



# **Tabulated Data for FREDYN Simulations of HALIFAX for Determining Helicopter Securing Loads**

*(Revised March 2006)*

*Doug Perrault*

*Kevin McTaggart*

**Defence R&D Canada – Atlantic**

Technical Memorandum  
DRDC Atlantic TM 2004-044  
March 2006

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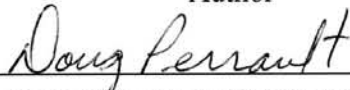
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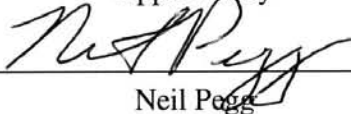
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Doug Perrault and Kevin McTaggart

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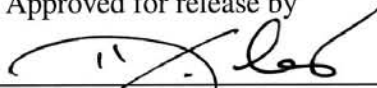


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K. Foster

Chair/Document Review Panel

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## Abstract

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In support of procurement of new maritime helicopters, DRDC Atlantic was tasked to simulate motions of the HALIFAX class in seaways. The data produced will aid in the determination of helicopter securing loads, which are highly dependent upon the motions of the ship. The present work reports a systematic series of simulations modelling a HALIFAX class frigate with nominally steady speed and heading (course-keeping) in a variety of seaway conditions. This memorandum provides the data in a tabulated format for quick reference. A companion report (DRDC TM 2004-043) describes the simulation conditions and key results.

## Résumé

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En appui à l'acquisition des nouveaux hélicoptères maritimes, RDDC Atlantique a reçu le mandat de simuler les mouvements d'un navire de la classe HALIFAX en mer. Les données produites permettront d'aider à déterminer des charges d'armage sécuritaires pour les hélicoptères, qui sont extrêmement dépendantes des mouvements des navires. Le présent travail présente la série systématique de simulations utilisées pour modéliser une frégate de la classe Halifax croisant à une vitesse régulière et selon une certaine orientation (conservation de cap) en présence de diverses conditions maritimes. Le mémoire présente les données sous forme de tableau pour consultation rapide. Un rapport d'accompagnement (RDDC TM 2004-043) comprend une description des conditions de simulation et des données résultantes.

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# **Executive summary**

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## **Introduction**

When onboard ship, maritime helicopters are secured to the deck using either a landing probe or a combination of the landing probe and chains. The loads required for securing the helicopter depend on the ship's motions. To assist with specification of design loads for the securing devices, DRDC Atlantic was tasked to compute motions of the HALIFAX class frigate at the location where the helicopter would be secured. The simulations cover a range of sea conditions, ship speeds and headings.

## **Principal Results**

A systematic series of simulations was carried out for HALIFAX in the operational light condition, at various speeds and headings, and with a specific variation of seaway parameters for both open ocean and coastal waters. The operational light loading condition for HALIFAX was selected as a likely conservative case because motions tend to become greater as displacement decreases. The principle results are files of time series data for each simulation run, as well as statistical analyses of the motion parameters.

## **Significance of Results**

The data provide numerical values for the key parameters (roll angle, pitch angle, accelerations of the ship at two specific securing points) for determining the design loads for securing devices. This memorandum provides the data in a tabulated format for quick reference. A companion report (DRDC TM 2004-043) describes the simulation conditions and resulting data. Care is required in using the data provided: Since motions are dependent on the displacement and mass distribution of the ship, significant changes from the operational light condition specified herein will influence the validity of the data.

## **Future Plans**

The data presented in this report will likely be used for developing design loads for the Maritime Helicopter Project. The data could also be used for a wide variety of other purposes, such as to investigate the feasibility of specific deck operations under various combinations of seaway, ship's speed and relative heading.

Doug Perrault, Kevin McTaggart; 2006; Tabulated Data for FREDYN Simulations of HALIFAX for Determining Helicopter Securing Loads

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Canada - Atlantic.



# Sommaire

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## Introduction

Les hélicoptères maritimes embarqués sont arrimés au pont au moyen d'un sabot d'atterrissage ou d'une combinaison de ce dernier et de chaînes. Les charges requises pour arrimer l'hélicoptère dépendent des mouvements du navire. Pour aider à la spécification des charges d'échantillonnage des dispositifs d'ancrage, RDDC Atlantique a été mandatée de calculer les mouvements d'une frégate de la classe HALIFAX à l'endroit où l'hélicoptère est arrimé. Les simulations couvrent toute une gamme de conditions maritimes, de vitesse de navire et de caps.

## Principaux Résultats

Une série systématique de simulations a été effectuée pour la classe HALIFAX en conditions opérationnelles à l'état lège, selon divers vitesses et caps, ainsi qu'avec une variation spécifique des paramètres de navigabilité en haute mer et en eaux côtières. Les conditions opérationnelles à l'état lège pour la classe HALIFAX ont été sélectionnées en retenant des valeurs vraisemblablement conservatrices car les mouvements tendent à devenir plus importants lorsque que le déplacement diminue. Les principaux résultats sont des fichiers de séries de données chronologiques pour chaque essai de simulation, de même que des analyses statistiques des paramètres de mouvement.

## Portée des Résultats

Les données fournissent des valeurs numériques des paramètres clés (angle de roulis, angle de tangage, accélérations du navire à deux points d'attaches spécifiques) pour déterminer les charges d'échantillonnage des dispositifs d'ancrage. Le mémoire présente ces données sous forme de tableau pour consultation rapide. Un rapport d'accompagnement (RDDC TM 2004-043) comprend une description des conditions de simulation et des données résultantes. La prudence est de mise avec les données fournies : les mouvements étant dépendants du déplacement et de la distribution de la masse du navire, tout changement important des conditions opérationnelles à l'état lège spécifiées ici influencera la validité des données.

## Recherches Futurs

Les données présentées dans ce rapport seront vraisemblablement utilisées pour développer les charges d'échantillonnage pour le projet d'hélicoptère maritime. Ces données pourront également être utilisées à d'autres fins, notamment pour étudier la

faisabilité des opérations de pont spécifiques en présence de diverses combinaisons de navigabilité, de vitesse et de cap relatif de navire.

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# 1 Introduction

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The Department of National Defence's Maritime Helicopter Project (MHP) is responsible for procurement of new ship-borne helicopters, including the full integration of the helicopter and on-board support systems with the ship. During operation in heavy seas, ship-borne helicopters are secured to the deck using either a landing probe or a combination of the landing probe and chains. The loads required for securing the helicopter are highly dependent upon the motions of the ship. To assist with specification of design loads, the Maritime Helicopter Project tasked DRDC Atlantic to compute motions of the HALIFAX class (aka Canadian Patrol Frigate, or CPF for short) in terms of accelerations of the helicopter parked at locations either in the hangar or on the flight deck over a range of sea conditions, ship speeds and headings. MHP asked for a comprehensive set of data to include several seaway conditions that affect the securing of helicopters in the hangar of a HALIFAX. This memorandum provides the tabulated data from simulations for a HALIFAX class frigate with nominally steady speed and heading (course-keeping) in each seaway. Also included are polar plots of the maximum absolute values of the most relevant (to the MHP) parameters. A companion report describes the simulation conditions and resulting data [1].

## 2 Coordinate Systems

---

FREDYN uses an earth-fixed axis system  $(x_e, y_e, z_e)$  and a ship-fixed axis system  $(x_g, y_g, z_g)$ , as shown in Figure 1. The plane  $x_e - y_e$  lies in the still waterplane, with the  $z_e$  axis pointing downward. The ship-fixed system  $(x_g, y_g, z_g)$ , which has its origin at the ship center of gravity, rotates and translates as the ship moves. When the ship is at rest in a calm water, the  $z_g$  axis points downward. Note that in the FREDYN output, these axes and all other parameters are represented by capital letters, as in Figure 1. Translations in position, as well as velocities and accelerations are positive in the direction of the axes. Rotations and rotational velocities and accelerations are positive when they are in accordance with the right-hand rule (with the right hand thumb pointing along the axis, the fingers curl in the direction of a positive rotation).

It should be noted that in the FREDYN program astern seas are considered to have zero relative angle (see Figure 1), which is different from the MHP convention where head seas are considered to be at zero relative angle (see Figure 2). The FREDYN convention is converted to the MHP convention in the data tables.

Table 1 gives some of the main FREDYN output parameters. Note that the output value for ZE, the vertical displacement of the ship CG, is given relative to its value

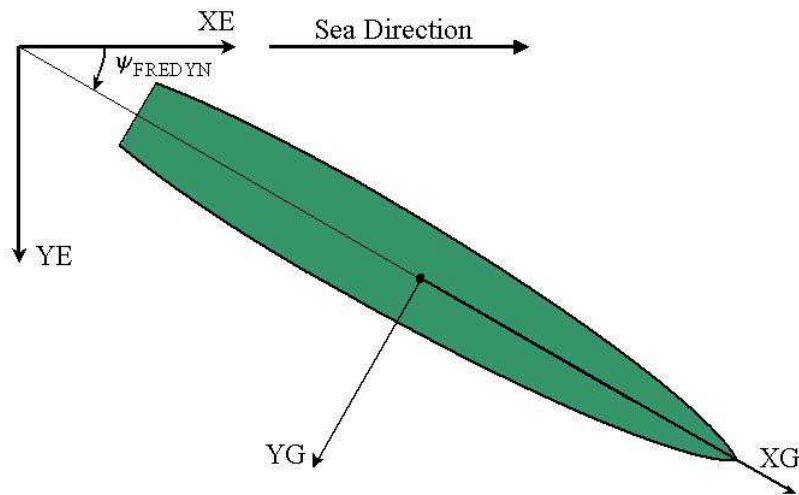


**Figure 1: FREDYN Relative Sea Convention**

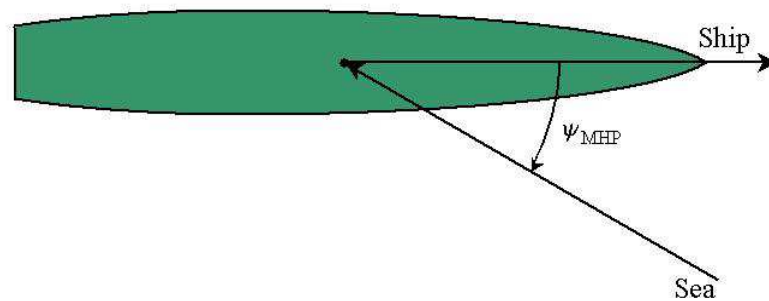


**Figure 2: MHP Relative Sea Convention**

when the ship is at rest in calm water. Table 2 gives some of the acceleration

**Table 1: FREDYN Output Parameters**

| Parameter  | Units   | Description                                                                                                     |
|------------|---------|-----------------------------------------------------------------------------------------------------------------|
| T          | (s)     | Time relative to beginning of simulation                                                                        |
| ZETAG      | (m)     | Wave surface displacement at ship CG                                                                            |
| ALFAY      | (deg)   | Beamwise component of wave slope at ship CG                                                                     |
| XE         | (m)     | Displacement of ship CG along $x_e$ axis                                                                        |
| YE         | (m)     | Displacement of ship CG along $y_e$ axis                                                                        |
| ZE         | (m)     | Displacement of ship CG along $z_e$ axis<br>(relative to calm water value)                                      |
| PHI        | (deg)   | Ship roll angle about $x_e$ axis, positive starboard side down                                                  |
| THETA      | (deg)   | Ship pitch angle about $y_e$ axis, positive bow up                                                              |
| PSI        | (deg)   | Ship yaw angle about $z_e$ axis, positive bow to starboard<br>(also represents ship heading relative to $x_e$ ) |
| PSI - PSI0 | (deg)   | Ship heading relative to initial heading, positive bow to starboard                                             |
| UG         | (m/s)   | Speed of ship CG in direction $x_g$                                                                             |
| VG         | (m/s)   | Speed of ship CG in direction $y_g$                                                                             |
| WG         | (m/s)   | Speed of ship CG in direction $z_g$                                                                             |
| P          | (deg/s) | Roll velocity about $x_g$ , positive starboard side down                                                        |
| Q          | (deg/s) | Pitch velocity about $y_g$ , positive bow up                                                                    |
| R          | (deg/s) | Yaw velocity about $z_g$ , positive bow to starboard                                                            |
| DEL(1)     | (deg)   | Rudder angle, positive trailing edge to port                                                                    |

parameters also generated by FREDYN.

### 3 Simulation Conditions

The conditions for the simulations were specified by the Maritime Helicopter Project. The operational light loading condition<sup>1</sup> for HALIFAX (see Table 3) was selected as a likely conservative case because motions tend to become greater as displacement decreases.

Several seaway conditions were investigated in order to give a comprehensive set of data. Bretschneider spectra were used to simulate deep water seaways, and JON-SWAP spectra (with a Gamma value of 2) were used to simulate littoral seaways. Tables 4 and 5 give the respective particulars of the specific seaways modelled. As can be seen in these tables, each sea state has two corresponding wave periods,

<sup>1</sup>The operational light loading condition used herein is the best estimate of what that condition will be when the helicopters are put into service. The actual condition at that time will likely be somewhat different.

**Table 2: FREDYN Output Accelerations**

| Parameter | Units                 | Description                                                      |
|-----------|-----------------------|------------------------------------------------------------------|
| XCOG      | (m/s <sup>2</sup> )   | Acceleration of ship CG in direction $x_g$                       |
| YCOG      | (m/s <sup>2</sup> )   | Acceleration of ship CG in direction $y_g$                       |
| ZCOG      | (m/s <sup>2</sup> )   | Acceleration of ship CG in direction $z_g$                       |
| PDOT      | (deg/s <sup>2</sup> ) | Roll acceleration about $x_g$ , positive starboard side down     |
| QDOT      | (deg/s <sup>2</sup> ) | Pitch acceleration about $y_g$ , positive bow up                 |
| RDOT      | (deg/s <sup>2</sup> ) | Yaw acceleration about $z_g$ , positive bow to starboard         |
| X1        | (m/s <sup>2</sup> )   | Acceleration of 1 <sup>st</sup> point on ship, parallel to $x_g$ |
| Y1        | (m/s <sup>2</sup> )   | Acceleration of 1 <sup>st</sup> point on ship, parallel to $y_g$ |
| Z1        | (m/s <sup>2</sup> )   | Acceleration of 1 <sup>st</sup> point on ship, parallel to $z_g$ |
| X2        | (m/s <sup>2</sup> )   | Acceleration of 2 <sup>nd</sup> point on ship, parallel to $x_g$ |
| Y2        | (m/s <sup>2</sup> )   | Acceleration of 2 <sup>nd</sup> point on ship, parallel to $y_g$ |
| Z2        | (m/s <sup>2</sup> )   | Acceleration of 2 <sup>nd</sup> point on ship, parallel to $z_g$ |

**Table 3: Main Particulars for HALIFAX Class Frigates, Operational Light Loading Condition**

|                                                                    |       |        |
|--------------------------------------------------------------------|-------|--------|
| Length, $L$                                                        | 124.5 | m      |
| Beam, $B$                                                          | 14.8  | m      |
| Midships draft, $T_{mid}$                                          | 4.967 | m      |
| Trim by stern, $t_s$                                               | 0.0   | m      |
| Displacement, $\Delta$                                             | 4700  | tonnes |
| Longitudinal centre of gravity, $\overline{LCG}$ , aft of midships | 2.8   | m      |
| Vertical centre of gravity, $\overline{KG}$                        | 6.70  | m      |
| Metacentric height, $\overline{GM}_{fluid}$                        | 0.89  | m      |

**Table 4: Seaway Conditions Investigated – Bretschneider Spectra**

| Sea State                                                                    | Seaway Type   | H <sub>S</sub> (m) | T <sub>P</sub> (s) | Notes                     |
|------------------------------------------------------------------------------|---------------|--------------------|--------------------|---------------------------|
| 5                                                                            | Bretschneider | 4.0                | 8.3                | T <sub>P</sub> = OONA 5%  |
|                                                                              |               |                    | 15.5               | T <sub>P</sub> = OONA 95% |
| 6                                                                            | Bretschneider | 6.0                | 10.3               | T <sub>P</sub> ≅ OONA 5%  |
|                                                                              |               |                    | 16.2               | T <sub>P</sub> = OONA 95% |
| 7                                                                            | Bretschneider | 9.0                | 13.1               | T <sub>P</sub> ≅ OONA 5%  |
|                                                                              |               |                    | 18.5               | T <sub>P</sub> = OONA 95% |
| 8                                                                            | Bretschneider | 14.0               | 16.4               | T <sub>P</sub> ∼ OONA 5%  |
|                                                                              |               |                    | 18.6               | T <sub>P</sub> = OONA 95% |
| >8                                                                           | Bretschneider | 17.7               | 20.0               | T <sub>P</sub> = OONA 5%  |
|                                                                              |               |                    | 25.7               | T <sub>P</sub> = OONA 95% |
| H <sub>S</sub> – Significant Wave Height; T <sub>P</sub> – Peak Wave Period; |               |                    |                    |                           |
| OONA – Open Ocean North Atlantic<br>(ref NATO Sea State Table)               |               |                    |                    |                           |

**Table 5: Seaway Conditions Investigated – JONSWAP Spectra**

| Sea State                                                                    | Seaway Type | H <sub>S</sub> (m) | T <sub>P</sub> (s) | Notes                     |
|------------------------------------------------------------------------------|-------------|--------------------|--------------------|---------------------------|
| 5                                                                            | JONSWAP     | 4.0                | 8.2                | T <sub>P</sub> = LECC 5%  |
|                                                                              |             |                    | 13.6               | T <sub>P</sub> = LECC 95% |
| 6                                                                            | JONSWAP     | 6.0                | 9.3                | T <sub>P</sub> = LECC 5%  |
|                                                                              |             |                    | 13.6               | T <sub>P</sub> = LECC 95% |
| 7                                                                            | JONSWAP     | 9.0                | 11.0               | T <sub>P</sub> = LECC 5%  |
|                                                                              |             |                    | 17.1               | T <sub>P</sub> = LECC 95% |
| H <sub>S</sub> – Significant Wave Height; T <sub>P</sub> – Peak Wave Period; |             |                    |                    |                           |
| LECC – Littoral East Coast Canada                                            |             |                    |                    |                           |
| (ref TDC Wind and Wave Atlas, East Coast of Canada)                          |             |                    |                    |                           |

each representing roughly a practical limit of wave period for that particular sea state. The selected wave periods represent the 5<sup>th</sup> and 95<sup>th</sup> percentiles, given the significant wave height. In all cases the significant wave height is the upper value for the associated sea state. The last two Bretschneider seaways (Sea State > 8) are based on the HALIFAX performance requirements for survivability without serious damage to mission-essential systems in a seaway with  $H_S > 17.7$  m.

Long-crested irregular seaways were simulated using linear superposition of 20 sinusoidal components to form a unidirectional seaway. Unidirectional seaways tend to be conservative (i.e. they generally represent the worst case) since all the energy flux is flowing in the same direction. Simulated motions vary with seed numbers used to generate the random phases. However, the variation of motion statistics with input phase seeds is usually very small when the ship does not approach capsized.

For each seaway simulations were conducted for a matrix of ship speeds and headings:

Ship Speed: 0 to 30kts in 5kt increments

Ship Heading: 0° to 345° in 15° increments

For each wave height the corresponding mean wind speed at 19.5 m elevation is assumed to be from the starboard beam (regardless of wave direction) and given by

$$v = 1.823H_S + 3.45$$

in  $m/s$ .

For simulations representing a nominal ship speed, the propeller RPM was set to a value such that FREDYN would give the desired ship speed in calm water. The propeller RPM used to give a desired ship speed with FREDYN will differ from the actual propeller RPM for the HALIFAX class due to assumptions made in numerical modelling.

It should be noted that FREDYN does not model variable pitch propellers, and that the present results are for the HALIFAX propellers set to a specified pitch value.

The program FREDYN requires average wave period,  $T_{wa}$ , as an input parameter. The following relationship, based on a Bretschneider spectrum, was used to determine average wave period as a function of a given peak wave period:

$$T_{wa} = 0.772T_P$$

The simulation time step was  $0.1s$  for all runs, and the duration of each simulation was one hour ( $3620s$  including a ramp-up time for eliminating integration start-up transients), which is considered adequate for providing enough motion data for meaningful statistical analysis.

## 4 Simulation Results

---

Additional processing was performed to extract the statistical data (mean value, standard deviation, minimum value and maximum value) for the following parameters:

- Speed;
- Heading (converted to MHP convention);

- Heave (position);
- Roll (angle); and
- Pitch (angle).
- Longitudinal (with respect to the ship centerline) acceleration at the hangar
- Lateral (with respect to the ship centerline) acceleration at the hangar
- Vertical acceleration at the hangar
- Generalized longitudinal force estimator at the hangar
- Generalized lateral force estimator at the hangar
- Longitudinal (with respect to the ship centerline) acceleration at the flight deck
- Lateral (with respect to the ship centerline) acceleration at the flight deck
- Vertical acceleration at the flight deck
- Generalized longitudinal force estimator at the flight deck
- Generalized lateral force estimator at the flight deck

For an explanation of the generalized force estimators, see [1].

A complete set of polar plots for roll and pitch angles, as well as all force estimators at the flight deck and hangar deck locations are included in annexes A through P. The polar plots can be read intuitively by imagining oneself on the ship facing the bow (top of plot) with the port to the left. Each of the radial lines represents the relative direction of the incoming seaway. The radial lines are shown for 30° increments on the polar plots, with 90° to the starboard and 270° to the port.. The rings in the plots represent (less intuitively) the ships speed in 10 knot increments. The plots are colour coded such that blue represents a low magnitude of the parameter being plotted, and red represents a high value.

Tabulated data is presented in annexes Q and R for heave, roll, and pitch for each seaway simulated. Further data are given in annexes S through V for the accelerations at the flight deck and hangar deck locations<sup>2</sup>. In both cases, the data reported are the maximum absolute value of the parameter in a given simulation run, and the standard deviation associated with the mean value of the parameter for that run.

---

<sup>2</sup>Actual securing points may not be on the centerline of the ship. The current proposed securing device allows for variances of  $\pm 0.5$  m fore and aft, and  $\pm 0.5$  m athwartships. Slightly higher loads (accelerations) may occur with off-center securing points.

The maximum absolute value is the most important value for determining securing loads, while the standard deviation gives an indication of the variability of the motion parameter.

## **5 Conclusions**

---

A comprehensive study was carried out to define the motion characteristics of HAL-IFAX in a broad variety of sea states. The results provide data for determining the loads induced on a secured helicopter by the moving ship.



## References

---

1. D. Perrault and K. A. McTaggart. FREDYN Simulations of HALIFAX for Determining Helicopter Securing Loads. Technical Memorandum DRDC Atlantic TM 2004-043, Defence Research and Development Canada - Atlantic, 2004.

# Symbols

**Table 6: General Symbols**

| Symbol                  | Description                                                                                                                                                  |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| $\phi$                  | Roll angle                                                                                                                                                   |
| $\theta$                | Pitch angle                                                                                                                                                  |
| $\psi$                  | Yaw (heading) angle                                                                                                                                          |
| $\psi_{FREDYN}$         | Yaw angle of ship with respect to sea direction - FREDYN convention                                                                                          |
| $\psi_{MHP}$            | Sea direction with respect to ship - MHP convention                                                                                                          |
| $\mu$                   | Coefficient of friction                                                                                                                                      |
| $\Delta$                | Displacement                                                                                                                                                 |
| $t_s$                   | Trim by stern                                                                                                                                                |
| $x_e, y_e, z_e$         | earth-fixed axes                                                                                                                                             |
| $x_g, y_g, z_g$         | ship-fixed axes (fixed at CG)                                                                                                                                |
| $B$                     | Beam                                                                                                                                                         |
| $\overline{GM}_{fluid}$ | Metacentric height, corrected for free surface                                                                                                               |
| $H_S$                   | Significant wave height                                                                                                                                      |
| $\overline{KG}$         | Vertical centre of gravity above baseline                                                                                                                    |
| $L$                     | Length between perpendiculars                                                                                                                                |
| $\overline{LCG}$        | Longitudinal centre of gravity, aft of midships                                                                                                              |
| $T_{3f}, T_{3v}$        | Coordinate transformation from earth-fixed reference frame to ship-fixed reference frame for translational velocities and rotational velocities respectively |
| $T_{mid}$               | Midships draft                                                                                                                                               |
| $T_P$                   | Peak wave period                                                                                                                                             |

**Table 7: FREDYN Symbols**

| Symbol           | Description                                                              |
|------------------|--------------------------------------------------------------------------|
| ALFAY            | Beamwise component of wave slope at ship CG                              |
| DEL(1)           | Rudder angle                                                             |
| P, Q, R          | Roll, pitch, yaw velocities about $x_g, y_g, z_g$ resp.                  |
| PDOT, QDOT, RDOT | Roll, pitch, yaw accelerations about $x_g, y_g, z_g$ resp.               |
| PHI, THETA, PSI  | Roll, pitch, yaw (heading) angles                                        |
| PSI - PSI0       | Ship heading relative to initial heading                                 |
| T                | Time relative to beginning of simulation                                 |
| UG, VG, WG       | Speed of ship CG in direction $x_g, y_g, z_g$ resp.                      |
| X1, Y1, Z1       | Accel. of 1 <sup>st</sup> pt. on ship, parallel to $x_g, y_g, z_g$ resp. |
| X2, Y2, Z2       | Accel. of 2 <sup>nd</sup> pt. on ship, parallel to $x_g, y_g, z_g$ resp. |
| XCOG, YCOG, ZCOG | Accel. of ship CG in direction $x_g, y_g, z_g$ resp.                     |
| XE, YE, ZE       | Displacement of ship CG along $x_e, y_e, z_e$ resp.                      |
| ZETAG            | Wave elevation at ship CG                                                |

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**Annex A**  
**Polar Plots of Maximum Absolute Roll Angle**  
**– Bretschneider Spectra (Open Ocean)**

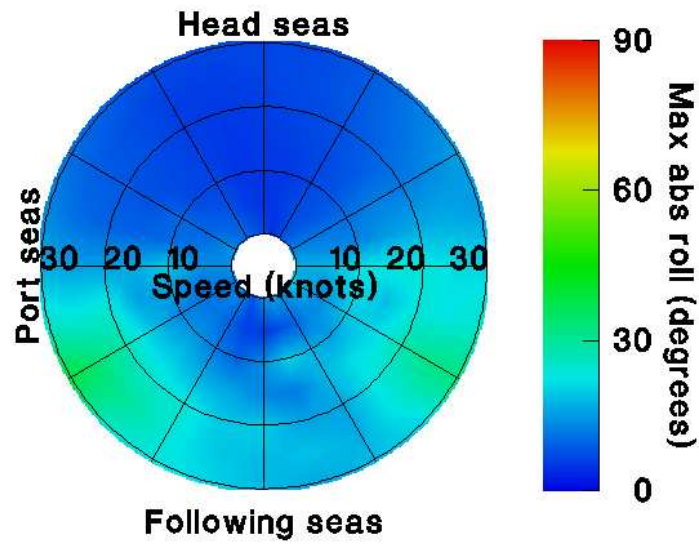


**Figure A.1:** Max. Abs. Roll Angles with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 4.0$  m and  $T_P = 8.3$  s.

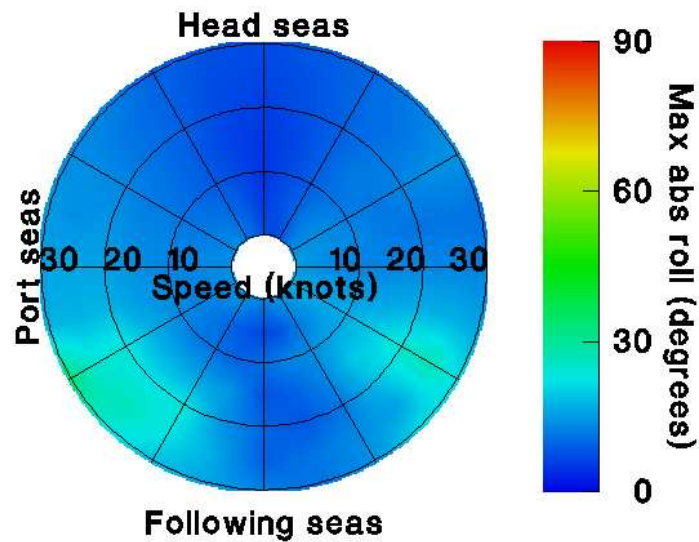


**Figure A.2:** Max. Abs. Roll Angles with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 4.0$  m and  $T_P = 15.5$  s.

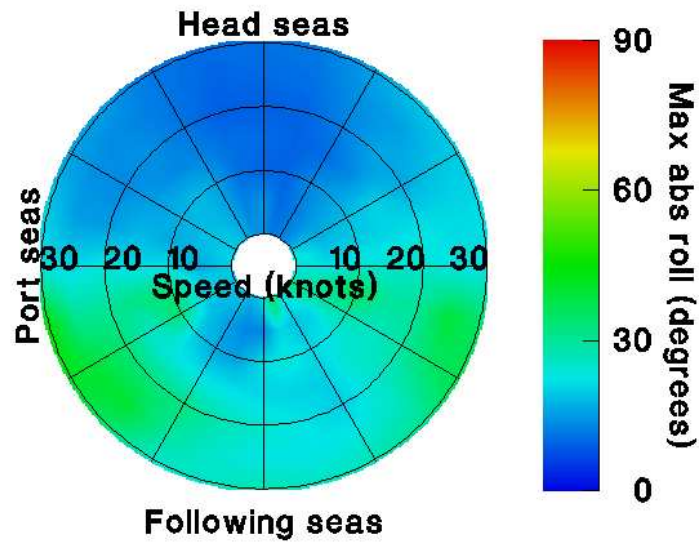


**Figure A.3:** Max. Abs. Roll Angles with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 6.0$  m and  $T_P = 10.3$  s.

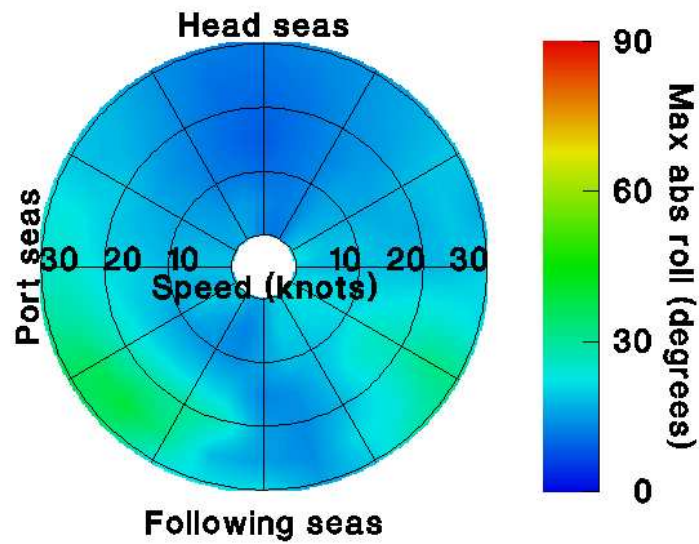


**Figure A.4:** Max. Abs. Roll Angles with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 6.0$  m and  $T_P = 16.2$  s.

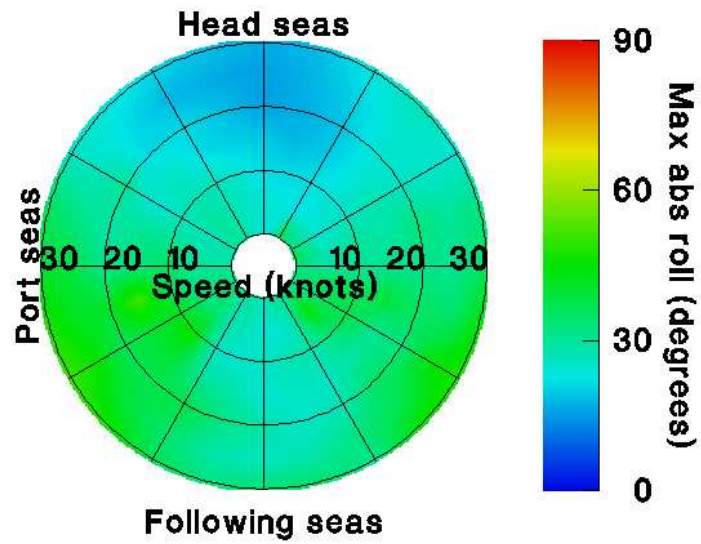


**Figure A.5:** Max. Abs. Roll Angles with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 9.0$  m and  $T_P = 13.1$  s.

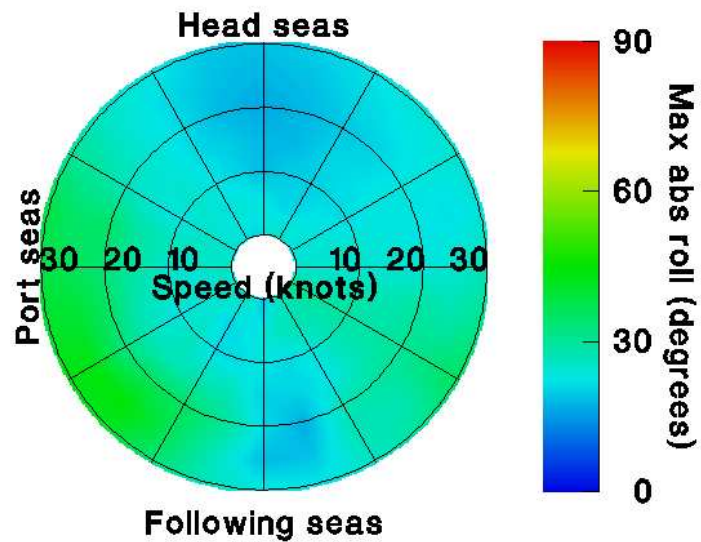


**Figure A.6:** Max. Abs. Roll Angles with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 9.0$  m and  $T_P = 18.5$  s.



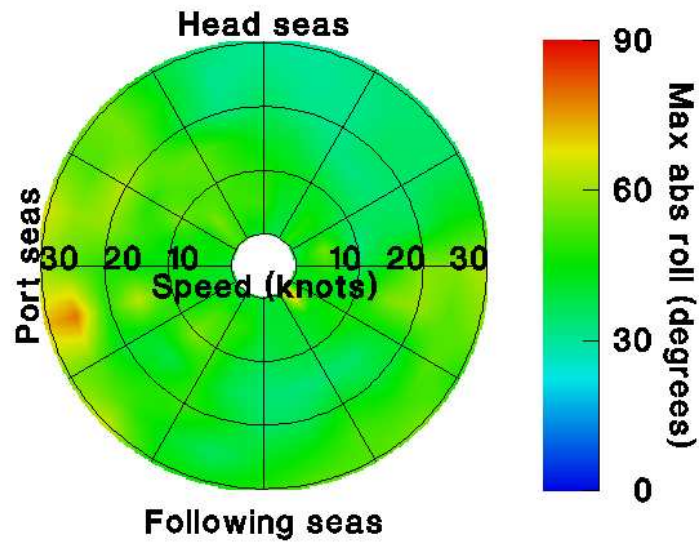


**Figure A.7:** Max. Abs. Roll Angles with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 14.0$  m and  $T_P = 16.4$  s.

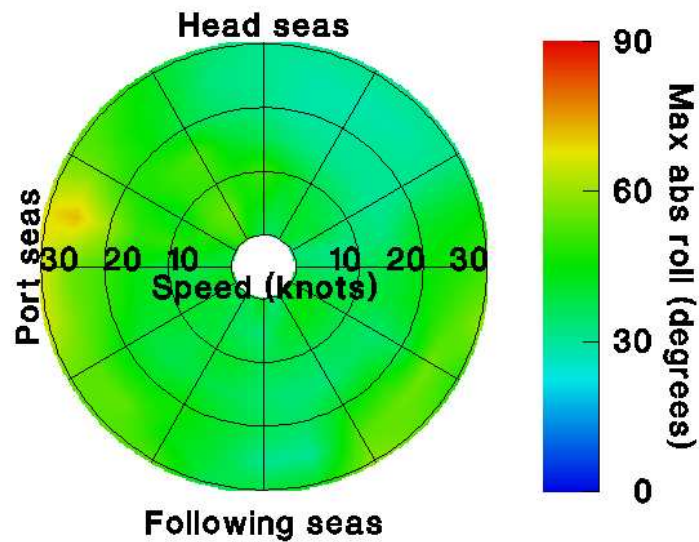


**Figure A.8:** Max. Abs. Roll Angles with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 14.0$  m and  $T_P = 18.6$  s.

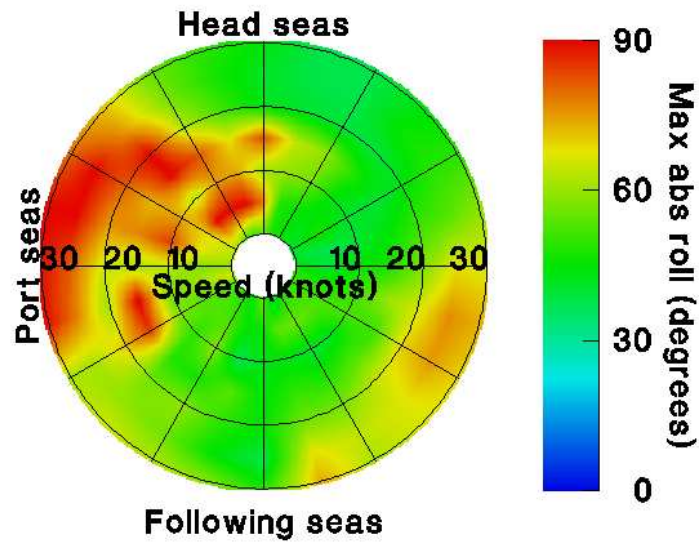


**Figure A.9:** Max. Abs. Roll Angles with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 17.7$  m and  $T_P = 20.0$  s.

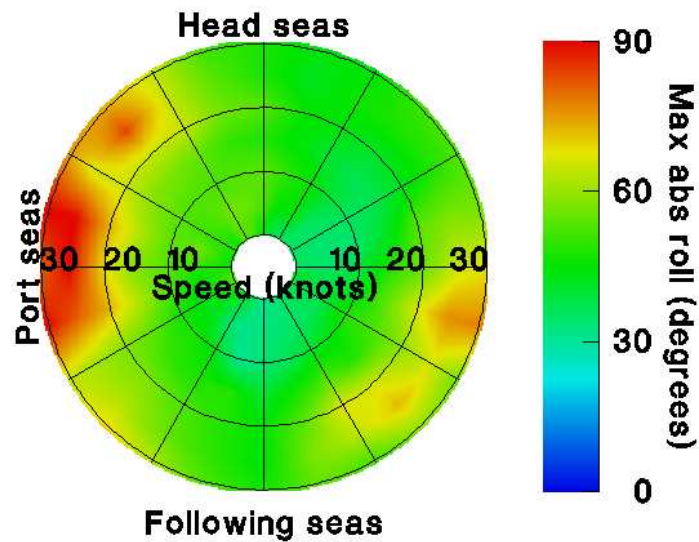


**Figure A.10:** Max. Abs. Roll Angles with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 17.7$  m and  $T_P = 25.7$  s.

**Annex B**  
**Polar Plots of Maximum Absolute Roll Angle**  
**– JONSWAP Spectra (Coastal Waters)**

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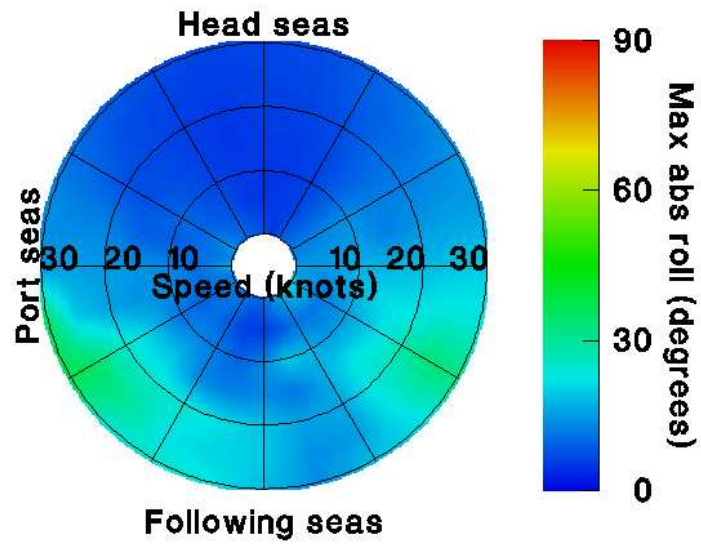


**Figure B.1:** Max. Abs. Roll Angles with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 4.0$  m and  $T_P = 8.2$  s.

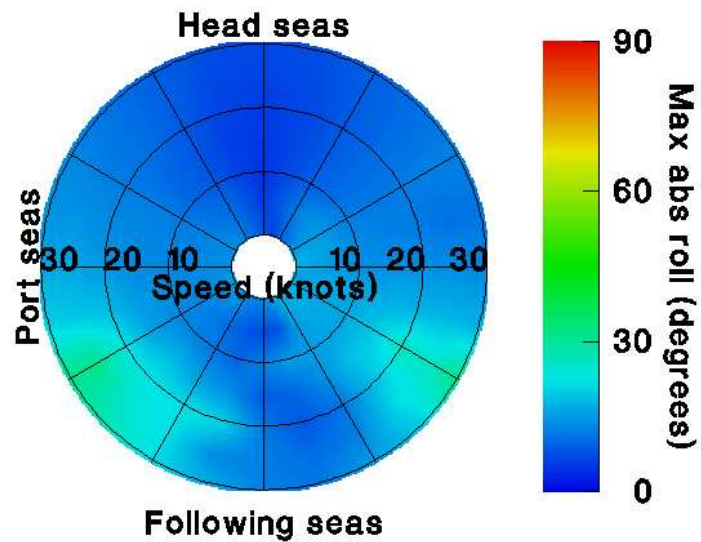


**Figure B.2:** Max. Abs. Roll Angles with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 4.0$  m and  $T_P = 13.6$  s.

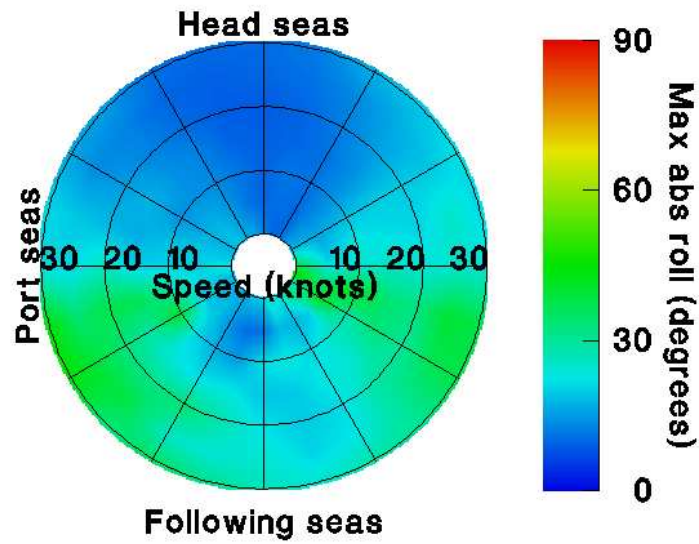


**Figure B.3:** Max. Abs. Roll Angles with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 6.0$  m and  $T_P = 9.3$  s.

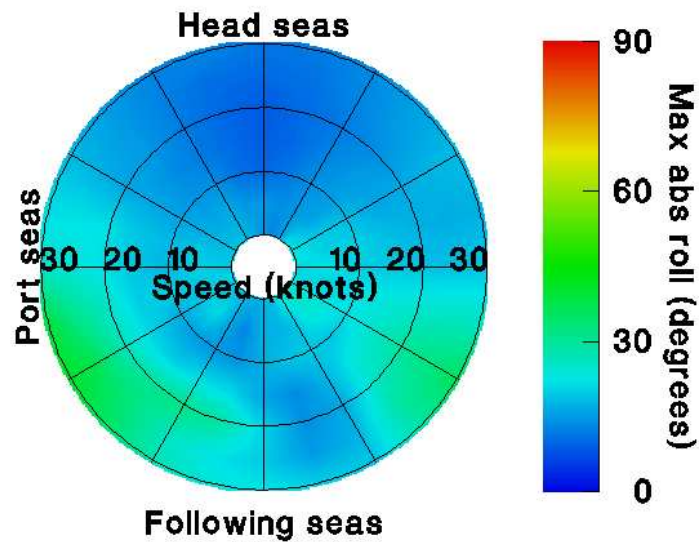


**Figure B.4:** Max. Abs. Roll Angles with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 6.0$  m and  $T_P = 13.6$  s.

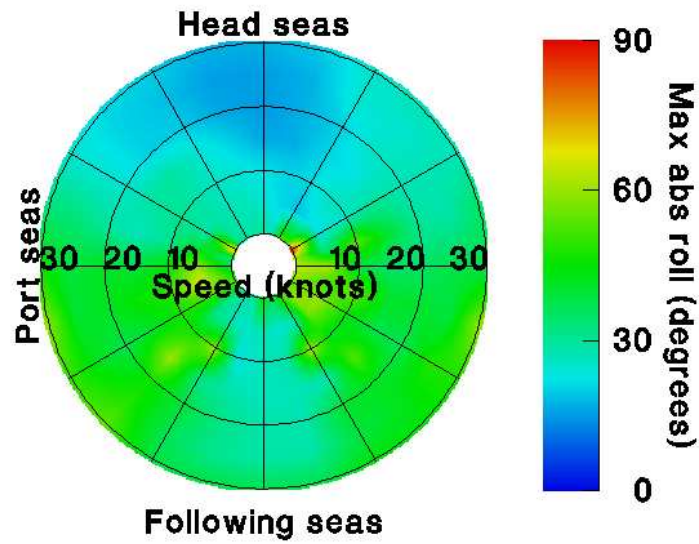


**Figure B.5:** Max. Abs. Roll Angles with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 9.0$  m and  $T_P = 11.0$  s.

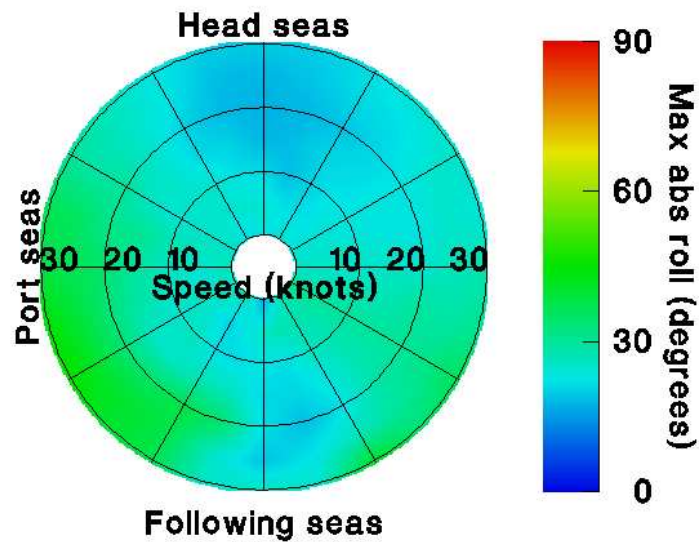


**Figure B.6:** Max. Abs. Roll Angles with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 9.0$  m and  $T_P = 17.1$  s.

**Annex C**  
**Polar Plots of Maximum Absolute Pitch**  
**Angle – Bretschneider Spectra (Open Ocean)**



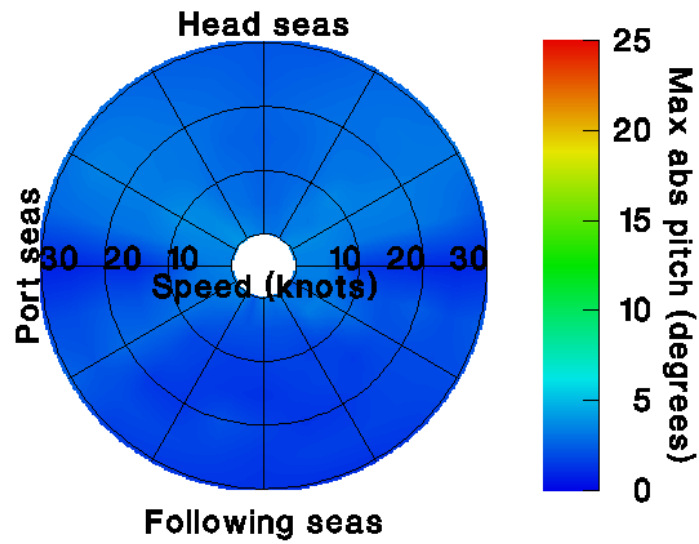


**Figure C.1:** Max. Abs. Pitch Angles with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 4.0$  m and  $T_P = 8.3$  s.

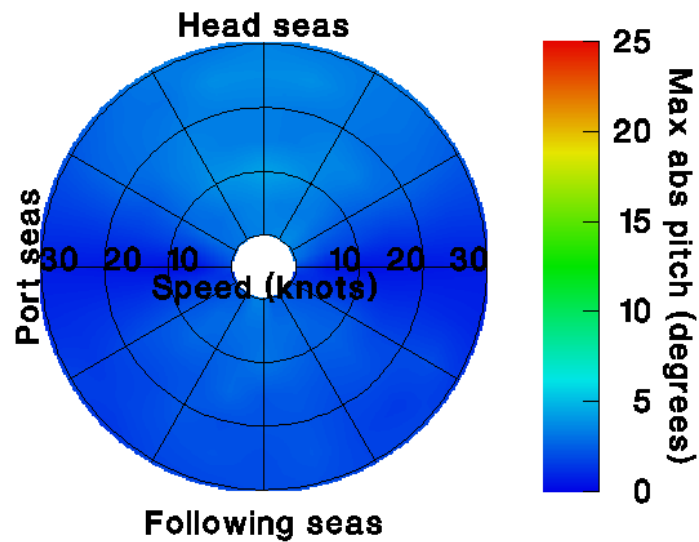


**Figure C.2:** Max. Abs. Pitch Angles with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 4.0$  m and  $T_P = 15.5$  s.



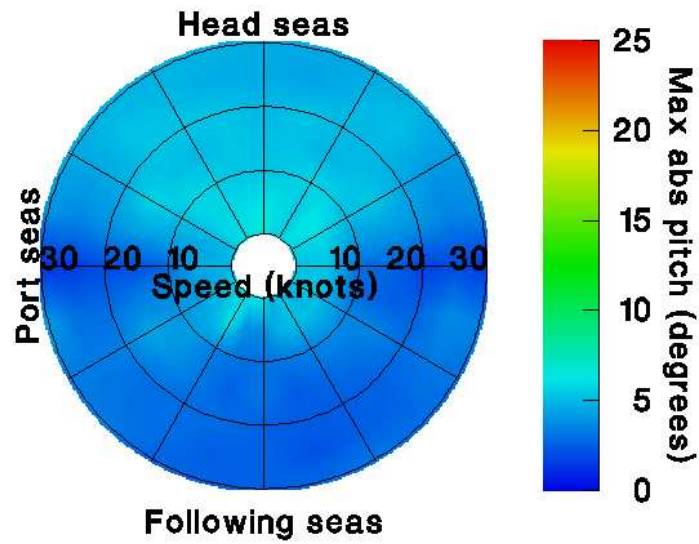


**Figure C.3:** Max. Abs. Pitch Angles with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 6.0$  m and  $T_P = 10.3$  s.

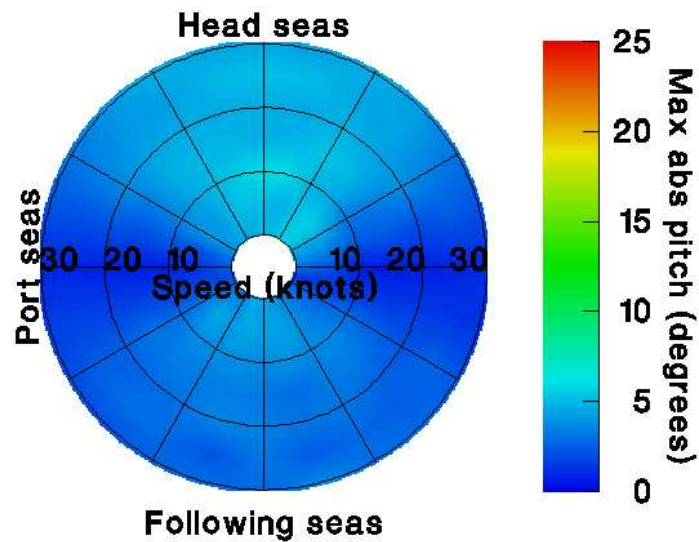


**Figure C.4:** Max. Abs. Pitch Angles with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 6.0$  m and  $T_P = 16.2$  s.

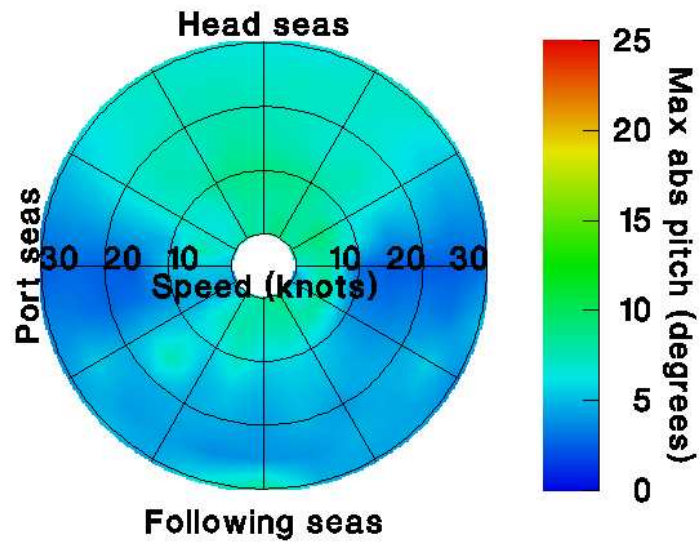


**Figure C.5:** Max. Abs. Pitch Angles with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 9.0$  m and  $T_P = 13.1$  s.

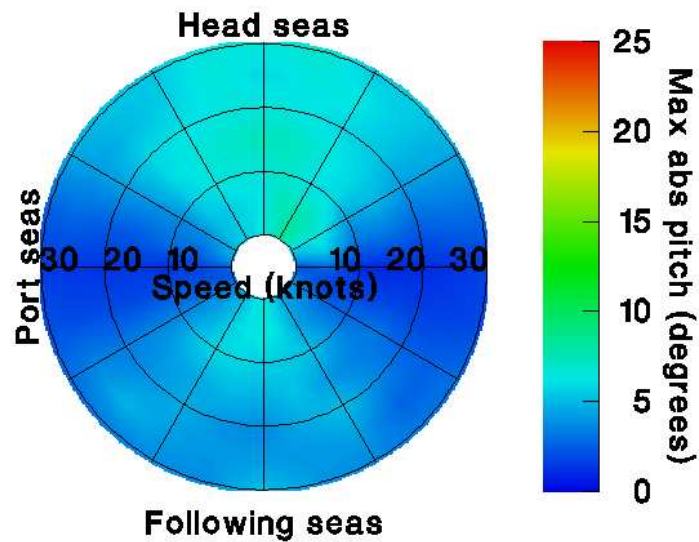


**Figure C.6:** Max. Abs. Pitch Angles with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 9.0$  m and  $T_P = 18.5$  s.

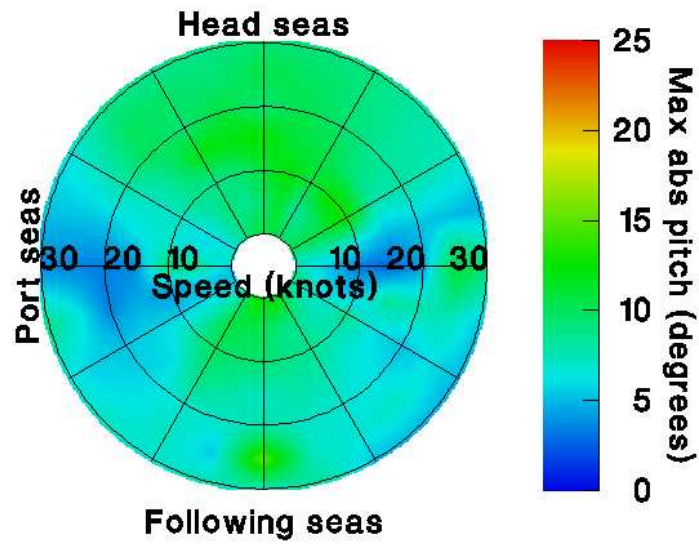


**Figure C.7:** Max. Abs. Pitch Angles with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 14.0$  m and  $T_P = 16.4$  s.

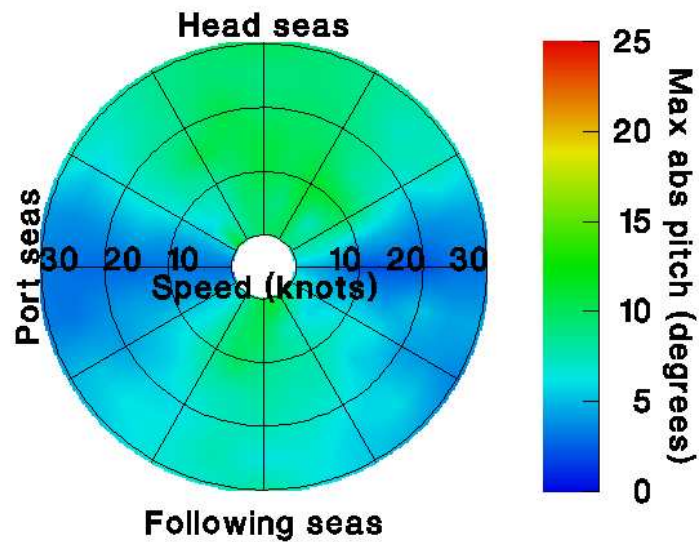


**Figure C.8:** Max. Abs. Pitch Angles with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 14.0$  m and  $T_P = 18.6$  s.

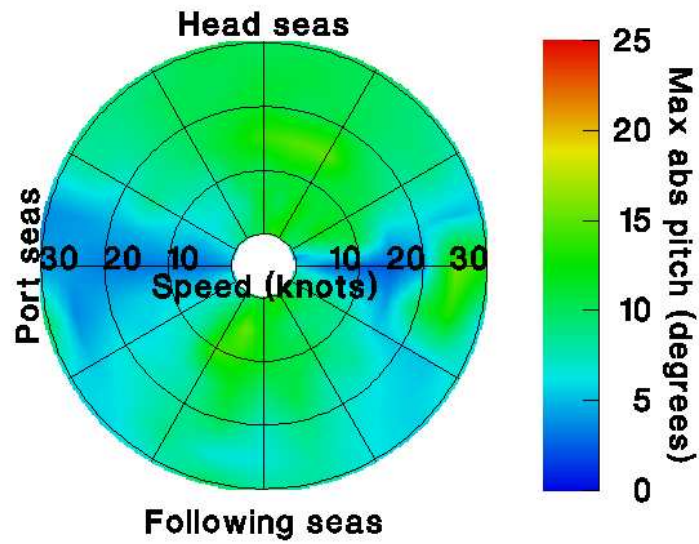


**Figure C.9:** Max. Abs. Pitch Angles with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 17.7$  m and  $T_P = 20.0$  s.

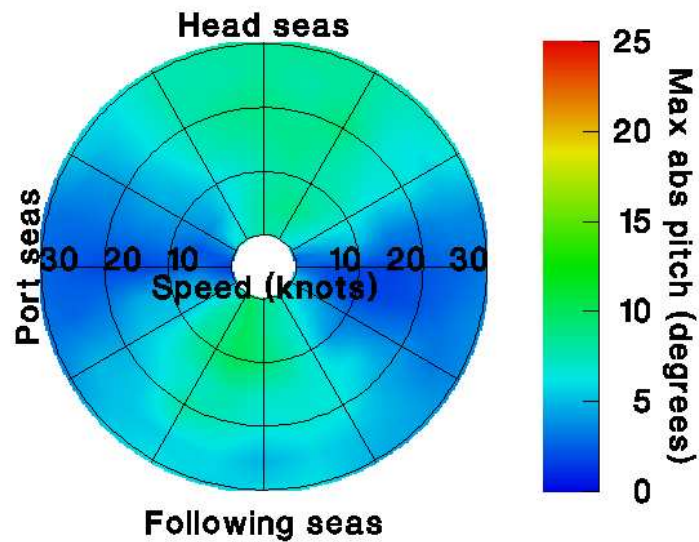


**Figure C.10:** Max. Abs. Pitch Angles with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 17.7$  m and  $T_P = 25.7$  s.

**Annex D**  
**Polar Plots of Maximum Absolute Pitch**  
**Angle – JONSWAP Spectra (Coastal Waters)**

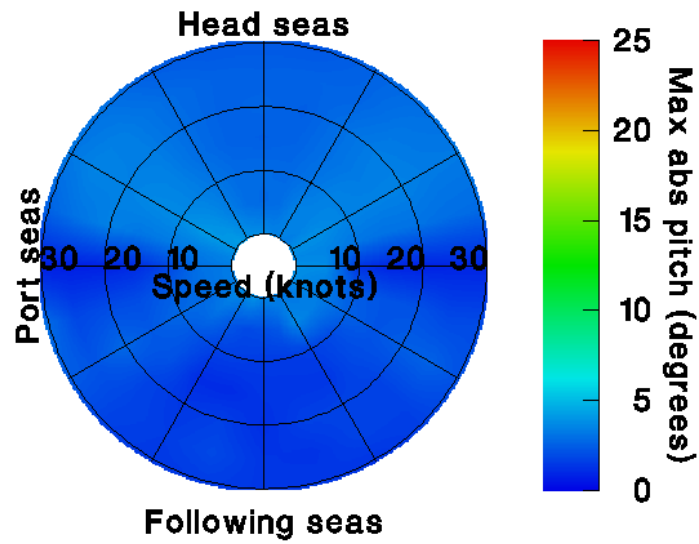


**Figure D.1:** Max. Abs. Pitch Angles with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 4.0$  m and  $T_P = 8.2$  s.

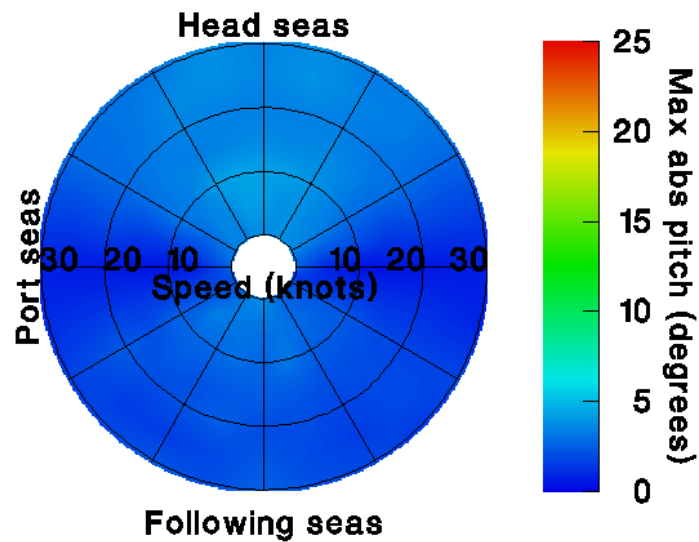


**Figure D.2:** Max. Abs. Pitch Angles with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 4.0$  m and  $T_P = 13.6$  s.



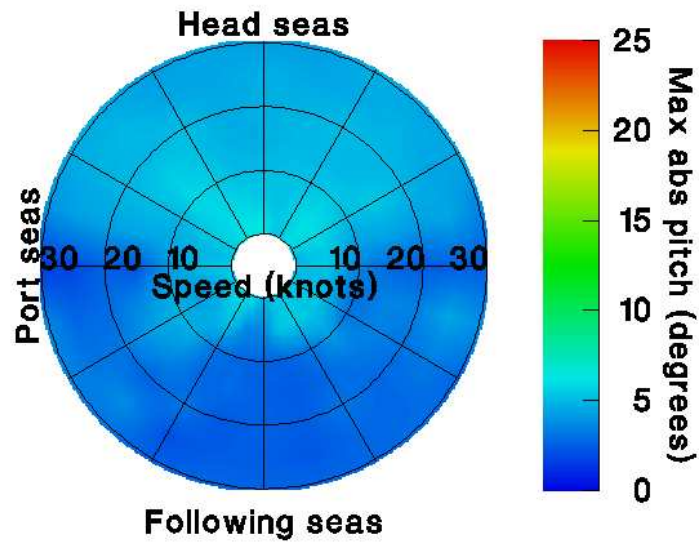


**Figure D.3:** Max. Abs. Pitch Angles with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 6.0$  m and  $T_P = 9.3$  s.

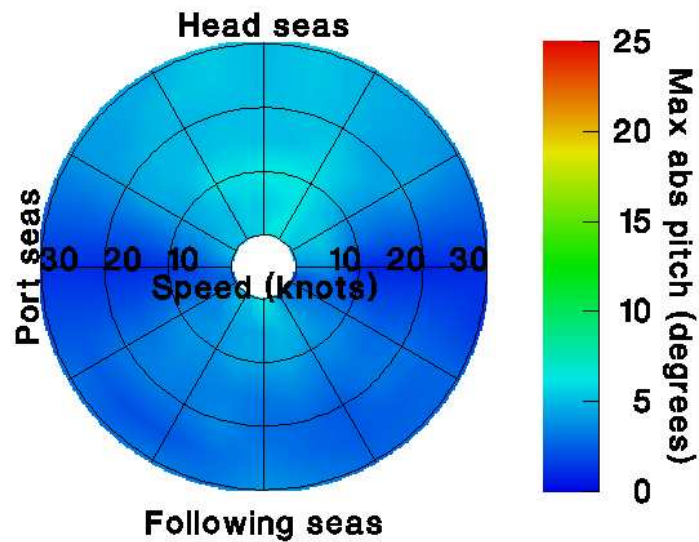


**Figure D.4:** Max. Abs. Pitch Angles with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 6.0$  m and  $T_P = 13.6$  s.

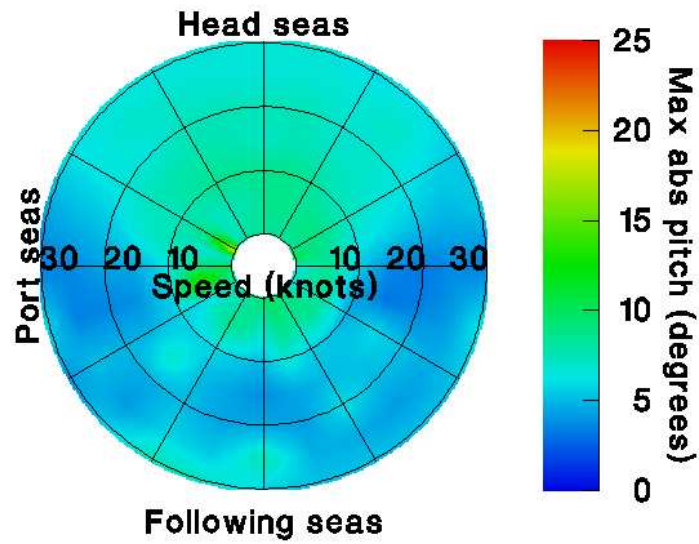


**Figure D.5:** Max. Abs. Pitch Angles with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 9.0$  m and  $T_P = 11.0$  s.

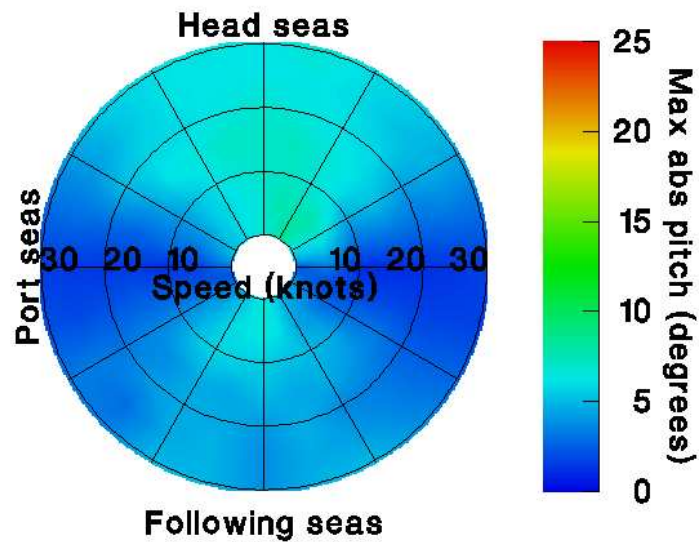


**Figure D.6:** Max. Abs. Pitch Angles with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 9.0$  m and  $T_P = 17.1$  s.



**Annex E**  
**Polar Plots of Maximum Absolute**  
**Longitudinal Force Estimator at Hangar**  
**Deck – Bretschneider Spectra (Open Ocean)**

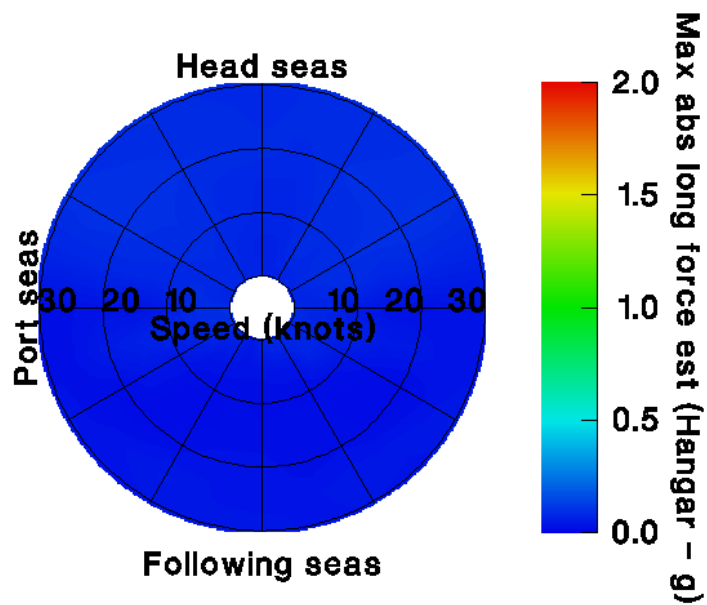


**Figure E.1:** Max. Abs. Long. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 4.0$  m and  $T_P = 8.3$  s.

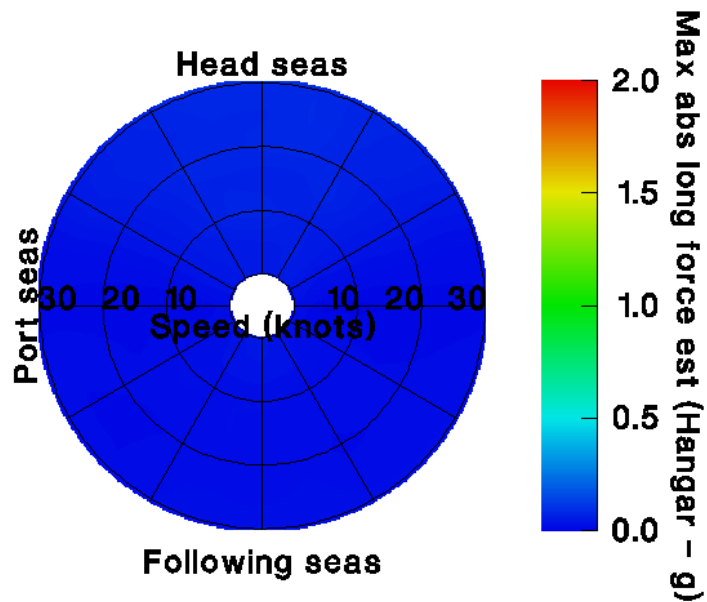


**Figure E.2:** Max. Abs. Long. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 4.0$  m and  $T_P = 15.5$  s.

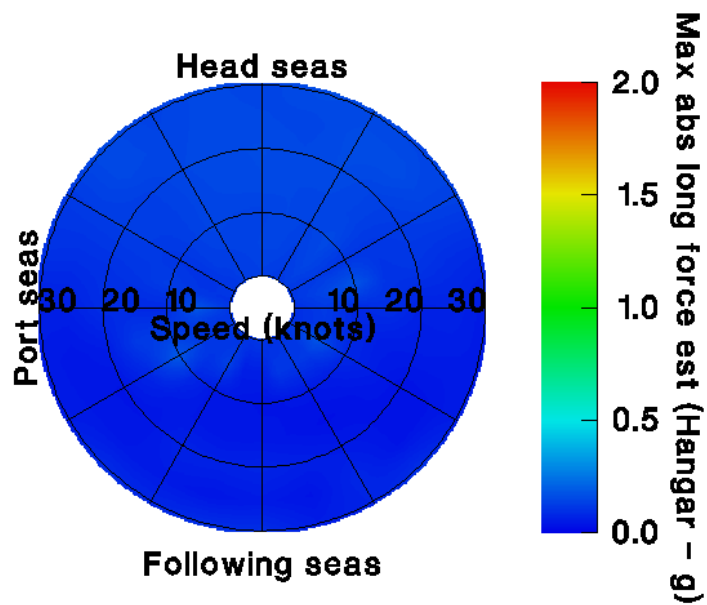


**Figure E.3:** Max. Abs. Long. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 6.0$  m and  $T_P = 10.3$  s.

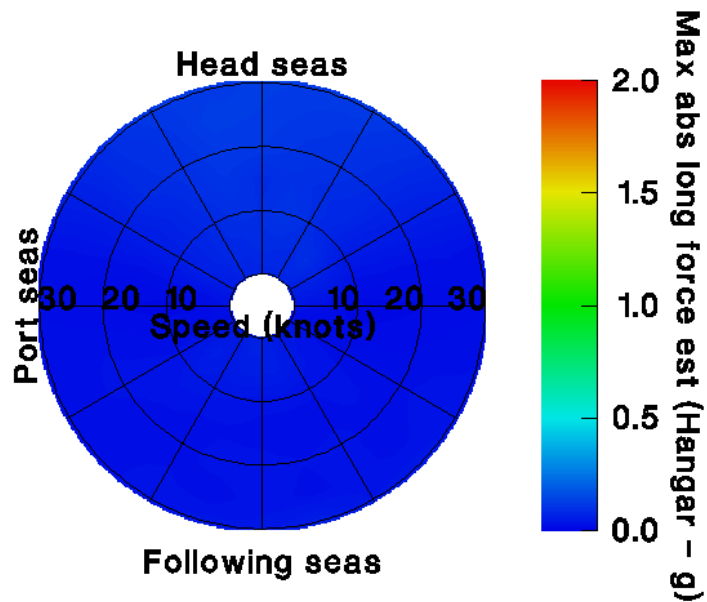


**Figure E.4:** Max. Abs. Long. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 6.0$  m and  $T_P = 16.2$  s.

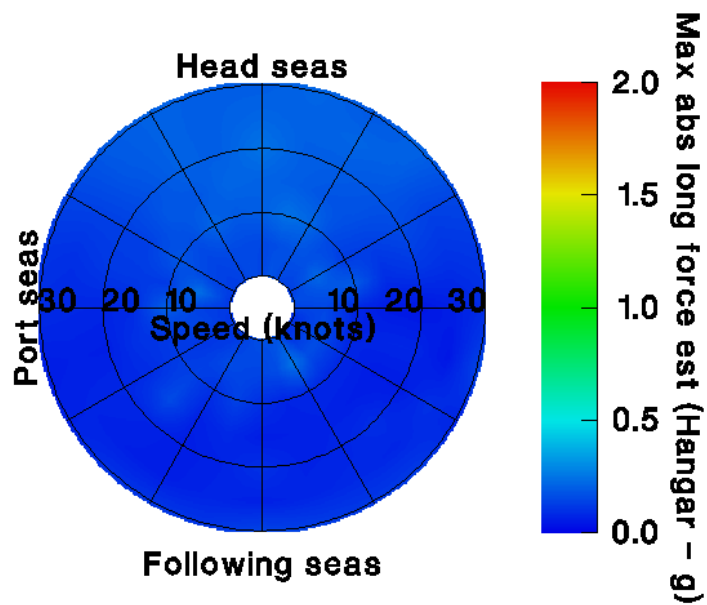


**Figure E.5:** Max. Abs. Long. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 9.0$  m and  $T_P = 13.1$  s.

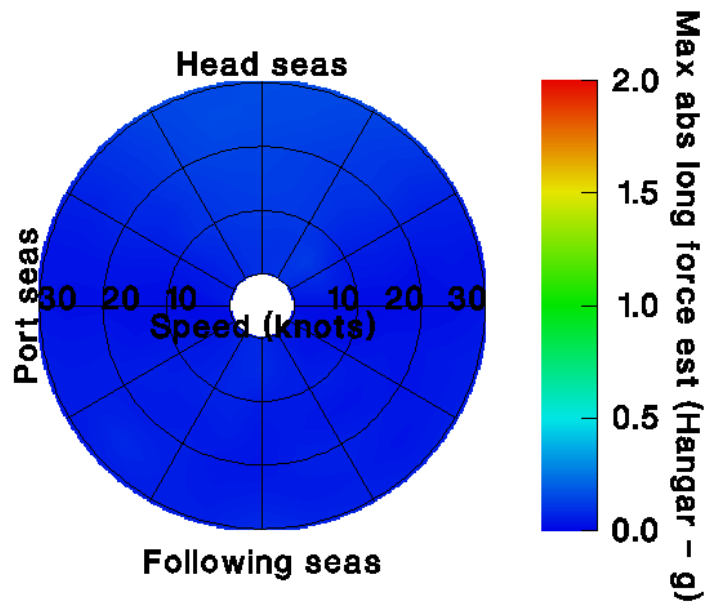


**Figure E.6:** Max. Abs. Long. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 9.0$  m and  $T_P = 18.5$  s.

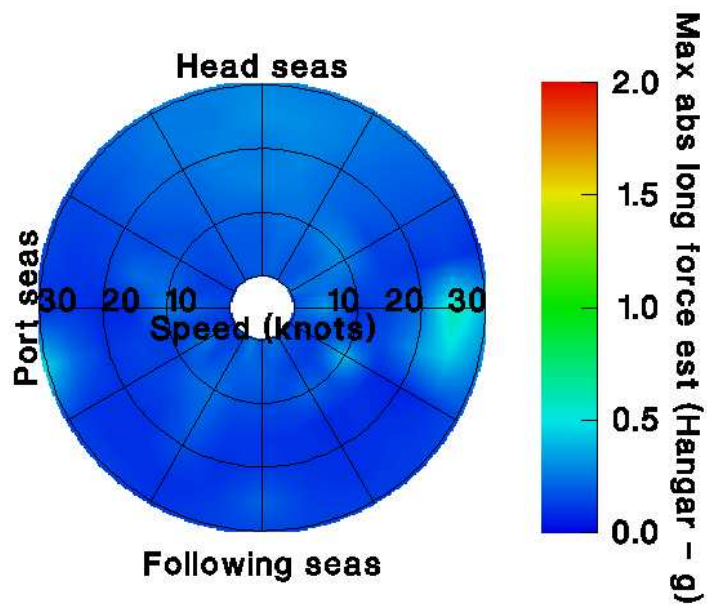


**Figure E.7:** Max. Abs. Long. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 14.0$  m and  $T_P = 16.4$  s.

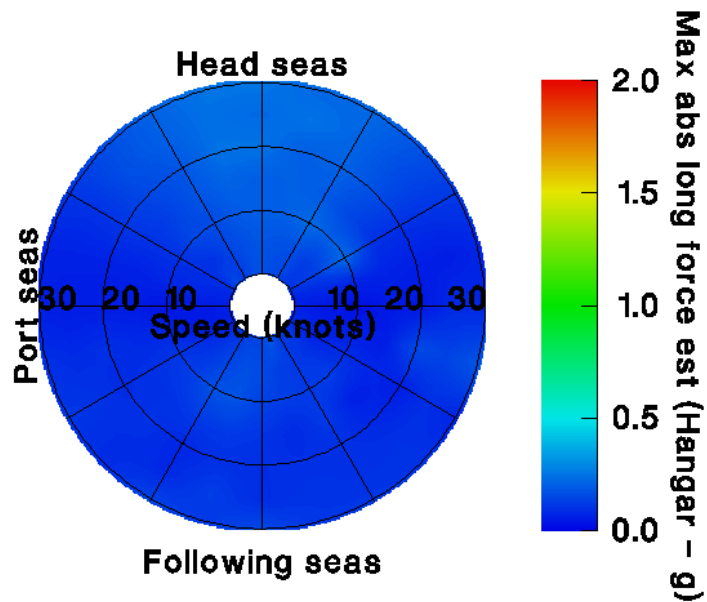


**Figure E.8:** Max. Abs. Long. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 14.0$  m and  $T_P = 18.6$  s.

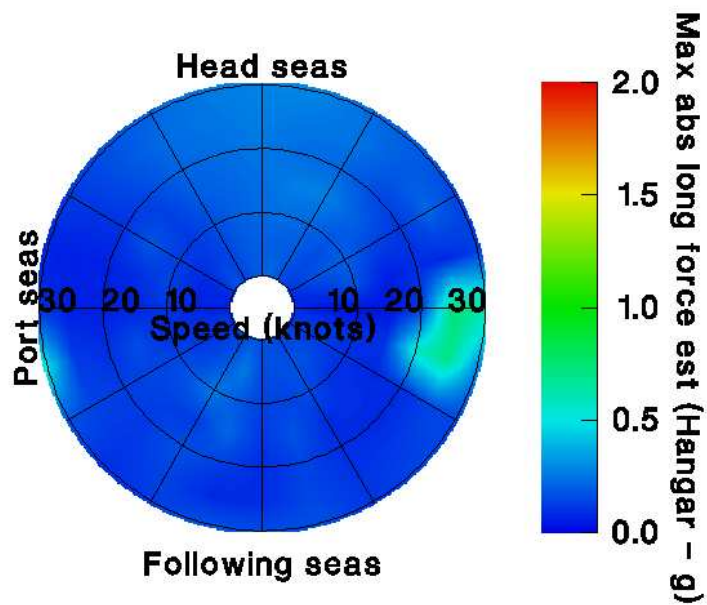


**Figure E.9:** Max. Abs. Long. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 17.7$  m and  $T_P = 20.0$  s.

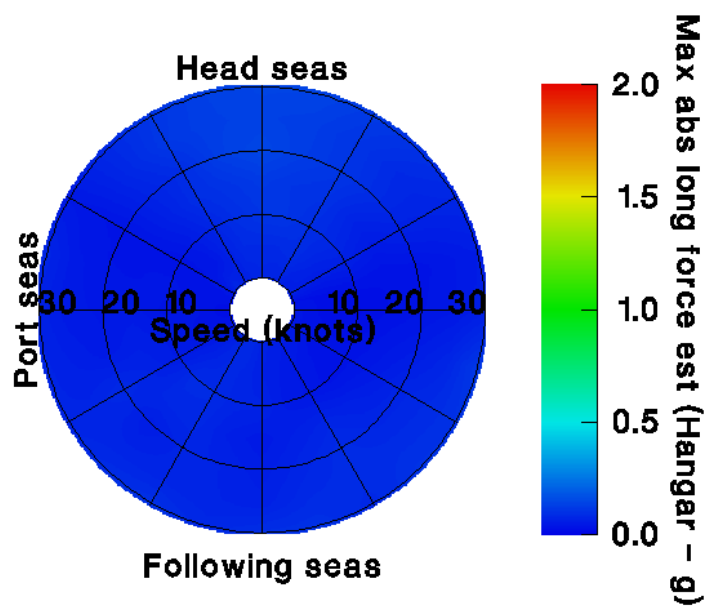


**Figure E.10:** Max. Abs. Long. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 17.7$  m and  $T_P = 25.7$  s.

**Annex F**  
**Polar Plots of Maximum Absolute**  
**Longitudinal Force Estimator at Hangar**  
**Deck – JONSWAP Spectra (Coastal Waters)**

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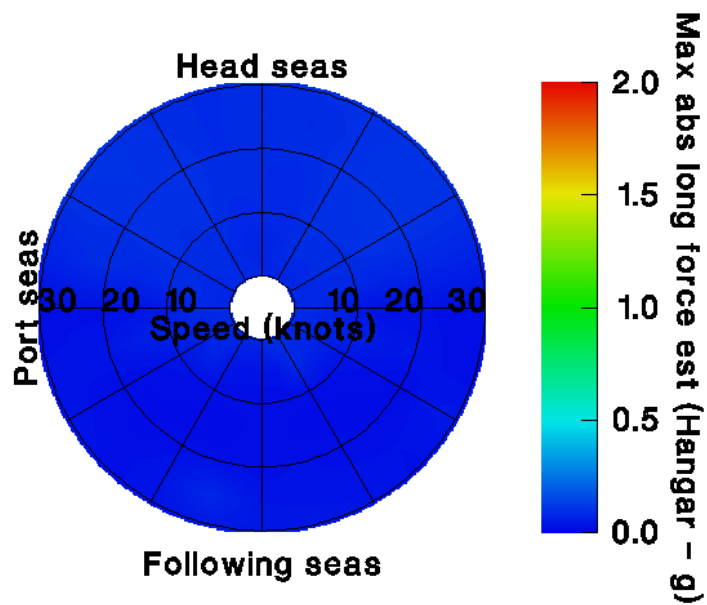


**Figure F.1:** Max. Abs. Long. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 4.0$  m and  $T_P = 8.2$  s.

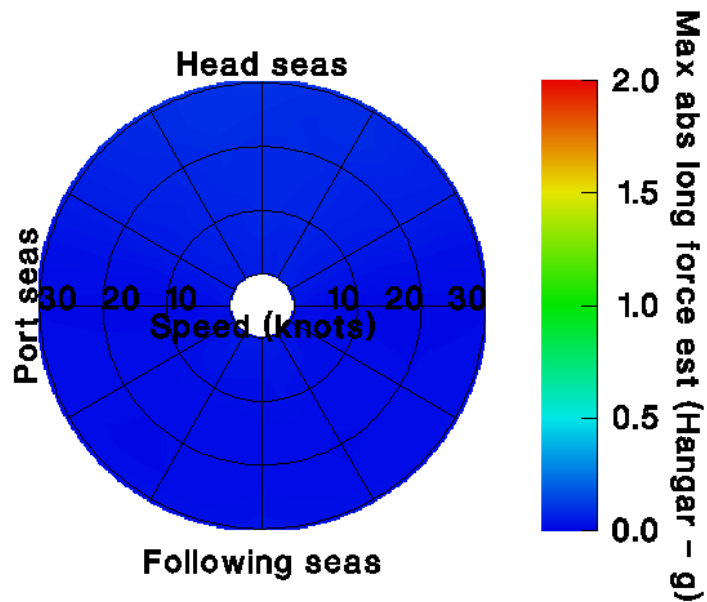


**Figure F.2:** Max. Abs. Long. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 4.0$  m and  $T_P = 13.6$  s.



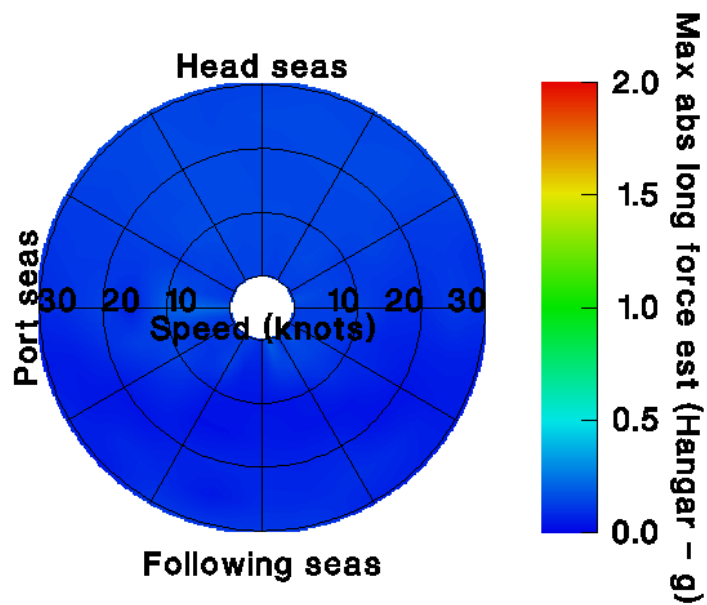


**Figure F.3:** Max. Abs. Long. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 6.0$  m and  $T_P = 9.3$  s.

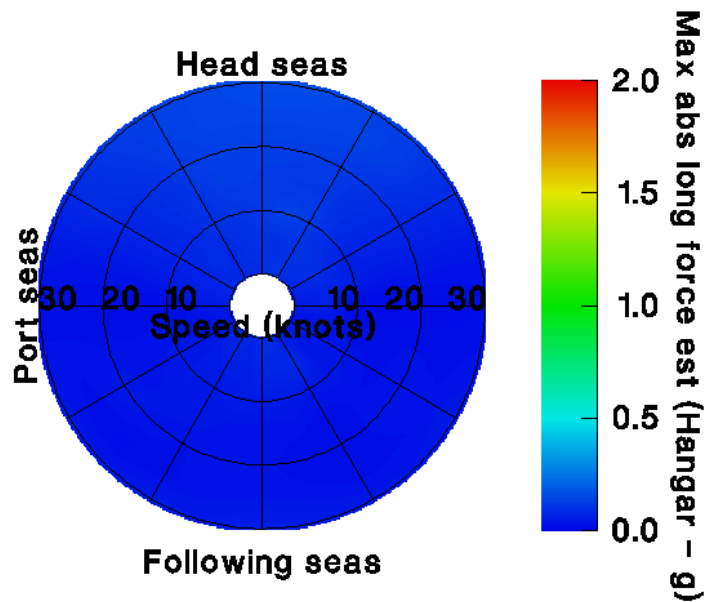


**Figure F.4:** Max. Abs. Long. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 6.0$  m and  $T_P = 13.6$  s.

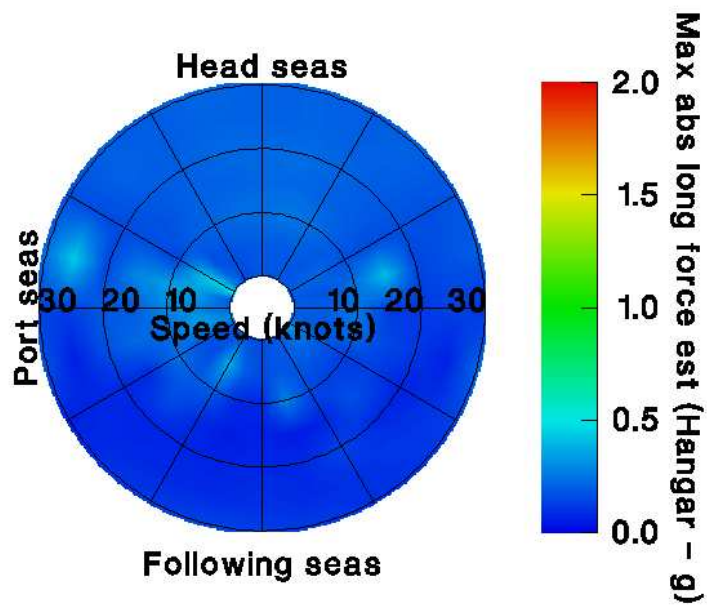


**Figure F.5:** Max. Abs. Long. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 9.0$  m and  $T_P = 11.0$  s.

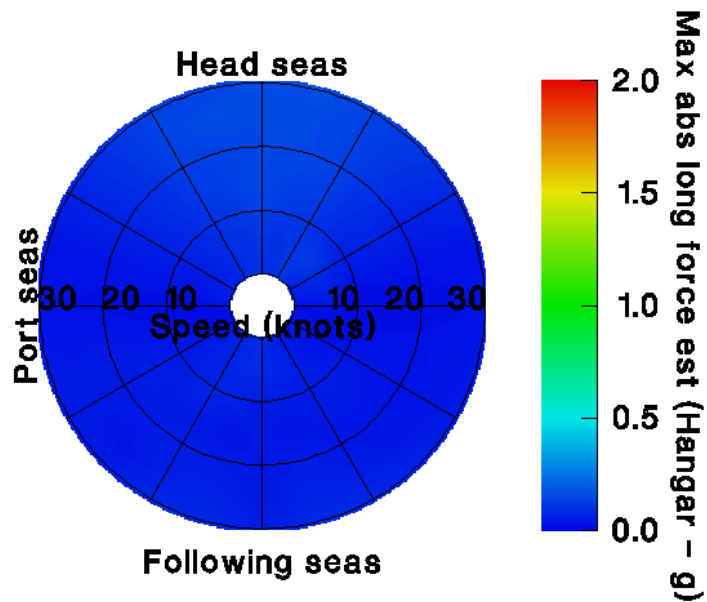


**Figure F.6:** Max. Abs. Long. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 9.0$  m and  $T_P = 17.1$  s.

**Annex G**  
**Polar Plots of Maximum Absolute Lateral**  
**Force Estimator at Hangar Deck –**  
**Bretschneider Spectra (Open Ocean)**

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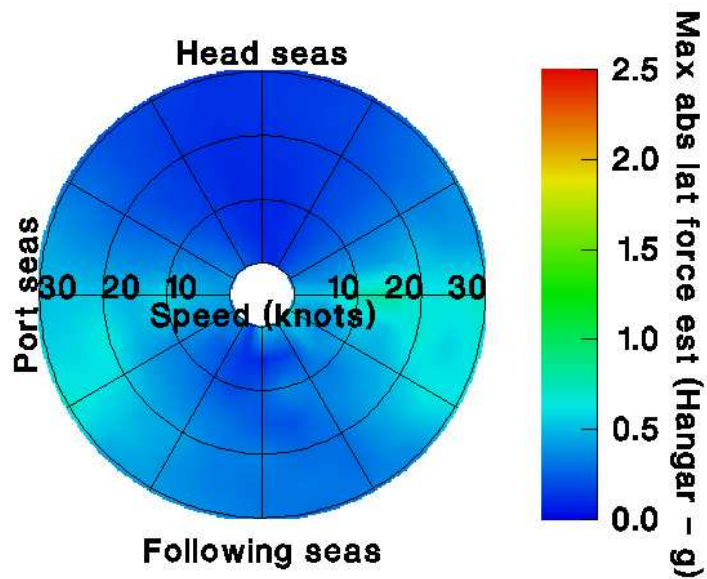


**Figure G.1:** Max. Abs. Lat. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 4.0$  m and  $T_P = 8.3$  s.

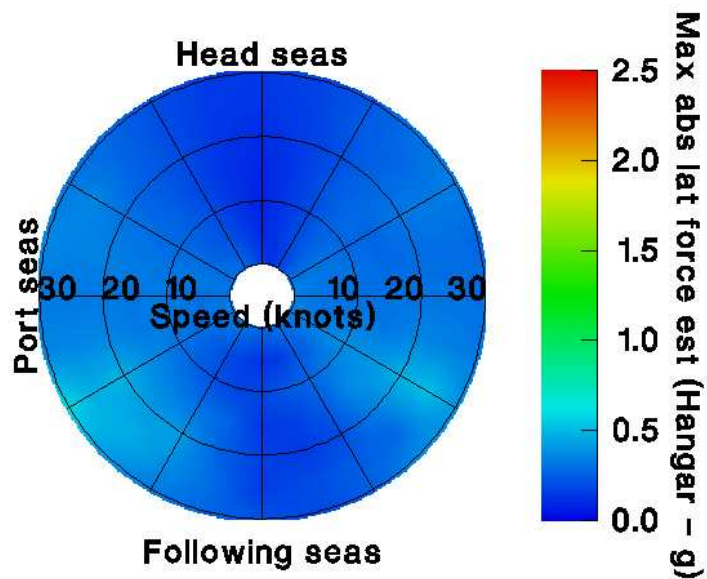


**Figure G.2:** Max. Abs. Lat. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 4.0$  m and  $T_P = 15.5$  s.

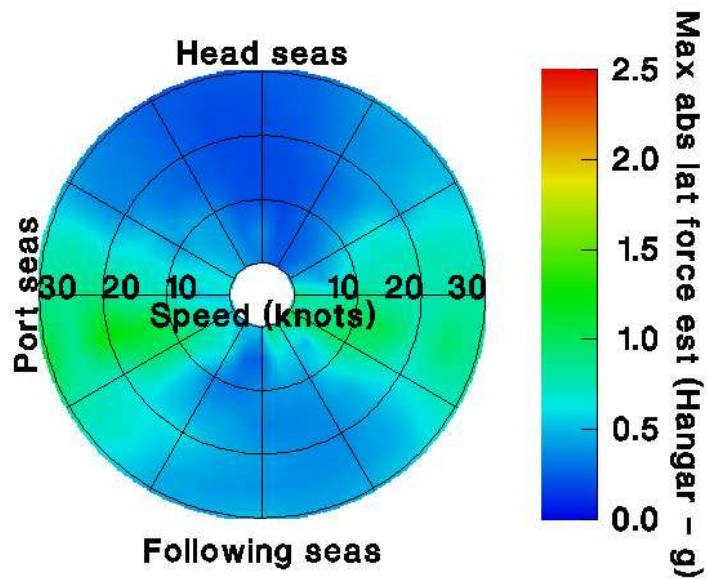


**Figure G.3:** Max. Abs. Lat. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 6.0$  m and  $T_P = 10.3$  s.

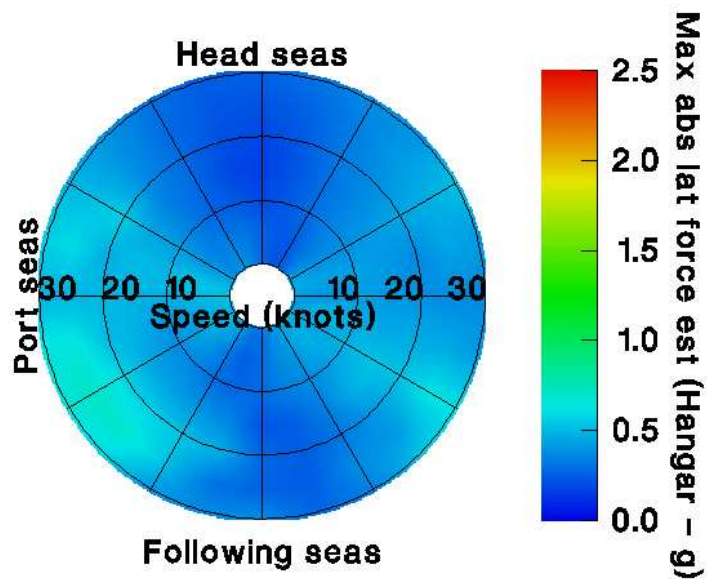


**Figure G.4:** Max. Abs. Lat. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 6.0$  m and  $T_P = 16.2$  s.

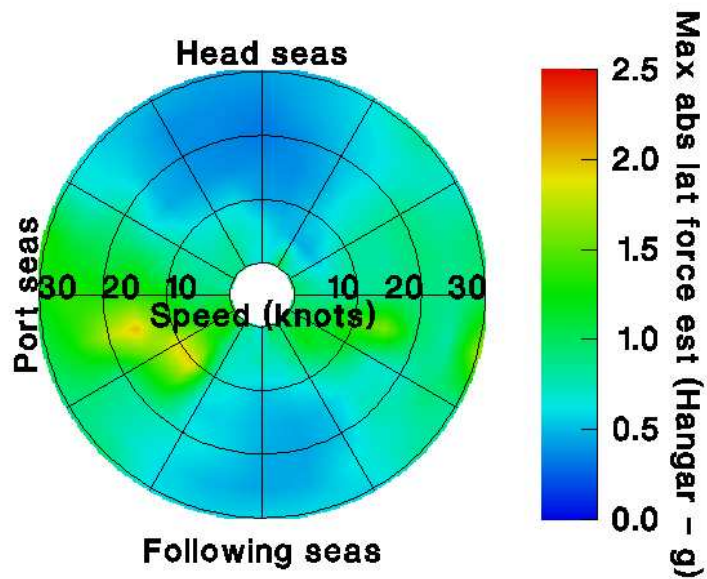


**Figure G.5:** Max. Abs. Lat. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 9.0$  m and  $T_P = 13.1$  s.

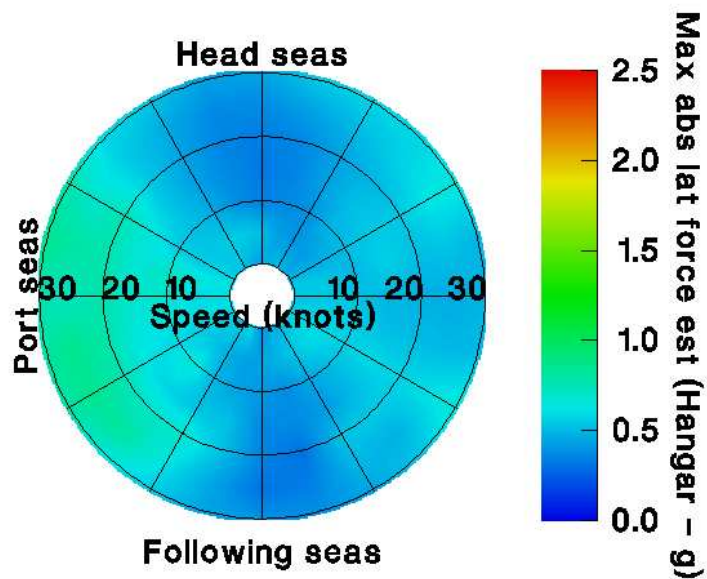


**Figure G.6:** Max. Abs. Lat. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 9.0$  m and  $T_P = 18.5$  s.

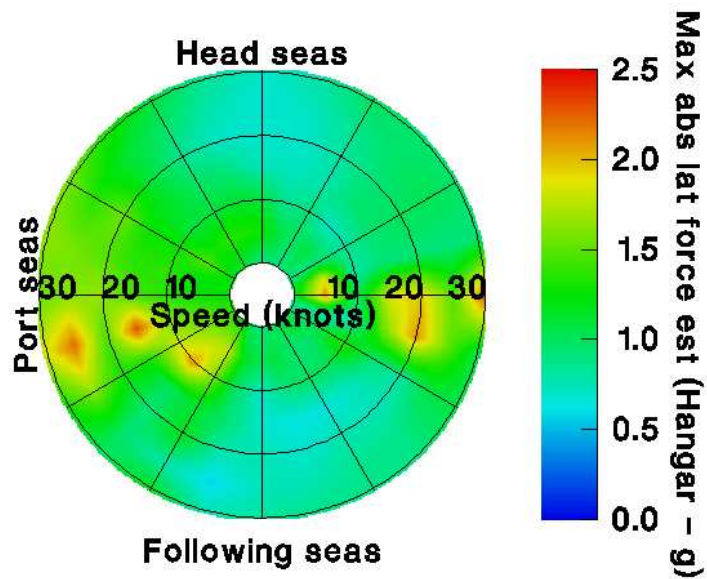


**Figure G.7:** Max. Abs. Lat. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 14.0$  m and  $T_P = 16.4$  s.

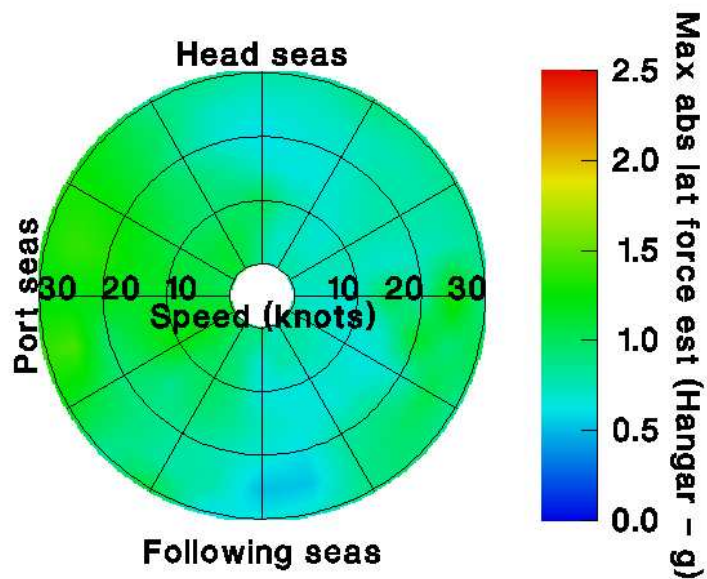


**Figure G.8:** Max. Abs. Lat. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 14.0$  m and  $T_P = 18.6$  s.



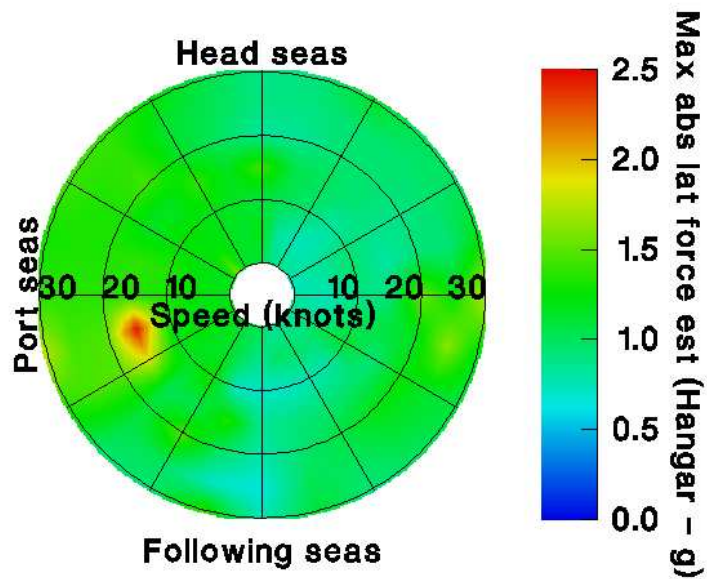


**Figure G.9:** Max. Abs. Lat. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 17.7$  m and  $T_P = 20.0$  s.

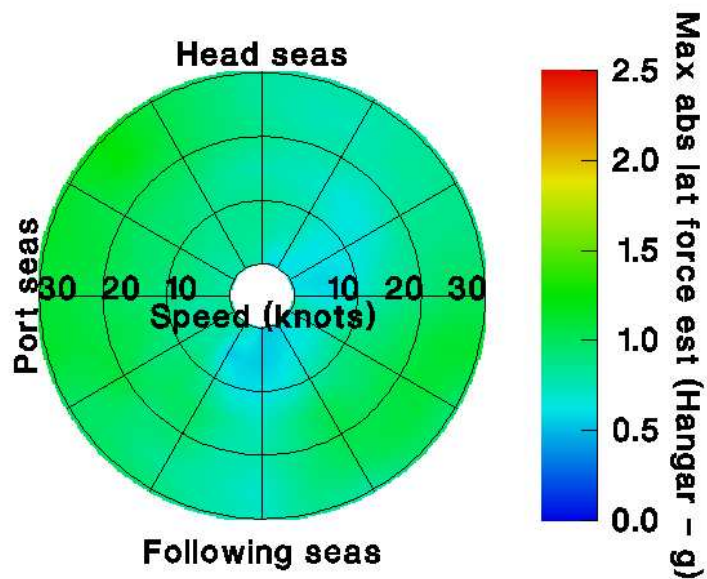


**Figure G.10:** Max. Abs. Lat. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 17.7$  m and  $T_P = 25.7$  s.



## **Annex H**

### **Polar Plots of Maximum Absolute Lateral Force Estimator at Hangar Deck – JONSWAP Spectra (Coastal Waters)**

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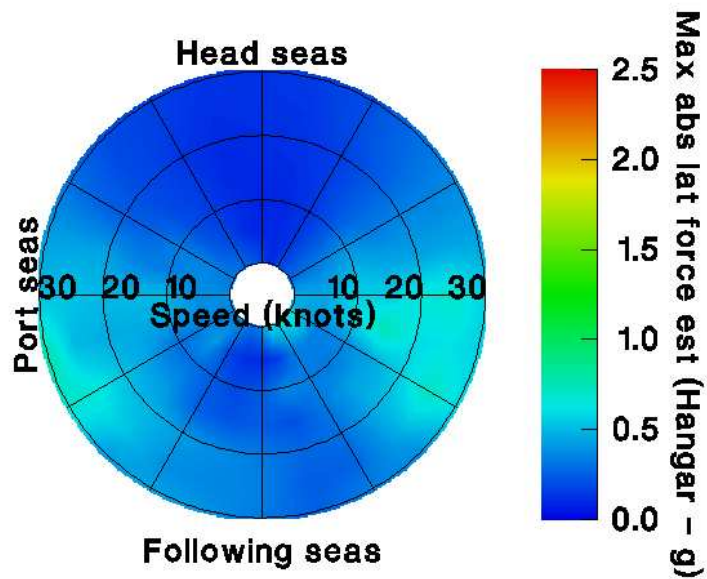


**Figure H.1:** Max. Abs. Lat. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 4.0$  m and  $T_P = 8.2$  s.

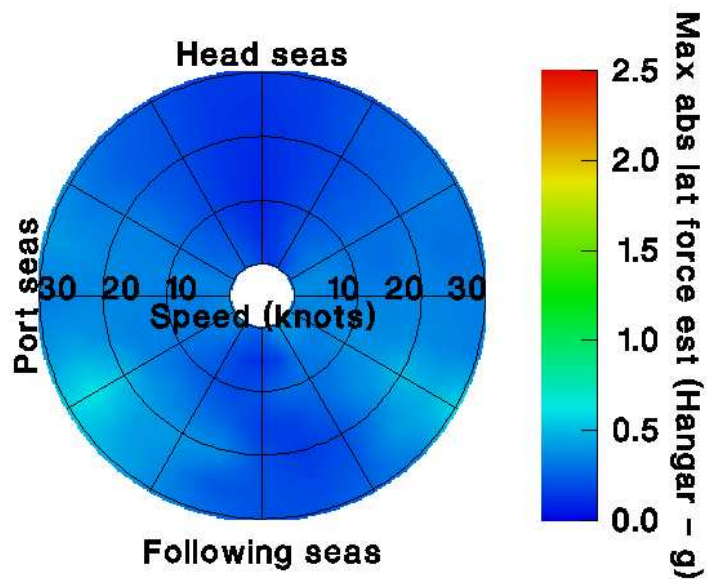


**Figure H.2:** Max. Abs. Lat. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 4.0$  m and  $T_P = 13.6$  s.

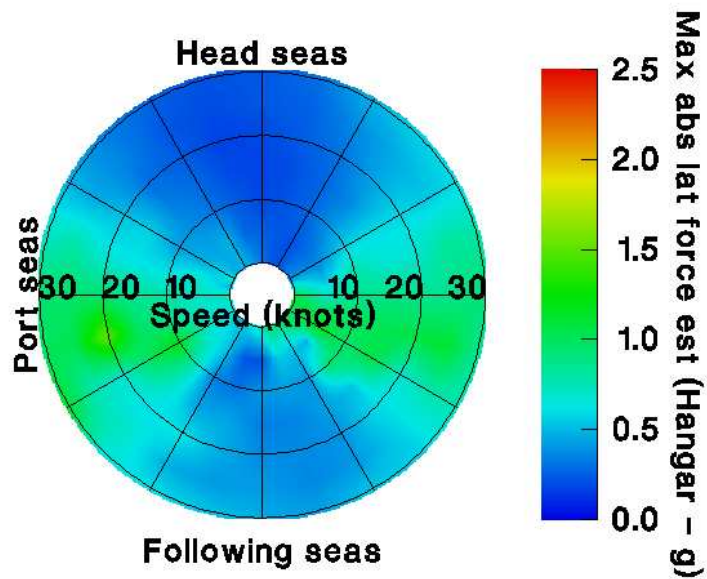


**Figure H.3:** Max. Abs. Lat. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 6.0$  m and  $T_P = 9.3$  s.

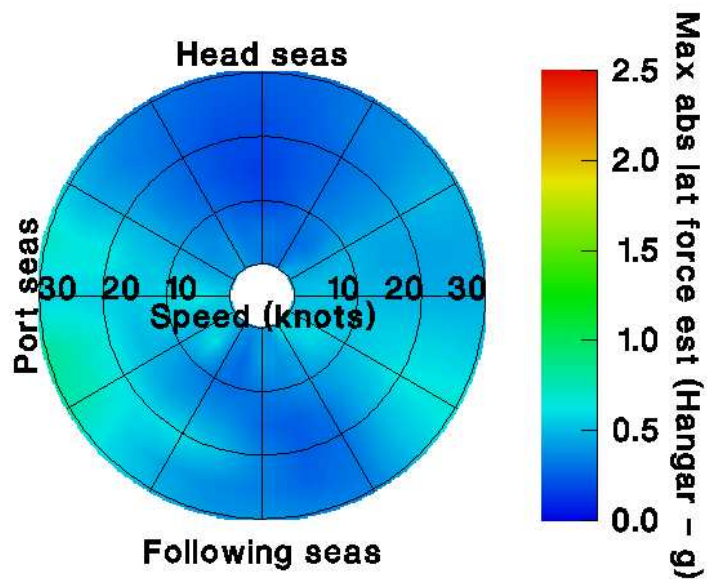


**Figure H.4:** Max. Abs. Lat. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 6.0$  m and  $T_P = 13.6$  s.

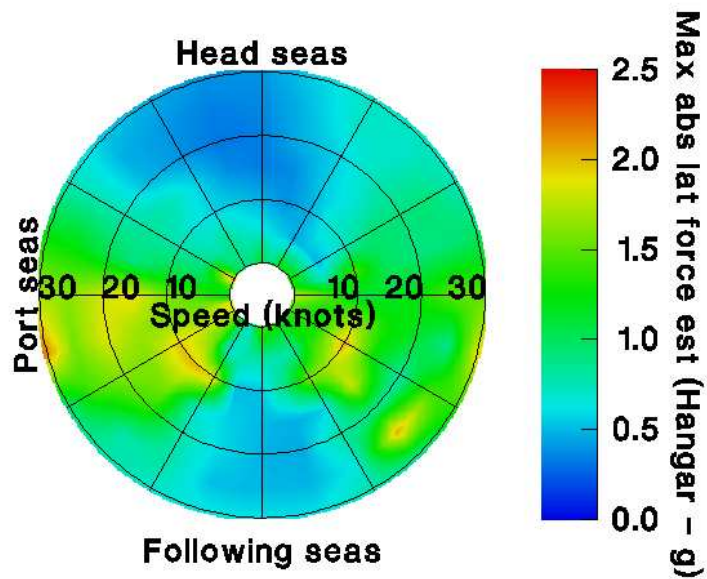


**Figure H.5:** Max. Abs. Lat. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 9.0$  m and  $T_P = 11.0$  s.

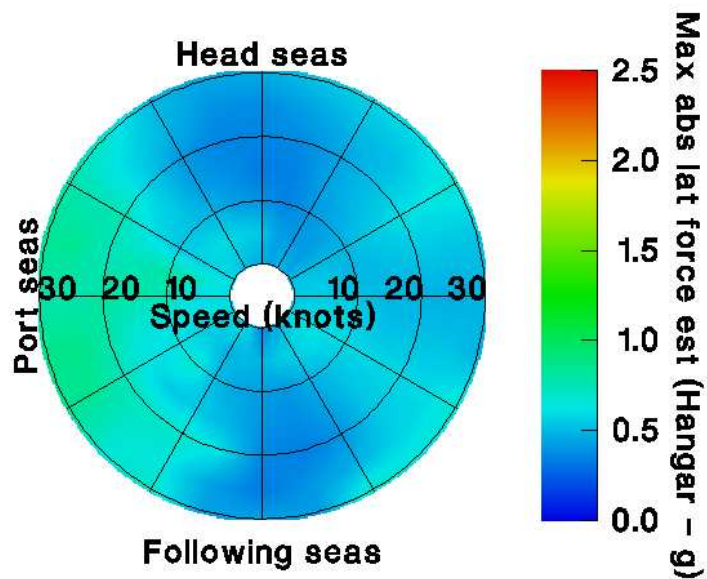


**Figure H.6:** Max. Abs. Lat. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 9.0$  m and  $T_P = 17.1$  s.

**Annex I**  
**Polar Plots of Maximum Absolute Vertical**  
**Force Estimator at Hangar Deck –**  
**Bretschneider Spectra (Open Ocean)**

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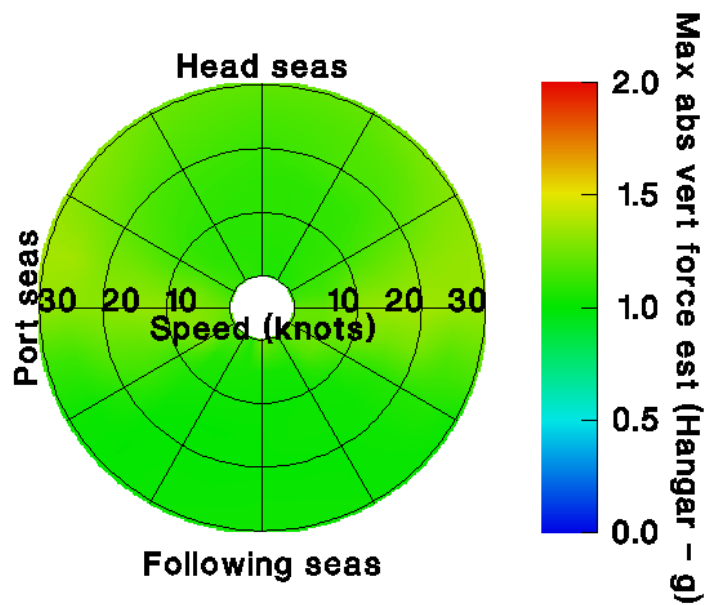


**Figure I.1:** Max. Abs. Vert. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 4.0$  m and  $T_P = 8.3$  s.

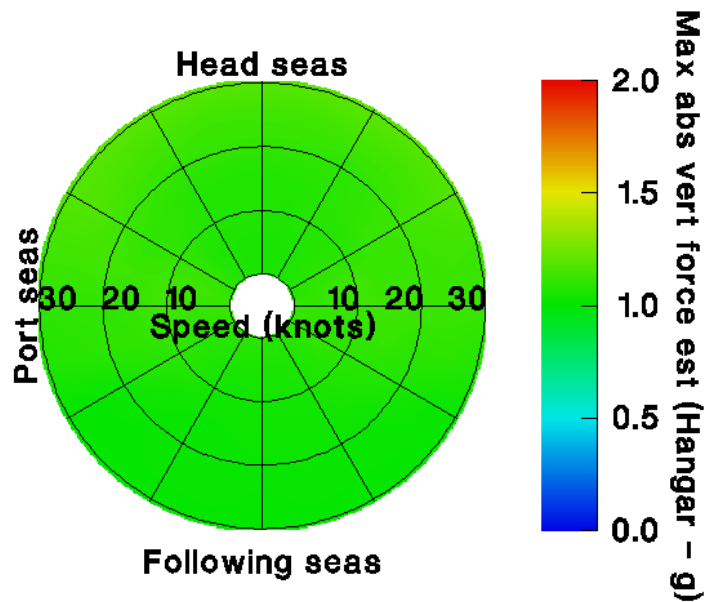


**Figure I.2:** Max. Abs. Vert. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 4.0$  m and  $T_P = 15.5$  s.

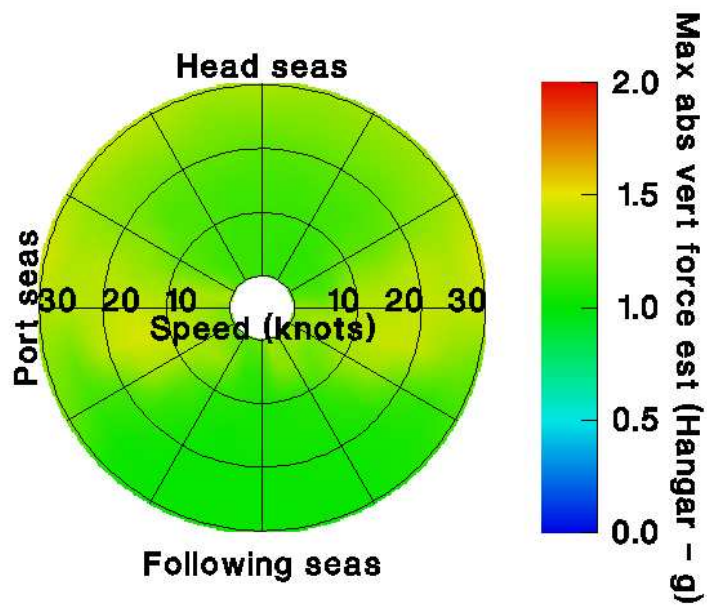


**Figure I.3:** Max. Abs. Vert. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 6.0$  m and  $T_P = 10.3$  s.

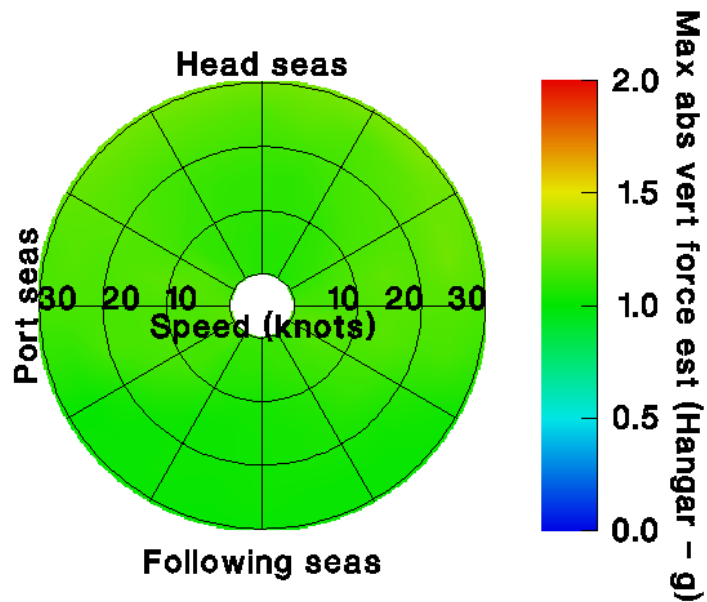


**Figure I.4:** Max. Abs. Vert. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 6.0$  m and  $T_P = 16.2$  s.

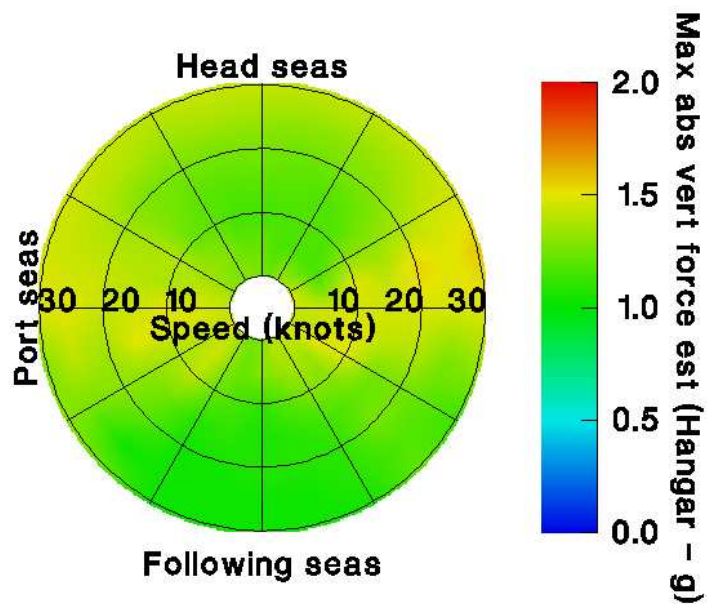


**Figure I.5:** Max. Abs. Vert. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 9.0$  m and  $T_P = 13.1$  s.

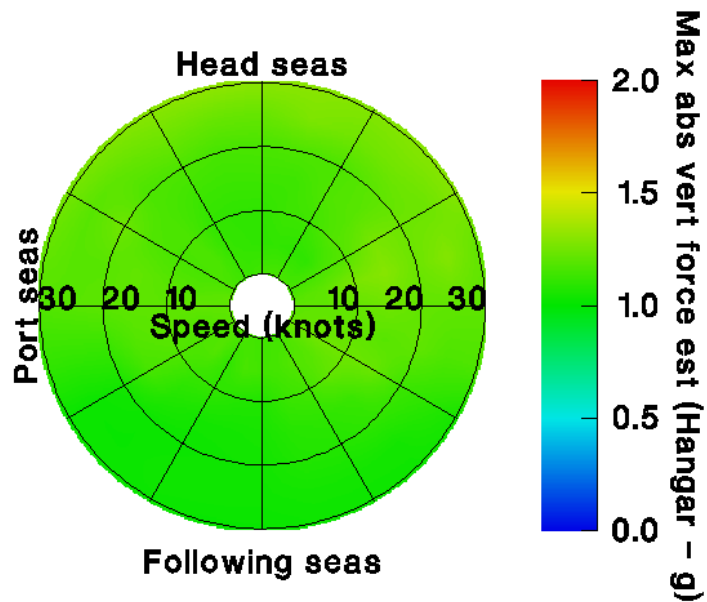


**Figure I.6:** Max. Abs. Vert. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 9.0$  m and  $T_P = 18.5$  s.



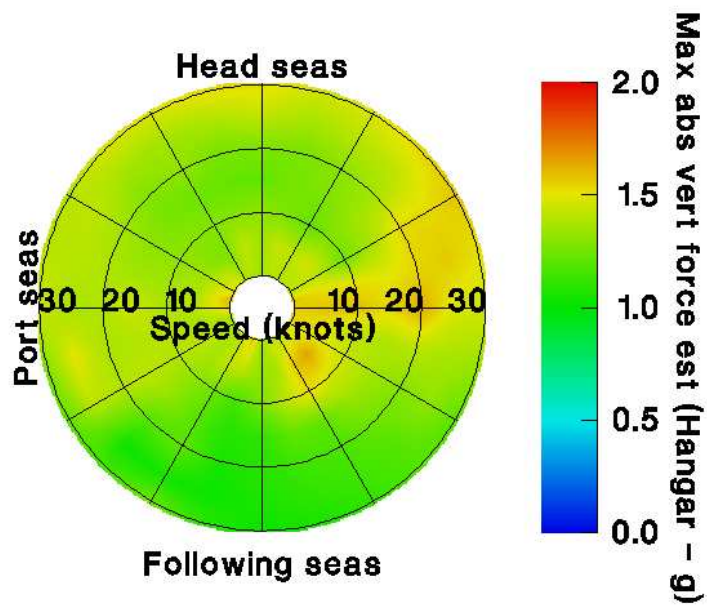


**Figure I.7:** Max. Abs. Vert. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 14.0$  m and  $T_P = 16.4$  s.

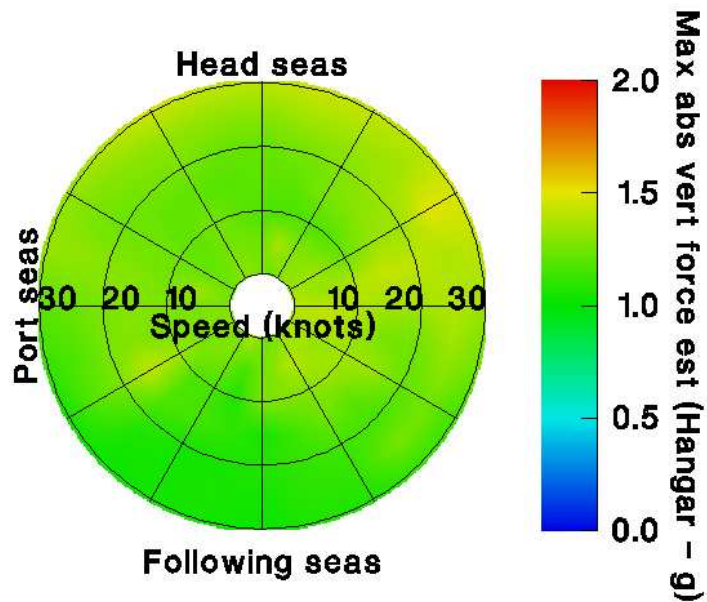


**Figure I.8:** Max. Abs. Vert. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 14.0$  m and  $T_P = 18.6$  s.

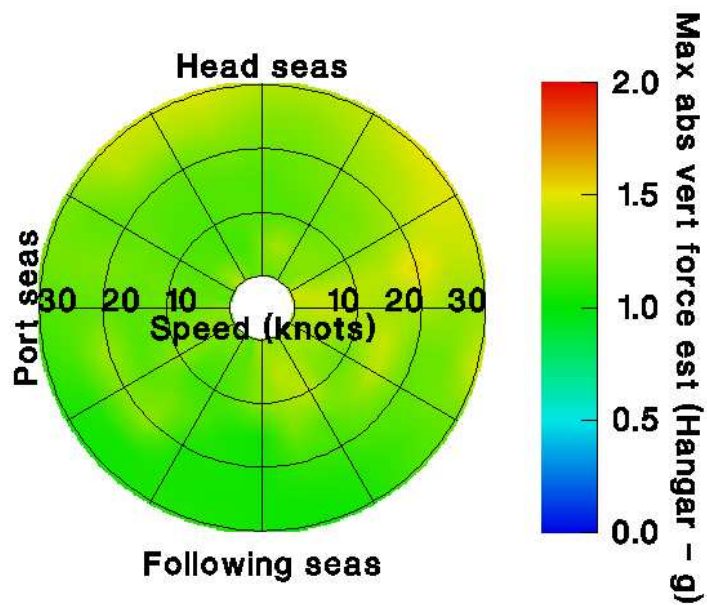


**Figure I.9:** Max. Abs. Vert. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 17.7$  m and  $T_P = 20.0$  s.

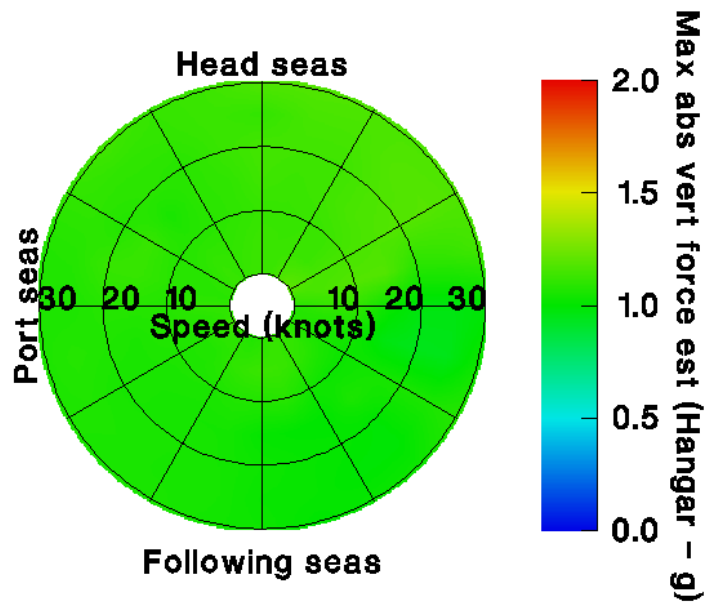


**Figure I.10:** Max. Abs. Vert. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 17.7$  m and  $T_P = 25.7$  s.

**Annex J**  
**Polar Plots of Maximum Absolute Vertical**  
**Force Estimator at Hangar Deck – JONSWAP**  
**Spectra (Coastal Waters)**

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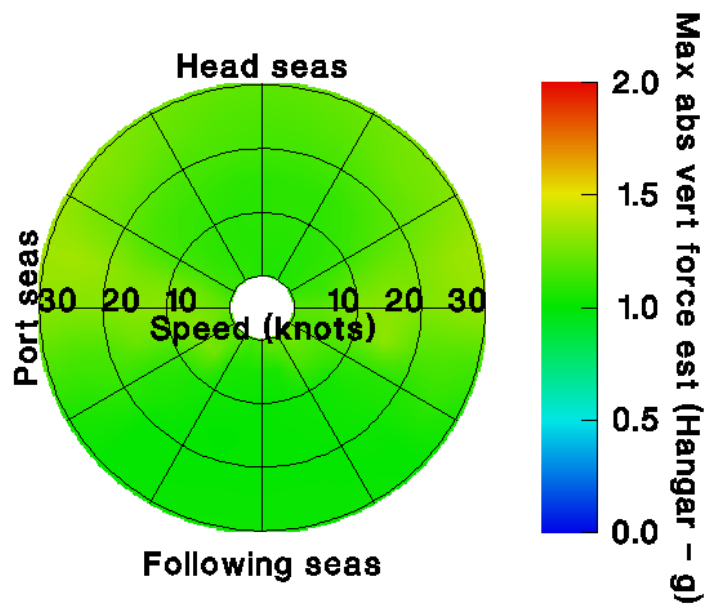


**Figure J.1:** Max. Abs. Vert. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 4.0$  m and  $T_P = 8.2$  s.

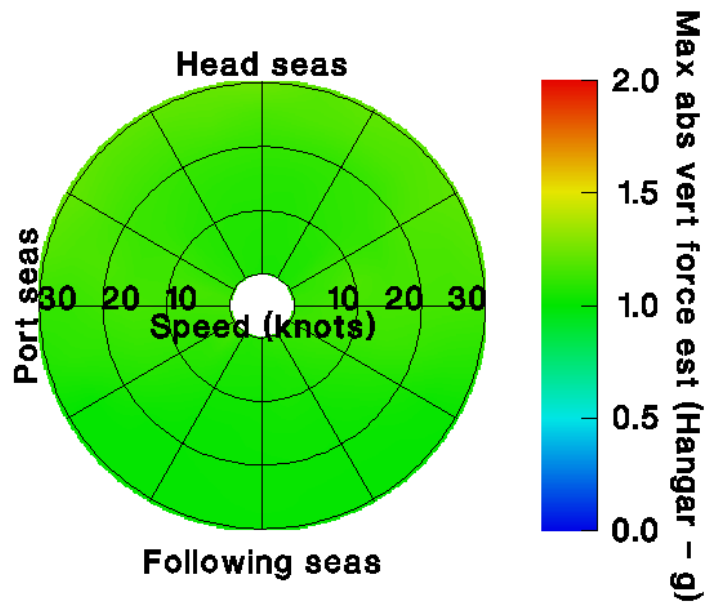


**Figure J.2:** Max. Abs. Vert. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 4.0$  m and  $T_P = 13.6$  s.

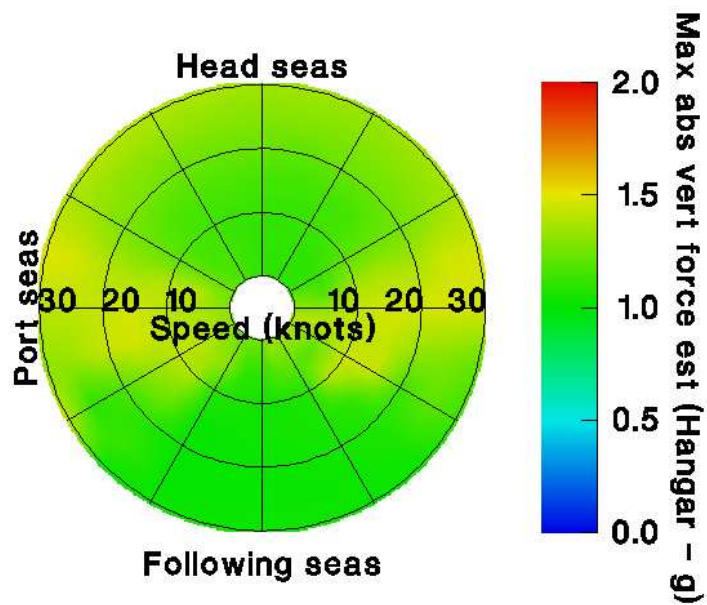


**Figure J.3:** Max. Abs. Vert. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 6.0$  m and  $T_P = 9.3$  s.

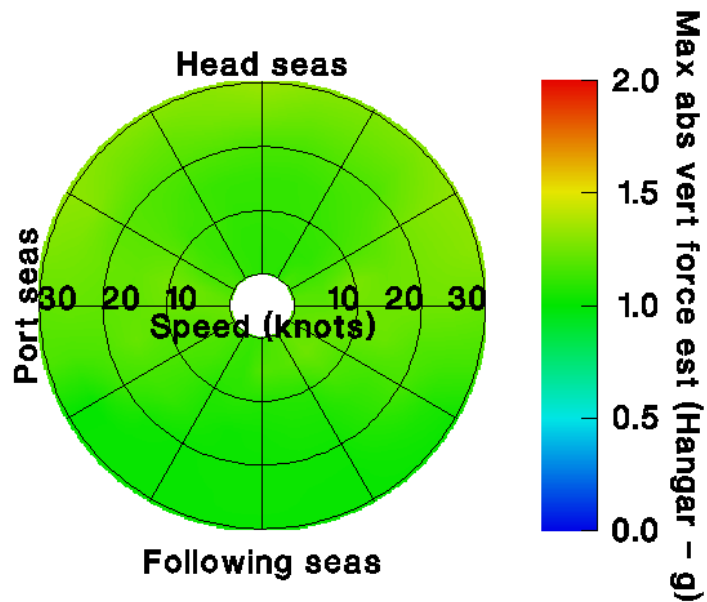


**Figure J.4:** Max. Abs. Vert. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 6.0$  m and  $T_P = 13.6$  s.

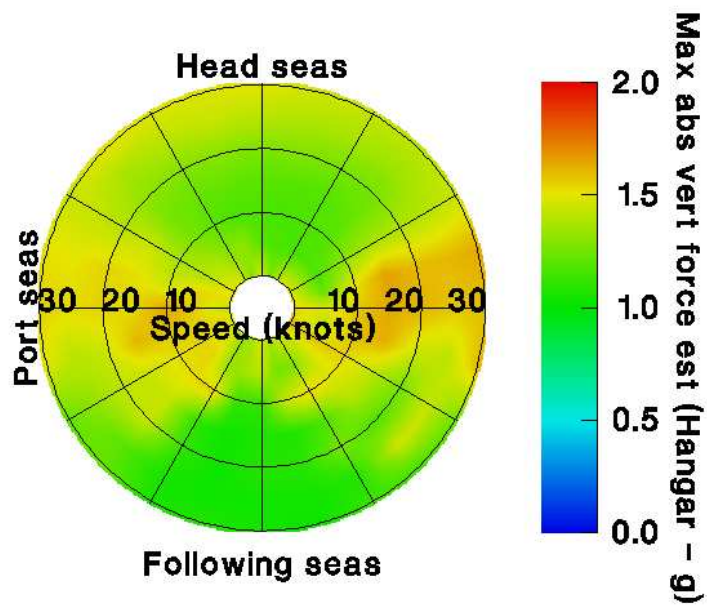


**Figure J.5:** Max. Abs. Vert. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 9.0$  m and  $T_P = 11.0$  s.

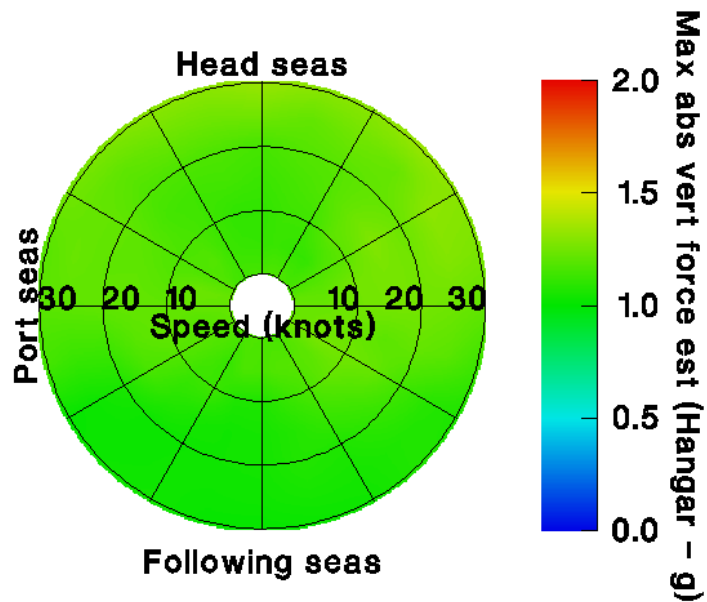


**Figure J.6:** Max. Abs. Vert. Force Est. at the Hangar Deck with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 9.0$  m and  $T_P = 17.1$  s.

**Annex K**  
**Polar Plots of Maximum Absolute**  
**Longitudinal Force Estimator at Flight Deck**  
**– Bretschneider Spectra (Open Ocean)**

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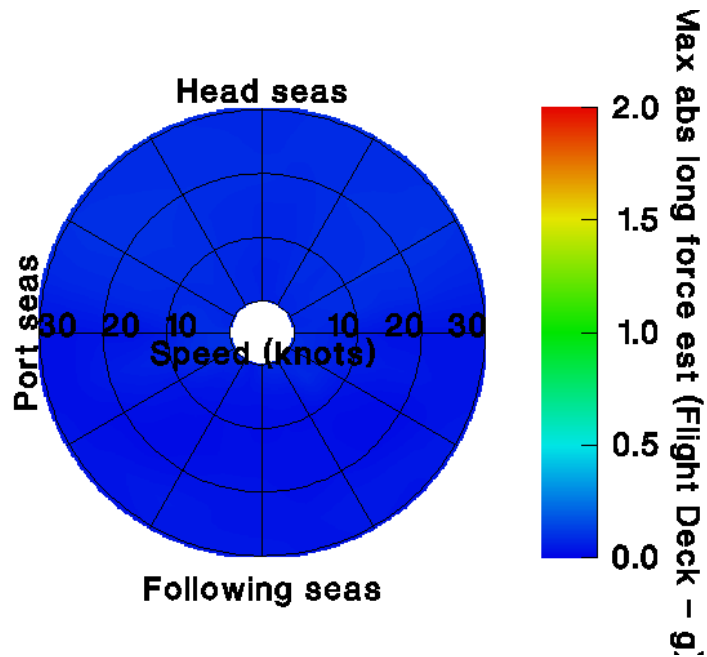


**Figure K.1:** Max. Abs. Long. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 4.0$  m and  $T_P = 8.3$  s.

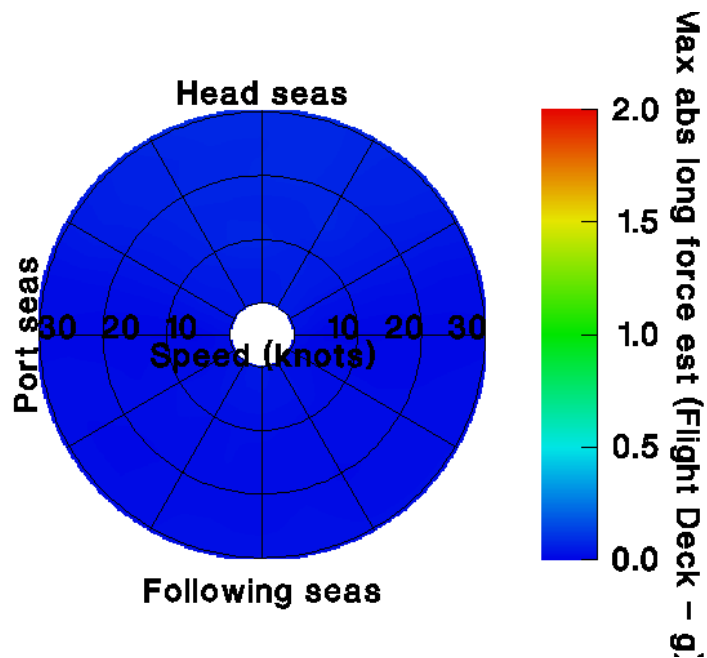


**Figure K.2:** Max. Abs. Long. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 4.0$  m and  $T_P = 15.5$  s.



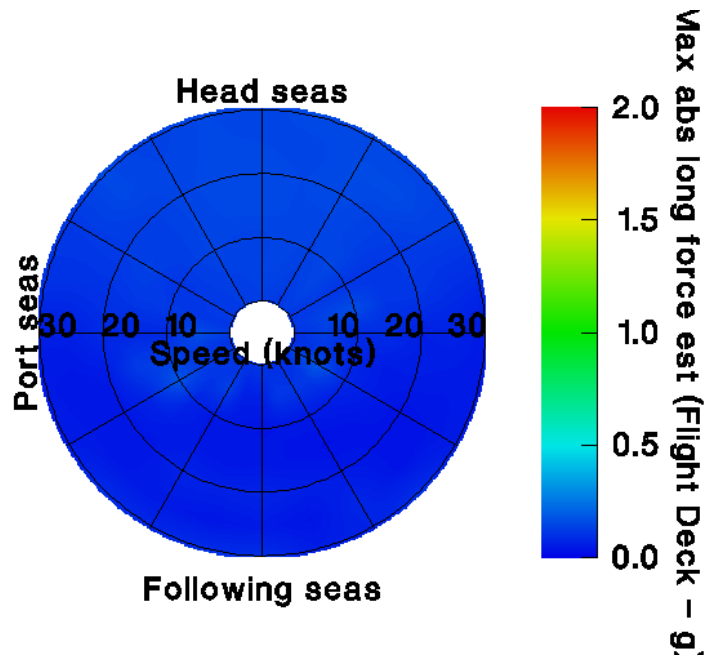


**Figure K.3:** Max. Abs. Long. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 6.0$  m and  $T_P = 10.3$  s.

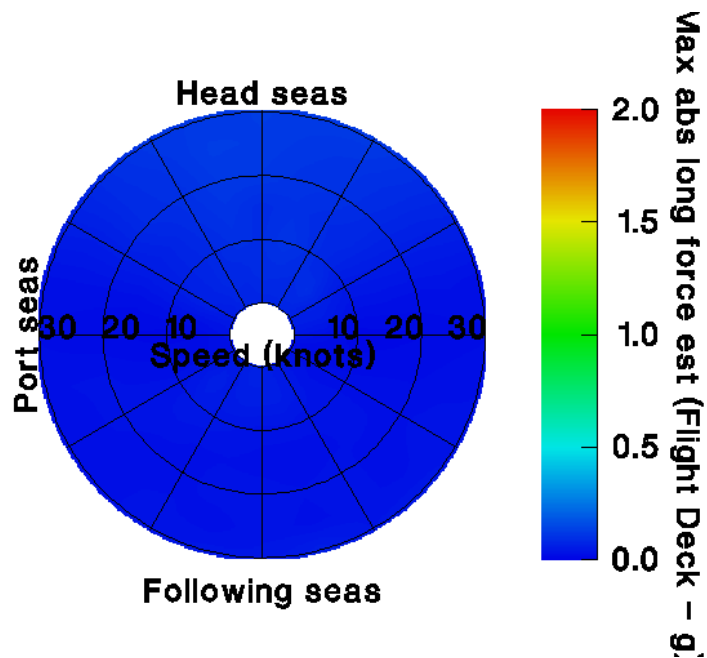


**Figure K.4:** Max. Abs. Long. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 6.0$  m and  $T_P = 16.2$  s.

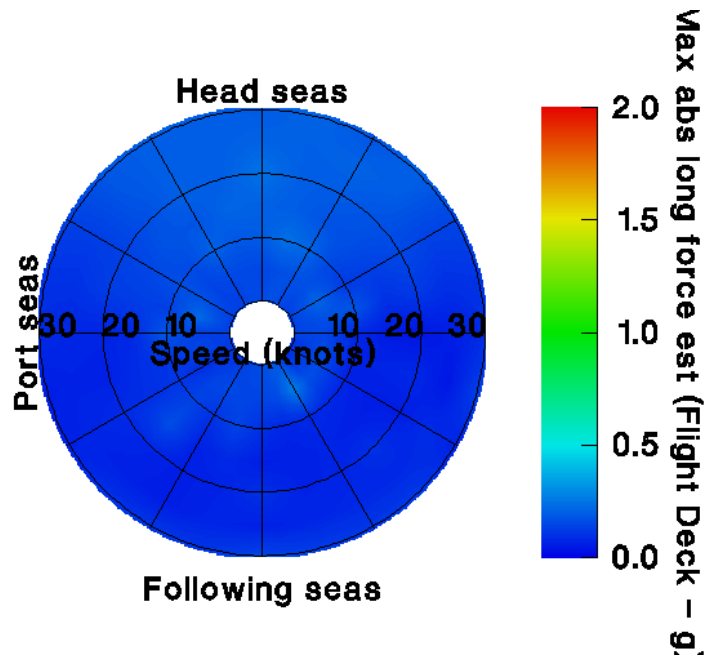


**Figure K.5:** Max. Abs. Long. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 9.0$  m and  $T_P = 13.1$  s.

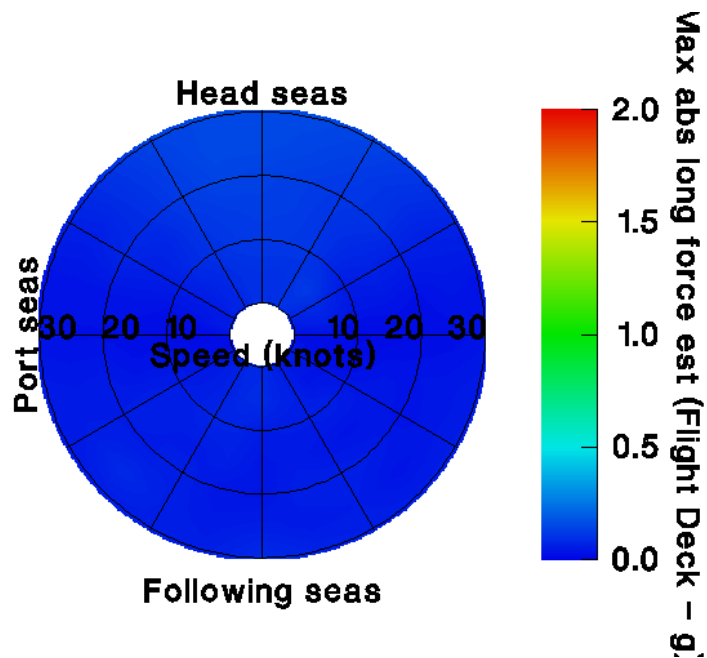


**Figure K.6:** Max. Abs. Long. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 9.0$  m and  $T_P = 18.5$  s.

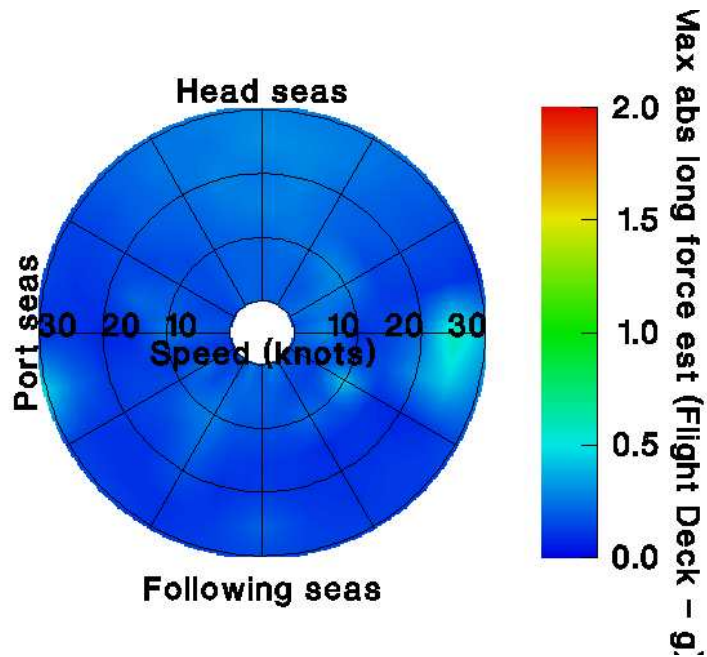


**Figure K.7:** Max. Abs. Long. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 14.0$  m and  $T_P = 16.4$  s.

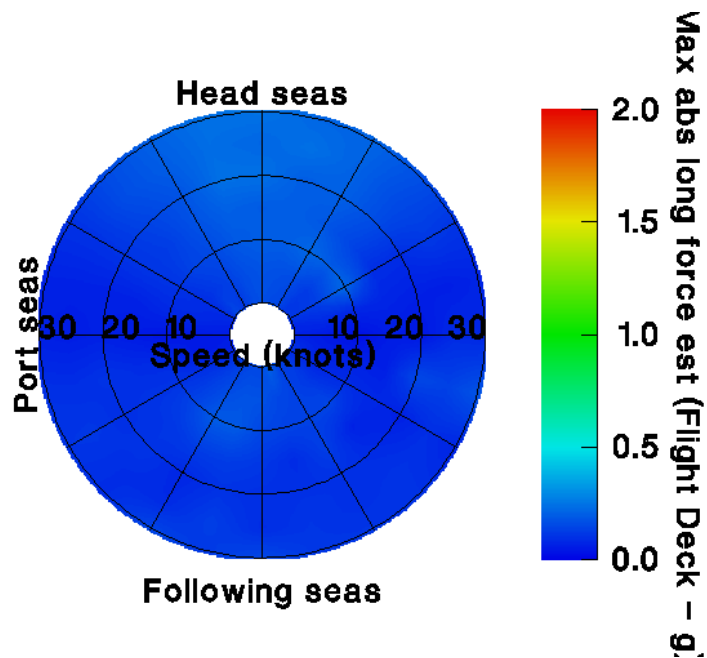


**Figure K.8:** Max. Abs. Long. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 14.0$  m and  $T_P = 18.6$  s.

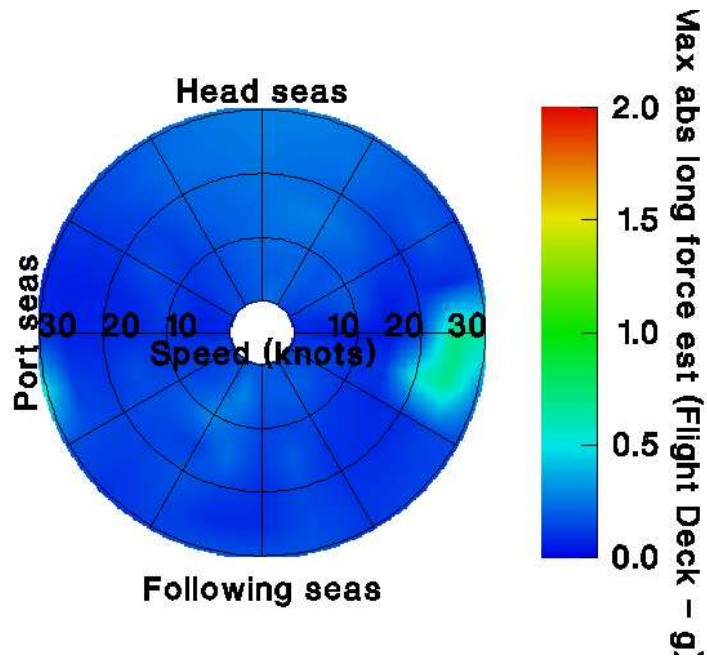


**Figure K.9:** Max. Abs. Long. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 17.7$  m and  $T_P = 20.0$  s.

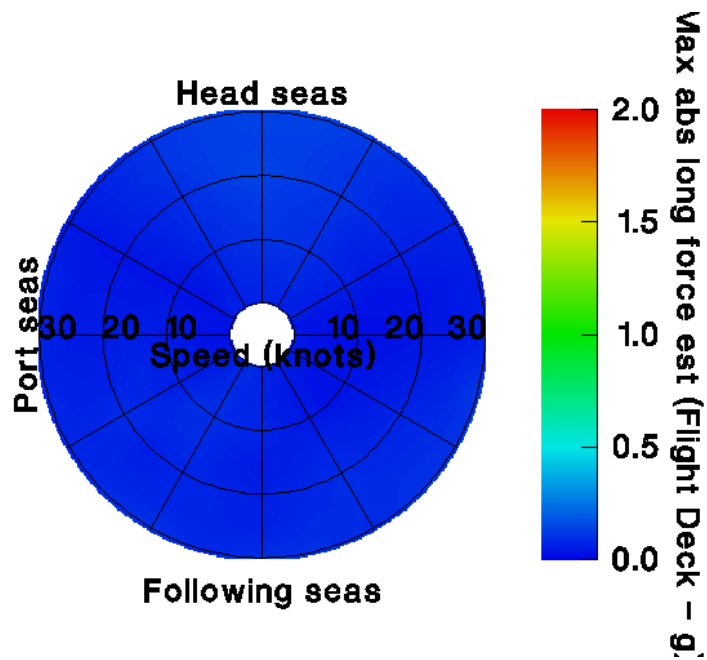


**Figure K.10:** Max. Abs. Long. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 17.7$  m and  $T_P = 25.7$  s.

**Annex L**  
**Polar Plots of Maximum Absolute**  
**Longitudinal Force Estimator at Flight Deck**  
**– JONSWAP Spectra (Coastal Waters)**

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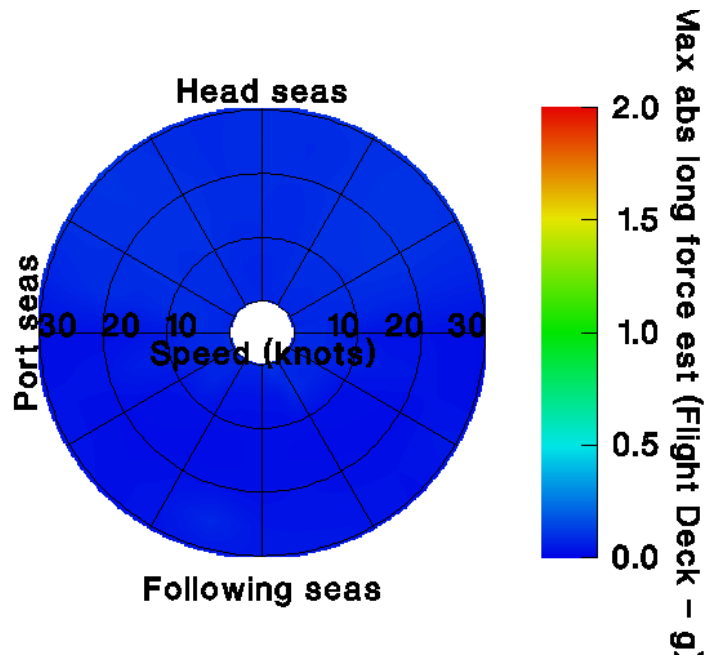


**Figure L.1:** Max. Abs. Long. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 4.0$  m and  $T_P = 8.2$  s.

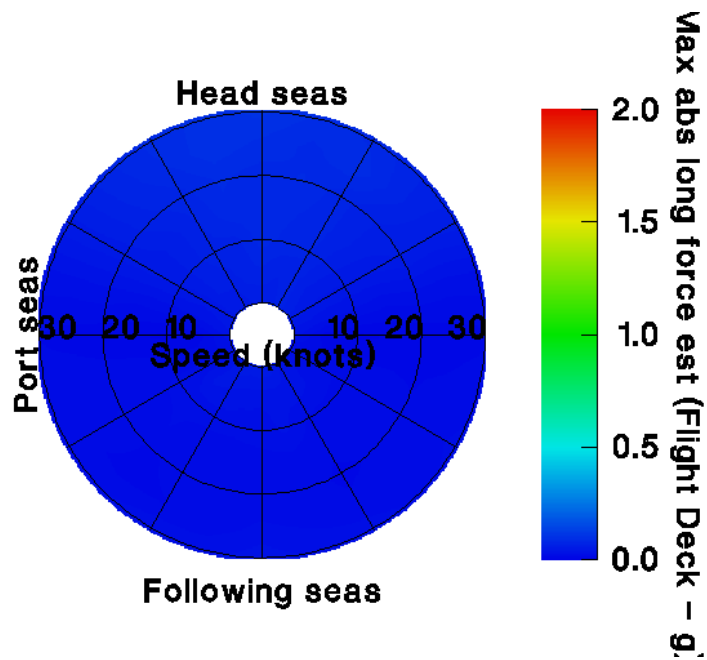


**Figure L.2:** Max. Abs. Long. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 4.0$  m and  $T_P = 13.6$  s.

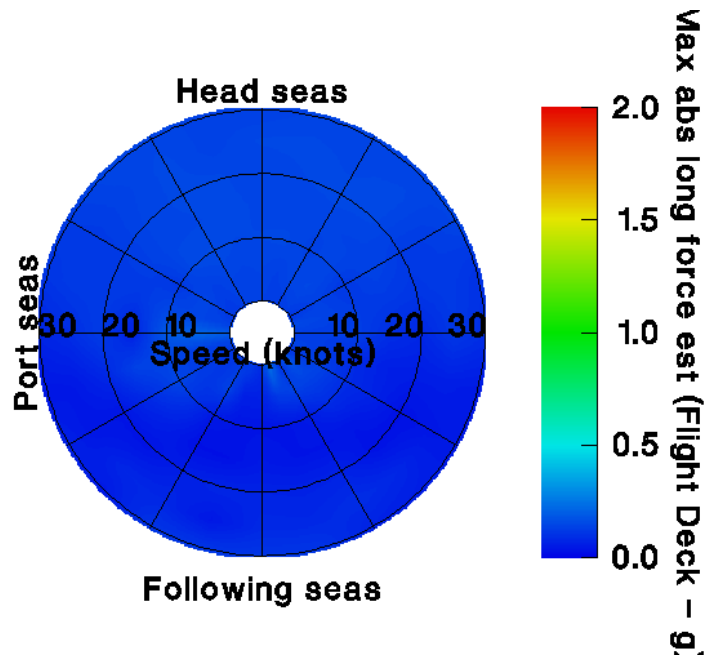


**Figure L.3:** Max. Abs. Long. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 6.0$  m and  $T_P = 9.3$  s.

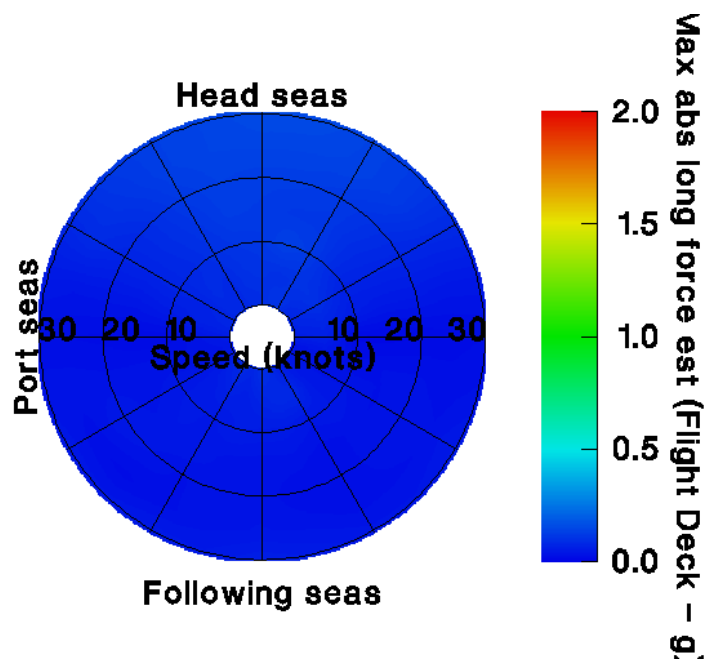


**Figure L.4:** Max. Abs. Long. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 6.0$  m and  $T_P = 13.6$  s.

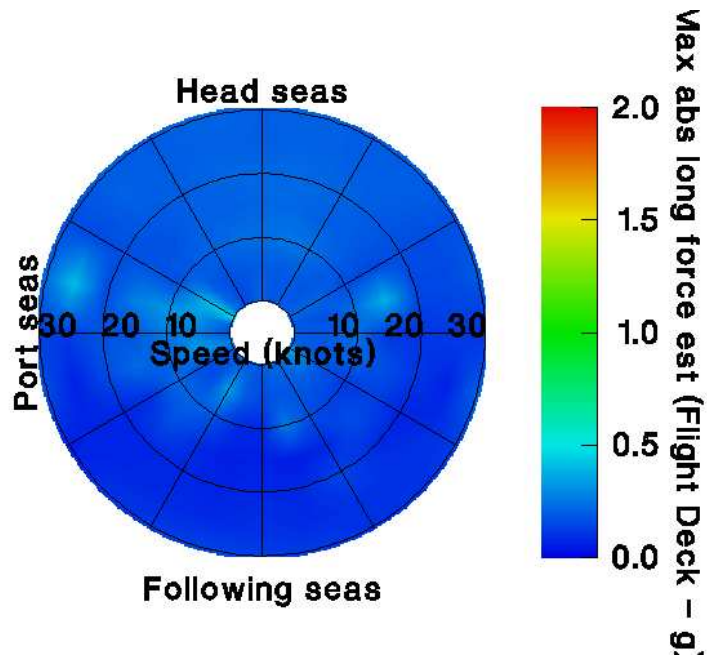


**Figure L.5:** Max. Abs. Long. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 9.0$  m and  $T_P = 11.0$  s.

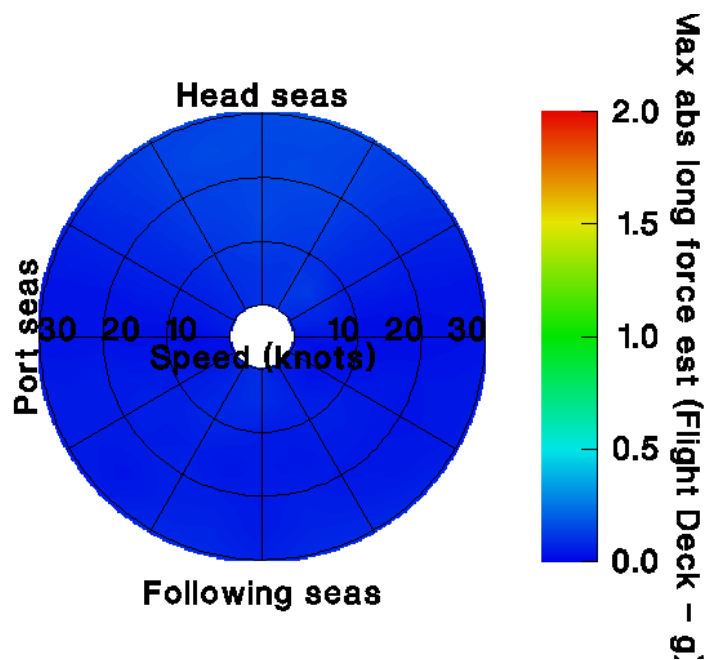


**Figure L.6:** Max. Abs. Long. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 9.0$  m and  $T_P = 17.1$  s.



**Annex M**  
**Polar Plots of Maximum Absolute Lateral**  
**Force Estimator at Flight Deck –**  
**Bretschneider Spectra (Open Ocean)**

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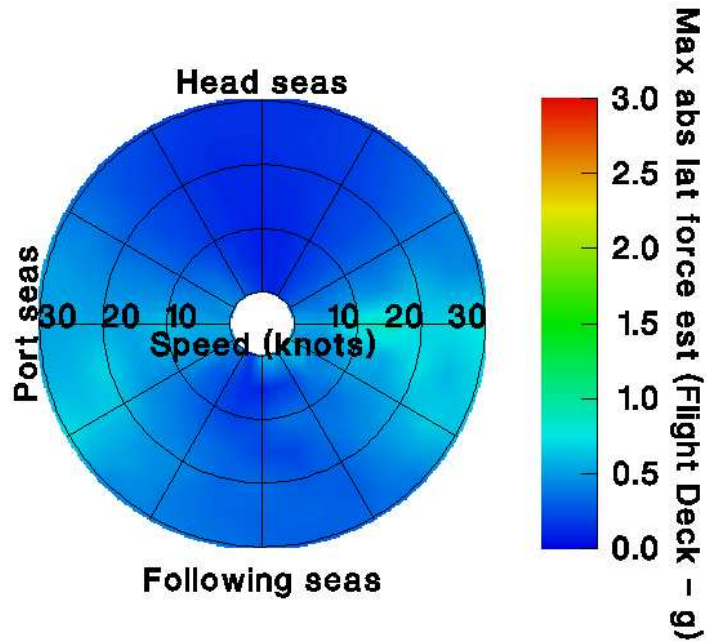


**Figure M.1:** Max. Abs. Lat. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 4.0$  m and  $T_P = 8.3$  s.

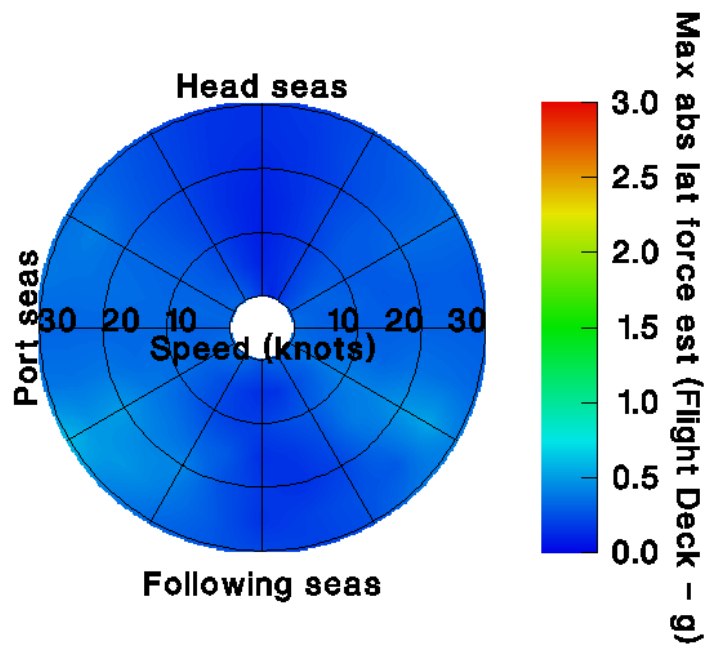


**Figure M.2:** Max. Abs. Lat. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 4.0$  m and  $T_P = 15.5$  s.

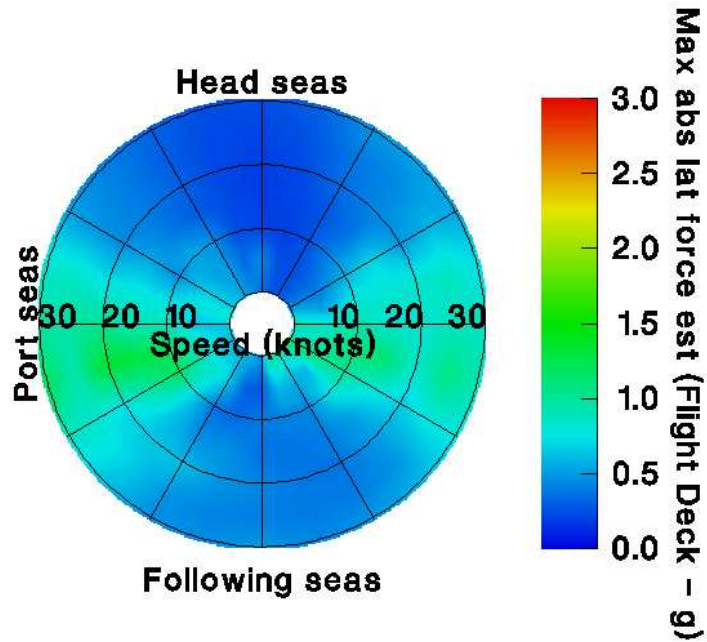


**Figure M.3:** Max. Abs. Lat. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 6.0$  m and  $T_P = 10.3$  s.

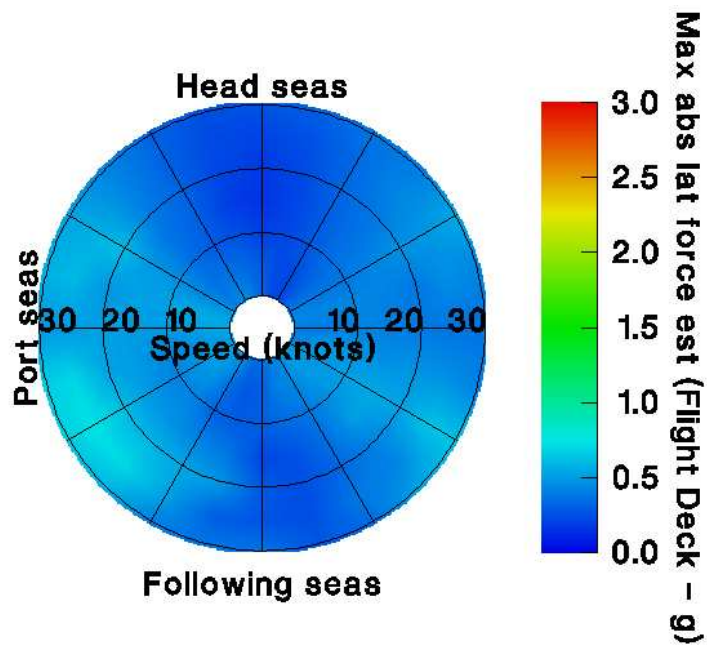


**Figure M.4:** Max. Abs. Lat. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 6.0$  m and  $T_P = 16.2$  s.

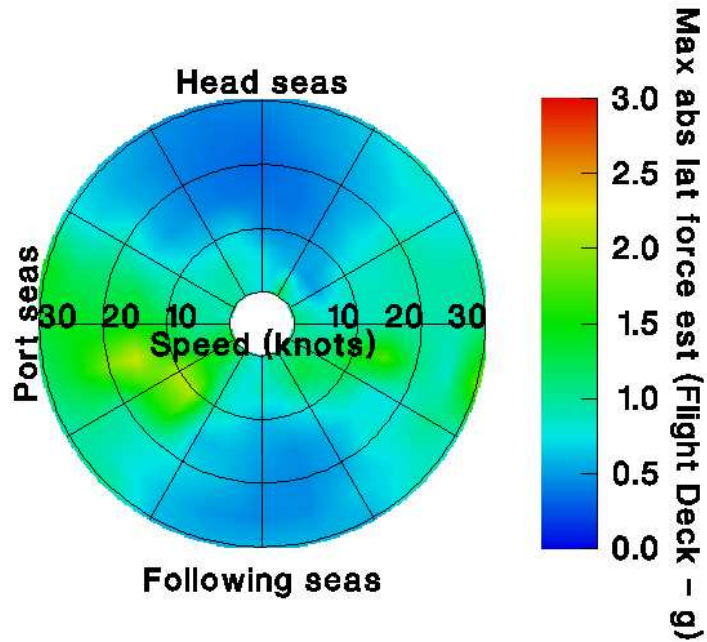


**Figure M.5:** Max. Abs. Lat. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 9.0$  m and  $T_P = 13.1$  s.

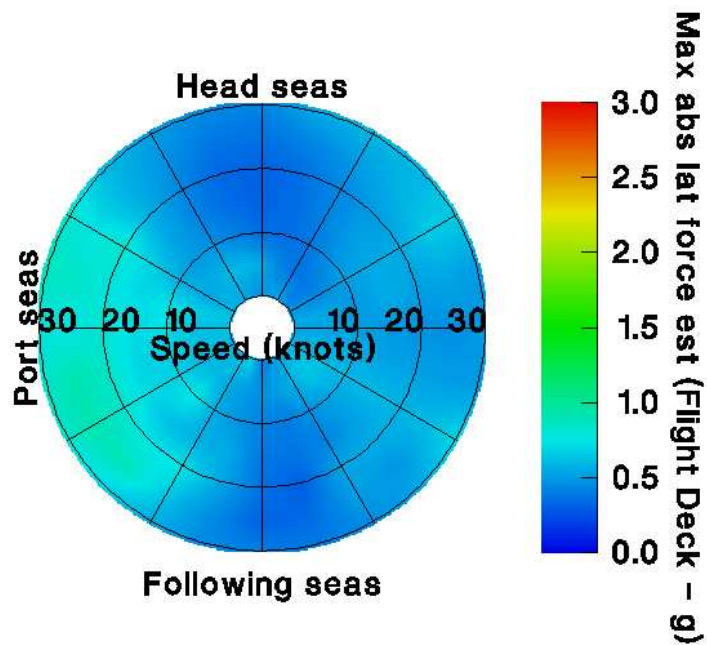


**Figure M.6:** Max. Abs. Lat. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 9.0$  m and  $T_P = 18.5$  s.

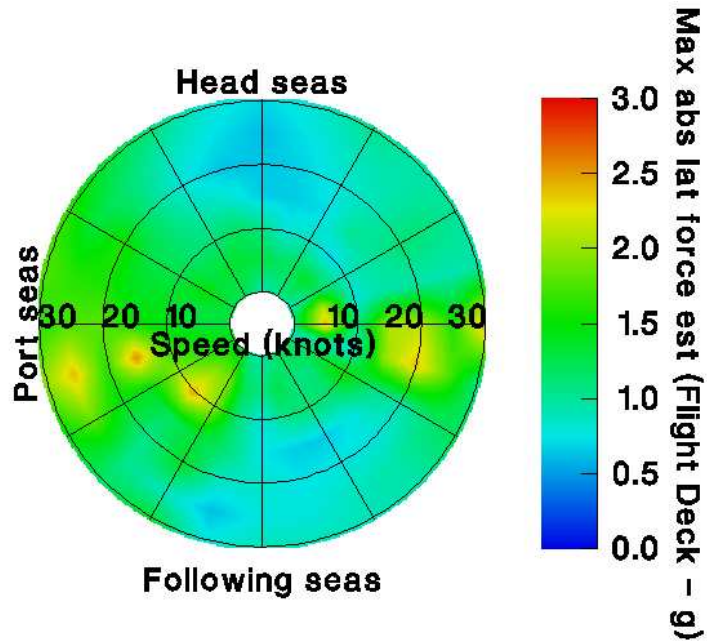


**Figure M.7:** Max. Abs. Lat. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 14.0$  m and  $T_P = 16.4$  s.

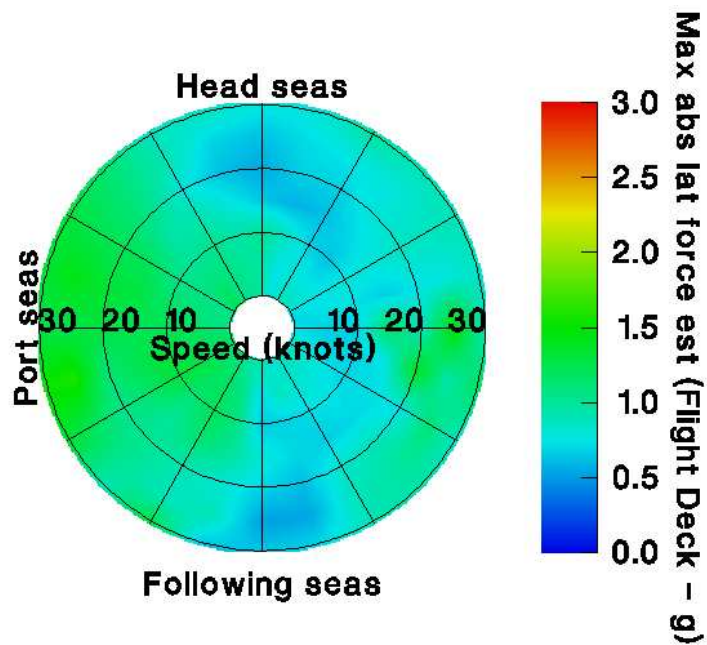


**Figure M.8:** Max. Abs. Lat. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 14.0$  m and  $T_P = 18.6$  s.

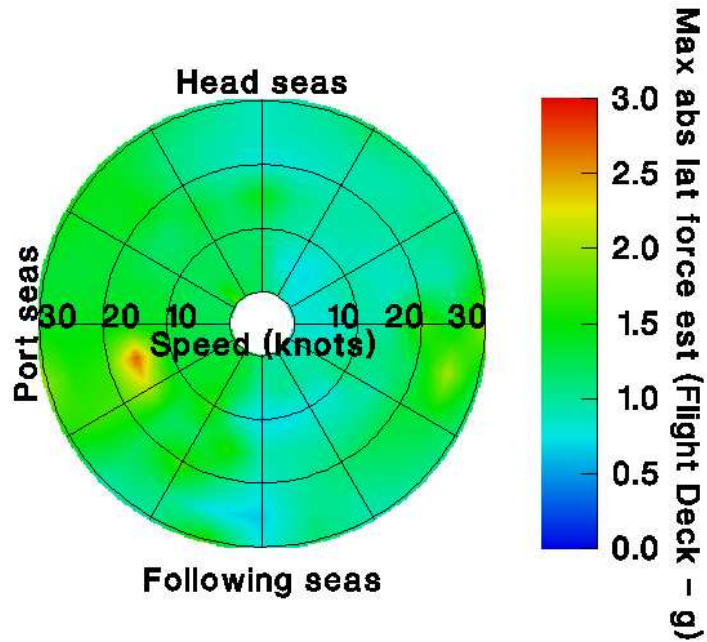


**Figure M.9:** Max. Abs. Lat. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 17.7$  m and  $T_P = 20.0$  s.

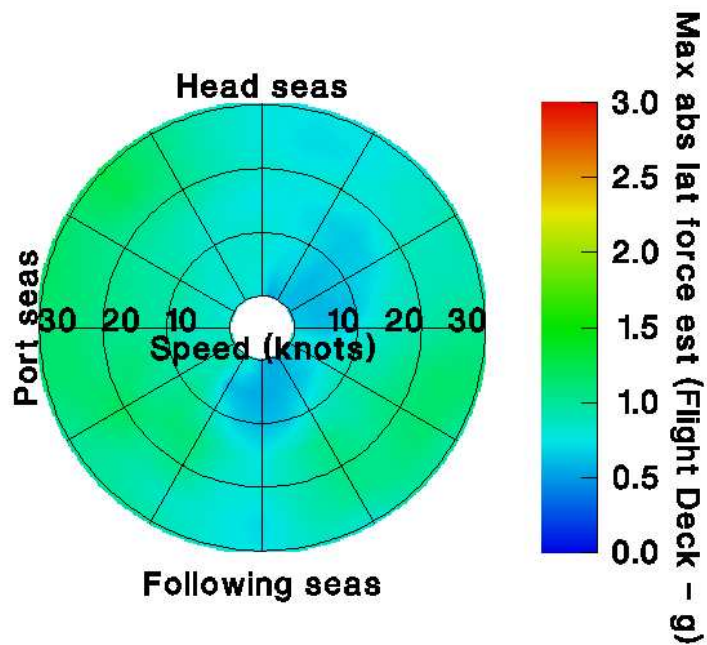


**Figure M.10:** Max. Abs. Lat. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 17.7$  m and  $T_P = 25.7$  s.

**Annex N**  
**Polar Plots of Maximum Absolute Lateral**  
**Force Estimator at Flight Deck – JONSWAP**  
**Spectra (Coastal Waters)**

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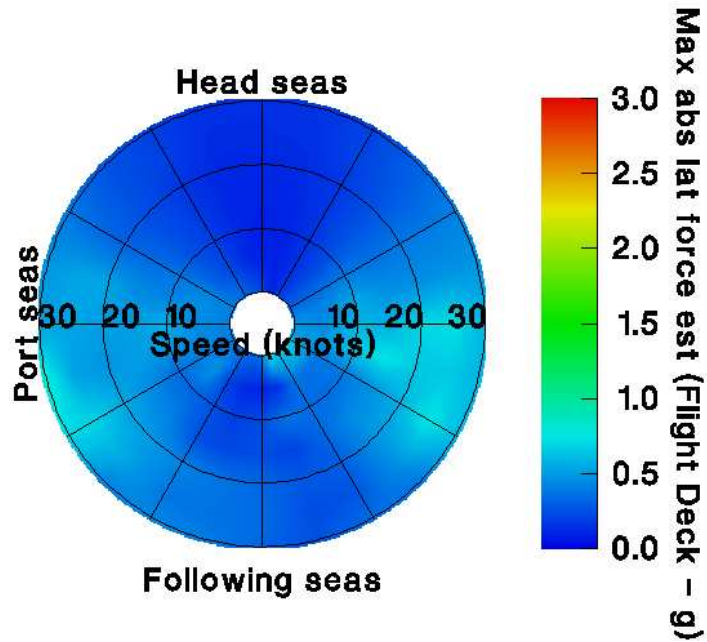


**Figure N.1:** Max. Abs. Lat. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 4.0$  m and  $T_P = 8.2$  s.

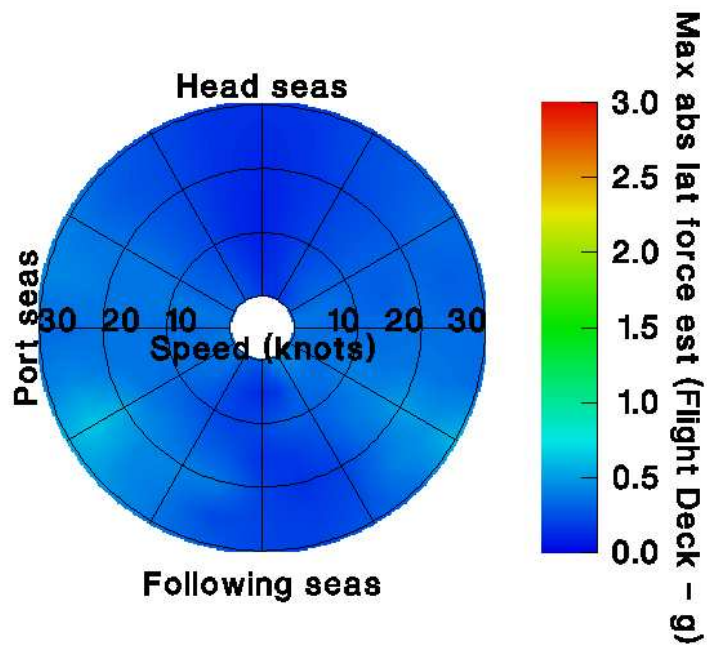


**Figure N.2:** Max. Abs. Lat. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 4.0$  m and  $T_P = 13.6$  s.



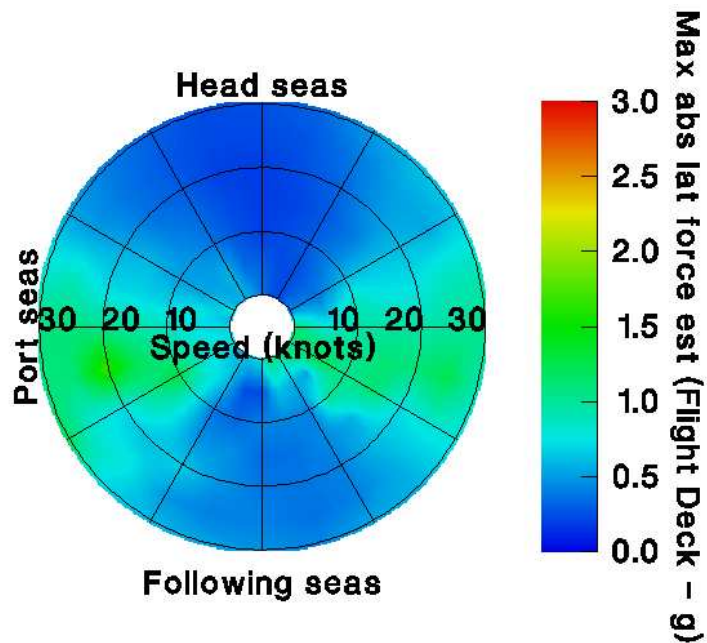


**Figure N.3:** Max. Abs. Lat. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 6.0$  m and  $T_P = 9.3$  s.

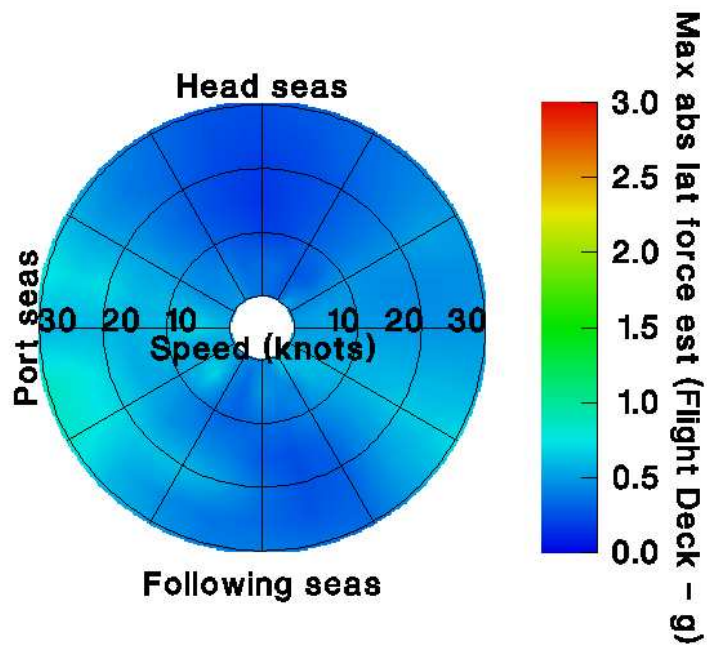


**Figure N.4:** Max. Abs. Lat. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 6.0$  m and  $T_P = 13.6$  s.

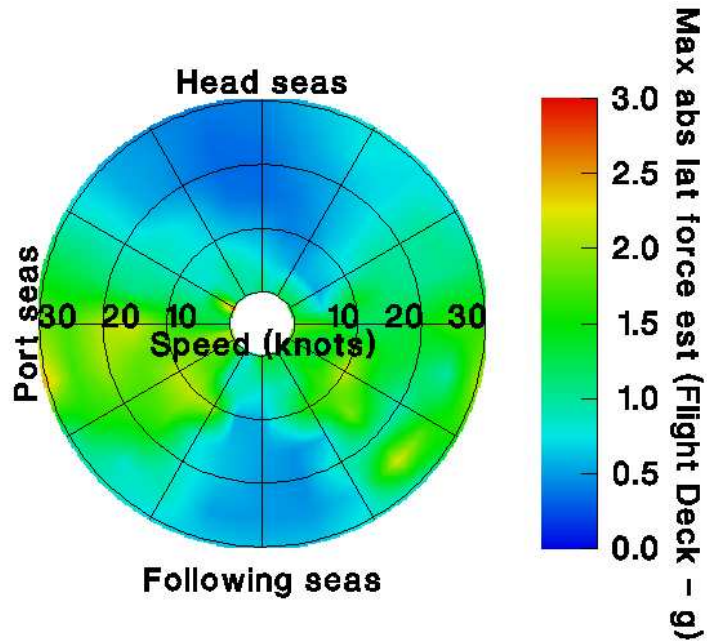


**Figure N.5:** Max. Abs. Lat. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 9.0$  m and  $T_P = 11.0$  s.

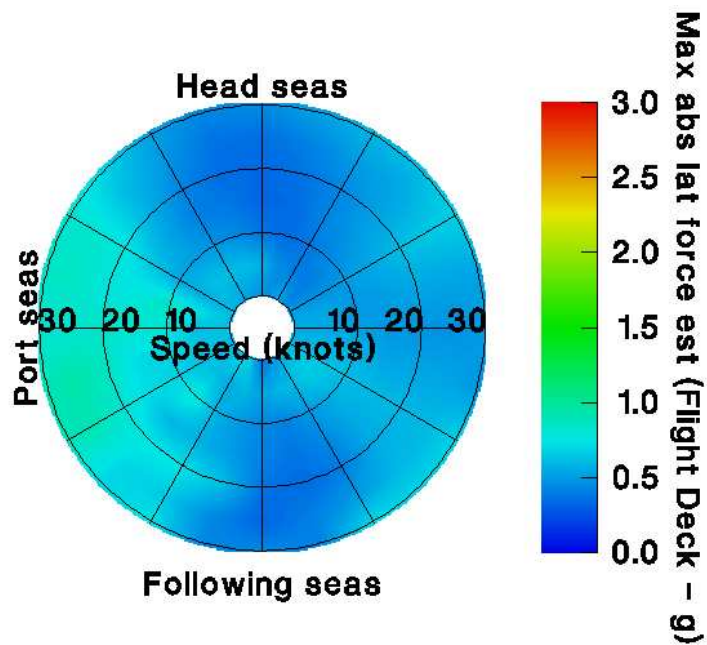


**Figure N.6:** Max. Abs. Lat. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 9.0$  m and  $T_P = 17.1$  s.

## **Annex O**

### **Polar Plots of Maximum Absolute Vertical Force Estimator at Flight Deck – Bretschneider Spectra (Open Ocean)**

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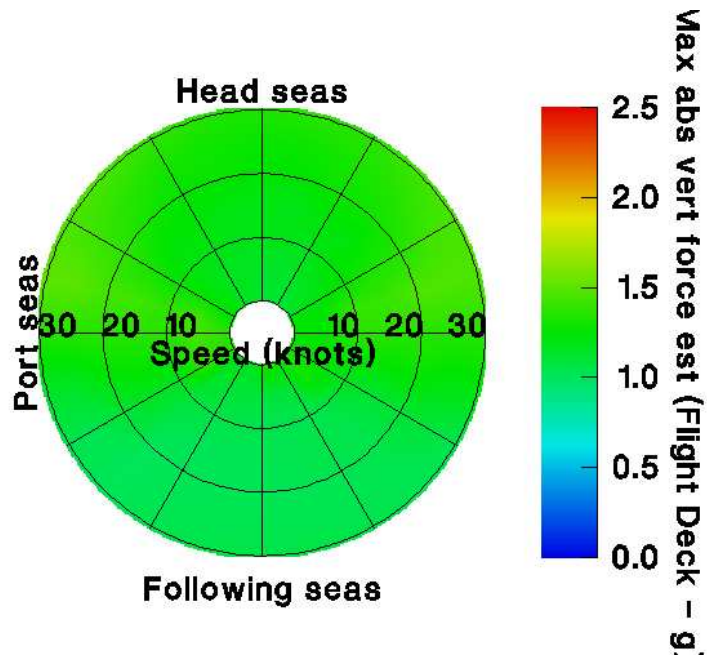


**Figure O.1:** Max. Abs. Vert. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 4.0$  m and  $T_P = 8.3$  s.

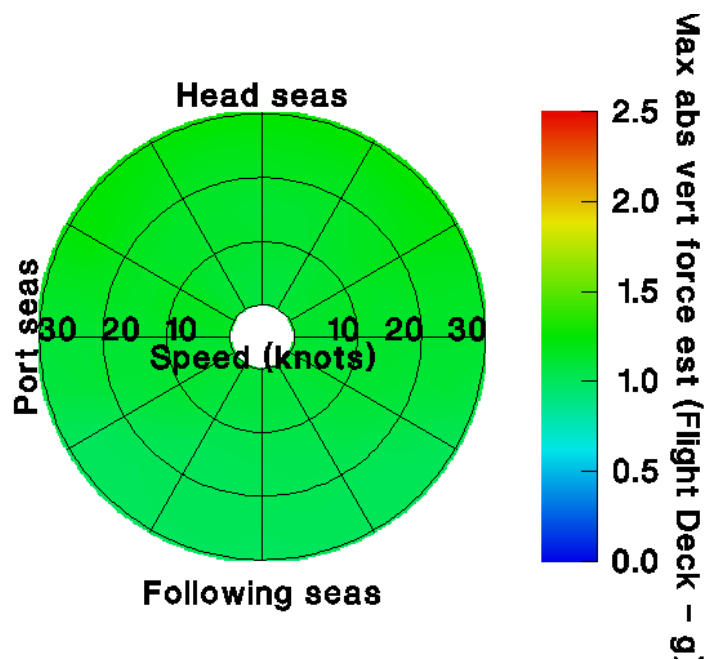


**Figure O.2:** Max. Abs. Vert. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 4.0$  m and  $T_P = 15.5$  s.

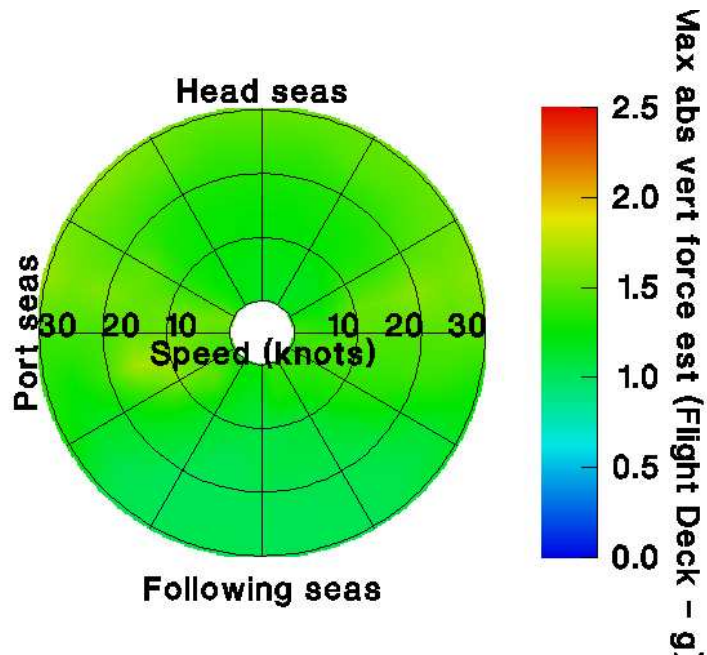


**Figure O.3:** Max. Abs. Vert. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 6.0$  m and  $T_P = 10.3$  s.

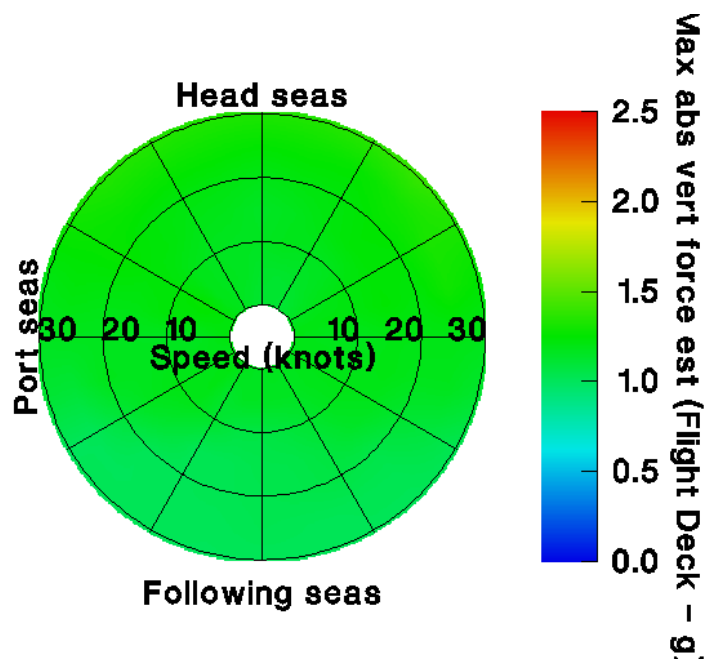


**Figure O.4:** Max. Abs. Vert. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 6.0$  m and  $T_P = 16.2$  s.

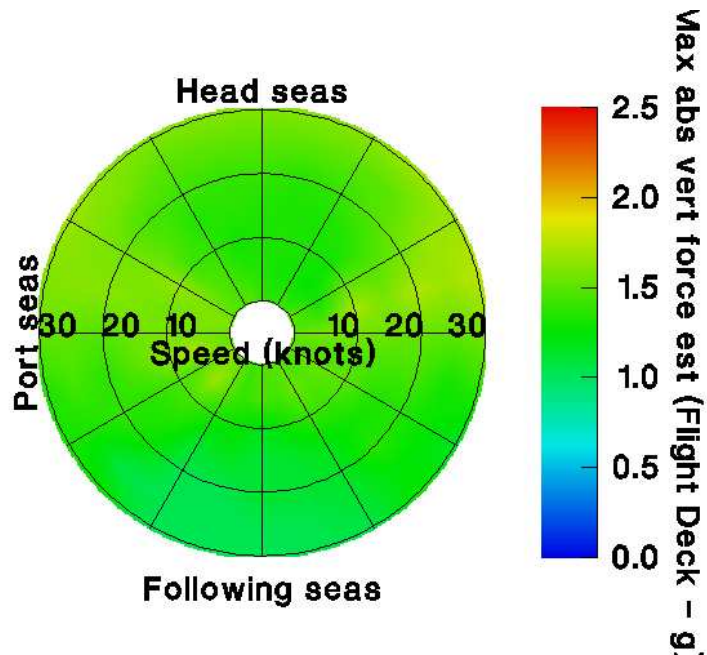


**Figure O.5:** Max. Abs. Vert. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 9.0$  m and  $T_P = 13.1$  s.

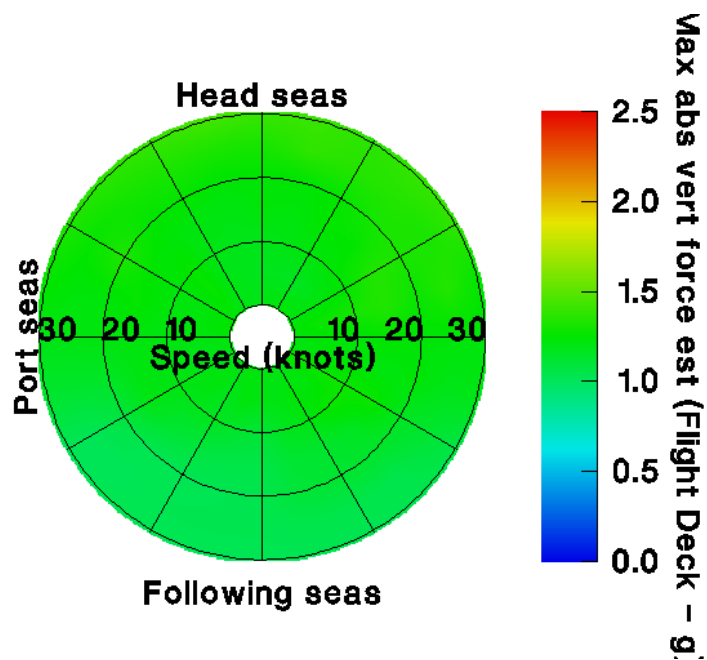


**Figure O.6:** Max. Abs. Vert. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 9.0$  m and  $T_P = 18.5$  s.



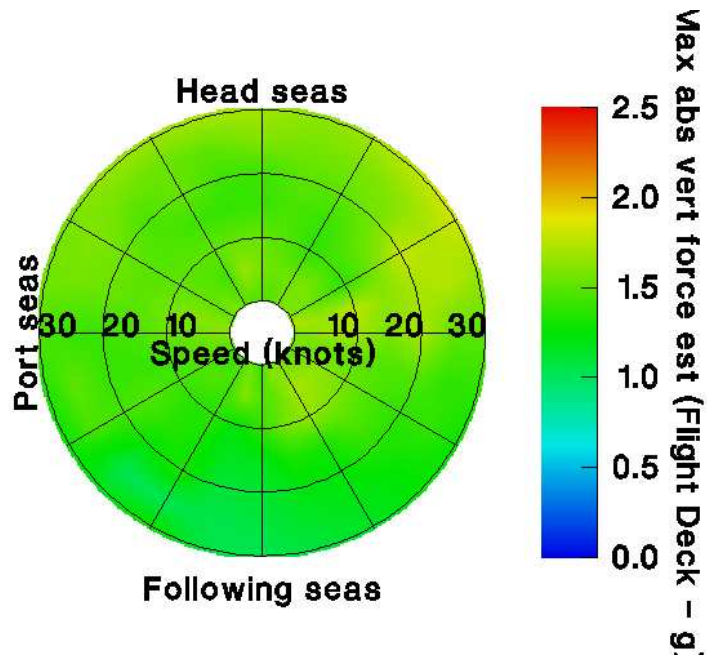


**Figure O.7:** Max. Abs. Vert. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 14.0$  m and  $T_P = 16.4$  s.

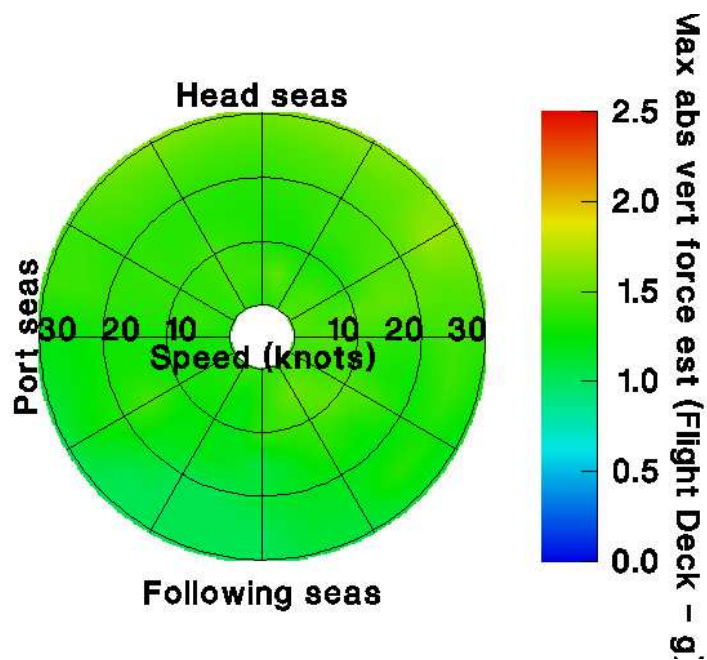


**Figure O.8:** Max. Abs. Vert. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 14.0$  m and  $T_P = 18.6$  s.

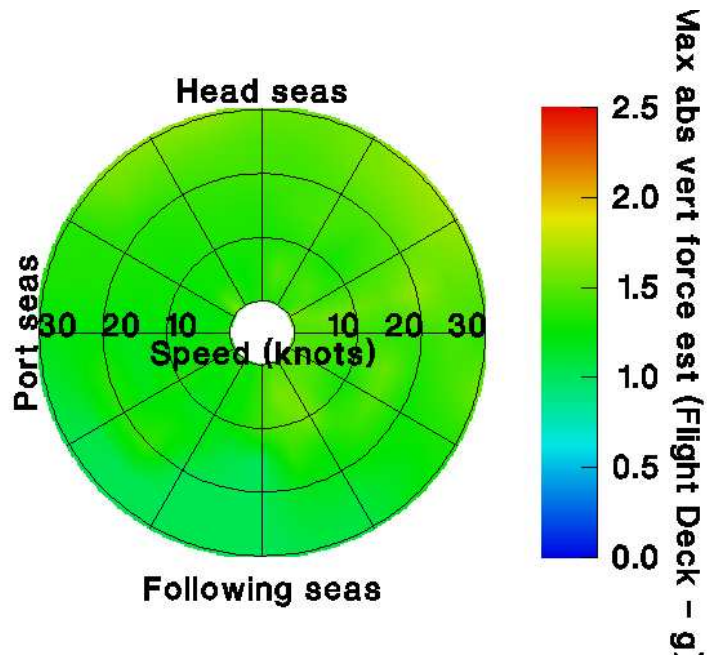


**Figure O.9:** Max. Abs. Vert. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 17.7$  m and  $T_P = 20.0$  s.

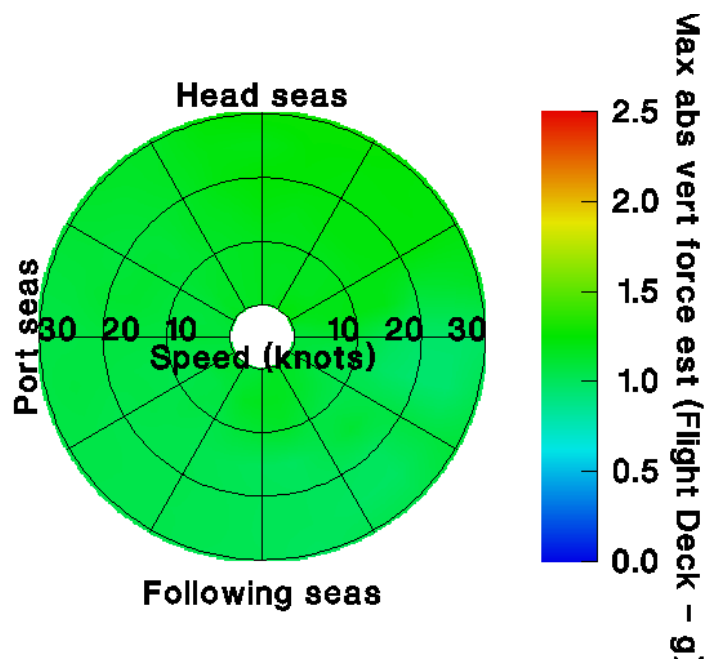


**Figure O.10:** Max. Abs. Vert. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: Bretschneider with  $H_S = 17.7$  m and  $T_P = 25.7$  s.



**Annex P**  
**Polar Plots of Maximum Absolute Vertical**  
**Force Estimator at Flight Deck – JONSWAP**  
**Spectra (Coastal Waters)**

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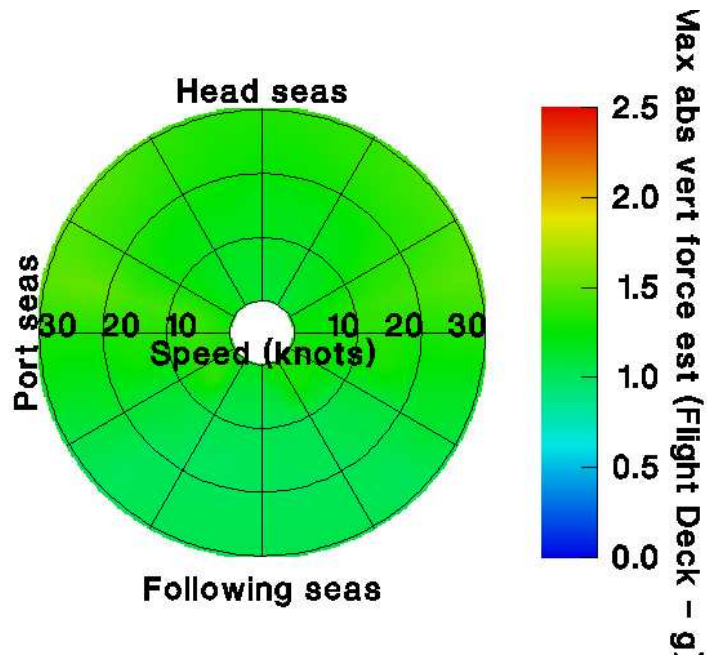


**Figure P.1:** Max. Abs. Vert. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 4.0$  m and  $T_P = 8.2$  s.

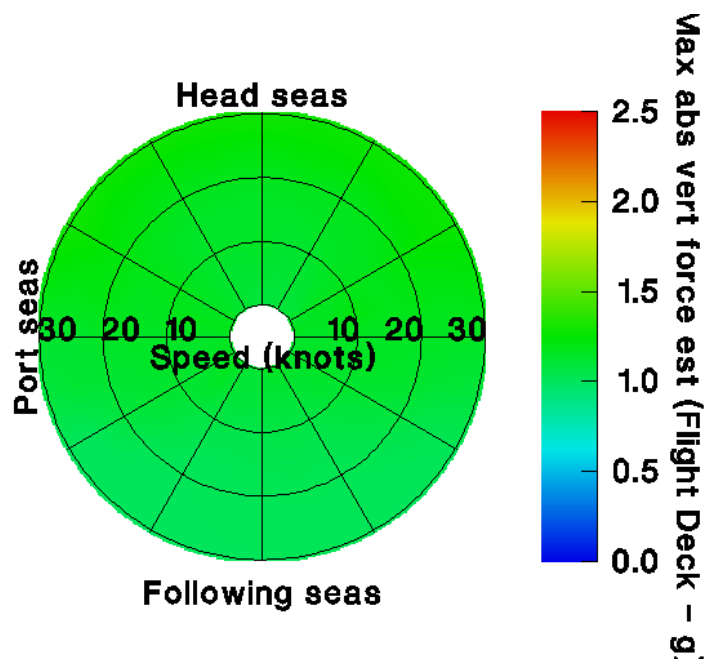


**Figure P.2:** Max. Abs. Vert. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 4.0$  m and  $T_P = 13.6$  s.

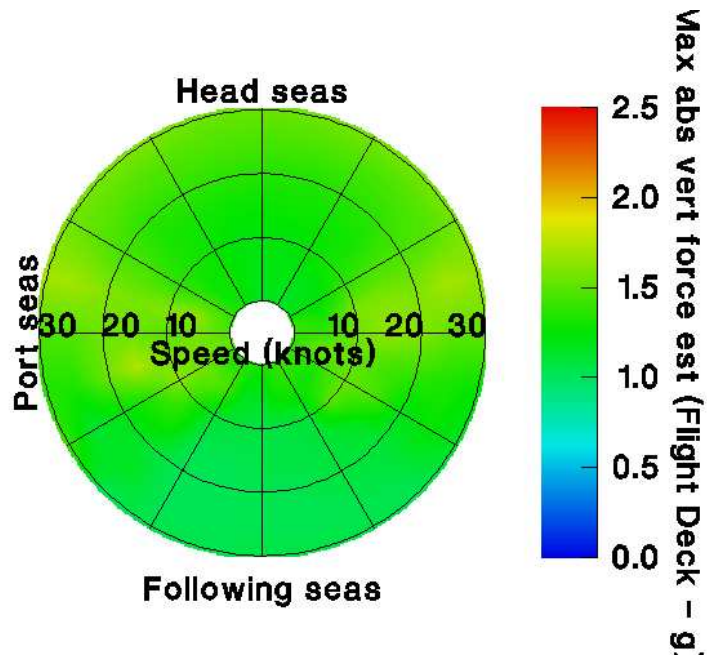


**Figure P.3:** Max. Abs. Vert. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 6.0$  m and  $T_P = 9.3$  s.

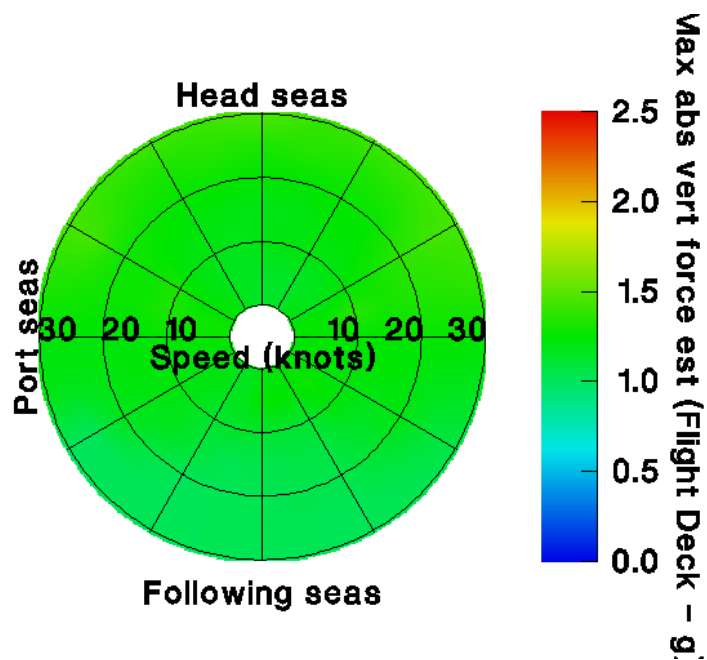


**Figure P.4:** Max. Abs. Vert. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 6.0$  m and  $T_P = 13.6$  s.

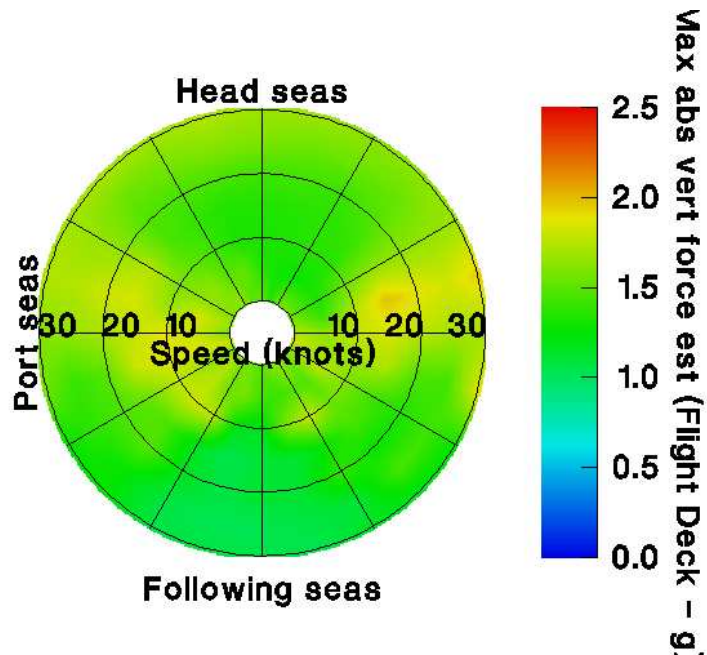


**Figure P.5:** Max. Abs. Vert. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 9.0$  m and  $T_P = 11.0$  s.

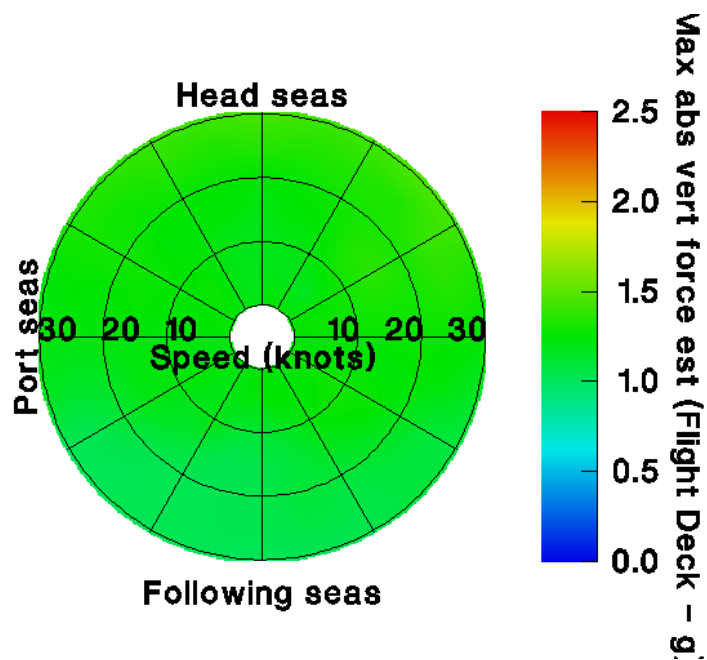


**Figure P.6:** Max. Abs. Vert. Force Est. at the Flight Deck with respect to Speed and Heading in a Seaway: JONSWAP with  $H_S = 9.0$  m and  $T_P = 17.1$  s.

## **Annex Q**

### **Tables of Motion Maxima – Bretschneider Spectrum (Open Ocean)**

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**Table Q.1:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 4.0$  m and  $T_p = 8.3$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | -0.2               | -23.8               | 0.870                   | 7.420       | 3.290        | 0.240                     | 1.390       | 0.900        |
| 15.0                                                                   | -0.2               | -4.6                | 0.730                   | 4.080       | 3.090        | 0.210                     | 0.580       | 0.830        |
| 30.0                                                                   | -0.2               | 16.7                | 0.860                   | 6.960       | 3.080        | 0.220                     | 1.150       | 0.840        |
| 45.0                                                                   | -0.2               | 33.5                | 1.110                   | 10.100      | 3.750        | 0.280                     | 1.990       | 0.940        |
| 60.0                                                                   | -0.3               | 44.5                | 1.500                   | 12.890      | 3.780        | 0.350                     | 2.560       | 1.010        |
| 75.0                                                                   | -0.5               | 52.4                | 1.870                   | 15.150      | 3.470        | 0.440                     | 3.030       | 1.060        |
| 90.0                                                                   | -0.6               | 59.0                | 2.390                   | 17.340      | 3.500        | 0.520                     | 3.450       | 1.060        |
| 105.0                                                                  | -0.7               | 63.4                | 2.520                   | 17.330      | 3.350        | 0.580                     | 3.550       | 1.030        |
| 120.0                                                                  | -1.6               | 96.0                | 2.880                   | 21.060      | 2.280        | 0.830                     | 4.040       | 0.530        |
| 135.0                                                                  | -2.1               | 102.8               | 2.250                   | 15.090      | 2.960        | 0.730                     | 3.350       | 0.830        |
| 150.0                                                                  | -2.4               | 105.0               | 2.580                   | 14.600      | 3.570        | 0.700                     | 3.220       | 0.880        |
| 165.0                                                                  | -2.5               | 106.2               | 2.460                   | 16.380      | 3.050        | 0.710                     | 3.310       | 0.840        |
| 180.0                                                                  | -0.7               | 74.0                | 2.850                   | 13.510      | 3.490        | 0.440                     | 2.890       | 0.790        |
| 195.0                                                                  | -0.0               | 200.3               | 0.780                   | 7.260       | 2.310        | 0.230                     | 1.390       | 0.710        |
| 210.0                                                                  | -0.2               | 382.2               | 2.400                   | 12.130      | 3.590        | 0.430                     | 2.710       | 1.010        |
| 225.0                                                                  | -0.0               | 384.6               | 2.230                   | 13.320      | 3.550        | 0.440                     | 2.800       | 1.070        |
| 240.0                                                                  | 0.7                | 293.3               | 2.640                   | 11.170      | 3.570        | 0.640                     | 3.080       | 1.070        |
| 255.0                                                                  | 0.6                | 292.8               | 2.580                   | 12.980      | 3.350        | 0.660                     | 3.270       | 1.070        |
| 270.0                                                                  | 0.3                | 295.4               | 2.310                   | 14.220      | 3.600        | 0.620                     | 3.080       | 1.090        |
| 285.0                                                                  | 0.2                | 299.4               | 2.140                   | 13.810      | 3.420        | 0.540                     | 3.390       | 1.120        |
| 300.0                                                                  | 0.0                | 303.8               | 2.070                   | 14.770      | 3.600        | 0.490                     | 3.070       | 1.120        |
| 315.0                                                                  | -0.1               | 309.3               | 1.700                   | 11.250      | 4.120        | 0.430                     | 2.690       | 1.090        |
| 330.0                                                                  | -0.1               | 314.8               | 1.460                   | 10.700      | 3.920        | 0.370                     | 2.270       | 1.060        |
| 345.0                                                                  | -0.1               | 322.9               | 1.090                   | 8.880       | 3.590        | 0.300                     | 1.910       | 0.990        |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.2:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 4.0$  m and  $T_p = 8.3$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b>  |                     | <b>Absolute Maximum</b> |                    |                     | <b>Standard Deviation</b> |                    |                     |
|------------------------------------------------------------------------|---------------------|---------------------|-------------------------|--------------------|---------------------|---------------------------|--------------------|---------------------|
| $\psi_{MHP}$<br>deg                                                    | <b>Speed</b><br>kts | $\psi_{MHP}$<br>deg | <b>Heave</b><br>m       | <b>Roll</b><br>deg | <b>Pitch</b><br>deg | <b>Heave</b><br>m         | <b>Roll</b><br>deg | <b>Pitch</b><br>deg |
| 0.0                                                                    | 4.8                 | -2.1                | 0.940                   | 5.000              | 2.640               | 0.240                     | 0.620              | 0.840               |
| 15.0                                                                   | 4.8                 | 12.8                | 0.880                   | 5.460              | 2.770               | 0.240                     | 0.770              | 0.850               |
| 30.0                                                                   | 4.8                 | 27.6                | 0.940                   | 7.500              | 3.320               | 0.280                     | 1.160              | 0.920               |
| 45.0                                                                   | 4.7                 | 42.1                | 1.260                   | 8.220              | 3.230               | 0.360                     | 1.660              | 1.020               |
| 60.0                                                                   | 4.4                 | 54.6                | 1.880                   | 11.420             | 3.700               | 0.470                     | 2.280              | 1.100               |
| 75.0                                                                   | 4.2                 | 58.0                | 2.040                   | 13.870             | 3.510               | 0.510                     | 2.650              | 1.100               |
| 90.0                                                                   | 4.1                 | 61.8                | 2.220                   | 17.840             | 3.430               | 0.560                     | 2.730              | 1.080               |
| 105.0                                                                  | 4.1                 | 64.0                | 2.310                   | 14.970             | 3.310               | 0.590                     | 2.850              | 1.080               |
| 120.0                                                                  | 4.1                 | 65.4                | 2.380                   | 13.420             | 3.390               | 0.600                     | 2.850              | 1.080               |
| 135.0                                                                  | 4.1                 | 65.8                | 2.750                   | 13.560             | 3.350               | 0.580                     | 2.740              | 1.080               |
| 150.0                                                                  | 4.6                 | 145.4               | 0.950                   | 9.440              | 2.200               | 0.260                     | 1.880              | 0.690               |
| 165.0                                                                  | 4.9                 | 163.1               | 0.690                   | 7.290              | 2.180               | 0.200                     | 1.410              | 0.600               |
| 180.0                                                                  | 4.9                 | 178.7               | 0.660                   | 5.480              | 2.100               | 0.190                     | 0.980              | 0.570               |
| 195.0                                                                  | 4.9                 | 194.1               | 0.760                   | 6.240              | 2.200               | 0.200                     | 1.300              | 0.590               |
| 210.0                                                                  | 4.9                 | 210.1               | 0.890                   | 9.330              | 2.220               | 0.250                     | 1.890              | 0.680               |
| 225.0                                                                  | 4.6                 | 229.1               | 1.280                   | 11.510             | 2.690               | 0.380                     | 2.490              | 0.830               |
| 240.0                                                                  | 4.6                 | 285.6               | 2.780                   | 11.260             | 3.090               | 0.770                     | 2.690              | 0.960               |
| 255.0                                                                  | 4.5                 | 287.1               | 2.870                   | 11.820             | 3.140               | 0.760                     | 2.650              | 0.980               |
| 270.0                                                                  | 4.5                 | 288.9               | 2.830                   | 14.230             | 3.110               | 0.740                     | 2.740              | 1.020               |
| 285.0                                                                  | 4.7                 | 291.1               | 2.510                   | 11.910             | 3.530               | 0.700                     | 2.620              | 1.070               |
| 300.0                                                                  | 4.9                 | 301.1               | 2.060                   | 9.870              | 3.690               | 0.540                     | 2.370              | 1.150               |
| 315.0                                                                  | 4.8                 | 314.2               | 1.280                   | 8.980              | 3.750               | 0.390                     | 1.840              | 1.070               |
| 330.0                                                                  | 4.8                 | 328.5               | 1.010                   | 8.030              | 3.180               | 0.300                     | 1.200              | 0.960               |
| 345.0                                                                  | 4.8                 | 343.2               | 0.970                   | 5.720              | 2.950               | 0.250                     | 0.830              | 0.880               |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                     |                     |                         |                    |                     |                           |                    |                     |

**Table Q.3:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 4.0$  m and  $T_p = 8.3$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 10.0               | -0.6                | 0.900                   | 5.360       | 2.550        | 0.300                     | 0.520       | 0.830        |
| 15.0                                                                   | 10.0               | 14.4                | 1.010                   | 5.230       | 2.730        | 0.310                     | 0.570       | 0.850        |
| 30.0                                                                   | 10.0               | 29.4                | 1.150                   | 6.840       | 2.890        | 0.350                     | 0.870       | 0.930        |
| 45.0                                                                   | 10.0               | 44.4                | 1.580                   | 8.180       | 3.690        | 0.440                     | 1.310       | 1.030        |
| 60.0                                                                   | 10.0               | 59.2                | 1.920                   | 10.840      | 3.410        | 0.580                     | 1.930       | 1.110        |
| 75.0                                                                   | 10.0               | 73.0                | 2.730                   | 12.870      | 3.150        | 0.760                     | 2.010       | 0.980        |
| 90.0                                                                   | 9.6                | 85.5                | 2.910                   | 22.310      | 1.430        | 0.870                     | 2.910       | 0.410        |
| 105.0                                                                  | 9.3                | 100.2               | 2.600                   | 22.250      | 2.390        | 0.730                     | 3.250       | 0.600        |
| 120.0                                                                  | 9.7                | 117.2               | 1.900                   | 19.380      | 2.960        | 0.490                     | 3.500       | 0.760        |
| 135.0                                                                  | 9.9                | 133.4               | 0.970                   | 15.130      | 1.960        | 0.320                     | 4.540       | 0.660        |
| 150.0                                                                  | 10.0               | 148.9               | 0.660                   | 17.690      | 1.630        | 0.230                     | 5.140       | 0.550        |
| 165.0                                                                  | 10.1               | 164.2               | 0.700                   | 20.670      | 1.740        | 0.190                     | 4.400       | 0.480        |
| 180.0                                                                  | 10.1               | 179.3               | 0.500                   | 13.600      | 1.640        | 0.180                     | 2.770       | 0.480        |
| 195.0                                                                  | 10.1               | 194.6               | 0.590                   | 9.650       | 1.520        | 0.200                     | 2.430       | 0.510        |
| 210.0                                                                  | 10.1               | 210.3               | 0.690                   | 12.460      | 1.700        | 0.250                     | 4.090       | 0.590        |
| 225.0                                                                  | 10.0               | 225.7               | 0.900                   | 15.070      | 1.880        | 0.340                     | 4.170       | 0.700        |
| 240.0                                                                  | 9.8                | 241.9               | 2.030                   | 13.200      | 2.960        | 0.520                     | 3.490       | 0.800        |
| 255.0                                                                  | 9.4                | 259.4               | 2.770                   | 15.930      | 2.680        | 0.780                     | 3.180       | 0.660        |
| 270.0                                                                  | 9.7                | 274.2               | 3.040                   | 19.890      | 1.790        | 0.920                     | 2.920       | 0.380        |
| 285.0                                                                  | 10.1               | 286.7               | 2.730                   | 10.180      | 3.250        | 0.800                     | 2.030       | 0.980        |
| 300.0                                                                  | 10.1               | 300.1               | 2.270                   | 10.030      | 3.890        | 0.610                     | 2.020       | 1.130        |
| 315.0                                                                  | 10.0               | 314.7               | 1.550                   | 6.740       | 3.540        | 0.460                     | 1.370       | 1.060        |
| 330.0                                                                  | 10.0               | 329.7               | 1.260                   | 6.730       | 2.880        | 0.360                     | 0.870       | 0.950        |
| 345.0                                                                  | 10.0               | 344.6               | 0.980                   | 5.020       | 2.860        | 0.310                     | 0.590       | 0.860        |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |



**Table Q.4:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 4.0$  m and  $T_p = 8.3$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b>  |                     | <b>Absolute Maximum</b> |                    |                     | <b>Standard Deviation</b> |                    |                     |
|------------------------------------------------------------------------|---------------------|---------------------|-------------------------|--------------------|---------------------|---------------------------|--------------------|---------------------|
| $\psi_{MHP}$<br>deg                                                    | <b>Speed</b><br>kts | $\psi_{MHP}$<br>deg | <b>Heave</b><br>m       | <b>Roll</b><br>deg | <b>Pitch</b><br>deg | <b>Heave</b><br>m         | <b>Roll</b><br>deg | <b>Pitch</b><br>deg |
| 0.0                                                                    | 15.2                | -0.2                | 1.270                   | 5.480              | 2.530               | 0.370                     | 0.480              | 0.810               |
| 15.0                                                                   | 15.2                | 14.8                | 1.330                   | 6.120              | 2.600               | 0.380                     | 0.540              | 0.830               |
| 30.0                                                                   | 15.2                | 29.8                | 1.400                   | 7.170              | 3.040               | 0.440                     | 0.780              | 0.910               |
| 45.0                                                                   | 15.1                | 44.8                | 1.580                   | 8.470              | 3.110               | 0.530                     | 1.130              | 1.010               |
| 60.0                                                                   | 15.2                | 59.6                | 2.250                   | 12.420             | 3.480               | 0.670                     | 1.640              | 1.070               |
| 75.0                                                                   | 15.2                | 74.0                | 2.660                   | 14.990             | 3.130               | 0.820                     | 1.890              | 0.930               |
| 90.0                                                                   | 15.1                | 88.4                | 3.030                   | 23.480             | 1.240               | 0.860                     | 3.050              | 0.210               |
| 105.0                                                                  | 15.0                | 103.3               | 2.300                   | 18.650             | 2.120               | 0.650                     | 3.200              | 0.590               |
| 120.0                                                                  | 15.1                | 118.8               | 1.350                   | 20.980             | 2.130               | 0.440                     | 6.480              | 0.640               |
| 135.0                                                                  | 15.2                | 134.5               | 0.900                   | 22.100             | 1.540               | 0.300                     | 7.600              | 0.520               |
| 150.0                                                                  | 15.2                | 149.7               | 0.830                   | 18.010             | 1.770               | 0.260                     | 5.300              | 0.580               |
| 165.0                                                                  | 15.1                | 164.7               | 0.560                   | 11.930             | 1.560               | 0.230                     | 2.730              | 0.530               |
| 180.0                                                                  | 15.3                | 179.7               | 0.460                   | 13.040             | 1.270               | 0.170                     | 1.500              | 0.420               |
| 195.0                                                                  | 15.2                | 194.6               | 0.590                   | 16.550             | 1.440               | 0.210                     | 2.500              | 0.480               |
| 210.0                                                                  | 15.2                | 209.8               | 0.710                   | 17.610             | 1.520               | 0.240                     | 4.810              | 0.540               |
| 225.0                                                                  | 15.2                | 225.3               | 1.020                   | 20.400             | 1.910               | 0.310                     | 7.450              | 0.570               |
| 240.0                                                                  | 15.1                | 241.1               | 1.910                   | 19.950             | 2.710               | 0.490                     | 6.050              | 0.700               |
| 255.0                                                                  | 15.0                | 256.7               | 2.420                   | 15.660             | 2.140               | 0.710                     | 3.500              | 0.650               |
| 270.0                                                                  | 15.1                | 271.7               | 2.950                   | 16.680             | 1.050               | 0.910                     | 3.390              | 0.210               |
| 285.0                                                                  | 15.3                | 285.9               | 2.760                   | 9.390              | 3.060               | 0.860                     | 2.190              | 0.930               |
| 300.0                                                                  | 15.2                | 300.1               | 2.350                   | 7.750              | 3.360               | 0.690                     | 1.670              | 1.090               |
| 315.0                                                                  | 15.2                | 314.9               | 1.700                   | 7.000              | 3.200               | 0.550                     | 1.190              | 1.030               |
| 330.0                                                                  | 15.2                | 329.9               | 1.410                   | 6.170              | 3.070               | 0.440                     | 0.730              | 0.920               |
| 345.0                                                                  | 15.2                | 344.8               | 1.310                   | 5.210              | 2.620               | 0.390                     | 0.490              | 0.840               |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                     |                     |                         |                    |                     |                           |                    |                     |

**Table Q.5:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 4.0$  m and  $T_p = 8.3$  s; Ship's speed is 20.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 20.3               | -0.1                | 1.380                   | 5.950       | 2.580        | 0.440                     | 0.460       | 0.780        |
| 15.0                                                                   | 20.3               | 14.9                | 1.500                   | 6.770       | 2.820        | 0.460                     | 0.500       | 0.810        |
| 30.0                                                                   | 20.3               | 29.9                | 1.630                   | 7.770       | 3.040        | 0.520                     | 0.720       | 0.880        |
| 45.0                                                                   | 20.3               | 44.9                | 1.910                   | 9.670       | 3.030        | 0.610                     | 1.060       | 0.970        |
| 60.0                                                                   | 20.3               | 59.8                | 2.460                   | 11.870      | 3.320        | 0.740                     | 1.560       | 1.030        |
| 75.0                                                                   | 20.4               | 74.4                | 3.110                   | 16.390      | 3.200        | 0.860                     | 2.020       | 0.880        |
| 90.0                                                                   | 20.3               | 89.1                | 2.630                   | 23.760      | 0.950        | 0.830                     | 3.120       | 0.180        |
| 105.0                                                                  | 20.2               | 104.0               | 2.870                   | 23.680      | 2.490        | 0.610                     | 4.130       | 0.510        |
| 120.0                                                                  | 20.3               | 119.5               | 1.480                   | 27.970      | 1.970        | 0.410                     | 9.330       | 0.510        |
| 135.0                                                                  | 20.3               | 134.9               | 0.910                   | 23.480      | 1.800        | 0.310                     | 7.210       | 0.530        |
| 150.0                                                                  | 20.4               | 149.6               | 0.630                   | 16.210      | 1.440        | 0.210                     | 3.810       | 0.450        |
| 165.0                                                                  | 20.8               | 164.7               | 0.510                   | 16.140      | 1.330        | 0.180                     | 1.740       | 0.410        |
| 180.0                                                                  | 20.1               | 179.6               | 0.480                   | 19.940      | 1.730        | 0.170                     | 2.800       | 0.430        |
| 195.0                                                                  | 20.7               | 195.0               | 0.590                   | 19.590      | 2.110        | 0.180                     | 2.710       | 0.420        |
| 210.0                                                                  | 20.5               | 210.1               | 0.670                   | 24.330      | 1.410        | 0.210                     | 4.430       | 0.450        |
| 225.0                                                                  | 20.3               | 225.0               | 0.740                   | 25.560      | 1.460        | 0.270                     | 7.280       | 0.470        |
| 240.0                                                                  | 20.3               | 240.5               | 1.550                   | 28.490      | 2.800        | 0.440                     | 8.840       | 0.560        |
| 255.0                                                                  | 20.2               | 255.9               | 2.720                   | 24.670      | 2.360        | 0.670                     | 4.440       | 0.590        |
| 270.0                                                                  | 20.3               | 270.9               | 2.880                   | 15.500      | 1.120        | 0.880                     | 3.720       | 0.190        |
| 285.0                                                                  | 20.4               | 285.5               | 3.070                   | 9.510       | 3.020        | 0.890                     | 2.610       | 0.890        |
| 300.0                                                                  | 20.3               | 300.1               | 2.410                   | 8.510       | 3.410        | 0.760                     | 1.890       | 1.040        |
| 315.0                                                                  | 20.3               | 315.0               | 1.920                   | 7.650       | 3.260        | 0.620                     | 1.210       | 0.980        |
| 330.0                                                                  | 20.3               | 329.9               | 1.740                   | 5.840       | 3.060        | 0.520                     | 0.710       | 0.880        |
| 345.0                                                                  | 20.3               | 344.9               | 1.500                   | 5.330       | 2.820        | 0.460                     | 0.460       | 0.810        |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.6:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 4.0$  m and  $T_p = 8.3$  s; Ship's speed is 25.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 25.4               | -0.1                | 1.530                   | 6.480       | 2.360        | 0.490                     | 0.490       | 0.740        |
| 15.0                                                                   | 25.4               | 14.9                | 1.640                   | 7.220       | 2.600        | 0.510                     | 0.520       | 0.760        |
| 30.0                                                                   | 25.4               | 29.9                | 1.930                   | 8.780       | 2.890        | 0.570                     | 0.750       | 0.830        |
| 45.0                                                                   | 25.4               | 44.9                | 2.460                   | 10.660      | 3.160        | 0.670                     | 1.140       | 0.920        |
| 60.0                                                                   | 25.4               | 59.8                | 2.630                   | 13.410      | 3.180        | 0.800                     | 1.700       | 0.990        |
| 75.0                                                                   | 25.4               | 74.6                | 3.520                   | 16.630      | 2.980        | 0.890                     | 2.160       | 0.850        |
| 90.0                                                                   | 25.4               | 89.4                | 2.580                   | 21.640      | 0.940        | 0.810                     | 3.260       | 0.180        |
| 105.0                                                                  | 25.4               | 104.4               | 1.990                   | 22.770      | 2.000        | 0.580                     | 5.110       | 0.480        |
| 120.0                                                                  | 25.4               | 119.9               | 1.250                   | 32.370      | 1.960        | 0.360                     | 10.780      | 0.490        |
| 135.0                                                                  | 25.3               | 134.9               | 0.920                   | 23.920      | 1.780        | 0.280                     | 6.670       | 0.490        |
| 150.0                                                                  | 25.4               | 149.9               | 0.710                   | 16.820      | 1.670        | 0.210                     | 3.270       | 0.450        |
| 165.0                                                                  | 25.3               | 164.9               | 0.570                   | 18.910      | 1.670        | 0.170                     | 2.270       | 0.400        |
| 180.0                                                                  | 25.6               | 179.9               | 0.510                   | 18.130      | 1.410        | 0.160                     | 2.100       | 0.370        |
| 195.0                                                                  | 25.3               | 194.7               | 0.550                   | 19.690      | 1.700        | 0.160                     | 3.530       | 0.400        |
| 210.0                                                                  | 25.3               | 209.8               | 0.700                   | 24.080      | 1.810        | 0.210                     | 4.530       | 0.460        |
| 225.0                                                                  | 25.1               | 224.5               | 0.890                   | 29.940      | 1.950        | 0.260                     | 7.620       | 0.470        |
| 240.0                                                                  | 25.4               | 240.2               | 1.390                   | 34.210      | 2.250        | 0.390                     | 11.780      | 0.550        |
| 255.0                                                                  | 25.4               | 255.6               | 2.090                   | 23.450      | 2.010        | 0.640                     | 5.390       | 0.550        |
| 270.0                                                                  | 25.4               | 270.6               | 2.780                   | 15.650      | 0.870        | 0.850                     | 4.000       | 0.200        |
| 285.0                                                                  | 25.4               | 285.4               | 3.190                   | 10.540      | 2.840        | 0.920                     | 3.110       | 0.850        |
| 300.0                                                                  | 25.4               | 300.1               | 2.600                   | 9.100       | 3.490        | 0.810                     | 2.240       | 0.980        |
| 315.0                                                                  | 25.4               | 315.1               | 2.330                   | 7.710       | 3.200        | 0.680                     | 1.410       | 0.920        |
| 330.0                                                                  | 25.4               | 330.0               | 1.860                   | 6.130       | 2.830        | 0.580                     | 0.810       | 0.830        |
| 345.0                                                                  | 25.4               | 345.0               | 1.640                   | 5.920       | 2.670        | 0.510                     | 0.510       | 0.760        |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.7:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 4.0$  m and  $T_p = 8.3$  s; Ship's speed is 30.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 30.5               | -0.0                | 1.550                   | 6.730       | 2.330        | 0.520                     | 0.500       | 0.690        |
| 15.0                                                                   | 30.5               | 14.9                | 1.620                   | 7.070       | 2.280        | 0.540                     | 0.500       | 0.720        |
| 30.0                                                                   | 30.5               | 29.9                | 1.900                   | 8.700       | 2.740        | 0.610                     | 0.780       | 0.780        |
| 45.0                                                                   | 30.5               | 44.9                | 2.420                   | 12.580      | 2.920        | 0.710                     | 1.290       | 0.870        |
| 60.0                                                                   | 30.5               | 59.8                | 2.680                   | 15.490      | 3.240        | 0.840                     | 1.960       | 0.940        |
| 75.0                                                                   | 30.5               | 74.7                | 2.770                   | 15.150      | 2.460        | 0.920                     | 2.240       | 0.820        |
| 90.0                                                                   | 30.5               | 89.5                | 2.560                   | 20.940      | 1.030        | 0.790                     | 3.280       | 0.180        |
| 105.0                                                                  | 30.5               | 104.6               | 2.230                   | 25.200      | 2.380        | 0.540                     | 6.150       | 0.410        |
| 120.0                                                                  | 30.4               | 119.9               | 1.330                   | 32.800      | 2.000        | 0.410                     | 12.060      | 0.570        |
| 135.0                                                                  | 30.5               | 134.7               | 0.850                   | 20.490      | 1.560        | 0.270                     | 6.390       | 0.480        |
| 150.0                                                                  | 30.5               | 149.9               | 0.630                   | 18.570      | 1.280        | 0.200                     | 3.680       | 0.380        |
| 165.0                                                                  | 30.5               | 164.8               | 0.610                   | 16.340      | 1.190        | 0.160                     | 2.500       | 0.310        |
| 180.0                                                                  | 30.5               | 179.9               | 0.550                   | 18.080      | 1.280        | 0.160                     | 2.730       | 0.310        |
| 195.0                                                                  | 30.6               | 194.9               | 0.610                   | 21.340      | 1.360        | 0.160                     | 3.750       | 0.310        |
| 210.0                                                                  | 30.4               | 209.9               | 0.750                   | 23.490      | 1.500        | 0.200                     | 5.000       | 0.400        |
| 225.0                                                                  | 30.4               | 224.9               | 0.840                   | 25.410      | 1.620        | 0.270                     | 6.330       | 0.490        |
| 240.0                                                                  | 30.4               | 240.1               | 1.630                   | 39.430      | 2.680        | 0.430                     | 12.420      | 0.630        |
| 255.0                                                                  | 30.5               | 255.3               | 2.080                   | 25.510      | 1.970        | 0.610                     | 6.640       | 0.520        |
| 270.0                                                                  | 30.5               | 270.4               | 2.800                   | 16.880      | 0.760        | 0.830                     | 4.280       | 0.210        |
| 285.0                                                                  | 30.5               | 285.3               | 3.080                   | 13.540      | 2.770        | 0.940                     | 3.410       | 0.810        |
| 300.0                                                                  | 30.5               | 300.2               | 2.770                   | 10.970      | 3.040        | 0.850                     | 2.700       | 0.930        |
| 315.0                                                                  | 30.5               | 315.1               | 2.470                   | 9.460       | 2.940        | 0.720                     | 1.680       | 0.860        |
| 330.0                                                                  | 30.5               | 330.0               | 1.910                   | 7.340       | 2.630        | 0.610                     | 0.990       | 0.780        |
| 345.0                                                                  | 30.5               | 345.0               | 1.680                   | 6.800       | 2.420        | 0.540                     | 0.620       | 0.710        |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.8:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 4.0$  m and  $T_p = 15.5$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | -0.0               | -14.9               | 2.620                   | 7.930       | 3.410        | 0.740                     | 1.990       | 1.040        |
| 15.0                                                                   | -0.1               | -6.0                | 2.460                   | 6.270       | 3.590        | 0.730                     | 1.350       | 1.050        |
| 30.0                                                                   | -0.2               | 5.3                 | 2.390                   | 8.080       | 3.690        | 0.730                     | 1.720       | 1.050        |
| 45.0                                                                   | -0.2               | 22.7                | 2.580                   | 11.720      | 3.830        | 0.740                     | 3.000       | 1.010        |
| 60.0                                                                   | -0.1               | 39.4                | 2.830                   | 13.820      | 3.400        | 0.790                     | 3.890       | 0.940        |
| 75.0                                                                   | -0.1               | 53.3                | 3.030                   | 15.660      | 3.180        | 0.840                     | 4.290       | 0.810        |
| 90.0                                                                   | -0.1               | 68.5                | 3.400                   | 15.320      | 1.990        | 0.900                     | 4.450       | 0.570        |
| 105.0                                                                  | -0.1               | 88.4                | 3.720                   | 15.940      | 1.260        | 0.950                     | 4.600       | 0.130        |
| 120.0                                                                  | -0.3               | 99.9                | 3.340                   | 16.750      | 2.040        | 0.930                     | 4.730       | 0.320        |
| 135.0                                                                  | -0.5               | 108.2               | 3.360                   | 15.360      | 2.250        | 0.910                     | 4.720       | 0.510        |
| 150.0                                                                  | -0.8               | 115.2               | 2.860                   | 15.160      | 2.490        | 0.880                     | 4.680       | 0.650        |
| 165.0                                                                  | -1.0               | 119.3               | 2.750                   | 14.300      | 2.560        | 0.860                     | 4.570       | 0.720        |
| 180.0                                                                  | -0.5               | 53.8                | 2.820                   | 12.510      | 3.470        | 0.770                     | 3.320       | 0.970        |
| 195.0                                                                  | 0.1                | 338.6               | 2.730                   | 13.390      | 3.440        | 0.810                     | 3.690       | 0.930        |
| 210.0                                                                  | 0.2                | 248.5               | 3.130                   | 14.960      | 2.560        | 0.940                     | 4.420       | 0.610        |
| 225.0                                                                  | 0.1                | 255.3               | 3.200                   | 14.510      | 2.310        | 0.970                     | 4.450       | 0.480        |
| 240.0                                                                  | 0.1                | 263.7               | 3.450                   | 14.580      | 2.080        | 0.990                     | 4.420       | 0.290        |
| 255.0                                                                  | 0.1                | 275.2               | 3.500                   | 14.230      | 1.290        | 1.000                     | 4.280       | 0.220        |
| 270.0                                                                  | 0.2                | 288.2               | 3.620                   | 14.020      | 1.800        | 0.960                     | 4.130       | 0.510        |
| 285.0                                                                  | 0.2                | 298.6               | 3.370                   | 13.690      | 2.430        | 0.920                     | 4.010       | 0.720        |
| 300.0                                                                  | 0.1                | 308.0               | 3.200                   | 13.520      | 2.830        | 0.870                     | 3.900       | 0.850        |
| 315.0                                                                  | 0.1                | 317.0               | 2.920                   | 13.920      | 3.130        | 0.830                     | 3.640       | 0.930        |
| 330.0                                                                  | 0.1                | 326.3               | 2.920                   | 12.130      | 3.240        | 0.800                     | 3.270       | 0.990        |
| 345.0                                                                  | 0.0                | 336.0               | 2.880                   | 10.350      | 3.380        | 0.760                     | 2.690       | 1.020        |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.9:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 4.0$  m and  $T_p = 15.5$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b>  |                     | <b>Absolute Maximum</b> |                    |                     | <b>Standard Deviation</b> |                    |                     |
|------------------------------------------------------------------------|---------------------|---------------------|-------------------------|--------------------|---------------------|---------------------------|--------------------|---------------------|
| $\psi_{MHP}$<br>deg                                                    | <b>Speed</b><br>kts | $\psi_{MHP}$<br>deg | <b>Heave</b><br>m       | <b>Roll</b><br>deg | <b>Pitch</b><br>deg | <b>Heave</b><br>m         | <b>Roll</b><br>deg | <b>Pitch</b><br>deg |
| 0.0                                                                    | 4.9                 | -2.4                | 2.820                   | 5.650              | 3.630               | 0.730                     | 0.880              | 1.070               |
| 15.0                                                                   | 4.8                 | 12.3                | 2.760                   | 7.460              | 3.380               | 0.730                     | 1.570              | 1.060               |
| 30.0                                                                   | 4.8                 | 27.1                | 2.960                   | 9.930              | 3.320               | 0.760                     | 2.510              | 1.020               |
| 45.0                                                                   | 4.8                 | 42.0                | 2.780                   | 12.560             | 3.310               | 0.800                     | 3.210              | 0.940               |
| 60.0                                                                   | 4.8                 | 56.5                | 3.220                   | 14.180             | 2.720               | 0.860                     | 3.600              | 0.800               |
| 75.0                                                                   | 4.8                 | 71.2                | 3.130                   | 13.980             | 1.920               | 0.920                     | 3.770              | 0.530               |
| 90.0                                                                   | 4.8                 | 85.7                | 3.240                   | 13.520             | 0.640               | 0.950                     | 3.980              | 0.140               |
| 105.0                                                                  | 4.7                 | 100.0               | 2.990                   | 15.480             | 1.100               | 0.930                     | 4.210              | 0.280               |
| 120.0                                                                  | 4.4                 | 110.5               | 3.630                   | 16.430             | 2.240               | 0.890                     | 4.210              | 0.520               |
| 135.0                                                                  | 4.2                 | 120.6               | 2.980                   | 14.240             | 2.520               | 0.850                     | 4.080              | 0.670               |
| 150.0                                                                  | 4.5                 | 143.2               | 2.490                   | 11.450             | 2.880               | 0.770                     | 2.900              | 0.840               |
| 165.0                                                                  | 4.7                 | 161.6               | 2.500                   | 7.820              | 2.910               | 0.730                     | 1.650              | 0.890               |
| 180.0                                                                  | 4.9                 | 178.1               | 2.380                   | 6.780              | 3.010               | 0.720                     | 1.340              | 0.910               |
| 195.0                                                                  | 4.9                 | 194.3               | 2.510                   | 8.140              | 2.980               | 0.730                     | 2.120              | 0.900               |
| 210.0                                                                  | 4.9                 | 210.7               | 2.500                   | 9.840              | 2.900               | 0.760                     | 3.020              | 0.870               |
| 225.0                                                                  | 4.9                 | 227.2               | 2.930                   | 11.860             | 2.800               | 0.830                     | 3.650              | 0.800               |
| 240.0                                                                  | 4.8                 | 243.0               | 3.370                   | 12.620             | 2.190               | 0.900                     | 3.980              | 0.640               |
| 255.0                                                                  | 4.9                 | 257.2               | 3.140                   | 12.530             | 1.540               | 0.960                     | 4.020              | 0.370               |
| 270.0                                                                  | 5.0                 | 271.5               | 3.360                   | 13.470             | 0.390               | 0.990                     | 3.840              | 0.070               |
| 285.0                                                                  | 5.0                 | 286.0               | 3.790                   | 13.000             | 1.600               | 0.960                     | 3.600              | 0.460               |
| 300.0                                                                  | 5.0                 | 300.3               | 3.230                   | 11.980             | 2.970               | 0.910                     | 3.440              | 0.770               |
| 315.0                                                                  | 5.0                 | 314.4               | 3.000                   | 11.560             | 2.890               | 0.840                     | 3.070              | 0.930               |
| 330.0                                                                  | 4.9                 | 328.6               | 2.700                   | 10.380             | 3.230               | 0.790                     | 2.510              | 1.020               |
| 345.0                                                                  | 4.9                 | 343.1               | 2.870                   | 8.410              | 3.500               | 0.750                     | 1.700              | 1.060               |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                     |                     |                         |                    |                     |                           |                    |                     |

**Table Q.10:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 4.0$  m and  $T_p = 15.5$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b>  |                     | <b>Absolute Maximum</b> |                    |                     | <b>Standard Deviation</b> |                    |                     |
|------------------------------------------------------------------------|---------------------|---------------------|-------------------------|--------------------|---------------------|---------------------------|--------------------|---------------------|
| $\psi_{MHP}$<br>deg                                                    | <b>Speed</b><br>kts | $\psi_{MHP}$<br>deg | <b>Heave</b><br>m       | <b>Roll</b><br>deg | <b>Pitch</b><br>deg | <b>Heave</b><br>m         | <b>Roll</b><br>deg | <b>Pitch</b><br>deg |
| 0.0                                                                    | 10.1                | -0.6                | 2.730                   | 4.790              | 4.420               | 0.750                     | 0.480              | 1.070               |
| 15.0                                                                   | 10.1                | 14.4                | 2.940                   | 7.040              | 4.170               | 0.760                     | 1.170              | 1.060               |
| 30.0                                                                   | 10.1                | 29.5                | 2.840                   | 9.030              | 3.670               | 0.780                     | 1.980              | 1.020               |
| 45.0                                                                   | 10.1                | 44.5                | 2.670                   | 11.320             | 3.110               | 0.830                     | 2.520              | 0.930               |
| 60.0                                                                   | 10.1                | 59.3                | 3.070                   | 12.550             | 2.450               | 0.880                     | 2.890              | 0.760               |
| 75.0                                                                   | 10.2                | 74.2                | 3.520                   | 13.450             | 1.750               | 0.920                     | 3.010              | 0.470               |
| 90.0                                                                   | 10.1                | 89.0                | 3.520                   | 12.880             | 0.310               | 0.930                     | 3.390              | 0.090               |
| 105.0                                                                  | 10.1                | 103.9               | 2.950                   | 15.250             | 1.280               | 0.890                     | 3.750              | 0.330               |
| 120.0                                                                  | 10.0                | 118.6               | 2.670                   | 17.130             | 2.350               | 0.840                     | 4.000              | 0.570               |
| 135.0                                                                  | 10.0                | 133.7               | 2.710                   | 15.810             | 2.630               | 0.780                     | 3.820              | 0.700               |
| 150.0                                                                  | 10.0                | 148.9               | 2.380                   | 13.960             | 2.480               | 0.730                     | 3.690              | 0.770               |
| 165.0                                                                  | 10.1                | 164.1               | 2.510                   | 12.870             | 2.820               | 0.710                     | 2.860              | 0.810               |
| 180.0                                                                  | 10.1                | 179.3               | 2.570                   | 10.500             | 3.180               | 0.700                     | 1.850              | 0.820               |
| 195.0                                                                  | 10.1                | 194.6               | 2.390                   | 9.620              | 2.730               | 0.710                     | 2.090              | 0.820               |
| 210.0                                                                  | 10.1                | 210.1               | 2.450                   | 11.220             | 2.570               | 0.750                     | 3.430              | 0.800               |
| 225.0                                                                  | 10.1                | 225.6               | 2.520                   | 11.940             | 2.800               | 0.810                     | 4.160              | 0.740               |
| 240.0                                                                  | 10.1                | 240.8               | 3.110                   | 13.430             | 2.400               | 0.880                     | 4.390              | 0.620               |
| 255.0                                                                  | 10.2                | 255.6               | 3.990                   | 14.010             | 1.470               | 0.940                     | 4.150              | 0.380               |
| 270.0                                                                  | 10.2                | 270.4               | 3.520                   | 13.140             | 0.290               | 0.970                     | 3.720              | 0.080               |
| 285.0                                                                  | 10.2                | 285.1               | 3.580                   | 12.730             | 1.670               | 0.960                     | 3.330              | 0.450               |
| 300.0                                                                  | 10.1                | 299.9               | 3.510                   | 11.510             | 2.610               | 0.910                     | 2.980              | 0.760               |
| 315.0                                                                  | 10.1                | 314.6               | 2.850                   | 10.070             | 3.230               | 0.850                     | 2.450              | 0.940               |
| 330.0                                                                  | 10.1                | 329.5               | 3.030                   | 8.750              | 3.880               | 0.800                     | 1.810              | 1.020               |
| 345.0                                                                  | 10.1                | 344.4               | 2.830                   | 7.070              | 4.080               | 0.770                     | 1.030              | 1.060               |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                     |                     |                         |                    |                     |                           |                    |                     |

**Table Q.11:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 4.0$  m and  $T_p = 15.5$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 15.2               | -0.3                | 2.710                   | 5.140       | 3.360        | 0.800                     | 0.450       | 1.060        |
| 15.0                                                                   | 15.2               | 14.8                | 2.620                   | 6.730       | 3.330        | 0.800                     | 1.080       | 1.050        |
| 30.0                                                                   | 15.2               | 29.9                | 2.850                   | 9.470       | 3.640        | 0.820                     | 1.780       | 1.010        |
| 45.0                                                                   | 15.2               | 44.9                | 3.530                   | 11.910      | 3.520        | 0.860                     | 2.360       | 0.920        |
| 60.0                                                                   | 15.2               | 59.8                | 3.000                   | 11.550      | 2.670        | 0.890                     | 2.820       | 0.760        |
| 75.0                                                                   | 15.3               | 74.7                | 3.020                   | 11.960      | 1.480        | 0.910                     | 2.660       | 0.460        |
| 90.0                                                                   | 15.3               | 89.6                | 3.670                   | 13.090      | 0.400        | 0.910                     | 3.060       | 0.110        |
| 105.0                                                                  | 15.3               | 104.5               | 3.150                   | 16.000      | 1.120        | 0.870                     | 3.620       | 0.320        |
| 120.0                                                                  | 15.2               | 119.3               | 2.610                   | 20.260      | 1.810        | 0.810                     | 4.900       | 0.520        |
| 135.0                                                                  | 15.2               | 134.6               | 2.350                   | 20.000      | 2.320        | 0.760                     | 5.060       | 0.640        |
| 150.0                                                                  | 15.2               | 149.7               | 2.130                   | 13.100      | 2.160        | 0.720                     | 3.120       | 0.700        |
| 165.0                                                                  | 15.2               | 164.7               | 2.200                   | 9.400       | 2.380        | 0.690                     | 1.950       | 0.760        |
| 180.0                                                                  | 15.3               | 179.7               | 2.130                   | 7.900       | 2.250        | 0.680                     | 0.950       | 0.700        |
| 195.0                                                                  | 15.2               | 194.8               | 2.440                   | 14.860      | 2.800        | 0.700                     | 2.150       | 0.800        |
| 210.0                                                                  | 15.2               | 209.9               | 2.090                   | 16.280      | 2.230        | 0.730                     | 3.670       | 0.730        |
| 225.0                                                                  | 15.2               | 225.2               | 2.780                   | 17.520      | 2.220        | 0.780                     | 5.710       | 0.680        |
| 240.0                                                                  | 15.2               | 240.4               | 2.990                   | 17.470      | 2.190        | 0.850                     | 5.450       | 0.570        |
| 255.0                                                                  | 15.3               | 255.3               | 3.270                   | 15.270      | 1.290        | 0.920                     | 4.490       | 0.360        |
| 270.0                                                                  | 15.3               | 270.2               | 3.310                   | 14.360      | 0.420        | 0.950                     | 3.810       | 0.110        |
| 285.0                                                                  | 15.3               | 285.0               | 3.790                   | 13.350      | 1.540        | 0.960                     | 3.280       | 0.450        |
| 300.0                                                                  | 15.2               | 299.9               | 3.220                   | 12.130      | 2.360        | 0.920                     | 2.840       | 0.750        |
| 315.0                                                                  | 15.2               | 314.7               | 3.660                   | 10.840      | 3.260        | 0.880                     | 2.210       | 0.930        |
| 330.0                                                                  | 15.2               | 329.7               | 2.740                   | 8.780       | 3.630        | 0.830                     | 1.520       | 1.010        |
| 345.0                                                                  | 15.2               | 344.7               | 2.640                   | 6.450       | 3.370        | 0.810                     | 0.770       | 1.050        |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |



**Table Q.12:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 4.0$  m and  $T_p = 15.5$  s; Ship's speed is 20.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b>  |                     | <b>Absolute Maximum</b> |                    |                     | <b>Standard Deviation</b> |                    |                     |
|------------------------------------------------------------------------|---------------------|---------------------|-------------------------|--------------------|---------------------|---------------------------|--------------------|---------------------|
| $\psi_{MHP}$<br>deg                                                    | <b>Speed</b><br>kts | $\psi_{MHP}$<br>deg | <b>Heave</b><br>m       | <b>Roll</b><br>deg | <b>Pitch</b><br>deg | <b>Heave</b><br>m         | <b>Roll</b><br>deg | <b>Pitch</b><br>deg |
| 0.0                                                                    | 20.3                | -0.1                | 2.890                   | 5.870              | 3.460               | 0.850                     | 0.490              | 1.040               |
| 15.0                                                                   | 20.3                | 14.9                | 2.770                   | 7.630              | 3.230               | 0.860                     | 1.110              | 1.030               |
| 30.0                                                                   | 20.3                | 30.0                | 3.460                   | 9.200              | 3.260               | 0.870                     | 1.800              | 0.990               |
| 45.0                                                                   | 20.3                | 45.0                | 3.010                   | 11.490             | 2.880               | 0.890                     | 2.430              | 0.910               |
| 60.0                                                                   | 20.3                | 59.9                | 3.460                   | 12.910             | 2.830               | 0.910                     | 3.030              | 0.750               |
| 75.0                                                                   | 20.4                | 74.8                | 3.170                   | 11.270             | 1.660               | 0.910                     | 2.450              | 0.470               |
| 90.0                                                                   | 20.4                | 89.8                | 3.570                   | 13.320             | 0.500               | 0.880                     | 2.840              | 0.140               |
| 105.0                                                                  | 20.4                | 104.8               | 3.030                   | 17.360             | 1.200               | 0.840                     | 3.450              | 0.300               |
| 120.0                                                                  | 20.3                | 119.7               | 3.180                   | 25.080             | 1.870               | 0.780                     | 6.340              | 0.480               |
| 135.0                                                                  | 20.3                | 134.8               | 2.210                   | 18.950             | 1.940               | 0.750                     | 5.520              | 0.620               |
| 150.0                                                                  | 20.3                | 149.8               | 2.040                   | 11.550             | 1.860               | 0.690                     | 3.120              | 0.640               |
| 165.0                                                                  | 20.4                | 164.8               | 1.880                   | 8.190              | 2.210               | 0.610                     | 1.650              | 0.640               |
| 180.0                                                                  | 20.4                | 179.9               | 1.960                   | 9.990              | 2.190               | 0.730                     | 1.010              | 0.740               |
| 195.0                                                                  | 20.4                | 194.9               | 1.980                   | 14.480             | 2.030               | 0.690                     | 2.120              | 0.720               |
| 210.0                                                                  | 20.4                | 209.9               | 2.570                   | 23.840             | 2.310               | 0.720                     | 3.490              | 0.650               |
| 225.0                                                                  | 20.4                | 225.0               | 2.210                   | 22.470             | 1.800               | 0.750                     | 4.890              | 0.580               |
| 240.0                                                                  | 20.4                | 240.2               | 3.020                   | 24.120             | 1.830               | 0.830                     | 6.950              | 0.540               |
| 255.0                                                                  | 20.4                | 255.1               | 2.780                   | 17.810             | 1.250               | 0.890                     | 4.570              | 0.340               |
| 270.0                                                                  | 20.4                | 270.1               | 3.270                   | 15.910             | 0.530               | 0.930                     | 3.770              | 0.140               |
| 285.0                                                                  | 20.4                | 285.0               | 3.860                   | 14.830             | 1.560               | 0.950                     | 3.190              | 0.450               |
| 300.0                                                                  | 20.4                | 299.9               | 3.650                   | 13.290             | 2.760               | 0.940                     | 2.800              | 0.740               |
| 315.0                                                                  | 20.3                | 314.8               | 3.050                   | 11.060             | 3.050               | 0.910                     | 2.060              | 0.910               |
| 330.0                                                                  | 20.3                | 329.8               | 3.270                   | 9.490              | 3.380               | 0.880                     | 1.370              | 0.990               |
| 345.0                                                                  | 20.3                | 344.8               | 3.010                   | 6.910              | 3.390               | 0.860                     | 0.670              | 1.030               |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                     |                     |                         |                    |                     |                           |                    |                     |

**Table Q.13:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 4.0$  m and  $T_p = 15.5$  s; Ship's speed is 25.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 25.4               | -0.1                | 3.390                   | 6.600       | 3.760        | 0.910                     | 0.550       | 1.010        |
| 15.0                                                                   | 25.4               | 15.0                | 3.360                   | 7.930       | 3.890        | 0.920                     | 1.110       | 1.000        |
| 30.0                                                                   | 25.4               | 30.0                | 3.100                   | 10.200      | 3.260        | 0.920                     | 1.780       | 0.970        |
| 45.0                                                                   | 25.4               | 45.0                | 3.400                   | 11.090      | 3.070        | 0.930                     | 2.420       | 0.890        |
| 60.0                                                                   | 25.4               | 60.0                | 3.700                   | 14.030      | 2.630        | 0.930                     | 3.170       | 0.740        |
| 75.0                                                                   | 25.4               | 74.9                | 3.210                   | 11.410      | 1.560        | 0.900                     | 2.370       | 0.470        |
| 90.0                                                                   | 25.4               | 89.9                | 3.440                   | 13.090      | 0.590        | 0.860                     | 2.750       | 0.170        |
| 105.0                                                                  | 25.4               | 104.8               | 2.910                   | 17.330      | 1.070        | 0.820                     | 3.460       | 0.280        |
| 120.0                                                                  | 25.4               | 119.9               | 2.380                   | 27.860      | 2.030        | 0.780                     | 8.310       | 0.490        |
| 135.0                                                                  | 25.4               | 134.9               | 2.300                   | 15.920      | 1.490        | 0.710                     | 5.550       | 0.550        |
| 150.0                                                                  | 25.4               | 149.9               | 2.030                   | 13.790      | 1.720        | 0.670                     | 3.680       | 0.610        |
| 165.0                                                                  | 25.5               | 164.9               | 2.220                   | 11.250      | 2.280        | 0.840                     | 2.220       | 0.770        |
| 180.0                                                                  | 25.6               | 179.9               | 1.860                   | 9.130       | 1.990        | 0.490                     | 0.740       | 0.590        |
| 195.0                                                                  | 25.5               | 195.0               | 2.560                   | 16.980      | 2.190        | 0.860                     | 2.260       | 0.770        |
| 210.0                                                                  | 25.5               | 210.0               | 2.000                   | 22.240      | 2.010        | 0.710                     | 3.890       | 0.610        |
| 225.0                                                                  | 25.4               | 225.0               | 2.260                   | 27.080      | 1.770        | 0.740                     | 5.630       | 0.570        |
| 240.0                                                                  | 25.4               | 240.0               | 2.340                   | 24.110      | 1.470        | 0.790                     | 6.690       | 0.460        |
| 255.0                                                                  | 25.4               | 255.0               | 3.320                   | 17.520      | 1.170        | 0.860                     | 4.370       | 0.330        |
| 270.0                                                                  | 25.4               | 270.0               | 3.340                   | 16.310      | 0.610        | 0.900                     | 3.600       | 0.170        |
| 285.0                                                                  | 25.4               | 285.0               | 3.160                   | 14.070      | 1.530        | 0.940                     | 3.040       | 0.450        |
| 300.0                                                                  | 25.4               | 299.9               | 3.320                   | 13.850      | 2.590        | 0.960                     | 2.680       | 0.730        |
| 315.0                                                                  | 25.4               | 314.9               | 3.440                   | 11.480      | 3.000        | 0.950                     | 1.870       | 0.880        |
| 330.0                                                                  | 25.4               | 329.9               | 3.100                   | 9.510       | 3.040        | 0.930                     | 1.180       | 0.960        |
| 345.0                                                                  | 25.4               | 344.9               | 3.500                   | 7.360       | 3.860        | 0.920                     | 0.580       | 1.000        |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.14:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 4.0$  m and  $T_p = 15.5$  s; Ship's speed is 30.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b>  |                     | <b>Absolute Maximum</b> |                    |                     | <b>Standard Deviation</b> |                    |                     |
|------------------------------------------------------------------------|---------------------|---------------------|-------------------------|--------------------|---------------------|---------------------------|--------------------|---------------------|
| $\psi_{MHP}$<br>deg                                                    | <b>Speed</b><br>kts | $\psi_{MHP}$<br>deg | <b>Heave</b><br>m       | <b>Roll</b><br>deg | <b>Pitch</b><br>deg | <b>Heave</b><br>m         | <b>Roll</b><br>deg | <b>Pitch</b><br>deg |
| 0.0                                                                    | 30.5                | -0.0                | 3.540                   | 7.290              | 3.540               | 0.970                     | 0.610              | 0.980               |
| 15.0                                                                   | 30.5                | 15.0                | 3.500                   | 8.680              | 3.280               | 0.970                     | 1.110              | 0.970               |
| 30.0                                                                   | 30.5                | 30.0                | 3.540                   | 10.050             | 3.310               | 0.970                     | 1.720              | 0.940               |
| 45.0                                                                   | 30.5                | 45.0                | 3.110                   | 12.600             | 3.020               | 0.970                     | 2.410              | 0.870               |
| 60.0                                                                   | 30.5                | 60.0                | 3.100                   | 14.660             | 2.380               | 0.960                     | 3.220              | 0.730               |
| 75.0                                                                   | 30.5                | 75.0                | 3.080                   | 10.800             | 1.640               | 0.900                     | 2.260              | 0.470               |
| 90.0                                                                   | 30.5                | 89.9                | 3.270                   | 12.570             | 0.660               | 0.830                     | 2.730              | 0.190               |
| 105.0                                                                  | 30.5                | 104.9               | 2.630                   | 16.100             | 0.930               | 0.780                     | 3.710              | 0.260               |
| 120.0                                                                  | 30.5                | 119.9               | 2.540                   | 21.530             | 1.410               | 0.710                     | 7.400              | 0.390               |
| 135.0                                                                  | 30.5                | 134.9               | 2.320                   | 21.790             | 1.810               | 0.510                     | 4.940              | 0.450               |
| 150.0                                                                  | 30.6                | 149.9               | 1.790                   | 14.190             | 1.770               | 0.630                     | 3.510              | 0.620               |
| 165.0                                                                  | 30.6                | 164.9               | 1.790                   | 11.240             | 2.020               | 0.630                     | 1.940              | 0.680               |
| 180.0                                                                  | 31.0                | 179.9               | 1.680                   | 12.830             | 2.020               | 0.650                     | 1.220              | 0.670               |
| 195.0                                                                  | 30.6                | 194.9               | 1.690                   | 16.060             | 1.830               | 0.610                     | 2.280              | 0.650               |
| 210.0                                                                  | 30.6                | 210.0               | 1.800                   | 18.470             | 1.780               | 0.630                     | 3.670              | 0.600               |
| 225.0                                                                  | 30.5                | 225.0               | 1.670                   | 23.960             | 1.360               | 0.560                     | 5.110              | 0.460               |
| 240.0                                                                  | 30.5                | 240.1               | 2.480                   | 33.680             | 1.760               | 0.760                     | 8.160              | 0.470               |
| 255.0                                                                  | 30.5                | 255.0               | 2.800                   | 17.460             | 1.090               | 0.830                     | 3.980              | 0.320               |
| 270.0                                                                  | 30.5                | 270.0               | 2.900                   | 15.740             | 0.690               | 0.880                     | 3.270              | 0.190               |
| 285.0                                                                  | 30.5                | 285.0               | 3.350                   | 15.070             | 1.560               | 0.930                     | 2.860              | 0.450               |
| 300.0                                                                  | 30.5                | 299.9               | 3.410                   | 13.860             | 2.230               | 0.970                     | 2.520              | 0.710               |
| 315.0                                                                  | 30.5                | 314.9               | 3.570                   | 12.970             | 2.760               | 0.980                     | 1.730              | 0.850               |
| 330.0                                                                  | 30.5                | 329.9               | 3.850                   | 9.740              | 3.340               | 0.980                     | 1.090              | 0.930               |
| 345.0                                                                  | 30.5                | 344.9               | 3.510                   | 7.960              | 3.150               | 0.970                     | 0.560              | 0.970               |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                     |                     |                         |                    |                     |                           |                    |                     |

**Table Q.15:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 6.0$  m and  $T_p = 10.3$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | -0.1               | -18.2               | 2.410                   | 14.030      | 7.230        | 0.650                     | 3.010       | 1.670        |
| 15.0                                                                   | -0.3               | -12.9               | 2.240                   | 11.690      | 5.690        | 0.620                     | 2.510       | 1.650        |
| 30.0                                                                   | -0.6               | -3.0                | 2.060                   | 12.340      | 5.870        | 0.600                     | 2.390       | 1.630        |
| 45.0                                                                   | -0.9               | 7.5                 | 2.280                   | 14.340      | 5.870        | 0.610                     | 3.110       | 1.620        |
| 60.0                                                                   | -1.2               | 18.4                | 2.850                   | 20.240      | 5.710        | 0.690                     | 4.450       | 1.620        |
| 75.0                                                                   | -1.6               | -14.9               | 3.960                   | 24.860      | 5.450        | 0.890                     | 6.670       | 1.540        |
| 90.0                                                                   | -1.5               | -5.5                | 4.090                   | 24.480      | 5.200        | 0.880                     | 6.690       | 1.530        |
| 105.0                                                                  | -1.3               | -6.7                | 3.600                   | 24.470      | 5.410        | 0.860                     | 6.460       | 1.550        |
| 120.0                                                                  | -1.3               | 47.4                | 4.750                   | 33.040      | 5.360        | 1.060                     | 7.110       | 1.180        |
| 135.0                                                                  | -3.0               | 105.0               | 4.960                   | 27.950      | 4.420        | 1.170                     | 6.370       | 1.080        |
| 150.0                                                                  | -3.7               | 109.0               | 3.970                   | 22.290      | 5.600        | 1.120                     | 6.130       | 1.220        |
| 165.0                                                                  | -4.0               | 106.1               | 4.310                   | 37.600      | 4.580        | 1.140                     | 6.280       | 1.180        |
| 180.0                                                                  | -0.2               | 328.0               | 2.680                   | 21.680      | 6.300        | 0.680                     | 4.480       | 1.580        |
| 195.0                                                                  | -0.2               | 16.8                | 3.670                   | 16.910      | 6.170        | 0.750                     | 4.070       | 1.640        |
| 210.0                                                                  | -0.2               | 385.8               | 3.640                   | 19.510      | 6.200        | 0.810                     | 4.240       | 1.650        |
| 225.0                                                                  | -0.1               | 392.3               | 4.070                   | 19.160      | 5.610        | 0.870                     | 4.780       | 1.660        |
| 240.0                                                                  | 0.0                | 393.2               | 3.730                   | 18.490      | 5.760        | 0.970                     | 5.050       | 1.630        |
| 255.0                                                                  | 0.0                | 386.6               | 3.940                   | 19.200      | 5.150        | 1.070                     | 5.870       | 1.560        |
| 270.0                                                                  | 0.5                | 300.2               | 3.690                   | 19.960      | 4.860        | 1.090                     | 4.960       | 1.530        |
| 285.0                                                                  | 0.3                | 303.6               | 4.930                   | 21.140      | 5.020        | 1.030                     | 4.870       | 1.620        |
| 300.0                                                                  | -0.0               | 309.2               | 4.270                   | 20.290      | 5.160        | 0.960                     | 5.080       | 1.660        |
| 315.0                                                                  | -0.1               | 315.9               | 4.000                   | 19.620      | 5.900        | 0.860                     | 4.780       | 1.710        |
| 330.0                                                                  | -0.3               | 325.3               | 3.740                   | 17.480      | 6.030        | 0.780                     | 4.050       | 1.690        |
| 345.0                                                                  | -0.1               | 333.7               | 2.580                   | 14.860      | 6.220        | 0.700                     | 3.350       | 1.670        |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.16:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 6.0$  m and  $T_p = 10.3$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b>  |                     | <b>Absolute Maximum</b> |                    |                     | <b>Standard Deviation</b> |                    |                     |
|------------------------------------------------------------------------|---------------------|---------------------|-------------------------|--------------------|---------------------|---------------------------|--------------------|---------------------|
| $\psi_{MHP}$<br>deg                                                    | <b>Speed</b><br>kts | $\psi_{MHP}$<br>deg | <b>Heave</b><br>m       | <b>Roll</b><br>deg | <b>Pitch</b><br>deg | <b>Heave</b><br>m         | <b>Roll</b><br>deg | <b>Pitch</b><br>deg |
| 0.0                                                                    | 4.1                 | -10.0               | 2.080                   | 14.660             | 6.080               | 0.620                     | 2.310              | 1.650               |
| 15.0                                                                   | 4.0                 | -2.0                | 1.910                   | 10.290             | 6.110               | 0.610                     | 2.030              | 1.630               |
| 30.0                                                                   | 3.9                 | 8.0                 | 2.080                   | 12.120             | 5.440               | 0.610                     | 2.280              | 1.630               |
| 45.0                                                                   | 3.8                 | 19.0                | 2.310                   | 14.480             | 6.430               | 0.650                     | 2.900              | 1.630               |
| 60.0                                                                   | 3.8                 | 31.1                | 2.950                   | 17.000             | 6.100               | 0.720                     | 3.580              | 1.650               |
| 75.0                                                                   | 3.7                 | 38.8                | 2.940                   | 19.380             | 5.640               | 0.780                     | 4.060              | 1.650               |
| 90.0                                                                   | 3.7                 | 46.5                | 3.450                   | 21.820             | 5.480               | 0.870                     | 4.510              | 1.620               |
| 105.0                                                                  | 3.7                 | 48.9                | 3.840                   | 30.690             | 5.230               | 0.890                     | 4.690              | 1.610               |
| 120.0                                                                  | 3.7                 | 46.7                | 3.270                   | 28.730             | 5.110               | 0.870                     | 4.810              | 1.610               |
| 135.0                                                                  | 3.7                 | 43.4                | 3.180                   | 20.510             | 5.270               | 0.830                     | 4.160              | 1.640               |
| 150.0                                                                  | 3.8                 | 45.4                | 4.740                   | 19.270             | 5.190               | 0.830                     | 4.390              | 1.630               |
| 165.0                                                                  | 3.8                 | 49.5                | 4.570                   | 21.110             | 4.980               | 0.820                     | 4.230              | 1.650               |
| 180.0                                                                  | 4.7                 | 178.6               | 2.000                   | 12.810             | 3.780               | 0.560                     | 2.490              | 1.210               |
| 195.0                                                                  | 4.6                 | 197.3               | 2.020                   | 13.220             | 3.870               | 0.610                     | 3.010              | 1.260               |
| 210.0                                                                  | 4.1                 | 368.4               | 4.470                   | 15.480             | 6.240               | 0.750                     | 3.880              | 1.630               |
| 225.0                                                                  | 4.5                 | 295.9               | 4.150                   | 17.860             | 5.030               | 1.110                     | 4.830              | 1.460               |
| 240.0                                                                  | 4.7                 | 286.9               | 4.480                   | 19.900             | 4.550               | 1.270                     | 5.020              | 1.230               |
| 255.0                                                                  | 4.5                 | 289.3               | 4.410                   | 20.700             | 4.150               | 1.260                     | 5.020              | 1.290               |
| 270.0                                                                  | 4.4                 | 292.8               | 4.400                   | 16.550             | 4.770               | 1.210                     | 4.790              | 1.410               |
| 285.0                                                                  | 4.5                 | 295.6               | 4.620                   | 17.940             | 4.440               | 1.160                     | 4.990              | 1.500               |
| 300.0                                                                  | 4.7                 | 302.6               | 4.250                   | 18.890             | 5.110               | 1.040                     | 4.520              | 1.650               |
| 315.0                                                                  | 4.7                 | 314.4               | 3.120                   | 18.190             | 5.830               | 0.880                     | 3.840              | 1.730               |
| 330.0                                                                  | 4.6                 | 327.1               | 2.660                   | 16.130             | 5.750               | 0.750                     | 3.210              | 1.710               |
| 345.0                                                                  | 4.4                 | 340.0               | 2.150                   | 12.740             | 5.980               | 0.660                     | 2.630              | 1.670               |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                     |                     |                         |                    |                     |                           |                    |                     |

**Table Q.17:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 6.0$  m and  $T_p = 10.3$  s; Ship's speed is 10.0 Knots

| Cmd Heading                                                            | Actual Mean |                  | Absolute Maximum |          |           | Standard Deviation |          |           |
|------------------------------------------------------------------------|-------------|------------------|------------------|----------|-----------|--------------------|----------|-----------|
|                                                                        | Speed kts   | $\psi_{MHP}$ deg | Heave m          | Roll deg | Pitch deg | Heave m            | Roll deg | Pitch deg |
| 0.0                                                                    | 9.8         | -1.2             | 2.520            | 9.660    | 5.330     | 0.700              | 1.390    | 1.610     |
| 15.0                                                                   | 9.7         | 13.7             | 2.370            | 9.810    | 5.450     | 0.710              | 1.500    | 1.610     |
| 30.0                                                                   | 9.7         | 28.7             | 2.950            | 13.420   | 5.840     | 0.780              | 2.200    | 1.640     |
| 45.0                                                                   | 9.7         | 43.7             | 3.210            | 16.040   | 5.660     | 0.890              | 2.840    | 1.660     |
| 60.0                                                                   | 9.7         | 58.2             | 3.730            | 18.520   | 5.090     | 1.050              | 3.530    | 1.580     |
| 75.0                                                                   | 9.7         | 71.6             | 4.270            | 20.040   | 4.170     | 1.220              | 4.140    | 1.270     |
| 90.0                                                                   | 9.0         | 81.8             | 5.040            | 24.410   | 2.950     | 1.290              | 4.770    | 0.720     |
| 105.0                                                                  | 8.6         | 88.7             | 4.960            | 37.890   | 2.950     | 1.280              | 5.980    | 0.390     |
| 120.0                                                                  | 8.4         | 100.7            | 4.780            | 27.500   | 3.640     | 1.170              | 6.260    | 0.740     |
| 135.0                                                                  | 8.9         | 125.6            | 3.530            | 23.020   | 3.800     | 0.850              | 5.520    | 1.150     |
| 150.0                                                                  | 9.4         | 145.7            | 1.900            | 21.210   | 3.480     | 0.650              | 6.160    | 1.110     |
| 165.0                                                                  | 9.6         | 162.0            | 1.650            | 23.800   | 3.240     | 0.560              | 6.340    | 1.050     |
| 180.0                                                                  | 9.9         | 178.3            | 1.530            | 21.590   | 3.030     | 0.540              | 5.320    | 1.040     |
| 195.0                                                                  | 10.0        | 194.6            | 1.620            | 16.070   | 3.080     | 0.570              | 3.960    | 1.080     |
| 210.0                                                                  | 9.8         | 211.5            | 1.990            | 16.660   | 3.430     | 0.660              | 5.380    | 1.150     |
| 225.0                                                                  | 9.3         | 231.7            | 3.400            | 20.380   | 4.170     | 0.880              | 5.740    | 1.220     |
| 240.0                                                                  | 8.5         | 259.3            | 4.320            | 34.160   | 4.070     | 1.250              | 5.930    | 0.920     |
| 255.0                                                                  | 8.6         | 269.8            | 5.130            | 34.080   | 3.690     | 1.370              | 5.530    | 0.520     |
| 270.0                                                                  | 9.2         | 277.4            | 4.820            | 22.050   | 2.780     | 1.400              | 4.710    | 0.670     |
| 285.0                                                                  | 10.0        | 287.5            | 4.870            | 16.730   | 4.270     | 1.310              | 4.030    | 1.270     |
| 300.0                                                                  | 10.0        | 300.3            | 3.660            | 17.420   | 5.220     | 1.130              | 3.770    | 1.610     |
| 315.0                                                                  | 9.8         | 314.3            | 3.890            | 18.500   | 5.860     | 0.940              | 3.160    | 1.690     |
| 330.0                                                                  | 9.8         | 329.1            | 2.820            | 16.230   | 5.670     | 0.810              | 2.210    | 1.670     |
| 345.0                                                                  | 9.8         | 343.9            | 2.710            | 10.950   | 5.360     | 0.720              | 1.640    | 1.630     |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |             |                  |                  |          |           |                    |          |           |

**Table Q.18:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 6.0$  m and  $T_p = 10.3$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 15.0               | -0.5                | 3.140                   | 10.500      | 5.150        | 0.810                     | 1.200       | 1.560        |
| 15.0                                                                   | 15.0               | 14.6                | 2.880                   | 9.460       | 5.310        | 0.830                     | 1.400       | 1.570        |
| 30.0                                                                   | 15.0               | 29.6                | 2.810                   | 10.460      | 4.880        | 0.900                     | 1.770       | 1.610        |
| 45.0                                                                   | 15.0               | 44.7                | 3.320                   | 13.760      | 5.140        | 1.010                     | 2.390       | 1.620        |
| 60.0                                                                   | 15.0               | 59.4                | 4.390                   | 20.510      | 5.410        | 1.150                     | 3.060       | 1.530        |
| 75.0                                                                   | 15.1               | 73.7                | 4.620                   | 21.010      | 4.130        | 1.270                     | 3.360       | 1.180        |
| 90.0                                                                   | 14.9               | 87.7                | 4.440                   | 24.290      | 2.760        | 1.270                     | 4.400       | 0.340        |
| 105.0                                                                  | 14.8               | 102.4               | 4.810                   | 29.930      | 2.510        | 1.110                     | 5.930       | 0.660        |
| 120.0                                                                  | 14.6               | 116.8               | 3.900                   | 25.700      | 3.630        | 0.920                     | 7.380       | 0.900        |
| 135.0                                                                  | 15.0               | 133.5               | 2.160                   | 25.360      | 3.030        | 0.730                     | 8.320       | 0.960        |
| 150.0                                                                  | 15.0               | 149.2               | 1.870                   | 20.330      | 2.810        | 0.620                     | 6.430       | 0.950        |
| 165.0                                                                  | 15.0               | 164.1               | 1.670                   | 20.670      | 2.410        | 0.540                     | 3.950       | 0.900        |
| 180.0                                                                  | 15.0               | 179.2               | 1.930                   | 20.930      | 3.220        | 0.560                     | 3.490       | 1.030        |
| 195.0                                                                  | 15.1               | 194.4               | 1.600                   | 22.520      | 2.610        | 0.520                     | 4.160       | 0.870        |
| 210.0                                                                  | 15.1               | 209.7               | 2.130                   | 23.040      | 3.270        | 0.600                     | 6.150       | 0.960        |
| 225.0                                                                  | 15.0               | 226.3               | 2.950                   | 23.720      | 3.920        | 0.770                     | 8.790       | 1.060        |
| 240.0                                                                  | 14.6               | 243.5               | 4.730                   | 25.020      | 4.510        | 0.990                     | 7.850       | 1.010        |
| 255.0                                                                  | 14.5               | 258.6               | 4.620                   | 32.300      | 3.440        | 1.230                     | 6.480       | 0.750        |
| 270.0                                                                  | 14.8               | 272.6               | 4.880                   | 21.060      | 2.060        | 1.380                     | 5.250       | 0.350        |
| 285.0                                                                  | 15.2               | 286.1               | 4.440                   | 18.120      | 4.250        | 1.360                     | 3.860       | 1.190        |
| 300.0                                                                  | 15.1               | 300.0               | 4.870                   | 15.440      | 5.880        | 1.210                     | 3.310       | 1.550        |
| 315.0                                                                  | 15.0               | 314.6               | 3.540                   | 13.470      | 5.230        | 1.050                     | 2.580       | 1.650        |
| 330.0                                                                  | 15.0               | 329.5               | 2.830                   | 12.840      | 5.010        | 0.920                     | 1.970       | 1.620        |
| 345.0                                                                  | 15.0               | 344.5               | 2.950                   | 10.720      | 5.370        | 0.840                     | 1.380       | 1.590        |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.19:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 6.0$  m and  $T_p = 10.3$  s; Ship's speed is 20.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 20.2               | -0.2                | 3.180                   | 9.320       | 4.990        | 0.940                     | 1.110       | 1.510        |
| 15.0                                                                   | 20.2               | 14.8                | 3.280                   | 9.690       | 5.280        | 0.960                     | 1.280       | 1.520        |
| 30.0                                                                   | 20.2               | 29.9                | 3.720                   | 12.670      | 5.110        | 1.020                     | 1.700       | 1.550        |
| 45.0                                                                   | 20.2               | 44.9                | 3.920                   | 16.430      | 5.000        | 1.120                     | 2.190       | 1.560        |
| 60.0                                                                   | 20.2               | 59.7                | 3.830                   | 16.580      | 4.580        | 1.230                     | 2.760       | 1.480        |
| 75.0                                                                   | 20.3               | 74.2                | 4.400                   | 21.920      | 4.050        | 1.300                     | 3.110       | 1.140        |
| 90.0                                                                   | 20.2               | 88.7                | 4.430                   | 25.150      | 1.680        | 1.230                     | 4.130       | 0.290        |
| 105.0                                                                  | 20.1               | 103.7               | 5.530                   | 29.970      | 2.620        | 1.050                     | 6.530       | 0.620        |
| 120.0                                                                  | 20.2               | 118.8               | 2.850                   | 29.590      | 2.970        | 0.840                     | 10.490      | 0.770        |
| 135.0                                                                  | 20.2               | 134.7               | 1.950                   | 24.760      | 2.630        | 0.590                     | 7.860       | 0.680        |
| 150.0                                                                  | 20.3               | 149.6               | 1.830                   | 20.070      | 2.470        | 0.570                     | 5.820       | 0.850        |
| 165.0                                                                  | 20.1               | 164.5               | 1.420                   | 22.470      | 2.480        | 0.500                     | 3.600       | 0.850        |
| 180.0                                                                  | 20.6               | 179.5               | 1.280                   | 24.840      | 2.570        | 0.530                     | 3.500       | 0.830        |
| 195.0                                                                  | 20.1               | 194.4               | 1.630                   | 27.270      | 2.920        | 0.560                     | 5.050       | 0.890        |
| 210.0                                                                  | 20.2               | 209.9               | 1.600                   | 32.560      | 2.940        | 0.620                     | 7.450       | 0.960        |
| 225.0                                                                  | 20.0               | 225.5               | 2.140                   | 33.460      | 2.980        | 0.700                     | 10.620      | 0.950        |
| 240.0                                                                  | 20.2               | 241.0               | 2.960                   | 34.500      | 3.460        | 0.920                     | 11.640      | 0.950        |
| 255.0                                                                  | 19.9               | 256.9               | 4.590                   | 29.860      | 2.850        | 1.160                     | 7.620       | 0.710        |
| 270.0                                                                  | 20.1               | 271.4               | 4.800                   | 23.190      | 2.050        | 1.350                     | 5.680       | 0.310        |
| 285.0                                                                  | 20.3               | 285.7               | 4.680                   | 15.160      | 3.970        | 1.390                     | 4.110       | 1.140        |
| 300.0                                                                  | 20.3               | 300.0               | 4.230                   | 13.530      | 4.660        | 1.290                     | 3.220       | 1.490        |
| 315.0                                                                  | 20.2               | 314.8               | 4.170                   | 14.370      | 5.340        | 1.150                     | 2.490       | 1.570        |
| 330.0                                                                  | 20.2               | 329.7               | 3.630                   | 11.400      | 5.380        | 1.040                     | 1.860       | 1.560        |
| 345.0                                                                  | 20.2               | 344.8               | 3.460                   | 9.030       | 5.340        | 0.970                     | 1.320       | 1.520        |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |



**Table Q.20:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 6.0$  m and  $T_p = 10.3$  s; Ship's speed is 25.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 25.4               | -0.1                | 3.680                   | 10.340      | 4.630        | 1.050                     | 1.160       | 1.430        |
| 15.0                                                                   | 25.4               | 14.9                | 3.470                   | 10.890      | 4.400        | 1.070                     | 1.310       | 1.450        |
| 30.0                                                                   | 25.4               | 29.9                | 3.840                   | 14.120      | 4.890        | 1.130                     | 1.710       | 1.490        |
| 45.0                                                                   | 25.3               | 44.9                | 4.390                   | 15.460      | 5.210        | 1.210                     | 2.190       | 1.500        |
| 60.0                                                                   | 25.3               | 59.8                | 4.170                   | 18.820      | 4.130        | 1.300                     | 2.800       | 1.430        |
| 75.0                                                                   | 25.3               | 74.5                | 4.550                   | 21.170      | 3.500        | 1.330                     | 3.050       | 1.100        |
| 90.0                                                                   | 25.3               | 89.2                | 4.250                   | 22.180      | 2.070        | 1.200                     | 4.100       | 0.290        |
| 105.0                                                                  | 25.2               | 104.2               | 4.490                   | 39.580      | 3.770        | 1.000                     | 8.340       | 0.610        |
| 120.0                                                                  | 25.2               | 119.7               | 2.990                   | 34.920      | 3.250        | 0.800                     | 13.500      | 0.730        |
| 135.0                                                                  | 25.2               | 134.7               | 1.460                   | 26.470      | 2.690        | 0.570                     | 9.540       | 0.760        |
| 150.0                                                                  | 25.1               | 149.8               | 1.800                   | 23.430      | 2.560        | 0.550                     | 6.170       | 0.810        |
| 165.0                                                                  | 25.8               | 164.4               | 1.460                   | 22.750      | 2.180        | 0.520                     | 3.250       | 0.810        |
| 180.0                                                                  | 25.6               | 179.8               | 1.590                   | 22.640      | 2.670        | 0.480                     | 3.270       | 0.770        |
| 195.0                                                                  | 25.7               | 195.1               | 1.340                   | 24.970      | 2.510        | 0.510                     | 4.450       | 0.800        |
| 210.0                                                                  | 25.4               | 210.0               | 1.870                   | 29.360      | 2.970        | 0.570                     | 6.840       | 0.840        |
| 225.0                                                                  | 25.2               | 225.3               | 1.690                   | 40.650      | 3.040        | 0.600                     | 10.760      | 0.830        |
| 240.0                                                                  | 25.2               | 240.5               | 3.410                   | 39.210      | 3.320        | 0.800                     | 13.720      | 0.770        |
| 255.0                                                                  | 25.2               | 255.9               | 4.330                   | 30.350      | 3.020        | 1.110                     | 8.650       | 0.700        |
| 270.0                                                                  | 25.3               | 270.9               | 4.370                   | 20.820      | 1.530        | 1.310                     | 6.050       | 0.320        |
| 285.0                                                                  | 25.4               | 285.5               | 4.840                   | 15.180      | 3.690        | 1.410                     | 4.260       | 1.100        |
| 300.0                                                                  | 25.4               | 300.1               | 4.070                   | 14.090      | 4.480        | 1.350                     | 3.520       | 1.430        |
| 315.0                                                                  | 25.4               | 314.9               | 4.160                   | 13.330      | 5.300        | 1.240                     | 2.670       | 1.500        |
| 330.0                                                                  | 25.4               | 329.9               | 3.780                   | 11.590      | 5.010        | 1.140                     | 1.830       | 1.480        |
| 345.0                                                                  | 25.4               | 344.9               | 3.460                   | 9.720       | 4.650        | 1.070                     | 1.290       | 1.450        |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.21:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 6.0$  m and  $T_p = 10.3$  s; Ship's speed is 30.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 30.5               | -0.0                | 3.890                   | 11.070      | 4.700        | 1.120                     | 1.280       | 1.360        |
| 15.0                                                                   | 30.5               | 15.0                | 3.670                   | 11.770      | 4.630        | 1.140                     | 1.350       | 1.380        |
| 30.0                                                                   | 30.5               | 30.0                | 3.780                   | 16.050      | 4.600        | 1.200                     | 1.820       | 1.420        |
| 45.0                                                                   | 30.5               | 44.9                | 4.590                   | 19.390      | 4.880        | 1.280                     | 2.360       | 1.440        |
| 60.0                                                                   | 30.4               | 59.8                | 4.420                   | 20.070      | 4.190        | 1.360                     | 2.850       | 1.380        |
| 75.0                                                                   | 30.4               | 74.6                | 5.180                   | 21.560      | 3.830        | 1.360                     | 3.090       | 1.080        |
| 90.0                                                                   | 30.4               | 89.4                | 4.350                   | 22.260      | 1.460        | 1.170                     | 4.100       | 0.300        |
| 105.0                                                                  | 30.3               | 104.5               | 3.840                   | 35.100      | 3.470        | 0.950                     | 10.250      | 0.570        |
| 120.0                                                                  | 30.1               | 119.7               | 3.040                   | 38.040      | 3.090        | 0.880                     | 15.960      | 0.880        |
| 135.0                                                                  | 30.2               | 135.0               | 2.490                   | 30.640      | 2.930        | 0.630                     | 9.070       | 0.840        |
| 150.0                                                                  | 30.9               | 148.9               | 1.680                   | 27.460      | 3.250        | 0.570                     | 6.070       | 0.830        |
| 165.0                                                                  | 31.3               | 164.3               | 1.420                   | 25.540      | 2.870        | 0.430                     | 4.080       | 0.700        |
| 180.0                                                                  | 30.3               | 179.5               | 1.570                   | 28.670      | 2.530        | 0.500                     | 4.760       | 0.800        |
| 195.0                                                                  | 31.3               | 195.1               | 1.400                   | 25.400      | 2.710        | 0.420                     | 5.450       | 0.670        |
| 210.0                                                                  | 31.0               | 210.7               | 1.780                   | 25.050      | 2.600        | 0.550                     | 7.050       | 0.790        |
| 225.0                                                                  | 30.3               | 225.1               | 2.350                   | 34.090      | 3.420        | 0.650                     | 9.580       | 0.900        |
| 240.0                                                                  | 30.2               | 240.6               | 4.080                   | 42.680      | 3.270        | 0.820                     | 15.100      | 0.880        |
| 255.0                                                                  | 30.3               | 255.5               | 4.770                   | 46.490      | 4.500        | 1.060                     | 10.640      | 0.710        |
| 270.0                                                                  | 30.4               | 270.6               | 4.270                   | 22.390      | 1.320        | 1.270                     | 5.890       | 0.340        |
| 285.0                                                                  | 30.5               | 285.4               | 5.650                   | 20.610      | 4.110        | 1.430                     | 4.940       | 1.070        |
| 300.0                                                                  | 30.5               | 300.1               | 4.520                   | 15.970      | 4.660        | 1.410                     | 4.020       | 1.370        |
| 315.0                                                                  | 30.5               | 315.1               | 4.450                   | 15.310      | 4.790        | 1.310                     | 3.150       | 1.430        |
| 330.0                                                                  | 30.5               | 330.0               | 3.930                   | 11.540      | 4.820        | 1.210                     | 2.050       | 1.410        |
| 345.0                                                                  | 30.5               | 345.0               | 3.810                   | 10.560      | 4.870        | 1.150                     | 1.480       | 1.370        |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.22:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 6.0$  m and  $T_p = 16.2$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | -0.2               | -19.6               | 4.170                   | 12.320      | 5.000        | 1.180                     | 3.160       | 1.510        |
| 15.0                                                                   | -0.4               | -11.2               | 3.860                   | 11.070      | 5.110        | 1.150                     | 2.700       | 1.530        |
| 30.0                                                                   | -0.6               | -1.8                | 3.660                   | 12.250      | 5.660        | 1.140                     | 2.610       | 1.530        |
| 45.0                                                                   | -0.4               | 17.6                | 4.150                   | 17.130      | 5.610        | 1.140                     | 3.810       | 1.480        |
| 60.0                                                                   | -0.1               | 40.8                | 4.350                   | 21.120      | 4.720        | 1.210                     | 5.190       | 1.310        |
| 75.0                                                                   | 0.1                | 57.8                | 4.600                   | 22.860      | 4.120        | 1.290                     | 5.710       | 1.050        |
| 90.0                                                                   | 0.1                | 74.2                | 5.100                   | 19.620      | 3.020        | 1.370                     | 5.790       | 0.630        |
| 105.0                                                                  | -0.2               | 93.6                | 5.200                   | 20.020      | 1.440        | 1.410                     | 6.070       | 0.250        |
| 120.0                                                                  | -0.6               | 104.0               | 5.570                   | 22.930      | 2.640        | 1.380                     | 6.240       | 0.570        |
| 135.0                                                                  | -1.1               | 111.6               | 5.080                   | 21.930      | 3.250        | 1.350                     | 6.190       | 0.800        |
| 150.0                                                                  | -1.5               | 118.3               | 4.160                   | 20.400      | 3.580        | 1.310                     | 6.050       | 0.980        |
| 165.0                                                                  | -1.8               | 124.3               | 4.080                   | 18.780      | 4.200        | 1.280                     | 5.750       | 1.110        |
| 180.0                                                                  | -1.3               | 86.0                | 4.400                   | 16.020      | 4.440        | 1.220                     | 5.580       | 1.330        |
| 195.0                                                                  | 0.0                | 358.1               | 4.410                   | 15.480      | 4.710        | 1.250                     | 4.910       | 1.370        |
| 210.0                                                                  | 0.3                | 252.3               | 4.660                   | 19.420      | 3.480        | 1.440                     | 5.790       | 0.780        |
| 225.0                                                                  | 0.1                | 258.0               | 5.420                   | 19.770      | 3.380        | 1.470                     | 5.810       | 0.610        |
| 240.0                                                                  | 0.0                | 265.7               | 5.830                   | 18.770      | 2.700        | 1.500                     | 5.770       | 0.390        |
| 255.0                                                                  | 0.1                | 275.9               | 5.790                   | 18.850      | 1.980        | 1.500                     | 5.590       | 0.350        |
| 270.0                                                                  | 0.2                | 287.1               | 5.750                   | 18.720      | 2.600        | 1.470                     | 5.360       | 0.680        |
| 285.0                                                                  | 0.2                | 296.8               | 5.110                   | 18.740      | 3.020        | 1.410                     | 5.180       | 0.960        |
| 300.0                                                                  | 0.2                | 305.4               | 4.680                   | 17.410      | 3.940        | 1.360                     | 5.000       | 1.160        |
| 315.0                                                                  | 0.2                | 314.1               | 4.420                   | 16.350      | 4.420        | 1.300                     | 4.730       | 1.300        |
| 330.0                                                                  | 0.1                | 322.8               | 4.340                   | 18.150      | 4.600        | 1.260                     | 4.330       | 1.400        |
| 345.0                                                                  | -0.1               | 331.6               | 4.530                   | 15.150      | 4.510        | 1.210                     | 3.800       | 1.460        |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.23:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 6.0$  m and  $T_p = 16.2$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b>  |                     | <b>Absolute Maximum</b> |                    |                     | <b>Standard Deviation</b> |                    |                     |
|------------------------------------------------------------------------|---------------------|---------------------|-------------------------|--------------------|---------------------|---------------------------|--------------------|---------------------|
| $\psi_{MHP}$<br>deg                                                    | <b>Speed</b><br>kts | $\psi_{MHP}$<br>deg | <b>Heave</b><br>m       | <b>Roll</b><br>deg | <b>Pitch</b><br>deg | <b>Heave</b><br>m         | <b>Roll</b><br>deg | <b>Pitch</b><br>deg |
| 0.0                                                                    | 4.2                 | -13.9               | 4.500                   | 13.420             | 5.130               | 1.160                     | 3.090              | 1.540               |
| 15.0                                                                   | 4.1                 | -5.4                | 4.410                   | 12.300             | 4.710               | 1.140                     | 2.720              | 1.550               |
| 30.0                                                                   | 4.0                 | 5.6                 | 4.260                   | 12.960             | 5.230               | 1.140                     | 2.820              | 1.540               |
| 45.0                                                                   | 4.1                 | 24.0                | 4.100                   | 16.250             | 5.660               | 1.160                     | 3.760              | 1.470               |
| 60.0                                                                   | 4.2                 | 43.6                | 4.440                   | 18.070             | 4.850               | 1.240                     | 4.780              | 1.320               |
| 75.0                                                                   | 4.3                 | 58.6                | 4.530                   | 18.810             | 3.610               | 1.300                     | 5.190              | 1.060               |
| 90.0                                                                   | 4.3                 | 73.3                | 4.830                   | 18.280             | 2.300               | 1.370                     | 5.350              | 0.650               |
| 105.0                                                                  | 4.3                 | 89.5                | 5.390                   | 21.940             | 1.300               | 1.390                     | 5.650              | 0.180               |
| 120.0                                                                  | 4.2                 | 100.7               | 5.090                   | 21.520             | 2.610               | 1.380                     | 5.810              | 0.430               |
| 135.0                                                                  | 4.0                 | 109.6               | 4.570                   | 21.520             | 3.300               | 1.340                     | 5.780              | 0.690               |
| 150.0                                                                  | 3.9                 | 116.9               | 4.790                   | 20.280             | 4.090               | 1.310                     | 5.690              | 0.860               |
| 165.0                                                                  | 3.8                 | 128.1               | 4.200                   | 20.110             | 4.420               | 1.250                     | 5.180              | 1.050               |
| 180.0                                                                  | 3.9                 | 149.1               | 4.060                   | 14.990             | 4.360               | 1.160                     | 3.690              | 1.250               |
| 195.0                                                                  | 4.7                 | 194.1               | 3.760                   | 12.450             | 4.500               | 1.130                     | 3.130              | 1.320               |
| 210.0                                                                  | 4.6                 | 213.1               | 4.090                   | 14.750             | 4.220               | 1.200                     | 4.140              | 1.260               |
| 225.0                                                                  | 4.5                 | 232.8               | 5.140                   | 17.010             | 4.620               | 1.310                     | 4.950              | 1.100               |
| 240.0                                                                  | 4.5                 | 248.1               | 5.060                   | 20.180             | 3.330               | 1.400                     | 5.360              | 0.810               |
| 255.0                                                                  | 4.7                 | 260.6               | 5.010                   | 16.660             | 1.810               | 1.460                     | 5.450              | 0.440               |
| 270.0                                                                  | 4.8                 | 273.8               | 5.050                   | 19.030             | 1.240               | 1.490                     | 5.270              | 0.190               |
| 285.0                                                                  | 4.9                 | 287.5               | 5.860                   | 18.560             | 2.200               | 1.460                     | 4.930              | 0.680               |
| 300.0                                                                  | 4.9                 | 300.8               | 5.040                   | 16.690             | 4.170               | 1.380                     | 4.610              | 1.080               |
| 315.0                                                                  | 4.9                 | 313.9               | 4.520                   | 15.460             | 4.080               | 1.300                     | 4.210              | 1.320               |
| 330.0                                                                  | 4.7                 | 326.7               | 4.930                   | 15.030             | 5.030               | 1.230                     | 3.740              | 1.450               |
| 345.0                                                                  | 4.5                 | 338.6               | 4.570                   | 15.580             | 5.280               | 1.180                     | 3.330              | 1.520               |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                     |                     |                         |                    |                     |                           |                    |                     |

**Table Q.24:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 6.0$  m and  $T_p = 16.2$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 9.9                | -1.3                | 4.470                   | 10.460      | 6.030        | 1.160                     | 1.230       | 1.550        |
| 15.0                                                                   | 9.9                | 13.8                | 4.560                   | 11.390      | 6.000        | 1.170                     | 1.970       | 1.530        |
| 30.0                                                                   | 9.9                | 28.9                | 4.070                   | 13.230      | 4.880        | 1.190                     | 2.850       | 1.460        |
| 45.0                                                                   | 9.9                | 43.9                | 4.880                   | 16.430      | 4.620        | 1.250                     | 3.480       | 1.330        |
| 60.0                                                                   | 10.0               | 58.7                | 4.790                   | 17.120      | 3.300        | 1.310                     | 3.880       | 1.080        |
| 75.0                                                                   | 10.1               | 73.5                | 4.870                   | 19.400      | 2.350        | 1.370                     | 4.130       | 0.670        |
| 90.0                                                                   | 10.0               | 88.3                | 4.620                   | 19.190      | 0.640        | 1.380                     | 4.630       | 0.150        |
| 105.0                                                                  | 10.0               | 103.2               | 4.620                   | 20.210      | 1.500        | 1.340                     | 5.050       | 0.430        |
| 120.0                                                                  | 9.7                | 117.3               | 4.450                   | 21.560      | 3.010        | 1.280                     | 5.040       | 0.770        |
| 135.0                                                                  | 9.7                | 132.1               | 4.390                   | 19.800      | 3.730        | 1.200                     | 4.560       | 0.980        |
| 150.0                                                                  | 9.7                | 147.6               | 3.770                   | 18.740      | 3.670        | 1.130                     | 4.510       | 1.090        |
| 165.0                                                                  | 9.8                | 163.1               | 3.730                   | 18.650      | 4.030        | 1.090                     | 4.220       | 1.160        |
| 180.0                                                                  | 9.9                | 178.6               | 3.490                   | 16.060      | 3.770        | 1.090                     | 3.430       | 1.210        |
| 195.0                                                                  | 10.0               | 194.3               | 3.660                   | 13.920      | 3.900        | 1.110                     | 3.350       | 1.200        |
| 210.0                                                                  | 9.9                | 210.5               | 3.860                   | 14.460      | 3.820        | 1.170                     | 4.570       | 1.170        |
| 225.0                                                                  | 9.8                | 226.6               | 4.360                   | 15.180      | 3.780        | 1.250                     | 5.510       | 1.070        |
| 240.0                                                                  | 9.8                | 242.1               | 4.530                   | 15.810      | 2.940        | 1.350                     | 5.860       | 0.860        |
| 255.0                                                                  | 10.0               | 256.5               | 5.250                   | 17.950      | 1.660        | 1.430                     | 5.810       | 0.510        |
| 270.0                                                                  | 10.1               | 271.0               | 5.350                   | 18.240      | 0.720        | 1.470                     | 5.390       | 0.130        |
| 285.0                                                                  | 10.1               | 285.5               | 5.590                   | 17.270      | 2.260        | 1.450                     | 4.790       | 0.620        |
| 300.0                                                                  | 10.1               | 300.0               | 5.210                   | 16.290      | 3.590        | 1.390                     | 4.120       | 1.060        |
| 315.0                                                                  | 10.0               | 314.3               | 4.070                   | 15.110      | 4.490        | 1.310                     | 3.390       | 1.320        |
| 330.0                                                                  | 9.9                | 329.0               | 4.480                   | 12.430      | 5.050        | 1.230                     | 2.530       | 1.460        |
| 345.0                                                                  | 9.9                | 343.8               | 4.680                   | 11.550      | 5.570        | 1.190                     | 1.710       | 1.530        |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.25:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 6.0$  m and  $T_p = 16.2$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 15.1               | -0.5                | 3.780                   | 8.760       | 4.710        | 1.210                     | 1.020       | 1.520        |
| 15.0                                                                   | 15.1               | 14.6                | 4.250                   | 11.070      | 4.990        | 1.220                     | 1.740       | 1.500        |
| 30.0                                                                   | 15.1               | 29.7                | 5.210                   | 12.930      | 5.350        | 1.250                     | 2.610       | 1.440        |
| 45.0                                                                   | 15.1               | 44.7                | 4.960                   | 15.300      | 4.960        | 1.290                     | 3.250       | 1.310        |
| 60.0                                                                   | 15.1               | 59.5                | 4.360                   | 16.350      | 3.460        | 1.340                     | 3.740       | 1.060        |
| 75.0                                                                   | 15.2               | 74.4                | 5.280                   | 17.510      | 2.420        | 1.360                     | 3.660       | 0.660        |
| 90.0                                                                   | 15.2               | 89.3                | 4.610                   | 18.760      | 0.670        | 1.350                     | 4.190       | 0.180        |
| 105.0                                                                  | 15.2               | 104.2               | 4.730                   | 22.000      | 1.480        | 1.310                     | 4.870       | 0.420        |
| 120.0                                                                  | 15.1               | 118.8               | 3.950                   | 25.960      | 2.630        | 1.240                     | 5.950       | 0.710        |
| 135.0                                                                  | 15.0               | 134.0               | 4.340                   | 24.400      | 3.340        | 1.150                     | 6.220       | 0.880        |
| 150.0                                                                  | 15.1               | 149.3               | 3.260                   | 18.500      | 3.310        | 1.110                     | 4.450       | 0.990        |
| 165.0                                                                  | 15.2               | 164.4               | 3.040                   | 14.200      | 2.840        | 1.070                     | 2.360       | 1.000        |
| 180.0                                                                  | 15.1               | 179.4               | 3.070                   | 12.780      | 3.230        | 1.060                     | 2.210       | 1.050        |
| 195.0                                                                  | 15.1               | 194.6               | 3.160                   | 19.500      | 3.430        | 1.090                     | 3.390       | 1.100        |
| 210.0                                                                  | 15.1               | 209.9               | 3.280                   | 20.860      | 3.350        | 1.130                     | 5.180       | 1.060        |
| 225.0                                                                  | 15.1               | 225.6               | 4.390                   | 20.840      | 3.360        | 1.190                     | 7.420       | 0.980        |
| 240.0                                                                  | 15.1               | 241.0               | 4.590                   | 20.450      | 3.130        | 1.300                     | 7.290       | 0.800        |
| 255.0                                                                  | 15.2               | 255.6               | 5.080                   | 20.020      | 1.700        | 1.390                     | 6.500       | 0.500        |
| 270.0                                                                  | 15.2               | 270.4               | 4.950                   | 20.390      | 0.720        | 1.440                     | 5.740       | 0.170        |
| 285.0                                                                  | 15.2               | 285.2               | 6.210                   | 18.490      | 2.060        | 1.440                     | 4.990       | 0.610        |
| 300.0                                                                  | 15.2               | 299.8               | 5.210                   | 17.040      | 3.380        | 1.400                     | 4.070       | 1.050        |
| 315.0                                                                  | 15.1               | 314.5               | 5.320                   | 14.580      | 4.840        | 1.330                     | 3.070       | 1.300        |
| 330.0                                                                  | 15.1               | 329.4               | 4.970                   | 12.600      | 4.910        | 1.270                     | 2.180       | 1.440        |
| 345.0                                                                  | 15.1               | 344.4               | 4.210                   | 10.330      | 4.890        | 1.240                     | 1.330       | 1.510        |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.26:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 6.0$  m and  $T_p = 16.2$  s; Ship's speed is 20.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 20.2               | -0.2                | 4.210                   | 9.670       | 4.750        | 1.280                     | 1.080       | 1.480        |
| 15.0                                                                   | 20.2               | 14.9                | 4.510                   | 11.220      | 4.590        | 1.290                     | 1.840       | 1.470        |
| 30.0                                                                   | 20.2               | 29.9                | 4.580                   | 13.890      | 4.860        | 1.300                     | 2.680       | 1.410        |
| 45.0                                                                   | 20.3               | 44.9                | 4.430                   | 14.910      | 4.400        | 1.330                     | 3.400       | 1.280        |
| 60.0                                                                   | 20.3               | 59.8                | 5.240                   | 18.210      | 3.990        | 1.350                     | 4.070       | 1.050        |
| 75.0                                                                   | 20.3               | 74.7                | 4.990                   | 16.830      | 2.030        | 1.340                     | 3.510       | 0.660        |
| 90.0                                                                   | 20.3               | 89.6                | 4.610                   | 18.020      | 0.840        | 1.310                     | 3.990       | 0.220        |
| 105.0                                                                  | 20.3               | 104.6               | 4.170                   | 23.790      | 1.520        | 1.270                     | 4.840       | 0.400        |
| 120.0                                                                  | 20.3               | 119.4               | 4.660                   | 27.590      | 2.310        | 1.190                     | 7.990       | 0.670        |
| 135.0                                                                  | 20.2               | 134.7               | 3.510                   | 23.250      | 2.730        | 1.140                     | 7.510       | 0.890        |
| 150.0                                                                  | 20.2               | 149.6               | 3.480                   | 17.810      | 3.240        | 1.140                     | 5.070       | 1.090        |
| 165.0                                                                  | 20.3               | 164.7               | 3.460                   | 13.640      | 3.180        | 1.040                     | 2.400       | 0.970        |
| 180.0                                                                  | 20.3               | 179.7               | 3.120                   | 15.460      | 3.450        | 1.000                     | 2.070       | 1.010        |
| 195.0                                                                  | 20.3               | 194.8               | 3.790                   | 26.650      | 3.620        | 1.110                     | 3.820       | 1.090        |
| 210.0                                                                  | 20.2               | 210.0               | 3.730                   | 30.480      | 3.150        | 1.200                     | 6.360       | 1.150        |
| 225.0                                                                  | 20.3               | 224.9               | 3.330                   | 30.380      | 2.770        | 1.140                     | 7.040       | 0.840        |
| 240.0                                                                  | 20.3               | 240.5               | 4.770                   | 27.280      | 2.580        | 1.260                     | 9.220       | 0.770        |
| 255.0                                                                  | 20.3               | 255.3               | 4.930                   | 24.250      | 1.690        | 1.350                     | 6.890       | 0.480        |
| 270.0                                                                  | 20.3               | 270.2               | 5.130                   | 21.550      | 0.830        | 1.410                     | 5.930       | 0.210        |
| 285.0                                                                  | 20.3               | 285.1               | 5.530                   | 19.940      | 2.160        | 1.430                     | 5.120       | 0.610        |
| 300.0                                                                  | 20.3               | 299.8               | 5.800                   | 19.850      | 3.790        | 1.410                     | 4.040       | 1.030        |
| 315.0                                                                  | 20.3               | 314.7               | 4.530                   | 16.080      | 4.390        | 1.380                     | 2.940       | 1.280        |
| 330.0                                                                  | 20.2               | 329.6               | 5.370                   | 13.430      | 4.660        | 1.330                     | 2.010       | 1.400        |
| 345.0                                                                  | 20.2               | 344.7               | 4.210                   | 10.700      | 4.680        | 1.300                     | 1.140       | 1.470        |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.27: Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 6.0$  m and  $T_p = 16.2$  s; Ship's speed is 25.0 Knots**

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 25.3               | -0.1                | 5.400                   | 10.840      | 5.190        | 1.360                     | 1.230       | 1.440        |
| 15.0                                                                   | 25.3               | 15.0                | 4.990                   | 12.280      | 5.140        | 1.360                     | 1.920       | 1.430        |
| 30.0                                                                   | 25.3               | 30.0                | 4.810                   | 14.410      | 4.500        | 1.370                     | 2.770       | 1.370        |
| 45.0                                                                   | 25.4               | 45.0                | 5.300                   | 16.270      | 4.460        | 1.380                     | 3.580       | 1.260        |
| 60.0                                                                   | 25.4               | 60.0                | 5.200                   | 19.000      | 3.440        | 1.370                     | 4.340       | 1.040        |
| 75.0                                                                   | 25.4               | 74.8                | 5.650                   | 19.560      | 2.420        | 1.330                     | 3.510       | 0.670        |
| 90.0                                                                   | 25.4               | 89.7                | 4.590                   | 18.570      | 0.960        | 1.270                     | 4.030       | 0.250        |
| 105.0                                                                  | 25.4               | 104.8               | 4.680                   | 23.660      | 1.430        | 1.220                     | 4.960       | 0.370        |
| 120.0                                                                  | 25.3               | 119.8               | 4.480                   | 32.560      | 2.710        | 1.160                     | 9.720       | 0.640        |
| 135.0                                                                  | 25.3               | 134.8               | 3.560                   | 23.450      | 2.500        | 1.110                     | 7.410       | 0.810        |
| 150.0                                                                  | 25.4               | 149.7               | 2.890                   | 21.890      | 2.850        | 0.920                     | 5.070       | 0.850        |
| 165.0                                                                  | 25.6               | 164.8               | 2.350                   | 13.630      | 2.420        | 0.810                     | 2.330       | 0.820        |
| 180.0                                                                  | 25.6               | 179.8               | 3.620                   | 15.360      | 3.230        | 1.290                     | 1.800       | 1.100        |
| 195.0                                                                  | 25.6               | 195.0               | 2.060                   | 17.980      | 2.240        | 0.670                     | 2.500       | 0.770        |
| 210.0                                                                  | 25.4               | 210.1               | 3.310                   | 31.130      | 2.910        | 1.270                     | 6.480       | 1.040        |
| 225.0                                                                  | 25.3               | 225.2               | 3.710                   | 39.620      | 2.960        | 1.210                     | 9.200       | 0.980        |
| 240.0                                                                  | 25.4               | 240.2               | 3.900                   | 35.770      | 2.470        | 1.210                     | 9.630       | 0.700        |
| 255.0                                                                  | 25.4               | 255.1               | 5.120                   | 28.180      | 1.700        | 1.320                     | 6.890       | 0.470        |
| 270.0                                                                  | 25.4               | 270.1               | 4.980                   | 25.180      | 0.940        | 1.380                     | 5.880       | 0.250        |
| 285.0                                                                  | 25.4               | 285.0               | 5.330                   | 23.130      | 2.130        | 1.420                     | 5.170       | 0.620        |
| 300.0                                                                  | 25.4               | 299.8               | 5.880                   | 18.740      | 3.410        | 1.430                     | 3.860       | 1.010        |
| 315.0                                                                  | 25.4               | 314.8               | 5.420                   | 17.510      | 4.090        | 1.420                     | 2.700       | 1.240        |
| 330.0                                                                  | 25.3               | 329.8               | 4.670                   | 14.100      | 4.290        | 1.390                     | 1.750       | 1.360        |
| 345.0                                                                  | 25.3               | 344.8               | 4.900                   | 11.040      | 4.960        | 1.370                     | 1.100       | 1.420        |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |



**Table Q.28:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 6.0$  m and  $T_p = 16.2$  s; Ship's speed is 30.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 30.5               | -0.0                | 5.130                   | 11.800      | 4.600        | 1.430                     | 1.380       | 1.390        |
| 15.0                                                                   | 30.5               | 15.0                | 5.220                   | 13.620      | 4.380        | 1.430                     | 2.020       | 1.380        |
| 30.0                                                                   | 30.5               | 30.1                | 5.600                   | 14.690      | 4.770        | 1.430                     | 2.780       | 1.330        |
| 45.0                                                                   | 30.5               | 45.1                | 4.940                   | 16.980      | 4.250        | 1.420                     | 3.660       | 1.230        |
| 60.0                                                                   | 30.4               | 60.0                | 4.830                   | 19.830      | 3.150        | 1.400                     | 4.640       | 1.020        |
| 75.0                                                                   | 30.5               | 74.9                | 4.420                   | 16.670      | 2.150        | 1.320                     | 3.590       | 0.670        |
| 90.0                                                                   | 30.5               | 89.8                | 4.730                   | 20.710      | 1.130        | 1.240                     | 4.290       | 0.290        |
| 105.0                                                                  | 30.5               | 104.8               | 4.060                   | 21.610      | 1.350        | 1.180                     | 5.430       | 0.350        |
| 120.0                                                                  | 30.4               | 119.9               | 3.670                   | 31.870      | 2.330        | 1.150                     | 11.460      | 0.670        |
| 135.0                                                                  | 30.4               | 134.8               | 3.660                   | 29.560      | 2.890        | 1.200                     | 8.990       | 0.870        |
| 150.0                                                                  | 30.8               | 149.6               | 2.920                   | 19.560      | 2.970        | 0.840                     | 4.520       | 0.850        |
| 165.0                                                                  | 30.8               | 164.7               | 3.030                   | 15.720      | 3.870        | 1.000                     | 2.760       | 0.980        |
| 180.0                                                                  | 30.5               | 179.7               | 2.680                   | 22.230      | 2.750        | 1.000                     | 2.550       | 1.020        |
| 195.0                                                                  | 30.9               | 195.0               | 2.930                   | 22.310      | 3.030        | 0.990                     | 3.470       | 0.960        |
| 210.0                                                                  | 30.7               | 210.1               | 2.520                   | 22.990      | 2.590        | 0.880                     | 5.110       | 0.820        |
| 225.0                                                                  | 30.4               | 225.1               | 2.980                   | 33.760      | 2.140        | 1.170                     | 8.260       | 0.800        |
| 240.0                                                                  | 30.4               | 240.1               | 3.310                   | 36.770      | 1.960        | 1.150                     | 9.730       | 0.620        |
| 255.0                                                                  | 30.5               | 255.1               | 4.530                   | 30.530      | 1.590        | 1.270                     | 6.450       | 0.460        |
| 270.0                                                                  | 30.5               | 270.0               | 4.750                   | 24.900      | 1.050        | 1.340                     | 5.460       | 0.290        |
| 285.0                                                                  | 30.5               | 285.0               | 4.620                   | 23.520      | 2.170        | 1.400                     | 5.000       | 0.620        |
| 300.0                                                                  | 30.5               | 299.9               | 5.330                   | 19.520      | 3.130        | 1.450                     | 3.620       | 0.990        |
| 315.0                                                                  | 30.5               | 314.9               | 5.090                   | 18.380      | 4.040        | 1.460                     | 2.560       | 1.200        |
| 330.0                                                                  | 30.5               | 329.9               | 5.450                   | 14.490      | 4.810        | 1.450                     | 1.690       | 1.320        |
| 345.0                                                                  | 30.5               | 344.9               | 5.200                   | 12.370      | 4.480        | 1.440                     | 1.240       | 1.370        |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.29:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 9.0$  m and  $T_p = 13.1$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                  | <b>Absolute Maximum</b> |          |           | <b>Standard Deviation</b> |          |           |
|------------------------------------------------------------------------|--------------------|------------------|-------------------------|----------|-----------|---------------------------|----------|-----------|
| $\psi_{MHP}$ deg                                                       | Speed kts          | $\psi_{MHP}$ deg | Heave m                 | Roll deg | Pitch deg | Heave m                   | Roll deg | Pitch deg |
| 0.0                                                                    | -1.0               | -32.0            | 5.530                   | 24.400   | 7.550     | 1.570                     | 6.800    | 2.400     |
| 15.0                                                                   | -1.6               | -24.8            | 5.480                   | 22.120   | 9.430     | 1.520                     | 6.740    | 2.440     |
| 30.0                                                                   | -3.1               | -86.6            | 6.500                   | 40.050   | 9.070     | 1.640                     | 9.770    | 2.100     |
| 45.0                                                                   | -3.0               | -71.3            | 6.270                   | 33.460   | 7.930     | 1.690                     | 10.140   | 1.980     |
| 60.0                                                                   | -2.5               | -84.7            | 7.070                   | 33.120   | 8.080     | 1.840                     | 10.210   | 1.530     |
| 75.0                                                                   | -0.5               | -74.5            | 7.360                   | 39.000   | 7.660     | 1.920                     | 9.900    | 1.070     |
| 90.0                                                                   | 0.2                | 62.4             | 6.650                   | 31.860   | 5.920     | 1.770                     | 8.390    | 1.740     |
| 105.0                                                                  | 0.3                | 87.5             | 7.780                   | 32.570   | 4.210     | 1.970                     | 9.060    | 0.700     |
| 120.0                                                                  | -2.6               | 104.1            | 7.880                   | 32.110   | 4.970     | 1.920                     | 9.500    | 1.180     |
| 135.0                                                                  | -3.6               | 108.0            | 8.380                   | 33.840   | 5.460     | 1.890                     | 9.310    | 1.400     |
| 150.0                                                                  | -4.1               | 81.2             | 6.390                   | 29.210   | 9.470     | 1.770                     | 10.270   | 1.770     |
| 165.0                                                                  | -2.9               | 44.8             | 7.540                   | 32.220   | 8.420     | 1.660                     | 9.120    | 2.170     |
| 180.0                                                                  | -1.0               | 11.2             | 5.440                   | 23.570   | 8.470     | 1.560                     | 7.420    | 2.380     |
| 195.0                                                                  | -0.3               | 31.9             | 6.050                   | 30.900   | 7.570     | 1.660                     | 7.630    | 2.330     |
| 210.0                                                                  | 0.2                | 39.3             | 7.160                   | 26.900   | 6.860     | 1.750                     | 7.830    | 2.240     |
| 225.0                                                                  | 0.4                | 273.9            | 8.100                   | 32.180   | 5.490     | 2.150                     | 8.980    | 0.920     |
| 240.0                                                                  | -0.1               | 274.4            | 8.080                   | 33.160   | 4.200     | 2.190                     | 9.030    | 0.760     |
| 255.0                                                                  | 0.5                | 282.3            | 7.970                   | 32.860   | 4.940     | 2.160                     | 8.610    | 1.100     |
| 270.0                                                                  | 0.7                | 288.3            | 7.860                   | 29.440   | 5.400     | 2.110                     | 8.520    | 1.450     |
| 285.0                                                                  | 0.7                | 294.8            | 8.380                   | 27.780   | 5.540     | 2.010                     | 8.130    | 1.780     |
| 300.0                                                                  | 0.5                | 299.8            | 7.020                   | 28.780   | 6.940     | 1.910                     | 7.950    | 1.980     |
| 315.0                                                                  | 0.5                | 306.0            | 7.440                   | 28.850   | 7.000     | 1.820                     | 7.730    | 2.160     |
| 330.0                                                                  | 0.2                | 311.9            | 7.240                   | 30.530   | 7.750     | 1.740                     | 7.860    | 2.260     |
| 345.0                                                                  | -0.0               | 319.7            | 6.980                   | 25.210   | 8.310     | 1.650                     | 7.120    | 2.370     |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                  |                         |          |           |                           |          |           |

**Table Q.30:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 9.0$  m and  $T_p = 13.1$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b>  |                     | <b>Absolute Maximum</b> |                    |                     | <b>Standard Deviation</b> |                    |                     |
|------------------------------------------------------------------------|---------------------|---------------------|-------------------------|--------------------|---------------------|---------------------------|--------------------|---------------------|
| $\psi_{MHP}$<br>deg                                                    | <b>Speed</b><br>kts | $\psi_{MHP}$<br>deg | <b>Heave</b><br>m       | <b>Roll</b><br>deg | <b>Pitch</b><br>deg | <b>Heave</b><br>m         | <b>Roll</b><br>deg | <b>Pitch</b><br>deg |
| 0.0                                                                    | 3.6                 | -32.7               | 6.140                   | 24.550             | 7.840               | 1.580                     | 7.010              | 2.450               |
| 15.0                                                                   | 3.4                 | -24.6               | 5.560                   | 23.800             | 8.240               | 1.510                     | 6.580              | 2.480               |
| 30.0                                                                   | 3.3                 | -17.7               | 5.250                   | 22.200             | 8.200               | 1.450                     | 6.390              | 2.500               |
| 45.0                                                                   | 3.1                 | -10.1               | 5.220                   | 23.980             | 8.150               | 1.430                     | 6.280              | 2.500               |
| 60.0                                                                   | 3.1                 | -0.1                | 4.550                   | 24.380             | 9.640               | 1.430                     | 6.160              | 2.480               |
| 75.0                                                                   | 3.2                 | 11.7                | 5.360                   | 26.510             | 8.410               | 1.470                     | 6.800              | 2.400               |
| 90.0                                                                   | 3.5                 | 35.9                | 5.820                   | 28.800             | 8.460               | 1.610                     | 7.830              | 2.190               |
| 105.0                                                                  | 3.3                 | 33.0                | 6.420                   | 38.070             | 8.680               | 1.580                     | 7.740              | 2.230               |
| 120.0                                                                  | 3.7                 | 64.9                | 7.540                   | 35.130             | 8.380               | 1.810                     | 8.740              | 1.620               |
| 135.0                                                                  | 3.2                 | 33.9                | 5.820                   | 45.140             | 8.240               | 1.570                     | 7.500              | 2.280               |
| 150.0                                                                  | 3.3                 | 43.2                | 6.610                   | 28.610             | 7.770               | 1.610                     | 7.660              | 2.250               |
| 165.0                                                                  | 3.4                 | 43.8                | 5.540                   | 23.830             | 8.040               | 1.620                     | 7.310              | 2.320               |
| 180.0                                                                  | 3.8                 | 96.3                | 6.250                   | 24.560             | 7.250               | 1.540                     | 8.750              | 2.230               |
| 195.0                                                                  | 3.9                 | 15.4                | 5.640                   | 26.970             | 7.940               | 1.650                     | 8.210              | 2.310               |
| 210.0                                                                  | 4.1                 | 30.3                | 5.710                   | 27.820             | 7.780               | 1.730                     | 8.030              | 2.250               |
| 225.0                                                                  | 4.5                 | 276.9               | 8.500                   | 34.160             | 6.610               | 2.140                     | 8.720              | 0.920               |
| 240.0                                                                  | 4.4                 | 278.6               | 8.000                   | 32.750             | 4.860               | 2.160                     | 8.430              | 0.930               |
| 255.0                                                                  | 4.3                 | 282.7               | 8.210                   | 31.270             | 5.240               | 2.140                     | 8.400              | 1.100               |
| 270.0                                                                  | 4.4                 | 288.0               | 8.740                   | 29.270             | 5.380               | 2.100                     | 7.820              | 1.430               |
| 285.0                                                                  | 4.5                 | 293.0               | 7.260                   | 28.390             | 8.040               | 2.030                     | 7.380              | 1.730               |
| 300.0                                                                  | 4.6                 | 300.8               | 7.000                   | 26.270             | 6.640               | 1.910                     | 7.170              | 2.040               |
| 315.0                                                                  | 4.4                 | 308.9               | 6.670                   | 30.410             | 6.480               | 1.790                     | 7.600              | 2.240               |
| 330.0                                                                  | 4.1                 | 315.7               | 6.460                   | 27.460             | 7.000               | 1.710                     | 7.350              | 2.330               |
| 345.0                                                                  | 3.9                 | 321.6               | 5.920                   | 26.470             | 8.420               | 1.640                     | 7.260              | 2.410               |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                     |                     |                         |                    |                     |                           |                    |                     |

**Table Q.31:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 9.0$  m and  $T_p = 13.1$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 8.9                | -5.5                | 6.110                   | 21.580      | 9.010        | 1.460                     | 4.180       | 2.500        |
| 15.0                                                                   | 8.6                | 8.2                 | 5.400                   | 21.390      | 8.770        | 1.440                     | 4.360       | 2.480        |
| 30.0                                                                   | 8.9                | 25.0                | 5.630                   | 22.040      | 8.560        | 1.500                     | 4.930       | 2.420        |
| 45.0                                                                   | 9.1                | 41.0                | 5.120                   | 24.590      | 7.450        | 1.620                     | 5.690       | 2.310        |
| 60.0                                                                   | 9.3                | 56.0                | 6.510                   | 25.920      | 6.480        | 1.760                     | 6.120       | 2.040        |
| 75.0                                                                   | 9.6                | 70.8                | 7.450                   | 30.290      | 6.290        | 1.910                     | 6.600       | 1.500        |
| 90.0                                                                   | 9.2                | 82.7                | 7.290                   | 29.600      | 2.920        | 1.980                     | 7.980       | 0.710        |
| 105.0                                                                  | 8.9                | 94.7                | 7.650                   | 36.570      | 3.300        | 1.940                     | 8.830       | 0.520        |
| 120.0                                                                  | 8.4                | 107.6               | 7.680                   | 38.840      | 4.090        | 1.820                     | 8.540       | 1.070        |
| 135.0                                                                  | 8.3                | 120.1               | 5.870                   | 32.350      | 5.120        | 1.670                     | 7.740       | 1.420        |
| 150.0                                                                  | 8.3                | 135.6               | 5.830                   | 28.220      | 5.700        | 1.500                     | 7.090       | 1.650        |
| 165.0                                                                  | 8.6                | 154.1               | 4.940                   | 27.050      | 5.920        | 1.340                     | 7.280       | 1.710        |
| 180.0                                                                  | 9.4                | 176.8               | 3.300                   | 26.060      | 5.650        | 1.260                     | 6.650       | 1.790        |
| 195.0                                                                  | 9.5                | 196.0               | 4.980                   | 24.470      | 7.120        | 1.330                     | 5.910       | 1.830        |
| 210.0                                                                  | 9.0                | 219.7               | 5.400                   | 25.650      | 5.650        | 1.550                     | 7.180       | 1.850        |
| 225.0                                                                  | 8.3                | 253.8               | 8.840                   | 45.720      | 5.860        | 1.980                     | 8.790       | 1.240        |
| 240.0                                                                  | 8.4                | 263.7               | 9.080                   | 43.660      | 5.050        | 2.100                     | 9.050       | 0.830        |
| 255.0                                                                  | 8.6                | 271.4               | 9.100                   | 37.930      | 3.620        | 2.150                     | 8.790       | 0.640        |
| 270.0                                                                  | 8.9                | 278.8               | 9.170                   | 35.610      | 5.360        | 2.160                     | 8.390       | 0.830        |
| 285.0                                                                  | 9.7                | 288.4               | 7.360                   | 31.190      | 4.780        | 2.110                     | 7.460       | 1.470        |
| 300.0                                                                  | 9.8                | 300.2               | 6.780                   | 26.380      | 6.930        | 1.950                     | 6.400       | 2.010        |
| 315.0                                                                  | 9.6                | 313.2               | 5.820                   | 27.610      | 7.140        | 1.770                     | 5.820       | 2.300        |
| 330.0                                                                  | 9.4                | 326.9               | 5.920                   | 26.210      | 8.590        | 1.620                     | 5.350       | 2.440        |
| 345.0                                                                  | 9.1                | 340.6               | 6.320                   | 24.480      | 8.700        | 1.510                     | 4.790       | 2.500        |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.32:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 9.0$  m and  $T_p = 13.1$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 14.7               | -1.3                | 5.930                   | 19.580      | 7.750        | 1.580                     | 2.940       | 2.430        |
| 15.0                                                                   | 14.7               | 13.9                | 5.860                   | 18.060      | 7.510        | 1.590                     | 3.300       | 2.410        |
| 30.0                                                                   | 14.7               | 29.1                | 5.080                   | 19.890      | 6.830        | 1.650                     | 3.920       | 2.360        |
| 45.0                                                                   | 14.8               | 44.3                | 7.040                   | 23.380      | 7.620        | 1.740                     | 4.460       | 2.220        |
| 60.0                                                                   | 14.9               | 58.9                | 6.270                   | 27.550      | 6.530        | 1.860                     | 5.200       | 1.950        |
| 75.0                                                                   | 15.0               | 73.3                | 7.710                   | 28.630      | 4.130        | 1.950                     | 5.930       | 1.380        |
| 90.0                                                                   | 14.9               | 87.8                | 7.390                   | 30.800      | 2.420        | 1.930                     | 7.560       | 0.410        |
| 105.0                                                                  | 14.9               | 102.9               | 7.850                   | 39.410      | 3.020        | 1.820                     | 8.730       | 0.740        |
| 120.0                                                                  | 14.4               | 116.4               | 5.660                   | 30.610      | 3.880        | 1.640                     | 8.230       | 1.140        |
| 135.0                                                                  | 14.4               | 131.7               | 4.580                   | 29.530      | 4.590        | 1.470                     | 8.720       | 1.350        |
| 150.0                                                                  | 15.1               | 148.7               | 3.750                   | 25.800      | 5.130        | 1.350                     | 7.170       | 1.480        |
| 165.0                                                                  | 15.0               | 163.5               | 3.880                   | 26.070      | 5.290        | 1.250                     | 4.750       | 1.450        |
| 180.0                                                                  | 14.7               | 178.5               | 3.750                   | 24.490      | 4.780        | 1.220                     | 5.040       | 1.510        |
| 195.0                                                                  | 14.7               | 194.2               | 3.590                   | 28.910      | 5.400        | 1.250                     | 6.080       | 1.590        |
| 210.0                                                                  | 15.0               | 209.9               | 4.000                   | 30.450      | 4.850        | 1.370                     | 7.480       | 1.610        |
| 225.0                                                                  | 14.4               | 229.8               | 7.940                   | 40.220      | 7.770        | 1.580                     | 10.240      | 1.460        |
| 240.0                                                                  | 14.0               | 247.1               | 8.720                   | 39.730      | 5.230        | 1.860                     | 10.310      | 1.280        |
| 255.0                                                                  | 14.2               | 260.4               | 10.100                  | 51.540      | 3.110        | 2.030                     | 10.110      | 0.800        |
| 270.0                                                                  | 14.6               | 273.5               | 8.130                   | 32.610      | 2.360        | 2.140                     | 9.080       | 0.490        |
| 285.0                                                                  | 15.0               | 286.7               | 8.010                   | 30.940      | 4.700        | 2.130                     | 7.880       | 1.360        |
| 300.0                                                                  | 15.0               | 300.0               | 7.800                   | 24.250      | 6.740        | 2.010                     | 6.170       | 1.960        |
| 315.0                                                                  | 14.9               | 314.0               | 7.200                   | 25.860      | 7.680        | 1.850                     | 4.910       | 2.240        |
| 330.0                                                                  | 14.8               | 328.7               | 5.980                   | 21.760      | 7.060        | 1.710                     | 3.980       | 2.380        |
| 345.0                                                                  | 14.7               | 343.6               | 5.870                   | 20.180      | 8.200        | 1.620                     | 3.350       | 2.420        |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.33:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 9.0$  m and  $T_p = 13.1$  s; Ship's speed is 20.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 20.0               | -0.5                | 6.360                   | 15.740      | 7.510        | 1.730                     | 2.640       | 2.320        |
| 15.0                                                                   | 20.0               | 14.6                | 6.140                   | 17.050      | 7.170        | 1.740                     | 3.070       | 2.310        |
| 30.0                                                                   | 20.0               | 29.8                | 6.200                   | 19.340      | 6.810        | 1.780                     | 3.600       | 2.270        |
| 45.0                                                                   | 20.0               | 44.8                | 6.380                   | 24.130      | 6.740        | 1.850                     | 4.150       | 2.150        |
| 60.0                                                                   | 20.1               | 59.5                | 7.680                   | 25.960      | 6.170        | 1.930                     | 4.760       | 1.900        |
| 75.0                                                                   | 20.2               | 74.0                | 8.350                   | 32.860      | 4.780        | 1.960                     | 5.770       | 1.340        |
| 90.0                                                                   | 20.1               | 88.7                | 7.240                   | 31.020      | 2.390        | 1.880                     | 7.490       | 0.400        |
| 105.0                                                                  | 20.1               | 104.0               | 6.630                   | 35.520      | 3.580        | 1.740                     | 9.360       | 0.710        |
| 120.0                                                                  | 19.9               | 118.4               | 5.110                   | 33.370      | 4.460        | 1.570                     | 11.260      | 1.050        |
| 135.0                                                                  | 19.9               | 134.3               | 4.780                   | 35.740      | 4.790        | 1.460                     | 11.150      | 1.380        |
| 150.0                                                                  | 19.9               | 149.2               | 3.680                   | 27.460      | 4.190        | 1.300                     | 6.980       | 1.390        |
| 165.0                                                                  | 20.0               | 164.1               | 3.340                   | 25.260      | 4.990        | 1.240                     | 4.980       | 1.520        |
| 180.0                                                                  | 20.3               | 179.2               | 3.060                   | 28.370      | 4.250        | 1.290                     | 4.650       | 1.460        |
| 195.0                                                                  | 20.2               | 194.7               | 3.330                   | 32.330      | 4.740        | 1.230                     | 6.470       | 1.510        |
| 210.0                                                                  | 20.1               | 210.1               | 3.450                   | 38.620      | 4.690        | 1.290                     | 9.200       | 1.420        |
| 225.0                                                                  | 20.0               | 225.4               | 4.860                   | 37.470      | 4.650        | 1.400                     | 11.260      | 1.310        |
| 240.0                                                                  | 19.8               | 242.3               | 8.260                   | 36.770      | 4.730        | 1.690                     | 12.850      | 1.230        |
| 255.0                                                                  | 19.8               | 257.5               | 9.030                   | 41.030      | 2.800        | 1.950                     | 11.390      | 0.850        |
| 270.0                                                                  | 20.0               | 271.9               | 8.110                   | 31.610      | 2.610        | 2.100                     | 9.810       | 0.450        |
| 285.0                                                                  | 20.2               | 286.0               | 7.340                   | 28.800      | 4.410        | 2.140                     | 8.240       | 1.310        |
| 300.0                                                                  | 20.2               | 299.9               | 7.660                   | 30.570      | 6.600        | 2.060                     | 6.000       | 1.900        |
| 315.0                                                                  | 20.1               | 314.4               | 6.790                   | 21.040      | 7.210        | 1.940                     | 4.490       | 2.170        |
| 330.0                                                                  | 20.1               | 329.3               | 6.140                   | 21.300      | 7.500        | 1.830                     | 3.720       | 2.280        |
| 345.0                                                                  | 20.0               | 344.3               | 6.290                   | 18.940      | 7.560        | 1.770                     | 3.180       | 2.320        |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.34:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 9.0$  m and  $T_p = 13.1$  s; Ship's speed is 25.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 25.2               | -0.2                | 6.640                   | 15.530      | 6.990        | 1.860                     | 2.680       | 2.210        |
| 15.0                                                                   | 25.2               | 14.9                | 7.180                   | 17.550      | 7.270        | 1.860                     | 2.900       | 2.200        |
| 30.0                                                                   | 25.2               | 30.0                | 6.530                   | 20.860      | 7.190        | 1.900                     | 3.620       | 2.180        |
| 45.0                                                                   | 25.2               | 45.0                | 6.320                   | 25.220      | 6.570        | 1.950                     | 4.070       | 2.080        |
| 60.0                                                                   | 25.2               | 59.7                | 6.470                   | 24.840      | 5.460        | 1.980                     | 4.640       | 1.840        |
| 75.0                                                                   | 25.2               | 74.3                | 6.870                   | 30.150      | 4.000        | 1.970                     | 5.760       | 1.320        |
| 90.0                                                                   | 25.2               | 89.1                | 7.180                   | 31.170      | 2.420        | 1.830                     | 7.850       | 0.440        |
| 105.0                                                                  | 25.2               | 104.4               | 5.960                   | 34.150      | 3.240        | 1.670                     | 10.560      | 0.670        |
| 120.0                                                                  | 25.0               | 119.4               | 5.410                   | 44.940      | 5.600        | 1.550                     | 14.900      | 1.070        |
| 135.0                                                                  | 24.9               | 134.0               | 4.320                   | 36.880      | 4.550        | 1.330                     | 11.470      | 1.220        |
| 150.0                                                                  | 25.1               | 149.2               | 3.600                   | 32.680      | 4.890        | 1.290                     | 7.960       | 1.340        |
| 165.0                                                                  | 25.7               | 164.2               | 3.320                   | 27.820      | 4.030        | 1.190                     | 4.860       | 1.380        |
| 180.0                                                                  | 26.2               | 179.6               | 3.260                   | 26.250      | 4.030        | 1.210                     | 3.910       | 1.420        |
| 195.0                                                                  | 25.8               | 195.0               | 3.370                   | 28.170      | 3.790        | 1.190                     | 5.240       | 1.360        |
| 210.0                                                                  | 25.2               | 209.9               | 3.490                   | 34.210      | 4.380        | 1.120                     | 8.230       | 1.310        |
| 225.0                                                                  | 25.0               | 225.4               | 4.280                   | 39.560      | 4.260        | 1.310                     | 12.530      | 1.210        |
| 240.0                                                                  | 25.0               | 240.5               | 5.600                   | 46.070      | 5.520        | 1.590                     | 16.390      | 1.250        |
| 255.0                                                                  | 25.0               | 256.3               | 8.830                   | 41.750      | 3.310        | 1.860                     | 12.450      | 0.840        |
| 270.0                                                                  | 25.1               | 271.1               | 7.210                   | 39.370      | 2.840        | 2.050                     | 10.600      | 0.480        |
| 285.0                                                                  | 25.3               | 285.7               | 7.860                   | 31.960      | 4.240        | 2.150                     | 8.640       | 1.290        |
| 300.0                                                                  | 25.3               | 300.0               | 6.980                   | 26.430      | 5.950        | 2.110                     | 5.990       | 1.840        |
| 315.0                                                                  | 25.3               | 314.7               | 7.150                   | 21.870      | 6.660        | 2.030                     | 4.580       | 2.090        |
| 330.0                                                                  | 25.3               | 329.6               | 7.570                   | 18.090      | 7.110        | 1.950                     | 3.520       | 2.180        |
| 345.0                                                                  | 25.2               | 344.7               | 6.830                   | 16.770      | 7.300        | 1.890                     | 3.000       | 2.210        |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.35: Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 9.0$  m and  $T_p = 13.1$  s; Ship's speed is 30.0 Knots**

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 30.4               | -0.0                | 6.530                   | 16.880      | 6.400        | 1.970                     | 2.700       | 2.110        |
| 15.0                                                                   | 30.4               | 15.1                | 6.370                   | 18.450      | 6.190        | 1.980                     | 3.080       | 2.110        |
| 30.0                                                                   | 30.4               | 30.1                | 7.380                   | 23.700      | 6.930        | 2.010                     | 3.640       | 2.090        |
| 45.0                                                                   | 30.4               | 45.0                | 7.130                   | 26.810      | 7.150        | 2.040                     | 4.140       | 2.000        |
| 60.0                                                                   | 30.3               | 59.8                | 7.370                   | 24.410      | 5.600        | 2.040                     | 4.590       | 1.790        |
| 75.0                                                                   | 30.3               | 74.5                | 7.840                   | 32.880      | 4.170        | 1.980                     | 6.000       | 1.300        |
| 90.0                                                                   | 30.3               | 89.3                | 7.170                   | 36.260      | 3.050        | 1.790                     | 8.480       | 0.490        |
| 105.0                                                                  | 30.2               | 104.5               | 8.350                   | 44.570      | 5.160        | 1.630                     | 12.100      | 0.690        |
| 120.0                                                                  | 29.9               | 119.2               | 5.440                   | 47.540      | 3.630        | 1.440                     | 15.530      | 0.970        |
| 135.0                                                                  | 29.6               | 133.6               | 5.190                   | 45.790      | 4.470        | 1.510                     | 13.180      | 1.390        |
| 150.0                                                                  | 30.6               | 148.6               | 3.460                   | 31.160      | 4.330        | 1.320                     | 8.800       | 1.410        |
| 165.0                                                                  | 30.9               | 163.5               | 4.020                   | 34.980      | 4.950        | 1.230                     | 6.490       | 1.520        |
| 180.0                                                                  | 31.5               | 179.1               | 6.910                   | 34.530      | 9.120        | 1.150                     | 6.020       | 1.480        |
| 195.0                                                                  | 31.1               | 194.7               | 5.240                   | 32.960      | 6.810        | 1.200                     | 7.060       | 1.530        |
| 210.0                                                                  | 30.8               | 210.7               | 3.680                   | 37.190      | 4.510        | 1.350                     | 9.580       | 1.490        |
| 225.0                                                                  | 29.7               | 226.5               | 5.820                   | 47.680      | 5.130        | 1.780                     | 14.440      | 1.710        |
| 240.0                                                                  | 30.0               | 240.6               | 5.480                   | 50.950      | 4.060        | 1.460                     | 16.320      | 1.080        |
| 255.0                                                                  | 30.2               | 255.6               | 7.710                   | 47.940      | 3.690        | 1.760                     | 13.020      | 0.870        |
| 270.0                                                                  | 30.3               | 270.7               | 7.880                   | 41.080      | 2.290        | 1.980                     | 10.710      | 0.530        |
| 285.0                                                                  | 30.4               | 285.6               | 8.950                   | 36.600      | 4.090        | 2.140                     | 9.370       | 1.260        |
| 300.0                                                                  | 30.4               | 300.1               | 7.110                   | 25.780      | 5.420        | 2.150                     | 6.240       | 1.780        |
| 315.0                                                                  | 30.4               | 314.9               | 7.280                   | 24.050      | 6.770        | 2.110                     | 4.740       | 2.000        |
| 330.0                                                                  | 30.4               | 329.9               | 7.750                   | 21.470      | 7.230        | 2.050                     | 3.920       | 2.080        |
| 345.0                                                                  | 30.4               | 344.9               | 6.260                   | 18.990      | 6.420        | 1.990                     | 3.100       | 2.100        |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |



**Table Q.36:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 9.0$  m and  $T_p = 18.5$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | -1.2               | -28.3               | 6.940                   | 21.530      | 6.530        | 1.960                     | 5.300       | 1.890        |
| 15.0                                                                   | -2.4               | -147.7              | 6.610                   | 25.700      | 6.560        | 1.880                     | 5.740       | 1.820        |
| 30.0                                                                   | -1.7               | -66.4               | 6.290                   | 26.180      | 8.730        | 1.910                     | 9.150       | 1.820        |
| 45.0                                                                   | -0.1               | 23.7                | 6.560                   | 23.540      | 7.480        | 1.860                     | 5.570       | 1.890        |
| 60.0                                                                   | 0.5                | 48.8                | 6.650                   | 23.420      | 5.710        | 1.950                     | 6.530       | 1.520        |
| 75.0                                                                   | 0.7                | 68.5                | 7.350                   | 24.330      | 4.250        | 2.050                     | 6.880       | 0.980        |
| 90.0                                                                   | 0.2                | 90.5                | 6.960                   | 24.770      | 1.850        | 2.110                     | 7.390       | 0.320        |
| 105.0                                                                  | -0.4               | 103.0               | 7.010                   | 26.820      | 3.370        | 2.100                     | 7.640       | 0.640        |
| 120.0                                                                  | -1.2               | 112.5               | 8.080                   | 31.890      | 4.130        | 2.050                     | 7.640       | 0.970        |
| 135.0                                                                  | -1.9               | 121.3               | 7.120                   | 29.040      | 4.390        | 2.020                     | 7.380       | 1.250        |
| 150.0                                                                  | -2.4               | 131.4               | 6.490                   | 25.470      | 4.660        | 1.970                     | 6.650       | 1.490        |
| 165.0                                                                  | -2.4               | 144.6               | 6.550                   | 24.010      | 5.700        | 1.910                     | 5.400       | 1.740        |
| 180.0                                                                  | -1.6               | 164.4               | 6.490                   | 18.350      | 6.610        | 1.850                     | 3.060       | 1.920        |
| 195.0                                                                  | 0.3                | 233.5               | 7.480                   | 25.160      | 5.970        | 2.070                     | 6.760       | 1.500        |
| 210.0                                                                  | 0.0                | 243.7               | 6.910                   | 25.270      | 5.000        | 2.150                     | 7.060       | 1.240        |
| 225.0                                                                  | -0.2               | 252.5               | 7.600                   | 25.570      | 4.250        | 2.210                     | 7.240       | 0.950        |
| 240.0                                                                  | -0.4               | 261.1               | 7.900                   | 25.070      | 3.340        | 2.250                     | 7.220       | 0.620        |
| 255.0                                                                  | -0.6               | 270.1               | 8.340                   | 25.170      | 2.270        | 2.270                     | 7.080       | 0.370        |
| 270.0                                                                  | -0.6               | 279.8               | 7.270                   | 26.880      | 2.690        | 2.260                     | 6.870       | 0.530        |
| 285.0                                                                  | -0.5               | 289.4               | 8.160                   | 24.310      | 4.260        | 2.230                     | 6.570       | 0.910        |
| 300.0                                                                  | -0.5               | 298.8               | 7.690                   | 24.710      | 4.860        | 2.180                     | 6.270       | 1.250        |
| 315.0                                                                  | -0.4               | 307.9               | 7.200                   | 23.160      | 5.330        | 2.110                     | 5.970       | 1.520        |
| 330.0                                                                  | -0.5               | 317.1               | 7.020                   | 23.260      | 5.560        | 2.050                     | 5.650       | 1.710        |
| 345.0                                                                  | -0.7               | 325.3               | 7.010                   | 21.020      | 5.880        | 2.000                     | 5.410       | 1.840        |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.37: Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 9.0$  m and  $T_p = 18.5$  s; Ship's speed is 5.0 Knots**

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 3.8                | -27.9               | 7.060                   | 23.140      | 6.250        | 1.950                     | 5.510       | 1.940        |
| 15.0                                                                   | 3.7                | -20.6               | 6.990                   | 21.060      | 7.530        | 1.910                     | 5.200       | 2.000        |
| 30.0                                                                   | 3.6                | -12.5               | 6.550                   | 21.090      | 7.670        | 1.880                     | 4.850       | 2.030        |
| 45.0                                                                   | 3.6                | -1.5                | 6.600                   | 22.990      | 7.530        | 1.860                     | 4.600       | 2.040        |
| 60.0                                                                   | 3.8                | 23.5                | 7.140                   | 23.710      | 6.620        | 1.870                     | 5.130       | 1.920        |
| 75.0                                                                   | 4.3                | 56.6                | 6.730                   | 24.620      | 5.660        | 1.990                     | 6.110       | 1.350        |
| 90.0                                                                   | 4.4                | 79.3                | 6.740                   | 24.540      | 2.810        | 2.090                     | 6.580       | 0.560        |
| 105.0                                                                  | 4.3                | 95.3                | 7.310                   | 26.250      | 1.590        | 2.090                     | 6.960       | 0.310        |
| 120.0                                                                  | 4.1                | 107.3               | 7.620                   | 29.800      | 2.820        | 2.050                     | 7.070       | 0.700        |
| 135.0                                                                  | 3.8                | 115.8               | 7.530                   | 27.430      | 3.800        | 2.010                     | 6.950       | 0.990        |
| 150.0                                                                  | 3.6                | 125.1               | 7.670                   | 27.840      | 4.500        | 1.970                     | 6.670       | 1.240        |
| 165.0                                                                  | 3.4                | 134.7               | 6.700                   | 26.910      | 6.060        | 1.930                     | 6.160       | 1.440        |
| 180.0                                                                  | 3.4                | 146.6               | 6.030                   | 23.240      | 6.480        | 1.880                     | 5.290       | 1.620        |
| 195.0                                                                  | 3.5                | 165.0               | 6.280                   | 22.570      | 6.210        | 1.840                     | 4.240       | 1.780        |
| 210.0                                                                  | 4.4                | 215.1               | 6.740                   | 20.990      | 5.610        | 1.940                     | 5.520       | 1.680        |
| 225.0                                                                  | 4.3                | 236.0               | 8.200                   | 23.630      | 4.550        | 2.080                     | 6.460       | 1.360        |
| 240.0                                                                  | 4.4                | 249.7               | 6.980                   | 24.950      | 3.710        | 2.180                     | 6.910       | 0.970        |
| 255.0                                                                  | 4.5                | 261.8               | 7.830                   | 23.800      | 2.120        | 2.230                     | 7.040       | 0.510        |
| 270.0                                                                  | 4.6                | 274.3               | 8.240                   | 24.330      | 1.760        | 2.250                     | 6.840       | 0.260        |
| 285.0                                                                  | 4.7                | 287.4               | 9.310                   | 25.890      | 2.860        | 2.230                     | 6.510       | 0.780        |
| 300.0                                                                  | 4.7                | 300.0               | 7.560                   | 25.510      | 3.840        | 2.150                     | 5.940       | 1.270        |
| 315.0                                                                  | 4.5                | 310.9               | 7.660                   | 24.060      | 5.250        | 2.080                     | 5.750       | 1.590        |
| 330.0                                                                  | 4.2                | 318.6               | 7.500                   | 23.660      | 5.450        | 2.030                     | 5.730       | 1.750        |
| 345.0                                                                  | 3.9                | 325.1               | 7.240                   | 24.130      | 5.960        | 1.990                     | 5.710       | 1.860        |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.38:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 9.0$  m and  $T_p = 18.5$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 9.4                | -3.3                | 6.360                   | 18.310      | 6.510        | 1.870                     | 3.110       | 2.060        |
| 15.0                                                                   | 9.5                | 11.9                | 6.850                   | 20.090      | 7.040        | 1.860                     | 3.360       | 2.030        |
| 30.0                                                                   | 9.6                | 27.4                | 6.550                   | 20.440      | 6.120        | 1.880                     | 3.980       | 1.920        |
| 45.0                                                                   | 9.7                | 42.6                | 7.350                   | 21.340      | 6.000        | 1.940                     | 4.560       | 1.710        |
| 60.0                                                                   | 9.8                | 57.5                | 6.830                   | 21.380      | 4.320        | 2.000                     | 4.880       | 1.360        |
| 75.0                                                                   | 9.9                | 72.9                | 8.040                   | 24.350      | 3.090        | 2.050                     | 5.110       | 0.830        |
| 90.0                                                                   | 9.9                | 88.0                | 6.890                   | 24.710      | 1.090        | 2.070                     | 5.740       | 0.230        |
| 105.0                                                                  | 9.9                | 103.1               | 7.560                   | 27.650      | 1.900        | 2.040                     | 6.190       | 0.480        |
| 120.0                                                                  | 9.5                | 116.6               | 7.410                   | 29.120      | 2.840        | 1.970                     | 5.770       | 0.890        |
| 135.0                                                                  | 9.3                | 130.6               | 7.070                   | 27.360      | 4.110        | 1.920                     | 5.080       | 1.210        |
| 150.0                                                                  | 9.2                | 144.9               | 5.480                   | 23.330      | 5.300        | 1.840                     | 4.860       | 1.400        |
| 165.0                                                                  | 9.1                | 159.5               | 5.670                   | 21.240      | 5.480        | 1.810                     | 4.810       | 1.570        |
| 180.0                                                                  | 9.4                | 176.8               | 6.230                   | 22.960      | 5.640        | 1.770                     | 4.860       | 1.630        |
| 195.0                                                                  | 9.7                | 193.7               | 5.870                   | 21.530      | 5.890        | 1.820                     | 4.980       | 1.650        |
| 210.0                                                                  | 9.6                | 211.3               | 6.470                   | 21.630      | 5.900        | 1.880                     | 5.650       | 1.540        |
| 225.0                                                                  | 9.6                | 228.1               | 7.110                   | 26.600      | 5.140        | 2.000                     | 7.050       | 1.380        |
| 240.0                                                                  | 9.6                | 243.4               | 7.760                   | 22.830      | 3.550        | 2.100                     | 7.530       | 1.050        |
| 255.0                                                                  | 9.9                | 257.2               | 8.230                   | 25.340      | 2.420        | 2.180                     | 7.710       | 0.610        |
| 270.0                                                                  | 9.9                | 271.4               | 8.880                   | 24.630      | 1.160        | 2.220                     | 7.480       | 0.200        |
| 285.0                                                                  | 10.0               | 285.7               | 8.650                   | 26.660      | 3.060        | 2.210                     | 6.840       | 0.720        |
| 300.0                                                                  | 9.9                | 299.9               | 8.040                   | 22.990      | 3.710        | 2.140                     | 5.690       | 1.270        |
| 315.0                                                                  | 9.8                | 313.7               | 8.650                   | 25.140      | 5.670        | 2.070                     | 4.950       | 1.660        |
| 330.0                                                                  | 9.7                | 327.8               | 6.390                   | 22.670      | 6.480        | 1.980                     | 4.200       | 1.890        |
| 345.0                                                                  | 9.5                | 342.0               | 6.550                   | 21.000      | 6.670        | 1.910                     | 3.490       | 2.010        |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.39:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 9.0$  m and  $T_p = 18.5$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b>  |                     | <b>Absolute Maximum</b> |                    |                     | <b>Standard Deviation</b> |                    |                     |
|------------------------------------------------------------------------|---------------------|---------------------|-------------------------|--------------------|---------------------|---------------------------|--------------------|---------------------|
| $\psi_{MHP}$<br>deg                                                    | <b>Speed</b><br>kts | $\psi_{MHP}$<br>deg | <b>Heave</b><br>m       | <b>Roll</b><br>deg | <b>Pitch</b><br>deg | <b>Heave</b><br>m         | <b>Roll</b><br>deg | <b>Pitch</b><br>deg |
| 0.0                                                                    | 14.9                | -1.1                | 7.580                   | 17.860             | 7.450               | 1.910                     | 2.350              | 2.030               |
| 15.0                                                                   | 14.9                | 14.1                | 8.180                   | 18.020             | 7.270               | 1.910                     | 2.830              | 2.000               |
| 30.0                                                                   | 14.9                | 29.2                | 8.170                   | 20.760             | 6.580               | 1.920                     | 3.590              | 1.880               |
| 45.0                                                                   | 15.0                | 44.2                | 7.220                   | 21.560             | 5.860               | 1.960                     | 4.040              | 1.680               |
| 60.0                                                                   | 15.0                | 59.0                | 8.330                   | 23.440             | 5.010               | 2.010                     | 4.450              | 1.320               |
| 75.0                                                                   | 15.1                | 74.0                | 7.710                   | 23.200             | 3.160               | 2.020                     | 4.500              | 0.820               |
| 90.0                                                                   | 15.1                | 89.0                | 7.170                   | 24.350             | 1.030               | 2.030                     | 5.260              | 0.270               |
| 105.0                                                                  | 15.1                | 104.1               | 7.170                   | 27.380             | 1.800               | 1.980                     | 5.860              | 0.480               |
| 120.0                                                                  | 14.9                | 118.4               | 7.630                   | 29.170             | 3.250               | 1.900                     | 6.110              | 0.840               |
| 135.0                                                                  | 14.9                | 133.6               | 6.390                   | 26.770             | 3.500               | 1.840                     | 6.060              | 1.150               |
| 150.0                                                                  | 14.9                | 148.7               | 5.640                   | 22.510             | 4.150               | 1.800                     | 4.360              | 1.340               |
| 165.0                                                                  | 14.9                | 163.7               | 5.460                   | 20.860             | 5.320               | 1.730                     | 3.570              | 1.400               |
| 180.0                                                                  | 15.0                | 178.9               | 5.290                   | 20.240             | 4.830               | 1.760                     | 3.510              | 1.460               |
| 195.0                                                                  | 15.0                | 194.3               | 5.350                   | 27.000             | 5.080               | 1.780                     | 4.850              | 1.520               |
| 210.0                                                                  | 15.0                | 209.9               | 6.020                   | 27.880             | 4.600               | 1.850                     | 6.700              | 1.440               |
| 225.0                                                                  | 14.9                | 226.0               | 6.550                   | 26.580             | 4.260               | 1.920                     | 8.710              | 1.280               |
| 240.0                                                                  | 14.9                | 241.6               | 7.460                   | 26.660             | 3.640               | 2.050                     | 9.260              | 1.010               |
| 255.0                                                                  | 15.1                | 256.0               | 6.960                   | 27.380             | 1.900               | 2.130                     | 8.980              | 0.610               |
| 270.0                                                                  | 15.1                | 270.7               | 8.040                   | 29.240             | 1.520               | 2.190                     | 8.420              | 0.240               |
| 285.0                                                                  | 15.2                | 285.3               | 7.870                   | 29.170             | 2.470               | 2.190                     | 7.670              | 0.710               |
| 300.0                                                                  | 15.1                | 299.9               | 7.100                   | 24.690             | 4.030               | 2.140                     | 5.940              | 1.250               |
| 315.0                                                                  | 15.0                | 314.3               | 8.050                   | 24.230             | 6.010               | 2.070                     | 4.600              | 1.630               |
| 330.0                                                                  | 14.9                | 328.9               | 8.500                   | 21.490             | 6.590               | 2.000                     | 3.530              | 1.870               |
| 345.0                                                                  | 14.9                | 343.8               | 7.890                   | 19.930             | 7.060               | 1.950                     | 2.870              | 2.000               |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                     |                     |                         |                    |                     |                           |                    |                     |

**Table Q.40:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 9.0$  m and  $T_p = 18.5$  s; Ship's speed is 20.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 20.1               | -0.5                | 6.820                   | 16.620      | 6.640        | 1.970                     | 2.310       | 1.980        |
| 15.0                                                                   | 20.1               | 14.7                | 6.410                   | 17.890      | 6.280        | 1.970                     | 2.990       | 1.950        |
| 30.0                                                                   | 20.1               | 29.8                | 6.610                   | 19.600      | 5.890        | 1.980                     | 3.860       | 1.850        |
| 45.0                                                                   | 20.1               | 44.7                | 8.100                   | 20.690      | 5.430        | 2.000                     | 4.380       | 1.650        |
| 60.0                                                                   | 20.2               | 59.6                | 7.300                   | 23.110      | 4.240        | 2.000                     | 4.990       | 1.310        |
| 75.0                                                                   | 20.3               | 74.4                | 7.620                   | 22.610      | 2.580        | 2.000                     | 4.550       | 0.840        |
| 90.0                                                                   | 20.3               | 89.4                | 7.010                   | 23.840      | 1.160        | 1.970                     | 5.240       | 0.330        |
| 105.0                                                                  | 20.3               | 104.5               | 7.180                   | 29.600      | 1.660        | 1.940                     | 5.820       | 0.470        |
| 120.0                                                                  | 20.1               | 119.2               | 6.190                   | 30.410      | 2.650        | 1.870                     | 8.230       | 0.820        |
| 135.0                                                                  | 20.1               | 134.4               | 5.710                   | 29.280      | 3.760        | 1.800                     | 7.400       | 1.110        |
| 150.0                                                                  | 20.1               | 149.3               | 6.520                   | 27.020      | 5.210        | 1.830                     | 5.180       | 1.420        |
| 165.0                                                                  | 20.2               | 164.4               | 5.220                   | 16.970      | 4.660        | 1.820                     | 3.140       | 1.450        |
| 180.0                                                                  | 20.2               | 179.5               | 4.290                   | 21.500      | 3.740        | 1.660                     | 3.110       | 1.310        |
| 195.0                                                                  | 20.2               | 194.6               | 5.150                   | 30.930      | 4.020        | 1.680                     | 4.520       | 1.260        |
| 210.0                                                                  | 20.2               | 209.9               | 5.210                   | 36.020      | 4.730        | 1.820                     | 7.370       | 1.360        |
| 225.0                                                                  | 20.2               | 225.0               | 5.780                   | 37.160      | 4.050        | 1.850                     | 8.440       | 1.150        |
| 240.0                                                                  | 20.1               | 240.7               | 6.610                   | 32.910      | 3.350        | 1.960                     | 10.910      | 0.970        |
| 255.0                                                                  | 20.2               | 255.5               | 7.830                   | 35.660      | 1.950        | 2.070                     | 9.870       | 0.610        |
| 270.0                                                                  | 20.3               | 270.4               | 7.180                   | 33.870      | 1.350        | 2.140                     | 9.150       | 0.290        |
| 285.0                                                                  | 20.3               | 285.2               | 7.270                   | 35.680      | 2.440        | 2.150                     | 8.270       | 0.720        |
| 300.0                                                                  | 20.2               | 299.8               | 7.960                   | 26.880      | 4.350        | 2.140                     | 6.140       | 1.240        |
| 315.0                                                                  | 20.2               | 314.5               | 8.390                   | 24.440      | 5.860        | 2.100                     | 4.620       | 1.610        |
| 330.0                                                                  | 20.1               | 329.4               | 6.680                   | 21.500      | 6.110        | 2.040                     | 3.400       | 1.820        |
| 345.0                                                                  | 20.1               | 344.4               | 6.530                   | 17.950      | 6.390        | 2.000                     | 2.480       | 1.940        |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.41:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 9.0$  m and  $T_p = 18.5$  s; Ship's speed is 25.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 25.2               | -0.2                | 7.120                   | 17.700      | 5.890        | 2.040                     | 2.580       | 1.920        |
| 15.0                                                                   | 25.2               | 14.9                | 7.000                   | 18.990      | 6.430        | 2.030                     | 3.280       | 1.900        |
| 30.0                                                                   | 25.2               | 30.0                | 6.880                   | 21.020      | 6.390        | 2.030                     | 4.160       | 1.800        |
| 45.0                                                                   | 25.2               | 45.0                | 6.840                   | 22.460      | 5.390        | 2.030                     | 5.010       | 1.620        |
| 60.0                                                                   | 25.3               | 59.8                | 8.060                   | 23.130      | 4.470        | 2.000                     | 5.520       | 1.300        |
| 75.0                                                                   | 25.3               | 74.6                | 8.290                   | 21.840      | 2.930        | 1.950                     | 5.000       | 0.850        |
| 90.0                                                                   | 25.3               | 89.6                | 6.750                   | 24.710      | 1.380        | 1.920                     | 5.650       | 0.390        |
| 105.0                                                                  | 25.3               | 104.6               | 6.780                   | 28.090      | 1.700        | 1.870                     | 5.860       | 0.450        |
| 120.0                                                                  | 25.2               | 119.6               | 6.490                   | 33.300      | 2.620        | 1.830                     | 9.720       | 0.790        |
| 135.0                                                                  | 25.2               | 134.5               | 5.110                   | 27.100      | 2.670        | 1.710                     | 6.980       | 0.960        |
| 150.0                                                                  | 25.3               | 149.5               | 5.280                   | 27.310      | 4.290        | 1.800                     | 6.700       | 1.300        |
| 165.0                                                                  | 25.5               | 164.5               | 5.450                   | 18.980      | 4.030        | 1.940                     | 3.610       | 1.500        |
| 180.0                                                                  | 25.6               | 179.7               | 4.900                   | 18.390      | 4.210        | 1.510                     | 1.900       | 1.200        |
| 195.0                                                                  | 25.6               | 195.1               | 5.410                   | 26.880      | 4.070        | 2.010                     | 4.400       | 1.540        |
| 210.0                                                                  | 25.3               | 210.0               | 5.890                   | 36.720      | 4.220        | 1.710                     | 6.800       | 1.220        |
| 225.0                                                                  | 25.2               | 225.2               | 7.510                   | 44.860      | 4.940        | 1.910                     | 10.830      | 1.290        |
| 240.0                                                                  | 25.3               | 240.2               | 7.570                   | 43.330      | 3.650        | 1.890                     | 11.500      | 0.930        |
| 255.0                                                                  | 25.3               | 255.2               | 7.220                   | 40.430      | 1.930        | 2.040                     | 10.070      | 0.600        |
| 270.0                                                                  | 25.3               | 270.2               | 7.620                   | 36.840      | 1.370        | 2.090                     | 9.330       | 0.350        |
| 285.0                                                                  | 25.3               | 285.1               | 8.600                   | 34.460      | 2.760        | 2.140                     | 8.830       | 0.740        |
| 300.0                                                                  | 25.3               | 299.8               | 8.450                   | 29.940      | 4.230        | 2.140                     | 6.090       | 1.220        |
| 315.0                                                                  | 25.3               | 314.7               | 6.790                   | 24.640      | 5.000        | 2.120                     | 4.430       | 1.570        |
| 330.0                                                                  | 25.3               | 329.6               | 6.790                   | 21.320      | 5.580        | 2.090                     | 3.190       | 1.770        |
| 345.0                                                                  | 25.2               | 344.7               | 7.300                   | 18.920      | 6.600        | 2.060                     | 2.450       | 1.880        |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.42:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 9.0$  m and  $T_p = 18.5$  s; Ship's speed is 30.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 30.4               | -0.1                | 8.440                   | 18.710      | 6.560        | 2.110                     | 2.880       | 1.860        |
| 15.0                                                                   | 30.4               | 15.0                | 7.700                   | 20.570      | 6.970        | 2.100                     | 3.660       | 1.830        |
| 30.0                                                                   | 30.4               | 30.1                | 7.720                   | 22.400      | 5.560        | 2.090                     | 4.460       | 1.760        |
| 45.0                                                                   | 30.4               | 45.1                | 8.000                   | 24.040      | 5.570        | 2.070                     | 5.260       | 1.590        |
| 60.0                                                                   | 30.4               | 60.0                | 8.530                   | 24.510      | 4.530        | 2.020                     | 6.220       | 1.300        |
| 75.0                                                                   | 30.4               | 74.7                | 6.940                   | 23.520      | 3.010        | 1.940                     | 5.670       | 0.870        |
| 90.0                                                                   | 30.4               | 89.7                | 6.400                   | 27.120      | 1.660        | 1.870                     | 6.400       | 0.450        |
| 105.0                                                                  | 30.4               | 104.7               | 6.560                   | 31.470      | 2.030        | 1.810                     | 6.320       | 0.450        |
| 120.0                                                                  | 30.3               | 119.8               | 6.020                   | 35.900      | 3.040        | 1.790                     | 11.700      | 0.810        |
| 135.0                                                                  | 30.3               | 134.5               | 5.410                   | 30.150      | 3.240        | 1.640                     | 9.330       | 1.020        |
| 150.0                                                                  | 30.5               | 149.5               | 5.010                   | 25.440      | 3.700        | 1.770                     | 6.370       | 1.290        |
| 165.0                                                                  | 30.8               | 164.5               | 4.600                   | 22.870      | 4.100        | 1.430                     | 3.340       | 1.350        |
| 180.0                                                                  | 30.5               | 179.4               | 4.460                   | 24.250      | 5.430        | 1.330                     | 2.950       | 1.400        |
| 195.0                                                                  | 31.1               | 194.9               | 4.000                   | 26.580      | 3.800        | 1.320                     | 4.020       | 1.240        |
| 210.0                                                                  | 30.7               | 210.2               | 5.030                   | 32.900      | 3.860        | 1.800                     | 6.720       | 1.320        |
| 225.0                                                                  | 30.4               | 225.0               | 5.500                   | 41.340      | 3.220        | 1.640                     | 8.900       | 0.990        |
| 240.0                                                                  | 30.4               | 240.0               | 5.220                   | 43.760      | 2.840        | 1.810                     | 9.960       | 0.780        |
| 255.0                                                                  | 30.4               | 255.1               | 8.060                   | 40.720      | 2.180        | 1.970                     | 9.370       | 0.610        |
| 270.0                                                                  | 30.4               | 270.1               | 6.920                   | 38.800      | 1.650        | 2.040                     | 9.110       | 0.410        |
| 285.0                                                                  | 30.4               | 285.1               | 6.840                   | 38.850      | 2.530        | 2.090                     | 8.810       | 0.760        |
| 300.0                                                                  | 30.4               | 299.8               | 7.770                   | 30.600      | 4.660        | 2.140                     | 5.970       | 1.200        |
| 315.0                                                                  | 30.4               | 314.8               | 7.460                   | 25.490      | 5.330        | 2.150                     | 4.090       | 1.530        |
| 330.0                                                                  | 30.4               | 329.8               | 6.770                   | 23.220      | 5.420        | 2.140                     | 3.170       | 1.720        |
| 345.0                                                                  | 30.4               | 344.9               | 8.800                   | 19.610      | 6.560        | 2.120                     | 2.660       | 1.820        |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.43:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 14.0$  m and  $T_p = 16.4$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | -1.9               | -362.1              | 9.790                   | 42.580      | 10.710       | 3.060                     | 13.900      | 2.550        |
| 15.0                                                                   | -1.3               | -366.1              | 9.680                   | 38.840      | 10.890       | 2.800                     | 13.940      | 3.000        |
| 30.0                                                                   | -4.3               | 98.6                | 9.980                   | 39.440      | 10.320       | 2.780                     | 12.640      | 2.990        |
| 45.0                                                                   | -4.6               | -120.5              | 9.980                   | 49.470      | 9.470        | 2.850                     | 12.060      | 2.710        |
| 60.0                                                                   | 1.3                | 32.4                | 9.560                   | 38.380      | 10.560       | 2.840                     | 11.940      | 2.640        |
| 75.0                                                                   | 2.5                | 77.1                | 10.750                  | 38.370      | 7.670        | 3.080                     | 10.190      | 1.410        |
| 90.0                                                                   | 1.1                | 99.2                | 11.590                  | 41.850      | 7.430        | 3.130                     | 11.370      | 1.070        |
| 105.0                                                                  | -1.8               | 109.2               | 10.520                  | 43.900      | 9.320        | 3.080                     | 11.610      | 1.660        |
| 120.0                                                                  | -4.6               | 118.2               | 9.950                   | 42.730      | 7.370        | 3.000                     | 11.320      | 2.150        |
| 135.0                                                                  | -5.7               | 125.8               | 9.710                   | 90.230      | 9.270        | 2.900                     | 10.830      | 2.530        |
| 150.0                                                                  | -3.9               | 322.4               | 8.870                   | 41.660      | 12.320       | 2.800                     | 13.090      | 2.900        |
| 165.0                                                                  | -3.4               | 324.2               | 10.140                  | 41.450      | 13.440       | 2.820                     | 13.480      | 3.040        |
| 180.0                                                                  | -2.2               | 783.2               | 9.810                   | 40.120      | 12.330       | 3.000                     | 14.260      | 2.740        |
| 195.0                                                                  | -2.6               | 28.5                | 13.120                  | 43.350      | 12.820       | 3.310                     | 13.800      | 2.400        |
| 210.0                                                                  | -0.5               | 260.7               | 12.250                  | 37.580      | 8.590        | 3.410                     | 12.170      | 1.430        |
| 225.0                                                                  | -1.1               | 262.1               | 13.940                  | 40.990      | 6.690        | 3.520                     | 12.360      | 1.180        |
| 240.0                                                                  | -1.8               | 266.7               | 14.080                  | 40.790      | 5.450        | 3.570                     | 12.510      | 0.850        |
| 255.0                                                                  | -2.4               | 272.0               | 11.660                  | 42.200      | 5.350        | 3.590                     | 12.560      | 0.720        |
| 270.0                                                                  | -2.4               | 277.0               | 14.400                  | 41.740      | 5.220        | 3.590                     | 12.330      | 0.920        |
| 285.0                                                                  | -2.2               | 281.9               | 13.840                  | 41.950      | 7.460        | 3.570                     | 12.250      | 1.270        |
| 300.0                                                                  | -1.4               | 288.1               | 15.280                  | 48.040      | 6.090        | 3.500                     | 12.130      | 1.690        |
| 315.0                                                                  | -1.7               | 292.9               | 14.960                  | 51.780      | 7.770        | 3.430                     | 12.190      | 2.020        |
| 330.0                                                                  | -1.9               | 298.9               | 11.820                  | 48.050      | 8.500        | 3.320                     | 11.890      | 2.330        |
| 345.0                                                                  | -2.1               | 151.1               | 13.100                  | 40.450      | 10.450       | 3.200                     | 12.700      | 2.510        |
| Wind at 56.4 knots (29.0 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |



**Table Q.44:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 14.0$  m and  $T_p = 16.4$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 2.8                | -48.0               | 12.450                  | 50.710      | 9.730        | 3.080                     | 11.150      | 2.830        |
| 15.0                                                                   | 2.1                | -79.8               | 12.160                  | 41.510      | 11.310       | 2.940                     | 14.560      | 2.730        |
| 30.0                                                                   | 2.2                | -120.7              | 10.480                  | 41.080      | 8.180        | 2.900                     | 11.430      | 2.240        |
| 45.0                                                                   | 2.8                | -101.7              | 9.820                   | 47.260      | 9.330        | 2.920                     | 12.910      | 2.160        |
| 60.0                                                                   | 3.6                | -92.5               | 10.860                  | 43.770      | 10.760       | 3.000                     | 13.030      | 1.820        |
| 75.0                                                                   | 4.3                | -74.4               | 11.310                  | 56.840      | 8.050        | 3.060                     | 13.770      | 1.390        |
| 90.0                                                                   | 5.1                | 89.4                | 14.740                  | 50.460      | 5.490        | 3.120                     | 10.620      | 0.730        |
| 105.0                                                                  | 4.4                | 103.8               | 10.770                  | 42.220      | 5.790        | 3.100                     | 11.030      | 1.120        |
| 120.0                                                                  | 3.4                | 112.7               | 11.740                  | 44.710      | 6.810        | 3.020                     | 10.950      | 1.630        |
| 135.0                                                                  | 2.5                | 120.3               | 11.580                  | 43.470      | 7.720        | 2.940                     | 10.840      | 2.000        |
| 150.0                                                                  | 2.0                | 128.7               | 10.130                  | 41.130      | 8.660        | 2.840                     | 10.380      | 2.320        |
| 165.0                                                                  | 1.5                | 132.3               | 9.060                   | 40.700      | 9.040        | 2.810                     | 10.310      | 2.480        |
| 180.0                                                                  | 2.2                | 82.9                | 10.340                  | 40.860      | 10.310       | 2.960                     | 14.670      | 2.760        |
| 195.0                                                                  | 3.5                | 364.1               | 11.030                  | 48.710      | 10.310       | 3.160                     | 14.000      | 2.490        |
| 210.0                                                                  | 4.2                | 258.4               | 15.470                  | 50.140      | 11.070       | 3.360                     | 12.010      | 1.480        |
| 225.0                                                                  | 3.7                | 262.3               | 11.900                  | 51.540      | 7.870        | 3.440                     | 12.390      | 1.250        |
| 240.0                                                                  | 3.3                | 267.8               | 10.610                  | 43.820      | 5.910        | 3.510                     | 12.510      | 0.880        |
| 255.0                                                                  | 3.8                | 275.6               | 14.020                  | 42.530      | 5.380        | 3.550                     | 12.090      | 0.720        |
| 270.0                                                                  | 3.6                | 281.8               | 13.570                  | 45.230      | 8.410        | 3.560                     | 12.060      | 1.080        |
| 285.0                                                                  | 4.1                | 288.6               | 13.090                  | 46.610      | 6.130        | 3.500                     | 11.710      | 1.600        |
| 300.0                                                                  | 3.9                | 294.7               | 14.570                  | 43.940      | 6.060        | 3.390                     | 11.320      | 2.050        |
| 315.0                                                                  | 3.5                | 298.7               | 13.670                  | 57.220      | 7.680        | 3.330                     | 11.470      | 2.310        |
| 330.0                                                                  | 3.3                | 303.3               | 14.030                  | 49.590      | 9.330        | 3.270                     | 11.480      | 2.550        |
| 345.0                                                                  | 2.9                | 307.7               | 13.130                  | 50.600      | 8.480        | 3.180                     | 11.450      | 2.720        |
| Wind at 56.4 knots (29.0 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.45:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 14.0$  m and  $T_p = 16.4$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 7.5                | -40.9               | 11.920                  | 47.840      | 11.070       | 3.010                     | 11.540      | 3.070        |
| 15.0                                                                   | 7.3                | -34.1               | 10.350                  | 43.970      | 12.600       | 2.920                     | 11.100      | 3.190        |
| 30.0                                                                   | 7.2                | -24.6               | 9.800                   | 42.990      | 10.910       | 2.820                     | 10.380      | 3.290        |
| 45.0                                                                   | 7.2                | -15.9               | 9.630                   | 39.330      | 13.030       | 2.760                     | 10.140      | 3.320        |
| 60.0                                                                   | 7.2                | 1.8                 | 9.540                   | 37.530      | 13.100       | 2.700                     | 9.240       | 3.360        |
| 75.0                                                                   | 9.8                | 71.2                | 10.290                  | 32.980      | 6.510        | 3.050                     | 8.400       | 1.680        |
| 90.0                                                                   | 9.8                | 88.5                | 11.830                  | 37.610      | 3.370        | 3.120                     | 10.160      | 0.530        |
| 105.0                                                                  | 9.6                | 104.5               | 11.740                  | 42.800      | 4.750        | 3.060                     | 10.560      | 1.010        |
| 120.0                                                                  | 8.9                | 116.0               | 10.640                  | 47.760      | 8.400        | 2.930                     | 9.970       | 1.580        |
| 135.0                                                                  | 8.1                | 126.4               | 10.610                  | 44.300      | 7.590        | 2.820                     | 8.640       | 1.930        |
| 150.0                                                                  | 7.7                | 135.1               | 11.410                  | 39.750      | 8.730        | 2.730                     | 8.250       | 2.140        |
| 165.0                                                                  | 7.4                | 144.3               | 9.750                   | 39.770      | 8.700        | 2.630                     | 8.710       | 2.330        |
| 180.0                                                                  | 7.4                | 154.7               | 9.100                   | 37.120      | 9.540        | 2.580                     | 8.320       | 2.580        |
| 195.0                                                                  | 8.9                | 199.1               | 8.230                   | 41.340      | 9.460        | 2.670                     | 8.680       | 2.770        |
| 210.0                                                                  | 8.3                | 237.7               | 10.380                  | 50.730      | 9.950        | 3.080                     | 11.520      | 2.270        |
| 225.0                                                                  | 8.3                | 253.6               | 13.230                  | 57.970      | 8.370        | 3.310                     | 12.220      | 1.600        |
| 240.0                                                                  | 8.3                | 261.0               | 13.800                  | 48.990      | 5.570        | 3.400                     | 12.400      | 1.180        |
| 255.0                                                                  | 8.4                | 270.4               | 11.140                  | 48.240      | 4.130        | 3.460                     | 12.560      | 0.710        |
| 270.0                                                                  | 8.6                | 278.9               | 12.760                  | 44.480      | 9.150        | 3.500                     | 12.590      | 0.910        |
| 285.0                                                                  | 9.1                | 288.4               | 13.010                  | 43.920      | 6.900        | 3.440                     | 11.820      | 1.580        |
| 300.0                                                                  | 9.3                | 299.0               | 12.840                  | 57.290      | 7.030        | 3.330                     | 10.800      | 2.300        |
| 315.0                                                                  | 8.4                | 306.6               | 12.640                  | 50.610      | 8.620        | 3.180                     | 10.830      | 2.690        |
| 330.0                                                                  | 7.9                | 309.6               | 12.410                  | 53.110      | 8.620        | 3.150                     | 11.370      | 2.810        |
| 345.0                                                                  | 7.7                | 314.9               | 11.230                  | 49.560      | 9.380        | 3.070                     | 11.280      | 2.990        |
| Wind at 56.4 knots (29.0 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.46:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 14.0$  m and  $T_p = 16.4$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 13.0               | -8.8                | 11.800                  | 41.660      | 12.750       | 2.790                     | 8.800       | 3.390        |
| 15.0                                                                   | 13.6               | 9.9                 | 11.760                  | 39.390      | 10.920       | 2.770                     | 7.640       | 3.350        |
| 30.0                                                                   | 14.0               | 26.7                | 11.210                  | 33.440      | 10.720       | 2.820                     | 6.670       | 3.210        |
| 45.0                                                                   | 14.4               | 42.6                | 11.340                  | 32.260      | 9.090        | 2.880                     | 6.620       | 2.910        |
| 60.0                                                                   | 14.6               | 57.5                | 10.320                  | 34.810      | 7.700        | 2.970                     | 6.370       | 2.430        |
| 75.0                                                                   | 15.0               | 73.1                | 12.120                  | 38.490      | 4.940        | 3.060                     | 8.570       | 1.570        |
| 90.0                                                                   | 15.0               | 88.9                | 13.080                  | 45.230      | 2.650        | 3.080                     | 10.260      | 0.490        |
| 105.0                                                                  | 15.0               | 104.7               | 12.030                  | 57.530      | 8.190        | 3.010                     | 10.810      | 0.970        |
| 120.0                                                                  | 14.4               | 117.4               | 10.030                  | 42.640      | 6.110        | 2.830                     | 9.450       | 1.460        |
| 135.0                                                                  | 14.0               | 131.7               | 9.580                   | 34.920      | 6.560        | 2.650                     | 7.940       | 1.820        |
| 150.0                                                                  | 14.2               | 146.4               | 7.470                   | 34.340      | 7.380        | 2.550                     | 5.910       | 2.060        |
| 165.0                                                                  | 14.6               | 162.0               | 7.120                   | 33.060      | 8.080        | 2.460                     | 5.180       | 2.150        |
| 180.0                                                                  | 14.6               | 177.5               | 7.270                   | 34.200      | 7.220        | 2.500                     | 6.100       | 2.360        |
| 195.0                                                                  | 14.7               | 194.8               | 7.050                   | 37.120      | 8.080        | 2.520                     | 7.650       | 2.390        |
| 210.0                                                                  | 14.2               | 216.7               | 11.100                  | 48.290      | 9.010        | 2.710                     | 10.990      | 2.210        |
| 225.0                                                                  | 13.8               | 235.0               | 10.900                  | 37.910      | 5.840        | 2.970                     | 12.520      | 1.920        |
| 240.0                                                                  | 13.7               | 248.5               | 12.670                  | 42.370      | 5.820        | 3.160                     | 13.210      | 1.610        |
| 255.0                                                                  | 13.9               | 261.5               | 17.120                  | 64.620      | 4.650        | 3.340                     | 13.980      | 0.980        |
| 270.0                                                                  | 14.2               | 274.6               | 12.420                  | 44.230      | 3.690        | 3.440                     | 14.000      | 0.630        |
| 285.0                                                                  | 14.5               | 287.4               | 15.020                  | 51.260      | 6.360        | 3.430                     | 13.190      | 1.490        |
| 300.0                                                                  | 14.6               | 300.2               | 10.790                  | 47.890      | 7.050        | 3.290                     | 10.230      | 2.330        |
| 315.0                                                                  | 14.4               | 312.9               | 12.520                  | 54.580      | 8.860        | 3.140                     | 9.420       | 2.850        |
| 330.0                                                                  | 13.9               | 326.0               | 12.580                  | 54.500      | 12.170       | 2.980                     | 9.290       | 3.170        |
| 345.0                                                                  | 13.5               | 339.5               | 11.930                  | 47.710      | 12.250       | 2.870                     | 8.440       | 3.320        |
| Wind at 56.4 knots (29.0 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.47:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 14.0$  m and  $T_p = 16.4$  s; Ship's speed is 20.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 19.6               | -1.6                | 10.110                  | 36.250      | 9.440        | 2.930                     | 6.700       | 3.230        |
| 15.0                                                                   | 19.6               | 13.6                | 10.860                  | 32.100      | 10.500       | 2.920                     | 5.940       | 3.190        |
| 30.0                                                                   | 19.7               | 29.1                | 10.650                  | 31.120      | 9.470        | 2.940                     | 6.030       | 3.080        |
| 45.0                                                                   | 19.8               | 44.1                | 11.570                  | 36.280      | 8.470        | 2.970                     | 6.100       | 2.810        |
| 60.0                                                                   | 19.8               | 58.6                | 11.270                  | 34.460      | 8.010        | 3.000                     | 5.650       | 2.360        |
| 75.0                                                                   | 20.0               | 73.8                | 12.560                  | 36.960      | 5.250        | 3.030                     | 8.880       | 1.560        |
| 90.0                                                                   | 20.0               | 89.1                | 13.380                  | 58.590      | 4.500        | 3.000                     | 10.650      | 0.570        |
| 105.0                                                                  | 20.0               | 104.3               | 13.100                  | 60.090      | 7.760        | 2.890                     | 11.600      | 0.880        |
| 120.0                                                                  | 19.7               | 118.6               | 10.140                  | 41.690      | 5.270        | 2.700                     | 10.940      | 1.320        |
| 135.0                                                                  | 19.6               | 133.4               | 8.260                   | 40.480      | 6.160        | 2.560                     | 10.070      | 1.670        |
| 150.0                                                                  | 19.6               | 148.0               | 7.130                   | 45.150      | 6.790        | 2.510                     | 7.620       | 1.860        |
| 165.0                                                                  | 19.6               | 163.7               | 7.480                   | 37.310      | 7.190        | 2.440                     | 5.640       | 2.140        |
| 180.0                                                                  | 19.8               | 179.8               | 8.280                   | 35.760      | 7.960        | 2.540                     | 6.250       | 2.440        |
| 195.0                                                                  | 19.7               | 195.7               | 8.150                   | 44.370      | 6.990        | 2.420                     | 8.930       | 2.270        |
| 210.0                                                                  | 19.7               | 210.4               | 9.910                   | 49.880      | 6.850        | 2.440                     | 11.020      | 1.990        |
| 225.0                                                                  | 19.6               | 226.6               | 7.990                   | 46.950      | 5.980        | 2.660                     | 12.950      | 1.880        |
| 240.0                                                                  | 19.3               | 243.6               | 12.400                  | 41.290      | 5.350        | 2.940                     | 14.920      | 1.570        |
| 255.0                                                                  | 19.6               | 258.3               | 13.580                  | 47.950      | 3.560        | 3.230                     | 15.530      | 1.040        |
| 270.0                                                                  | 19.6               | 272.8               | 13.010                  | 48.610      | 3.410        | 3.370                     | 15.530      | 0.600        |
| 285.0                                                                  | 19.8               | 286.6               | 14.820                  | 59.450      | 5.270        | 3.380                     | 14.260      | 1.440        |
| 300.0                                                                  | 19.9               | 300.3               | 14.460                  | 63.420      | 7.870        | 3.320                     | 11.010      | 2.290        |
| 315.0                                                                  | 19.8               | 314.1               | 10.810                  | 52.910      | 10.250       | 3.180                     | 9.390       | 2.790        |
| 330.0                                                                  | 19.7               | 328.6               | 11.180                  | 39.840      | 9.250        | 3.070                     | 7.860       | 3.070        |
| 345.0                                                                  | 19.6               | 343.4               | 9.950                   | 32.160      | 10.930       | 2.990                     | 7.350       | 3.200        |
| Wind at 56.4 knots (29.0 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.48:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 14.0$  m and  $T_p = 16.4$  s; Ship's speed is 25.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 25.0               | -0.7                | 11.210                  | 33.020      | 10.690       | 3.060                     | 5.940       | 3.080        |
| 15.0                                                                   | 25.0               | 14.6                | 10.710                  | 30.580      | 9.930        | 3.040                     | 5.670       | 3.050        |
| 30.0                                                                   | 25.0               | 29.8                | 10.280                  | 31.520      | 9.260        | 3.040                     | 5.770       | 2.950        |
| 45.0                                                                   | 25.0               | 44.6                | 11.220                  | 34.730      | 8.280        | 3.040                     | 5.710       | 2.730        |
| 60.0                                                                   | 25.0               | 59.2                | 11.860                  | 35.640      | 7.570        | 3.040                     | 5.660       | 2.310        |
| 75.0                                                                   | 25.0               | 74.1                | 12.230                  | 43.470      | 5.190        | 3.000                     | 9.830       | 1.570        |
| 90.0                                                                   | 25.1               | 89.2                | 11.310                  | 57.340      | 11.540       | 2.920                     | 11.220      | 0.700        |
| 105.0                                                                  | 25.0               | 104.2               | 10.840                  | 53.250      | 7.580        | 2.820                     | 12.180      | 0.830        |
| 120.0                                                                  | 24.8               | 119.1               | 9.140                   | 53.670      | 6.140        | 2.690                     | 14.280      | 1.310        |
| 135.0                                                                  | 24.6               | 133.6               | 8.080                   | 49.150      | 7.120        | 2.640                     | 12.490      | 1.750        |
| 150.0                                                                  | 24.9               | 148.5               | 7.360                   | 51.870      | 6.700        | 2.640                     | 8.750       | 2.000        |
| 165.0                                                                  | 25.5               | 163.7               | 7.250                   | 45.830      | 7.230        | 2.100                     | 5.930       | 1.930        |
| 180.0                                                                  | 26.3               | 179.3               | 11.930                  | 42.200      | 15.070       | 2.440                     | 5.570       | 2.200        |
| 195.0                                                                  | 26.0               | 195.3               | 5.060                   | 35.660      | 5.440        | 1.680                     | 6.150       | 1.730        |
| 210.0                                                                  | 25.1               | 210.5               | 6.840                   | 42.260      | 7.470        | 2.230                     | 10.010      | 1.770        |
| 225.0                                                                  | 24.8               | 225.5               | 6.870                   | 51.210      | 6.240        | 2.520                     | 13.840      | 1.710        |
| 240.0                                                                  | 24.7               | 241.4               | 12.130                  | 53.860      | 5.660        | 2.730                     | 16.430      | 1.510        |
| 255.0                                                                  | 24.8               | 256.7               | 14.000                  | 79.390      | 6.820        | 3.100                     | 16.720      | 1.070        |
| 270.0                                                                  | 24.8               | 271.8               | 11.610                  | 53.870      | 3.580        | 3.290                     | 16.500      | 0.650        |
| 285.0                                                                  | 25.0               | 286.2               | 12.920                  | 59.270      | 5.240        | 3.340                     | 15.500      | 1.410        |
| 300.0                                                                  | 25.0               | 300.4               | 13.950                  | 52.170      | 7.080        | 3.320                     | 11.190      | 2.230        |
| 315.0                                                                  | 25.1               | 314.7               | 12.200                  | 56.750      | 9.790        | 3.250                     | 8.860       | 2.710        |
| 330.0                                                                  | 25.0               | 329.4               | 10.610                  | 43.640      | 9.910        | 3.170                     | 7.720       | 2.940        |
| 345.0                                                                  | 25.0               | 344.3               | 10.690                  | 30.610      | 9.240        | 3.100                     | 6.500       | 3.050        |
| Wind at 56.4 knots (29.0 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.49:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 14.0$  m and  $T_p = 16.4$  s; Ship's speed is 30.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 30.3               | -0.1                | 11.510                  | 29.720      | 9.380        | 3.170                     | 5.730       | 2.930        |
| 15.0                                                                   | 30.2               | 15.0                | 11.310                  | 29.930      | 9.080        | 3.150                     | 5.540       | 2.910        |
| 30.0                                                                   | 30.2               | 30.1                | 11.420                  | 33.060      | 8.910        | 3.120                     | 5.710       | 2.820        |
| 45.0                                                                   | 30.2               | 44.9                | 10.500                  | 34.390      | 7.930        | 3.120                     | 6.070       | 2.640        |
| 60.0                                                                   | 30.2               | 59.5                | 10.730                  | 35.110      | 7.360        | 3.070                     | 5.900       | 2.270        |
| 75.0                                                                   | 30.1               | 74.2                | 12.130                  | 43.810      | 4.670        | 2.990                     | 10.720      | 1.570        |
| 90.0                                                                   | 30.1               | 89.2                | 13.820                  | 63.610      | 9.280        | 2.850                     | 12.240      | 0.760        |
| 105.0                                                                  | 30.1               | 104.2               | 9.560                   | 57.990      | 5.400        | 2.730                     | 13.020      | 0.780        |
| 120.0                                                                  | 29.8               | 119.5               | 8.580                   | 46.950      | 4.990        | 2.620                     | 15.870      | 1.230        |
| 135.0                                                                  | 29.3               | 132.0               | 6.980                   | 56.790      | 4.890        | 2.430                     | 13.050      | 1.570        |
| 150.0                                                                  | 29.6               | 146.6               | 6.090                   | 52.890      | 5.310        | 2.370                     | 10.280      | 1.980        |
| 165.0                                                                  | 30.3               | 161.6               | 7.730                   | 54.150      | 8.310        | 2.660                     | 8.030       | 2.360        |
| 180.0                                                                  | 31.0               | 177.2               | 6.360                   | 48.160      | 6.790        | 2.190                     | 7.460       | 2.300        |
| 195.0                                                                  | 31.5               | 194.2               | 7.210                   | 45.700      | 7.760        | 2.260                     | 8.790       | 2.230        |
| 210.0                                                                  | 30.4               | 212.5               | 7.620                   | 46.030      | 6.570        | 2.650                     | 13.300      | 2.350        |
| 225.0                                                                  | 30.0               | 225.7               | 9.110                   | 66.410      | 7.500        | 2.340                     | 13.570      | 1.720        |
| 240.0                                                                  | 29.7               | 240.5               | 9.790                   | 57.310      | 6.390        | 2.700                     | 18.150      | 1.620        |
| 255.0                                                                  | 29.9               | 255.8               | 12.950                  | 71.380      | 8.900        | 2.990                     | 17.420      | 1.130        |
| 270.0                                                                  | 30.0               | 271.1               | 12.710                  | 60.720      | 3.670        | 3.210                     | 16.720      | 0.730        |
| 285.0                                                                  | 30.1               | 285.9               | 11.800                  | 67.320      | 5.450        | 3.310                     | 16.030      | 1.410        |
| 300.0                                                                  | 30.2               | 300.4               | 13.050                  | 53.480      | 6.270        | 3.340                     | 11.760      | 2.170        |
| 315.0                                                                  | 30.3               | 315.0               | 11.680                  | 56.160      | 8.750        | 3.300                     | 9.490       | 2.610        |
| 330.0                                                                  | 30.3               | 329.8               | 13.490                  | 40.060      | 8.560        | 3.250                     | 7.630       | 2.810        |
| 345.0                                                                  | 30.3               | 344.8               | 11.380                  | 33.920      | 8.910        | 3.200                     | 6.500       | 2.900        |
| Wind at 56.4 knots (29.0 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.50:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 14.0$  m and  $T_p = 18.6$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | -0.3               | -529.3              | 11.310                  | 38.670      | 10.150       | 3.130                     | 13.570      | 2.470        |
| 15.0                                                                   | -2.6               | -113.0              | 9.610                   | 35.890      | 10.260       | 2.900                     | 10.280      | 2.950        |
| 30.0                                                                   | -4.0               | -135.5              | 9.400                   | 38.280      | 9.650        | 2.920                     | 10.500      | 2.760        |
| 45.0                                                                   | -3.8               | -120.5              | 10.690                  | 43.110      | 9.280        | 3.010                     | 11.610      | 2.440        |
| 60.0                                                                   | 2.2                | 51.7                | 10.240                  | 31.950      | 7.860        | 3.030                     | 8.320       | 2.240        |
| 75.0                                                                   | 2.1                | 80.1                | 11.670                  | 35.270      | 6.780        | 3.190                     | 9.140       | 0.950        |
| 90.0                                                                   | 0.3                | 101.2               | 14.170                  | 37.560      | 5.210        | 3.220                     | 10.040      | 0.890        |
| 105.0                                                                  | -1.5               | 111.4               | 12.190                  | 40.250      | 7.030        | 3.170                     | 10.390      | 1.430        |
| 120.0                                                                  | -3.6               | 122.6               | 11.010                  | 42.530      | 7.170        | 3.090                     | 10.100      | 1.960        |
| 135.0                                                                  | -4.7               | 134.3               | 9.630                   | 43.990      | 8.710        | 3.010                     | 8.890       | 2.390        |
| 150.0                                                                  | -4.5               | 149.3               | 9.790                   | 37.240      | 10.570       | 2.930                     | 6.800       | 2.750        |
| 165.0                                                                  | -2.9               | 168.9               | 9.850                   | 30.610      | 12.220       | 2.860                     | 3.970       | 3.010        |
| 180.0                                                                  | -1.3               | 526.9               | 12.020                  | 45.660      | 10.780       | 3.120                     | 14.360      | 2.620        |
| 195.0                                                                  | -1.6               | 358.3               | 12.420                  | 38.780      | 9.410        | 3.320                     | 13.520      | 2.120        |
| 210.0                                                                  | -0.4               | 251.6               | 12.160                  | 36.740      | 7.520        | 3.430                     | 10.820      | 1.600        |
| 225.0                                                                  | -0.7               | 256.9               | 12.640                  | 37.960      | 6.040        | 3.490                     | 10.960      | 1.280        |
| 240.0                                                                  | -1.2               | 263.7               | 12.720                  | 39.640      | 5.230        | 3.560                     | 11.010      | 0.840        |
| 255.0                                                                  | -2.0               | 270.9               | 13.200                  | 44.640      | 3.460        | 3.620                     | 11.010      | 0.560        |
| 270.0                                                                  | -2.1               | 278.3               | 11.730                  | 40.780      | 3.020        | 3.590                     | 10.760      | 0.730        |
| 285.0                                                                  | -2.1               | 284.3               | 13.050                  | 38.590      | 4.150        | 3.570                     | 10.580      | 1.120        |
| 300.0                                                                  | -2.4               | 290.2               | 11.430                  | 41.080      | 5.690        | 3.520                     | 10.520      | 1.490        |
| 315.0                                                                  | -2.7               | 241.7               | 11.070                  | 49.510      | 12.130       | 3.500                     | 15.350      | 1.780        |
| 330.0                                                                  | -2.6               | 252.0               | 11.240                  | 49.770      | 8.470        | 3.400                     | 14.630      | 2.040        |
| 345.0                                                                  | -2.7               | 50.0                | 10.460                  | 40.700      | 9.040        | 3.300                     | 12.180      | 2.320        |
| Wind at 56.4 knots (29.0 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.51:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 14.0$  m and  $T_p = 18.6$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 2.8                | -40.7               | 10.760                  | 44.120      | 9.430        | 3.170                     | 9.890       | 2.680        |
| 15.0                                                                   | 2.2                | -132.5              | 10.130                  | 39.890      | 8.970        | 2.960                     | 9.730       | 2.280        |
| 30.0                                                                   | 2.6                | -88.1               | 10.490                  | 42.080      | 10.840       | 3.010                     | 14.600      | 2.330        |
| 45.0                                                                   | 3.1                | -99.6               | 10.150                  | 40.180      | 7.370        | 3.060                     | 12.460      | 1.930        |
| 60.0                                                                   | 3.6                | -83.8               | 10.670                  | 40.780      | 8.520        | 3.100                     | 13.240      | 1.770        |
| 75.0                                                                   | 5.1                | 66.4                | 10.430                  | 31.580      | 6.780        | 3.100                     | 7.920       | 1.650        |
| 90.0                                                                   | 4.9                | 89.0                | 11.720                  | 34.390      | 4.250        | 3.210                     | 9.050       | 0.530        |
| 105.0                                                                  | 4.4                | 104.1               | 11.780                  | 38.150      | 4.680        | 3.180                     | 9.630       | 0.920        |
| 120.0                                                                  | 3.6                | 114.9               | 10.440                  | 42.500      | 5.700        | 3.120                     | 9.570       | 1.450        |
| 135.0                                                                  | 3.0                | 122.9               | 11.130                  | 44.120      | 5.870        | 3.060                     | 9.310       | 1.790        |
| 150.0                                                                  | 2.5                | 131.4               | 10.680                  | 43.820      | 7.030        | 3.000                     | 8.830       | 2.110        |
| 165.0                                                                  | 2.2                | 138.9               | 10.450                  | 39.650      | 8.190        | 2.940                     | 8.340       | 2.340        |
| 180.0                                                                  | 2.1                | 149.1               | 10.330                  | 33.640      | 10.430       | 2.880                     | 7.690       | 2.550        |
| 195.0                                                                  | 4.2                | 206.2               | 9.440                   | 35.680      | 9.810        | 2.980                     | 7.830       | 2.720        |
| 210.0                                                                  | 4.3                | 241.2               | 12.130                  | 37.900      | 8.700        | 3.300                     | 10.330      | 1.960        |
| 225.0                                                                  | 4.0                | 251.2               | 10.800                  | 40.640      | 6.410        | 3.420                     | 10.700      | 1.550        |
| 240.0                                                                  | 3.9                | 260.4               | 11.250                  | 40.820      | 5.400        | 3.490                     | 10.840      | 1.070        |
| 255.0                                                                  | 4.0                | 270.1               | 11.440                  | 40.510      | 3.620        | 3.540                     | 10.810      | 0.580        |
| 270.0                                                                  | 4.0                | 278.8               | 13.040                  | 38.890      | 3.140        | 3.560                     | 10.750      | 0.640        |
| 285.0                                                                  | 4.0                | 287.8               | 13.010                  | 45.300      | 4.030        | 3.510                     | 10.380      | 1.200        |
| 300.0                                                                  | 3.9                | 296.2               | 13.560                  | 49.160      | 5.490        | 3.450                     | 9.810       | 1.730        |
| 315.0                                                                  | 3.6                | 301.3               | 12.010                  | 53.690      | 6.240        | 3.410                     | 10.060      | 2.020        |
| 330.0                                                                  | 3.3                | 307.1               | 11.820                  | 56.020      | 7.340        | 3.330                     | 10.100      | 2.290        |
| 345.0                                                                  | 3.0                | 313.4               | 11.810                  | 46.550      | 9.550        | 3.250                     | 10.050      | 2.510        |
| Wind at 56.4 knots (29.0 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |



**Table Q.52:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 14.0$  m and  $T_p = 18.6$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 7.6                | -33.6               | 10.900                  | 51.350      | 11.070       | 3.100                     | 10.010      | 2.880        |
| 15.0                                                                   | 7.4                | -26.9               | 9.830                   | 44.360      | 10.060       | 3.030                     | 9.880       | 2.970        |
| 30.0                                                                   | 7.4                | -18.7               | 10.360                  | 38.380      | 11.540       | 2.980                     | 9.350       | 3.050        |
| 45.0                                                                   | 7.4                | -8.1                | 10.190                  | 36.540      | 11.420       | 2.930                     | 8.770       | 3.100        |
| 60.0                                                                   | 7.6                | 13.7                | 10.520                  | 33.650      | 9.990        | 2.890                     | 8.110       | 2.990        |
| 75.0                                                                   | 9.9                | 71.8                | 11.250                  | 33.680      | 4.940        | 3.130                     | 7.480       | 1.340        |
| 90.0                                                                   | 9.9                | 88.5                | 12.190                  | 35.970      | 2.040        | 3.180                     | 8.570       | 0.400        |
| 105.0                                                                  | 9.7                | 104.0               | 11.420                  | 39.970      | 4.840        | 3.120                     | 8.910       | 0.810        |
| 120.0                                                                  | 9.0                | 116.0               | 10.870                  | 37.780      | 6.410        | 3.050                     | 7.980       | 1.340        |
| 135.0                                                                  | 8.4                | 127.3               | 10.630                  | 37.960      | 7.300        | 2.980                     | 7.040       | 1.720        |
| 150.0                                                                  | 7.9                | 137.5               | 9.600                   | 36.950      | 7.810        | 2.900                     | 6.560       | 2.030        |
| 165.0                                                                  | 7.7                | 145.8               | 9.820                   | 38.990      | 8.230        | 2.850                     | 6.650       | 2.180        |
| 180.0                                                                  | 7.6                | 157.3               | 9.330                   | 37.850      | 8.720        | 2.780                     | 7.040       | 2.360        |
| 195.0                                                                  | 9.0                | 194.5               | 9.430                   | 41.390      | 10.170       | 2.850                     | 7.480       | 2.550        |
| 210.0                                                                  | 8.9                | 221.5               | 10.860                  | 41.700      | 8.440        | 3.070                     | 9.680       | 2.270        |
| 225.0                                                                  | 8.7                | 238.4               | 10.750                  | 38.910      | 6.820        | 3.220                     | 10.460      | 1.890        |
| 240.0                                                                  | 8.8                | 251.0               | 13.820                  | 42.100      | 5.650        | 3.390                     | 11.110      | 1.400        |
| 255.0                                                                  | 9.1                | 262.7               | 10.940                  | 40.510      | 3.920        | 3.480                     | 11.570      | 0.820        |
| 270.0                                                                  | 9.3                | 274.9               | 12.860                  | 39.410      | 3.140        | 3.510                     | 11.710      | 0.460        |
| 285.0                                                                  | 9.5                | 287.2               | 12.170                  | 50.280      | 4.010        | 3.490                     | 11.220      | 1.150        |
| 300.0                                                                  | 9.4                | 299.6               | 11.600                  | 41.390      | 6.070        | 3.400                     | 9.520       | 1.920        |
| 315.0                                                                  | 8.9                | 310.0               | 13.000                  | 49.740      | 7.720        | 3.260                     | 9.230       | 2.400        |
| 330.0                                                                  | 8.0                | 314.6               | 12.790                  | 49.980      | 7.880        | 3.210                     | 9.820       | 2.570        |
| 345.0                                                                  | 7.7                | 320.9               | 11.610                  | 46.870      | 9.540        | 3.140                     | 9.760       | 2.760        |
| Wind at 56.4 knots (29.0 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.53:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 14.0$  m and  $T_p = 18.6$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 13.9               | -4.3                | 12.430                  | 37.630      | 10.830       | 2.950                     | 6.640       | 3.100        |
| 15.0                                                                   | 14.0               | 11.3                | 12.170                  | 32.970      | 10.080       | 2.930                     | 6.070       | 3.070        |
| 30.0                                                                   | 14.3               | 27.1                | 11.590                  | 31.230      | 10.130       | 2.960                     | 5.830       | 2.910        |
| 45.0                                                                   | 14.5               | 42.6                | 10.880                  | 30.880      | 8.160        | 2.990                     | 5.490       | 2.590        |
| 60.0                                                                   | 14.7               | 57.4                | 10.760                  | 30.570      | 7.800        | 3.050                     | 5.320       | 2.090        |
| 75.0                                                                   | 15.0               | 73.4                | 12.550                  | 32.830      | 4.730        | 3.110                     | 7.490       | 1.300        |
| 90.0                                                                   | 15.0               | 88.8                | 11.670                  | 39.430      | 2.180        | 3.120                     | 8.480       | 0.430        |
| 105.0                                                                  | 15.0               | 104.3               | 10.510                  | 39.780      | 4.020        | 3.090                     | 8.670       | 0.750        |
| 120.0                                                                  | 14.5               | 117.6               | 11.250                  | 34.730      | 6.230        | 2.930                     | 7.470       | 1.250        |
| 135.0                                                                  | 14.3               | 132.0               | 9.700                   | 36.010      | 5.610        | 2.840                     | 5.980       | 1.640        |
| 150.0                                                                  | 14.2               | 146.8               | 10.810                  | 33.420      | 7.550        | 2.740                     | 5.030       | 1.920        |
| 165.0                                                                  | 14.4               | 162.1               | 7.950                   | 33.300      | 7.490        | 2.710                     | 4.750       | 2.110        |
| 180.0                                                                  | 14.5               | 178.0               | 8.220                   | 34.710      | 8.070        | 2.700                     | 5.680       | 2.230        |
| 195.0                                                                  | 14.6               | 194.4               | 8.100                   | 37.410      | 7.620        | 2.760                     | 7.270       | 2.250        |
| 210.0                                                                  | 14.4               | 212.7               | 10.380                  | 39.550      | 7.420        | 2.800                     | 9.610       | 2.100        |
| 225.0                                                                  | 14.2               | 230.3               | 11.050                  | 37.540      | 5.660        | 3.040                     | 11.510      | 1.780        |
| 240.0                                                                  | 14.3               | 244.5               | 12.680                  | 40.010      | 5.070        | 3.240                     | 12.560      | 1.500        |
| 255.0                                                                  | 14.6               | 258.5               | 12.400                  | 43.410      | 4.320        | 3.380                     | 13.020      | 0.930        |
| 270.0                                                                  | 14.7               | 272.6               | 11.330                  | 44.890      | 2.730        | 3.440                     | 13.160      | 0.460        |
| 285.0                                                                  | 14.8               | 286.5               | 12.110                  | 49.350      | 4.710        | 3.440                     | 12.510      | 1.120        |
| 300.0                                                                  | 14.7               | 300.1               | 11.800                  | 46.040      | 6.680        | 3.360                     | 10.040      | 1.910        |
| 315.0                                                                  | 14.5               | 313.5               | 11.990                  | 50.220      | 8.130        | 3.250                     | 8.450       | 2.480        |
| 330.0                                                                  | 14.2               | 327.0               | 12.270                  | 52.870      | 10.740       | 3.130                     | 7.820       | 2.830        |
| 345.0                                                                  | 13.9               | 341.0               | 12.710                  | 41.670      | 10.190       | 3.020                     | 7.300       | 3.040        |
| Wind at 56.4 knots (29.0 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.54:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 14.0$  m and  $T_p = 18.6$  s; Ship's speed is 20.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 19.7               | -1.5                | 9.960                   | 31.890      | 9.470        | 3.040                     | 5.730       | 3.000        |
| 15.0                                                                   | 19.7               | 13.8                | 11.190                  | 28.770      | 9.770        | 3.020                     | 5.460       | 2.950        |
| 30.0                                                                   | 19.8               | 29.0                | 10.240                  | 29.160      | 9.110        | 3.030                     | 5.290       | 2.800        |
| 45.0                                                                   | 19.8               | 44.0                | 12.000                  | 30.880      | 8.330        | 3.040                     | 5.060       | 2.520        |
| 60.0                                                                   | 19.9               | 58.6                | 9.980                   | 30.490      | 6.270        | 3.050                     | 4.720       | 2.040        |
| 75.0                                                                   | 20.1               | 73.8                | 10.770                  | 41.640      | 3.970        | 3.060                     | 7.850       | 1.310        |
| 90.0                                                                   | 20.1               | 89.0                | 12.170                  | 45.090      | 2.050        | 3.040                     | 8.760       | 0.510        |
| 105.0                                                                  | 20.1               | 104.1               | 9.550                   | 43.980      | 5.390        | 3.020                     | 8.940       | 0.720        |
| 120.0                                                                  | 19.9               | 118.6               | 9.240                   | 37.810      | 4.200        | 2.870                     | 8.760       | 1.160        |
| 135.0                                                                  | 19.9               | 133.6               | 8.290                   | 45.750      | 5.510        | 2.760                     | 6.700       | 1.480        |
| 150.0                                                                  | 19.8               | 148.5               | 8.040                   | 43.220      | 6.340        | 2.770                     | 5.890       | 1.820        |
| 165.0                                                                  | 19.8               | 163.7               | 8.200                   | 35.370      | 7.140        | 2.730                     | 5.020       | 2.060        |
| 180.0                                                                  | 20.0               | 179.4               | 8.870                   | 37.510      | 7.530        | 2.810                     | 5.760       | 2.310        |
| 195.0                                                                  | 19.9               | 194.4               | 8.400                   | 41.330      | 7.400        | 2.660                     | 7.470       | 2.020        |
| 210.0                                                                  | 19.9               | 209.6               | 8.040                   | 46.910      | 6.090        | 2.720                     | 9.530       | 1.850        |
| 225.0                                                                  | 19.8               | 225.8               | 9.830                   | 44.310      | 5.740        | 2.830                     | 11.740      | 1.690        |
| 240.0                                                                  | 19.7               | 241.8               | 11.420                  | 44.360      | 4.400        | 3.090                     | 14.120      | 1.440        |
| 255.0                                                                  | 19.9               | 256.9               | 12.490                  | 49.890      | 3.950        | 3.250                     | 14.580      | 0.930        |
| 270.0                                                                  | 19.9               | 271.6               | 13.120                  | 51.950      | 2.820        | 3.370                     | 14.350      | 0.510        |
| 285.0                                                                  | 20.0               | 286.0               | 11.570                  | 61.440      | 4.040        | 3.390                     | 13.870      | 1.100        |
| 300.0                                                                  | 19.9               | 300.2               | 13.190                  | 49.340      | 6.540        | 3.340                     | 10.480      | 1.890        |
| 315.0                                                                  | 19.9               | 314.3               | 12.170                  | 45.950      | 8.110        | 3.260                     | 8.440       | 2.440        |
| 330.0                                                                  | 19.8               | 328.7               | 10.260                  | 39.290      | 8.590        | 3.170                     | 7.070       | 2.770        |
| 345.0                                                                  | 19.7               | 343.5               | 10.460                  | 34.470      | 10.760       | 3.090                     | 6.220       | 2.930        |
| Wind at 56.4 knots (29.0 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.55: Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 14.0$  m and  $T_p = 18.6$  s; Ship's speed is 25.0 Knots**

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 25.0               | -0.6                | 10.870                  | 31.330      | 9.020        | 3.120                     | 5.560       | 2.880        |
| 15.0                                                                   | 25.0               | 14.6                | 10.760                  | 28.470      | 9.180        | 3.100                     | 5.250       | 2.840        |
| 30.0                                                                   | 25.0               | 29.7                | 12.110                  | 28.450      | 9.010        | 3.090                     | 5.170       | 2.720        |
| 45.0                                                                   | 25.0               | 44.6                | 10.610                  | 28.530      | 7.150        | 3.090                     | 5.090       | 2.460        |
| 60.0                                                                   | 25.0               | 59.2                | 13.060                  | 31.840      | 7.650        | 3.060                     | 4.930       | 2.020        |
| 75.0                                                                   | 25.1               | 74.2                | 10.510                  | 43.010      | 4.130        | 3.010                     | 8.680       | 1.350        |
| 90.0                                                                   | 25.2               | 89.2                | 14.160                  | 47.350      | 3.070        | 2.960                     | 9.560       | 0.610        |
| 105.0                                                                  | 25.1               | 104.1               | 11.970                  | 51.140      | 4.430        | 2.890                     | 9.530       | 0.670        |
| 120.0                                                                  | 25.0               | 119.0               | 10.300                  | 56.170      | 4.160        | 2.820                     | 10.540      | 1.110        |
| 135.0                                                                  | 24.8               | 133.8               | 11.430                  | 55.570      | 6.020        | 2.820                     | 10.980      | 1.650        |
| 150.0                                                                  | 24.8               | 148.3               | 7.760                   | 52.950      | 5.550        | 2.510                     | 5.760       | 1.720        |
| 165.0                                                                  | 25.6               | 164.1               | 8.440                   | 30.730      | 6.660        | 2.980                     | 4.440       | 2.190        |
| 180.0                                                                  | 25.9               | 179.3               | 7.510                   | 31.060      | 6.370        | 2.220                     | 3.720       | 1.700        |
| 195.0                                                                  | 25.7               | 196.3               | 9.760                   | 40.530      | 7.710        | 3.100                     | 7.940       | 2.380        |
| 210.0                                                                  | 25.1               | 210.4               | 8.630                   | 43.890      | 6.440        | 2.630                     | 9.890       | 1.920        |
| 225.0                                                                  | 24.9               | 225.0               | 8.310                   | 54.620      | 6.340        | 2.830                     | 13.050      | 1.710        |
| 240.0                                                                  | 24.9               | 240.5               | 13.100                  | 53.530      | 5.140        | 2.890                     | 14.800      | 1.380        |
| 255.0                                                                  | 25.1               | 256.0               | 10.530                  | 56.570      | 3.170        | 3.170                     | 15.690      | 0.920        |
| 270.0                                                                  | 25.0               | 271.1               | 11.950                  | 55.320      | 3.030        | 3.300                     | 15.420      | 0.560        |
| 285.0                                                                  | 25.1               | 285.8               | 14.380                  | 72.290      | 3.860        | 3.350                     | 15.120      | 1.120        |
| 300.0                                                                  | 25.1               | 300.1               | 13.960                  | 56.380      | 5.660        | 3.330                     | 10.680      | 1.860        |
| 315.0                                                                  | 25.1               | 314.7               | 12.620                  | 46.400      | 7.380        | 3.290                     | 8.640       | 2.370        |
| 330.0                                                                  | 25.0               | 329.4               | 11.840                  | 42.230      | 8.800        | 3.220                     | 7.240       | 2.670        |
| 345.0                                                                  | 25.0               | 344.3               | 10.870                  | 32.320      | 9.420        | 3.180                     | 6.140       | 2.830        |
| Wind at 56.4 knots (29.0 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.56:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 14.0$  m and  $T_p = 18.6$  s; Ship's speed is 30.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 30.2               | -0.2                | 11.940                  | 30.530      | 10.220       | 3.210                     | 5.390       | 2.760        |
| 15.0                                                                   | 30.2               | 15.0                | 12.720                  | 30.950      | 9.400        | 3.180                     | 5.290       | 2.730        |
| 30.0                                                                   | 30.2               | 30.0                | 10.610                  | 31.150      | 8.520        | 3.160                     | 5.400       | 2.640        |
| 45.0                                                                   | 30.2               | 44.9                | 10.610                  | 31.340      | 7.900        | 3.140                     | 5.530       | 2.400        |
| 60.0                                                                   | 30.2               | 59.6                | 12.140                  | 31.610      | 6.900        | 3.070                     | 5.590       | 2.000        |
| 75.0                                                                   | 30.2               | 74.3                | 12.610                  | 45.280      | 4.570        | 2.990                     | 9.730       | 1.370        |
| 90.0                                                                   | 30.2               | 89.3                | 10.560                  | 51.360      | 3.030        | 2.890                     | 10.700      | 0.690        |
| 105.0                                                                  | 30.2               | 104.1               | 9.980                   | 58.830      | 4.630        | 2.860                     | 10.400      | 0.700        |
| 120.0                                                                  | 30.0               | 119.4               | 9.280                   | 47.750      | 3.490        | 2.740                     | 12.710      | 1.090        |
| 135.0                                                                  | 29.8               | 133.7               | 7.990                   | 53.490      | 4.480        | 2.690                     | 11.380      | 1.460        |
| 150.0                                                                  | 30.0               | 148.1               | 7.250                   | 58.980      | 5.460        | 2.320                     | 7.560       | 1.720        |
| 165.0                                                                  | 30.2               | 162.5               | 7.880                   | 43.870      | 6.290        | 2.890                     | 6.160       | 2.190        |
| 180.0                                                                  | 30.8               | 177.9               | 6.260                   | 40.830      | 8.530        | 2.040                     | 5.620       | 2.130        |
| 195.0                                                                  | 31.6               | 194.5               | 7.150                   | 37.060      | 6.840        | 2.090                     | 7.000       | 1.930        |
| 210.0                                                                  | 30.8               | 210.9               | 10.640                  | 53.410      | 6.740        | 2.600                     | 10.350      | 2.000        |
| 225.0                                                                  | 30.1               | 225.2               | 8.270                   | 52.760      | 5.390        | 2.690                     | 12.430      | 1.650        |
| 240.0                                                                  | 30.0               | 240.1               | 9.480                   | 55.280      | 4.970        | 2.810                     | 15.070      | 1.390        |
| 255.0                                                                  | 30.1               | 255.5               | 12.730                  | 66.260      | 3.390        | 3.090                     | 15.830      | 0.960        |
| 270.0                                                                  | 30.1               | 270.7               | 10.970                  | 68.700      | 3.280        | 3.230                     | 16.210      | 0.640        |
| 285.0                                                                  | 30.2               | 285.5               | 11.210                  | 67.610      | 4.180        | 3.280                     | 15.520      | 1.140        |
| 300.0                                                                  | 30.2               | 300.2               | 12.360                  | 55.670      | 7.340        | 3.320                     | 11.270      | 1.820        |
| 315.0                                                                  | 30.2               | 314.9               | 11.690                  | 51.290      | 7.330        | 3.320                     | 8.800       | 2.310        |
| 330.0                                                                  | 30.2               | 329.7               | 11.040                  | 41.990      | 8.510        | 3.280                     | 6.920       | 2.580        |
| 345.0                                                                  | 30.2               | 344.7               | 11.790                  | 35.520      | 9.410        | 3.250                     | 6.180       | 2.710        |
| Wind at 56.4 knots (29.0 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.57: Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 17.7$  m and  $T_p = 20.0$  s; Ship's speed is 0.0 Knots**

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | -0.5               | -110.6              | 15.010                  | 53.140      | 10.480       | 3.930                     | 16.320      | 3.240        |
| 15.0                                                                   | -2.8               | 189.5               | 12.900                  | 47.680      | 14.150       | 3.750                     | 8.570       | 3.600        |
| 30.0                                                                   | -4.0               | -145.1              | 13.100                  | 45.310      | 12.400       | 3.740                     | 12.480      | 3.440        |
| 45.0                                                                   | 2.0                | 30.6                | 12.030                  | 41.770      | 10.030       | 3.770                     | 8.720       | 3.200        |
| 60.0                                                                   | 3.8                | 54.5                | 16.320                  | 39.890      | 8.480        | 3.900                     | 8.330       | 2.410        |
| 75.0                                                                   | 2.8                | 85.5                | 14.710                  | 40.390      | 3.780        | 4.060                     | 9.500       | 0.710        |
| 90.0                                                                   | 0.3                | 106.0               | 13.620                  | 47.350      | 6.440        | 4.060                     | 10.430      | 1.270        |
| 105.0                                                                  | -2.3               | 118.7               | 14.700                  | 49.020      | 8.170        | 3.990                     | 10.740      | 1.980        |
| 120.0                                                                  | -4.4               | 132.0               | 13.570                  | 49.930      | 8.560        | 3.890                     | 9.640       | 2.620        |
| 135.0                                                                  | -5.1               | 146.2               | 14.140                  | 49.960      | 11.720       | 3.800                     | 7.880       | 3.140        |
| 150.0                                                                  | -4.3               | 160.0               | 13.360                  | 46.120      | 13.260       | 3.720                     | 5.420       | 3.440        |
| 165.0                                                                  | -2.8               | 173.3               | 12.860                  | 36.900      | 13.420       | 3.720                     | 4.350       | 3.610        |
| 180.0                                                                  | 0.4                | 310.9               | 13.630                  | 57.050      | 11.530       | 3.980                     | 15.820      | 3.050        |
| 195.0                                                                  | 1.1                | 234.8               | 13.520                  | 44.960      | 10.150       | 4.180                     | 12.370      | 2.650        |
| 210.0                                                                  | -0.2               | 245.4               | 15.280                  | 46.370      | 8.900        | 4.340                     | 12.570      | 2.230        |
| 225.0                                                                  | -0.7               | 253.7               | 14.990                  | 51.090      | 7.340        | 4.460                     | 12.920      | 1.690        |
| 240.0                                                                  | -1.1               | 261.7               | 15.070                  | 53.610      | 5.700        | 4.550                     | 13.050      | 1.120        |
| 255.0                                                                  | -2.3               | 269.6               | 16.480                  | 66.760      | 6.300        | 4.630                     | 13.210      | 0.650        |
| 270.0                                                                  | -2.8               | 277.2               | 15.620                  | 60.050      | 3.750        | 4.610                     | 13.040      | 0.730        |
| 285.0                                                                  | -3.5               | 283.1               | 16.720                  | 62.150      | 5.370        | 4.570                     | 12.910      | 1.170        |
| 300.0                                                                  | -3.5               | 288.4               | 14.190                  | 65.240      | 6.330        | 4.570                     | 13.060      | 1.600        |
| 315.0                                                                  | -3.9               | 295.7               | 14.500                  | 60.830      | 8.520        | 4.500                     | 13.310      | 2.070        |
| 330.0                                                                  | -0.6               | 141.1               | 14.180                  | 55.590      | 9.240        | 4.340                     | 17.270      | 2.230        |
| 345.0                                                                  | 0.6                | 141.0               | 13.620                  | 48.720      | 10.260       | 4.200                     | 15.110      | 2.600        |
| Wind at 69.4 knots (35.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.58:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 17.7$  m and  $T_p = 20.0$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 1.7                | -41.7               | 14.800                  | 79.240      | 12.100       | 4.130                     | 12.730      | 3.010        |
| 15.0                                                                   | 1.3                | -140.8              | 14.000                  | 48.270      | 10.030       | 3.770                     | 9.780       | 2.900        |
| 30.0                                                                   | 1.9                | -124.7              | 13.510                  | 44.830      | 13.290       | 3.830                     | 12.950      | 2.660        |
| 45.0                                                                   | 2.6                | -114.2              | 14.050                  | 44.190      | 10.940       | 3.890                     | 13.860      | 2.350        |
| 60.0                                                                   | 3.5                | -61.9               | 14.570                  | 47.960      | 12.820       | 3.910                     | 21.000      | 2.430        |
| 75.0                                                                   | 5.8                | 71.4                | 13.700                  | 37.400      | 8.130        | 3.990                     | 8.250       | 1.510        |
| 90.0                                                                   | 5.0                | 94.4                | 14.840                  | 39.890      | 3.010        | 4.070                     | 9.770       | 0.590        |
| 105.0                                                                  | 4.3                | 108.2               | 12.850                  | 47.460      | 7.200        | 4.050                     | 9.810       | 1.290        |
| 120.0                                                                  | 3.4                | 118.0               | 12.680                  | 52.150      | 9.460        | 3.960                     | 9.620       | 1.820        |
| 135.0                                                                  | 2.5                | 127.1               | 13.750                  | 54.130      | 9.600        | 3.900                     | 9.320       | 2.240        |
| 150.0                                                                  | 1.9                | 134.9               | 13.350                  | 55.650      | 9.000        | 3.840                     | 8.830       | 2.570        |
| 165.0                                                                  | 1.5                | 143.3               | 13.400                  | 55.410      | 10.670       | 3.770                     | 8.240       | 2.850        |
| 180.0                                                                  | 1.3                | 153.9               | 13.260                  | 44.340      | 12.090       | 3.700                     | 7.470       | 3.140        |
| 195.0                                                                  | 1.8                | 168.9               | 12.560                  | 45.540      | 15.740       | 3.690                     | 6.630       | 3.380        |
| 210.0                                                                  | 4.5                | 235.3               | 13.990                  | 52.360      | 11.830       | 4.200                     | 12.110      | 2.510        |
| 225.0                                                                  | 4.1                | 248.3               | 15.750                  | 53.330      | 8.970        | 4.360                     | 12.530      | 1.950        |
| 240.0                                                                  | 3.6                | 258.0               | 15.880                  | 52.670      | 6.590        | 4.470                     | 12.890      | 1.370        |
| 255.0                                                                  | 3.6                | 268.2               | 15.690                  | 60.940      | 5.030        | 4.540                     | 13.120      | 0.800        |
| 270.0                                                                  | 3.5                | 276.9               | 17.010                  | 58.130      | 3.030        | 4.580                     | 13.180      | 0.610        |
| 285.0                                                                  | 3.6                | 285.8               | 16.240                  | 67.810      | 4.240        | 4.540                     | 13.020      | 1.120        |
| 300.0                                                                  | 3.0                | 292.4               | 16.280                  | 68.270      | 6.070        | 4.520                     | 12.800      | 1.630        |
| 315.0                                                                  | 2.6                | 298.6               | 18.060                  | 90.290      | 6.410        | 4.480                     | 12.990      | 2.060        |
| 330.0                                                                  | 2.3                | 306.2               | 16.840                  | 90.230      | 7.360        | 4.390                     | 12.830      | 2.490        |
| 345.0                                                                  | 2.0                | 312.9               | 16.320                  | 90.120      | 8.310        | 4.290                     | 12.870      | 2.830        |
| Wind at 69.4 knots (35.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.59: Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 17.7$  m and  $T_p = 20.0$  s; Ship's speed is 10.0 Knots**

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 6.9                | -37.5               | 15.710                  | 60.950      | 10.380       | 4.070                     | 12.820      | 3.180        |
| 15.0                                                                   | 6.8                | -31.4               | 14.960                  | 59.550      | 11.800       | 3.990                     | 12.400      | 3.340        |
| 30.0                                                                   | 6.8                | -26.2               | 14.540                  | 55.910      | 10.660       | 3.920                     | 12.020      | 3.410        |
| 45.0                                                                   | 7.7                | -78.8               | 14.410                  | 44.380      | 11.000       | 3.940                     | 17.950      | 2.110        |
| 60.0                                                                   | 6.9                | -10.9               | 13.370                  | 41.340      | 11.220       | 3.820                     | 12.260      | 3.430        |
| 75.0                                                                   | 7.6                | 24.5                | 13.240                  | 40.060      | 11.290       | 3.810                     | 10.950      | 3.160        |
| 90.0                                                                   | 9.7                | 88.3                | 14.330                  | 45.520      | 2.400        | 4.050                     | 9.450       | 0.460        |
| 105.0                                                                  | 9.5                | 103.2               | 14.270                  | 50.830      | 5.880        | 4.040                     | 9.350       | 0.900        |
| 120.0                                                                  | 8.7                | 114.3               | 13.920                  | 52.050      | 8.430        | 3.900                     | 8.060       | 1.480        |
| 135.0                                                                  | 8.1                | 125.0               | 12.300                  | 41.910      | 8.390        | 3.860                     | 7.050       | 1.950        |
| 150.0                                                                  | 7.6                | 134.4               | 14.190                  | 40.650      | 10.810       | 3.760                     | 6.230       | 2.300        |
| 165.0                                                                  | 7.3                | 144.5               | 13.230                  | 43.230      | 10.680       | 3.730                     | 6.290       | 2.590        |
| 180.0                                                                  | 7.1                | 153.9               | 12.270                  | 43.640      | 11.840       | 3.710                     | 6.310       | 2.820        |
| 195.0                                                                  | 7.0                | 165.7               | 11.770                  | 37.200      | 13.110       | 3.690                     | 6.030       | 3.040        |
| 210.0                                                                  | 8.8                | 220.9               | 14.220                  | 58.560      | 14.460       | 3.980                     | 11.370      | 2.740        |
| 225.0                                                                  | 8.8                | 240.1               | 15.830                  | 49.090      | 7.960        | 4.230                     | 12.540      | 2.150        |
| 240.0                                                                  | 8.8                | 251.8               | 19.900                  | 58.090      | 6.750        | 4.330                     | 13.230      | 1.630        |
| 255.0                                                                  | 8.9                | 263.4               | 14.470                  | 55.340      | 5.610        | 4.470                     | 13.710      | 1.010        |
| 270.0                                                                  | 8.9                | 275.4               | 15.670                  | 64.350      | 3.290        | 4.510                     | 14.040      | 0.610        |
| 285.0                                                                  | 9.1                | 286.9               | 17.110                  | 84.430      | 5.210        | 4.470                     | 13.880      | 1.210        |
| 300.0                                                                  | 8.9                | 298.5               | 15.590                  | 75.030      | 6.240        | 4.370                     | 12.630      | 2.020        |
| 315.0                                                                  | 7.9                | 306.1               | 15.320                  | 62.320      | 7.870        | 4.270                     | 12.340      | 2.500        |
| 330.0                                                                  | 7.3                | 310.9               | 15.050                  | 74.960      | 7.830        | 4.220                     | 12.860      | 2.740        |
| 345.0                                                                  | 7.1                | 317.3               | 14.290                  | 74.100      | 10.790       | 4.150                     | 12.790      | 3.030        |
| Wind at 69.4 knots (35.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |



**Table Q.60:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 17.7$  m and  $T_p = 20.0$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 11.9               | -21.9               | 14.670                  | 82.730      | 13.800       | 3.910                     | 12.190      | 3.550        |
| 15.0                                                                   | 11.7               | -12.9               | 14.720                  | 64.060      | 14.880       | 3.830                     | 11.630      | 3.630        |
| 30.0                                                                   | 11.8               | 0.1                 | 14.120                  | 59.350      | 15.200       | 3.770                     | 10.780      | 3.670        |
| 45.0                                                                   | 12.1               | 19.1                | 12.880                  | 48.490      | 11.010       | 3.770                     | 9.440       | 3.550        |
| 60.0                                                                   | 12.7               | 42.5                | 15.380                  | 40.200      | 9.730        | 3.850                     | 6.890       | 3.030        |
| 75.0                                                                   | 14.8               | 72.7                | 15.230                  | 44.280      | 5.390        | 3.950                     | 8.950       | 1.480        |
| 90.0                                                                   | 14.7               | 88.3                | 14.410                  | 47.830      | 2.360        | 3.990                     | 9.940       | 0.500        |
| 105.0                                                                  | 14.6               | 102.6               | 14.480                  | 60.460      | 4.220        | 3.920                     | 9.620       | 0.780        |
| 120.0                                                                  | 13.9               | 115.1               | 14.140                  | 50.280      | 5.610        | 3.850                     | 7.930       | 1.340        |
| 135.0                                                                  | 13.5               | 129.1               | 12.300                  | 53.000      | 8.430        | 3.710                     | 7.010       | 1.860        |
| 150.0                                                                  | 13.4               | 143.3               | 12.050                  | 48.310      | 7.850        | 3.620                     | 6.100       | 2.220        |
| 165.0                                                                  | 13.2               | 158.7               | 13.520                  | 49.910      | 10.900       | 3.600                     | 6.030       | 2.560        |
| 180.0                                                                  | 14.0               | 176.8               | 10.910                  | 43.750      | 9.150        | 3.590                     | 6.480       | 2.770        |
| 195.0                                                                  | 13.9               | 196.1               | 14.770                  | 54.420      | 11.690       | 3.590                     | 9.450       | 2.670        |
| 210.0                                                                  | 14.0               | 215.4               | 12.960                  | 46.370      | 8.240        | 3.760                     | 11.530      | 2.460        |
| 225.0                                                                  | 14.1               | 231.1               | 14.490                  | 48.580      | 6.910        | 3.940                     | 12.760      | 2.040        |
| 240.0                                                                  | 14.2               | 245.1               | 14.260                  | 84.700      | 5.860        | 4.150                     | 14.360      | 1.720        |
| 255.0                                                                  | 14.3               | 259.0               | 15.590                  | 91.170      | 5.660        | 4.330                     | 15.530      | 1.120        |
| 270.0                                                                  | 14.4               | 273.2               | 16.320                  | 61.400      | 3.150        | 4.390                     | 15.360      | 0.600        |
| 285.0                                                                  | 14.5               | 286.6               | 16.240                  | 77.370      | 4.880        | 4.370                     | 15.190      | 1.210        |
| 300.0                                                                  | 14.4               | 300.2               | 15.020                  | 72.310      | 8.620        | 4.250                     | 12.410      | 2.120        |
| 315.0                                                                  | 14.2               | 312.9               | 14.610                  | 90.480      | 8.600        | 4.210                     | 11.700      | 2.820        |
| 330.0                                                                  | 13.3               | 324.8               | 14.920                  | 82.370      | 10.040       | 4.040                     | 11.140      | 3.230        |
| 345.0                                                                  | 12.1               | 330.4               | 14.070                  | 68.580      | 11.740       | 3.970                     | 11.930      | 3.420        |
| Wind at 69.4 knots (35.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.61:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 17.7$  m and  $T_p = 20.0$  s; Ship's speed is 20.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 19.2               | -2.9                | 12.650                  | 42.850      | 11.560       | 3.880                     | 8.240       | 3.520        |
| 15.0                                                                   | 19.2               | 12.2                | 12.870                  | 40.940      | 10.140       | 3.840                     | 7.480       | 3.470        |
| 30.0                                                                   | 19.3               | 27.5                | 14.280                  | 39.300      | 10.900       | 3.830                     | 6.770       | 3.300        |
| 45.0                                                                   | 19.4               | 42.5                | 15.300                  | 39.530      | 9.520        | 3.840                     | 6.130       | 2.950        |
| 60.0                                                                   | 19.5               | 57.0                | 13.220                  | 43.780      | 8.160        | 3.850                     | 5.500       | 2.400        |
| 75.0                                                                   | 19.9               | 73.4                | 14.920                  | 50.730      | 6.020        | 3.880                     | 10.270      | 1.500        |
| 90.0                                                                   | 19.8               | 88.3                | 15.530                  | 57.420      | 3.960        | 3.900                     | 11.340      | 0.600        |
| 105.0                                                                  | 19.6               | 102.9               | 13.570                  | 66.050      | 10.780       | 3.800                     | 10.900      | 0.810        |
| 120.0                                                                  | 19.5               | 117.0               | 12.490                  | 70.260      | 5.390        | 3.740                     | 9.310       | 1.260        |
| 135.0                                                                  | 19.3               | 131.9               | 12.740                  | 64.800      | 6.260        | 3.570                     | 8.950       | 1.710        |
| 150.0                                                                  | 19.2               | 146.9               | 10.430                  | 56.960      | 7.100        | 3.560                     | 8.850       | 2.200        |
| 165.0                                                                  | 19.6               | 163.2               | 11.000                  | 56.370      | 9.130        | 3.760                     | 7.170       | 2.710        |
| 180.0                                                                  | 19.7               | 178.9               | 10.820                  | 44.930      | 7.230        | 3.520                     | 7.040       | 2.440        |
| 195.0                                                                  | 19.6               | 195.3               | 10.880                  | 49.250      | 10.270       | 3.600                     | 9.910       | 2.720        |
| 210.0                                                                  | 19.5               | 210.8               | 12.380                  | 59.230      | 8.430        | 3.490                     | 11.300      | 2.280        |
| 225.0                                                                  | 19.3               | 227.1               | 15.340                  | 56.490      | 7.270        | 3.700                     | 13.470      | 1.980        |
| 240.0                                                                  | 19.5               | 242.2               | 12.730                  | 70.460      | 6.480        | 3.970                     | 15.390      | 1.620        |
| 255.0                                                                  | 19.7               | 257.3               | 16.180                  | 60.820      | 4.970        | 4.190                     | 16.620      | 1.070        |
| 270.0                                                                  | 19.7               | 272.1               | 14.920                  | 66.540      | 3.460        | 4.290                     | 17.040      | 0.620        |
| 285.0                                                                  | 19.7               | 286.3               | 16.460                  | 75.580      | 4.660        | 4.300                     | 17.070      | 1.210        |
| 300.0                                                                  | 19.7               | 300.5               | 13.560                  | 81.120      | 6.620        | 4.220                     | 13.480      | 2.110        |
| 315.0                                                                  | 19.6               | 314.1               | 15.260                  | 90.180      | 8.830        | 4.140                     | 11.640      | 2.770        |
| 330.0                                                                  | 19.4               | 328.2               | 13.590                  | 62.680      | 10.180       | 4.030                     | 10.410      | 3.190        |
| 345.0                                                                  | 19.3               | 342.5               | 12.980                  | 51.640      | 10.650       | 3.940                     | 9.030       | 3.430        |
| Wind at 69.4 knots (35.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.62:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 17.7$  m and  $T_p = 20.0$  s; Ship's speed is 25.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 24.8               | -1.3                | 12.570                  | 41.690      | 11.060       | 3.950                     | 7.760       | 3.370        |
| 15.0                                                                   | 24.7               | 13.8                | 13.080                  | 38.150      | 10.950       | 3.910                     | 6.930       | 3.320        |
| 30.0                                                                   | 24.8               | 29.0                | 12.700                  | 37.890      | 10.190       | 3.870                     | 6.410       | 3.180        |
| 45.0                                                                   | 24.8               | 43.7                | 13.470                  | 45.840      | 9.480        | 3.860                     | 6.000       | 2.860        |
| 60.0                                                                   | 24.7               | 58.0                | 14.170                  | 48.870      | 9.100        | 3.850                     | 5.780       | 2.350        |
| 75.0                                                                   | 24.9               | 73.6                | 14.030                  | 53.640      | 5.160        | 3.840                     | 11.130      | 1.550        |
| 90.0                                                                   | 24.8               | 88.5                | 13.600                  | 68.230      | 15.710       | 3.780                     | 12.010      | 0.820        |
| 105.0                                                                  | 24.7               | 103.0               | 14.290                  | 76.620      | 13.330       | 3.770                     | 12.480      | 0.840        |
| 120.0                                                                  | 24.6               | 118.0               | 12.810                  | 75.410      | 5.370        | 3.670                     | 10.710      | 1.230        |
| 135.0                                                                  | 24.6               | 133.1               | 10.670                  | 66.450      | 5.800        | 3.580                     | 11.030      | 1.700        |
| 150.0                                                                  | 24.5               | 147.2               | 8.890                   | 63.990      | 6.530        | 3.390                     | 7.470       | 1.890        |
| 165.0                                                                  | 25.0               | 162.8               | 11.290                  | 68.380      | 8.270        | 3.070                     | 5.510       | 2.110        |
| 180.0                                                                  | 26.0               | 179.2               | 8.270                   | 38.100      | 6.560        | 2.970                     | 4.470       | 2.180        |
| 195.0                                                                  | 25.6               | 194.8               | 8.540                   | 44.540      | 6.450        | 3.210                     | 6.760       | 2.180        |
| 210.0                                                                  | 24.8               | 210.2               | 10.480                  | 55.920      | 9.010        | 3.420                     | 11.310      | 2.220        |
| 225.0                                                                  | 24.8               | 224.8               | 10.500                  | 59.480      | 6.500        | 3.480                     | 12.270      | 1.740        |
| 240.0                                                                  | 24.7               | 240.6               | 14.440                  | 61.640      | 5.380        | 3.760                     | 16.100      | 1.600        |
| 255.0                                                                  | 24.9               | 256.1               | 14.550                  | 78.530      | 3.730        | 4.050                     | 18.260      | 1.080        |
| 270.0                                                                  | 24.8               | 271.4               | 14.310                  | 81.920      | 4.230        | 4.200                     | 19.010      | 0.660        |
| 285.0                                                                  | 24.9               | 285.8               | 11.520                  | 90.100      | 4.130        | 4.230                     | 18.490      | 1.230        |
| 300.0                                                                  | 24.9               | 300.4               | 15.400                  | 90.230      | 8.230        | 4.260                     | 14.060      | 2.130        |
| 315.0                                                                  | 24.9               | 314.9               | 14.290                  | 74.460      | 8.650        | 4.140                     | 12.310      | 2.710        |
| 330.0                                                                  | 24.8               | 329.3               | 14.560                  | 56.900      | 10.330       | 4.070                     | 9.760       | 3.100        |
| 345.0                                                                  | 24.8               | 343.9               | 12.650                  | 47.440      | 10.180       | 4.010                     | 9.000       | 3.300        |
| Wind at 69.4 knots (35.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.63:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 17.7$  m and  $T_p = 20.0$  s; Ship's speed is 30.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 30.1               | -0.5                | 15.400                  | 44.780      | 10.050       | 4.040                     | 7.350       | 3.230        |
| 15.0                                                                   | 30.0               | 14.6                | 12.400                  | 37.640      | 10.270       | 3.980                     | 6.530       | 3.210        |
| 30.0                                                                   | 30.0               | 29.6                | 13.040                  | 38.250      | 10.240       | 3.930                     | 6.230       | 3.070        |
| 45.0                                                                   | 30.0               | 44.4                | 14.200                  | 43.300      | 9.120        | 3.880                     | 5.820       | 2.780        |
| 60.0                                                                   | 29.9               | 58.8                | 15.810                  | 48.990      | 7.730        | 3.820                     | 5.810       | 2.310        |
| 75.0                                                                   | 30.0               | 73.8                | 14.670                  | 59.420      | 5.400        | 3.770                     | 12.370      | 1.580        |
| 90.0                                                                   | 29.9               | 88.6                | 16.630                  | 67.080      | 13.090       | 3.720                     | 13.200      | 0.870        |
| 105.0                                                                  | 29.8               | 103.3               | 14.640                  | 73.070      | 5.900        | 3.640                     | 13.560      | 0.810        |
| 120.0                                                                  | 29.6               | 118.4               | 12.410                  | 69.070      | 6.980        | 3.650                     | 13.540      | 1.280        |
| 135.0                                                                  | 29.4               | 132.7               | 9.700                   | 66.540      | 5.640        | 3.510                     | 11.430      | 1.620        |
| 150.0                                                                  | 29.2               | 146.3               | 8.740                   | 62.000      | 6.290        | 3.150                     | 8.290       | 1.940        |
| 165.0                                                                  | 29.4               | 159.7               | 10.880                  | 74.150      | 8.100        | 3.400                     | 7.880       | 2.490        |
| 180.0                                                                  | 30.3               | 176.7               | 8.570                   | 48.420      | 8.490        | 2.840                     | 6.820       | 2.410        |
| 195.0                                                                  | 30.6               | 196.2               | 12.870                  | 60.330      | 10.260       | 3.690                     | 12.440      | 2.960        |
| 210.0                                                                  | 30.9               | 210.9               | 9.100                   | 62.780      | 6.940        | 3.470                     | 11.330      | 2.420        |
| 225.0                                                                  | 30.0               | 224.9               | 9.540                   | 65.680      | 5.680        | 3.300                     | 12.470      | 1.750        |
| 240.0                                                                  | 29.7               | 240.1               | 12.440                  | 62.030      | 6.100        | 3.690                     | 17.070      | 1.700        |
| 255.0                                                                  | 29.6               | 254.9               | 15.430                  | 90.070      | 10.510       | 4.050                     | 18.850      | 1.360        |
| 270.0                                                                  | 29.9               | 270.8               | 14.740                  | 90.220      | 4.050        | 4.160                     | 20.270      | 0.730        |
| 285.0                                                                  | 30.0               | 285.2               | 11.020                  | 90.470      | 3.930        | 4.400                     | 19.630      | 1.320        |
| 300.0                                                                  | 30.1               | 300.4               | 16.830                  | 79.690      | 8.150        | 4.180                     | 13.460      | 2.060        |
| 315.0                                                                  | 30.1               | 315.1               | 15.420                  | 70.970      | 9.020        | 4.150                     | 11.880      | 2.630        |
| 330.0                                                                  | 30.1               | 329.8               | 14.530                  | 55.050      | 9.190        | 4.130                     | 10.260      | 2.980        |
| 345.0                                                                  | 30.1               | 344.6               | 14.990                  | 48.820      | 10.960       | 4.070                     | 8.330       | 3.160        |
| Wind at 69.4 knots (35.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.64:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 17.7$  m and  $T_p = 25.7$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | -0.7               | -1.3                | 13.730                  | 44.080      | 8.070        | 4.160                     | 7.360       | 2.530        |
| 15.0                                                                   | 0.7                | 12.9                | 13.110                  | 37.350      | 7.950        | 4.100                     | 6.620       | 2.450        |
| 30.0                                                                   | 1.7                | 26.6                | 13.190                  | 34.630      | 6.660        | 4.080                     | 6.130       | 2.260        |
| 45.0                                                                   | 2.5                | 41.8                | 14.250                  | 35.480      | 6.480        | 4.120                     | 5.880       | 1.930        |
| 60.0                                                                   | 2.6                | 58.7                | 14.180                  | 35.200      | 5.050        | 4.100                     | 5.590       | 1.360        |
| 75.0                                                                   | 1.7                | 77.0                | 15.310                  | 35.340      | 2.450        | 4.170                     | 5.480       | 0.610        |
| 90.0                                                                   | 0.9                | 94.9                | 14.600                  | 36.320      | 3.250        | 4.200                     | 5.730       | 0.410        |
| 105.0                                                                  | 0.1                | 109.7               | 16.190                  | 43.060      | 5.370        | 4.170                     | 6.050       | 0.960        |
| 120.0                                                                  | -1.2               | 125.3               | 13.390                  | 37.810      | 5.420        | 4.110                     | 6.380       | 1.520        |
| 135.0                                                                  | -2.4               | 140.3               | 16.240                  | 38.080      | 6.270        | 4.130                     | 5.830       | 2.000        |
| 150.0                                                                  | -2.9               | 154.1               | 14.030                  | 34.320      | 7.470        | 4.070                     | 4.440       | 2.300        |
| 165.0                                                                  | -2.8               | 165.8               | 13.710                  | 32.840      | 8.540        | 4.050                     | 3.060       | 2.470        |
| 180.0                                                                  | -2.1               | 177.6               | 13.860                  | 29.840      | 8.010        | 4.040                     | 3.000       | 2.560        |
| 195.0                                                                  | -1.0               | 191.8               | 13.380                  | 36.750      | 10.100       | 4.100                     | 4.520       | 2.580        |
| 210.0                                                                  | 0.1                | 209.9               | 14.450                  | 41.320      | 8.620        | 4.180                     | 6.490       | 2.390        |
| 225.0                                                                  | 0.3                | 229.9               | 14.470                  | 42.140      | 6.600        | 4.280                     | 7.940       | 1.900        |
| 240.0                                                                  | -0.1               | 248.0               | 15.960                  | 52.080      | 4.820        | 4.450                     | 9.090       | 1.240        |
| 255.0                                                                  | -0.9               | 262.0               | 16.280                  | 52.400      | 2.490        | 4.490                     | 9.290       | 0.600        |
| 270.0                                                                  | -1.6               | 274.8               | 16.420                  | 46.560      | 1.530        | 4.520                     | 9.360       | 0.260        |
| 285.0                                                                  | -2.4               | 286.8               | 15.140                  | 44.970      | 2.620        | 4.470                     | 9.100       | 0.780        |
| 300.0                                                                  | -3.7               | 302.0               | 14.610                  | 48.060      | 4.230        | 4.450                     | 8.920       | 1.480        |
| 315.0                                                                  | -3.6               | 316.8               | 13.990                  | 46.460      | 7.230        | 4.390                     | 8.470       | 1.990        |
| 330.0                                                                  | -2.9               | 331.7               | 14.310                  | 54.250      | 6.680        | 4.280                     | 8.050       | 2.290        |
| 345.0                                                                  | -1.8               | 345.9               | 14.340                  | 51.210      | 7.600        | 4.200                     | 7.680       | 2.460        |
| Wind at 69.4 knots (35.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.65:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 17.7$  m and  $T_p = 25.7$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 2.6                | -22.8               | 15.670                  | 52.650      | 8.140        | 4.190                     | 8.740       | 2.370        |
| 15.0                                                                   | 2.9                | -7.4                | 15.540                  | 45.040      | 8.680        | 4.110                     | 8.080       | 2.520        |
| 30.0                                                                   | 3.4                | 9.2                 | 15.110                  | 45.730      | 9.020        | 4.060                     | 7.230       | 2.510        |
| 45.0                                                                   | 4.1                | 27.0                | 13.590                  | 35.950      | 7.750        | 4.060                     | 6.040       | 2.310        |
| 60.0                                                                   | 4.7                | 48.0                | 13.870                  | 34.960      | 6.420        | 4.090                     | 5.070       | 1.790        |
| 75.0                                                                   | 4.9                | 66.8                | 13.940                  | 33.660      | 4.130        | 4.180                     | 5.100       | 1.100        |
| 90.0                                                                   | 4.6                | 83.1                | 14.220                  | 35.280      | 2.070        | 4.160                     | 5.550       | 0.400        |
| 105.0                                                                  | 4.3                | 97.1                | 14.690                  | 38.640      | 2.400        | 4.180                     | 5.440       | 0.400        |
| 120.0                                                                  | 4.0                | 108.9               | 15.030                  | 37.610      | 4.300        | 4.160                     | 5.050       | 0.870        |
| 135.0                                                                  | 3.5                | 121.0               | 14.010                  | 35.990      | 5.560        | 4.140                     | 4.450       | 1.340        |
| 150.0                                                                  | 3.1                | 133.4               | 13.880                  | 35.050      | 6.770        | 4.100                     | 3.830       | 1.750        |
| 165.0                                                                  | 2.8                | 145.1               | 13.280                  | 33.700      | 7.700        | 4.060                     | 3.410       | 2.050        |
| 180.0                                                                  | 2.6                | 156.9               | 14.460                  | 32.950      | 8.830        | 4.050                     | 3.030       | 2.280        |
| 195.0                                                                  | 2.5                | 169.3               | 15.600                  | 31.360      | 10.200       | 4.040                     | 2.910       | 2.460        |
| 210.0                                                                  | 2.7                | 183.2               | 13.960                  | 32.820      | 8.650        | 4.060                     | 3.370       | 2.560        |
| 225.0                                                                  | 3.7                | 209.2               | 13.530                  | 41.990      | 7.980        | 4.160                     | 5.590       | 2.350        |
| 240.0                                                                  | 4.6                | 237.6               | 13.370                  | 43.020      | 5.690        | 4.380                     | 8.390       | 1.620        |
| 255.0                                                                  | 4.5                | 251.8               | 14.750                  | 43.110      | 4.690        | 4.440                     | 8.970       | 1.090        |
| 270.0                                                                  | 4.1                | 266.2               | 15.730                  | 49.270      | 2.860        | 4.480                     | 9.270       | 0.490        |
| 285.0                                                                  | 3.8                | 279.0               | 16.630                  | 56.330      | 2.150        | 4.500                     | 9.270       | 0.380        |
| 300.0                                                                  | 3.3                | 290.2               | 16.530                  | 50.430      | 3.650        | 4.450                     | 9.080       | 0.850        |
| 315.0                                                                  | 3.0                | 300.5               | 16.230                  | 52.630      | 4.330        | 4.420                     | 9.130       | 1.310        |
| 330.0                                                                  | 2.7                | 311.4               | 17.260                  | 55.970      | 5.870        | 4.370                     | 9.150       | 1.730        |
| 345.0                                                                  | 2.6                | 323.6               | 16.650                  | 55.680      | 7.190        | 4.290                     | 9.030       | 2.100        |
| Wind at 69.4 knots (35.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.66:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 17.7$  m and  $T_p = 25.7$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 7.4                | -24.1               | 14.660                  | 54.340      | 7.670        | 4.170                     | 9.090       | 2.400        |
| 15.0                                                                   | 7.4                | -12.0               | 14.290                  | 49.490      | 8.220        | 4.110                     | 8.710       | 2.540        |
| 30.0                                                                   | 7.6                | 2.2                 | 15.230                  | 45.370      | 7.760        | 4.070                     | 8.030       | 2.590        |
| 45.0                                                                   | 7.9                | 19.7                | 14.150                  | 39.930      | 7.920        | 4.050                     | 6.670       | 2.460        |
| 60.0                                                                   | 8.3                | 39.5                | 14.690                  | 35.600      | 6.710        | 4.080                     | 4.980       | 2.080        |
| 75.0                                                                   | 8.6                | 61.1                | 14.010                  | 34.510      | 5.340        | 4.080                     | 4.020       | 1.360        |
| 90.0                                                                   | 8.9                | 82.5                | 15.020                  | 38.720      | 1.900        | 4.130                     | 5.610       | 0.480        |
| 105.0                                                                  | 8.6                | 94.8                | 17.720                  | 42.670      | 1.620        | 4.120                     | 5.290       | 0.270        |
| 120.0                                                                  | 8.3                | 105.8               | 13.530                  | 48.820      | 3.250        | 4.130                     | 4.630       | 0.690        |
| 135.0                                                                  | 8.1                | 114.5               | 14.240                  | 43.970      | 3.960        | 4.100                     | 3.700       | 0.980        |
| 150.0                                                                  | 8.0                | 127.8               | 13.780                  | 41.810      | 6.420        | 4.100                     | 3.110       | 1.440        |
| 165.0                                                                  | 7.8                | 141.5               | 13.520                  | 36.820      | 8.240        | 4.020                     | 2.260       | 1.820        |
| 180.0                                                                  | 7.7                | 155.3               | 13.350                  | 33.670      | 9.410        | 3.990                     | 1.470       | 2.100        |
| 195.0                                                                  | 7.7                | 171.9               | 13.350                  | 31.490      | 10.230       | 4.000                     | 1.970       | 2.320        |
| 210.0                                                                  | 8.7                | 201.6               | 13.810                  | 44.150      | 9.380        | 4.090                     | 5.570       | 2.280        |
| 225.0                                                                  | 9.3                | 223.0               | 14.210                  | 47.610      | 7.870        | 4.230                     | 8.110       | 1.890        |
| 240.0                                                                  | 9.6                | 239.4               | 14.320                  | 46.910      | 5.430        | 4.300                     | 9.250       | 1.430        |
| 255.0                                                                  | 9.7                | 254.2               | 16.570                  | 52.370      | 5.070        | 4.360                     | 10.390      | 0.910        |
| 270.0                                                                  | 9.5                | 268.7               | 14.600                  | 53.760      | 2.090        | 4.420                     | 10.450      | 0.370        |
| 285.0                                                                  | 9.3                | 282.5               | 16.830                  | 53.810      | 3.330        | 4.420                     | 10.160      | 0.540        |
| 300.0                                                                  | 8.9                | 295.7               | 15.140                  | 53.590      | 4.250        | 4.410                     | 9.170       | 1.110        |
| 315.0                                                                  | 8.2                | 306.6               | 15.120                  | 52.960      | 4.910        | 4.350                     | 9.010       | 1.560        |
| 330.0                                                                  | 7.7                | 315.2               | 14.960                  | 52.090      | 5.800        | 4.300                     | 9.150       | 1.870        |
| 345.0                                                                  | 7.6                | 325.2               | 15.980                  | 52.910      | 6.720        | 4.240                     | 9.190       | 2.170        |
| Wind at 69.4 knots (35.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.67:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 17.7$  m and  $T_p = 25.7$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 13.3               | -6.3                | 13.300                  | 47.790      | 8.340        | 4.060                     | 6.900       | 2.620        |
| 15.0                                                                   | 13.2               | 7.7                 | 14.160                  | 44.450      | 8.780        | 4.010                     | 6.300       | 2.610        |
| 30.0                                                                   | 13.3               | 22.6                | 12.670                  | 40.880      | 8.070        | 4.020                     | 5.500       | 2.480        |
| 45.0                                                                   | 13.7               | 38.6                | 14.500                  | 37.000      | 7.290        | 4.010                     | 4.250       | 2.160        |
| 60.0                                                                   | 13.8               | 53.8                | 14.950                  | 37.430      | 5.980        | 4.040                     | 3.760       | 1.700        |
| 75.0                                                                   | 14.3               | 71.1                | 14.870                  | 41.480      | 3.560        | 4.070                     | 5.930       | 1.030        |
| 90.0                                                                   | 14.2               | 85.8                | 12.980                  | 49.060      | 1.610        | 4.090                     | 6.620       | 0.430        |
| 105.0                                                                  | 14.0               | 99.9                | 13.530                  | 54.710      | 1.960        | 4.060                     | 6.220       | 0.410        |
| 120.0                                                                  | 13.4               | 112.4               | 14.060                  | 52.210      | 3.420        | 4.070                     | 4.810       | 0.810        |
| 135.0                                                                  | 13.5               | 127.9               | 14.190                  | 48.350      | 5.890        | 4.010                     | 4.460       | 1.290        |
| 150.0                                                                  | 13.6               | 143.3               | 13.900                  | 53.400      | 6.640        | 3.910                     | 4.080       | 1.640        |
| 165.0                                                                  | 13.7               | 159.4               | 13.640                  | 47.120      | 6.960        | 3.960                     | 4.240       | 1.960        |
| 180.0                                                                  | 14.0               | 176.0               | 12.900                  | 40.830      | 7.100        | 3.980                     | 5.080       | 2.110        |
| 195.0                                                                  | 14.1               | 192.4               | 13.410                  | 48.860      | 7.870        | 4.010                     | 6.820       | 2.120        |
| 210.0                                                                  | 14.2               | 208.8               | 12.960                  | 47.640      | 7.030        | 4.000                     | 8.040       | 1.910        |
| 225.0                                                                  | 14.3               | 224.6               | 14.380                  | 49.690      | 6.700        | 4.130                     | 9.420       | 1.660        |
| 240.0                                                                  | 14.6               | 239.7               | 14.810                  | 54.670      | 5.580        | 4.250                     | 10.450      | 1.290        |
| 255.0                                                                  | 14.7               | 254.8               | 17.150                  | 63.240      | 4.650        | 4.300                     | 11.810      | 0.820        |
| 270.0                                                                  | 14.7               | 269.6               | 14.450                  | 57.840      | 1.710        | 4.360                     | 12.230      | 0.370        |
| 285.0                                                                  | 14.6               | 284.1               | 15.030                  | 63.310      | 3.280        | 4.330                     | 11.900      | 0.670        |
| 300.0                                                                  | 14.5               | 298.4               | 14.640                  | 58.660      | 4.610        | 4.300                     | 9.910       | 1.260        |
| 315.0                                                                  | 14.3               | 312.5               | 14.240                  | 57.290      | 5.390        | 4.250                     | 8.950       | 1.800        |
| 330.0                                                                  | 14.0               | 326.4               | 13.950                  | 54.700      | 7.100        | 4.180                     | 8.030       | 2.210        |
| 345.0                                                                  | 13.7               | 340.2               | 13.850                  | 50.010      | 7.890        | 4.110                     | 7.390       | 2.490        |
| Wind at 69.4 knots (35.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |



**Table Q.68:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 17.7$  m and  $T_p = 25.7$  s; Ship's speed is 20.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 19.4               | -2.5                | 16.630                  | 53.710      | 8.990        | 4.040                     | 5.660       | 2.600        |
| 15.0                                                                   | 19.4               | 12.4                | 15.220                  | 45.650      | 8.300        | 3.970                     | 4.970       | 2.570        |
| 30.0                                                                   | 19.4               | 27.2                | 16.340                  | 44.050      | 9.310        | 3.980                     | 4.360       | 2.410        |
| 45.0                                                                   | 19.4               | 42.1                | 14.300                  | 41.420      | 6.810        | 3.970                     | 4.050       | 2.100        |
| 60.0                                                                   | 19.4               | 56.7                | 14.720                  | 42.800      | 6.640        | 4.000                     | 4.190       | 1.660        |
| 75.0                                                                   | 19.7               | 72.5                | 13.840                  | 54.060      | 3.400        | 3.980                     | 7.560       | 1.060        |
| 90.0                                                                   | 19.6               | 87.1                | 13.100                  | 55.280      | 2.260        | 4.030                     | 7.830       | 0.510        |
| 105.0                                                                  | 19.5               | 101.8               | 13.920                  | 66.960      | 2.280        | 3.990                     | 7.750       | 0.480        |
| 120.0                                                                  | 19.5               | 116.7               | 14.030                  | 58.860      | 3.980        | 3.980                     | 6.220       | 0.850        |
| 135.0                                                                  | 19.4               | 131.5               | 13.190                  | 65.740      | 4.840        | 3.910                     | 5.980       | 1.250        |
| 150.0                                                                  | 19.5               | 146.8               | 14.980                  | 67.800      | 6.470        | 3.870                     | 5.630       | 1.590        |
| 165.0                                                                  | 19.5               | 162.4               | 11.650                  | 53.910      | 6.690        | 3.910                     | 5.660       | 1.890        |
| 180.0                                                                  | 19.6               | 177.8               | 11.400                  | 45.180      | 6.470        | 3.880                     | 5.950       | 1.830        |
| 195.0                                                                  | 19.6               | 193.7               | 12.710                  | 48.370      | 7.320        | 3.930                     | 7.790       | 2.040        |
| 210.0                                                                  | 19.5               | 209.1               | 15.660                  | 52.770      | 8.080        | 3.890                     | 9.040       | 1.790        |
| 225.0                                                                  | 19.6               | 224.3               | 13.290                  | 57.500      | 5.610        | 4.030                     | 10.540      | 1.560        |
| 240.0                                                                  | 19.6               | 239.4               | 14.040                  | 57.910      | 4.720        | 4.110                     | 11.410      | 1.180        |
| 255.0                                                                  | 19.8               | 254.7               | 14.160                  | 73.580      | 3.340        | 4.250                     | 13.100      | 0.760        |
| 270.0                                                                  | 19.8               | 269.9               | 14.410                  | 70.270      | 1.940        | 4.280                     | 14.010      | 0.410        |
| 285.0                                                                  | 19.8               | 284.6               | 14.810                  | 73.930      | 3.130        | 4.310                     | 13.820      | 0.750        |
| 300.0                                                                  | 19.8               | 299.1               | 13.400                  | 65.500      | 4.070        | 4.240                     | 10.810      | 1.310        |
| 315.0                                                                  | 19.7               | 313.6               | 15.320                  | 65.210      | 6.030        | 4.190                     | 9.600       | 1.830        |
| 330.0                                                                  | 19.6               | 328.2               | 17.840                  | 65.320      | 7.420        | 4.140                     | 7.910       | 2.230        |
| 345.0                                                                  | 19.5               | 342.8               | 16.970                  | 56.270      | 8.590        | 4.050                     | 6.630       | 2.480        |
| Wind at 69.4 knots (35.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.69:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 17.7$  m and  $T_p = 25.7$  s; Ship's speed is 25.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 24.8               | -1.5                | 12.740                  | 47.300      | 8.340        | 4.000                     | 5.380       | 2.560        |
| 15.0                                                                   | 24.8               | 13.5                | 13.890                  | 42.180      | 7.850        | 3.980                     | 4.730       | 2.540        |
| 30.0                                                                   | 24.8               | 28.4                | 14.060                  | 46.600      | 8.440        | 3.950                     | 4.440       | 2.380        |
| 45.0                                                                   | 24.8               | 43.2                | 15.020                  | 47.590      | 6.760        | 3.930                     | 4.370       | 2.090        |
| 60.0                                                                   | 24.7               | 57.8                | 13.700                  | 47.690      | 5.710        | 3.950                     | 4.760       | 1.670        |
| 75.0                                                                   | 24.9               | 73.2                | 14.960                  | 57.820      | 3.900        | 3.940                     | 8.680       | 1.120        |
| 90.0                                                                   | 24.9               | 87.9                | 13.540                  | 64.710      | 2.620        | 3.960                     | 8.970       | 0.620        |
| 105.0                                                                  | 24.8               | 102.7               | 13.620                  | 76.610      | 3.100        | 3.950                     | 8.970       | 0.560        |
| 120.0                                                                  | 24.8               | 117.7               | 13.000                  | 65.650      | 3.280        | 3.920                     | 6.450       | 0.880        |
| 135.0                                                                  | 24.7               | 132.5               | 12.930                  | 72.090      | 4.650        | 3.890                     | 5.850       | 1.260        |
| 150.0                                                                  | 24.7               | 147.6               | 11.410                  | 63.650      | 5.240        | 3.900                     | 5.370       | 1.740        |
| 165.0                                                                  | 24.8               | 163.1               | 11.100                  | 57.610      | 5.750        | 3.980                     | 5.160       | 1.980        |
| 180.0                                                                  | 25.0               | 178.5               | 10.400                  | 43.980      | 4.800        | 3.740                     | 4.900       | 1.800        |
| 195.0                                                                  | 25.0               | 194.2               | 11.480                  | 49.170      | 5.980        | 4.120                     | 7.560       | 2.110        |
| 210.0                                                                  | 24.9               | 209.3               | 11.670                  | 55.020      | 5.650        | 3.890                     | 8.820       | 1.810        |
| 225.0                                                                  | 24.9               | 224.3               | 13.790                  | 62.280      | 5.320        | 3.970                     | 10.820      | 1.530        |
| 240.0                                                                  | 24.8               | 239.4               | 13.710                  | 61.490      | 5.000        | 4.010                     | 11.710      | 1.150        |
| 255.0                                                                  | 24.8               | 254.7               | 14.080                  | 81.500      | 2.780        | 4.210                     | 14.370      | 0.760        |
| 270.0                                                                  | 24.8               | 269.8               | 14.630                  | 90.350      | 2.320        | 4.230                     | 15.720      | 0.480        |
| 285.0                                                                  | 24.9               | 284.5               | 13.190                  | 89.960      | 3.000        | 4.210                     | 15.320      | 0.780        |
| 300.0                                                                  | 25.0               | 299.4               | 14.890                  | 65.890      | 4.380        | 4.180                     | 10.980      | 1.350        |
| 315.0                                                                  | 24.9               | 314.1               | 17.450                  | 83.850      | 5.960        | 4.140                     | 9.790       | 1.840        |
| 330.0                                                                  | 24.9               | 328.9               | 14.540                  | 64.600      | 7.790        | 4.090                     | 8.200       | 2.220        |
| 345.0                                                                  | 24.8               | 343.7               | 13.030                  | 54.110      | 7.720        | 4.050                     | 6.390       | 2.460        |
| Wind at 69.4 knots (35.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table Q.70:** Course-Keeping Ability and Motion Parameters: Bretschneider Spectrum with  $H_s = 17.7$  m and  $T_p = 25.7$  s; Ship's speed is 30.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 30.0               | -0.9                | 13.820                  | 47.580      | 8.370        | 4.010                     | 5.180       | 2.500        |
| 15.0                                                                   | 30.0               | 14.1                | 14.740                  | 43.780      | 8.800        | 3.980                     | 4.600       | 2.470        |
| 30.0                                                                   | 30.0               | 28.9                | 12.510                  | 44.180      | 7.960        | 3.940                     | 4.410       | 2.340        |
| 45.0                                                                   | 30.0               | 43.8                | 14.950                  | 51.210      | 7.320        | 3.910                     | 4.300       | 2.080        |
| 60.0                                                                   | 30.0               | 58.5                | 14.160                  | 52.640      | 6.740        | 3.890                     | 4.790       | 1.690        |
| 75.0                                                                   | 30.1               | 73.7                | 13.570                  | 56.710      | 3.830        | 3.870                     | 9.790       | 1.180        |
| 90.0                                                                   | 30.0               | 88.4                | 13.230                  | 68.080      | 3.210        | 3.900                     | 10.120      | 0.710        |
| 105.0                                                                  | 30.0               | 103.2               | 12.700                  | 77.390      | 3.910        | 3.830                     | 9.800       | 0.630        |
| 120.0                                                                  | 29.9               | 118.4               | 14.240                  | 56.580      | 3.720        | 3.900                     | 7.130       | 0.950        |
| 135.0                                                                  | 29.8               | 133.1               | 10.980                  | 59.560      | 4.400        | 3.910                     | 5.860       | 1.350        |
| 150.0                                                                  | 29.9               | 148.2               | 10.200                  | 50.910      | 4.720        | 3.870                     | 4.400       | 1.700        |
| 165.0                                                                  | 30.1               | 163.4               | 10.470                  | 55.090      | 6.120        | 3.600                     | 3.940       | 1.750        |
| 180.0                                                                  | 30.4               | 178.7               | 10.830                  | 46.990      | 5.940        | 3.880                     | 4.660       | 2.020        |
| 195.0                                                                  | 30.4               | 194.1               | 11.700                  | 52.460      | 5.630        | 3.620                     | 5.270       | 1.830        |
| 210.0                                                                  | 30.2               | 209.5               | 12.950                  | 63.370      | 6.210        | 3.830                     | 8.900       | 1.850        |
| 225.0                                                                  | 30.1               | 224.6               | 12.600                  | 69.940      | 5.430        | 4.020                     | 11.590      | 1.630        |
| 240.0                                                                  | 30.1               | 239.6               | 13.550                  | 64.420      | 3.840        | 4.000                     | 12.000      | 1.160        |
| 255.0                                                                  | 29.9               | 254.7               | 14.210                  | 90.220      | 3.110        | 4.160                     | 15.510      | 0.800        |
| 270.0                                                                  | 29.9               | 269.6               | 14.870                  | 79.500      | 2.760        | 4.200                     | 17.030      | 0.560        |
| 285.0                                                                  | 29.9               | 284.6               | 13.070                  | 90.240      | 3.180        | 4.250                     | 16.940      | 0.830        |
| 300.0                                                                  | 30.1               | 299.5               | 16.830                  | 75.640      | 5.590        | 4.160                     | 11.010      | 1.370        |
| 315.0                                                                  | 30.1               | 314.4               | 14.280                  | 73.560      | 5.970        | 4.110                     | 9.420       | 1.820        |
| 330.0                                                                  | 30.1               | 329.3               | 12.170                  | 65.330      | 7.440        | 4.100                     | 7.600       | 2.190        |
| 345.0                                                                  | 30.0               | 344.2               | 15.430                  | 51.100      | 8.070        | 4.060                     | 6.190       | 2.400        |
| Wind at 69.4 knots (35.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

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## **Annex R**

### **Tables of Motion Maxima – JONSWAP Spectrum (Coastal Waters)**

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**Table R.1:** Course-Keeping Ability and Motion Parameters: JONSWAP Spectrum with  $H_s = 4.0$  m and  $T_p = 8.2$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | -0.2               | -28.4               | 0.780                   | 8.200       | 3.800        | 0.240                     | 1.540       | 0.990        |
| 15.0                                                                   | -0.2               | -6.7                | 0.690                   | 4.880       | 3.530        | 0.190                     | 0.710       | 0.870        |
| 30.0                                                                   | -0.2               | 20.1                | 0.770                   | 8.660       | 3.480        | 0.210                     | 1.270       | 0.910        |
| 45.0                                                                   | -0.2               | 35.0                | 1.080                   | 9.990       | 3.380        | 0.280                     | 2.010       | 1.020        |
| 60.0                                                                   | -0.4               | 43.8                | 1.500                   | 11.950      | 3.930        | 0.350                     | 2.490       | 1.080        |
| 75.0                                                                   | -0.6               | 50.6                | 1.850                   | 12.850      | 3.670        | 0.440                     | 2.740       | 1.110        |
| 90.0                                                                   | -0.7               | 56.8                | 2.330                   | 15.520      | 3.890        | 0.520                     | 3.260       | 1.100        |
| 105.0                                                                  | -0.8               | 60.5                | 2.280                   | 15.930      | 3.870        | 0.570                     | 3.330       | 1.080        |
| 120.0                                                                  | -0.9               | 65.1                | 3.030                   | 21.260      | 3.690        | 0.630                     | 3.530       | 0.980        |
| 135.0                                                                  | -2.1               | 102.4               | 3.020                   | 20.640      | 3.150        | 0.760                     | 3.370       | 0.800        |
| 150.0                                                                  | -2.2               | 104.5               | 2.340                   | 16.220      | 3.250        | 0.730                     | 3.200       | 0.860        |
| 165.0                                                                  | -2.4               | 103.6               | 2.750                   | 14.320      | 3.570        | 0.770                     | 3.080       | 0.750        |
| 180.0                                                                  | -0.8               | 59.1                | 2.240                   | 10.270      | 3.400        | 0.390                     | 2.620       | 0.870        |
| 195.0                                                                  | -0.2               | 352.3               | 2.130                   | 9.700       | 3.960        | 0.340                     | 2.720       | 1.020        |
| 210.0                                                                  | -0.2               | 382.7               | 2.800                   | 11.630      | 3.620        | 0.440                     | 2.640       | 1.080        |
| 225.0                                                                  | 0.0                | 379.0               | 2.140                   | 12.040      | 3.720        | 0.440                     | 2.880       | 1.130        |
| 240.0                                                                  | 0.7                | 294.4               | 2.450                   | 12.960      | 3.350        | 0.660                     | 3.050       | 1.090        |
| 255.0                                                                  | 0.5                | 293.5               | 2.470                   | 11.910      | 3.360        | 0.680                     | 3.090       | 1.080        |
| 270.0                                                                  | 0.3                | 296.5               | 2.380                   | 16.960      | 3.350        | 0.630                     | 3.310       | 1.120        |
| 285.0                                                                  | 0.1                | 300.8               | 2.090                   | 12.440      | 3.560        | 0.560                     | 3.070       | 1.160        |
| 300.0                                                                  | 0.0                | 305.3               | 1.940                   | 15.620      | 3.930        | 0.490                     | 2.930       | 1.170        |
| 315.0                                                                  | -0.0               | 309.8               | 1.700                   | 11.830      | 4.250        | 0.430                     | 2.680       | 1.160        |
| 330.0                                                                  | -0.1               | 315.0               | 1.640                   | 10.340      | 4.000        | 0.370                     | 2.310       | 1.130        |
| 345.0                                                                  | -0.1               | 321.5               | 1.130                   | 9.640       | 3.840        | 0.300                     | 1.960       | 1.080        |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table R.2:** Course-Keeping Ability and Motion Parameters: JONSWAP Spectrum with  $H_s = 4.0$  m and  $T_p = 8.2$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b>  |                     | <b>Absolute Maximum</b> |                    |                     | <b>Standard Deviation</b> |                    |                     |
|------------------------------------------------------------------------|---------------------|---------------------|-------------------------|--------------------|---------------------|---------------------------|--------------------|---------------------|
| $\psi_{MHP}$<br>deg                                                    | <b>Speed</b><br>kts | $\psi_{MHP}$<br>deg | <b>Heave</b><br>m       | <b>Roll</b><br>deg | <b>Pitch</b><br>deg | <b>Heave</b><br>m         | <b>Roll</b><br>deg | <b>Pitch</b><br>deg |
| 0.0                                                                    | 4.8                 | -2.1                | 0.820                   | 5.190              | 2.820               | 0.230                     | 0.760              | 0.870               |
| 15.0                                                                   | 4.8                 | 12.8                | 0.810                   | 5.530              | 2.950               | 0.230                     | 0.920              | 0.890               |
| 30.0                                                                   | 4.7                 | 27.8                | 0.940                   | 6.350              | 3.540               | 0.270                     | 1.160              | 0.980               |
| 45.0                                                                   | 4.7                 | 42.2                | 1.210                   | 9.730              | 3.540               | 0.360                     | 1.670              | 1.100               |
| 60.0                                                                   | 4.4                 | 53.9                | 1.740                   | 12.790             | 3.870               | 0.480                     | 2.170              | 1.160               |
| 75.0                                                                   | 4.1                 | 56.6                | 1.830                   | 14.310             | 3.550               | 0.520                     | 2.450              | 1.150               |
| 90.0                                                                   | 4.1                 | 60.8                | 2.220                   | 15.080             | 3.790               | 0.580                     | 2.720              | 1.130               |
| 105.0                                                                  | 4.1                 | 63.1                | 2.210                   | 13.020             | 3.380               | 0.610                     | 2.750              | 1.110               |
| 120.0                                                                  | 4.1                 | 64.0                | 2.170                   | 11.500             | 3.330               | 0.610                     | 2.740              | 1.110               |
| 135.0                                                                  | 4.0                 | 64.2                | 2.510                   | 11.620             | 3.460               | 0.600                     | 2.770              | 1.120               |
| 150.0                                                                  | 4.1                 | 74.6                | 2.060                   | 11.330             | 3.660               | 0.540                     | 2.700              | 1.090               |
| 165.0                                                                  | 4.9                 | 163.1               | 0.710                   | 7.700              | 2.350               | 0.190                     | 1.380              | 0.620               |
| 180.0                                                                  | 4.9                 | 178.7               | 0.650                   | 5.470              | 2.020               | 0.170                     | 0.940              | 0.580               |
| 195.0                                                                  | 4.9                 | 194.1               | 0.770                   | 5.930              | 1.940               | 0.190                     | 1.200              | 0.610               |
| 210.0                                                                  | 4.8                 | 210.3               | 0.880                   | 8.730              | 2.370               | 0.250                     | 1.790              | 0.720               |
| 225.0                                                                  | 4.5                 | 283.4               | 2.860                   | 10.650             | 3.070               | 0.750                     | 2.590              | 0.970               |
| 240.0                                                                  | 4.6                 | 285.3               | 2.660                   | 9.640              | 2.840               | 0.800                     | 2.580              | 0.930               |
| 255.0                                                                  | 4.5                 | 286.8               | 2.870                   | 11.060             | 2.980               | 0.800                     | 2.530              | 0.960               |
| 270.0                                                                  | 4.5                 | 288.9               | 2.840                   | 10.340             | 3.020               | 0.770                     | 2.520              | 1.010               |
| 285.0                                                                  | 4.7                 | 291.3               | 2.610                   | 10.460             | 3.360               | 0.730                     | 2.560              | 1.090               |
| 300.0                                                                  | 4.9                 | 301.2               | 2.230                   | 10.360             | 4.150               | 0.560                     | 2.430              | 1.200               |
| 315.0                                                                  | 4.8                 | 314.0               | 1.410                   | 8.720              | 3.850               | 0.400                     | 1.860              | 1.160               |
| 330.0                                                                  | 4.8                 | 328.1               | 0.940                   | 8.040              | 3.400               | 0.290                     | 1.340              | 1.030               |
| 345.0                                                                  | 4.8                 | 343.0               | 0.850                   | 5.560              | 2.970               | 0.240                     | 0.800              | 0.920               |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                     |                     |                         |                    |                     |                           |                    |                     |

**Table R.3:** Course-Keeping Ability and Motion Parameters: JONSWAP Spectrum with  $H_s = 4.0$  m and  $T_p = 8.2$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b>  |                     | <b>Absolute Maximum</b> |                    |                     | <b>Standard Deviation</b> |                    |                     |
|------------------------------------------------------------------------|---------------------|---------------------|-------------------------|--------------------|---------------------|---------------------------|--------------------|---------------------|
| $\psi_{MHP}$<br>deg                                                    | <b>Speed</b><br>kts | $\psi_{MHP}$<br>deg | <b>Heave</b><br>m       | <b>Roll</b><br>deg | <b>Pitch</b><br>deg | <b>Heave</b><br>m         | <b>Roll</b><br>deg | <b>Pitch</b><br>deg |
| 0.0                                                                    | 10.0                | -0.6                | 0.850                   | 5.220              | 2.880               | 0.290                     | 0.540              | 0.860               |
| 15.0                                                                   | 10.0                | 14.4                | 1.060                   | 5.230              | 2.810               | 0.310                     | 0.560              | 0.900               |
| 30.0                                                                   | 10.0                | 29.4                | 1.090                   | 6.230              | 3.120               | 0.360                     | 0.860              | 0.990               |
| 45.0                                                                   | 9.9                 | 44.5                | 1.500                   | 9.430              | 3.520               | 0.460                     | 1.320              | 1.110               |
| 60.0                                                                   | 10.0                | 59.1                | 1.980                   | 14.100             | 3.520               | 0.610                     | 1.900              | 1.160               |
| 75.0                                                                   | 10.0                | 73.0                | 2.790                   | 15.200             | 3.180               | 0.790                     | 1.960              | 0.980               |
| 90.0                                                                   | 9.7                 | 86.0                | 2.790                   | 17.710             | 1.320               | 0.880                     | 2.540              | 0.360               |
| 105.0                                                                  | 9.4                 | 100.8               | 2.460                   | 17.910             | 2.410               | 0.740                     | 3.100              | 0.600               |
| 120.0                                                                  | 9.6                 | 116.9               | 1.910                   | 15.590             | 2.610               | 0.520                     | 3.320              | 0.780               |
| 135.0                                                                  | 9.9                 | 133.2               | 0.870                   | 14.810             | 1.940               | 0.330                     | 4.600              | 0.710               |
| 150.0                                                                  | 10.0                | 148.8               | 0.670                   | 17.580             | 1.640               | 0.230                     | 5.430              | 0.590               |
| 165.0                                                                  | 10.1                | 164.1               | 0.530                   | 19.880             | 1.520               | 0.180                     | 4.610              | 0.510               |
| 180.0                                                                  | 10.1                | 179.2               | 0.540                   | 13.060             | 1.520               | 0.160                     | 2.890              | 0.480               |
| 195.0                                                                  | 10.1                | 194.7               | 0.570                   | 9.660              | 1.620               | 0.180                     | 2.630              | 0.520               |
| 210.0                                                                  | 10.1                | 210.3               | 0.680                   | 12.150             | 1.680               | 0.240                     | 4.100              | 0.600               |
| 225.0                                                                  | 10.0                | 225.9               | 1.090                   | 13.420             | 2.220               | 0.350                     | 3.990              | 0.750               |
| 240.0                                                                  | 9.7                 | 242.3               | 1.960                   | 11.230             | 2.780               | 0.550                     | 3.270              | 0.840               |
| 255.0                                                                  | 9.5                 | 259.2               | 2.720                   | 14.300             | 2.460               | 0.800                     | 3.160              | 0.650               |
| 270.0                                                                  | 9.8                 | 273.7               | 2.970                   | 13.570             | 1.820               | 0.930                     | 2.570              | 0.330               |
| 285.0                                                                  | 10.2                | 286.6               | 2.930                   | 9.210              | 3.300               | 0.830                     | 1.980              | 0.980               |
| 300.0                                                                  | 10.1                | 300.1               | 2.230                   | 9.920              | 3.780               | 0.650                     | 2.030              | 1.180               |
| 315.0                                                                  | 10.0                | 314.7               | 1.560                   | 8.010              | 3.510               | 0.480                     | 1.370              | 1.130               |
| 330.0                                                                  | 10.0                | 329.6               | 1.160                   | 6.460              | 3.200               | 0.370                     | 0.910              | 1.010               |
| 345.0                                                                  | 10.0                | 344.6               | 1.120                   | 5.710              | 2.860               | 0.310                     | 0.600              | 0.910               |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                     |                     |                         |                    |                     |                           |                    |                     |



**Table R.4:** Course-Keeping Ability and Motion Parameters: JONSWAP Spectrum with  $H_s = 4.0$  m and  $T_p = 8.2$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b>  |                     | <b>Absolute Maximum</b> |                    |                     | <b>Standard Deviation</b> |                    |                     |
|------------------------------------------------------------------------|---------------------|---------------------|-------------------------|--------------------|---------------------|---------------------------|--------------------|---------------------|
| $\psi_{MHP}$<br>deg                                                    | <b>Speed</b><br>kts | $\psi_{MHP}$<br>deg | <b>Heave</b><br>m       | <b>Roll</b><br>deg | <b>Pitch</b><br>deg | <b>Heave</b><br>m         | <b>Roll</b><br>deg | <b>Pitch</b><br>deg |
| 0.0                                                                    | 15.2                | -0.2                | 1.240                   | 5.560              | 2.540               | 0.370                     | 0.470              | 0.850               |
| 15.0                                                                   | 15.2                | 14.8                | 1.260                   | 5.610              | 2.650               | 0.390                     | 0.510              | 0.880               |
| 30.0                                                                   | 15.1                | 29.8                | 1.440                   | 6.790              | 3.000               | 0.450                     | 0.760              | 0.970               |
| 45.0                                                                   | 15.1                | 44.8                | 1.740                   | 9.360              | 3.300               | 0.560                     | 1.130              | 1.090               |
| 60.0                                                                   | 15.2                | 59.7                | 2.250                   | 12.440             | 3.510               | 0.700                     | 1.660              | 1.120               |
| 75.0                                                                   | 15.2                | 74.1                | 2.980                   | 12.560             | 3.040               | 0.840                     | 1.750              | 0.930               |
| 90.0                                                                   | 15.1                | 88.5                | 2.770                   | 17.820             | 0.940               | 0.860                     | 2.630              | 0.200               |
| 105.0                                                                  | 15.0                | 103.3               | 2.980                   | 21.890             | 2.220               | 0.670                     | 3.300              | 0.570               |
| 120.0                                                                  | 15.0                | 118.5               | 1.460                   | 20.860             | 2.230               | 0.460                     | 6.370              | 0.670               |
| 135.0                                                                  | 15.2                | 134.3               | 1.070                   | 22.960             | 1.970               | 0.300                     | 7.380              | 0.550               |
| 150.0                                                                  | 15.3                | 149.7               | 0.610                   | 16.830             | 1.410               | 0.210                     | 4.530              | 0.440               |
| 165.0                                                                  | 15.3                | 164.7               | 0.460                   | 11.490             | 1.430               | 0.160                     | 2.320              | 0.420               |
| 180.0                                                                  | 15.2                | 179.5               | 0.570                   | 13.490             | 1.410               | 0.190                     | 1.940              | 0.450               |
| 195.0                                                                  | 15.2                | 194.7               | 0.410                   | 12.270             | 1.100               | 0.150                     | 2.280              | 0.400               |
| 210.0                                                                  | 15.2                | 209.8               | 0.500                   | 13.440             | 1.140               | 0.160                     | 3.200              | 0.340               |
| 225.0                                                                  | 15.2                | 225.4               | 1.050                   | 19.910             | 2.220               | 0.320                     | 7.210              | 0.610               |
| 240.0                                                                  | 15.1                | 241.1               | 1.380                   | 19.650             | 2.360               | 0.510                     | 6.170              | 0.750               |
| 255.0                                                                  | 15.0                | 256.7               | 2.630                   | 14.200             | 2.030               | 0.730                     | 3.590              | 0.640               |
| 270.0                                                                  | 15.1                | 271.5               | 2.870                   | 14.730             | 1.100               | 0.920                     | 2.980              | 0.200               |
| 285.0                                                                  | 15.3                | 285.8               | 2.750                   | 9.370              | 3.180               | 0.880                     | 2.050              | 0.930               |
| 300.0                                                                  | 15.2                | 300.1               | 2.400                   | 7.730              | 3.690               | 0.730                     | 1.710              | 1.140               |
| 315.0                                                                  | 15.1                | 314.8               | 1.750                   | 7.320              | 3.480               | 0.580                     | 1.290              | 1.100               |
| 330.0                                                                  | 15.1                | 329.8               | 1.430                   | 6.020              | 2.940               | 0.460                     | 0.810              | 0.980               |
| 345.0                                                                  | 15.2                | 344.8               | 1.320                   | 5.070              | 2.620               | 0.390                     | 0.510              | 0.880               |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                     |                     |                         |                    |                     |                           |                    |                     |

**Table R.5:** Course-Keeping Ability and Motion Parameters: JONSWAP Spectrum with  $H_s = 4.0$  m and  $T_p = 8.2$  s; Ship's speed is 20.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b>  |                     | <b>Absolute Maximum</b> |                    |                     | <b>Standard Deviation</b> |                    |                     |
|------------------------------------------------------------------------|---------------------|---------------------|-------------------------|--------------------|---------------------|---------------------------|--------------------|---------------------|
| $\psi_{MHP}$<br>deg                                                    | <b>Speed</b><br>kts | $\psi_{MHP}$<br>deg | <b>Heave</b><br>m       | <b>Roll</b><br>deg | <b>Pitch</b><br>deg | <b>Heave</b><br>m         | <b>Roll</b><br>deg | <b>Pitch</b><br>deg |
| 0.0                                                                    | 20.3                | -0.1                | 1.380                   | 6.030              | 2.700               | 0.440                     | 0.440              | 0.810               |
| 15.0                                                                   | 20.3                | 14.9                | 1.440                   | 6.230              | 2.530               | 0.460                     | 0.500              | 0.840               |
| 30.0                                                                   | 20.3                | 29.9                | 1.650                   | 7.550              | 2.990               | 0.540                     | 0.710              | 0.930               |
| 45.0                                                                   | 20.3                | 44.9                | 1.940                   | 10.420             | 3.370               | 0.650                     | 1.080              | 1.050               |
| 60.0                                                                   | 20.3                | 59.8                | 2.720                   | 12.230             | 3.500               | 0.790                     | 1.550              | 1.090               |
| 75.0                                                                   | 20.4                | 74.5                | 2.980                   | 14.520             | 3.080               | 0.880                     | 1.830              | 0.890               |
| 90.0                                                                   | 20.3                | 89.1                | 2.560                   | 18.160             | 0.870               | 0.840                     | 2.680              | 0.170               |
| 105.0                                                                  | 20.2                | 104.1               | 2.610                   | 22.070             | 2.170               | 0.630                     | 4.030              | 0.520               |
| 120.0                                                                  | 20.3                | 119.3               | 1.640                   | 28.010             | 2.510               | 0.420                     | 9.190              | 0.530               |
| 135.0                                                                  | 20.2                | 134.8               | 1.020                   | 24.620             | 1.730               | 0.350                     | 8.080              | 0.610               |
| 150.0                                                                  | 20.4                | 149.8               | 0.720                   | 16.210             | 1.760               | 0.210                     | 4.000              | 0.460               |
| 165.0                                                                  | 20.3                | 164.6               | 0.490                   | 15.920             | 1.690               | 0.170                     | 2.170              | 0.420               |
| 180.0                                                                  | 20.6                | 179.8               | 0.450                   | 19.090             | 1.210               | 0.160                     | 1.890              | 0.400               |
| 195.0                                                                  | 20.4                | 194.7               | 0.500                   | 21.770             | 1.700               | 0.170                     | 3.360              | 0.410               |
| 210.0                                                                  | 20.3                | 209.8               | 0.620                   | 24.630             | 1.440               | 0.200                     | 5.030              | 0.460               |
| 225.0                                                                  | 20.3                | 225.1               | 0.810                   | 25.830             | 1.760               | 0.240                     | 7.620              | 0.480               |
| 240.0                                                                  | 20.3                | 240.6               | 1.810                   | 25.480             | 2.800               | 0.470                     | 9.700              | 0.620               |
| 255.0                                                                  | 20.2                | 255.9               | 2.340                   | 16.210             | 2.010               | 0.690                     | 4.380              | 0.590               |
| 270.0                                                                  | 20.3                | 270.9               | 2.860                   | 15.000             | 0.830               | 0.890                     | 3.380              | 0.180               |
| 285.0                                                                  | 20.4                | 285.5               | 3.270                   | 12.850             | 3.460               | 0.920                     | 2.470              | 0.890               |
| 300.0                                                                  | 20.3                | 300.1               | 2.590                   | 8.010              | 3.460               | 0.810                     | 1.880              | 1.090               |
| 315.0                                                                  | 20.3                | 315.0               | 2.100                   | 6.950              | 3.400               | 0.670                     | 1.290              | 1.050               |
| 330.0                                                                  | 20.3                | 329.9               | 1.690                   | 6.060              | 2.940               | 0.540                     | 0.780              | 0.940               |
| 345.0                                                                  | 20.3                | 344.9               | 1.450                   | 5.270              | 2.620               | 0.460                     | 0.510              | 0.840               |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                     |                     |                         |                    |                     |                           |                    |                     |

**Table R.6:** Course-Keeping Ability and Motion Parameters: JONSWAP Spectrum  
with  $H_s = 4.0$  m and  $T_p = 8.2$  s; Ship's speed is 25.0 Knots

| <b>Cmd<br/>Heading</b>                                                 | <b>Actual<br/>Mean</b> |                            | <b>Absolute<br/>Maximum</b> |             |              | <b>Standard<br/>Deviation</b> |             |              |
|------------------------------------------------------------------------|------------------------|----------------------------|-----------------------------|-------------|--------------|-------------------------------|-------------|--------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts           | $\psi_{\text{MHP}}$<br>deg | Heave<br>m                  | Roll<br>deg | Pitch<br>deg | Heave<br>m                    | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 25.4                   | -0.1                       | 1.570                       | 6.370       | 2.590        | 0.480                         | 0.490       | 0.760        |
| 15.0                                                                   | 25.4                   | 14.9                       | 1.640                       | 6.660       | 2.650        | 0.510                         | 0.480       | 0.790        |
| 30.0                                                                   | 25.4                   | 29.9                       | 1.800                       | 8.770       | 2.700        | 0.590                         | 0.740       | 0.880        |
| 45.0                                                                   | 25.4                   | 44.9                       | 2.300                       | 10.300      | 3.180        | 0.720                         | 1.160       | 1.000        |
| 60.0                                                                   | 25.4                   | 59.8                       | 2.850                       | 12.940      | 3.310        | 0.850                         | 1.680       | 1.050        |
| 75.0                                                                   | 25.4                   | 74.6                       | 3.300                       | 15.550      | 2.950        | 0.920                         | 2.050       | 0.850        |
| 90.0                                                                   | 25.4                   | 89.4                       | 2.700                       | 19.160      | 0.940        | 0.820                         | 2.800       | 0.180        |
| 105.0                                                                  | 25.4                   | 104.4                      | 2.090                       | 24.150      | 1.870        | 0.590                         | 5.020       | 0.470        |
| 120.0                                                                  | 25.3                   | 119.7                      | 1.740                       | 34.110      | 2.630        | 0.460                         | 12.780      | 0.620        |
| 135.0                                                                  | 25.3                   | 134.9                      | 1.050                       | 23.990      | 1.680        | 0.270                         | 7.250       | 0.490        |
| 150.0                                                                  | 25.5                   | 149.8                      | 0.690                       | 15.220      | 1.770        | 0.200                         | 3.160       | 0.420        |
| 165.0                                                                  | 25.5                   | 164.8                      | 0.550                       | 13.780      | 1.310        | 0.160                         | 1.970       | 0.370        |
| 180.0                                                                  | 25.4                   | 179.8                      | 0.490                       | 20.140      | 1.410        | 0.150                         | 2.830       | 0.360        |
| 195.0                                                                  | 25.5                   | 194.9                      | 0.570                       | 20.710      | 1.920        | 0.160                         | 3.200       | 0.370        |
| 210.0                                                                  | 25.4                   | 210.0                      | 0.570                       | 22.260      | 1.580        | 0.190                         | 4.550       | 0.410        |
| 225.0                                                                  | 25.3                   | 225.0                      | 0.950                       | 30.460      | 1.780        | 0.270                         | 7.790       | 0.500        |
| 240.0                                                                  | 25.3                   | 240.2                      | 1.670                       | 35.230      | 2.250        | 0.440                         | 12.450      | 0.620        |
| 255.0                                                                  | 25.4                   | 255.5                      | 1.960                       | 19.610      | 1.840        | 0.660                         | 5.390       | 0.540        |
| 270.0                                                                  | 25.4                   | 270.6                      | 2.740                       | 15.590      | 0.780        | 0.860                         | 3.620       | 0.190        |
| 285.0                                                                  | 25.4                   | 285.3                      | 3.310                       | 12.960      | 3.090        | 0.950                         | 2.910       | 0.850        |
| 300.0                                                                  | 25.4                   | 300.1                      | 2.850                       | 10.030      | 3.570        | 0.870                         | 2.310       | 1.040        |
| 315.0                                                                  | 25.4                   | 315.1                      | 2.200                       | 7.270       | 3.340        | 0.730                         | 1.540       | 0.990        |
| 330.0                                                                  | 25.4                   | 330.0                      | 1.900                       | 6.390       | 2.900        | 0.590                         | 0.950       | 0.880        |
| 345.0                                                                  | 25.4                   | 345.0                      | 1.650                       | 5.860       | 2.650        | 0.510                         | 0.570       | 0.790        |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                        |                            |                             |             |              |                               |             |              |

**Table R.7:** Course-Keeping Ability and Motion Parameters: JONSWAP Spectrum  
with  $H_s = 4.0$  m and  $T_p = 8.2$  s; Ship's speed is 30.0 Knots

| <b>Cmd<br/>Heading</b>                                                 | <b>Actual<br/>Mean</b> |                     | <b>Absolute<br/>Maximum</b> |             |              | <b>Standard<br/>Deviation</b> |             |              |
|------------------------------------------------------------------------|------------------------|---------------------|-----------------------------|-------------|--------------|-------------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts           | $\psi_{MHP}$<br>deg | Heave<br>m                  | Roll<br>deg | Pitch<br>deg | Heave<br>m                    | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 30.5                   | -0.1                | 1.550                       | 6.670       | 2.360        | 0.490                         | 0.520       | 0.690        |
| 15.0                                                                   | 30.5                   | 14.9                | 1.540                       | 7.270       | 2.320        | 0.520                         | 0.500       | 0.730        |
| 30.0                                                                   | 30.5                   | 29.9                | 1.990                       | 9.330       | 2.660        | 0.610                         | 0.770       | 0.820        |
| 45.0                                                                   | 30.5                   | 44.9                | 2.250                       | 12.440      | 2.970        | 0.750                         | 1.330       | 0.940        |
| 60.0                                                                   | 30.5                   | 59.9                | 2.750                       | 14.740      | 3.280        | 0.900                         | 1.910       | 1.000        |
| 75.0                                                                   | 30.5                   | 74.7                | 3.120                       | 15.020      | 2.890        | 0.950                         | 2.170       | 0.830        |
| 90.0                                                                   | 30.5                   | 89.6                | 2.830                       | 20.130      | 0.930        | 0.790                         | 2.960       | 0.180        |
| 105.0                                                                  | 30.5                   | 104.6               | 2.020                       | 23.950      | 1.990        | 0.560                         | 6.170       | 0.420        |
| 120.0                                                                  | 30.4                   | 119.9               | 1.400                       | 32.110      | 2.170        | 0.420                         | 12.210      | 0.590        |
| 135.0                                                                  | 30.4                   | 134.9               | 0.910                       | 20.930      | 1.660        | 0.280                         | 6.410       | 0.490        |
| 150.0                                                                  | 30.6                   | 149.8               | 0.700                       | 18.990      | 1.340        | 0.190                         | 3.460       | 0.360        |
| 165.0                                                                  | 30.4                   | 165.0               | 0.550                       | 13.880      | 1.510        | 0.160                         | 2.410       | 0.320        |
| 180.0                                                                  | 30.7                   | 179.9               | 0.520                       | 18.120      | 1.440        | 0.140                         | 3.010       | 0.260        |
| 195.0                                                                  | 30.4                   | 194.8               | 0.580                       | 23.000      | 1.560        | 0.160                         | 4.140       | 0.330        |
| 210.0                                                                  | 30.6                   | 210.0               | 0.600                       | 25.490      | 1.470        | 0.180                         | 5.300       | 0.370        |
| 225.0                                                                  | 30.4                   | 225.0               | 0.900                       | 24.050      | 1.680        | 0.270                         | 7.100       | 0.480        |
| 240.0                                                                  | 30.4                   | 240.0               | 1.490                       | 37.260      | 2.460        | 0.400                         | 12.430      | 0.600        |
| 255.0                                                                  | 30.5                   | 255.3               | 2.570                       | 36.820      | 3.010        | 0.630                         | 6.960       | 0.520        |
| 270.0                                                                  | 30.5                   | 270.4               | 2.750                       | 14.360      | 0.730        | 0.830                         | 3.910       | 0.210        |
| 285.0                                                                  | 30.5                   | 285.3               | 2.960                       | 13.940      | 2.600        | 0.970                         | 3.190       | 0.820        |
| 300.0                                                                  | 30.5                   | 300.1               | 2.980                       | 10.990      | 3.180        | 0.910                         | 2.780       | 0.990        |
| 315.0                                                                  | 30.5                   | 315.1               | 2.310                       | 9.170       | 3.070        | 0.760                         | 1.940       | 0.930        |
| 330.0                                                                  | 30.5                   | 330.1               | 1.940                       | 7.360       | 2.510        | 0.610                         | 1.120       | 0.810        |
| 345.0                                                                  | 30.5                   | 345.0               | 1.640                       | 6.560       | 2.340        | 0.520                         | 0.670       | 0.730        |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                        |                     |                             |             |              |                               |             |              |

**Table R.8:** Course-Keeping Ability and Motion Parameters: JONSWAP Spectrum with  $H_s = 4.0$  m and  $T_p = 13.6$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 0.0                | -14.0               | 2.360                   | 8.710       | 3.650        | 0.690                     | 2.180       | 1.110        |
| 15.0                                                                   | -0.1               | -6.1                | 2.190                   | 6.000       | 3.860        | 0.680                     | 1.450       | 1.120        |
| 30.0                                                                   | -0.3               | 2.2                 | 2.060                   | 8.990       | 3.980        | 0.670                     | 1.740       | 1.120        |
| 45.0                                                                   | -0.3               | 16.8                | 2.200                   | 11.720      | 3.810        | 0.680                     | 2.980       | 1.100        |
| 60.0                                                                   | -0.2               | 36.1                | 2.560                   | 15.300      | 3.780        | 0.740                     | 4.210       | 1.020        |
| 75.0                                                                   | -0.1               | 52.3                | 3.180                   | 17.340      | 3.020        | 0.800                     | 4.800       | 0.890        |
| 90.0                                                                   | -0.0               | 65.2                | 3.120                   | 17.460      | 2.680        | 0.870                     | 4.910       | 0.710        |
| 105.0                                                                  | -0.1               | 82.6                | 3.430                   | 15.280      | 1.430        | 0.930                     | 4.960       | 0.290        |
| 120.0                                                                  | -0.3               | 97.2                | 3.530                   | 16.920      | 2.150        | 0.930                     | 5.160       | 0.290        |
| 135.0                                                                  | -0.6               | 105.0               | 3.210                   | 17.950      | 2.420        | 0.910                     | 5.230       | 0.500        |
| 150.0                                                                  | -0.9               | 109.1               | 3.030                   | 17.390      | 2.770        | 0.890                     | 5.210       | 0.610        |
| 165.0                                                                  | -0.5               | 40.2                | 2.830                   | 15.700      | 3.410        | 0.760                     | 3.560       | 0.970        |
| 180.0                                                                  | -0.3               | 35.7                | 2.560                   | 13.700      | 3.830        | 0.700                     | 2.870       | 1.080        |
| 195.0                                                                  | 0.1                | 362.1               | 2.810                   | 12.440      | 3.630        | 0.730                     | 3.360       | 1.060        |
| 210.0                                                                  | 0.2                | 354.0               | 2.940                   | 14.680      | 3.550        | 0.810                     | 4.140       | 0.950        |
| 225.0                                                                  | 0.3                | 264.4               | 3.370                   | 15.360      | 2.320        | 0.990                     | 4.880       | 0.360        |
| 240.0                                                                  | 0.3                | 272.2               | 3.270                   | 15.440      | 2.250        | 1.000                     | 4.800       | 0.260        |
| 255.0                                                                  | 0.3                | 283.8               | 3.360                   | 15.030      | 2.110        | 0.980                     | 4.660       | 0.470        |
| 270.0                                                                  | 0.3                | 294.1               | 3.490                   | 13.730      | 2.620        | 0.930                     | 4.600       | 0.700        |
| 285.0                                                                  | 0.2                | 302.8               | 3.250                   | 14.080      | 3.070        | 0.890                     | 4.540       | 0.850        |
| 300.0                                                                  | 0.1                | 311.1               | 2.960                   | 13.750      | 3.320        | 0.840                     | 4.390       | 0.950        |
| 315.0                                                                  | 0.1                | 319.6               | 2.660                   | 13.820      | 3.670        | 0.790                     | 4.130       | 1.020        |
| 330.0                                                                  | 0.1                | 328.7               | 2.630                   | 12.640      | 3.380        | 0.750                     | 3.640       | 1.070        |
| 345.0                                                                  | 0.0                | 337.9               | 2.520                   | 10.870      | 3.740        | 0.720                     | 2.940       | 1.100        |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table R.9:** Course-Keeping Ability and Motion Parameters: JONSWAP Spectrum with  $H_s = 4.0$  m and  $T_p = 13.6$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b>  |                     | <b>Absolute Maximum</b> |                    |                     | <b>Standard Deviation</b> |                    |                     |
|------------------------------------------------------------------------|---------------------|---------------------|-------------------------|--------------------|---------------------|---------------------------|--------------------|---------------------|
| $\psi_{MHP}$<br>deg                                                    | <b>Speed</b><br>kts | $\psi_{MHP}$<br>deg | <b>Heave</b><br>m       | <b>Roll</b><br>deg | <b>Pitch</b><br>deg | <b>Heave</b><br>m         | <b>Roll</b><br>deg | <b>Pitch</b><br>deg |
| 0.0                                                                    | 4.8                 | -2.5                | 2.490                   | 5.790              | 4.310               | 0.680                     | 0.980              | 1.140               |
| 15.0                                                                   | 4.8                 | 11.8                | 2.500                   | 8.300              | 3.870               | 0.690                     | 1.700              | 1.130               |
| 30.0                                                                   | 4.7                 | 26.3                | 2.700                   | 12.110             | 3.970               | 0.710                     | 2.770              | 1.100               |
| 45.0                                                                   | 4.7                 | 41.0                | 2.730                   | 14.460             | 3.580               | 0.770                     | 3.580              | 1.030               |
| 60.0                                                                   | 4.7                 | 55.3                | 3.050                   | 15.240             | 3.350               | 0.830                     | 4.030              | 0.890               |
| 75.0                                                                   | 4.7                 | 69.9                | 3.000                   | 15.790             | 2.240               | 0.900                     | 4.270              | 0.630               |
| 90.0                                                                   | 4.6                 | 83.5                | 3.420                   | 15.080             | 0.880               | 0.940                     | 4.500              | 0.230               |
| 105.0                                                                  | 4.4                 | 95.7                | 3.650                   | 17.180             | 1.220               | 0.930                     | 4.700              | 0.220               |
| 120.0                                                                  | 4.3                 | 104.0               | 3.480                   | 16.600             | 2.340               | 0.900                     | 4.720              | 0.450               |
| 135.0                                                                  | 4.2                 | 112.8               | 3.140                   | 16.500             | 2.690               | 0.860                     | 4.650              | 0.620               |
| 150.0                                                                  | 4.2                 | 128.2               | 2.560                   | 15.670             | 2.960               | 0.790                     | 4.150              | 0.810               |
| 165.0                                                                  | 4.6                 | 161.0               | 2.230                   | 8.100              | 3.070               | 0.670                     | 1.820              | 0.940               |
| 180.0                                                                  | 4.8                 | 178.1               | 2.160                   | 6.990              | 3.020               | 0.650                     | 1.450              | 0.950               |
| 195.0                                                                  | 4.9                 | 194.6               | 2.260                   | 8.610              | 3.140               | 0.670                     | 2.310              | 0.950               |
| 210.0                                                                  | 4.9                 | 211.3               | 2.400                   | 10.400             | 3.220               | 0.720                     | 3.270              | 0.930               |
| 225.0                                                                  | 4.7                 | 228.6               | 2.840                   | 12.310             | 3.470               | 0.810                     | 4.000              | 0.860               |
| 240.0                                                                  | 4.7                 | 245.3               | 3.310                   | 13.030             | 2.450               | 0.900                     | 4.400              | 0.680               |
| 255.0                                                                  | 4.8                 | 258.9               | 3.040                   | 13.450             | 1.640               | 0.970                     | 4.510              | 0.390               |
| 270.0                                                                  | 4.9                 | 272.8               | 3.560                   | 13.520             | 0.830               | 1.000                     | 4.290              | 0.120               |
| 285.0                                                                  | 5.0                 | 287.0               | 3.610                   | 12.900             | 1.960               | 0.960                     | 3.940              | 0.560               |
| 300.0                                                                  | 5.0                 | 301.0               | 3.060                   | 13.010             | 2.840               | 0.890                     | 3.700              | 0.860               |
| 315.0                                                                  | 5.0                 | 314.8               | 3.100                   | 11.280             | 3.550               | 0.810                     | 3.200              | 1.020               |
| 330.0                                                                  | 4.9                 | 329.0               | 2.750                   | 10.860             | 3.670               | 0.740                     | 2.590              | 1.090               |
| 345.0                                                                  | 4.9                 | 343.3               | 2.590                   | 8.560              | 4.280               | 0.700                     | 1.770              | 1.130               |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                     |                     |                         |                    |                     |                           |                    |                     |

**Table R.10:** Course-Keeping Ability and Motion Parameters: JONSWAP Spectrum with  $H_s = 4.0$  m and  $T_p = 13.6$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b>  |                     | <b>Absolute Maximum</b> |                    |                     | <b>Standard Deviation</b> |                    |                     |
|------------------------------------------------------------------------|---------------------|---------------------|-------------------------|--------------------|---------------------|---------------------------|--------------------|---------------------|
| $\psi_{MHP}$<br>deg                                                    | <b>Speed</b><br>kts | $\psi_{MHP}$<br>deg | <b>Heave</b><br>m       | <b>Roll</b><br>deg | <b>Pitch</b><br>deg | <b>Heave</b><br>m         | <b>Roll</b><br>deg | <b>Pitch</b><br>deg |
| 0.0                                                                    | 10.0                | -0.6                | 2.650                   | 4.800              | 4.390               | 0.720                     | 0.470              | 1.150               |
| 15.0                                                                   | 10.0                | 14.4                | 2.730                   | 7.210              | 4.280               | 0.720                     | 1.170              | 1.130               |
| 30.0                                                                   | 10.0                | 29.4                | 2.890                   | 9.440              | 4.050               | 0.750                     | 1.960              | 1.090               |
| 45.0                                                                   | 10.1                | 44.4                | 2.670                   | 10.670             | 3.560               | 0.800                     | 2.550              | 1.010               |
| 60.0                                                                   | 10.1                | 59.3                | 3.280                   | 12.640             | 2.930               | 0.870                     | 3.020              | 0.850               |
| 75.0                                                                   | 10.1                | 74.0                | 3.490                   | 13.540             | 2.090               | 0.920                     | 3.250              | 0.540               |
| 90.0                                                                   | 10.1                | 88.8                | 3.340                   | 14.120             | 0.360               | 0.930                     | 3.720              | 0.090               |
| 105.0                                                                  | 10.1                | 103.7               | 3.280                   | 16.480             | 1.430               | 0.880                     | 4.070              | 0.370               |
| 120.0                                                                  | 10.0                | 118.3               | 2.810                   | 16.520             | 2.400               | 0.820                     | 4.260              | 0.620               |
| 135.0                                                                  | 10.0                | 133.5               | 2.550                   | 15.850             | 2.400               | 0.740                     | 4.150              | 0.750               |
| 150.0                                                                  | 10.0                | 148.8               | 2.170                   | 15.420             | 2.510               | 0.690                     | 3.930              | 0.820               |
| 165.0                                                                  | 10.0                | 164.0               | 2.350                   | 15.470             | 3.270               | 0.650                     | 3.120              | 0.850               |
| 180.0                                                                  | 10.1                | 179.3               | 1.700                   | 12.420             | 2.640               | 0.650                     | 2.020              | 0.860               |
| 195.0                                                                  | 10.1                | 194.6               | 2.260                   | 9.970              | 2.990               | 0.660                     | 2.290              | 0.870               |
| 210.0                                                                  | 10.1                | 210.2               | 2.330                   | 11.630             | 2.730               | 0.700                     | 3.660              | 0.840               |
| 225.0                                                                  | 10.0                | 225.8               | 2.560                   | 12.850             | 2.740               | 0.770                     | 4.500              | 0.790               |
| 240.0                                                                  | 10.0                | 241.2               | 2.900                   | 13.100             | 2.640               | 0.860                     | 4.690              | 0.670               |
| 255.0                                                                  | 10.1                | 255.9               | 3.660                   | 14.300             | 1.500               | 0.930                     | 4.470              | 0.420               |
| 270.0                                                                  | 10.2                | 270.7               | 3.260                   | 13.070             | 0.370               | 0.980                     | 4.030              | 0.090               |
| 285.0                                                                  | 10.2                | 285.3               | 3.420                   | 12.910             | 1.690               | 0.960                     | 3.470              | 0.520               |
| 300.0                                                                  | 10.1                | 299.9               | 3.200                   | 11.740             | 3.220               | 0.900                     | 3.020              | 0.840               |
| 315.0                                                                  | 10.1                | 314.6               | 2.940                   | 9.840              | 3.380               | 0.820                     | 2.370              | 1.010               |
| 330.0                                                                  | 10.1                | 329.5               | 2.940                   | 8.500              | 4.280               | 0.770                     | 1.640              | 1.100               |
| 345.0                                                                  | 10.1                | 344.4               | 2.850                   | 6.450              | 4.400               | 0.730                     | 0.950              | 1.130               |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                     |                     |                         |                    |                     |                           |                    |                     |

**Table R.11:** Course-Keeping Ability and Motion Parameters: JONSWAP Spectrum with  $H_s = 4.0$  m and  $T_p = 13.6$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 15.2               | -0.3                | 2.570                   | 5.300       | 3.710        | 0.770                     | 0.410       | 1.130        |
| 15.0                                                                   | 15.2               | 14.8                | 2.450                   | 6.820       | 3.600        | 0.780                     | 1.000       | 1.120        |
| 30.0                                                                   | 15.2               | 29.9                | 2.760                   | 8.760       | 3.710        | 0.800                     | 1.670       | 1.080        |
| 45.0                                                                   | 15.2               | 44.9                | 3.290                   | 10.400      | 3.500        | 0.840                     | 2.220       | 1.000        |
| 60.0                                                                   | 15.2               | 59.8                | 3.240                   | 11.640      | 2.810        | 0.890                     | 2.720       | 0.840        |
| 75.0                                                                   | 15.3               | 74.6                | 3.230                   | 12.560      | 1.580        | 0.920                     | 2.770       | 0.530        |
| 90.0                                                                   | 15.3               | 89.5                | 3.430                   | 14.140      | 0.420        | 0.900                     | 3.320       | 0.120        |
| 105.0                                                                  | 15.3               | 104.4               | 3.050                   | 17.050      | 1.300        | 0.860                     | 3.940       | 0.360        |
| 120.0                                                                  | 15.2               | 119.2               | 2.780                   | 20.090      | 1.940        | 0.790                     | 5.270       | 0.570        |
| 135.0                                                                  | 15.2               | 134.5               | 2.090                   | 19.410      | 2.120        | 0.720                     | 5.490       | 0.680        |
| 150.0                                                                  | 15.3               | 149.8               | 1.850                   | 14.030      | 2.100        | 0.670                     | 3.520       | 0.720        |
| 165.0                                                                  | 15.2               | 164.7               | 1.770                   | 9.970       | 2.320        | 0.640                     | 1.800       | 0.750        |
| 180.0                                                                  | 15.2               | 179.7               | 1.900                   | 8.730       | 2.490        | 0.630                     | 1.250       | 0.810        |
| 195.0                                                                  | 15.2               | 194.8               | 1.840                   | 14.080      | 2.330        | 0.640                     | 2.150       | 0.770        |
| 210.0                                                                  | 15.2               | 209.9               | 1.930                   | 15.800      | 2.210        | 0.670                     | 3.630       | 0.750        |
| 225.0                                                                  | 15.2               | 225.3               | 2.200                   | 18.660      | 2.360        | 0.740                     | 6.130       | 0.720        |
| 240.0                                                                  | 15.2               | 240.6               | 2.810                   | 16.210      | 2.090        | 0.830                     | 5.880       | 0.620        |
| 255.0                                                                  | 15.3               | 255.4               | 3.280                   | 15.020      | 1.420        | 0.910                     | 4.790       | 0.400        |
| 270.0                                                                  | 15.3               | 270.3               | 3.340                   | 13.790      | 0.450        | 0.960                     | 4.020       | 0.120        |
| 285.0                                                                  | 15.3               | 285.1               | 3.500                   | 13.200      | 1.580        | 0.960                     | 3.280       | 0.510        |
| 300.0                                                                  | 15.2               | 299.9               | 3.260                   | 12.570      | 2.930        | 0.920                     | 2.700       | 0.830        |
| 315.0                                                                  | 15.2               | 314.7               | 3.340                   | 9.810       | 3.470        | 0.860                     | 1.980       | 1.000        |
| 330.0                                                                  | 15.2               | 329.7               | 2.540                   | 8.320       | 3.360        | 0.810                     | 1.340       | 1.080        |
| 345.0                                                                  | 15.2               | 344.7               | 2.590                   | 6.180       | 3.570        | 0.780                     | 0.660       | 1.120        |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |



**Table R.12:** Course-Keeping Ability and Motion Parameters: JONSWAP Spectrum with  $H_s = 4.0$  m and  $T_p = 13.6$  s; Ship's speed is 20.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 20.3               | -0.1                | 2.850                   | 5.580       | 3.470        | 0.840                     | 0.420       | 1.100        |
| 15.0                                                                   | 20.3               | 14.9                | 2.970                   | 6.880       | 3.510        | 0.840                     | 0.950       | 1.090        |
| 30.0                                                                   | 20.3               | 30.0                | 3.000                   | 8.540       | 3.450        | 0.860                     | 1.570       | 1.060        |
| 45.0                                                                   | 20.3               | 45.0                | 2.870                   | 10.620      | 3.140        | 0.890                     | 2.140       | 0.980        |
| 60.0                                                                   | 20.3               | 59.9                | 3.510                   | 12.160      | 3.000        | 0.920                     | 2.730       | 0.820        |
| 75.0                                                                   | 20.4               | 74.8                | 3.300                   | 12.040      | 1.800        | 0.910                     | 2.430       | 0.530        |
| 90.0                                                                   | 20.4               | 89.7                | 3.350                   | 14.080      | 0.520        | 0.880                     | 3.040       | 0.140        |
| 105.0                                                                  | 20.4               | 104.7               | 2.930                   | 17.530      | 1.290        | 0.830                     | 3.820       | 0.330        |
| 120.0                                                                  | 20.3               | 119.6               | 2.400                   | 25.960      | 1.810        | 0.760                     | 7.230       | 0.530        |
| 135.0                                                                  | 20.3               | 134.9               | 2.040                   | 19.210      | 1.970        | 0.700                     | 5.690       | 0.630        |
| 150.0                                                                  | 20.4               | 149.9               | 1.670                   | 11.400      | 1.770        | 0.640                     | 3.160       | 0.640        |
| 165.0                                                                  | 20.3               | 164.8               | 1.900                   | 8.360       | 2.070        | 0.530                     | 1.570       | 0.600        |
| 180.0                                                                  | 20.4               | 179.9               | 1.740                   | 11.930      | 2.000        | 0.580                     | 1.080       | 0.700        |
| 195.0                                                                  | 20.3               | 194.8               | 2.210                   | 21.120      | 2.520        | 0.680                     | 2.770       | 0.810        |
| 210.0                                                                  | 20.4               | 209.9               | 2.020                   | 22.230      | 2.180        | 0.630                     | 3.720       | 0.650        |
| 225.0                                                                  | 20.4               | 225.0               | 2.260                   | 22.750      | 1.980        | 0.700                     | 5.390       | 0.610        |
| 240.0                                                                  | 20.3               | 240.3               | 3.410                   | 23.450      | 2.450        | 0.800                     | 7.480       | 0.580        |
| 255.0                                                                  | 20.4               | 255.2               | 2.970                   | 18.430      | 1.430        | 0.880                     | 4.920       | 0.380        |
| 270.0                                                                  | 20.4               | 270.1               | 3.290                   | 15.190      | 0.540        | 0.930                     | 3.990       | 0.150        |
| 285.0                                                                  | 20.4               | 285.0               | 3.700                   | 13.570      | 1.950        | 0.960                     | 3.120       | 0.510        |
| 300.0                                                                  | 20.3               | 299.9               | 3.490                   | 12.150      | 2.830        | 0.940                     | 2.510       | 0.820        |
| 315.0                                                                  | 20.3               | 314.8               | 3.060                   | 11.040      | 3.230        | 0.910                     | 1.790       | 0.980        |
| 330.0                                                                  | 20.3               | 329.8               | 2.900                   | 8.760       | 3.610        | 0.870                     | 1.160       | 1.060        |
| 345.0                                                                  | 20.3               | 344.8               | 2.940                   | 6.570       | 3.460        | 0.850                     | 0.540       | 1.090        |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table R.13:** Course-Keeping Ability and Motion Parameters: JONSWAP Spectrum with  $H_s = 4.0$  m and  $T_p = 13.6$  s; Ship's speed is 25.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 25.4               | -0.1                | 3.140                   | 6.520       | 3.610        | 0.910                     | 0.460       | 1.070        |
| 15.0                                                                   | 25.4               | 15.0                | 3.320                   | 7.180       | 3.970        | 0.910                     | 0.910       | 1.060        |
| 30.0                                                                   | 25.4               | 30.0                | 3.110                   | 9.140       | 3.550        | 0.920                     | 1.490       | 1.030        |
| 45.0                                                                   | 25.4               | 45.0                | 3.140                   | 10.440      | 3.390        | 0.940                     | 2.090       | 0.950        |
| 60.0                                                                   | 25.4               | 60.0                | 3.350                   | 12.660      | 2.730        | 0.940                     | 2.750       | 0.810        |
| 75.0                                                                   | 25.4               | 74.9                | 3.040                   | 10.810      | 1.730        | 0.910                     | 2.280       | 0.530        |
| 90.0                                                                   | 25.4               | 89.8                | 3.260                   | 13.750      | 0.610        | 0.850                     | 2.890       | 0.170        |
| 105.0                                                                  | 25.4               | 104.8               | 2.610                   | 17.820      | 1.140        | 0.790                     | 3.820       | 0.300        |
| 120.0                                                                  | 25.4               | 119.9               | 2.380                   | 25.580      | 1.820        | 0.740                     | 8.890       | 0.520        |
| 135.0                                                                  | 25.4               | 134.9               | 1.940                   | 21.980      | 1.970        | 0.630                     | 5.530       | 0.540        |
| 150.0                                                                  | 25.4               | 149.9               | 1.450                   | 12.570      | 1.570        | 0.540                     | 3.680       | 0.580        |
| 165.0                                                                  | 25.5               | 164.9               | 1.490                   | 10.510      | 1.930        | 0.570                     | 2.020       | 0.690        |
| 180.0                                                                  | 25.5               | 179.9               | 2.160                   | 12.400      | 2.340        | 0.670                     | 1.110       | 0.720        |
| 195.0                                                                  | 25.5               | 195.0               | 1.620                   | 13.380      | 1.880        | 0.580                     | 2.100       | 0.670        |
| 210.0                                                                  | 25.5               | 210.0               | 1.110                   | 22.180      | 1.590        | 0.470                     | 3.630       | 0.530        |
| 225.0                                                                  | 25.4               | 225.0               | 1.740                   | 24.600      | 1.540        | 0.720                     | 6.260       | 0.610        |
| 240.0                                                                  | 25.4               | 240.1               | 2.450                   | 31.780      | 2.060        | 0.770                     | 8.320       | 0.530        |
| 255.0                                                                  | 25.4               | 255.1               | 2.930                   | 19.560      | 1.280        | 0.850                     | 4.810       | 0.360        |
| 270.0                                                                  | 25.4               | 270.1               | 3.100                   | 16.350      | 0.650        | 0.900                     | 3.750       | 0.180        |
| 285.0                                                                  | 25.4               | 285.0               | 3.490                   | 14.590      | 1.670        | 0.950                     | 2.890       | 0.510        |
| 300.0                                                                  | 25.4               | 299.9               | 3.420                   | 12.690      | 2.870        | 0.960                     | 2.350       | 0.800        |
| 315.0                                                                  | 25.4               | 314.9               | 2.930                   | 10.980      | 3.090        | 0.950                     | 1.630       | 0.950        |
| 330.0                                                                  | 25.4               | 329.9               | 3.420                   | 9.440       | 3.660        | 0.930                     | 1.040       | 1.030        |
| 345.0                                                                  | 25.4               | 344.9               | 3.350                   | 6.860       | 3.900        | 0.920                     | 0.530       | 1.060        |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table R.14:** Course-Keeping Ability and Motion Parameters: JONSWAP Spectrum with  $H_s = 4.0$  m and  $T_p = 13.6$  s; Ship's speed is 30.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 30.5               | -0.0                | 3.520                   | 6.830       | 3.540        | 0.980                     | 0.530       | 1.040        |
| 15.0                                                                   | 30.5               | 15.0                | 3.930                   | 7.810       | 3.900        | 0.980                     | 0.900       | 1.030        |
| 30.0                                                                   | 30.5               | 30.0                | 3.450                   | 9.230       | 3.270        | 0.980                     | 1.420       | 1.000        |
| 45.0                                                                   | 30.5               | 45.0                | 3.620                   | 11.150      | 3.380        | 0.980                     | 1.990       | 0.930        |
| 60.0                                                                   | 30.5               | 60.0                | 3.330                   | 12.640      | 2.770        | 0.970                     | 2.740       | 0.790        |
| 75.0                                                                   | 30.5               | 74.9                | 3.300                   | 11.540      | 1.710        | 0.910                     | 2.090       | 0.530        |
| 90.0                                                                   | 30.5               | 89.9                | 3.150                   | 13.250      | 0.680        | 0.830                     | 2.830       | 0.190        |
| 105.0                                                                  | 30.5               | 104.9               | 2.740                   | 17.320      | 0.940        | 0.760                     | 4.110       | 0.280        |
| 120.0                                                                  | 30.4               | 119.9               | 2.480                   | 31.750      | 1.900        | 0.740                     | 9.700       | 0.510        |
| 135.0                                                                  | 30.5               | 134.9               | 1.440                   | 19.390      | 1.510        | 0.480                     | 5.720       | 0.500        |
| 150.0                                                                  | 30.6               | 149.8               | 1.630                   | 15.440      | 1.960        | 0.620                     | 3.820       | 0.670        |
| 165.0                                                                  | 30.7               | 164.9               | 2.030                   | 11.790      | 2.070        | 0.590                     | 2.060       | 0.700        |
| 180.0                                                                  | 30.6               | 179.8               | 2.140                   | 12.350      | 2.640        | 0.590                     | 1.540       | 0.730        |
| 195.0                                                                  | 30.7               | 195.0               | 1.950                   | 17.220      | 2.070        | 0.590                     | 2.620       | 0.690        |
| 210.0                                                                  | 30.6               | 210.1               | 2.000                   | 21.450      | 2.370        | 0.630                     | 4.060       | 0.650        |
| 225.0                                                                  | 30.5               | 225.0               | 2.000                   | 28.150      | 1.890        | 0.590                     | 5.960       | 0.530        |
| 240.0                                                                  | 30.5               | 240.0               | 2.220                   | 30.900      | 1.640        | 0.700                     | 8.060       | 0.450        |
| 255.0                                                                  | 30.5               | 255.1               | 3.110                   | 20.410      | 1.140        | 0.820                     | 4.480       | 0.350        |
| 270.0                                                                  | 30.5               | 270.0               | 3.080                   | 16.660      | 0.750        | 0.870                     | 3.430       | 0.200        |
| 285.0                                                                  | 30.5               | 285.0               | 3.580                   | 14.320      | 1.800        | 0.950                     | 2.630       | 0.510        |
| 300.0                                                                  | 30.5               | 299.9               | 3.700                   | 13.370      | 2.840        | 0.990                     | 2.190       | 0.780        |
| 315.0                                                                  | 30.5               | 314.9               | 3.560                   | 11.560      | 3.110        | 0.990                     | 1.530       | 0.920        |
| 330.0                                                                  | 30.5               | 329.9               | 3.280                   | 9.260       | 3.170        | 0.990                     | 1.010       | 0.990        |
| 345.0                                                                  | 30.5               | 344.9               | 3.770                   | 7.750       | 3.910        | 0.980                     | 0.610       | 1.020        |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table R.15:** Course-Keeping Ability and Motion Parameters: JONSWAP Spectrum with  $H_s = 6.0$  m and  $T_p = 9.3$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | -0.1               | -21.2               | 1.970                   | 13.010      | 6.650        | 0.530                     | 2.680       | 1.680        |
| 15.0                                                                   | -0.2               | -12.9               | 1.660                   | 9.700       | 5.700        | 0.480                     | 2.020       | 1.640        |
| 30.0                                                                   | -0.5               | -0.8                | 1.620                   | 10.030      | 5.550        | 0.460                     | 1.730       | 1.610        |
| 45.0                                                                   | -0.9               | 12.3                | 1.810                   | 15.240      | 5.990        | 0.500                     | 2.850       | 1.620        |
| 60.0                                                                   | -1.1               | 23.7                | 2.590                   | 18.510      | 5.670        | 0.580                     | 3.930       | 1.650        |
| 75.0                                                                   | -1.8               | 34.8                | 3.330                   | 28.840      | 4.980        | 0.730                     | 5.600       | 1.570        |
| 90.0                                                                   | -2.2               | -14.4               | 3.540                   | 41.700      | 5.160        | 0.860                     | 6.560       | 1.570        |
| 105.0                                                                  | -1.6               | -3.1                | 3.690                   | 46.950      | 5.060        | 0.820                     | 6.370       | 1.580        |
| 120.0                                                                  | -1.2               | 13.1                | 4.510                   | 23.750      | 5.370        | 0.860                     | 6.320       | 1.400        |
| 135.0                                                                  | -3.2               | 107.2               | 4.360                   | 37.300      | 5.240        | 1.110                     | 5.760       | 1.200        |
| 150.0                                                                  | -4.1               | 109.6               | 4.230                   | 22.080      | 5.710        | 1.080                     | 5.660       | 1.310        |
| 165.0                                                                  | -3.7               | 111.5               | 4.060                   | 26.100      | 5.120        | 1.070                     | 5.540       | 1.290        |
| 180.0                                                                  | -0.8               | 153.3               | 3.720                   | 20.120      | 4.800        | 0.520                     | 3.490       | 1.360        |
| 195.0                                                                  | -0.3               | 17.5                | 3.660                   | 19.110      | 5.990        | 0.650                     | 3.680       | 1.680        |
| 210.0                                                                  | -0.3               | 387.8               | 3.450                   | 17.210      | 5.950        | 0.720                     | 3.980       | 1.710        |
| 225.0                                                                  | -0.3               | 393.4               | 3.920                   | 17.000      | 6.040        | 0.800                     | 4.380       | 1.730        |
| 240.0                                                                  | -0.1               | 392.3               | 3.600                   | 18.140      | 5.130        | 0.890                     | 4.810       | 1.690        |
| 255.0                                                                  | 0.5                | 310.5               | 3.860                   | 18.440      | 5.500        | 1.100                     | 5.300       | 1.520        |
| 270.0                                                                  | -0.1               | 314.6               | 3.820                   | 24.190      | 5.570        | 1.080                     | 5.290       | 1.560        |
| 285.0                                                                  | -0.2               | 305.4               | 3.760                   | 19.020      | 5.190        | 0.950                     | 4.630       | 1.700        |
| 300.0                                                                  | -0.3               | 310.6               | 3.200                   | 17.990      | 5.580        | 0.860                     | 4.400       | 1.740        |
| 315.0                                                                  | -0.2               | 316.2               | 3.090                   | 19.780      | 5.810        | 0.770                     | 4.390       | 1.770        |
| 330.0                                                                  | -0.1               | 323.1               | 2.700                   | 16.810      | 6.210        | 0.680                     | 3.710       | 1.750        |
| 345.0                                                                  | -0.1               | 330.8               | 2.540                   | 16.720      | 6.500        | 0.600                     | 3.220       | 1.720        |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table R.16:** Course-Keeping Ability and Motion Parameters: JONSWAP Spectrum with  $H_s = 6.0$  m and  $T_p = 9.3$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b>  |                     | <b>Absolute Maximum</b> |                    |                     | <b>Standard Deviation</b> |                    |                     |
|------------------------------------------------------------------------|---------------------|---------------------|-------------------------|--------------------|---------------------|---------------------------|--------------------|---------------------|
| $\psi_{MHP}$<br>deg                                                    | <b>Speed</b><br>kts | $\psi_{MHP}$<br>deg | <b>Heave</b><br>m       | <b>Roll</b><br>deg | <b>Pitch</b><br>deg | <b>Heave</b><br>m         | <b>Roll</b><br>deg | <b>Pitch</b><br>deg |
| 0.0                                                                    | 4.0                 | -12.7               | 1.730                   | 9.920              | 5.490               | 0.500                     | 1.930              | 1.640               |
| 15.0                                                                   | 3.9                 | -1.6                | 1.660                   | 10.880             | 5.230               | 0.480                     | 1.820              | 1.610               |
| 30.0                                                                   | 3.9                 | 10.9                | 1.730                   | 10.050             | 5.710               | 0.490                     | 1.850              | 1.610               |
| 45.0                                                                   | 3.8                 | 22.6                | 2.070                   | 13.670             | 6.090               | 0.550                     | 2.320              | 1.650               |
| 60.0                                                                   | 3.8                 | 32.4                | 2.500                   | 16.360             | 5.970               | 0.620                     | 3.090              | 1.680               |
| 75.0                                                                   | 3.7                 | 39.8                | 2.750                   | 18.030             | 5.600               | 0.700                     | 3.570              | 1.700               |
| 90.0                                                                   | 3.6                 | 42.9                | 3.210                   | 22.320             | 5.420               | 0.750                     | 3.790              | 1.690               |
| 105.0                                                                  | 3.6                 | 45.4                | 3.660                   | 34.670             | 5.030               | 0.790                     | 4.050              | 1.680               |
| 120.0                                                                  | 3.7                 | 45.3                | 3.340                   | 43.950             | 5.370               | 0.770                     | 4.250              | 1.680               |
| 135.0                                                                  | 3.7                 | 42.8                | 3.110                   | 19.900             | 5.420               | 0.730                     | 3.780              | 1.690               |
| 150.0                                                                  | 3.7                 | 44.0                | 2.930                   | 17.500             | 5.580               | 0.730                     | 3.600              | 1.710               |
| 165.0                                                                  | 3.8                 | 51.5                | 3.160                   | 18.060             | 5.370               | 0.730                     | 4.140              | 1.710               |
| 180.0                                                                  | 4.7                 | 178.8               | 1.430                   | 10.670             | 3.600               | 0.440                     | 2.290              | 1.150               |
| 195.0                                                                  | 4.6                 | 196.7               | 1.570                   | 10.770             | 3.690               | 0.480                     | 2.560              | 1.210               |
| 210.0                                                                  | 4.1                 | 373.7               | 4.000                   | 14.600             | 5.490               | 0.660                     | 3.440              | 1.680               |
| 225.0                                                                  | 4.4                 | 300.1               | 3.970                   | 19.320             | 4.800               | 1.010                     | 4.380              | 1.580               |
| 240.0                                                                  | 4.5                 | 289.0               | 4.350                   | 18.900             | 4.310               | 1.220                     | 4.550              | 1.340               |
| 255.0                                                                  | 4.4                 | 290.4               | 4.070                   | 21.440             | 4.300               | 1.210                     | 4.760              | 1.410               |
| 270.0                                                                  | 4.3                 | 294.0               | 4.190                   | 20.320             | 5.120               | 1.150                     | 4.480              | 1.500               |
| 285.0                                                                  | 4.4                 | 296.8               | 4.500                   | 19.360             | 4.910               | 1.100                     | 4.400              | 1.590               |
| 300.0                                                                  | 4.6                 | 302.9               | 3.650                   | 17.330             | 5.400               | 0.980                     | 4.220              | 1.720               |
| 315.0                                                                  | 4.6                 | 314.4               | 2.880                   | 17.390             | 5.820               | 0.790                     | 3.470              | 1.780               |
| 330.0                                                                  | 4.5                 | 326.6               | 2.460                   | 15.230             | 5.870               | 0.650                     | 2.760              | 1.740               |
| 345.0                                                                  | 4.3                 | 338.2               | 1.860                   | 11.690             | 5.800               | 0.540                     | 2.310              | 1.670               |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                     |                     |                         |                    |                     |                           |                    |                     |

**Table R.17:** Course-Keeping Ability and Motion Parameters: JONSWAP Spectrum with  $H_s = 6.0$  m and  $T_p = 9.3$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b>  |                     | <b>Absolute Maximum</b> |                    |                     | <b>Standard Deviation</b> |                    |                     |
|------------------------------------------------------------------------|---------------------|---------------------|-------------------------|--------------------|---------------------|---------------------------|--------------------|---------------------|
| $\psi_{MHP}$<br>deg                                                    | <b>Speed</b><br>kts | $\psi_{MHP}$<br>deg | <b>Heave</b><br>m       | <b>Roll</b><br>deg | <b>Pitch</b><br>deg | <b>Heave</b><br>m         | <b>Roll</b><br>deg | <b>Pitch</b><br>deg |
| 0.0                                                                    | 9.7                 | -1.2                | 1.950                   | 9.630              | 5.060               | 0.590                     | 1.380              | 1.580               |
| 15.0                                                                   | 9.7                 | 13.7                | 2.070                   | 11.500             | 5.240               | 0.610                     | 1.480              | 1.600               |
| 30.0                                                                   | 9.7                 | 28.7                | 2.230                   | 10.980             | 5.270               | 0.680                     | 1.900              | 1.660               |
| 45.0                                                                   | 9.7                 | 43.7                | 3.130                   | 14.240             | 5.500               | 0.820                     | 2.570              | 1.710               |
| 60.0                                                                   | 9.7                 | 58.1                | 3.450                   | 18.820             | 5.060               | 1.000                     | 3.320              | 1.640               |
| 75.0                                                                   | 9.7                 | 71.5                | 3.960                   | 23.250             | 4.440               | 1.190                     | 3.870              | 1.330               |
| 90.0                                                                   | 8.7                 | 77.7                | 4.260                   | 24.350             | 3.660               | 1.250                     | 4.490              | 1.000               |
| 105.0                                                                  | 8.6                 | 81.7                | 4.390                   | 43.870             | 3.060               | 1.260                     | 4.970              | 0.780               |
| 120.0                                                                  | 8.5                 | 85.6                | 4.830                   | 27.780             | 3.160               | 1.260                     | 5.310              | 0.650               |
| 135.0                                                                  | 8.5                 | 100.0               | 4.260                   | 25.710             | 4.310               | 1.130                     | 5.690              | 0.840               |
| 150.0                                                                  | 9.3                 | 145.5               | 1.490                   | 20.820             | 3.120               | 0.540                     | 6.480              | 1.110               |
| 165.0                                                                  | 9.7                 | 162.2               | 1.200                   | 23.540             | 2.650               | 0.440                     | 6.580              | 0.980               |
| 180.0                                                                  | 9.9                 | 178.2               | 1.150                   | 21.950             | 2.680               | 0.420                     | 5.290              | 0.970               |
| 195.0                                                                  | 10.0                | 194.6               | 1.250                   | 15.410             | 2.780               | 0.450                     | 4.220              | 1.020               |
| 210.0                                                                  | 9.8                 | 211.6               | 1.510                   | 17.130             | 2.990               | 0.560                     | 5.560              | 1.140               |
| 225.0                                                                  | 8.9                 | 239.9               | 4.160                   | 21.720             | 4.630               | 0.950                     | 5.680              | 1.190               |
| 240.0                                                                  | 8.5                 | 268.0               | 4.890                   | 41.060             | 4.910               | 1.300                     | 5.730              | 0.740               |
| 255.0                                                                  | 8.5                 | 273.6               | 4.650                   | 29.080             | 4.650               | 1.360                     | 4.980              | 0.630               |
| 270.0                                                                  | 9.0                 | 279.6               | 4.460                   | 20.860             | 4.040               | 1.370                     | 4.270              | 0.850               |
| 285.0                                                                  | 9.9                 | 287.8               | 4.880                   | 18.800             | 4.560               | 1.280                     | 3.780              | 1.340               |
| 300.0                                                                  | 9.9                 | 300.3               | 3.660                   | 14.170             | 4.980               | 1.090                     | 3.430              | 1.670               |
| 315.0                                                                  | 9.8                 | 314.3               | 3.110                   | 14.420             | 5.910               | 0.880                     | 3.030              | 1.750               |
| 330.0                                                                  | 9.7                 | 329.0               | 2.470                   | 13.650             | 5.600               | 0.720                     | 2.210              | 1.700               |
| 345.0                                                                  | 9.7                 | 343.9               | 1.950                   | 11.660             | 5.110               | 0.630                     | 1.620              | 1.620               |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                     |                     |                         |                    |                     |                           |                    |                     |

**Table R.18:** Course-Keeping Ability and Motion Parameters: JONSWAP Spectrum with  $H_s = 6.0$  m and  $T_p = 9.3$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 15.0               | -0.5                | 2.320                   | 9.280       | 4.680        | 0.730                     | 1.220       | 1.530        |
| 15.0                                                                   | 15.0               | 14.6                | 2.420                   | 9.750       | 4.980        | 0.750                     | 1.330       | 1.550        |
| 30.0                                                                   | 15.0               | 29.6                | 2.650                   | 11.130      | 5.000        | 0.830                     | 1.670       | 1.610        |
| 45.0                                                                   | 15.0               | 44.7                | 3.190                   | 14.200      | 4.970        | 0.960                     | 2.250       | 1.660        |
| 60.0                                                                   | 15.0               | 59.4                | 3.970                   | 20.080      | 5.490        | 1.120                     | 2.830       | 1.590        |
| 75.0                                                                   | 15.1               | 73.6                | 4.300                   | 21.900      | 4.530        | 1.250                     | 3.160       | 1.240        |
| 90.0                                                                   | 14.8               | 87.3                | 4.330                   | 25.760      | 2.830        | 1.260                     | 4.060       | 0.390        |
| 105.0                                                                  | 14.6               | 101.8               | 4.750                   | 33.550      | 3.580        | 1.080                     | 5.960       | 0.670        |
| 120.0                                                                  | 14.5               | 115.8               | 4.330                   | 33.710      | 3.570        | 0.880                     | 7.470       | 0.930        |
| 135.0                                                                  | 14.9               | 133.2               | 2.320                   | 24.450      | 3.210        | 0.640                     | 8.930       | 0.950        |
| 150.0                                                                  | 15.0               | 149.1               | 1.380                   | 23.510      | 2.790        | 0.500                     | 6.650       | 0.880        |
| 165.0                                                                  | 15.0               | 164.2               | 1.200                   | 19.780      | 2.360        | 0.370                     | 3.890       | 0.770        |
| 180.0                                                                  | 15.1               | 179.2               | 1.110                   | 19.130      | 2.550        | 0.430                     | 3.290       | 0.840        |
| 195.0                                                                  | 15.0               | 194.5               | 1.270                   | 23.110      | 2.910        | 0.460                     | 4.710       | 1.010        |
| 210.0                                                                  | 15.0               | 209.7               | 1.420                   | 22.190      | 2.740        | 0.480                     | 6.440       | 0.910        |
| 225.0                                                                  | 15.0               | 226.9               | 3.360                   | 23.690      | 3.690        | 0.690                     | 9.190       | 1.060        |
| 240.0                                                                  | 14.4               | 244.9               | 4.030                   | 29.050      | 4.310        | 0.970                     | 7.720       | 0.980        |
| 255.0                                                                  | 14.4               | 259.4               | 4.240                   | 37.030      | 3.590        | 1.210                     | 6.380       | 0.760        |
| 270.0                                                                  | 14.7               | 273.0               | 4.670                   | 20.040      | 2.140        | 1.370                     | 4.890       | 0.400        |
| 285.0                                                                  | 15.2               | 286.3               | 4.760                   | 16.910      | 4.510        | 1.340                     | 3.640       | 1.250        |
| 300.0                                                                  | 15.1               | 300.0               | 4.310                   | 17.770      | 5.140        | 1.180                     | 3.260       | 1.610        |
| 315.0                                                                  | 15.0               | 314.5               | 3.540                   | 14.390      | 5.580        | 1.000                     | 2.610       | 1.690        |
| 330.0                                                                  | 15.0               | 329.5               | 2.830                   | 12.730      | 5.210        | 0.850                     | 1.970       | 1.640        |
| 345.0                                                                  | 15.0               | 344.5               | 2.550                   | 9.680       | 4.780        | 0.770                     | 1.420       | 1.570        |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table R.19:** Course-Keeping Ability and Motion Parameters: JONSWAP Spectrum with  $H_s = 6.0$  m and  $T_p = 9.3$  s; Ship's speed is 20.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 20.2               | -0.2                | 2.800                   | 8.860       | 4.790        | 0.870                     | 1.110       | 1.470        |
| 15.0                                                                   | 20.2               | 14.8                | 2.900                   | 9.890       | 4.880        | 0.890                     | 1.210       | 1.500        |
| 30.0                                                                   | 20.2               | 29.8                | 3.160                   | 12.320      | 5.120        | 0.970                     | 1.610       | 1.560        |
| 45.0                                                                   | 20.2               | 44.9                | 3.450                   | 15.500      | 4.940        | 1.090                     | 2.080       | 1.600        |
| 60.0                                                                   | 20.2               | 59.7                | 3.890                   | 20.170      | 5.010        | 1.210                     | 2.670       | 1.530        |
| 75.0                                                                   | 20.3               | 74.2                | 4.150                   | 20.610      | 4.260        | 1.300                     | 2.820       | 1.190        |
| 90.0                                                                   | 20.1               | 88.5                | 4.350                   | 24.060      | 2.440        | 1.230                     | 3.830       | 0.320        |
| 105.0                                                                  | 20.1               | 103.6               | 4.430                   | 32.570      | 3.540        | 1.010                     | 6.690       | 0.650        |
| 120.0                                                                  | 20.1               | 118.8               | 2.600                   | 29.890      | 3.060        | 0.790                     | 10.740      | 0.800        |
| 135.0                                                                  | 20.1               | 134.5               | 1.950                   | 29.490      | 2.780        | 0.610                     | 9.960       | 0.880        |
| 150.0                                                                  | 20.2               | 149.6               | 1.700                   | 21.540      | 3.180        | 0.570                     | 6.400       | 0.930        |
| 165.0                                                                  | 20.3               | 164.2               | 1.170                   | 19.830      | 2.490        | 0.450                     | 3.820       | 0.820        |
| 180.0                                                                  | 20.6               | 179.6               | 1.340                   | 22.170      | 2.670        | 0.390                     | 3.010       | 0.760        |
| 195.0                                                                  | 20.4               | 194.5               | 1.170                   | 27.910      | 2.290        | 0.430                     | 5.400       | 0.770        |
| 210.0                                                                  | 20.2               | 210.0               | 1.700                   | 33.990      | 3.230        | 0.580                     | 7.890       | 0.950        |
| 225.0                                                                  | 20.1               | 225.4               | 2.020                   | 32.210      | 2.610        | 0.590                     | 10.360      | 0.880        |
| 240.0                                                                  | 20.1               | 241.3               | 2.710                   | 33.780      | 3.240        | 0.850                     | 11.460      | 0.950        |
| 255.0                                                                  | 19.9               | 257.2               | 5.580                   | 37.840      | 2.890        | 1.130                     | 7.580       | 0.740        |
| 270.0                                                                  | 20.0               | 271.7               | 4.480                   | 25.870      | 2.580        | 1.340                     | 5.460       | 0.350        |
| 285.0                                                                  | 20.3               | 285.8               | 4.660                   | 17.920      | 4.420        | 1.380                     | 3.930       | 1.200        |
| 300.0                                                                  | 20.3               | 300.0               | 4.010                   | 15.500      | 5.010        | 1.270                     | 3.330       | 1.550        |
| 315.0                                                                  | 20.2               | 314.8               | 4.020                   | 12.910      | 4.910        | 1.120                     | 2.580       | 1.620        |
| 330.0                                                                  | 20.2               | 329.8               | 3.370                   | 10.610      | 5.200        | 0.990                     | 1.830       | 1.570        |
| 345.0                                                                  | 20.2               | 344.8               | 2.730                   | 8.960       | 4.640        | 0.900                     | 1.310       | 1.500        |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |



**Table R.20:** Course-Keeping Ability and Motion Parameters: JONSWAP Spectrum with  $H_s = 6.0$  m and  $T_p = 9.3$  s; Ship's speed is 25.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 25.4               | -0.1                | 3.220                   | 10.000      | 4.760        | 0.960                     | 1.090       | 1.400        |
| 15.0                                                                   | 25.4               | 14.9                | 3.060                   | 11.100      | 4.560        | 0.990                     | 1.190       | 1.420        |
| 30.0                                                                   | 25.4               | 29.9                | 3.670                   | 13.490      | 4.610        | 1.070                     | 1.650       | 1.490        |
| 45.0                                                                   | 25.3               | 44.9                | 3.910                   | 16.960      | 4.870        | 1.190                     | 2.140       | 1.540        |
| 60.0                                                                   | 25.3               | 59.8                | 3.890                   | 19.450      | 4.460        | 1.290                     | 2.630       | 1.470        |
| 75.0                                                                   | 25.3               | 74.4                | 4.990                   | 25.450      | 4.560        | 1.340                     | 2.950       | 1.160        |
| 90.0                                                                   | 25.2               | 89.0                | 4.480                   | 24.770      | 2.570        | 1.200                     | 3.870       | 0.310        |
| 105.0                                                                  | 25.2               | 104.3               | 3.760                   | 40.450      | 4.500        | 0.970                     | 9.220       | 0.660        |
| 120.0                                                                  | 25.1               | 119.3               | 2.740                   | 37.050      | 3.340        | 0.720                     | 13.550      | 0.740        |
| 135.0                                                                  | 25.1               | 134.7               | 1.800                   | 29.940      | 2.780        | 0.590                     | 10.410      | 0.840        |
| 150.0                                                                  | 25.3               | 149.6               | 1.600                   | 22.940      | 2.780        | 0.470                     | 5.810       | 0.780        |
| 165.0                                                                  | 25.7               | 164.6               | 1.080                   | 20.870      | 2.300        | 0.390                     | 3.100       | 0.720        |
| 180.0                                                                  | 25.5               | 179.7               | 1.140                   | 24.740      | 2.490        | 0.350                     | 3.770       | 0.650        |
| 195.0                                                                  | 25.7               | 195.1               | 1.170                   | 23.980      | 2.470        | 0.380                     | 3.950       | 0.720        |
| 210.0                                                                  | 25.4               | 210.2               | 1.400                   | 25.670      | 2.150        | 0.470                     | 6.460       | 0.800        |
| 225.0                                                                  | 25.0               | 225.8               | 2.960                   | 38.750      | 3.830        | 0.750                     | 12.020      | 1.030        |
| 240.0                                                                  | 25.2               | 240.7               | 2.330                   | 40.120      | 3.150        | 0.790                     | 15.290      | 0.890        |
| 255.0                                                                  | 25.2               | 256.0               | 4.900                   | 34.030      | 2.710        | 1.070                     | 8.730       | 0.720        |
| 270.0                                                                  | 25.2               | 271.1               | 4.140                   | 21.010      | 1.870        | 1.300                     | 5.820       | 0.340        |
| 285.0                                                                  | 25.4               | 285.6               | 5.200                   | 19.640      | 4.330        | 1.410                     | 4.570       | 1.150        |
| 300.0                                                                  | 25.4               | 300.1               | 4.330                   | 13.710      | 4.800        | 1.340                     | 3.510       | 1.480        |
| 315.0                                                                  | 25.4               | 314.9               | 3.850                   | 12.770      | 4.970        | 1.220                     | 2.850       | 1.540        |
| 330.0                                                                  | 25.4               | 329.9               | 3.530                   | 9.740       | 4.500        | 1.090                     | 1.940       | 1.490        |
| 345.0                                                                  | 25.4               | 344.9               | 3.120                   | 9.190       | 4.500        | 1.000                     | 1.340       | 1.420        |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table R.21:** Course-Keeping Ability and Motion Parameters: JONSWAP Spectrum with  $H_s = 6.0$  m and  $T_p = 9.3$  s; Ship's speed is 30.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 30.5               | -0.0                | 3.210                   | 10.420      | 4.270        | 1.020                     | 1.200       | 1.310        |
| 15.0                                                                   | 30.5               | 14.9                | 3.440                   | 12.190      | 4.300        | 1.050                     | 1.280       | 1.340        |
| 30.0                                                                   | 30.5               | 29.9                | 3.720                   | 17.440      | 4.820        | 1.140                     | 1.820       | 1.410        |
| 45.0                                                                   | 30.5               | 44.9                | 4.120                   | 19.680      | 4.510        | 1.270                     | 2.380       | 1.470        |
| 60.0                                                                   | 30.4               | 59.8                | 4.800                   | 22.170      | 4.640        | 1.360                     | 2.830       | 1.420        |
| 75.0                                                                   | 30.4               | 74.5                | 4.930                   | 21.250      | 3.570        | 1.360                     | 2.910       | 1.110        |
| 90.0                                                                   | 30.4               | 89.3                | 4.040                   | 23.870      | 2.540        | 1.170                     | 4.110       | 0.320        |
| 105.0                                                                  | 30.3               | 104.5               | 3.440                   | 38.170      | 3.900        | 0.930                     | 10.740      | 0.600        |
| 120.0                                                                  | 30.1               | 119.4               | 2.260                   | 37.960      | 2.750        | 0.670                     | 14.760      | 0.770        |
| 135.0                                                                  | 30.2               | 134.6               | 2.060                   | 30.450      | 2.920        | 0.590                     | 10.030      | 0.860        |
| 150.0                                                                  | 31.0               | 149.1               | 1.440                   | 28.790      | 2.810        | 0.430                     | 5.510       | 0.740        |
| 165.0                                                                  | 30.1               | 164.8               | 1.090                   | 24.670      | 2.770        | 0.390                     | 4.270       | 0.690        |
| 180.0                                                                  | 30.6               | 179.4               | 1.200                   | 26.930      | 2.770        | 0.310                     | 5.130       | 0.560        |
| 195.0                                                                  | 30.2               | 194.5               | 1.320                   | 31.850      | 2.760        | 0.400                     | 5.980       | 0.720        |
| 210.0                                                                  | 31.1               | 210.4               | 1.280                   | 36.510      | 2.560        | 0.410                     | 7.020       | 0.710        |
| 225.0                                                                  | 30.4               | 225.3               | 1.980                   | 32.530      | 3.050        | 0.570                     | 9.550       | 0.910        |
| 240.0                                                                  | 29.9               | 241.2               | 4.310                   | 45.030      | 3.610        | 0.840                     | 17.340      | 1.010        |
| 255.0                                                                  | 30.3               | 255.5               | 3.930                   | 45.620      | 3.810        | 1.020                     | 11.160      | 0.740        |
| 270.0                                                                  | 30.4               | 270.7               | 4.120                   | 21.370      | 1.500        | 1.260                     | 5.860       | 0.350        |
| 285.0                                                                  | 30.5               | 285.4               | 4.730                   | 21.290      | 3.890        | 1.440                     | 5.520       | 1.110        |
| 300.0                                                                  | 30.5               | 300.1               | 4.740                   | 16.680      | 4.680        | 1.410                     | 4.260       | 1.420        |
| 315.0                                                                  | 30.5               | 315.1               | 3.790                   | 15.450      | 4.630        | 1.290                     | 3.380       | 1.460        |
| 330.0                                                                  | 30.5               | 330.1               | 3.410                   | 10.940      | 4.300        | 1.160                     | 2.190       | 1.400        |
| 345.0                                                                  | 30.5               | 345.0               | 3.450                   | 10.330      | 4.480        | 1.050                     | 1.480       | 1.340        |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table R.22:** Course-Keeping Ability and Motion Parameters: JONSWAP Spectrum with  $H_s = 6.0$  m and  $T_p = 13.6$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                  | <b>Absolute Maximum</b> |          |           | <b>Standard Deviation</b> |          |           |
|------------------------------------------------------------------------|--------------------|------------------|-------------------------|----------|-----------|---------------------------|----------|-----------|
| $\psi_{MHP}$ deg                                                       | Speed kts          | $\psi_{MHP}$ deg | Heave m                 | Roll deg | Pitch deg | Heave m                   | Roll deg | Pitch deg |
| 0.0                                                                    | -0.1               | -18.5            | 3.710                   | 14.340   | 5.570     | 1.060                     | 3.730    | 1.650     |
| 15.0                                                                   | -0.5               | -12.0            | 3.010                   | 13.020   | 6.710     | 1.040                     | 3.380    | 1.670     |
| 30.0                                                                   | -0.8               | -3.6             | 3.250                   | 16.160   | 6.420     | 1.030                     | 3.590    | 1.660     |
| 45.0                                                                   | -1.2               | -58.6            | 4.700                   | 22.580   | 5.440     | 1.210                     | 7.060    | 1.250     |
| 60.0                                                                   | -0.3               | 32.5             | 4.060                   | 22.050   | 5.210     | 1.080                     | 5.310    | 1.540     |
| 75.0                                                                   | -0.1               | 49.5             | 4.740                   | 23.580   | 4.410     | 1.170                     | 6.130    | 1.370     |
| 90.0                                                                   | 0.2                | 65.1             | 4.510                   | 20.270   | 3.900     | 1.280                     | 6.310    | 1.040     |
| 105.0                                                                  | -0.0               | 88.9             | 5.110                   | 22.150   | 2.200     | 1.390                     | 6.730    | 0.300     |
| 120.0                                                                  | -0.7               | 99.4             | 4.930                   | 23.370   | 2.940     | 1.370                     | 6.920    | 0.540     |
| 135.0                                                                  | -1.3               | 106.4            | 5.140                   | 24.960   | 3.470     | 1.340                     | 6.980    | 0.800     |
| 150.0                                                                  | -1.8               | 109.3            | 4.580                   | 23.920   | 3.930     | 1.310                     | 6.930    | 0.930     |
| 165.0                                                                  | -1.4               | 56.9             | 4.630                   | 18.780   | 5.920     | 1.210                     | 5.950    | 1.290     |
| 180.0                                                                  | -0.9               | 37.8             | 3.600                   | 17.360   | 6.710     | 1.090                     | 4.630    | 1.590     |
| 195.0                                                                  | -0.1               | 374.4            | 3.800                   | 17.290   | 5.370     | 1.110                     | 4.690    | 1.590     |
| 210.0                                                                  | 0.1                | 378.5            | 4.560                   | 18.310   | 5.390     | 1.200                     | 5.260    | 1.480     |
| 225.0                                                                  | 0.3                | 365.6            | 4.710                   | 18.800   | 4.920     | 1.280                     | 6.180    | 1.310     |
| 240.0                                                                  | 0.6                | 277.2            | 5.440                   | 19.900   | 3.150     | 1.480                     | 6.220    | 0.510     |
| 255.0                                                                  | 0.5                | 285.1            | 4.920                   | 21.010   | 2.760     | 1.460                     | 6.100    | 0.750     |
| 270.0                                                                  | 0.5                | 293.6            | 5.190                   | 19.060   | 3.610     | 1.410                     | 5.900    | 1.030     |
| 285.0                                                                  | 0.4                | 300.7            | 4.870                   | 19.050   | 4.580     | 1.350                     | 5.740    | 1.220     |
| 300.0                                                                  | 0.3                | 309.0            | 4.310                   | 19.190   | 5.260     | 1.280                     | 5.720    | 1.390     |
| 315.0                                                                  | 0.2                | 316.0            | 4.190                   | 19.140   | 5.070     | 1.220                     | 5.410    | 1.490     |
| 330.0                                                                  | 0.1                | 324.5            | 3.990                   | 18.650   | 5.240     | 1.160                     | 5.180    | 1.570     |
| 345.0                                                                  | 0.0                | 332.4            | 3.870                   | 17.090   | 5.450     | 1.120                     | 4.420    | 1.620     |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                  |                         |          |           |                           |          |           |

**Table R.23:** Course-Keeping Ability and Motion Parameters: JONSWAP Spectrum with  $H_s = 6.0$  m and  $T_p = 13.6$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b>  |                     | <b>Absolute Maximum</b> |                    |                     | <b>Standard Deviation</b> |                    |                     |
|------------------------------------------------------------------------|---------------------|---------------------|-------------------------|--------------------|---------------------|---------------------------|--------------------|---------------------|
| $\psi_{MHP}$<br>deg                                                    | <b>Speed</b><br>kts | $\psi_{MHP}$<br>deg | <b>Heave</b><br>m       | <b>Roll</b><br>deg | <b>Pitch</b><br>deg | <b>Heave</b><br>m         | <b>Roll</b><br>deg | <b>Pitch</b><br>deg |
| 0.0                                                                    | 4.2                 | -12.0               | 3.770                   | 15.020             | 5.410               | 1.040                     | 3.240              | 1.690               |
| 15.0                                                                   | 4.0                 | -7.0                | 3.530                   | 14.040             | 5.850               | 1.030                     | 3.180              | 1.700               |
| 30.0                                                                   | 3.9                 | 0.5                 | 3.950                   | 14.830             | 6.190               | 1.030                     | 3.240              | 1.700               |
| 45.0                                                                   | 3.9                 | 11.1                | 3.740                   | 15.920             | 5.540               | 1.030                     | 3.560              | 1.660               |
| 60.0                                                                   | 4.0                 | 29.4                | 4.200                   | 20.060             | 5.540               | 1.080                     | 4.850              | 1.590               |
| 75.0                                                                   | 4.1                 | 49.3                | 4.670                   | 20.180             | 5.120               | 1.190                     | 5.560              | 1.400               |
| 90.0                                                                   | 4.2                 | 61.7                | 4.240                   | 22.710             | 4.050               | 1.270                     | 5.990              | 1.150               |
| 105.0                                                                  | 4.3                 | 78.3                | 5.090                   | 20.190             | 2.610               | 1.360                     | 6.130              | 0.620               |
| 120.0                                                                  | 4.1                 | 92.0                | 5.280                   | 23.610             | 3.170               | 1.370                     | 6.370              | 0.330               |
| 135.0                                                                  | 4.0                 | 100.0               | 5.660                   | 24.640             | 3.840               | 1.350                     | 6.540              | 0.520               |
| 150.0                                                                  | 3.9                 | 53.6                | 4.990                   | 19.270             | 4.850               | 1.210                     | 5.780              | 1.370               |
| 165.0                                                                  | 4.0                 | 54.1                | 4.360                   | 17.330             | 5.040               | 1.200                     | 5.500              | 1.430               |
| 180.0                                                                  | 4.0                 | 63.4                | 4.520                   | 17.500             | 4.550               | 1.210                     | 5.660              | 1.440               |
| 195.0                                                                  | 4.7                 | 195.6               | 3.450                   | 13.090             | 4.370               | 1.010                     | 3.490              | 1.430               |
| 210.0                                                                  | 4.4                 | 219.3               | 3.730                   | 16.110             | 4.390               | 1.130                     | 4.730              | 1.360               |
| 225.0                                                                  | 4.3                 | 251.8               | 5.050                   | 21.490             | 3.750               | 1.380                     | 5.980              | 0.870               |
| 240.0                                                                  | 4.3                 | 260.6               | 4.940                   | 19.790             | 3.480               | 1.450                     | 6.160              | 0.600               |
| 255.0                                                                  | 4.4                 | 270.2               | 4.880                   | 19.390             | 2.130               | 1.480                     | 6.080              | 0.330               |
| 270.0                                                                  | 4.6                 | 280.1               | 5.080                   | 20.810             | 2.030               | 1.480                     | 5.800              | 0.520               |
| 285.0                                                                  | 4.8                 | 290.4               | 5.210                   | 19.380             | 3.410               | 1.420                     | 5.490              | 0.950               |
| 300.0                                                                  | 4.9                 | 302.4               | 4.600                   | 17.380             | 4.350               | 1.320                     | 5.010              | 1.300               |
| 315.0                                                                  | 4.8                 | 314.6               | 4.790                   | 16.440             | 5.020               | 1.220                     | 4.490              | 1.510               |
| 330.0                                                                  | 4.8                 | 327.8               | 3.870                   | 16.920             | 4.980               | 1.130                     | 3.930              | 1.620               |
| 345.0                                                                  | 4.5                 | 339.9               | 3.880                   | 14.800             | 5.670               | 1.070                     | 3.380              | 1.680               |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                     |                     |                         |                    |                     |                           |                    |                     |

**Table R.24:** Course-Keeping Ability and Motion Parameters: JONSWAP Spectrum with  $H_s = 6.0$  m and  $T_p = 13.6$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 9.8                | -1.3                | 4.190                   | 9.950       | 6.440        | 1.070                     | 1.320       | 1.690        |
| 15.0                                                                   | 9.8                | 13.7                | 3.910                   | 11.450      | 6.600        | 1.070                     | 2.040       | 1.680        |
| 30.0                                                                   | 9.8                | 28.7                | 4.390                   | 14.260      | 6.110        | 1.120                     | 3.000       | 1.610        |
| 45.0                                                                   | 9.9                | 43.8                | 3.920                   | 15.410      | 5.190        | 1.190                     | 3.690       | 1.500        |
| 60.0                                                                   | 9.9                | 58.5                | 4.400                   | 18.640      | 4.080        | 1.280                     | 4.310       | 1.270        |
| 75.0                                                                   | 10.0               | 73.1                | 5.260                   | 20.640      | 2.950        | 1.350                     | 4.600       | 0.830        |
| 90.0                                                                   | 9.9                | 87.8                | 4.440                   | 20.330      | 0.900        | 1.370                     | 5.280       | 0.190        |
| 105.0                                                                  | 9.9                | 102.5               | 4.890                   | 22.460      | 1.880        | 1.320                     | 5.670       | 0.500        |
| 120.0                                                                  | 9.5                | 116.3               | 4.360                   | 22.030      | 3.310        | 1.220                     | 5.490       | 0.860        |
| 135.0                                                                  | 9.5                | 131.2               | 4.280                   | 18.990      | 3.880        | 1.120                     | 5.120       | 1.080        |
| 150.0                                                                  | 9.6                | 147.0               | 3.350                   | 19.730      | 3.910        | 1.020                     | 4.970       | 1.180        |
| 165.0                                                                  | 9.7                | 162.7               | 3.430                   | 19.200      | 4.650        | 0.960                     | 4.730       | 1.220        |
| 180.0                                                                  | 9.8                | 178.5               | 3.290                   | 17.170      | 4.400        | 0.960                     | 3.970       | 1.280        |
| 195.0                                                                  | 9.9                | 194.5               | 3.470                   | 14.590      | 4.580        | 0.970                     | 3.520       | 1.260        |
| 210.0                                                                  | 9.9                | 210.9               | 3.470                   | 14.750      | 3.860        | 1.050                     | 4.870       | 1.250        |
| 225.0                                                                  | 9.7                | 227.5               | 3.890                   | 15.330      | 4.120        | 1.170                     | 5.830       | 1.170        |
| 240.0                                                                  | 9.6                | 243.5               | 4.920                   | 16.890      | 3.720        | 1.300                     | 6.230       | 0.960        |
| 255.0                                                                  | 9.8                | 257.7               | 5.120                   | 20.480      | 2.440        | 1.410                     | 6.330       | 0.570        |
| 270.0                                                                  | 10.0               | 272.0               | 5.180                   | 17.950      | 1.120        | 1.480                     | 5.920       | 0.190        |
| 285.0                                                                  | 10.1               | 286.1               | 5.280                   | 18.290      | 2.910        | 1.450                     | 5.070       | 0.800        |
| 300.0                                                                  | 10.1               | 300.2               | 4.920                   | 16.080      | 4.320        | 1.350                     | 4.260       | 1.250        |
| 315.0                                                                  | 10.0               | 314.4               | 4.400                   | 14.590      | 4.810        | 1.240                     | 3.460       | 1.500        |
| 330.0                                                                  | 9.9                | 329.0               | 4.380                   | 14.310      | 6.180        | 1.150                     | 2.590       | 1.620        |
| 345.0                                                                  | 9.9                | 343.8               | 4.170                   | 10.980      | 6.090        | 1.090                     | 1.630       | 1.680        |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table R.25:** Course-Keeping Ability and Motion Parameters: JONSWAP Spectrum with  $H_s = 6.0$  m and  $T_p = 13.6$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b>  |                     | <b>Absolute Maximum</b> |                    |                     | <b>Standard Deviation</b> |                    |                     |
|------------------------------------------------------------------------|---------------------|---------------------|-------------------------|--------------------|---------------------|---------------------------|--------------------|---------------------|
| $\psi_{MHP}$<br>deg                                                    | <b>Speed</b><br>kts | $\psi_{MHP}$<br>deg | <b>Heave</b><br>m       | <b>Roll</b><br>deg | <b>Pitch</b><br>deg | <b>Heave</b><br>m         | <b>Roll</b><br>deg | <b>Pitch</b><br>deg |
| 0.0                                                                    | 15.0                | -0.5                | 3.750                   | 8.920              | 5.130               | 1.150                     | 0.990              | 1.670               |
| 15.0                                                                   | 15.0                | 14.6                | 4.010                   | 10.320             | 5.200               | 1.160                     | 1.700              | 1.650               |
| 30.0                                                                   | 15.0                | 29.7                | 4.200                   | 12.990             | 5.660               | 1.190                     | 2.510              | 1.590               |
| 45.0                                                                   | 15.1                | 44.7                | 5.020                   | 15.090             | 5.060               | 1.250                     | 3.140              | 1.470               |
| 60.0                                                                   | 15.1                | 59.5                | 4.660                   | 16.000             | 4.040               | 1.310                     | 3.740              | 1.240               |
| 75.0                                                                   | 15.2                | 74.2                | 4.930                   | 18.610             | 2.630               | 1.350                     | 3.910              | 0.800               |
| 90.0                                                                   | 15.2                | 89.0                | 4.690                   | 19.620             | 0.810               | 1.340                     | 4.730              | 0.190               |
| 105.0                                                                  | 15.2                | 104.0               | 4.680                   | 23.580             | 1.860               | 1.270                     | 5.540              | 0.500               |
| 120.0                                                                  | 15.0                | 118.3               | 4.410                   | 25.350             | 2.740               | 1.180                     | 6.540              | 0.790               |
| 135.0                                                                  | 15.0                | 133.7               | 3.410                   | 23.800             | 3.170               | 1.060                     | 7.320              | 0.970               |
| 150.0                                                                  | 15.3                | 149.5               | 2.820                   | 17.560             | 3.120               | 1.000                     | 4.820              | 1.060               |
| 165.0                                                                  | 15.2                | 164.4               | 2.750                   | 13.690             | 3.590               | 0.960                     | 2.760              | 1.100               |
| 180.0                                                                  | 15.2                | 179.3               | 2.640                   | 16.100             | 3.240               | 0.950                     | 2.620              | 1.160               |
| 195.0                                                                  | 15.1                | 194.5               | 2.590                   | 21.410             | 3.440               | 0.950                     | 3.430              | 1.120               |
| 210.0                                                                  | 15.1                | 209.9               | 2.850                   | 21.970             | 3.470               | 1.010                     | 5.730              | 1.140               |
| 225.0                                                                  | 15.0                | 225.9               | 3.470                   | 20.080             | 3.650               | 1.120                     | 7.780              | 1.040               |
| 240.0                                                                  | 15.0                | 241.5               | 4.690                   | 21.110             | 3.070               | 1.240                     | 7.880              | 0.900               |
| 255.0                                                                  | 15.1                | 256.2               | 5.010                   | 20.230             | 2.050               | 1.370                     | 7.020              | 0.580               |
| 270.0                                                                  | 15.2                | 270.9               | 5.090                   | 19.250             | 0.980               | 1.450                     | 6.200              | 0.200               |
| 285.0                                                                  | 15.2                | 285.4               | 4.780                   | 19.310             | 2.420               | 1.450                     | 5.070              | 0.770               |
| 300.0                                                                  | 15.2                | 299.9               | 5.000                   | 16.610             | 4.480               | 1.380                     | 3.840              | 1.230               |
| 315.0                                                                  | 15.1                | 314.5               | 4.920                   | 14.100             | 4.990               | 1.290                     | 2.740              | 1.470               |
| 330.0                                                                  | 15.0                | 329.4               | 3.970                   | 11.990             | 5.120               | 1.220                     | 1.940              | 1.600               |
| 345.0                                                                  | 15.0                | 344.4               | 3.760                   | 10.410             | 5.340               | 1.170                     | 1.190              | 1.650               |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                     |                     |                         |                    |                     |                           |                    |                     |

**Table R.26:** Course-Keeping Ability and Motion Parameters: JONSWAP Spectrum with  $H_s = 6.0$  m and  $T_p = 13.6$  s; Ship's speed is 20.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 20.2               | -0.2                | 4.500                   | 8.810       | 5.130        | 1.240                     | 0.990       | 1.620        |
| 15.0                                                                   | 20.2               | 14.9                | 4.340                   | 10.460      | 5.310        | 1.250                     | 1.630       | 1.600        |
| 30.0                                                                   | 20.2               | 29.9                | 4.240                   | 11.960      | 5.070        | 1.270                     | 2.380       | 1.550        |
| 45.0                                                                   | 20.2               | 45.0                | 4.410                   | 13.910      | 4.290        | 1.310                     | 3.040       | 1.440        |
| 60.0                                                                   | 20.3               | 59.8                | 5.160                   | 16.850      | 4.550        | 1.350                     | 3.630       | 1.210        |
| 75.0                                                                   | 20.3               | 74.6                | 4.950                   | 17.210      | 2.710        | 1.350                     | 3.650       | 0.800        |
| 90.0                                                                   | 20.3               | 89.5                | 4.430                   | 19.110      | 0.900        | 1.300                     | 4.450       | 0.230        |
| 105.0                                                                  | 20.3               | 104.5               | 4.660                   | 25.020      | 2.050        | 1.230                     | 5.680       | 0.470        |
| 120.0                                                                  | 20.2               | 119.3               | 3.780                   | 30.170      | 3.110        | 1.130                     | 8.460       | 0.720        |
| 135.0                                                                  | 20.2               | 134.7               | 3.560                   | 25.740      | 3.160        | 1.060                     | 8.700       | 0.980        |
| 150.0                                                                  | 20.3               | 149.7               | 2.440                   | 16.440      | 2.310        | 0.880                     | 4.030       | 0.830        |
| 165.0                                                                  | 20.2               | 164.6               | 2.270                   | 14.020      | 2.770        | 0.790                     | 2.550       | 0.880        |
| 180.0                                                                  | 20.4               | 179.8               | 2.620                   | 20.690      | 2.930        | 0.870                     | 2.330       | 1.020        |
| 195.0                                                                  | 20.3               | 194.9               | 3.360                   | 29.010      | 3.760        | 1.030                     | 4.840       | 1.210        |
| 210.0                                                                  | 20.3               | 210.0               | 3.040                   | 31.850      | 3.160        | 0.950                     | 6.190       | 1.030        |
| 225.0                                                                  | 20.3               | 225.0               | 3.650                   | 30.740      | 3.280        | 1.030                     | 7.570       | 0.880        |
| 240.0                                                                  | 20.2               | 240.7               | 4.750                   | 27.040      | 3.210        | 1.180                     | 9.760       | 0.820        |
| 255.0                                                                  | 20.3               | 255.6               | 4.590                   | 25.890      | 1.980        | 1.320                     | 7.530       | 0.560        |
| 270.0                                                                  | 20.3               | 270.4               | 4.830                   | 22.150      | 1.040        | 1.410                     | 6.320       | 0.240        |
| 285.0                                                                  | 20.3               | 285.2               | 5.760                   | 22.020      | 2.500        | 1.440                     | 5.080       | 0.760        |
| 300.0                                                                  | 20.3               | 299.9               | 5.210                   | 16.380      | 4.160        | 1.410                     | 3.570       | 1.200        |
| 315.0                                                                  | 20.2               | 314.6               | 4.570                   | 15.010      | 4.950        | 1.360                     | 2.550       | 1.430        |
| 330.0                                                                  | 20.2               | 329.6               | 4.010                   | 12.170      | 4.940        | 1.300                     | 1.610       | 1.550        |
| 345.0                                                                  | 20.2               | 344.7               | 4.430                   | 10.070      | 5.130        | 1.260                     | 1.050       | 1.600        |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table R.27:** Course-Keeping Ability and Motion Parameters: JONSWAP Spectrum with  $H_s = 6.0$  m and  $T_p = 13.6$  s; Ship's speed is 25.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 25.3               | -0.1                | 4.710                   | 10.280      | 5.060        | 1.340                     | 1.110       | 1.560        |
| 15.0                                                                   | 25.3               | 15.0                | 5.020                   | 11.040      | 5.360        | 1.340                     | 1.610       | 1.550        |
| 30.0                                                                   | 25.3               | 30.0                | 4.650                   | 13.160      | 4.980        | 1.360                     | 2.310       | 1.500        |
| 45.0                                                                   | 25.3               | 45.0                | 4.560                   | 15.220      | 4.500        | 1.380                     | 2.980       | 1.400        |
| 60.0                                                                   | 25.4               | 59.9                | 5.040                   | 17.710      | 4.190        | 1.380                     | 3.710       | 1.190        |
| 75.0                                                                   | 25.4               | 74.8                | 4.680                   | 16.850      | 2.660        | 1.350                     | 3.430       | 0.790        |
| 90.0                                                                   | 25.4               | 89.7                | 4.280                   | 18.890      | 1.020        | 1.260                     | 4.420       | 0.260        |
| 105.0                                                                  | 25.4               | 104.7               | 4.240                   | 26.320      | 1.880        | 1.170                     | 5.930       | 0.430        |
| 120.0                                                                  | 25.3               | 119.8               | 3.600                   | 32.750      | 2.730        | 1.110                     | 11.590      | 0.730        |
| 135.0                                                                  | 25.3               | 134.8               | 2.550                   | 29.230      | 2.510        | 1.050                     | 8.600       | 0.890        |
| 150.0                                                                  | 25.4               | 149.7               | 2.090                   | 17.670      | 2.400        | 0.780                     | 5.310       | 0.840        |
| 165.0                                                                  | 25.6               | 164.7               | 2.220                   | 15.110      | 2.810        | 0.840                     | 2.970       | 0.990        |
| 180.0                                                                  | 25.6               | 179.8               | 3.290                   | 19.890      | 3.460        | 1.030                     | 2.330       | 1.070        |
| 195.0                                                                  | 25.6               | 195.0               | 2.400                   | 22.430      | 2.950        | 0.860                     | 3.340       | 1.000        |
| 210.0                                                                  | 25.4               | 210.0               | 2.000                   | 25.870      | 2.230        | 0.680                     | 5.390       | 0.770        |
| 225.0                                                                  | 25.4               | 225.0               | 2.600                   | 33.550      | 2.130        | 0.900                     | 7.580       | 0.710        |
| 240.0                                                                  | 25.4               | 240.2               | 3.440                   | 37.460      | 2.540        | 1.130                     | 10.960      | 0.750        |
| 255.0                                                                  | 25.4               | 255.3               | 4.630                   | 31.340      | 2.030        | 1.290                     | 7.790       | 0.540        |
| 270.0                                                                  | 25.4               | 270.2               | 4.740                   | 23.990      | 1.120        | 1.370                     | 6.280       | 0.270        |
| 285.0                                                                  | 25.4               | 285.1               | 5.460                   | 22.160      | 2.520        | 1.430                     | 5.020       | 0.750        |
| 300.0                                                                  | 25.4               | 299.9               | 5.100                   | 17.610      | 4.070        | 1.440                     | 3.430       | 1.170        |
| 315.0                                                                  | 25.4               | 314.8               | 4.460                   | 15.010      | 4.370        | 1.410                     | 2.300       | 1.380        |
| 330.0                                                                  | 25.3               | 329.8               | 4.930                   | 12.480      | 5.210        | 1.380                     | 1.580       | 1.500        |
| 345.0                                                                  | 25.3               | 344.8               | 5.060                   | 10.620      | 5.440        | 1.350                     | 1.090       | 1.540        |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |



**Table R.28:** Course-Keeping Ability and Motion Parameters: JONSWAP Spectrum with  $H_s = 6.0$  m and  $T_p = 13.6$  s; Ship's speed is 30.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 30.5               | -0.0                | 4.920                   | 11.410      | 5.030        | 1.430                     | 1.260       | 1.510        |
| 15.0                                                                   | 30.5               | 15.0                | 5.690                   | 12.060      | 5.380        | 1.430                     | 1.630       | 1.490        |
| 30.0                                                                   | 30.4               | 30.1                | 5.170                   | 13.710      | 4.740        | 1.430                     | 2.250       | 1.450        |
| 45.0                                                                   | 30.4               | 45.1                | 5.170                   | 15.840      | 4.450        | 1.440                     | 3.030       | 1.350        |
| 60.0                                                                   | 30.4               | 60.0                | 5.030                   | 18.610      | 3.790        | 1.420                     | 3.810       | 1.160        |
| 75.0                                                                   | 30.5               | 74.9                | 4.970                   | 17.370      | 2.630        | 1.350                     | 3.450       | 0.790        |
| 90.0                                                                   | 30.5               | 89.8                | 4.380                   | 19.640      | 1.140        | 1.220                     | 4.570       | 0.290        |
| 105.0                                                                  | 30.5               | 104.8               | 4.070                   | 26.040      | 1.440        | 1.130                     | 6.550       | 0.400        |
| 120.0                                                                  | 30.3               | 119.9               | 3.270                   | 36.540      | 2.740        | 1.110                     | 12.860      | 0.720        |
| 135.0                                                                  | 30.4               | 134.8               | 2.830                   | 28.670      | 2.760        | 0.910                     | 8.950       | 0.830        |
| 150.0                                                                  | 30.7               | 149.7               | 2.410                   | 19.490      | 2.780        | 0.940                     | 5.570       | 0.980        |
| 165.0                                                                  | 31.0               | 164.7               | 3.150                   | 20.870      | 3.530        | 0.850                     | 3.300       | 1.020        |
| 180.0                                                                  | 30.6               | 179.7               | 3.240                   | 22.890      | 4.110        | 0.880                     | 3.250       | 1.100        |
| 195.0                                                                  | 31.0               | 195.0               | 3.290                   | 23.880      | 3.230        | 0.860                     | 3.980       | 0.990        |
| 210.0                                                                  | 30.7               | 210.2               | 3.040                   | 28.050      | 3.450        | 0.950                     | 6.100       | 0.960        |
| 225.0                                                                  | 30.4               | 225.2               | 3.020                   | 35.490      | 2.870        | 1.020                     | 9.180       | 0.900        |
| 240.0                                                                  | 30.4               | 240.2               | 3.470                   | 41.410      | 3.130        | 1.100                     | 12.340      | 0.760        |
| 255.0                                                                  | 30.5               | 255.2               | 4.570                   | 40.360      | 2.020        | 1.250                     | 7.630       | 0.530        |
| 270.0                                                                  | 30.5               | 270.1               | 4.890                   | 24.790      | 1.180        | 1.330                     | 5.920       | 0.310        |
| 285.0                                                                  | 30.5               | 285.1               | 5.260                   | 21.740      | 2.660        | 1.430                     | 4.880       | 0.750        |
| 300.0                                                                  | 30.5               | 299.9               | 5.800                   | 18.340      | 4.020        | 1.470                     | 3.210       | 1.140        |
| 315.0                                                                  | 30.5               | 314.9               | 5.210                   | 15.470      | 4.500        | 1.470                     | 2.310       | 1.340        |
| 330.0                                                                  | 30.5               | 329.9               | 4.930                   | 12.840      | 4.500        | 1.450                     | 1.680       | 1.440        |
| 345.0                                                                  | 30.4               | 344.9               | 5.270                   | 13.260      | 5.540        | 1.440                     | 1.440       | 1.490        |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table R.29:** Course-Keeping Ability and Motion Parameters: JONSWAP Spectrum with  $H_s = 9.0$  m and  $T_p = 11.0$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | -0.9               | -27.2               | 8.650                   | 31.440      | 8.090        | 1.340                     | 6.780       | 2.530        |
| 15.0                                                                   | -1.4               | -21.1               | 5.100                   | 25.080      | 8.540        | 1.290                     | 6.930       | 2.550        |
| 30.0                                                                   | -3.4               | 33.0                | 6.650                   | 54.860      | 8.320        | 1.490                     | 9.930       | 2.180        |
| 45.0                                                                   | -4.5               | -99.2               | 6.840                   | 51.120      | 8.260        | 1.570                     | 9.850       | 2.010        |
| 60.0                                                                   | -5.1               | -111.1              | 6.010                   | 90.410      | 8.860        | 1.680                     | 9.940       | 1.840        |
| 75.0                                                                   | -0.6               | -51.8               | 7.090                   | 63.370      | 10.500       | 1.730                     | 11.420      | 1.650        |
| 90.0                                                                   | 0.2                | 7.1                 | 8.150                   | 63.260      | 6.560        | 1.650                     | 11.580      | 1.840        |
| 105.0                                                                  | 0.4                | 50.3                | 6.200                   | 62.430      | 6.980        | 1.680                     | 10.540      | 1.770        |
| 120.0                                                                  | -0.6               | 93.8                | 8.010                   | 53.430      | 5.950        | 1.810                     | 10.500      | 1.210        |
| 135.0                                                                  | -3.6               | 82.6                | 7.070                   | 59.410      | 9.330        | 1.710                     | 11.070      | 1.700        |
| 150.0                                                                  | -3.7               | 46.3                | 7.250                   | 52.430      | 8.800        | 1.550                     | 10.540      | 2.130        |
| 165.0                                                                  | -2.8               | 41.1                | 6.790                   | 35.440      | 10.410       | 1.450                     | 9.090       | 2.300        |
| 180.0                                                                  | -1.1               | 19.7                | 6.930                   | 45.600      | 9.430        | 1.380                     | 7.800       | 2.490        |
| 195.0                                                                  | -0.6               | 31.3                | 6.090                   | 29.050      | 8.990        | 1.490                     | 7.610       | 2.470        |
| 210.0                                                                  | 0.3                | 36.8                | 6.580                   | 27.040      | 7.410        | 1.540                     | 7.820       | 2.430        |
| 225.0                                                                  | 0.9                | 387.4               | 8.460                   | 33.420      | 7.570        | 1.700                     | 8.620       | 2.210        |
| 240.0                                                                  | 0.8                | 281.2               | 8.690                   | 54.130      | 8.110        | 2.050                     | 9.820       | 1.350        |
| 255.0                                                                  | 0.6                | 284.9               | 7.900                   | 46.490      | 8.680        | 2.020                     | 9.620       | 1.510        |
| 270.0                                                                  | -2.0               | 276.9               | 5.260                   | 38.590      | 10.580       | 1.900                     | 11.590      | 1.950        |
| 285.0                                                                  | 0.2                | 292.5               | 7.380                   | 33.400      | 7.040        | 1.900                     | 8.950       | 1.920        |
| 300.0                                                                  | -0.9               | -202.8              | 10.930                  | 75.140      | 18.900       | 1.850                     | 10.270      | 2.190        |
| 315.0                                                                  | 0.3                | 306.3               | 7.640                   | 31.160      | 7.660        | 1.660                     | 8.120       | 2.350        |
| 330.0                                                                  | 0.4                | 314.6               | 6.990                   | 29.810      | 7.800        | 1.520                     | 7.560       | 2.480        |
| 345.0                                                                  | 0.0                | 322.0               | 6.020                   | 27.780      | 8.560        | 1.420                     | 6.900       | 2.520        |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table R.30:** Course-Keeping Ability and Motion Parameters: JONSWAP Spectrum with  $H_s = 9.0$  m and  $T_p = 11.0$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 3.6                | -26.8               | 4.600                   | 24.470      | 8.530        | 1.290                     | 5.980       | 2.620        |
| 15.0                                                                   | 3.5                | -19.4               | 4.400                   | 21.400      | 8.870        | 1.220                     | 5.610       | 2.620        |
| 30.0                                                                   | 3.3                | -13.2               | 4.150                   | 19.090      | 8.410        | 1.160                     | 5.140       | 2.620        |
| 45.0                                                                   | 3.0                | -8.2                | 4.380                   | 21.440      | 9.030        | 1.170                     | 5.480       | 2.620        |
| 60.0                                                                   | 2.9                | 2.2                 | 3.890                   | 23.550      | 8.910        | 1.170                     | 5.880       | 2.580        |
| 75.0                                                                   | 2.7                | 8.1                 | 4.280                   | 31.500      | 8.500        | 1.220                     | 6.830       | 2.560        |
| 90.0                                                                   | 2.9                | 14.0                | 5.160                   | 62.790      | 8.650        | 1.300                     | 7.820       | 2.470        |
| 105.0                                                                  | 3.1                | 24.7                | 5.300                   | 50.130      | 8.740        | 1.340                     | 7.610       | 2.400        |
| 120.0                                                                  | 3.1                | 21.7                | 5.800                   | 60.450      | 8.500        | 1.250                     | 6.720       | 2.500        |
| 135.0                                                                  | 3.1                | 26.2                | 5.320                   | 57.830      | 8.670        | 1.270                     | 6.480       | 2.510        |
| 150.0                                                                  | 3.2                | 33.4                | 4.220                   | 26.870      | 8.240        | 1.310                     | 6.620       | 2.520        |
| 165.0                                                                  | 3.3                | 38.7                | 4.330                   | 24.170      | 8.780        | 1.350                     | 6.820       | 2.530        |
| 180.0                                                                  | 3.9                | 146.8               | 6.830                   | 27.870      | 7.000        | 1.170                     | 7.410       | 2.140        |
| 195.0                                                                  | 3.7                | 23.7                | 4.860                   | 25.290      | 8.170        | 1.400                     | 7.260       | 2.540        |
| 210.0                                                                  | 3.8                | 388.6               | 5.900                   | 27.870      | 8.880        | 1.490                     | 7.740       | 2.480        |
| 225.0                                                                  | 4.2                | 359.3               | 7.370                   | 31.070      | 7.500        | 1.680                     | 8.530       | 2.220        |
| 240.0                                                                  | 4.4                | 283.9               | 8.460                   | 50.130      | 5.910        | 2.030                     | 8.780       | 1.430        |
| 255.0                                                                  | 4.1                | 286.1               | 8.260                   | 67.470      | 15.360       | 2.030                     | 9.340       | 1.630        |
| 270.0                                                                  | 4.0                | 291.3               | 7.300                   | 59.360      | 8.840        | 1.940                     | 8.370       | 1.870        |
| 285.0                                                                  | 4.2                | 295.7               | 7.490                   | 43.030      | 6.680        | 1.870                     | 7.750       | 2.060        |
| 300.0                                                                  | 4.4                | 301.0               | 6.380                   | 28.950      | 9.180        | 1.760                     | 7.280       | 2.270        |
| 315.0                                                                  | 4.3                | 310.6               | 5.860                   | 29.010      | 7.200        | 1.590                     | 7.140       | 2.460        |
| 330.0                                                                  | 4.1                | 318.7               | 5.430                   | 27.060      | 7.550        | 1.450                     | 6.580       | 2.550        |
| 345.0                                                                  | 3.8                | 324.2               | 5.430                   | 27.090      | 7.800        | 1.390                     | 6.690       | 2.590        |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table R.31:** Course-Keeping Ability and Motion Parameters: JONSWAP Spectrum with  $H_s = 9.0$  m and  $T_p = 11.0$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b>  |                     | <b>Absolute Maximum</b> |                    |                     | <b>Standard Deviation</b> |                    |                     |
|------------------------------------------------------------------------|---------------------|---------------------|-------------------------|--------------------|---------------------|---------------------------|--------------------|---------------------|
| $\psi_{MHP}$<br>deg                                                    | <b>Speed</b><br>kts | $\psi_{MHP}$<br>deg | <b>Heave</b><br>m       | <b>Roll</b><br>deg | <b>Pitch</b><br>deg | <b>Heave</b><br>m         | <b>Roll</b><br>deg | <b>Pitch</b><br>deg |
| 0.0                                                                    | 8.8                 | -5.3                | 4.120                   | 22.170             | 8.630               | 1.220                     | 3.930              | 2.570               |
| 15.0                                                                   | 8.4                 | 6.8                 | 4.380                   | 20.620             | 8.790               | 1.210                     | 4.290              | 2.560               |
| 30.0                                                                   | 8.0                 | 16.1                | 4.710                   | 21.540             | 8.380               | 1.230                     | 4.840              | 2.550               |
| 45.0                                                                   | 8.0                 | 30.6                | 4.840                   | 26.690             | 7.540               | 1.340                     | 5.360              | 2.500               |
| 60.0                                                                   | 8.4                 | 49.7                | 5.500                   | 25.650             | 7.280               | 1.550                     | 6.270              | 2.330               |
| 75.0                                                                   | 8.3                 | 59.0                | 6.050                   | 54.240             | 6.490               | 1.670                     | 6.590              | 2.110               |
| 90.0                                                                   | 8.6                 | 73.9                | 7.270                   | 38.280             | 5.580               | 1.840                     | 7.580              | 1.500               |
| 105.0                                                                  | 8.5                 | 82.1                | 7.590                   | 55.350             | 4.350               | 1.880                     | 8.990              | 0.940               |
| 120.0                                                                  | 8.3                 | 92.0                | 8.780                   | 44.770             | 4.760               | 1.850                     | 9.820              | 0.830               |
| 135.0                                                                  | 8.1                 | 99.6                | 7.380                   | 41.630             | 5.350               | 1.800                     | 9.930              | 0.990               |
| 150.0                                                                  | 8.1                 | 87.4                | 7.690                   | 60.730             | 5.530               | 1.760                     | 8.610              | 1.610               |
| 165.0                                                                  | 8.1                 | 125.9               | 6.320                   | 28.610             | 6.720               | 1.350                     | 8.240              | 1.810               |
| 180.0                                                                  | 9.1                 | 174.8               | 2.890                   | 26.410             | 5.020               | 1.010                     | 7.130              | 1.790               |
| 195.0                                                                  | 9.6                 | 195.2               | 3.160                   | 22.970             | 5.490               | 1.050                     | 6.120              | 1.830               |
| 210.0                                                                  | 8.5                 | 274.0               | 8.870                   | 59.280             | 5.850               | 1.990                     | 9.520              | 1.100               |
| 225.0                                                                  | 8.3                 | 275.4               | 9.570                   | 47.440             | 5.700               | 2.030                     | 9.490              | 1.090               |
| 240.0                                                                  | 8.3                 | 276.6               | 8.550                   | 46.150             | 5.720               | 2.060                     | 9.600              | 1.040               |
| 255.0                                                                  | 8.4                 | 280.1               | 7.550                   | 48.590             | 5.740               | 2.070                     | 8.680              | 1.180               |
| 270.0                                                                  | 8.5                 | 283.8               | 8.830                   | 44.930             | 6.170               | 2.070                     | 8.180              | 1.390               |
| 285.0                                                                  | 9.4                 | 289.4               | 7.380                   | 31.140             | 7.750               | 2.000                     | 7.410              | 1.760               |
| 300.0                                                                  | 9.7                 | 300.2               | 6.920                   | 30.810             | 7.220               | 1.830                     | 6.440              | 2.220               |
| 315.0                                                                  | 9.5                 | 313.0               | 5.610                   | 28.710             | 8.150               | 1.610                     | 6.120              | 2.470               |
| 330.0                                                                  | 9.3                 | 327.3               | 5.220                   | 25.570             | 8.460               | 1.420                     | 4.790              | 2.570               |
| 345.0                                                                  | 9.1                 | 341.2               | 4.500                   | 24.110             | 8.660               | 1.290                     | 4.440              | 2.590               |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                     |                     |                         |                    |                     |                           |                    |                     |

**Table R.32:** Course-Keeping Ability and Motion Parameters: JONSWAP Spectrum with  $H_s = 9.0$  m and  $T_p = 11.0$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                            | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|----------------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts       | $\psi_{\text{MHP}}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 14.7               | -1.3                       | 4.500                   | 16.190      | 7.120        | 1.400                     | 2.970       | 2.470        |
| 15.0                                                                   | 14.7               | 13.8                       | 4.650                   | 17.020      | 7.620        | 1.410                     | 3.130       | 2.460        |
| 30.0                                                                   | 14.6               | 29.0                       | 5.170                   | 21.170      | 7.290        | 1.480                     | 3.760       | 2.440        |
| 45.0                                                                   | 14.7               | 44.2                       | 5.670                   | 22.680      | 7.160        | 1.610                     | 4.370       | 2.360        |
| 60.0                                                                   | 14.8               | 58.9                       | 6.820                   | 29.900      | 6.730        | 1.770                     | 5.170       | 2.120        |
| 75.0                                                                   | 14.6               | 71.8                       | 7.110                   | 40.470      | 5.880        | 1.860                     | 6.170       | 1.630        |
| 90.0                                                                   | 14.4               | 86.4                       | 7.600                   | 34.950      | 3.750        | 1.890                     | 8.460       | 0.600        |
| 105.0                                                                  | 14.4               | 101.2                      | 7.260                   | 41.400      | 3.190        | 1.740                     | 9.850       | 0.780        |
| 120.0                                                                  | 14.2               | 115.1                      | 6.140                   | 38.010      | 5.930        | 1.500                     | 9.800       | 1.220        |
| 135.0                                                                  | 14.4               | 130.4                      | 6.170                   | 53.600      | 5.360        | 1.290                     | 10.010      | 1.410        |
| 150.0                                                                  | 14.8               | 148.0                      | 3.680                   | 27.000      | 5.040        | 1.070                     | 7.420       | 1.420        |
| 165.0                                                                  | 14.7               | 162.9                      | 3.180                   | 26.930      | 4.530        | 0.990                     | 5.650       | 1.440        |
| 180.0                                                                  | 14.6               | 178.3                      | 2.490                   | 26.360      | 3.830        | 0.910                     | 5.190       | 1.420        |
| 195.0                                                                  | 14.8               | 193.9                      | 3.080                   | 28.470      | 4.480        | 0.990                     | 6.140       | 1.520        |
| 210.0                                                                  | 14.8               | 209.8                      | 2.940                   | 31.610      | 5.090        | 1.110                     | 7.970       | 1.610        |
| 225.0                                                                  | 14.1               | 234.1                      | 7.660                   | 61.040      | 7.150        | 1.480                     | 11.410      | 1.550        |
| 240.0                                                                  | 13.4               | 253.5                      | 7.240                   | 40.390      | 4.840        | 1.830                     | 11.000      | 1.240        |
| 255.0                                                                  | 13.3               | 265.5                      | 8.710                   | 46.100      | 3.950        | 1.980                     | 10.600      | 0.810        |
| 270.0                                                                  | 13.9               | 276.0                      | 8.560                   | 39.340      | 4.560        | 2.090                     | 9.330       | 0.780        |
| 285.0                                                                  | 14.8               | 287.1                      | 6.850                   | 26.480      | 6.590        | 2.070                     | 7.290       | 1.610        |
| 300.0                                                                  | 15.0               | 299.9                      | 6.460                   | 29.080      | 7.510        | 1.910                     | 5.900       | 2.160        |
| 315.0                                                                  | 14.8               | 314.0                      | 5.750                   | 29.740      | 7.700        | 1.720                     | 5.130       | 2.400        |
| 330.0                                                                  | 14.7               | 328.7                      | 5.770                   | 24.770      | 7.850        | 1.560                     | 4.240       | 2.490        |
| 345.0                                                                  | 14.7               | 343.6                      | 5.000                   | 20.590      | 7.610        | 1.440                     | 3.360       | 2.480        |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                            |                         |             |              |                           |             |              |

**Table R.33:** Course-Keeping Ability and Motion Parameters: JONSWAP Spectrum with  $H_s = 9.0$  m and  $T_p = 11.0$  s; Ship's speed is 20.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 20.0               | -0.6                | 5.340                   | 15.010      | 7.500        | 1.580                     | 2.620       | 2.350        |
| 15.0                                                                   | 20.0               | 14.6                | 5.710                   | 17.330      | 7.610        | 1.590                     | 2.790       | 2.350        |
| 30.0                                                                   | 20.0               | 29.8                | 5.830                   | 20.600      | 6.740        | 1.650                     | 3.380       | 2.340        |
| 45.0                                                                   | 20.0               | 44.8                | 5.980                   | 25.950      | 6.950        | 1.750                     | 4.030       | 2.260        |
| 60.0                                                                   | 20.0               | 59.5                | 6.790                   | 27.020      | 6.440        | 1.860                     | 4.600       | 2.050        |
| 75.0                                                                   | 20.1               | 73.8                | 7.920                   | 30.230      | 5.200        | 1.920                     | 5.810       | 1.530        |
| 90.0                                                                   | 19.8               | 88.0                | 7.520                   | 34.910      | 3.180        | 1.850                     | 8.320       | 0.530        |
| 105.0                                                                  | 19.9               | 103.3               | 6.330                   | 41.150      | 3.480        | 1.660                     | 10.360      | 0.790        |
| 120.0                                                                  | 19.9               | 118.3               | 4.530                   | 37.970      | 5.150        | 1.410                     | 11.760      | 1.100        |
| 135.0                                                                  | 19.7               | 133.8               | 4.300                   | 41.890      | 5.040        | 1.210                     | 11.610      | 1.320        |
| 150.0                                                                  | 19.6               | 148.5               | 5.720                   | 41.340      | 6.100        | 1.150                     | 8.910       | 1.560        |
| 165.0                                                                  | 19.9               | 163.9               | 2.930                   | 27.730      | 4.300        | 1.090                     | 5.780       | 1.490        |
| 180.0                                                                  | 20.3               | 179.2               | 3.000                   | 28.290      | 4.660        | 0.970                     | 4.620       | 1.380        |
| 195.0                                                                  | 20.0               | 194.7               | 3.020                   | 31.890      | 4.480        | 1.120                     | 6.930       | 1.580        |
| 210.0                                                                  | 19.8               | 211.0               | 4.690                   | 39.430      | 5.200        | 1.140                     | 10.290      | 1.610        |
| 225.0                                                                  | 19.6               | 228.0               | 7.450                   | 45.600      | 4.620        | 1.230                     | 12.500      | 1.360        |
| 240.0                                                                  | 19.5               | 244.4               | 7.270                   | 38.010      | 4.920        | 1.570                     | 13.530      | 1.220        |
| 255.0                                                                  | 19.2               | 259.4               | 8.430                   | 41.990      | 3.640        | 1.870                     | 12.010      | 0.900        |
| 270.0                                                                  | 19.4               | 273.3               | 7.220                   | 42.330      | 4.400        | 2.050                     | 10.320      | 0.640        |
| 285.0                                                                  | 20.1               | 286.3               | 7.110                   | 29.530      | 5.350        | 2.100                     | 7.470       | 1.530        |
| 300.0                                                                  | 20.1               | 300.0               | 6.400                   | 24.620      | 6.610        | 1.990                     | 5.620       | 2.080        |
| 315.0                                                                  | 20.1               | 314.4               | 5.540                   | 20.470      | 6.430        | 1.840                     | 4.640       | 2.300        |
| 330.0                                                                  | 20.1               | 329.3               | 6.020                   | 19.870      | 7.370        | 1.710                     | 3.910       | 2.370        |
| 345.0                                                                  | 20.0               | 344.3               | 6.000                   | 16.230      | 7.490        | 1.620                     | 3.110       | 2.360        |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table R.34:** Course-Keeping Ability and Motion Parameters: JONSWAP Spectrum with  $H_s = 9.0$  m and  $T_p = 11.0$  s; Ship's speed is 25.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                            | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|----------------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts       | $\psi_{\text{MHP}}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 25.3               | -0.2                       | 5.570                   | 15.380      | 6.610        | 1.730                     | 2.540       | 2.220        |
| 15.0                                                                   | 25.3               | 14.9                       | 5.560                   | 17.210      | 6.800        | 1.740                     | 2.800       | 2.230        |
| 30.0                                                                   | 25.2               | 30.0                       | 6.100                   | 24.540      | 6.740        | 1.800                     | 3.300       | 2.230        |
| 45.0                                                                   | 25.2               | 44.9                       | 6.240                   | 24.700      | 7.090        | 1.870                     | 3.790       | 2.170        |
| 60.0                                                                   | 25.2               | 59.7                       | 6.200                   | 27.420      | 5.820        | 1.940                     | 4.420       | 1.980        |
| 75.0                                                                   | 25.2               | 74.1                       | 6.750                   | 28.430      | 4.880        | 1.950                     | 5.540       | 1.490        |
| 90.0                                                                   | 25.0               | 88.7                       | 7.950                   | 38.640      | 3.850        | 1.810                     | 8.380       | 0.520        |
| 105.0                                                                  | 25.0               | 104.4                      | 6.590                   | 39.020      | 4.180        | 1.580                     | 12.200      | 0.780        |
| 120.0                                                                  | 24.7               | 118.5                      | 6.730                   | 48.510      | 4.670        | 1.390                     | 15.910      | 1.110        |
| 135.0                                                                  | 24.6               | 132.1                      | 7.990                   | 42.360      | 4.240        | 1.200                     | 13.060      | 1.230        |
| 150.0                                                                  | 24.8               | 149.1                      | 2.760                   | 38.920      | 4.670        | 1.060                     | 9.190       | 1.400        |
| 165.0                                                                  | 25.7               | 164.1                      | 3.390                   | 28.730      | 4.770        | 0.960                     | 5.580       | 1.380        |
| 180.0                                                                  | 26.4               | 179.6                      | 5.170                   | 29.190      | 7.620        | 0.940                     | 3.700       | 1.390        |
| 195.0                                                                  | 25.8               | 194.9                      | 3.520                   | 30.900      | 5.400        | 0.960                     | 6.340       | 1.370        |
| 210.0                                                                  | 25.0               | 210.7                      | 4.900                   | 36.730      | 5.850        | 1.230                     | 10.370      | 1.600        |
| 225.0                                                                  | 24.7               | 226.5                      | 4.630                   | 49.030      | 4.150        | 1.200                     | 14.030      | 1.350        |
| 240.0                                                                  | 24.6               | 242.1                      | 7.170                   | 43.360      | 5.240        | 1.410                     | 16.720      | 1.200        |
| 255.0                                                                  | 24.7               | 257.1                      | 7.140                   | 40.590      | 3.480        | 1.770                     | 13.230      | 0.910        |
| 270.0                                                                  | 24.9               | 271.9                      | 8.060                   | 39.120      | 3.700        | 2.020                     | 10.610      | 0.570        |
| 285.0                                                                  | 25.2               | 286.0                      | 8.120                   | 33.240      | 5.000        | 2.110                     | 7.870       | 1.480        |
| 300.0                                                                  | 25.3               | 300.1                      | 6.810                   | 24.170      | 6.290        | 2.070                     | 5.970       | 2.000        |
| 315.0                                                                  | 25.3               | 314.7                      | 6.850                   | 20.590      | 6.940        | 1.950                     | 4.620       | 2.200        |
| 330.0                                                                  | 25.3               | 329.7                      | 5.800                   | 18.550      | 7.020        | 1.840                     | 3.880       | 2.240        |
| 345.0                                                                  | 25.3               | 344.7                      | 5.770                   | 15.400      | 6.750        | 1.770                     | 2.870       | 2.240        |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                            |                         |             |              |                           |             |              |

**Table R.35:** Course-Keeping Ability and Motion Parameters: JONSWAP Spectrum with  $H_s = 9.0$  m and  $T_p = 11.0$  s; Ship's speed is 30.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 30.4               | 0.0                 | 5.810                   | 17.390      | 6.750        | 1.840                     | 2.470       | 2.100        |
| 15.0                                                                   | 30.4               | 15.1                | 5.670                   | 19.730      | 6.700        | 1.860                     | 2.830       | 2.120        |
| 30.0                                                                   | 30.4               | 30.1                | 5.710                   | 25.020      | 5.950        | 1.910                     | 3.480       | 2.130        |
| 45.0                                                                   | 30.4               | 45.0                | 6.390                   | 27.270      | 6.260        | 1.980                     | 3.970       | 2.090        |
| 60.0                                                                   | 30.3               | 59.7                | 6.180                   | 26.490      | 5.520        | 2.010                     | 4.240       | 1.920        |
| 75.0                                                                   | 30.3               | 74.3                | 7.570                   | 35.630      | 5.440        | 1.970                     | 5.650       | 1.450        |
| 90.0                                                                   | 30.1               | 89.0                | 7.690                   | 37.160      | 3.350        | 1.770                     | 8.930       | 0.540        |
| 105.0                                                                  | 30.0               | 104.3               | 7.610                   | 59.660      | 6.360        | 1.510                     | 14.440      | 0.820        |
| 120.0                                                                  | 29.7               | 118.6               | 5.350                   | 47.440      | 5.300        | 1.200                     | 16.120      | 0.970        |
| 135.0                                                                  | 29.9               | 134.1               | 3.810                   | 44.070      | 5.150        | 1.260                     | 13.060      | 1.460        |
| 150.0                                                                  | 30.5               | 147.4               | 4.480                   | 44.480      | 5.340        | 1.120                     | 9.190       | 1.450        |
| 165.0                                                                  | 31.0               | 162.7               | 3.330                   | 38.130      | 5.300        | 0.920                     | 6.800       | 1.370        |
| 180.0                                                                  | 31.1               | 178.6               | 3.240                   | 38.340      | 5.570        | 0.870                     | 6.730       | 1.410        |
| 195.0                                                                  | 31.4               | 194.6               | 5.880                   | 38.550      | 7.340        | 0.930                     | 7.700       | 1.480        |
| 210.0                                                                  | 30.8               | 211.0               | 5.580                   | 38.790      | 7.700        | 1.080                     | 10.470      | 1.550        |
| 225.0                                                                  | 29.7               | 226.0               | 5.530                   | 54.110      | 5.590        | 1.390                     | 14.320      | 1.630        |
| 240.0                                                                  | 29.8               | 240.9               | 4.920                   | 50.320      | 3.950        | 1.290                     | 17.850      | 1.130        |
| 255.0                                                                  | 29.9               | 256.1               | 9.430                   | 60.340      | 6.000        | 1.650                     | 14.420      | 1.010        |
| 270.0                                                                  | 30.1               | 271.2               | 8.170                   | 46.350      | 3.390        | 1.960                     | 10.960      | 0.600        |
| 285.0                                                                  | 30.3               | 285.7               | 7.750                   | 33.090      | 4.540        | 2.130                     | 8.410       | 1.450        |
| 300.0                                                                  | 30.4               | 300.1               | 6.880                   | 24.930      | 6.130        | 2.130                     | 6.410       | 1.930        |
| 315.0                                                                  | 30.4               | 315.0               | 6.720                   | 20.880      | 6.490        | 2.050                     | 5.310       | 2.090        |
| 330.0                                                                  | 30.4               | 329.9               | 5.890                   | 20.370      | 6.330        | 1.950                     | 3.990       | 2.120        |
| 345.0                                                                  | 30.4               | 345.0               | 5.720                   | 17.430      | 6.520        | 1.870                     | 2.980       | 2.110        |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |



**Table R.36:** Course-Keeping Ability and Motion Parameters: JONSWAP Spectrum with  $H_s = 9.0$  m and  $T_p = 17.1$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | -1.5               | -109.1              | 6.420                   | 23.830      | 7.110        | 1.890                     | 8.030       | 1.970        |
| 15.0                                                                   | -2.4               | -147.9              | 6.040                   | 22.110      | 6.730        | 1.860                     | 5.780       | 1.870        |
| 30.0                                                                   | -1.8               | -69.5               | 5.700                   | 25.950      | 8.950        | 1.890                     | 9.120       | 1.870        |
| 45.0                                                                   | -0.2               | 21.9                | 5.950                   | 22.740      | 7.620        | 1.850                     | 5.530       | 1.960        |
| 60.0                                                                   | 0.6                | 49.0                | 6.690                   | 23.410      | 5.970        | 1.950                     | 6.600       | 1.580        |
| 75.0                                                                   | 0.7                | 69.2                | 6.790                   | 24.530      | 4.940        | 2.040                     | 6.960       | 0.990        |
| 90.0                                                                   | 0.1                | 90.9                | 7.780                   | 25.710      | 2.030        | 2.110                     | 7.450       | 0.360        |
| 105.0                                                                  | -0.5               | 103.2               | 7.190                   | 27.040      | 3.280        | 2.080                     | 7.720       | 0.690        |
| 120.0                                                                  | -1.4               | 113.0               | 8.080                   | 32.410      | 4.370        | 2.060                     | 7.750       | 1.030        |
| 135.0                                                                  | -2.1               | 121.6               | 6.430                   | 29.060      | 4.460        | 2.010                     | 7.410       | 1.310        |
| 150.0                                                                  | -2.6               | 131.7               | 6.850                   | 26.690      | 4.950        | 1.960                     | 6.740       | 1.570        |
| 165.0                                                                  | -2.5               | 144.3               | 6.190                   | 21.860      | 5.950        | 1.890                     | 5.500       | 1.790        |
| 180.0                                                                  | -1.7               | 164.5               | 6.030                   | 16.640      | 6.910        | 1.820                     | 3.000       | 1.980        |
| 195.0                                                                  | 0.4                | 236.4               | 7.160                   | 23.880      | 5.880        | 2.080                     | 7.000       | 1.480        |
| 210.0                                                                  | 0.0                | 244.9               | 7.070                   | 26.380      | 5.380        | 2.150                     | 7.230       | 1.260        |
| 225.0                                                                  | -0.2               | 253.3               | 7.530                   | 26.040      | 4.370        | 2.210                     | 7.380       | 0.970        |
| 240.0                                                                  | -0.4               | 261.6               | 7.990                   | 25.450      | 3.250        | 2.260                     | 7.350       | 0.640        |
| 255.0                                                                  | -0.6               | 270.4               | 8.240                   | 25.800      | 2.190        | 2.280                     | 7.220       | 0.400        |
| 270.0                                                                  | -0.6               | 279.9               | 7.420                   | 27.070      | 3.120        | 2.270                     | 7.020       | 0.570        |
| 285.0                                                                  | -0.5               | 288.9               | 8.200                   | 25.540      | 4.460        | 2.230                     | 6.750       | 0.930        |
| 300.0                                                                  | -0.5               | 297.9               | 7.040                   | 25.110      | 5.280        | 2.180                     | 6.430       | 1.260        |
| 315.0                                                                  | -0.4               | 307.0               | 6.960                   | 23.830      | 5.390        | 2.110                     | 6.090       | 1.540        |
| 330.0                                                                  | -0.6               | 315.5               | 6.990                   | 22.640      | 5.940        | 2.060                     | 5.840       | 1.750        |
| 345.0                                                                  | -0.8               | 324.3               | 6.620                   | 21.500      | 6.280        | 2.000                     | 5.600       | 1.880        |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table R.37:** Course-Keeping Ability and Motion Parameters: JONSWAP Spectrum with  $H_s = 9.0$  m and  $T_p = 17.1$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b>  |                     | <b>Absolute Maximum</b> |                    |                     | <b>Standard Deviation</b> |                    |                     |
|------------------------------------------------------------------------|---------------------|---------------------|-------------------------|--------------------|---------------------|---------------------------|--------------------|---------------------|
| $\psi_{MHP}$<br>deg                                                    | <b>Speed</b><br>kts | $\psi_{MHP}$<br>deg | <b>Heave</b><br>m       | <b>Roll</b><br>deg | <b>Pitch</b><br>deg | <b>Heave</b><br>m         | <b>Roll</b><br>deg | <b>Pitch</b><br>deg |
| 0.0                                                                    | 3.8                 | -29.6               | 6.450                   | 24.060             | 6.710               | 1.950                     | 5.720              | 1.990               |
| 15.0                                                                   | 3.6                 | -22.7               | 6.500                   | 22.360             | 7.810               | 1.910                     | 5.570              | 2.050               |
| 30.0                                                                   | 3.5                 | -14.4               | 6.310                   | 21.610             | 7.630               | 1.880                     | 5.190              | 2.080               |
| 45.0                                                                   | 3.5                 | -3.6                | 6.190                   | 22.790             | 7.910               | 1.840                     | 4.840              | 2.100               |
| 60.0                                                                   | 3.8                 | 26.6                | 7.310                   | 24.390             | 6.830               | 1.850                     | 5.260              | 1.950               |
| 75.0                                                                   | 4.3                 | 58.4                | 6.610                   | 24.990             | 5.320               | 1.990                     | 6.280              | 1.360               |
| 90.0                                                                   | 4.5                 | 79.9                | 6.420                   | 25.360             | 3.290               | 2.080                     | 6.620              | 0.570               |
| 105.0                                                                  | 4.4                 | 95.6                | 7.170                   | 26.520             | 1.800               | 2.080                     | 7.040              | 0.340               |
| 120.0                                                                  | 4.1                 | 107.0               | 8.020                   | 30.300             | 2.790               | 2.050                     | 7.130              | 0.730               |
| 135.0                                                                  | 3.8                 | 115.4               | 7.120                   | 27.710             | 3.990               | 2.010                     | 7.070              | 1.020               |
| 150.0                                                                  | 3.5                 | 124.8               | 7.090                   | 27.830             | 4.590               | 1.960                     | 6.770              | 1.280               |
| 165.0                                                                  | 3.4                 | 134.5               | 6.670                   | 27.880             | 6.150               | 1.910                     | 6.210              | 1.490               |
| 180.0                                                                  | 3.3                 | 146.5               | 6.080                   | 24.760             | 6.420               | 1.860                     | 5.340              | 1.670               |
| 195.0                                                                  | 3.4                 | 162.2               | 6.770                   | 23.050             | 6.210               | 1.820                     | 4.600              | 1.800               |
| 210.0                                                                  | 4.4                 | 216.2               | 6.420                   | 20.690             | 5.890               | 1.930                     | 5.600              | 1.730               |
| 225.0                                                                  | 4.3                 | 237.0               | 7.600                   | 23.760             | 4.860               | 2.090                     | 6.570              | 1.380               |
| 240.0                                                                  | 4.4                 | 250.4               | 7.100                   | 25.820             | 3.880               | 2.170                     | 7.010              | 0.990               |
| 255.0                                                                  | 4.5                 | 262.4               | 7.280                   | 24.000             | 2.190               | 2.240                     | 7.180              | 0.520               |
| 270.0                                                                  | 4.6                 | 274.8               | 8.320                   | 24.250             | 1.740               | 2.260                     | 6.990              | 0.280               |
| 285.0                                                                  | 4.7                 | 287.5               | 9.530                   | 26.370             | 3.000               | 2.230                     | 6.690              | 0.820               |
| 300.0                                                                  | 4.7                 | 299.8               | 7.260                   | 25.640             | 4.240               | 2.150                     | 6.190              | 1.320               |
| 315.0                                                                  | 4.5                 | 310.0               | 7.730                   | 25.420             | 5.480               | 2.090                     | 6.050              | 1.620               |
| 330.0                                                                  | 4.1                 | 317.1               | 6.940                   | 24.480             | 5.820               | 2.040                     | 6.010              | 1.790               |
| 345.0                                                                  | 3.9                 | 323.5               | 6.620                   | 25.080             | 6.370               | 2.000                     | 5.910              | 1.900               |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                     |                     |                         |                    |                     |                           |                    |                     |

**Table R.38:** Course-Keeping Ability and Motion Parameters: JONSWAP Spectrum with  $H_s = 9.0$  m and  $T_p = 17.1$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b>  |                     | <b>Absolute Maximum</b> |                    |                     | <b>Standard Deviation</b> |                    |                     |
|------------------------------------------------------------------------|---------------------|---------------------|-------------------------|--------------------|---------------------|---------------------------|--------------------|---------------------|
| $\psi_{MHP}$<br>deg                                                    | <b>Speed</b><br>kts | $\psi_{MHP}$<br>deg | <b>Heave</b><br>m       | <b>Roll</b><br>deg | <b>Pitch</b><br>deg | <b>Heave</b><br>m         | <b>Roll</b><br>deg | <b>Pitch</b><br>deg |
| 0.0                                                                    | 9.4                 | -3.6                | 6.400                   | 21.210             | 7.030               | 1.850                     | 3.260              | 2.120               |
| 15.0                                                                   | 9.5                 | 11.9                | 6.500                   | 18.480             | 7.180               | 1.850                     | 3.480              | 2.100               |
| 30.0                                                                   | 9.6                 | 27.4                | 6.060                   | 21.010             | 6.820               | 1.880                     | 4.120              | 1.990               |
| 45.0                                                                   | 9.7                 | 42.7                | 7.330                   | 22.600             | 6.060               | 1.930                     | 4.710              | 1.770               |
| 60.0                                                                   | 9.8                 | 57.5                | 6.830                   | 22.450             | 4.600               | 1.990                     | 5.030              | 1.410               |
| 75.0                                                                   | 9.9                 | 72.9                | 7.250                   | 24.510             | 2.980               | 2.060                     | 5.340              | 0.870               |
| 90.0                                                                   | 9.9                 | 88.0                | 6.760                   | 25.070             | 1.140               | 2.070                     | 5.870              | 0.230               |
| 105.0                                                                  | 9.9                 | 103.1               | 7.340                   | 27.740             | 1.850               | 2.040                     | 6.310              | 0.500               |
| 120.0                                                                  | 9.5                 | 116.4               | 7.000                   | 29.390             | 3.020               | 1.960                     | 5.890              | 0.930               |
| 135.0                                                                  | 9.2                 | 130.3               | 6.870                   | 27.670             | 4.690               | 1.900                     | 5.170              | 1.240               |
| 150.0                                                                  | 9.1                 | 144.4               | 6.410                   | 25.910             | 5.120               | 1.810                     | 4.820              | 1.440               |
| 165.0                                                                  | 9.0                 | 159.4               | 6.100                   | 21.800             | 5.280               | 1.780                     | 5.080              | 1.620               |
| 180.0                                                                  | 9.4                 | 176.8               | 5.880                   | 22.670             | 5.570               | 1.760                     | 5.090              | 1.690               |
| 195.0                                                                  | 9.7                 | 193.7               | 6.160                   | 21.690             | 5.750               | 1.810                     | 4.990              | 1.700               |
| 210.0                                                                  | 9.6                 | 211.3               | 6.500                   | 22.050             | 5.810               | 1.860                     | 5.730              | 1.590               |
| 225.0                                                                  | 9.5                 | 228.4               | 6.990                   | 26.440             | 5.210               | 1.990                     | 7.060              | 1.420               |
| 240.0                                                                  | 9.5                 | 243.7               | 7.730                   | 25.070             | 3.740               | 2.100                     | 7.620              | 1.090               |
| 255.0                                                                  | 9.8                 | 257.4               | 8.500                   | 25.280             | 2.540               | 2.190                     | 7.780              | 0.630               |
| 270.0                                                                  | 9.9                 | 271.7               | 8.200                   | 26.120             | 1.130               | 2.230                     | 7.670              | 0.210               |
| 285.0                                                                  | 10.0                | 285.8               | 7.800                   | 27.610             | 3.050               | 2.210                     | 7.020              | 0.750               |
| 300.0                                                                  | 9.9                 | 300.0               | 7.160                   | 24.290             | 4.080               | 2.160                     | 6.060              | 1.330               |
| 315.0                                                                  | 9.8                 | 313.7               | 7.190                   | 25.320             | 5.260               | 2.050                     | 5.170              | 1.710               |
| 330.0                                                                  | 9.6                 | 327.5               | 6.930                   | 24.440             | 6.270               | 1.960                     | 4.430              | 1.940               |
| 345.0                                                                  | 9.4                 | 341.6               | 6.620                   | 21.960             | 6.610               | 1.900                     | 4.010              | 2.080               |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                     |                     |                         |                    |                     |                           |                    |                     |

**Table R.39:** Course-Keeping Ability and Motion Parameters: JONSWAP Spectrum with  $H_s = 9.0$  m and  $T_p = 17.1$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 14.9               | -1.1                | 7.000                   | 17.610      | 7.110        | 1.910                     | 2.490       | 2.090        |
| 15.0                                                                   | 14.9               | 14.1                | 7.520                   | 18.640      | 7.340        | 1.890                     | 3.070       | 2.060        |
| 30.0                                                                   | 14.9               | 29.2                | 7.130                   | 21.010      | 6.640        | 1.920                     | 3.760       | 1.950        |
| 45.0                                                                   | 15.0               | 44.2                | 7.340                   | 21.540      | 6.150        | 1.960                     | 4.190       | 1.730        |
| 60.0                                                                   | 15.0               | 59.0                | 8.470                   | 23.160      | 5.260        | 1.990                     | 4.610       | 1.370        |
| 75.0                                                                   | 15.1               | 74.0                | 7.230                   | 23.430      | 3.200        | 2.020                     | 4.720       | 0.850        |
| 90.0                                                                   | 15.1               | 89.0                | 7.230                   | 25.350      | 1.120        | 2.020                     | 5.440       | 0.270        |
| 105.0                                                                  | 15.1               | 104.1               | 7.000                   | 27.530      | 1.850        | 1.980                     | 6.090       | 0.500        |
| 120.0                                                                  | 14.9               | 118.3               | 7.550                   | 29.840      | 3.300        | 1.900                     | 6.290       | 0.870        |
| 135.0                                                                  | 14.9               | 133.5               | 6.400                   | 27.380      | 4.070        | 1.820                     | 6.320       | 1.170        |
| 150.0                                                                  | 14.9               | 148.6               | 5.190                   | 23.290      | 4.680        | 1.760                     | 4.980       | 1.350        |
| 165.0                                                                  | 15.0               | 163.8               | 4.870                   | 21.010      | 4.560        | 1.730                     | 3.260       | 1.430        |
| 180.0                                                                  | 14.9               | 178.9               | 4.850                   | 21.190      | 5.050        | 1.730                     | 4.030       | 1.590        |
| 195.0                                                                  | 15.0               | 194.3               | 5.040                   | 26.470      | 4.520        | 1.760                     | 4.540       | 1.500        |
| 210.0                                                                  | 15.0               | 209.9               | 5.400                   | 27.640      | 4.720        | 1.830                     | 6.800       | 1.490        |
| 225.0                                                                  | 14.8               | 226.2               | 6.410                   | 25.730      | 3.870        | 1.900                     | 8.750       | 1.320        |
| 240.0                                                                  | 14.9               | 241.8               | 7.400                   | 25.700      | 3.640        | 2.030                     | 9.390       | 1.030        |
| 255.0                                                                  | 15.1               | 256.1               | 7.850                   | 29.170      | 2.480        | 2.130                     | 9.120       | 0.630        |
| 270.0                                                                  | 15.1               | 270.8               | 7.860                   | 29.630      | 1.590        | 2.190                     | 8.650       | 0.250        |
| 285.0                                                                  | 15.2               | 285.4               | 7.930                   | 31.210      | 2.610        | 2.190                     | 8.040       | 0.740        |
| 300.0                                                                  | 15.1               | 299.9               | 7.060                   | 25.550      | 4.490        | 2.150                     | 6.300       | 1.310        |
| 315.0                                                                  | 15.0               | 314.3               | 8.360                   | 25.170      | 6.390        | 2.070                     | 4.980       | 1.700        |
| 330.0                                                                  | 14.9               | 328.9               | 7.610                   | 21.030      | 6.460        | 1.990                     | 3.800       | 1.930        |
| 345.0                                                                  | 14.9               | 343.8               | 7.270                   | 20.630      | 7.310        | 1.930                     | 2.830       | 2.050        |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table R.40:** Course-Keeping Ability and Motion Parameters: JONSWAP Spectrum with  $H_s = 9.0$  m and  $T_p = 17.1$  s; Ship's speed is 20.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 20.1               | -0.5                | 6.740                   | 17.430      | 6.910        | 1.960                     | 2.490       | 2.030        |
| 15.0                                                                   | 20.1               | 14.7                | 6.320                   | 17.890      | 6.480        | 1.960                     | 3.190       | 2.010        |
| 30.0                                                                   | 20.1               | 29.8                | 6.490                   | 19.270      | 6.150        | 1.970                     | 4.050       | 1.910        |
| 45.0                                                                   | 20.1               | 44.8                | 7.730                   | 21.050      | 5.850        | 1.990                     | 4.570       | 1.700        |
| 60.0                                                                   | 20.2               | 59.6                | 7.300                   | 22.760      | 4.300        | 2.000                     | 5.170       | 1.360        |
| 75.0                                                                   | 20.2               | 74.4                | 6.870                   | 23.030      | 2.920        | 1.990                     | 4.810       | 0.870        |
| 90.0                                                                   | 20.3               | 89.4                | 7.090                   | 24.820      | 1.250        | 1.970                     | 5.460       | 0.330        |
| 105.0                                                                  | 20.3               | 104.5               | 6.520                   | 30.020      | 1.670        | 1.930                     | 6.040       | 0.490        |
| 120.0                                                                  | 20.1               | 119.2               | 6.180                   | 30.050      | 2.600        | 1.850                     | 8.540       | 0.840        |
| 135.0                                                                  | 20.1               | 134.3               | 5.320                   | 28.670      | 3.330        | 1.770                     | 6.820       | 1.090        |
| 150.0                                                                  | 20.2               | 149.3               | 4.820                   | 22.120      | 3.730        | 1.660                     | 4.110       | 1.150        |
| 165.0                                                                  | 20.1               | 164.3               | 5.360                   | 18.690      | 4.840        | 1.870                     | 3.440       | 1.680        |
| 180.0                                                                  | 20.3               | 179.4               | 5.190                   | 21.820      | 4.080        | 1.650                     | 3.140       | 1.290        |
| 195.0                                                                  | 20.2               | 194.8               | 5.270                   | 34.240      | 4.700        | 1.860                     | 5.880       | 1.640        |
| 210.0                                                                  | 20.1               | 210.0               | 5.360                   | 38.520      | 4.710        | 1.830                     | 7.930       | 1.480        |
| 225.0                                                                  | 20.1               | 225.1               | 5.510                   | 35.910      | 4.130        | 1.830                     | 9.660       | 1.240        |
| 240.0                                                                  | 20.1               | 240.8               | 7.100                   | 34.080      | 3.240        | 1.960                     | 11.070      | 1.000        |
| 255.0                                                                  | 20.2               | 255.5               | 8.020                   | 33.580      | 2.160        | 2.070                     | 10.000      | 0.620        |
| 270.0                                                                  | 20.3               | 270.4               | 7.350                   | 35.170      | 1.440        | 2.150                     | 9.520       | 0.300        |
| 285.0                                                                  | 20.3               | 285.2               | 7.460                   | 31.450      | 2.750        | 2.170                     | 8.490       | 0.750        |
| 300.0                                                                  | 20.2               | 299.9               | 8.640                   | 30.010      | 5.150        | 2.150                     | 6.390       | 1.290        |
| 315.0                                                                  | 20.2               | 314.5               | 7.470                   | 25.290      | 5.840        | 2.100                     | 4.770       | 1.660        |
| 330.0                                                                  | 20.1               | 329.3               | 6.360                   | 20.910      | 5.940        | 2.040                     | 3.420       | 1.880        |
| 345.0                                                                  | 20.1               | 344.4               | 6.200                   | 18.180      | 6.430        | 1.990                     | 2.520       | 1.990        |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table R.41:** Course-Keeping Ability and Motion Parameters: JONSWAP Spectrum with  $H_s = 9.0$  m and  $T_p = 17.1$  s; Ship's speed is 25.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 25.2               | -0.2                | 7.200                   | 17.760      | 6.190        | 2.050                     | 2.640       | 1.970        |
| 15.0                                                                   | 25.2               | 14.9                | 7.070                   | 19.250      | 6.310        | 2.030                     | 3.380       | 1.950        |
| 30.0                                                                   | 25.2               | 30.0                | 6.720                   | 21.170      | 5.910        | 2.030                     | 4.300       | 1.850        |
| 45.0                                                                   | 25.2               | 45.0                | 6.440                   | 21.860      | 5.190        | 2.040                     | 5.040       | 1.670        |
| 60.0                                                                   | 25.3               | 59.8                | 8.070                   | 24.660      | 4.780        | 2.010                     | 5.790       | 1.350        |
| 75.0                                                                   | 25.3               | 74.6                | 6.930                   | 25.380      | 3.080        | 1.970                     | 5.310       | 0.880        |
| 90.0                                                                   | 25.3               | 89.6                | 6.900                   | 26.700      | 1.410        | 1.910                     | 5.910       | 0.390        |
| 105.0                                                                  | 25.3               | 104.6               | 7.190                   | 28.580      | 1.710        | 1.870                     | 6.230       | 0.460        |
| 120.0                                                                  | 25.2               | 119.6               | 5.840                   | 32.290      | 2.630        | 1.820                     | 9.980       | 0.810        |
| 135.0                                                                  | 25.2               | 134.6               | 6.270                   | 29.670      | 3.480        | 1.720                     | 8.100       | 1.030        |
| 150.0                                                                  | 25.3               | 149.5               | 5.410                   | 27.260      | 4.290        | 1.730                     | 6.610       | 1.300        |
| 165.0                                                                  | 25.4               | 164.5               | 4.480                   | 22.220      | 4.590        | 1.420                     | 3.170       | 1.260        |
| 180.0                                                                  | 25.8               | 179.8               | 5.120                   | 19.150      | 3.840        | 1.740                     | 2.000       | 1.390        |
| 195.0                                                                  | 25.6               | 194.9               | 4.450                   | 25.370      | 4.820        | 1.450                     | 4.190       | 1.280        |
| 210.0                                                                  | 25.3               | 210.1               | 6.230                   | 37.790      | 4.620        | 1.760                     | 7.730       | 1.350        |
| 225.0                                                                  | 25.3               | 225.0               | 4.910                   | 40.960      | 2.910        | 1.720                     | 8.540       | 1.040        |
| 240.0                                                                  | 25.2               | 240.3               | 6.980                   | 41.190      | 3.420        | 1.870                     | 11.800      | 0.950        |
| 255.0                                                                  | 25.3               | 255.2               | 7.790                   | 39.950      | 1.930        | 2.030                     | 10.250      | 0.620        |
| 270.0                                                                  | 25.3               | 270.2               | 7.350                   | 36.810      | 1.470        | 2.100                     | 9.720       | 0.350        |
| 285.0                                                                  | 25.3               | 285.1               | 8.430                   | 36.080      | 2.960        | 2.130                     | 9.230       | 0.760        |
| 300.0                                                                  | 25.3               | 299.9               | 8.420                   | 28.580      | 4.170        | 2.150                     | 6.440       | 1.270        |
| 315.0                                                                  | 25.3               | 314.7               | 6.890                   | 26.230      | 5.330        | 2.130                     | 4.660       | 1.620        |
| 330.0                                                                  | 25.2               | 329.6               | 7.450                   | 22.610      | 6.160        | 2.090                     | 3.410       | 1.830        |
| 345.0                                                                  | 25.2               | 344.7               | 7.000                   | 18.610      | 6.250        | 2.060                     | 2.610       | 1.930        |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

**Table R.42:** Course-Keeping Ability and Motion Parameters: JONSWAP Spectrum with  $H_s = 9.0$  m and  $T_p = 17.1$  s; Ship's speed is 30.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |             |              | <b>Standard Deviation</b> |             |              |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|-------------|--------------|---------------------------|-------------|--------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Heave<br>m              | Roll<br>deg | Pitch<br>deg | Heave<br>m                | Roll<br>deg | Pitch<br>deg |
| 0.0                                                                    | 30.4               | -0.0                | 7.940                   | 19.870      | 6.170        | 2.120                     | 2.900       | 1.910        |
| 15.0                                                                   | 30.4               | 15.1                | 7.680                   | 20.330      | 6.750        | 2.110                     | 3.600       | 1.880        |
| 30.0                                                                   | 30.4               | 30.1                | 7.270                   | 22.240      | 5.980        | 2.090                     | 4.440       | 1.800        |
| 45.0                                                                   | 30.4               | 45.1                | 7.810                   | 24.060      | 5.530        | 2.080                     | 5.310       | 1.640        |
| 60.0                                                                   | 30.4               | 60.0                | 7.330                   | 25.170      | 4.500        | 2.030                     | 6.300       | 1.340        |
| 75.0                                                                   | 30.4               | 74.7                | 8.050                   | 23.710      | 2.990        | 1.950                     | 5.930       | 0.900        |
| 90.0                                                                   | 30.4               | 89.7                | 6.650                   | 27.690      | 1.670        | 1.860                     | 6.680       | 0.450        |
| 105.0                                                                  | 30.4               | 104.7               | 5.860                   | 30.800      | 1.770        | 1.800                     | 6.650       | 0.460        |
| 120.0                                                                  | 30.3               | 119.7               | 5.610                   | 36.510      | 2.810        | 1.780                     | 12.260      | 0.840        |
| 135.0                                                                  | 30.2               | 134.5               | 5.480                   | 33.660      | 3.880        | 1.780                     | 10.630      | 1.160        |
| 150.0                                                                  | 30.3               | 149.2               | 6.960                   | 42.020      | 5.150        | 2.120                     | 8.400       | 1.530        |
| 165.0                                                                  | 30.8               | 164.0               | 4.100                   | 25.140      | 4.890        | 1.400                     | 3.960       | 1.390        |
| 180.0                                                                  | 31.2               | 179.7               | 3.990                   | 26.500      | 3.900        | 1.530                     | 3.150       | 1.390        |
| 195.0                                                                  | 30.9               | 194.7               | 4.340                   | 25.300      | 4.940        | 1.380                     | 4.580       | 1.380        |
| 210.0                                                                  | 30.5               | 210.3               | 7.080                   | 37.520      | 5.040        | 2.140                     | 8.630       | 1.530        |
| 225.0                                                                  | 30.4               | 225.1               | 5.630                   | 40.400      | 3.480        | 1.720                     | 9.740       | 1.080        |
| 240.0                                                                  | 30.4               | 240.1               | 5.800                   | 46.880      | 3.210        | 1.840                     | 12.320      | 0.920        |
| 255.0                                                                  | 30.4               | 255.1               | 8.080                   | 45.430      | 2.120        | 1.970                     | 9.670       | 0.630        |
| 270.0                                                                  | 30.4               | 270.1               | 7.250                   | 38.870      | 1.640        | 2.050                     | 9.490       | 0.410        |
| 285.0                                                                  | 30.4               | 285.1               | 7.100                   | 37.060      | 2.830        | 2.100                     | 9.140       | 0.780        |
| 300.0                                                                  | 30.4               | 299.9               | 7.750                   | 30.330      | 4.350        | 2.150                     | 6.300       | 1.250        |
| 315.0                                                                  | 30.4               | 314.8               | 8.200                   | 26.830      | 5.560        | 2.160                     | 4.360       | 1.580        |
| 330.0                                                                  | 30.4               | 329.8               | 7.690                   | 23.020      | 6.080        | 2.150                     | 3.140       | 1.770        |
| 345.0                                                                  | 30.4               | 344.9               | 8.240                   | 20.170      | 6.470        | 2.130                     | 2.740       | 1.870        |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |             |              |                           |             |              |

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## **Annex S**

### **Tables of Hangar Deck Accelerations – Bretschneider Spectrum (Open Ocean)**

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**Table S.1:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 4.0$  m and  $T_p = 8.3$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | -0.2               | -23.8               | 0.695                   | 1.547          | 10.612          | 0.166                     | 0.318          | 0.247           |
| 15.0                                                                   | -0.2               | -4.6                | 0.687                   | 0.803          | 10.486          | 0.154                     | 0.119          | 0.216           |
| 30.0                                                                   | -0.2               | 16.7                | 0.645                   | 1.398          | 10.438          | 0.157                     | 0.251          | 0.212           |
| 45.0                                                                   | -0.2               | 33.5                | 0.713                   | 2.218          | 10.503          | 0.173                     | 0.469          | 0.240           |
| 60.0                                                                   | -0.3               | 44.5                | 0.740                   | 3.015          | 10.845          | 0.185                     | 0.640          | 0.273           |
| 75.0                                                                   | -0.5               | 52.4                | 0.702                   | 4.528          | 11.373          | 0.192                     | 0.783          | 0.313           |
| 90.0                                                                   | -0.6               | 59.0                | 0.797                   | 5.340          | 12.039          | 0.195                     | 0.914          | 0.361           |
| 105.0                                                                  | -0.7               | 63.4                | 0.877                   | 4.679          | 11.992          | 0.192                     | 0.967          | 0.395           |
| 120.0                                                                  | -1.6               | 96.0                | 0.681                   | 6.297          | 12.289          | 0.127                     | 1.165          | 0.613           |
| 135.0                                                                  | -2.1               | 102.8               | 0.800                   | 5.456          | 12.100          | 0.173                     | 1.052          | 0.499           |
| 150.0                                                                  | -2.4               | 105.0               | 0.929                   | 4.678          | 11.612          | 0.177                     | 1.019          | 0.482           |
| 165.0                                                                  | -2.5               | 106.2               | 0.845                   | 4.901          | 12.027          | 0.175                     | 1.014          | 0.497           |
| 180.0                                                                  | -0.7               | 74.0                | 0.705                   | 5.715          | 12.487          | 0.146                     | 0.674          | 0.347           |
| 195.0                                                                  | -0.0               | 200.3               | 0.417                   | 1.467          | 10.541          | 0.119                     | 0.290          | 0.191           |
| 210.0                                                                  | -0.2               | 382.2               | 0.704                   | 3.747          | 11.613          | 0.183                     | 0.681          | 0.366           |
| 225.0                                                                  | -0.0               | 384.6               | 0.721                   | 3.686          | 11.736          | 0.196                     | 0.718          | 0.368           |
| 240.0                                                                  | 0.7                | 293.3               | 0.890                   | 3.618          | 11.828          | 0.207                     | 0.922          | 0.477           |
| 255.0                                                                  | 0.6                | 292.8               | 0.908                   | 4.123          | 11.823          | 0.209                     | 0.962          | 0.499           |
| 270.0                                                                  | 0.3                | 295.4               | 0.957                   | 4.143          | 12.186          | 0.209                     | 0.910          | 0.475           |
| 285.0                                                                  | 0.2                | 299.4               | 0.688                   | 3.746          | 11.572          | 0.210                     | 0.895          | 0.437           |
| 300.0                                                                  | 0.0                | 303.8               | 0.755                   | 4.294          | 11.168          | 0.206                     | 0.808          | 0.402           |
| 315.0                                                                  | -0.1               | 309.3               | 0.816                   | 3.228          | 11.205          | 0.200                     | 0.701          | 0.363           |
| 330.0                                                                  | -0.1               | 314.8               | 0.768                   | 2.978          | 10.817          | 0.192                     | 0.585          | 0.328           |
| 345.0                                                                  | -0.1               | 322.9               | 0.738                   | 2.078          | 10.817          | 0.181                     | 0.471          | 0.290           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table S.2:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 4.0$  m and  $T_p = 8.3$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 4.8                | -2.1                | 0.671                   | 0.888          | 10.621          | 0.179                     | 0.117          | 0.270           |
| 15.0                                                                   | 4.8                | 12.8                | 0.687                   | 1.033          | 10.568          | 0.181                     | 0.164          | 0.267           |
| 30.0                                                                   | 4.8                | 27.6                | 0.875                   | 1.398          | 10.621          | 0.192                     | 0.291          | 0.283           |
| 45.0                                                                   | 4.7                | 42.1                | 0.836                   | 2.023          | 10.816          | 0.209                     | 0.467          | 0.315           |
| 60.0                                                                   | 4.4                | 54.6                | 0.892                   | 2.950          | 10.997          | 0.222                     | 0.673          | 0.357           |
| 75.0                                                                   | 4.2                | 58.0                | 0.813                   | 3.676          | 11.197          | 0.221                     | 0.766          | 0.378           |
| 90.0                                                                   | 4.1                | 61.8                | 0.719                   | 5.344          | 12.033          | 0.219                     | 0.815          | 0.408           |
| 105.0                                                                  | 4.1                | 64.0                | 0.693                   | 3.973          | 11.893          | 0.218                     | 0.857          | 0.419           |
| 120.0                                                                  | 4.1                | 65.4                | 0.713                   | 3.749          | 12.178          | 0.217                     | 0.856          | 0.430           |
| 135.0                                                                  | 4.1                | 65.8                | 0.733                   | 4.382          | 11.646          | 0.218                     | 0.830          | 0.420           |
| 150.0                                                                  | 4.6                | 145.4               | 0.402                   | 1.968          | 10.359          | 0.101                     | 0.431          | 0.130           |
| 165.0                                                                  | 4.9                | 163.1               | 0.367                   | 1.450          | 10.242          | 0.088                     | 0.289          | 0.097           |
| 180.0                                                                  | 4.9                | 178.7               | 0.332                   | 1.068          | 10.253          | 0.083                     | 0.191          | 0.092           |
| 195.0                                                                  | 4.9                | 194.1               | 0.336                   | 1.277          | 10.305          | 0.085                     | 0.277          | 0.102           |
| 210.0                                                                  | 4.9                | 210.1               | 0.367                   | 2.006          | 10.398          | 0.095                     | 0.432          | 0.129           |
| 225.0                                                                  | 4.6                | 229.1               | 0.429                   | 2.625          | 10.585          | 0.117                     | 0.633          | 0.207           |
| 240.0                                                                  | 4.6                | 285.6               | 0.703                   | 3.907          | 12.410          | 0.203                     | 0.943          | 0.614           |
| 255.0                                                                  | 4.5                | 287.1               | 0.840                   | 4.387          | 12.792          | 0.211                     | 0.941          | 0.609           |
| 270.0                                                                  | 4.5                | 288.9               | 0.861                   | 4.873          | 12.632          | 0.217                     | 0.937          | 0.588           |
| 285.0                                                                  | 4.7                | 291.1               | 0.900                   | 4.236          | 12.245          | 0.225                     | 0.896          | 0.551           |
| 300.0                                                                  | 4.9                | 301.1               | 0.794                   | 3.100          | 11.384          | 0.234                     | 0.742          | 0.425           |
| 315.0                                                                  | 4.8                | 314.2               | 0.848                   | 2.770          | 10.813          | 0.219                     | 0.526          | 0.348           |
| 330.0                                                                  | 4.8                | 328.5               | 0.814                   | 1.839          | 10.714          | 0.201                     | 0.324          | 0.309           |
| 345.0                                                                  | 4.8                | 343.2               | 0.721                   | 1.245          | 10.638          | 0.186                     | 0.191          | 0.281           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table S.3:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 4.0$  m and  $T_p = 8.3$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 10.0               | -0.6                | 0.741                   | 0.967          | 10.776          | 0.201                     | 0.100          | 0.324           |
| 15.0                                                                   | 10.0               | 14.4                | 0.719                   | 1.025          | 10.725          | 0.204                     | 0.144          | 0.321           |
| 30.0                                                                   | 10.0               | 29.4                | 0.872                   | 1.519          | 10.816          | 0.218                     | 0.267          | 0.323           |
| 45.0                                                                   | 10.0               | 44.4                | 0.853                   | 2.130          | 10.839          | 0.236                     | 0.443          | 0.326           |
| 60.0                                                                   | 10.0               | 59.2                | 0.934                   | 2.915          | 11.120          | 0.249                     | 0.679          | 0.414           |
| 75.0                                                                   | 10.0               | 73.0                | 0.885                   | 4.418          | 12.133          | 0.224                     | 0.837          | 0.637           |
| 90.0                                                                   | 9.6                | 85.5                | 0.478                   | 7.587          | 12.995          | 0.105                     | 0.973          | 0.833           |
| 105.0                                                                  | 9.3                | 100.2               | 0.703                   | 5.568          | 12.761          | 0.118                     | 1.020          | 0.508           |
| 120.0                                                                  | 9.7                | 117.2               | 0.428                   | 4.600          | 11.112          | 0.097                     | 0.923          | 0.249           |
| 135.0                                                                  | 9.9                | 133.4               | 0.272                   | 3.180          | 10.274          | 0.079                     | 0.986          | 0.145           |
| 150.0                                                                  | 10.0               | 148.9               | 0.209                   | 3.356          | 10.086          | 0.066                     | 1.022          | 0.119           |
| 165.0                                                                  | 10.1               | 164.2               | 0.232                   | 3.736          | 10.000          | 0.060                     | 0.840          | 0.093           |
| 180.0                                                                  | 10.1               | 179.3               | 0.217                   | 2.466          | 9.993           | 0.058                     | 0.514          | 0.064           |
| 195.0                                                                  | 10.1               | 194.6               | 0.244                   | 1.860          | 10.097          | 0.062                     | 0.473          | 0.054           |
| 210.0                                                                  | 10.1               | 210.3               | 0.214                   | 2.407          | 10.159          | 0.069                     | 0.836          | 0.081           |
| 225.0                                                                  | 10.0               | 225.7               | 0.252                   | 3.114          | 10.357          | 0.080                     | 0.926          | 0.133           |
| 240.0                                                                  | 9.8                | 241.9               | 0.421                   | 3.523          | 10.968          | 0.099                     | 0.928          | 0.243           |
| 255.0                                                                  | 9.4                | 259.4               | 0.784                   | 5.077          | 12.354          | 0.126                     | 1.026          | 0.526           |
| 270.0                                                                  | 9.7                | 274.2               | 0.504                   | 5.917          | 13.092          | 0.092                     | 1.036          | 0.889           |
| 285.0                                                                  | 10.1               | 286.7               | 0.770                   | 3.936          | 12.158          | 0.225                     | 0.880          | 0.725           |
| 300.0                                                                  | 10.1               | 300.1               | 0.862                   | 3.051          | 11.200          | 0.253                     | 0.697          | 0.472           |
| 315.0                                                                  | 10.0               | 314.7               | 0.911                   | 1.960          | 10.854          | 0.242                     | 0.457          | 0.347           |
| 330.0                                                                  | 10.0               | 329.7               | 0.856                   | 1.488          | 10.772          | 0.222                     | 0.268          | 0.331           |
| 345.0                                                                  | 10.0               | 344.6               | 0.839                   | 1.085          | 10.714          | 0.206                     | 0.147          | 0.325           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table S.4:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 4.0$  m and  $T_p = 8.3$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 15.2               | -0.2                | 0.766                   | 1.076          | 10.772          | 0.219                     | 0.099          | 0.320           |
| 15.0                                                                   | 15.2               | 14.8                | 0.765                   | 1.160          | 10.732          | 0.223                     | 0.150          | 0.316           |
| 30.0                                                                   | 15.2               | 29.8                | 0.898                   | 1.694          | 10.837          | 0.238                     | 0.263          | 0.328           |
| 45.0                                                                   | 15.1               | 44.8                | 0.896                   | 2.252          | 10.986          | 0.257                     | 0.424          | 0.372           |
| 60.0                                                                   | 15.2               | 59.6                | 0.959                   | 3.180          | 11.559          | 0.264                     | 0.646          | 0.528           |
| 75.0                                                                   | 15.2               | 74.0                | 0.775                   | 4.298          | 12.289          | 0.226                     | 0.807          | 0.771           |
| 90.0                                                                   | 15.1               | 88.4                | 0.338                   | 8.318          | 13.248          | 0.054                     | 0.966          | 0.841           |
| 105.0                                                                  | 15.0               | 103.3               | 0.487                   | 5.094          | 12.191          | 0.093                     | 0.976          | 0.418           |
| 120.0                                                                  | 15.1               | 118.8               | 0.251                   | 4.542          | 10.598          | 0.066                     | 1.412          | 0.238           |
| 135.0                                                                  | 15.2               | 134.5               | 0.161                   | 3.985          | 10.107          | 0.050                     | 1.471          | 0.199           |
| 150.0                                                                  | 15.2               | 149.7               | 0.275                   | 3.409          | 10.092          | 0.069                     | 1.010          | 0.132           |
| 165.0                                                                  | 15.1               | 164.7               | 0.236                   | 2.181          | 10.076          | 0.065                     | 0.506          | 0.080           |
| 180.0                                                                  | 15.3               | 179.7               | 0.248                   | 2.285          | 9.940           | 0.059                     | 0.264          | 0.044           |
| 195.0                                                                  | 15.2               | 194.6               | 0.245                   | 3.056          | 9.877           | 0.058                     | 0.445          | 0.052           |
| 210.0                                                                  | 15.2               | 209.8               | 0.200                   | 3.386          | 9.880           | 0.059                     | 0.903          | 0.060           |
| 225.0                                                                  | 15.2               | 225.3               | 0.180                   | 3.947          | 10.072          | 0.056                     | 1.478          | 0.114           |
| 240.0                                                                  | 15.1               | 241.1               | 0.406                   | 4.248          | 11.135          | 0.071                     | 1.363          | 0.199           |
| 255.0                                                                  | 15.0               | 256.7               | 0.639                   | 4.872          | 11.972          | 0.103                     | 1.055          | 0.418           |
| 270.0                                                                  | 15.1               | 271.7               | 0.310                   | 4.808          | 13.007          | 0.048                     | 1.079          | 0.891           |
| 285.0                                                                  | 15.3               | 285.9               | 0.803                   | 3.651          | 12.465          | 0.225                     | 0.904          | 0.852           |
| 300.0                                                                  | 15.2               | 300.1               | 0.911                   | 2.583          | 11.586          | 0.267                     | 0.657          | 0.592           |
| 315.0                                                                  | 15.2               | 314.9               | 0.937                   | 1.830          | 11.188          | 0.259                     | 0.422          | 0.412           |
| 330.0                                                                  | 15.2               | 329.9               | 0.876                   | 1.421          | 10.990          | 0.240                     | 0.242          | 0.345           |
| 345.0                                                                  | 15.2               | 344.8               | 0.816                   | 1.010          | 10.865          | 0.225                     | 0.129          | 0.322           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table S.5:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 4.0$  m and  $T_p = 8.3$  s; Ship's speed is 20.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 20.3               | -0.1                | 0.900                   | 1.188          | 11.012          | 0.234                     | 0.107          | 0.393           |
| 15.0                                                                   | 20.3               | 14.9                | 0.818                   | 1.427          | 11.183          | 0.239                     | 0.150          | 0.396           |
| 30.0                                                                   | 20.3               | 29.9                | 0.925                   | 1.701          | 11.428          | 0.254                     | 0.254          | 0.441           |
| 45.0                                                                   | 20.3               | 44.9                | 0.973                   | 2.282          | 11.369          | 0.272                     | 0.407          | 0.528           |
| 60.0                                                                   | 20.3               | 59.8                | 1.006                   | 3.478          | 11.786          | 0.276                     | 0.618          | 0.692           |
| 75.0                                                                   | 20.4               | 74.4                | 0.811                   | 5.089          | 12.744          | 0.226                     | 0.807          | 0.886           |
| 90.0                                                                   | 20.3               | 89.1                | 0.290                   | 6.272          | 13.354          | 0.044                     | 0.947          | 0.831           |
| 105.0                                                                  | 20.2               | 104.0               | 0.478                   | 6.744          | 12.425          | 0.076                     | 1.120          | 0.392           |
| 120.0                                                                  | 20.3               | 119.5               | 0.162                   | 5.376          | 10.595          | 0.041                     | 1.843          | 0.298           |
| 135.0                                                                  | 20.3               | 134.9               | 0.215                   | 4.463          | 10.139          | 0.054                     | 1.339          | 0.155           |
| 150.0                                                                  | 20.4               | 149.6               | 0.309                   | 2.965          | 9.963           | 0.063                     | 0.688          | 0.076           |
| 165.0                                                                  | 20.8               | 164.7               | 0.252                   | 2.770          | 9.917           | 0.065                     | 0.311          | 0.047           |
| 180.0                                                                  | 20.1               | 179.6               | 0.374                   | 3.457          | 9.920           | 0.072                     | 0.477          | 0.083           |
| 195.0                                                                  | 20.7               | 195.0               | 0.380                   | 3.296          | 9.926           | 0.067                     | 0.469          | 0.071           |
| 210.0                                                                  | 20.5               | 210.1               | 0.289                   | 4.294          | 9.898           | 0.061                     | 0.783          | 0.099           |
| 225.0                                                                  | 20.3               | 225.0               | 0.188                   | 4.650          | 9.899           | 0.049                     | 1.335          | 0.137           |
| 240.0                                                                  | 20.3               | 240.5               | 0.219                   | 5.870          | 10.693          | 0.044                     | 1.799          | 0.183           |
| 255.0                                                                  | 20.2               | 255.9               | 0.508                   | 6.462          | 11.862          | 0.083                     | 1.192          | 0.355           |
| 270.0                                                                  | 20.3               | 270.9               | 0.357                   | 5.225          | 12.826          | 0.043                     | 1.110          | 0.877           |
| 285.0                                                                  | 20.4               | 285.5               | 0.793                   | 3.755          | 12.534          | 0.223                     | 0.949          | 0.961           |
| 300.0                                                                  | 20.3               | 300.1               | 0.959                   | 2.484          | 12.020          | 0.274                     | 0.671          | 0.751           |
| 315.0                                                                  | 20.3               | 315.0               | 0.985                   | 1.943          | 11.552          | 0.271                     | 0.414          | 0.566           |
| 330.0                                                                  | 20.3               | 329.9               | 0.936                   | 1.345          | 11.299          | 0.254                     | 0.235          | 0.463           |
| 345.0                                                                  | 20.3               | 344.9               | 0.917                   | 1.086          | 11.213          | 0.240                     | 0.129          | 0.408           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table S.6:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 4.0$  m and  $T_p = 8.3$  s; Ship's speed is 25.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 25.4               | -0.1                | 0.819                   | 1.355          | 11.398          | 0.243                     | 0.125          | 0.539           |
| 15.0                                                                   | 25.4               | 14.9                | 0.886                   | 1.574          | 11.465          | 0.248                     | 0.156          | 0.555           |
| 30.0                                                                   | 25.4               | 29.9                | 0.903                   | 1.882          | 11.572          | 0.263                     | 0.248          | 0.612           |
| 45.0                                                                   | 25.4               | 44.9                | 0.939                   | 2.593          | 11.800          | 0.280                     | 0.397          | 0.713           |
| 60.0                                                                   | 25.4               | 59.8                | 1.043                   | 3.227          | 12.350          | 0.283                     | 0.607          | 0.864           |
| 75.0                                                                   | 25.4               | 74.6                | 0.743                   | 4.271          | 12.946          | 0.227                     | 0.795          | 0.998           |
| 90.0                                                                   | 25.4               | 89.4                | 0.334                   | 6.627          | 13.087          | 0.042                     | 0.957          | 0.821           |
| 105.0                                                                  | 25.4               | 104.4               | 0.323                   | 5.563          | 11.504          | 0.062                     | 1.258          | 0.352           |
| 120.0                                                                  | 25.4               | 119.9               | 0.346                   | 6.464          | 10.550          | 0.055                     | 2.035          | 0.282           |
| 135.0                                                                  | 25.3               | 134.9               | 0.437                   | 4.333          | 10.061          | 0.069                     | 1.185          | 0.124           |
| 150.0                                                                  | 25.4               | 149.9               | 0.438                   | 2.898          | 9.948           | 0.082                     | 0.577          | 0.077           |
| 165.0                                                                  | 25.3               | 164.9               | 0.376                   | 3.249          | 10.025          | 0.087                     | 0.400          | 0.083           |
| 180.0                                                                  | 25.6               | 179.9               | 0.353                   | 3.071          | 10.043          | 0.081                     | 0.370          | 0.088           |
| 195.0                                                                  | 25.3               | 194.7               | 0.385                   | 3.340          | 9.974           | 0.086                     | 0.617          | 0.114           |
| 210.0                                                                  | 25.3               | 209.8               | 0.486                   | 4.020          | 9.996           | 0.080                     | 0.783          | 0.123           |
| 225.0                                                                  | 25.1               | 224.5               | 0.383                   | 5.019          | 9.875           | 0.063                     | 1.320          | 0.203           |
| 240.0                                                                  | 25.4               | 240.2               | 0.237                   | 6.171          | 10.074          | 0.054                     | 2.222          | 0.278           |
| 255.0                                                                  | 25.4               | 255.6               | 0.303                   | 5.717          | 11.105          | 0.067                     | 1.353          | 0.299           |
| 270.0                                                                  | 25.4               | 270.6               | 0.291                   | 5.311          | 12.809          | 0.044                     | 1.145          | 0.863           |
| 285.0                                                                  | 25.4               | 285.4               | 0.759                   | 3.876          | 13.323          | 0.220                     | 1.008          | 1.059           |
| 300.0                                                                  | 25.4               | 300.1               | 1.010                   | 3.047          | 12.491          | 0.277                     | 0.708          | 0.910           |
| 315.0                                                                  | 25.4               | 315.1               | 0.939                   | 2.016          | 12.201          | 0.277                     | 0.438          | 0.744           |
| 330.0                                                                  | 25.4               | 330.0               | 0.901                   | 1.500          | 11.740          | 0.262                     | 0.253          | 0.633           |
| 345.0                                                                  | 25.4               | 345.0               | 0.912                   | 1.207          | 11.596          | 0.248                     | 0.151          | 0.564           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table S.7:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 4.0$  m and  $T_p = 8.3$  s; Ship's speed is 30.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 30.5               | -0.0                | 0.789                   | 1.358          | 11.921          | 0.246                     | 0.141          | 0.691           |
| 15.0                                                                   | 30.5               | 14.9                | 0.866                   | 1.498          | 11.894          | 0.252                     | 0.155          | 0.711           |
| 30.0                                                                   | 30.5               | 29.9                | 0.883                   | 1.982          | 11.988          | 0.268                     | 0.241          | 0.778           |
| 45.0                                                                   | 30.5               | 44.9                | 0.927                   | 2.964          | 12.466          | 0.284                     | 0.395          | 0.886           |
| 60.0                                                                   | 30.5               | 59.8                | 0.960                   | 3.991          | 12.715          | 0.286                     | 0.616          | 1.021           |
| 75.0                                                                   | 30.5               | 74.7                | 0.744                   | 3.950          | 13.086          | 0.229                     | 0.776          | 1.102           |
| 90.0                                                                   | 30.5               | 89.5                | 0.344                   | 6.901          | 13.085          | 0.044                     | 0.960          | 0.815           |
| 105.0                                                                  | 30.5               | 104.6               | 0.334                   | 6.424          | 11.760          | 0.052                     | 1.432          | 0.334           |
| 120.0                                                                  | 30.4               | 119.9               | 0.505                   | 5.938          | 10.074          | 0.080                     | 2.168          | 0.292           |
| 135.0                                                                  | 30.5               | 134.7               | 0.344                   | 3.589          | 9.948           | 0.080                     | 1.123          | 0.115           |
| 150.0                                                                  | 30.5               | 149.9               | 0.396                   | 3.323          | 10.080          | 0.085                     | 0.666          | 0.107           |
| 165.0                                                                  | 30.5               | 164.8               | 0.351                   | 2.883          | 10.128          | 0.085                     | 0.460          | 0.108           |
| 180.0                                                                  | 30.5               | 179.9               | 0.450                   | 3.218          | 10.144          | 0.089                     | 0.500          | 0.121           |
| 195.0                                                                  | 30.6               | 194.9               | 0.414                   | 3.795          | 10.149          | 0.086                     | 0.679          | 0.133           |
| 210.0                                                                  | 30.4               | 209.9               | 0.379                   | 4.109          | 10.005          | 0.089                     | 0.894          | 0.146           |
| 225.0                                                                  | 30.4               | 224.9               | 0.321                   | 4.318          | 9.890           | 0.079                     | 1.106          | 0.144           |
| 240.0                                                                  | 30.4               | 240.1               | 0.446                   | 7.030          | 10.089          | 0.077                     | 2.221          | 0.314           |
| 255.0                                                                  | 30.5               | 255.3               | 0.249                   | 5.623          | 11.029          | 0.061                     | 1.563          | 0.246           |
| 270.0                                                                  | 30.5               | 270.4               | 0.230                   | 4.905          | 13.063          | 0.048                     | 1.190          | 0.848           |
| 285.0                                                                  | 30.5               | 285.3               | 0.742                   | 4.515          | 13.345          | 0.218                     | 1.043          | 1.153           |
| 300.0                                                                  | 30.5               | 300.2               | 0.935                   | 3.008          | 12.979          | 0.278                     | 0.766          | 1.057           |
| 315.0                                                                  | 30.5               | 315.1               | 0.888                   | 2.138          | 12.664          | 0.279                     | 0.478          | 0.908           |
| 330.0                                                                  | 30.5               | 330.0               | 0.941                   | 1.746          | 12.183          | 0.265                     | 0.287          | 0.789           |
| 345.0                                                                  | 30.5               | 345.0               | 0.824                   | 1.341          | 11.957          | 0.251                     | 0.181          | 0.716           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |



**Table S.8:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 4.0$  m and  $T_p = 15.5$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | -0.0               | -14.9               | 0.488                   | 1.678          | 10.361          | 0.122                     | 0.390          | 0.191           |
| 15.0                                                                   | -0.1               | -6.0                | 0.487                   | 1.141          | 10.353          | 0.124                     | 0.255          | 0.184           |
| 30.0                                                                   | -0.2               | 5.3                 | 0.537                   | 1.561          | 10.340          | 0.123                     | 0.332          | 0.182           |
| 45.0                                                                   | -0.2               | 22.7                | 0.533                   | 2.292          | 10.460          | 0.120                     | 0.599          | 0.191           |
| 60.0                                                                   | -0.1               | 39.4                | 0.372                   | 2.940          | 10.578          | 0.110                     | 0.794          | 0.210           |
| 75.0                                                                   | -0.1               | 53.3                | 0.374                   | 3.497          | 10.702          | 0.094                     | 0.889          | 0.231           |
| 90.0                                                                   | -0.1               | 68.5                | 0.250                   | 3.285          | 10.982          | 0.062                     | 0.924          | 0.260           |
| 105.0                                                                  | -0.1               | 88.4                | 0.169                   | 3.545          | 11.047          | 0.012                     | 0.926          | 0.283           |
| 120.0                                                                  | -0.3               | 99.9                | 0.271                   | 3.416          | 10.791          | 0.030                     | 0.936          | 0.280           |
| 135.0                                                                  | -0.5               | 108.2               | 0.305                   | 3.067          | 10.855          | 0.051                     | 0.928          | 0.269           |
| 150.0                                                                  | -0.8               | 115.2               | 0.335                   | 3.025          | 10.665          | 0.068                     | 0.913          | 0.257           |
| 165.0                                                                  | -1.0               | 119.3               | 0.369                   | 2.996          | 10.702          | 0.076                     | 0.889          | 0.250           |
| 180.0                                                                  | -0.5               | 53.8                | 0.497                   | 2.674          | 10.736          | 0.112                     | 0.624          | 0.205           |
| 195.0                                                                  | 0.1                | 338.6               | 0.434                   | 3.047          | 10.751          | 0.106                     | 0.717          | 0.222           |
| 210.0                                                                  | 0.2                | 248.5               | 0.349                   | 3.184          | 10.836          | 0.060                     | 0.892          | 0.284           |
| 225.0                                                                  | 0.1                | 255.3               | 0.327                   | 3.304          | 10.793          | 0.045                     | 0.904          | 0.301           |
| 240.0                                                                  | 0.1                | 263.7               | 0.251                   | 3.320          | 10.924          | 0.027                     | 0.906          | 0.317           |
| 255.0                                                                  | 0.1                | 275.2               | 0.164                   | 3.351          | 11.015          | 0.021                     | 0.894          | 0.322           |
| 270.0                                                                  | 0.2                | 288.2               | 0.236                   | 3.006          | 11.139          | 0.054                     | 0.879          | 0.306           |
| 285.0                                                                  | 0.2                | 298.6               | 0.292                   | 3.121          | 11.013          | 0.080                     | 0.854          | 0.281           |
| 300.0                                                                  | 0.1                | 308.0               | 0.327                   | 2.947          | 10.783          | 0.097                     | 0.820          | 0.257           |
| 315.0                                                                  | 0.1                | 317.0               | 0.419                   | 3.000          | 10.671          | 0.108                     | 0.755          | 0.236           |
| 330.0                                                                  | 0.1                | 326.3               | 0.474                   | 2.865          | 10.554          | 0.115                     | 0.667          | 0.217           |
| 345.0                                                                  | 0.0                | 336.0               | 0.470                   | 2.372          | 10.417          | 0.119                     | 0.539          | 0.201           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table S.9:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 4.0$  m and  $T_p = 15.5$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 4.9                | -2.4                | 0.533                   | 1.018          | 10.373          | 0.143                     | 0.164          | 0.201           |
| 15.0                                                                   | 4.8                | 12.3                | 0.541                   | 1.416          | 10.407          | 0.142                     | 0.316          | 0.202           |
| 30.0                                                                   | 4.8                | 27.1                | 0.569                   | 2.039          | 10.445          | 0.137                     | 0.528          | 0.212           |
| 45.0                                                                   | 4.8                | 42.0                | 0.479                   | 2.559          | 10.625          | 0.126                     | 0.691          | 0.229           |
| 60.0                                                                   | 4.8                | 56.5                | 0.336                   | 3.206          | 10.795          | 0.103                     | 0.796          | 0.257           |
| 75.0                                                                   | 4.8                | 71.2                | 0.224                   | 3.077          | 10.964          | 0.059                     | 0.827          | 0.290           |
| 90.0                                                                   | 4.8                | 85.7                | 0.058                   | 3.088          | 10.967          | 0.013                     | 0.841          | 0.303           |
| 105.0                                                                  | 4.7                | 100.0               | 0.129                   | 3.033          | 10.837          | 0.022                     | 0.853          | 0.286           |
| 120.0                                                                  | 4.4                | 110.5               | 0.234                   | 3.456          | 10.964          | 0.044                     | 0.846          | 0.259           |
| 135.0                                                                  | 4.2                | 120.6               | 0.259                   | 2.756          | 10.583          | 0.058                     | 0.804          | 0.232           |
| 150.0                                                                  | 4.5                | 143.2               | 0.329                   | 2.212          | 10.477          | 0.074                     | 0.562          | 0.178           |
| 165.0                                                                  | 4.7                | 161.6               | 0.342                   | 1.488          | 10.363          | 0.079                     | 0.329          | 0.150           |
| 180.0                                                                  | 4.9                | 178.1               | 0.345                   | 1.329          | 10.367          | 0.080                     | 0.257          | 0.138           |
| 195.0                                                                  | 4.9                | 194.3               | 0.356                   | 1.624          | 10.399          | 0.079                     | 0.398          | 0.139           |
| 210.0                                                                  | 4.9                | 210.7               | 0.338                   | 2.004          | 10.407          | 0.075                     | 0.582          | 0.153           |
| 225.0                                                                  | 4.9                | 227.2               | 0.277                   | 2.440          | 10.541          | 0.068                     | 0.728          | 0.184           |
| 240.0                                                                  | 4.8                | 243.0               | 0.221                   | 2.856          | 10.671          | 0.054                     | 0.822          | 0.233           |
| 255.0                                                                  | 4.9                | 257.2               | 0.165                   | 2.939          | 10.823          | 0.031                     | 0.841          | 0.281           |
| 270.0                                                                  | 5.0                | 271.5               | 0.044                   | 2.980          | 11.010          | 0.008                     | 0.831          | 0.320           |
| 285.0                                                                  | 5.0                | 286.0               | 0.233                   | 3.264          | 11.209          | 0.049                     | 0.807          | 0.318           |
| 300.0                                                                  | 5.0                | 300.3               | 0.399                   | 2.914          | 11.055          | 0.096                     | 0.777          | 0.284           |
| 315.0                                                                  | 5.0                | 314.4               | 0.464                   | 2.424          | 10.557          | 0.123                     | 0.679          | 0.245           |
| 330.0                                                                  | 4.9                | 328.6               | 0.485                   | 2.193          | 10.451          | 0.135                     | 0.536          | 0.221           |
| 345.0                                                                  | 4.9                | 343.1               | 0.512                   | 1.667          | 10.372          | 0.141                     | 0.346          | 0.207           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table S.10:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 4.0$  m and  $T_p = 15.5$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 10.1               | -0.6                | 0.763                   | 0.852          | 10.565          | 0.163                     | 0.092          | 0.213           |
| 15.0                                                                   | 10.1               | 14.4                | 0.654                   | 1.428          | 10.457          | 0.160                     | 0.260          | 0.213           |
| 30.0                                                                   | 10.1               | 29.5                | 0.543                   | 1.942          | 10.661          | 0.154                     | 0.458          | 0.221           |
| 45.0                                                                   | 10.1               | 44.5                | 0.514                   | 2.676          | 10.605          | 0.138                     | 0.604          | 0.242           |
| 60.0                                                                   | 10.1               | 59.3                | 0.362                   | 2.782          | 10.753          | 0.106                     | 0.709          | 0.281           |
| 75.0                                                                   | 10.2               | 74.2                | 0.215                   | 3.102          | 11.223          | 0.053                     | 0.708          | 0.314           |
| 90.0                                                                   | 10.1               | 89.0                | 0.054                   | 2.949          | 11.101          | 0.013                     | 0.739          | 0.309           |
| 105.0                                                                  | 10.1               | 103.9               | 0.120                   | 3.407          | 10.877          | 0.025                     | 0.769          | 0.271           |
| 120.0                                                                  | 10.0               | 118.6               | 0.200                   | 3.840          | 10.722          | 0.041                     | 0.833          | 0.230           |
| 135.0                                                                  | 10.0               | 133.7               | 0.201                   | 3.264          | 10.536          | 0.049                     | 0.766          | 0.190           |
| 150.0                                                                  | 10.0               | 148.9               | 0.182                   | 2.698          | 10.303          | 0.054                     | 0.723          | 0.158           |
| 165.0                                                                  | 10.1               | 164.1               | 0.221                   | 2.349          | 10.238          | 0.056                     | 0.549          | 0.134           |
| 180.0                                                                  | 10.1               | 179.3               | 0.257                   | 1.885          | 10.234          | 0.057                     | 0.342          | 0.116           |
| 195.0                                                                  | 10.1               | 194.6               | 0.231                   | 1.803          | 10.149          | 0.057                     | 0.379          | 0.105           |
| 210.0                                                                  | 10.1               | 210.1               | 0.218                   | 2.170          | 10.208          | 0.055                     | 0.661          | 0.114           |
| 225.0                                                                  | 10.1               | 225.6               | 0.260                   | 2.577          | 10.520          | 0.051                     | 0.830          | 0.144           |
| 240.0                                                                  | 10.1               | 240.8               | 0.220                   | 3.082          | 10.763          | 0.044                     | 0.916          | 0.190           |
| 255.0                                                                  | 10.2               | 255.6               | 0.191                   | 3.318          | 10.972          | 0.030                     | 0.866          | 0.249           |
| 270.0                                                                  | 10.2               | 270.4               | 0.066                   | 3.219          | 11.283          | 0.015                     | 0.818          | 0.311           |
| 285.0                                                                  | 10.2               | 285.1               | 0.198                   | 3.138          | 11.186          | 0.049                     | 0.775          | 0.333           |
| 300.0                                                                  | 10.1               | 299.9               | 0.373                   | 2.783          | 10.930          | 0.104                     | 0.725          | 0.304           |
| 315.0                                                                  | 10.1               | 314.6               | 0.513                   | 2.530          | 10.725          | 0.138                     | 0.594          | 0.257           |
| 330.0                                                                  | 10.1               | 329.5               | 0.614                   | 2.006          | 10.520          | 0.153                     | 0.428          | 0.228           |
| 345.0                                                                  | 10.1               | 344.4               | 0.738                   | 1.359          | 10.559          | 0.160                     | 0.235          | 0.217           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table S.11:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 4.0$  m and  $T_p = 15.5$  s; Ship's speed is 15.0 Knots

| Cmd<br>Heading                                                         | Actual<br>Mean |                     | Absolute<br>Maximum |                |                 | Standard<br>Deviation |                |                 |
|------------------------------------------------------------------------|----------------|---------------------|---------------------|----------------|-----------------|-----------------------|----------------|-----------------|
|                                                                        | Speed<br>kts   | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$     | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$       | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 15.2           | -0.3                | 0.642               | 0.949          | 10.496          | 0.181                 | 0.089          | 0.230           |
| 15.0                                                                   | 15.2           | 14.8                | 0.635               | 1.413          | 10.538          | 0.178                 | 0.254          | 0.229           |
| 30.0                                                                   | 15.2           | 29.9                | 0.761               | 2.206          | 10.673          | 0.170                 | 0.435          | 0.239           |
| 45.0                                                                   | 15.2           | 44.9                | 0.556               | 2.744          | 10.861          | 0.152                 | 0.594          | 0.271           |
| 60.0                                                                   | 15.2           | 59.8                | 0.401               | 2.672          | 11.043          | 0.115                 | 0.719          | 0.315           |
| 75.0                                                                   | 15.3           | 74.7                | 0.194               | 2.708          | 10.980          | 0.055                 | 0.659          | 0.332           |
| 90.0                                                                   | 15.3           | 89.6                | 0.074               | 3.050          | 11.162          | 0.020                 | 0.681          | 0.307           |
| 105.0                                                                  | 15.3           | 104.5               | 0.126               | 3.170          | 11.027          | 0.027                 | 0.732          | 0.259           |
| 120.0                                                                  | 15.2           | 119.3               | 0.163               | 3.998          | 10.629          | 0.035                 | 0.996          | 0.231           |
| 135.0                                                                  | 15.2           | 134.6               | 0.208               | 3.784          | 10.373          | 0.039                 | 0.964          | 0.186           |
| 150.0                                                                  | 15.2           | 149.7               | 0.170               | 2.346          | 10.142          | 0.039                 | 0.576          | 0.130           |
| 165.0                                                                  | 15.2           | 164.7               | 0.190               | 1.658          | 10.131          | 0.048                 | 0.361          | 0.109           |
| 180.0                                                                  | 15.3           | 179.7               | 0.170               | 1.377          | 10.090          | 0.038                 | 0.168          | 0.089           |
| 195.0                                                                  | 15.2           | 194.8               | 0.238               | 2.697          | 10.035          | 0.049                 | 0.373          | 0.086           |
| 210.0                                                                  | 15.2           | 209.9               | 0.157               | 3.051          | 9.999           | 0.041                 | 0.660          | 0.084           |
| 225.0                                                                  | 15.2           | 225.2               | 0.202               | 3.523          | 10.111          | 0.041                 | 1.086          | 0.102           |
| 240.0                                                                  | 15.2           | 240.4               | 0.187               | 3.758          | 10.538          | 0.037                 | 1.098          | 0.157           |
| 255.0                                                                  | 15.3           | 255.3               | 0.130               | 3.197          | 10.861          | 0.030                 | 0.909          | 0.220           |
| 270.0                                                                  | 15.3           | 270.2               | 0.079               | 3.161          | 10.948          | 0.022                 | 0.826          | 0.300           |
| 285.0                                                                  | 15.3           | 285.0               | 0.194               | 3.254          | 11.113          | 0.052                 | 0.764          | 0.349           |
| 300.0                                                                  | 15.2           | 299.9               | 0.393               | 2.948          | 10.850          | 0.113                 | 0.716          | 0.347           |
| 315.0                                                                  | 15.2           | 314.7               | 0.529               | 2.481          | 10.850          | 0.152                 | 0.561          | 0.296           |
| 330.0                                                                  | 15.2           | 329.7               | 0.680               | 1.847          | 10.572          | 0.169                 | 0.382          | 0.255           |
| 345.0                                                                  | 15.2           | 344.7               | 0.687               | 1.270          | 10.523          | 0.178                 | 0.190          | 0.237           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                |                     |                     |                |                 |                       |                |                 |

**Table S.12:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 4.0$  m and  $T_p = 15.5$  s; Ship's speed is 20.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 20.3               | -0.1                | 0.801                   | 1.137          | 10.869          | 0.197                     | 0.106          | 0.301           |
| 15.0                                                                   | 20.3               | 14.9                | 0.815                   | 1.567          | 10.897          | 0.194                     | 0.264          | 0.300           |
| 30.0                                                                   | 20.3               | 30.0                | 0.690                   | 2.076          | 10.784          | 0.185                     | 0.444          | 0.315           |
| 45.0                                                                   | 20.3               | 45.0                | 0.568                   | 2.720          | 10.915          | 0.165                     | 0.609          | 0.346           |
| 60.0                                                                   | 20.3               | 59.9                | 0.429                   | 3.212          | 11.168          | 0.124                     | 0.760          | 0.375           |
| 75.0                                                                   | 20.4               | 74.8                | 0.225                   | 2.843          | 11.050          | 0.058                     | 0.627          | 0.352           |
| 90.0                                                                   | 20.4               | 89.8                | 0.096                   | 3.091          | 11.130          | 0.026                     | 0.641          | 0.302           |
| 105.0                                                                  | 20.4               | 104.8               | 0.137                   | 3.567          | 10.762          | 0.032                     | 0.687          | 0.241           |
| 120.0                                                                  | 20.3               | 119.7               | 0.189                   | 4.745          | 10.421          | 0.039                     | 1.232          | 0.233           |
| 135.0                                                                  | 20.3               | 134.8               | 0.160                   | 3.376          | 10.025          | 0.042                     | 1.001          | 0.157           |
| 150.0                                                                  | 20.3               | 149.8               | 0.140                   | 2.018          | 10.032          | 0.044                     | 0.560          | 0.105           |
| 165.0                                                                  | 20.4               | 164.8               | 0.201                   | 1.449          | 10.047          | 0.049                     | 0.300          | 0.081           |
| 180.0                                                                  | 20.4               | 179.9               | 0.184                   | 1.706          | 10.018          | 0.050                     | 0.177          | 0.077           |
| 195.0                                                                  | 20.4               | 194.9               | 0.155                   | 2.538          | 9.990           | 0.048                     | 0.363          | 0.070           |
| 210.0                                                                  | 20.4               | 209.9               | 0.181                   | 4.205          | 10.014          | 0.037                     | 0.601          | 0.084           |
| 225.0                                                                  | 20.4               | 225.0               | 0.132                   | 4.104          | 9.955           | 0.034                     | 0.867          | 0.086           |
| 240.0                                                                  | 20.4               | 240.2               | 0.160                   | 4.802          | 10.098          | 0.038                     | 1.344          | 0.124           |
| 255.0                                                                  | 20.4               | 255.1               | 0.179                   | 3.607          | 10.812          | 0.034                     | 0.895          | 0.192           |
| 270.0                                                                  | 20.4               | 270.1               | 0.098                   | 3.171          | 10.860          | 0.028                     | 0.806          | 0.289           |
| 285.0                                                                  | 20.4               | 285.0               | 0.192                   | 3.460          | 11.241          | 0.055                     | 0.742          | 0.370           |
| 300.0                                                                  | 20.4               | 299.9               | 0.414                   | 3.074          | 11.192          | 0.121                     | 0.712          | 0.412           |
| 315.0                                                                  | 20.3               | 314.8               | 0.591                   | 2.463          | 11.005          | 0.163                     | 0.534          | 0.378           |
| 330.0                                                                  | 20.3               | 329.8               | 0.722                   | 2.000          | 10.905          | 0.184                     | 0.353          | 0.337           |
| 345.0                                                                  | 20.3               | 344.8               | 0.728                   | 1.400          | 10.938          | 0.194                     | 0.170          | 0.312           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table S.13:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 4.0$  m and  $T_p = 15.5$  s; Ship's speed is 25.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 25.4               | -0.1                | 0.757                   | 1.364          | 11.210          | 0.212                     | 0.127          | 0.430           |
| 15.0                                                                   | 25.4               | 15.0                | 0.856                   | 1.637          | 11.184          | 0.208                     | 0.270          | 0.429           |
| 30.0                                                                   | 25.4               | 30.0                | 0.711                   | 2.368          | 11.260          | 0.197                     | 0.444          | 0.437           |
| 45.0                                                                   | 25.4               | 45.0                | 0.652                   | 2.648          | 11.220          | 0.175                     | 0.610          | 0.455           |
| 60.0                                                                   | 25.4               | 60.0                | 0.433                   | 3.286          | 11.367          | 0.133                     | 0.786          | 0.458           |
| 75.0                                                                   | 25.4               | 74.9                | 0.198                   | 2.904          | 11.136          | 0.061                     | 0.613          | 0.376           |
| 90.0                                                                   | 25.4               | 89.9                | 0.113                   | 3.027          | 11.072          | 0.032                     | 0.620          | 0.294           |
| 105.0                                                                  | 25.4               | 104.8               | 0.168                   | 3.407          | 10.818          | 0.040                     | 0.685          | 0.227           |
| 120.0                                                                  | 25.4               | 119.9               | 0.198                   | 5.197          | 10.037          | 0.049                     | 1.545          | 0.233           |
| 135.0                                                                  | 25.4               | 134.9               | 0.161                   | 2.723          | 9.967           | 0.052                     | 0.984          | 0.127           |
| 150.0                                                                  | 25.4               | 149.9               | 0.184                   | 2.472          | 9.965           | 0.059                     | 0.646          | 0.091           |
| 165.0                                                                  | 25.5               | 164.9               | 0.267                   | 2.005          | 10.003          | 0.077                     | 0.394          | 0.086           |
| 180.0                                                                  | 25.6               | 179.9               | 0.203                   | 1.533          | 9.930           | 0.059                     | 0.130          | 0.042           |
| 195.0                                                                  | 25.5               | 195.0               | 0.239                   | 2.843          | 10.022          | 0.073                     | 0.380          | 0.076           |
| 210.0                                                                  | 25.5               | 210.0               | 0.224                   | 3.791          | 9.980           | 0.051                     | 0.665          | 0.093           |
| 225.0                                                                  | 25.4               | 225.0               | 0.150                   | 4.733          | 9.942           | 0.043                     | 0.976          | 0.113           |
| 240.0                                                                  | 25.4               | 240.0               | 0.143                   | 4.633          | 9.900           | 0.040                     | 1.221          | 0.094           |
| 255.0                                                                  | 25.4               | 255.0               | 0.188                   | 3.600          | 10.662          | 0.040                     | 0.839          | 0.169           |
| 270.0                                                                  | 25.4               | 270.0               | 0.127                   | 3.182          | 10.847          | 0.034                     | 0.761          | 0.279           |
| 285.0                                                                  | 25.4               | 285.0               | 0.200                   | 3.457          | 11.187          | 0.058                     | 0.703          | 0.394           |
| 300.0                                                                  | 25.4               | 299.9               | 0.507                   | 3.608          | 11.586          | 0.129                     | 0.695          | 0.498           |
| 315.0                                                                  | 25.4               | 314.9               | 0.643                   | 2.639          | 11.390          | 0.173                     | 0.502          | 0.486           |
| 330.0                                                                  | 25.4               | 329.9               | 0.670                   | 2.007          | 11.288          | 0.196                     | 0.320          | 0.461           |
| 345.0                                                                  | 25.4               | 344.9               | 0.777                   | 1.456          | 11.135          | 0.208                     | 0.157          | 0.441           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table S.14:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 4.0$  m and  $T_p = 15.5$  s; Ship's speed is 30.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 30.5               | -0.0                | 0.857                   | 1.416          | 11.697          | 0.224                     | 0.153          | 0.588           |
| 15.0                                                                   | 30.5               | 15.0                | 0.848                   | 1.831          | 11.719          | 0.220                     | 0.278          | 0.583           |
| 30.0                                                                   | 30.5               | 30.0                | 0.714                   | 2.333          | 11.804          | 0.208                     | 0.436          | 0.580           |
| 45.0                                                                   | 30.5               | 45.0                | 0.685                   | 3.106          | 11.669          | 0.185                     | 0.607          | 0.577           |
| 60.0                                                                   | 30.5               | 60.0                | 0.487                   | 3.353          | 11.626          | 0.140                     | 0.796          | 0.548           |
| 75.0                                                                   | 30.5               | 75.0                | 0.201                   | 2.721          | 11.113          | 0.065                     | 0.592          | 0.403           |
| 90.0                                                                   | 30.5               | 89.9                | 0.135                   | 2.889          | 11.063          | 0.037                     | 0.617          | 0.285           |
| 105.0                                                                  | 30.5               | 104.9               | 0.190                   | 3.209          | 10.545          | 0.048                     | 0.744          | 0.209           |
| 120.0                                                                  | 30.5               | 119.9               | 0.239                   | 3.913          | 9.946           | 0.056                     | 1.331          | 0.177           |
| 135.0                                                                  | 30.5               | 134.9               | 0.255                   | 3.754          | 9.945           | 0.054                     | 0.859          | 0.101           |
| 150.0                                                                  | 30.6               | 149.9               | 0.261                   | 2.469          | 9.929           | 0.080                     | 0.606          | 0.079           |
| 165.0                                                                  | 30.6               | 164.9               | 0.296                   | 1.944          | 9.895           | 0.093                     | 0.341          | 0.054           |
| 180.0                                                                  | 31.0               | 179.9               | 0.331                   | 2.227          | 9.872           | 0.093                     | 0.222          | 0.043           |
| 195.0                                                                  | 30.6               | 194.9               | 0.257                   | 2.730          | 9.879           | 0.084                     | 0.395          | 0.055           |
| 210.0                                                                  | 30.6               | 210.0               | 0.231                   | 3.190          | 9.889           | 0.072                     | 0.625          | 0.076           |
| 225.0                                                                  | 30.5               | 225.0               | 0.166                   | 4.038          | 9.904           | 0.047                     | 0.877          | 0.107           |
| 240.0                                                                  | 30.5               | 240.1               | 0.224                   | 5.971          | 9.875           | 0.052                     | 1.456          | 0.157           |
| 255.0                                                                  | 30.5               | 255.0               | 0.166                   | 3.621          | 10.466          | 0.048                     | 0.775          | 0.147           |
| 270.0                                                                  | 30.5               | 270.0               | 0.141                   | 3.173          | 10.810          | 0.040                     | 0.691          | 0.269           |
| 285.0                                                                  | 30.5               | 285.0               | 0.212                   | 3.681          | 11.204          | 0.061                     | 0.662          | 0.426           |
| 300.0                                                                  | 30.5               | 299.9               | 0.465                   | 3.164          | 11.609          | 0.135                     | 0.669          | 0.580           |
| 315.0                                                                  | 30.5               | 314.9               | 0.608                   | 2.811          | 11.778          | 0.181                     | 0.477          | 0.603           |
| 330.0                                                                  | 30.5               | 329.9               | 0.754                   | 2.139          | 11.732          | 0.206                     | 0.306          | 0.601           |
| 345.0                                                                  | 30.5               | 344.9               | 0.860                   | 1.580          | 11.744          | 0.219                     | 0.163          | 0.593           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table S.15:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 6.0$  m and  $T_p = 10.3$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                            | <b>Absolute Maximum</b> |                       |                        | <b>Standard Deviation</b> |                       |                        |
|------------------------------------------------------------------------|--------------------|----------------------------|-------------------------|-----------------------|------------------------|---------------------------|-----------------------|------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts       | $\psi_{\text{MHP}}$<br>deg | Long<br>$\text{m/s}^2$  | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ | Long<br>$\text{m/s}^2$    | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ |
| 0.0                                                                    | -0.1               | -18.2                      | 1.297                   | 3.260                 | 10.934                 | 0.264                     | 0.643                 | 0.380                  |
| 15.0                                                                   | -0.3               | -12.9                      | 1.218                   | 2.579                 | 10.834                 | 0.262                     | 0.511                 | 0.358                  |
| 30.0                                                                   | -0.6               | -3.0                       | 1.183                   | 2.455                 | 10.797                 | 0.259                     | 0.473                 | 0.340                  |
| 45.0                                                                   | -0.9               | 7.5                        | 1.237                   | 2.920                 | 10.986                 | 0.256                     | 0.646                 | 0.333                  |
| 60.0                                                                   | -1.2               | 18.4                       | 1.124                   | 4.596                 | 11.062                 | 0.255                     | 0.973                 | 0.356                  |
| 75.0                                                                   | -1.6               | -14.9                      | 1.103                   | 6.460                 | 12.182                 | 0.251                     | 1.500                 | 0.460                  |
| 90.0                                                                   | -1.5               | -5.5                       | 0.922                   | 9.357                 | 13.091                 | 0.245                     | 1.504                 | 0.464                  |
| 105.0                                                                  | -1.3               | -6.7                       | 0.938                   | 6.912                 | 12.545                 | 0.250                     | 1.433                 | 0.439                  |
| 120.0                                                                  | -1.3               | 47.4                       | 1.139                   | 10.664                | 13.194                 | 0.195                     | 1.640                 | 0.609                  |
| 135.0                                                                  | -3.0               | 105.0                      | 1.033                   | 9.153                 | 13.948                 | 0.193                     | 1.688                 | 0.679                  |
| 150.0                                                                  | -3.7               | 109.0                      | 1.089                   | 7.490                 | 12.734                 | 0.207                     | 1.597                 | 0.638                  |
| 165.0                                                                  | -4.0               | 106.1                      | 0.949                   | 9.331                 | 13.581                 | 0.206                     | 1.631                 | 0.661                  |
| 180.0                                                                  | -0.2               | 328.0                      | 1.160                   | 4.845                 | 12.018                 | 0.245                     | 0.890                 | 0.381                  |
| 195.0                                                                  | -0.2               | 16.8                       | 1.077                   | 5.573                 | 11.947                 | 0.258                     | 0.915                 | 0.427                  |
| 210.0                                                                  | -0.2               | 385.8                      | 1.045                   | 4.760                 | 11.685                 | 0.258                     | 0.996                 | 0.450                  |
| 225.0                                                                  | -0.1               | 392.3                      | 1.153                   | 5.469                 | 11.981                 | 0.262                     | 1.136                 | 0.482                  |
| 240.0                                                                  | 0.0                | 393.2                      | 1.087                   | 5.121                 | 11.953                 | 0.262                     | 1.259                 | 0.527                  |
| 255.0                                                                  | 0.0                | 386.6                      | 1.118                   | 5.777                 | 12.552                 | 0.259                     | 1.442                 | 0.586                  |
| 270.0                                                                  | 0.5                | 300.2                      | 1.138                   | 5.539                 | 12.487                 | 0.257                     | 1.343                 | 0.601                  |
| 285.0                                                                  | 0.3                | 303.6                      | 1.061                   | 7.078                 | 13.409                 | 0.262                     | 1.282                 | 0.572                  |
| 300.0                                                                  | -0.0               | 309.2                      | 1.137                   | 5.645                 | 13.168                 | 0.268                     | 1.247                 | 0.531                  |
| 315.0                                                                  | -0.1               | 315.9                      | 1.077                   | 5.228                 | 11.547                 | 0.270                     | 1.133                 | 0.492                  |
| 330.0                                                                  | -0.3               | 325.3                      | 1.278                   | 4.493                 | 11.329                 | 0.262                     | 0.946                 | 0.436                  |
| 345.0                                                                  | -0.1               | 333.7                      | 1.239                   | 3.950                 | 11.069                 | 0.264                     | 0.761                 | 0.404                  |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                            |                         |                       |                        |                           |                       |                        |



**Table S.16:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 6.0$  m and  $T_p = 10.3$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 4.1                | -10.0               | 1.406                   | 3.926          | 11.021          | 0.298                     | 0.465          | 0.394           |
| 15.0                                                                   | 4.0                | -2.0                | 1.411                   | 2.217          | 10.865          | 0.295                     | 0.391          | 0.380           |
| 30.0                                                                   | 3.9                | 8.0                 | 1.270                   | 2.415          | 10.792          | 0.294                     | 0.455          | 0.375           |
| 45.0                                                                   | 3.8                | 19.0                | 1.439                   | 2.758          | 10.839          | 0.292                     | 0.627          | 0.382           |
| 60.0                                                                   | 3.8                | 31.1                | 1.201                   | 3.827          | 11.006          | 0.291                     | 0.834          | 0.406           |
| 75.0                                                                   | 3.7                | 38.8                | 1.397                   | 4.542          | 11.385          | 0.290                     | 0.987          | 0.431           |
| 90.0                                                                   | 3.7                | 46.5                | 1.202                   | 7.099          | 12.727          | 0.284                     | 1.139          | 0.472           |
| 105.0                                                                  | 3.7                | 48.9                | 1.144                   | 8.566          | 13.719          | 0.281                     | 1.188          | 0.493           |
| 120.0                                                                  | 3.7                | 46.7                | 1.747                   | 9.560          | 12.369          | 0.285                     | 1.181          | 0.495           |
| 135.0                                                                  | 3.7                | 43.4                | 1.196                   | 5.118          | 12.046          | 0.287                     | 1.016          | 0.474           |
| 150.0                                                                  | 3.8                | 45.4                | 1.126                   | 5.448          | 12.801          | 0.286                     | 1.044          | 0.487           |
| 165.0                                                                  | 3.8                | 49.5                | 1.164                   | 5.941          | 12.481          | 0.288                     | 1.006          | 0.476           |
| 180.0                                                                  | 4.7                | 178.6               | 0.596                   | 2.566          | 10.739          | 0.146                     | 0.492          | 0.183           |
| 195.0                                                                  | 4.6                | 197.3               | 0.573                   | 2.856          | 10.891          | 0.149                     | 0.634          | 0.211           |
| 210.0                                                                  | 4.1                | 368.4               | 1.353                   | 6.215          | 12.688          | 0.290                     | 0.866          | 0.443           |
| 225.0                                                                  | 4.5                | 295.9               | 1.089                   | 7.452          | 13.417          | 0.266                     | 1.352          | 0.622           |
| 240.0                                                                  | 4.7                | 286.9               | 1.121                   | 7.887          | 13.375          | 0.235                     | 1.492          | 0.760           |
| 255.0                                                                  | 4.5                | 289.3               | 1.130                   | 7.419          | 13.366          | 0.244                     | 1.489          | 0.749           |
| 270.0                                                                  | 4.4                | 292.8               | 1.782                   | 5.338          | 13.503          | 0.264                     | 1.414          | 0.703           |
| 285.0                                                                  | 4.5                | 295.6               | 1.104                   | 6.490          | 13.491          | 0.273                     | 1.400          | 0.666           |
| 300.0                                                                  | 4.7                | 302.6               | 1.022                   | 5.468          | 12.017          | 0.292                     | 1.217          | 0.583           |
| 315.0                                                                  | 4.7                | 314.4               | 1.280                   | 4.622          | 11.296          | 0.303                     | 0.993          | 0.506           |
| 330.0                                                                  | 4.6                | 327.1               | 1.295                   | 4.231          | 11.042          | 0.303                     | 0.769          | 0.454           |
| 345.0                                                                  | 4.4                | 340.0               | 1.337                   | 2.958          | 11.060          | 0.300                     | 0.571          | 0.415           |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table S.17:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 6.0$  m and  $T_p = 10.3$  s; Ship's speed is 10.0 Knots

| <b>Cmd<br/>Heading</b>                                                 | <b>Actual<br/>Mean</b> |                     | <b>Absolute<br/>Maximum</b>     |                                |                                 | <b>Standard<br/>Deviation</b>   |                                |                                 |
|------------------------------------------------------------------------|------------------------|---------------------|---------------------------------|--------------------------------|---------------------------------|---------------------------------|--------------------------------|---------------------------------|
| $\psi_{MHP}$<br>deg                                                    | <b>Speed<br/>kts</b>   | $\psi_{MHP}$<br>deg | <b>Long<br/>m/s<sup>2</sup></b> | <b>Lat<br/>m/s<sup>2</sup></b> | <b>Vert<br/>m/s<sup>2</sup></b> | <b>Long<br/>m/s<sup>2</sup></b> | <b>Lat<br/>m/s<sup>2</sup></b> | <b>Vert<br/>m/s<sup>2</sup></b> |
| 0.0                                                                    | 9.8                    | -1.2                | 1.359                           | 1.974                          | 11.134                          | 0.330                           | 0.264                          | 0.438                           |
| 15.0                                                                   | 9.7                    | 13.7                | 1.470                           | 1.824                          | 11.014                          | 0.328                           | 0.348                          | 0.432                           |
| 30.0                                                                   | 9.7                    | 28.7                | 1.369                           | 2.696                          | 11.023                          | 0.330                           | 0.585                          | 0.444                           |
| 45.0                                                                   | 9.7                    | 43.7                | 1.517                           | 3.960                          | 11.280                          | 0.326                           | 0.838                          | 0.469                           |
| 60.0                                                                   | 9.7                    | 58.2                | 1.094                           | 5.431                          | 11.886                          | 0.307                           | 1.108                          | 0.556                           |
| 75.0                                                                   | 9.7                    | 71.6                | 1.788                           | 6.944                          | 13.132                          | 0.256                           | 1.338                          | 0.753                           |
| 90.0                                                                   | 9.0                    | 81.8                | 0.794                           | 8.476                          | 13.837                          | 0.149                           | 1.468                          | 0.883                           |
| 105.0                                                                  | 8.6                    | 88.7                | 0.778                           | 10.536                         | 13.624                          | 0.085                           | 1.654                          | 0.876                           |
| 120.0                                                                  | 8.4                    | 100.7               | 0.801                           | 9.259                          | 13.403                          | 0.109                           | 1.627                          | 0.716                           |
| 135.0                                                                  | 8.9                    | 125.6               | 0.542                           | 6.549                          | 11.821                          | 0.124                           | 1.296                          | 0.375                           |
| 150.0                                                                  | 9.4                    | 145.7               | 0.426                           | 4.053                          | 10.622                          | 0.110                           | 1.271                          | 0.247                           |
| 165.0                                                                  | 9.6                    | 162.0               | 0.388                           | 4.152                          | 10.375                          | 0.105                           | 1.224                          | 0.221                           |
| 180.0                                                                  | 9.9                    | 178.3               | 0.370                           | 3.912                          | 10.232                          | 0.103                           | 0.984                          | 0.168                           |
| 195.0                                                                  | 10.0                   | 194.6               | 0.430                           | 3.164                          | 10.595                          | 0.105                           | 0.764                          | 0.123                           |
| 210.0                                                                  | 9.8                    | 211.5               | 0.414                           | 3.315                          | 10.674                          | 0.112                           | 1.135                          | 0.170                           |
| 225.0                                                                  | 9.3                    | 231.7               | 0.797                           | 5.900                          | 11.839                          | 0.128                           | 1.371                          | 0.318                           |
| 240.0                                                                  | 8.5                    | 259.3               | 1.870                           | 9.762                          | 13.576                          | 0.141                           | 1.644                          | 0.713                           |
| 255.0                                                                  | 8.6                    | 269.8               | 1.239                           | 10.251                         | 14.442                          | 0.105                           | 1.648                          | 0.884                           |
| 270.0                                                                  | 9.2                    | 277.4               | 0.816                           | 7.408                          | 13.752                          | 0.137                           | 1.543                          | 0.974                           |
| 285.0                                                                  | 10.0                   | 287.5               | 1.264                           | 6.281                          | 13.195                          | 0.256                           | 1.373                          | 0.876                           |
| 300.0                                                                  | 10.0                   | 300.3               | 1.089                           | 4.173                          | 11.857                          | 0.310                           | 1.155                          | 0.655                           |
| 315.0                                                                  | 9.8                    | 314.3               | 1.281                           | 4.674                          | 11.613                          | 0.330                           | 0.876                          | 0.521                           |
| 330.0                                                                  | 9.8                    | 329.1               | 1.436                           | 3.864                          | 11.349                          | 0.334                           | 0.579                          | 0.476                           |
| 345.0                                                                  | 9.8                    | 343.9               | 1.378                           | 2.216                          | 11.058                          | 0.331                           | 0.363                          | 0.443                           |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                        |                     |                                 |                                |                                 |                                 |                                |                                 |

**Table S.18:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 6.0$  m and  $T_p = 10.3$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 15.0               | -0.5                | 1.541                   | 1.814          | 11.289          | 0.359                     | 0.240          | 0.459           |
| 15.0                                                                   | 15.0               | 14.6                | 1.471                   | 2.070          | 11.211          | 0.359                     | 0.352          | 0.459           |
| 30.0                                                                   | 15.0               | 29.6                | 1.457                   | 2.503          | 11.328          | 0.361                     | 0.541          | 0.478           |
| 45.0                                                                   | 15.0               | 44.7                | 1.373                   | 3.570          | 11.315          | 0.353                     | 0.788          | 0.534           |
| 60.0                                                                   | 15.0               | 59.4                | 1.110                   | 6.634          | 11.874          | 0.324                     | 1.059          | 0.674           |
| 75.0                                                                   | 15.1               | 73.7                | 1.047                   | 7.188          | 13.228          | 0.251                     | 1.222          | 0.895           |
| 90.0                                                                   | 14.9               | 87.7                | 0.971                   | 7.576          | 13.888          | 0.079                     | 1.367          | 0.928           |
| 105.0                                                                  | 14.8               | 102.4               | 0.557                   | 10.232         | 14.150          | 0.100                     | 1.514          | 0.653           |
| 120.0                                                                  | 14.6               | 116.8               | 0.546                   | 7.778          | 13.053          | 0.090                     | 1.683          | 0.475           |
| 135.0                                                                  | 15.0               | 133.5               | 0.352                   | 4.898          | 10.850          | 0.070                     | 1.640          | 0.334           |
| 150.0                                                                  | 15.0               | 149.2               | 0.281                   | 3.879          | 10.401          | 0.083                     | 1.229          | 0.232           |
| 165.0                                                                  | 15.0               | 164.1               | 0.374                   | 3.585          | 10.288          | 0.091                     | 0.732          | 0.168           |
| 180.0                                                                  | 15.0               | 179.2               | 0.421                   | 3.517          | 10.236          | 0.103                     | 0.616          | 0.148           |
| 195.0                                                                  | 15.1               | 194.4               | 0.395                   | 4.383          | 9.957           | 0.083                     | 0.735          | 0.117           |
| 210.0                                                                  | 15.1               | 209.7               | 0.452                   | 4.358          | 10.380          | 0.077                     | 1.148          | 0.122           |
| 225.0                                                                  | 15.0               | 226.3               | 0.505                   | 5.553          | 11.004          | 0.084                     | 1.792          | 0.206           |
| 240.0                                                                  | 14.6               | 243.5               | 0.791                   | 9.260          | 13.314          | 0.105                     | 1.849          | 0.403           |
| 255.0                                                                  | 14.5               | 258.6               | 1.197                   | 11.432         | 14.418          | 0.118                     | 1.729          | 0.643           |
| 270.0                                                                  | 14.8               | 272.6               | 0.835                   | 7.620          | 14.236          | 0.071                     | 1.625          | 0.988           |
| 285.0                                                                  | 15.2               | 286.1               | 1.080                   | 6.899          | 13.218          | 0.248                     | 1.384          | 1.003           |
| 300.0                                                                  | 15.1               | 300.0               | 1.232                   | 5.019          | 12.783          | 0.324                     | 1.089          | 0.783           |
| 315.0                                                                  | 15.0               | 314.6               | 1.275                   | 3.164          | 11.536          | 0.355                     | 0.769          | 0.610           |
| 330.0                                                                  | 15.0               | 329.5               | 1.421                   | 2.508          | 11.550          | 0.361                     | 0.513          | 0.520           |
| 345.0                                                                  | 15.0               | 344.5               | 1.509                   | 2.171          | 11.303          | 0.361                     | 0.308          | 0.477           |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table S.19:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 6.0$  m and  $T_p = 10.3$  s; Ship's speed is 20.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 20.2               | -0.2                | 1.555                   | 1.980          | 11.733          | 0.384                     | 0.249          | 0.603           |
| 15.0                                                                   | 20.2               | 14.8                | 1.482                   | 2.264          | 11.842          | 0.384                     | 0.352          | 0.602           |
| 30.0                                                                   | 20.2               | 29.9                | 1.554                   | 3.502          | 11.921          | 0.385                     | 0.539          | 0.641           |
| 45.0                                                                   | 20.2               | 44.9                | 1.371                   | 4.291          | 11.823          | 0.375                     | 0.760          | 0.715           |
| 60.0                                                                   | 20.2               | 59.7                | 1.203                   | 4.632          | 12.343          | 0.340                     | 1.007          | 0.849           |
| 75.0                                                                   | 20.3               | 74.2                | 1.090                   | 7.525          | 13.892          | 0.251                     | 1.172          | 1.011           |
| 90.0                                                                   | 20.2               | 88.7                | 0.643                   | 7.542          | 14.048          | 0.065                     | 1.296          | 0.917           |
| 105.0                                                                  | 20.1               | 103.7               | 0.565                   | 7.593          | 14.050          | 0.087                     | 1.555          | 0.600           |
| 120.0                                                                  | 20.2               | 118.8               | 0.304                   | 6.281          | 11.310          | 0.068                     | 2.099          | 0.472           |
| 135.0                                                                  | 20.2               | 134.7               | 0.373                   | 4.729          | 10.343          | 0.068                     | 1.468          | 0.231           |
| 150.0                                                                  | 20.3               | 149.6               | 0.506                   | 3.645          | 10.144          | 0.088                     | 1.055          | 0.154           |
| 165.0                                                                  | 20.1               | 164.5               | 0.605                   | 3.819          | 10.094          | 0.100                     | 0.636          | 0.132           |
| 180.0                                                                  | 20.6               | 179.5               | 0.724                   | 4.224          | 9.989           | 0.106                     | 0.597          | 0.131           |
| 195.0                                                                  | 20.1               | 194.4               | 0.668                   | 4.682          | 9.989           | 0.099                     | 0.857          | 0.169           |
| 210.0                                                                  | 20.2               | 209.9               | 0.698                   | 5.907          | 9.995           | 0.091                     | 1.315          | 0.221           |
| 225.0                                                                  | 20.0               | 225.5               | 0.388                   | 6.114          | 10.536          | 0.076                     | 2.005          | 0.253           |
| 240.0                                                                  | 20.2               | 241.0               | 0.369                   | 6.801          | 11.248          | 0.077                     | 2.392          | 0.297           |
| 255.0                                                                  | 19.9               | 256.9               | 0.524                   | 12.649         | 13.993          | 0.101                     | 1.895          | 0.565           |
| 270.0                                                                  | 20.1               | 271.4               | 0.899                   | 9.009          | 13.888          | 0.069                     | 1.685          | 0.976           |
| 285.0                                                                  | 20.3               | 285.7               | 0.986                   | 6.598          | 13.799          | 0.244                     | 1.417          | 1.113           |
| 300.0                                                                  | 20.3               | 300.0               | 1.248                   | 3.727          | 12.661          | 0.336                     | 1.063          | 0.962           |
| 315.0                                                                  | 20.2               | 314.8               | 1.291                   | 3.223          | 12.224          | 0.371                     | 0.741          | 0.798           |
| 330.0                                                                  | 20.2               | 329.7               | 1.460                   | 2.540          | 12.069          | 0.384                     | 0.487          | 0.701           |
| 345.0                                                                  | 20.2               | 344.8               | 1.529                   | 1.905          | 12.000          | 0.384                     | 0.303          | 0.629           |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table S.20:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 6.0$  m and  $T_p = 10.3$  s; Ship's speed is 25.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 25.4               | -0.1                | 1.483                   | 2.096          | 12.636          | 0.401                     | 0.288          | 0.846           |
| 15.0                                                                   | 25.4               | 14.9                | 1.414                   | 2.552          | 12.552          | 0.402                     | 0.375          | 0.850           |
| 30.0                                                                   | 25.4               | 29.9                | 1.590                   | 3.639          | 12.578          | 0.402                     | 0.543          | 0.886           |
| 45.0                                                                   | 25.3               | 44.9                | 1.606                   | 4.250          | 12.596          | 0.391                     | 0.745          | 0.951           |
| 60.0                                                                   | 25.3               | 59.8                | 1.315                   | 5.584          | 12.873          | 0.352                     | 0.993          | 1.043           |
| 75.0                                                                   | 25.3               | 74.5                | 0.926                   | 7.309          | 13.450          | 0.255                     | 1.139          | 1.128           |
| 90.0                                                                   | 25.3               | 89.2                | 0.709                   | 7.872          | 13.895          | 0.066                     | 1.281          | 0.911           |
| 105.0                                                                  | 25.2               | 104.2               | 0.530                   | 9.441          | 12.898          | 0.088                     | 1.846          | 0.562           |
| 120.0                                                                  | 25.2               | 119.7               | 0.375                   | 7.058          | 10.613          | 0.079                     | 2.569          | 0.443           |
| 135.0                                                                  | 25.2               | 134.7               | 0.376                   | 4.666          | 10.213          | 0.091                     | 1.695          | 0.216           |
| 150.0                                                                  | 25.1               | 149.8               | 0.768                   | 3.995          | 10.037          | 0.119                     | 1.078          | 0.160           |
| 165.0                                                                  | 25.8               | 164.4               | 0.368                   | 3.895          | 9.948           | 0.108                     | 0.576          | 0.105           |
| 180.0                                                                  | 25.6               | 179.8               | 0.503                   | 3.950          | 9.932           | 0.113                     | 0.573          | 0.115           |
| 195.0                                                                  | 25.7               | 195.1               | 0.402                   | 4.187          | 9.937           | 0.105                     | 0.767          | 0.143           |
| 210.0                                                                  | 25.4               | 210.0               | 0.498                   | 4.779          | 9.946           | 0.107                     | 1.176          | 0.206           |
| 225.0                                                                  | 25.2               | 225.3               | 0.464                   | 6.754          | 9.997           | 0.091                     | 1.897          | 0.311           |
| 240.0                                                                  | 25.2               | 240.5               | 0.445                   | 7.460          | 11.070          | 0.075                     | 2.615          | 0.357           |
| 255.0                                                                  | 25.2               | 255.9               | 0.412                   | 8.286          | 12.139          | 0.092                     | 2.034          | 0.454           |
| 270.0                                                                  | 25.3               | 270.9               | 0.611                   | 8.660          | 13.660          | 0.070                     | 1.725          | 0.951           |
| 285.0                                                                  | 25.4               | 285.5               | 0.940                   | 7.541          | 13.547          | 0.244                     | 1.433          | 1.229           |
| 300.0                                                                  | 25.4               | 300.1               | 1.220                   | 3.800          | 13.040          | 0.342                     | 1.098          | 1.148           |
| 315.0                                                                  | 25.4               | 314.9               | 1.531                   | 3.299          | 12.901          | 0.384                     | 0.763          | 1.030           |
| 330.0                                                                  | 25.4               | 329.9               | 1.419                   | 2.446          | 13.108          | 0.398                     | 0.496          | 0.939           |
| 345.0                                                                  | 25.4               | 344.9               | 1.508                   | 1.968          | 12.610          | 0.400                     | 0.325          | 0.876           |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table S.21:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 6.0$  m and  $T_p = 10.3$  s; Ship's speed is 30.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 30.5               | -0.0                | 1.401                   | 2.387          | 13.609          | 0.413                     | 0.340          | 1.109           |
| 15.0                                                                   | 30.5               | 15.0                | 1.585                   | 2.827          | 13.146          | 0.414                     | 0.399          | 1.114           |
| 30.0                                                                   | 30.5               | 30.0                | 1.499                   | 4.350          | 13.233          | 0.415                     | 0.556          | 1.146           |
| 45.0                                                                   | 30.5               | 44.9                | 1.443                   | 4.714          | 13.195          | 0.402                     | 0.752          | 1.193           |
| 60.0                                                                   | 30.4               | 59.8                | 1.372                   | 4.996          | 13.393          | 0.362                     | 0.970          | 1.242           |
| 75.0                                                                   | 30.4               | 74.6                | 0.863                   | 6.836          | 14.465          | 0.257                     | 1.099          | 1.242           |
| 90.0                                                                   | 30.4               | 89.4                | 0.469                   | 8.096          | 14.144          | 0.069                     | 1.272          | 0.893           |
| 105.0                                                                  | 30.3               | 104.5               | 0.528                   | 8.174          | 12.078          | 0.088                     | 2.197          | 0.532           |
| 120.0                                                                  | 30.1               | 119.7               | 0.557                   | 7.386          | 11.175          | 0.124                     | 2.913          | 0.482           |
| 135.0                                                                  | 30.2               | 135.0               | 0.978                   | 5.654          | 10.392          | 0.128                     | 1.589          | 0.229           |
| 150.0                                                                  | 30.9               | 148.9               | 0.694                   | 4.810          | 9.944           | 0.138                     | 1.073          | 0.195           |
| 165.0                                                                  | 31.3               | 164.3               | 0.573                   | 4.358          | 10.011          | 0.138                     | 0.739          | 0.158           |
| 180.0                                                                  | 30.3               | 179.5               | 0.997                   | 5.078          | 9.989           | 0.155                     | 0.849          | 0.193           |
| 195.0                                                                  | 31.3               | 195.1               | 0.980                   | 4.528          | 10.059          | 0.134                     | 0.973          | 0.182           |
| 210.0                                                                  | 31.0               | 210.7               | 0.802                   | 4.506          | 9.999           | 0.125                     | 1.250          | 0.167           |
| 225.0                                                                  | 30.3               | 225.1               | 0.919                   | 5.913          | 10.305          | 0.123                     | 1.655          | 0.283           |
| 240.0                                                                  | 30.2               | 240.6               | 0.551                   | 8.099          | 12.258          | 0.116                     | 2.749          | 0.468           |
| 255.0                                                                  | 30.3               | 255.5               | 0.528                   | 11.216         | 12.951          | 0.095                     | 2.362          | 0.432           |
| 270.0                                                                  | 30.4               | 270.6               | 0.576                   | 8.493          | 13.679          | 0.075                     | 1.676          | 0.927           |
| 285.0                                                                  | 30.5               | 285.4               | 1.013                   | 6.996          | 14.482          | 0.242                     | 1.511          | 1.326           |
| 300.0                                                                  | 30.5               | 300.1               | 1.169                   | 4.361          | 13.696          | 0.347                     | 1.170          | 1.337           |
| 315.0                                                                  | 30.5               | 315.1               | 1.551                   | 3.401          | 13.921          | 0.392                     | 0.846          | 1.264           |
| 330.0                                                                  | 30.5               | 330.0               | 1.343                   | 2.481          | 13.822          | 0.407                     | 0.552          | 1.191           |
| 345.0                                                                  | 30.5               | 345.0               | 1.511                   | 2.327          | 13.438          | 0.410                     | 0.386          | 1.136           |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table S.22:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 6.0$  m and  $T_p = 16.2$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | -0.2               | -19.6               | 0.715                   | 2.802          | 10.600          | 0.171                     | 0.617          | 0.278           |
| 15.0                                                                   | -0.4               | -11.2               | 0.733                   | 2.263          | 10.611          | 0.173                     | 0.506          | 0.267           |
| 30.0                                                                   | -0.6               | -1.8                | 0.757                   | 2.230          | 10.502          | 0.174                     | 0.488          | 0.260           |
| 45.0                                                                   | -0.4               | 17.6                | 0.685                   | 3.204          | 10.581          | 0.169                     | 0.759          | 0.274           |
| 60.0                                                                   | -0.1               | 40.8                | 0.600                   | 4.484          | 10.865          | 0.149                     | 1.066          | 0.315           |
| 75.0                                                                   | 0.1                | 57.8                | 0.505                   | 4.673          | 11.074          | 0.115                     | 1.190          | 0.349           |
| 90.0                                                                   | 0.1                | 74.2                | 0.397                   | 4.128          | 11.429          | 0.063                     | 1.198          | 0.382           |
| 105.0                                                                  | -0.2               | 93.6                | 0.212                   | 4.067          | 11.645          | 0.023                     | 1.200          | 0.405           |
| 120.0                                                                  | -0.6               | 104.0               | 0.354                   | 4.882          | 11.555          | 0.052                     | 1.218          | 0.400           |
| 135.0                                                                  | -1.1               | 111.6               | 0.422                   | 4.598          | 11.369          | 0.079                     | 1.202          | 0.387           |
| 150.0                                                                  | -1.5               | 118.3               | 0.481                   | 4.286          | 11.034          | 0.100                     | 1.171          | 0.371           |
| 165.0                                                                  | -1.8               | 124.3               | 0.545                   | 3.676          | 11.187          | 0.116                     | 1.112          | 0.355           |
| 180.0                                                                  | -1.3               | 86.0                | 0.669                   | 3.133          | 11.134          | 0.147                     | 1.032          | 0.312           |
| 195.0                                                                  | 0.0                | 358.1               | 0.654                   | 3.237          | 11.039          | 0.152                     | 0.953          | 0.310           |
| 210.0                                                                  | 0.3                | 252.3               | 0.535                   | 4.291          | 11.230          | 0.072                     | 1.174          | 0.397           |
| 225.0                                                                  | 0.1                | 258.0               | 0.449                   | 4.853          | 11.586          | 0.056                     | 1.190          | 0.415           |
| 240.0                                                                  | 0.0                | 265.7               | 0.329                   | 5.103          | 11.721          | 0.036                     | 1.189          | 0.431           |
| 255.0                                                                  | 0.1                | 275.9               | 0.242                   | 5.000          | 11.831          | 0.033                     | 1.171          | 0.436           |
| 270.0                                                                  | 0.2                | 287.1               | 0.344                   | 5.282          | 11.714          | 0.067                     | 1.142          | 0.420           |
| 285.0                                                                  | 0.2                | 296.8               | 0.390                   | 4.837          | 11.455          | 0.101                     | 1.105          | 0.393           |
| 300.0                                                                  | 0.2                | 305.4               | 0.472                   | 4.352          | 11.217          | 0.126                     | 1.055          | 0.366           |
| 315.0                                                                  | 0.2                | 314.1               | 0.582                   | 3.647          | 11.156          | 0.145                     | 0.986          | 0.339           |
| 330.0                                                                  | 0.1                | 322.8               | 0.694                   | 4.175          | 10.901          | 0.157                     | 0.886          | 0.317           |
| 345.0                                                                  | -0.1               | 331.6               | 0.713                   | 3.695          | 10.717          | 0.165                     | 0.762          | 0.296           |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table S.23:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 6.0$  m and  $T_p = 16.2$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 4.2                | -13.9               | 0.917                   | 2.651          | 10.604          | 0.201                     | 0.590          | 0.286           |
| 15.0                                                                   | 4.1                | -5.4                | 0.879                   | 2.309          | 10.570          | 0.202                     | 0.511          | 0.280           |
| 30.0                                                                   | 4.0                | 5.6                 | 0.838                   | 2.396          | 10.715          | 0.201                     | 0.543          | 0.282           |
| 45.0                                                                   | 4.1                | 24.0                | 0.952                   | 3.221          | 10.810          | 0.192                     | 0.777          | 0.302           |
| 60.0                                                                   | 4.2                | 43.6                | 0.671                   | 3.974          | 10.965          | 0.167                     | 1.027          | 0.343           |
| 75.0                                                                   | 4.3                | 58.6                | 0.501                   | 4.302          | 11.270          | 0.126                     | 1.133          | 0.379           |
| 90.0                                                                   | 4.3                | 73.3                | 0.255                   | 3.931          | 11.348          | 0.065                     | 1.154          | 0.413           |
| 105.0                                                                  | 4.3                | 89.5                | 0.161                   | 5.095          | 11.825          | 0.017                     | 1.159          | 0.425           |
| 120.0                                                                  | 4.2                | 100.7               | 0.304                   | 4.468          | 11.595          | 0.034                     | 1.154          | 0.412           |
| 135.0                                                                  | 4.0                | 109.6               | 0.350                   | 4.752          | 11.271          | 0.055                     | 1.132          | 0.385           |
| 150.0                                                                  | 3.9                | 116.9               | 0.466                   | 4.095          | 11.088          | 0.071                     | 1.106          | 0.363           |
| 165.0                                                                  | 3.8                | 128.1               | 0.558                   | 3.747          | 10.951          | 0.090                     | 0.994          | 0.323           |
| 180.0                                                                  | 3.9                | 149.1               | 0.576                   | 2.781          | 10.743          | 0.109                     | 0.709          | 0.259           |
| 195.0                                                                  | 4.7                | 194.1               | 0.581                   | 2.467          | 10.807          | 0.111                     | 0.592          | 0.199           |
| 210.0                                                                  | 4.6                | 213.1               | 0.482                   | 3.196          | 10.723          | 0.105                     | 0.808          | 0.223           |
| 225.0                                                                  | 4.5                | 232.8               | 0.584                   | 4.026          | 11.219          | 0.091                     | 1.007          | 0.284           |
| 240.0                                                                  | 4.5                | 248.1               | 0.386                   | 4.556          | 11.198          | 0.065                     | 1.115          | 0.347           |
| 255.0                                                                  | 4.7                | 260.6               | 0.225                   | 4.510          | 11.449          | 0.036                     | 1.147          | 0.401           |
| 270.0                                                                  | 4.8                | 273.8               | 0.143                   | 4.995          | 11.491          | 0.018                     | 1.140          | 0.438           |
| 285.0                                                                  | 4.9                | 287.5               | 0.317                   | 5.276          | 11.682          | 0.070                     | 1.102          | 0.434           |
| 300.0                                                                  | 4.9                | 300.8               | 0.606                   | 3.981          | 11.646          | 0.128                     | 1.041          | 0.394           |
| 315.0                                                                  | 4.9                | 313.9               | 0.708                   | 3.374          | 10.956          | 0.166                     | 0.925          | 0.347           |
| 330.0                                                                  | 4.7                | 326.7               | 0.846                   | 3.297          | 10.790          | 0.187                     | 0.784          | 0.316           |
| 345.0                                                                  | 4.5                | 338.6               | 0.811                   | 3.151          | 10.778          | 0.197                     | 0.660          | 0.297           |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |



**Table S.24:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 6.0$  m and  $T_p = 16.2$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 9.9                | -1.3                | 0.922                   | 1.941          | 10.803          | 0.228                     | 0.230          | 0.300           |
| 15.0                                                                   | 9.9                | 13.8                | 1.084                   | 2.338          | 10.801          | 0.226                     | 0.421          | 0.304           |
| 30.0                                                                   | 9.9                | 28.9                | 0.916                   | 2.880          | 10.739          | 0.214                     | 0.653          | 0.318           |
| 45.0                                                                   | 9.9                | 43.9                | 0.724                   | 3.548          | 11.014          | 0.189                     | 0.834          | 0.352           |
| 60.0                                                                   | 10.0               | 58.7                | 0.477                   | 3.822          | 11.413          | 0.142                     | 0.955          | 0.398           |
| 75.0                                                                   | 10.1               | 73.5                | 0.295                   | 4.331          | 11.560          | 0.072                     | 0.956          | 0.440           |
| 90.0                                                                   | 10.0               | 88.3                | 0.093                   | 4.273          | 11.511          | 0.021                     | 0.981          | 0.440           |
| 105.0                                                                  | 10.0               | 103.2               | 0.175                   | 4.584          | 11.524          | 0.034                     | 1.005          | 0.402           |
| 120.0                                                                  | 9.7                | 117.3               | 0.280                   | 4.793          | 11.385          | 0.054                     | 1.040          | 0.358           |
| 135.0                                                                  | 9.7                | 132.1               | 0.339                   | 4.214          | 11.087          | 0.067                     | 0.924          | 0.298           |
| 150.0                                                                  | 9.7                | 147.6               | 0.319                   | 3.669          | 10.719          | 0.076                     | 0.900          | 0.248           |
| 165.0                                                                  | 9.8                | 163.1               | 0.350                   | 3.398          | 10.485          | 0.080                     | 0.815          | 0.215           |
| 180.0                                                                  | 9.9                | 178.6               | 0.335                   | 2.904          | 10.281          | 0.081                     | 0.635          | 0.180           |
| 195.0                                                                  | 10.0               | 194.3               | 0.373                   | 2.706          | 10.307          | 0.082                     | 0.613          | 0.146           |
| 210.0                                                                  | 9.9                | 210.5               | 0.419                   | 2.930          | 10.637          | 0.079                     | 0.888          | 0.162           |
| 225.0                                                                  | 9.8                | 226.6               | 0.438                   | 3.588          | 11.097          | 0.073                     | 1.113          | 0.206           |
| 240.0                                                                  | 9.8                | 242.1               | 0.319                   | 3.753          | 11.452          | 0.061                     | 1.235          | 0.277           |
| 255.0                                                                  | 10.0               | 256.5               | 0.219                   | 3.998          | 11.530          | 0.042                     | 1.211          | 0.347           |
| 270.0                                                                  | 10.1               | 271.0               | 0.105                   | 4.766          | 11.431          | 0.023                     | 1.170          | 0.425           |
| 285.0                                                                  | 10.1               | 285.5               | 0.301                   | 4.898          | 11.824          | 0.064                     | 1.096          | 0.452           |
| 300.0                                                                  | 10.1               | 300.0               | 0.545                   | 4.273          | 11.359          | 0.137                     | 1.006          | 0.427           |
| 315.0                                                                  | 10.0               | 314.3               | 0.719                   | 3.372          | 10.972          | 0.186                     | 0.816          | 0.366           |
| 330.0                                                                  | 9.9                | 329.0               | 0.819                   | 2.636          | 10.990          | 0.213                     | 0.593          | 0.326           |
| 345.0                                                                  | 9.9                | 343.8               | 0.973                   | 2.382          | 10.798          | 0.223                     | 0.367          | 0.305           |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table S.25:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 6.0$  m and  $T_p = 16.2$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 15.1               | -0.5                | 0.894                   | 1.603          | 10.829          | 0.252                     | 0.200          | 0.326           |
| 15.0                                                                   | 15.1               | 14.6                | 0.994                   | 2.200          | 10.753          | 0.249                     | 0.400          | 0.327           |
| 30.0                                                                   | 15.1               | 29.7                | 0.863                   | 2.973          | 11.112          | 0.235                     | 0.638          | 0.346           |
| 45.0                                                                   | 15.1               | 44.7                | 0.797                   | 3.574          | 11.368          | 0.207                     | 0.829          | 0.389           |
| 60.0                                                                   | 15.1               | 59.5                | 0.529                   | 4.154          | 11.437          | 0.151                     | 0.972          | 0.439           |
| 75.0                                                                   | 15.2               | 74.4                | 0.301                   | 4.068          | 11.889          | 0.073                     | 0.887          | 0.461           |
| 90.0                                                                   | 15.2               | 89.3                | 0.117                   | 4.087          | 11.694          | 0.030                     | 0.896          | 0.438           |
| 105.0                                                                  | 15.2               | 104.2               | 0.206                   | 4.466          | 11.699          | 0.040                     | 0.945          | 0.383           |
| 120.0                                                                  | 15.1               | 118.8               | 0.275                   | 5.259          | 11.178          | 0.052                     | 1.212          | 0.367           |
| 135.0                                                                  | 15.0               | 134.0               | 0.325                   | 4.767          | 10.902          | 0.061                     | 1.203          | 0.299           |
| 150.0                                                                  | 15.1               | 149.3               | 0.279                   | 3.407          | 10.442          | 0.062                     | 0.837          | 0.222           |
| 165.0                                                                  | 15.2               | 164.4               | 0.233                   | 2.517          | 10.239          | 0.057                     | 0.438          | 0.165           |
| 180.0                                                                  | 15.1               | 179.4               | 0.269                   | 2.214          | 10.201          | 0.063                     | 0.393          | 0.147           |
| 195.0                                                                  | 15.1               | 194.6               | 0.297                   | 3.608          | 10.086          | 0.065                     | 0.588          | 0.131           |
| 210.0                                                                  | 15.1               | 209.9               | 0.289                   | 3.971          | 10.025          | 0.060                     | 0.935          | 0.122           |
| 225.0                                                                  | 15.1               | 225.6               | 0.340                   | 4.336          | 10.533          | 0.063                     | 1.431          | 0.154           |
| 240.0                                                                  | 15.1               | 241.0               | 0.361                   | 4.472          | 11.105          | 0.056                     | 1.473          | 0.233           |
| 255.0                                                                  | 15.2               | 255.6               | 0.246                   | 4.724          | 11.399          | 0.045                     | 1.304          | 0.303           |
| 270.0                                                                  | 15.2               | 270.4               | 0.143                   | 4.798          | 11.431          | 0.033                     | 1.215          | 0.408           |
| 285.0                                                                  | 15.2               | 285.2               | 0.246                   | 5.045          | 11.655          | 0.066                     | 1.126          | 0.470           |
| 300.0                                                                  | 15.2               | 299.8               | 0.534                   | 4.458          | 11.455          | 0.147                     | 1.015          | 0.478           |
| 315.0                                                                  | 15.1               | 314.5               | 0.712                   | 3.384          | 11.302          | 0.204                     | 0.777          | 0.420           |
| 330.0                                                                  | 15.1               | 329.4               | 0.928                   | 2.764          | 11.019          | 0.233                     | 0.539          | 0.366           |
| 345.0                                                                  | 15.1               | 344.4               | 1.070                   | 1.922          | 10.902          | 0.248                     | 0.303          | 0.337           |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table S.26:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 6.0$  m and  $T_p = 16.2$  s; Ship's speed is 20.0 Knots

| <b>Cmd<br/>Heading</b>                                                 | <b>Actual<br/>Mean</b> |                     | <b>Absolute<br/>Maximum</b> |                |                 | <b>Standard<br/>Deviation</b> |                |                 |
|------------------------------------------------------------------------|------------------------|---------------------|-----------------------------|----------------|-----------------|-------------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts           | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$             | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$               | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 20.2                   | -0.2                | 1.164                       | 1.850          | 11.179          | 0.274                         | 0.227          | 0.419           |
| 15.0                                                                   | 20.2                   | 14.9                | 1.060                       | 2.332          | 11.180          | 0.269                         | 0.431          | 0.418           |
| 30.0                                                                   | 20.2                   | 29.9                | 1.003                       | 3.269          | 11.311          | 0.255                         | 0.662          | 0.437           |
| 45.0                                                                   | 20.3                   | 44.9                | 0.824                       | 3.717          | 11.517          | 0.223                         | 0.864          | 0.477           |
| 60.0                                                                   | 20.3                   | 59.8                | 0.570                       | 4.505          | 11.639          | 0.162                         | 1.041          | 0.501           |
| 75.0                                                                   | 20.3                   | 74.7                | 0.289                       | 3.679          | 11.645          | 0.077                         | 0.858          | 0.485           |
| 90.0                                                                   | 20.3                   | 89.6                | 0.154                       | 3.869          | 11.667          | 0.040                         | 0.850          | 0.431           |
| 105.0                                                                  | 20.3                   | 104.6               | 0.230                       | 4.584          | 11.363          | 0.049                         | 0.916          | 0.359           |
| 120.0                                                                  | 20.3                   | 119.4               | 0.277                       | 5.197          | 10.722          | 0.060                         | 1.550          | 0.366           |
| 135.0                                                                  | 20.2                   | 134.7               | 0.258                       | 4.090          | 10.242          | 0.066                         | 1.371          | 0.255           |
| 150.0                                                                  | 20.2                   | 149.6               | 0.347                       | 3.132          | 10.305          | 0.078                         | 0.917          | 0.192           |
| 165.0                                                                  | 20.3                   | 164.7               | 0.314                       | 2.430          | 10.253          | 0.072                         | 0.439          | 0.142           |
| 180.0                                                                  | 20.3                   | 179.7               | 0.364                       | 2.754          | 10.157          | 0.077                         | 0.361          | 0.122           |
| 195.0                                                                  | 20.3                   | 194.8               | 0.352                       | 4.662          | 10.090          | 0.074                         | 0.659          | 0.135           |
| 210.0                                                                  | 20.2                   | 210.0               | 0.266                       | 5.266          | 10.068          | 0.070                         | 1.106          | 0.169           |
| 225.0                                                                  | 20.3                   | 224.9               | 0.244                       | 5.660          | 9.992           | 0.053                         | 1.245          | 0.167           |
| 240.0                                                                  | 20.3                   | 240.5               | 0.338                       | 5.837          | 10.423          | 0.061                         | 1.791          | 0.187           |
| 255.0                                                                  | 20.3                   | 255.3               | 0.304                       | 5.027          | 11.430          | 0.052                         | 1.326          | 0.267           |
| 270.0                                                                  | 20.3                   | 270.2               | 0.153                       | 4.984          | 11.410          | 0.042                         | 1.222          | 0.392           |
| 285.0                                                                  | 20.3                   | 285.1               | 0.267                       | 4.617          | 11.457          | 0.069                         | 1.129          | 0.490           |
| 300.0                                                                  | 20.3                   | 299.8               | 0.548                       | 5.598          | 11.718          | 0.156                         | 1.014          | 0.551           |
| 315.0                                                                  | 20.3                   | 314.7               | 0.880                       | 3.676          | 11.373          | 0.219                         | 0.755          | 0.521           |
| 330.0                                                                  | 20.2                   | 329.6               | 0.965                       | 2.864          | 11.278          | 0.252                         | 0.508          | 0.472           |
| 345.0                                                                  | 20.2                   | 344.7               | 1.179                       | 2.139          | 11.292          | 0.269                         | 0.269          | 0.437           |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                        |                     |                             |                |                 |                               |                |                 |

**Table S.27:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 6.0$  m and  $T_p = 16.2$  s; Ship's speed is 25.0 Knots

| Cmd<br>Heading                                                         | Actual<br>Mean |                     | Absolute<br>Maximum |                |                 | Standard<br>Deviation |                |                 |
|------------------------------------------------------------------------|----------------|---------------------|---------------------|----------------|-----------------|-----------------------|----------------|-----------------|
|                                                                        | Speed<br>kts   | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$     | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$       | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 25.3           | -0.1                | 1.230               | 2.188          | 11.550          | 0.293                 | 0.275          | 0.587           |
| 15.0                                                                   | 25.3           | 15.0                | 1.135               | 2.596          | 11.859          | 0.286                 | 0.459          | 0.581           |
| 30.0                                                                   | 25.3           | 30.0                | 1.051               | 3.389          | 11.511          | 0.272                 | 0.687          | 0.589           |
| 45.0                                                                   | 25.4           | 45.0                | 0.888               | 4.120          | 11.794          | 0.238                 | 0.901          | 0.610           |
| 60.0                                                                   | 25.4           | 60.0                | 0.589               | 4.676          | 12.071          | 0.174                 | 1.091          | 0.599           |
| 75.0                                                                   | 25.4           | 74.8                | 0.316               | 4.443          | 12.270          | 0.081                 | 0.858          | 0.507           |
| 90.0                                                                   | 25.4           | 89.7                | 0.190               | 3.687          | 11.601          | 0.048                 | 0.847          | 0.421           |
| 105.0                                                                  | 25.4           | 104.8               | 0.268               | 4.470          | 11.371          | 0.062                 | 0.921          | 0.334           |
| 120.0                                                                  | 25.3           | 119.8               | 0.378               | 6.194          | 10.334          | 0.075                 | 1.812          | 0.340           |
| 135.0                                                                  | 25.3           | 134.8               | 0.268               | 4.061          | 10.041          | 0.082                 | 1.319          | 0.208           |
| 150.0                                                                  | 25.4           | 149.7               | 0.350               | 3.810          | 10.021          | 0.086                 | 0.896          | 0.151           |
| 165.0                                                                  | 25.6           | 164.8               | 0.278               | 2.393          | 9.998           | 0.080                 | 0.413          | 0.094           |
| 180.0                                                                  | 25.6           | 179.8               | 0.362               | 2.625          | 10.117          | 0.109                 | 0.313          | 0.116           |
| 195.0                                                                  | 25.6           | 195.0               | 0.250               | 3.015          | 9.970           | 0.069                 | 0.415          | 0.081           |
| 210.0                                                                  | 25.4           | 210.1               | 0.325               | 5.145          | 10.067          | 0.091                 | 1.106          | 0.217           |
| 225.0                                                                  | 25.3           | 225.2               | 0.283               | 6.787          | 9.959           | 0.078                 | 1.597          | 0.279           |
| 240.0                                                                  | 25.4           | 240.2               | 0.277               | 6.976          | 9.943           | 0.064                 | 1.757          | 0.193           |
| 255.0                                                                  | 25.4           | 255.1               | 0.299               | 6.518          | 10.798          | 0.061                 | 1.283          | 0.238           |
| 270.0                                                                  | 25.4           | 270.1               | 0.187               | 4.785          | 11.434          | 0.050                 | 1.183          | 0.378           |
| 285.0                                                                  | 25.4           | 285.0               | 0.284               | 5.868          | 11.695          | 0.073                 | 1.119          | 0.519           |
| 300.0                                                                  | 25.4           | 299.8               | 0.556               | 5.111          | 11.766          | 0.166                 | 0.991          | 0.651           |
| 315.0                                                                  | 25.4           | 314.8               | 0.894               | 3.880          | 11.810          | 0.232                 | 0.718          | 0.660           |
| 330.0                                                                  | 25.3           | 329.8               | 1.023               | 2.843          | 11.821          | 0.268                 | 0.464          | 0.627           |
| 345.0                                                                  | 25.3           | 344.8               | 1.286               | 2.304          | 11.735          | 0.286                 | 0.269          | 0.599           |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                |                     |                     |                |                 |                       |                |                 |

**Table S.28:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 6.0$  m and  $T_p = 16.2$  s; Ship's speed is 30.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 30.5               | -0.0                | 1.265                   | 2.583          | 12.294          | 0.309                     | 0.327          | 0.785           |
| 15.0                                                                   | 30.5               | 15.0                | 1.218                   | 3.108          | 12.327          | 0.302                     | 0.491          | 0.777           |
| 30.0                                                                   | 30.5               | 30.1                | 1.222                   | 3.774          | 12.406          | 0.285                     | 0.694          | 0.773           |
| 45.0                                                                   | 30.5               | 45.1                | 0.959                   | 3.931          | 12.679          | 0.250                     | 0.918          | 0.768           |
| 60.0                                                                   | 30.4               | 60.0                | 0.667                   | 5.210          | 12.125          | 0.184                     | 1.147          | 0.711           |
| 75.0                                                                   | 30.5               | 74.9                | 0.273                   | 4.133          | 11.854          | 0.086                     | 0.866          | 0.536           |
| 90.0                                                                   | 30.5               | 89.8                | 0.224                   | 3.667          | 11.463          | 0.057                     | 0.884          | 0.410           |
| 105.0                                                                  | 30.5               | 104.8               | 0.307                   | 4.106          | 10.910          | 0.075                     | 1.011          | 0.312           |
| 120.0                                                                  | 30.4               | 119.9               | 0.362                   | 6.068          | 10.036          | 0.095                     | 2.063          | 0.326           |
| 135.0                                                                  | 30.4               | 134.8               | 0.448                   | 5.226          | 9.979           | 0.119                     | 1.566          | 0.218           |
| 150.0                                                                  | 30.8               | 149.6               | 0.388                   | 3.421          | 10.011          | 0.110                     | 0.782          | 0.134           |
| 165.0                                                                  | 30.8               | 164.7               | 0.625                   | 2.698          | 9.961           | 0.135                     | 0.486          | 0.098           |
| 180.0                                                                  | 30.5               | 179.7               | 0.407                   | 3.869          | 9.906           | 0.142                     | 0.454          | 0.103           |
| 195.0                                                                  | 30.9               | 195.0               | 0.445                   | 3.779          | 9.916           | 0.127                     | 0.596          | 0.110           |
| 210.0                                                                  | 30.7               | 210.1               | 0.363                   | 3.852          | 9.942           | 0.096                     | 0.867          | 0.136           |
| 225.0                                                                  | 30.4               | 225.1               | 0.285                   | 5.583          | 10.037          | 0.091                     | 1.404          | 0.271           |
| 240.0                                                                  | 30.4               | 240.1               | 0.289                   | 6.415          | 9.936           | 0.074                     | 1.711          | 0.256           |
| 255.0                                                                  | 30.5               | 255.1               | 0.277                   | 6.398          | 10.826          | 0.072                     | 1.195          | 0.219           |
| 270.0                                                                  | 30.5               | 270.0               | 0.229                   | 4.826          | 11.348          | 0.059                     | 1.086          | 0.367           |
| 285.0                                                                  | 30.5               | 285.0               | 0.300                   | 5.553          | 11.441          | 0.077                     | 1.068          | 0.550           |
| 300.0                                                                  | 30.5               | 299.9               | 0.617                   | 4.896          | 11.981          | 0.175                     | 0.956          | 0.759           |
| 315.0                                                                  | 30.5               | 314.9               | 0.906                   | 3.988          | 12.271          | 0.243                     | 0.697          | 0.807           |
| 330.0                                                                  | 30.5               | 329.9               | 1.162                   | 3.005          | 12.296          | 0.281                     | 0.464          | 0.803           |
| 345.0                                                                  | 30.5               | 344.9               | 1.184                   | 2.492          | 12.363          | 0.302                     | 0.313          | 0.794           |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table S.29:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 9.0$  m and  $T_p = 13.1$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | -1.0               | -32.0               | 1.403                   | 6.173          | 12.239          | 0.322                     | 1.382          | 0.548           |
| 15.0                                                                   | -1.6               | -24.8               | 1.781                   | 6.691          | 12.149          | 0.321                     | 1.337          | 0.531           |
| 30.0                                                                   | -3.1               | -86.6               | 1.479                   | 11.689         | 13.398          | 0.282                     | 1.958          | 0.719           |
| 45.0                                                                   | -3.0               | -71.3               | 1.320                   | 8.074          | 13.307          | 0.262                     | 2.051          | 0.737           |
| 60.0                                                                   | -2.5               | -84.7               | 1.194                   | 8.305          | 14.191          | 0.212                     | 2.143          | 0.834           |
| 75.0                                                                   | -0.5               | -74.5               | 1.533                   | 10.081         | 14.679          | 0.162                     | 2.132          | 0.865           |
| 90.0                                                                   | 0.2                | 62.4                | 1.356                   | 9.289          | 13.997          | 0.253                     | 1.948          | 0.735           |
| 105.0                                                                  | 0.3                | 87.5                | 0.935                   | 9.543          | 13.945          | 0.115                     | 2.063          | 0.889           |
| 120.0                                                                  | -2.6               | 104.1               | 0.985                   | 9.266          | 14.255          | 0.173                     | 2.095          | 0.873           |
| 135.0                                                                  | -3.6               | 108.0               | 0.862                   | 11.423         | 14.615          | 0.195                     | 2.064          | 0.848           |
| 150.0                                                                  | -4.1               | 81.2                | 1.720                   | 8.764          | 13.909          | 0.246                     | 2.124          | 0.773           |
| 165.0                                                                  | -2.9               | 44.8                | 1.652                   | 10.608         | 13.834          | 0.291                     | 1.843          | 0.650           |
| 180.0                                                                  | -1.0               | 11.2                | 1.643                   | 5.828          | 12.550          | 0.315                     | 1.476          | 0.546           |
| 195.0                                                                  | -0.3               | 31.9                | 1.520                   | 8.146          | 12.295          | 0.316                     | 1.579          | 0.599           |
| 210.0                                                                  | 0.2                | 39.3                | 1.295                   | 8.237          | 13.054          | 0.313                     | 1.679          | 0.634           |
| 225.0                                                                  | 0.4                | 273.9               | 1.106                   | 12.415         | 13.878          | 0.145                     | 2.141          | 0.873           |
| 240.0                                                                  | -0.1               | 274.4               | 1.186                   | 12.932         | 14.810          | 0.125                     | 2.154          | 0.892           |
| 255.0                                                                  | 0.5                | 282.3               | 1.102                   | 11.685         | 13.952          | 0.173                     | 2.058          | 0.869           |
| 270.0                                                                  | 0.7                | 288.3               | 1.190                   | 10.259         | 14.156          | 0.223                     | 1.992          | 0.826           |
| 285.0                                                                  | 0.7                | 294.8               | 1.150                   | 7.669          | 13.762          | 0.268                     | 1.874          | 0.756           |
| 300.0                                                                  | 0.5                | 299.8               | 1.244                   | 9.161          | 13.162          | 0.288                     | 1.792          | 0.717           |
| 315.0                                                                  | 0.5                | 306.0               | 1.247                   | 8.640          | 12.649          | 0.308                     | 1.716          | 0.671           |
| 330.0                                                                  | 0.2                | 311.9               | 1.355                   | 8.469          | 12.465          | 0.316                     | 1.667          | 0.641           |
| 345.0                                                                  | -0.0               | 319.7               | 1.559                   | 6.793          | 12.913          | 0.325                     | 1.489          | 0.593           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table S.30:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 9.0$  m and  $T_p = 13.1$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                            | <b>Absolute Maximum</b> |                       |                        | <b>Standard Deviation</b> |                       |                        |
|------------------------------------------------------------------------|--------------------|----------------------------|-------------------------|-----------------------|------------------------|---------------------------|-----------------------|------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts       | $\psi_{\text{MHP}}$<br>deg | Long<br>$\text{m/s}^2$  | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ | Long<br>$\text{m/s}^2$    | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ |
| 0.0                                                                    | 3.6                | -32.7                      | 1.467                   | 6.627                 | 12.064                 | 0.367                     | 1.436                 | 0.589                  |
| 15.0                                                                   | 3.4                | -24.6                      | 1.616                   | 5.383                 | 11.487                 | 0.371                     | 1.318                 | 0.560                  |
| 30.0                                                                   | 3.3                | -17.7                      | 1.685                   | 4.827                 | 11.496                 | 0.375                     | 1.255                 | 0.544                  |
| 45.0                                                                   | 3.1                | -10.1                      | 1.698                   | 4.622                 | 11.357                 | 0.374                     | 1.232                 | 0.535                  |
| 60.0                                                                   | 3.1                | -0.1                       | 2.195                   | 5.347                 | 11.401                 | 0.371                     | 1.234                 | 0.541                  |
| 75.0                                                                   | 3.2                | 11.7                       | 1.715                   | 6.787                 | 12.405                 | 0.356                     | 1.408                 | 0.569                  |
| 90.0                                                                   | 3.5                | 35.9                       | 1.459                   | 7.981                 | 14.241                 | 0.326                     | 1.716                 | 0.656                  |
| 105.0                                                                  | 3.3                | 33.0                       | 1.574                   | 10.053                | 14.142                 | 0.332                     | 1.670                 | 0.642                  |
| 120.0                                                                  | 3.7                | 64.9                       | 1.612                   | 10.891                | 14.854                 | 0.244                     | 1.927                 | 0.803                  |
| 135.0                                                                  | 3.2                | 33.9                       | 1.633                   | 12.104                | 13.260                 | 0.342                     | 1.570                 | 0.636                  |
| 150.0                                                                  | 3.3                | 43.2                       | 2.464                   | 9.564                 | 13.467                 | 0.336                     | 1.614                 | 0.641                  |
| 165.0                                                                  | 3.4                | 43.8                       | 1.617                   | 7.019                 | 13.062                 | 0.344                     | 1.542                 | 0.618                  |
| 180.0                                                                  | 3.8                | 96.3                       | 1.423                   | 7.725                 | 12.698                 | 0.302                     | 1.705                 | 0.532                  |
| 195.0                                                                  | 3.9                | 15.4                       | 1.464                   | 6.798                 | 12.064                 | 0.343                     | 1.662                 | 0.608                  |
| 210.0                                                                  | 4.1                | 30.3                       | 1.580                   | 7.654                 | 12.878                 | 0.340                     | 1.693                 | 0.647                  |
| 225.0                                                                  | 4.5                | 276.9                      | 1.292                   | 12.079                | 14.312                 | 0.149                     | 2.144                 | 0.913                  |
| 240.0                                                                  | 4.4                | 278.6                      | 1.059                   | 13.911                | 13.645                 | 0.151                     | 2.094                 | 0.920                  |
| 255.0                                                                  | 4.3                | 282.7                      | 1.486                   | 10.793                | 14.375                 | 0.178                     | 2.098                 | 0.919                  |
| 270.0                                                                  | 4.4                | 288.0                      | 1.338                   | 9.258                 | 14.561                 | 0.231                     | 1.975                 | 0.883                  |
| 285.0                                                                  | 4.5                | 293.0                      | 2.380                   | 8.599                 | 14.045                 | 0.280                     | 1.838                 | 0.821                  |
| 300.0                                                                  | 4.6                | 300.8                      | 1.499                   | 7.609                 | 13.313                 | 0.318                     | 1.715                 | 0.729                  |
| 315.0                                                                  | 4.4                | 308.9                      | 1.394                   | 7.634                 | 12.958                 | 0.337                     | 1.696                 | 0.665                  |
| 330.0                                                                  | 4.1                | 315.7                      | 1.511                   | 8.162                 | 12.592                 | 0.352                     | 1.584                 | 0.647                  |
| 345.0                                                                  | 3.9                | 321.6                      | 1.529                   | 7.102                 | 11.932                 | 0.362                     | 1.523                 | 0.612                  |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                            |                         |                       |                        |                           |                       |                        |

**Table S.31:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 9.0$  m and  $T_p = 13.1$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 8.9                | -5.5                | 1.962                   | 4.279          | 11.269          | 0.432                     | 0.790          | 0.562           |
| 15.0                                                                   | 8.6                | 8.2                 | 2.390                   | 4.261          | 11.454          | 0.428                     | 0.874          | 0.552           |
| 30.0                                                                   | 8.9                | 25.0                | 2.206                   | 5.184          | 11.532          | 0.413                     | 1.114          | 0.583           |
| 45.0                                                                   | 9.1                | 41.0                | 1.520                   | 6.102          | 11.527          | 0.384                     | 1.406          | 0.638           |
| 60.0                                                                   | 9.3                | 56.0                | 1.214                   | 7.884          | 12.825          | 0.339                     | 1.633          | 0.733           |
| 75.0                                                                   | 9.6                | 70.8                | 1.934                   | 8.403          | 14.694          | 0.249                     | 1.754          | 0.894           |
| 90.0                                                                   | 9.2                | 82.7                | 0.758                   | 8.097          | 14.327          | 0.115                     | 1.894          | 0.997           |
| 105.0                                                                  | 8.9                | 94.7                | 0.657                   | 13.922         | 14.963          | 0.075                     | 1.946          | 0.946           |
| 120.0                                                                  | 8.4                | 107.6               | 0.785                   | 11.690         | 14.502          | 0.124                     | 1.826          | 0.811           |
| 135.0                                                                  | 8.3                | 120.1               | 0.785                   | 8.742          | 12.733          | 0.143                     | 1.640          | 0.667           |
| 150.0                                                                  | 8.3                | 135.6               | 0.773                   | 6.580          | 12.560          | 0.151                     | 1.477          | 0.519           |
| 165.0                                                                  | 8.6                | 154.1               | 0.694                   | 5.779          | 11.681          | 0.151                     | 1.434          | 0.412           |
| 180.0                                                                  | 9.4                | 176.8               | 0.936                   | 5.199          | 10.823          | 0.147                     | 1.248          | 0.284           |
| 195.0                                                                  | 9.5                | 196.0               | 1.338                   | 6.115          | 11.379          | 0.156                     | 1.167          | 0.231           |
| 210.0                                                                  | 9.0                | 219.7               | 0.937                   | 7.144          | 12.000          | 0.165                     | 1.558          | 0.327           |
| 225.0                                                                  | 8.3                | 253.8               | 1.334                   | 19.168         | 13.789          | 0.149                     | 2.138          | 0.732           |
| 240.0                                                                  | 8.4                | 263.7               | 1.227                   | 18.895         | 13.409          | 0.118                     | 2.222          | 0.864           |
| 255.0                                                                  | 8.6                | 271.4               | 1.132                   | 13.384         | 14.376          | 0.108                     | 2.204          | 0.945           |
| 270.0                                                                  | 8.9                | 278.8               | 2.018                   | 12.635         | 14.855          | 0.142                     | 2.168          | 1.001           |
| 285.0                                                                  | 9.7                | 288.4               | 1.200                   | 8.896          | 13.464          | 0.241                     | 1.994          | 0.949           |
| 300.0                                                                  | 9.8                | 300.2               | 1.817                   | 7.922          | 13.711          | 0.337                     | 1.677          | 0.794           |
| 315.0                                                                  | 9.6                | 313.2               | 1.592                   | 6.122          | 12.100          | 0.381                     | 1.381          | 0.670           |
| 330.0                                                                  | 9.4                | 326.9               | 2.119                   | 5.582          | 11.834          | 0.409                     | 1.161          | 0.612           |
| 345.0                                                                  | 9.1                | 340.6               | 1.861                   | 5.928          | 11.284          | 0.427                     | 0.943          | 0.584           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |



**Table S.32:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 9.0$  m and  $T_p = 13.1$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 14.7               | -1.3                | 2.065                   | 3.902          | 11.868          | 0.470                     | 0.579          | 0.624           |
| 15.0                                                                   | 14.7               | 13.9                | 1.963                   | 3.749          | 11.784          | 0.466                     | 0.752          | 0.611           |
| 30.0                                                                   | 14.7               | 29.1                | 1.758                   | 4.618          | 11.507          | 0.448                     | 1.021          | 0.639           |
| 45.0                                                                   | 14.8               | 44.3                | 1.692                   | 6.761          | 12.039          | 0.412                     | 1.280          | 0.691           |
| 60.0                                                                   | 14.9               | 58.9                | 1.292                   | 8.017          | 12.924          | 0.355                     | 1.552          | 0.837           |
| 75.0                                                                   | 15.0               | 73.3                | 0.932                   | 7.801          | 13.808          | 0.233                     | 1.628          | 0.998           |
| 90.0                                                                   | 14.9               | 87.8                | 0.505                   | 8.844          | 14.446          | 0.073                     | 1.744          | 1.006           |
| 105.0                                                                  | 14.9               | 102.9               | 0.776                   | 15.909         | 13.866          | 0.095                     | 1.792          | 0.816           |
| 120.0                                                                  | 14.4               | 116.4               | 0.534                   | 6.826          | 12.364          | 0.110                     | 1.763          | 0.678           |
| 135.0                                                                  | 14.4               | 131.7               | 0.599                   | 6.656          | 11.872          | 0.108                     | 1.760          | 0.551           |
| 150.0                                                                  | 15.1               | 148.7               | 0.681                   | 5.122          | 11.195          | 0.115                     | 1.350          | 0.367           |
| 165.0                                                                  | 15.0               | 163.5               | 0.623                   | 4.529          | 10.730          | 0.109                     | 0.872          | 0.301           |
| 180.0                                                                  | 14.7               | 178.5               | 0.577                   | 4.855          | 10.324          | 0.121                     | 0.887          | 0.269           |
| 195.0                                                                  | 14.7               | 194.2               | 0.825                   | 5.555          | 10.850          | 0.124                     | 1.086          | 0.221           |
| 210.0                                                                  | 15.0               | 209.9               | 0.633                   | 5.675          | 10.554          | 0.110                     | 1.392          | 0.214           |
| 225.0                                                                  | 14.4               | 229.8               | 1.562                   | 12.837         | 12.095          | 0.136                     | 2.148          | 0.392           |
| 240.0                                                                  | 14.0               | 247.1               | 0.866                   | 13.774         | 12.866          | 0.134                     | 2.336          | 0.575           |
| 255.0                                                                  | 14.2               | 260.4               | 0.999                   | 19.707         | 14.762          | 0.115                     | 2.377          | 0.772           |
| 270.0                                                                  | 14.6               | 273.5               | 0.833                   | 13.339         | 14.182          | 0.091                     | 2.286          | 1.003           |
| 285.0                                                                  | 15.0               | 286.7               | 1.205                   | 11.082         | 13.750          | 0.231                     | 2.102          | 1.046           |
| 300.0                                                                  | 15.0               | 300.0               | 1.311                   | 6.637          | 13.448          | 0.347                     | 1.690          | 0.909           |
| 315.0                                                                  | 14.9               | 314.0               | 1.833                   | 4.592          | 12.464          | 0.409                     | 1.249          | 0.763           |
| 330.0                                                                  | 14.8               | 328.7               | 1.777                   | 4.119          | 11.818          | 0.444                     | 0.906          | 0.690           |
| 345.0                                                                  | 14.7               | 343.6               | 2.152                   | 3.824          | 11.743          | 0.464                     | 0.671          | 0.647           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table S.33:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 9.0$  m and  $T_p = 13.1$  s; Ship's speed is 20.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 20.0               | -0.5                | 2.439                   | 3.122          | 12.464          | 0.502                     | 0.564          | 0.801           |
| 15.0                                                                   | 20.0               | 14.6                | 1.997                   | 3.842          | 12.132          | 0.494                     | 0.756          | 0.786           |
| 30.0                                                                   | 20.0               | 29.8                | 1.943                   | 5.088          | 12.390          | 0.474                     | 1.004          | 0.801           |
| 45.0                                                                   | 20.0               | 44.8                | 1.768                   | 6.112          | 12.607          | 0.437                     | 1.254          | 0.854           |
| 60.0                                                                   | 20.1               | 59.5                | 1.551                   | 8.817          | 13.493          | 0.371                     | 1.515          | 0.980           |
| 75.0                                                                   | 20.2               | 74.0                | 1.151                   | 9.197          | 15.167          | 0.234                     | 1.598          | 1.083           |
| 90.0                                                                   | 20.1               | 88.7                | 0.417                   | 8.892          | 14.555          | 0.077                     | 1.685          | 0.994           |
| 105.0                                                                  | 20.1               | 104.0               | 0.778                   | 9.630          | 13.750          | 0.099                     | 1.863          | 0.748           |
| 120.0                                                                  | 19.9               | 118.4               | 0.531                   | 6.877          | 12.303          | 0.109                     | 2.242          | 0.672           |
| 135.0                                                                  | 19.9               | 134.3               | 0.945                   | 7.579          | 12.342          | 0.124                     | 2.119          | 0.463           |
| 150.0                                                                  | 19.9               | 149.2               | 0.721                   | 5.161          | 10.788          | 0.133                     | 1.286          | 0.298           |
| 165.0                                                                  | 20.0               | 164.1               | 0.668                   | 4.383          | 10.557          | 0.142                     | 0.894          | 0.263           |
| 180.0                                                                  | 20.3               | 179.2               | 0.984                   | 4.642          | 10.595          | 0.154                     | 0.789          | 0.239           |
| 195.0                                                                  | 20.2               | 194.7               | 0.671                   | 5.761          | 10.204          | 0.134                     | 1.100          | 0.268           |
| 210.0                                                                  | 20.1               | 210.1               | 0.555                   | 6.633          | 10.135          | 0.111                     | 1.607          | 0.362           |
| 225.0                                                                  | 20.0               | 225.4               | 0.688                   | 7.594          | 11.493          | 0.102                     | 2.092          | 0.354           |
| 240.0                                                                  | 19.8               | 242.3               | 0.791                   | 8.530          | 12.819          | 0.125                     | 2.655          | 0.430           |
| 255.0                                                                  | 19.8               | 257.5               | 0.598                   | 16.935         | 13.236          | 0.118                     | 2.527          | 0.637           |
| 270.0                                                                  | 20.0               | 271.9               | 0.745                   | 12.690         | 14.177          | 0.088                     | 2.376          | 0.974           |
| 285.0                                                                  | 20.2               | 286.0               | 1.166                   | 10.236         | 14.035          | 0.227                     | 2.172          | 1.135           |
| 300.0                                                                  | 20.2               | 299.9               | 1.301                   | 8.295          | 13.321          | 0.363                     | 1.690          | 1.088           |
| 315.0                                                                  | 20.1               | 314.4               | 1.675                   | 5.169          | 12.446          | 0.432                     | 1.182          | 0.959           |
| 330.0                                                                  | 20.1               | 329.3               | 2.051                   | 3.943          | 12.461          | 0.471                     | 0.861          | 0.881           |
| 345.0                                                                  | 20.0               | 344.3               | 1.971                   | 3.596          | 12.358          | 0.490                     | 0.659          | 0.829           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table S.34:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 9.0$  m and  $T_p = 13.1$  s; Ship's speed is 25.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 25.2               | -0.2                | 2.130                   | 3.599          | 13.226          | 0.522                     | 0.624          | 1.079           |
| 15.0                                                                   | 25.2               | 14.9                | 2.025                   | 4.639          | 13.064          | 0.521                     | 0.772          | 1.060           |
| 30.0                                                                   | 25.2               | 30.0                | 2.129                   | 5.574          | 13.046          | 0.497                     | 1.028          | 1.063           |
| 45.0                                                                   | 25.2               | 45.0                | 1.976                   | 6.607          | 13.327          | 0.458                     | 1.245          | 1.094           |
| 60.0                                                                   | 25.2               | 59.7                | 1.339                   | 7.508          | 14.170          | 0.385                     | 1.489          | 1.159           |
| 75.0                                                                   | 25.2               | 74.3                | 1.020                   | 8.450          | 14.662          | 0.240                     | 1.582          | 1.179           |
| 90.0                                                                   | 25.2               | 89.1                | 0.609                   | 8.521          | 14.484          | 0.087                     | 1.710          | 0.978           |
| 105.0                                                                  | 25.2               | 104.4               | 0.428                   | 7.804          | 12.497          | 0.105                     | 2.021          | 0.675           |
| 120.0                                                                  | 25.0               | 119.4               | 0.982                   | 9.169          | 11.739          | 0.134                     | 2.847          | 0.653           |
| 135.0                                                                  | 24.9               | 134.0               | 0.743                   | 7.002          | 11.516          | 0.148                     | 2.078          | 0.393           |
| 150.0                                                                  | 25.1               | 149.2               | 0.816                   | 6.367          | 10.695          | 0.163                     | 1.388          | 0.290           |
| 165.0                                                                  | 25.7               | 164.2               | 0.739                   | 4.622          | 10.125          | 0.152                     | 0.858          | 0.218           |
| 180.0                                                                  | 26.2               | 179.6               | 0.647                   | 4.414          | 10.043          | 0.167                     | 0.683          | 0.189           |
| 195.0                                                                  | 25.8               | 195.0               | 0.728                   | 4.854          | 10.031          | 0.142                     | 0.888          | 0.217           |
| 210.0                                                                  | 25.2               | 209.9               | 0.569                   | 5.800          | 10.165          | 0.141                     | 1.389          | 0.325           |
| 225.0                                                                  | 25.0               | 225.4               | 0.617                   | 7.261          | 10.138          | 0.116                     | 2.186          | 0.464           |
| 240.0                                                                  | 25.0               | 240.5               | 0.716                   | 9.322          | 12.341          | 0.129                     | 3.105          | 0.531           |
| 255.0                                                                  | 25.0               | 256.3               | 0.632                   | 12.478         | 13.933          | 0.121                     | 2.621          | 0.539           |
| 270.0                                                                  | 25.1               | 271.1               | 0.804                   | 13.452         | 14.687          | 0.101                     | 2.459          | 0.926           |
| 285.0                                                                  | 25.3               | 285.7               | 0.956                   | 10.894         | 14.144          | 0.230                     | 2.250          | 1.233           |
| 300.0                                                                  | 25.3               | 300.0               | 1.318                   | 6.644          | 13.817          | 0.373                     | 1.696          | 1.268           |
| 315.0                                                                  | 25.3               | 314.7               | 1.812                   | 5.546          | 13.624          | 0.447                     | 1.220          | 1.198           |
| 330.0                                                                  | 25.3               | 329.6               | 2.043                   | 3.859          | 13.203          | 0.490                     | 0.852          | 1.152           |
| 345.0                                                                  | 25.2               | 344.7               | 1.969                   | 3.886          | 13.495          | 0.514                     | 0.671          | 1.112           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table S.35:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 9.0$  m and  $T_p = 13.1$  s; Ship's speed is 30.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 30.4               | -0.0                | 1.940                   | 4.320          | 14.147          | 0.534                     | 0.700          | 1.396           |
| 15.0                                                                   | 30.4               | 15.1                | 2.144                   | 4.907          | 14.034          | 0.533                     | 0.842          | 1.371           |
| 30.0                                                                   | 30.4               | 30.1                | 1.845                   | 6.212          | 14.030          | 0.512                     | 1.058          | 1.357           |
| 45.0                                                                   | 30.4               | 45.0                | 2.086                   | 8.236          | 14.067          | 0.473                     | 1.265          | 1.345           |
| 60.0                                                                   | 30.3               | 59.8                | 1.454                   | 6.569          | 14.271          | 0.400                     | 1.470          | 1.354           |
| 75.0                                                                   | 30.3               | 74.5                | 1.135                   | 9.291          | 15.415          | 0.247                     | 1.584          | 1.269           |
| 90.0                                                                   | 30.3               | 89.3                | 0.908                   | 9.893          | 14.655          | 0.100                     | 1.813          | 0.962           |
| 105.0                                                                  | 30.2               | 104.5               | 1.401                   | 16.661         | 13.024          | 0.134                     | 2.301          | 0.646           |
| 120.0                                                                  | 29.9               | 119.2               | 0.698                   | 8.201          | 10.991          | 0.162                     | 2.833          | 0.589           |
| 135.0                                                                  | 29.6               | 133.6               | 1.198                   | 8.199          | 11.948          | 0.224                     | 2.310          | 0.454           |
| 150.0                                                                  | 30.6               | 148.6               | 1.156                   | 5.529          | 10.256          | 0.213                     | 1.540          | 0.321           |
| 165.0                                                                  | 30.9               | 163.5               | 1.286                   | 5.910          | 10.166          | 0.243                     | 1.128          | 0.321           |
| 180.0                                                                  | 31.5               | 179.1               | 1.475                   | 5.788          | 10.072          | 0.243                     | 1.052          | 0.309           |
| 195.0                                                                  | 31.1               | 194.7               | 1.102                   | 5.605          | 10.090          | 0.237                     | 1.234          | 0.312           |
| 210.0                                                                  | 30.8               | 210.7               | 1.156                   | 5.954          | 10.023          | 0.203                     | 1.659          | 0.317           |
| 225.0                                                                  | 29.7               | 226.5               | 1.026                   | 9.152          | 12.091          | 0.224                     | 2.520          | 0.549           |
| 240.0                                                                  | 30.0               | 240.6               | 0.653                   | 8.567          | 12.814          | 0.143                     | 2.942          | 0.586           |
| 255.0                                                                  | 30.2               | 255.6               | 0.554                   | 10.161         | 12.589          | 0.133                     | 2.643          | 0.512           |
| 270.0                                                                  | 30.3               | 270.7               | 0.892                   | 12.098         | 14.747          | 0.112                     | 2.450          | 0.889           |
| 285.0                                                                  | 30.4               | 285.6               | 1.068                   | 13.177         | 14.363          | 0.232                     | 2.364          | 1.303           |
| 300.0                                                                  | 30.4               | 300.1               | 1.392                   | 6.930          | 14.422          | 0.376                     | 1.761          | 1.451           |
| 315.0                                                                  | 30.4               | 314.9               | 1.865                   | 5.396          | 14.148          | 0.459                     | 1.270          | 1.457           |
| 330.0                                                                  | 30.4               | 329.9               | 2.047                   | 4.985          | 13.999          | 0.502                     | 0.973          | 1.441           |
| 345.0                                                                  | 30.4               | 344.9               | 1.980                   | 4.320          | 14.207          | 0.528                     | 0.757          | 1.418           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table S.36:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 9.0$  m and  $T_p = 18.5$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | -1.2               | -28.3               | 0.974                   | 4.180          | 11.264          | 0.188                     | 0.973          | 0.358           |
| 15.0                                                                   | -2.4               | -147.7              | 0.914                   | 4.924          | 11.388          | 0.177                     | 1.054          | 0.422           |
| 30.0                                                                   | -1.7               | -66.4               | 1.088                   | 5.183          | 11.475          | 0.179                     | 1.608          | 0.413           |
| 45.0                                                                   | -0.1               | 23.7                | 0.888                   | 4.403          | 11.372          | 0.196                     | 1.104          | 0.396           |
| 60.0                                                                   | 0.5                | 48.8                | 0.607                   | 5.047          | 11.279          | 0.149                     | 1.328          | 0.449           |
| 75.0                                                                   | 0.7                | 68.5                | 0.486                   | 5.463          | 11.617          | 0.088                     | 1.377          | 0.484           |
| 90.0                                                                   | 0.2                | 90.5                | 0.216                   | 5.199          | 11.880          | 0.028                     | 1.387          | 0.515           |
| 105.0                                                                  | -0.4               | 103.0               | 0.411                   | 5.501          | 11.847          | 0.048                     | 1.401          | 0.520           |
| 120.0                                                                  | -1.2               | 112.5               | 0.489                   | 5.662          | 12.139          | 0.077                     | 1.404          | 0.511           |
| 135.0                                                                  | -1.9               | 121.3               | 0.452                   | 5.410          | 11.722          | 0.109                     | 1.356          | 0.494           |
| 150.0                                                                  | -2.4               | 131.4               | 0.540                   | 4.889          | 11.195          | 0.139                     | 1.233          | 0.461           |
| 165.0                                                                  | -2.4               | 144.6               | 0.697                   | 4.627          | 11.272          | 0.169                     | 1.006          | 0.425           |
| 180.0                                                                  | -1.6               | 164.4               | 0.792                   | 3.747          | 11.197          | 0.186                     | 0.601          | 0.375           |
| 195.0                                                                  | 0.3                | 233.5               | 0.798                   | 5.848          | 11.314          | 0.126                     | 1.330          | 0.400           |
| 210.0                                                                  | 0.0                | 243.7               | 0.706                   | 5.494          | 11.486          | 0.100                     | 1.399          | 0.432           |
| 225.0                                                                  | -0.2               | 252.5               | 0.514                   | 5.507          | 11.606          | 0.074                     | 1.434          | 0.457           |
| 240.0                                                                  | -0.4               | 261.1               | 0.353                   | 5.621          | 11.667          | 0.048                     | 1.431          | 0.476           |
| 255.0                                                                  | -0.6               | 270.1               | 0.201                   | 6.005          | 11.824          | 0.029                     | 1.409          | 0.490           |
| 270.0                                                                  | -0.6               | 279.8               | 0.342                   | 5.940          | 11.888          | 0.041                     | 1.373          | 0.485           |
| 285.0                                                                  | -0.5               | 289.4               | 0.590                   | 5.981          | 11.855          | 0.075                     | 1.319          | 0.470           |
| 300.0                                                                  | -0.5               | 298.8               | 0.519                   | 5.932          | 11.574          | 0.108                     | 1.254          | 0.446           |
| 315.0                                                                  | -0.4               | 307.9               | 0.685                   | 5.360          | 11.273          | 0.138                     | 1.184          | 0.420           |
| 330.0                                                                  | -0.5               | 317.1               | 0.748                   | 5.302          | 11.199          | 0.162                     | 1.103          | 0.393           |
| 345.0                                                                  | -0.7               | 325.3               | 0.922                   | 4.679          | 11.122          | 0.180                     | 1.024          | 0.369           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table S.37:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 9.0$  m and  $T_p = 18.5$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 3.8                | -27.9               | 1.019                   | 5.101          | 10.846          | 0.221                     | 1.040          | 0.369           |
| 15.0                                                                   | 3.7                | -20.6               | 0.977                   | 4.214          | 10.897          | 0.231                     | 0.965          | 0.360           |
| 30.0                                                                   | 3.6                | -12.5               | 1.061                   | 3.970          | 10.805          | 0.236                     | 0.893          | 0.357           |
| 45.0                                                                   | 3.6                | -1.5                | 1.253                   | 4.128          | 10.848          | 0.238                     | 0.859          | 0.366           |
| 60.0                                                                   | 3.8                | 23.5                | 0.912                   | 4.621          | 11.421          | 0.220                     | 1.041          | 0.411           |
| 75.0                                                                   | 4.3                | 56.6                | 0.679                   | 5.343          | 11.858          | 0.137                     | 1.303          | 0.493           |
| 90.0                                                                   | 4.4                | 79.3                | 0.274                   | 5.373          | 11.868          | 0.044                     | 1.309          | 0.531           |
| 105.0                                                                  | 4.3                | 95.3                | 0.158                   | 5.614          | 12.038          | 0.023                     | 1.308          | 0.534           |
| 120.0                                                                  | 4.1                | 107.3               | 0.337                   | 5.878          | 12.231          | 0.044                     | 1.300          | 0.520           |
| 135.0                                                                  | 3.8                | 115.8               | 0.341                   | 5.839          | 11.668          | 0.066                     | 1.279          | 0.499           |
| 150.0                                                                  | 3.6                | 125.1               | 0.557                   | 5.300          | 11.637          | 0.090                     | 1.227          | 0.468           |
| 165.0                                                                  | 3.4                | 134.7               | 0.686                   | 4.887          | 11.306          | 0.110                     | 1.133          | 0.429           |
| 180.0                                                                  | 3.4                | 146.6               | 0.871                   | 4.362          | 11.247          | 0.127                     | 0.982          | 0.379           |
| 195.0                                                                  | 3.5                | 165.0               | 0.814                   | 4.288          | 11.381          | 0.141                     | 0.812          | 0.324           |
| 210.0                                                                  | 4.4                | 215.1               | 0.637                   | 4.711          | 10.853          | 0.125                     | 1.070          | 0.278           |
| 225.0                                                                  | 4.3                | 236.0               | 0.526                   | 5.139          | 11.616          | 0.097                     | 1.285          | 0.348           |
| 240.0                                                                  | 4.4                | 249.7               | 0.425                   | 5.516          | 11.494          | 0.067                     | 1.386          | 0.403           |
| 255.0                                                                  | 4.5                | 261.8               | 0.275                   | 6.055          | 11.593          | 0.038                     | 1.423          | 0.445           |
| 270.0                                                                  | 4.6                | 274.3               | 0.116                   | 5.731          | 11.933          | 0.021                     | 1.407          | 0.481           |
| 285.0                                                                  | 4.7                | 287.4               | 0.351                   | 6.488          | 11.613          | 0.062                     | 1.364          | 0.481           |
| 300.0                                                                  | 4.7                | 300.0               | 0.481                   | 5.523          | 11.391          | 0.120                     | 1.268          | 0.456           |
| 315.0                                                                  | 4.5                | 310.9               | 0.700                   | 5.297          | 11.507          | 0.166                     | 1.186          | 0.423           |
| 330.0                                                                  | 4.2                | 318.6               | 0.849                   | 5.442          | 11.027          | 0.191                     | 1.143          | 0.400           |
| 345.0                                                                  | 3.9                | 325.1               | 0.985                   | 5.438          | 10.910          | 0.207                     | 1.105          | 0.383           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table S.38:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 9.0$  m and  $T_p = 18.5$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 9.4                | -3.3                | 1.195                   | 3.385          | 10.854          | 0.273                     | 0.569          | 0.379           |
| 15.0                                                                   | 9.5                | 11.9                | 1.170                   | 3.713          | 11.137          | 0.270                     | 0.675          | 0.401           |
| 30.0                                                                   | 9.6                | 27.4                | 1.109                   | 3.869          | 11.172          | 0.250                     | 0.872          | 0.433           |
| 45.0                                                                   | 9.7                | 42.6                | 0.812                   | 4.834          | 11.580          | 0.208                     | 1.051          | 0.474           |
| 60.0                                                                   | 9.8                | 57.5                | 0.506                   | 5.064          | 11.657          | 0.148                     | 1.142          | 0.516           |
| 75.0                                                                   | 9.9                | 72.9                | 0.380                   | 4.916          | 12.439          | 0.074                     | 1.081          | 0.540           |
| 90.0                                                                   | 9.9                | 88.0                | 0.134                   | 5.158          | 11.963          | 0.030                     | 1.091          | 0.541           |
| 105.0                                                                  | 9.9                | 103.1               | 0.191                   | 5.509          | 11.944          | 0.039                     | 1.111          | 0.511           |
| 120.0                                                                  | 9.5                | 116.6               | 0.404                   | 5.554          | 12.173          | 0.059                     | 1.104          | 0.486           |
| 135.0                                                                  | 9.3                | 130.6               | 0.588                   | 5.001          | 11.933          | 0.076                     | 0.982          | 0.422           |
| 150.0                                                                  | 9.2                | 144.9               | 0.535                   | 4.423          | 11.283          | 0.088                     | 0.959          | 0.367           |
| 165.0                                                                  | 9.1                | 159.5               | 0.520                   | 3.800          | 11.051          | 0.099                     | 0.940          | 0.324           |
| 180.0                                                                  | 9.4                | 176.8               | 0.517                   | 4.083          | 10.499          | 0.103                     | 0.900          | 0.273           |
| 195.0                                                                  | 9.7                | 193.7               | 0.677                   | 4.353          | 10.597          | 0.104                     | 0.906          | 0.209           |
| 210.0                                                                  | 9.6                | 211.3               | 0.700                   | 4.913          | 10.884          | 0.096                     | 1.082          | 0.212           |
| 225.0                                                                  | 9.6                | 228.1               | 0.562                   | 6.665          | 10.990          | 0.089                     | 1.403          | 0.251           |
| 240.0                                                                  | 9.6                | 243.4               | 0.501                   | 5.823          | 11.546          | 0.071                     | 1.530          | 0.323           |
| 255.0                                                                  | 9.9                | 257.2               | 0.355                   | 6.068          | 11.848          | 0.050                     | 1.532          | 0.385           |
| 270.0                                                                  | 9.9                | 271.4               | 0.206                   | 6.810          | 11.836          | 0.033                     | 1.527          | 0.454           |
| 285.0                                                                  | 10.0               | 285.7               | 0.296                   | 7.073          | 11.710          | 0.058                     | 1.440          | 0.485           |
| 300.0                                                                  | 9.9                | 299.9               | 0.503                   | 5.421          | 11.407          | 0.131                     | 1.281          | 0.483           |
| 315.0                                                                  | 9.8                | 313.7               | 0.892                   | 5.145          | 11.432          | 0.194                     | 1.072          | 0.441           |
| 330.0                                                                  | 9.7                | 327.8               | 1.015                   | 4.629          | 10.925          | 0.237                     | 0.867          | 0.402           |
| 345.0                                                                  | 9.5                | 342.0               | 1.152                   | 3.806          | 10.859          | 0.262                     | 0.661          | 0.381           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table S.39:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 9.0$  m and  $T_p = 18.5$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 14.9               | -1.1                | 1.312                   | 3.212          | 11.159          | 0.304                     | 0.449          | 0.419           |
| 15.0                                                                   | 14.9               | 14.1                | 1.253                   | 3.500          | 11.129          | 0.298                     | 0.621          | 0.432           |
| 30.0                                                                   | 14.9               | 29.2                | 1.091                   | 4.343          | 11.551          | 0.273                     | 0.857          | 0.464           |
| 45.0                                                                   | 15.0               | 44.2                | 0.866                   | 5.085          | 11.693          | 0.224                     | 1.023          | 0.504           |
| 60.0                                                                   | 15.0               | 59.0                | 0.615                   | 5.434          | 12.441          | 0.154                     | 1.138          | 0.549           |
| 75.0                                                                   | 15.1               | 74.0                | 0.397                   | 5.578          | 12.728          | 0.076                     | 0.975          | 0.552           |
| 90.0                                                                   | 15.1               | 89.0                | 0.167                   | 4.861          | 12.224          | 0.044                     | 0.980          | 0.534           |
| 105.0                                                                  | 15.1               | 104.1               | 0.351                   | 5.089          | 11.703          | 0.055                     | 1.018          | 0.481           |
| 120.0                                                                  | 14.9               | 118.4               | 0.446                   | 5.814          | 12.092          | 0.071                     | 1.200          | 0.490           |
| 135.0                                                                  | 14.9               | 133.6               | 0.338                   | 4.976          | 11.071          | 0.082                     | 1.153          | 0.417           |
| 150.0                                                                  | 14.9               | 148.7               | 0.385                   | 4.078          | 10.802          | 0.088                     | 0.825          | 0.335           |
| 165.0                                                                  | 14.9               | 163.7               | 0.497                   | 3.747          | 10.672          | 0.095                     | 0.681          | 0.281           |
| 180.0                                                                  | 15.0               | 178.9               | 0.408                   | 3.642          | 10.320          | 0.089                     | 0.622          | 0.239           |
| 195.0                                                                  | 15.0               | 194.3               | 0.596                   | 5.162          | 10.230          | 0.095                     | 0.843          | 0.210           |
| 210.0                                                                  | 15.0               | 209.9               | 0.482                   | 5.227          | 10.252          | 0.084                     | 1.196          | 0.194           |
| 225.0                                                                  | 14.9               | 226.0               | 0.528                   | 5.562          | 10.572          | 0.085                     | 1.652          | 0.197           |
| 240.0                                                                  | 14.9               | 241.6               | 0.577                   | 6.012          | 11.350          | 0.075                     | 1.817          | 0.256           |
| 255.0                                                                  | 15.1               | 256.0               | 0.321                   | 6.375          | 11.651          | 0.061                     | 1.726          | 0.341           |
| 270.0                                                                  | 15.1               | 270.7               | 0.224                   | 6.752          | 11.871          | 0.047                     | 1.664          | 0.435           |
| 285.0                                                                  | 15.2               | 285.3               | 0.369                   | 6.492          | 11.945          | 0.061                     | 1.569          | 0.496           |
| 300.0                                                                  | 15.1               | 299.9               | 0.573                   | 6.438          | 11.596          | 0.138                     | 1.352          | 0.523           |
| 315.0                                                                  | 15.0               | 314.3               | 0.777                   | 5.264          | 11.435          | 0.212                     | 1.047          | 0.490           |
| 330.0                                                                  | 14.9               | 328.9               | 1.107                   | 4.313          | 11.163          | 0.264                     | 0.763          | 0.454           |
| 345.0                                                                  | 14.9               | 343.8               | 1.245                   | 3.658          | 11.120          | 0.292                     | 0.553          | 0.424           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |



**Table S.40:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 9.0$  m and  $T_p = 18.5$  s; Ship's speed is 20.0 Knots

| <b>Cmd<br/>Heading</b>                                                 | <b>Actual<br/>Mean</b> |                     | <b>Absolute<br/>Maximum</b> |                |                 | <b>Standard<br/>Deviation</b> |                |                 |
|------------------------------------------------------------------------|------------------------|---------------------|-----------------------------|----------------|-----------------|-------------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts           | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$             | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$               | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 20.1                   | -0.5                | 1.381                       | 3.310          | 11.440          | 0.332                         | 0.472          | 0.520           |
| 15.0                                                                   | 20.1                   | 14.7                | 1.279                       | 3.656          | 11.536          | 0.324                         | 0.684          | 0.525           |
| 30.0                                                                   | 20.1                   | 29.8                | 1.143                       | 4.369          | 11.484          | 0.295                         | 0.939          | 0.547           |
| 45.0                                                                   | 20.1                   | 44.7                | 1.062                       | 4.896          | 11.804          | 0.242                         | 1.110          | 0.574           |
| 60.0                                                                   | 20.2                   | 59.6                | 0.641                       | 5.383          | 12.184          | 0.163                         | 1.266          | 0.606           |
| 75.0                                                                   | 20.3                   | 74.4                | 0.293                       | 5.091          | 12.138          | 0.081                         | 0.974          | 0.569           |
| 90.0                                                                   | 20.3                   | 89.4                | 0.216                       | 4.651          | 11.931          | 0.058                         | 0.951          | 0.521           |
| 105.0                                                                  | 20.3                   | 104.5               | 0.367                       | 5.035          | 11.926          | 0.073                         | 0.967          | 0.443           |
| 120.0                                                                  | 20.1                   | 119.2               | 0.341                       | 5.620          | 11.108          | 0.089                         | 1.560          | 0.488           |
| 135.0                                                                  | 20.1                   | 134.4               | 0.514                       | 5.430          | 10.852          | 0.100                         | 1.357          | 0.381           |
| 150.0                                                                  | 20.1                   | 149.3               | 0.603                       | 5.283          | 10.587          | 0.114                         | 0.952          | 0.313           |
| 165.0                                                                  | 20.2                   | 164.4               | 0.598                       | 2.992          | 10.517          | 0.113                         | 0.572          | 0.245           |
| 180.0                                                                  | 20.2                   | 179.5               | 0.365                       | 3.539          | 10.192          | 0.103                         | 0.535          | 0.209           |
| 195.0                                                                  | 20.2                   | 194.6               | 0.397                       | 5.201          | 10.169          | 0.094                         | 0.753          | 0.228           |
| 210.0                                                                  | 20.2                   | 209.9               | 0.598                       | 6.881          | 10.077          | 0.093                         | 1.257          | 0.293           |
| 225.0                                                                  | 20.2                   | 225.0               | 0.507                       | 6.960          | 10.053          | 0.081                         | 1.471          | 0.252           |
| 240.0                                                                  | 20.1                   | 240.7               | 0.514                       | 7.503          | 10.239          | 0.086                         | 2.062          | 0.237           |
| 255.0                                                                  | 20.2                   | 255.5               | 0.460                       | 7.747          | 11.018          | 0.074                         | 1.821          | 0.324           |
| 270.0                                                                  | 20.3                   | 270.4               | 0.280                       | 7.694          | 11.806          | 0.059                         | 1.746          | 0.432           |
| 285.0                                                                  | 20.3                   | 285.2               | 0.355                       | 7.594          | 11.705          | 0.065                         | 1.645          | 0.513           |
| 300.0                                                                  | 20.2                   | 299.8               | 0.720                       | 7.441          | 12.247          | 0.147                         | 1.401          | 0.578           |
| 315.0                                                                  | 20.2                   | 314.5               | 0.928                       | 5.434          | 11.484          | 0.231                         | 1.058          | 0.582           |
| 330.0                                                                  | 20.1                   | 329.4               | 1.259                       | 4.409          | 11.534          | 0.288                         | 0.741          | 0.555           |
| 345.0                                                                  | 20.1                   | 344.4               | 1.436                       | 3.539          | 11.367          | 0.319                         | 0.499          | 0.531           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                        |                     |                             |                |                 |                               |                |                 |

**Table S.41:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 9.0$  m and  $T_p = 18.5$  s; Ship's speed is 25.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 25.2               | -0.2                | 1.540                   | 3.737          | 12.044          | 0.354                     | 0.559          | 0.697           |
| 15.0                                                                   | 25.2               | 14.9                | 1.457                   | 4.271          | 12.511          | 0.345                     | 0.764          | 0.697           |
| 30.0                                                                   | 25.2               | 30.0                | 1.266                   | 4.974          | 12.232          | 0.316                     | 1.012          | 0.701           |
| 45.0                                                                   | 25.2               | 45.0                | 1.010                   | 5.535          | 12.315          | 0.258                     | 1.240          | 0.690           |
| 60.0                                                                   | 25.3               | 59.8                | 0.626                   | 6.214          | 12.156          | 0.173                     | 1.371          | 0.664           |
| 75.0                                                                   | 25.3               | 74.6                | 0.415                   | 5.223          | 12.673          | 0.087                     | 1.042          | 0.584           |
| 90.0                                                                   | 25.3               | 89.6                | 0.263                   | 4.595          | 11.891          | 0.071                     | 1.000          | 0.509           |
| 105.0                                                                  | 25.3               | 104.6               | 0.430                   | 4.865          | 11.520          | 0.092                     | 0.949          | 0.397           |
| 120.0                                                                  | 25.2               | 119.6               | 0.419                   | 6.050          | 10.772          | 0.110                     | 1.783          | 0.448           |
| 135.0                                                                  | 25.2               | 134.5               | 0.351                   | 4.688          | 10.238          | 0.117                     | 1.250          | 0.304           |
| 150.0                                                                  | 25.3               | 149.5               | 0.534                   | 4.914          | 10.246          | 0.141                     | 1.188          | 0.269           |
| 165.0                                                                  | 25.5               | 164.5               | 0.479                   | 3.375          | 10.237          | 0.155                     | 0.651          | 0.233           |
| 180.0                                                                  | 25.6               | 179.7               | 0.595                   | 3.079          | 10.147          | 0.116                     | 0.324          | 0.141           |
| 195.0                                                                  | 25.6               | 195.1               | 0.488                   | 4.407          | 10.183          | 0.146                     | 0.718          | 0.227           |
| 210.0                                                                  | 25.3               | 210.0               | 0.588                   | 6.108          | 10.194          | 0.113                     | 1.139          | 0.296           |
| 225.0                                                                  | 25.2               | 225.2               | 0.824                   | 7.987          | 10.024          | 0.116                     | 1.856          | 0.429           |
| 240.0                                                                  | 25.3               | 240.2               | 0.551                   | 8.440          | 10.046          | 0.097                     | 2.067          | 0.327           |
| 255.0                                                                  | 25.3               | 255.2               | 0.435                   | 8.532          | 10.926          | 0.086                     | 1.776          | 0.338           |
| 270.0                                                                  | 25.3               | 270.2               | 0.266                   | 7.065          | 11.701          | 0.069                     | 1.740          | 0.433           |
| 285.0                                                                  | 25.3               | 285.1               | 0.350                   | 7.975          | 11.707          | 0.072                     | 1.711          | 0.543           |
| 300.0                                                                  | 25.3               | 299.8               | 0.582                   | 6.795          | 11.708          | 0.155                     | 1.389          | 0.652           |
| 315.0                                                                  | 25.3               | 314.7               | 0.966                   | 5.447          | 11.946          | 0.247                     | 1.028          | 0.705           |
| 330.0                                                                  | 25.3               | 329.6               | 1.291                   | 4.566          | 12.186          | 0.307                     | 0.721          | 0.716           |
| 345.0                                                                  | 25.2               | 344.7               | 1.551                   | 3.715          | 12.057          | 0.341                     | 0.524          | 0.705           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table S.42:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 9.0$  m and  $T_p = 18.5$  s; Ship's speed is 30.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 30.4               | -0.1                | 1.554                   | 4.439          | 12.863          | 0.372                     | 0.658          | 0.913           |
| 15.0                                                                   | 30.4               | 15.0                | 1.549                   | 5.469          | 12.797          | 0.364                     | 0.864          | 0.906           |
| 30.0                                                                   | 30.4               | 30.1                | 1.427                   | 5.749          | 12.624          | 0.335                     | 1.085          | 0.897           |
| 45.0                                                                   | 30.4               | 45.1                | 1.151                   | 5.766          | 12.698          | 0.279                     | 1.295          | 0.845           |
| 60.0                                                                   | 30.4               | 60.0                | 0.721                   | 6.399          | 12.690          | 0.186                     | 1.499          | 0.757           |
| 75.0                                                                   | 30.4               | 74.7                | 0.364                   | 4.844          | 11.940          | 0.094                     | 1.142          | 0.603           |
| 90.0                                                                   | 30.4               | 89.7                | 0.371                   | 4.795          | 11.858          | 0.084                     | 1.118          | 0.502           |
| 105.0                                                                  | 30.4               | 104.7               | 0.537                   | 5.010          | 11.542          | 0.111                     | 1.020          | 0.368           |
| 120.0                                                                  | 30.3               | 119.8               | 0.584                   | 6.589          | 10.280          | 0.135                     | 2.089          | 0.416           |
| 135.0                                                                  | 30.3               | 134.5               | 0.567                   | 5.283          | 10.166          | 0.153                     | 1.631          | 0.305           |
| 150.0                                                                  | 30.5               | 149.5               | 0.614                   | 4.421          | 10.123          | 0.183                     | 1.104          | 0.249           |
| 165.0                                                                  | 30.8               | 164.5               | 0.705                   | 3.847          | 10.106          | 0.188                     | 0.582          | 0.175           |
| 180.0                                                                  | 30.5               | 179.4               | 0.907                   | 4.096          | 10.001          | 0.196                     | 0.507          | 0.165           |
| 195.0                                                                  | 31.1               | 194.9               | 0.592                   | 4.369          | 9.982           | 0.165                     | 0.672          | 0.172           |
| 210.0                                                                  | 30.7               | 210.2               | 0.595                   | 5.387          | 10.077          | 0.170                     | 1.115          | 0.279           |
| 225.0                                                                  | 30.4               | 225.0               | 0.522                   | 6.299          | 10.093          | 0.122                     | 1.493          | 0.381           |
| 240.0                                                                  | 30.4               | 240.0               | 0.443                   | 7.780          | 10.046          | 0.106                     | 1.716          | 0.364           |
| 255.0                                                                  | 30.4               | 255.1               | 0.493                   | 7.910          | 10.935          | 0.104                     | 1.605          | 0.356           |
| 270.0                                                                  | 30.4               | 270.1               | 0.334                   | 7.408          | 11.579          | 0.082                     | 1.654          | 0.445           |
| 285.0                                                                  | 30.4               | 285.1               | 0.340                   | 8.423          | 12.035          | 0.078                     | 1.672          | 0.579           |
| 300.0                                                                  | 30.4               | 299.8               | 0.643                   | 7.804          | 12.378          | 0.166                     | 1.386          | 0.729           |
| 315.0                                                                  | 30.4               | 314.8               | 1.028                   | 5.856          | 12.572          | 0.263                     | 0.988          | 0.861           |
| 330.0                                                                  | 30.4               | 329.8               | 1.437                   | 5.343          | 12.767          | 0.328                     | 0.744          | 0.910           |
| 345.0                                                                  | 30.4               | 344.9               | 1.529                   | 4.339          | 12.939          | 0.360                     | 0.603          | 0.918           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table S.43:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 14.0$  m and  $T_p = 16.4$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | -1.9               | -362.1              | 1.793                   | 8.632          | 13.187          | 0.295                     | 2.550          | 0.827           |
| 15.0                                                                   | -1.3               | -366.1              | 1.976                   | 9.215          | 13.737          | 0.337                     | 2.529          | 0.755           |
| 30.0                                                                   | -4.3               | 98.6                | 1.772                   | 8.748          | 13.706          | 0.340                     | 2.284          | 0.905           |
| 45.0                                                                   | -4.6               | -120.5              | 1.763                   | 9.562          | 13.748          | 0.313                     | 2.228          | 0.965           |
| 60.0                                                                   | 1.3                | 32.4                | 2.577                   | 8.331          | 13.763          | 0.325                     | 2.314          | 0.929           |
| 75.0                                                                   | 2.5                | 77.1                | 1.540                   | 10.353         | 15.438          | 0.185                     | 2.022          | 1.027           |
| 90.0                                                                   | 1.1                | 99.2                | 1.789                   | 10.027         | 15.197          | 0.134                     | 2.055          | 1.059           |
| 105.0                                                                  | -1.8               | 109.2               | 1.926                   | 8.374          | 15.258          | 0.183                     | 2.135          | 1.082           |
| 120.0                                                                  | -4.6               | 118.2               | 1.136                   | 9.402          | 14.771          | 0.240                     | 2.150          | 1.059           |
| 135.0                                                                  | -5.7               | 125.8               | 1.749                   | 12.037         | 14.010          | 0.295                     | 2.060          | 1.035           |
| 150.0                                                                  | -3.9               | 322.4               | 2.213                   | 10.442         | 13.786          | 0.339                     | 2.370          | 0.864           |
| 165.0                                                                  | -3.4               | 324.2               | 2.536                   | 9.420          | 14.282          | 0.347                     | 2.457          | 0.813           |
| 180.0                                                                  | -2.2               | 783.2               | 1.594                   | 9.077          | 13.194          | 0.308                     | 2.617          | 0.827           |
| 195.0                                                                  | -2.6               | 28.5                | 2.866                   | 9.449          | 15.626          | 0.313                     | 2.527          | 0.793           |
| 210.0                                                                  | -0.5               | 260.7               | 1.401                   | 12.213         | 14.059          | 0.164                     | 2.593          | 0.864           |
| 225.0                                                                  | -1.1               | 262.1               | 1.206                   | 13.183         | 13.395          | 0.140                     | 2.612          | 0.861           |
| 240.0                                                                  | -1.8               | 266.7               | 0.905                   | 13.679         | 13.251          | 0.110                     | 2.602          | 0.877           |
| 255.0                                                                  | -2.4               | 272.0               | 1.109                   | 12.915         | 13.714          | 0.099                     | 2.572          | 0.877           |
| 270.0                                                                  | -2.4               | 277.0               | 1.325                   | 12.264         | 15.306          | 0.122                     | 2.443          | 0.867           |
| 285.0                                                                  | -2.2               | 281.9               | 1.506                   | 12.116         | 15.755          | 0.168                     | 2.355          | 0.853           |
| 300.0                                                                  | -1.4               | 288.1               | 1.159                   | 11.972         | 14.768          | 0.205                     | 2.288          | 0.821           |
| 315.0                                                                  | -1.7               | 292.9               | 1.333                   | 11.557         | 14.857          | 0.242                     | 2.246          | 0.803           |
| 330.0                                                                  | -1.9               | 298.9               | 1.764                   | 10.903         | 13.778          | 0.284                     | 2.181          | 0.769           |
| 345.0                                                                  | -2.1               | 151.1               | 1.761                   | 10.105         | 13.629          | 0.302                     | 2.320          | 0.758           |
| Wind at 56.4 knots (29.0 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table S.44:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 14.0$  m and  $T_p = 16.4$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                            | <b>Absolute Maximum</b> |                       |                        | <b>Standard Deviation</b> |                       |                        |
|------------------------------------------------------------------------|--------------------|----------------------------|-------------------------|-----------------------|------------------------|---------------------------|-----------------------|------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts       | $\psi_{\text{MHP}}$<br>deg | Long<br>$\text{m/s}^2$  | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ | Long<br>$\text{m/s}^2$    | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ |
| 0.0                                                                    | 2.8                | -48.0                      | 1.776                   | 12.813                | 13.215                 | 0.366                     | 2.098                 | 0.728                  |
| 15.0                                                                   | 2.1                | -79.8                      | 2.252                   | 10.752                | 14.126                 | 0.327                     | 2.615                 | 0.805                  |
| 30.0                                                                   | 2.2                | -120.7                     | 1.930                   | 9.588                 | 13.809                 | 0.217                     | 2.104                 | 0.952                  |
| 45.0                                                                   | 2.8                | -101.7                     | 1.747                   | 10.741                | 14.322                 | 0.233                     | 2.321                 | 0.971                  |
| 60.0                                                                   | 3.6                | -92.5                      | 2.437                   | 9.138                 | 14.010                 | 0.207                     | 2.324                 | 1.000                  |
| 75.0                                                                   | 4.3                | -74.4                      | 2.432                   | 18.279                | 15.019                 | 0.184                     | 2.476                 | 1.029                  |
| 90.0                                                                   | 5.1                | 89.4                       | 3.397                   | 21.114                | 15.531                 | 0.105                     | 2.009                 | 1.069                  |
| 105.0                                                                  | 4.4                | 103.8                      | 1.669                   | 8.089                 | 14.772                 | 0.124                     | 1.965                 | 1.036                  |
| 120.0                                                                  | 3.4                | 112.7                      | 1.234                   | 10.389                | 14.951                 | 0.161                     | 1.982                 | 1.017                  |
| 135.0                                                                  | 2.5                | 120.3                      | 1.247                   | 9.323                 | 16.253                 | 0.192                     | 1.986                 | 0.987                  |
| 150.0                                                                  | 2.0                | 128.7                      | 1.254                   | 9.209                 | 15.408                 | 0.222                     | 1.932                 | 0.921                  |
| 165.0                                                                  | 1.5                | 132.3                      | 1.608                   | 10.596                | 13.457                 | 0.238                     | 1.957                 | 0.885                  |
| 180.0                                                                  | 2.2                | 82.9                       | 2.068                   | 10.222                | 12.962                 | 0.323                     | 2.632                 | 0.724                  |
| 195.0                                                                  | 3.5                | 364.1                      | 1.962                   | 11.438                | 13.717                 | 0.308                     | 2.593                 | 0.762                  |
| 210.0                                                                  | 4.2                | 258.4                      | 2.019                   | 17.657                | 14.086                 | 0.168                     | 2.580                 | 0.817                  |
| 225.0                                                                  | 3.7                | 262.3                      | 1.473                   | 17.267                | 13.415                 | 0.150                     | 2.650                 | 0.816                  |
| 240.0                                                                  | 3.3                | 267.8                      | 2.636                   | 15.861                | 14.038                 | 0.144                     | 2.645                 | 0.862                  |
| 255.0                                                                  | 3.8                | 275.6                      | 1.236                   | 14.175                | 13.327                 | 0.098                     | 2.552                 | 0.877                  |
| 270.0                                                                  | 3.6                | 281.8                      | 2.088                   | 12.575                | 13.868                 | 0.147                     | 2.508                 | 0.875                  |
| 285.0                                                                  | 4.1                | 288.6                      | 1.376                   | 11.723                | 13.576                 | 0.197                     | 2.375                 | 0.839                  |
| 300.0                                                                  | 3.9                | 294.7                      | 1.289                   | 14.449                | 13.365                 | 0.256                     | 2.254                 | 0.802                  |
| 315.0                                                                  | 3.5                | 298.7                      | 1.528                   | 12.680                | 12.689                 | 0.291                     | 2.211                 | 0.793                  |
| 330.0                                                                  | 3.3                | 303.3                      | 1.768                   | 13.426                | 12.532                 | 0.326                     | 2.169                 | 0.761                  |
| 345.0                                                                  | 2.9                | 307.7                      | 1.838                   | 13.031                | 14.041                 | 0.350                     | 2.137                 | 0.744                  |
| Wind at 56.4 knots (29.0 m/s) is from the starboard beam in all cases. |                    |                            |                         |                       |                        |                           |                       |                        |

**Table S.45:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 14.0$  m and  $T_p = 16.4$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 7.5                | -40.9               | 2.114                   | 10.686         | 12.952          | 0.439                     | 2.134          | 0.753           |
| 15.0                                                                   | 7.3                | -34.1               | 2.444                   | 8.350          | 12.505          | 0.460                     | 2.050          | 0.747           |
| 30.0                                                                   | 7.2                | -24.6               | 2.401                   | 8.930          | 11.951          | 0.476                     | 1.923          | 0.722           |
| 45.0                                                                   | 7.2                | -15.9               | 2.966                   | 6.828          | 12.581          | 0.484                     | 1.878          | 0.725           |
| 60.0                                                                   | 7.2                | 1.8                 | 2.963                   | 8.207          | 12.245          | 0.490                     | 1.740          | 0.742           |
| 75.0                                                                   | 9.8                | 71.2                | 1.833                   | 7.847          | 14.925          | 0.220                     | 1.815          | 1.067           |
| 90.0                                                                   | 9.8                | 88.5                | 0.914                   | 9.806          | 15.601          | 0.076                     | 1.828          | 1.069           |
| 105.0                                                                  | 9.6                | 104.5               | 1.247                   | 7.262          | 13.868          | 0.104                     | 1.799          | 0.958           |
| 120.0                                                                  | 8.9                | 116.0               | 4.151                   | 13.464         | 14.204          | 0.175                     | 1.790          | 0.897           |
| 135.0                                                                  | 8.1                | 126.4               | 1.800                   | 9.910          | 14.383          | 0.167                     | 1.605          | 0.810           |
| 150.0                                                                  | 7.7                | 135.1               | 2.232                   | 9.735          | 15.066          | 0.178                     | 1.592          | 0.759           |
| 165.0                                                                  | 7.4                | 144.3               | 1.536                   | 9.074          | 13.800          | 0.190                     | 1.720          | 0.707           |
| 180.0                                                                  | 7.4                | 154.7               | 1.550                   | 7.041          | 12.453          | 0.205                     | 1.604          | 0.625           |
| 195.0                                                                  | 8.9                | 199.1               | 1.619                   | 9.461          | 11.214          | 0.217                     | 1.706          | 0.365           |
| 210.0                                                                  | 8.3                | 237.7               | 2.343                   | 15.170         | 12.112          | 0.232                     | 2.485          | 0.558           |
| 225.0                                                                  | 8.3                | 253.6               | 2.164                   | 20.477         | 12.921          | 0.179                     | 2.653          | 0.705           |
| 240.0                                                                  | 8.3                | 261.0               | 1.311                   | 17.787         | 13.606          | 0.139                     | 2.661          | 0.779           |
| 255.0                                                                  | 8.4                | 270.4               | 1.151                   | 15.536         | 13.860          | 0.099                     | 2.721          | 0.852           |
| 270.0                                                                  | 8.6                | 278.9               | 2.704                   | 13.330         | 13.540          | 0.150                     | 2.710          | 0.883           |
| 285.0                                                                  | 9.1                | 288.4               | 2.130                   | 13.506         | 13.337          | 0.208                     | 2.534          | 0.869           |
| 300.0                                                                  | 9.3                | 299.0               | 1.854                   | 12.411         | 12.907          | 0.308                     | 2.222          | 0.815           |
| 315.0                                                                  | 8.4                | 306.6               | 1.571                   | 10.714         | 12.755          | 0.370                     | 2.102          | 0.766           |
| 330.0                                                                  | 7.9                | 309.6               | 1.956                   | 10.728         | 12.708          | 0.392                     | 2.134          | 0.771           |
| 345.0                                                                  | 7.7                | 314.9               | 2.102                   | 11.182         | 12.705          | 0.422                     | 2.116          | 0.742           |
| Wind at 56.4 knots (29.0 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table S.46:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 14.0$  m and  $T_p = 16.4$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 13.0               | -8.8                | 2.850                   | 7.297          | 11.915          | 0.564                     | 1.602          | 0.775           |
| 15.0                                                                   | 13.6               | 9.9                 | 2.671                   | 7.195          | 12.376          | 0.555                     | 1.533          | 0.805           |
| 30.0                                                                   | 14.0               | 26.7                | 2.295                   | 7.654          | 12.520          | 0.524                     | 1.551          | 0.848           |
| 45.0                                                                   | 14.4               | 42.6                | 1.896                   | 9.347          | 13.200          | 0.457                     | 1.710          | 0.948           |
| 60.0                                                                   | 14.6               | 57.5                | 1.360                   | 9.408          | 13.508          | 0.353                     | 1.726          | 1.061           |
| 75.0                                                                   | 15.0               | 73.1                | 1.258                   | 9.148          | 14.676          | 0.196                     | 1.754          | 1.112           |
| 90.0                                                                   | 15.0               | 88.9                | 1.457                   | 18.342         | 15.073          | 0.087                     | 1.792          | 1.041           |
| 105.0                                                                  | 15.0               | 104.7               | 1.629                   | 15.791         | 13.605          | 0.126                     | 1.844          | 0.852           |
| 120.0                                                                  | 14.4               | 117.4               | 0.863                   | 9.159          | 13.329          | 0.136                     | 1.734          | 0.794           |
| 135.0                                                                  | 14.0               | 131.7               | 0.992                   | 7.098          | 13.120          | 0.147                     | 1.469          | 0.671           |
| 150.0                                                                  | 14.2               | 146.4               | 0.785                   | 6.317          | 11.903          | 0.154                     | 1.135          | 0.538           |
| 165.0                                                                  | 14.6               | 162.0               | 1.041                   | 6.293          | 11.982          | 0.167                     | 0.968          | 0.452           |
| 180.0                                                                  | 14.6               | 177.5               | 1.065                   | 6.719          | 10.797          | 0.191                     | 1.082          | 0.415           |
| 195.0                                                                  | 14.7               | 194.8               | 1.205                   | 9.283          | 10.592          | 0.171                     | 1.393          | 0.378           |
| 210.0                                                                  | 14.2               | 216.7               | 2.068                   | 11.115         | 11.572          | 0.193                     | 2.125          | 0.422           |
| 225.0                                                                  | 13.8               | 235.0               | 1.304                   | 9.758          | 12.943          | 0.163                     | 2.481          | 0.502           |
| 240.0                                                                  | 13.7               | 248.5               | 1.312                   | 12.591         | 13.925          | 0.162                     | 2.738          | 0.587           |
| 255.0                                                                  | 13.9               | 261.5               | 1.354                   | 22.614         | 13.609          | 0.137                     | 2.920          | 0.729           |
| 270.0                                                                  | 14.2               | 274.6               | 0.752                   | 14.047         | 14.292          | 0.103                     | 2.998          | 0.865           |
| 285.0                                                                  | 14.5               | 287.4               | 2.332                   | 13.298         | 13.292          | 0.195                     | 2.834          | 0.895           |
| 300.0                                                                  | 14.6               | 300.2               | 1.437                   | 12.565         | 12.892          | 0.328                     | 2.265          | 0.886           |
| 315.0                                                                  | 14.4               | 312.9               | 1.814                   | 11.295         | 12.422          | 0.432                     | 1.879          | 0.821           |
| 330.0                                                                  | 13.9               | 326.0               | 2.144                   | 9.694          | 12.144          | 0.500                     | 1.713          | 0.795           |
| 345.0                                                                  | 13.5               | 339.5               | 2.532                   | 8.936          | 12.010          | 0.546                     | 1.530          | 0.770           |
| Wind at 56.4 knots (29.0 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table S.47:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 14.0$  m and  $T_p = 16.4$  s; Ship's speed is 20.0 Knots

| <b>Cmd<br/>Heading</b>                                                 | <b>Actual<br/>Mean</b> |                     | <b>Absolute<br/>Maximum</b> |                |                 | <b>Standard<br/>Deviation</b> |                |                 |
|------------------------------------------------------------------------|------------------------|---------------------|-----------------------------|----------------|-----------------|-------------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts           | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$             | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$               | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 19.6                   | -1.6                | 2.516                       | 6.801          | 12.491          | 0.585                         | 1.350          | 0.944           |
| 15.0                                                                   | 19.6                   | 13.6                | 2.904                       | 6.795          | 12.490          | 0.590                         | 1.365          | 0.945           |
| 30.0                                                                   | 19.7                   | 29.1                | 2.275                       | 7.924          | 12.837          | 0.554                         | 1.564          | 0.979           |
| 45.0                                                                   | 19.8                   | 44.1                | 2.007                       | 9.154          | 13.378          | 0.485                         | 1.701          | 1.058           |
| 60.0                                                                   | 19.8                   | 58.6                | 1.641                       | 9.929          | 15.140          | 0.369                         | 1.689          | 1.137           |
| 75.0                                                                   | 20.0                   | 73.8                | 0.999                       | 9.121          | 15.079          | 0.197                         | 1.791          | 1.149           |
| 90.0                                                                   | 20.0                   | 89.1                | 2.330                       | 19.173         | 16.040          | 0.111                         | 1.852          | 1.014           |
| 105.0                                                                  | 20.0                   | 104.3               | 3.213                       | 20.742         | 13.785          | 0.148                         | 2.022          | 0.779           |
| 120.0                                                                  | 19.7                   | 118.6               | 0.691                       | 7.954          | 12.655          | 0.151                         | 1.974          | 0.750           |
| 135.0                                                                  | 19.6                   | 133.4               | 0.948                       | 7.334          | 12.171          | 0.174                         | 1.819          | 0.560           |
| 150.0                                                                  | 19.6                   | 148.0               | 0.927                       | 7.554          | 11.371          | 0.193                         | 1.365          | 0.468           |
| 165.0                                                                  | 19.6                   | 163.7               | 1.022                       | 6.768          | 11.223          | 0.202                         | 1.020          | 0.401           |
| 180.0                                                                  | 19.8                   | 179.8               | 1.199                       | 7.525          | 10.641          | 0.211                         | 1.078          | 0.380           |
| 195.0                                                                  | 19.7                   | 195.7               | 0.928                       | 7.526          | 10.286          | 0.192                         | 1.544          | 0.455           |
| 210.0                                                                  | 19.7                   | 210.4               | 1.585                       | 11.865         | 11.889          | 0.176                         | 1.926          | 0.587           |
| 225.0                                                                  | 19.6                   | 226.6               | 0.949                       | 9.057          | 11.452          | 0.160                         | 2.352          | 0.519           |
| 240.0                                                                  | 19.3                   | 243.6               | 1.047                       | 12.731         | 13.702          | 0.163                         | 2.926          | 0.524           |
| 255.0                                                                  | 19.6                   | 258.3               | 1.059                       | 14.132         | 13.496          | 0.148                         | 3.084          | 0.658           |
| 270.0                                                                  | 19.6                   | 272.8               | 0.772                       | 16.425         | 13.617          | 0.113                         | 3.210          | 0.833           |
| 285.0                                                                  | 19.8                   | 286.6               | 1.265                       | 14.513         | 13.640          | 0.183                         | 3.040          | 0.958           |
| 300.0                                                                  | 19.9                   | 300.3               | 1.573                       | 15.147         | 13.316          | 0.344                         | 2.475          | 1.010           |
| 315.0                                                                  | 19.8                   | 314.1               | 2.146                       | 11.105         | 12.628          | 0.466                         | 1.940          | 0.985           |
| 330.0                                                                  | 19.7                   | 328.6               | 2.294                       | 8.401          | 12.987          | 0.539                         | 1.531          | 0.966           |
| 345.0                                                                  | 19.6                   | 343.4               | 2.842                       | 6.950          | 12.428          | 0.573                         | 1.400          | 0.952           |
| Wind at 56.4 knots (29.0 m/s) is from the starboard beam in all cases. |                        |                     |                             |                |                 |                               |                |                 |



**Table S.48:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 14.0$  m and  $T_p = 16.4$  s; Ship's speed is 25.0 Knots

| <b>Cmd<br/>Heading</b>                                                 | <b>Actual<br/>Mean</b> |                            | <b>Absolute<br/>Maximum</b>     |                                |                                 | <b>Standard<br/>Deviation</b>   |                                |                                 |
|------------------------------------------------------------------------|------------------------|----------------------------|---------------------------------|--------------------------------|---------------------------------|---------------------------------|--------------------------------|---------------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | <b>Speed<br/>kts</b>   | $\psi_{\text{MHP}}$<br>deg | <b>Long<br/>m/s<sup>2</sup></b> | <b>Lat<br/>m/s<sup>2</sup></b> | <b>Vert<br/>m/s<sup>2</sup></b> | <b>Long<br/>m/s<sup>2</sup></b> | <b>Lat<br/>m/s<sup>2</sup></b> | <b>Vert<br/>m/s<sup>2</sup></b> |
| 0.0                                                                    | 25.0                   | -0.7                       | 3.165                           | 6.647                          | 14.020                          | 0.620                           | 1.316                          | 1.229                           |
| 15.0                                                                   | 25.0                   | 14.6                       | 2.960                           | 7.149                          | 13.370                          | 0.614                           | 1.415                          | 1.209                           |
| 30.0                                                                   | 25.0                   | 29.8                       | 2.607                           | 8.680                          | 13.732                          | 0.578                           | 1.595                          | 1.206                           |
| 45.0                                                                   | 25.0                   | 44.6                       | 2.033                           | 9.512                          | 14.009                          | 0.511                           | 1.703                          | 1.245                           |
| 60.0                                                                   | 25.0                   | 59.2                       | 1.659                           | 10.159                         | 15.050                          | 0.382                           | 1.767                          | 1.261                           |
| 75.0                                                                   | 25.0                   | 74.1                       | 1.237                           | 8.876                          | 15.394                          | 0.207                           | 1.909                          | 1.185                           |
| 90.0                                                                   | 25.1                   | 89.2                       | 6.261                           | 14.439                         | 14.542                          | 0.178                           | 1.896                          | 1.011                           |
| 105.0                                                                  | 25.0                   | 104.2                      | 4.410                           | 15.110                         | 13.406                          | 0.180                           | 2.058                          | 0.691                           |
| 120.0                                                                  | 24.8                   | 119.1                      | 0.984                           | 10.422                         | 12.964                          | 0.193                           | 2.573                          | 0.737                           |
| 135.0                                                                  | 24.6                   | 133.6                      | 1.148                           | 8.493                          | 11.657                          | 0.226                           | 2.198                          | 0.577                           |
| 150.0                                                                  | 24.9                   | 148.5                      | 0.988                           | 8.484                          | 11.219                          | 0.228                           | 1.520                          | 0.465                           |
| 165.0                                                                  | 25.5                   | 163.7                      | 1.208                           | 7.475                          | 10.839                          | 0.215                           | 1.010                          | 0.389                           |
| 180.0                                                                  | 26.3                   | 179.3                      | 2.078                           | 7.336                          | 10.416                          | 0.249                           | 0.922                          | 0.383                           |
| 195.0                                                                  | 26.0                   | 195.3                      | 1.112                           | 5.761                          | 10.064                          | 0.165                           | 1.010                          | 0.323                           |
| 210.0                                                                  | 25.1                   | 210.5                      | 0.965                           | 7.818                          | 10.220                          | 0.175                           | 1.660                          | 0.512                           |
| 225.0                                                                  | 24.8                   | 225.5                      | 0.942                           | 9.258                          | 10.108                          | 0.180                           | 2.377                          | 0.700                           |
| 240.0                                                                  | 24.7                   | 241.4                      | 1.021                           | 16.006                         | 13.880                          | 0.177                           | 3.007                          | 0.684                           |
| 255.0                                                                  | 24.8                   | 256.7                      | 2.292                           | 21.670                         | 14.788                          | 0.173                           | 3.146                          | 0.670                           |
| 270.0                                                                  | 24.8                   | 271.8                      | 1.166                           | 15.823                         | 13.481                          | 0.138                           | 3.291                          | 0.852                           |
| 285.0                                                                  | 25.0                   | 286.2                      | 1.100                           | 15.447                         | 13.820                          | 0.187                           | 3.228                          | 1.036                           |
| 300.0                                                                  | 25.0                   | 300.4                      | 1.419                           | 13.207                         | 13.962                          | 0.363                           | 2.604                          | 1.169                           |
| 315.0                                                                  | 25.1                   | 314.7                      | 1.961                           | 11.075                         | 13.396                          | 0.489                           | 1.987                          | 1.214                           |
| 330.0                                                                  | 25.0                   | 329.4                      | 2.631                           | 9.512                          | 13.318                          | 0.563                           | 1.617                          | 1.236                           |
| 345.0                                                                  | 25.0                   | 344.3                      | 2.547                           | 7.567                          | 13.524                          | 0.599                           | 1.355                          | 1.235                           |
| Wind at 56.4 knots (29.0 m/s) is from the starboard beam in all cases. |                        |                            |                                 |                                |                                 |                                 |                                |                                 |

**Table S.49:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 14.0$  m and  $T_p = 16.4$  s; Ship's speed is 30.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                            | <b>Absolute Maximum</b> |                       |                        | <b>Standard Deviation</b> |                       |                        |
|------------------------------------------------------------------------|--------------------|----------------------------|-------------------------|-----------------------|------------------------|---------------------------|-----------------------|------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts       | $\psi_{\text{MHP}}$<br>deg | Long<br>$\text{m/s}^2$  | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ | Long<br>$\text{m/s}^2$    | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ |
| 0.0                                                                    | 30.3               | -0.1                       | 2.875                   | 6.895                 | 15.090                 | 0.629                     | 1.395                 | 1.558                  |
| 15.0                                                                   | 30.2               | 15.0                       | 2.637                   | 7.769                 | 14.275                 | 0.628                     | 1.496                 | 1.528                  |
| 30.0                                                                   | 30.2               | 30.1                       | 2.622                   | 9.690                 | 14.536                 | 0.595                     | 1.659                 | 1.499                  |
| 45.0                                                                   | 30.2               | 44.9                       | 2.254                   | 9.339                 | 15.106                 | 0.531                     | 1.802                 | 1.496                  |
| 60.0                                                                   | 30.2               | 59.5                       | 1.684                   | 9.488                 | 15.433                 | 0.410                     | 1.796                 | 1.463                  |
| 75.0                                                                   | 30.1               | 74.2                       | 0.927                   | 9.112                 | 14.901                 | 0.214                     | 2.085                 | 1.249                  |
| 90.0                                                                   | 30.1               | 89.2                       | 3.688                   | 22.633                | 14.299                 | 0.161                     | 2.092                 | 1.009                  |
| 105.0                                                                  | 30.1               | 104.2                      | 2.737                   | 10.312                | 13.175                 | 0.192                     | 2.134                 | 0.681                  |
| 120.0                                                                  | 29.8               | 119.5                      | 1.549                   | 10.544                | 11.692                 | 0.233                     | 2.829                 | 0.625                  |
| 135.0                                                                  | 29.3               | 132.0                      | 1.224                   | 8.873                 | 11.658                 | 0.274                     | 2.215                 | 0.625                  |
| 150.0                                                                  | 29.6               | 146.6                      | 1.313                   | 8.652                 | 10.857                 | 0.311                     | 1.706                 | 0.580                  |
| 165.0                                                                  | 30.3               | 161.6                      | 1.355                   | 8.635                 | 10.337                 | 0.371                     | 1.316                 | 0.550                  |
| 180.0                                                                  | 31.0               | 177.2                      | 1.428                   | 8.132                 | 9.980                  | 0.372                     | 1.212                 | 0.566                  |
| 195.0                                                                  | 31.5               | 194.2                      | 1.348                   | 7.630                 | 10.798                 | 0.347                     | 1.460                 | 0.534                  |
| 210.0                                                                  | 30.4               | 212.5                      | 1.039                   | 11.940                | 12.390                 | 0.315                     | 2.275                 | 0.598                  |
| 225.0                                                                  | 30.0               | 225.7                      | 1.374                   | 9.971                 | 11.321                 | 0.222                     | 2.240                 | 0.718                  |
| 240.0                                                                  | 29.7               | 240.5                      | 1.369                   | 12.237                | 11.770                 | 0.236                     | 3.225                 | 0.803                  |
| 255.0                                                                  | 29.9               | 255.8                      | 4.838                   | 17.672                | 12.434                 | 0.226                     | 3.122                 | 0.775                  |
| 270.0                                                                  | 30.0               | 271.1                      | 0.856                   | 14.679                | 14.460                 | 0.153                     | 3.268                 | 0.883                  |
| 285.0                                                                  | 30.1               | 285.9                      | 1.525                   | 16.146                | 13.849                 | 0.193                     | 3.293                 | 1.118                  |
| 300.0                                                                  | 30.2               | 300.4                      | 1.494                   | 15.612                | 13.773                 | 0.376                     | 2.813                 | 1.336                  |
| 315.0                                                                  | 30.3               | 315.0                      | 2.072                   | 13.164                | 14.477                 | 0.506                     | 2.211                 | 1.484                  |
| 330.0                                                                  | 30.3               | 329.8                      | 2.529                   | 10.910                | 14.585                 | 0.580                     | 1.732                 | 1.532                  |
| 345.0                                                                  | 30.3               | 344.8                      | 2.727                   | 8.443                 | 14.990                 | 0.618                     | 1.477                 | 1.567                  |
| Wind at 56.4 knots (29.0 m/s) is from the starboard beam in all cases. |                    |                            |                         |                       |                        |                           |                       |                        |

**Table S.50:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 14.0$  m and  $T_p = 18.6$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                            | <b>Absolute Maximum</b> |                       |                        | <b>Standard Deviation</b> |                       |                        |
|------------------------------------------------------------------------|--------------------|----------------------------|-------------------------|-----------------------|------------------------|---------------------------|-----------------------|------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts       | $\psi_{\text{MHP}}$<br>deg | Long<br>$\text{m/s}^2$  | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ | Long<br>$\text{m/s}^2$    | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ |
| 0.0                                                                    | -0.3               | -529.3                     | 1.682                   | 8.316                 | 12.405                 | 0.239                     | 2.446                 | 0.601                  |
| 15.0                                                                   | -2.6               | -113.0                     | 1.547                   | 7.246                 | 11.963                 | 0.293                     | 1.823                 | 0.605                  |
| 30.0                                                                   | -4.0               | -135.5                     | 1.439                   | 7.602                 | 12.915                 | 0.274                     | 1.865                 | 0.732                  |
| 45.0                                                                   | -3.8               | -120.5                     | 1.137                   | 8.306                 | 13.075                 | 0.236                     | 2.054                 | 0.802                  |
| 60.0                                                                   | 2.2                | 51.7                       | 1.028                   | 7.575                 | 13.047                 | 0.233                     | 1.707                 | 0.799                  |
| 75.0                                                                   | 2.1                | 80.1                       | 0.681                   | 6.975                 | 13.784                 | 0.094                     | 1.692                 | 0.836                  |
| 90.0                                                                   | 0.3                | 101.2                      | 0.640                   | 7.010                 | 13.801                 | 0.081                     | 1.744                 | 0.859                  |
| 105.0                                                                  | -1.5               | 111.4                      | 0.859                   | 7.531                 | 13.597                 | 0.121                     | 1.813                 | 0.869                  |
| 120.0                                                                  | -3.6               | 122.6                      | 0.832                   | 7.704                 | 13.619                 | 0.176                     | 1.805                 | 0.853                  |
| 135.0                                                                  | -4.7               | 134.3                      | 1.208                   | 8.435                 | 13.398                 | 0.235                     | 1.619                 | 0.780                  |
| 150.0                                                                  | -4.5               | 149.3                      | 1.214                   | 7.402                 | 12.696                 | 0.277                     | 1.281                 | 0.687                  |
| 165.0                                                                  | -2.9               | 168.9                      | 1.894                   | 6.765                 | 12.174                 | 0.300                     | 0.888                 | 0.552                  |
| 180.0                                                                  | -1.3               | 526.9                      | 1.394                   | 9.769                 | 12.343                 | 0.253                     | 2.552                 | 0.601                  |
| 195.0                                                                  | -1.6               | 358.3                      | 1.413                   | 8.607                 | 13.776                 | 0.202                     | 2.408                 | 0.616                  |
| 210.0                                                                  | -0.4               | 251.6                      | 1.245                   | 9.370                 | 12.704                 | 0.143                     | 2.191                 | 0.647                  |
| 225.0                                                                  | -0.7               | 256.9                      | 0.978                   | 10.393                | 12.572                 | 0.112                     | 2.210                 | 0.666                  |
| 240.0                                                                  | -1.2               | 263.7                      | 0.665                   | 10.992                | 12.610                 | 0.077                     | 2.190                 | 0.688                  |
| 255.0                                                                  | -2.0               | 270.9                      | 0.618                   | 11.229                | 12.715                 | 0.062                     | 2.138                 | 0.698                  |
| 270.0                                                                  | -2.1               | 278.3                      | 0.574                   | 10.495                | 12.530                 | 0.069                     | 2.057                 | 0.684                  |
| 285.0                                                                  | -2.1               | 284.3                      | 0.699                   | 10.010                | 12.290                 | 0.102                     | 1.977                 | 0.665                  |
| 300.0                                                                  | -2.4               | 290.2                      | 0.912                   | 9.888                 | 12.275                 | 0.141                     | 1.924                 | 0.651                  |
| 315.0                                                                  | -2.7               | 241.7                      | 1.598                   | 11.560                | 12.259                 | 0.182                     | 2.698                 | 0.663                  |
| 330.0                                                                  | -2.6               | 252.0                      | 1.163                   | 10.564                | 12.837                 | 0.194                     | 2.566                 | 0.637                  |
| 345.0                                                                  | -2.7               | 50.0                       | 1.556                   | 9.662                 | 12.788                 | 0.228                     | 2.138                 | 0.627                  |
| Wind at 56.4 knots (29.0 m/s) is from the starboard beam in all cases. |                    |                            |                         |                       |                        |                           |                       |                        |

**Table S.51:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 14.0$  m and  $T_p = 18.6$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 2.8                | -40.7               | 1.798                   | 8.992          | 12.151          | 0.294                     | 1.786          | 0.588           |
| 15.0                                                                   | 2.2                | -132.5              | 1.671                   | 6.967          | 13.503          | 0.188                     | 1.721          | 0.748           |
| 30.0                                                                   | 2.6                | -88.1               | 1.623                   | 7.237          | 12.629          | 0.229                     | 2.513          | 0.734           |
| 45.0                                                                   | 3.1                | -99.6               | 1.254                   | 6.944          | 12.802          | 0.175                     | 2.155          | 0.795           |
| 60.0                                                                   | 3.6                | -83.8               | 1.320                   | 7.035          | 13.175          | 0.173                     | 2.265          | 0.812           |
| 75.0                                                                   | 5.1                | 66.4                | 0.827                   | 7.448          | 12.939          | 0.164                     | 1.625          | 0.848           |
| 90.0                                                                   | 4.9                | 89.0                | 0.469                   | 6.671          | 13.895          | 0.054                     | 1.593          | 0.855           |
| 105.0                                                                  | 4.4                | 104.1               | 0.557                   | 6.764          | 13.751          | 0.068                     | 1.648          | 0.843           |
| 120.0                                                                  | 3.6                | 114.9               | 0.715                   | 7.148          | 13.085          | 0.106                     | 1.648          | 0.829           |
| 135.0                                                                  | 3.0                | 122.9               | 1.027                   | 7.630          | 13.256          | 0.136                     | 1.629          | 0.810           |
| 150.0                                                                  | 2.5                | 131.4               | 1.204                   | 7.743          | 13.759          | 0.166                     | 1.579          | 0.766           |
| 165.0                                                                  | 2.2                | 138.9               | 1.293                   | 7.961          | 12.998          | 0.190                     | 1.520          | 0.718           |
| 180.0                                                                  | 2.1                | 149.1               | 1.609                   | 6.428          | 12.129          | 0.212                     | 1.424          | 0.647           |
| 195.0                                                                  | 4.2                | 206.2               | 1.640                   | 8.719          | 11.278          | 0.221                     | 1.585          | 0.363           |
| 210.0                                                                  | 4.3                | 241.2               | 1.434                   | 9.431          | 12.211          | 0.163                     | 2.110          | 0.501           |
| 225.0                                                                  | 4.0                | 251.2               | 1.153                   | 10.847         | 12.586          | 0.131                     | 2.157          | 0.562           |
| 240.0                                                                  | 3.9                | 260.4               | 0.864                   | 11.804         | 12.310          | 0.097                     | 2.186          | 0.617           |
| 255.0                                                                  | 4.0                | 270.1               | 0.457                   | 11.497         | 12.578          | 0.059                     | 2.166          | 0.654           |
| 270.0                                                                  | 4.0                | 278.8               | 0.485                   | 11.040         | 12.418          | 0.057                     | 2.149          | 0.674           |
| 285.0                                                                  | 4.0                | 287.8               | 0.808                   | 10.522         | 13.205          | 0.107                     | 2.046          | 0.664           |
| 300.0                                                                  | 3.9                | 296.2               | 0.924                   | 10.756         | 12.053          | 0.166                     | 1.899          | 0.633           |
| 315.0                                                                  | 3.6                | 301.3               | 1.013                   | 10.738         | 12.010          | 0.205                     | 1.876          | 0.629           |
| 330.0                                                                  | 3.3                | 307.1               | 1.413                   | 10.940         | 12.220          | 0.241                     | 1.853          | 0.616           |
| 345.0                                                                  | 3.0                | 313.4               | 1.640                   | 10.202         | 12.354          | 0.272                     | 1.822          | 0.596           |
| Wind at 56.4 knots (29.0 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table S.52:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 14.0$  m and  $T_p = 18.6$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                            | <b>Absolute Maximum</b> |                       |                        | <b>Standard Deviation</b> |                       |                        |
|------------------------------------------------------------------------|--------------------|----------------------------|-------------------------|-----------------------|------------------------|---------------------------|-----------------------|------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts       | $\psi_{\text{MHP}}$<br>deg | Long<br>$\text{m/s}^2$  | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ | Long<br>$\text{m/s}^2$    | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ |
| 0.0                                                                    | 7.6                | -33.6                      | 1.995                   | 10.257                | 11.539                 | 0.363                     | 1.786                 | 0.613                  |
| 15.0                                                                   | 7.4                | -26.9                      | 2.001                   | 8.128                 | 11.421                 | 0.384                     | 1.763                 | 0.610                  |
| 30.0                                                                   | 7.4                | -18.7                      | 2.263                   | 6.965                 | 11.534                 | 0.399                     | 1.673                 | 0.604                  |
| 45.0                                                                   | 7.4                | -8.1                       | 1.961                   | 6.471                 | 11.643                 | 0.409                     | 1.582                 | 0.619                  |
| 60.0                                                                   | 7.6                | 13.7                       | 2.259                   | 7.491                 | 12.148                 | 0.389                     | 1.549                 | 0.696                  |
| 75.0                                                                   | 9.9                | 71.8                       | 0.713                   | 7.178                 | 13.583                 | 0.130                     | 1.476                 | 0.867                  |
| 90.0                                                                   | 9.9                | 88.5                       | 0.256                   | 6.710                 | 13.643                 | 0.053                     | 1.448                 | 0.835                  |
| 105.0                                                                  | 9.7                | 104.0                      | 0.596                   | 6.536                 | 13.194                 | 0.067                     | 1.452                 | 0.770                  |
| 120.0                                                                  | 9.0                | 116.0                      | 0.912                   | 6.379                 | 13.298                 | 0.095                     | 1.358                 | 0.747                  |
| 135.0                                                                  | 8.4                | 127.3                      | 1.272                   | 7.023                 | 13.201                 | 0.120                     | 1.231                 | 0.682                  |
| 150.0                                                                  | 7.9                | 137.5                      | 1.216                   | 6.488                 | 12.580                 | 0.138                     | 1.189                 | 0.620                  |
| 165.0                                                                  | 7.7                | 145.8                      | 1.251                   | 6.389                 | 12.554                 | 0.148                     | 1.244                 | 0.602                  |
| 180.0                                                                  | 7.6                | 157.3                      | 1.348                   | 6.252                 | 12.427                 | 0.164                     | 1.324                 | 0.577                  |
| 195.0                                                                  | 9.0                | 194.5                      | 1.754                   | 8.862                 | 10.512                 | 0.176                     | 1.415                 | 0.367                  |
| 210.0                                                                  | 8.9                | 221.5                      | 1.709                   | 9.948                 | 11.322                 | 0.169                     | 1.926                 | 0.341                  |
| 225.0                                                                  | 8.7                | 238.4                      | 1.269                   | 9.636                 | 11.552                 | 0.148                     | 2.127                 | 0.420                  |
| 240.0                                                                  | 8.8                | 251.0                      | 1.114                   | 12.247                | 13.346                 | 0.124                     | 2.249                 | 0.507                  |
| 255.0                                                                  | 9.1                | 262.7                      | 0.771                   | 12.239                | 12.313                 | 0.088                     | 2.313                 | 0.584                  |
| 270.0                                                                  | 9.3                | 274.9                      | 0.373                   | 11.223                | 12.608                 | 0.058                     | 2.377                 | 0.641                  |
| 285.0                                                                  | 9.5                | 287.2                      | 0.782                   | 11.514                | 12.258                 | 0.101                     | 2.264                 | 0.659                  |
| 300.0                                                                  | 9.4                | 299.6                      | 0.964                   | 10.405                | 12.130                 | 0.202                     | 1.923                 | 0.633                  |
| 315.0                                                                  | 8.9                | 310.0                      | 1.481                   | 9.775                 | 11.867                 | 0.278                     | 1.739                 | 0.617                  |
| 330.0                                                                  | 8.0                | 314.6                      | 1.565                   | 9.280                 | 12.340                 | 0.310                     | 1.789                 | 0.615                  |
| 345.0                                                                  | 7.7                | 320.9                      | 1.880                   | 9.502                 | 11.869                 | 0.341                     | 1.768                 | 0.601                  |
| Wind at 56.4 knots (29.0 m/s) is from the starboard beam in all cases. |                    |                            |                         |                       |                        |                           |                       |                        |

**Table S.53:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 14.0$  m and  $T_p = 18.6$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 13.9               | -4.3                | 1.970                   | 7.019          | 11.921          | 0.463                     | 1.209          | 0.681           |
| 15.0                                                                   | 14.0               | 11.3                | 2.022                   | 6.150          | 11.834          | 0.459                     | 1.223          | 0.704           |
| 30.0                                                                   | 14.3               | 27.1                | 1.877                   | 6.532          | 12.407          | 0.423                     | 1.329          | 0.759           |
| 45.0                                                                   | 14.5               | 42.6                | 1.442                   | 7.352          | 12.642          | 0.353                     | 1.365          | 0.826           |
| 60.0                                                                   | 14.7               | 57.4                | 0.994                   | 7.663          | 13.146          | 0.250                     | 1.382          | 0.886           |
| 75.0                                                                   | 15.0               | 73.4                | 0.701                   | 6.728          | 14.083          | 0.130                     | 1.386          | 0.873           |
| 90.0                                                                   | 15.0               | 88.8                | 0.515                   | 10.597         | 13.239          | 0.069                     | 1.402          | 0.802           |
| 105.0                                                                  | 15.0               | 104.3               | 0.554                   | 7.195          | 12.342          | 0.087                     | 1.365          | 0.675           |
| 120.0                                                                  | 14.5               | 117.6               | 0.757                   | 6.331          | 13.097          | 0.115                     | 1.322          | 0.669           |
| 135.0                                                                  | 14.3               | 132.0               | 0.626                   | 6.735          | 11.857          | 0.130                     | 1.105          | 0.555           |
| 150.0                                                                  | 14.2               | 146.8               | 1.194                   | 6.439          | 12.214          | 0.146                     | 0.981          | 0.472           |
| 165.0                                                                  | 14.4               | 162.1               | 0.844                   | 6.597          | 11.192          | 0.146                     | 0.915          | 0.423           |
| 180.0                                                                  | 14.5               | 178.0               | 1.081                   | 7.236          | 10.279          | 0.158                     | 1.016          | 0.373           |
| 195.0                                                                  | 14.6               | 194.4               | 1.192                   | 8.550          | 10.951          | 0.144                     | 1.286          | 0.385           |
| 210.0                                                                  | 14.4               | 212.7               | 1.185                   | 9.407          | 11.283          | 0.150                     | 1.774          | 0.360           |
| 225.0                                                                  | 14.2               | 230.3               | 1.013                   | 8.420          | 11.535          | 0.136                     | 2.195          | 0.410           |
| 240.0                                                                  | 14.3               | 244.5               | 0.969                   | 10.308         | 13.993          | 0.128                     | 2.476          | 0.429           |
| 255.0                                                                  | 14.6               | 258.5               | 0.819                   | 11.116         | 12.655          | 0.107                     | 2.520          | 0.515           |
| 270.0                                                                  | 14.7               | 272.6               | 0.547                   | 11.321         | 12.664          | 0.078                     | 2.599          | 0.632           |
| 285.0                                                                  | 14.8               | 286.5               | 0.644                   | 11.793         | 12.665          | 0.105                     | 2.505          | 0.697           |
| 300.0                                                                  | 14.7               | 300.1               | 1.011                   | 11.482         | 12.223          | 0.214                     | 2.083          | 0.690           |
| 315.0                                                                  | 14.5               | 313.5               | 1.322                   | 10.169         | 11.937          | 0.318                     | 1.648          | 0.674           |
| 330.0                                                                  | 14.2               | 327.0               | 1.777                   | 9.460          | 11.856          | 0.395                     | 1.412          | 0.669           |
| 345.0                                                                  | 13.9               | 341.0               | 2.078                   | 8.229          | 11.674          | 0.442                     | 1.292          | 0.664           |
| Wind at 56.4 knots (29.0 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table S.54:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 14.0$  m and  $T_p = 18.6$  s; Ship's speed is 20.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 19.7               | -1.5                | 2.428                   | 5.833          | 11.972          | 0.499                     | 1.142          | 0.799           |
| 15.0                                                                   | 19.7               | 13.8                | 1.987                   | 6.561          | 12.341          | 0.489                     | 1.227          | 0.811           |
| 30.0                                                                   | 19.8               | 29.0                | 2.076                   | 6.709          | 12.618          | 0.451                     | 1.339          | 0.843           |
| 45.0                                                                   | 19.8               | 44.0                | 1.642                   | 7.793          | 13.114          | 0.369                     | 1.408          | 0.883           |
| 60.0                                                                   | 19.9               | 58.6                | 0.962                   | 7.833          | 13.191          | 0.260                     | 1.367          | 0.941           |
| 75.0                                                                   | 20.1               | 73.8                | 0.606                   | 7.134          | 13.987          | 0.137                     | 1.421          | 0.885           |
| 90.0                                                                   | 20.1               | 89.0                | 0.431                   | 7.604          | 13.220          | 0.090                     | 1.374          | 0.759           |
| 105.0                                                                  | 20.1               | 104.1               | 1.545                   | 11.778         | 12.148          | 0.119                     | 1.399          | 0.568           |
| 120.0                                                                  | 19.9               | 118.6               | 0.595                   | 7.097          | 11.928          | 0.142                     | 1.562          | 0.648           |
| 135.0                                                                  | 19.9               | 133.6               | 0.814                   | 8.650          | 11.228          | 0.150                     | 1.190          | 0.483           |
| 150.0                                                                  | 19.8               | 148.5               | 0.974                   | 7.948          | 11.191          | 0.177                     | 1.059          | 0.438           |
| 165.0                                                                  | 19.8               | 163.7               | 0.946                   | 5.887          | 10.907          | 0.190                     | 0.890          | 0.413           |
| 180.0                                                                  | 20.0               | 179.4               | 0.923                   | 6.531          | 10.535          | 0.188                     | 0.968          | 0.398           |
| 195.0                                                                  | 19.9               | 194.4               | 0.994                   | 7.379          | 10.281          | 0.167                     | 1.238          | 0.463           |
| 210.0                                                                  | 19.9               | 209.6               | 0.751                   | 8.222          | 10.215          | 0.145                     | 1.590          | 0.559           |
| 225.0                                                                  | 19.8               | 225.8               | 1.026                   | 8.897          | 10.846          | 0.140                     | 2.055          | 0.515           |
| 240.0                                                                  | 19.7               | 241.8               | 0.880                   | 9.245          | 12.386          | 0.144                     | 2.641          | 0.462           |
| 255.0                                                                  | 19.9               | 256.9               | 0.958                   | 9.739          | 12.349          | 0.121                     | 2.693          | 0.544           |
| 270.0                                                                  | 19.9               | 271.6               | 0.566                   | 12.171         | 12.488          | 0.095                     | 2.753          | 0.664           |
| 285.0                                                                  | 20.0               | 286.0               | 0.632                   | 13.150         | 12.807          | 0.108                     | 2.708          | 0.771           |
| 300.0                                                                  | 19.9               | 300.2               | 1.076                   | 12.259         | 12.085          | 0.227                     | 2.217          | 0.769           |
| 315.0                                                                  | 19.9               | 314.3               | 1.501                   | 10.739         | 12.227          | 0.346                     | 1.708          | 0.780           |
| 330.0                                                                  | 19.8               | 328.7               | 1.799                   | 8.354          | 12.450          | 0.429                     | 1.347          | 0.790           |
| 345.0                                                                  | 19.7               | 343.5               | 2.412                   | 6.723          | 12.040          | 0.479                     | 1.172          | 0.785           |
| Wind at 56.4 knots (29.0 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table S.55:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 14.0$  m and  $T_p = 18.6$  s; Ship's speed is 25.0 Knots

| <b>Cmd<br/>Heading</b>                                                 | <b>Actual<br/>Mean</b> |                            | <b>Absolute<br/>Maximum</b> |                       |                        | <b>Standard<br/>Deviation</b> |                       |                        |
|------------------------------------------------------------------------|------------------------|----------------------------|-----------------------------|-----------------------|------------------------|-------------------------------|-----------------------|------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts           | $\psi_{\text{MHP}}$<br>deg | Long<br>$\text{m/s}^2$      | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ | Long<br>$\text{m/s}^2$        | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ |
| 0.0                                                                    | 25.0                   | -0.6                       | 2.204                       | 6.747                 | 12.794                 | 0.528                         | 1.203                 | 1.021                  |
| 15.0                                                                   | 25.0                   | 14.6                       | 2.421                       | 6.900                 | 13.295                 | 0.518                         | 1.279                 | 1.015                  |
| 30.0                                                                   | 25.0                   | 29.7                       | 2.113                       | 7.374                 | 13.245                 | 0.482                         | 1.395                 | 1.023                  |
| 45.0                                                                   | 25.0                   | 44.6                       | 1.599                       | 7.509                 | 13.236                 | 0.395                         | 1.469                 | 1.022                  |
| 60.0                                                                   | 25.0                   | 59.2                       | 1.075                       | 7.904                 | 14.738                 | 0.275                         | 1.451                 | 1.022                  |
| 75.0                                                                   | 25.1                   | 74.2                       | 0.554                       | 7.582                 | 13.512                 | 0.146                         | 1.549                 | 0.925                  |
| 90.0                                                                   | 25.2                   | 89.2                       | 0.866                       | 13.486                | 13.744                 | 0.111                         | 1.517                 | 0.751                  |
| 105.0                                                                  | 25.1                   | 104.1                      | 1.390                       | 9.045                 | 13.084                 | 0.145                         | 1.489                 | 0.525                  |
| 120.0                                                                  | 25.0                   | 119.0                      | 0.953                       | 10.457                | 12.242                 | 0.175                         | 1.871                 | 0.622                  |
| 135.0                                                                  | 24.8                   | 133.8                      | 1.004                       | 9.366                 | 12.420                 | 0.210                         | 1.929                 | 0.541                  |
| 150.0                                                                  | 24.8                   | 148.3                      | 0.981                       | 8.519                 | 10.840                 | 0.208                         | 0.992                 | 0.449                  |
| 165.0                                                                  | 25.6                   | 164.1                      | 1.059                       | 5.238                 | 10.788                 | 0.232                         | 0.776                 | 0.384                  |
| 180.0                                                                  | 25.9                   | 179.3                      | 0.893                       | 5.048                 | 10.200                 | 0.173                         | 0.603                 | 0.278                  |
| 195.0                                                                  | 25.7                   | 196.3                      | 1.265                       | 7.873                 | 10.368                 | 0.229                         | 1.340                 | 0.395                  |
| 210.0                                                                  | 25.1                   | 210.4                      | 0.843                       | 7.897                 | 10.255                 | 0.182                         | 1.631                 | 0.528                  |
| 225.0                                                                  | 24.9                   | 225.0                      | 0.879                       | 8.894                 | 10.195                 | 0.173                         | 2.173                 | 0.719                  |
| 240.0                                                                  | 24.9                   | 240.5                      | 1.071                       | 10.837                | 11.620                 | 0.161                         | 2.630                 | 0.592                  |
| 255.0                                                                  | 25.1                   | 256.0                      | 0.860                       | 14.192                | 11.514                 | 0.139                         | 2.761                 | 0.645                  |
| 270.0                                                                  | 25.0                   | 271.1                      | 0.524                       | 11.758                | 12.072                 | 0.112                         | 2.851                 | 0.742                  |
| 285.0                                                                  | 25.1                   | 285.8                      | 0.667                       | 13.707                | 13.014                 | 0.118                         | 2.887                 | 0.856                  |
| 300.0                                                                  | 25.1                   | 300.1                      | 0.994                       | 12.685                | 12.441                 | 0.238                         | 2.278                 | 0.871                  |
| 315.0                                                                  | 25.1                   | 314.7                      | 1.646                       | 10.880                | 12.765                 | 0.369                         | 1.805                 | 0.940                  |
| 330.0                                                                  | 25.0                   | 329.4                      | 2.010                       | 9.417                 | 13.023                 | 0.457                         | 1.459                 | 0.997                  |
| 345.0                                                                  | 25.0                   | 344.3                      | 2.351                       | 7.059                 | 12.923                 | 0.505                         | 1.245                 | 1.015                  |
| Wind at 56.4 knots (29.0 m/s) is from the starboard beam in all cases. |                        |                            |                             |                       |                        |                               |                       |                        |



**Table S.56:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 14.0$  m and  $T_p = 18.6$  s; Ship's speed is 30.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                            | <b>Absolute Maximum</b> |                       |                        | <b>Standard Deviation</b> |                       |                        |
|------------------------------------------------------------------------|--------------------|----------------------------|-------------------------|-----------------------|------------------------|---------------------------|-----------------------|------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts       | $\psi_{\text{MHP}}$<br>deg | Long<br>$\text{m/s}^2$  | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ | Long<br>$\text{m/s}^2$    | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ |
| 0.0                                                                    | 30.2               | -0.2                       | 2.507                   | 7.806                 | 13.905                 | 0.550                     | 1.282                 | 1.300                  |
| 15.0                                                                   | 30.2               | 15.0                       | 2.167                   | 7.703                 | 14.238                 | 0.536                     | 1.373                 | 1.284                  |
| 30.0                                                                   | 30.2               | 30.0                       | 2.222                   | 9.115                 | 14.039                 | 0.500                     | 1.503                 | 1.269                  |
| 45.0                                                                   | 30.2               | 44.9                       | 1.761                   | 8.396                 | 13.767                 | 0.417                     | 1.595                 | 1.208                  |
| 60.0                                                                   | 30.2               | 59.6                       | 1.157                   | 8.640                 | 14.508                 | 0.293                     | 1.591                 | 1.143                  |
| 75.0                                                                   | 30.2               | 74.3                       | 0.747                   | 8.351                 | 13.976                 | 0.156                     | 1.745                 | 0.975                  |
| 90.0                                                                   | 30.2               | 89.3                       | 0.754                   | 8.252                 | 13.098                 | 0.128                     | 1.684                 | 0.778                  |
| 105.0                                                                  | 30.2               | 104.1                      | 1.792                   | 10.402                | 12.301                 | 0.177                     | 1.606                 | 0.533                  |
| 120.0                                                                  | 30.0               | 119.4                      | 0.720                   | 8.212                 | 11.200                 | 0.206                     | 2.224                 | 0.555                  |
| 135.0                                                                  | 29.8               | 133.7                      | 1.065                   | 9.177                 | 10.910                 | 0.249                     | 1.953                 | 0.489                  |
| 150.0                                                                  | 30.0               | 148.1                      | 1.122                   | 8.862                 | 10.468                 | 0.263                     | 1.251                 | 0.475                  |
| 165.0                                                                  | 30.2               | 162.5                      | 1.102                   | 6.894                 | 10.451                 | 0.326                     | 1.007                 | 0.445                  |
| 180.0                                                                  | 30.8               | 177.9                      | 1.553                   | 6.396                 | 10.012                 | 0.322                     | 0.894                 | 0.438                  |
| 195.0                                                                  | 31.6               | 194.5                      | 1.165                   | 5.980                 | 10.253                 | 0.273                     | 1.138                 | 0.423                  |
| 210.0                                                                  | 30.8               | 210.9                      | 1.446                   | 11.157                | 10.194                 | 0.259                     | 1.702                 | 0.522                  |
| 225.0                                                                  | 30.1               | 225.2                      | 0.868                   | 8.264                 | 10.118                 | 0.210                     | 2.017                 | 0.692                  |
| 240.0                                                                  | 30.0               | 240.1                      | 1.120                   | 11.803                | 10.162                 | 0.194                     | 2.572                 | 0.722                  |
| 255.0                                                                  | 30.1               | 255.5                      | 0.995                   | 13.510                | 10.929                 | 0.167                     | 2.650                 | 0.776                  |
| 270.0                                                                  | 30.1               | 270.7                      | 0.624                   | 11.893                | 11.826                 | 0.132                     | 2.895                 | 0.838                  |
| 285.0                                                                  | 30.2               | 285.5                      | 0.690                   | 12.659                | 13.015                 | 0.129                     | 2.904                 | 0.952                  |
| 300.0                                                                  | 30.2               | 300.2                      | 1.078                   | 12.897                | 13.064                 | 0.254                     | 2.443                 | 0.957                  |
| 315.0                                                                  | 30.2               | 314.9                      | 1.593                   | 11.540                | 13.703                 | 0.391                     | 1.926                 | 1.147                  |
| 330.0                                                                  | 30.2               | 329.7                      | 2.061                   | 8.565                 | 14.356                 | 0.483                     | 1.527                 | 1.243                  |
| 345.0                                                                  | 30.2               | 344.7                      | 2.444                   | 8.772                 | 14.013                 | 0.528                     | 1.355                 | 1.289                  |
| Wind at 56.4 knots (29.0 m/s) is from the starboard beam in all cases. |                    |                            |                         |                       |                        |                           |                       |                        |

**Table S.57:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 17.7$  m and  $T_p = 20.0$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | -0.5               | -110.6              | 1.902                   | 11.040         | 12.050          | 0.294                     | 2.897          | 0.630           |
| 15.0                                                                   | -2.8               | 189.5               | 2.346                   | 8.524          | 11.890          | 0.333                     | 1.635          | 0.592           |
| 30.0                                                                   | -4.0               | -145.1              | 1.647                   | 8.952          | 12.130          | 0.322                     | 2.163          | 0.732           |
| 45.0                                                                   | 2.0                | 30.6                | 1.302                   | 8.394          | 12.399          | 0.320                     | 1.711          | 0.963           |
| 60.0                                                                   | 3.8                | 54.5                | 1.007                   | 7.770          | 14.152          | 0.237                     | 1.671          | 0.974           |
| 75.0                                                                   | 2.8                | 85.5                | 0.753                   | 7.041          | 14.305          | 0.085                     | 1.581          | 0.916           |
| 90.0                                                                   | 0.3                | 106.0               | 1.007                   | 8.217          | 13.442          | 0.107                     | 1.691          | 0.911           |
| 105.0                                                                  | -2.3               | 118.7               | 1.078                   | 8.190          | 13.521          | 0.155                     | 1.778          | 0.947           |
| 120.0                                                                  | -4.4               | 132.0               | 1.121                   | 7.933          | 13.629          | 0.225                     | 1.658          | 0.912           |
| 135.0                                                                  | -5.1               | 146.2               | 1.479                   | 8.217          | 13.599          | 0.290                     | 1.413          | 0.814           |
| 150.0                                                                  | -4.3               | 160.0               | 1.437                   | 8.569          | 12.996          | 0.322                     | 1.117          | 0.646           |
| 165.0                                                                  | -2.8               | 173.3               | 1.727                   | 7.607          | 12.644          | 0.333                     | 1.085          | 0.516           |
| 180.0                                                                  | 0.4                | 310.9               | 1.772                   | 10.460         | 13.597          | 0.271                     | 2.842          | 0.658           |
| 195.0                                                                  | 1.1                | 234.8               | 1.822                   | 10.278         | 11.714          | 0.227                     | 2.464          | 0.587           |
| 210.0                                                                  | -0.2               | 245.4               | 1.544                   | 11.067         | 12.725          | 0.200                     | 2.481          | 0.642           |
| 225.0                                                                  | -0.7               | 253.7               | 1.260                   | 11.894         | 12.533          | 0.149                     | 2.493          | 0.713           |
| 240.0                                                                  | -1.1               | 261.7               | 0.963                   | 12.045         | 12.687          | 0.104                     | 2.454          | 0.748           |
| 255.0                                                                  | -2.3               | 269.6               | 1.121                   | 11.961         | 12.517          | 0.086                     | 2.390          | 0.795           |
| 270.0                                                                  | -2.8               | 277.2               | 0.644                   | 11.703         | 13.092          | 0.084                     | 2.276          | 0.806           |
| 285.0                                                                  | -3.5               | 283.1               | 0.770                   | 11.602         | 11.806          | 0.116                     | 2.192          | 0.813           |
| 300.0                                                                  | -3.5               | 288.4               | 1.033                   | 11.387         | 12.099          | 0.160                     | 2.141          | 0.843           |
| 315.0                                                                  | -3.9               | 295.7               | 1.874                   | 15.422         | 13.688          | 0.204                     | 2.193          | 0.857           |
| 330.0                                                                  | -0.6               | 141.1               | 1.365                   | 11.267         | 13.293          | 0.199                     | 3.093          | 0.703           |
| 345.0                                                                  | 0.6                | 141.0               | 1.770                   | 11.268         | 11.940          | 0.229                     | 2.814          | 0.618           |
| Wind at 69.4 knots (35.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table S.58:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 17.7$  m and  $T_p = 20.0$  s; Ship's speed is 5.0 Knots

| <b>Cmd<br/>Heading</b>                                                 | <b>Actual<br/>Mean</b> |                            | <b>Absolute<br/>Maximum</b>   |                              |                               | <b>Standard<br/>Deviation</b> |                              |                               |
|------------------------------------------------------------------------|------------------------|----------------------------|-------------------------------|------------------------------|-------------------------------|-------------------------------|------------------------------|-------------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | <b>Speed</b><br>kts    | $\psi_{\text{MHP}}$<br>deg | <b>Long</b><br>$\text{m/s}^2$ | <b>Lat</b><br>$\text{m/s}^2$ | <b>Vert</b><br>$\text{m/s}^2$ | <b>Long</b><br>$\text{m/s}^2$ | <b>Lat</b><br>$\text{m/s}^2$ | <b>Vert</b><br>$\text{m/s}^2$ |
| 0.0                                                                    | 1.7                    | -41.7                      | 1.990                         | 12.019                       | 12.376                        | 0.303                         | 2.119                        | 0.796                         |
| 15.0                                                                   | 1.3                    | -140.8                     | 1.912                         | 8.213                        | 13.485                        | 0.228                         | 1.679                        | 0.830                         |
| 30.0                                                                   | 1.9                    | -124.7                     | 1.918                         | 7.364                        | 12.737                        | 0.211                         | 2.161                        | 0.850                         |
| 45.0                                                                   | 2.6                    | -114.2                     | 1.514                         | 7.323                        | 12.730                        | 0.187                         | 2.287                        | 0.871                         |
| 60.0                                                                   | 3.5                    | -61.9                      | 1.753                         | 8.268                        | 12.611                        | 0.237                         | 3.488                        | 0.904                         |
| 75.0                                                                   | 5.8                    | 71.4                       | 1.044                         | 8.034                        | 14.052                        | 0.143                         | 1.507                        | 0.935                         |
| 90.0                                                                   | 5.0                    | 94.4                       | 0.426                         | 7.176                        | 14.211                        | 0.063                         | 1.564                        | 0.881                         |
| 105.0                                                                  | 4.3                    | 108.2                      | 1.194                         | 7.899                        | 13.435                        | 0.098                         | 1.571                        | 0.857                         |
| 120.0                                                                  | 3.4                    | 118.0                      | 1.296                         | 9.798                        | 13.168                        | 0.129                         | 1.560                        | 0.872                         |
| 135.0                                                                  | 2.5                    | 127.1                      | 1.642                         | 9.185                        | 12.837                        | 0.163                         | 1.537                        | 0.880                         |
| 150.0                                                                  | 1.9                    | 134.9                      | 1.725                         | 9.514                        | 13.511                        | 0.191                         | 1.495                        | 0.870                         |
| 165.0                                                                  | 1.5                    | 143.3                      | 1.633                         | 9.671                        | 13.866                        | 0.219                         | 1.443                        | 0.843                         |
| 180.0                                                                  | 1.3                    | 153.9                      | 1.553                         | 8.417                        | 12.749                        | 0.247                         | 1.361                        | 0.778                         |
| 195.0                                                                  | 1.8                    | 168.9                      | 2.629                         | 9.719                        | 11.779                        | 0.272                         | 1.266                        | 0.661                         |
| 210.0                                                                  | 4.5                    | 235.3                      | 1.898                         | 11.270                       | 11.735                        | 0.206                         | 2.385                        | 0.537                         |
| 225.0                                                                  | 4.1                    | 248.3                      | 1.470                         | 11.293                       | 11.778                        | 0.168                         | 2.426                        | 0.615                         |
| 240.0                                                                  | 3.6                    | 258.0                      | 1.087                         | 12.443                       | 12.483                        | 0.135                         | 2.439                        | 0.682                         |
| 255.0                                                                  | 3.6                    | 268.2                      | 1.022                         | 11.809                       | 12.841                        | 0.096                         | 2.430                        | 0.727                         |
| 270.0                                                                  | 3.5                    | 276.9                      | 0.681                         | 12.218                       | 12.028                        | 0.078                         | 2.389                        | 0.754                         |
| 285.0                                                                  | 3.6                    | 285.8                      | 0.741                         | 11.981                       | 11.885                        | 0.094                         | 2.312                        | 0.776                         |
| 300.0                                                                  | 3.0                    | 292.4                      | 0.864                         | 12.014                       | 11.718                        | 0.141                         | 2.191                        | 0.813                         |
| 315.0                                                                  | 2.6                    | 298.6                      | 1.197                         | 11.984                       | 11.764                        | 0.189                         | 2.160                        | 0.881                         |
| 330.0                                                                  | 2.3                    | 306.2                      | 1.474                         | 11.749                       | 11.346                        | 0.235                         | 2.101                        | 0.866                         |
| 345.0                                                                  | 2.0                    | 312.9                      | 1.836                         | 11.067                       | 11.192                        | 0.276                         | 2.091                        | 0.857                         |
| Wind at 69.4 knots (35.7 m/s) is from the starboard beam in all cases. |                        |                            |                               |                              |                               |                               |                              |                               |

**Table S.59:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 17.7$  m and  $T_p = 20.0$  s; Ship's speed is 10.0 Knots

| <b>Cmd<br/>Heading</b>                                                 | <b>Actual<br/>Mean</b> |                     | <b>Absolute<br/>Maximum</b>     |                                |                                 | <b>Standard<br/>Deviation</b>   |                                |                                 |
|------------------------------------------------------------------------|------------------------|---------------------|---------------------------------|--------------------------------|---------------------------------|---------------------------------|--------------------------------|---------------------------------|
| $\psi_{MHP}$<br>deg                                                    | <b>Speed<br/>kts</b>   | $\psi_{MHP}$<br>deg | <b>Long<br/>m/s<sup>2</sup></b> | <b>Lat<br/>m/s<sup>2</sup></b> | <b>Vert<br/>m/s<sup>2</sup></b> | <b>Long<br/>m/s<sup>2</sup></b> | <b>Lat<br/>m/s<sup>2</sup></b> | <b>Vert<br/>m/s<sup>2</sup></b> |
| 0.0                                                                    | 6.9                    | -37.5               | 2.268                           | 10.669                         | 11.601                          | 0.362                           | 2.158                          | 0.826                           |
| 15.0                                                                   | 6.8                    | -31.4               | 2.331                           | 10.013                         | 11.505                          | 0.388                           | 2.122                          | 0.778                           |
| 30.0                                                                   | 6.8                    | -26.2               | 2.127                           | 9.239                          | 11.862                          | 0.402                           | 2.093                          | 0.748                           |
| 45.0                                                                   | 7.7                    | -78.8               | 1.781                           | 7.904                          | 12.336                          | 0.242                           | 2.961                          | 0.794                           |
| 60.0                                                                   | 6.9                    | -10.9               | 2.022                           | 9.022                          | 12.497                          | 0.410                           | 2.164                          | 0.787                           |
| 75.0                                                                   | 7.6                    | 24.5                | 1.794                           | 9.483                          | 13.801                          | 0.368                           | 2.004                          | 0.889                           |
| 90.0                                                                   | 9.7                    | 88.3                | 0.341                           | 8.638                          | 13.801                          | 0.061                           | 1.504                          | 0.858                           |
| 105.0                                                                  | 9.5                    | 103.2               | 0.976                           | 9.943                          | 13.030                          | 0.088                           | 1.477                          | 0.735                           |
| 120.0                                                                  | 8.7                    | 114.3               | 0.972                           | 11.200                         | 11.887                          | 0.107                           | 1.280                          | 0.714                           |
| 135.0                                                                  | 8.1                    | 125.0               | 1.021                           | 7.824                          | 12.271                          | 0.140                           | 1.118                          | 0.667                           |
| 150.0                                                                  | 7.6                    | 134.4               | 1.596                           | 7.538                          | 13.852                          | 0.159                           | 1.031                          | 0.647                           |
| 165.0                                                                  | 7.3                    | 144.5               | 1.388                           | 6.924                          | 13.254                          | 0.177                           | 1.079                          | 0.656                           |
| 180.0                                                                  | 7.1                    | 153.9               | 1.383                           | 6.961                          | 12.674                          | 0.190                           | 1.119                          | 0.666                           |
| 195.0                                                                  | 7.0                    | 165.7               | 1.889                           | 6.946                          | 11.669                          | 0.207                           | 1.082                          | 0.638                           |
| 210.0                                                                  | 8.8                    | 220.9               | 2.602                           | 12.785                         | 11.132                          | 0.212                           | 2.189                          | 0.500                           |
| 225.0                                                                  | 8.8                    | 240.1               | 1.835                           | 11.582                         | 11.070                          | 0.174                           | 2.427                          | 0.506                           |
| 240.0                                                                  | 8.8                    | 251.8               | 1.469                           | 11.758                         | 12.810                          | 0.150                           | 2.533                          | 0.579                           |
| 255.0                                                                  | 8.9                    | 263.4               | 0.936                           | 12.913                         | 11.907                          | 0.118                           | 2.583                          | 0.665                           |
| 270.0                                                                  | 8.9                    | 275.4               | 1.086                           | 13.027                         | 12.136                          | 0.096                           | 2.619                          | 0.733                           |
| 285.0                                                                  | 9.1                    | 286.9               | 1.423                           | 13.160                         | 12.241                          | 0.110                           | 2.531                          | 0.806                           |
| 300.0                                                                  | 8.9                    | 298.5               | 1.302                           | 12.302                         | 11.571                          | 0.190                           | 2.240                          | 0.796                           |
| 315.0                                                                  | 7.9                    | 306.1               | 1.182                           | 12.382                         | 11.449                          | 0.250                           | 2.113                          | 0.801                           |
| 330.0                                                                  | 7.3                    | 310.9               | 1.577                           | 11.688                         | 11.382                          | 0.287                           | 2.152                          | 0.865                           |
| 345.0                                                                  | 7.1                    | 317.3               | 1.996                           | 11.474                         | 11.692                          | 0.333                           | 2.126                          | 0.872                           |
| Wind at 69.4 knots (35.7 m/s) is from the starboard beam in all cases. |                        |                     |                                 |                                |                                 |                                 |                                |                                 |

**Table S.60:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 17.7$  m and  $T_p = 20.0$  s; Ship's speed is 15.0 Knots

| <b>Cmd<br/>Heading</b>                                                 | <b>Actual<br/>Mean</b> |                            | <b>Absolute<br/>Maximum</b> |                       |                        | <b>Standard<br/>Deviation</b> |                       |                        |
|------------------------------------------------------------------------|------------------------|----------------------------|-----------------------------|-----------------------|------------------------|-------------------------------|-----------------------|------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts           | $\psi_{\text{MHP}}$<br>deg | Long<br>$\text{m/s}^2$      | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ | Long<br>$\text{m/s}^2$        | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ |
| 0.0                                                                    | 11.9                   | -21.9                      | 2.331                       | 13.946                | 11.536                 | 0.485                         | 1.995                 | 0.976                  |
| 15.0                                                                   | 11.7                   | -12.9                      | 2.690                       | 10.444                | 12.001                 | 0.506                         | 1.948                 | 0.940                  |
| 30.0                                                                   | 11.8                   | 0.1                        | 2.742                       | 9.802                 | 12.198                 | 0.516                         | 1.869                 | 0.950                  |
| 45.0                                                                   | 12.1                   | 19.1                       | 2.127                       | 9.192                 | 12.324                 | 0.481                         | 1.778                 | 1.006                  |
| 60.0                                                                   | 12.7                   | 42.5                       | 1.446                       | 8.608                 | 12.831                 | 0.366                         | 1.513                 | 1.039                  |
| 75.0                                                                   | 14.8                   | 72.7                       | 0.615                       | 7.871                 | 13.864                 | 0.138                         | 1.503                 | 0.936                  |
| 90.0                                                                   | 14.7                   | 88.3                       | 0.386                       | 8.957                 | 13.250                 | 0.079                         | 1.550                 | 0.783                  |
| 105.0                                                                  | 14.6                   | 102.6                      | 1.025                       | 10.721                | 14.171                 | 0.100                         | 1.538                 | 0.613                  |
| 120.0                                                                  | 13.9                   | 115.1                      | 0.810                       | 9.076                 | 13.885                 | 0.127                         | 1.324                 | 0.597                  |
| 135.0                                                                  | 13.5                   | 129.1                      | 0.999                       | 9.481                 | 12.606                 | 0.152                         | 1.242                 | 0.544                  |
| 150.0                                                                  | 13.4                   | 143.3                      | 0.900                       | 9.290                 | 11.591                 | 0.168                         | 1.163                 | 0.503                  |
| 165.0                                                                  | 13.2                   | 158.7                      | 1.767                       | 8.907                 | 12.319                 | 0.192                         | 1.151                 | 0.479                  |
| 180.0                                                                  | 14.0                   | 176.8                      | 1.113                       | 8.380                 | 10.069                 | 0.186                         | 1.159                 | 0.464                  |
| 195.0                                                                  | 13.9                   | 196.1                      | 2.182                       | 13.160                | 10.334                 | 0.201                         | 1.702                 | 0.497                  |
| 210.0                                                                  | 14.0                   | 215.4                      | 1.206                       | 10.211                | 11.375                 | 0.182                         | 2.115                 | 0.508                  |
| 225.0                                                                  | 14.1                   | 231.1                      | 1.332                       | 10.110                | 12.341                 | 0.160                         | 2.346                 | 0.565                  |
| 240.0                                                                  | 14.2                   | 245.1                      | 1.418                       | 18.124                | 11.630                 | 0.153                         | 2.691                 | 0.615                  |
| 255.0                                                                  | 14.3                   | 259.0                      | 1.599                       | 24.076                | 11.613                 | 0.144                         | 2.901                 | 0.718                  |
| 270.0                                                                  | 14.4                   | 273.2                      | 0.710                       | 13.076                | 11.757                 | 0.095                         | 2.858                 | 0.774                  |
| 285.0                                                                  | 14.5                   | 286.6                      | 0.917                       | 13.517                | 12.054                 | 0.108                         | 2.814                 | 0.872                  |
| 300.0                                                                  | 14.4                   | 300.2                      | 1.835                       | 11.537                | 12.069                 | 0.215                         | 2.334                 | 0.776                  |
| 315.0                                                                  | 14.2                   | 312.9                      | 1.264                       | 11.324                | 11.618                 | 0.317                         | 2.009                 | 0.896                  |
| 330.0                                                                  | 13.3                   | 324.8                      | 1.916                       | 13.506                | 11.606                 | 0.406                         | 1.854                 | 0.886                  |
| 345.0                                                                  | 12.1                   | 330.4                      | 2.129                       | 11.458                | 11.604                 | 0.449                         | 1.952                 | 0.933                  |
| Wind at 69.4 knots (35.7 m/s) is from the starboard beam in all cases. |                        |                            |                             |                       |                        |                               |                       |                        |

**Table S.61:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 17.7$  m and  $T_p = 20.0$  s; Ship's speed is 20.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 19.2               | -2.9                | 2.564                   | 8.128          | 12.116          | 0.545                     | 1.577          | 0.948           |
| 15.0                                                                   | 19.2               | 12.2                | 2.295                   | 8.376          | 12.193          | 0.535                     | 1.583          | 0.953           |
| 30.0                                                                   | 19.3               | 27.5                | 2.155                   | 9.416          | 12.701          | 0.490                     | 1.576          | 0.987           |
| 45.0                                                                   | 19.4               | 42.5                | 1.536                   | 9.281          | 13.234          | 0.396                     | 1.521          | 1.039           |
| 60.0                                                                   | 19.5               | 57.0                | 1.135                   | 8.743          | 13.420          | 0.282                     | 1.293          | 1.041           |
| 75.0                                                                   | 19.9               | 73.4                | 0.903                   | 9.173          | 15.282          | 0.147                     | 1.689          | 0.971           |
| 90.0                                                                   | 19.8               | 88.3                | 1.277                   | 15.234         | 13.466          | 0.105                     | 1.783          | 0.777           |
| 105.0                                                                  | 19.6               | 102.9               | 5.537                   | 11.385         | 12.086          | 0.196                     | 1.722          | 0.609           |
| 120.0                                                                  | 19.5               | 117.0               | 0.907                   | 12.330         | 11.869          | 0.166                     | 1.588          | 0.632           |
| 135.0                                                                  | 19.3               | 131.9               | 0.810                   | 11.927         | 11.695          | 0.186                     | 1.561          | 0.585           |
| 150.0                                                                  | 19.2               | 146.9               | 0.943                   | 10.628         | 11.070          | 0.234                     | 1.560          | 0.591           |
| 165.0                                                                  | 19.6               | 163.2               | 1.390                   | 9.355          | 10.962          | 0.252                     | 1.250          | 0.525           |
| 180.0                                                                  | 19.7               | 178.9               | 0.880                   | 7.644          | 10.124          | 0.217                     | 1.133          | 0.549           |
| 195.0                                                                  | 19.6               | 195.3               | 1.264                   | 9.630          | 10.378          | 0.226                     | 1.669          | 0.624           |
| 210.0                                                                  | 19.5               | 210.8               | 1.675                   | 14.160         | 10.242          | 0.199                     | 1.933          | 0.660           |
| 225.0                                                                  | 19.3               | 227.1               | 1.224                   | 10.814         | 12.787          | 0.180                     | 2.354          | 0.662           |
| 240.0                                                                  | 19.5               | 242.2               | 1.276                   | 14.541         | 12.510          | 0.165                     | 2.749          | 0.719           |
| 255.0                                                                  | 19.7               | 257.3               | 0.967                   | 14.393         | 13.170          | 0.136                     | 2.931          | 0.826           |
| 270.0                                                                  | 19.7               | 272.1               | 0.610                   | 13.322         | 11.838          | 0.105                     | 3.087          | 0.911           |
| 285.0                                                                  | 19.7               | 286.3               | 0.642                   | 12.990         | 12.600          | 0.114                     | 3.118          | 1.003           |
| 300.0                                                                  | 19.7               | 300.5               | 1.011                   | 12.887         | 11.769          | 0.223                     | 2.577          | 0.869           |
| 315.0                                                                  | 19.6               | 314.1               | 1.485                   | 13.975         | 12.108          | 0.349                     | 2.095          | 0.956           |
| 330.0                                                                  | 19.4               | 328.2               | 2.166                   | 11.311         | 11.903          | 0.447                     | 1.839          | 0.905           |
| 345.0                                                                  | 19.3               | 342.5               | 2.300                   | 9.777          | 12.358          | 0.515                     | 1.621          | 0.931           |
| Wind at 69.4 knots (35.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table S.62:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 17.7$  m and  $T_p = 20.0$  s; Ship's speed is 25.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                            | <b>Absolute Maximum</b> |                       |                        | <b>Standard Deviation</b> |                       |                        |
|------------------------------------------------------------------------|--------------------|----------------------------|-------------------------|-----------------------|------------------------|---------------------------|-----------------------|------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts       | $\psi_{\text{MHP}}$<br>deg | Long<br>$\text{m/s}^2$  | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ | Long<br>$\text{m/s}^2$    | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ |
| 0.0                                                                    | 24.8               | -1.3                       | 2.696                   | 8.851                 | 12.713                 | 0.575                     | 1.653                 | 1.105                  |
| 15.0                                                                   | 24.7               | 13.8                       | 2.547                   | 8.873                 | 12.721                 | 0.563                     | 1.641                 | 1.092                  |
| 30.0                                                                   | 24.8               | 29.0                       | 2.482                   | 9.341                 | 13.360                 | 0.515                     | 1.649                 | 1.095                  |
| 45.0                                                                   | 24.8               | 43.7                       | 1.842                   | 9.321                 | 13.743                 | 0.418                     | 1.565                 | 1.107                  |
| 60.0                                                                   | 24.7               | 58.0                       | 2.172                   | 9.433                 | 14.449                 | 0.298                     | 1.338                 | 1.102                  |
| 75.0                                                                   | 24.9               | 73.6                       | 0.797                   | 9.059                 | 13.961                 | 0.162                     | 1.833                 | 1.042                  |
| 90.0                                                                   | 24.8               | 88.5                       | 7.420                   | 12.153                | 12.929                 | 0.210                     | 1.835                 | 0.809                  |
| 105.0                                                                  | 24.7               | 103.0                      | 6.933                   | 16.087                | 12.208                 | 0.238                     | 1.951                 | 0.713                  |
| 120.0                                                                  | 24.6               | 118.0                      | 1.420                   | 11.179                | 12.156                 | 0.210                     | 1.789                 | 0.690                  |
| 135.0                                                                  | 24.6               | 133.1                      | 1.180                   | 10.839                | 11.116                 | 0.244                     | 1.843                 | 0.637                  |
| 150.0                                                                  | 24.5               | 147.2                      | 1.058                   | 9.732                 | 10.437                 | 0.248                     | 1.222                 | 0.575                  |
| 165.0                                                                  | 25.0               | 162.8                      | 1.479                   | 10.112                | 10.212                 | 0.247                     | 0.859                 | 0.508                  |
| 180.0                                                                  | 26.0               | 179.2                      | 0.892                   | 6.337                 | 10.158                 | 0.224                     | 0.680                 | 0.402                  |
| 195.0                                                                  | 25.6               | 194.8                      | 0.812                   | 6.988                 | 10.159                 | 0.212                     | 1.029                 | 0.514                  |
| 210.0                                                                  | 24.8               | 210.2                      | 1.405                   | 9.710                 | 10.340                 | 0.227                     | 1.808                 | 0.742                  |
| 225.0                                                                  | 24.8               | 224.8                      | 1.090                   | 10.202                | 10.245                 | 0.189                     | 1.945                 | 0.833                  |
| 240.0                                                                  | 24.7               | 240.6                      | 1.413                   | 14.244                | 10.510                 | 0.194                     | 2.717                 | 0.858                  |
| 255.0                                                                  | 24.9               | 256.1                      | 1.204                   | 13.984                | 11.413                 | 0.159                     | 3.035                 | 1.053                  |
| 270.0                                                                  | 24.8               | 271.4                      | 0.638                   | 13.417                | 11.802                 | 0.123                     | 3.296                 | 1.136                  |
| 285.0                                                                  | 24.9               | 285.8                      | 0.611                   | 12.902                | 12.313                 | 0.120                     | 3.249                 | 1.266                  |
| 300.0                                                                  | 24.9               | 300.4                      | 1.085                   | 13.080                | 11.849                 | 0.238                     | 2.672                 | 1.037                  |
| 315.0                                                                  | 24.9               | 314.9                      | 1.701                   | 13.513                | 13.568                 | 0.378                     | 2.329                 | 1.016                  |
| 330.0                                                                  | 24.8               | 329.3                      | 2.288                   | 11.142                | 13.493                 | 0.484                     | 1.862                 | 1.061                  |
| 345.0                                                                  | 24.8               | 343.9                      | 2.477                   | 10.071                | 13.563                 | 0.545                     | 1.762                 | 1.103                  |
| Wind at 69.4 knots (35.7 m/s) is from the starboard beam in all cases. |                    |                            |                         |                       |                        |                           |                       |                        |

**Table S.63:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 17.7$  m and  $T_p = 20.0$  s; Ship's speed is 30.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 30.1               | -0.5                | 2.796                   | 8.710          | 13.815          | 0.599                     | 1.742          | 1.363           |
| 15.0                                                                   | 30.0               | 14.6                | 2.870                   | 9.065          | 13.606          | 0.594                     | 1.722          | 1.344           |
| 30.0                                                                   | 30.0               | 29.6                | 2.283                   | 11.309         | 14.044          | 0.539                     | 1.735          | 1.286           |
| 45.0                                                                   | 30.0               | 44.4                | 1.946                   | 9.932          | 14.902          | 0.442                     | 1.625          | 1.229           |
| 60.0                                                                   | 29.9               | 58.8                | 1.455                   | 9.642          | 14.636          | 0.306                     | 1.388          | 1.138           |
| 75.0                                                                   | 30.0               | 73.8                | 1.316                   | 11.753         | 14.126          | 0.176                     | 2.044          | 1.120           |
| 90.0                                                                   | 29.9               | 88.6                | 6.126                   | 17.504         | 12.957          | 0.196                     | 2.024          | 0.880           |
| 105.0                                                                  | 29.8               | 103.3               | 2.845                   | 11.640         | 14.491          | 0.217                     | 2.075          | 0.756           |
| 120.0                                                                  | 29.6               | 118.4               | 1.470                   | 10.738         | 11.982          | 0.270                     | 2.282          | 0.723           |
| 135.0                                                                  | 29.4               | 132.7               | 1.441                   | 9.790          | 11.470          | 0.300                     | 1.870          | 0.676           |
| 150.0                                                                  | 29.2               | 146.3               | 1.132                   | 8.980          | 10.299          | 0.300                     | 1.260          | 0.674           |
| 165.0                                                                  | 29.4               | 159.7               | 1.695                   | 10.880         | 9.981           | 0.375                     | 1.148          | 0.717           |
| 180.0                                                                  | 30.3               | 176.7               | 1.666                   | 7.409          | 10.126          | 0.365                     | 1.012          | 0.610           |
| 195.0                                                                  | 30.6               | 196.2               | 1.863                   | 14.128         | 10.480          | 0.435                     | 2.022          | 0.749           |
| 210.0                                                                  | 30.9               | 210.9               | 1.218                   | 9.276          | 10.394          | 0.302                     | 1.765          | 0.745           |
| 225.0                                                                  | 30.0               | 224.9               | 0.947                   | 9.291          | 10.064          | 0.226                     | 1.846          | 0.956           |
| 240.0                                                                  | 29.7               | 240.1               | 1.804                   | 13.016         | 10.202          | 0.248                     | 2.812          | 0.974           |
| 255.0                                                                  | 29.6               | 254.9               | 5.370                   | 17.343         | 10.817          | 0.346                     | 2.997          | 1.292           |
| 270.0                                                                  | 29.9               | 270.8               | 1.033                   | 13.241         | 11.555          | 0.151                     | 3.369          | 1.323           |
| 285.0                                                                  | 30.0               | 285.2               | 0.716                   | 12.708         | 12.399          | 0.162                     | 3.190          | 1.699           |
| 300.0                                                                  | 30.1               | 300.4               | 1.205                   | 13.892         | 12.609          | 0.249                     | 2.659          | 1.040           |
| 315.0                                                                  | 30.1               | 315.1               | 1.685                   | 13.686         | 14.284          | 0.396                     | 2.385          | 1.144           |
| 330.0                                                                  | 30.1               | 329.8               | 2.121                   | 12.315         | 14.420          | 0.509                     | 2.121          | 1.266           |
| 345.0                                                                  | 30.1               | 344.6               | 2.583                   | 10.512         | 14.624          | 0.573                     | 1.835          | 1.342           |
| Wind at 69.4 knots (35.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |



**Table S.64:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 17.7$  m and  $T_p = 25.7$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | -0.7               | -1.3                | 0.744                   | 7.478          | 11.097          | 0.176                     | 1.209          | 0.725           |
| 15.0                                                                   | 0.7                | 12.9                | 0.697                   | 5.630          | 11.067          | 0.175                     | 1.152          | 0.702           |
| 30.0                                                                   | 1.7                | 26.6                | 0.647                   | 5.718          | 11.446          | 0.161                     | 1.127          | 0.682           |
| 45.0                                                                   | 2.5                | 41.8                | 0.564                   | 5.992          | 11.810          | 0.136                     | 1.094          | 0.654           |
| 60.0                                                                   | 2.6                | 58.7                | 0.644                   | 6.030          | 11.804          | 0.093                     | 0.979          | 0.593           |
| 75.0                                                                   | 1.7                | 77.0                | 0.300                   | 5.918          | 11.142          | 0.056                     | 0.867          | 0.477           |
| 90.0                                                                   | 0.9                | 94.9                | 0.430                   | 6.656          | 10.593          | 0.049                     | 0.891          | 0.409           |
| 105.0                                                                  | 0.1                | 109.7               | 0.417                   | 8.011          | 10.669          | 0.056                     | 0.953          | 0.418           |
| 120.0                                                                  | -1.2               | 125.3               | 0.500                   | 6.365          | 10.712          | 0.077                     | 1.030          | 0.471           |
| 135.0                                                                  | -2.4               | 140.3               | 0.564                   | 6.326          | 11.034          | 0.113                     | 0.976          | 0.505           |
| 150.0                                                                  | -2.9               | 154.1               | 0.567                   | 5.547          | 10.973          | 0.136                     | 0.781          | 0.473           |
| 165.0                                                                  | -2.8               | 165.8               | 0.600                   | 5.385          | 10.972          | 0.148                     | 0.603          | 0.424           |
| 180.0                                                                  | -2.1               | 177.6               | 0.672                   | 5.543          | 10.678          | 0.156                     | 0.644          | 0.401           |
| 195.0                                                                  | -1.0               | 191.8               | 0.833                   | 6.813          | 10.524          | 0.150                     | 0.901          | 0.400           |
| 210.0                                                                  | 0.1                | 209.9               | 0.777                   | 7.543          | 10.709          | 0.130                     | 1.209          | 0.434           |
| 225.0                                                                  | 0.3                | 229.9               | 0.591                   | 7.848          | 11.006          | 0.093                     | 1.413          | 0.464           |
| 240.0                                                                  | -0.1               | 248.0               | 0.423                   | 8.390          | 11.198          | 0.064                     | 1.563          | 0.528           |
| 255.0                                                                  | -0.9               | 262.0               | 0.333                   | 8.375          | 10.850          | 0.044                     | 1.547          | 0.551           |
| 270.0                                                                  | -1.6               | 274.8               | 0.222                   | 8.072          | 10.894          | 0.039                     | 1.506          | 0.570           |
| 285.0                                                                  | -2.4               | 286.8               | 0.329                   | 7.728          | 10.716          | 0.052                     | 1.398          | 0.592           |
| 300.0                                                                  | -3.7               | 302.0               | 0.418                   | 7.649          | 10.851          | 0.091                     | 1.285          | 0.681           |
| 315.0                                                                  | -3.6               | 316.8               | 0.799                   | 7.682          | 11.067          | 0.127                     | 1.206          | 0.726           |
| 330.0                                                                  | -2.9               | 331.7               | 0.603                   | 7.783          | 10.927          | 0.151                     | 1.188          | 0.738           |
| 345.0                                                                  | -1.8               | 345.9               | 0.681                   | 8.030          | 11.078          | 0.167                     | 1.194          | 0.736           |
| Wind at 69.4 knots (35.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table S.65:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 17.7$  m and  $T_p = 25.7$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 2.6                | -22.8               | 0.837                   | 8.194          | 11.124          | 0.170                     | 1.377          | 0.683           |
| 15.0                                                                   | 2.9                | -7.4                | 0.835                   | 7.379          | 11.045          | 0.191                     | 1.317          | 0.698           |
| 30.0                                                                   | 3.4                | 9.2                 | 0.911                   | 7.299          | 11.050          | 0.194                     | 1.239          | 0.704           |
| 45.0                                                                   | 4.1                | 27.0                | 0.725                   | 5.992          | 11.079          | 0.175                     | 1.122          | 0.692           |
| 60.0                                                                   | 4.7                | 48.0                | 0.548                   | 6.043          | 11.361          | 0.125                     | 0.976          | 0.648           |
| 75.0                                                                   | 4.9                | 66.8                | 0.304                   | 5.656          | 11.420          | 0.070                     | 0.866          | 0.559           |
| 90.0                                                                   | 4.6                | 83.1                | 0.272                   | 5.826          | 10.928          | 0.037                     | 0.873          | 0.440           |
| 105.0                                                                  | 4.3                | 97.1                | 0.312                   | 7.101          | 10.449          | 0.039                     | 0.851          | 0.374           |
| 120.0                                                                  | 4.0                | 108.9               | 0.309                   | 6.943          | 10.422          | 0.045                     | 0.780          | 0.372           |
| 135.0                                                                  | 3.5                | 121.0               | 0.404                   | 6.458          | 10.712          | 0.060                     | 0.678          | 0.381           |
| 150.0                                                                  | 3.1                | 133.4               | 0.476                   | 6.188          | 10.914          | 0.080                     | 0.585          | 0.397           |
| 165.0                                                                  | 2.8                | 145.1               | 0.548                   | 5.774          | 11.057          | 0.103                     | 0.529          | 0.425           |
| 180.0                                                                  | 2.6                | 156.9               | 0.624                   | 5.305          | 11.081          | 0.119                     | 0.488          | 0.447           |
| 195.0                                                                  | 2.5                | 169.3               | 0.760                   | 5.596          | 10.952          | 0.132                     | 0.493          | 0.464           |
| 210.0                                                                  | 2.7                | 183.2               | 0.802                   | 5.338          | 10.790          | 0.133                     | 0.571          | 0.479           |
| 225.0                                                                  | 3.7                | 209.2               | 0.679                   | 7.855          | 10.546          | 0.112                     | 0.953          | 0.456           |
| 240.0                                                                  | 4.6                | 237.6               | 0.494                   | 8.041          | 10.568          | 0.078                     | 1.435          | 0.483           |
| 255.0                                                                  | 4.5                | 251.8               | 0.354                   | 7.703          | 10.578          | 0.059                     | 1.506          | 0.517           |
| 270.0                                                                  | 4.1                | 266.2               | 0.415                   | 8.077          | 10.876          | 0.050                     | 1.530          | 0.544           |
| 285.0                                                                  | 3.8                | 279.0               | 0.326                   | 8.835          | 10.654          | 0.039                     | 1.504          | 0.560           |
| 300.0                                                                  | 3.3                | 290.2               | 0.385                   | 8.212          | 10.722          | 0.043                     | 1.459          | 0.565           |
| 315.0                                                                  | 3.0                | 300.5               | 0.406                   | 8.256          | 10.935          | 0.067                     | 1.441          | 0.592           |
| 330.0                                                                  | 2.7                | 311.4               | 0.648                   | 8.358          | 10.873          | 0.101                     | 1.422          | 0.636           |
| 345.0                                                                  | 2.6                | 323.6               | 0.844                   | 8.377          | 10.966          | 0.138                     | 1.404          | 0.663           |
| Wind at 69.4 knots (35.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table S.66:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 17.7$  m and  $T_p = 25.7$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 7.4                | -24.1               | 1.076                   | 8.507          | 10.976          | 0.192                     | 1.446          | 0.712           |
| 15.0                                                                   | 7.4                | -12.0               | 1.089                   | 7.750          | 11.020          | 0.214                     | 1.409          | 0.725           |
| 30.0                                                                   | 7.6                | 2.2                 | 0.923                   | 7.560          | 11.040          | 0.223                     | 1.343          | 0.730           |
| 45.0                                                                   | 7.9                | 19.7                | 0.817                   | 6.523          | 11.123          | 0.207                     | 1.187          | 0.722           |
| 60.0                                                                   | 8.3                | 39.5                | 0.644                   | 6.297          | 11.368          | 0.161                     | 0.980          | 0.686           |
| 75.0                                                                   | 8.6                | 61.1                | 0.331                   | 6.069          | 11.620          | 0.089                     | 0.753          | 0.599           |
| 90.0                                                                   | 8.9                | 82.5                | 0.215                   | 6.866          | 10.893          | 0.040                     | 0.900          | 0.420           |
| 105.0                                                                  | 8.6                | 94.8                | 0.278                   | 8.381          | 10.235          | 0.046                     | 0.850          | 0.319           |
| 120.0                                                                  | 8.3                | 105.8               | 0.359                   | 9.068          | 10.094          | 0.055                     | 0.759          | 0.272           |
| 135.0                                                                  | 8.1                | 114.5               | 0.348                   | 8.484          | 10.050          | 0.060                     | 0.596          | 0.302           |
| 150.0                                                                  | 8.0                | 127.8               | 0.441                   | 7.751          | 10.247          | 0.074                     | 0.522          | 0.312           |
| 165.0                                                                  | 7.8                | 141.5               | 0.519                   | 6.444          | 10.673          | 0.085                     | 0.402          | 0.324           |
| 180.0                                                                  | 7.7                | 155.3               | 0.718                   | 6.103          | 10.538          | 0.100                     | 0.296          | 0.342           |
| 195.0                                                                  | 7.7                | 171.9               | 0.723                   | 6.009          | 10.527          | 0.109                     | 0.374          | 0.371           |
| 210.0                                                                  | 8.7                | 201.6               | 0.861                   | 7.786          | 10.406          | 0.102                     | 0.945          | 0.458           |
| 225.0                                                                  | 9.3                | 223.0               | 0.885                   | 9.295          | 10.443          | 0.091                     | 1.372          | 0.504           |
| 240.0                                                                  | 9.6                | 239.4               | 0.538                   | 8.805          | 10.435          | 0.078                     | 1.559          | 0.525           |
| 255.0                                                                  | 9.7                | 254.2               | 0.525                   | 8.930          | 10.644          | 0.068                     | 1.729          | 0.613           |
| 270.0                                                                  | 9.5                | 268.7               | 0.357                   | 8.974          | 10.590          | 0.060                     | 1.740          | 0.612           |
| 285.0                                                                  | 9.3                | 282.5               | 0.427                   | 9.037          | 10.733          | 0.048                     | 1.686          | 0.612           |
| 300.0                                                                  | 8.9                | 295.7               | 0.320                   | 9.591          | 10.634          | 0.057                     | 1.521          | 0.556           |
| 315.0                                                                  | 8.2                | 306.6               | 0.510                   | 8.893          | 10.635          | 0.092                     | 1.454          | 0.600           |
| 330.0                                                                  | 7.7                | 315.2               | 0.744                   | 8.439          | 10.695          | 0.126                     | 1.451          | 0.645           |
| 345.0                                                                  | 7.6                | 325.2               | 0.949                   | 8.422          | 10.846          | 0.161                     | 1.453          | 0.690           |
| Wind at 69.4 knots (35.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table S.67:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 17.7$  m and  $T_p = 25.7$  s; Ship's speed is 15.0 Knots

| <b>Cmd<br/>Heading</b>                                                 | <b>Actual<br/>Mean</b> |                     | <b>Absolute<br/>Maximum</b> |                |                 | <b>Standard<br/>Deviation</b> |                |                 |
|------------------------------------------------------------------------|------------------------|---------------------|-----------------------------|----------------|-----------------|-------------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts           | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$             | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$               | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 13.3                   | -6.3                | 1.188                       | 7.531          | 11.209          | 0.250                         | 1.124          | 0.682           |
| 15.0                                                                   | 13.2                   | 7.7                 | 1.073                       | 7.330          | 11.075          | 0.252                         | 1.077          | 0.701           |
| 30.0                                                                   | 13.3                   | 22.6                | 1.005                       | 6.774          | 11.199          | 0.232                         | 1.012          | 0.711           |
| 45.0                                                                   | 13.7                   | 38.6                | 0.716                       | 6.310          | 11.417          | 0.187                         | 0.861          | 0.675           |
| 60.0                                                                   | 13.8                   | 53.8                | 0.507                       | 6.614          | 11.484          | 0.133                         | 0.760          | 0.631           |
| 75.0                                                                   | 14.3                   | 71.1                | 0.312                       | 7.722          | 11.623          | 0.075                         | 0.960          | 0.471           |
| 90.0                                                                   | 14.2                   | 85.8                | 0.312                       | 8.442          | 10.034          | 0.060                         | 1.073          | 0.324           |
| 105.0                                                                  | 14.0                   | 99.9                | 0.429                       | 9.202          | 9.495           | 0.076                         | 1.031          | 0.254           |
| 120.0                                                                  | 13.4                   | 112.4               | 0.500                       | 9.765          | 10.232          | 0.095                         | 0.833          | 0.323           |
| 135.0                                                                  | 13.5                   | 127.9               | 0.637                       | 9.353          | 10.446          | 0.112                         | 0.823          | 0.339           |
| 150.0                                                                  | 13.6                   | 143.3               | 0.733                       | 10.229         | 9.802           | 0.122                         | 0.798          | 0.338           |
| 165.0                                                                  | 13.7                   | 159.4               | 0.626                       | 8.660          | 9.847           | 0.132                         | 0.812          | 0.357           |
| 180.0                                                                  | 14.0                   | 176.0               | 0.486                       | 7.078          | 9.928           | 0.127                         | 0.890          | 0.409           |
| 195.0                                                                  | 14.1                   | 192.4               | 0.609                       | 8.203          | 10.261          | 0.129                         | 1.162          | 0.480           |
| 210.0                                                                  | 14.2                   | 208.8               | 0.811                       | 9.627          | 10.268          | 0.121                         | 1.362          | 0.513           |
| 225.0                                                                  | 14.3                   | 224.6               | 0.803                       | 9.880          | 10.319          | 0.113                         | 1.587          | 0.563           |
| 240.0                                                                  | 14.6                   | 239.7               | 0.710                       | 9.286          | 10.407          | 0.097                         | 1.745          | 0.597           |
| 255.0                                                                  | 14.7                   | 254.8               | 0.600                       | 10.293         | 10.397          | 0.084                         | 1.928          | 0.745           |
| 270.0                                                                  | 14.7                   | 269.6               | 0.511                       | 9.551          | 10.653          | 0.073                         | 2.023          | 0.775           |
| 285.0                                                                  | 14.6                   | 284.1               | 0.380                       | 9.692          | 11.034          | 0.060                         | 1.995          | 0.750           |
| 300.0                                                                  | 14.5                   | 298.4               | 0.377                       | 9.358          | 11.052          | 0.073                         | 1.690          | 0.617           |
| 315.0                                                                  | 14.3                   | 312.5               | 0.631                       | 9.421          | 10.341          | 0.126                         | 1.490          | 0.636           |
| 330.0                                                                  | 14.0                   | 326.4               | 0.915                       | 8.993          | 10.770          | 0.181                         | 1.298          | 0.639           |
| 345.0                                                                  | 13.7                   | 340.2               | 1.047                       | 8.140          | 10.856          | 0.224                         | 1.182          | 0.654           |
| Wind at 69.4 knots (35.7 m/s) is from the starboard beam in all cases. |                        |                     |                             |                |                 |                               |                |                 |

**Table S.68:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 17.7$  m and  $T_p = 25.7$  s; Ship's speed is 20.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                            | <b>Absolute Maximum</b> |                       |                        | <b>Standard Deviation</b> |                       |                        |
|------------------------------------------------------------------------|--------------------|----------------------------|-------------------------|-----------------------|------------------------|---------------------------|-----------------------|------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts       | $\psi_{\text{MHP}}$<br>deg | Long<br>$\text{m/s}^2$  | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ | Long<br>$\text{m/s}^2$    | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ |
| 0.0                                                                    | 19.4               | -2.5                       | 1.453                   | 8.615                 | 11.282                 | 0.275                     | 0.965                 | 0.672                  |
| 15.0                                                                   | 19.4               | 12.4                       | 1.253                   | 7.813                 | 11.202                 | 0.271                     | 0.921                 | 0.671                  |
| 30.0                                                                   | 19.4               | 27.2                       | 1.100                   | 7.877                 | 11.171                 | 0.244                     | 0.865                 | 0.677                  |
| 45.0                                                                   | 19.4               | 42.1                       | 0.889                   | 7.342                 | 11.481                 | 0.199                     | 0.805                 | 0.665                  |
| 60.0                                                                   | 19.4               | 56.7                       | 0.648                   | 8.341                 | 11.657                 | 0.145                     | 0.751                 | 0.600                  |
| 75.0                                                                   | 19.7               | 72.5                       | 0.345                   | 8.613                 | 10.716                 | 0.087                     | 1.183                 | 0.474                  |
| 90.0                                                                   | 19.6               | 87.1                       | 0.380                   | 9.020                 | 9.525                  | 0.084                     | 1.229                 | 0.357                  |
| 105.0                                                                  | 19.5               | 101.8                      | 0.549                   | 10.451                | 9.275                  | 0.108                     | 1.223                 | 0.402                  |
| 120.0                                                                  | 19.5               | 116.7                      | 0.745                   | 10.682                | 10.406                 | 0.145                     | 1.052                 | 0.452                  |
| 135.0                                                                  | 19.4               | 131.5                      | 0.751                   | 10.263                | 9.785                  | 0.162                     | 1.025                 | 0.478                  |
| 150.0                                                                  | 19.5               | 146.8                      | 0.890                   | 10.497                | 9.933                  | 0.178                     | 0.963                 | 0.482                  |
| 165.0                                                                  | 19.5               | 162.4                      | 0.737                   | 8.794                 | 9.981                  | 0.189                     | 0.938                 | 0.499                  |
| 180.0                                                                  | 19.6               | 177.8                      | 0.579                   | 7.650                 | 10.118                 | 0.176                     | 0.941                 | 0.526                  |
| 195.0                                                                  | 19.6               | 193.7                      | 0.695                   | 7.751                 | 10.264                 | 0.176                     | 1.243                 | 0.581                  |
| 210.0                                                                  | 19.5               | 209.1                      | 0.717                   | 9.347                 | 10.356                 | 0.157                     | 1.447                 | 0.633                  |
| 225.0                                                                  | 19.6               | 224.3                      | 0.551                   | 9.026                 | 10.351                 | 0.146                     | 1.701                 | 0.702                  |
| 240.0                                                                  | 19.6               | 239.4                      | 0.854                   | 10.946                | 10.334                 | 0.130                     | 1.850                 | 0.718                  |
| 255.0                                                                  | 19.8               | 254.7                      | 0.494                   | 10.575                | 10.507                 | 0.106                     | 2.067                 | 0.909                  |
| 270.0                                                                  | 19.8               | 269.9                      | 0.450                   | 10.093                | 10.635                 | 0.090                     | 2.269                 | 0.955                  |
| 285.0                                                                  | 19.8               | 284.6                      | 0.393                   | 10.653                | 11.009                 | 0.075                     | 2.257                 | 0.980                  |
| 300.0                                                                  | 19.8               | 299.1                      | 0.366                   | 10.319                | 10.574                 | 0.087                     | 1.847                 | 0.701                  |
| 315.0                                                                  | 19.7               | 313.6                      | 0.687                   | 10.336                | 10.771                 | 0.146                     | 1.603                 | 0.723                  |
| 330.0                                                                  | 19.6               | 328.2                      | 0.894                   | 10.193                | 10.658                 | 0.203                     | 1.296                 | 0.691                  |
| 345.0                                                                  | 19.5               | 342.8                      | 1.292                   | 9.229                 | 11.033                 | 0.249                     | 1.090                 | 0.665                  |
| Wind at 69.4 knots (35.7 m/s) is from the starboard beam in all cases. |                    |                            |                         |                       |                        |                           |                       |                        |

**Table S.69:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 17.7$  m and  $T_p = 25.7$  s; Ship's speed is 25.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 24.8               | -1.5                | 1.332                   | 8.095          | 10.920          | 0.298                     | 0.972          | 0.705           |
| 15.0                                                                   | 24.8               | 13.5                | 1.273                   | 7.373          | 11.347          | 0.293                     | 0.936          | 0.711           |
| 30.0                                                                   | 24.8               | 28.4                | 1.071                   | 7.249          | 11.340          | 0.261                     | 0.911          | 0.713           |
| 45.0                                                                   | 24.8               | 43.2                | 0.838                   | 8.178          | 11.641          | 0.213                     | 0.833          | 0.694           |
| 60.0                                                                   | 24.7               | 57.8                | 0.702                   | 8.269          | 11.674          | 0.159                     | 0.761          | 0.614           |
| 75.0                                                                   | 24.9               | 73.2                | 0.435                   | 8.931          | 10.926          | 0.101                     | 1.324          | 0.538           |
| 90.0                                                                   | 24.9               | 87.9                | 0.455                   | 9.936          | 9.506           | 0.103                     | 1.351          | 0.456           |
| 105.0                                                                  | 24.8               | 102.7               | 0.741                   | 11.158         | 9.332           | 0.133                     | 1.351          | 0.520           |
| 120.0                                                                  | 24.8               | 117.7               | 0.868                   | 10.845         | 10.419          | 0.174                     | 1.048          | 0.463           |
| 135.0                                                                  | 24.7               | 132.5               | 0.900                   | 10.600         | 9.756           | 0.198                     | 0.933          | 0.495           |
| 150.0                                                                  | 24.7               | 147.6               | 0.893                   | 9.705          | 9.769           | 0.233                     | 0.855          | 0.501           |
| 165.0                                                                  | 24.8               | 163.1               | 0.851                   | 8.867          | 9.997           | 0.241                     | 0.772          | 0.518           |
| 180.0                                                                  | 25.0               | 178.5               | 0.648                   | 6.772          | 10.024          | 0.213                     | 0.703          | 0.498           |
| 195.0                                                                  | 25.0               | 194.2               | 0.708                   | 7.718          | 10.321          | 0.227                     | 1.118          | 0.629           |
| 210.0                                                                  | 24.9               | 209.3               | 0.741                   | 8.201          | 10.320          | 0.198                     | 1.328          | 0.685           |
| 225.0                                                                  | 24.9               | 224.3               | 0.719                   | 9.173          | 10.404          | 0.176                     | 1.645          | 0.817           |
| 240.0                                                                  | 24.8               | 239.4               | 0.712                   | 9.910          | 10.495          | 0.153                     | 1.808          | 0.825           |
| 255.0                                                                  | 24.8               | 254.7               | 0.606                   | 10.811         | 10.626          | 0.134                     | 2.156          | 1.115           |
| 270.0                                                                  | 24.8               | 269.8               | 0.495                   | 10.801         | 10.418          | 0.109                     | 2.427          | 1.198           |
| 285.0                                                                  | 24.9               | 284.5               | 0.495                   | 10.993         | 10.616          | 0.090                     | 2.412          | 1.153           |
| 300.0                                                                  | 25.0               | 299.4               | 0.400                   | 10.681         | 10.855          | 0.100                     | 1.857          | 0.744           |
| 315.0                                                                  | 24.9               | 314.1               | 0.768                   | 12.261         | 10.826          | 0.160                     | 1.623          | 0.774           |
| 330.0                                                                  | 24.9               | 328.9               | 1.141                   | 10.522         | 10.898          | 0.226                     | 1.352          | 0.736           |
| 345.0                                                                  | 24.8               | 343.7               | 1.301                   | 9.192          | 11.097          | 0.274                     | 1.074          | 0.715           |
| Wind at 69.4 knots (35.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table S.70:** Accelerations at Hangar Deck: Bretschneider Spectrum with  $H_s = 17.7$  m and  $T_p = 25.7$  s; Ship's speed is 30.0 Knots

| <b>Cmd<br/>Heading</b>                                                 | <b>Actual<br/>Mean</b> |                            | <b>Absolute<br/>Maximum</b> |                       |                        | <b>Standard<br/>Deviation</b> |                       |                        |
|------------------------------------------------------------------------|------------------------|----------------------------|-----------------------------|-----------------------|------------------------|-------------------------------|-----------------------|------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts           | $\psi_{\text{MHP}}$<br>deg | Long<br>$\text{m/s}^2$      | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ | Long<br>$\text{m/s}^2$        | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ |
| 0.0                                                                    | 30.0                   | -0.9                       | 1.417                       | 8.068                 | 11.589                 | 0.316                         | 1.039                 | 0.746                  |
| 15.0                                                                   | 30.0                   | 14.1                       | 1.393                       | 7.782                 | 11.589                 | 0.308                         | 1.014                 | 0.746                  |
| 30.0                                                                   | 30.0                   | 28.9                       | 1.197                       | 7.927                 | 11.502                 | 0.278                         | 0.972                 | 0.751                  |
| 45.0                                                                   | 30.0                   | 43.8                       | 1.002                       | 8.035                 | 11.480                 | 0.224                         | 0.850                 | 0.730                  |
| 60.0                                                                   | 30.0                   | 58.5                       | 0.780                       | 8.612                 | 11.558                 | 0.168                         | 0.752                 | 0.648                  |
| 75.0                                                                   | 30.1                   | 73.7                       | 0.549                       | 8.880                 | 11.262                 | 0.116                         | 1.486                 | 0.660                  |
| 90.0                                                                   | 30.0                   | 88.4                       | 0.601                       | 10.097                | 9.697                  | 0.120                         | 1.494                 | 0.564                  |
| 105.0                                                                  | 30.0                   | 103.2                      | 1.165                       | 11.201                | 10.192                 | 0.155                         | 1.436                 | 0.594                  |
| 120.0                                                                  | 29.9                   | 118.4                      | 1.005                       | 9.327                 | 10.638                 | 0.202                         | 1.159                 | 0.434                  |
| 135.0                                                                  | 29.8                   | 133.1                      | 1.034                       | 9.467                 | 10.138                 | 0.235                         | 0.940                 | 0.433                  |
| 150.0                                                                  | 29.9                   | 148.2                      | 0.807                       | 7.796                 | 10.040                 | 0.259                         | 0.677                 | 0.414                  |
| 165.0                                                                  | 30.1                   | 163.4                      | 0.993                       | 8.352                 | 9.801                  | 0.252                         | 0.564                 | 0.427                  |
| 180.0                                                                  | 30.4                   | 178.7                      | 0.977                       | 7.142                 | 10.133                 | 0.277                         | 0.658                 | 0.467                  |
| 195.0                                                                  | 30.4                   | 194.1                      | 0.817                       | 7.893                 | 10.226                 | 0.238                         | 0.737                 | 0.483                  |
| 210.0                                                                  | 30.2                   | 209.5                      | 1.016                       | 9.314                 | 10.413                 | 0.243                         | 1.314                 | 0.685                  |
| 225.0                                                                  | 30.1                   | 224.6                      | 0.913                       | 9.751                 | 10.334                 | 0.225                         | 1.696                 | 0.926                  |
| 240.0                                                                  | 30.1                   | 239.6                      | 0.714                       | 9.425                 | 10.464                 | 0.179                         | 1.797                 | 0.905                  |
| 255.0                                                                  | 29.9                   | 254.7                      | 0.726                       | 11.370                | 10.445                 | 0.161                         | 2.172                 | 1.341                  |
| 270.0                                                                  | 29.9                   | 269.6                      | 0.692                       | 10.894                | 10.476                 | 0.133                         | 2.490                 | 1.407                  |
| 285.0                                                                  | 29.9                   | 284.6                      | 0.770                       | 11.391                | 10.561                 | 0.118                         | 2.498                 | 1.429                  |
| 300.0                                                                  | 30.1                   | 299.5                      | 0.474                       | 11.342                | 10.871                 | 0.111                         | 1.839                 | 0.766                  |
| 315.0                                                                  | 30.1                   | 314.4                      | 0.805                       | 12.224                | 11.264                 | 0.169                         | 1.573                 | 0.740                  |
| 330.0                                                                  | 30.1                   | 329.3                      | 1.087                       | 10.503                | 10.972                 | 0.241                         | 1.267                 | 0.756                  |
| 345.0                                                                  | 30.0                   | 344.2                      | 1.308                       | 9.245                 | 11.120                 | 0.292                         | 1.114                 | 0.743                  |
| Wind at 69.4 knots (35.7 m/s) is from the starboard beam in all cases. |                        |                            |                             |                       |                        |                               |                       |                        |

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## **Annex T**

### **Tables of Hangar Deck Accelerations – JONSWAP Spectrum (Coastal Waters)**

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**Table T.1:** Accelerations at Hangar Deck: JONSWAP Spectrum with  $H_s = 4.0$  m and  $T_p = 8.2$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | -0.2               | -28.4               | 0.798                   | 1.939          | 10.520          | 0.185                     | 0.370          | 0.265           |
| 15.0                                                                   | -0.2               | -6.7                | 0.761                   | 0.931          | 10.463          | 0.167                     | 0.148          | 0.222           |
| 30.0                                                                   | -0.2               | 20.1                | 0.727                   | 1.745          | 10.448          | 0.174                     | 0.286          | 0.222           |
| 45.0                                                                   | -0.2               | 35.0                | 0.738                   | 2.203          | 10.546          | 0.190                     | 0.491          | 0.248           |
| 60.0                                                                   | -0.4               | 43.8                | 0.837                   | 2.679          | 10.745          | 0.197                     | 0.646          | 0.276           |
| 75.0                                                                   | -0.6               | 50.6                | 0.757                   | 3.781          | 11.361          | 0.199                     | 0.754          | 0.307           |
| 90.0                                                                   | -0.7               | 56.8                | 0.850                   | 4.635          | 11.804          | 0.197                     | 0.892          | 0.350           |
| 105.0                                                                  | -0.8               | 60.5                | 0.811                   | 4.569          | 11.545          | 0.194                     | 0.933          | 0.374           |
| 120.0                                                                  | -0.9               | 65.1                | 0.818                   | 6.507          | 12.491          | 0.178                     | 0.968          | 0.432           |
| 135.0                                                                  | -2.1               | 102.4               | 0.857                   | 6.953          | 12.703          | 0.160                     | 1.074          | 0.505           |
| 150.0                                                                  | -2.2               | 104.5               | 0.884                   | 5.724          | 11.931          | 0.167                     | 1.019          | 0.484           |
| 165.0                                                                  | -2.4               | 103.6               | 1.059                   | 6.183          | 12.321          | 0.155                     | 1.012          | 0.520           |
| 180.0                                                                  | -0.8               | 59.1                | 0.773                   | 3.490          | 11.720          | 0.164                     | 0.593          | 0.312           |
| 195.0                                                                  | -0.2               | 352.3               | 0.753                   | 2.775          | 11.215          | 0.185                     | 0.612          | 0.304           |
| 210.0                                                                  | -0.2               | 382.7               | 0.826                   | 3.719          | 11.978          | 0.195                     | 0.688          | 0.370           |
| 225.0                                                                  | 0.0                | 379.0               | 0.760                   | 3.562          | 11.688          | 0.203                     | 0.741          | 0.369           |
| 240.0                                                                  | 0.7                | 294.4               | 0.802                   | 3.547          | 11.606          | 0.202                     | 0.916          | 0.469           |
| 255.0                                                                  | 0.5                | 293.5               | 0.801                   | 3.646          | 11.647          | 0.201                     | 0.938          | 0.489           |
| 270.0                                                                  | 0.3                | 296.5               | 0.787                   | 3.951          | 12.113          | 0.204                     | 0.932          | 0.474           |
| 285.0                                                                  | 0.1                | 300.8               | 0.681                   | 3.286          | 11.507          | 0.209                     | 0.865          | 0.436           |
| 300.0                                                                  | 0.0                | 305.3               | 0.750                   | 3.310          | 11.061          | 0.209                     | 0.795          | 0.402           |
| 315.0                                                                  | -0.0               | 309.8               | 0.801                   | 3.029          | 11.105          | 0.209                     | 0.713          | 0.370           |
| 330.0                                                                  | -0.1               | 315.0               | 0.822                   | 2.881          | 10.841          | 0.205                     | 0.609          | 0.337           |
| 345.0                                                                  | -0.1               | 321.5               | 0.818                   | 2.505          | 10.789          | 0.198                     | 0.502          | 0.303           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table T.2:** Accelerations at Hangar Deck: JONSWAP Spectrum with  $H_s = 4.0$  m and  $T_p = 8.2$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 4.8                | -2.1                | 0.697                   | 0.960          | 10.596          | 0.192                     | 0.143          | 0.267           |
| 15.0                                                                   | 4.8                | 12.8                | 0.794                   | 1.042          | 10.584          | 0.195                     | 0.192          | 0.266           |
| 30.0                                                                   | 4.7                | 27.8                | 0.925                   | 1.343          | 10.610          | 0.209                     | 0.301          | 0.282           |
| 45.0                                                                   | 4.7                | 42.2                | 0.844                   | 2.305          | 10.665          | 0.225                     | 0.488          | 0.317           |
| 60.0                                                                   | 4.4                | 53.9                | 0.864                   | 3.276          | 10.976          | 0.229                     | 0.676          | 0.361           |
| 75.0                                                                   | 4.1                | 56.6                | 0.796                   | 3.942          | 11.130          | 0.225                     | 0.743          | 0.377           |
| 90.0                                                                   | 4.1                | 60.8                | 0.749                   | 4.418          | 11.867          | 0.220                     | 0.823          | 0.407           |
| 105.0                                                                  | 4.1                | 63.1                | 0.751                   | 4.247          | 11.636          | 0.216                     | 0.849          | 0.418           |
| 120.0                                                                  | 4.1                | 64.0                | 0.712                   | 3.326          | 11.602          | 0.215                     | 0.842          | 0.427           |
| 135.0                                                                  | 4.0                | 64.2                | 0.728                   | 3.443          | 11.569          | 0.217                     | 0.835          | 0.426           |
| 150.0                                                                  | 4.1                | 74.6                | 0.847                   | 3.288          | 11.365          | 0.209                     | 0.778          | 0.395           |
| 165.0                                                                  | 4.9                | 163.1               | 0.364                   | 1.495          | 10.304          | 0.096                     | 0.283          | 0.100           |
| 180.0                                                                  | 4.9                | 178.7               | 0.357                   | 1.029          | 10.284          | 0.090                     | 0.185          | 0.094           |
| 195.0                                                                  | 4.9                | 194.1               | 0.348                   | 1.234          | 10.328          | 0.092                     | 0.262          | 0.104           |
| 210.0                                                                  | 4.8                | 210.3               | 0.397                   | 1.871          | 10.423          | 0.105                     | 0.425          | 0.136           |
| 225.0                                                                  | 4.5                | 283.4               | 0.760                   | 4.166          | 12.237          | 0.194                     | 0.911          | 0.562           |
| 240.0                                                                  | 4.6                | 285.3               | 0.671                   | 3.397          | 12.493          | 0.191                     | 0.940          | 0.618           |
| 255.0                                                                  | 4.5                | 286.8               | 0.743                   | 3.906          | 12.725          | 0.198                     | 0.936          | 0.613           |
| 270.0                                                                  | 4.5                | 288.9               | 0.796                   | 3.758          | 12.455          | 0.206                     | 0.918          | 0.591           |
| 285.0                                                                  | 4.7                | 291.3               | 0.895                   | 3.740          | 12.213          | 0.218                     | 0.896          | 0.555           |
| 300.0                                                                  | 4.9                | 301.2               | 0.816                   | 3.515          | 11.317          | 0.236                     | 0.764          | 0.436           |
| 315.0                                                                  | 4.8                | 314.0               | 0.934                   | 2.429          | 10.907          | 0.234                     | 0.551          | 0.353           |
| 330.0                                                                  | 4.8                | 328.1               | 0.840                   | 1.889          | 10.683          | 0.218                     | 0.357          | 0.306           |
| 345.0                                                                  | 4.8                | 343.0               | 0.768                   | 1.159          | 10.649          | 0.201                     | 0.191          | 0.279           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table T.3:** Accelerations at Hangar Deck: JONSWAP Spectrum with  $H_s = 4.0$  m and  $T_p = 8.2$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 10.0               | -0.6                | 0.851                   | 0.903          | 10.726          | 0.214                     | 0.103          | 0.311           |
| 15.0                                                                   | 10.0               | 14.4                | 0.777                   | 0.997          | 10.738          | 0.220                     | 0.147          | 0.306           |
| 30.0                                                                   | 10.0               | 29.4                | 0.942                   | 1.397          | 10.736          | 0.237                     | 0.278          | 0.310           |
| 45.0                                                                   | 9.9                | 44.5                | 0.923                   | 2.252          | 10.854          | 0.253                     | 0.467          | 0.329           |
| 60.0                                                                   | 10.0               | 59.1                | 0.892                   | 3.849          | 11.062          | 0.252                     | 0.693          | 0.426           |
| 75.0                                                                   | 10.0               | 73.0                | 0.812                   | 4.851          | 11.968          | 0.214                     | 0.837          | 0.630           |
| 90.0                                                                   | 9.7                | 86.0                | 0.405                   | 5.699          | 12.783          | 0.088                     | 0.921          | 0.791           |
| 105.0                                                                  | 9.4                | 100.8               | 0.676                   | 5.650          | 12.152          | 0.109                     | 0.991          | 0.490           |
| 120.0                                                                  | 9.6                | 116.9               | 0.370                   | 3.669          | 10.988          | 0.097                     | 0.910          | 0.264           |
| 135.0                                                                  | 9.9                | 133.2               | 0.284                   | 3.161          | 10.281          | 0.085                     | 1.012          | 0.147           |
| 150.0                                                                  | 10.0               | 148.8               | 0.239                   | 3.389          | 10.138          | 0.074                     | 1.086          | 0.119           |
| 165.0                                                                  | 10.1               | 164.1               | 0.249                   | 3.691          | 10.028          | 0.065                     | 0.882          | 0.093           |
| 180.0                                                                  | 10.1               | 179.2               | 0.233                   | 2.393          | 9.927           | 0.062                     | 0.536          | 0.059           |
| 195.0                                                                  | 10.1               | 194.7               | 0.242                   | 1.892          | 10.069          | 0.068                     | 0.515          | 0.053           |
| 210.0                                                                  | 10.1               | 210.3               | 0.258                   | 2.429          | 10.187          | 0.075                     | 0.847          | 0.086           |
| 225.0                                                                  | 10.0               | 225.9               | 0.284                   | 2.964          | 10.412          | 0.087                     | 0.915          | 0.145           |
| 240.0                                                                  | 9.7                | 242.3               | 0.393                   | 2.919          | 10.991          | 0.101                     | 0.914          | 0.264           |
| 255.0                                                                  | 9.5                | 259.2               | 0.687                   | 4.452          | 12.008          | 0.118                     | 1.031          | 0.522           |
| 270.0                                                                  | 9.8                | 273.7               | 0.452                   | 5.059          | 12.965          | 0.076                     | 0.989          | 0.848           |
| 285.0                                                                  | 10.2               | 286.6               | 0.847                   | 3.287          | 12.370          | 0.214                     | 0.881          | 0.720           |
| 300.0                                                                  | 10.1               | 300.1               | 0.952                   | 3.390          | 11.237          | 0.256                     | 0.720          | 0.488           |
| 315.0                                                                  | 10.0               | 314.7               | 0.904                   | 2.020          | 10.961          | 0.258                     | 0.474          | 0.352           |
| 330.0                                                                  | 10.0               | 329.6               | 0.945                   | 1.588          | 10.811          | 0.242                     | 0.283          | 0.319           |
| 345.0                                                                  | 10.0               | 344.6               | 0.807                   | 1.159          | 10.642          | 0.223                     | 0.150          | 0.311           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table T.4:** Accelerations at Hangar Deck: JONSWAP Spectrum with  $H_s = 4.0$  m and  $T_p = 8.2$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 15.2               | -0.2                | 0.857                   | 1.046          | 10.707          | 0.236                     | 0.097          | 0.306           |
| 15.0                                                                   | 15.2               | 14.8                | 0.794                   | 1.143          | 10.786          | 0.243                     | 0.151          | 0.304           |
| 30.0                                                                   | 15.1               | 29.8                | 0.960                   | 1.571          | 10.808          | 0.261                     | 0.274          | 0.324           |
| 45.0                                                                   | 15.1               | 44.8                | 1.004                   | 2.431          | 11.072          | 0.277                     | 0.450          | 0.388           |
| 60.0                                                                   | 15.2               | 59.7                | 1.020                   | 3.240          | 11.510          | 0.268                     | 0.665          | 0.539           |
| 75.0                                                                   | 15.2               | 74.1                | 0.766                   | 4.417          | 12.303          | 0.215                     | 0.806          | 0.757           |
| 90.0                                                                   | 15.1               | 88.5                | 0.279                   | 5.437          | 12.899          | 0.047                     | 0.902          | 0.794           |
| 105.0                                                                  | 15.0               | 103.3               | 0.475                   | 7.499          | 12.877          | 0.088                     | 1.001          | 0.429           |
| 120.0                                                                  | 15.0               | 118.5               | 0.282                   | 4.466          | 10.642          | 0.067                     | 1.413          | 0.252           |
| 135.0                                                                  | 15.2               | 134.3               | 0.218                   | 4.369          | 10.269          | 0.052                     | 1.445          | 0.207           |
| 150.0                                                                  | 15.3               | 149.7               | 0.204                   | 3.186          | 10.056          | 0.057                     | 0.856          | 0.101           |
| 165.0                                                                  | 15.3               | 164.7               | 0.219                   | 2.054          | 9.946           | 0.059                     | 0.435          | 0.058           |
| 180.0                                                                  | 15.2               | 179.5               | 0.296                   | 2.421          | 9.922           | 0.062                     | 0.340          | 0.057           |
| 195.0                                                                  | 15.2               | 194.7               | 0.178                   | 2.205          | 9.862           | 0.055                     | 0.411          | 0.037           |
| 210.0                                                                  | 15.2               | 209.8               | 0.171                   | 2.476          | 9.899           | 0.043                     | 0.605          | 0.043           |
| 225.0                                                                  | 15.2               | 225.4               | 0.237                   | 3.978          | 10.348          | 0.055                     | 1.434          | 0.120           |
| 240.0                                                                  | 15.1               | 241.1               | 0.233                   | 4.297          | 10.638          | 0.073                     | 1.405          | 0.201           |
| 255.0                                                                  | 15.0               | 256.7               | 0.578                   | 4.594          | 12.168          | 0.096                     | 1.073          | 0.426           |
| 270.0                                                                  | 15.1               | 271.5               | 0.323                   | 4.938          | 12.756          | 0.042                     | 1.021          | 0.846           |
| 285.0                                                                  | 15.3               | 285.8               | 0.768                   | 3.511          | 12.468          | 0.213                     | 0.894          | 0.837           |
| 300.0                                                                  | 15.2               | 300.1               | 0.966                   | 2.562          | 11.463          | 0.269                     | 0.672          | 0.607           |
| 315.0                                                                  | 15.1               | 314.8               | 0.950                   | 1.889          | 11.188          | 0.280                     | 0.450          | 0.429           |
| 330.0                                                                  | 15.1               | 329.8               | 0.968                   | 1.476          | 11.075          | 0.264                     | 0.260          | 0.342           |
| 345.0                                                                  | 15.2               | 344.8               | 0.886                   | 0.978          | 10.853          | 0.244                     | 0.132          | 0.311           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table T.5:** Accelerations at Hangar Deck: JONSWAP Spectrum with  $H_s = 4.0$  m and  $T_p = 8.2$  s; Ship's speed is 20.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 20.3               | -0.1                | 0.865                   | 1.140          | 11.259          | 0.252                     | 0.103          | 0.401           |
| 15.0                                                                   | 20.3               | 14.9                | 0.865                   | 1.317          | 11.257          | 0.259                     | 0.153          | 0.412           |
| 30.0                                                                   | 20.3               | 29.9                | 0.982                   | 1.630          | 11.338          | 0.280                     | 0.265          | 0.468           |
| 45.0                                                                   | 20.3               | 44.9                | 1.030                   | 2.359          | 11.603          | 0.295                     | 0.433          | 0.564           |
| 60.0                                                                   | 20.3               | 59.8                | 1.048                   | 3.540          | 11.899          | 0.282                     | 0.642          | 0.708           |
| 75.0                                                                   | 20.4               | 74.5                | 0.768                   | 4.251          | 12.462          | 0.217                     | 0.791          | 0.868           |
| 90.0                                                                   | 20.3               | 89.1                | 0.322                   | 6.503          | 12.579          | 0.041                     | 0.897          | 0.788           |
| 105.0                                                                  | 20.2               | 104.1               | 0.407                   | 5.899          | 11.674          | 0.070                     | 1.097          | 0.394           |
| 120.0                                                                  | 20.3               | 119.3               | 0.193                   | 5.561          | 10.548          | 0.042                     | 1.835          | 0.304           |
| 135.0                                                                  | 20.2               | 134.8               | 0.226                   | 4.646          | 10.165          | 0.057                     | 1.510          | 0.182           |
| 150.0                                                                  | 20.4               | 149.8               | 0.254                   | 2.855          | 9.948           | 0.064                     | 0.723          | 0.071           |
| 165.0                                                                  | 20.3               | 164.6               | 0.325                   | 2.772          | 9.895           | 0.066                     | 0.382          | 0.058           |
| 180.0                                                                  | 20.6               | 179.8               | 0.267                   | 3.263          | 9.909           | 0.068                     | 0.324          | 0.054           |
| 195.0                                                                  | 20.4               | 194.7               | 0.320                   | 3.714          | 9.887           | 0.063                     | 0.577          | 0.087           |
| 210.0                                                                  | 20.3               | 209.8               | 0.294                   | 4.203          | 9.899           | 0.060                     | 0.888          | 0.122           |
| 225.0                                                                  | 20.3               | 225.1               | 0.185                   | 4.865          | 9.914           | 0.048                     | 1.404          | 0.148           |
| 240.0                                                                  | 20.3               | 240.6               | 0.247                   | 5.296          | 10.916          | 0.050                     | 1.967          | 0.197           |
| 255.0                                                                  | 20.2               | 255.9               | 0.367                   | 4.599          | 11.449          | 0.078                     | 1.184          | 0.363           |
| 270.0                                                                  | 20.3               | 270.9               | 0.285                   | 4.992          | 12.721          | 0.039                     | 1.068          | 0.832           |
| 285.0                                                                  | 20.4               | 285.5               | 0.904                   | 4.359          | 13.016          | 0.211                     | 0.932          | 0.939           |
| 300.0                                                                  | 20.3               | 300.1               | 0.915                   | 2.429          | 12.074          | 0.280                     | 0.684          | 0.770           |
| 315.0                                                                  | 20.3               | 315.0               | 0.994                   | 1.915          | 11.753          | 0.295                     | 0.441          | 0.607           |
| 330.0                                                                  | 20.3               | 329.9               | 1.009                   | 1.382          | 11.449          | 0.280                     | 0.254          | 0.493           |
| 345.0                                                                  | 20.3               | 344.9               | 0.845                   | 1.071          | 11.419          | 0.259                     | 0.139          | 0.424           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table T.6:** Accelerations at Hangar Deck: JONSWAP Spectrum with  $H_s = 4.0$  m and  $T_p = 8.2$  s; Ship's speed is 25.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 25.4               | -0.1                | 0.938                   | 1.292          | 11.471          | 0.259                     | 0.124          | 0.570           |
| 15.0                                                                   | 25.4               | 14.9                | 0.839                   | 1.376          | 11.584          | 0.267                     | 0.149          | 0.593           |
| 30.0                                                                   | 25.4               | 29.9                | 0.955                   | 2.008          | 11.822          | 0.290                     | 0.252          | 0.673           |
| 45.0                                                                   | 25.4               | 44.9                | 1.078                   | 2.671          | 12.223          | 0.307                     | 0.418          | 0.783           |
| 60.0                                                                   | 25.4               | 59.8                | 1.024                   | 3.489          | 12.234          | 0.293                     | 0.634          | 0.889           |
| 75.0                                                                   | 25.4               | 74.6                | 0.763                   | 4.336          | 13.033          | 0.217                     | 0.792          | 0.970           |
| 90.0                                                                   | 25.4               | 89.4                | 0.270                   | 6.820          | 12.842          | 0.040                     | 0.901          | 0.780           |
| 105.0                                                                  | 25.4               | 104.4               | 0.285                   | 6.069          | 11.514          | 0.056                     | 1.245          | 0.362           |
| 120.0                                                                  | 25.3               | 119.7               | 0.385                   | 7.137          | 10.840          | 0.060                     | 2.434          | 0.358           |
| 135.0                                                                  | 25.3               | 134.9               | 0.313                   | 4.603          | 9.900           | 0.065                     | 1.286          | 0.138           |
| 150.0                                                                  | 25.5               | 149.8               | 0.346                   | 2.647          | 9.934           | 0.074                     | 0.557          | 0.064           |
| 165.0                                                                  | 25.5               | 164.8               | 0.356                   | 2.386          | 9.997           | 0.077                     | 0.350          | 0.067           |
| 180.0                                                                  | 25.4               | 179.8               | 0.388                   | 3.439          | 9.976           | 0.083                     | 0.492          | 0.098           |
| 195.0                                                                  | 25.5               | 194.9               | 0.797                   | 3.562          | 9.986           | 0.079                     | 0.559          | 0.096           |
| 210.0                                                                  | 25.4               | 210.0               | 0.381                   | 3.790          | 9.946           | 0.072                     | 0.788          | 0.114           |
| 225.0                                                                  | 25.3               | 225.0               | 0.267                   | 5.224          | 9.885           | 0.061                     | 1.364          | 0.187           |
| 240.0                                                                  | 25.3               | 240.2               | 0.298                   | 6.641          | 10.530          | 0.053                     | 2.349          | 0.283           |
| 255.0                                                                  | 25.4               | 255.5               | 0.334                   | 4.973          | 11.381          | 0.065                     | 1.357          | 0.309           |
| 270.0                                                                  | 25.4               | 270.6               | 0.287                   | 5.224          | 12.699          | 0.042                     | 1.095          | 0.818           |
| 285.0                                                                  | 25.4               | 285.3               | 0.795                   | 4.374          | 13.349          | 0.210                     | 0.987          | 1.036           |
| 300.0                                                                  | 25.4               | 300.1               | 0.970                   | 2.682          | 12.387          | 0.287                     | 0.731          | 0.946           |
| 315.0                                                                  | 25.4               | 315.1               | 1.022                   | 1.884          | 12.395          | 0.304                     | 0.470          | 0.818           |
| 330.0                                                                  | 25.4               | 330.0               | 0.941                   | 1.587          | 12.014          | 0.288                     | 0.281          | 0.691           |
| 345.0                                                                  | 25.4               | 345.0               | 0.827                   | 1.174          | 11.672          | 0.267                     | 0.162          | 0.601           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table T.7:** Accelerations at Hangar Deck: JONSWAP Spectrum with  $H_s = 4.0$  m and  $T_p = 8.2$  s; Ship's speed is 30.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 30.5               | -0.1                | 0.876                   | 1.328          | 11.821          | 0.257                     | 0.141          | 0.712           |
| 15.0                                                                   | 30.5               | 14.9                | 0.935                   | 1.589          | 11.950          | 0.266                     | 0.150          | 0.744           |
| 30.0                                                                   | 30.5               | 29.9                | 0.956                   | 2.055          | 12.189          | 0.292                     | 0.238          | 0.848           |
| 45.0                                                                   | 30.5               | 44.9                | 1.035                   | 2.934          | 12.408          | 0.313                     | 0.411          | 0.986           |
| 60.0                                                                   | 30.5               | 59.9                | 0.991                   | 3.698          | 12.713          | 0.298                     | 0.634          | 1.066           |
| 75.0                                                                   | 30.5               | 74.7                | 0.727                   | 4.320          | 13.291          | 0.219                     | 0.782          | 1.068           |
| 90.0                                                                   | 30.5               | 89.6                | 0.215                   | 5.510          | 13.146          | 0.042                     | 0.919          | 0.769           |
| 105.0                                                                  | 30.5               | 104.6               | 0.232                   | 5.631          | 11.202          | 0.053                     | 1.439          | 0.341           |
| 120.0                                                                  | 30.4               | 119.9               | 0.445                   | 5.872          | 10.330          | 0.076                     | 2.195          | 0.304           |
| 135.0                                                                  | 30.4               | 134.9               | 0.289                   | 3.679          | 9.915           | 0.075                     | 1.118          | 0.115           |
| 150.0                                                                  | 30.6               | 149.8               | 0.382                   | 3.472          | 10.083          | 0.082                     | 0.626          | 0.096           |
| 165.0                                                                  | 30.4               | 165.0               | 0.456                   | 2.531          | 10.040          | 0.087                     | 0.443          | 0.100           |
| 180.0                                                                  | 30.7               | 179.9               | 0.455                   | 3.180          | 10.080          | 0.084                     | 0.550          | 0.120           |
| 195.0                                                                  | 30.4               | 194.8               | 0.429                   | 3.987          | 10.073          | 0.089                     | 0.744          | 0.142           |
| 210.0                                                                  | 30.6               | 210.0               | 0.336                   | 4.371          | 10.041          | 0.084                     | 0.940          | 0.146           |
| 225.0                                                                  | 30.4               | 225.0               | 0.289                   | 4.067          | 9.893           | 0.073                     | 1.234          | 0.157           |
| 240.0                                                                  | 30.4               | 240.0               | 0.390                   | 6.772          | 10.277          | 0.069                     | 2.214          | 0.324           |
| 255.0                                                                  | 30.5               | 255.3               | 0.323                   | 7.984          | 11.551          | 0.061                     | 1.643          | 0.278           |
| 270.0                                                                  | 30.5               | 270.4               | 0.202                   | 5.056          | 12.917          | 0.047                     | 1.136          | 0.803           |
| 285.0                                                                  | 30.5               | 285.3               | 0.669                   | 4.299          | 13.229          | 0.209                     | 1.013          | 1.130           |
| 300.0                                                                  | 30.5               | 300.1               | 0.971                   | 3.120          | 13.068          | 0.291                     | 0.794          | 1.116           |
| 315.0                                                                  | 30.5               | 315.1               | 1.054                   | 2.045          | 12.720          | 0.307                     | 0.529          | 1.010           |
| 330.0                                                                  | 30.5               | 330.1               | 0.904                   | 1.646          | 12.274          | 0.287                     | 0.314          | 0.856           |
| 345.0                                                                  | 30.5               | 345.0               | 0.833                   | 1.383          | 11.996          | 0.266                     | 0.191          | 0.749           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |



**Table T.8:** Accelerations at Hangar Deck: JONSWAP Spectrum with  $H_s = 4.0$  m and  $T_p = 13.6$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 0.0                | -14.0               | 0.543                   | 1.840          | 10.382          | 0.135                     | 0.429          | 0.207           |
| 15.0                                                                   | -0.1               | -6.1                | 0.579                   | 1.294          | 10.381          | 0.136                     | 0.276          | 0.200           |
| 30.0                                                                   | -0.3               | 2.2                 | 0.663                   | 1.696          | 10.367          | 0.136                     | 0.332          | 0.196           |
| 45.0                                                                   | -0.3               | 16.8                | 0.599                   | 2.234          | 10.436          | 0.133                     | 0.592          | 0.202           |
| 60.0                                                                   | -0.2               | 36.1                | 0.532                   | 3.118          | 10.542          | 0.125                     | 0.857          | 0.226           |
| 75.0                                                                   | -0.1               | 52.3                | 0.409                   | 3.855          | 10.985          | 0.110                     | 0.993          | 0.257           |
| 90.0                                                                   | -0.0               | 65.2                | 0.351                   | 3.895          | 10.875          | 0.086                     | 1.029          | 0.285           |
| 105.0                                                                  | -0.1               | 82.6                | 0.211                   | 3.223          | 11.108          | 0.032                     | 1.023          | 0.321           |
| 120.0                                                                  | -0.3               | 97.2                | 0.307                   | 3.986          | 11.021          | 0.031                     | 1.034          | 0.324           |
| 135.0                                                                  | -0.6               | 105.0               | 0.321                   | 4.361          | 11.012          | 0.055                     | 1.040          | 0.312           |
| 150.0                                                                  | -0.9               | 109.1               | 0.373                   | 4.097          | 10.958          | 0.067                     | 1.031          | 0.304           |
| 165.0                                                                  | -0.5               | 40.2                | 0.515                   | 3.702          | 10.919          | 0.116                     | 0.689          | 0.240           |
| 180.0                                                                  | -0.3               | 35.7                | 0.538                   | 2.727          | 10.709          | 0.130                     | 0.550          | 0.214           |
| 195.0                                                                  | 0.1                | 362.1               | 0.507                   | 2.734          | 10.595          | 0.126                     | 0.666          | 0.226           |
| 210.0                                                                  | 0.2                | 354.0               | 0.528                   | 3.103          | 10.711          | 0.113                     | 0.834          | 0.262           |
| 225.0                                                                  | 0.3                | 264.4               | 0.345                   | 3.679          | 11.421          | 0.038                     | 1.012          | 0.357           |
| 240.0                                                                  | 0.3                | 272.2               | 0.294                   | 3.491          | 11.398          | 0.029                     | 1.006          | 0.367           |
| 255.0                                                                  | 0.3                | 283.8               | 0.251                   | 3.804          | 11.124          | 0.056                     | 0.997          | 0.356           |
| 270.0                                                                  | 0.3                | 294.1               | 0.343                   | 3.457          | 11.289          | 0.086                     | 0.988          | 0.329           |
| 285.0                                                                  | 0.2                | 302.8               | 0.411                   | 3.325          | 11.187          | 0.104                     | 0.965          | 0.301           |
| 300.0                                                                  | 0.1                | 311.1               | 0.421                   | 3.273          | 10.959          | 0.116                     | 0.917          | 0.275           |
| 315.0                                                                  | 0.1                | 319.6               | 0.503                   | 2.896          | 10.705          | 0.124                     | 0.847          | 0.253           |
| 330.0                                                                  | 0.1                | 328.7               | 0.486                   | 2.707          | 10.591          | 0.128                     | 0.738          | 0.233           |
| 345.0                                                                  | 0.0                | 337.9               | 0.530                   | 2.311          | 10.445          | 0.132                     | 0.588          | 0.218           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table T.9:** Accelerations at Hangar Deck: JONSWAP Spectrum with  $H_s = 4.0$  m and  $T_p = 13.6$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 4.8                | -2.5                | 0.684                   | 1.104          | 10.457          | 0.158                     | 0.186          | 0.221           |
| 15.0                                                                   | 4.8                | 11.8                | 0.625                   | 1.566          | 10.446          | 0.157                     | 0.345          | 0.221           |
| 30.0                                                                   | 4.7                | 26.3                | 0.657                   | 2.353          | 10.512          | 0.151                     | 0.585          | 0.231           |
| 45.0                                                                   | 4.7                | 41.0                | 0.531                   | 2.964          | 10.524          | 0.141                     | 0.779          | 0.251           |
| 60.0                                                                   | 4.7                | 55.3                | 0.453                   | 3.325          | 10.985          | 0.123                     | 0.901          | 0.281           |
| 75.0                                                                   | 4.7                | 69.9                | 0.325                   | 3.732          | 11.026          | 0.080                     | 0.952          | 0.326           |
| 90.0                                                                   | 4.6                | 83.5                | 0.112                   | 3.379          | 11.253          | 0.024                     | 0.963          | 0.352           |
| 105.0                                                                  | 4.4                | 95.7                | 0.170                   | 3.756          | 11.187          | 0.021                     | 0.971          | 0.338           |
| 120.0                                                                  | 4.3                | 104.0               | 0.278                   | 3.261          | 11.025          | 0.042                     | 0.956          | 0.312           |
| 135.0                                                                  | 4.2                | 112.8               | 0.295                   | 3.417          | 10.803          | 0.058                     | 0.930          | 0.282           |
| 150.0                                                                  | 4.2                | 128.2               | 0.350                   | 3.113          | 10.587          | 0.075                     | 0.809          | 0.233           |
| 165.0                                                                  | 4.6                | 161.0               | 0.324                   | 1.653          | 10.382          | 0.087                     | 0.361          | 0.161           |
| 180.0                                                                  | 4.8                | 178.1               | 0.316                   | 1.269          | 10.369          | 0.088                     | 0.278          | 0.145           |
| 195.0                                                                  | 4.9                | 194.6               | 0.338                   | 1.589          | 10.393          | 0.086                     | 0.433          | 0.146           |
| 210.0                                                                  | 4.9                | 211.3               | 0.364                   | 2.195          | 10.409          | 0.082                     | 0.631          | 0.164           |
| 225.0                                                                  | 4.7                | 228.6               | 0.391                   | 2.929          | 10.827          | 0.077                     | 0.803          | 0.205           |
| 240.0                                                                  | 4.7                | 245.3               | 0.268                   | 3.201          | 10.759          | 0.062                     | 0.917          | 0.266           |
| 255.0                                                                  | 4.8                | 258.9               | 0.190                   | 3.224          | 10.974          | 0.036                     | 0.956          | 0.329           |
| 270.0                                                                  | 4.9                | 272.8               | 0.104                   | 3.233          | 11.199          | 0.013                     | 0.948          | 0.376           |
| 285.0                                                                  | 5.0                | 287.0               | 0.300                   | 3.674          | 11.350          | 0.071                     | 0.913          | 0.365           |
| 300.0                                                                  | 5.0                | 301.0               | 0.412                   | 2.901          | 10.867          | 0.118                     | 0.866          | 0.313           |
| 315.0                                                                  | 5.0                | 314.8               | 0.553                   | 2.526          | 10.715          | 0.140                     | 0.734          | 0.268           |
| 330.0                                                                  | 4.9                | 329.0               | 0.573                   | 2.258          | 10.517          | 0.150                     | 0.572          | 0.245           |
| 345.0                                                                  | 4.9                | 343.3               | 0.666                   | 1.704          | 10.503          | 0.155                     | 0.372          | 0.229           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table T.10:** Accelerations at Hangar Deck: JONSWAP Spectrum with  $H_s = 4.0$  m and  $T_p = 13.6$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 10.0               | -0.6                | 0.824                   | 0.895          | 10.555          | 0.180                     | 0.091          | 0.242           |
| 15.0                                                                   | 10.0               | 14.4                | 0.748                   | 1.506          | 10.497          | 0.176                     | 0.265          | 0.239           |
| 30.0                                                                   | 10.0               | 29.4                | 0.710                   | 2.136          | 10.655          | 0.169                     | 0.470          | 0.244           |
| 45.0                                                                   | 10.1               | 44.4                | 0.575                   | 2.435          | 10.728          | 0.155                     | 0.638          | 0.260           |
| 60.0                                                                   | 10.1               | 59.3                | 0.451                   | 2.976          | 11.062          | 0.128                     | 0.771          | 0.310           |
| 75.0                                                                   | 10.1               | 74.0                | 0.296                   | 3.189          | 11.508          | 0.070                     | 0.796          | 0.362           |
| 90.0                                                                   | 10.1               | 88.8                | 0.061                   | 3.360          | 11.308          | 0.014                     | 0.830          | 0.358           |
| 105.0                                                                  | 10.1               | 103.7               | 0.163                   | 3.818          | 11.137          | 0.032                     | 0.847          | 0.304           |
| 120.0                                                                  | 10.0               | 118.3               | 0.225                   | 3.818          | 10.781          | 0.048                     | 0.896          | 0.250           |
| 135.0                                                                  | 10.0               | 133.5               | 0.213                   | 3.102          | 10.523          | 0.055                     | 0.839          | 0.202           |
| 150.0                                                                  | 10.0               | 148.8               | 0.207                   | 2.897          | 10.275          | 0.059                     | 0.772          | 0.169           |
| 165.0                                                                  | 10.0               | 164.0               | 0.320                   | 2.867          | 10.325          | 0.062                     | 0.602          | 0.142           |
| 180.0                                                                  | 10.1               | 179.3               | 0.270                   | 2.209          | 10.146          | 0.061                     | 0.374          | 0.119           |
| 195.0                                                                  | 10.1               | 194.6               | 0.244                   | 1.864          | 10.186          | 0.062                     | 0.422          | 0.107           |
| 210.0                                                                  | 10.1               | 210.2               | 0.261                   | 2.231          | 10.240          | 0.060                     | 0.709          | 0.119           |
| 225.0                                                                  | 10.0               | 225.8               | 0.237                   | 2.582          | 10.447          | 0.057                     | 0.902          | 0.151           |
| 240.0                                                                  | 10.0               | 241.2               | 0.247                   | 3.115          | 10.756          | 0.051                     | 0.991          | 0.210           |
| 255.0                                                                  | 10.1               | 255.9               | 0.181                   | 3.578          | 11.058          | 0.036                     | 0.953          | 0.284           |
| 270.0                                                                  | 10.2               | 270.7               | 0.061                   | 3.273          | 11.255          | 0.016                     | 0.913          | 0.366           |
| 285.0                                                                  | 10.2               | 285.3               | 0.256                   | 3.505          | 11.195          | 0.067                     | 0.852          | 0.390           |
| 300.0                                                                  | 10.1               | 299.9               | 0.443                   | 3.019          | 11.155          | 0.127                     | 0.778          | 0.341           |
| 315.0                                                                  | 10.1               | 314.6               | 0.570                   | 2.471          | 10.710          | 0.156                     | 0.610          | 0.281           |
| 330.0                                                                  | 10.1               | 329.5               | 0.694                   | 1.854          | 10.636          | 0.169                     | 0.421          | 0.257           |
| 345.0                                                                  | 10.1               | 344.4               | 0.664                   | 1.227          | 10.534          | 0.176                     | 0.231          | 0.246           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table T.11:** Accelerations at Hangar Deck: JONSWAP Spectrum with  $H_s = 4.0$  m and  $T_p = 13.6$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 15.2               | -0.3                | 0.849                   | 0.959          | 10.617          | 0.199                     | 0.085          | 0.260           |
| 15.0                                                                   | 15.2               | 14.8                | 0.791                   | 1.411          | 10.612          | 0.196                     | 0.243          | 0.257           |
| 30.0                                                                   | 15.2               | 29.9                | 0.731                   | 1.984          | 10.768          | 0.186                     | 0.428          | 0.265           |
| 45.0                                                                   | 15.2               | 44.9                | 0.618                   | 2.437          | 10.867          | 0.171                     | 0.590          | 0.293           |
| 60.0                                                                   | 15.2               | 59.8                | 0.479                   | 2.937          | 10.946          | 0.138                     | 0.736          | 0.356           |
| 75.0                                                                   | 15.3               | 74.6                | 0.253                   | 2.841          | 11.229          | 0.072                     | 0.728          | 0.390           |
| 90.0                                                                   | 15.3               | 89.5                | 0.079                   | 3.500          | 11.347          | 0.021                     | 0.763          | 0.356           |
| 105.0                                                                  | 15.3               | 104.4               | 0.150                   | 3.583          | 11.141          | 0.031                     | 0.812          | 0.289           |
| 120.0                                                                  | 15.2               | 119.2               | 0.182                   | 4.041          | 10.615          | 0.039                     | 1.083          | 0.254           |
| 135.0                                                                  | 15.2               | 134.5               | 0.179                   | 3.644          | 10.281          | 0.040                     | 1.049          | 0.198           |
| 150.0                                                                  | 15.3               | 149.8               | 0.166                   | 2.509          | 10.094          | 0.043                     | 0.643          | 0.133           |
| 165.0                                                                  | 15.2               | 164.7               | 0.198                   | 1.763          | 10.122          | 0.044                     | 0.331          | 0.108           |
| 180.0                                                                  | 15.2               | 179.7               | 0.188                   | 1.541          | 10.102          | 0.052                     | 0.222          | 0.098           |
| 195.0                                                                  | 15.2               | 194.8               | 0.187                   | 2.579          | 10.003          | 0.046                     | 0.373          | 0.085           |
| 210.0                                                                  | 15.2               | 209.9               | 0.155                   | 2.997          | 9.997           | 0.039                     | 0.657          | 0.082           |
| 225.0                                                                  | 15.2               | 225.3               | 0.227                   | 3.655          | 10.240          | 0.045                     | 1.187          | 0.124           |
| 240.0                                                                  | 15.2               | 240.6               | 0.187                   | 3.536          | 10.636          | 0.042                     | 1.200          | 0.174           |
| 255.0                                                                  | 15.3               | 255.4               | 0.184                   | 3.366          | 11.029          | 0.035                     | 0.993          | 0.249           |
| 270.0                                                                  | 15.3               | 270.3               | 0.086                   | 3.645          | 11.337          | 0.023                     | 0.909          | 0.355           |
| 285.0                                                                  | 15.3               | 285.1               | 0.237                   | 3.520          | 11.176          | 0.069                     | 0.824          | 0.417           |
| 300.0                                                                  | 15.2               | 299.9               | 0.488                   | 3.400          | 11.050          | 0.137                     | 0.733          | 0.396           |
| 315.0                                                                  | 15.2               | 314.7               | 0.568                   | 2.529          | 10.940          | 0.170                     | 0.547          | 0.326           |
| 330.0                                                                  | 15.2               | 329.7               | 0.688                   | 1.899          | 10.768          | 0.187                     | 0.367          | 0.286           |
| 345.0                                                                  | 15.2               | 344.7               | 0.836                   | 1.276          | 10.686          | 0.195                     | 0.180          | 0.268           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table T.12:** Accelerations at Hangar Deck: JONSWAP Spectrum with  $H_s = 4.0$  m and  $T_p = 13.6$  s; Ship's speed is 20.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 20.3               | -0.1                | 0.813                   | 1.114          | 10.941          | 0.217                     | 0.096          | 0.333           |
| 15.0                                                                   | 20.3               | 14.9                | 0.864                   | 1.479          | 10.929          | 0.213                     | 0.241          | 0.333           |
| 30.0                                                                   | 20.3               | 30.0                | 0.733                   | 1.939          | 10.876          | 0.202                     | 0.414          | 0.347           |
| 45.0                                                                   | 20.3               | 45.0                | 0.624                   | 2.498          | 10.991          | 0.183                     | 0.578          | 0.378           |
| 60.0                                                                   | 20.3               | 59.9                | 0.559                   | 2.943          | 11.472          | 0.148                     | 0.738          | 0.430           |
| 75.0                                                                   | 20.4               | 74.8                | 0.282                   | 3.343          | 11.386          | 0.075                     | 0.680          | 0.416           |
| 90.0                                                                   | 20.4               | 89.7                | 0.100                   | 3.496          | 11.326          | 0.027                     | 0.715          | 0.350           |
| 105.0                                                                  | 20.4               | 104.7               | 0.146                   | 3.742          | 10.986          | 0.034                     | 0.775          | 0.271           |
| 120.0                                                                  | 20.3               | 119.6               | 0.161                   | 5.044          | 10.345          | 0.041                     | 1.416          | 0.261           |
| 135.0                                                                  | 20.3               | 134.9               | 0.160                   | 3.449          | 10.060          | 0.041                     | 1.036          | 0.159           |
| 150.0                                                                  | 20.4               | 149.9               | 0.142                   | 1.977          | 10.016          | 0.041                     | 0.562          | 0.100           |
| 165.0                                                                  | 20.3               | 164.8               | 0.180                   | 1.454          | 10.041          | 0.045                     | 0.282          | 0.073           |
| 180.0                                                                  | 20.4               | 179.9               | 0.176                   | 2.046          | 9.981           | 0.050                     | 0.188          | 0.069           |
| 195.0                                                                  | 20.3               | 194.8               | 0.210                   | 3.730          | 10.001          | 0.055                     | 0.477          | 0.077           |
| 210.0                                                                  | 20.4               | 209.9               | 0.173                   | 4.022          | 9.959           | 0.039                     | 0.647          | 0.080           |
| 225.0                                                                  | 20.4               | 225.0               | 0.139                   | 4.166          | 9.962           | 0.034                     | 0.962          | 0.094           |
| 240.0                                                                  | 20.3               | 240.3               | 0.234                   | 5.192          | 10.352          | 0.042                     | 1.464          | 0.149           |
| 255.0                                                                  | 20.4               | 255.2               | 0.188                   | 3.803          | 10.809          | 0.037                     | 0.987          | 0.217           |
| 270.0                                                                  | 20.4               | 270.1               | 0.106                   | 3.628          | 11.190          | 0.030                     | 0.891          | 0.342           |
| 285.0                                                                  | 20.4               | 285.0               | 0.272                   | 3.610          | 11.480          | 0.072                     | 0.793          | 0.450           |
| 300.0                                                                  | 20.3               | 299.9               | 0.493                   | 3.314          | 11.186          | 0.144                     | 0.702          | 0.475           |
| 315.0                                                                  | 20.3               | 314.8               | 0.672                   | 2.402          | 11.109          | 0.182                     | 0.510          | 0.418           |
| 330.0                                                                  | 20.3               | 329.8               | 0.747                   | 1.998          | 11.029          | 0.201                     | 0.332          | 0.373           |
| 345.0                                                                  | 20.3               | 344.8               | 0.867                   | 1.376          | 11.017          | 0.213                     | 0.156          | 0.347           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table T.13:** Accelerations at Hangar Deck: JONSWAP Spectrum with  $H_s = 4.0$  m and  $T_p = 13.6$  s; Ship's speed is 25.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 25.4               | -0.1                | 0.920                   | 1.304          | 11.386          | 0.231                     | 0.118          | 0.471           |
| 15.0                                                                   | 25.4               | 15.0                | 0.833                   | 1.531          | 11.526          | 0.228                     | 0.242          | 0.469           |
| 30.0                                                                   | 25.4               | 30.0                | 0.924                   | 2.328          | 11.511          | 0.216                     | 0.403          | 0.479           |
| 45.0                                                                   | 25.4               | 45.0                | 0.728                   | 2.577          | 11.471          | 0.194                     | 0.568          | 0.499           |
| 60.0                                                                   | 25.4               | 60.0                | 0.545                   | 3.280          | 11.649          | 0.156                     | 0.740          | 0.523           |
| 75.0                                                                   | 25.4               | 74.9                | 0.268                   | 2.851          | 11.376          | 0.079                     | 0.653          | 0.457           |
| 90.0                                                                   | 25.4               | 89.8                | 0.119                   | 3.425          | 11.288          | 0.033                     | 0.688          | 0.341           |
| 105.0                                                                  | 25.4               | 104.8               | 0.170                   | 3.573          | 10.729          | 0.041                     | 0.774          | 0.249           |
| 120.0                                                                  | 25.4               | 119.9               | 0.187                   | 4.693          | 10.028          | 0.050                     | 1.657          | 0.248           |
| 135.0                                                                  | 25.4               | 134.9               | 0.184                   | 4.059          | 9.953           | 0.050                     | 0.980          | 0.126           |
| 150.0                                                                  | 25.4               | 149.9               | 0.164                   | 2.218          | 9.937           | 0.055                     | 0.643          | 0.081           |
| 165.0                                                                  | 25.5               | 164.9               | 0.215                   | 1.847          | 9.948           | 0.067                     | 0.357          | 0.067           |
| 180.0                                                                  | 25.5               | 179.9               | 0.249                   | 2.123          | 10.005          | 0.069                     | 0.195          | 0.058           |
| 195.0                                                                  | 25.5               | 195.0               | 0.186                   | 2.279          | 9.947           | 0.061                     | 0.355          | 0.059           |
| 210.0                                                                  | 25.5               | 210.0               | 0.152                   | 3.754          | 9.895           | 0.045                     | 0.617          | 0.084           |
| 225.0                                                                  | 25.4               | 225.0               | 0.131                   | 4.270          | 9.920           | 0.043                     | 1.085          | 0.124           |
| 240.0                                                                  | 25.4               | 240.1               | 0.175                   | 6.201          | 9.900           | 0.043                     | 1.528          | 0.155           |
| 255.0                                                                  | 25.4               | 255.1               | 0.203                   | 4.244          | 10.773          | 0.042                     | 0.945          | 0.189           |
| 270.0                                                                  | 25.4               | 270.1               | 0.126                   | 3.400          | 10.950          | 0.036                     | 0.834          | 0.329           |
| 285.0                                                                  | 25.4               | 285.0               | 0.265                   | 3.942          | 11.431          | 0.075                     | 0.744          | 0.486           |
| 300.0                                                                  | 25.4               | 299.9               | 0.513                   | 3.133          | 11.608          | 0.151                     | 0.675          | 0.564           |
| 315.0                                                                  | 25.4               | 314.9               | 0.714                   | 2.432          | 11.490          | 0.192                     | 0.479          | 0.535           |
| 330.0                                                                  | 25.4               | 329.9               | 0.846                   | 2.116          | 11.436          | 0.214                     | 0.308          | 0.506           |
| 345.0                                                                  | 25.4               | 344.9               | 0.999                   | 1.393          | 11.624          | 0.227                     | 0.155          | 0.483           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table T.14:** Accelerations at Hangar Deck: JONSWAP Spectrum with  $H_s = 4.0$  m and  $T_p = 13.6$  s; Ship's speed is 30.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 30.5               | -0.0                | 1.047                   | 1.434          | 12.255          | 0.244                     | 0.145          | 0.637           |
| 15.0                                                                   | 30.5               | 15.0                | 0.918                   | 1.691          | 11.693          | 0.240                     | 0.247          | 0.633           |
| 30.0                                                                   | 30.5               | 30.0                | 0.838                   | 2.246          | 11.911          | 0.226                     | 0.393          | 0.633           |
| 45.0                                                                   | 30.5               | 45.0                | 0.709                   | 2.781          | 11.696          | 0.203                     | 0.551          | 0.632           |
| 60.0                                                                   | 30.5               | 60.0                | 0.583                   | 3.214          | 11.809          | 0.163                     | 0.737          | 0.622           |
| 75.0                                                                   | 30.5               | 74.9                | 0.272                   | 3.060          | 11.637          | 0.083                     | 0.620          | 0.498           |
| 90.0                                                                   | 30.5               | 89.9                | 0.137                   | 3.295          | 11.244          | 0.038                     | 0.680          | 0.330           |
| 105.0                                                                  | 30.5               | 104.9               | 0.204                   | 3.389          | 10.591          | 0.049                     | 0.844          | 0.232           |
| 120.0                                                                  | 30.4               | 119.9               | 0.262                   | 5.840          | 9.958           | 0.064                     | 1.751          | 0.236           |
| 135.0                                                                  | 30.5               | 134.9               | 0.206                   | 3.330          | 9.921           | 0.060                     | 0.995          | 0.111           |
| 150.0                                                                  | 30.6               | 149.8               | 0.287                   | 2.681          | 9.937           | 0.086                     | 0.661          | 0.087           |
| 165.0                                                                  | 30.7               | 164.9               | 0.293                   | 2.054          | 9.959           | 0.094                     | 0.364          | 0.053           |
| 180.0                                                                  | 30.6               | 179.8               | 0.371                   | 2.125          | 9.900           | 0.102                     | 0.279          | 0.046           |
| 195.0                                                                  | 30.7               | 195.0               | 0.287                   | 2.964          | 9.900           | 0.091                     | 0.458          | 0.063           |
| 210.0                                                                  | 30.6               | 210.1               | 0.319                   | 3.661          | 9.913           | 0.077                     | 0.695          | 0.083           |
| 225.0                                                                  | 30.5               | 225.0               | 0.241                   | 4.723          | 9.949           | 0.055                     | 1.021          | 0.141           |
| 240.0                                                                  | 30.5               | 240.0               | 0.201                   | 5.524          | 9.888           | 0.048                     | 1.434          | 0.148           |
| 255.0                                                                  | 30.5               | 255.1               | 0.184                   | 3.982          | 10.530          | 0.049                     | 0.891          | 0.164           |
| 270.0                                                                  | 30.5               | 270.0               | 0.154                   | 3.319          | 10.975          | 0.042                     | 0.765          | 0.316           |
| 285.0                                                                  | 30.5               | 285.0               | 0.267                   | 4.097          | 11.670          | 0.079                     | 0.689          | 0.528           |
| 300.0                                                                  | 30.5               | 299.9               | 0.516                   | 3.629          | 11.995          | 0.157                     | 0.650          | 0.659           |
| 315.0                                                                  | 30.5               | 314.9               | 0.757                   | 2.805          | 11.833          | 0.199                     | 0.463          | 0.663           |
| 330.0                                                                  | 30.5               | 329.9               | 0.883                   | 2.178          | 11.935          | 0.225                     | 0.303          | 0.656           |
| 345.0                                                                  | 30.5               | 344.9               | 0.977                   | 1.612          | 11.991          | 0.239                     | 0.177          | 0.644           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table T.15:** Accelerations at Hangar Deck: JONSWAP Spectrum with  $H_s = 6.0$  m and  $T_p = 9.3$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                            | <b>Absolute Maximum</b> |                       |                        | <b>Standard Deviation</b> |                       |                        |
|------------------------------------------------------------------------|--------------------|----------------------------|-------------------------|-----------------------|------------------------|---------------------------|-----------------------|------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts       | $\psi_{\text{MHP}}$<br>deg | Long<br>$\text{m/s}^2$  | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ | Long<br>$\text{m/s}^2$    | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ |
| 0.0                                                                    | -0.1               | -21.2                      | 1.342                   | 3.236                 | 10.941                 | 0.282                     | 0.612                 | 0.399                  |
| 15.0                                                                   | -0.2               | -12.9                      | 1.245                   | 2.392                 | 10.761                 | 0.280                     | 0.429                 | 0.373                  |
| 30.0                                                                   | -0.5               | -0.8                       | 1.208                   | 2.082                 | 10.782                 | 0.276                     | 0.347                 | 0.348                  |
| 45.0                                                                   | -0.9               | 12.3                       | 1.293                   | 3.042                 | 10.749                 | 0.274                     | 0.621                 | 0.339                  |
| 60.0                                                                   | -1.1               | 23.7                       | 1.122                   | 3.907                 | 10.986                 | 0.273                     | 0.900                 | 0.356                  |
| 75.0                                                                   | -1.8               | 34.8                       | 1.739                   | 7.114                 | 12.680                 | 0.265                     | 1.273                 | 0.440                  |
| 90.0                                                                   | -2.2               | -14.4                      | 1.282                   | 10.949                | 12.748                 | 0.261                     | 1.550                 | 0.491                  |
| 105.0                                                                  | -1.6               | -3.1                       | 1.254                   | 10.846                | 13.746                 | 0.263                     | 1.484                 | 0.489                  |
| 120.0                                                                  | -1.2               | 13.1                       | 1.061                   | 8.374                 | 13.420                 | 0.237                     | 1.445                 | 0.531                  |
| 135.0                                                                  | -3.2               | 107.2                      | 1.834                   | 12.035                | 13.846                 | 0.224                     | 1.659                 | 0.686                  |
| 150.0                                                                  | -4.1               | 109.6                      | 1.141                   | 7.956                 | 12.973                 | 0.228                     | 1.596                 | 0.652                  |
| 165.0                                                                  | -3.7               | 111.5                      | 2.209                   | 9.550                 | 13.358                 | 0.234                     | 1.569                 | 0.644                  |
| 180.0                                                                  | -0.8               | 153.3                      | 0.852                   | 7.153                 | 12.178                 | 0.216                     | 0.704                 | 0.345                  |
| 195.0                                                                  | -0.3               | 17.5                       | 1.262                   | 6.173                 | 12.333                 | 0.277                     | 0.880                 | 0.448                  |
| 210.0                                                                  | -0.3               | 387.8                      | 1.238                   | 4.979                 | 12.019                 | 0.280                     | 0.990                 | 0.482                  |
| 225.0                                                                  | -0.3               | 393.4                      | 1.179                   | 5.380                 | 12.237                 | 0.281                     | 1.111                 | 0.507                  |
| 240.0                                                                  | -0.1               | 392.3                      | 1.146                   | 5.905                 | 12.554                 | 0.279                     | 1.241                 | 0.552                  |
| 255.0                                                                  | 0.5                | 310.5                      | 1.272                   | 6.605                 | 13.024                 | 0.266                     | 1.458                 | 0.651                  |
| 270.0                                                                  | -0.1               | 314.6                      | 2.034                   | 7.196                 | 12.878                 | 0.272                     | 1.433                 | 0.644                  |
| 285.0                                                                  | -0.2               | 305.4                      | 1.234                   | 4.950                 | 12.126                 | 0.281                     | 1.270                 | 0.580                  |
| 300.0                                                                  | -0.3               | 310.6                      | 1.080                   | 6.367                 | 12.297                 | 0.283                     | 1.171                 | 0.539                  |
| 315.0                                                                  | -0.2               | 316.2                      | 1.187                   | 4.588                 | 11.736                 | 0.288                     | 1.101                 | 0.502                  |
| 330.0                                                                  | -0.1               | 323.1                      | 1.309                   | 4.923                 | 11.365                 | 0.287                     | 0.922                 | 0.464                  |
| 345.0                                                                  | -0.1               | 330.8                      | 1.336                   | 4.404                 | 11.090                 | 0.285                     | 0.770                 | 0.431                  |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                            |                         |                       |                        |                           |                       |                        |



**Table T.16:** Accelerations at Hangar Deck: JONSWAP Spectrum with  $H_s = 6.0$  m and  $T_p = 9.3$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                            | <b>Absolute Maximum</b> |                       |                        | <b>Standard Deviation</b> |                       |                        |
|------------------------------------------------------------------------|--------------------|----------------------------|-------------------------|-----------------------|------------------------|---------------------------|-----------------------|------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts       | $\psi_{\text{MHP}}$<br>deg | Long<br>$\text{m/s}^2$  | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ | Long<br>$\text{m/s}^2$    | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ |
| 0.0                                                                    | 4.0                | -12.7                      | 1.406                   | 2.544                 | 10.824                 | 0.316                     | 0.407                 | 0.404                  |
| 15.0                                                                   | 3.9                | -1.6                       | 1.314                   | 2.244                 | 10.910                 | 0.312                     | 0.350                 | 0.389                  |
| 30.0                                                                   | 3.9                | 10.9                       | 1.459                   | 2.196                 | 10.791                 | 0.311                     | 0.387                 | 0.385                  |
| 45.0                                                                   | 3.8                | 22.6                       | 1.483                   | 2.857                 | 10.813                 | 0.313                     | 0.554                 | 0.392                  |
| 60.0                                                                   | 3.8                | 32.4                       | 1.352                   | 3.526                 | 10.956                 | 0.312                     | 0.770                 | 0.415                  |
| 75.0                                                                   | 3.7                | 39.8                       | 1.401                   | 4.895                 | 11.384                 | 0.309                     | 0.932                 | 0.439                  |
| 90.0                                                                   | 3.6                | 42.9                       | 1.290                   | 6.936                 | 12.960                 | 0.306                     | 1.016                 | 0.464                  |
| 105.0                                                                  | 3.6                | 45.4                       | 1.246                   | 9.885                 | 13.902                 | 0.303                     | 1.092                 | 0.491                  |
| 120.0                                                                  | 3.7                | 45.3                       | 1.379                   | 11.747                | 12.183                 | 0.307                     | 1.095                 | 0.506                  |
| 135.0                                                                  | 3.7                | 42.8                       | 1.363                   | 4.738                 | 11.639                 | 0.306                     | 0.964                 | 0.478                  |
| 150.0                                                                  | 3.7                | 44.0                       | 1.366                   | 5.140                 | 11.884                 | 0.308                     | 0.929                 | 0.488                  |
| 165.0                                                                  | 3.8                | 51.5                       | 1.205                   | 5.416                 | 11.761                 | 0.306                     | 0.998                 | 0.488                  |
| 180.0                                                                  | 4.7                | 178.8                      | 0.613                   | 2.165                 | 10.743                 | 0.153                     | 0.457                 | 0.181                  |
| 195.0                                                                  | 4.6                | 196.7                      | 0.603                   | 2.250                 | 10.906                 | 0.157                     | 0.568                 | 0.212                  |
| 210.0                                                                  | 4.1                | 373.7                      | 1.364                   | 4.992                 | 12.851                 | 0.314                     | 0.821                 | 0.463                  |
| 225.0                                                                  | 4.4                | 300.1                      | 1.063                   | 6.458                 | 13.244                 | 0.287                     | 1.262                 | 0.605                  |
| 240.0                                                                  | 4.5                | 289.0                      | 1.079                   | 6.950                 | 13.834                 | 0.260                     | 1.461                 | 0.759                  |
| 255.0                                                                  | 4.4                | 290.4                      | 1.163                   | 6.874                 | 13.686                 | 0.270                     | 1.482                 | 0.767                  |
| 270.0                                                                  | 4.3                | 294.0                      | 2.269                   | 6.866                 | 13.443                 | 0.286                     | 1.396                 | 0.719                  |
| 285.0                                                                  | 4.4                | 296.8                      | 1.338                   | 6.801                 | 13.869                 | 0.293                     | 1.338                 | 0.676                  |
| 300.0                                                                  | 4.6                | 302.9                      | 1.334                   | 4.751                 | 12.082                 | 0.308                     | 1.200                 | 0.608                  |
| 315.0                                                                  | 4.6                | 314.4                      | 1.301                   | 4.438                 | 11.294                 | 0.321                     | 0.960                 | 0.522                  |
| 330.0                                                                  | 4.5                | 326.6                      | 1.416                   | 4.689                 | 11.362                 | 0.324                     | 0.714                 | 0.465                  |
| 345.0                                                                  | 4.3                | 338.2                      | 1.377                   | 2.739                 | 11.062                 | 0.320                     | 0.526                 | 0.426                  |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                            |                         |                       |                        |                           |                       |                        |

**Table T.17:** Accelerations at Hangar Deck: JONSWAP Spectrum with  $H_s = 6.0$  m and  $T_p = 9.3$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                            | <b>Absolute Maximum</b> |                       |                        | <b>Standard Deviation</b> |                       |                        |
|------------------------------------------------------------------------|--------------------|----------------------------|-------------------------|-----------------------|------------------------|---------------------------|-----------------------|------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts       | $\psi_{\text{MHP}}$<br>deg | Long<br>$\text{m/s}^2$  | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ | Long<br>$\text{m/s}^2$    | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ |
| 0.0                                                                    | 9.7                | -1.2                       | 1.475                   | 1.843                 | 10.969                 | 0.348                     | 0.262                 | 0.437                  |
| 15.0                                                                   | 9.7                | 13.7                       | 1.505                   | 2.219                 | 10.888                 | 0.349                     | 0.341                 | 0.435                  |
| 30.0                                                                   | 9.7                | 28.7                       | 1.362                   | 2.727                 | 11.066                 | 0.352                     | 0.543                 | 0.447                  |
| 45.0                                                                   | 9.7                | 43.7                       | 1.465                   | 3.945                 | 11.278                 | 0.347                     | 0.817                 | 0.482                  |
| 60.0                                                                   | 9.7                | 58.1                       | 1.173                   | 5.667                 | 11.835                 | 0.322                     | 1.113                 | 0.571                  |
| 75.0                                                                   | 9.7                | 71.5                       | 1.182                   | 7.704                 | 13.285                 | 0.269                     | 1.358                 | 0.771                  |
| 90.0                                                                   | 8.7                | 77.7                       | 1.419                   | 8.369                 | 14.035                 | 0.213                     | 1.512                 | 0.881                  |
| 105.0                                                                  | 8.6                | 81.7                       | 0.921                   | 9.994                 | 13.980                 | 0.168                     | 1.591                 | 0.917                  |
| 120.0                                                                  | 8.5                | 85.6                       | 0.852                   | 9.311                 | 14.189                 | 0.140                     | 1.645                 | 0.918                  |
| 135.0                                                                  | 8.5                | 100.0                      | 0.954                   | 9.561                 | 13.867                 | 0.129                     | 1.605                 | 0.770                  |
| 150.0                                                                  | 9.3                | 145.5                      | 0.472                   | 3.993                 | 10.574                 | 0.118                     | 1.352                 | 0.245                  |
| 165.0                                                                  | 9.7                | 162.2                      | 0.347                   | 4.204                 | 10.320                 | 0.110                     | 1.265                 | 0.213                  |
| 180.0                                                                  | 9.9                | 178.2                      | 0.368                   | 4.073                 | 10.133                 | 0.106                     | 0.980                 | 0.155                  |
| 195.0                                                                  | 10.0               | 194.6                      | 0.372                   | 3.086                 | 10.388                 | 0.110                     | 0.821                 | 0.110                  |
| 210.0                                                                  | 9.8                | 211.6                      | 0.430                   | 3.476                 | 10.544                 | 0.118                     | 1.188                 | 0.168                  |
| 225.0                                                                  | 8.9                | 239.9                      | 0.914                   | 7.801                 | 13.370                 | 0.142                     | 1.478                 | 0.463                  |
| 240.0                                                                  | 8.5                | 268.0                      | 1.391                   | 12.094                | 13.851                 | 0.146                     | 1.745                 | 0.892                  |
| 255.0                                                                  | 8.5                | 273.6                      | 1.327                   | 8.569                 | 13.779                 | 0.137                     | 1.663                 | 0.960                  |
| 270.0                                                                  | 9.0                | 279.6                      | 1.989                   | 7.940                 | 13.905                 | 0.184                     | 1.556                 | 1.014                  |
| 285.0                                                                  | 9.9                | 287.8                      | 1.644                   | 5.999                 | 13.699                 | 0.272                     | 1.386                 | 0.900                  |
| 300.0                                                                  | 9.9                | 300.3                      | 1.167                   | 4.285                 | 11.831                 | 0.325                     | 1.126                 | 0.679                  |
| 315.0                                                                  | 9.8                | 314.3                      | 1.540                   | 3.807                 | 11.371                 | 0.353                     | 0.863                 | 0.542                  |
| 330.0                                                                  | 9.7                | 329.0                      | 1.575                   | 3.135                 | 11.157                 | 0.357                     | 0.578                 | 0.481                  |
| 345.0                                                                  | 9.7                | 343.9                      | 1.465                   | 2.422                 | 10.993                 | 0.353                     | 0.358                 | 0.448                  |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                            |                         |                       |                        |                           |                       |                        |

**Table T.18:** Accelerations at Hangar Deck: JONSWAP Spectrum with  $H_s = 6.0$  m and  $T_p = 9.3$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                            | <b>Absolute Maximum</b> |                       |                        | <b>Standard Deviation</b> |                       |                        |
|------------------------------------------------------------------------|--------------------|----------------------------|-------------------------|-----------------------|------------------------|---------------------------|-----------------------|------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts       | $\psi_{\text{MHP}}$<br>deg | Long<br>$\text{m/s}^2$  | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ | Long<br>$\text{m/s}^2$    | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ |
| 0.0                                                                    | 15.0               | -0.5                       | 1.452                   | 1.743                 | 11.317                 | 0.380                     | 0.242                 | 0.461                  |
| 15.0                                                                   | 15.0               | 14.6                       | 1.412                   | 2.062                 | 11.241                 | 0.381                     | 0.341                 | 0.463                  |
| 30.0                                                                   | 15.0               | 29.6                       | 1.422                   | 2.729                 | 11.224                 | 0.385                     | 0.532                 | 0.492                  |
| 45.0                                                                   | 15.0               | 44.7                       | 1.389                   | 3.777                 | 11.344                 | 0.375                     | 0.785                 | 0.555                  |
| 60.0                                                                   | 15.0               | 59.4                       | 1.425                   | 5.922                 | 12.098                 | 0.341                     | 1.057                 | 0.698                  |
| 75.0                                                                   | 15.1               | 73.6                       | 1.132                   | 6.566                 | 13.615                 | 0.266                     | 1.249                 | 0.924                  |
| 90.0                                                                   | 14.8               | 87.3                       | 0.910                   | 8.780                 | 14.436                 | 0.094                     | 1.409                 | 0.991                  |
| 105.0                                                                  | 14.6               | 101.8                      | 0.661                   | 10.089                | 14.068                 | 0.111                     | 1.603                 | 0.699                  |
| 120.0                                                                  | 14.5               | 115.8                      | 0.701                   | 10.545                | 14.087                 | 0.095                     | 1.762                 | 0.531                  |
| 135.0                                                                  | 14.9               | 133.2                      | 0.384                   | 5.192                 | 10.870                 | 0.079                     | 1.775                 | 0.348                  |
| 150.0                                                                  | 15.0               | 149.1                      | 0.359                   | 4.211                 | 10.381                 | 0.090                     | 1.276                 | 0.238                  |
| 165.0                                                                  | 15.0               | 164.2                      | 0.386                   | 3.527                 | 10.232                 | 0.089                     | 0.732                 | 0.150                  |
| 180.0                                                                  | 15.1               | 179.2                      | 0.483                   | 3.340                 | 10.178                 | 0.095                     | 0.578                 | 0.128                  |
| 195.0                                                                  | 15.0               | 194.5                      | 0.301                   | 4.472                 | 9.973                  | 0.098                     | 0.843                 | 0.105                  |
| 210.0                                                                  | 15.0               | 209.7                      | 0.288                   | 4.401                 | 9.996                  | 0.082                     | 1.217                 | 0.119                  |
| 225.0                                                                  | 15.0               | 226.9                      | 0.679                   | 6.949                 | 12.179                 | 0.086                     | 1.892                 | 0.218                  |
| 240.0                                                                  | 14.4               | 244.9                      | 0.805                   | 9.669                 | 12.811                 | 0.114                     | 1.883                 | 0.463                  |
| 255.0                                                                  | 14.4               | 259.4                      | 1.308                   | 9.846                 | 14.401                 | 0.128                     | 1.801                 | 0.707                  |
| 270.0                                                                  | 14.7               | 273.0                      | 0.616                   | 8.234                 | 14.366                 | 0.087                     | 1.659                 | 1.057                  |
| 285.0                                                                  | 15.2               | 286.3                      | 1.073                   | 6.150                 | 13.399                 | 0.264                     | 1.381                 | 1.046                  |
| 300.0                                                                  | 15.1               | 300.0                      | 1.296                   | 5.657                 | 12.176                 | 0.340                     | 1.092                 | 0.813                  |
| 315.0                                                                  | 15.0               | 314.5                      | 1.462                   | 3.333                 | 11.641                 | 0.376                     | 0.777                 | 0.633                  |
| 330.0                                                                  | 15.0               | 329.5                      | 1.469                   | 2.776                 | 11.485                 | 0.387                     | 0.515                 | 0.539                  |
| 345.0                                                                  | 15.0               | 344.5                      | 1.519                   | 1.941                 | 11.519                 | 0.383                     | 0.311                 | 0.485                  |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                            |                         |                       |                        |                           |                       |                        |

**Table T.19:** Accelerations at Hangar Deck: JONSWAP Spectrum with  $H_s = 6.0$  m and  $T_p = 9.3$  s; Ship's speed is 20.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                            | <b>Absolute Maximum</b> |                       |                        | <b>Standard Deviation</b> |                       |                        |
|------------------------------------------------------------------------|--------------------|----------------------------|-------------------------|-----------------------|------------------------|---------------------------|-----------------------|------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts       | $\psi_{\text{MHP}}$<br>deg | Long<br>$\text{m/s}^2$  | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ | Long<br>$\text{m/s}^2$    | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ |
| 0.0                                                                    | 20.2               | -0.2                       | 1.400                   | 1.898                 | 12.086                 | 0.407                     | 0.253                 | 0.638                  |
| 15.0                                                                   | 20.2               | 14.8                       | 1.472                   | 2.407                 | 11.833                 | 0.409                     | 0.347                 | 0.639                  |
| 30.0                                                                   | 20.2               | 29.8                       | 1.524                   | 3.056                 | 12.086                 | 0.412                     | 0.535                 | 0.681                  |
| 45.0                                                                   | 20.2               | 44.9                       | 1.507                   | 4.453                 | 12.059                 | 0.399                     | 0.764                 | 0.753                  |
| 60.0                                                                   | 20.2               | 59.7                       | 1.235                   | 5.809                 | 12.207                 | 0.357                     | 1.016                 | 0.881                  |
| 75.0                                                                   | 20.3               | 74.2                       | 1.062                   | 6.639                 | 13.574                 | 0.266                     | 1.175                 | 1.052                  |
| 90.0                                                                   | 20.1               | 88.5                       | 0.826                   | 8.455                 | 14.457                 | 0.078                     | 1.348                 | 0.987                  |
| 105.0                                                                  | 20.1               | 103.6                      | 0.572                   | 10.490                | 13.063                 | 0.094                     | 1.649                 | 0.624                  |
| 120.0                                                                  | 20.1               | 118.8                      | 0.311                   | 6.518                 | 11.077                 | 0.068                     | 2.181                 | 0.495                  |
| 135.0                                                                  | 20.1               | 134.5                      | 0.307                   | 5.873                 | 10.520                 | 0.081                     | 1.896                 | 0.301                  |
| 150.0                                                                  | 20.2               | 149.6                      | 0.694                   | 3.933                 | 10.300                 | 0.110                     | 1.169                 | 0.170                  |
| 165.0                                                                  | 20.3               | 164.2                      | 0.670                   | 3.701                 | 10.072                 | 0.115                     | 0.681                 | 0.134                  |
| 180.0                                                                  | 20.6               | 179.6                      | 0.706                   | 3.777                 | 9.975                  | 0.105                     | 0.516                 | 0.101                  |
| 195.0                                                                  | 20.4               | 194.5                      | 0.748                   | 4.642                 | 9.937                  | 0.101                     | 0.919                 | 0.180                  |
| 210.0                                                                  | 20.2               | 210.0                      | 0.618                   | 6.272                 | 9.956                  | 0.095                     | 1.407                 | 0.235                  |
| 225.0                                                                  | 20.1               | 225.4                      | 0.342                   | 5.915                 | 10.593                 | 0.071                     | 1.947                 | 0.254                  |
| 240.0                                                                  | 20.1               | 241.3                      | 0.368                   | 6.735                 | 11.415                 | 0.077                     | 2.385                 | 0.303                  |
| 255.0                                                                  | 19.9               | 257.2                      | 0.864                   | 15.006                | 14.088                 | 0.108                     | 1.949                 | 0.611                  |
| 270.0                                                                  | 20.0               | 271.7                      | 1.329                   | 9.261                 | 14.094                 | 0.084                     | 1.732                 | 1.051                  |
| 285.0                                                                  | 20.3               | 285.8                      | 1.145                   | 6.371                 | 13.730                 | 0.260                     | 1.418                 | 1.167                  |
| 300.0                                                                  | 20.3               | 300.0                      | 1.258                   | 5.176                 | 12.552                 | 0.352                     | 1.082                 | 0.996                  |
| 315.0                                                                  | 20.2               | 314.8                      | 1.435                   | 2.950                 | 12.405                 | 0.396                     | 0.756                 | 0.839                  |
| 330.0                                                                  | 20.2               | 329.8                      | 1.503                   | 2.427                 | 12.129                 | 0.411                     | 0.486                 | 0.741                  |
| 345.0                                                                  | 20.2               | 344.8                      | 1.499                   | 1.738                 | 12.079                 | 0.410                     | 0.303                 | 0.666                  |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                            |                         |                       |                        |                           |                       |                        |

**Table T.20:** Accelerations at Hangar Deck: JONSWAP Spectrum with  $H_s = 6.0$  m and  $T_p = 9.3$  s; Ship's speed is 25.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                            | <b>Absolute Maximum</b> |                       |                        | <b>Standard Deviation</b> |                       |                        |
|------------------------------------------------------------------------|--------------------|----------------------------|-------------------------|-----------------------|------------------------|---------------------------|-----------------------|------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts       | $\psi_{\text{MHP}}$<br>deg | Long<br>$\text{m/s}^2$  | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ | Long<br>$\text{m/s}^2$    | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ |
| 0.0                                                                    | 25.4               | -0.1                       | 1.495                   | 2.297                 | 12.695                 | 0.427                     | 0.283                 | 0.913                  |
| 15.0                                                                   | 25.4               | 14.9                       | 1.512                   | 2.546                 | 12.701                 | 0.428                     | 0.359                 | 0.918                  |
| 30.0                                                                   | 25.4               | 29.9                       | 1.461                   | 3.706                 | 12.605                 | 0.431                     | 0.539                 | 0.958                  |
| 45.0                                                                   | 25.3               | 44.9                       | 1.523                   | 4.639                 | 12.731                 | 0.417                     | 0.757                 | 1.007                  |
| 60.0                                                                   | 25.3               | 59.8                       | 1.262                   | 5.345                 | 12.881                 | 0.369                     | 0.993                 | 1.082                  |
| 75.0                                                                   | 25.3               | 74.4                       | 1.150                   | 8.308                 | 14.319                 | 0.270                     | 1.146                 | 1.180                  |
| 90.0                                                                   | 25.2               | 89.0                       | 1.220                   | 8.467                 | 14.496                 | 0.078                     | 1.326                 | 0.980                  |
| 105.0                                                                  | 25.2               | 104.3                      | 0.597                   | 11.091                | 12.597                 | 0.091                     | 2.066                 | 0.595                  |
| 120.0                                                                  | 25.1               | 119.3                      | 0.426                   | 7.592                 | 11.844                 | 0.087                     | 2.641                 | 0.504                  |
| 135.0                                                                  | 25.1               | 134.7                      | 0.777                   | 5.528                 | 10.329                 | 0.106                     | 1.869                 | 0.255                  |
| 150.0                                                                  | 25.3               | 149.6                      | 0.924                   | 4.082                 | 10.062                 | 0.120                     | 1.023                 | 0.144                  |
| 165.0                                                                  | 25.7               | 164.6                      | 0.783                   | 3.600                 | 9.989                  | 0.115                     | 0.548                 | 0.100                  |
| 180.0                                                                  | 25.5               | 179.7                      | 0.821                   | 4.152                 | 9.976                  | 0.119                     | 0.653                 | 0.139                  |
| 195.0                                                                  | 25.7               | 195.1                      | 0.445                   | 4.073                 | 9.920                  | 0.108                     | 0.690                 | 0.119                  |
| 210.0                                                                  | 25.4               | 210.2                      | 0.780                   | 4.658                 | 9.919                  | 0.112                     | 1.119                 | 0.177                  |
| 225.0                                                                  | 25.0               | 225.8                      | 0.780                   | 7.025                 | 11.027                 | 0.114                     | 2.160                 | 0.366                  |
| 240.0                                                                  | 25.2               | 240.7                      | 0.382                   | 7.493                 | 10.618                 | 0.080                     | 2.948                 | 0.399                  |
| 255.0                                                                  | 25.2               | 256.0                      | 0.494                   | 10.177                | 13.202                 | 0.097                     | 2.115                 | 0.493                  |
| 270.0                                                                  | 25.2               | 271.1                      | 0.962                   | 9.476                 | 13.918                 | 0.079                     | 1.781                 | 1.026                  |
| 285.0                                                                  | 25.4               | 285.6                      | 1.154                   | 7.928                 | 14.465                 | 0.258                     | 1.507                 | 1.281                  |
| 300.0                                                                  | 25.4               | 300.1                      | 1.219                   | 4.505                 | 13.160                 | 0.358                     | 1.116                 | 1.191                  |
| 315.0                                                                  | 25.4               | 314.9                      | 1.390                   | 3.504                 | 12.974                 | 0.410                     | 0.791                 | 1.094                  |
| 330.0                                                                  | 25.4               | 329.9                      | 1.521                   | 2.252                 | 12.980                 | 0.427                     | 0.515                 | 1.014                  |
| 345.0                                                                  | 25.4               | 344.9                      | 1.371                   | 1.977                 | 12.856                 | 0.426                     | 0.337                 | 0.944                  |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                            |                         |                       |                        |                           |                       |                        |

**Table T.21:** Accelerations at Hangar Deck: JONSWAP Spectrum with  $H_s = 6.0$  m and  $T_p = 9.3$  s; Ship's speed is 30.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                            | <b>Absolute Maximum</b> |                       |                        | <b>Standard Deviation</b> |                       |                        |
|------------------------------------------------------------------------|--------------------|----------------------------|-------------------------|-----------------------|------------------------|---------------------------|-----------------------|------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts       | $\psi_{\text{MHP}}$<br>deg | Long<br>$\text{m/s}^2$  | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ | Long<br>$\text{m/s}^2$    | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ |
| 0.0                                                                    | 30.5               | -0.0                       | 1.327                   | 2.287                 | 13.254                 | 0.434                     | 0.336                 | 1.195                  |
| 15.0                                                                   | 30.5               | 14.9                       | 1.439                   | 2.997                 | 13.383                 | 0.438                     | 0.386                 | 1.208                  |
| 30.0                                                                   | 30.5               | 29.9                       | 1.420                   | 4.780                 | 13.168                 | 0.443                     | 0.557                 | 1.248                  |
| 45.0                                                                   | 30.5               | 44.9                       | 1.430                   | 5.633                 | 13.349                 | 0.431                     | 0.770                 | 1.278                  |
| 60.0                                                                   | 30.4               | 59.8                       | 1.446                   | 5.910                 | 13.379                 | 0.381                     | 0.991                 | 1.293                  |
| 75.0                                                                   | 30.4               | 74.5                       | 0.958                   | 7.923                 | 14.385                 | 0.270                     | 1.123                 | 1.286                  |
| 90.0                                                                   | 30.4               | 89.3                       | 0.974                   | 9.280                 | 14.366                 | 0.076                     | 1.367                 | 0.969                  |
| 105.0                                                                  | 30.3               | 104.5                      | 0.525                   | 8.189                 | 11.858                 | 0.091                     | 2.323                 | 0.551                  |
| 120.0                                                                  | 30.1               | 119.4                      | 0.529                   | 7.445                 | 11.060                 | 0.115                     | 2.695                 | 0.456                  |
| 135.0                                                                  | 30.2               | 134.6                      | 0.579                   | 5.535                 | 10.044                 | 0.125                     | 1.744                 | 0.246                  |
| 150.0                                                                  | 31.0               | 149.1                      | 0.658                   | 5.383                 | 9.995                  | 0.133                     | 0.987                 | 0.188                  |
| 165.0                                                                  | 30.1               | 164.8                      | 1.108                   | 4.316                 | 10.166                 | 0.148                     | 0.764                 | 0.166                  |
| 180.0                                                                  | 30.6               | 179.4                      | 1.143                   | 4.624                 | 10.147                 | 0.142                     | 0.906                 | 0.222                  |
| 195.0                                                                  | 30.2               | 194.5                      | 1.184                   | 5.409                 | 10.098                 | 0.154                     | 1.053                 | 0.240                  |
| 210.0                                                                  | 31.1               | 210.4                      | 1.099                   | 6.084                 | 10.084                 | 0.133                     | 1.250                 | 0.190                  |
| 225.0                                                                  | 30.4               | 225.3                      | 0.462                   | 6.354                 | 9.982                  | 0.120                     | 1.653                 | 0.259                  |
| 240.0                                                                  | 29.9               | 241.2                      | 0.706                   | 11.320                | 14.192                 | 0.135                     | 3.210                 | 0.570                  |
| 255.0                                                                  | 30.3               | 255.5                      | 0.443                   | 9.834                 | 12.828                 | 0.098                     | 2.511                 | 0.469                  |
| 270.0                                                                  | 30.4               | 270.7                      | 0.760                   | 9.266                 | 13.957                 | 0.081                     | 1.757                 | 0.998                  |
| 285.0                                                                  | 30.5               | 285.4                      | 1.017                   | 7.088                 | 14.590                 | 0.256                     | 1.630                 | 1.384                  |
| 300.0                                                                  | 30.5               | 300.1                      | 1.266                   | 4.925                 | 13.593                 | 0.366                     | 1.217                 | 1.393                  |
| 315.0                                                                  | 30.5               | 315.1                      | 1.464                   | 3.459                 | 13.876                 | 0.418                     | 0.886                 | 1.357                  |
| 330.0                                                                  | 30.5               | 330.1                      | 1.454                   | 2.620                 | 13.670                 | 0.437                     | 0.578                 | 1.302                  |
| 345.0                                                                  | 30.5               | 345.0                      | 1.382                   | 2.180                 | 13.570                 | 0.438                     | 0.400                 | 1.226                  |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                            |                         |                       |                        |                           |                       |                        |

**Table T.22:** Accelerations at Hangar Deck: JONSWAP Spectrum with  $H_s = 6.0$  m and  $T_p = 13.6$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | -0.1               | -18.5               | 0.871                   | 3.343          | 10.683          | 0.201                     | 0.734          | 0.317           |
| 15.0                                                                   | -0.5               | -12.0               | 1.091                   | 2.965          | 10.811          | 0.202                     | 0.650          | 0.308           |
| 30.0                                                                   | -0.8               | -3.6                | 1.015                   | 3.139          | 10.657          | 0.201                     | 0.690          | 0.304           |
| 45.0                                                                   | -1.2               | -58.6               | 0.797                   | 4.871          | 11.481          | 0.149                     | 1.350          | 0.416           |
| 60.0                                                                   | -0.3               | 32.5                | 0.717                   | 4.607          | 11.150          | 0.190                     | 1.097          | 0.343           |
| 75.0                                                                   | -0.1               | 49.5                | 0.606                   | 5.015          | 11.704          | 0.169                     | 1.295          | 0.387           |
| 90.0                                                                   | 0.2                | 65.1                | 0.527                   | 4.855          | 11.799          | 0.129                     | 1.361          | 0.435           |
| 105.0                                                                  | -0.0               | 88.9                | 0.306                   | 5.254          | 11.822          | 0.034                     | 1.390          | 0.500           |
| 120.0                                                                  | -0.7               | 99.4                | 0.448                   | 5.172          | 11.602          | 0.061                     | 1.398          | 0.493           |
| 135.0                                                                  | -1.3               | 106.4               | 0.481                   | 5.640          | 12.031          | 0.090                     | 1.402          | 0.480           |
| 150.0                                                                  | -1.8               | 109.3               | 0.565                   | 6.295          | 11.634          | 0.106                     | 1.387          | 0.467           |
| 165.0                                                                  | -1.4               | 56.9                | 0.863                   | 4.175          | 11.548          | 0.154                     | 1.169          | 0.397           |
| 180.0                                                                  | -0.9               | 37.8                | 0.999                   | 4.157          | 11.063          | 0.190                     | 0.891          | 0.328           |
| 195.0                                                                  | -0.1               | 374.4               | 0.738                   | 3.768          | 11.028          | 0.191                     | 0.940          | 0.340           |
| 210.0                                                                  | 0.1                | 378.5               | 0.887                   | 4.282          | 11.253          | 0.179                     | 1.079          | 0.373           |
| 225.0                                                                  | 0.3                | 365.6               | 0.744                   | 4.555          | 11.363          | 0.162                     | 1.266          | 0.419           |
| 240.0                                                                  | 0.6                | 277.2               | 0.444                   | 5.643          | 11.807          | 0.062                     | 1.363          | 0.530           |
| 255.0                                                                  | 0.5                | 285.1               | 0.404                   | 5.368          | 12.062          | 0.093                     | 1.345          | 0.512           |
| 270.0                                                                  | 0.5                | 293.6               | 0.500                   | 5.255          | 12.096          | 0.128                     | 1.311          | 0.484           |
| 285.0                                                                  | 0.4                | 300.7               | 0.661                   | 4.938          | 11.725          | 0.152                     | 1.262          | 0.450           |
| 300.0                                                                  | 0.3                | 309.0               | 0.791                   | 4.576          | 11.456          | 0.171                     | 1.230          | 0.417           |
| 315.0                                                                  | 0.2                | 316.0               | 0.791                   | 4.313          | 11.431          | 0.182                     | 1.139          | 0.389           |
| 330.0                                                                  | 0.1                | 324.5               | 0.803                   | 4.432          | 11.021          | 0.191                     | 1.057          | 0.361           |
| 345.0                                                                  | 0.0                | 332.4               | 0.847                   | 3.818          | 10.853          | 0.196                     | 0.891          | 0.338           |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table T.23:** Accelerations at Hangar Deck: JONSWAP Spectrum with  $H_s = 6.0$  m and  $T_p = 13.6$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 4.2                | -12.0               | 1.041                   | 3.282          | 10.734          | 0.235                     | 0.631          | 0.330           |
| 15.0                                                                   | 4.0                | -7.0                | 0.967                   | 3.143          | 10.737          | 0.236                     | 0.605          | 0.323           |
| 30.0                                                                   | 3.9                | 0.5                 | 1.021                   | 2.842          | 10.778          | 0.236                     | 0.620          | 0.320           |
| 45.0                                                                   | 3.9                | 11.1                | 1.035                   | 3.150          | 10.812          | 0.231                     | 0.712          | 0.324           |
| 60.0                                                                   | 4.0                | 29.4                | 0.961                   | 4.329          | 11.211          | 0.219                     | 1.024          | 0.363           |
| 75.0                                                                   | 4.1                | 49.3                | 0.757                   | 5.063          | 11.615          | 0.192                     | 1.237          | 0.411           |
| 90.0                                                                   | 4.2                | 61.7                | 0.613                   | 5.415          | 11.786          | 0.155                     | 1.349          | 0.460           |
| 105.0                                                                  | 4.3                | 78.3                | 0.374                   | 5.010          | 12.122          | 0.076                     | 1.348          | 0.516           |
| 120.0                                                                  | 4.1                | 92.0                | 0.425                   | 5.895          | 12.103          | 0.036                     | 1.336          | 0.519           |
| 135.0                                                                  | 4.0                | 100.0               | 0.456                   | 5.642          | 12.195          | 0.053                     | 1.338          | 0.496           |
| 150.0                                                                  | 3.9                | 53.6                | 0.865                   | 4.360          | 11.795          | 0.185                     | 1.217          | 0.411           |
| 165.0                                                                  | 4.0                | 54.1                | 0.834                   | 3.899          | 11.534          | 0.193                     | 1.163          | 0.399           |
| 180.0                                                                  | 4.0                | 63.4                | 0.722                   | 4.364          | 11.608          | 0.191                     | 1.186          | 0.394           |
| 195.0                                                                  | 4.7                | 195.6               | 0.551                   | 2.786          | 10.849          | 0.129                     | 0.667          | 0.215           |
| 210.0                                                                  | 4.4                | 219.3               | 0.609                   | 3.562          | 11.008          | 0.122                     | 0.943          | 0.265           |
| 225.0                                                                  | 4.3                | 251.8               | 0.474                   | 6.052          | 11.391          | 0.084                     | 1.288          | 0.435           |
| 240.0                                                                  | 4.3                | 260.6               | 0.437                   | 5.132          | 11.562          | 0.060                     | 1.337          | 0.492           |
| 255.0                                                                  | 4.4                | 270.2               | 0.326                   | 5.099          | 11.692          | 0.038                     | 1.360          | 0.541           |
| 270.0                                                                  | 4.6                | 280.1               | 0.358                   | 6.521          | 12.067          | 0.066                     | 1.342          | 0.557           |
| 285.0                                                                  | 4.8                | 290.4               | 0.613                   | 5.255          | 12.135          | 0.126                     | 1.298          | 0.523           |
| 300.0                                                                  | 4.9                | 302.4               | 0.668                   | 4.111          | 11.359          | 0.179                     | 1.192          | 0.456           |
| 315.0                                                                  | 4.8                | 314.6               | 0.905                   | 3.710          | 11.182          | 0.208                     | 1.033          | 0.399           |
| 330.0                                                                  | 4.8                | 327.8               | 0.819                   | 3.956          | 10.918          | 0.223                     | 0.861          | 0.366           |
| 345.0                                                                  | 4.5                | 339.9               | 0.994                   | 3.044          | 10.772          | 0.232                     | 0.692          | 0.344           |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |



**Table T.24:** Accelerations at Hangar Deck: JONSWAP Spectrum with  $H_s = 6.0$  m and  $T_p = 13.6$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 9.8                | -1.3                | 1.152                   | 1.881          | 10.863          | 0.266                     | 0.249          | 0.354           |
| 15.0                                                                   | 9.8                | 13.7                | 1.349                   | 2.183          | 10.920          | 0.263                     | 0.443          | 0.355           |
| 30.0                                                                   | 9.8                | 28.7                | 1.232                   | 3.169          | 10.970          | 0.251                     | 0.708          | 0.365           |
| 45.0                                                                   | 9.9                | 43.8                | 0.887                   | 3.633          | 11.064          | 0.230                     | 0.926          | 0.393           |
| 60.0                                                                   | 9.9                | 58.5                | 0.652                   | 4.734          | 11.427          | 0.191                     | 1.107          | 0.462           |
| 75.0                                                                   | 10.0               | 73.1                | 0.546                   | 4.870          | 12.490          | 0.111                     | 1.137          | 0.542           |
| 90.0                                                                   | 9.9                | 87.8                | 0.139                   | 4.976          | 12.248          | 0.026                     | 1.171          | 0.553           |
| 105.0                                                                  | 9.9                | 102.5               | 0.261                   | 5.333          | 12.063          | 0.047                     | 1.173          | 0.485           |
| 120.0                                                                  | 9.5                | 116.3               | 0.361                   | 5.106          | 11.543          | 0.072                     | 1.168          | 0.412           |
| 135.0                                                                  | 9.5                | 131.2               | 0.446                   | 4.490          | 11.446          | 0.082                     | 1.054          | 0.332           |
| 150.0                                                                  | 9.6                | 147.0               | 0.401                   | 4.044          | 10.691          | 0.088                     | 0.999          | 0.269           |
| 165.0                                                                  | 9.7                | 162.7               | 0.489                   | 3.466          | 10.598          | 0.092                     | 0.916          | 0.226           |
| 180.0                                                                  | 9.8                | 178.5               | 0.488                   | 3.155          | 10.497          | 0.094                     | 0.738          | 0.188           |
| 195.0                                                                  | 9.9                | 194.5               | 0.530                   | 2.836          | 10.712          | 0.094                     | 0.658          | 0.152           |
| 210.0                                                                  | 9.9                | 210.9               | 0.417                   | 2.984          | 10.560          | 0.092                     | 0.969          | 0.176           |
| 225.0                                                                  | 9.7                | 227.5               | 0.475                   | 3.714          | 11.066          | 0.088                     | 1.210          | 0.237           |
| 240.0                                                                  | 9.6                | 243.5               | 0.434                   | 4.488          | 11.475          | 0.080                     | 1.361          | 0.335           |
| 255.0                                                                  | 9.8                | 257.7               | 0.338                   | 5.563          | 11.613          | 0.057                     | 1.384          | 0.440           |
| 270.0                                                                  | 10.0               | 272.0               | 0.162                   | 5.625          | 12.192          | 0.028                     | 1.368          | 0.555           |
| 285.0                                                                  | 10.1               | 286.1               | 0.493                   | 5.260          | 12.342          | 0.105                     | 1.261          | 0.575           |
| 300.0                                                                  | 10.1               | 300.2               | 0.696                   | 4.408          | 11.905          | 0.188                     | 1.120          | 0.506           |
| 315.0                                                                  | 10.0               | 314.4               | 0.820                   | 3.644          | 11.111          | 0.229                     | 0.892          | 0.420           |
| 330.0                                                                  | 9.9                | 329.0               | 1.010                   | 2.877          | 11.163          | 0.250                     | 0.643          | 0.384           |
| 345.0                                                                  | 9.9                | 343.8               | 1.090                   | 2.382          | 10.851          | 0.262                     | 0.375          | 0.366           |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table T.25:** Accelerations at Hangar Deck: JONSWAP Spectrum with  $H_s = 6.0$  m and  $T_p = 13.6$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 15.0               | -0.5                | 1.223                   | 1.577          | 10.964          | 0.295                     | 0.201          | 0.391           |
| 15.0                                                                   | 15.0               | 14.6                | 1.154                   | 2.251          | 10.953          | 0.290                     | 0.403          | 0.384           |
| 30.0                                                                   | 15.0               | 29.7                | 1.145                   | 2.818          | 11.071          | 0.275                     | 0.648          | 0.396           |
| 45.0                                                                   | 15.1               | 44.7                | 0.915                   | 3.623          | 11.373          | 0.250                     | 0.858          | 0.434           |
| 60.0                                                                   | 15.1               | 59.5                | 0.728                   | 4.437          | 11.677          | 0.204                     | 1.049          | 0.522           |
| 75.0                                                                   | 15.2               | 74.2                | 0.449                   | 4.416          | 12.103          | 0.111                     | 1.039          | 0.581           |
| 90.0                                                                   | 15.2               | 89.0                | 0.125                   | 4.866          | 12.191          | 0.033                     | 1.073          | 0.551           |
| 105.0                                                                  | 15.2               | 104.0               | 0.298                   | 5.477          | 12.100          | 0.048                     | 1.125          | 0.459           |
| 120.0                                                                  | 15.0               | 118.3               | 0.288                   | 5.612          | 11.288          | 0.062                     | 1.371          | 0.418           |
| 135.0                                                                  | 15.0               | 133.7               | 0.316                   | 4.581          | 10.849          | 0.068                     | 1.437          | 0.343           |
| 150.0                                                                  | 15.3               | 149.5               | 0.263                   | 3.133          | 10.345          | 0.064                     | 0.882          | 0.216           |
| 165.0                                                                  | 15.2               | 164.4               | 0.340                   | 2.412          | 10.321          | 0.066                     | 0.512          | 0.177           |
| 180.0                                                                  | 15.2               | 179.3               | 0.323                   | 2.783          | 10.168          | 0.077                     | 0.463          | 0.163           |
| 195.0                                                                  | 15.1               | 194.5               | 0.341                   | 3.855          | 10.079          | 0.066                     | 0.595          | 0.136           |
| 210.0                                                                  | 15.1               | 209.9               | 0.437                   | 4.191          | 10.414          | 0.070                     | 1.057          | 0.131           |
| 225.0                                                                  | 15.0               | 225.9               | 0.425                   | 4.224          | 11.007          | 0.070                     | 1.526          | 0.186           |
| 240.0                                                                  | 15.0               | 241.5               | 0.334                   | 4.941          | 11.339          | 0.067                     | 1.646          | 0.273           |
| 255.0                                                                  | 15.1               | 256.2               | 0.325                   | 4.996          | 12.070          | 0.057                     | 1.482          | 0.380           |
| 270.0                                                                  | 15.2               | 270.9               | 0.161                   | 5.391          | 11.904          | 0.037                     | 1.404          | 0.536           |
| 285.0                                                                  | 15.2               | 285.4               | 0.413                   | 5.375          | 11.974          | 0.105                     | 1.269          | 0.616           |
| 300.0                                                                  | 15.2               | 299.9               | 0.707                   | 4.841          | 11.769          | 0.201                     | 1.070          | 0.588           |
| 315.0                                                                  | 15.1               | 314.5               | 0.900                   | 3.321          | 11.466          | 0.249                     | 0.782          | 0.488           |
| 330.0                                                                  | 15.0               | 329.4               | 1.068                   | 2.604          | 11.089          | 0.274                     | 0.534          | 0.432           |
| 345.0                                                                  | 15.0               | 344.4               | 1.279                   | 2.008          | 10.984          | 0.289                     | 0.295          | 0.403           |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table T.26:** Accelerations at Hangar Deck: JONSWAP Spectrum with  $H_s = 6.0$  m and  $T_p = 13.6$  s; Ship's speed is 20.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 20.2               | -0.2                | 1.282                   | 1.916          | 11.417          | 0.317                     | 0.221          | 0.499           |
| 15.0                                                                   | 20.2               | 14.9                | 1.280                   | 2.319          | 11.359          | 0.312                     | 0.406          | 0.492           |
| 30.0                                                                   | 20.2               | 29.9                | 1.196                   | 2.818          | 11.527          | 0.296                     | 0.635          | 0.505           |
| 45.0                                                                   | 20.2               | 45.0                | 1.010                   | 3.590          | 11.489          | 0.267                     | 0.845          | 0.547           |
| 60.0                                                                   | 20.3               | 59.8                | 0.770                   | 4.571          | 12.349          | 0.216                     | 1.036          | 0.618           |
| 75.0                                                                   | 20.3               | 74.6                | 0.469                   | 4.281          | 12.315          | 0.116                     | 0.993          | 0.626           |
| 90.0                                                                   | 20.3               | 89.5                | 0.161                   | 4.669          | 12.250          | 0.042                     | 1.018          | 0.542           |
| 105.0                                                                  | 20.3               | 104.5               | 0.310                   | 5.529          | 11.570          | 0.055                     | 1.121          | 0.430           |
| 120.0                                                                  | 20.2               | 119.3               | 0.362                   | 6.247          | 11.367          | 0.065                     | 1.666          | 0.410           |
| 135.0                                                                  | 20.2               | 134.7               | 0.328                   | 4.816          | 10.683          | 0.069                     | 1.610          | 0.287           |
| 150.0                                                                  | 20.3               | 149.7               | 0.256                   | 2.879          | 10.115          | 0.063                     | 0.727          | 0.154           |
| 165.0                                                                  | 20.2               | 164.6               | 0.233                   | 2.496          | 10.121          | 0.071                     | 0.461          | 0.131           |
| 180.0                                                                  | 20.4               | 179.8               | 0.362                   | 3.529          | 10.076          | 0.078                     | 0.402          | 0.119           |
| 195.0                                                                  | 20.3               | 194.9               | 0.381                   | 5.037          | 10.104          | 0.087                     | 0.836          | 0.154           |
| 210.0                                                                  | 20.3               | 210.0               | 0.286                   | 5.879          | 9.989           | 0.067                     | 1.085          | 0.163           |
| 225.0                                                                  | 20.3               | 225.0               | 0.366                   | 5.831          | 10.146          | 0.055                     | 1.361          | 0.183           |
| 240.0                                                                  | 20.2               | 240.7               | 0.451                   | 6.157          | 11.069          | 0.070                     | 1.937          | 0.236           |
| 255.0                                                                  | 20.3               | 255.6               | 0.317                   | 6.447          | 11.561          | 0.060                     | 1.521          | 0.327           |
| 270.0                                                                  | 20.3               | 270.4               | 0.212                   | 5.538          | 11.915          | 0.047                     | 1.397          | 0.513           |
| 285.0                                                                  | 20.3               | 285.2               | 0.405                   | 6.423          | 12.090          | 0.108                     | 1.258          | 0.660           |
| 300.0                                                                  | 20.3               | 299.9               | 0.736                   | 4.743          | 11.785          | 0.209                     | 1.032          | 0.696           |
| 315.0                                                                  | 20.2               | 314.6               | 0.924                   | 3.564          | 11.605          | 0.264                     | 0.742          | 0.615           |
| 330.0                                                                  | 20.2               | 329.6               | 1.184                   | 2.627          | 11.585          | 0.295                     | 0.472          | 0.555           |
| 345.0                                                                  | 20.2               | 344.7               | 1.336                   | 2.010          | 11.579          | 0.311                     | 0.269          | 0.516           |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table T.27:** Accelerations at Hangar Deck: JONSWAP Spectrum with  $H_s = 6.0$  m and  $T_p = 13.6$  s; Ship's speed is 25.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 25.3               | -0.1                | 1.439                   | 2.178          | 12.448          | 0.337                     | 0.266          | 0.681           |
| 15.0                                                                   | 25.3               | 15.0                | 1.423                   | 2.503          | 12.081          | 0.332                     | 0.418          | 0.675           |
| 30.0                                                                   | 25.3               | 30.0                | 1.396                   | 3.335          | 12.066          | 0.314                     | 0.628          | 0.683           |
| 45.0                                                                   | 25.3               | 45.0                | 1.228                   | 3.794          | 12.052          | 0.283                     | 0.835          | 0.707           |
| 60.0                                                                   | 25.4               | 59.9                | 0.813                   | 4.967          | 12.667          | 0.228                     | 1.047          | 0.744           |
| 75.0                                                                   | 25.4               | 74.8                | 0.422                   | 4.411          | 12.561          | 0.120                     | 0.961          | 0.671           |
| 90.0                                                                   | 25.4               | 89.7                | 0.198                   | 4.552          | 12.227          | 0.050                     | 1.005          | 0.529           |
| 105.0                                                                  | 25.4               | 104.7               | 0.275                   | 5.612          | 11.393          | 0.064                     | 1.152          | 0.396           |
| 120.0                                                                  | 25.3               | 119.8               | 0.329                   | 6.304          | 10.516          | 0.080                     | 2.169          | 0.393           |
| 135.0                                                                  | 25.3               | 134.8               | 0.301                   | 5.141          | 10.244          | 0.086                     | 1.531          | 0.225           |
| 150.0                                                                  | 25.4               | 149.7               | 0.275                   | 3.136          | 9.988           | 0.084                     | 0.931          | 0.138           |
| 165.0                                                                  | 25.6               | 164.7               | 0.355                   | 2.667          | 10.023          | 0.098                     | 0.529          | 0.114           |
| 180.0                                                                  | 25.6               | 179.8               | 0.390                   | 3.382          | 10.115          | 0.106                     | 0.406          | 0.111           |
| 195.0                                                                  | 25.6               | 195.0               | 0.358                   | 3.742          | 10.033          | 0.095                     | 0.563          | 0.115           |
| 210.0                                                                  | 25.4               | 210.0               | 0.291                   | 4.378          | 9.973           | 0.068                     | 0.911          | 0.164           |
| 225.0                                                                  | 25.4               | 225.0               | 0.212                   | 5.532          | 9.983           | 0.057                     | 1.304          | 0.219           |
| 240.0                                                                  | 25.4               | 240.2               | 0.263                   | 7.299          | 9.939           | 0.066                     | 2.012          | 0.257           |
| 255.0                                                                  | 25.4               | 255.3               | 0.348                   | 7.413          | 11.402          | 0.066                     | 1.519          | 0.283           |
| 270.0                                                                  | 25.4               | 270.2               | 0.234                   | 5.676          | 12.036          | 0.056                     | 1.360          | 0.491           |
| 285.0                                                                  | 25.4               | 285.1               | 0.395                   | 6.447          | 12.345          | 0.111                     | 1.238          | 0.712           |
| 300.0                                                                  | 25.4               | 299.9               | 0.894                   | 4.569          | 12.701          | 0.218                     | 1.008          | 0.814           |
| 315.0                                                                  | 25.4               | 314.8               | 1.078                   | 3.382          | 12.229          | 0.277                     | 0.699          | 0.773           |
| 330.0                                                                  | 25.3               | 329.8               | 1.307                   | 2.869          | 12.043          | 0.311                     | 0.464          | 0.734           |
| 345.0                                                                  | 25.3               | 344.8               | 1.424                   | 2.337          | 12.369          | 0.332                     | 0.285          | 0.701           |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table T.28:** Accelerations at Hangar Deck: JONSWAP Spectrum with  $H_s = 6.0$  m and  $T_p = 13.6$  s; Ship's speed is 30.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 30.5               | -0.0                | 1.590                   | 2.460          | 13.271          | 0.353                     | 0.321          | 0.905           |
| 15.0                                                                   | 30.5               | 15.0                | 1.582                   | 2.777          | 12.748          | 0.347                     | 0.438          | 0.896           |
| 30.0                                                                   | 30.4               | 30.1                | 1.408                   | 3.296          | 12.550          | 0.330                     | 0.624          | 0.886           |
| 45.0                                                                   | 30.4               | 45.1                | 1.219                   | 4.046          | 12.612          | 0.294                     | 0.845          | 0.883           |
| 60.0                                                                   | 30.4               | 60.0                | 0.872                   | 4.743          | 12.920          | 0.237                     | 1.061          | 0.872           |
| 75.0                                                                   | 30.5               | 74.9                | 0.434                   | 4.486          | 12.834          | 0.126                     | 0.959          | 0.742           |
| 90.0                                                                   | 30.5               | 89.8                | 0.234                   | 4.636          | 12.022          | 0.059                     | 1.028          | 0.516           |
| 105.0                                                                  | 30.5               | 104.8               | 0.337                   | 5.333          | 11.272          | 0.077                     | 1.261          | 0.365           |
| 120.0                                                                  | 30.3               | 119.9               | 0.497                   | 6.690          | 10.075          | 0.100                     | 2.308          | 0.360           |
| 135.0                                                                  | 30.4               | 134.8               | 0.408                   | 5.173          | 9.990           | 0.107                     | 1.559          | 0.206           |
| 150.0                                                                  | 30.7               | 149.7               | 0.424                   | 3.347          | 9.996           | 0.127                     | 0.967          | 0.152           |
| 165.0                                                                  | 31.0               | 164.7               | 0.539                   | 3.609          | 10.007          | 0.143                     | 0.587          | 0.111           |
| 180.0                                                                  | 30.6               | 179.7               | 0.633                   | 3.998          | 9.957           | 0.158                     | 0.585          | 0.120           |
| 195.0                                                                  | 31.0               | 195.0               | 0.485                   | 4.040          | 10.033          | 0.131                     | 0.700          | 0.119           |
| 210.0                                                                  | 30.7               | 210.2               | 0.537                   | 4.908          | 9.982           | 0.117                     | 1.041          | 0.176           |
| 225.0                                                                  | 30.4               | 225.2               | 0.426                   | 5.859          | 10.039          | 0.100                     | 1.568          | 0.293           |
| 240.0                                                                  | 30.4               | 240.2               | 0.470                   | 7.835          | 9.915           | 0.087                     | 2.185          | 0.361           |
| 255.0                                                                  | 30.5               | 255.2               | 0.336                   | 8.389          | 11.509          | 0.077                     | 1.478          | 0.259           |
| 270.0                                                                  | 30.5               | 270.1               | 0.267                   | 5.535          | 11.841          | 0.065                     | 1.271          | 0.473           |
| 285.0                                                                  | 30.5               | 285.1               | 0.460                   | 6.992          | 12.548          | 0.115                     | 1.197          | 0.763           |
| 300.0                                                                  | 30.5               | 299.9               | 0.780                   | 5.244          | 12.946          | 0.226                     | 0.980          | 0.943           |
| 315.0                                                                  | 30.5               | 314.9               | 1.184                   | 4.006          | 12.708          | 0.287                     | 0.706          | 0.944           |
| 330.0                                                                  | 30.5               | 329.9               | 1.325                   | 3.140          | 12.808          | 0.326                     | 0.485          | 0.934           |
| 345.0                                                                  | 30.4               | 344.9               | 1.430                   | 2.719          | 12.814          | 0.345                     | 0.362          | 0.916           |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table T.29:** Accelerations at Hangar Deck: JONSWAP Spectrum with  $H_s = 9.0$  m and  $T_p = 11.0$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | -0.9               | -27.2               | 1.828                   | 12.006         | 14.694          | 0.372                     | 1.456          | 0.615           |
| 15.0                                                                   | -1.4               | -21.1               | 1.738                   | 8.146          | 12.383          | 0.366                     | 1.428          | 0.583           |
| 30.0                                                                   | -3.4               | 33.0                | 1.850                   | 12.977         | 14.196          | 0.321                     | 2.138          | 0.821           |
| 45.0                                                                   | -4.5               | -99.2               | 1.765                   | 12.214         | 14.622          | 0.306                     | 2.239          | 0.900           |
| 60.0                                                                   | -5.1               | -111.1              | 2.012                   | 13.695         | 14.601          | 0.293                     | 2.363          | 1.026           |
| 75.0                                                                   | -0.6               | -51.8               | 1.884                   | 13.247         | 15.029          | 0.281                     | 2.525          | 0.997           |
| 90.0                                                                   | 0.2                | 7.1                 | 2.044                   | 17.691         | 15.009          | 0.315                     | 2.535          | 0.916           |
| 105.0                                                                  | 0.4                | 50.3                | 1.985                   | 14.773         | 15.244          | 0.303                     | 2.421          | 0.931           |
| 120.0                                                                  | -0.6               | 93.8                | 3.434                   | 13.725         | 15.598          | 0.232                     | 2.503          | 1.057           |
| 135.0                                                                  | -3.6               | 82.6                | 2.628                   | 12.122         | 14.092          | 0.285                     | 2.524          | 0.993           |
| 150.0                                                                  | -3.7               | 46.3                | 1.948                   | 12.265         | 14.628          | 0.325                     | 2.279          | 0.817           |
| 165.0                                                                  | -2.8               | 41.1                | 1.859                   | 13.227         | 13.454          | 0.337                     | 1.943          | 0.717           |
| 180.0                                                                  | -1.1               | 19.7                | 1.623                   | 14.659         | 14.632          | 0.363                     | 1.667          | 0.641           |
| 195.0                                                                  | -0.6               | 31.3                | 1.715                   | 7.306          | 13.367          | 0.365                     | 1.676          | 0.667           |
| 210.0                                                                  | 0.3                | 36.8                | 1.661                   | 8.506          | 13.175          | 0.365                     | 1.755          | 0.698           |
| 225.0                                                                  | 0.9                | 387.4               | 1.705                   | 13.702         | 13.988          | 0.349                     | 1.976          | 0.777           |
| 240.0                                                                  | 0.8                | 281.2               | 1.970                   | 17.754         | 14.506          | 0.261                     | 2.491          | 1.022           |
| 255.0                                                                  | 0.6                | 284.9               | 2.894                   | 18.844         | 15.001          | 0.295                     | 2.439          | 1.007           |
| 270.0                                                                  | -2.0               | 276.9               | 2.161                   | 10.651         | 13.714          | 0.638                     | 3.307          | 1.524           |
| 285.0                                                                  | 0.2                | 292.5               | 1.806                   | 13.959         | 14.917          | 0.334                     | 2.170          | 0.882           |
| 300.0                                                                  | -0.9               | -202.8              | 4.858                   | 20.675         | 14.950          | 0.368                     | 2.231          | 0.914           |
| 315.0                                                                  | 0.3                | 306.3               | 2.568                   | 10.569         | 14.658          | 0.368                     | 1.873          | 0.755           |
| 330.0                                                                  | 0.4                | 314.6               | 1.570                   | 8.692          | 14.137          | 0.378                     | 1.707          | 0.705           |
| 345.0                                                                  | 0.0                | 322.0               | 1.650                   | 8.818          | 12.606          | 0.372                     | 1.530          | 0.647           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table T.30:** Accelerations at Hangar Deck: JONSWAP Spectrum with  $H_s = 9.0$  m and  $T_p = 11.0$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 3.6                | -26.8               | 1.919                   | 6.390          | 11.725          | 0.426                     | 1.298          | 0.624           |
| 15.0                                                                   | 3.5                | -19.4               | 1.856                   | 5.651          | 11.507          | 0.427                     | 1.166          | 0.594           |
| 30.0                                                                   | 3.3                | -13.2               | 1.946                   | 4.606          | 11.313          | 0.431                     | 1.040          | 0.572           |
| 45.0                                                                   | 3.0                | -8.2                | 1.802                   | 5.120          | 11.548          | 0.425                     | 1.112          | 0.570           |
| 60.0                                                                   | 2.9                | 2.2                 | 2.241                   | 4.854          | 11.481          | 0.417                     | 1.212          | 0.570           |
| 75.0                                                                   | 2.7                | 8.1                 | 1.703                   | 7.025          | 11.989          | 0.412                     | 1.434          | 0.602           |
| 90.0                                                                   | 2.9                | 14.0                | 1.913                   | 14.826         | 14.564          | 0.397                     | 1.660          | 0.670           |
| 105.0                                                                  | 3.1                | 24.7                | 1.806                   | 12.138         | 13.911          | 0.387                     | 1.659          | 0.694           |
| 120.0                                                                  | 3.1                | 21.7                | 1.894                   | 12.752         | 15.499          | 0.410                     | 1.434          | 0.670           |
| 135.0                                                                  | 3.1                | 26.2                | 1.955                   | 12.658         | 14.173          | 0.408                     | 1.389          | 0.669           |
| 150.0                                                                  | 3.2                | 33.4                | 1.834                   | 7.871          | 12.535          | 0.406                     | 1.436          | 0.649           |
| 165.0                                                                  | 3.3                | 38.7                | 1.774                   | 7.415          | 12.314          | 0.404                     | 1.490          | 0.658           |
| 180.0                                                                  | 3.9                | 146.8               | 1.587                   | 7.720          | 13.901          | 0.276                     | 1.462          | 0.448           |
| 195.0                                                                  | 3.7                | 23.7                | 1.973                   | 7.648          | 13.328          | 0.407                     | 1.581          | 0.663           |
| 210.0                                                                  | 3.8                | 388.6               | 3.788                   | 6.431          | 12.984          | 0.407                     | 1.718          | 0.704           |
| 225.0                                                                  | 4.2                | 359.3               | 1.684                   | 15.048         | 15.152          | 0.368                     | 2.028          | 0.818           |
| 240.0                                                                  | 4.4                | 283.9               | 1.619                   | 17.601         | 15.159          | 0.271                     | 2.359          | 1.047           |
| 255.0                                                                  | 4.1                | 286.1               | 3.567                   | 15.641         | 15.219          | 0.314                     | 2.370          | 1.060           |
| 270.0                                                                  | 4.0                | 291.3               | 2.868                   | 14.426         | 15.236          | 0.351                     | 2.174          | 0.994           |
| 285.0                                                                  | 4.2                | 295.7               | 3.392                   | 10.273         | 15.163          | 0.374                     | 2.018          | 0.916           |
| 300.0                                                                  | 4.4                | 301.0               | 4.232                   | 8.643          | 13.691          | 0.386                     | 1.852          | 0.811           |
| 315.0                                                                  | 4.3                | 310.6               | 1.632                   | 7.423          | 13.556          | 0.397                     | 1.713          | 0.751           |
| 330.0                                                                  | 4.1                | 318.7               | 1.710                   | 8.385          | 12.752          | 0.414                     | 1.532          | 0.696           |
| 345.0                                                                  | 3.8                | 324.2               | 1.800                   | 7.033          | 13.013          | 0.421                     | 1.491          | 0.667           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table T.31:** Accelerations at Hangar Deck: JONSWAP Spectrum with  $H_s = 9.0$  m and  $T_p = 11.0$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 8.8                | -5.3                | 2.354                   | 4.692          | 11.476          | 0.484                     | 0.754          | 0.611           |
| 15.0                                                                   | 8.4                | 6.8                 | 2.519                   | 3.820          | 11.336          | 0.481                     | 0.866          | 0.598           |
| 30.0                                                                   | 8.0                | 16.1                | 2.437                   | 4.737          | 11.517          | 0.472                     | 1.048          | 0.597           |
| 45.0                                                                   | 8.0                | 30.6                | 2.010                   | 6.839          | 11.664          | 0.451                     | 1.306          | 0.633           |
| 60.0                                                                   | 8.4                | 49.7                | 1.661                   | 7.118          | 12.915          | 0.409                     | 1.703          | 0.741           |
| 75.0                                                                   | 8.3                | 59.0                | 2.328                   | 14.134         | 14.705          | 0.379                     | 1.876          | 0.857           |
| 90.0                                                                   | 8.6                | 73.9                | 2.630                   | 10.833         | 15.410          | 0.289                     | 2.109          | 1.079           |
| 105.0                                                                  | 8.5                | 82.1                | 2.289                   | 16.548         | 15.655          | 0.192                     | 2.334          | 1.195           |
| 120.0                                                                  | 8.3                | 92.0                | 1.282                   | 20.087         | 15.127          | 0.149                     | 2.363          | 1.122           |
| 135.0                                                                  | 8.1                | 99.6                | 1.308                   | 16.805         | 14.610          | 0.151                     | 2.353          | 1.054           |
| 150.0                                                                  | 8.1                | 87.4                | 1.537                   | 15.660         | 15.258          | 0.276                     | 2.192          | 0.971           |
| 165.0                                                                  | 8.1                | 125.9               | 2.749                   | 9.082          | 14.152          | 0.234                     | 1.819          | 0.617           |
| 180.0                                                                  | 9.1                | 174.8               | 0.740                   | 5.124          | 10.845          | 0.161                     | 1.348          | 0.304           |
| 195.0                                                                  | 9.6                | 195.2               | 0.833                   | 5.008          | 10.996          | 0.163                     | 1.199          | 0.210           |
| 210.0                                                                  | 8.5                | 274.0               | 1.876                   | 19.204         | 15.342          | 0.220                     | 2.564          | 1.129           |
| 225.0                                                                  | 8.3                | 275.4               | 1.876                   | 19.629         | 14.995          | 0.217                     | 2.573          | 1.146           |
| 240.0                                                                  | 8.3                | 276.6               | 2.424                   | 19.233         | 14.934          | 0.215                     | 2.589          | 1.161           |
| 255.0                                                                  | 8.4                | 280.1               | 2.124                   | 15.575         | 15.447          | 0.237                     | 2.447          | 1.173           |
| 270.0                                                                  | 8.5                | 283.8               | 2.878                   | 15.662         | 16.255          | 0.281                     | 2.349          | 1.175           |
| 285.0                                                                  | 9.4                | 289.4               | 3.399                   | 10.546         | 14.177          | 0.336                     | 2.151          | 1.072           |
| 300.0                                                                  | 9.7                | 300.2               | 1.457                   | 7.719          | 13.520          | 0.392                     | 1.793          | 0.888           |
| 315.0                                                                  | 9.5                | 313.0               | 1.975                   | 6.447          | 12.495          | 0.436                     | 1.502          | 0.756           |
| 330.0                                                                  | 9.3                | 327.3               | 2.114                   | 5.687          | 11.779          | 0.467                     | 1.120          | 0.690           |
| 345.0                                                                  | 9.1                | 341.2               | 2.323                   | 5.332          | 11.368          | 0.480                     | 0.913          | 0.646           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |



**Table T.32:** Accelerations at Hangar Deck: JONSWAP Spectrum with  $H_s = 9.0$  m and  $T_p = 11.0$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 14.7               | -1.3                | 2.175                   | 3.318          | 11.795          | 0.522                     | 0.590          | 0.692           |
| 15.0                                                                   | 14.7               | 13.8                | 2.225                   | 3.741          | 11.687          | 0.517                     | 0.738          | 0.675           |
| 30.0                                                                   | 14.6               | 29.0                | 2.034                   | 5.503          | 11.609          | 0.501                     | 1.029          | 0.691           |
| 45.0                                                                   | 14.7               | 44.2                | 1.957                   | 6.484          | 12.025          | 0.464                     | 1.341          | 0.746           |
| 60.0                                                                   | 14.8               | 58.9                | 1.579                   | 9.285          | 13.542          | 0.406                     | 1.680          | 0.892           |
| 75.0                                                                   | 14.6               | 71.8                | 4.051                   | 9.708          | 16.287          | 0.341                     | 1.875          | 1.149           |
| 90.0                                                                   | 14.4               | 86.4                | 1.197                   | 11.147         | 16.090          | 0.135                     | 2.183          | 1.254           |
| 105.0                                                                  | 14.4               | 101.2               | 1.515                   | 12.714         | 15.965          | 0.131                     | 2.184          | 0.991           |
| 120.0                                                                  | 14.2               | 115.1               | 1.270                   | 12.033         | 13.855          | 0.138                     | 2.126          | 0.754           |
| 135.0                                                                  | 14.4               | 130.4               | 1.699                   | 17.730         | 13.677          | 0.126                     | 2.049          | 0.608           |
| 150.0                                                                  | 14.8               | 148.0               | 0.734                   | 5.561          | 11.439          | 0.113                     | 1.406          | 0.391           |
| 165.0                                                                  | 14.7               | 162.9               | 0.523                   | 4.667          | 10.528          | 0.126                     | 1.036          | 0.328           |
| 180.0                                                                  | 14.6               | 178.3               | 0.653                   | 4.948          | 10.408          | 0.133                     | 0.916          | 0.260           |
| 195.0                                                                  | 14.8               | 193.9               | 0.557                   | 5.574          | 10.109          | 0.120                     | 1.076          | 0.233           |
| 210.0                                                                  | 14.8               | 209.8               | 0.856                   | 6.720          | 10.866          | 0.123                     | 1.514          | 0.232           |
| 225.0                                                                  | 14.1               | 234.1               | 1.581                   | 15.747         | 14.078          | 0.168                     | 2.491          | 0.615           |
| 240.0                                                                  | 13.4               | 253.5               | 0.858                   | 15.732         | 14.154          | 0.158                     | 2.680          | 0.824           |
| 255.0                                                                  | 13.3               | 265.5               | 2.269                   | 16.481         | 15.806          | 0.163                     | 2.736          | 1.056           |
| 270.0                                                                  | 13.9               | 276.0               | 1.866                   | 19.017         | 14.984          | 0.175                     | 2.648          | 1.257           |
| 285.0                                                                  | 14.8               | 287.1               | 2.864                   | 8.872          | 14.932          | 0.316                     | 2.228          | 1.224           |
| 300.0                                                                  | 15.0               | 299.9               | 1.668                   | 8.189          | 14.242          | 0.405                     | 1.749          | 1.022           |
| 315.0                                                                  | 14.8               | 314.0               | 1.747                   | 7.587          | 12.362          | 0.464                     | 1.334          | 0.862           |
| 330.0                                                                  | 14.7               | 328.7               | 2.059                   | 5.646          | 12.059          | 0.501                     | 0.970          | 0.775           |
| 345.0                                                                  | 14.7               | 343.6               | 2.031                   | 3.796          | 11.983          | 0.516                     | 0.685          | 0.722           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table T.33:** Accelerations at Hangar Deck: JONSWAP Spectrum with  $H_s = 9.0$  m and  $T_p = 11.0$  s; Ship's speed is 20.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                            | <b>Absolute Maximum</b> |                       |                        | <b>Standard Deviation</b> |                       |                        |
|------------------------------------------------------------------------|--------------------|----------------------------|-------------------------|-----------------------|------------------------|---------------------------|-----------------------|------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts       | $\psi_{\text{MHP}}$<br>deg | Long<br>$\text{m/s}^2$  | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ | Long<br>$\text{m/s}^2$    | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ |
| 0.0                                                                    | 20.0               | -0.6                       | 2.243                   | 3.325                 | 12.584                 | 0.553                     | 0.571                 | 0.894                  |
| 15.0                                                                   | 20.0               | 14.6                       | 2.286                   | 4.794                 | 12.675                 | 0.547                     | 0.731                 | 0.880                  |
| 30.0                                                                   | 20.0               | 29.8                       | 2.160                   | 5.679                 | 12.386                 | 0.528                     | 1.002                 | 0.887                  |
| 45.0                                                                   | 20.0               | 44.8                       | 1.910                   | 7.478                 | 12.362                 | 0.491                     | 1.294                 | 0.933                  |
| 60.0                                                                   | 20.0               | 59.5                       | 1.678                   | 8.959                 | 13.628                 | 0.425                     | 1.595                 | 1.062                  |
| 75.0                                                                   | 20.1               | 73.8                       | 1.421                   | 8.961                 | 15.705                 | 0.309                     | 1.811                 | 1.274                  |
| 90.0                                                                   | 19.8               | 88.0                       | 1.167                   | 12.569                | 15.853                 | 0.123                     | 2.114                 | 1.250                  |
| 105.0                                                                  | 19.9               | 103.3                      | 1.165                   | 11.294                | 14.295                 | 0.119                     | 2.190                 | 0.875                  |
| 120.0                                                                  | 19.9               | 118.3                      | 0.676                   | 7.949                 | 12.275                 | 0.108                     | 2.349                 | 0.684                  |
| 135.0                                                                  | 19.7               | 133.8                      | 0.840                   | 8.372                 | 11.467                 | 0.129                     | 2.230                 | 0.478                  |
| 150.0                                                                  | 19.6               | 148.5                      | 1.411                   | 7.993                 | 12.420                 | 0.165                     | 1.674                 | 0.376                  |
| 165.0                                                                  | 19.9               | 163.9                      | 0.835                   | 4.585                 | 10.673                 | 0.164                     | 1.029                 | 0.274                  |
| 180.0                                                                  | 20.3               | 179.2                      | 0.825                   | 4.807                 | 10.606                 | 0.164                     | 0.791                 | 0.218                  |
| 195.0                                                                  | 20.0               | 194.7                      | 0.721                   | 5.812                 | 10.148                 | 0.156                     | 1.188                 | 0.278                  |
| 210.0                                                                  | 19.8               | 211.0                      | 0.751                   | 7.649                 | 10.874                 | 0.144                     | 1.879                 | 0.352                  |
| 225.0                                                                  | 19.6               | 228.0                      | 0.717                   | 13.232                | 14.057                 | 0.113                     | 2.424                 | 0.435                  |
| 240.0                                                                  | 19.5               | 244.4                      | 0.817                   | 15.759                | 13.877                 | 0.129                     | 2.899                 | 0.575                  |
| 255.0                                                                  | 19.2               | 259.4                      | 1.677                   | 18.347                | 14.209                 | 0.151                     | 2.896                 | 0.844                  |
| 270.0                                                                  | 19.4               | 273.3                      | 1.871                   | 17.891                | 15.175                 | 0.166                     | 2.802                 | 1.257                  |
| 285.0                                                                  | 20.1               | 286.3                      | 1.493                   | 10.466                | 15.181                 | 0.298                     | 2.311                 | 1.346                  |
| 300.0                                                                  | 20.1               | 300.0                      | 1.556                   | 7.604                 | 13.777                 | 0.416                     | 1.711                 | 1.213                  |
| 315.0                                                                  | 20.1               | 314.4                      | 1.915                   | 4.879                 | 12.965                 | 0.484                     | 1.245                 | 1.071                  |
| 330.0                                                                  | 20.1               | 329.3                      | 2.003                   | 3.891                 | 12.694                 | 0.526                     | 0.897                 | 0.994                  |
| 345.0                                                                  | 20.0               | 344.3                      | 2.224                   | 3.119                 | 12.796                 | 0.545                     | 0.650                 | 0.936                  |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                            |                         |                       |                        |                           |                       |                        |

**Table T.34:** Accelerations at Hangar Deck: JONSWAP Spectrum with  $H_s = 9.0$  m and  $T_p = 11.0$  s; Ship's speed is 25.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                            | <b>Absolute Maximum</b> |                       |                        | <b>Standard Deviation</b> |                       |                        |
|------------------------------------------------------------------------|--------------------|----------------------------|-------------------------|-----------------------|------------------------|---------------------------|-----------------------|------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts       | $\psi_{\text{MHP}}$<br>deg | Long<br>$\text{m/s}^2$  | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ | Long<br>$\text{m/s}^2$    | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ |
| 0.0                                                                    | 25.3               | -0.2                       | 2.003                   | 3.651                 | 13.902                 | 0.573                     | 0.624                 | 1.222                  |
| 15.0                                                                   | 25.3               | 14.9                       | 2.106                   | 5.045                 | 13.524                 | 0.569                     | 0.775                 | 1.198                  |
| 30.0                                                                   | 25.2               | 30.0                       | 2.007                   | 7.007                 | 13.407                 | 0.554                     | 1.018                 | 1.185                  |
| 45.0                                                                   | 25.2               | 44.9                       | 2.014                   | 6.864                 | 13.185                 | 0.510                     | 1.262                 | 1.193                  |
| 60.0                                                                   | 25.2               | 59.7                       | 1.654                   | 9.135                 | 13.773                 | 0.438                     | 1.546                 | 1.264                  |
| 75.0                                                                   | 25.2               | 74.1                       | 1.714                   | 8.946                 | 15.765                 | 0.310                     | 1.766                 | 1.393                  |
| 90.0                                                                   | 25.0               | 88.7                       | 1.406                   | 14.914                | 15.424                 | 0.117                     | 2.115                 | 1.221                  |
| 105.0                                                                  | 25.0               | 104.4                      | 0.649                   | 8.364                 | 13.826                 | 0.123                     | 2.429                 | 0.771                  |
| 120.0                                                                  | 24.7               | 118.5                      | 1.002                   | 14.040                | 14.158                 | 0.148                     | 3.115                 | 0.765                  |
| 135.0                                                                  | 24.6               | 132.1                      | 1.147                   | 20.255                | 14.363                 | 0.172                     | 2.397                 | 0.517                  |
| 150.0                                                                  | 24.8               | 149.1                      | 1.004                   | 6.402                 | 10.507                 | 0.187                     | 1.609                 | 0.311                  |
| 165.0                                                                  | 25.7               | 164.1                      | 0.830                   | 4.804                 | 10.252                 | 0.180                     | 0.987                 | 0.229                  |
| 180.0                                                                  | 26.4               | 179.6                      | 0.979                   | 4.916                 | 10.167                 | 0.183                     | 0.655                 | 0.161                  |
| 195.0                                                                  | 25.8               | 194.9                      | 0.837                   | 5.060                 | 10.072                 | 0.176                     | 1.090                 | 0.250                  |
| 210.0                                                                  | 25.0               | 210.7                      | 0.889                   | 7.888                 | 10.248                 | 0.190                     | 1.808                 | 0.359                  |
| 225.0                                                                  | 24.7               | 226.5                      | 0.778                   | 7.798                 | 11.693                 | 0.158                     | 2.534                 | 0.478                  |
| 240.0                                                                  | 24.6               | 242.1                      | 0.787                   | 14.020                | 12.934                 | 0.140                     | 3.305                 | 0.594                  |
| 255.0                                                                  | 24.7               | 257.1                      | 0.609                   | 15.322                | 13.781                 | 0.143                     | 3.003                 | 0.682                  |
| 270.0                                                                  | 24.9               | 271.9                      | 1.274                   | 15.844                | 15.014                 | 0.135                     | 2.844                 | 1.205                  |
| 285.0                                                                  | 25.2               | 286.0                      | 4.395                   | 12.101                | 14.745                 | 0.306                     | 2.366                 | 1.444                  |
| 300.0                                                                  | 25.3               | 300.1                      | 1.590                   | 7.707                 | 14.131                 | 0.425                     | 1.760                 | 1.424                  |
| 315.0                                                                  | 25.3               | 314.7                      | 2.077                   | 4.676                 | 13.493                 | 0.500                     | 1.250                 | 1.341                  |
| 330.0                                                                  | 25.3               | 329.7                      | 1.942                   | 4.047                 | 13.857                 | 0.544                     | 0.920                 | 1.297                  |
| 345.0                                                                  | 25.3               | 344.7                      | 2.084                   | 3.419                 | 14.120                 | 0.565                     | 0.664                 | 1.253                  |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                            |                         |                       |                        |                           |                       |                        |

**Table T.35:** Accelerations at Hangar Deck: JONSWAP Spectrum with  $H_s = 9.0$  m and  $T_p = 11.0$  s; Ship's speed is 30.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 30.4               | 0.0                 | 2.035                   | 4.012          | 14.713          | 0.587                     | 0.694          | 1.575           |
| 15.0                                                                   | 30.4               | 15.1                | 2.100                   | 5.681          | 14.341          | 0.585                     | 0.840          | 1.544           |
| 30.0                                                                   | 30.4               | 30.1                | 1.981                   | 7.047          | 14.134          | 0.565                     | 1.058          | 1.504           |
| 45.0                                                                   | 30.4               | 45.0                | 2.049                   | 7.069          | 13.882          | 0.527                     | 1.277          | 1.479           |
| 60.0                                                                   | 30.3               | 59.7                | 1.779                   | 7.255          | 14.189          | 0.453                     | 1.502          | 1.479           |
| 75.0                                                                   | 30.3               | 74.3                | 1.972                   | 9.886          | 16.051          | 0.315                     | 1.726          | 1.495           |
| 90.0                                                                   | 30.1               | 89.0                | 1.067                   | 14.748         | 15.623          | 0.122                     | 2.176          | 1.201           |
| 105.0                                                                  | 30.0               | 104.3               | 2.185                   | 18.916         | 15.735          | 0.155                     | 2.866          | 0.784           |
| 120.0                                                                  | 29.7               | 118.6               | 1.385                   | 13.357         | 12.135          | 0.172                     | 2.934          | 0.610           |
| 135.0                                                                  | 29.9               | 134.1               | 1.030                   | 8.139          | 11.190          | 0.209                     | 2.293          | 0.402           |
| 150.0                                                                  | 30.5               | 147.4               | 1.062                   | 7.871          | 11.113          | 0.223                     | 1.607          | 0.377           |
| 165.0                                                                  | 31.0               | 162.7               | 1.253                   | 6.053          | 10.021          | 0.250                     | 1.186          | 0.348           |
| 180.0                                                                  | 31.1               | 178.6               | 1.343                   | 6.170          | 10.297          | 0.273                     | 1.172          | 0.363           |
| 195.0                                                                  | 31.4               | 194.6               | 1.492                   | 6.444          | 10.619          | 0.264                     | 1.350          | 0.350           |
| 210.0                                                                  | 30.8               | 211.0               | 1.217                   | 6.681          | 10.344          | 0.229                     | 1.832          | 0.342           |
| 225.0                                                                  | 29.7               | 226.0               | 1.021                   | 7.869          | 12.108          | 0.229                     | 2.494          | 0.522           |
| 240.0                                                                  | 29.8               | 240.9               | 0.606                   | 8.685          | 11.839          | 0.153                     | 3.249          | 0.642           |
| 255.0                                                                  | 29.9               | 256.1               | 1.852                   | 21.722         | 14.680          | 0.164                     | 3.084          | 0.681           |
| 270.0                                                                  | 30.1               | 271.2               | 1.395                   | 16.993         | 15.297          | 0.136                     | 2.850          | 1.149           |
| 285.0                                                                  | 30.3               | 285.7               | 2.188                   | 12.315         | 14.900          | 0.297                     | 2.452          | 1.559           |
| 300.0                                                                  | 30.4               | 300.1               | 1.724                   | 7.386          | 14.207          | 0.432                     | 1.846          | 1.642           |
| 315.0                                                                  | 30.4               | 315.0               | 1.997                   | 5.395          | 14.899          | 0.510                     | 1.384          | 1.628           |
| 330.0                                                                  | 30.4               | 329.9               | 1.964                   | 4.627          | 14.570          | 0.552                     | 0.998          | 1.619           |
| 345.0                                                                  | 30.4               | 345.0               | 2.207                   | 3.944          | 14.628          | 0.575                     | 0.758          | 1.597           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table T.36:** Accelerations at Hangar Deck: JONSWAP Spectrum with  $H_s = 9.0$  m and  $T_p = 17.1$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | -1.5               | -109.1              | 0.997                   | 4.579          | 11.325          | 0.192                     | 1.408          | 0.380           |
| 15.0                                                                   | -2.4               | -147.9              | 0.938                   | 4.316          | 11.558          | 0.184                     | 1.060          | 0.434           |
| 30.0                                                                   | -1.8               | -69.5               | 1.187                   | 5.242          | 11.579          | 0.187                     | 1.602          | 0.427           |
| 45.0                                                                   | -0.2               | 21.9                | 0.822                   | 4.373          | 11.390          | 0.204                     | 1.091          | 0.408           |
| 60.0                                                                   | 0.6                | 49.0                | 0.635                   | 5.070          | 11.335          | 0.158                     | 1.343          | 0.466           |
| 75.0                                                                   | 0.7                | 69.2                | 0.546                   | 5.416          | 11.878          | 0.092                     | 1.396          | 0.500           |
| 90.0                                                                   | 0.1                | 90.9                | 0.234                   | 5.330          | 12.042          | 0.031                     | 1.401          | 0.533           |
| 105.0                                                                  | -0.5               | 103.2               | 0.425                   | 5.487          | 12.003          | 0.053                     | 1.417          | 0.536           |
| 120.0                                                                  | -1.4               | 113.0               | 0.560                   | 5.861          | 12.227          | 0.085                     | 1.424          | 0.529           |
| 135.0                                                                  | -2.1               | 121.6               | 0.470                   | 5.506          | 11.806          | 0.117                     | 1.363          | 0.508           |
| 150.0                                                                  | -2.6               | 131.7               | 0.552                   | 4.934          | 11.327          | 0.149                     | 1.244          | 0.475           |
| 165.0                                                                  | -2.5               | 144.3               | 0.711                   | 4.244          | 11.409          | 0.176                     | 1.019          | 0.438           |
| 180.0                                                                  | -1.7               | 164.5               | 0.877                   | 3.437          | 11.509          | 0.194                     | 0.594          | 0.388           |
| 195.0                                                                  | 0.4                | 236.4               | 0.812                   | 5.481          | 11.526          | 0.126                     | 1.374          | 0.423           |
| 210.0                                                                  | 0.0                | 244.9               | 0.778                   | 6.046          | 11.485          | 0.104                     | 1.428          | 0.453           |
| 225.0                                                                  | -0.2               | 253.3               | 0.520                   | 5.712          | 11.628          | 0.078                     | 1.460          | 0.484           |
| 240.0                                                                  | -0.4               | 261.6               | 0.349                   | 5.587          | 11.675          | 0.052                     | 1.454          | 0.503           |
| 255.0                                                                  | -0.6               | 270.4               | 0.214                   | 5.897          | 11.926          | 0.033                     | 1.434          | 0.516           |
| 270.0                                                                  | -0.6               | 279.9               | 0.378                   | 5.994          | 11.934          | 0.047                     | 1.397          | 0.510           |
| 285.0                                                                  | -0.5               | 288.9               | 0.626                   | 5.786          | 12.034          | 0.080                     | 1.348          | 0.494           |
| 300.0                                                                  | -0.5               | 297.9               | 0.685                   | 5.977          | 11.803          | 0.114                     | 1.280          | 0.470           |
| 315.0                                                                  | -0.4               | 307.0               | 0.656                   | 5.526          | 11.289          | 0.143                     | 1.204          | 0.440           |
| 330.0                                                                  | -0.6               | 315.5               | 0.792                   | 5.148          | 11.235          | 0.168                     | 1.134          | 0.414           |
| 345.0                                                                  | -0.8               | 324.3               | 0.954                   | 4.826          | 11.355          | 0.186                     | 1.058          | 0.389           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table T.37:** Accelerations at Hangar Deck: JONSWAP Spectrum with  $H_s = 9.0$  m and  $T_p = 17.1$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 3.8                | -29.6               | 1.016                   | 5.316          | 10.957          | 0.227                     | 1.077          | 0.390           |
| 15.0                                                                   | 3.6                | -22.7               | 1.031                   | 4.312          | 11.064          | 0.236                     | 1.028          | 0.382           |
| 30.0                                                                   | 3.5                | -14.4               | 1.127                   | 4.080          | 10.924          | 0.241                     | 0.955          | 0.375           |
| 45.0                                                                   | 3.5                | -3.6                | 1.268                   | 4.129          | 10.958          | 0.245                     | 0.898          | 0.384           |
| 60.0                                                                   | 3.8                | 26.6                | 0.926                   | 4.943          | 11.530          | 0.226                     | 1.078          | 0.435           |
| 75.0                                                                   | 4.3                | 58.4                | 0.711                   | 5.386          | 11.845          | 0.139                     | 1.336          | 0.515           |
| 90.0                                                                   | 4.5                | 79.9                | 0.346                   | 5.470          | 12.063          | 0.046                     | 1.317          | 0.550           |
| 105.0                                                                  | 4.4                | 95.6                | 0.212                   | 5.792          | 12.196          | 0.025                     | 1.323          | 0.551           |
| 120.0                                                                  | 4.1                | 107.0               | 0.295                   | 6.017          | 12.408          | 0.049                     | 1.312          | 0.537           |
| 135.0                                                                  | 3.8                | 115.4               | 0.373                   | 5.948          | 11.786          | 0.071                     | 1.307          | 0.518           |
| 150.0                                                                  | 3.5                | 124.8               | 0.596                   | 5.599          | 11.680          | 0.095                     | 1.247          | 0.481           |
| 165.0                                                                  | 3.4                | 134.5               | 0.733                   | 5.460          | 11.634          | 0.116                     | 1.146          | 0.438           |
| 180.0                                                                  | 3.3                | 146.5               | 0.902                   | 4.793          | 11.370          | 0.133                     | 0.991          | 0.389           |
| 195.0                                                                  | 3.4                | 162.2               | 0.837                   | 5.012          | 11.483          | 0.144                     | 0.872          | 0.342           |
| 210.0                                                                  | 4.4                | 216.2               | 0.716                   | 4.731          | 10.948          | 0.131                     | 1.092          | 0.294           |
| 225.0                                                                  | 4.3                | 237.0               | 0.621                   | 5.277          | 11.399          | 0.101                     | 1.309          | 0.370           |
| 240.0                                                                  | 4.4                | 250.4               | 0.456                   | 5.591          | 11.745          | 0.071                     | 1.405          | 0.425           |
| 255.0                                                                  | 4.5                | 262.4               | 0.277                   | 6.236          | 11.607          | 0.040                     | 1.448          | 0.473           |
| 270.0                                                                  | 4.6                | 274.8               | 0.157                   | 5.697          | 12.003          | 0.023                     | 1.437          | 0.508           |
| 285.0                                                                  | 4.7                | 287.5               | 0.407                   | 7.085          | 12.128          | 0.069                     | 1.395          | 0.504           |
| 300.0                                                                  | 4.7                | 299.8               | 0.512                   | 5.641          | 11.545          | 0.130                     | 1.304          | 0.476           |
| 315.0                                                                  | 4.5                | 310.0               | 0.753                   | 5.863          | 11.631          | 0.174                     | 1.225          | 0.441           |
| 330.0                                                                  | 4.1                | 317.1               | 0.879                   | 5.833          | 11.136          | 0.196                     | 1.186          | 0.421           |
| 345.0                                                                  | 3.9                | 323.5               | 0.994                   | 5.600          | 11.000          | 0.214                     | 1.137          | 0.405           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table T.38:** Accelerations at Hangar Deck: JONSWAP Spectrum with  $H_s = 9.0$  m and  $T_p = 17.1$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 9.4                | -3.6                | 1.339                   | 3.899          | 10.879          | 0.283                     | 0.591          | 0.397           |
| 15.0                                                                   | 9.5                | 11.9                | 1.170                   | 3.467          | 11.142          | 0.279                     | 0.698          | 0.420           |
| 30.0                                                                   | 9.6                | 27.4                | 1.092                   | 3.965          | 11.185          | 0.260                     | 0.899          | 0.455           |
| 45.0                                                                   | 9.7                | 42.7                | 0.847                   | 4.469          | 11.823          | 0.220                     | 1.076          | 0.496           |
| 60.0                                                                   | 9.8                | 57.5                | 0.595                   | 4.918          | 11.809          | 0.157                     | 1.167          | 0.537           |
| 75.0                                                                   | 9.9                | 72.9                | 0.356                   | 4.818          | 12.276          | 0.080                     | 1.118          | 0.564           |
| 90.0                                                                   | 9.9                | 88.0                | 0.140                   | 5.203          | 12.250          | 0.031                     | 1.113          | 0.561           |
| 105.0                                                                  | 9.9                | 103.1               | 0.224                   | 5.616          | 12.075          | 0.041                     | 1.136          | 0.529           |
| 120.0                                                                  | 9.5                | 116.4               | 0.422                   | 5.752          | 12.247          | 0.063                     | 1.129          | 0.501           |
| 135.0                                                                  | 9.2                | 130.3               | 0.592                   | 5.239          | 11.980          | 0.079                     | 1.003          | 0.433           |
| 150.0                                                                  | 9.1                | 144.4               | 0.553                   | 4.654          | 11.452          | 0.090                     | 0.959          | 0.371           |
| 165.0                                                                  | 9.0                | 159.4               | 0.492                   | 4.012          | 10.979          | 0.102                     | 0.991          | 0.334           |
| 180.0                                                                  | 9.4                | 176.8               | 0.504                   | 4.238          | 10.468          | 0.106                     | 0.944          | 0.280           |
| 195.0                                                                  | 9.7                | 193.7               | 0.647                   | 4.464          | 10.479          | 0.108                     | 0.909          | 0.213           |
| 210.0                                                                  | 9.6                | 211.3               | 0.747                   | 5.121          | 11.147          | 0.099                     | 1.100          | 0.220           |
| 225.0                                                                  | 9.5                | 228.4               | 0.620                   | 6.827          | 11.061          | 0.093                     | 1.412          | 0.266           |
| 240.0                                                                  | 9.5                | 243.7               | 0.475                   | 5.991          | 11.626          | 0.075                     | 1.553          | 0.339           |
| 255.0                                                                  | 9.8                | 257.4               | 0.408                   | 6.151          | 12.030          | 0.053                     | 1.555          | 0.408           |
| 270.0                                                                  | 9.9                | 271.7               | 0.207                   | 7.451          | 11.940          | 0.034                     | 1.568          | 0.481           |
| 285.0                                                                  | 10.0               | 285.8               | 0.389                   | 7.852          | 11.701          | 0.064                     | 1.475          | 0.509           |
| 300.0                                                                  | 9.9                | 300.0               | 0.584                   | 5.415          | 11.506          | 0.142                     | 1.343          | 0.500           |
| 315.0                                                                  | 9.8                | 313.7               | 0.801                   | 5.170          | 11.400          | 0.205                     | 1.113          | 0.452           |
| 330.0                                                                  | 9.6                | 327.5               | 1.046                   | 4.828          | 11.158          | 0.248                     | 0.889          | 0.414           |
| 345.0                                                                  | 9.4                | 341.6               | 1.159                   | 4.195          | 10.858          | 0.272                     | 0.744          | 0.395           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table T.39:** Accelerations at Hangar Deck: JONSWAP Spectrum with  $H_s = 9.0$  m and  $T_p = 17.1$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 14.9               | -1.1                | 1.492                   | 3.230          | 11.093          | 0.314                     | 0.476          | 0.432           |
| 15.0                                                                   | 14.9               | 14.1                | 1.333                   | 3.428          | 11.336          | 0.309                     | 0.670          | 0.450           |
| 30.0                                                                   | 14.9               | 29.2                | 1.270                   | 4.366          | 11.572          | 0.284                     | 0.898          | 0.483           |
| 45.0                                                                   | 15.0               | 44.2                | 0.916                   | 4.877          | 12.126          | 0.238                     | 1.060          | 0.529           |
| 60.0                                                                   | 15.0               | 59.0                | 0.694                   | 5.422          | 12.649          | 0.165                     | 1.178          | 0.575           |
| 75.0                                                                   | 15.1               | 74.0                | 0.352                   | 5.054          | 12.416          | 0.082                     | 1.011          | 0.577           |
| 90.0                                                                   | 15.1               | 89.0                | 0.167                   | 4.860          | 12.369          | 0.045                     | 1.007          | 0.554           |
| 105.0                                                                  | 15.1               | 104.1               | 0.370                   | 5.129          | 11.798          | 0.056                     | 1.057          | 0.498           |
| 120.0                                                                  | 14.9               | 118.3               | 0.440                   | 5.741          | 12.057          | 0.073                     | 1.239          | 0.509           |
| 135.0                                                                  | 14.9               | 133.5               | 0.476                   | 5.255          | 11.364          | 0.085                     | 1.207          | 0.429           |
| 150.0                                                                  | 14.9               | 148.6               | 0.471                   | 4.249          | 11.010          | 0.093                     | 0.950          | 0.349           |
| 165.0                                                                  | 15.0               | 163.8               | 0.376                   | 3.726          | 10.568          | 0.088                     | 0.614          | 0.276           |
| 180.0                                                                  | 14.9               | 178.9               | 0.494                   | 3.921          | 10.266          | 0.105                     | 0.720          | 0.254           |
| 195.0                                                                  | 15.0               | 194.3               | 0.381                   | 4.803          | 10.180          | 0.078                     | 0.778          | 0.216           |
| 210.0                                                                  | 15.0               | 209.9               | 0.525                   | 5.394          | 10.316          | 0.087                     | 1.217          | 0.194           |
| 225.0                                                                  | 14.8               | 226.2               | 0.496                   | 5.356          | 10.702          | 0.089                     | 1.666          | 0.203           |
| 240.0                                                                  | 14.9               | 241.8               | 0.595                   | 6.133          | 11.382          | 0.078                     | 1.852          | 0.279           |
| 255.0                                                                  | 15.1               | 256.1               | 0.409                   | 6.578          | 11.743          | 0.063                     | 1.759          | 0.356           |
| 270.0                                                                  | 15.1               | 270.8               | 0.245                   | 7.554          | 11.978          | 0.048                     | 1.708          | 0.458           |
| 285.0                                                                  | 15.2               | 285.4               | 0.382                   | 7.550          | 11.893          | 0.066                     | 1.641          | 0.520           |
| 300.0                                                                  | 15.1               | 299.9               | 0.622                   | 5.986          | 11.763          | 0.150                     | 1.430          | 0.541           |
| 315.0                                                                  | 15.0               | 314.3               | 0.889                   | 5.455          | 11.291          | 0.225                     | 1.114          | 0.504           |
| 330.0                                                                  | 14.9               | 328.9               | 1.206                   | 4.186          | 11.186          | 0.274                     | 0.818          | 0.462           |
| 345.0                                                                  | 14.9               | 343.8               | 1.318                   | 3.815          | 11.266          | 0.304                     | 0.549          | 0.438           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |



**Table T.40:** Accelerations at Hangar Deck: JONSWAP Spectrum with  $H_s = 9.0$  m and  $T_p = 17.1$  s; Ship's speed is 20.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 20.1               | -0.5                | 1.462                   | 3.547          | 11.342          | 0.341                     | 0.505          | 0.534           |
| 15.0                                                                   | 20.1               | 14.7                | 1.518                   | 3.767          | 11.639          | 0.334                     | 0.728          | 0.542           |
| 30.0                                                                   | 20.1               | 29.8                | 1.358                   | 4.350          | 11.729          | 0.308                     | 0.985          | 0.573           |
| 45.0                                                                   | 20.1               | 44.8                | 1.003                   | 5.087          | 11.935          | 0.256                     | 1.165          | 0.605           |
| 60.0                                                                   | 20.2               | 59.6                | 0.642                   | 5.974          | 12.125          | 0.175                     | 1.318          | 0.636           |
| 75.0                                                                   | 20.2               | 74.4                | 0.343                   | 5.325          | 12.310          | 0.086                     | 1.021          | 0.598           |
| 90.0                                                                   | 20.3               | 89.4                | 0.223                   | 4.704          | 12.344          | 0.059                     | 0.983          | 0.541           |
| 105.0                                                                  | 20.3               | 104.5               | 0.368                   | 5.169          | 12.011          | 0.074                     | 1.006          | 0.459           |
| 120.0                                                                  | 20.1               | 119.2               | 0.349                   | 5.755          | 11.238          | 0.092                     | 1.623          | 0.510           |
| 135.0                                                                  | 20.1               | 134.3               | 0.393                   | 5.342          | 10.864          | 0.099                     | 1.260          | 0.380           |
| 150.0                                                                  | 20.2               | 149.3               | 0.438                   | 3.929          | 10.456          | 0.100                     | 0.761          | 0.271           |
| 165.0                                                                  | 20.1               | 164.3               | 0.574                   | 3.335          | 10.577          | 0.130                     | 0.635          | 0.279           |
| 180.0                                                                  | 20.3               | 179.4               | 0.439                   | 3.621          | 10.217          | 0.100                     | 0.538          | 0.210           |
| 195.0                                                                  | 20.2               | 194.8               | 0.532                   | 6.003          | 10.191          | 0.112                     | 0.999          | 0.273           |
| 210.0                                                                  | 20.1               | 210.0               | 0.586                   | 6.894          | 10.102          | 0.103                     | 1.370          | 0.300           |
| 225.0                                                                  | 20.1               | 225.1               | 0.524                   | 7.039          | 10.051          | 0.088                     | 1.703          | 0.289           |
| 240.0                                                                  | 20.1               | 240.8               | 0.479                   | 7.346          | 10.388          | 0.091                     | 2.111          | 0.249           |
| 255.0                                                                  | 20.2               | 255.5               | 0.481                   | 7.875          | 11.154          | 0.076                     | 1.847          | 0.340           |
| 270.0                                                                  | 20.3               | 270.4               | 0.292                   | 7.954          | 11.935          | 0.060                     | 1.815          | 0.450           |
| 285.0                                                                  | 20.3               | 285.2               | 0.325                   | 7.269          | 11.873          | 0.070                     | 1.684          | 0.539           |
| 300.0                                                                  | 20.2               | 299.9               | 0.684                   | 7.492          | 11.955          | 0.158                     | 1.472          | 0.603           |
| 315.0                                                                  | 20.2               | 314.5               | 0.929                   | 5.563          | 11.550          | 0.244                     | 1.104          | 0.601           |
| 330.0                                                                  | 20.1               | 329.3               | 1.293                   | 4.063          | 11.526          | 0.301                     | 0.763          | 0.575           |
| 345.0                                                                  | 20.1               | 344.4               | 1.371                   | 3.544          | 11.505          | 0.330                     | 0.514          | 0.546           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table T.41:** Accelerations at Hangar Deck: JONSWAP Spectrum with  $H_s = 9.0$  m and  $T_p = 17.1$  s; Ship's speed is 25.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 25.2               | -0.2                | 1.482                   | 3.738          | 12.339          | 0.363                     | 0.572          | 0.712           |
| 15.0                                                                   | 25.2               | 14.9                | 1.484                   | 4.269          | 11.942          | 0.356                     | 0.793          | 0.714           |
| 30.0                                                                   | 25.2               | 30.0                | 1.370                   | 5.011          | 12.244          | 0.328                     | 1.052          | 0.725           |
| 45.0                                                                   | 25.2               | 45.0                | 1.081                   | 5.128          | 12.047          | 0.273                     | 1.268          | 0.729           |
| 60.0                                                                   | 25.3               | 59.8                | 0.667                   | 6.244          | 12.881          | 0.187                     | 1.444          | 0.712           |
| 75.0                                                                   | 25.3               | 74.6                | 0.371                   | 5.269          | 12.661          | 0.092                     | 1.096          | 0.618           |
| 90.0                                                                   | 25.3               | 89.6                | 0.279                   | 4.604          | 12.179          | 0.072                     | 1.038          | 0.529           |
| 105.0                                                                  | 25.3               | 104.6               | 0.415                   | 5.186          | 11.766          | 0.094                     | 1.019          | 0.414           |
| 120.0                                                                  | 25.2               | 119.6               | 0.405                   | 5.868          | 10.644          | 0.112                     | 1.825          | 0.452           |
| 135.0                                                                  | 25.2               | 134.6               | 0.434                   | 5.609          | 10.487          | 0.120                     | 1.440          | 0.305           |
| 150.0                                                                  | 25.3               | 149.5               | 0.579                   | 4.789          | 10.278          | 0.140                     | 1.174          | 0.264           |
| 165.0                                                                  | 25.4               | 164.5               | 0.660                   | 3.989          | 10.324          | 0.132                     | 0.572          | 0.195           |
| 180.0                                                                  | 25.8               | 179.8               | 0.472                   | 3.199          | 10.153          | 0.135                     | 0.342          | 0.164           |
| 195.0                                                                  | 25.6               | 194.9               | 0.675                   | 4.319          | 10.104          | 0.120                     | 0.687          | 0.193           |
| 210.0                                                                  | 25.3               | 210.1               | 0.601                   | 6.232          | 10.152          | 0.125                     | 1.312          | 0.328           |
| 225.0                                                                  | 25.3               | 225.0               | 0.337                   | 6.710          | 10.046          | 0.096                     | 1.441          | 0.348           |
| 240.0                                                                  | 25.2               | 240.3               | 0.510                   | 8.367          | 10.089          | 0.100                     | 2.129          | 0.330           |
| 255.0                                                                  | 25.3               | 255.2               | 0.451                   | 8.675          | 11.079          | 0.088                     | 1.818          | 0.352           |
| 270.0                                                                  | 25.3               | 270.2               | 0.307                   | 7.549          | 11.840          | 0.071                     | 1.803          | 0.456           |
| 285.0                                                                  | 25.3               | 285.1               | 0.355                   | 8.425          | 12.085          | 0.076                     | 1.787          | 0.564           |
| 300.0                                                                  | 25.3               | 299.9               | 0.665                   | 7.448          | 11.993          | 0.168                     | 1.494          | 0.687           |
| 315.0                                                                  | 25.3               | 314.7               | 1.019                   | 5.844          | 11.882          | 0.260                     | 1.098          | 0.737           |
| 330.0                                                                  | 25.2               | 329.6               | 1.391                   | 4.882          | 12.157          | 0.320                     | 0.779          | 0.741           |
| 345.0                                                                  | 25.2               | 344.7               | 1.599                   | 3.849          | 12.191          | 0.352                     | 0.555          | 0.726           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table T.42:** Accelerations at Hangar Deck: JONSWAP Spectrum with  $H_s = 9.0$  m and  $T_p = 17.1$  s; Ship's speed is 30.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 30.4               | -0.0                | 1.588                   | 4.664          | 13.201          | 0.382                     | 0.668          | 0.933           |
| 15.0                                                                   | 30.4               | 15.1                | 1.643                   | 5.291          | 12.785          | 0.376                     | 0.862          | 0.929           |
| 30.0                                                                   | 30.4               | 30.1                | 1.390                   | 5.654          | 12.765          | 0.347                     | 1.103          | 0.918           |
| 45.0                                                                   | 30.4               | 45.1                | 1.192                   | 5.969          | 13.089          | 0.291                     | 1.329          | 0.897           |
| 60.0                                                                   | 30.4               | 60.0                | 0.837                   | 6.552          | 12.779          | 0.199                     | 1.552          | 0.803           |
| 75.0                                                                   | 30.4               | 74.7                | 0.340                   | 5.212          | 12.490          | 0.099                     | 1.200          | 0.643           |
| 90.0                                                                   | 30.4               | 89.7                | 0.338                   | 4.859          | 11.928          | 0.085                     | 1.161          | 0.522           |
| 105.0                                                                  | 30.4               | 104.7               | 0.471                   | 4.770          | 11.138          | 0.113                     | 1.078          | 0.381           |
| 120.0                                                                  | 30.3               | 119.7               | 0.497                   | 6.748          | 10.428          | 0.140                     | 2.199          | 0.434           |
| 135.0                                                                  | 30.2               | 134.5               | 0.710                   | 6.401          | 10.560          | 0.174                     | 1.857          | 0.338           |
| 150.0                                                                  | 30.3               | 149.2               | 0.851                   | 7.060          | 10.160          | 0.225                     | 1.449          | 0.308           |
| 165.0                                                                  | 30.8               | 164.0               | 0.859                   | 4.207          | 10.036          | 0.198                     | 0.687          | 0.212           |
| 180.0                                                                  | 31.2               | 179.7               | 0.615                   | 4.451          | 9.934           | 0.190                     | 0.545          | 0.170           |
| 195.0                                                                  | 30.9               | 194.7               | 0.840                   | 4.244          | 9.969           | 0.188                     | 0.765          | 0.207           |
| 210.0                                                                  | 30.5               | 210.3               | 0.795                   | 6.988          | 10.229          | 0.203                     | 1.442          | 0.363           |
| 225.0                                                                  | 30.4               | 225.1               | 0.545                   | 6.567          | 10.138          | 0.134                     | 1.636          | 0.417           |
| 240.0                                                                  | 30.4               | 240.1               | 0.506                   | 8.292          | 9.956           | 0.117                     | 2.121          | 0.475           |
| 255.0                                                                  | 30.4               | 255.1               | 0.489                   | 8.442          | 11.338          | 0.107                     | 1.666          | 0.371           |
| 270.0                                                                  | 30.4               | 270.1               | 0.313                   | 7.607          | 11.728          | 0.083                     | 1.714          | 0.471           |
| 285.0                                                                  | 30.4               | 285.1               | 0.364                   | 8.210          | 11.697          | 0.083                     | 1.730          | 0.603           |
| 300.0                                                                  | 30.4               | 299.9               | 0.647                   | 7.759          | 12.273          | 0.179                     | 1.480          | 0.775           |
| 315.0                                                                  | 30.4               | 314.8               | 1.077                   | 6.786          | 12.531          | 0.278                     | 1.067          | 0.904           |
| 330.0                                                                  | 30.4               | 329.8               | 1.374                   | 5.028          | 12.814          | 0.338                     | 0.765          | 0.942           |
| 345.0                                                                  | 30.4               | 344.9               | 1.379                   | 4.493          | 12.820          | 0.368                     | 0.625          | 0.939           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

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## **Annex U**

### **Tables of Flight Deck Accelerations – Bretschneider Spectrum (Open Ocean)**

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**Table U.1:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 4.0$  m and  $T_p = 8.3$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | -0.2               | -23.8               | 0.695                   | 1.656          | 11.045          | 0.165                     | 0.359          | 0.452           |
| 15.0                                                                   | -0.2               | -4.6                | 0.687                   | 0.845          | 10.965          | 0.154                     | 0.125          | 0.401           |
| 30.0                                                                   | -0.2               | 16.7                | 0.644                   | 1.443          | 10.890          | 0.157                     | 0.271          | 0.396           |
| 45.0                                                                   | -0.2               | 33.5                | 0.708                   | 2.406          | 10.995          | 0.173                     | 0.524          | 0.446           |
| 60.0                                                                   | -0.3               | 44.5                | 0.732                   | 3.087          | 11.557          | 0.184                     | 0.725          | 0.498           |
| 75.0                                                                   | -0.5               | 52.4                | 0.716                   | 4.970          | 12.584          | 0.192                     | 0.890          | 0.552           |
| 90.0                                                                   | -0.6               | 59.0                | 0.869                   | 5.318          | 11.996          | 0.196                     | 1.029          | 0.601           |
| 105.0                                                                  | -0.7               | 63.4                | 0.948                   | 4.944          | 12.354          | 0.192                     | 1.085          | 0.627           |
| 120.0                                                                  | -1.6               | 96.0                | 0.658                   | 6.647          | 12.631          | 0.127                     | 1.212          | 0.681           |
| 135.0                                                                  | -2.1               | 102.8               | 0.778                   | 6.666          | 13.013          | 0.171                     | 1.189          | 0.697           |
| 150.0                                                                  | -2.4               | 105.0               | 0.865                   | 5.503          | 12.471          | 0.176                     | 1.165          | 0.701           |
| 165.0                                                                  | -2.5               | 106.2               | 0.837                   | 6.350          | 13.167          | 0.173                     | 1.149          | 0.702           |
| 180.0                                                                  | -0.7               | 74.0                | 0.703                   | 5.869          | 12.666          | 0.146                     | 0.700          | 0.478           |
| 195.0                                                                  | -0.0               | 200.3               | 0.419                   | 1.540          | 11.174          | 0.120                     | 0.314          | 0.344           |
| 210.0                                                                  | -0.2               | 382.2               | 0.701                   | 3.830          | 11.949          | 0.184                     | 0.768          | 0.589           |
| 225.0                                                                  | -0.0               | 384.6               | 0.716                   | 4.186          | 12.037          | 0.196                     | 0.833          | 0.630           |
| 240.0                                                                  | 0.7                | 293.3               | 0.935                   | 4.590          | 13.145          | 0.209                     | 1.078          | 0.768           |
| 255.0                                                                  | 0.6                | 292.8               | 0.987                   | 5.196          | 13.214          | 0.210                     | 1.118          | 0.794           |
| 270.0                                                                  | 0.3                | 295.4               | 0.994                   | 5.351          | 13.493          | 0.210                     | 1.067          | 0.768           |
| 285.0                                                                  | 0.2                | 299.4               | 0.718                   | 4.319          | 12.801          | 0.211                     | 1.039          | 0.736           |
| 300.0                                                                  | 0.0                | 303.8               | 0.746                   | 5.131          | 11.958          | 0.207                     | 0.944          | 0.690           |
| 315.0                                                                  | -0.1               | 309.3               | 0.845                   | 4.052          | 12.347          | 0.201                     | 0.822          | 0.635           |
| 330.0                                                                  | -0.1               | 314.8               | 0.757                   | 3.529          | 11.605          | 0.192                     | 0.691          | 0.585           |
| 345.0                                                                  | -0.1               | 322.9               | 0.736                   | 2.398          | 11.397          | 0.181                     | 0.549          | 0.525           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.2:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 4.0$  m and  $T_p = 8.3$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 4.8                | -2.1                | 0.671                   | 0.948          | 11.287          | 0.179                     | 0.119          | 0.521           |
| 15.0                                                                   | 4.8                | 12.8                | 0.687                   | 1.024          | 11.174          | 0.181                     | 0.176          | 0.520           |
| 30.0                                                                   | 4.8                | 27.6                | 0.874                   | 1.509          | 11.371          | 0.192                     | 0.341          | 0.553           |
| 45.0                                                                   | 4.7                | 42.1                | 0.835                   | 2.274          | 11.525          | 0.210                     | 0.562          | 0.615           |
| 60.0                                                                   | 4.4                | 54.6                | 0.884                   | 3.299          | 12.065          | 0.223                     | 0.807          | 0.686           |
| 75.0                                                                   | 4.2                | 58.0                | 0.806                   | 3.904          | 12.315          | 0.222                     | 0.905          | 0.705           |
| 90.0                                                                   | 4.1                | 61.8                | 0.736                   | 5.339          | 12.299          | 0.220                     | 0.958          | 0.727           |
| 105.0                                                                  | 4.1                | 64.0                | 0.690                   | 4.551          | 12.540          | 0.219                     | 1.004          | 0.741           |
| 120.0                                                                  | 4.1                | 65.4                | 0.752                   | 4.090          | 12.376          | 0.218                     | 1.006          | 0.748           |
| 135.0                                                                  | 4.1                | 65.8                | 0.797                   | 4.361          | 12.772          | 0.219                     | 0.984          | 0.742           |
| 150.0                                                                  | 4.6                | 145.4               | 0.410                   | 2.092          | 10.841          | 0.101                     | 0.475          | 0.219           |
| 165.0                                                                  | 4.9                | 163.1               | 0.368                   | 1.518          | 10.682          | 0.088                     | 0.295          | 0.171           |
| 180.0                                                                  | 4.9                | 178.7               | 0.332                   | 1.104          | 10.667          | 0.084                     | 0.191          | 0.164           |
| 195.0                                                                  | 4.9                | 194.1               | 0.339                   | 1.364          | 10.703          | 0.085                     | 0.299          | 0.180           |
| 210.0                                                                  | 4.9                | 210.1               | 0.374                   | 2.192          | 10.843          | 0.095                     | 0.482          | 0.225           |
| 225.0                                                                  | 4.6                | 229.1               | 0.443                   | 2.954          | 11.154          | 0.117                     | 0.732          | 0.343           |
| 240.0                                                                  | 4.6                | 285.6               | 0.722                   | 4.873          | 13.549          | 0.204                     | 1.105          | 0.906           |
| 255.0                                                                  | 4.5                | 287.1               | 0.898                   | 5.159          | 13.838          | 0.212                     | 1.113          | 0.919           |
| 270.0                                                                  | 4.5                | 288.9               | 0.891                   | 5.530          | 14.180          | 0.218                     | 1.114          | 0.909           |
| 285.0                                                                  | 4.7                | 291.1               | 0.928                   | 4.554          | 14.006          | 0.227                     | 1.089          | 0.895           |
| 300.0                                                                  | 4.9                | 301.1               | 0.784                   | 3.790          | 12.640          | 0.236                     | 0.924          | 0.784           |
| 315.0                                                                  | 4.8                | 314.2               | 0.842                   | 3.504          | 11.852          | 0.220                     | 0.657          | 0.668           |
| 330.0                                                                  | 4.8                | 328.5               | 0.813                   | 2.248          | 11.426          | 0.201                     | 0.407          | 0.596           |
| 345.0                                                                  | 4.8                | 343.2               | 0.720                   | 1.452          | 11.411          | 0.186                     | 0.230          | 0.543           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.3:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 4.0$  m and  $T_p = 8.3$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 10.0               | -0.6                | 0.740                   | 0.941          | 11.678          | 0.201                     | 0.103          | 0.619           |
| 15.0                                                                   | 10.0               | 14.4                | 0.716                   | 1.080          | 11.684          | 0.204                     | 0.163          | 0.619           |
| 30.0                                                                   | 10.0               | 29.4                | 0.869                   | 1.636          | 11.656          | 0.218                     | 0.328          | 0.651           |
| 45.0                                                                   | 10.0               | 44.4                | 0.847                   | 2.345          | 12.138          | 0.237                     | 0.555          | 0.695           |
| 60.0                                                                   | 10.0               | 59.2                | 0.925                   | 3.453          | 12.378          | 0.250                     | 0.842          | 0.817           |
| 75.0                                                                   | 10.0               | 73.0                | 0.923                   | 4.945          | 13.780          | 0.225                     | 1.001          | 0.982           |
| 90.0                                                                   | 9.6                | 85.5                | 0.458                   | 8.098          | 13.435          | 0.105                     | 0.986          | 0.930           |
| 105.0                                                                  | 9.3                | 100.2               | 0.622                   | 5.775          | 12.345          | 0.117                     | 1.105          | 0.578           |
| 120.0                                                                  | 9.7                | 117.2               | 0.384                   | 5.052          | 11.502          | 0.096                     | 1.022          | 0.319           |
| 135.0                                                                  | 9.9                | 133.4               | 0.292                   | 3.379          | 10.476          | 0.078                     | 1.035          | 0.178           |
| 150.0                                                                  | 10.0               | 148.9               | 0.211                   | 3.446          | 10.232          | 0.066                     | 1.050          | 0.133           |
| 165.0                                                                  | 10.1               | 164.2               | 0.233                   | 3.738          | 10.146          | 0.060                     | 0.849          | 0.104           |
| 180.0                                                                  | 10.1               | 179.3               | 0.218                   | 2.491          | 10.148          | 0.059                     | 0.511          | 0.082           |
| 195.0                                                                  | 10.1               | 194.6               | 0.246                   | 1.922          | 10.352          | 0.062                     | 0.495          | 0.088           |
| 210.0                                                                  | 10.1               | 210.3               | 0.217                   | 2.507          | 10.378          | 0.070                     | 0.880          | 0.128           |
| 225.0                                                                  | 10.0               | 225.7               | 0.270                   | 3.309          | 10.615          | 0.081                     | 0.989          | 0.199           |
| 240.0                                                                  | 9.8                | 241.9               | 0.380                   | 4.260          | 11.432          | 0.099                     | 1.033          | 0.340           |
| 255.0                                                                  | 9.4                | 259.4               | 0.729                   | 5.527          | 12.413          | 0.125                     | 1.127          | 0.620           |
| 270.0                                                                  | 9.7                | 274.2               | 0.507                   | 6.320          | 13.406          | 0.092                     | 1.071          | 0.974           |
| 285.0                                                                  | 10.1               | 286.7               | 0.809                   | 4.598          | 13.489          | 0.227                     | 1.090          | 1.061           |
| 300.0                                                                  | 10.1               | 300.1               | 0.851                   | 3.302          | 12.488          | 0.255                     | 0.902          | 0.867           |
| 315.0                                                                  | 10.0               | 314.7               | 0.907                   | 2.443          | 11.910          | 0.242                     | 0.607          | 0.717           |
| 330.0                                                                  | 10.0               | 329.7               | 0.853                   | 1.705          | 11.786          | 0.222                     | 0.362          | 0.664           |
| 345.0                                                                  | 10.0               | 344.6               | 0.839                   | 1.282          | 11.743          | 0.206                     | 0.192          | 0.627           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |



**Table U.4:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 4.0$  m and  $T_p = 8.3$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 15.2               | -0.2                | 0.764                   | 1.108          | 11.873          | 0.219                     | 0.104          | 0.648           |
| 15.0                                                                   | 15.2               | 14.8                | 0.764                   | 1.223          | 11.719          | 0.224                     | 0.168          | 0.652           |
| 30.0                                                                   | 15.2               | 29.8                | 0.897                   | 1.857          | 12.119          | 0.239                     | 0.323          | 0.697           |
| 45.0                                                                   | 15.1               | 44.8                | 0.892                   | 2.391          | 12.047          | 0.258                     | 0.537          | 0.774           |
| 60.0                                                                   | 15.2               | 59.6                | 0.951                   | 3.299          | 12.995          | 0.266                     | 0.816          | 0.942           |
| 75.0                                                                   | 15.2               | 74.0                | 0.799                   | 4.635          | 13.745          | 0.227                     | 0.971          | 1.108           |
| 90.0                                                                   | 15.1               | 88.4                | 0.333                   | 8.954          | 13.400          | 0.054                     | 0.964          | 0.856           |
| 105.0                                                                  | 15.0               | 103.3               | 0.474                   | 5.505          | 12.203          | 0.092                     | 1.050          | 0.471           |
| 120.0                                                                  | 15.1               | 118.8               | 0.243                   | 4.850          | 10.876          | 0.065                     | 1.459          | 0.252           |
| 135.0                                                                  | 15.2               | 134.5               | 0.165                   | 4.102          | 10.268          | 0.050                     | 1.523          | 0.215           |
| 150.0                                                                  | 15.2               | 149.7               | 0.274                   | 3.537          | 10.369          | 0.069                     | 1.054          | 0.152           |
| 165.0                                                                  | 15.1               | 164.7               | 0.236                   | 2.224          | 10.260          | 0.065                     | 0.520          | 0.093           |
| 180.0                                                                  | 15.3               | 179.7               | 0.248                   | 2.293          | 10.068          | 0.059                     | 0.263          | 0.051           |
| 195.0                                                                  | 15.2               | 194.6               | 0.245                   | 3.146          | 9.940           | 0.058                     | 0.455          | 0.053           |
| 210.0                                                                  | 15.2               | 209.8               | 0.199                   | 3.505          | 9.953           | 0.059                     | 0.944          | 0.062           |
| 225.0                                                                  | 15.2               | 225.3               | 0.187                   | 4.196          | 10.249          | 0.056                     | 1.543          | 0.143           |
| 240.0                                                                  | 15.1               | 241.1               | 0.359                   | 4.622          | 11.511          | 0.071                     | 1.420          | 0.254           |
| 255.0                                                                  | 15.0               | 256.7               | 0.610                   | 5.146          | 12.479          | 0.102                     | 1.138          | 0.491           |
| 270.0                                                                  | 15.1               | 271.7               | 0.309                   | 5.267          | 13.368          | 0.048                     | 1.094          | 0.921           |
| 285.0                                                                  | 15.3               | 285.9               | 0.825                   | 4.513          | 14.063          | 0.226                     | 1.118          | 1.179           |
| 300.0                                                                  | 15.2               | 300.1               | 0.905                   | 3.405          | 12.906          | 0.268                     | 0.882          | 0.988           |
| 315.0                                                                  | 15.2               | 314.9               | 0.933                   | 2.274          | 12.163          | 0.261                     | 0.580          | 0.800           |
| 330.0                                                                  | 15.2               | 329.9               | 0.874                   | 1.726          | 12.191          | 0.241                     | 0.342          | 0.708           |
| 345.0                                                                  | 15.2               | 344.8               | 0.814                   | 1.152          | 11.824          | 0.225                     | 0.178          | 0.658           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.5:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 4.0$  m and  $T_p = 8.3$  s; Ship's speed is 20.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 20.3               | -0.1                | 0.896                   | 1.257          | 12.234          | 0.235                     | 0.116          | 0.736           |
| 15.0                                                                   | 20.3               | 14.9                | 0.815                   | 1.477          | 12.220          | 0.240                     | 0.166          | 0.745           |
| 30.0                                                                   | 20.3               | 29.9                | 0.921                   | 1.807          | 12.575          | 0.255                     | 0.307          | 0.819           |
| 45.0                                                                   | 20.3               | 44.9                | 0.969                   | 2.383          | 12.665          | 0.273                     | 0.512          | 0.931           |
| 60.0                                                                   | 20.3               | 59.8                | 0.992                   | 3.689          | 13.178          | 0.277                     | 0.785          | 1.107           |
| 75.0                                                                   | 20.4               | 74.4                | 0.835                   | 5.837          | 14.434          | 0.227                     | 0.970          | 1.216           |
| 90.0                                                                   | 20.3               | 89.1                | 0.297                   | 6.650          | 13.364          | 0.044                     | 0.952          | 0.840           |
| 105.0                                                                  | 20.2               | 104.0               | 0.461                   | 7.244          | 12.440          | 0.075                     | 1.167          | 0.417           |
| 120.0                                                                  | 20.3               | 119.5               | 0.161                   | 5.636          | 10.871          | 0.040                     | 1.897          | 0.313           |
| 135.0                                                                  | 20.3               | 134.9               | 0.211                   | 4.618          | 10.316          | 0.054                     | 1.384          | 0.172           |
| 150.0                                                                  | 20.4               | 149.6               | 0.308                   | 3.008          | 10.126          | 0.063                     | 0.705          | 0.088           |
| 165.0                                                                  | 20.8               | 164.7               | 0.252                   | 2.770          | 10.038          | 0.065                     | 0.315          | 0.065           |
| 180.0                                                                  | 20.1               | 179.6               | 0.374                   | 3.476          | 10.020          | 0.072                     | 0.477          | 0.097           |
| 195.0                                                                  | 20.7               | 195.0               | 0.380                   | 3.295          | 10.016          | 0.067                     | 0.473          | 0.080           |
| 210.0                                                                  | 20.5               | 210.1               | 0.288                   | 4.363          | 9.945           | 0.061                     | 0.799          | 0.099           |
| 225.0                                                                  | 20.3               | 225.0               | 0.186                   | 4.750          | 9.924           | 0.049                     | 1.377          | 0.139           |
| 240.0                                                                  | 20.3               | 240.5               | 0.217                   | 6.239          | 10.944          | 0.043                     | 1.854          | 0.217           |
| 255.0                                                                  | 20.2               | 255.9               | 0.486                   | 6.832          | 12.150          | 0.082                     | 1.237          | 0.405           |
| 270.0                                                                  | 20.3               | 270.9               | 0.358                   | 5.336          | 13.403          | 0.043                     | 1.128          | 0.909           |
| 285.0                                                                  | 20.4               | 285.5               | 0.802                   | 4.525          | 14.031          | 0.223                     | 1.160          | 1.282           |
| 300.0                                                                  | 20.3               | 300.1               | 0.947                   | 3.234          | 13.519          | 0.275                     | 0.892          | 1.143           |
| 315.0                                                                  | 20.3               | 315.0               | 0.977                   | 2.350          | 12.802          | 0.272                     | 0.572          | 0.950           |
| 330.0                                                                  | 20.3               | 329.9               | 0.933                   | 1.672          | 12.342          | 0.255                     | 0.335          | 0.831           |
| 345.0                                                                  | 20.3               | 344.9               | 0.914                   | 1.218          | 12.450          | 0.240                     | 0.180          | 0.755           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.6:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 4.0$  m and  $T_p = 8.3$  s; Ship's speed is 25.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 25.4               | -0.1                | 0.816                   | 1.418          | 12.477          | 0.243                     | 0.139          | 0.891           |
| 15.0                                                                   | 25.4               | 14.9                | 0.884                   | 1.650          | 12.596          | 0.249                     | 0.170          | 0.915           |
| 30.0                                                                   | 25.4               | 29.9                | 0.897                   | 1.972          | 12.927          | 0.264                     | 0.293          | 0.997           |
| 45.0                                                                   | 25.4               | 44.9                | 0.930                   | 2.792          | 13.283          | 0.281                     | 0.488          | 1.122           |
| 60.0                                                                   | 25.4               | 59.8                | 1.029                   | 3.692          | 13.969          | 0.284                     | 0.760          | 1.286           |
| 75.0                                                                   | 25.4               | 74.6                | 0.747                   | 4.606          | 14.414          | 0.228                     | 0.951          | 1.329           |
| 90.0                                                                   | 25.4               | 89.4                | 0.330                   | 7.108          | 13.221          | 0.042                     | 0.970          | 0.834           |
| 105.0                                                                  | 25.4               | 104.4               | 0.311                   | 5.841          | 11.873          | 0.061                     | 1.272          | 0.361           |
| 120.0                                                                  | 25.4               | 119.9               | 0.342                   | 6.653          | 10.715          | 0.055                     | 2.090          | 0.303           |
| 135.0                                                                  | 25.3               | 134.9               | 0.435                   | 4.425          | 10.137          | 0.070                     | 1.206          | 0.135           |
| 150.0                                                                  | 25.4               | 149.9               | 0.437                   | 2.889          | 10.105          | 0.082                     | 0.582          | 0.106           |
| 165.0                                                                  | 25.3               | 164.9               | 0.375                   | 3.240          | 10.168          | 0.087                     | 0.401          | 0.130           |
| 180.0                                                                  | 25.6               | 179.9               | 0.353                   | 3.062          | 10.242          | 0.081                     | 0.370          | 0.139           |
| 195.0                                                                  | 25.3               | 194.7               | 0.385                   | 3.360          | 10.124          | 0.086                     | 0.619          | 0.149           |
| 210.0                                                                  | 25.3               | 209.8               | 0.486                   | 4.007          | 10.109          | 0.080                     | 0.788          | 0.140           |
| 225.0                                                                  | 25.1               | 224.5               | 0.382                   | 5.083          | 9.903           | 0.063                     | 1.339          | 0.203           |
| 240.0                                                                  | 25.4               | 240.2               | 0.235                   | 6.346          | 10.197          | 0.054                     | 2.283          | 0.299           |
| 255.0                                                                  | 25.4               | 255.6               | 0.287                   | 5.776          | 11.378          | 0.067                     | 1.367          | 0.332           |
| 270.0                                                                  | 25.4               | 270.6               | 0.285                   | 5.450          | 13.271          | 0.044                     | 1.166          | 0.903           |
| 285.0                                                                  | 25.4               | 285.4               | 0.782                   | 4.803          | 14.828          | 0.221                     | 1.210          | 1.380           |
| 300.0                                                                  | 25.4               | 300.1               | 0.984                   | 4.012          | 13.955          | 0.278                     | 0.915          | 1.305           |
| 315.0                                                                  | 25.4               | 315.1               | 0.929                   | 2.523          | 13.449          | 0.278                     | 0.586          | 1.132           |
| 330.0                                                                  | 25.4               | 330.0               | 0.892                   | 1.796          | 12.859          | 0.263                     | 0.348          | 1.009           |
| 345.0                                                                  | 25.4               | 345.0               | 0.909                   | 1.397          | 12.618          | 0.249                     | 0.201          | 0.921           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.7:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 4.0$  m and  $T_p = 8.3$  s; Ship's speed is 30.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 30.5               | -0.0                | 0.786                   | 1.447          | 13.095          | 0.247                     | 0.161          | 1.066           |
| 15.0                                                                   | 30.5               | 14.9                | 0.863                   | 1.574          | 13.397          | 0.253                     | 0.171          | 1.093           |
| 30.0                                                                   | 30.5               | 29.9                | 0.876                   | 2.129          | 13.371          | 0.268                     | 0.279          | 1.184           |
| 45.0                                                                   | 30.5               | 44.9                | 0.918                   | 3.088          | 14.059          | 0.285                     | 0.472          | 1.313           |
| 60.0                                                                   | 30.5               | 59.8                | 0.942                   | 4.199          | 14.291          | 0.288                     | 0.751          | 1.455           |
| 75.0                                                                   | 30.5               | 74.7                | 0.729                   | 4.210          | 14.360          | 0.229                     | 0.924          | 1.440           |
| 90.0                                                                   | 30.5               | 89.5                | 0.332                   | 7.590          | 13.368          | 0.044                     | 0.981          | 0.834           |
| 105.0                                                                  | 30.5               | 104.6               | 0.325                   | 6.860          | 11.880          | 0.052                     | 1.453          | 0.343           |
| 120.0                                                                  | 30.4               | 119.9               | 0.501                   | 6.037          | 10.144          | 0.080                     | 2.204          | 0.310           |
| 135.0                                                                  | 30.5               | 134.7               | 0.344                   | 3.635          | 10.082          | 0.080                     | 1.131          | 0.126           |
| 150.0                                                                  | 30.5               | 149.9               | 0.396                   | 3.333          | 10.334          | 0.085                     | 0.668          | 0.159           |
| 165.0                                                                  | 30.5               | 164.8               | 0.351                   | 2.884          | 10.437          | 0.085                     | 0.459          | 0.176           |
| 180.0                                                                  | 30.5               | 179.9               | 0.450                   | 3.242          | 10.416          | 0.089                     | 0.502          | 0.194           |
| 195.0                                                                  | 30.6               | 194.9               | 0.414                   | 3.829          | 10.449          | 0.086                     | 0.684          | 0.190           |
| 210.0                                                                  | 30.4               | 209.9               | 0.379                   | 4.121          | 10.210          | 0.089                     | 0.900          | 0.185           |
| 225.0                                                                  | 30.4               | 224.9               | 0.320                   | 4.339          | 9.966           | 0.079                     | 1.114          | 0.149           |
| 240.0                                                                  | 30.4               | 240.1               | 0.444                   | 7.255          | 10.249          | 0.077                     | 2.261          | 0.321           |
| 255.0                                                                  | 30.5               | 255.3               | 0.242                   | 5.734          | 11.245          | 0.061                     | 1.576          | 0.280           |
| 270.0                                                                  | 30.5               | 270.4               | 0.227                   | 5.061          | 13.323          | 0.048                     | 1.212          | 0.897           |
| 285.0                                                                  | 30.5               | 285.3               | 0.754                   | 5.271          | 14.832          | 0.219                     | 1.235          | 1.480           |
| 300.0                                                                  | 30.5               | 300.2               | 0.918                   | 3.803          | 14.354          | 0.279                     | 0.953          | 1.464           |
| 315.0                                                                  | 30.5               | 315.1               | 0.898                   | 2.783          | 14.335          | 0.280                     | 0.612          | 1.316           |
| 330.0                                                                  | 30.5               | 330.0               | 0.931                   | 2.202          | 13.663          | 0.266                     | 0.373          | 1.185           |
| 345.0                                                                  | 30.5               | 345.0               | 0.816                   | 1.539          | 13.251          | 0.251                     | 0.229          | 1.094           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.8:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 4.0$  m and  $T_p = 15.5$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | -0.0               | -14.9               | 0.488                   | 1.794          | 10.602          | 0.122                     | 0.390          | 0.297           |
| 15.0                                                                   | -0.1               | -6.0                | 0.486                   | 1.125          | 10.593          | 0.124                     | 0.250          | 0.289           |
| 30.0                                                                   | -0.2               | 5.3                 | 0.536                   | 1.534          | 10.632          | 0.123                     | 0.328          | 0.285           |
| 45.0                                                                   | -0.2               | 22.7                | 0.529                   | 2.283          | 10.832          | 0.120                     | 0.598          | 0.291           |
| 60.0                                                                   | -0.1               | 39.4                | 0.378                   | 2.822          | 10.966          | 0.110                     | 0.796          | 0.305           |
| 75.0                                                                   | -0.1               | 53.3                | 0.390                   | 3.437          | 11.124          | 0.094                     | 0.891          | 0.313           |
| 90.0                                                                   | -0.1               | 68.5                | 0.254                   | 3.330          | 11.344          | 0.062                     | 0.917          | 0.308           |
| 105.0                                                                  | -0.1               | 88.4                | 0.163                   | 3.496          | 11.007          | 0.012                     | 0.912          | 0.283           |
| 120.0                                                                  | -0.3               | 99.9                | 0.254                   | 3.566          | 10.831          | 0.030                     | 0.942          | 0.290           |
| 135.0                                                                  | -0.5               | 108.2               | 0.304                   | 3.285          | 11.023          | 0.051                     | 0.951          | 0.301           |
| 150.0                                                                  | -0.8               | 115.2               | 0.336                   | 3.143          | 10.865          | 0.068                     | 0.947          | 0.308           |
| 165.0                                                                  | -1.0               | 119.3               | 0.370                   | 3.228          | 11.011          | 0.076                     | 0.925          | 0.311           |
| 180.0                                                                  | -0.5               | 53.8                | 0.496                   | 2.724          | 10.778          | 0.112                     | 0.631          | 0.296           |
| 195.0                                                                  | 0.1                | 338.6               | 0.433                   | 3.079          | 10.828          | 0.106                     | 0.728          | 0.311           |
| 210.0                                                                  | 0.2                | 248.5               | 0.351                   | 3.440          | 11.114          | 0.059                     | 0.925          | 0.343           |
| 225.0                                                                  | 0.1                | 255.3               | 0.332                   | 3.519          | 10.994          | 0.045                     | 0.926          | 0.339           |
| 240.0                                                                  | 0.1                | 263.7               | 0.238                   | 3.328          | 11.075          | 0.026                     | 0.911          | 0.329           |
| 255.0                                                                  | 0.1                | 275.2               | 0.156                   | 3.404          | 11.016          | 0.021                     | 0.887          | 0.329           |
| 270.0                                                                  | 0.2                | 288.2               | 0.238                   | 3.137          | 11.281          | 0.054                     | 0.879          | 0.350           |
| 285.0                                                                  | 0.2                | 298.6               | 0.297                   | 3.252          | 11.400          | 0.081                     | 0.864          | 0.358           |
| 300.0                                                                  | 0.1                | 308.0               | 0.335                   | 3.142          | 11.212          | 0.098                     | 0.832          | 0.353           |
| 315.0                                                                  | 0.1                | 317.0               | 0.414                   | 3.290          | 11.099          | 0.108                     | 0.766          | 0.341           |
| 330.0                                                                  | 0.1                | 326.3               | 0.466                   | 3.091          | 10.969          | 0.115                     | 0.674          | 0.325           |
| 345.0                                                                  | 0.0                | 336.0               | 0.468                   | 2.599          | 10.736          | 0.119                     | 0.542          | 0.307           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.9:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 4.0$  m and  $T_p = 15.5$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 4.9                | -2.4                | 0.529                   | 1.008          | 10.798          | 0.143                     | 0.160          | 0.346           |
| 15.0                                                                   | 4.8                | 12.3                | 0.540                   | 1.397          | 10.723          | 0.142                     | 0.316          | 0.347           |
| 30.0                                                                   | 4.8                | 27.1                | 0.567                   | 1.987          | 10.829          | 0.137                     | 0.537          | 0.354           |
| 45.0                                                                   | 4.8                | 42.0                | 0.475                   | 2.539          | 11.109          | 0.126                     | 0.706          | 0.364           |
| 60.0                                                                   | 4.8                | 56.5                | 0.338                   | 3.221          | 11.131          | 0.103                     | 0.811          | 0.365           |
| 75.0                                                                   | 4.8                | 71.2                | 0.228                   | 2.957          | 11.245          | 0.059                     | 0.826          | 0.342           |
| 90.0                                                                   | 4.8                | 85.7                | 0.059                   | 3.041          | 10.979          | 0.013                     | 0.827          | 0.309           |
| 105.0                                                                  | 4.7                | 100.0               | 0.124                   | 3.068          | 10.892          | 0.022                     | 0.860          | 0.295           |
| 120.0                                                                  | 4.4                | 110.5               | 0.218                   | 3.702          | 11.204          | 0.044                     | 0.877          | 0.288           |
| 135.0                                                                  | 4.2                | 120.6               | 0.244                   | 2.873          | 10.815          | 0.058                     | 0.844          | 0.271           |
| 150.0                                                                  | 4.5                | 143.2               | 0.336                   | 2.356          | 10.743          | 0.074                     | 0.594          | 0.224           |
| 165.0                                                                  | 4.7                | 161.6               | 0.347                   | 1.562          | 10.732          | 0.079                     | 0.343          | 0.195           |
| 180.0                                                                  | 4.9                | 178.1               | 0.348                   | 1.399          | 10.755          | 0.080                     | 0.259          | 0.186           |
| 195.0                                                                  | 4.9                | 194.3               | 0.360                   | 1.772          | 10.795          | 0.079                     | 0.415          | 0.190           |
| 210.0                                                                  | 4.9                | 210.7               | 0.345                   | 2.232          | 10.731          | 0.075                     | 0.620          | 0.209           |
| 225.0                                                                  | 4.9                | 227.2               | 0.284                   | 2.713          | 10.882          | 0.068                     | 0.781          | 0.244           |
| 240.0                                                                  | 4.8                | 243.0               | 0.209                   | 3.199          | 10.920          | 0.054                     | 0.871          | 0.284           |
| 255.0                                                                  | 4.9                | 257.2               | 0.158                   | 3.027          | 11.018          | 0.030                     | 0.865          | 0.305           |
| 270.0                                                                  | 5.0                | 271.5               | 0.042                   | 3.021          | 11.010          | 0.008                     | 0.827          | 0.324           |
| 285.0                                                                  | 5.0                | 286.0               | 0.235                   | 3.308          | 11.533          | 0.049                     | 0.813          | 0.359           |
| 300.0                                                                  | 5.0                | 300.3               | 0.413                   | 3.118          | 11.638          | 0.096                     | 0.803          | 0.384           |
| 315.0                                                                  | 5.0                | 314.4               | 0.461                   | 2.775          | 11.033          | 0.123                     | 0.707          | 0.379           |
| 330.0                                                                  | 4.9                | 328.6               | 0.482                   | 2.412          | 10.853          | 0.135                     | 0.554          | 0.364           |
| 345.0                                                                  | 4.9                | 343.1               | 0.507                   | 1.684          | 10.826          | 0.141                     | 0.354          | 0.351           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.10:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 4.0$  m and  $T_p = 15.5$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 10.1               | -0.6                | 0.760                   | 0.847          | 11.125          | 0.163                     | 0.089          | 0.396           |
| 15.0                                                                   | 10.1               | 14.4                | 0.647                   | 1.415          | 11.079          | 0.160                     | 0.266          | 0.396           |
| 30.0                                                                   | 10.1               | 29.5                | 0.541                   | 1.970          | 11.041          | 0.154                     | 0.478          | 0.401           |
| 45.0                                                                   | 10.1               | 44.5                | 0.512                   | 2.718          | 11.143          | 0.139                     | 0.635          | 0.405           |
| 60.0                                                                   | 10.1               | 59.3                | 0.363                   | 2.839          | 11.179          | 0.106                     | 0.740          | 0.398           |
| 75.0                                                                   | 10.2               | 74.2                | 0.216                   | 3.147          | 11.462          | 0.053                     | 0.714          | 0.360           |
| 90.0                                                                   | 10.1               | 89.0                | 0.054                   | 2.912          | 11.118          | 0.013                     | 0.728          | 0.315           |
| 105.0                                                                  | 10.1               | 103.9               | 0.115                   | 3.495          | 10.917          | 0.025                     | 0.783          | 0.284           |
| 120.0                                                                  | 10.0               | 118.6               | 0.189                   | 4.046          | 10.966          | 0.041                     | 0.867          | 0.250           |
| 135.0                                                                  | 10.0               | 133.7               | 0.207                   | 3.466          | 10.773          | 0.049                     | 0.806          | 0.212           |
| 150.0                                                                  | 10.0               | 148.9               | 0.186                   | 2.770          | 10.461          | 0.054                     | 0.752          | 0.178           |
| 165.0                                                                  | 10.1               | 164.1               | 0.223                   | 2.386          | 10.384          | 0.056                     | 0.563          | 0.152           |
| 180.0                                                                  | 10.1               | 179.3               | 0.261                   | 1.945          | 10.399          | 0.057                     | 0.342          | 0.133           |
| 195.0                                                                  | 10.1               | 194.6               | 0.234                   | 1.920          | 10.273          | 0.057                     | 0.398          | 0.124           |
| 210.0                                                                  | 10.1               | 210.1               | 0.223                   | 2.300          | 10.406          | 0.055                     | 0.703          | 0.141           |
| 225.0                                                                  | 10.1               | 225.6               | 0.268                   | 2.853          | 10.814          | 0.051                     | 0.882          | 0.178           |
| 240.0                                                                  | 10.1               | 240.8               | 0.228                   | 3.446          | 11.037          | 0.044                     | 0.961          | 0.226           |
| 255.0                                                                  | 10.2               | 255.6               | 0.198                   | 3.618          | 11.106          | 0.029                     | 0.893          | 0.270           |
| 270.0                                                                  | 10.2               | 270.4               | 0.067                   | 3.305          | 11.306          | 0.015                     | 0.818          | 0.320           |
| 285.0                                                                  | 10.2               | 285.1               | 0.199                   | 3.265          | 11.426          | 0.049                     | 0.789          | 0.374           |
| 300.0                                                                  | 10.1               | 299.9               | 0.380                   | 3.118          | 11.489          | 0.104                     | 0.765          | 0.411           |
| 315.0                                                                  | 10.1               | 314.6               | 0.510                   | 2.817          | 11.245          | 0.138                     | 0.640          | 0.410           |
| 330.0                                                                  | 10.1               | 329.5               | 0.606                   | 2.199          | 11.174          | 0.153                     | 0.464          | 0.401           |
| 345.0                                                                  | 10.1               | 344.4               | 0.731                   | 1.446          | 11.243          | 0.161                     | 0.255          | 0.396           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.11:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 4.0$  m and  $T_p = 15.5$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 15.2               | -0.3                | 0.640                   | 0.922          | 10.946          | 0.181                     | 0.086          | 0.435           |
| 15.0                                                                   | 15.2               | 14.8                | 0.634                   | 1.413          | 10.999          | 0.178                     | 0.263          | 0.435           |
| 30.0                                                                   | 15.2               | 29.9                | 0.758                   | 2.224          | 11.240          | 0.170                     | 0.461          | 0.442           |
| 45.0                                                                   | 15.2               | 44.9                | 0.553                   | 2.837          | 11.416          | 0.153                     | 0.633          | 0.450           |
| 60.0                                                                   | 15.2               | 59.8                | 0.398                   | 2.832          | 11.513          | 0.115                     | 0.760          | 0.438           |
| 75.0                                                                   | 15.3               | 74.7                | 0.196                   | 2.768          | 11.207          | 0.055                     | 0.671          | 0.380           |
| 90.0                                                                   | 15.3               | 89.6                | 0.074                   | 3.027          | 11.197          | 0.020                     | 0.674          | 0.318           |
| 105.0                                                                  | 15.3               | 104.5               | 0.130                   | 3.226          | 11.124          | 0.027                     | 0.743          | 0.271           |
| 120.0                                                                  | 15.2               | 119.3               | 0.168                   | 4.113          | 10.848          | 0.035                     | 1.023          | 0.244           |
| 135.0                                                                  | 15.2               | 134.6               | 0.214                   | 3.901          | 10.599          | 0.039                     | 1.002          | 0.202           |
| 150.0                                                                  | 15.2               | 149.7               | 0.173                   | 2.408          | 10.271          | 0.039                     | 0.600          | 0.145           |
| 165.0                                                                  | 15.2               | 164.7               | 0.192                   | 1.686          | 10.195          | 0.048                     | 0.374          | 0.122           |
| 180.0                                                                  | 15.3               | 179.7               | 0.172                   | 1.403          | 10.119          | 0.038                     | 0.170          | 0.095           |
| 195.0                                                                  | 15.2               | 194.8               | 0.242                   | 2.806          | 10.063          | 0.049                     | 0.389          | 0.089           |
| 210.0                                                                  | 15.2               | 209.9               | 0.160                   | 3.189          | 10.006          | 0.041                     | 0.693          | 0.085           |
| 225.0                                                                  | 15.2               | 225.2               | 0.208                   | 3.747          | 10.287          | 0.041                     | 1.135          | 0.120           |
| 240.0                                                                  | 15.2               | 240.4               | 0.193                   | 3.926          | 10.765          | 0.037                     | 1.135          | 0.184           |
| 255.0                                                                  | 15.3               | 255.3               | 0.134                   | 3.373          | 10.920          | 0.030                     | 0.931          | 0.238           |
| 270.0                                                                  | 15.3               | 270.2               | 0.079                   | 3.230          | 10.994          | 0.022                     | 0.826          | 0.313           |
| 285.0                                                                  | 15.3               | 285.0               | 0.195                   | 3.402          | 11.333          | 0.052                     | 0.780          | 0.392           |
| 300.0                                                                  | 15.2               | 299.9               | 0.389                   | 3.251          | 11.320          | 0.113                     | 0.766          | 0.452           |
| 315.0                                                                  | 15.2               | 314.7               | 0.528                   | 2.703          | 11.220          | 0.152                     | 0.616          | 0.454           |
| 330.0                                                                  | 15.2               | 329.7               | 0.677                   | 2.047          | 11.200          | 0.170                     | 0.426          | 0.441           |
| 345.0                                                                  | 15.2               | 344.7               | 0.684                   | 1.352          | 11.119          | 0.179                     | 0.216          | 0.435           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |



**Table U.12:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 4.0$  m and  $T_p = 15.5$  s; Ship's speed is 20.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 20.3               | -0.1                | 0.795                   | 1.097          | 11.382          | 0.198                     | 0.104          | 0.506           |
| 15.0                                                                   | 20.3               | 14.9                | 0.808                   | 1.572          | 11.447          | 0.195                     | 0.272          | 0.506           |
| 30.0                                                                   | 20.3               | 30.0                | 0.685                   | 2.127          | 11.359          | 0.185                     | 0.469          | 0.518           |
| 45.0                                                                   | 20.3               | 45.0                | 0.563                   | 2.806          | 11.533          | 0.165                     | 0.647          | 0.528           |
| 60.0                                                                   | 20.3               | 59.9                | 0.423                   | 3.356          | 11.761          | 0.124                     | 0.802          | 0.499           |
| 75.0                                                                   | 20.4               | 74.8                | 0.225                   | 2.854          | 11.404          | 0.058                     | 0.641          | 0.403           |
| 90.0                                                                   | 20.4               | 89.8                | 0.096                   | 3.085          | 11.182          | 0.026                     | 0.635          | 0.315           |
| 105.0                                                                  | 20.4               | 104.8               | 0.140                   | 3.643          | 10.876          | 0.032                     | 0.694          | 0.252           |
| 120.0                                                                  | 20.3               | 119.7               | 0.187                   | 4.827          | 10.591          | 0.039                     | 1.262          | 0.246           |
| 135.0                                                                  | 20.3               | 134.8               | 0.163                   | 3.442          | 10.082          | 0.042                     | 1.031          | 0.171           |
| 150.0                                                                  | 20.3               | 149.8               | 0.142                   | 2.051          | 10.061          | 0.044                     | 0.575          | 0.114           |
| 165.0                                                                  | 20.4               | 164.8               | 0.203                   | 1.457          | 10.090          | 0.049                     | 0.306          | 0.087           |
| 180.0                                                                  | 20.4               | 179.9               | 0.185                   | 1.719          | 10.039          | 0.050                     | 0.179          | 0.080           |
| 195.0                                                                  | 20.4               | 194.9               | 0.156                   | 2.580          | 9.981           | 0.048                     | 0.371          | 0.069           |
| 210.0                                                                  | 20.4               | 209.9               | 0.183                   | 4.305          | 9.976           | 0.037                     | 0.619          | 0.077           |
| 225.0                                                                  | 20.4               | 225.0               | 0.134                   | 4.234          | 9.961           | 0.034                     | 0.896          | 0.082           |
| 240.0                                                                  | 20.4               | 240.2               | 0.163                   | 4.979          | 10.225          | 0.038                     | 1.381          | 0.145           |
| 255.0                                                                  | 20.4               | 255.1               | 0.184                   | 3.744          | 10.937          | 0.034                     | 0.912          | 0.208           |
| 270.0                                                                  | 20.4               | 270.1               | 0.098                   | 3.228          | 10.919          | 0.028                     | 0.805          | 0.307           |
| 285.0                                                                  | 20.4               | 285.0               | 0.194                   | 3.568          | 11.480          | 0.055                     | 0.757          | 0.414           |
| 300.0                                                                  | 20.4               | 299.9               | 0.412                   | 3.312          | 11.610          | 0.122                     | 0.762          | 0.516           |
| 315.0                                                                  | 20.3               | 314.8               | 0.587                   | 2.713          | 11.619          | 0.164                     | 0.590          | 0.535           |
| 330.0                                                                  | 20.3               | 329.8               | 0.711                   | 2.151          | 11.393          | 0.184                     | 0.398          | 0.520           |
| 345.0                                                                  | 20.3               | 344.8               | 0.721                   | 1.473          | 11.326          | 0.194                     | 0.197          | 0.508           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.13:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 4.0$  m and  $T_p = 15.5$  s; Ship's speed is 25.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 25.4               | -0.1                | 0.757                   | 1.391          | 11.801          | 0.212                     | 0.128          | 0.633           |
| 15.0                                                                   | 25.4               | 15.0                | 0.847                   | 1.635          | 11.862          | 0.208                     | 0.279          | 0.632           |
| 30.0                                                                   | 25.4               | 30.0                | 0.706                   | 2.438          | 11.783          | 0.197                     | 0.467          | 0.639           |
| 45.0                                                                   | 25.4               | 45.0                | 0.642                   | 2.781          | 11.971          | 0.176                     | 0.646          | 0.640           |
| 60.0                                                                   | 25.4               | 60.0                | 0.430                   | 3.401          | 11.989          | 0.133                     | 0.824          | 0.590           |
| 75.0                                                                   | 25.4               | 74.9                | 0.198                   | 2.950          | 11.413          | 0.062                     | 0.627          | 0.428           |
| 90.0                                                                   | 25.4               | 89.9                | 0.113                   | 3.032          | 11.140          | 0.032                     | 0.617          | 0.310           |
| 105.0                                                                  | 25.4               | 104.8               | 0.171                   | 3.464          | 10.941          | 0.040                     | 0.691          | 0.237           |
| 120.0                                                                  | 25.4               | 119.9               | 0.196                   | 5.279          | 10.187          | 0.049                     | 1.578          | 0.246           |
| 135.0                                                                  | 25.4               | 134.9               | 0.160                   | 2.797          | 9.988           | 0.052                     | 1.001          | 0.135           |
| 150.0                                                                  | 25.4               | 149.9               | 0.185                   | 2.498          | 9.972           | 0.059                     | 0.655          | 0.097           |
| 165.0                                                                  | 25.5               | 164.9               | 0.268                   | 2.022          | 10.021          | 0.077                     | 0.399          | 0.091           |
| 180.0                                                                  | 25.6               | 179.9               | 0.204                   | 1.534          | 9.935           | 0.059                     | 0.130          | 0.044           |
| 195.0                                                                  | 25.5               | 195.0               | 0.240                   | 2.869          | 10.018          | 0.073                     | 0.385          | 0.074           |
| 210.0                                                                  | 25.5               | 210.0               | 0.225                   | 3.837          | 9.962           | 0.051                     | 0.675          | 0.088           |
| 225.0                                                                  | 25.4               | 225.0               | 0.152                   | 4.819          | 9.916           | 0.043                     | 0.996          | 0.105           |
| 240.0                                                                  | 25.4               | 240.0               | 0.142                   | 4.747          | 9.899           | 0.040                     | 1.247          | 0.094           |
| 255.0                                                                  | 25.4               | 255.0               | 0.193                   | 3.619          | 10.782          | 0.040                     | 0.851          | 0.185           |
| 270.0                                                                  | 25.4               | 270.0               | 0.128                   | 3.193          | 10.920          | 0.034                     | 0.760          | 0.300           |
| 285.0                                                                  | 25.4               | 285.0               | 0.200                   | 3.572          | 11.408          | 0.058                     | 0.716          | 0.441           |
| 300.0                                                                  | 25.4               | 299.9               | 0.496                   | 4.016          | 12.297          | 0.130                     | 0.744          | 0.609           |
| 315.0                                                                  | 25.4               | 314.9               | 0.631                   | 2.865          | 12.040          | 0.173                     | 0.557          | 0.647           |
| 330.0                                                                  | 25.4               | 329.9               | 0.663                   | 2.221          | 11.806          | 0.196                     | 0.365          | 0.644           |
| 345.0                                                                  | 25.4               | 344.9               | 0.765                   | 1.574          | 11.722          | 0.208                     | 0.185          | 0.634           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.14:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 4.0$  m and  $T_p = 15.5$  s; Ship's speed is 30.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 30.5               | -0.0                | 0.849                   | 1.415          | 12.398          | 0.224                     | 0.158          | 0.802           |
| 15.0                                                                   | 30.5               | 15.0                | 0.838                   | 1.869          | 12.464          | 0.221                     | 0.287          | 0.796           |
| 30.0                                                                   | 30.5               | 30.0                | 0.711                   | 2.406          | 12.473          | 0.208                     | 0.459          | 0.792           |
| 45.0                                                                   | 30.5               | 45.0                | 0.675                   | 3.177          | 12.553          | 0.185                     | 0.639          | 0.774           |
| 60.0                                                                   | 30.5               | 60.0                | 0.482                   | 3.476          | 12.211          | 0.141                     | 0.830          | 0.693           |
| 75.0                                                                   | 30.5               | 75.0                | 0.201                   | 2.793          | 11.385          | 0.065                     | 0.606          | 0.457           |
| 90.0                                                                   | 30.5               | 89.9                | 0.135                   | 2.897          | 11.171          | 0.037                     | 0.615          | 0.303           |
| 105.0                                                                  | 30.5               | 104.9               | 0.190                   | 3.245          | 10.628          | 0.048                     | 0.748          | 0.217           |
| 120.0                                                                  | 30.5               | 119.9               | 0.238                   | 4.000          | 9.958           | 0.056                     | 1.350          | 0.186           |
| 135.0                                                                  | 30.5               | 134.9               | 0.255                   | 3.809          | 9.938           | 0.054                     | 0.867          | 0.106           |
| 150.0                                                                  | 30.6               | 149.9               | 0.261                   | 2.476          | 9.933           | 0.080                     | 0.610          | 0.084           |
| 165.0                                                                  | 30.6               | 164.9               | 0.296                   | 1.948          | 9.903           | 0.093                     | 0.342          | 0.057           |
| 180.0                                                                  | 31.0               | 179.9               | 0.331                   | 2.231          | 9.883           | 0.093                     | 0.222          | 0.043           |
| 195.0                                                                  | 30.6               | 194.9               | 0.256                   | 2.738          | 9.885           | 0.084                     | 0.397          | 0.055           |
| 210.0                                                                  | 30.6               | 210.0               | 0.231                   | 3.214          | 9.883           | 0.072                     | 0.630          | 0.073           |
| 225.0                                                                  | 30.5               | 225.0               | 0.166                   | 4.072          | 9.892           | 0.047                     | 0.886          | 0.102           |
| 240.0                                                                  | 30.5               | 240.1               | 0.223                   | 6.094          | 9.859           | 0.052                     | 1.479          | 0.153           |
| 255.0                                                                  | 30.5               | 255.0               | 0.166                   | 3.699          | 10.551          | 0.048                     | 0.782          | 0.162           |
| 270.0                                                                  | 30.5               | 270.0               | 0.141                   | 3.172          | 10.895          | 0.040                     | 0.688          | 0.293           |
| 285.0                                                                  | 30.5               | 285.0               | 0.212                   | 3.813          | 11.459          | 0.061                     | 0.673          | 0.476           |
| 300.0                                                                  | 30.5               | 299.9               | 0.460                   | 3.414          | 12.203          | 0.135                     | 0.716          | 0.702           |
| 315.0                                                                  | 30.5               | 314.9               | 0.600                   | 3.095          | 12.449          | 0.181                     | 0.531          | 0.776           |
| 330.0                                                                  | 30.5               | 329.9               | 0.741                   | 2.289          | 12.243          | 0.207                     | 0.350          | 0.795           |
| 345.0                                                                  | 30.5               | 344.9               | 0.847                   | 1.640          | 12.507          | 0.220                     | 0.191          | 0.797           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.15:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 6.0$  m and  $T_p = 10.3$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                            | <b>Absolute Maximum</b> |                       |                        | <b>Standard Deviation</b> |                       |                        |
|------------------------------------------------------------------------|--------------------|----------------------------|-------------------------|-----------------------|------------------------|---------------------------|-----------------------|------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts       | $\psi_{\text{MHP}}$<br>deg | Long<br>$\text{m/s}^2$  | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ | Long<br>$\text{m/s}^2$    | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ |
| 0.0                                                                    | -0.1               | -18.2                      | 1.281                   | 3.577                 | 11.607                 | 0.264                     | 0.676                 | 0.682                  |
| 15.0                                                                   | -0.3               | -12.9                      | 1.215                   | 2.793                 | 11.520                 | 0.262                     | 0.527                 | 0.652                  |
| 30.0                                                                   | -0.6               | -3.0                       | 1.179                   | 2.623                 | 11.349                 | 0.258                     | 0.476                 | 0.626                  |
| 45.0                                                                   | -0.9               | 7.5                        | 1.234                   | 3.191                 | 11.925                 | 0.255                     | 0.661                 | 0.609                  |
| 60.0                                                                   | -1.2               | 18.4                       | 1.120                   | 4.551                 | 12.060                 | 0.254                     | 1.013                 | 0.623                  |
| 75.0                                                                   | -1.6               | -14.9                      | 1.144                   | 6.866                 | 13.595                 | 0.252                     | 1.561                 | 0.718                  |
| 90.0                                                                   | -1.5               | -5.5                       | 0.954                   | 10.020                | 14.319                 | 0.246                     | 1.560                 | 0.702                  |
| 105.0                                                                  | -1.3               | -6.7                       | 0.952                   | 7.531                 | 13.142                 | 0.250                     | 1.488                 | 0.691                  |
| 120.0                                                                  | -1.3               | 47.4                       | 1.203                   | 11.600                | 13.344                 | 0.194                     | 1.691                 | 0.732                  |
| 135.0                                                                  | -3.0               | 105.0                      | 0.976                   | 9.560                 | 14.290                 | 0.191                     | 1.845                 | 0.852                  |
| 150.0                                                                  | -3.7               | 109.0                      | 0.912                   | 8.485                 | 13.611                 | 0.204                     | 1.770                 | 0.851                  |
| 165.0                                                                  | -4.0               | 106.1                      | 0.953                   | 10.055                | 13.495                 | 0.202                     | 1.782                 | 0.861                  |
| 180.0                                                                  | -0.2               | 328.0                      | 1.153                   | 4.597                 | 12.514                 | 0.245                     | 0.923                 | 0.656                  |
| 195.0                                                                  | -0.2               | 16.8                       | 1.069                   | 5.935                 | 12.672                 | 0.258                     | 0.973                 | 0.710                  |
| 210.0                                                                  | -0.2               | 385.8                      | 1.025                   | 5.616                 | 12.302                 | 0.258                     | 1.078                 | 0.739                  |
| 225.0                                                                  | -0.1               | 392.3                      | 1.124                   | 5.494                 | 12.859                 | 0.263                     | 1.238                 | 0.785                  |
| 240.0                                                                  | 0.0                | 393.2                      | 1.169                   | 5.923                 | 13.242                 | 0.264                     | 1.381                 | 0.835                  |
| 255.0                                                                  | 0.0                | 386.6                      | 1.031                   | 6.136                 | 13.985                 | 0.261                     | 1.564                 | 0.894                  |
| 270.0                                                                  | 0.5                | 300.2                      | 1.264                   | 6.497                 | 14.163                 | 0.261                     | 1.485                 | 0.912                  |
| 285.0                                                                  | 0.3                | 303.6                      | 1.100                   | 8.013                 | 15.084                 | 0.264                     | 1.424                 | 0.888                  |
| 300.0                                                                  | -0.0               | 309.2                      | 1.270                   | 6.575                 | 15.282                 | 0.271                     | 1.366                 | 0.853                  |
| 315.0                                                                  | -0.1               | 315.9                      | 1.173                   | 6.287                 | 12.989                 | 0.272                     | 1.240                 | 0.813                  |
| 330.0                                                                  | -0.3               | 325.3                      | 1.265                   | 5.182                 | 12.375                 | 0.263                     | 1.030                 | 0.737                  |
| 345.0                                                                  | -0.1               | 333.7                      | 1.231                   | 4.757                 | 11.909                 | 0.264                     | 0.822                 | 0.708                  |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                            |                         |                       |                        |                           |                       |                        |

**Table U.16:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 6.0$  m and  $T_p = 10.3$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                            | <b>Absolute Maximum</b> |                       |                        | <b>Standard Deviation</b> |                       |                        |
|------------------------------------------------------------------------|--------------------|----------------------------|-------------------------|-----------------------|------------------------|---------------------------|-----------------------|------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts       | $\psi_{\text{MHP}}$<br>deg | Long<br>$\text{m/s}^2$  | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ | Long<br>$\text{m/s}^2$    | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ |
| 0.0                                                                    | 4.1                | -10.0                      | 1.395                   | 4.555                 | 11.868                 | 0.298                     | 0.483                 | 0.767                  |
| 15.0                                                                   | 4.0                | -2.0                       | 1.398                   | 2.538                 | 11.883                 | 0.295                     | 0.393                 | 0.746                  |
| 30.0                                                                   | 3.9                | 8.0                        | 1.264                   | 2.400                 | 11.742                 | 0.293                     | 0.461                 | 0.738                  |
| 45.0                                                                   | 3.8                | 19.0                       | 1.422                   | 3.165                 | 11.606                 | 0.292                     | 0.657                 | 0.745                  |
| 60.0                                                                   | 3.8                | 31.1                       | 1.193                   | 4.000                 | 11.990                 | 0.291                     | 0.896                 | 0.769                  |
| 75.0                                                                   | 3.7                | 38.8                       | 1.380                   | 5.002                 | 12.746                 | 0.290                     | 1.069                 | 0.795                  |
| 90.0                                                                   | 3.7                | 46.5                       | 1.302                   | 7.968                 | 13.389                 | 0.285                     | 1.236                 | 0.825                  |
| 105.0                                                                  | 3.7                | 48.9                       | 1.135                   | 9.156                 | 14.562                 | 0.282                     | 1.289                 | 0.837                  |
| 120.0                                                                  | 3.7                | 46.7                       | 1.857                   | 10.601                | 13.488                 | 0.286                     | 1.284                 | 0.839                  |
| 135.0                                                                  | 3.7                | 43.4                       | 1.180                   | 5.839                 | 13.059                 | 0.288                     | 1.121                 | 0.829                  |
| 150.0                                                                  | 3.8                | 45.4                       | 1.114                   | 5.740                 | 12.702                 | 0.287                     | 1.143                 | 0.837                  |
| 165.0                                                                  | 3.8                | 49.5                       | 1.158                   | 6.180                 | 12.898                 | 0.289                     | 1.122                 | 0.835                  |
| 180.0                                                                  | 4.7                | 178.6                      | 0.603                   | 2.702                 | 11.461                 | 0.147                     | 0.502                 | 0.301                  |
| 195.0                                                                  | 4.6                | 197.3                      | 0.588                   | 3.158                 | 11.587                 | 0.149                     | 0.694                 | 0.348                  |
| 210.0                                                                  | 4.1                | 368.4                      | 1.344                   | 6.578                 | 12.706                 | 0.290                     | 0.939                 | 0.795                  |
| 225.0                                                                  | 4.5                | 295.9                      | 1.091                   | 8.276                 | 14.560                 | 0.268                     | 1.497                 | 0.958                  |
| 240.0                                                                  | 4.7                | 286.9                      | 1.184                   | 8.189                 | 15.071                 | 0.237                     | 1.635                 | 1.051                  |
| 255.0                                                                  | 4.5                | 289.3                      | 1.208                   | 7.931                 | 14.543                 | 0.247                     | 1.640                 | 1.052                  |
| 270.0                                                                  | 4.4                | 292.8                      | 1.648                   | 6.227                 | 15.237                 | 0.267                     | 1.583                 | 1.043                  |
| 285.0                                                                  | 4.5                | 295.6                      | 1.154                   | 7.591                 | 15.271                 | 0.277                     | 1.572                 | 1.024                  |
| 300.0                                                                  | 4.7                | 302.6                      | 1.152                   | 6.824                 | 13.730                 | 0.295                     | 1.389                 | 0.968                  |
| 315.0                                                                  | 4.7                | 314.4                      | 1.245                   | 5.379                 | 12.603                 | 0.306                     | 1.140                 | 0.901                  |
| 330.0                                                                  | 4.6                | 327.1                      | 1.286                   | 5.096                 | 11.969                 | 0.304                     | 0.871                 | 0.843                  |
| 345.0                                                                  | 4.4                | 340.0                      | 1.333                   | 3.355                 | 11.989                 | 0.301                     | 0.623                 | 0.799                  |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                            |                         |                       |                        |                           |                       |                        |

**Table U.17:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 6.0$  m and  $T_p = 10.3$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 9.8                | -1.2                | 1.349                   | 2.165          | 12.029          | 0.331                     | 0.265          | 0.890           |
| 15.0                                                                   | 9.7                | 13.7                | 1.465                   | 1.904          | 12.201          | 0.329                     | 0.364          | 0.883           |
| 30.0                                                                   | 9.7                | 28.7                | 1.359                   | 2.665          | 12.160          | 0.331                     | 0.652          | 0.907           |
| 45.0                                                                   | 9.7                | 43.7                | 1.496                   | 4.203          | 12.550          | 0.328                     | 0.958          | 0.936           |
| 60.0                                                                   | 9.7                | 58.2                | 1.075                   | 5.704          | 13.506          | 0.309                     | 1.264          | 1.004           |
| 75.0                                                                   | 9.7                | 71.6                | 1.613                   | 7.696          | 14.927          | 0.257                     | 1.467          | 1.105           |
| 90.0                                                                   | 9.0                | 81.8                | 0.830                   | 9.335          | 14.880          | 0.150                     | 1.492          | 1.031           |
| 105.0                                                                  | 8.6                | 88.7                | 0.752                   | 11.164         | 13.905          | 0.085                     | 1.651          | 0.905           |
| 120.0                                                                  | 8.4                | 100.7               | 0.758                   | 9.499          | 13.538          | 0.106                     | 1.713          | 0.761           |
| 135.0                                                                  | 8.9                | 125.6               | 0.582                   | 7.513          | 12.472          | 0.123                     | 1.419          | 0.448           |
| 150.0                                                                  | 9.4                | 145.7               | 0.461                   | 4.255          | 10.994          | 0.110                     | 1.329          | 0.283           |
| 165.0                                                                  | 9.6                | 162.0               | 0.394                   | 4.146          | 10.634          | 0.105                     | 1.246          | 0.240           |
| 180.0                                                                  | 9.9                | 178.3               | 0.376                   | 3.983          | 10.550          | 0.103                     | 0.983          | 0.187           |
| 195.0                                                                  | 10.0               | 194.6               | 0.438                   | 3.353          | 11.065          | 0.105                     | 0.806          | 0.176           |
| 210.0                                                                  | 9.8                | 211.5               | 0.431                   | 3.593          | 11.152          | 0.112                     | 1.227          | 0.252           |
| 225.0                                                                  | 9.3                | 231.7               | 0.697                   | 7.101          | 12.612          | 0.127                     | 1.512          | 0.431           |
| 240.0                                                                  | 8.5                | 259.3               | 1.792                   | 11.948         | 15.611          | 0.138                     | 1.756          | 0.813           |
| 255.0                                                                  | 8.6                | 269.8               | 1.299                   | 12.240         | 16.826          | 0.104                     | 1.691          | 0.946           |
| 270.0                                                                  | 9.2                | 277.4               | 0.828                   | 8.762          | 15.001          | 0.137                     | 1.609          | 1.108           |
| 285.0                                                                  | 10.0               | 287.5               | 1.181                   | 7.137          | 15.076          | 0.257                     | 1.573          | 1.212           |
| 300.0                                                                  | 10.0               | 300.3               | 1.083                   | 4.566          | 13.494          | 0.313                     | 1.371          | 1.071           |
| 315.0                                                                  | 9.8                | 314.3               | 1.270                   | 5.477          | 12.526          | 0.333                     | 1.048          | 0.969           |
| 330.0                                                                  | 9.8                | 329.1               | 1.430                   | 4.529          | 12.365          | 0.336                     | 0.705          | 0.934           |
| 345.0                                                                  | 9.8                | 343.9               | 1.366                   | 2.496          | 12.372          | 0.333                     | 0.424          | 0.893           |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.18:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 6.0$  m and  $T_p = 10.3$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                            | <b>Absolute Maximum</b> |                       |                        | <b>Standard Deviation</b> |                       |                        |
|------------------------------------------------------------------------|--------------------|----------------------------|-------------------------|-----------------------|------------------------|---------------------------|-----------------------|------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts       | $\psi_{\text{MHP}}$<br>deg | Long<br>$\text{m/s}^2$  | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ | Long<br>$\text{m/s}^2$    | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ |
| 0.0                                                                    | 15.0               | -0.5                       | 1.523                   | 1.862                 | 12.440                 | 0.361                     | 0.240                 | 0.959                  |
| 15.0                                                                   | 15.0               | 14.6                       | 1.459                   | 2.152                 | 12.303                 | 0.361                     | 0.369                 | 0.966                  |
| 30.0                                                                   | 15.0               | 29.6                       | 1.444                   | 2.659                 | 12.614                 | 0.363                     | 0.616                 | 0.997                  |
| 45.0                                                                   | 15.0               | 44.7                       | 1.354                   | 3.738                 | 12.660                 | 0.356                     | 0.921                 | 1.043                  |
| 60.0                                                                   | 15.0               | 59.4                       | 1.101                   | 6.974                 | 13.430                 | 0.327                     | 1.231                 | 1.141                  |
| 75.0                                                                   | 15.1               | 73.7                       | 1.099                   | 7.965                 | 15.228                 | 0.253                     | 1.357                 | 1.237                  |
| 90.0                                                                   | 14.9               | 87.7                       | 0.921                   | 7.958                 | 14.411                 | 0.078                     | 1.363                 | 0.962                  |
| 105.0                                                                  | 14.8               | 102.4                      | 0.532                   | 11.121                | 13.859                 | 0.099                     | 1.595                 | 0.698                  |
| 120.0                                                                  | 14.6               | 116.8                      | 0.515                   | 7.919                 | 13.053                 | 0.089                     | 1.779                 | 0.519                  |
| 135.0                                                                  | 15.0               | 133.5                      | 0.366                   | 5.143                 | 11.265                 | 0.069                     | 1.717                 | 0.364                  |
| 150.0                                                                  | 15.0               | 149.2                      | 0.289                   | 4.028                 | 10.670                 | 0.083                     | 1.287                 | 0.260                  |
| 165.0                                                                  | 15.0               | 164.1                      | 0.372                   | 3.691                 | 10.646                 | 0.091                     | 0.753                 | 0.188                  |
| 180.0                                                                  | 15.0               | 179.2                      | 0.425                   | 3.591                 | 10.543                 | 0.103                     | 0.618                 | 0.162                  |
| 195.0                                                                  | 15.1               | 194.4                      | 0.389                   | 4.656                 | 10.058                 | 0.083                     | 0.755                 | 0.109                  |
| 210.0                                                                  | 15.1               | 209.7                      | 0.464                   | 4.547                 | 10.796                 | 0.077                     | 1.211                 | 0.120                  |
| 225.0                                                                  | 15.0               | 226.3                      | 0.531                   | 6.419                 | 11.559                 | 0.083                     | 1.901                 | 0.263                  |
| 240.0                                                                  | 14.6               | 243.5                      | 0.730                   | 9.400                 | 13.180                 | 0.103                     | 1.955                 | 0.486                  |
| 255.0                                                                  | 14.5               | 258.6                      | 1.237                   | 12.655                | 16.760                 | 0.116                     | 1.814                 | 0.717                  |
| 270.0                                                                  | 14.8               | 272.6                      | 0.787                   | 8.757                 | 14.888                 | 0.071                     | 1.652                 | 1.040                  |
| 285.0                                                                  | 15.2               | 286.1                      | 1.155                   | 7.699                 | 14.928                 | 0.250                     | 1.589                 | 1.322                  |
| 300.0                                                                  | 15.1               | 300.0                      | 1.341                   | 5.444                 | 14.857                 | 0.328                     | 1.331                 | 1.203                  |
| 315.0                                                                  | 15.0               | 314.6                      | 1.261                   | 3.854                 | 12.841                 | 0.358                     | 0.965                 | 1.075                  |
| 330.0                                                                  | 15.0               | 329.5                      | 1.405                   | 2.898                 | 12.514                 | 0.364                     | 0.646                 | 1.010                  |
| 345.0                                                                  | 15.0               | 344.5                      | 1.500                   | 2.289                 | 12.385                 | 0.363                     | 0.373                 | 0.971                  |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                            |                         |                       |                        |                           |                       |                        |

**Table U.19:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 6.0$  m and  $T_p = 10.3$  s; Ship's speed is 20.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 20.2               | -0.2                | 1.542                   | 1.959          | 13.027          | 0.386                     | 0.255          | 1.111           |
| 15.0                                                                   | 20.2               | 14.8                | 1.463                   | 2.310          | 13.068          | 0.387                     | 0.369          | 1.118           |
| 30.0                                                                   | 20.2               | 29.9                | 1.537                   | 3.472          | 13.157          | 0.388                     | 0.607          | 1.167           |
| 45.0                                                                   | 20.2               | 44.9                | 1.355                   | 4.316          | 13.385          | 0.379                     | 0.891          | 1.229           |
| 60.0                                                                   | 20.2               | 59.7                | 1.193                   | 4.851          | 14.032          | 0.343                     | 1.184          | 1.324           |
| 75.0                                                                   | 20.3               | 74.2                | 1.146                   | 8.139          | 16.048          | 0.253                     | 1.312          | 1.348           |
| 90.0                                                                   | 20.2               | 88.7                | 0.607                   | 8.093          | 14.431          | 0.064                     | 1.300          | 0.941           |
| 105.0                                                                  | 20.1               | 103.7               | 0.554                   | 8.141          | 13.912          | 0.086                     | 1.619          | 0.633           |
| 120.0                                                                  | 20.2               | 118.8               | 0.313                   | 6.600          | 11.805          | 0.067                     | 2.171          | 0.500           |
| 135.0                                                                  | 20.2               | 134.7               | 0.370                   | 4.968          | 10.594          | 0.068                     | 1.524          | 0.254           |
| 150.0                                                                  | 20.3               | 149.6               | 0.503                   | 3.721          | 10.326          | 0.088                     | 1.084          | 0.171           |
| 165.0                                                                  | 20.1               | 164.5               | 0.605                   | 3.826          | 10.268          | 0.100                     | 0.644          | 0.142           |
| 180.0                                                                  | 20.6               | 179.5               | 0.724                   | 4.266          | 10.229          | 0.106                     | 0.598          | 0.134           |
| 195.0                                                                  | 20.1               | 194.4               | 0.667                   | 4.766          | 9.995           | 0.099                     | 0.866          | 0.165           |
| 210.0                                                                  | 20.2               | 209.9               | 0.692                   | 6.170          | 9.971           | 0.091                     | 1.351          | 0.212           |
| 225.0                                                                  | 20.0               | 225.5               | 0.409                   | 6.325          | 10.890          | 0.076                     | 2.094          | 0.270           |
| 240.0                                                                  | 20.2               | 241.0               | 0.381                   | 7.258          | 11.653          | 0.075                     | 2.485          | 0.356           |
| 255.0                                                                  | 19.9               | 256.9               | 0.488                   | 13.364         | 13.851          | 0.100                     | 1.957          | 0.618           |
| 270.0                                                                  | 20.1               | 271.4               | 0.841                   | 10.109         | 14.039          | 0.068                     | 1.713          | 1.029           |
| 285.0                                                                  | 20.3               | 285.7               | 1.020                   | 7.366          | 15.687          | 0.246                     | 1.623          | 1.428           |
| 300.0                                                                  | 20.3               | 300.0               | 1.218                   | 4.513          | 14.135          | 0.339                     | 1.314          | 1.384           |
| 315.0                                                                  | 20.2               | 314.8               | 1.264                   | 3.925          | 13.671          | 0.375                     | 0.941          | 1.260           |
| 330.0                                                                  | 20.2               | 329.7               | 1.439                   | 3.068          | 13.120          | 0.387                     | 0.623          | 1.187           |
| 345.0                                                                  | 20.2               | 344.8               | 1.513                   | 2.232          | 13.093          | 0.387                     | 0.369          | 1.127           |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |



**Table U.20:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 6.0$  m and  $T_p = 10.3$  s; Ship's speed is 25.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                            | <b>Absolute Maximum</b> |                       |                        | <b>Standard Deviation</b> |                       |                        |
|------------------------------------------------------------------------|--------------------|----------------------------|-------------------------|-----------------------|------------------------|---------------------------|-----------------------|------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts       | $\psi_{\text{MHP}}$<br>deg | Long<br>$\text{m/s}^2$  | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ | Long<br>$\text{m/s}^2$    | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ |
| 0.0                                                                    | 25.4               | -0.1                       | 1.463                   | 2.104                 | 14.104                 | 0.404                     | 0.306                 | 1.357                  |
| 15.0                                                                   | 25.4               | 14.9                       | 1.403                   | 2.635                 | 13.881                 | 0.405                     | 0.396                 | 1.366                  |
| 30.0                                                                   | 25.4               | 29.9                       | 1.567                   | 3.854                 | 14.577                 | 0.406                     | 0.607                 | 1.412                  |
| 45.0                                                                   | 25.3               | 44.9                       | 1.585                   | 4.370                 | 14.292                 | 0.395                     | 0.868                 | 1.471                  |
| 60.0                                                                   | 25.3               | 59.8                       | 1.289                   | 5.848                 | 14.774                 | 0.355                     | 1.163                 | 1.527                  |
| 75.0                                                                   | 25.3               | 74.5                       | 0.974                   | 8.631                 | 15.262                 | 0.256                     | 1.281                 | 1.468                  |
| 90.0                                                                   | 25.3               | 89.2                       | 0.682                   | 8.595                 | 14.686                 | 0.065                     | 1.295                 | 0.939                  |
| 105.0                                                                  | 25.2               | 104.2                      | 0.484                   | 10.606                | 13.398                 | 0.086                     | 1.909                 | 0.597                  |
| 120.0                                                                  | 25.2               | 119.7                      | 0.387                   | 7.581                 | 10.927                 | 0.078                     | 2.652                 | 0.475                  |
| 135.0                                                                  | 25.2               | 134.7                      | 0.375                   | 4.711                 | 10.361                 | 0.091                     | 1.727                 | 0.231                  |
| 150.0                                                                  | 25.1               | 149.8                      | 0.768                   | 3.979                 | 10.242                 | 0.119                     | 1.089                 | 0.171                  |
| 165.0                                                                  | 25.8               | 164.4                      | 0.368                   | 3.900                 | 9.964                  | 0.108                     | 0.579                 | 0.117                  |
| 180.0                                                                  | 25.6               | 179.8                      | 0.503                   | 3.948                 | 10.033                 | 0.113                     | 0.574                 | 0.128                  |
| 195.0                                                                  | 25.7               | 195.1                      | 0.402                   | 4.184                 | 9.996                  | 0.105                     | 0.770                 | 0.149                  |
| 210.0                                                                  | 25.4               | 210.0                      | 0.496                   | 4.770                 | 9.973                  | 0.107                     | 1.190                 | 0.206                  |
| 225.0                                                                  | 25.2               | 225.3                      | 0.463                   | 6.886                 | 10.197                 | 0.092                     | 1.942                 | 0.312                  |
| 240.0                                                                  | 25.2               | 240.5                      | 0.453                   | 8.187                 | 11.492                 | 0.074                     | 2.699                 | 0.385                  |
| 255.0                                                                  | 25.2               | 255.9                      | 0.406                   | 9.041                 | 12.381                 | 0.092                     | 2.082                 | 0.505                  |
| 270.0                                                                  | 25.3               | 270.9                      | 0.584                   | 9.510                 | 14.138                 | 0.070                     | 1.753                 | 1.011                  |
| 285.0                                                                  | 25.4               | 285.5                      | 0.991                   | 8.457                 | 15.328                 | 0.245                     | 1.641                 | 1.551                  |
| 300.0                                                                  | 25.4               | 300.1                      | 1.189                   | 4.848                 | 14.845                 | 0.345                     | 1.344                 | 1.574                  |
| 315.0                                                                  | 25.4               | 314.9                      | 1.495                   | 4.031                 | 14.785                 | 0.387                     | 0.960                 | 1.497                  |
| 330.0                                                                  | 25.4               | 329.9                      | 1.400                   | 2.969                 | 14.677                 | 0.401                     | 0.634                 | 1.433                  |
| 345.0                                                                  | 25.4               | 344.9                      | 1.490                   | 2.262                 | 13.877                 | 0.403                     | 0.396                 | 1.374                  |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                            |                         |                       |                        |                           |                       |                        |

**Table U.21:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 6.0$  m and  $T_p = 10.3$  s; Ship's speed is 30.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 30.5               | -0.0                | 1.390                   | 2.482          | 15.179          | 0.415                     | 0.370          | 1.643           |
| 15.0                                                                   | 30.5               | 15.0                | 1.565                   | 3.099          | 15.054          | 0.417                     | 0.426          | 1.654           |
| 30.0                                                                   | 30.5               | 30.0                | 1.476                   | 4.805          | 14.953          | 0.418                     | 0.617          | 1.697           |
| 45.0                                                                   | 30.5               | 44.9                | 1.421                   | 5.188          | 15.140          | 0.405                     | 0.864          | 1.730           |
| 60.0                                                                   | 30.4               | 59.8                | 1.331                   | 5.388          | 15.040          | 0.366                     | 1.131          | 1.741           |
| 75.0                                                                   | 30.4               | 74.6                | 0.898                   | 7.222          | 16.126          | 0.259                     | 1.234          | 1.591           |
| 90.0                                                                   | 30.4               | 89.4                | 0.458                   | 8.446          | 14.741          | 0.068                     | 1.291          | 0.925           |
| 105.0                                                                  | 30.3               | 104.5               | 0.487                   | 8.908          | 12.396          | 0.087                     | 2.251          | 0.561           |
| 120.0                                                                  | 30.1               | 119.7               | 0.556                   | 7.543          | 11.528          | 0.124                     | 2.981          | 0.511           |
| 135.0                                                                  | 30.2               | 135.0               | 0.976                   | 5.736          | 10.631          | 0.128                     | 1.606          | 0.243           |
| 150.0                                                                  | 30.9               | 148.9               | 0.694                   | 4.849          | 10.029          | 0.138                     | 1.079          | 0.211           |
| 165.0                                                                  | 31.3               | 164.3               | 0.573                   | 4.319          | 10.174          | 0.137                     | 0.739          | 0.193           |
| 180.0                                                                  | 30.3               | 179.5               | 0.996                   | 5.040          | 10.185          | 0.155                     | 0.850          | 0.228           |
| 195.0                                                                  | 31.3               | 195.1               | 0.979                   | 4.508          | 10.218          | 0.134                     | 0.978          | 0.211           |
| 210.0                                                                  | 31.0               | 210.7               | 0.802                   | 4.554          | 10.106          | 0.125                     | 1.259          | 0.176           |
| 225.0                                                                  | 30.3               | 225.1               | 0.918                   | 6.089          | 10.465          | 0.123                     | 1.674          | 0.284           |
| 240.0                                                                  | 30.2               | 240.6               | 0.547                   | 8.578          | 12.807          | 0.115                     | 2.823          | 0.487           |
| 255.0                                                                  | 30.3               | 255.5               | 0.496                   | 12.188         | 13.302          | 0.094                     | 2.409          | 0.483           |
| 270.0                                                                  | 30.4               | 270.6               | 0.561                   | 9.195          | 13.997          | 0.075                     | 1.701          | 0.995           |
| 285.0                                                                  | 30.5               | 285.4               | 1.052                   | 8.107          | 16.469          | 0.243                     | 1.706          | 1.653           |
| 300.0                                                                  | 30.5               | 300.1               | 1.135                   | 5.299          | 15.424          | 0.350                     | 1.403          | 1.780           |
| 315.0                                                                  | 30.5               | 315.1               | 1.508                   | 4.120          | 16.161          | 0.395                     | 1.029          | 1.753           |
| 330.0                                                                  | 30.5               | 330.0               | 1.320                   | 3.190          | 15.386          | 0.409                     | 0.685          | 1.706           |
| 345.0                                                                  | 30.5               | 345.0               | 1.483                   | 2.520          | 14.937          | 0.413                     | 0.458          | 1.659           |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.22:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 6.0$  m and  $T_p = 16.2$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | -0.2               | -19.6               | 0.714                   | 3.146          | 11.010          | 0.171                     | 0.616          | 0.429           |
| 15.0                                                                   | -0.4               | -11.2               | 0.730                   | 2.432          | 11.050          | 0.173                     | 0.498          | 0.417           |
| 30.0                                                                   | -0.6               | -1.8                | 0.756                   | 2.080          | 10.859          | 0.174                     | 0.476          | 0.408           |
| 45.0                                                                   | -0.4               | 17.6                | 0.668                   | 2.996          | 11.047          | 0.169                     | 0.753          | 0.413           |
| 60.0                                                                   | -0.1               | 40.8                | 0.596                   | 4.185          | 11.374          | 0.149                     | 1.064          | 0.436           |
| 75.0                                                                   | 0.1                | 57.8                | 0.541                   | 4.418          | 11.738          | 0.116                     | 1.183          | 0.439           |
| 90.0                                                                   | 0.1                | 74.2                | 0.411                   | 3.993          | 11.850          | 0.063                     | 1.179          | 0.419           |
| 105.0                                                                  | -0.2               | 93.6                | 0.202                   | 3.993          | 11.648          | 0.023                     | 1.194          | 0.403           |
| 120.0                                                                  | -0.6               | 104.0               | 0.324                   | 5.031          | 11.667          | 0.052                     | 1.241          | 0.420           |
| 135.0                                                                  | -1.1               | 111.6               | 0.380                   | 5.014          | 11.548          | 0.078                     | 1.246          | 0.434           |
| 150.0                                                                  | -1.5               | 118.3               | 0.487                   | 4.576          | 11.501          | 0.100                     | 1.223          | 0.440           |
| 165.0                                                                  | -1.8               | 124.3               | 0.548                   | 3.914          | 11.578          | 0.116                     | 1.164          | 0.443           |
| 180.0                                                                  | -1.3               | 86.0                | 0.663                   | 3.338          | 11.442          | 0.147                     | 1.052          | 0.429           |
| 195.0                                                                  | 0.0                | 358.1               | 0.652                   | 3.489          | 11.511          | 0.152                     | 0.967          | 0.442           |
| 210.0                                                                  | 0.3                | 252.3               | 0.544                   | 4.737          | 11.727          | 0.071                     | 1.222          | 0.460           |
| 225.0                                                                  | 0.1                | 258.0               | 0.461                   | 4.888          | 11.899          | 0.056                     | 1.224          | 0.458           |
| 240.0                                                                  | 0.0                | 265.7               | 0.304                   | 5.362          | 11.799          | 0.035                     | 1.202          | 0.448           |
| 255.0                                                                  | 0.1                | 275.9               | 0.249                   | 5.106          | 11.765          | 0.033                     | 1.168          | 0.448           |
| 270.0                                                                  | 0.2                | 287.1               | 0.353                   | 5.486          | 12.016          | 0.067                     | 1.142          | 0.467           |
| 285.0                                                                  | 0.2                | 296.8               | 0.399                   | 5.239          | 12.033          | 0.102                     | 1.115          | 0.482           |
| 300.0                                                                  | 0.2                | 305.4               | 0.487                   | 4.786          | 11.918          | 0.127                     | 1.071          | 0.484           |
| 315.0                                                                  | 0.2                | 314.1               | 0.578                   | 4.028          | 11.787          | 0.145                     | 1.002          | 0.476           |
| 330.0                                                                  | 0.1                | 322.8               | 0.688                   | 4.522          | 11.544          | 0.158                     | 0.898          | 0.462           |
| 345.0                                                                  | -0.1               | 331.6               | 0.710                   | 4.121          | 11.195          | 0.165                     | 0.768          | 0.445           |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.23:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 6.0$  m and  $T_p = 16.2$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 4.2                | -13.9               | 0.910                   | 2.919          | 11.156          | 0.201                     | 0.585          | 0.485           |
| 15.0                                                                   | 4.1                | -5.4                | 0.875                   | 2.379          | 11.089          | 0.202                     | 0.501          | 0.478           |
| 30.0                                                                   | 4.0                | 5.6                 | 0.835                   | 2.334          | 11.150          | 0.201                     | 0.533          | 0.478           |
| 45.0                                                                   | 4.1                | 24.0                | 0.945                   | 3.145          | 11.427          | 0.192                     | 0.780          | 0.490           |
| 60.0                                                                   | 4.2                | 43.6                | 0.654                   | 3.862          | 11.671          | 0.167                     | 1.036          | 0.508           |
| 75.0                                                                   | 4.3                | 58.6                | 0.527                   | 4.259          | 11.901          | 0.126                     | 1.136          | 0.497           |
| 90.0                                                                   | 4.3                | 73.3                | 0.270                   | 3.797          | 11.592          | 0.065                     | 1.138          | 0.460           |
| 105.0                                                                  | 4.3                | 89.5                | 0.153                   | 5.054          | 11.771          | 0.017                     | 1.144          | 0.427           |
| 120.0                                                                  | 4.2                | 100.7               | 0.270                   | 4.760          | 11.701          | 0.034                     | 1.170          | 0.423           |
| 135.0                                                                  | 4.0                | 109.6               | 0.324                   | 4.982          | 11.599          | 0.055                     | 1.172          | 0.415           |
| 150.0                                                                  | 3.9                | 116.9               | 0.482                   | 4.295          | 11.412          | 0.071                     | 1.156          | 0.404           |
| 165.0                                                                  | 3.8                | 128.1               | 0.573                   | 4.014          | 11.396          | 0.089                     | 1.047          | 0.379           |
| 180.0                                                                  | 3.9                | 149.1               | 0.589                   | 2.934          | 11.375          | 0.109                     | 0.742          | 0.323           |
| 195.0                                                                  | 4.7                | 194.1               | 0.595                   | 2.694          | 11.421          | 0.112                     | 0.624          | 0.272           |
| 210.0                                                                  | 4.6                | 213.1               | 0.497                   | 3.636          | 11.134          | 0.105                     | 0.875          | 0.307           |
| 225.0                                                                  | 4.5                | 232.8               | 0.616                   | 4.800          | 11.845          | 0.091                     | 1.093          | 0.370           |
| 240.0                                                                  | 4.5                | 248.1               | 0.408                   | 4.942          | 11.635          | 0.065                     | 1.182          | 0.408           |
| 255.0                                                                  | 4.7                | 260.6               | 0.227                   | 4.677          | 11.645          | 0.036                     | 1.177          | 0.425           |
| 270.0                                                                  | 4.8                | 273.8               | 0.147                   | 5.138          | 11.478          | 0.018                     | 1.140          | 0.444           |
| 285.0                                                                  | 4.9                | 287.5               | 0.321                   | 5.511          | 12.028          | 0.070                     | 1.114          | 0.488           |
| 300.0                                                                  | 4.9                | 300.8               | 0.642                   | 4.356          | 12.510          | 0.128                     | 1.074          | 0.518           |
| 315.0                                                                  | 4.9                | 313.9               | 0.701                   | 3.569          | 11.635          | 0.166                     | 0.961          | 0.519           |
| 330.0                                                                  | 4.7                | 326.7               | 0.834                   | 3.645          | 11.521          | 0.187                     | 0.805          | 0.509           |
| 345.0                                                                  | 4.5                | 338.6               | 0.794                   | 3.319          | 11.466          | 0.197                     | 0.665          | 0.495           |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.24:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 6.0$  m and  $T_p = 16.2$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 9.9                | -1.3                | 0.909                   | 2.002          | 11.414          | 0.229                     | 0.222          | 0.555           |
| 15.0                                                                   | 9.9                | 13.8                | 1.073                   | 2.242          | 11.631          | 0.226                     | 0.419          | 0.559           |
| 30.0                                                                   | 9.9                | 28.9                | 0.905                   | 2.836          | 11.487          | 0.214                     | 0.671          | 0.566           |
| 45.0                                                                   | 9.9                | 43.9                | 0.717                   | 3.534          | 11.522          | 0.190                     | 0.866          | 0.568           |
| 60.0                                                                   | 10.0               | 58.7                | 0.469                   | 3.869          | 11.951          | 0.142                     | 0.987          | 0.548           |
| 75.0                                                                   | 10.1               | 73.5                | 0.301                   | 4.319          | 11.907          | 0.072                     | 0.958          | 0.500           |
| 90.0                                                                   | 10.0               | 88.3                | 0.092                   | 4.236          | 11.539          | 0.021                     | 0.966          | 0.449           |
| 105.0                                                                  | 10.0               | 103.2               | 0.180                   | 4.712          | 11.609          | 0.034                     | 1.024          | 0.417           |
| 120.0                                                                  | 9.7                | 117.3               | 0.286                   | 5.192          | 11.780          | 0.054                     | 1.086          | 0.384           |
| 135.0                                                                  | 9.7                | 132.1               | 0.354                   | 4.573          | 11.505          | 0.066                     | 0.980          | 0.330           |
| 150.0                                                                  | 9.7                | 147.6               | 0.330                   | 3.773          | 11.026          | 0.075                     | 0.937          | 0.273           |
| 165.0                                                                  | 9.8                | 163.1               | 0.358                   | 3.412          | 10.656          | 0.080                     | 0.833          | 0.233           |
| 180.0                                                                  | 9.9                | 178.6               | 0.340                   | 3.034          | 10.447          | 0.081                     | 0.639          | 0.195           |
| 195.0                                                                  | 10.0               | 194.3               | 0.385                   | 2.903          | 10.530          | 0.082                     | 0.646          | 0.168           |
| 210.0                                                                  | 9.9                | 210.5               | 0.439                   | 3.184          | 11.058          | 0.079                     | 0.956          | 0.204           |
| 225.0                                                                  | 9.8                | 226.6               | 0.462                   | 4.205          | 11.607          | 0.072                     | 1.195          | 0.259           |
| 240.0                                                                  | 9.8                | 242.1               | 0.338                   | 4.160          | 11.846          | 0.061                     | 1.305          | 0.328           |
| 255.0                                                                  | 10.0               | 256.5               | 0.230                   | 4.300          | 11.642          | 0.042                     | 1.255          | 0.374           |
| 270.0                                                                  | 10.1               | 271.0               | 0.105                   | 4.919          | 11.450          | 0.023                     | 1.178          | 0.435           |
| 285.0                                                                  | 10.1               | 285.5               | 0.306                   | 5.164          | 12.153          | 0.064                     | 1.116          | 0.501           |
| 300.0                                                                  | 10.1               | 300.0               | 0.564                   | 4.683          | 12.157          | 0.137                     | 1.061          | 0.555           |
| 315.0                                                                  | 10.0               | 314.3               | 0.711                   | 3.562          | 11.697          | 0.187                     | 0.879          | 0.562           |
| 330.0                                                                  | 9.9                | 329.0               | 0.814                   | 2.855          | 11.487          | 0.213                     | 0.645          | 0.559           |
| 345.0                                                                  | 9.9                | 343.8               | 0.963                   | 2.556          | 11.441          | 0.224                     | 0.392          | 0.552           |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.25:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 6.0$  m and  $T_p = 16.2$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 15.1               | -0.5                | 0.885                   | 1.548          | 11.317          | 0.253                     | 0.192          | 0.611           |
| 15.0                                                                   | 15.1               | 14.6                | 0.987                   | 2.141          | 11.557          | 0.250                     | 0.404          | 0.614           |
| 30.0                                                                   | 15.1               | 29.7                | 0.857                   | 2.958          | 11.919          | 0.236                     | 0.667          | 0.624           |
| 45.0                                                                   | 15.1               | 44.7                | 0.782                   | 3.624          | 12.199          | 0.208                     | 0.877          | 0.626           |
| 60.0                                                                   | 15.1               | 59.5                | 0.523                   | 4.230          | 12.188          | 0.152                     | 1.021          | 0.597           |
| 75.0                                                                   | 15.2               | 74.4                | 0.307                   | 4.160          | 12.309          | 0.073                     | 0.898          | 0.524           |
| 90.0                                                                   | 15.2               | 89.3                | 0.117                   | 4.090          | 11.783          | 0.030                     | 0.885          | 0.452           |
| 105.0                                                                  | 15.2               | 104.2               | 0.215                   | 4.605          | 11.869          | 0.040                     | 0.961          | 0.399           |
| 120.0                                                                  | 15.1               | 118.8               | 0.288                   | 5.471          | 11.573          | 0.052                     | 1.249          | 0.386           |
| 135.0                                                                  | 15.0               | 134.0               | 0.342                   | 4.972          | 11.217          | 0.061                     | 1.255          | 0.323           |
| 150.0                                                                  | 15.1               | 149.3               | 0.286                   | 3.508          | 10.642          | 0.062                     | 0.873          | 0.243           |
| 165.0                                                                  | 15.2               | 164.4               | 0.236                   | 2.541          | 10.341          | 0.057                     | 0.450          | 0.178           |
| 180.0                                                                  | 15.1               | 179.4               | 0.273                   | 2.262          | 10.288          | 0.064                     | 0.399          | 0.153           |
| 195.0                                                                  | 15.1               | 194.6               | 0.302                   | 3.785          | 10.090          | 0.066                     | 0.610          | 0.126           |
| 210.0                                                                  | 15.1               | 209.9               | 0.298                   | 4.238          | 10.066          | 0.060                     | 0.985          | 0.118           |
| 225.0                                                                  | 15.1               | 225.6               | 0.351                   | 4.696          | 10.875          | 0.063                     | 1.505          | 0.184           |
| 240.0                                                                  | 15.1               | 241.0               | 0.376                   | 4.876          | 11.508          | 0.056                     | 1.531          | 0.273           |
| 255.0                                                                  | 15.2               | 255.6               | 0.255                   | 4.935          | 11.498          | 0.045                     | 1.343          | 0.328           |
| 270.0                                                                  | 15.2               | 270.4               | 0.147                   | 4.951          | 11.487          | 0.033                     | 1.224          | 0.424           |
| 285.0                                                                  | 15.2               | 285.2               | 0.249                   | 5.171          | 11.853          | 0.066                     | 1.149          | 0.521           |
| 300.0                                                                  | 15.2               | 299.8               | 0.520                   | 4.932          | 12.147          | 0.147                     | 1.080          | 0.604           |
| 315.0                                                                  | 15.1               | 314.5               | 0.705                   | 3.702          | 12.063          | 0.205                     | 0.853          | 0.620           |
| 330.0                                                                  | 15.1               | 329.4               | 0.911                   | 3.072          | 11.747          | 0.235                     | 0.601          | 0.614           |
| 345.0                                                                  | 15.1               | 344.4               | 1.058                   | 1.939          | 11.647          | 0.249                     | 0.336          | 0.608           |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.26:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 6.0$  m and  $T_p = 16.2$  s; Ship's speed is 20.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 20.2               | -0.2                | 1.158                   | 1.773          | 11.737          | 0.275                     | 0.222          | 0.708           |
| 15.0                                                                   | 20.2               | 14.9                | 1.047                   | 2.324          | 11.965          | 0.271                     | 0.437          | 0.709           |
| 30.0                                                                   | 20.2               | 29.9                | 0.992                   | 3.239          | 12.029          | 0.256                     | 0.691          | 0.723           |
| 45.0                                                                   | 20.3               | 44.9                | 0.810                   | 3.785          | 12.347          | 0.224                     | 0.912          | 0.722           |
| 60.0                                                                   | 20.3               | 59.8                | 0.561                   | 4.721          | 12.233          | 0.162                     | 1.094          | 0.663           |
| 75.0                                                                   | 20.3               | 74.7                | 0.291                   | 3.790          | 12.020          | 0.077                     | 0.873          | 0.552           |
| 90.0                                                                   | 20.3               | 89.6                | 0.154                   | 3.880          | 11.792          | 0.040                     | 0.843          | 0.449           |
| 105.0                                                                  | 20.3               | 104.6               | 0.222                   | 4.745          | 11.563          | 0.049                     | 0.930          | 0.375           |
| 120.0                                                                  | 20.3               | 119.4               | 0.286                   | 5.253          | 10.989          | 0.061                     | 1.590          | 0.385           |
| 135.0                                                                  | 20.2               | 134.7               | 0.264                   | 4.141          | 10.356          | 0.066                     | 1.416          | 0.277           |
| 150.0                                                                  | 20.2               | 149.6               | 0.352                   | 3.298          | 10.503          | 0.079                     | 0.945          | 0.211           |
| 165.0                                                                  | 20.3               | 164.7               | 0.318                   | 2.449          | 10.316          | 0.072                     | 0.447          | 0.151           |
| 180.0                                                                  | 20.3               | 179.7               | 0.368                   | 2.814          | 10.195          | 0.078                     | 0.364          | 0.126           |
| 195.0                                                                  | 20.3               | 194.8               | 0.357                   | 4.796          | 10.091          | 0.075                     | 0.673          | 0.125           |
| 210.0                                                                  | 20.2               | 210.0               | 0.269                   | 5.419          | 10.014          | 0.070                     | 1.140          | 0.149           |
| 225.0                                                                  | 20.3               | 224.9               | 0.252                   | 5.905          | 9.971           | 0.053                     | 1.291          | 0.157           |
| 240.0                                                                  | 20.3               | 240.5               | 0.349                   | 6.151          | 10.731          | 0.061                     | 1.846          | 0.219           |
| 255.0                                                                  | 20.3               | 255.3               | 0.320                   | 5.249          | 11.637          | 0.052                     | 1.357          | 0.289           |
| 270.0                                                                  | 20.3               | 270.2               | 0.157                   | 5.170          | 11.500          | 0.042                     | 1.229          | 0.414           |
| 285.0                                                                  | 20.3               | 285.1               | 0.269                   | 4.782          | 11.883          | 0.069                     | 1.148          | 0.544           |
| 300.0                                                                  | 20.3               | 299.8               | 0.569                   | 6.112          | 12.468          | 0.156                     | 1.079          | 0.674           |
| 315.0                                                                  | 20.3               | 314.7               | 0.871                   | 4.053          | 12.099          | 0.220                     | 0.834          | 0.720           |
| 330.0                                                                  | 20.2               | 329.6               | 0.958                   | 3.149          | 11.985          | 0.253                     | 0.573          | 0.718           |
| 345.0                                                                  | 20.2               | 344.7               | 1.172                   | 2.239          | 11.943          | 0.270                     | 0.305          | 0.707           |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.27:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 6.0$  m and  $T_p = 16.2$  s; Ship's speed is 25.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 25.3               | -0.1                | 1.219                   | 2.121          | 12.344          | 0.294                     | 0.275          | 0.873           |
| 15.0                                                                   | 25.3               | 15.0                | 1.119                   | 2.532          | 12.478          | 0.288                     | 0.468          | 0.871           |
| 30.0                                                                   | 25.3               | 30.0                | 1.037                   | 3.353          | 12.366          | 0.273                     | 0.714          | 0.878           |
| 45.0                                                                   | 25.4               | 45.0                | 0.869                   | 4.233          | 12.770          | 0.240                     | 0.945          | 0.864           |
| 60.0                                                                   | 25.4               | 60.0                | 0.582                   | 4.827          | 12.972          | 0.174                     | 1.141          | 0.765           |
| 75.0                                                                   | 25.4               | 74.8                | 0.322                   | 4.576          | 12.728          | 0.081                     | 0.874          | 0.576           |
| 90.0                                                                   | 25.4               | 89.7                | 0.190                   | 3.674          | 11.752          | 0.048                     | 0.844          | 0.443           |
| 105.0                                                                  | 25.4               | 104.8               | 0.275                   | 4.581          | 11.563          | 0.062                     | 0.933          | 0.350           |
| 120.0                                                                  | 25.3               | 119.8               | 0.374                   | 6.309          | 10.599          | 0.075                     | 1.853          | 0.360           |
| 135.0                                                                  | 25.3               | 134.8               | 0.271                   | 4.169          | 10.103          | 0.082                     | 1.344          | 0.222           |
| 150.0                                                                  | 25.4               | 149.7               | 0.353                   | 3.883          | 10.045          | 0.086                     | 0.909          | 0.161           |
| 165.0                                                                  | 25.6               | 164.8               | 0.279                   | 2.408          | 10.027          | 0.080                     | 0.418          | 0.100           |
| 180.0                                                                  | 25.6               | 179.8               | 0.364                   | 2.634          | 10.139          | 0.109                     | 0.315          | 0.119           |
| 195.0                                                                  | 25.6               | 195.0               | 0.251                   | 3.027          | 9.968           | 0.069                     | 0.418          | 0.078           |
| 210.0                                                                  | 25.4               | 210.1               | 0.328                   | 5.219          | 10.044          | 0.091                     | 1.124          | 0.208           |
| 225.0                                                                  | 25.3               | 225.2               | 0.289                   | 6.987          | 9.919           | 0.078                     | 1.635          | 0.267           |
| 240.0                                                                  | 25.4               | 240.2               | 0.273                   | 7.291          | 9.948           | 0.064                     | 1.800          | 0.194           |
| 255.0                                                                  | 25.4               | 255.1               | 0.313                   | 6.900          | 10.895          | 0.061                     | 1.308          | 0.258           |
| 270.0                                                                  | 25.4               | 270.1               | 0.187                   | 4.896          | 11.544          | 0.050                     | 1.188          | 0.405           |
| 285.0                                                                  | 25.4               | 285.0               | 0.287                   | 5.953          | 12.053          | 0.073                     | 1.136          | 0.576           |
| 300.0                                                                  | 25.4               | 299.8               | 0.547                   | 5.576          | 12.437          | 0.166                     | 1.056          | 0.775           |
| 315.0                                                                  | 25.4               | 314.8               | 0.878                   | 4.293          | 12.659          | 0.233                     | 0.799          | 0.866           |
| 330.0                                                                  | 25.3               | 329.8               | 1.017                   | 3.103          | 12.566          | 0.270                     | 0.532          | 0.875           |
| 345.0                                                                  | 25.3               | 344.8               | 1.258                   | 2.322          | 12.515          | 0.288                     | 0.304          | 0.869           |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |



**Table U.28:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 6.0$  m and  $T_p = 16.2$  s; Ship's speed is 30.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 30.5               | -0.0                | 1.252                   | 2.673          | 13.115          | 0.310                     | 0.334          | 1.085           |
| 15.0                                                                   | 30.5               | 15.0                | 1.203                   | 3.076          | 13.207          | 0.304                     | 0.502          | 1.079           |
| 30.0                                                                   | 30.5               | 30.1                | 1.196                   | 3.775          | 13.405          | 0.287                     | 0.722          | 1.072           |
| 45.0                                                                   | 30.5               | 45.1                | 0.935                   | 3.977          | 13.809          | 0.252                     | 0.959          | 1.035           |
| 60.0                                                                   | 30.4               | 60.0                | 0.655                   | 5.453          | 13.027          | 0.185                     | 1.193          | 0.892           |
| 75.0                                                                   | 30.5               | 74.9                | 0.276                   | 4.202          | 12.300          | 0.086                     | 0.882          | 0.607           |
| 90.0                                                                   | 30.5               | 89.8                | 0.224                   | 3.670          | 11.623          | 0.057                     | 0.883          | 0.435           |
| 105.0                                                                  | 30.5               | 104.8               | 0.306                   | 4.128          | 11.038          | 0.075                     | 1.022          | 0.326           |
| 120.0                                                                  | 30.4               | 119.9               | 0.361                   | 6.267          | 10.088          | 0.095                     | 2.098          | 0.342           |
| 135.0                                                                  | 30.4               | 134.8               | 0.447                   | 5.333          | 9.988           | 0.119                     | 1.584          | 0.227           |
| 150.0                                                                  | 30.8               | 149.6               | 0.388                   | 3.431          | 10.028          | 0.110                     | 0.787          | 0.140           |
| 165.0                                                                  | 30.8               | 164.7               | 0.624                   | 2.698          | 9.981           | 0.135                     | 0.488          | 0.103           |
| 180.0                                                                  | 30.5               | 179.7               | 0.407                   | 3.876          | 9.916           | 0.142                     | 0.456          | 0.105           |
| 195.0                                                                  | 30.9               | 195.0               | 0.445                   | 3.792          | 9.916           | 0.127                     | 0.599          | 0.109           |
| 210.0                                                                  | 30.7               | 210.1               | 0.363                   | 3.878          | 9.951           | 0.096                     | 0.873          | 0.132           |
| 225.0                                                                  | 30.4               | 225.1               | 0.287                   | 5.657          | 9.991           | 0.091                     | 1.422          | 0.265           |
| 240.0                                                                  | 30.4               | 240.1               | 0.289                   | 6.553          | 9.924           | 0.073                     | 1.742          | 0.249           |
| 255.0                                                                  | 30.5               | 255.1               | 0.281                   | 6.656          | 10.967          | 0.072                     | 1.213          | 0.237           |
| 270.0                                                                  | 30.5               | 270.0               | 0.229                   | 4.892          | 11.489          | 0.059                     | 1.088          | 0.399           |
| 285.0                                                                  | 30.5               | 285.0               | 0.299                   | 5.630          | 11.788          | 0.077                     | 1.081          | 0.613           |
| 300.0                                                                  | 30.5               | 299.9               | 0.604                   | 5.246          | 12.639          | 0.175                     | 1.021          | 0.898           |
| 315.0                                                                  | 30.5               | 314.9               | 0.888                   | 4.314          | 13.228          | 0.244                     | 0.777          | 1.029           |
| 330.0                                                                  | 30.5               | 329.9               | 1.147                   | 3.199          | 13.258          | 0.282                     | 0.531          | 1.066           |
| 345.0                                                                  | 30.5               | 344.9               | 1.161                   | 2.521          | 13.141          | 0.304                     | 0.348          | 1.076           |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.29:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 9.0$  m and  $T_p = 13.1$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | -1.0               | -32.0               | 1.464                   | 7.095          | 13.701          | 0.325                     | 1.401          | 0.871           |
| 15.0                                                                   | -1.6               | -24.8               | 1.755                   | 7.661          | 13.348          | 0.324                     | 1.336          | 0.840           |
| 30.0                                                                   | -3.1               | -86.6               | 1.517                   | 13.479         | 13.859          | 0.283                     | 2.061          | 0.965           |
| 45.0                                                                   | -3.0               | -71.3               | 1.285                   | 9.732          | 13.772          | 0.262                     | 2.152          | 0.947           |
| 60.0                                                                   | -2.5               | -84.7               | 1.290                   | 9.133          | 15.108          | 0.210                     | 2.261          | 0.974           |
| 75.0                                                                   | -0.5               | -74.5               | 1.385                   | 10.702         | 14.394          | 0.163                     | 2.162          | 0.926           |
| 90.0                                                                   | 0.2                | 62.4                | 1.448                   | 10.831         | 14.900          | 0.256                     | 1.968          | 0.941           |
| 105.0                                                                  | 0.3                | 87.5                | 1.005                   | 9.727          | 14.785          | 0.116                     | 2.073          | 0.924           |
| 120.0                                                                  | -2.6               | 104.1               | 0.934                   | 9.807          | 15.043          | 0.171                     | 2.243          | 0.981           |
| 135.0                                                                  | -3.6               | 108.0               | 0.937                   | 11.361         | 13.897          | 0.193                     | 2.223          | 0.991           |
| 150.0                                                                  | -4.1               | 81.2                | 1.675                   | 8.762          | 14.606          | 0.245                     | 2.243          | 0.973           |
| 165.0                                                                  | -2.9               | 44.8                | 1.851                   | 11.132         | 14.690          | 0.293                     | 1.877          | 0.881           |
| 180.0                                                                  | -1.0               | 11.2                | 1.610                   | 6.446          | 14.228          | 0.318                     | 1.505          | 0.860           |
| 195.0                                                                  | -0.3               | 31.9                | 1.489                   | 9.206          | 13.916          | 0.321                     | 1.622          | 0.923           |
| 210.0                                                                  | 0.2                | 39.3                | 1.315                   | 9.495          | 15.002          | 0.319                     | 1.742          | 0.968           |
| 225.0                                                                  | 0.4                | 273.9               | 1.030                   | 13.012         | 15.214          | 0.145                     | 2.201          | 0.966           |
| 240.0                                                                  | -0.1               | 274.4               | 1.231                   | 14.125         | 16.588          | 0.125                     | 2.197          | 0.956           |
| 255.0                                                                  | 0.5                | 282.3               | 1.185                   | 12.772         | 14.651          | 0.177                     | 2.107          | 1.002           |
| 270.0                                                                  | 0.7                | 288.3               | 1.310                   | 10.727         | 15.194          | 0.227                     | 2.054          | 1.037           |
| 285.0                                                                  | 0.7                | 294.8               | 1.330                   | 8.377          | 15.847          | 0.274                     | 1.950          | 1.037           |
| 300.0                                                                  | 0.5                | 299.8               | 1.340                   | 10.201         | 15.114          | 0.295                     | 1.870          | 1.028           |
| 315.0                                                                  | 0.5                | 306.0               | 1.373                   | 9.767          | 14.617          | 0.316                     | 1.791          | 1.008           |
| 330.0                                                                  | 0.2                | 311.9               | 1.302                   | 8.541          | 14.282          | 0.323                     | 1.717          | 0.978           |
| 345.0                                                                  | -0.0               | 319.7               | 1.532                   | 8.041          | 14.731          | 0.331                     | 1.533          | 0.937           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.30:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 9.0$  m and  $T_p = 13.1$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 3.6                | -32.7               | 1.451                   | 7.598          | 13.262          | 0.371                     | 1.471          | 0.997           |
| 15.0                                                                   | 3.4                | -24.6               | 1.604                   | 6.312          | 12.753          | 0.374                     | 1.340          | 0.971           |
| 30.0                                                                   | 3.3                | -17.7               | 1.664                   | 5.688          | 12.672          | 0.378                     | 1.264          | 0.958           |
| 45.0                                                                   | 3.1                | -10.1               | 1.686                   | 5.016          | 12.369          | 0.376                     | 1.241          | 0.944           |
| 60.0                                                                   | 3.1                | -0.1                | 2.170                   | 5.187          | 12.605          | 0.372                     | 1.245          | 0.936           |
| 75.0                                                                   | 3.2                | 11.7                | 1.690                   | 7.389          | 13.864          | 0.357                     | 1.424          | 0.941           |
| 90.0                                                                   | 3.5                | 35.9                | 1.437                   | 8.413          | 15.586          | 0.328                     | 1.743          | 0.987           |
| 105.0                                                                  | 3.3                | 33.0                | 1.560                   | 10.095         | 14.373          | 0.335                     | 1.700          | 0.974           |
| 120.0                                                                  | 3.7                | 64.9                | 1.582                   | 11.055         | 14.977          | 0.247                     | 1.948          | 0.983           |
| 135.0                                                                  | 3.2                | 33.9                | 1.667                   | 12.792         | 14.645          | 0.344                     | 1.609          | 0.976           |
| 150.0                                                                  | 3.3                | 43.2                | 2.669                   | 11.837         | 15.098          | 0.339                     | 1.674          | 0.975           |
| 165.0                                                                  | 3.4                | 43.8                | 1.582                   | 8.491          | 14.106          | 0.348                     | 1.599          | 0.986           |
| 180.0                                                                  | 3.8                | 96.3                | 1.418                   | 8.680          | 14.325          | 0.307                     | 1.767          | 0.841           |
| 195.0                                                                  | 3.9                | 15.4                | 1.442                   | 7.502          | 13.643          | 0.348                     | 1.721          | 0.987           |
| 210.0                                                                  | 4.1                | 30.3                | 1.520                   | 9.237          | 14.793          | 0.346                     | 1.758          | 1.022           |
| 225.0                                                                  | 4.5                | 276.9               | 1.405                   | 12.915         | 16.590          | 0.151                     | 2.201          | 1.013           |
| 240.0                                                                  | 4.4                | 278.6               | 0.929                   | 15.094         | 14.726          | 0.151                     | 2.150          | 1.030           |
| 255.0                                                                  | 4.3                | 282.7               | 1.465                   | 11.548         | 16.777          | 0.179                     | 2.160          | 1.065           |
| 270.0                                                                  | 4.4                | 288.0               | 1.254                   | 9.562          | 15.465          | 0.234                     | 2.063          | 1.109           |
| 285.0                                                                  | 4.5                | 293.0               | 2.251                   | 9.927          | 15.741          | 0.285                     | 1.954          | 1.119           |
| 300.0                                                                  | 4.6                | 300.8               | 1.727                   | 8.471          | 15.727          | 0.324                     | 1.838          | 1.090           |
| 315.0                                                                  | 4.4                | 308.9               | 1.381                   | 8.923          | 14.658          | 0.343                     | 1.778          | 1.050           |
| 330.0                                                                  | 4.1                | 315.7               | 1.487                   | 9.356          | 14.057          | 0.358                     | 1.648          | 1.042           |
| 345.0                                                                  | 3.9                | 321.6               | 1.520                   | 8.128          | 13.367          | 0.367                     | 1.571          | 1.018           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.31:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 9.0$  m and  $T_p = 13.1$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 8.9                | -5.5                | 1.924                   | 4.589          | 12.944          | 0.436                     | 0.779          | 1.081           |
| 15.0                                                                   | 8.6                | 8.2                 | 2.362                   | 4.298          | 13.108          | 0.430                     | 0.862          | 1.076           |
| 30.0                                                                   | 8.9                | 25.0                | 2.171                   | 4.905          | 12.972          | 0.417                     | 1.138          | 1.091           |
| 45.0                                                                   | 9.1                | 41.0                | 1.489                   | 5.844          | 12.679          | 0.388                     | 1.466          | 1.114           |
| 60.0                                                                   | 9.3                | 56.0                | 1.185                   | 8.238          | 14.877          | 0.343                     | 1.720          | 1.159           |
| 75.0                                                                   | 9.6                | 70.8                | 1.803                   | 8.692          | 16.866          | 0.251                     | 1.809          | 1.166           |
| 90.0                                                                   | 9.2                | 82.7                | 0.787                   | 8.297          | 15.386          | 0.116                     | 1.878          | 1.065           |
| 105.0                                                                  | 8.9                | 94.7                | 0.650                   | 14.801         | 14.500          | 0.075                     | 1.977          | 0.961           |
| 120.0                                                                  | 8.4                | 107.6               | 0.708                   | 12.181         | 14.775          | 0.121                     | 1.966          | 0.887           |
| 135.0                                                                  | 8.3                | 120.1               | 0.802                   | 9.497          | 13.780          | 0.141                     | 1.808          | 0.762           |
| 150.0                                                                  | 8.3                | 135.6               | 0.856                   | 7.494          | 13.585          | 0.150                     | 1.608          | 0.601           |
| 165.0                                                                  | 8.6                | 154.1               | 0.727                   | 6.479          | 12.508          | 0.151                     | 1.493          | 0.463           |
| 180.0                                                                  | 9.4                | 176.8               | 0.967                   | 5.684          | 11.658          | 0.148                     | 1.266          | 0.309           |
| 195.0                                                                  | 9.5                | 196.0               | 1.391                   | 7.318          | 12.357          | 0.157                     | 1.258          | 0.304           |
| 210.0                                                                  | 9.0                | 219.7               | 1.008                   | 8.921          | 12.763          | 0.165                     | 1.738          | 0.455           |
| 225.0                                                                  | 8.3                | 253.8               | 1.369                   | 20.490         | 13.974          | 0.144                     | 2.302          | 0.840           |
| 240.0                                                                  | 8.4                | 263.7               | 1.126                   | 20.699         | 14.155          | 0.113                     | 2.335          | 0.933           |
| 255.0                                                                  | 8.6                | 271.4               | 1.082                   | 14.777         | 16.062          | 0.106                     | 2.268          | 1.003           |
| 270.0                                                                  | 8.9                | 278.8               | 1.839                   | 13.512         | 15.591          | 0.141                     | 2.220          | 1.104           |
| 285.0                                                                  | 9.7                | 288.4               | 1.285                   | 9.553          | 15.167          | 0.244                     | 2.127          | 1.195           |
| 300.0                                                                  | 9.8                | 300.2               | 1.654                   | 8.734          | 16.341          | 0.342                     | 1.848          | 1.182           |
| 315.0                                                                  | 9.6                | 313.2               | 1.565                   | 6.786          | 13.872          | 0.387                     | 1.515          | 1.113           |
| 330.0                                                                  | 9.4                | 326.9               | 2.068                   | 6.227          | 13.689          | 0.414                     | 1.244          | 1.091           |
| 345.0                                                                  | 9.1                | 340.6               | 1.820                   | 6.969          | 12.647          | 0.431                     | 0.973          | 1.092           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.32:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 9.0$  m and  $T_p = 13.1$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 14.7               | -1.3                | 2.047                   | 3.772          | 13.125          | 0.475                     | 0.566          | 1.210           |
| 15.0                                                                   | 14.7               | 13.9                | 1.947                   | 3.600          | 12.929          | 0.471                     | 0.752          | 1.201           |
| 30.0                                                                   | 14.7               | 29.1                | 1.725                   | 4.551          | 12.990          | 0.453                     | 1.075          | 1.222           |
| 45.0                                                                   | 14.8               | 44.3                | 1.641                   | 6.763          | 13.448          | 0.417                     | 1.384          | 1.227           |
| 60.0                                                                   | 14.9               | 58.9                | 1.304                   | 8.164          | 14.583          | 0.359                     | 1.673          | 1.299           |
| 75.0                                                                   | 15.0               | 73.3                | 0.992                   | 8.569          | 15.527          | 0.234                     | 1.694          | 1.250           |
| 90.0                                                                   | 14.9               | 87.8                | 0.490                   | 9.295          | 15.177          | 0.073                     | 1.734          | 1.032           |
| 105.0                                                                  | 14.9               | 102.9               | 0.736                   | 17.297         | 14.129          | 0.095                     | 1.882          | 0.861           |
| 120.0                                                                  | 14.4               | 116.4               | 0.579                   | 7.548          | 13.111          | 0.108                     | 1.892          | 0.745           |
| 135.0                                                                  | 14.4               | 131.7               | 0.630                   | 7.282          | 12.632          | 0.108                     | 1.869          | 0.606           |
| 150.0                                                                  | 15.1               | 148.7               | 0.716                   | 5.482          | 11.843          | 0.116                     | 1.416          | 0.407           |
| 165.0                                                                  | 15.0               | 163.5               | 0.640                   | 4.566          | 11.137          | 0.109                     | 0.892          | 0.321           |
| 180.0                                                                  | 14.7               | 178.5               | 0.593                   | 5.203          | 10.755          | 0.122                     | 0.900          | 0.269           |
| 195.0                                                                  | 14.7               | 194.2               | 0.853                   | 5.969          | 11.574          | 0.124                     | 1.135          | 0.213           |
| 210.0                                                                  | 15.0               | 209.9               | 0.658                   | 6.045          | 11.064          | 0.110                     | 1.487          | 0.210           |
| 225.0                                                                  | 14.4               | 229.8               | 1.626                   | 15.557         | 12.997          | 0.135                     | 2.324          | 0.493           |
| 240.0                                                                  | 14.0               | 247.1               | 0.943                   | 15.774         | 13.368          | 0.130                     | 2.495          | 0.681           |
| 255.0                                                                  | 14.2               | 260.4               | 0.915                   | 21.577         | 14.685          | 0.114                     | 2.478          | 0.828           |
| 270.0                                                                  | 14.6               | 273.5               | 0.806                   | 14.179         | 15.341          | 0.090                     | 2.336          | 1.057           |
| 285.0                                                                  | 15.0               | 286.7               | 1.276                   | 12.503         | 15.718          | 0.232                     | 2.238          | 1.272           |
| 300.0                                                                  | 15.0               | 300.0               | 1.459                   | 7.414          | 15.566          | 0.352                     | 1.881          | 1.297           |
| 315.0                                                                  | 14.9               | 314.0               | 1.772                   | 5.139          | 14.453          | 0.416                     | 1.415          | 1.226           |
| 330.0                                                                  | 14.8               | 328.7               | 1.754                   | 4.496          | 13.082          | 0.450                     | 1.020          | 1.210           |
| 345.0                                                                  | 14.7               | 343.6               | 2.126                   | 3.844          | 13.462          | 0.469                     | 0.716          | 1.205           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.33:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 9.0$  m and  $T_p = 13.1$  s; Ship's speed is 20.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 20.0               | -0.5                | 2.408                   | 3.183          | 13.856          | 0.507                     | 0.560          | 1.390           |
| 15.0                                                                   | 20.0               | 14.6                | 1.964                   | 3.824          | 13.323          | 0.500                     | 0.766          | 1.386           |
| 30.0                                                                   | 20.0               | 29.8                | 1.912                   | 5.079          | 13.708          | 0.480                     | 1.071          | 1.396           |
| 45.0                                                                   | 20.0               | 44.8                | 1.733                   | 6.096          | 14.521          | 0.443                     | 1.369          | 1.407           |
| 60.0                                                                   | 20.1               | 59.5                | 1.507                   | 9.557          | 15.352          | 0.376                     | 1.655          | 1.460           |
| 75.0                                                                   | 20.2               | 74.0                | 1.204                   | 9.449          | 17.022          | 0.235                     | 1.676          | 1.331           |
| 90.0                                                                   | 20.1               | 88.7                | 0.404                   | 9.289          | 14.986          | 0.077                     | 1.686          | 1.024           |
| 105.0                                                                  | 20.1               | 104.0               | 0.829                   | 10.754         | 14.190          | 0.099                     | 1.945          | 0.790           |
| 120.0                                                                  | 19.9               | 118.4               | 0.575                   | 7.582          | 13.029          | 0.108                     | 2.343          | 0.724           |
| 135.0                                                                  | 19.9               | 134.3               | 0.989                   | 8.093          | 13.289          | 0.123                     | 2.231          | 0.512           |
| 150.0                                                                  | 19.9               | 149.2               | 0.715                   | 5.245          | 11.234          | 0.133                     | 1.333          | 0.329           |
| 165.0                                                                  | 20.0               | 164.1               | 0.679                   | 4.443          | 10.998          | 0.143                     | 0.912          | 0.281           |
| 180.0                                                                  | 20.3               | 179.2               | 0.983                   | 4.664          | 11.060          | 0.154                     | 0.795          | 0.240           |
| 195.0                                                                  | 20.2               | 194.7               | 0.679                   | 6.023          | 10.202          | 0.134                     | 1.122          | 0.256           |
| 210.0                                                                  | 20.1               | 210.1               | 0.576                   | 7.012          | 10.151          | 0.110                     | 1.663          | 0.343           |
| 225.0                                                                  | 20.0               | 225.4               | 0.718                   | 8.282          | 12.230          | 0.102                     | 2.202          | 0.360           |
| 240.0                                                                  | 19.8               | 242.3               | 0.874                   | 9.684          | 13.580          | 0.124                     | 2.794          | 0.523           |
| 255.0                                                                  | 19.8               | 257.5               | 0.635                   | 18.410         | 13.424          | 0.119                     | 2.625          | 0.696           |
| 270.0                                                                  | 20.0               | 271.9               | 0.721                   | 13.334         | 14.533          | 0.088                     | 2.420          | 1.025           |
| 285.0                                                                  | 20.2               | 286.0               | 1.224                   | 11.687         | 15.951          | 0.228                     | 2.304          | 1.359           |
| 300.0                                                                  | 20.2               | 299.9               | 1.347                   | 8.995          | 15.361          | 0.368                     | 1.900          | 1.488           |
| 315.0                                                                  | 20.1               | 314.4               | 1.649                   | 5.795          | 14.105          | 0.438                     | 1.368          | 1.422           |
| 330.0                                                                  | 20.1               | 329.3               | 2.027                   | 4.182          | 13.936          | 0.478                     | 0.984          | 1.406           |
| 345.0                                                                  | 20.0               | 344.3               | 1.940                   | 3.601          | 13.671          | 0.496                     | 0.703          | 1.390           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.34:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 9.0$  m and  $T_p = 13.1$  s; Ship's speed is 25.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 25.2               | -0.2                | 2.083                   | 3.626          | 14.746          | 0.528                     | 0.638          | 1.671           |
| 15.0                                                                   | 25.2               | 14.9                | 1.994                   | 4.789          | 14.713          | 0.528                     | 0.791          | 1.665           |
| 30.0                                                                   | 25.2               | 30.0                | 2.087                   | 5.698          | 14.686          | 0.504                     | 1.096          | 1.663           |
| 45.0                                                                   | 25.2               | 45.0                | 1.933                   | 6.966          | 14.824          | 0.465                     | 1.362          | 1.661           |
| 60.0                                                                   | 25.2               | 59.7                | 1.367                   | 7.708          | 16.383          | 0.390                     | 1.631          | 1.657           |
| 75.0                                                                   | 25.2               | 74.3                | 0.974                   | 9.274          | 16.449          | 0.241                     | 1.667          | 1.429           |
| 90.0                                                                   | 25.2               | 89.1                | 0.606                   | 8.981          | 14.879          | 0.087                     | 1.720          | 1.015           |
| 105.0                                                                  | 25.2               | 104.4               | 0.423                   | 8.256          | 12.773          | 0.105                     | 2.086          | 0.713           |
| 120.0                                                                  | 25.0               | 119.4               | 0.916                   | 10.427         | 12.327          | 0.131                     | 2.969          | 0.700           |
| 135.0                                                                  | 24.9               | 134.0               | 0.792                   | 7.216          | 12.065          | 0.148                     | 2.142          | 0.424           |
| 150.0                                                                  | 25.1               | 149.2               | 0.815                   | 6.492          | 11.038          | 0.163                     | 1.407          | 0.306           |
| 165.0                                                                  | 25.7               | 164.2               | 0.739                   | 4.607          | 10.282          | 0.152                     | 0.864          | 0.230           |
| 180.0                                                                  | 26.2               | 179.6               | 0.646                   | 4.412          | 10.173          | 0.167                     | 0.685          | 0.195           |
| 195.0                                                                  | 25.8               | 195.0               | 0.728                   | 4.859          | 10.046          | 0.142                     | 0.895          | 0.216           |
| 210.0                                                                  | 25.2               | 209.9               | 0.574                   | 6.147          | 10.193          | 0.141                     | 1.412          | 0.320           |
| 225.0                                                                  | 25.0               | 225.4               | 0.639                   | 7.857          | 10.346          | 0.116                     | 2.254          | 0.459           |
| 240.0                                                                  | 25.0               | 240.5               | 0.739                   | 10.409         | 12.883          | 0.128                     | 3.243          | 0.559           |
| 255.0                                                                  | 25.0               | 256.3               | 0.676                   | 13.678         | 14.196          | 0.121                     | 2.708          | 0.595           |
| 270.0                                                                  | 25.1               | 271.1               | 0.772                   | 14.374         | 14.951          | 0.100                     | 2.502          | 0.983           |
| 285.0                                                                  | 25.3               | 285.7               | 0.995                   | 11.894         | 15.892          | 0.230                     | 2.386          | 1.465           |
| 300.0                                                                  | 25.3               | 300.0               | 1.267                   | 7.282          | 15.742          | 0.377                     | 1.919          | 1.670           |
| 315.0                                                                  | 25.3               | 314.7               | 1.760                   | 5.411          | 15.469          | 0.454                     | 1.409          | 1.672           |
| 330.0                                                                  | 25.3               | 329.6               | 2.002                   | 4.306          | 14.616          | 0.497                     | 0.988          | 1.681           |
| 345.0                                                                  | 25.2               | 344.7               | 1.949                   | 3.806          | 14.829          | 0.521                     | 0.729          | 1.678           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.35:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 9.0$  m and  $T_p = 13.1$  s; Ship's speed is 30.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 30.4               | -0.0                | 1.892                   | 4.436          | 15.874          | 0.540                     | 0.737          | 2.002           |
| 15.0                                                                   | 30.4               | 15.1                | 2.106                   | 5.187          | 15.824          | 0.540                     | 0.882          | 1.991           |
| 30.0                                                                   | 30.4               | 30.1                | 1.799                   | 6.626          | 15.960          | 0.518                     | 1.134          | 1.973           |
| 45.0                                                                   | 30.4               | 45.0                | 2.029                   | 8.527          | 16.521          | 0.479                     | 1.384          | 1.928           |
| 60.0                                                                   | 30.3               | 59.8                | 1.420                   | 6.944          | 16.395          | 0.404                     | 1.611          | 1.870           |
| 75.0                                                                   | 30.3               | 74.5                | 1.098                   | 9.573          | 17.419          | 0.248                     | 1.673          | 1.532           |
| 90.0                                                                   | 30.3               | 89.3                | 0.901                   | 10.728         | 15.483          | 0.100                     | 1.831          | 1.005           |
| 105.0                                                                  | 30.2               | 104.5               | 1.332                   | 18.177         | 13.380          | 0.133                     | 2.362          | 0.678           |
| 120.0                                                                  | 29.9               | 119.2               | 0.695                   | 8.386          | 11.336          | 0.161                     | 2.908          | 0.623           |
| 135.0                                                                  | 29.6               | 133.6               | 1.184                   | 8.813          | 12.619          | 0.224                     | 2.353          | 0.480           |
| 150.0                                                                  | 30.6               | 148.6               | 1.154                   | 5.585          | 10.303          | 0.213                     | 1.554          | 0.336           |
| 165.0                                                                  | 30.9               | 163.5               | 1.286                   | 5.867          | 10.204          | 0.243                     | 1.130          | 0.331           |
| 180.0                                                                  | 31.5               | 179.1               | 1.477                   | 5.862          | 9.999           | 0.243                     | 1.053          | 0.317           |
| 195.0                                                                  | 31.1               | 194.7               | 1.102                   | 5.613          | 10.113          | 0.237                     | 1.241          | 0.318           |
| 210.0                                                                  | 30.8               | 210.7               | 1.153                   | 5.999          | 10.030          | 0.203                     | 1.678          | 0.316           |
| 225.0                                                                  | 29.7               | 226.5               | 1.008                   | 10.327         | 12.648          | 0.223                     | 2.592          | 0.560           |
| 240.0                                                                  | 30.0               | 240.6               | 0.646                   | 9.170          | 12.880          | 0.142                     | 3.030          | 0.598           |
| 255.0                                                                  | 30.2               | 255.6               | 0.572                   | 11.147         | 12.963          | 0.133                     | 2.721          | 0.571           |
| 270.0                                                                  | 30.3               | 270.7               | 0.870                   | 12.955         | 15.061          | 0.112                     | 2.486          | 0.955           |
| 285.0                                                                  | 30.4               | 285.6               | 1.042                   | 14.629         | 15.734          | 0.233                     | 2.490          | 1.547           |
| 300.0                                                                  | 30.4               | 300.1               | 1.336                   | 7.617          | 16.554          | 0.380                     | 1.982          | 1.866           |
| 315.0                                                                  | 30.4               | 314.9               | 1.804                   | 6.099          | 16.087          | 0.465                     | 1.463          | 1.951           |
| 330.0                                                                  | 30.4               | 329.9               | 2.006                   | 4.899          | 15.737          | 0.508                     | 1.109          | 1.990           |
| 345.0                                                                  | 30.4               | 344.9               | 1.949                   | 4.196          | 15.832          | 0.534                     | 0.837          | 2.000           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |



**Table U.36:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 9.0$  m and  $T_p = 18.5$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | -1.2               | -28.3               | 0.964                   | 4.520          | 11.709          | 0.189                     | 0.950          | 0.507           |
| 15.0                                                                   | -2.4               | -147.7              | 0.902                   | 5.243          | 12.032          | 0.178                     | 1.076          | 0.555           |
| 30.0                                                                   | -1.7               | -66.4               | 1.059                   | 5.510          | 12.073          | 0.180                     | 1.613          | 0.537           |
| 45.0                                                                   | -0.1               | 23.7                | 0.857                   | 4.176          | 12.202          | 0.196                     | 1.085          | 0.540           |
| 60.0                                                                   | 0.5                | 48.8                | 0.697                   | 4.926          | 11.851          | 0.150                     | 1.308          | 0.551           |
| 75.0                                                                   | 0.7                | 68.5                | 0.504                   | 5.414          | 12.197          | 0.088                     | 1.346          | 0.531           |
| 90.0                                                                   | 0.2                | 90.5                | 0.236                   | 5.192          | 11.958          | 0.029                     | 1.374          | 0.514           |
| 105.0                                                                  | -0.4               | 103.0               | 0.402                   | 5.700          | 11.914          | 0.048                     | 1.421          | 0.531           |
| 120.0                                                                  | -1.2               | 112.5               | 0.537                   | 5.994          | 12.718          | 0.076                     | 1.446          | 0.545           |
| 135.0                                                                  | -1.9               | 121.3               | 0.480                   | 5.943          | 12.078          | 0.108                     | 1.409          | 0.555           |
| 150.0                                                                  | -2.4               | 131.4               | 0.536                   | 5.379          | 11.561          | 0.139                     | 1.284          | 0.549           |
| 165.0                                                                  | -2.4               | 144.6               | 0.714                   | 4.872          | 11.775          | 0.169                     | 1.043          | 0.545           |
| 180.0                                                                  | -1.6               | 164.4               | 0.812                   | 4.021          | 12.041          | 0.187                     | 0.623          | 0.520           |
| 195.0                                                                  | 0.3                | 233.5               | 0.820                   | 6.775          | 12.082          | 0.127                     | 1.426          | 0.522           |
| 210.0                                                                  | 0.0                | 243.7               | 0.732                   | 6.420          | 11.931          | 0.100                     | 1.489          | 0.528           |
| 225.0                                                                  | -0.2               | 252.5               | 0.548                   | 5.832          | 11.807          | 0.074                     | 1.505          | 0.520           |
| 240.0                                                                  | -0.4               | 261.1               | 0.385                   | 5.796          | 11.728          | 0.048                     | 1.473          | 0.503           |
| 255.0                                                                  | -0.6               | 270.1               | 0.210                   | 6.199          | 11.840          | 0.029                     | 1.424          | 0.494           |
| 270.0                                                                  | -0.6               | 279.8               | 0.326                   | 6.051          | 11.992          | 0.041                     | 1.371          | 0.495           |
| 285.0                                                                  | -0.5               | 289.4               | 0.555                   | 6.136          | 12.387          | 0.075                     | 1.312          | 0.511           |
| 300.0                                                                  | -0.5               | 298.8               | 0.542                   | 6.080          | 12.318          | 0.109                     | 1.251          | 0.523           |
| 315.0                                                                  | -0.4               | 307.9               | 0.671                   | 5.567          | 12.091          | 0.139                     | 1.182          | 0.528           |
| 330.0                                                                  | -0.5               | 317.1               | 0.730                   | 5.522          | 11.826          | 0.163                     | 1.099          | 0.524           |
| 345.0                                                                  | -0.7               | 325.3               | 0.909                   | 4.960          | 11.759          | 0.180                     | 1.008          | 0.517           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.37:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 9.0$  m and  $T_p = 18.5$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 3.8                | -27.9               | 1.010                   | 5.502          | 11.535          | 0.222                     | 1.026          | 0.574           |
| 15.0                                                                   | 3.7                | -20.6               | 0.968                   | 4.325          | 11.570          | 0.232                     | 0.944          | 0.575           |
| 30.0                                                                   | 3.6                | -12.5               | 1.050                   | 3.727          | 11.420          | 0.237                     | 0.868          | 0.575           |
| 45.0                                                                   | 3.6                | -1.5                | 1.223                   | 3.793          | 11.637          | 0.239                     | 0.835          | 0.581           |
| 60.0                                                                   | 3.8                | 23.5                | 0.901                   | 4.366          | 12.042          | 0.221                     | 1.026          | 0.601           |
| 75.0                                                                   | 4.3                | 56.6                | 0.656                   | 5.346          | 12.586          | 0.137                     | 1.285          | 0.597           |
| 90.0                                                                   | 4.4                | 79.3                | 0.284                   | 5.300          | 12.223          | 0.044                     | 1.276          | 0.549           |
| 105.0                                                                  | 4.3                | 95.3                | 0.166                   | 5.669          | 11.995          | 0.023                     | 1.306          | 0.537           |
| 120.0                                                                  | 4.1                | 107.3               | 0.363                   | 6.197          | 12.591          | 0.045                     | 1.330          | 0.539           |
| 135.0                                                                  | 3.8                | 115.8               | 0.361                   | 6.409          | 11.942          | 0.066                     | 1.324          | 0.533           |
| 150.0                                                                  | 3.6                | 125.1               | 0.607                   | 5.605          | 12.171          | 0.089                     | 1.279          | 0.515           |
| 165.0                                                                  | 3.4                | 134.7               | 0.723                   | 5.107          | 11.860          | 0.110                     | 1.180          | 0.486           |
| 180.0                                                                  | 3.4                | 146.6               | 0.904                   | 4.625          | 11.746          | 0.127                     | 1.016          | 0.442           |
| 195.0                                                                  | 3.5                | 165.0               | 0.847                   | 4.933          | 12.038          | 0.141                     | 0.833          | 0.387           |
| 210.0                                                                  | 4.4                | 215.1               | 0.672                   | 5.423          | 11.533          | 0.125                     | 1.174          | 0.370           |
| 225.0                                                                  | 4.3                | 236.0               | 0.561                   | 6.001          | 12.042          | 0.097                     | 1.398          | 0.433           |
| 240.0                                                                  | 4.4                | 249.7               | 0.453                   | 5.875          | 11.853          | 0.067                     | 1.475          | 0.458           |
| 255.0                                                                  | 4.5                | 261.8               | 0.289                   | 6.264          | 11.635          | 0.038                     | 1.474          | 0.464           |
| 270.0                                                                  | 4.6                | 274.3               | 0.121                   | 5.985          | 11.951          | 0.021                     | 1.421          | 0.484           |
| 285.0                                                                  | 4.7                | 287.4               | 0.353                   | 6.711          | 11.994          | 0.062                     | 1.371          | 0.514           |
| 300.0                                                                  | 4.7                | 300.0               | 0.493                   | 5.420          | 11.994          | 0.121                     | 1.284          | 0.549           |
| 315.0                                                                  | 4.5                | 310.9               | 0.684                   | 5.534          | 12.475          | 0.167                     | 1.200          | 0.567           |
| 330.0                                                                  | 4.2                | 318.6               | 0.835                   | 5.917          | 11.750          | 0.192                     | 1.148          | 0.571           |
| 345.0                                                                  | 3.9                | 325.1               | 0.975                   | 5.899          | 11.659          | 0.209                     | 1.099          | 0.573           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.38:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 9.0$  m and  $T_p = 18.5$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 9.4                | -3.3                | 1.183                   | 3.452          | 11.594          | 0.274                     | 0.545          | 0.669           |
| 15.0                                                                   | 9.5                | 11.9                | 1.161                   | 3.441          | 11.799          | 0.272                     | 0.653          | 0.687           |
| 30.0                                                                   | 9.6                | 27.4                | 1.092                   | 3.744          | 11.947          | 0.251                     | 0.866          | 0.694           |
| 45.0                                                                   | 9.7                | 42.6                | 0.799                   | 4.654          | 12.193          | 0.209                     | 1.058          | 0.682           |
| 60.0                                                                   | 9.8                | 57.5                | 0.519                   | 5.088          | 12.285          | 0.148                     | 1.145          | 0.649           |
| 75.0                                                                   | 9.9                | 72.9                | 0.391                   | 4.826          | 12.910          | 0.074                     | 1.062          | 0.592           |
| 90.0                                                                   | 9.9                | 88.0                | 0.130                   | 5.096          | 12.040          | 0.030                     | 1.070          | 0.550           |
| 105.0                                                                  | 9.9                | 103.1               | 0.198                   | 5.647          | 12.119          | 0.039                     | 1.130          | 0.527           |
| 120.0                                                                  | 9.5                | 116.6               | 0.434                   | 5.821          | 12.600          | 0.060                     | 1.144          | 0.513           |
| 135.0                                                                  | 9.3                | 130.6               | 0.635                   | 5.243          | 12.601          | 0.076                     | 1.038          | 0.458           |
| 150.0                                                                  | 9.2                | 144.9               | 0.567                   | 4.628          | 11.837          | 0.088                     | 1.003          | 0.399           |
| 165.0                                                                  | 9.1                | 159.5               | 0.547                   | 3.898          | 11.487          | 0.099                     | 0.967          | 0.341           |
| 180.0                                                                  | 9.4                | 176.8               | 0.541                   | 4.219          | 10.766          | 0.103                     | 0.915          | 0.273           |
| 195.0                                                                  | 9.7                | 193.7               | 0.710                   | 4.806          | 11.111          | 0.105                     | 0.956          | 0.206           |
| 210.0                                                                  | 9.6                | 211.3               | 0.737                   | 5.645          | 11.468          | 0.096                     | 1.181          | 0.252           |
| 225.0                                                                  | 9.6                | 228.1               | 0.601                   | 7.623          | 11.542          | 0.088                     | 1.519          | 0.312           |
| 240.0                                                                  | 9.6                | 243.4               | 0.537                   | 6.711          | 11.804          | 0.071                     | 1.627          | 0.377           |
| 255.0                                                                  | 9.9                | 257.2               | 0.376                   | 6.592          | 11.899          | 0.050                     | 1.603          | 0.408           |
| 270.0                                                                  | 9.9                | 271.4               | 0.214                   | 7.222          | 11.860          | 0.034                     | 1.557          | 0.460           |
| 285.0                                                                  | 10.0               | 285.7               | 0.300                   | 7.280          | 12.016          | 0.058                     | 1.461          | 0.518           |
| 300.0                                                                  | 9.9                | 299.9               | 0.525                   | 5.754          | 12.023          | 0.131                     | 1.324          | 0.580           |
| 315.0                                                                  | 9.8                | 313.7               | 0.850                   | 4.984          | 12.446          | 0.195                     | 1.115          | 0.616           |
| 330.0                                                                  | 9.7                | 327.8               | 0.998                   | 4.651          | 11.766          | 0.238                     | 0.895          | 0.637           |
| 345.0                                                                  | 9.5                | 342.0               | 1.141                   | 4.092          | 11.683          | 0.264                     | 0.663          | 0.654           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.39:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 9.0$  m and  $T_p = 18.5$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 14.9               | -1.1                | 1.281                   | 3.090          | 12.081          | 0.306                     | 0.429          | 0.746           |
| 15.0                                                                   | 14.9               | 14.1                | 1.234                   | 3.416          | 11.995          | 0.300                     | 0.609          | 0.758           |
| 30.0                                                                   | 14.9               | 29.2                | 1.064                   | 4.237          | 12.362          | 0.275                     | 0.868          | 0.763           |
| 45.0                                                                   | 15.0               | 44.2                | 0.851                   | 5.010          | 12.296          | 0.225                     | 1.054          | 0.738           |
| 60.0                                                                   | 15.0               | 59.0                | 0.656                   | 5.441          | 13.233          | 0.154                     | 1.168          | 0.694           |
| 75.0                                                                   | 15.1               | 74.0                | 0.408                   | 5.556          | 13.214          | 0.076                     | 0.969          | 0.609           |
| 90.0                                                                   | 15.1               | 89.0                | 0.167                   | 4.819          | 12.365          | 0.044                     | 0.967          | 0.548           |
| 105.0                                                                  | 15.1               | 104.1               | 0.368                   | 5.232          | 11.903          | 0.055                     | 1.037          | 0.500           |
| 120.0                                                                  | 14.9               | 118.4               | 0.472                   | 6.026          | 12.603          | 0.071                     | 1.240          | 0.517           |
| 135.0                                                                  | 14.9               | 133.6               | 0.355                   | 5.086          | 11.409          | 0.082                     | 1.203          | 0.448           |
| 150.0                                                                  | 14.9               | 148.7               | 0.401                   | 4.148          | 11.087          | 0.088                     | 0.859          | 0.361           |
| 165.0                                                                  | 14.9               | 163.7               | 0.513                   | 3.785          | 10.958          | 0.095                     | 0.703          | 0.296           |
| 180.0                                                                  | 15.0               | 178.9               | 0.422                   | 3.821          | 10.357          | 0.089                     | 0.640          | 0.237           |
| 195.0                                                                  | 15.0               | 194.3               | 0.612                   | 5.499          | 10.375          | 0.095                     | 0.882          | 0.190           |
| 210.0                                                                  | 15.0               | 209.9               | 0.499                   | 5.636          | 10.630          | 0.084                     | 1.265          | 0.173           |
| 225.0                                                                  | 14.9               | 226.0               | 0.548                   | 6.081          | 10.927          | 0.086                     | 1.749          | 0.223           |
| 240.0                                                                  | 14.9               | 241.6               | 0.615                   | 6.951          | 11.776          | 0.076                     | 1.902          | 0.302           |
| 255.0                                                                  | 15.1               | 256.0               | 0.343                   | 6.819          | 11.872          | 0.062                     | 1.794          | 0.363           |
| 270.0                                                                  | 15.1               | 270.7               | 0.238                   | 7.129          | 11.959          | 0.047                     | 1.698          | 0.448           |
| 285.0                                                                  | 15.2               | 285.3               | 0.376                   | 7.040          | 12.396          | 0.061                     | 1.596          | 0.533           |
| 300.0                                                                  | 15.1               | 299.9               | 0.605                   | 6.771          | 12.324          | 0.138                     | 1.401          | 0.619           |
| 315.0                                                                  | 15.0               | 314.3               | 0.758                   | 5.350          | 12.157          | 0.213                     | 1.108          | 0.667           |
| 330.0                                                                  | 14.9               | 328.9               | 1.092                   | 4.223          | 11.881          | 0.266                     | 0.814          | 0.706           |
| 345.0                                                                  | 14.9               | 343.8               | 1.229                   | 3.466          | 11.821          | 0.294                     | 0.562          | 0.728           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.40:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 9.0$  m and  $T_p = 18.5$  s; Ship's speed is 20.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 20.1               | -0.5                | 1.356                   | 3.121          | 12.188          | 0.335                     | 0.456          | 0.854           |
| 15.0                                                                   | 20.1               | 14.7                | 1.264                   | 3.547          | 12.234          | 0.326                     | 0.681          | 0.860           |
| 30.0                                                                   | 20.1               | 29.8                | 1.131                   | 4.414          | 12.425          | 0.297                     | 0.961          | 0.854           |
| 45.0                                                                   | 20.1               | 44.7                | 1.032                   | 4.971          | 12.887          | 0.243                     | 1.151          | 0.818           |
| 60.0                                                                   | 20.2               | 59.6                | 0.619                   | 5.532          | 13.011          | 0.164                     | 1.310          | 0.757           |
| 75.0                                                                   | 20.3               | 74.4                | 0.300                   | 5.146          | 12.542          | 0.081                     | 0.977          | 0.632           |
| 90.0                                                                   | 20.3               | 89.4                | 0.215                   | 4.633          | 12.103          | 0.058                     | 0.945          | 0.541           |
| 105.0                                                                  | 20.3               | 104.5               | 0.382                   | 5.155          | 12.172          | 0.073                     | 0.986          | 0.464           |
| 120.0                                                                  | 20.1               | 119.2               | 0.336                   | 5.713          | 11.361          | 0.089                     | 1.603          | 0.515           |
| 135.0                                                                  | 20.1               | 134.4               | 0.540                   | 5.553          | 11.189          | 0.100                     | 1.403          | 0.410           |
| 150.0                                                                  | 20.1               | 149.3               | 0.625                   | 5.367          | 11.002          | 0.114                     | 0.982          | 0.340           |
| 165.0                                                                  | 20.2               | 164.4               | 0.609                   | 2.994          | 10.827          | 0.113                     | 0.582          | 0.258           |
| 180.0                                                                  | 20.2               | 179.5               | 0.369                   | 3.586          | 10.245          | 0.103                     | 0.544          | 0.210           |
| 195.0                                                                  | 20.2               | 194.6               | 0.403                   | 5.347          | 10.111          | 0.094                     | 0.771          | 0.217           |
| 210.0                                                                  | 20.2               | 209.9               | 0.611                   | 7.375          | 10.037          | 0.093                     | 1.300          | 0.270           |
| 225.0                                                                  | 20.2               | 225.0               | 0.525                   | 7.406          | 10.073          | 0.081                     | 1.531          | 0.233           |
| 240.0                                                                  | 20.1               | 240.7               | 0.534                   | 8.194          | 10.552          | 0.086                     | 2.136          | 0.263           |
| 255.0                                                                  | 20.2               | 255.5               | 0.486                   | 8.403          | 11.243          | 0.075                     | 1.881          | 0.342           |
| 270.0                                                                  | 20.3               | 270.4               | 0.299                   | 8.067          | 11.938          | 0.059                     | 1.776          | 0.453           |
| 285.0                                                                  | 20.3               | 285.2               | 0.354                   | 7.734          | 12.073          | 0.065                     | 1.669          | 0.557           |
| 300.0                                                                  | 20.2               | 299.8               | 0.757                   | 8.105          | 13.151          | 0.147                     | 1.449          | 0.672           |
| 315.0                                                                  | 20.2               | 314.5               | 0.903                   | 5.703          | 12.378          | 0.233                     | 1.120          | 0.753           |
| 330.0                                                                  | 20.1               | 329.4               | 1.225                   | 4.288          | 12.396          | 0.290                     | 0.792          | 0.804           |
| 345.0                                                                  | 20.1               | 344.4               | 1.417                   | 3.302          | 12.171          | 0.322                     | 0.517          | 0.834           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.41:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 9.0$  m and  $T_p = 18.5$  s; Ship's speed is 25.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 25.2               | -0.2                | 1.523                   | 3.650          | 12.901          | 0.357                     | 0.552          | 1.034           |
| 15.0                                                                   | 25.2               | 14.9                | 1.413                   | 4.234          | 13.546          | 0.348                     | 0.768          | 1.034           |
| 30.0                                                                   | 25.2               | 30.0                | 1.240                   | 4.963          | 13.269          | 0.319                     | 1.038          | 1.010           |
| 45.0                                                                   | 25.2               | 45.0                | 0.991                   | 5.722          | 13.226          | 0.260                     | 1.284          | 0.930           |
| 60.0                                                                   | 25.3               | 59.8                | 0.610                   | 6.474          | 12.905          | 0.174                     | 1.418          | 0.822           |
| 75.0                                                                   | 25.3               | 74.6                | 0.424                   | 5.308          | 13.280          | 0.087                     | 1.050          | 0.652           |
| 90.0                                                                   | 25.3               | 89.6                | 0.263                   | 4.605          | 12.086          | 0.071                     | 1.000          | 0.533           |
| 105.0                                                                  | 25.3               | 104.6               | 0.423                   | 4.946          | 11.667          | 0.092                     | 0.966          | 0.418           |
| 120.0                                                                  | 25.2               | 119.6               | 0.430                   | 6.080          | 11.029          | 0.110                     | 1.823          | 0.472           |
| 135.0                                                                  | 25.2               | 134.5               | 0.349                   | 4.700          | 10.302          | 0.117                     | 1.274          | 0.324           |
| 150.0                                                                  | 25.3               | 149.5               | 0.545                   | 5.111          | 10.319          | 0.141                     | 1.209          | 0.284           |
| 165.0                                                                  | 25.5               | 164.5               | 0.484                   | 3.393          | 10.291          | 0.155                     | 0.660          | 0.246           |
| 180.0                                                                  | 25.6               | 179.7               | 0.601                   | 3.091          | 10.177          | 0.116                     | 0.327          | 0.144           |
| 195.0                                                                  | 25.6               | 195.1               | 0.494                   | 4.454          | 10.182          | 0.147                     | 0.729          | 0.222           |
| 210.0                                                                  | 25.3               | 210.0               | 0.597                   | 6.295          | 10.155          | 0.113                     | 1.160          | 0.288           |
| 225.0                                                                  | 25.2               | 225.2               | 0.850                   | 8.805          | 10.002          | 0.116                     | 1.911          | 0.413           |
| 240.0                                                                  | 25.3               | 240.2               | 0.568                   | 9.064          | 10.027          | 0.097                     | 2.129          | 0.324           |
| 255.0                                                                  | 25.3               | 255.2               | 0.456                   | 9.086          | 11.149          | 0.087                     | 1.824          | 0.351           |
| 270.0                                                                  | 25.3               | 270.2               | 0.294                   | 7.354          | 11.866          | 0.070                     | 1.764          | 0.460           |
| 285.0                                                                  | 25.3               | 285.1               | 0.349                   | 8.342          | 12.100          | 0.072                     | 1.729          | 0.596           |
| 300.0                                                                  | 25.3               | 299.8               | 0.569                   | 7.382          | 12.417          | 0.155                     | 1.432          | 0.742           |
| 315.0                                                                  | 25.3               | 314.7               | 0.946                   | 5.767          | 12.810          | 0.249                     | 1.089          | 0.870           |
| 330.0                                                                  | 25.3               | 329.6               | 1.263                   | 4.660          | 13.043          | 0.310                     | 0.775          | 0.966           |
| 345.0                                                                  | 25.2               | 344.7               | 1.518                   | 3.775          | 13.002          | 0.344                     | 0.544          | 1.010           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.42:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 9.0$  m and  $T_p = 18.5$  s; Ship's speed is 30.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 30.4               | -0.1                | 1.514                   | 4.288          | 13.870          | 0.376                     | 0.665          | 1.264           |
| 15.0                                                                   | 30.4               | 15.0                | 1.511                   | 5.510          | 13.846          | 0.367                     | 0.876          | 1.261           |
| 30.0                                                                   | 30.4               | 30.1                | 1.401                   | 5.928          | 13.414          | 0.338                     | 1.114          | 1.223           |
| 45.0                                                                   | 30.4               | 45.1                | 1.130                   | 5.813          | 13.712          | 0.281                     | 1.337          | 1.098           |
| 60.0                                                                   | 30.4               | 60.0                | 0.712                   | 6.581          | 13.589          | 0.187                     | 1.542          | 0.919           |
| 75.0                                                                   | 30.4               | 74.7                | 0.360                   | 4.882          | 12.351          | 0.094                     | 1.153          | 0.672           |
| 90.0                                                                   | 30.4               | 89.7                | 0.371                   | 4.811          | 12.083          | 0.084                     | 1.123          | 0.528           |
| 105.0                                                                  | 30.4               | 104.7               | 0.534                   | 4.986          | 11.740          | 0.111                     | 1.034          | 0.389           |
| 120.0                                                                  | 30.3               | 119.8               | 0.579                   | 6.987          | 10.381          | 0.135                     | 2.126          | 0.438           |
| 135.0                                                                  | 30.3               | 134.5               | 0.566                   | 5.421          | 10.209          | 0.153                     | 1.651          | 0.320           |
| 150.0                                                                  | 30.5               | 149.5               | 0.613                   | 4.427          | 10.155          | 0.183                     | 1.113          | 0.261           |
| 165.0                                                                  | 30.8               | 164.5               | 0.705                   | 3.859          | 10.144          | 0.188                     | 0.585          | 0.182           |
| 180.0                                                                  | 30.5               | 179.4               | 0.907                   | 4.105          | 10.011          | 0.196                     | 0.510          | 0.168           |
| 195.0                                                                  | 31.1               | 194.9               | 0.592                   | 4.393          | 9.997           | 0.165                     | 0.676          | 0.170           |
| 210.0                                                                  | 30.7               | 210.2               | 0.594                   | 5.459          | 10.062          | 0.170                     | 1.126          | 0.274           |
| 225.0                                                                  | 30.4               | 225.0               | 0.530                   | 6.477          | 10.057          | 0.122                     | 1.515          | 0.374           |
| 240.0                                                                  | 30.4               | 240.0               | 0.442                   | 8.081          | 10.019          | 0.106                     | 1.750          | 0.353           |
| 255.0                                                                  | 30.4               | 255.1               | 0.515                   | 8.232          | 11.045          | 0.104                     | 1.642          | 0.367           |
| 270.0                                                                  | 30.4               | 270.1               | 0.334                   | 7.635          | 11.779          | 0.083                     | 1.673          | 0.477           |
| 285.0                                                                  | 30.4               | 285.1               | 0.340                   | 8.640          | 12.454          | 0.079                     | 1.685          | 0.640           |
| 300.0                                                                  | 30.4               | 299.8               | 0.639                   | 8.210          | 13.118          | 0.167                     | 1.425          | 0.820           |
| 315.0                                                                  | 30.4               | 314.8               | 1.005                   | 6.037          | 13.468          | 0.265                     | 1.053          | 1.039           |
| 330.0                                                                  | 30.4               | 329.8               | 1.398                   | 5.119          | 13.733          | 0.331                     | 0.806          | 1.181           |
| 345.0                                                                  | 30.4               | 344.9               | 1.491                   | 4.455          | 14.139          | 0.363                     | 0.632          | 1.240           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.43:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 14.0$  m and  $T_p = 16.4$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                            | <b>Absolute Maximum</b> |                       |                        | <b>Standard Deviation</b> |                       |                        |
|------------------------------------------------------------------------|--------------------|----------------------------|-------------------------|-----------------------|------------------------|---------------------------|-----------------------|------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts       | $\psi_{\text{MHP}}$<br>deg | Long<br>$\text{m/s}^2$  | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ | Long<br>$\text{m/s}^2$    | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ |
| 0.0                                                                    | -1.9               | -362.1                     | 1.962                   | 8.942                 | 14.495                 | 0.302                     | 2.586                 | 1.038                  |
| 15.0                                                                   | -1.3               | -366.1                     | 1.928                   | 9.623                 | 14.425                 | 0.341                     | 2.578                 | 1.027                  |
| 30.0                                                                   | -4.3               | 98.6                       | 1.921                   | 10.230                | 15.451                 | 0.345                     | 2.343                 | 1.182                  |
| 45.0                                                                   | -4.6               | -120.5                     | 1.991                   | 10.380                | 15.516                 | 0.319                     | 2.330                 | 1.201                  |
| 60.0                                                                   | 1.3                | 32.4                       | 2.377                   | 8.491                 | 15.922                 | 0.328                     | 2.285                 | 1.165                  |
| 75.0                                                                   | 2.5                | 77.1                       | 1.508                   | 10.603                | 17.220                 | 0.188                     | 1.974                 | 1.110                  |
| 90.0                                                                   | 1.1                | 99.2                       | 1.913                   | 10.465                | 15.220                 | 0.141                     | 2.116                 | 1.093                  |
| 105.0                                                                  | -1.8               | 109.2                      | 2.044                   | 9.038                 | 15.762                 | 0.187                     | 2.252                 | 1.186                  |
| 120.0                                                                  | -4.6               | 118.2                      | 1.278                   | 10.566                | 14.601                 | 0.243                     | 2.303                 | 1.223                  |
| 135.0                                                                  | -5.7               | 125.8                      | 1.750                   | 13.127                | 15.117                 | 0.299                     | 2.223                 | 1.253                  |
| 150.0                                                                  | -3.9               | 322.4                      | 2.154                   | 12.086                | 15.258                 | 0.343                     | 2.432                 | 1.133                  |
| 165.0                                                                  | -3.4               | 324.2                      | 2.773                   | 9.795                 | 16.387                 | 0.352                     | 2.514                 | 1.106                  |
| 180.0                                                                  | -2.2               | 783.2                      | 1.703                   | 9.646                 | 13.743                 | 0.311                     | 2.671                 | 1.062                  |
| 195.0                                                                  | -2.6               | 28.5                       | 2.699                   | 9.699                 | 15.254                 | 0.328                     | 2.529                 | 0.989                  |
| 210.0                                                                  | -0.5               | 260.7                      | 1.493                   | 13.074                | 14.798                 | 0.165                     | 2.770                 | 0.983                  |
| 225.0                                                                  | -1.1               | 262.1                      | 1.388                   | 14.080                | 13.578                 | 0.141                     | 2.778                 | 0.942                  |
| 240.0                                                                  | -1.8               | 266.7                      | 0.938                   | 14.385                | 14.275                 | 0.112                     | 2.721                 | 0.909                  |
| 255.0                                                                  | -2.4               | 272.0                      | 1.160                   | 13.633                | 15.067                 | 0.100                     | 2.642                 | 0.880                  |
| 270.0                                                                  | -2.4               | 277.0                      | 1.441                   | 12.983                | 16.089                 | 0.124                     | 2.471                 | 0.895                  |
| 285.0                                                                  | -2.2               | 281.9                      | 1.791                   | 12.755                | 15.864                 | 0.172                     | 2.355                 | 0.928                  |
| 300.0                                                                  | -1.4               | 288.1                      | 1.310                   | 12.631                | 14.950                 | 0.211                     | 2.272                 | 0.957                  |
| 315.0                                                                  | -1.7               | 292.9                      | 1.443                   | 12.291                | 15.751                 | 0.250                     | 2.216                 | 0.983                  |
| 330.0                                                                  | -1.9               | 298.9                      | 2.104                   | 11.772                | 15.031                 | 0.298                     | 2.151                 | 0.990                  |
| 345.0                                                                  | -2.1               | 151.1                      | 2.052                   | 11.228                | 14.444                 | 0.313                     | 2.313                 | 0.990                  |
| Wind at 56.4 knots (29.0 m/s) is from the starboard beam in all cases. |                    |                            |                         |                       |                        |                           |                       |                        |



**Table U.44:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 14.0$  m and  $T_p = 16.4$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 2.8                | -48.0               | 2.028                   | 12.931         | 15.425          | 0.375                     | 2.079          | 1.086           |
| 15.0                                                                   | 2.1                | -79.8               | 2.146                   | 11.723         | 15.174          | 0.333                     | 2.641          | 1.069           |
| 30.0                                                                   | 2.2                | -120.7              | 1.885                   | 12.110         | 15.201          | 0.219                     | 2.225          | 1.093           |
| 45.0                                                                   | 2.8                | -101.7              | 1.918                   | 13.657         | 15.734          | 0.236                     | 2.411          | 1.127           |
| 60.0                                                                   | 3.6                | -92.5               | 2.598                   | 11.606         | 14.867          | 0.213                     | 2.394          | 1.123           |
| 75.0                                                                   | 4.3                | -74.4               | 2.496                   | 21.078         | 16.289          | 0.185                     | 2.501          | 1.105           |
| 90.0                                                                   | 5.1                | 89.4                | 3.065                   | 24.055         | 16.634          | 0.105                     | 2.004          | 1.082           |
| 105.0                                                                  | 4.4                | 103.8               | 1.811                   | 9.874          | 14.929          | 0.127                     | 2.048          | 1.087           |
| 120.0                                                                  | 3.4                | 112.7               | 1.387                   | 12.874         | 16.097          | 0.163                     | 2.103          | 1.119           |
| 135.0                                                                  | 2.5                | 120.3               | 1.430                   | 10.613         | 16.550          | 0.195                     | 2.123          | 1.115           |
| 150.0                                                                  | 2.0                | 128.7               | 1.389                   | 10.700         | 16.673          | 0.225                     | 2.070          | 1.060           |
| 165.0                                                                  | 1.5                | 132.3               | 1.775                   | 12.487         | 15.051          | 0.240                     | 2.089          | 1.030           |
| 180.0                                                                  | 2.2                | 82.9                | 2.041                   | 10.494         | 14.410          | 0.329                     | 2.652          | 0.995           |
| 195.0                                                                  | 3.5                | 364.1               | 2.074                   | 12.160         | 15.881          | 0.316                     | 2.618          | 1.033           |
| 210.0                                                                  | 4.2                | 258.4               | 2.171                   | 18.847         | 13.835          | 0.170                     | 2.768          | 0.912           |
| 225.0                                                                  | 3.7                | 262.3               | 1.553                   | 19.147         | 14.570          | 0.150                     | 2.838          | 0.902           |
| 240.0                                                                  | 3.3                | 267.8               | 2.417                   | 16.665         | 14.360          | 0.136                     | 2.769          | 0.902           |
| 255.0                                                                  | 3.8                | 275.6               | 1.169                   | 15.033         | 14.867          | 0.097                     | 2.620          | 0.894           |
| 270.0                                                                  | 3.6                | 281.8               | 1.956                   | 12.869         | 15.198          | 0.144                     | 2.549          | 0.925           |
| 285.0                                                                  | 4.1                | 288.6               | 1.539                   | 12.691         | 15.933          | 0.198                     | 2.401          | 0.977           |
| 300.0                                                                  | 3.9                | 294.7               | 1.431                   | 15.014         | 15.005          | 0.261                     | 2.261          | 1.024           |
| 315.0                                                                  | 3.5                | 298.7               | 1.585                   | 12.858         | 14.706          | 0.298                     | 2.205          | 1.057           |
| 330.0                                                                  | 3.3                | 303.3               | 1.865                   | 13.446         | 13.974          | 0.335                     | 2.160          | 1.072           |
| 345.0                                                                  | 2.9                | 307.7               | 2.008                   | 12.954         | 16.524          | 0.359                     | 2.118          | 1.085           |
| Wind at 56.4 knots (29.0 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.45:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 14.0$  m and  $T_p = 16.4$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                            | <b>Absolute Maximum</b> |                       |                        | <b>Standard Deviation</b> |                       |                        |
|------------------------------------------------------------------------|--------------------|----------------------------|-------------------------|-----------------------|------------------------|---------------------------|-----------------------|------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts       | $\psi_{\text{MHP}}$<br>deg | Long<br>$\text{m/s}^2$  | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ | Long<br>$\text{m/s}^2$    | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ |
| 0.0                                                                    | 7.5                | -40.9                      | 2.084                   | 10.454                | 15.134                 | 0.448                     | 2.098                 | 1.221                  |
| 15.0                                                                   | 7.3                | -34.1                      | 2.372                   | 7.836                 | 14.523                 | 0.467                     | 2.016                 | 1.229                  |
| 30.0                                                                   | 7.2                | -24.6                      | 2.351                   | 8.710                 | 13.394                 | 0.482                     | 1.890                 | 1.220                  |
| 45.0                                                                   | 7.2                | -15.9                      | 2.923                   | 6.633                 | 13.971                 | 0.490                     | 1.836                 | 1.221                  |
| 60.0                                                                   | 7.2                | 1.8                        | 2.900                   | 8.633                 | 13.506                 | 0.494                     | 1.698                 | 1.239                  |
| 75.0                                                                   | 9.8                | 71.2                       | 1.777                   | 7.871                 | 17.410                 | 0.222                     | 1.776                 | 1.235                  |
| 90.0                                                                   | 9.8                | 88.5                       | 0.866                   | 10.527                | 16.670                 | 0.077                     | 1.814                 | 1.077                  |
| 105.0                                                                  | 9.6                | 104.5                      | 1.306                   | 7.917                 | 14.823                 | 0.105                     | 1.885                 | 1.010                  |
| 120.0                                                                  | 8.9                | 116.0                      | 4.329                   | 15.464                | 15.386                 | 0.177                     | 1.917                 | 0.993                  |
| 135.0                                                                  | 8.1                | 126.4                      | 1.938                   | 11.215                | 15.764                 | 0.169                     | 1.743                 | 0.921                  |
| 150.0                                                                  | 7.7                | 135.1                      | 2.313                   | 11.144                | 16.267                 | 0.181                     | 1.722                 | 0.866                  |
| 165.0                                                                  | 7.4                | 144.3                      | 1.655                   | 10.293                | 15.315                 | 0.192                     | 1.836                 | 0.800                  |
| 180.0                                                                  | 7.4                | 154.7                      | 1.661                   | 7.589                 | 13.507                 | 0.208                     | 1.666                 | 0.684                  |
| 195.0                                                                  | 8.9                | 199.1                      | 1.734                   | 11.159                | 11.893                 | 0.220                     | 1.882                 | 0.389                  |
| 210.0                                                                  | 8.3                | 237.7                      | 2.657                   | 19.236                | 13.310                 | 0.234                     | 2.790                 | 0.734                  |
| 225.0                                                                  | 8.3                | 253.6                      | 2.425                   | 24.090                | 13.261                 | 0.177                     | 2.894                 | 0.822                  |
| 240.0                                                                  | 8.3                | 261.0                      | 1.486                   | 19.346                | 14.054                 | 0.139                     | 2.851                 | 0.848                  |
| 255.0                                                                  | 8.4                | 270.4                      | 1.082                   | 16.335                | 13.758                 | 0.099                     | 2.842                 | 0.878                  |
| 270.0                                                                  | 8.6                | 278.9                      | 2.555                   | 14.080                | 15.158                 | 0.152                     | 2.790                 | 0.925                  |
| 285.0                                                                  | 9.1                | 288.4                      | 1.981                   | 13.702                | 15.396                 | 0.207                     | 2.586                 | 1.006                  |
| 300.0                                                                  | 9.3                | 299.0                      | 1.777                   | 12.493                | 14.823                 | 0.312                     | 2.260                 | 1.105                  |
| 315.0                                                                  | 8.4                | 306.6                      | 1.482                   | 11.141                | 14.713                 | 0.379                     | 2.113                 | 1.154                  |
| 330.0                                                                  | 7.9                | 309.6                      | 1.921                   | 10.857                | 14.914                 | 0.402                     | 2.126                 | 1.184                  |
| 345.0                                                                  | 7.7                | 314.9                      | 2.077                   | 11.824                | 14.998                 | 0.431                     | 2.105                 | 1.195                  |
| Wind at 56.4 knots (29.0 m/s) is from the starboard beam in all cases. |                    |                            |                         |                       |                        |                           |                       |                        |

**Table U.46:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 14.0$  m and  $T_p = 16.4$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 13.0               | -8.8                | 2.780                   | 6.585          | 13.748          | 0.572                     | 1.525          | 1.404           |
| 15.0                                                                   | 13.6               | 9.9                 | 2.601                   | 6.574          | 14.250          | 0.563                     | 1.468          | 1.441           |
| 30.0                                                                   | 14.0               | 26.7                | 2.247                   | 7.046          | 13.701          | 0.531                     | 1.522          | 1.461           |
| 45.0                                                                   | 14.4               | 42.6                | 1.850                   | 10.119         | 14.784          | 0.464                     | 1.723          | 1.477           |
| 60.0                                                                   | 14.6               | 57.5                | 1.420                   | 9.541          | 15.347          | 0.358                     | 1.754          | 1.443           |
| 75.0                                                                   | 15.0               | 73.1                | 1.197                   | 9.461          | 16.076          | 0.197                     | 1.743          | 1.268           |
| 90.0                                                                   | 15.0               | 88.9                | 1.441                   | 20.442         | 15.475          | 0.087                     | 1.797          | 1.051           |
| 105.0                                                                  | 15.0               | 104.7               | 1.623                   | 19.691         | 14.418          | 0.126                     | 1.931          | 0.907           |
| 120.0                                                                  | 14.4               | 117.4               | 0.957                   | 10.852         | 14.301          | 0.137                     | 1.848          | 0.874           |
| 135.0                                                                  | 14.0               | 131.7               | 1.090                   | 7.611          | 14.419          | 0.148                     | 1.563          | 0.755           |
| 150.0                                                                  | 14.2               | 146.4               | 0.822                   | 6.451          | 12.787          | 0.156                     | 1.190          | 0.591           |
| 165.0                                                                  | 14.6               | 162.0               | 1.102                   | 6.576          | 12.917          | 0.168                     | 1.004          | 0.479           |
| 180.0                                                                  | 14.6               | 177.5               | 1.104                   | 7.377          | 11.488          | 0.193                     | 1.132          | 0.398           |
| 195.0                                                                  | 14.7               | 194.8               | 1.278                   | 10.963         | 11.494          | 0.172                     | 1.492          | 0.353           |
| 210.0                                                                  | 14.2               | 216.7               | 2.173                   | 12.923         | 12.594          | 0.195                     | 2.317          | 0.462           |
| 225.0                                                                  | 13.8               | 235.0               | 1.443                   | 11.742         | 13.384          | 0.165                     | 2.703          | 0.578           |
| 240.0                                                                  | 13.7               | 248.5               | 1.472                   | 13.779         | 14.488          | 0.163                     | 2.960          | 0.696           |
| 255.0                                                                  | 13.9               | 261.5               | 1.313                   | 25.110         | 13.725          | 0.141                     | 3.089          | 0.778           |
| 270.0                                                                  | 14.2               | 274.6               | 0.735                   | 15.329         | 14.156          | 0.104                     | 3.100          | 0.891           |
| 285.0                                                                  | 14.5               | 287.4               | 2.212                   | 13.629         | 14.761          | 0.193                     | 2.912          | 1.027           |
| 300.0                                                                  | 14.6               | 300.2               | 1.323                   | 12.642         | 14.645          | 0.332                     | 2.352          | 1.190           |
| 315.0                                                                  | 14.4               | 312.9               | 1.756                   | 11.173         | 14.330          | 0.439                     | 1.926          | 1.277           |
| 330.0                                                                  | 13.9               | 326.0               | 2.057                   | 9.238          | 13.870          | 0.508                     | 1.694          | 1.347           |
| 345.0                                                                  | 13.5               | 339.5               | 2.480                   | 8.153          | 13.635          | 0.554                     | 1.486          | 1.376           |
| Wind at 56.4 knots (29.0 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.47:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 14.0$  m and  $T_p = 16.4$  s; Ship's speed is 20.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 19.6               | -1.6                | 2.484                   | 6.303          | 13.907          | 0.596                     | 1.298          | 1.596           |
| 15.0                                                                   | 19.6               | 13.6                | 2.828                   | 6.762          | 14.747          | 0.600                     | 1.329          | 1.616           |
| 30.0                                                                   | 19.7               | 29.1                | 2.213                   | 7.953          | 14.792          | 0.564                     | 1.576          | 1.632           |
| 45.0                                                                   | 19.8               | 44.1                | 1.961                   | 8.873          | 15.341          | 0.493                     | 1.747          | 1.623           |
| 60.0                                                                   | 19.8               | 58.6                | 1.716                   | 11.241         | 17.638          | 0.373                     | 1.755          | 1.543           |
| 75.0                                                                   | 20.0               | 73.8                | 1.067                   | 9.249          | 16.669          | 0.198                     | 1.802          | 1.307           |
| 90.0                                                                   | 20.0               | 89.1                | 2.315                   | 20.724         | 16.964          | 0.111                     | 1.866          | 1.032           |
| 105.0                                                                  | 20.0               | 104.3               | 3.145                   | 23.413         | 14.567          | 0.147                     | 2.107          | 0.837           |
| 120.0                                                                  | 19.7               | 118.6               | 0.737                   | 8.928          | 13.371          | 0.150                     | 2.065          | 0.817           |
| 135.0                                                                  | 19.6               | 133.4               | 1.009                   | 7.702          | 13.273          | 0.174                     | 1.898          | 0.613           |
| 150.0                                                                  | 19.6               | 148.0               | 0.988                   | 7.689          | 12.165          | 0.193                     | 1.404          | 0.496           |
| 165.0                                                                  | 19.6               | 163.7               | 1.059                   | 7.233          | 11.853          | 0.204                     | 1.048          | 0.418           |
| 180.0                                                                  | 19.8               | 179.8               | 1.230                   | 8.187          | 11.026          | 0.213                     | 1.112          | 0.375           |
| 195.0                                                                  | 19.7               | 195.7               | 0.962                   | 8.416          | 10.694          | 0.194                     | 1.605          | 0.436           |
| 210.0                                                                  | 19.7               | 210.4               | 1.660                   | 13.758         | 12.912          | 0.176                     | 2.025          | 0.573           |
| 225.0                                                                  | 19.6               | 226.6               | 0.988                   | 10.132         | 12.134          | 0.161                     | 2.499          | 0.515           |
| 240.0                                                                  | 19.3               | 243.6               | 1.131                   | 14.258         | 14.025          | 0.165                     | 3.105          | 0.598           |
| 255.0                                                                  | 19.6               | 258.3               | 1.144                   | 15.892         | 13.694          | 0.152                     | 3.242          | 0.710           |
| 270.0                                                                  | 19.6               | 272.8               | 0.756                   | 17.759         | 13.816          | 0.115                     | 3.313          | 0.870           |
| 285.0                                                                  | 19.8               | 286.6               | 1.152                   | 15.394         | 15.177          | 0.183                     | 3.114          | 1.099           |
| 300.0                                                                  | 19.9               | 300.3               | 1.524                   | 15.570         | 15.281          | 0.348                     | 2.563          | 1.310           |
| 315.0                                                                  | 19.8               | 314.1               | 2.051                   | 10.891         | 14.220          | 0.473                     | 1.986          | 1.454           |
| 330.0                                                                  | 19.7               | 328.6               | 2.237                   | 7.686          | 15.124          | 0.549                     | 1.541          | 1.537           |
| 345.0                                                                  | 19.6               | 343.4               | 2.794                   | 6.333          | 13.966          | 0.584                     | 1.354          | 1.577           |
| Wind at 56.4 knots (29.0 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.48:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 14.0$  m and  $T_p = 16.4$  s; Ship's speed is 25.0 Knots

| <b>Cmd<br/>Heading</b>                                                 | <b>Actual<br/>Mean</b> |                            | <b>Absolute<br/>Maximum</b> |                       |                        | <b>Standard<br/>Deviation</b> |                       |                        |
|------------------------------------------------------------------------|------------------------|----------------------------|-----------------------------|-----------------------|------------------------|-------------------------------|-----------------------|------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts           | $\psi_{\text{MHP}}$<br>deg | Long<br>$\text{m/s}^2$      | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ | Long<br>$\text{m/s}^2$        | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ |
| 0.0                                                                    | 25.0                   | -0.7                       | 3.072                       | 6.027                 | 15.831                 | 0.630                         | 1.294                 | 1.886                  |
| 15.0                                                                   | 25.0                   | 14.6                       | 2.900                       | 7.368                 | 15.405                 | 0.625                         | 1.421                 | 1.883                  |
| 30.0                                                                   | 25.0                   | 29.8                       | 2.561                       | 8.854                 | 15.533                 | 0.589                         | 1.638                 | 1.873                  |
| 45.0                                                                   | 25.0                   | 44.6                       | 1.950                       | 9.256                 | 15.994                 | 0.520                         | 1.774                 | 1.835                  |
| 60.0                                                                   | 25.0                   | 59.2                       | 1.575                       | 10.798                | 16.867                 | 0.387                         | 1.863                 | 1.668                  |
| 75.0                                                                   | 25.0                   | 74.1                       | 1.198                       | 9.078                 | 17.174                 | 0.208                         | 1.940                 | 1.340                  |
| 90.0                                                                   | 25.1                   | 89.2                       | 6.163                       | 15.465                | 14.823                 | 0.176                         | 1.915                 | 1.036                  |
| 105.0                                                                  | 25.0                   | 104.2                      | 4.320                       | 17.642                | 13.511                 | 0.178                         | 2.124                 | 0.738                  |
| 120.0                                                                  | 24.8                   | 119.1                      | 0.973                       | 10.985                | 13.690                 | 0.192                         | 2.667                 | 0.787                  |
| 135.0                                                                  | 24.6                   | 133.6                      | 1.227                       | 9.465                 | 12.242                 | 0.226                         | 2.272                 | 0.616                  |
| 150.0                                                                  | 24.9                   | 148.5                      | 1.040                       | 8.644                 | 11.802                 | 0.228                         | 1.550                 | 0.487                  |
| 165.0                                                                  | 25.5                   | 163.7                      | 1.242                       | 7.630                 | 11.303                 | 0.215                         | 1.023                 | 0.399                  |
| 180.0                                                                  | 26.3                   | 179.3                      | 2.096                       | 7.656                 | 10.538                 | 0.251                         | 0.933                 | 0.385                  |
| 195.0                                                                  | 26.0                   | 195.3                      | 1.142                       | 6.102                 | 10.324                 | 0.165                         | 1.024                 | 0.319                  |
| 210.0                                                                  | 25.1                   | 210.5                      | 0.995                       | 8.655                 | 10.129                 | 0.176                         | 1.706                 | 0.500                  |
| 225.0                                                                  | 24.8                   | 225.5                      | 0.969                       | 10.324                | 10.044                 | 0.180                         | 2.480                 | 0.689                  |
| 240.0                                                                  | 24.7                   | 241.4                      | 1.083                       | 17.743                | 14.218                 | 0.178                         | 3.147                 | 0.703                  |
| 255.0                                                                  | 24.8                   | 256.7                      | 2.283                       | 23.630                | 14.929                 | 0.176                         | 3.279                 | 0.708                  |
| 270.0                                                                  | 24.8                   | 271.8                      | 1.160                       | 17.125                | 13.665                 | 0.141                         | 3.383                 | 0.899                  |
| 285.0                                                                  | 25.0                   | 286.2                      | 1.048                       | 15.863                | 15.359                 | 0.187                         | 3.296                 | 1.185                  |
| 300.0                                                                  | 25.0                   | 300.4                      | 1.327                       | 13.017                | 15.739                 | 0.366                         | 2.703                 | 1.479                  |
| 315.0                                                                  | 25.1                   | 314.7                      | 1.921                       | 11.173                | 15.305                 | 0.497                         | 2.082                 | 1.686                  |
| 330.0                                                                  | 25.0                   | 329.4                      | 2.554                       | 8.927                 | 15.085                 | 0.573                         | 1.651                 | 1.811                  |
| 345.0                                                                  | 25.0                   | 344.3                      | 2.508                       | 7.291                 | 14.913                 | 0.610                         | 1.349                 | 1.857                  |
| Wind at 56.4 knots (29.0 m/s) is from the starboard beam in all cases. |                        |                            |                             |                       |                        |                               |                       |                        |

**Table U.49:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 14.0$  m and  $T_p = 16.4$  s; Ship's speed is 30.0 Knots

| <b>Cmd<br/>Heading</b>                                                 | <b>Actual<br/>Mean</b> |                            | <b>Absolute<br/>Maximum</b> |                       |                        | <b>Standard<br/>Deviation</b> |                       |                        |
|------------------------------------------------------------------------|------------------------|----------------------------|-----------------------------|-----------------------|------------------------|-------------------------------|-----------------------|------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts           | $\psi_{\text{MHP}}$<br>deg | Long<br>$\text{m/s}^2$      | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ | Long<br>$\text{m/s}^2$        | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ |
| 0.0                                                                    | 30.3                   | -0.1                       | 2.795                       | 6.934                 | 16.697                 | 0.640                         | 1.426                 | 2.225                  |
| 15.0                                                                   | 30.2                   | 15.0                       | 2.590                       | 8.198                 | 16.072                 | 0.639                         | 1.540                 | 2.215                  |
| 30.0                                                                   | 30.2                   | 30.1                       | 2.551                       | 10.105                | 16.679                 | 0.605                         | 1.735                 | 2.178                  |
| 45.0                                                                   | 30.2                   | 44.9                       | 2.162                       | 9.374                 | 17.476                 | 0.540                         | 1.893                 | 2.106                  |
| 60.0                                                                   | 30.2                   | 59.5                       | 1.577                       | 9.740                 | 17.940                 | 0.415                         | 1.901                 | 1.896                  |
| 75.0                                                                   | 30.1                   | 74.2                       | 0.912                       | 9.397                 | 16.372                 | 0.214                         | 2.128                 | 1.408                  |
| 90.0                                                                   | 30.1                   | 89.2                       | 3.683                       | 24.821                | 14.735                 | 0.160                         | 2.116                 | 1.037                  |
| 105.0                                                                  | 30.1                   | 104.2                      | 2.678                       | 10.678                | 13.524                 | 0.191                         | 2.176                 | 0.714                  |
| 120.0                                                                  | 29.8                   | 119.5                      | 1.500                       | 12.054                | 12.377                 | 0.233                         | 2.913                 | 0.664                  |
| 135.0                                                                  | 29.3                   | 132.0                      | 1.160                       | 9.191                 | 12.368                 | 0.273                         | 2.257                 | 0.647                  |
| 150.0                                                                  | 29.6                   | 146.6                      | 1.293                       | 8.849                 | 11.296                 | 0.310                         | 1.725                 | 0.590                  |
| 165.0                                                                  | 30.3                   | 161.6                      | 1.345                       | 8.774                 | 10.609                 | 0.371                         | 1.324                 | 0.559                  |
| 180.0                                                                  | 31.0                   | 177.2                      | 1.427                       | 8.935                 | 10.090                 | 0.372                         | 1.217                 | 0.573                  |
| 195.0                                                                  | 31.5                   | 194.2                      | 1.348                       | 7.947                 | 10.509                 | 0.347                         | 1.473                 | 0.535                  |
| 210.0                                                                  | 30.4                   | 212.5                      | 1.069                       | 13.751                | 13.119                 | 0.315                         | 2.332                 | 0.601                  |
| 225.0                                                                  | 30.0                   | 225.7                      | 1.419                       | 11.453                | 11.878                 | 0.222                         | 2.301                 | 0.718                  |
| 240.0                                                                  | 29.7                   | 240.5                      | 1.372                       | 14.113                | 12.434                 | 0.236                         | 3.352                 | 0.816                  |
| 255.0                                                                  | 29.9                   | 255.8                      | 4.764                       | 18.925                | 12.830                 | 0.226                         | 3.231                 | 0.808                  |
| 270.0                                                                  | 30.0                   | 271.1                      | 0.858                       | 15.567                | 14.733                 | 0.155                         | 3.340                 | 0.938                  |
| 285.0                                                                  | 30.1                   | 285.9                      | 1.481                       | 17.503                | 15.327                 | 0.194                         | 3.353                 | 1.276                  |
| 300.0                                                                  | 30.2                   | 300.4                      | 1.396                       | 16.271                | 15.425                 | 0.380                         | 2.920                 | 1.658                  |
| 315.0                                                                  | 30.3                   | 315.0                      | 1.980                       | 13.190                | 16.466                 | 0.514                         | 2.322                 | 1.979                  |
| 330.0                                                                  | 30.3                   | 329.8                      | 2.426                       | 11.064                | 16.506                 | 0.589                         | 1.810                 | 2.119                  |
| 345.0                                                                  | 30.3                   | 344.8                      | 2.644                       | 8.079                 | 16.925                 | 0.628                         | 1.512                 | 2.199                  |
| Wind at 56.4 knots (29.0 m/s) is from the starboard beam in all cases. |                        |                            |                             |                       |                        |                               |                       |                        |

**Table U.50:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 14.0$  m and  $T_p = 18.6$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | -0.3               | -529.3              | 1.648                   | 9.635          | 12.792          | 0.241                     | 2.515          | 0.778           |
| 15.0                                                                   | -2.6               | -113.0              | 1.515                   | 7.282          | 13.012          | 0.296                     | 1.859          | 0.835           |
| 30.0                                                                   | -4.0               | -135.5              | 1.411                   | 8.521          | 14.060          | 0.277                     | 1.897          | 0.933           |
| 45.0                                                                   | -3.8               | -120.5              | 1.069                   | 9.129          | 14.181          | 0.238                     | 2.096          | 0.963           |
| 60.0                                                                   | 2.2                | 51.7                | 1.061                   | 7.379          | 14.452          | 0.235                     | 1.654          | 0.952           |
| 75.0                                                                   | 2.1                | 80.1                | 0.730                   | 6.773          | 14.991          | 0.096                     | 1.644          | 0.859           |
| 90.0                                                                   | 0.3                | 101.2               | 0.692                   | 7.273          | 13.835          | 0.083                     | 1.771          | 0.878           |
| 105.0                                                                  | -1.5               | 111.4               | 0.956                   | 8.109          | 14.157          | 0.123                     | 1.880          | 0.935           |
| 120.0                                                                  | -3.6               | 122.6               | 0.928                   | 8.452          | 14.211          | 0.177                     | 1.886          | 0.967           |
| 135.0                                                                  | -4.7               | 134.3               | 1.286                   | 9.017          | 14.182          | 0.237                     | 1.694          | 0.940           |
| 150.0                                                                  | -4.5               | 149.3               | 1.314                   | 8.188          | 13.502          | 0.279                     | 1.348          | 0.899           |
| 165.0                                                                  | -2.9               | 168.9               | 2.086                   | 7.510          | 13.565          | 0.304                     | 1.005          | 0.798           |
| 180.0                                                                  | -1.3               | 526.9               | 1.461                   | 9.783          | 13.361          | 0.256                     | 2.598          | 0.780           |
| 195.0                                                                  | -1.6               | 358.3               | 1.489                   | 8.910          | 13.762          | 0.206                     | 2.426          | 0.750           |
| 210.0                                                                  | -0.4               | 251.6               | 1.339                   | 10.250         | 13.697          | 0.144                     | 2.370          | 0.766           |
| 225.0                                                                  | -0.7               | 256.9               | 1.108                   | 11.101         | 13.002          | 0.114                     | 2.362          | 0.743           |
| 240.0                                                                  | -1.2               | 263.7               | 0.709                   | 11.473         | 12.857          | 0.078                     | 2.294          | 0.714           |
| 255.0                                                                  | -2.0               | 270.9               | 0.568                   | 11.435         | 12.885          | 0.062                     | 2.193          | 0.692           |
| 270.0                                                                  | -2.1               | 278.3               | 0.532                   | 10.679         | 12.758          | 0.070                     | 2.071          | 0.684           |
| 285.0                                                                  | -2.1               | 284.3               | 0.662                   | 10.221         | 12.924          | 0.102                     | 1.967          | 0.698           |
| 300.0                                                                  | -2.4               | 290.2               | 0.849                   | 10.201         | 12.994          | 0.142                     | 1.900          | 0.726           |
| 315.0                                                                  | -2.7               | 241.7               | 1.489                   | 12.571         | 13.356          | 0.186                     | 2.712          | 0.780           |
| 330.0                                                                  | -2.6               | 252.0               | 1.116                   | 10.168         | 13.882          | 0.198                     | 2.575          | 0.771           |
| 345.0                                                                  | -2.7               | 50.0                | 1.511                   | 10.133         | 12.961          | 0.233                     | 2.117          | 0.782           |
| Wind at 56.4 knots (29.0 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.51:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 14.0$  m and  $T_p = 18.6$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 2.8                | -40.7               | 1.728                   | 9.487          | 13.781          | 0.299                     | 1.737          | 0.852           |
| 15.0                                                                   | 2.2                | -132.5              | 1.650                   | 7.302          | 14.936          | 0.190                     | 1.768          | 0.852           |
| 30.0                                                                   | 2.6                | -88.1               | 1.557                   | 7.846          | 13.372          | 0.232                     | 2.521          | 0.889           |
| 45.0                                                                   | 3.1                | -99.6               | 1.211                   | 7.352          | 14.052          | 0.177                     | 2.181          | 0.905           |
| 60.0                                                                   | 3.6                | -83.8               | 1.293                   | 7.390          | 14.148          | 0.175                     | 2.284          | 0.912           |
| 75.0                                                                   | 5.1                | 66.4                | 0.890                   | 7.292          | 13.850          | 0.165                     | 1.569          | 0.949           |
| 90.0                                                                   | 4.9                | 89.0                | 0.509                   | 6.596          | 14.475          | 0.055                     | 1.574          | 0.859           |
| 105.0                                                                  | 4.4                | 104.1               | 0.607                   | 6.802          | 13.854          | 0.069                     | 1.688          | 0.873           |
| 120.0                                                                  | 3.6                | 114.9               | 0.806                   | 7.417          | 13.737          | 0.107                     | 1.711          | 0.895           |
| 135.0                                                                  | 3.0                | 122.9               | 1.167                   | 7.923          | 14.654          | 0.137                     | 1.698          | 0.897           |
| 150.0                                                                  | 2.5                | 131.4               | 1.361                   | 8.083          | 15.213          | 0.166                     | 1.650          | 0.861           |
| 165.0                                                                  | 2.2                | 138.9               | 1.451                   | 8.689          | 14.174          | 0.191                     | 1.581          | 0.814           |
| 180.0                                                                  | 2.1                | 149.1               | 1.714                   | 6.982          | 12.926          | 0.214                     | 1.469          | 0.739           |
| 195.0                                                                  | 4.2                | 206.2               | 1.734                   | 10.315         | 11.804          | 0.223                     | 1.787          | 0.467           |
| 210.0                                                                  | 4.3                | 241.2               | 1.589                   | 11.455         | 12.838          | 0.166                     | 2.337          | 0.625           |
| 225.0                                                                  | 4.0                | 251.2               | 1.303                   | 11.879         | 12.873          | 0.133                     | 2.354          | 0.652           |
| 240.0                                                                  | 3.9                | 260.4               | 0.949                   | 12.551         | 12.707          | 0.097                     | 2.331          | 0.667           |
| 255.0                                                                  | 4.0                | 270.1               | 0.494                   | 11.979         | 12.488          | 0.059                     | 2.246          | 0.657           |
| 270.0                                                                  | 4.0                | 278.8               | 0.496                   | 11.549         | 12.785          | 0.056                     | 2.190          | 0.675           |
| 285.0                                                                  | 4.0                | 287.8               | 0.821                   | 10.811         | 13.837          | 0.106                     | 2.057          | 0.712           |
| 300.0                                                                  | 3.9                | 296.2               | 0.889                   | 10.428         | 13.482          | 0.167                     | 1.888          | 0.754           |
| 315.0                                                                  | 3.6                | 301.3               | 1.137                   | 10.753         | 13.514          | 0.208                     | 1.847          | 0.796           |
| 330.0                                                                  | 3.3                | 307.1               | 1.344                   | 10.555         | 13.908          | 0.246                     | 1.811          | 0.824           |
| 345.0                                                                  | 3.0                | 313.4               | 1.609                   | 9.966          | 13.881          | 0.277                     | 1.775          | 0.837           |
| Wind at 56.4 knots (29.0 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |



**Table U.52:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 14.0$  m and  $T_p = 18.6$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                            | <b>Absolute Maximum</b> |                       |                        | <b>Standard Deviation</b> |                       |                        |
|------------------------------------------------------------------------|--------------------|----------------------------|-------------------------|-----------------------|------------------------|---------------------------|-----------------------|------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts       | $\psi_{\text{MHP}}$<br>deg | Long<br>$\text{m/s}^2$  | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ | Long<br>$\text{m/s}^2$    | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ |
| 0.0                                                                    | 7.6                | -33.6                      | 1.974                   | 10.020                | 13.008                 | 0.369                     | 1.732                 | 0.975                  |
| 15.0                                                                   | 7.4                | -26.9                      | 1.946                   | 8.543                 | 12.543                 | 0.389                     | 1.707                 | 0.992                  |
| 30.0                                                                   | 7.4                | -18.7                      | 2.196                   | 6.803                 | 12.726                 | 0.404                     | 1.619                 | 0.998                  |
| 45.0                                                                   | 7.4                | -8.1                       | 1.908                   | 6.273                 | 12.713                 | 0.412                     | 1.526                 | 1.017                  |
| 60.0                                                                   | 7.6                | 13.7                       | 2.222                   | 7.631                 | 13.094                 | 0.392                     | 1.494                 | 1.063                  |
| 75.0                                                                   | 9.9                | 71.8                       | 0.763                   | 7.277                 | 14.625                 | 0.131                     | 1.431                 | 0.947                  |
| 90.0                                                                   | 9.9                | 88.5                       | 0.272                   | 6.622                 | 13.960                 | 0.054                     | 1.433                 | 0.839                  |
| 105.0                                                                  | 9.7                | 104.0                      | 0.653                   | 6.711                 | 13.585                 | 0.068                     | 1.491                 | 0.804                  |
| 120.0                                                                  | 9.0                | 116.0                      | 0.921                   | 6.909                 | 14.509                 | 0.096                     | 1.412                 | 0.806                  |
| 135.0                                                                  | 8.4                | 127.3                      | 1.440                   | 7.422                 | 14.734                 | 0.121                     | 1.294                 | 0.759                  |
| 150.0                                                                  | 7.9                | 137.5                      | 1.328                   | 7.066                 | 13.632                 | 0.140                     | 1.256                 | 0.697                  |
| 165.0                                                                  | 7.7                | 145.8                      | 1.358                   | 6.727                 | 13.768                 | 0.150                     | 1.304                 | 0.668                  |
| 180.0                                                                  | 7.6                | 157.3                      | 1.450                   | 6.554                 | 13.537                 | 0.166                     | 1.367                 | 0.620                  |
| 195.0                                                                  | 9.0                | 194.5                      | 1.879                   | 10.692                | 11.588                 | 0.179                     | 1.546                 | 0.344                  |
| 210.0                                                                  | 8.9                | 221.5                      | 1.886                   | 12.003                | 12.201                 | 0.172                     | 2.144                 | 0.407                  |
| 225.0                                                                  | 8.7                | 238.4                      | 1.402                   | 10.849                | 12.245                 | 0.151                     | 2.350                 | 0.519                  |
| 240.0                                                                  | 8.8                | 251.0                      | 1.049                   | 12.834                | 12.943                 | 0.125                     | 2.438                 | 0.578                  |
| 255.0                                                                  | 9.1                | 262.7                      | 0.845                   | 13.052                | 12.455                 | 0.091                     | 2.453                 | 0.609                  |
| 270.0                                                                  | 9.3                | 274.9                      | 0.390                   | 12.024                | 12.879                 | 0.060                     | 2.458                 | 0.644                  |
| 285.0                                                                  | 9.5                | 287.2                      | 0.821                   | 11.511                | 13.382                 | 0.101                     | 2.308                 | 0.713                  |
| 300.0                                                                  | 9.4                | 299.6                      | 1.026                   | 10.424                | 13.500                 | 0.202                     | 1.946                 | 0.795                  |
| 315.0                                                                  | 8.9                | 310.0                      | 1.385                   | 9.749                 | 13.402                 | 0.281                     | 1.728                 | 0.881                  |
| 330.0                                                                  | 8.0                | 314.6                      | 1.530                   | 10.107                | 14.094                 | 0.315                     | 1.751                 | 0.917                  |
| 345.0                                                                  | 7.7                | 320.9                      | 1.852                   | 9.246                 | 13.491                 | 0.346                     | 1.730                 | 0.941                  |
| Wind at 56.4 knots (29.0 m/s) is from the starboard beam in all cases. |                    |                            |                         |                       |                        |                           |                       |                        |

**Table U.53:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 14.0$  m and  $T_p = 18.6$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                            | <b>Absolute Maximum</b> |                       |                        | <b>Standard Deviation</b> |                       |                        |
|------------------------------------------------------------------------|--------------------|----------------------------|-------------------------|-----------------------|------------------------|---------------------------|-----------------------|------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts       | $\psi_{\text{MHP}}$<br>deg | Long<br>$\text{m/s}^2$  | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ | Long<br>$\text{m/s}^2$    | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ |
| 0.0                                                                    | 13.9               | -4.3                       | 1.918                   | 6.357                 | 12.888                 | 0.468                     | 1.132                 | 1.189                  |
| 15.0                                                                   | 14.0               | 11.3                       | 1.989                   | 5.710                 | 13.016                 | 0.464                     | 1.153                 | 1.214                  |
| 30.0                                                                   | 14.3               | 27.1                       | 1.802                   | 6.116                 | 13.795                 | 0.428                     | 1.288                 | 1.225                  |
| 45.0                                                                   | 14.5               | 42.6                       | 1.410                   | 7.024                 | 13.721                 | 0.356                     | 1.351                 | 1.199                  |
| 60.0                                                                   | 14.7               | 57.4                       | 0.926                   | 7.787                 | 14.367                 | 0.252                     | 1.376                 | 1.127                  |
| 75.0                                                                   | 15.0               | 73.4                       | 0.734                   | 6.646                 | 14.954                 | 0.130                     | 1.363                 | 0.953                  |
| 90.0                                                                   | 15.0               | 88.8                       | 0.565                   | 11.887                | 13.436                 | 0.070                     | 1.400                 | 0.810                  |
| 105.0                                                                  | 15.0               | 104.3                      | 0.606                   | 7.423                 | 12.820                 | 0.087                     | 1.400                 | 0.712                  |
| 120.0                                                                  | 14.5               | 117.6                      | 0.820                   | 7.154                 | 13.901                 | 0.115                     | 1.386                 | 0.724                  |
| 135.0                                                                  | 14.3               | 132.0                      | 0.676                   | 6.871                 | 12.619                 | 0.131                     | 1.160                 | 0.615                  |
| 150.0                                                                  | 14.2               | 146.8                      | 1.302                   | 6.622                 | 13.308                 | 0.147                     | 1.030                 | 0.513                  |
| 165.0                                                                  | 14.4               | 162.1                      | 0.882                   | 6.899                 | 11.830                 | 0.148                     | 0.961                 | 0.429                  |
| 180.0                                                                  | 14.5               | 178.0                      | 1.130                   | 7.882                 | 10.544                 | 0.159                     | 1.075                 | 0.352                  |
| 195.0                                                                  | 14.6               | 194.4                      | 1.253                   | 9.949                 | 11.775                 | 0.145                     | 1.374                 | 0.352                  |
| 210.0                                                                  | 14.4               | 212.7                      | 1.260                   | 10.998                | 11.909                 | 0.152                     | 1.915                 | 0.347                  |
| 225.0                                                                  | 14.2               | 230.3                      | 1.093                   | 9.727                 | 11.935                 | 0.138                     | 2.368                 | 0.448                  |
| 240.0                                                                  | 14.3               | 244.5                      | 1.048                   | 11.352                | 14.124                 | 0.131                     | 2.648                 | 0.495                  |
| 255.0                                                                  | 14.6               | 258.5                      | 0.899                   | 12.253                | 12.822                 | 0.112                     | 2.667                 | 0.545                  |
| 270.0                                                                  | 14.7               | 272.6                      | 0.532                   | 11.947                | 12.697                 | 0.081                     | 2.694                 | 0.650                  |
| 285.0                                                                  | 14.8               | 286.5                      | 0.659                   | 12.715                | 13.302                 | 0.105                     | 2.558                 | 0.763                  |
| 300.0                                                                  | 14.7               | 300.1                      | 1.073                   | 11.950                | 13.787                 | 0.215                     | 2.120                 | 0.859                  |
| 315.0                                                                  | 14.5               | 313.5                      | 1.262                   | 9.348                 | 13.240                 | 0.322                     | 1.668                 | 0.976                  |
| 330.0                                                                  | 14.2               | 327.0                      | 1.716                   | 9.109                 | 13.263                 | 0.400                     | 1.392                 | 1.075                  |
| 345.0                                                                  | 13.9               | 341.0                      | 2.025                   | 7.723                 | 12.990                 | 0.447                     | 1.236                 | 1.143                  |
| Wind at 56.4 knots (29.0 m/s) is from the starboard beam in all cases. |                    |                            |                         |                       |                        |                           |                       |                        |

**Table U.54:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 14.0$  m and  $T_p = 18.6$  s; Ship's speed is 20.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                            | <b>Absolute Maximum</b> |                       |                        | <b>Standard Deviation</b> |                       |                        |
|------------------------------------------------------------------------|--------------------|----------------------------|-------------------------|-----------------------|------------------------|---------------------------|-----------------------|------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts       | $\psi_{\text{MHP}}$<br>deg | Long<br>$\text{m/s}^2$  | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ | Long<br>$\text{m/s}^2$    | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ |
| 0.0                                                                    | 19.7               | -1.5                       | 2.384                   | 5.426                 | 13.370                 | 0.506                     | 1.085                 | 1.331                  |
| 15.0                                                                   | 19.7               | 13.8                       | 1.957                   | 6.739                 | 13.774                 | 0.496                     | 1.192                 | 1.344                  |
| 30.0                                                                   | 19.8               | 29.0                       | 2.023                   | 6.729                 | 13.815                 | 0.457                     | 1.335                 | 1.336                  |
| 45.0                                                                   | 19.8               | 44.0                       | 1.581                   | 7.793                 | 14.252                 | 0.374                     | 1.432                 | 1.277                  |
| 60.0                                                                   | 19.9               | 58.6                       | 0.905                   | 8.358                 | 14.506                 | 0.262                     | 1.396                 | 1.194                  |
| 75.0                                                                   | 20.1               | 73.8                       | 0.631                   | 7.298                 | 14.835                 | 0.137                     | 1.415                 | 0.971                  |
| 90.0                                                                   | 20.1               | 89.0                       | 0.431                   | 8.435                 | 13.451                 | 0.090                     | 1.376                 | 0.772                  |
| 105.0                                                                  | 20.1               | 104.1                      | 1.503                   | 13.930                | 12.487                 | 0.119                     | 1.436                 | 0.608                  |
| 120.0                                                                  | 19.9               | 118.6                      | 0.636                   | 7.302                 | 12.584                 | 0.142                     | 1.620                 | 0.698                  |
| 135.0                                                                  | 19.9               | 133.6                      | 0.878                   | 8.857                 | 11.805                 | 0.150                     | 1.228                 | 0.518                  |
| 150.0                                                                  | 19.8               | 148.5                      | 1.009                   | 8.147                 | 11.817                 | 0.177                     | 1.090                 | 0.465                  |
| 165.0                                                                  | 19.8               | 163.7                      | 0.983                   | 6.108                 | 11.421                 | 0.191                     | 0.918                 | 0.421                  |
| 180.0                                                                  | 20.0               | 179.4                      | 0.945                   | 6.772                 | 11.032                 | 0.190                     | 1.002                 | 0.386                  |
| 195.0                                                                  | 19.9               | 194.4                      | 1.031                   | 7.979                 | 10.253                 | 0.168                     | 1.282                 | 0.444                  |
| 210.0                                                                  | 19.9               | 209.6                      | 0.766                   | 8.950                 | 10.237                 | 0.145                     | 1.660                 | 0.537                  |
| 225.0                                                                  | 19.8               | 225.8                      | 1.073                   | 10.086                | 11.526                 | 0.141                     | 2.167                 | 0.501                  |
| 240.0                                                                  | 19.7               | 241.8                      | 0.941                   | 10.263                | 12.997                 | 0.146                     | 2.783                 | 0.495                  |
| 255.0                                                                  | 19.9               | 256.9                      | 1.029                   | 10.993                | 12.625                 | 0.127                     | 2.827                 | 0.572                  |
| 270.0                                                                  | 19.9               | 271.6                      | 0.639                   | 12.839                | 12.569                 | 0.099                     | 2.841                 | 0.697                  |
| 285.0                                                                  | 20.0               | 286.0                      | 0.628                   | 13.063                | 13.585                 | 0.109                     | 2.760                 | 0.855                  |
| 300.0                                                                  | 19.9               | 300.2                      | 1.037                   | 11.992                | 13.273                 | 0.229                     | 2.257                 | 0.939                  |
| 315.0                                                                  | 19.9               | 314.3                      | 1.401                   | 10.615                | 13.515                 | 0.350                     | 1.737                 | 1.089                  |
| 330.0                                                                  | 19.8               | 328.7                      | 1.737                   | 7.775                 | 13.469                 | 0.436                     | 1.343                 | 1.210                  |
| 345.0                                                                  | 19.7               | 343.5                      | 2.354                   | 6.184                 | 13.406                 | 0.487                     | 1.132                 | 1.279                  |
| Wind at 56.4 knots (29.0 m/s) is from the starboard beam in all cases. |                    |                            |                         |                       |                        |                           |                       |                        |

**Table U.55:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 14.0$  m and  $T_p = 18.6$  s; Ship's speed is 25.0 Knots

| <b>Cmd<br/>Heading</b>                                                 | <b>Actual<br/>Mean</b> |                     | <b>Absolute<br/>Maximum</b> |                |                 | <b>Standard<br/>Deviation</b> |                |                 |
|------------------------------------------------------------------------|------------------------|---------------------|-----------------------------|----------------|-----------------|-------------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts           | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$             | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$               | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 25.0                   | -0.6                | 2.147                       | 6.239          | 14.121          | 0.536                         | 1.172          | 1.560           |
| 15.0                                                                   | 25.0                   | 14.6                | 2.370                       | 7.133          | 14.507          | 0.526                         | 1.268          | 1.556           |
| 30.0                                                                   | 25.0                   | 29.7                | 2.056                       | 7.550          | 14.787          | 0.489                         | 1.411          | 1.530           |
| 45.0                                                                   | 25.0                   | 44.6                | 1.558                       | 7.771          | 14.806          | 0.401                         | 1.517          | 1.425           |
| 60.0                                                                   | 25.0                   | 59.2                | 1.179                       | 8.712          | 16.404          | 0.277                         | 1.507          | 1.288           |
| 75.0                                                                   | 25.1                   | 74.2                | 0.581                       | 7.602          | 14.450          | 0.146                         | 1.556          | 1.015           |
| 90.0                                                                   | 25.2                   | 89.2                | 0.864                       | 14.935         | 14.077          | 0.111                         | 1.527          | 0.766           |
| 105.0                                                                  | 25.1                   | 104.1               | 1.343                       | 9.273          | 13.805          | 0.145                         | 1.517          | 0.560           |
| 120.0                                                                  | 25.0                   | 119.0               | 0.933                       | 10.979         | 12.878          | 0.174                         | 1.923          | 0.665           |
| 135.0                                                                  | 24.8                   | 133.8               | 1.038                       | 9.666          | 13.266          | 0.209                         | 1.978          | 0.574           |
| 150.0                                                                  | 24.8                   | 148.3               | 0.959                       | 8.812          | 11.245          | 0.208                         | 1.014          | 0.468           |
| 165.0                                                                  | 25.6                   | 164.1               | 1.084                       | 5.330          | 11.227          | 0.233                         | 0.791          | 0.399           |
| 180.0                                                                  | 25.9                   | 179.3               | 0.908                       | 5.096          | 10.128          | 0.173                         | 0.611          | 0.280           |
| 195.0                                                                  | 25.7                   | 196.3               | 1.298                       | 8.828          | 10.282          | 0.230                         | 1.380          | 0.381           |
| 210.0                                                                  | 25.1                   | 210.4               | 0.866                       | 8.647          | 10.215          | 0.183                         | 1.674          | 0.516           |
| 225.0                                                                  | 24.9                   | 225.0               | 0.907                       | 9.844          | 10.093          | 0.173                         | 2.258          | 0.706           |
| 240.0                                                                  | 24.9                   | 240.5               | 1.124                       | 11.969         | 12.290          | 0.162                         | 2.741          | 0.594           |
| 255.0                                                                  | 25.1                   | 256.0               | 0.933                       | 15.656         | 11.874          | 0.143                         | 2.872          | 0.669           |
| 270.0                                                                  | 25.0                   | 271.1               | 0.560                       | 12.363         | 12.191          | 0.115                         | 2.927          | 0.788           |
| 285.0                                                                  | 25.1                   | 285.8               | 0.656                       | 14.234         | 13.853          | 0.119                         | 2.929          | 0.955           |
| 300.0                                                                  | 25.1                   | 300.1               | 0.996                       | 12.430         | 13.630          | 0.240                         | 2.320          | 1.040           |
| 315.0                                                                  | 25.1                   | 314.7               | 1.589                       | 10.862         | 14.273          | 0.374                         | 1.835          | 1.244           |
| 330.0                                                                  | 25.0                   | 329.4               | 1.928                       | 9.084          | 14.402          | 0.465                         | 1.463          | 1.421           |
| 345.0                                                                  | 25.0                   | 344.3               | 2.306                       | 6.798          | 14.239          | 0.514                         | 1.228          | 1.511           |
| Wind at 56.4 knots (29.0 m/s) is from the starboard beam in all cases. |                        |                     |                             |                |                 |                               |                |                 |

**Table U.56:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 14.0$  m and  $T_p = 18.6$  s; Ship's speed is 30.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                            | <b>Absolute Maximum</b> |                       |                        | <b>Standard Deviation</b> |                       |                        |
|------------------------------------------------------------------------|--------------------|----------------------------|-------------------------|-----------------------|------------------------|---------------------------|-----------------------|------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts       | $\psi_{\text{MHP}}$<br>deg | Long<br>$\text{m/s}^2$  | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ | Long<br>$\text{m/s}^2$    | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ |
| 0.0                                                                    | 30.2               | -0.2                       | 2.437                   | 7.681                 | 15.424                 | 0.558                     | 1.296                 | 1.847                  |
| 15.0                                                                   | 30.2               | 15.0                       | 2.143                   | 7.803                 | 15.689                 | 0.545                     | 1.398                 | 1.838                  |
| 30.0                                                                   | 30.2               | 30.0                       | 2.133                   | 9.559                 | 15.890                 | 0.508                     | 1.550                 | 1.788                  |
| 45.0                                                                   | 30.2               | 44.9                       | 1.686                   | 8.835                 | 15.470                 | 0.423                     | 1.662                 | 1.610                  |
| 60.0                                                                   | 30.2               | 59.6                       | 1.078                   | 8.835                 | 16.128                 | 0.295                     | 1.661                 | 1.410                  |
| 75.0                                                                   | 30.2               | 74.3                       | 0.735                   | 8.486                 | 14.877                 | 0.156                     | 1.762                 | 1.067                  |
| 90.0                                                                   | 30.2               | 89.3                       | 0.752                   | 8.385                 | 13.435                 | 0.128                     | 1.695                 | 0.795                  |
| 105.0                                                                  | 30.2               | 104.1                      | 1.758                   | 11.602                | 12.706                 | 0.176                     | 1.624                 | 0.558                  |
| 120.0                                                                  | 30.0               | 119.4                      | 0.717                   | 8.301                 | 11.568                 | 0.206                     | 2.271                 | 0.588                  |
| 135.0                                                                  | 29.8               | 133.7                      | 1.021                   | 9.379                 | 11.244                 | 0.249                     | 1.981                 | 0.511                  |
| 150.0                                                                  | 30.0               | 148.1                      | 1.107                   | 8.893                 | 10.781                 | 0.263                     | 1.263                 | 0.485                  |
| 165.0                                                                  | 30.2               | 162.5                      | 1.115                   | 6.957                 | 10.662                 | 0.326                     | 1.017                 | 0.452                  |
| 180.0                                                                  | 30.8               | 177.9                      | 1.552                   | 6.438                 | 10.030                 | 0.322                     | 0.900                 | 0.441                  |
| 195.0                                                                  | 31.6               | 194.5                      | 1.162                   | 6.037                 | 10.151                 | 0.273                     | 1.147                 | 0.421                  |
| 210.0                                                                  | 30.8               | 210.9                      | 1.494                   | 12.870                | 10.083                 | 0.259                     | 1.736                 | 0.514                  |
| 225.0                                                                  | 30.1               | 225.2                      | 0.890                   | 8.989                 | 10.074                 | 0.210                     | 2.063                 | 0.686                  |
| 240.0                                                                  | 30.0               | 240.1                      | 1.071                   | 13.207                | 10.168                 | 0.194                     | 2.658                 | 0.717                  |
| 255.0                                                                  | 30.1               | 255.5                      | 1.002                   | 14.996                | 11.189                 | 0.169                     | 2.738                 | 0.796                  |
| 270.0                                                                  | 30.1               | 270.7                      | 0.621                   | 12.403                | 12.025                 | 0.135                     | 2.954                 | 0.892                  |
| 285.0                                                                  | 30.2               | 285.5                      | 0.689                   | 13.093                | 13.866                 | 0.130                     | 2.936                 | 1.061                  |
| 300.0                                                                  | 30.2               | 300.2                      | 1.001                   | 12.941                | 13.825                 | 0.256                     | 2.477                 | 1.131                  |
| 315.0                                                                  | 30.2               | 314.9                      | 1.533                   | 11.298                | 15.101                 | 0.396                     | 1.969                 | 1.463                  |
| 330.0                                                                  | 30.2               | 329.7                      | 2.014                   | 8.539                 | 15.875                 | 0.490                     | 1.576                 | 1.684                  |
| 345.0                                                                  | 30.2               | 344.7                      | 2.375                   | 8.582                 | 15.557                 | 0.536                     | 1.371                 | 1.800                  |
| Wind at 56.4 knots (29.0 m/s) is from the starboard beam in all cases. |                    |                            |                         |                       |                        |                           |                       |                        |

**Table U.57:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 17.7$  m and  $T_p = 20.0$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | -0.5               | -110.6              | 1.863                   | 11.493         | 13.217          | 0.299                     | 3.032          | 0.805           |
| 15.0                                                                   | -2.8               | 189.5               | 2.545                   | 10.582         | 12.839          | 0.339                     | 1.786          | 0.821           |
| 30.0                                                                   | -4.0               | -145.1              | 1.795                   | 9.881          | 13.237          | 0.326                     | 2.207          | 0.958           |
| 45.0                                                                   | 2.0                | 30.6                | 1.247                   | 7.842          | 13.151          | 0.321                     | 1.615          | 1.174           |
| 60.0                                                                   | 3.8                | 54.5                | 1.109                   | 7.620          | 15.805          | 0.240                     | 1.593          | 1.108           |
| 75.0                                                                   | 2.8                | 85.5                | 0.802                   | 7.708          | 14.422          | 0.088                     | 1.582          | 0.911           |
| 90.0                                                                   | 0.3                | 106.0               | 0.973                   | 8.446          | 14.264          | 0.111                     | 1.733          | 0.965           |
| 105.0                                                                  | -2.3               | 118.7               | 1.104                   | 8.295          | 14.714          | 0.159                     | 1.820          | 1.059           |
| 120.0                                                                  | -4.4               | 132.0               | 1.199                   | 8.318          | 14.866          | 0.227                     | 1.697          | 1.070           |
| 135.0                                                                  | -5.1               | 146.2               | 1.664                   | 8.514          | 14.873          | 0.293                     | 1.468          | 1.017           |
| 150.0                                                                  | -4.3               | 160.0               | 1.580                   | 9.530          | 13.992          | 0.327                     | 1.245          | 0.885           |
| 165.0                                                                  | -2.8               | 173.3               | 1.945                   | 9.178          | 14.396          | 0.339                     | 1.309          | 0.747           |
| 180.0                                                                  | 0.4                | 310.9               | 1.886                   | 11.457         | 13.440          | 0.276                     | 2.984          | 0.807           |
| 195.0                                                                  | 1.1                | 234.8               | 1.943                   | 12.439         | 12.369          | 0.233                     | 2.751          | 0.736           |
| 210.0                                                                  | -0.2               | 245.4               | 1.686                   | 13.294         | 13.530          | 0.205                     | 2.755          | 0.760           |
| 225.0                                                                  | -0.7               | 253.7               | 1.420                   | 12.976         | 12.897          | 0.153                     | 2.722          | 0.786           |
| 240.0                                                                  | -1.1               | 261.7               | 1.061                   | 12.870         | 12.886          | 0.108                     | 2.617          | 0.764           |
| 255.0                                                                  | -2.3               | 269.6               | 1.312                   | 12.025         | 12.569          | 0.091                     | 2.483          | 0.778           |
| 270.0                                                                  | -2.8               | 277.2               | 0.782                   | 11.564         | 13.102          | 0.087                     | 2.304          | 0.790           |
| 285.0                                                                  | -3.5               | 283.1               | 0.737                   | 12.396         | 12.477          | 0.118                     | 2.184          | 0.832           |
| 300.0                                                                  | -3.5               | 288.4               | 1.130                   | 11.630         | 12.303          | 0.165                     | 2.103          | 0.896           |
| 315.0                                                                  | -3.9               | 295.7               | 1.549                   | 17.495         | 15.891          | 0.212                     | 2.139          | 0.944           |
| 330.0                                                                  | -0.6               | 141.1               | 1.477                   | 12.916         | 13.776          | 0.204                     | 3.268          | 0.822           |
| 345.0                                                                  | 0.6                | 141.0               | 1.714                   | 12.461         | 12.392          | 0.237                     | 3.038          | 0.768           |
| Wind at 69.4 knots (35.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.58:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 17.7$  m and  $T_p = 20.0$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                            | <b>Absolute Maximum</b> |                       |                        | <b>Standard Deviation</b> |                       |                        |
|------------------------------------------------------------------------|--------------------|----------------------------|-------------------------|-----------------------|------------------------|---------------------------|-----------------------|------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts       | $\psi_{\text{MHP}}$<br>deg | Long<br>$\text{m/s}^2$  | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ | Long<br>$\text{m/s}^2$    | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ |
| 0.0                                                                    | 1.7                | -41.7                      | 1.955                   | 12.375                | 12.976                 | 0.308                     | 2.011                 | 1.008                  |
| 15.0                                                                   | 1.3                | -140.8                     | 1.887                   | 7.964                 | 14.629                 | 0.231                     | 1.692                 | 0.946                  |
| 30.0                                                                   | 1.9                | -124.7                     | 2.156                   | 7.242                 | 13.682                 | 0.216                     | 2.160                 | 0.979                  |
| 45.0                                                                   | 2.6                | -114.2                     | 1.686                   | 6.923                 | 14.417                 | 0.190                     | 2.284                 | 0.997                  |
| 60.0                                                                   | 3.5                | -61.9                      | 1.683                   | 8.245                 | 13.518                 | 0.239                     | 3.453                 | 1.060                  |
| 75.0                                                                   | 5.8                | 71.4                       | 1.004                   | 8.178                 | 15.302                 | 0.146                     | 1.454                 | 0.981                  |
| 90.0                                                                   | 5.0                | 94.4                       | 0.450                   | 7.719                 | 14.330                 | 0.065                     | 1.592                 | 0.887                  |
| 105.0                                                                  | 4.3                | 108.2                      | 1.264                   | 7.977                 | 14.033                 | 0.100                     | 1.609                 | 0.914                  |
| 120.0                                                                  | 3.4                | 118.0                      | 1.460                   | 9.646                 | 14.194                 | 0.131                     | 1.594                 | 0.963                  |
| 135.0                                                                  | 2.5                | 127.1                      | 1.858                   | 9.669                 | 14.370                 | 0.165                     | 1.570                 | 0.994                  |
| 150.0                                                                  | 1.9                | 134.9                      | 1.961                   | 10.050                | 15.333                 | 0.194                     | 1.526                 | 0.989                  |
| 165.0                                                                  | 1.5                | 143.3                      | 1.853                   | 10.270                | 15.559                 | 0.222                     | 1.473                 | 0.955                  |
| 180.0                                                                  | 1.3                | 153.9                      | 1.777                   | 9.059                 | 13.621                 | 0.251                     | 1.395                 | 0.873                  |
| 195.0                                                                  | 1.8                | 168.9                      | 2.877                   | 12.551                | 12.459                 | 0.277                     | 1.349                 | 0.715                  |
| 210.0                                                                  | 4.5                | 235.3                      | 2.045                   | 13.873                | 12.351                 | 0.212                     | 2.685                 | 0.623                  |
| 225.0                                                                  | 4.1                | 248.3                      | 1.618                   | 13.586                | 12.104                 | 0.173                     | 2.689                 | 0.679                  |
| 240.0                                                                  | 3.6                | 258.0                      | 1.205                   | 13.023                | 12.557                 | 0.139                     | 2.646                 | 0.714                  |
| 255.0                                                                  | 3.6                | 268.2                      | 1.128                   | 12.530                | 12.778                 | 0.097                     | 2.561                 | 0.725                  |
| 270.0                                                                  | 3.5                | 276.9                      | 0.641                   | 12.727                | 11.934                 | 0.078                     | 2.454                 | 0.746                  |
| 285.0                                                                  | 3.6                | 285.8                      | 0.687                   | 11.869                | 11.913                 | 0.092                     | 2.314                 | 0.805                  |
| 300.0                                                                  | 3.0                | 292.4                      | 0.794                   | 11.941                | 12.198                 | 0.139                     | 2.144                 | 0.885                  |
| 315.0                                                                  | 2.6                | 298.6                      | 1.355                   | 12.069                | 12.597                 | 0.192                     | 2.082                 | 0.997                  |
| 330.0                                                                  | 2.3                | 306.2                      | 1.412                   | 11.889                | 12.648                 | 0.240                     | 1.998                 | 1.025                  |
| 345.0                                                                  | 2.0                | 312.9                      | 1.796                   | 11.296                | 12.282                 | 0.282                     | 1.977                 | 1.052                  |
| Wind at 69.4 knots (35.7 m/s) is from the starboard beam in all cases. |                    |                            |                         |                       |                        |                           |                       |                        |

**Table U.59:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 17.7$  m and  $T_p = 20.0$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                            | <b>Absolute Maximum</b> |                       |                        | <b>Standard Deviation</b> |                       |                        |
|------------------------------------------------------------------------|--------------------|----------------------------|-------------------------|-----------------------|------------------------|---------------------------|-----------------------|------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts       | $\psi_{\text{MHP}}$<br>deg | Long<br>$\text{m/s}^2$  | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ | Long<br>$\text{m/s}^2$    | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ |
| 0.0                                                                    | 6.9                | -37.5                      | 2.234                   | 10.923                | 12.909                 | 0.368                     | 2.050                 | 1.125                  |
| 15.0                                                                   | 6.8                | -31.4                      | 2.298                   | 9.608                 | 12.949                 | 0.394                     | 2.026                 | 1.110                  |
| 30.0                                                                   | 6.8                | -26.2                      | 2.099                   | 8.903                 | 13.438                 | 0.408                     | 2.009                 | 1.097                  |
| 45.0                                                                   | 7.7                | -78.8                      | 1.730                   | 8.230                 | 12.674                 | 0.247                     | 2.943                 | 0.950                  |
| 60.0                                                                   | 6.9                | -10.9                      | 1.963                   | 9.174                 | 13.502                 | 0.414                     | 2.095                 | 1.127                  |
| 75.0                                                                   | 7.6                | 24.5                       | 1.774                   | 9.726                 | 15.096                 | 0.372                     | 1.947                 | 1.174                  |
| 90.0                                                                   | 9.7                | 88.3                       | 0.337                   | 8.979                 | 13.944                 | 0.062                     | 1.525                 | 0.849                  |
| 105.0                                                                  | 9.5                | 103.2                      | 1.041                   | 10.137                | 13.445                 | 0.090                     | 1.520                 | 0.780                  |
| 120.0                                                                  | 8.7                | 114.3                      | 1.020                   | 11.182                | 12.414                 | 0.107                     | 1.314                 | 0.792                  |
| 135.0                                                                  | 8.1                | 125.0                      | 1.137                   | 7.917                 | 13.180                 | 0.141                     | 1.140                 | 0.769                  |
| 150.0                                                                  | 7.6                | 134.4                      | 1.487                   | 7.649                 | 15.565                 | 0.161                     | 1.055                 | 0.753                  |
| 165.0                                                                  | 7.3                | 144.5                      | 1.397                   | 7.036                 | 14.469                 | 0.181                     | 1.110                 | 0.749                  |
| 180.0                                                                  | 7.1                | 153.9                      | 1.485                   | 6.921                 | 13.917                 | 0.194                     | 1.157                 | 0.736                  |
| 195.0                                                                  | 7.0                | 165.7                      | 2.084                   | 8.635                 | 12.399                 | 0.211                     | 1.121                 | 0.665                  |
| 210.0                                                                  | 8.8                | 220.9                      | 2.904                   | 16.300                | 11.913                 | 0.218                     | 2.457                 | 0.512                  |
| 225.0                                                                  | 8.8                | 240.1                      | 2.061                   | 13.992                | 11.521                 | 0.181                     | 2.703                 | 0.554                  |
| 240.0                                                                  | 8.8                | 251.8                      | 1.607                   | 13.529                | 13.043                 | 0.157                     | 2.780                 | 0.620                  |
| 255.0                                                                  | 8.9                | 263.4                      | 1.023                   | 13.737                | 11.985                 | 0.125                     | 2.770                 | 0.683                  |
| 270.0                                                                  | 8.9                | 275.4                      | 1.053                   | 13.642                | 12.187                 | 0.099                     | 2.729                 | 0.747                  |
| 285.0                                                                  | 9.1                | 286.9                      | 1.375                   | 13.160                | 12.642                 | 0.109                     | 2.574                 | 0.865                  |
| 300.0                                                                  | 8.9                | 298.5                      | 1.199                   | 12.090                | 12.619                 | 0.189                     | 2.210                 | 0.935                  |
| 315.0                                                                  | 7.9                | 306.1                      | 1.126                   | 12.367                | 12.643                 | 0.251                     | 2.034                 | 1.003                  |
| 330.0                                                                  | 7.3                | 310.9                      | 1.513                   | 11.875                | 12.838                 | 0.290                     | 2.049                 | 1.091                  |
| 345.0                                                                  | 7.1                | 317.3                      | 1.946                   | 11.703                | 12.990                 | 0.338                     | 2.020                 | 1.133                  |
| Wind at 69.4 knots (35.7 m/s) is from the starboard beam in all cases. |                    |                            |                         |                       |                        |                           |                       |                        |



**Table U.60:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 17.7$  m and  $T_p = 20.0$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 11.9               | -21.9               | 2.290                   | 14.703         | 13.142          | 0.491                     | 1.862          | 1.408           |
| 15.0                                                                   | 11.7               | -12.9               | 2.642                   | 10.438         | 13.954          | 0.512                     | 1.815          | 1.409           |
| 30.0                                                                   | 11.8               | 0.1                 | 2.658                   | 9.545          | 14.276          | 0.522                     | 1.725          | 1.439           |
| 45.0                                                                   | 12.1               | 19.1                | 2.106                   | 9.350          | 13.426          | 0.486                     | 1.640          | 1.475           |
| 60.0                                                                   | 12.7               | 42.5                | 1.368                   | 8.565          | 14.110          | 0.368                     | 1.423          | 1.402           |
| 75.0                                                                   | 14.8               | 72.7                | 0.618                   | 8.506          | 14.868          | 0.139                     | 1.489          | 0.985           |
| 90.0                                                                   | 14.7               | 88.3                | 0.398                   | 9.592          | 13.365          | 0.080                     | 1.585          | 0.774           |
| 105.0                                                                  | 14.6               | 102.6               | 1.137                   | 10.980         | 15.149          | 0.101                     | 1.580          | 0.668           |
| 120.0                                                                  | 13.9               | 115.1               | 0.789                   | 9.337          | 14.601          | 0.127                     | 1.369          | 0.667           |
| 135.0                                                                  | 13.5               | 129.1               | 0.941                   | 9.607          | 13.750          | 0.152                     | 1.285          | 0.625           |
| 150.0                                                                  | 13.4               | 143.3               | 0.992                   | 9.607          | 12.493          | 0.169                     | 1.212          | 0.562           |
| 165.0                                                                  | 13.2               | 158.7               | 1.913                   | 9.354          | 13.460          | 0.196                     | 1.217          | 0.505           |
| 180.0                                                                  | 14.0               | 176.8               | 1.165                   | 9.156          | 9.816           | 0.188                     | 1.254          | 0.423           |
| 195.0                                                                  | 13.9               | 196.1               | 2.334                   | 15.831         | 10.387          | 0.206                     | 1.844          | 0.462           |
| 210.0                                                                  | 14.0               | 215.4               | 1.265                   | 11.739         | 11.901          | 0.186                     | 2.300          | 0.491           |
| 225.0                                                                  | 14.1               | 231.1               | 1.449                   | 11.771         | 12.814          | 0.165                     | 2.552          | 0.570           |
| 240.0                                                                  | 14.2               | 245.1               | 1.562                   | 20.577         | 11.872          | 0.159                     | 2.906          | 0.642           |
| 255.0                                                                  | 14.3               | 259.0               | 1.584                   | 26.679         | 11.638          | 0.153                     | 3.102          | 0.744           |
| 270.0                                                                  | 14.4               | 273.2               | 0.735                   | 13.742         | 11.748          | 0.103                     | 2.986          | 0.816           |
| 285.0                                                                  | 14.5               | 286.6               | 0.870                   | 13.415         | 12.354          | 0.108                     | 2.875          | 0.958           |
| 300.0                                                                  | 14.4               | 300.2               | 1.682                   | 11.904         | 12.821          | 0.214                     | 2.337          | 0.948           |
| 315.0                                                                  | 14.2               | 312.9               | 1.204                   | 11.130         | 12.720          | 0.320                     | 1.959          | 1.180           |
| 330.0                                                                  | 13.3               | 324.8               | 1.850                   | 13.852         | 13.238          | 0.411                     | 1.767          | 1.269           |
| 345.0                                                                  | 12.1               | 330.4               | 2.088                   | 11.238         | 13.235          | 0.456                     | 1.838          | 1.340           |
| Wind at 69.4 knots (35.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.61:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 17.7$  m and  $T_p = 20.0$  s; Ship's speed is 20.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 19.2               | -2.9                | 2.491                   | 7.578          | 14.042          | 0.554                     | 1.463          | 1.527           |
| 15.0                                                                   | 19.2               | 12.2                | 2.235                   | 8.062          | 13.910          | 0.544                     | 1.489          | 1.534           |
| 30.0                                                                   | 19.3               | 27.5                | 2.105                   | 9.003          | 14.264          | 0.497                     | 1.502          | 1.523           |
| 45.0                                                                   | 19.4               | 42.5                | 1.495                   | 9.585          | 14.414          | 0.400                     | 1.476          | 1.461           |
| 60.0                                                                   | 19.5               | 57.0                | 1.058                   | 9.338          | 14.525          | 0.283                     | 1.266          | 1.307           |
| 75.0                                                                   | 19.9               | 73.4                | 0.967                   | 9.128          | 16.329          | 0.148                     | 1.688          | 1.020           |
| 90.0                                                                   | 19.8               | 88.3                | 1.275                   | 17.362         | 13.647          | 0.106                     | 1.816          | 0.768           |
| 105.0                                                                  | 19.6               | 102.9               | 5.419                   | 12.014         | 12.998          | 0.194                     | 1.755          | 0.660           |
| 120.0                                                                  | 19.5               | 117.0               | 0.888                   | 13.177         | 12.345          | 0.165                     | 1.627          | 0.685           |
| 135.0                                                                  | 19.3               | 131.9               | 0.839                   | 12.383         | 12.630          | 0.185                     | 1.598          | 0.621           |
| 150.0                                                                  | 19.2               | 146.9               | 0.975                   | 11.272         | 11.784          | 0.234                     | 1.602          | 0.615           |
| 165.0                                                                  | 19.6               | 163.2               | 1.450                   | 9.736          | 11.608          | 0.256                     | 1.302          | 0.520           |
| 180.0                                                                  | 19.7               | 178.9               | 0.910                   | 7.909          | 9.996           | 0.219                     | 1.183          | 0.532           |
| 195.0                                                                  | 19.6               | 195.3               | 1.322                   | 11.014         | 10.109          | 0.228                     | 1.756          | 0.600           |
| 210.0                                                                  | 19.5               | 210.8               | 1.800                   | 16.373         | 10.156          | 0.200                     | 2.047          | 0.644           |
| 225.0                                                                  | 19.3               | 227.1               | 1.322                   | 12.327         | 13.517          | 0.183                     | 2.501          | 0.651           |
| 240.0                                                                  | 19.5               | 242.2               | 1.375                   | 16.786         | 13.158          | 0.169                     | 2.918          | 0.738           |
| 255.0                                                                  | 19.7               | 257.3               | 1.044                   | 15.971         | 13.216          | 0.145                     | 3.099          | 0.863           |
| 270.0                                                                  | 19.7               | 272.1               | 0.718                   | 14.053         | 12.062          | 0.113                     | 3.208          | 0.977           |
| 285.0                                                                  | 19.7               | 286.3               | 0.635                   | 13.438         | 12.892          | 0.115                     | 3.177          | 1.115           |
| 300.0                                                                  | 19.7               | 300.5               | 1.063                   | 13.408         | 13.139          | 0.224                     | 2.582          | 1.051           |
| 315.0                                                                  | 19.6               | 314.1               | 1.418                   | 14.610         | 13.137          | 0.352                     | 2.079          | 1.259           |
| 330.0                                                                  | 19.4               | 328.2               | 2.095                   | 10.843         | 13.700          | 0.455                     | 1.759          | 1.361           |
| 345.0                                                                  | 19.3               | 342.5               | 2.228                   | 9.087          | 13.842          | 0.524                     | 1.518          | 1.466           |
| Wind at 69.4 knots (35.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.62:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 17.7$  m and  $T_p = 20.0$  s; Ship's speed is 25.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 24.8               | -1.3                | 2.620                   | 8.612          | 14.247          | 0.586                     | 1.589          | 1.692           |
| 15.0                                                                   | 24.7               | 13.8                | 2.481                   | 8.994          | 14.379          | 0.574                     | 1.600          | 1.679           |
| 30.0                                                                   | 24.8               | 29.0                | 2.403                   | 9.379          | 15.206          | 0.524                     | 1.626          | 1.643           |
| 45.0                                                                   | 24.8               | 43.7                | 1.745                   | 9.245          | 15.511          | 0.424                     | 1.557          | 1.545           |
| 60.0                                                                   | 24.7               | 58.0                | 1.971                   | 10.699         | 15.792          | 0.299                     | 1.336          | 1.381           |
| 75.0                                                                   | 24.9               | 73.6                | 0.791                   | 8.936          | 14.870          | 0.162                     | 1.835          | 1.094           |
| 90.0                                                                   | 24.8               | 88.5                | 7.283                   | 13.067         | 14.326          | 0.206                     | 1.859          | 0.802           |
| 105.0                                                                  | 24.7               | 103.0               | 6.862                   | 20.279         | 13.905          | 0.237                     | 1.988          | 0.744           |
| 120.0                                                                  | 24.6               | 118.0               | 1.344                   | 12.854         | 12.888          | 0.209                     | 1.823          | 0.726           |
| 135.0                                                                  | 24.6               | 133.1               | 1.128                   | 11.342         | 11.662          | 0.243                     | 1.879          | 0.655           |
| 150.0                                                                  | 24.5               | 147.2               | 1.072                   | 10.030         | 10.847          | 0.248                     | 1.244          | 0.582           |
| 165.0                                                                  | 25.0               | 162.8               | 1.510                   | 10.193         | 10.880          | 0.247                     | 0.886          | 0.512           |
| 180.0                                                                  | 26.0               | 179.2               | 0.891                   | 6.459          | 10.071          | 0.225                     | 0.695          | 0.402           |
| 195.0                                                                  | 25.6               | 194.8               | 0.830                   | 7.159          | 10.062          | 0.213                     | 1.051          | 0.507           |
| 210.0                                                                  | 24.8               | 210.2               | 1.440                   | 10.931         | 10.072          | 0.228                     | 1.877          | 0.732           |
| 225.0                                                                  | 24.8               | 224.8               | 1.134                   | 11.457         | 10.159          | 0.190                     | 2.021          | 0.831           |
| 240.0                                                                  | 24.7               | 240.6               | 1.495                   | 16.484         | 10.493          | 0.196                     | 2.844          | 0.861           |
| 255.0                                                                  | 24.9               | 256.1               | 1.310                   | 15.274         | 11.637          | 0.165                     | 3.173          | 1.092           |
| 270.0                                                                  | 24.8               | 271.4               | 0.631                   | 14.089         | 12.163          | 0.128                     | 3.390          | 1.207           |
| 285.0                                                                  | 24.9               | 285.8               | 0.586                   | 13.016         | 12.910          | 0.120                     | 3.297          | 1.375           |
| 300.0                                                                  | 24.9               | 300.4               | 1.002                   | 13.504         | 13.055          | 0.239                     | 2.682          | 1.217           |
| 315.0                                                                  | 24.9               | 314.9               | 1.614                   | 14.044         | 14.817          | 0.382                     | 2.293          | 1.348           |
| 330.0                                                                  | 24.8               | 329.3               | 2.217                   | 10.761         | 14.754          | 0.492                     | 1.806          | 1.516           |
| 345.0                                                                  | 24.8               | 343.9               | 2.411                   | 9.562          | 14.718          | 0.556                     | 1.685          | 1.644           |
| Wind at 69.4 knots (35.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.63:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 17.7$  m and  $T_p = 20.0$  s; Ship's speed is 30.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 30.1               | -0.5                | 2.716                   | 8.527          | 15.109          | 0.610                     | 1.739          | 1.956           |
| 15.0                                                                   | 30.0               | 14.6                | 2.775                   | 9.658          | 15.102          | 0.604                     | 1.731          | 1.941           |
| 30.0                                                                   | 30.0               | 29.6                | 2.253                   | 11.856         | 15.522          | 0.549                     | 1.760          | 1.833           |
| 45.0                                                                   | 30.0               | 44.4                | 1.868                   | 10.270         | 16.598          | 0.449                     | 1.653          | 1.671           |
| 60.0                                                                   | 29.9               | 58.8                | 1.350                   | 9.481          | 16.458          | 0.308                     | 1.412          | 1.427           |
| 75.0                                                                   | 30.0               | 73.8                | 1.311                   | 12.622         | 15.106          | 0.176                     | 2.053          | 1.180           |
| 90.0                                                                   | 29.9               | 88.6                | 6.060                   | 19.979         | 13.338          | 0.195                     | 2.045          | 0.867           |
| 105.0                                                                  | 29.8               | 103.3               | 2.814                   | 12.244         | 15.171          | 0.216                     | 2.102          | 0.767           |
| 120.0                                                                  | 29.6               | 118.4               | 1.452                   | 11.161         | 12.947          | 0.270                     | 2.325          | 0.748           |
| 135.0                                                                  | 29.4               | 132.7               | 1.385                   | 10.077         | 12.135          | 0.299                     | 1.897          | 0.688           |
| 150.0                                                                  | 29.2               | 146.3               | 1.144                   | 8.977          | 10.600          | 0.300                     | 1.271          | 0.676           |
| 165.0                                                                  | 29.4               | 159.7               | 1.737                   | 11.321         | 10.462          | 0.375                     | 1.160          | 0.715           |
| 180.0                                                                  | 30.3               | 176.7               | 1.693                   | 7.491          | 9.919           | 0.365                     | 1.023          | 0.611           |
| 195.0                                                                  | 30.6               | 196.2               | 1.836                   | 16.777         | 10.377          | 0.436                     | 2.076          | 0.741           |
| 210.0                                                                  | 30.9               | 210.9               | 1.245                   | 9.735          | 10.278          | 0.303                     | 1.795          | 0.739           |
| 225.0                                                                  | 30.0               | 224.9               | 0.997                   | 9.429          | 10.049          | 0.228                     | 1.892          | 0.955           |
| 240.0                                                                  | 29.7               | 240.1               | 1.719                   | 14.940         | 10.285          | 0.248                     | 2.914          | 0.977           |
| 255.0                                                                  | 29.6               | 254.9               | 5.271                   | 19.471         | 10.795          | 0.341                     | 3.114          | 1.342           |
| 270.0                                                                  | 29.9               | 270.8               | 1.030                   | 13.825         | 11.842          | 0.153                     | 3.439          | 1.388           |
| 285.0                                                                  | 30.0               | 285.2               | 0.702                   | 13.345         | 13.086          | 0.158                     | 3.253          | 1.818           |
| 300.0                                                                  | 30.1               | 300.4               | 1.186                   | 14.718         | 13.336          | 0.250                     | 2.671          | 1.224           |
| 315.0                                                                  | 30.1               | 315.1               | 1.618                   | 13.870         | 15.779          | 0.402                     | 2.367          | 1.477           |
| 330.0                                                                  | 30.1               | 329.8               | 2.054                   | 12.453         | 16.018          | 0.517                     | 2.097          | 1.728           |
| 345.0                                                                  | 30.1               | 344.6               | 2.510                   | 10.446         | 16.226          | 0.583                     | 1.820          | 1.887           |
| Wind at 69.4 knots (35.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.64:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 17.7$  m and  $T_p = 25.7$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | -0.7               | -1.3                | 0.692                   | 7.424          | 11.512          | 0.177                     | 1.136          | 0.811           |
| 15.0                                                                   | 0.7                | 12.9                | 0.671                   | 5.319          | 11.471          | 0.175                     | 1.090          | 0.786           |
| 30.0                                                                   | 1.7                | 26.6                | 0.603                   | 5.925          | 11.898          | 0.162                     | 1.075          | 0.751           |
| 45.0                                                                   | 2.5                | 41.8                | 0.554                   | 5.870          | 12.190          | 0.137                     | 1.055          | 0.694           |
| 60.0                                                                   | 2.6                | 58.7                | 0.714                   | 6.053          | 11.917          | 0.094                     | 0.971          | 0.590           |
| 75.0                                                                   | 1.7                | 77.0                | 0.333                   | 6.309          | 10.999          | 0.059                     | 0.922          | 0.454           |
| 90.0                                                                   | 0.9                | 94.9                | 0.461                   | 6.730          | 10.727          | 0.052                     | 0.944          | 0.414           |
| 105.0                                                                  | 0.1                | 109.7               | 0.439                   | 7.904          | 10.890          | 0.057                     | 0.981          | 0.457           |
| 120.0                                                                  | -1.2               | 125.3               | 0.477                   | 6.386          | 11.127          | 0.078                     | 1.030          | 0.542           |
| 135.0                                                                  | -2.4               | 140.3               | 0.543                   | 6.219          | 11.397          | 0.113                     | 0.964          | 0.591           |
| 150.0                                                                  | -2.9               | 154.1               | 0.605                   | 5.562          | 11.399          | 0.136                     | 0.783          | 0.552           |
| 165.0                                                                  | -2.8               | 165.8               | 0.650                   | 5.475          | 11.375          | 0.148                     | 0.650          | 0.480           |
| 180.0                                                                  | -2.1               | 177.6               | 0.720                   | 6.140          | 10.996          | 0.158                     | 0.740          | 0.417           |
| 195.0                                                                  | -1.0               | 191.8               | 0.897                   | 7.797          | 10.766          | 0.153                     | 1.029          | 0.377           |
| 210.0                                                                  | 0.1                | 209.9               | 0.822                   | 8.483          | 10.957          | 0.132                     | 1.355          | 0.391           |
| 225.0                                                                  | 0.3                | 229.9               | 0.624                   | 8.855          | 11.343          | 0.096                     | 1.559          | 0.423           |
| 240.0                                                                  | -0.1               | 248.0               | 0.384                   | 8.944          | 11.476          | 0.068                     | 1.681          | 0.494           |
| 255.0                                                                  | -0.9               | 262.0               | 0.361                   | 8.755          | 10.699          | 0.045                     | 1.611          | 0.521           |
| 270.0                                                                  | -1.6               | 274.8               | 0.252                   | 8.480          | 10.773          | 0.039                     | 1.518          | 0.553           |
| 285.0                                                                  | -2.4               | 286.8               | 0.317                   | 7.905          | 10.872          | 0.051                     | 1.363          | 0.601           |
| 300.0                                                                  | -3.7               | 302.0               | 0.391                   | 7.682          | 11.004          | 0.090                     | 1.212          | 0.719           |
| 315.0                                                                  | -3.6               | 316.8               | 0.750                   | 7.524          | 11.505          | 0.127                     | 1.127          | 0.787           |
| 330.0                                                                  | -2.9               | 331.7               | 0.575                   | 7.686          | 11.286          | 0.151                     | 1.116          | 0.812           |
| 345.0                                                                  | -1.8               | 345.9               | 0.651                   | 8.017          | 11.428          | 0.167                     | 1.124          | 0.817           |
| Wind at 69.4 knots (35.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.65:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 17.7$  m and  $T_p = 25.7$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 2.6                | -22.8               | 0.808                   | 7.814          | 11.524          | 0.171                     | 1.248          | 0.793           |
| 15.0                                                                   | 2.9                | -7.4                | 0.817                   | 6.982          | 11.385          | 0.192                     | 1.192          | 0.819           |
| 30.0                                                                   | 3.4                | 9.2                 | 0.876                   | 6.828          | 11.498          | 0.195                     | 1.130          | 0.825           |
| 45.0                                                                   | 4.1                | 27.0                | 0.679                   | 5.809          | 11.478          | 0.175                     | 1.040          | 0.789           |
| 60.0                                                                   | 4.7                | 48.0                | 0.505                   | 6.026          | 11.742          | 0.126                     | 0.931          | 0.689           |
| 75.0                                                                   | 4.9                | 66.8                | 0.348                   | 5.790          | 11.635          | 0.072                     | 0.874          | 0.547           |
| 90.0                                                                   | 4.6                | 83.1                | 0.301                   | 5.996          | 10.854          | 0.040                     | 0.927          | 0.423           |
| 105.0                                                                  | 4.3                | 97.1                | 0.336                   | 7.214          | 10.461          | 0.041                     | 0.899          | 0.383           |
| 120.0                                                                  | 4.0                | 108.9               | 0.290                   | 7.110          | 10.582          | 0.046                     | 0.813          | 0.401           |
| 135.0                                                                  | 3.5                | 121.0               | 0.378                   | 6.505          | 10.990          | 0.060                     | 0.693          | 0.425           |
| 150.0                                                                  | 3.1                | 133.4               | 0.446                   | 6.065          | 11.307          | 0.080                     | 0.589          | 0.450           |
| 165.0                                                                  | 2.8                | 145.1               | 0.539                   | 5.650          | 11.511          | 0.102                     | 0.524          | 0.480           |
| 180.0                                                                  | 2.6                | 156.9               | 0.670                   | 5.325          | 11.552          | 0.119                     | 0.481          | 0.494           |
| 195.0                                                                  | 2.5                | 169.3               | 0.802                   | 5.739          | 11.412          | 0.132                     | 0.495          | 0.491           |
| 210.0                                                                  | 2.7                | 183.2               | 0.865                   | 5.959          | 10.799          | 0.134                     | 0.599          | 0.471           |
| 225.0                                                                  | 3.7                | 209.2               | 0.718                   | 8.823          | 10.462          | 0.114                     | 1.075          | 0.387           |
| 240.0                                                                  | 4.6                | 237.6               | 0.520                   | 8.861          | 10.501          | 0.082                     | 1.584          | 0.434           |
| 255.0                                                                  | 4.5                | 251.8               | 0.371                   | 8.489          | 10.515          | 0.064                     | 1.632          | 0.484           |
| 270.0                                                                  | 4.1                | 266.2               | 0.386                   | 8.540          | 10.871          | 0.054                     | 1.610          | 0.525           |
| 285.0                                                                  | 3.8                | 279.0               | 0.358                   | 8.960          | 10.649          | 0.041                     | 1.531          | 0.557           |
| 300.0                                                                  | 3.3                | 290.2               | 0.354                   | 8.306          | 10.770          | 0.042                     | 1.434          | 0.582           |
| 315.0                                                                  | 3.0                | 300.5               | 0.397                   | 8.214          | 11.169          | 0.066                     | 1.374          | 0.636           |
| 330.0                                                                  | 2.7                | 311.4               | 0.631                   | 8.129          | 11.309          | 0.101                     | 1.324          | 0.704           |
| 345.0                                                                  | 2.6                | 323.6               | 0.822                   | 8.057          | 11.401          | 0.138                     | 1.285          | 0.753           |
| Wind at 69.4 knots (35.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.66:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 17.7$  m and  $T_p = 25.7$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 7.4                | -24.1               | 1.060                   | 8.164          | 11.531          | 0.193                     | 1.320          | 0.846           |
| 15.0                                                                   | 7.4                | -12.0               | 1.062                   | 7.446          | 11.634          | 0.215                     | 1.279          | 0.874           |
| 30.0                                                                   | 7.6                | 2.2                 | 0.913                   | 7.098          | 11.555          | 0.224                     | 1.217          | 0.888           |
| 45.0                                                                   | 7.9                | 19.7                | 0.781                   | 6.277          | 11.566          | 0.208                     | 1.077          | 0.870           |
| 60.0                                                                   | 8.3                | 39.5                | 0.608                   | 6.524          | 11.729          | 0.161                     | 0.902          | 0.786           |
| 75.0                                                                   | 8.6                | 61.1                | 0.336                   | 6.119          | 11.869          | 0.089                     | 0.726          | 0.615           |
| 90.0                                                                   | 8.9                | 82.5                | 0.234                   | 7.306          | 10.808          | 0.041                     | 0.948          | 0.403           |
| 105.0                                                                  | 8.6                | 94.8                | 0.289                   | 8.821          | 10.191          | 0.047                     | 0.898          | 0.325           |
| 120.0                                                                  | 8.3                | 105.8               | 0.349                   | 9.286          | 10.268          | 0.055                     | 0.798          | 0.299           |
| 135.0                                                                  | 8.1                | 114.5               | 0.350                   | 8.615          | 10.352          | 0.060                     | 0.628          | 0.324           |
| 150.0                                                                  | 8.0                | 127.8               | 0.430                   | 7.824          | 10.623          | 0.074                     | 0.546          | 0.343           |
| 165.0                                                                  | 7.8                | 141.5               | 0.553                   | 6.271          | 11.172          | 0.085                     | 0.430          | 0.351           |
| 180.0                                                                  | 7.7                | 155.3               | 0.768                   | 5.974          | 10.958          | 0.099                     | 0.345          | 0.356           |
| 195.0                                                                  | 7.7                | 171.9               | 0.763                   | 6.545          | 10.736          | 0.108                     | 0.449          | 0.358           |
| 210.0                                                                  | 8.7                | 201.6               | 0.920                   | 8.415          | 10.295          | 0.102                     | 1.059          | 0.411           |
| 225.0                                                                  | 9.3                | 223.0               | 0.930                   | 10.395         | 10.579          | 0.094                     | 1.513          | 0.462           |
| 240.0                                                                  | 9.6                | 239.4               | 0.563                   | 9.593          | 10.264          | 0.084                     | 1.707          | 0.496           |
| 255.0                                                                  | 9.7                | 254.2               | 0.640                   | 9.532          | 10.354          | 0.076                     | 1.871          | 0.607           |
| 270.0                                                                  | 9.5                | 268.7               | 0.421                   | 9.523          | 10.572          | 0.067                     | 1.842          | 0.623           |
| 285.0                                                                  | 9.3                | 282.5               | 0.507                   | 9.275          | 10.731          | 0.052                     | 1.739          | 0.641           |
| 300.0                                                                  | 8.9                | 295.7               | 0.303                   | 9.558          | 10.769          | 0.057                     | 1.509          | 0.606           |
| 315.0                                                                  | 8.2                | 306.6               | 0.495                   | 8.645          | 10.985          | 0.092                     | 1.394          | 0.674           |
| 330.0                                                                  | 7.7                | 315.2               | 0.724                   | 8.136          | 11.139          | 0.126                     | 1.359          | 0.741           |
| 345.0                                                                  | 7.6                | 325.2               | 0.930                   | 8.129          | 11.396          | 0.162                     | 1.341          | 0.805           |
| Wind at 69.4 knots (35.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.67:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 17.7$  m and  $T_p = 25.7$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 13.3               | -6.3                | 1.152                   | 7.249          | 12.012          | 0.251                     | 1.016          | 0.899           |
| 15.0                                                                   | 13.2               | 7.7                 | 1.060                   | 7.383          | 11.755          | 0.253                     | 0.968          | 0.918           |
| 30.0                                                                   | 13.3               | 22.6                | 0.973                   | 6.765          | 11.984          | 0.233                     | 0.917          | 0.909           |
| 45.0                                                                   | 13.7               | 38.6                | 0.689                   | 6.338          | 12.014          | 0.187                     | 0.800          | 0.821           |
| 60.0                                                                   | 13.8               | 53.8                | 0.472                   | 6.737          | 11.889          | 0.133                     | 0.730          | 0.708           |
| 75.0                                                                   | 14.3               | 71.1                | 0.313                   | 8.145          | 11.786          | 0.075                     | 0.985          | 0.464           |
| 90.0                                                                   | 14.2               | 85.8                | 0.311                   | 8.712          | 9.925           | 0.060                     | 1.115          | 0.317           |
| 105.0                                                                  | 14.0               | 99.9                | 0.428                   | 9.254          | 9.616           | 0.076                     | 1.066          | 0.282           |
| 120.0                                                                  | 13.4               | 112.4               | 0.499                   | 10.072         | 10.424          | 0.095                     | 0.863          | 0.348           |
| 135.0                                                                  | 13.5               | 127.9               | 0.630                   | 9.327          | 10.988          | 0.111                     | 0.851          | 0.365           |
| 150.0                                                                  | 13.6               | 143.3               | 0.723                   | 10.539         | 10.316          | 0.122                     | 0.838          | 0.352           |
| 165.0                                                                  | 13.7               | 159.4               | 0.616                   | 9.054          | 9.804           | 0.133                     | 0.878          | 0.346           |
| 180.0                                                                  | 14.0               | 176.0               | 0.479                   | 7.375          | 9.922           | 0.128                     | 0.974          | 0.384           |
| 195.0                                                                  | 14.1               | 192.4               | 0.644                   | 8.759          | 10.080          | 0.131                     | 1.251          | 0.455           |
| 210.0                                                                  | 14.2               | 208.8               | 0.845                   | 10.879         | 10.216          | 0.123                     | 1.465          | 0.493           |
| 225.0                                                                  | 14.3               | 224.6               | 0.839                   | 11.119         | 10.281          | 0.116                     | 1.705          | 0.548           |
| 240.0                                                                  | 14.6               | 239.7               | 0.749                   | 10.033         | 10.499          | 0.102                     | 1.871          | 0.588           |
| 255.0                                                                  | 14.7               | 254.8               | 0.731                   | 11.051         | 10.413          | 0.092                     | 2.064          | 0.762           |
| 270.0                                                                  | 14.7               | 269.6               | 0.592                   | 10.003         | 10.602          | 0.080                     | 2.134          | 0.813           |
| 285.0                                                                  | 14.6               | 284.1               | 0.443                   | 9.941          | 11.012          | 0.064                     | 2.063          | 0.808           |
| 300.0                                                                  | 14.5               | 298.4               | 0.363                   | 9.333          | 11.084          | 0.073                     | 1.697          | 0.690           |
| 315.0                                                                  | 14.3               | 312.5               | 0.609                   | 9.125          | 10.838          | 0.127                     | 1.468          | 0.746           |
| 330.0                                                                  | 14.0               | 326.4               | 0.891                   | 8.566          | 11.391          | 0.182                     | 1.245          | 0.795           |
| 345.0                                                                  | 13.7               | 340.2               | 1.019                   | 7.805          | 11.568          | 0.225                     | 1.097          | 0.850           |
| Wind at 69.4 knots (35.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |



**Table U.68:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 17.7$  m and  $T_p = 25.7$  s; Ship's speed is 20.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 19.4               | -2.5                | 1.410                   | 8.164          | 12.339          | 0.277                     | 0.893          | 0.937           |
| 15.0                                                                   | 19.4               | 12.4                | 1.203                   | 7.540          | 12.204          | 0.273                     | 0.850          | 0.937           |
| 30.0                                                                   | 19.4               | 27.2                | 1.040                   | 8.157          | 12.056          | 0.245                     | 0.813          | 0.909           |
| 45.0                                                                   | 19.4               | 42.1                | 0.851                   | 7.426          | 12.068          | 0.199                     | 0.777          | 0.832           |
| 60.0                                                                   | 19.4               | 56.7                | 0.605                   | 8.859          | 12.101          | 0.144                     | 0.757          | 0.689           |
| 75.0                                                                   | 19.7               | 72.5                | 0.345                   | 8.683          | 10.736          | 0.087                     | 1.203          | 0.456           |
| 90.0                                                                   | 19.6               | 87.1                | 0.379                   | 9.260          | 9.488           | 0.084                     | 1.254          | 0.353           |
| 105.0                                                                  | 19.5               | 101.8               | 0.547                   | 10.802         | 9.359           | 0.108                     | 1.241          | 0.422           |
| 120.0                                                                  | 19.5               | 116.7               | 0.742                   | 10.981         | 10.624          | 0.145                     | 1.071          | 0.474           |
| 135.0                                                                  | 19.4               | 131.5               | 0.748                   | 10.250         | 9.775           | 0.162                     | 1.049          | 0.488           |
| 150.0                                                                  | 19.5               | 146.8               | 0.884                   | 10.658         | 9.929           | 0.179                     | 0.999          | 0.484           |
| 165.0                                                                  | 19.5               | 162.4               | 0.733                   | 9.039          | 9.943           | 0.190                     | 0.986          | 0.490           |
| 180.0                                                                  | 19.6               | 177.8               | 0.607                   | 7.922          | 10.034          | 0.177                     | 0.990          | 0.520           |
| 195.0                                                                  | 19.6               | 193.7               | 0.688                   | 8.018          | 10.156          | 0.178                     | 1.301          | 0.570           |
| 210.0                                                                  | 19.5               | 209.1               | 0.733                   | 10.401         | 10.278          | 0.158                     | 1.515          | 0.625           |
| 225.0                                                                  | 19.6               | 224.3               | 0.585                   | 9.820          | 10.278          | 0.148                     | 1.787          | 0.696           |
| 240.0                                                                  | 19.6               | 239.4               | 0.897                   | 12.076         | 10.260          | 0.133                     | 1.946          | 0.723           |
| 255.0                                                                  | 19.8               | 254.7               | 0.568                   | 10.631         | 10.519          | 0.112                     | 2.191          | 0.940           |
| 270.0                                                                  | 19.8               | 269.9               | 0.495                   | 10.308         | 10.616          | 0.096                     | 2.373          | 1.010           |
| 285.0                                                                  | 19.8               | 284.6               | 0.471                   | 10.564         | 11.041          | 0.078                     | 2.324          | 1.056           |
| 300.0                                                                  | 19.8               | 299.1               | 0.349                   | 10.143         | 10.637          | 0.088                     | 1.852          | 0.785           |
| 315.0                                                                  | 19.7               | 313.6               | 0.660                   | 10.109         | 10.975          | 0.146                     | 1.590          | 0.848           |
| 330.0                                                                  | 19.6               | 328.2               | 0.857                   | 10.283         | 11.235          | 0.205                     | 1.268          | 0.867           |
| 345.0                                                                  | 19.5               | 342.8               | 1.257                   | 8.819          | 11.963          | 0.251                     | 1.035          | 0.900           |
| Wind at 69.4 knots (35.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.69:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 17.7$  m and  $T_p = 25.7$  s; Ship's speed is 25.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 24.8               | -1.5                | 1.303                   | 7.594          | 11.758          | 0.301                     | 0.903          | 0.997           |
| 15.0                                                                   | 24.8               | 13.5                | 1.252                   | 6.938          | 12.319          | 0.296                     | 0.874          | 1.003           |
| 30.0                                                                   | 24.8               | 28.4                | 1.052                   | 7.111          | 12.153          | 0.263                     | 0.866          | 0.972           |
| 45.0                                                                   | 24.8               | 43.2                | 0.804                   | 8.358          | 12.185          | 0.214                     | 0.811          | 0.881           |
| 60.0                                                                   | 24.7               | 57.8                | 0.666                   | 8.423          | 12.134          | 0.159                     | 0.763          | 0.711           |
| 75.0                                                                   | 24.9               | 73.2                | 0.433                   | 8.931          | 11.028          | 0.101                     | 1.335          | 0.512           |
| 90.0                                                                   | 24.9               | 87.9                | 0.455                   | 10.033         | 9.488           | 0.103                     | 1.363          | 0.442           |
| 105.0                                                                  | 24.8               | 102.7               | 0.739                   | 11.381         | 9.403           | 0.133                     | 1.359          | 0.524           |
| 120.0                                                                  | 24.8               | 117.7               | 0.867                   | 11.331         | 10.603          | 0.174                     | 1.056          | 0.477           |
| 135.0                                                                  | 24.7               | 132.5               | 0.895                   | 10.560         | 9.727           | 0.198                     | 0.946          | 0.498           |
| 150.0                                                                  | 24.7               | 147.6               | 0.890                   | 10.101         | 9.733           | 0.233                     | 0.877          | 0.501           |
| 165.0                                                                  | 24.8               | 163.1               | 0.847                   | 8.950          | 9.948           | 0.242                     | 0.799          | 0.517           |
| 180.0                                                                  | 25.0               | 178.5               | 0.645                   | 6.838          | 9.998           | 0.213                     | 0.725          | 0.501           |
| 195.0                                                                  | 25.0               | 194.2               | 0.723                   | 7.944          | 10.213          | 0.228                     | 1.150          | 0.623           |
| 210.0                                                                  | 24.9               | 209.3               | 0.739                   | 8.344          | 10.232          | 0.198                     | 1.366          | 0.683           |
| 225.0                                                                  | 24.9               | 224.3               | 0.716                   | 9.361          | 10.318          | 0.177                     | 1.699          | 0.820           |
| 240.0                                                                  | 24.8               | 239.4               | 0.711                   | 10.759         | 10.435          | 0.154                     | 1.876          | 0.832           |
| 255.0                                                                  | 24.8               | 254.7               | 0.662                   | 11.221         | 10.646          | 0.139                     | 2.258          | 1.152           |
| 270.0                                                                  | 24.8               | 269.8               | 0.486                   | 11.203         | 10.464          | 0.112                     | 2.515          | 1.262           |
| 285.0                                                                  | 24.9               | 284.5               | 0.449                   | 10.937         | 10.703          | 0.092                     | 2.468          | 1.242           |
| 300.0                                                                  | 25.0               | 299.4               | 0.384                   | 10.578         | 10.933          | 0.100                     | 1.856          | 0.834           |
| 315.0                                                                  | 24.9               | 314.1               | 0.732                   | 12.246         | 11.058          | 0.160                     | 1.606          | 0.907           |
| 330.0                                                                  | 24.9               | 328.9               | 1.097                   | 10.489         | 11.435          | 0.228                     | 1.310          | 0.939           |
| 345.0                                                                  | 24.8               | 343.7               | 1.259                   | 8.720          | 11.907          | 0.276                     | 1.018          | 0.972           |
| Wind at 69.4 knots (35.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table U.70:** Accelerations at Flight Deck: Bretschneider Spectrum with  $H_s = 17.7$  m and  $T_p = 25.7$  s; Ship's speed is 30.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                            | <b>Absolute Maximum</b> |                       |                        | <b>Standard Deviation</b> |                       |                        |
|------------------------------------------------------------------------|--------------------|----------------------------|-------------------------|-----------------------|------------------------|---------------------------|-----------------------|------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts       | $\psi_{\text{MHP}}$<br>deg | Long<br>$\text{m/s}^2$  | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ | Long<br>$\text{m/s}^2$    | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ |
| 0.0                                                                    | 30.0               | -0.9                       | 1.391                   | 7.671                 | 12.545                 | 0.320                     | 0.975                 | 1.056                  |
| 15.0                                                                   | 30.0               | 14.1                       | 1.373                   | 7.277                 | 12.483                 | 0.311                     | 0.962                 | 1.055                  |
| 30.0                                                                   | 30.0               | 28.9                       | 1.174                   | 7.538                 | 12.493                 | 0.280                     | 0.935                 | 1.029                  |
| 45.0                                                                   | 30.0               | 43.8                       | 0.960                   | 7.855                 | 12.140                 | 0.225                     | 0.830                 | 0.932                  |
| 60.0                                                                   | 30.0               | 58.5                       | 0.725                   | 9.328                 | 12.023                 | 0.167                     | 0.746                 | 0.751                  |
| 75.0                                                                   | 30.1               | 73.7                       | 0.548                   | 8.803                 | 11.420                 | 0.116                     | 1.492                 | 0.637                  |
| 90.0                                                                   | 30.0               | 88.4                       | 0.600                   | 10.404                | 9.671                  | 0.120                     | 1.501                 | 0.541                  |
| 105.0                                                                  | 30.0               | 103.2                      | 1.165                   | 11.199                | 10.211                 | 0.155                     | 1.439                 | 0.586                  |
| 120.0                                                                  | 29.9               | 118.4                      | 0.999                   | 9.479                 | 10.827                 | 0.201                     | 1.163                 | 0.448                  |
| 135.0                                                                  | 29.8               | 133.1                      | 1.014                   | 9.794                 | 10.299                 | 0.235                     | 0.945                 | 0.438                  |
| 150.0                                                                  | 29.9               | 148.2                      | 0.806                   | 7.812                 | 10.210                 | 0.259                     | 0.686                 | 0.418                  |
| 165.0                                                                  | 30.1               | 163.4                      | 0.990                   | 8.408                 | 9.749                  | 0.252                     | 0.575                 | 0.430                  |
| 180.0                                                                  | 30.4               | 178.7                      | 0.976                   | 7.201                 | 10.064                 | 0.278                     | 0.670                 | 0.467                  |
| 195.0                                                                  | 30.4               | 194.1                      | 0.816                   | 7.999                 | 10.114                 | 0.239                     | 0.749                 | 0.481                  |
| 210.0                                                                  | 30.2               | 209.5                      | 1.015                   | 9.473                 | 10.302                 | 0.244                     | 1.335                 | 0.683                  |
| 225.0                                                                  | 30.1               | 224.6                      | 0.912                   | 9.971                 | 10.302                 | 0.225                     | 1.733                 | 0.929                  |
| 240.0                                                                  | 30.1               | 239.6                      | 0.710                   | 9.564                 | 10.402                 | 0.179                     | 1.840                 | 0.912                  |
| 255.0                                                                  | 29.9               | 254.7                      | 0.719                   | 11.187                | 10.449                 | 0.163                     | 2.239                 | 1.376                  |
| 270.0                                                                  | 29.9               | 269.6                      | 0.678                   | 11.228                | 10.515                 | 0.136                     | 2.553                 | 1.468                  |
| 285.0                                                                  | 29.9               | 284.6                      | 0.733                   | 11.871                | 10.625                 | 0.117                     | 2.530                 | 1.507                  |
| 300.0                                                                  | 30.1               | 299.5                      | 0.466                   | 11.350                | 10.953                 | 0.112                     | 1.829                 | 0.858                  |
| 315.0                                                                  | 30.1               | 314.4                      | 0.740                   | 12.378                | 11.312                 | 0.170                     | 1.542                 | 0.895                  |
| 330.0                                                                  | 30.1               | 329.3                      | 1.042                   | 10.640                | 11.296                 | 0.243                     | 1.220                 | 0.978                  |
| 345.0                                                                  | 30.0               | 344.2                      | 1.281                   | 8.706                 | 12.233                 | 0.295                     | 1.051                 | 1.022                  |
| Wind at 69.4 knots (35.7 m/s) is from the starboard beam in all cases. |                    |                            |                         |                       |                        |                           |                       |                        |

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## **Annex V**

### **Tables of Flight Deck Accelerations – JONSWAP Spectrum (Coastal Waters)**

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**Table V.1:** Accelerations at Flight Deck: JONSWAP Spectrum with  $H_s = 4.0$  m and  $T_p = 8.2$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | -0.2               | -28.4               | 0.797                   | 2.295          | 11.071          | 0.185                     | 0.429          | 0.499           |
| 15.0                                                                   | -0.2               | -6.7                | 0.761                   | 0.959          | 10.907          | 0.167                     | 0.159          | 0.423           |
| 30.0                                                                   | -0.2               | 20.1                | 0.726                   | 1.837          | 10.889          | 0.174                     | 0.316          | 0.427           |
| 45.0                                                                   | -0.2               | 35.0                | 0.737                   | 2.421          | 11.043          | 0.190                     | 0.560          | 0.475           |
| 60.0                                                                   | -0.4               | 43.8                | 0.832                   | 3.111          | 11.601          | 0.196                     | 0.742          | 0.514           |
| 75.0                                                                   | -0.6               | 50.6                | 0.735                   | 4.179          | 12.452          | 0.198                     | 0.871          | 0.548           |
| 90.0                                                                   | -0.7               | 56.8                | 0.892                   | 4.797          | 12.397          | 0.197                     | 1.010          | 0.583           |
| 105.0                                                                  | -0.8               | 60.5                | 0.829                   | 5.044          | 12.623          | 0.194                     | 1.054          | 0.605           |
| 120.0                                                                  | -0.9               | 65.1                | 0.856                   | 6.478          | 13.607          | 0.178                     | 1.057          | 0.610           |
| 135.0                                                                  | -2.1               | 102.4               | 0.800                   | 7.300          | 12.983          | 0.158                     | 1.194          | 0.675           |
| 150.0                                                                  | -2.2               | 104.5               | 0.837                   | 6.305          | 12.702          | 0.165                     | 1.151          | 0.679           |
| 165.0                                                                  | -2.4               | 103.6               | 1.143                   | 7.588          | 12.910          | 0.154                     | 1.120          | 0.670           |
| 180.0                                                                  | -0.8               | 59.1                | 0.771                   | 3.531          | 11.796          | 0.163                     | 0.628          | 0.484           |
| 195.0                                                                  | -0.2               | 352.3               | 0.752                   | 3.256          | 11.672          | 0.185                     | 0.687          | 0.540           |
| 210.0                                                                  | -0.2               | 382.7               | 0.824                   | 3.685          | 11.912          | 0.195                     | 0.785          | 0.607           |
| 225.0                                                                  | 0.0                | 379.0               | 0.753                   | 3.785          | 12.575          | 0.203                     | 0.857          | 0.633           |
| 240.0                                                                  | 0.7                | 294.4               | 0.868                   | 3.872          | 12.763          | 0.203                     | 1.062          | 0.739           |
| 255.0                                                                  | 0.5                | 293.5               | 0.861                   | 4.066          | 12.712          | 0.203                     | 1.088          | 0.762           |
| 270.0                                                                  | 0.3                | 296.5               | 0.861                   | 4.278          | 12.756          | 0.205                     | 1.077          | 0.750           |
| 285.0                                                                  | 0.1                | 300.8               | 0.715                   | 3.988          | 12.570          | 0.210                     | 1.015          | 0.721           |
| 300.0                                                                  | 0.0                | 305.3               | 0.745                   | 4.193          | 12.159          | 0.210                     | 0.935          | 0.684           |
| 315.0                                                                  | -0.0               | 309.8               | 0.787                   | 3.734          | 12.129          | 0.209                     | 0.841          | 0.649           |
| 330.0                                                                  | -0.1               | 315.0               | 0.820                   | 3.439          | 11.637          | 0.205                     | 0.724          | 0.607           |
| 345.0                                                                  | -0.1               | 321.5               | 0.814                   | 2.856          | 11.400          | 0.198                     | 0.594          | 0.561           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table V.2:** Accelerations at Flight Deck: JONSWAP Spectrum with  $H_s = 4.0$  m and  $T_p = 8.2$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 4.8                | -2.1                | 0.697                   | 1.017          | 11.230          | 0.192                     | 0.144          | 0.534           |
| 15.0                                                                   | 4.8                | 12.8                | 0.793                   | 1.024          | 11.277          | 0.195                     | 0.204          | 0.538           |
| 30.0                                                                   | 4.7                | 27.8                | 0.923                   | 1.502          | 11.419          | 0.209                     | 0.357          | 0.577           |
| 45.0                                                                   | 4.7                | 42.2                | 0.841                   | 2.338          | 11.478          | 0.226                     | 0.592          | 0.641           |
| 60.0                                                                   | 4.4                | 53.9                | 0.852                   | 3.506          | 12.058          | 0.230                     | 0.817          | 0.692           |
| 75.0                                                                   | 4.1                | 56.6                | 0.780                   | 4.212          | 12.380          | 0.226                     | 0.885          | 0.698           |
| 90.0                                                                   | 4.1                | 60.8                | 0.787                   | 4.372          | 12.361          | 0.220                     | 0.964          | 0.717           |
| 105.0                                                                  | 4.1                | 63.1                | 0.793                   | 4.898          | 12.416          | 0.217                     | 0.993          | 0.724           |
| 120.0                                                                  | 4.1                | 64.0                | 0.747                   | 3.758          | 12.508          | 0.216                     | 0.989          | 0.728           |
| 135.0                                                                  | 4.0                | 64.2                | 0.748                   | 3.601          | 12.493          | 0.218                     | 0.985          | 0.732           |
| 150.0                                                                  | 4.1                | 74.6                | 0.842                   | 3.711          | 12.686          | 0.210                     | 0.921          | 0.687           |
| 165.0                                                                  | 4.9                | 163.1               | 0.367                   | 1.502          | 10.779          | 0.096                     | 0.288          | 0.181           |
| 180.0                                                                  | 4.9                | 178.7               | 0.357                   | 1.045          | 10.710          | 0.090                     | 0.184          | 0.173           |
| 195.0                                                                  | 4.9                | 194.1               | 0.349                   | 1.337          | 10.745          | 0.093                     | 0.287          | 0.190           |
| 210.0                                                                  | 4.8                | 210.3               | 0.404                   | 2.039          | 10.915          | 0.105                     | 0.481          | 0.243           |
| 225.0                                                                  | 4.5                | 283.4               | 0.777                   | 4.760          | 13.562          | 0.195                     | 1.062          | 0.835           |
| 240.0                                                                  | 4.6                | 285.3               | 0.708                   | 4.196          | 13.412          | 0.192                     | 1.088          | 0.883           |
| 255.0                                                                  | 4.5                | 286.8               | 0.767                   | 4.492          | 13.538          | 0.199                     | 1.093          | 0.891           |
| 270.0                                                                  | 4.5                | 288.9               | 0.819                   | 4.426          | 13.807          | 0.207                     | 1.085          | 0.884           |
| 285.0                                                                  | 4.7                | 291.3               | 0.922                   | 4.640          | 13.880          | 0.220                     | 1.080          | 0.875           |
| 300.0                                                                  | 4.9                | 301.2               | 0.830                   | 4.283          | 12.755          | 0.238                     | 0.945          | 0.785           |
| 315.0                                                                  | 4.8                | 314.0               | 0.924                   | 2.886          | 11.720          | 0.235                     | 0.694          | 0.693           |
| 330.0                                                                  | 4.8                | 328.1               | 0.839                   | 2.329          | 11.389          | 0.218                     | 0.447          | 0.620           |
| 345.0                                                                  | 4.8                | 343.0               | 0.768                   | 1.373          | 11.281          | 0.201                     | 0.235          | 0.561           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table V.3:** Accelerations at Flight Deck: JONSWAP Spectrum with  $H_s = 4.0$  m and  $T_p = 8.2$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 10.0               | -0.6                | 0.848                   | 0.936          | 11.766          | 0.215                     | 0.104          | 0.627           |
| 15.0                                                                   | 10.0               | 14.4                | 0.776                   | 1.073          | 11.606          | 0.220                     | 0.168          | 0.633           |
| 30.0                                                                   | 10.0               | 29.4                | 0.940                   | 1.600          | 11.694          | 0.238                     | 0.345          | 0.674           |
| 45.0                                                                   | 9.9                | 44.5                | 0.918                   | 2.453          | 11.886          | 0.254                     | 0.588          | 0.724           |
| 60.0                                                                   | 10.0               | 59.1                | 0.887                   | 3.986          | 12.322          | 0.253                     | 0.859          | 0.820           |
| 75.0                                                                   | 10.0               | 73.0                | 0.843                   | 5.356          | 13.422          | 0.215                     | 0.991          | 0.947           |
| 90.0                                                                   | 9.7                | 86.0                | 0.411                   | 5.893          | 13.263          | 0.088                     | 0.920          | 0.861           |
| 105.0                                                                  | 9.4                | 100.8               | 0.618                   | 6.318          | 12.504          | 0.108                     | 1.070          | 0.555           |
| 120.0                                                                  | 9.6                | 116.9               | 0.327                   | 3.943          | 11.383          | 0.096                     | 1.009          | 0.333           |
| 135.0                                                                  | 9.9                | 133.2               | 0.299                   | 3.358          | 10.499          | 0.085                     | 1.063          | 0.182           |
| 150.0                                                                  | 10.0               | 148.8               | 0.243                   | 3.422          | 10.308          | 0.074                     | 1.118          | 0.133           |
| 165.0                                                                  | 10.1               | 164.1               | 0.250                   | 3.721          | 10.153          | 0.065                     | 0.892          | 0.104           |
| 180.0                                                                  | 10.1               | 179.2               | 0.233                   | 2.432          | 10.136          | 0.062                     | 0.535          | 0.074           |
| 195.0                                                                  | 10.1               | 194.7               | 0.243                   | 1.980          | 10.325          | 0.068                     | 0.538          | 0.091           |
| 210.0                                                                  | 10.1               | 210.3               | 0.262                   | 2.569          | 10.416          | 0.075                     | 0.895          | 0.137           |
| 225.0                                                                  | 10.0               | 225.9               | 0.302                   | 3.211          | 10.680          | 0.087                     | 0.984          | 0.216           |
| 240.0                                                                  | 9.7                | 242.3               | 0.345                   | 3.394          | 11.441          | 0.100                     | 1.023          | 0.361           |
| 255.0                                                                  | 9.5                | 259.2               | 0.644                   | 4.904          | 12.424          | 0.116                     | 1.119          | 0.608           |
| 270.0                                                                  | 9.8                | 273.7               | 0.456                   | 5.694          | 13.186          | 0.076                     | 1.012          | 0.910           |
| 285.0                                                                  | 10.2               | 286.6               | 0.866                   | 4.217          | 14.063          | 0.215                     | 1.077          | 1.027           |
| 300.0                                                                  | 10.1               | 300.1               | 0.941                   | 3.764          | 12.515          | 0.258                     | 0.927          | 0.870           |
| 315.0                                                                  | 10.0               | 314.7               | 0.901                   | 2.540          | 12.109          | 0.259                     | 0.636          | 0.747           |
| 330.0                                                                  | 10.0               | 329.6               | 0.942                   | 1.964          | 11.776          | 0.243                     | 0.386          | 0.687           |
| 345.0                                                                  | 10.0               | 344.6               | 0.806                   | 1.289          | 11.609          | 0.223                     | 0.199          | 0.642           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |



**Table V.4:** Accelerations at Flight Deck: JONSWAP Spectrum with  $H_s = 4.0$  m and  $T_p = 8.2$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 15.2               | -0.2                | 0.855                   | 1.070          | 11.741          | 0.237                     | 0.100          | 0.669           |
| 15.0                                                                   | 15.2               | 14.8                | 0.791                   | 1.185          | 11.771          | 0.243                     | 0.171          | 0.678           |
| 30.0                                                                   | 15.1               | 29.8                | 0.955                   | 1.735          | 11.908          | 0.262                     | 0.339          | 0.734           |
| 45.0                                                                   | 15.1               | 44.8                | 0.998                   | 2.692          | 12.107          | 0.279                     | 0.571          | 0.816           |
| 60.0                                                                   | 15.2               | 59.7                | 1.010                   | 3.576          | 13.084          | 0.270                     | 0.836          | 0.944           |
| 75.0                                                                   | 15.2               | 74.1                | 0.793                   | 4.649          | 13.802          | 0.216                     | 0.961          | 1.068           |
| 90.0                                                                   | 15.1               | 88.5                | 0.282                   | 5.533          | 13.210          | 0.047                     | 0.893          | 0.806           |
| 105.0                                                                  | 15.0               | 103.3               | 0.450                   | 7.455          | 12.928          | 0.086                     | 1.067          | 0.475           |
| 120.0                                                                  | 15.0               | 118.5               | 0.251                   | 4.650          | 10.810          | 0.066                     | 1.461          | 0.268           |
| 135.0                                                                  | 15.2               | 134.3               | 0.223                   | 4.501          | 10.470          | 0.051                     | 1.499          | 0.223           |
| 150.0                                                                  | 15.3               | 149.7               | 0.211                   | 3.312          | 10.240          | 0.057                     | 0.891          | 0.117           |
| 165.0                                                                  | 15.3               | 164.7               | 0.219                   | 2.093          | 10.064          | 0.059                     | 0.449          | 0.069           |
| 180.0                                                                  | 15.2               | 179.5               | 0.296                   | 2.465          | 10.072          | 0.063                     | 0.338          | 0.063           |
| 195.0                                                                  | 15.2               | 194.7               | 0.178                   | 2.243          | 9.884           | 0.055                     | 0.421          | 0.038           |
| 210.0                                                                  | 15.2               | 209.8               | 0.170                   | 2.531          | 9.957           | 0.043                     | 0.631          | 0.050           |
| 225.0                                                                  | 15.2               | 225.4               | 0.246                   | 4.162          | 10.609          | 0.055                     | 1.499          | 0.152           |
| 240.0                                                                  | 15.1               | 241.1               | 0.250                   | 4.544          | 10.907          | 0.073                     | 1.462          | 0.259           |
| 255.0                                                                  | 15.0               | 256.7               | 0.562                   | 5.039          | 12.532          | 0.095                     | 1.144          | 0.492           |
| 270.0                                                                  | 15.1               | 271.5               | 0.324                   | 5.000          | 13.148          | 0.042                     | 1.030          | 0.873           |
| 285.0                                                                  | 15.3               | 285.8               | 0.791                   | 4.485          | 13.946          | 0.214                     | 1.096          | 1.134           |
| 300.0                                                                  | 15.2               | 300.1               | 0.954                   | 3.384          | 12.783          | 0.271                     | 0.893          | 0.986           |
| 315.0                                                                  | 15.1               | 314.8               | 0.945                   | 2.494          | 12.134          | 0.281                     | 0.618          | 0.838           |
| 330.0                                                                  | 15.1               | 329.8               | 0.966                   | 1.784          | 12.072          | 0.265                     | 0.367          | 0.746           |
| 345.0                                                                  | 15.2               | 344.8               | 0.885                   | 1.137          | 12.076          | 0.245                     | 0.185          | 0.684           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table V.5:** Accelerations at Flight Deck: JONSWAP Spectrum with  $H_s = 4.0$  m and  $T_p = 8.2$  s; Ship's speed is 20.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 20.3               | -0.1                | 0.865                   | 1.182          | 12.304          | 0.253                     | 0.112          | 0.783           |
| 15.0                                                                   | 20.3               | 14.9                | 0.864                   | 1.347          | 12.425          | 0.260                     | 0.168          | 0.804           |
| 30.0                                                                   | 20.3               | 29.9                | 0.977                   | 1.738          | 12.599          | 0.281                     | 0.320          | 0.887           |
| 45.0                                                                   | 20.3               | 44.9                | 1.018                   | 2.634          | 12.795          | 0.297                     | 0.544          | 0.988           |
| 60.0                                                                   | 20.3               | 59.8                | 1.040                   | 3.859          | 13.236          | 0.284                     | 0.811          | 1.111           |
| 75.0                                                                   | 20.4               | 74.5                | 0.786                   | 4.540          | 14.071          | 0.218                     | 0.944          | 1.175           |
| 90.0                                                                   | 20.3               | 89.1                | 0.317                   | 6.943          | 12.874          | 0.041                     | 0.899          | 0.797           |
| 105.0                                                                  | 20.2               | 104.1               | 0.393                   | 6.343          | 11.915          | 0.070                     | 1.137          | 0.420           |
| 120.0                                                                  | 20.3               | 119.3               | 0.193                   | 5.774          | 10.810          | 0.041                     | 1.889          | 0.318           |
| 135.0                                                                  | 20.2               | 134.8               | 0.226                   | 4.753          | 10.339          | 0.057                     | 1.564          | 0.203           |
| 150.0                                                                  | 20.4               | 149.8               | 0.253                   | 2.916          | 10.052          | 0.064                     | 0.742          | 0.082           |
| 165.0                                                                  | 20.3               | 164.6               | 0.325                   | 2.774          | 9.977           | 0.066                     | 0.385          | 0.068           |
| 180.0                                                                  | 20.6               | 179.8               | 0.267                   | 3.267          | 9.998           | 0.068                     | 0.324          | 0.067           |
| 195.0                                                                  | 20.4               | 194.7               | 0.319                   | 3.718          | 9.948           | 0.063                     | 0.582          | 0.092           |
| 210.0                                                                  | 20.3               | 209.8               | 0.294                   | 4.236          | 9.913           | 0.060                     | 0.905          | 0.121           |
| 225.0                                                                  | 20.3               | 225.1               | 0.183                   | 4.994          | 10.011          | 0.048                     | 1.450          | 0.153           |
| 240.0                                                                  | 20.3               | 240.6               | 0.222                   | 5.531          | 11.260          | 0.049                     | 2.028          | 0.231           |
| 255.0                                                                  | 20.2               | 255.9               | 0.357                   | 4.720          | 11.810          | 0.077                     | 1.222          | 0.409           |
| 270.0                                                                  | 20.3               | 270.9               | 0.270                   | 5.065          | 12.920          | 0.039                     | 1.081          | 0.862           |
| 285.0                                                                  | 20.4               | 285.5               | 0.932                   | 5.353          | 14.855          | 0.212                     | 1.130          | 1.233           |
| 300.0                                                                  | 20.3               | 300.1               | 0.906                   | 3.143          | 13.438          | 0.281                     | 0.904          | 1.146           |
| 315.0                                                                  | 20.3               | 315.0               | 0.991                   | 2.431          | 13.044          | 0.296                     | 0.608          | 1.009           |
| 330.0                                                                  | 20.3               | 329.9               | 1.006                   | 1.715          | 12.786          | 0.281                     | 0.363          | 0.901           |
| 345.0                                                                  | 20.3               | 344.9               | 0.844                   | 1.225          | 12.562          | 0.260                     | 0.193          | 0.811           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table V.6:** Accelerations at Flight Deck: JONSWAP Spectrum with  $H_s = 4.0$  m and  $T_p = 8.2$  s; Ship's speed is 25.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 25.4               | -0.1                | 0.934                   | 1.369          | 12.673          | 0.260                     | 0.141          | 0.975           |
| 15.0                                                                   | 25.4               | 14.9                | 0.837                   | 1.447          | 12.794          | 0.268                     | 0.163          | 1.007           |
| 30.0                                                                   | 25.4               | 29.9                | 0.950                   | 2.129          | 13.316          | 0.291                     | 0.297          | 1.110           |
| 45.0                                                                   | 25.4               | 44.9                | 1.070                   | 2.799          | 13.569          | 0.309                     | 0.513          | 1.219           |
| 60.0                                                                   | 25.4               | 59.8                | 1.007                   | 3.866          | 13.558          | 0.294                     | 0.791          | 1.296           |
| 75.0                                                                   | 25.4               | 74.6                | 0.752                   | 4.725          | 14.492          | 0.218                     | 0.942          | 1.275           |
| 90.0                                                                   | 25.4               | 89.4                | 0.268                   | 7.166          | 13.114          | 0.040                     | 0.911          | 0.794           |
| 105.0                                                                  | 25.4               | 104.4               | 0.274                   | 6.429          | 11.697          | 0.056                     | 1.263          | 0.373           |
| 120.0                                                                  | 25.3               | 119.7               | 0.381                   | 7.419          | 11.180          | 0.060                     | 2.505          | 0.385           |
| 135.0                                                                  | 25.3               | 134.9               | 0.311                   | 4.758          | 9.921           | 0.065                     | 1.309          | 0.150           |
| 150.0                                                                  | 25.5               | 149.8               | 0.346                   | 2.673          | 10.039          | 0.074                     | 0.563          | 0.086           |
| 165.0                                                                  | 25.5               | 164.8               | 0.356                   | 2.395          | 10.205          | 0.077                     | 0.351          | 0.106           |
| 180.0                                                                  | 25.4               | 179.8               | 0.388                   | 3.451          | 10.129          | 0.083                     | 0.492          | 0.136           |
| 195.0                                                                  | 25.5               | 194.9               | 0.797                   | 3.592          | 10.125          | 0.079                     | 0.561          | 0.124           |
| 210.0                                                                  | 25.4               | 210.0               | 0.381                   | 3.774          | 10.066          | 0.072                     | 0.793          | 0.124           |
| 225.0                                                                  | 25.3               | 225.0               | 0.266                   | 5.293          | 9.898           | 0.061                     | 1.388          | 0.188           |
| 240.0                                                                  | 25.3               | 240.2               | 0.295                   | 6.853          | 10.763          | 0.053                     | 2.415          | 0.303           |
| 255.0                                                                  | 25.4               | 255.5               | 0.316                   | 5.173          | 11.688          | 0.065                     | 1.373          | 0.343           |
| 270.0                                                                  | 25.4               | 270.6               | 0.278                   | 5.324          | 12.879          | 0.042                     | 1.111          | 0.858           |
| 285.0                                                                  | 25.4               | 285.3               | 0.814                   | 5.251          | 14.974          | 0.211                     | 1.177          | 1.331           |
| 300.0                                                                  | 25.4               | 300.1               | 0.958                   | 3.444          | 13.917          | 0.288                     | 0.937          | 1.325           |
| 315.0                                                                  | 25.4               | 315.1               | 1.012                   | 2.533          | 13.872          | 0.305                     | 0.624          | 1.234           |
| 330.0                                                                  | 25.4               | 330.0               | 0.934                   | 1.988          | 13.349          | 0.289                     | 0.382          | 1.118           |
| 345.0                                                                  | 25.4               | 345.0               | 0.824                   | 1.338          | 12.852          | 0.268                     | 0.217          | 1.012           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table V.7:** Accelerations at Flight Deck: JONSWAP Spectrum with  $H_s = 4.0$  m and  $T_p = 8.2$  s; Ship's speed is 30.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 30.5               | -0.1                | 0.870                   | 1.405          | 13.087          | 0.258                     | 0.164          | 1.141           |
| 15.0                                                                   | 30.5               | 14.9                | 0.927                   | 1.667          | 13.321          | 0.267                     | 0.166          | 1.186           |
| 30.0                                                                   | 30.5               | 29.9                | 0.949                   | 2.123          | 13.498          | 0.293                     | 0.275          | 1.320           |
| 45.0                                                                   | 30.5               | 44.9                | 1.022                   | 3.148          | 14.090          | 0.314                     | 0.489          | 1.452           |
| 60.0                                                                   | 30.5               | 59.9                | 0.974                   | 4.126          | 14.296          | 0.300                     | 0.775          | 1.485           |
| 75.0                                                                   | 30.5               | 74.7                | 0.743                   | 4.779          | 14.758          | 0.219                     | 0.923          | 1.379           |
| 90.0                                                                   | 30.5               | 89.6                | 0.212                   | 5.750          | 13.288          | 0.042                     | 0.935          | 0.789           |
| 105.0                                                                  | 30.5               | 104.6               | 0.224                   | 5.842          | 11.498          | 0.053                     | 1.459          | 0.352           |
| 120.0                                                                  | 30.4               | 119.9               | 0.444                   | 6.007          | 10.536          | 0.076                     | 2.234          | 0.322           |
| 135.0                                                                  | 30.4               | 134.9               | 0.288                   | 3.689          | 9.990           | 0.075                     | 1.126          | 0.125           |
| 150.0                                                                  | 30.6               | 149.8               | 0.382                   | 3.509          | 10.365          | 0.082                     | 0.628          | 0.141           |
| 165.0                                                                  | 30.4               | 165.0               | 0.456                   | 2.567          | 10.244          | 0.087                     | 0.443          | 0.161           |
| 180.0                                                                  | 30.7               | 179.9               | 0.454                   | 3.199          | 10.334          | 0.084                     | 0.551          | 0.182           |
| 195.0                                                                  | 30.4               | 194.8               | 0.429                   | 4.013          | 10.262          | 0.089                     | 0.747          | 0.189           |
| 210.0                                                                  | 30.6               | 210.0               | 0.336                   | 4.372          | 10.237          | 0.084                     | 0.945          | 0.176           |
| 225.0                                                                  | 30.4               | 225.0               | 0.286                   | 4.073          | 9.924           | 0.073                     | 1.243          | 0.161           |
| 240.0                                                                  | 30.4               | 240.0               | 0.389                   | 6.990          | 10.358          | 0.069                     | 2.254          | 0.331           |
| 255.0                                                                  | 30.5               | 255.3               | 0.308                   | 8.400          | 11.794          | 0.061                     | 1.661          | 0.313           |
| 270.0                                                                  | 30.5               | 270.4               | 0.201                   | 5.203          | 13.142          | 0.047                     | 1.154          | 0.852           |
| 285.0                                                                  | 30.5               | 285.3               | 0.678                   | 4.720          | 14.664          | 0.209                     | 1.194          | 1.430           |
| 300.0                                                                  | 30.5               | 300.1               | 0.957                   | 3.947          | 14.620          | 0.292                     | 0.981          | 1.509           |
| 315.0                                                                  | 30.5               | 315.1               | 1.034                   | 2.696          | 14.440          | 0.309                     | 0.668          | 1.459           |
| 330.0                                                                  | 30.5               | 330.1               | 0.899                   | 1.992          | 13.707          | 0.288                     | 0.405          | 1.316           |
| 345.0                                                                  | 30.5               | 345.0               | 0.828                   | 1.517          | 13.192          | 0.267                     | 0.244          | 1.185           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table V.8:** Accelerations at Flight Deck: JONSWAP Spectrum with  $H_s = 4.0$  m and  $T_p = 13.6$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 0.0                | -14.0               | 0.542                   | 1.911          | 10.663          | 0.135                     | 0.428          | 0.326           |
| 15.0                                                                   | -0.1               | -6.1                | 0.579                   | 1.419          | 10.661          | 0.136                     | 0.273          | 0.319           |
| 30.0                                                                   | -0.3               | 2.2                 | 0.661                   | 1.662          | 10.683          | 0.136                     | 0.327          | 0.314           |
| 45.0                                                                   | -0.3               | 16.8                | 0.592                   | 2.122          | 10.745          | 0.133                     | 0.589          | 0.317           |
| 60.0                                                                   | -0.2               | 36.1                | 0.516                   | 2.977          | 10.956          | 0.125                     | 0.857          | 0.335           |
| 75.0                                                                   | -0.1               | 52.3                | 0.404                   | 3.720          | 11.488          | 0.110                     | 0.992          | 0.357           |
| 90.0                                                                   | -0.0               | 65.2                | 0.365                   | 3.877          | 11.251          | 0.087                     | 1.024          | 0.361           |
| 105.0                                                                  | -0.1               | 82.6                | 0.203                   | 3.279          | 11.174          | 0.032                     | 1.007          | 0.335           |
| 120.0                                                                  | -0.3               | 97.2                | 0.286                   | 3.987          | 11.076          | 0.031                     | 1.037          | 0.331           |
| 135.0                                                                  | -0.6               | 105.0               | 0.324                   | 4.614          | 11.242          | 0.055                     | 1.064          | 0.345           |
| 150.0                                                                  | -0.9               | 109.1               | 0.374                   | 4.439          | 11.331          | 0.067                     | 1.064          | 0.352           |
| 165.0                                                                  | -0.5               | 40.2                | 0.514                   | 4.001          | 11.402          | 0.116                     | 0.698          | 0.328           |
| 180.0                                                                  | -0.3               | 35.7                | 0.536                   | 2.853          | 10.933          | 0.130                     | 0.556          | 0.325           |
| 195.0                                                                  | 0.1                | 362.1               | 0.504                   | 2.962          | 10.845          | 0.126                     | 0.673          | 0.338           |
| 210.0                                                                  | 0.2                | 354.0               | 0.525                   | 3.174          | 10.990          | 0.113                     | 0.843          | 0.354           |
| 225.0                                                                  | 0.3                | 264.4               | 0.349                   | 3.778          | 11.570          | 0.037                     | 1.021          | 0.378           |
| 240.0                                                                  | 0.3                | 272.2               | 0.286                   | 3.514          | 11.419          | 0.029                     | 1.003          | 0.378           |
| 255.0                                                                  | 0.3                | 283.8               | 0.264                   | 3.856          | 11.502          | 0.056                     | 0.996          | 0.400           |
| 270.0                                                                  | 0.3                | 294.1               | 0.349                   | 3.666          | 11.373          | 0.086                     | 0.996          | 0.414           |
| 285.0                                                                  | 0.2                | 302.8               | 0.406                   | 3.561          | 11.622          | 0.105                     | 0.976          | 0.410           |
| 300.0                                                                  | 0.1                | 311.1               | 0.420                   | 3.541          | 11.504          | 0.116                     | 0.927          | 0.394           |
| 315.0                                                                  | 0.1                | 319.6               | 0.497                   | 3.213          | 11.202          | 0.124                     | 0.854          | 0.375           |
| 330.0                                                                  | 0.1                | 328.7               | 0.484                   | 2.945          | 10.986          | 0.128                     | 0.741          | 0.353           |
| 345.0                                                                  | 0.0                | 337.9               | 0.529                   | 2.447          | 10.824          | 0.132                     | 0.590          | 0.337           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table V.9:** Accelerations at Flight Deck: JONSWAP Spectrum with  $H_s = 4.0$  m and  $T_p = 13.6$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 4.8                | -2.5                | 0.679                   | 1.131          | 10.985          | 0.158                     | 0.182          | 0.385           |
| 15.0                                                                   | 4.8                | 11.8                | 0.621                   | 1.528          | 10.879          | 0.157                     | 0.346          | 0.383           |
| 30.0                                                                   | 4.7                | 26.3                | 0.653                   | 2.312          | 10.991          | 0.152                     | 0.596          | 0.391           |
| 45.0                                                                   | 4.7                | 41.0                | 0.529                   | 2.895          | 11.052          | 0.141                     | 0.795          | 0.405           |
| 60.0                                                                   | 4.7                | 55.3                | 0.448                   | 3.281          | 11.526          | 0.123                     | 0.918          | 0.419           |
| 75.0                                                                   | 4.7                | 69.9                | 0.334                   | 3.745          | 11.400          | 0.080                     | 0.955          | 0.404           |
| 90.0                                                                   | 4.6                | 83.5                | 0.116                   | 3.330          | 11.294          | 0.024                     | 0.947          | 0.365           |
| 105.0                                                                  | 4.4                | 95.7                | 0.163                   | 3.740          | 11.205          | 0.020                     | 0.970          | 0.343           |
| 120.0                                                                  | 4.3                | 104.0               | 0.256                   | 3.312          | 11.272          | 0.041                     | 0.979          | 0.336           |
| 135.0                                                                  | 4.2                | 112.8               | 0.304                   | 3.611          | 11.062          | 0.057                     | 0.971          | 0.322           |
| 150.0                                                                  | 4.2                | 128.2               | 0.358                   | 3.314          | 10.856          | 0.074                     | 0.855          | 0.285           |
| 165.0                                                                  | 4.6                | 161.0               | 0.329                   | 1.723          | 10.770          | 0.087                     | 0.376          | 0.213           |
| 180.0                                                                  | 4.8                | 178.1               | 0.320                   | 1.289          | 10.752          | 0.088                     | 0.280          | 0.199           |
| 195.0                                                                  | 4.9                | 194.6               | 0.342                   | 1.689          | 10.801          | 0.086                     | 0.452          | 0.204           |
| 210.0                                                                  | 4.9                | 211.3               | 0.372                   | 2.474          | 10.819          | 0.082                     | 0.674          | 0.228           |
| 225.0                                                                  | 4.7                | 228.6               | 0.406                   | 3.442          | 11.316          | 0.076                     | 0.865          | 0.275           |
| 240.0                                                                  | 4.7                | 245.3               | 0.264                   | 3.609          | 11.045          | 0.062                     | 0.972          | 0.328           |
| 255.0                                                                  | 4.8                | 258.9               | 0.180                   | 3.458          | 11.184          | 0.036                     | 0.982          | 0.355           |
| 270.0                                                                  | 4.9                | 272.8               | 0.104                   | 3.309          | 11.198          | 0.013                     | 0.942          | 0.382           |
| 285.0                                                                  | 5.0                | 287.0               | 0.303                   | 3.936          | 11.705          | 0.071                     | 0.927          | 0.432           |
| 300.0                                                                  | 5.0                | 301.0               | 0.408                   | 3.132          | 11.347          | 0.118                     | 0.901          | 0.446           |
| 315.0                                                                  | 5.0                | 314.8               | 0.549                   | 2.889          | 11.295          | 0.140                     | 0.770          | 0.424           |
| 330.0                                                                  | 4.9                | 329.0               | 0.568                   | 2.510          | 11.032          | 0.150                     | 0.597          | 0.404           |
| 345.0                                                                  | 4.9                | 343.3               | 0.661                   | 1.817          | 10.988          | 0.156                     | 0.383          | 0.391           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table V.10:** Accelerations at Flight Deck: JONSWAP Spectrum with  $H_s = 4.0$  m and  $T_p = 13.6$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 10.0               | -0.6                | 0.817                   | 0.914          | 11.330          | 0.180                     | 0.089          | 0.448           |
| 15.0                                                                   | 10.0               | 14.4                | 0.746                   | 1.509          | 11.031          | 0.177                     | 0.274          | 0.444           |
| 30.0                                                                   | 10.0               | 29.4                | 0.707                   | 2.166          | 11.114          | 0.169                     | 0.496          | 0.444           |
| 45.0                                                                   | 10.1               | 44.4                | 0.570                   | 2.550          | 11.384          | 0.156                     | 0.679          | 0.449           |
| 60.0                                                                   | 10.1               | 59.3                | 0.444                   | 3.083          | 11.587          | 0.128                     | 0.813          | 0.462           |
| 75.0                                                                   | 10.1               | 74.0                | 0.300                   | 3.257          | 11.952          | 0.070                     | 0.808          | 0.428           |
| 90.0                                                                   | 10.1               | 88.8                | 0.061                   | 3.323          | 11.329          | 0.014                     | 0.818          | 0.366           |
| 105.0                                                                  | 10.1               | 103.7               | 0.156                   | 3.895          | 11.317          | 0.032                     | 0.866          | 0.321           |
| 120.0                                                                  | 10.0               | 118.3               | 0.205                   | 4.107          | 11.007          | 0.048                     | 0.937          | 0.275           |
| 135.0                                                                  | 10.0               | 133.5               | 0.211                   | 3.287          | 10.784          | 0.054                     | 0.882          | 0.226           |
| 150.0                                                                  | 10.0               | 148.8               | 0.210                   | 2.965          | 10.442          | 0.059                     | 0.803          | 0.191           |
| 165.0                                                                  | 10.0               | 164.0               | 0.326                   | 2.910          | 10.545          | 0.062                     | 0.616          | 0.162           |
| 180.0                                                                  | 10.1               | 179.3               | 0.272                   | 2.228          | 10.306          | 0.061                     | 0.374          | 0.138           |
| 195.0                                                                  | 10.1               | 194.6               | 0.248                   | 2.004          | 10.357          | 0.062                     | 0.444          | 0.131           |
| 210.0                                                                  | 10.1               | 210.2               | 0.268                   | 2.375          | 10.405          | 0.060                     | 0.755          | 0.152           |
| 225.0                                                                  | 10.0               | 225.8               | 0.244                   | 2.798          | 10.720          | 0.057                     | 0.960          | 0.190           |
| 240.0                                                                  | 10.0               | 241.2               | 0.251                   | 3.338          | 11.077          | 0.051                     | 1.044          | 0.253           |
| 255.0                                                                  | 10.1               | 255.9               | 0.175                   | 3.806          | 11.254          | 0.036                     | 0.984          | 0.310           |
| 270.0                                                                  | 10.2               | 270.7               | 0.060                   | 3.378          | 11.284          | 0.016                     | 0.912          | 0.376           |
| 285.0                                                                  | 10.2               | 285.3               | 0.257                   | 3.798          | 11.552          | 0.067                     | 0.873          | 0.450           |
| 300.0                                                                  | 10.1               | 299.9               | 0.453                   | 3.419          | 11.764          | 0.127                     | 0.835          | 0.480           |
| 315.0                                                                  | 10.1               | 314.6               | 0.565                   | 2.743          | 11.322          | 0.156                     | 0.670          | 0.460           |
| 330.0                                                                  | 10.1               | 329.5               | 0.682                   | 2.175          | 11.217          | 0.169                     | 0.470          | 0.448           |
| 345.0                                                                  | 10.1               | 344.4               | 0.658                   | 1.292          | 11.246          | 0.176                     | 0.257          | 0.444           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table V.11:** Accelerations at Flight Deck: JONSWAP Spectrum with  $H_s = 4.0$  m and  $T_p = 13.6$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 15.2               | -0.3                | 0.844                   | 0.916          | 11.232          | 0.200                     | 0.083          | 0.491           |
| 15.0                                                                   | 15.2               | 14.8                | 0.784                   | 1.419          | 11.246          | 0.196                     | 0.254          | 0.486           |
| 30.0                                                                   | 15.2               | 29.9                | 0.725                   | 2.029          | 11.404          | 0.187                     | 0.461          | 0.488           |
| 45.0                                                                   | 15.2               | 44.9                | 0.616                   | 2.583          | 11.465          | 0.171                     | 0.640          | 0.502           |
| 60.0                                                                   | 15.2               | 59.8                | 0.475                   | 3.036          | 11.629          | 0.139                     | 0.791          | 0.517           |
| 75.0                                                                   | 15.3               | 74.6                | 0.255                   | 2.862          | 11.644          | 0.072                     | 0.746          | 0.457           |
| 90.0                                                                   | 15.3               | 89.5                | 0.079                   | 3.483          | 11.390          | 0.021                     | 0.754          | 0.368           |
| 105.0                                                                  | 15.3               | 104.4               | 0.156                   | 3.614          | 11.276          | 0.031                     | 0.826          | 0.304           |
| 120.0                                                                  | 15.2               | 119.2               | 0.186                   | 4.221          | 10.846          | 0.039                     | 1.115          | 0.268           |
| 135.0                                                                  | 15.2               | 134.5               | 0.183                   | 3.751          | 10.448          | 0.040                     | 1.091          | 0.215           |
| 150.0                                                                  | 15.3               | 149.8               | 0.168                   | 2.577          | 10.169          | 0.043                     | 0.669          | 0.149           |
| 165.0                                                                  | 15.2               | 164.7               | 0.200                   | 1.798          | 10.195          | 0.044                     | 0.343          | 0.120           |
| 180.0                                                                  | 15.2               | 179.7               | 0.189                   | 1.570          | 10.162          | 0.052                     | 0.224          | 0.107           |
| 195.0                                                                  | 15.2               | 194.8               | 0.189                   | 2.677          | 10.042          | 0.046                     | 0.389          | 0.088           |
| 210.0                                                                  | 15.2               | 209.9               | 0.159                   | 3.130          | 10.044          | 0.039                     | 0.690          | 0.088           |
| 225.0                                                                  | 15.2               | 225.3               | 0.234                   | 3.861          | 10.476          | 0.045                     | 1.242          | 0.147           |
| 240.0                                                                  | 15.2               | 240.6               | 0.194                   | 3.733          | 10.899          | 0.042                     | 1.242          | 0.205           |
| 255.0                                                                  | 15.3               | 255.4               | 0.190                   | 3.599          | 11.121          | 0.035                     | 1.018          | 0.272           |
| 270.0                                                                  | 15.3               | 270.3               | 0.087                   | 3.726          | 11.385          | 0.023                     | 0.908          | 0.370           |
| 285.0                                                                  | 15.3               | 285.1               | 0.239                   | 3.691          | 11.443          | 0.069                     | 0.848          | 0.477           |
| 300.0                                                                  | 15.2               | 299.9               | 0.483                   | 3.770          | 11.673          | 0.137                     | 0.800          | 0.538           |
| 315.0                                                                  | 15.2               | 314.7               | 0.560                   | 2.865          | 11.423          | 0.171                     | 0.617          | 0.511           |
| 330.0                                                                  | 15.2               | 329.7               | 0.681                   | 2.180          | 11.231          | 0.187                     | 0.423          | 0.493           |
| 345.0                                                                  | 15.2               | 344.7               | 0.832                   | 1.372          | 11.203          | 0.196                     | 0.213          | 0.488           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |



**Table V.12:** Accelerations at Flight Deck: JONSWAP Spectrum with  $H_s = 4.0$  m and  $T_p = 13.6$  s; Ship's speed is 20.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 20.3               | -0.1                | 0.809                   | 1.089          | 11.499          | 0.217                     | 0.095          | 0.564           |
| 15.0                                                                   | 20.3               | 14.9                | 0.857                   | 1.495          | 11.632          | 0.214                     | 0.251          | 0.565           |
| 30.0                                                                   | 20.3               | 30.0                | 0.728                   | 2.002          | 11.535          | 0.203                     | 0.446          | 0.572           |
| 45.0                                                                   | 20.3               | 45.0                | 0.621                   | 2.572          | 11.712          | 0.183                     | 0.627          | 0.589           |
| 60.0                                                                   | 20.3               | 59.9                | 0.554                   | 2.998          | 12.119          | 0.148                     | 0.793          | 0.598           |
| 75.0                                                                   | 20.4               | 74.8                | 0.284                   | 3.430          | 11.838          | 0.075                     | 0.701          | 0.484           |
| 90.0                                                                   | 20.4               | 89.7                | 0.100                   | 3.498          | 11.390          | 0.027                     | 0.709          | 0.365           |
| 105.0                                                                  | 20.4               | 104.7               | 0.149                   | 3.852          | 11.126          | 0.034                     | 0.785          | 0.283           |
| 120.0                                                                  | 20.3               | 119.6               | 0.164                   | 5.168          | 10.542          | 0.041                     | 1.453          | 0.275           |
| 135.0                                                                  | 20.3               | 134.9               | 0.162                   | 3.512          | 10.138          | 0.041                     | 1.068          | 0.173           |
| 150.0                                                                  | 20.4               | 149.9               | 0.143                   | 2.003          | 10.033          | 0.041                     | 0.577          | 0.109           |
| 165.0                                                                  | 20.3               | 164.8               | 0.181                   | 1.464          | 10.091          | 0.045                     | 0.288          | 0.078           |
| 180.0                                                                  | 20.4               | 179.9               | 0.177                   | 2.061          | 10.004          | 0.050                     | 0.189          | 0.073           |
| 195.0                                                                  | 20.3               | 194.8               | 0.212                   | 3.798          | 9.988           | 0.055                     | 0.486          | 0.073           |
| 210.0                                                                  | 20.4               | 209.9               | 0.175                   | 4.119          | 9.937           | 0.039                     | 0.666          | 0.073           |
| 225.0                                                                  | 20.4               | 225.0               | 0.141                   | 4.313          | 9.962           | 0.034                     | 0.994          | 0.089           |
| 240.0                                                                  | 20.3               | 240.3               | 0.240                   | 5.449          | 10.608          | 0.042                     | 1.506          | 0.173           |
| 255.0                                                                  | 20.4               | 255.2               | 0.193                   | 3.884          | 10.962          | 0.037                     | 1.006          | 0.237           |
| 270.0                                                                  | 20.4               | 270.1               | 0.106                   | 3.673          | 11.277          | 0.030                     | 0.889          | 0.363           |
| 285.0                                                                  | 20.4               | 285.0               | 0.275                   | 3.849          | 11.930          | 0.072                     | 0.816          | 0.512           |
| 300.0                                                                  | 20.3               | 299.9               | 0.490                   | 3.634          | 11.903          | 0.145                     | 0.773          | 0.618           |
| 315.0                                                                  | 20.3               | 314.8               | 0.664                   | 2.773          | 11.827          | 0.183                     | 0.582          | 0.602           |
| 330.0                                                                  | 20.3               | 329.8               | 0.742                   | 2.240          | 11.580          | 0.202                     | 0.388          | 0.579           |
| 345.0                                                                  | 20.3               | 344.8               | 0.861                   | 1.521          | 11.575          | 0.213                     | 0.191          | 0.568           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table V.13:** Accelerations at Flight Deck: JONSWAP Spectrum with  $H_s = 4.0$  m and  $T_p = 13.6$  s; Ship's speed is 25.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 25.4               | -0.1                | 0.909                   | 1.280          | 12.071          | 0.232                     | 0.120          | 0.700           |
| 15.0                                                                   | 25.4               | 15.0                | 0.828                   | 1.537          | 12.274          | 0.229                     | 0.253          | 0.699           |
| 30.0                                                                   | 25.4               | 30.0                | 0.912                   | 2.369          | 12.233          | 0.217                     | 0.432          | 0.705           |
| 45.0                                                                   | 25.4               | 45.0                | 0.715                   | 2.691          | 12.386          | 0.195                     | 0.614          | 0.713           |
| 60.0                                                                   | 25.4               | 60.0                | 0.536                   | 3.411          | 12.421          | 0.156                     | 0.790          | 0.701           |
| 75.0                                                                   | 25.4               | 74.9                | 0.265                   | 2.884          | 11.811          | 0.079                     | 0.674          | 0.528           |
| 90.0                                                                   | 25.4               | 89.8                | 0.119                   | 3.440          | 11.373          | 0.033                     | 0.684          | 0.359           |
| 105.0                                                                  | 25.4               | 104.8               | 0.168                   | 3.651          | 10.837          | 0.041                     | 0.781          | 0.260           |
| 120.0                                                                  | 25.4               | 119.9               | 0.185                   | 4.791          | 10.133          | 0.050                     | 1.694          | 0.262           |
| 135.0                                                                  | 25.4               | 134.9               | 0.183                   | 4.159          | 9.975           | 0.050                     | 0.998          | 0.135           |
| 150.0                                                                  | 25.4               | 149.9               | 0.165                   | 2.239          | 9.945           | 0.055                     | 0.652          | 0.087           |
| 165.0                                                                  | 25.5               | 164.9               | 0.215                   | 1.852          | 9.966           | 0.067                     | 0.361          | 0.071           |
| 180.0                                                                  | 25.5               | 179.9               | 0.250                   | 2.128          | 10.024          | 0.069                     | 0.195          | 0.060           |
| 195.0                                                                  | 25.5               | 195.0               | 0.186                   | 2.294          | 9.946           | 0.061                     | 0.358          | 0.057           |
| 210.0                                                                  | 25.5               | 210.0               | 0.152                   | 3.782          | 9.886           | 0.045                     | 0.625          | 0.080           |
| 225.0                                                                  | 25.4               | 225.0               | 0.133                   | 4.343          | 9.902           | 0.043                     | 1.106          | 0.115           |
| 240.0                                                                  | 25.4               | 240.1               | 0.174                   | 6.409          | 9.940           | 0.043                     | 1.564          | 0.158           |
| 255.0                                                                  | 25.4               | 255.1               | 0.207                   | 4.338          | 10.914          | 0.042                     | 0.958          | 0.207           |
| 270.0                                                                  | 25.4               | 270.1               | 0.126                   | 3.438          | 11.032          | 0.036                     | 0.831          | 0.354           |
| 285.0                                                                  | 25.4               | 285.0               | 0.267                   | 4.175          | 11.770          | 0.075                     | 0.765          | 0.551           |
| 300.0                                                                  | 25.4               | 299.9               | 0.511                   | 3.646          | 12.425          | 0.151                     | 0.745          | 0.716           |
| 315.0                                                                  | 25.4               | 314.9               | 0.707                   | 2.662          | 12.130          | 0.192                     | 0.549          | 0.722           |
| 330.0                                                                  | 25.4               | 329.9               | 0.842                   | 2.316          | 12.086          | 0.215                     | 0.364          | 0.713           |
| 345.0                                                                  | 25.4               | 344.9               | 0.987                   | 1.557          | 12.182          | 0.228                     | 0.189          | 0.703           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table V.14:** Accelerations at Flight Deck: JONSWAP Spectrum with  $H_s = 4.0$  m and  $T_p = 13.6$  s; Ship's speed is 30.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 30.5               | -0.0                | 1.035                   | 1.457          | 12.834          | 0.245                     | 0.152          | 0.876           |
| 15.0                                                                   | 30.5               | 15.0                | 0.913                   | 1.741          | 12.571          | 0.241                     | 0.259          | 0.873           |
| 30.0                                                                   | 30.5               | 30.0                | 0.829                   | 2.369          | 12.636          | 0.227                     | 0.421          | 0.868           |
| 45.0                                                                   | 30.5               | 45.0                | 0.703                   | 2.880          | 12.557          | 0.204                     | 0.592          | 0.856           |
| 60.0                                                                   | 30.5               | 60.0                | 0.577                   | 3.354          | 12.514          | 0.163                     | 0.783          | 0.811           |
| 75.0                                                                   | 30.5               | 74.9                | 0.274                   | 3.172          | 12.024          | 0.083                     | 0.641          | 0.573           |
| 90.0                                                                   | 30.5               | 89.9                | 0.137                   | 3.315          | 11.368          | 0.038                     | 0.677          | 0.351           |
| 105.0                                                                  | 30.5               | 104.9               | 0.202                   | 3.450          | 10.680          | 0.049                     | 0.850          | 0.240           |
| 120.0                                                                  | 30.4               | 119.9               | 0.261                   | 5.982          | 10.016          | 0.064                     | 1.778          | 0.247           |
| 135.0                                                                  | 30.5               | 134.9               | 0.206                   | 3.361          | 9.927           | 0.060                     | 1.004          | 0.118           |
| 150.0                                                                  | 30.6               | 149.8               | 0.287                   | 2.694          | 9.943           | 0.086                     | 0.666          | 0.091           |
| 165.0                                                                  | 30.7               | 164.9               | 0.293                   | 2.055          | 9.972           | 0.094                     | 0.365          | 0.056           |
| 180.0                                                                  | 30.6               | 179.8               | 0.371                   | 2.129          | 9.902           | 0.102                     | 0.280          | 0.047           |
| 195.0                                                                  | 30.7               | 195.0               | 0.287                   | 2.973          | 9.898           | 0.091                     | 0.460          | 0.062           |
| 210.0                                                                  | 30.6               | 210.1               | 0.319                   | 3.689          | 9.905           | 0.077                     | 0.700          | 0.081           |
| 225.0                                                                  | 30.5               | 225.0               | 0.241                   | 4.768          | 9.925           | 0.055                     | 1.032          | 0.136           |
| 240.0                                                                  | 30.5               | 240.0               | 0.200                   | 5.624          | 9.879           | 0.048                     | 1.457          | 0.143           |
| 255.0                                                                  | 30.5               | 255.1               | 0.187                   | 4.055          | 10.637          | 0.050                     | 0.899          | 0.181           |
| 270.0                                                                  | 30.5               | 270.0               | 0.154                   | 3.325          | 11.085          | 0.042                     | 0.761          | 0.345           |
| 285.0                                                                  | 30.5               | 285.0               | 0.269                   | 4.290          | 12.099          | 0.079                     | 0.709          | 0.601           |
| 300.0                                                                  | 30.5               | 299.9               | 0.511                   | 3.970          | 12.797          | 0.157                     | 0.718          | 0.823           |
| 315.0                                                                  | 30.5               | 314.9               | 0.742                   | 3.113          | 12.615          | 0.200                     | 0.531          | 0.861           |
| 330.0                                                                  | 30.5               | 329.9               | 0.874                   | 2.394          | 12.762          | 0.226                     | 0.356          | 0.874           |
| 345.0                                                                  | 30.5               | 344.9               | 0.957                   | 1.674          | 12.683          | 0.240                     | 0.209          | 0.874           |
| Wind at 20.8 knots (10.7 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table V.15:** Accelerations at Flight Deck: JONSWAP Spectrum with  $H_s = 6.0$  m and  $T_p = 9.3$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | -0.1               | -21.2               | 1.334                   | 3.824          | 11.609          | 0.282                     | 0.673          | 0.732           |
| 15.0                                                                   | -0.2               | -12.9               | 1.243                   | 2.706          | 11.534          | 0.280                     | 0.456          | 0.703           |
| 30.0                                                                   | -0.5               | -0.8                | 1.206                   | 2.192          | 11.387          | 0.275                     | 0.351          | 0.665           |
| 45.0                                                                   | -0.9               | 12.3                | 1.290                   | 3.279          | 11.322          | 0.273                     | 0.653          | 0.645           |
| 60.0                                                                   | -1.1               | 23.7                | 1.118                   | 4.372          | 12.143          | 0.271                     | 0.962          | 0.653           |
| 75.0                                                                   | -1.8               | 34.8                | 1.534                   | 7.679          | 13.936          | 0.265                     | 1.336          | 0.709           |
| 90.0                                                                   | -2.2               | -14.4               | 1.238                   | 11.559         | 13.519          | 0.261                     | 1.630          | 0.742           |
| 105.0                                                                  | -1.6               | -3.1                | 1.399                   | 11.138         | 13.387          | 0.263                     | 1.556          | 0.734           |
| 120.0                                                                  | -1.2               | 13.1                | 1.035                   | 8.960          | 13.682          | 0.236                     | 1.489          | 0.712           |
| 135.0                                                                  | -3.2               | 107.2               | 1.914                   | 13.262         | 13.909          | 0.221                     | 1.848          | 0.895           |
| 150.0                                                                  | -4.1               | 109.6               | 0.993                   | 9.289          | 13.887          | 0.224                     | 1.801          | 0.896           |
| 165.0                                                                  | -3.7               | 111.5               | 2.488                   | 11.036         | 13.321          | 0.233                     | 1.760          | 0.879           |
| 180.0                                                                  | -0.8               | 153.3               | 0.864                   | 7.289          | 12.690          | 0.217                     | 0.731          | 0.588           |
| 195.0                                                                  | -0.3               | 17.5                | 1.257                   | 6.577          | 13.184          | 0.277                     | 0.964          | 0.763           |
| 210.0                                                                  | -0.3               | 387.8               | 1.224                   | 6.074          | 13.311          | 0.280                     | 1.101          | 0.802           |
| 225.0                                                                  | -0.3               | 393.4               | 1.147                   | 5.706          | 12.828          | 0.282                     | 1.248          | 0.834           |
| 240.0                                                                  | -0.1               | 392.3               | 1.132                   | 7.043          | 13.895          | 0.281                     | 1.389          | 0.881           |
| 255.0                                                                  | 0.5                | 310.5               | 1.363                   | 7.048          | 15.064          | 0.269                     | 1.610          | 0.970           |
| 270.0                                                                  | -0.1               | 314.6               | 1.947                   | 6.861          | 14.509          | 0.275                     | 1.583          | 0.952           |
| 285.0                                                                  | -0.2               | 305.4               | 1.359                   | 5.941          | 13.846          | 0.283                     | 1.438          | 0.918           |
| 300.0                                                                  | -0.3               | 310.6               | 1.139                   | 7.537          | 13.807          | 0.285                     | 1.329          | 0.877           |
| 315.0                                                                  | -0.2               | 316.2               | 1.184                   | 5.498          | 12.971          | 0.289                     | 1.238          | 0.845           |
| 330.0                                                                  | -0.1               | 323.1               | 1.297                   | 5.801          | 12.491          | 0.288                     | 1.040          | 0.805           |
| 345.0                                                                  | -0.1               | 330.8               | 1.333                   | 5.315          | 11.890          | 0.285                     | 0.862          | 0.770           |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table V.16:** Accelerations at Flight Deck: JONSWAP Spectrum with  $H_s = 6.0$  m and  $T_p = 9.3$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 4.0                | -12.7               | 1.400                   | 3.082          | 11.710          | 0.316                     | 0.445          | 0.814           |
| 15.0                                                                   | 3.9                | -1.6                | 1.310                   | 2.423          | 12.016          | 0.312                     | 0.354          | 0.793           |
| 30.0                                                                   | 3.9                | 10.9                | 1.453                   | 2.365          | 11.801          | 0.311                     | 0.403          | 0.786           |
| 45.0                                                                   | 3.8                | 22.6                | 1.474                   | 3.183          | 11.756          | 0.313                     | 0.609          | 0.794           |
| 60.0                                                                   | 3.8                | 32.4                | 1.327                   | 3.766          | 12.039          | 0.312                     | 0.856          | 0.814           |
| 75.0                                                                   | 3.7                | 39.8                | 1.383                   | 5.467          | 12.793          | 0.309                     | 1.045          | 0.834           |
| 90.0                                                                   | 3.6                | 42.9                | 1.253                   | 7.586          | 13.647          | 0.307                     | 1.136          | 0.847           |
| 105.0                                                                  | 3.6                | 45.4                | 1.227                   | 10.773         | 15.374          | 0.304                     | 1.220          | 0.866           |
| 120.0                                                                  | 3.7                | 45.3                | 1.414                   | 12.531         | 13.280          | 0.308                     | 1.224          | 0.881           |
| 135.0                                                                  | 3.7                | 42.8                | 1.355                   | 5.272          | 12.535          | 0.308                     | 1.096          | 0.867           |
| 150.0                                                                  | 3.7                | 44.0                | 1.357                   | 5.590          | 12.809          | 0.309                     | 1.068          | 0.879           |
| 165.0                                                                  | 3.8                | 51.5                | 1.192                   | 6.387          | 12.686          | 0.307                     | 1.136          | 0.879           |
| 180.0                                                                  | 4.7                | 178.8               | 0.622                   | 2.308          | 11.493          | 0.154                     | 0.466          | 0.313           |
| 195.0                                                                  | 4.6                | 196.7               | 0.614                   | 2.448          | 11.581          | 0.157                     | 0.629          | 0.360           |
| 210.0                                                                  | 4.1                | 373.7               | 1.355                   | 5.837          | 13.990          | 0.315                     | 0.923          | 0.858           |
| 225.0                                                                  | 4.4                | 300.1               | 1.134                   | 7.665          | 14.883          | 0.290                     | 1.429          | 0.969           |
| 240.0                                                                  | 4.5                | 289.0               | 1.192                   | 7.710          | 15.144          | 0.262                     | 1.639          | 1.086           |
| 255.0                                                                  | 4.4                | 290.4               | 1.257                   | 8.085          | 15.414          | 0.272                     | 1.664          | 1.109           |
| 270.0                                                                  | 4.3                | 294.0               | 2.149                   | 7.045          | 15.453          | 0.289                     | 1.590          | 1.082           |
| 285.0                                                                  | 4.4                | 296.8               | 1.396                   | 7.618          | 16.085          | 0.296                     | 1.542          | 1.059           |
| 300.0                                                                  | 4.6                | 302.9               | 1.457                   | 5.387          | 14.079          | 0.312                     | 1.405          | 1.015           |
| 315.0                                                                  | 4.6                | 314.4               | 1.273                   | 5.110          | 12.473          | 0.323                     | 1.138          | 0.943           |
| 330.0                                                                  | 4.5                | 326.6               | 1.405                   | 5.667          | 12.619          | 0.325                     | 0.850          | 0.892           |
| 345.0                                                                  | 4.3                | 338.2               | 1.373                   | 3.357          | 12.146          | 0.320                     | 0.602          | 0.848           |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table V.17:** Accelerations at Flight Deck: JONSWAP Spectrum with  $H_s = 6.0$  m and  $T_p = 9.3$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                            | <b>Absolute Maximum</b> |                       |                        | <b>Standard Deviation</b> |                       |                        |
|------------------------------------------------------------------------|--------------------|----------------------------|-------------------------|-----------------------|------------------------|---------------------------|-----------------------|------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts       | $\psi_{\text{MHP}}$<br>deg | Long<br>$\text{m/s}^2$  | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ | Long<br>$\text{m/s}^2$    | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ |
| 0.0                                                                    | 9.7                | -1.2                       | 1.472                   | 1.925                 | 12.059                 | 0.349                     | 0.264                 | 0.935                  |
| 15.0                                                                   | 9.7                | 13.7                       | 1.499                   | 2.377                 | 11.957                 | 0.350                     | 0.359                 | 0.936                  |
| 30.0                                                                   | 9.7                | 28.7                       | 1.353                   | 2.883                 | 12.359                 | 0.354                     | 0.625                 | 0.958                  |
| 45.0                                                                   | 9.7                | 43.7                       | 1.451                   | 4.080                 | 12.847                 | 0.350                     | 0.960                 | 0.987                  |
| 60.0                                                                   | 9.7                | 58.1                       | 1.150                   | 5.993                 | 13.453                 | 0.325                     | 1.295                 | 1.040                  |
| 75.0                                                                   | 9.7                | 71.5                       | 1.237                   | 8.613                 | 15.511                 | 0.271                     | 1.515                 | 1.148                  |
| 90.0                                                                   | 8.7                | 77.7                       | 1.294                   | 9.382                 | 15.225                 | 0.214                     | 1.591                 | 1.137                  |
| 105.0                                                                  | 8.6                | 81.7                       | 0.869                   | 10.060                | 14.939                 | 0.169                     | 1.627                 | 1.087                  |
| 120.0                                                                  | 8.5                | 85.6                       | 0.894                   | 9.949                 | 15.098                 | 0.140                     | 1.675                 | 1.033                  |
| 135.0                                                                  | 8.5                | 100.0                      | 0.893                   | 10.177                | 14.522                 | 0.128                     | 1.677                 | 0.848                  |
| 150.0                                                                  | 9.3                | 145.5                      | 0.519                   | 4.163                 | 10.947                 | 0.118                     | 1.420                 | 0.281                  |
| 165.0                                                                  | 9.7                | 162.2                      | 0.348                   | 4.250                 | 10.613                 | 0.110                     | 1.285                 | 0.228                  |
| 180.0                                                                  | 9.9                | 178.2                      | 0.371                   | 4.200                 | 10.393                 | 0.106                     | 0.978                 | 0.173                  |
| 195.0                                                                  | 10.0               | 194.6                      | 0.378                   | 3.296                 | 10.748                 | 0.110                     | 0.864                 | 0.170                  |
| 210.0                                                                  | 9.8                | 211.6                      | 0.448                   | 3.828                 | 10.965                 | 0.118                     | 1.284                 | 0.257                  |
| 225.0                                                                  | 8.9                | 239.9                      | 0.979                   | 7.926                 | 13.280                 | 0.140                     | 1.630                 | 0.572                  |
| 240.0                                                                  | 8.5                | 268.0                      | 1.439                   | 12.949                | 16.005                 | 0.145                     | 1.824                 | 0.995                  |
| 255.0                                                                  | 8.5                | 273.6                      | 1.405                   | 9.845                 | 15.489                 | 0.137                     | 1.719                 | 1.067                  |
| 270.0                                                                  | 9.0                | 279.6                      | 1.839                   | 8.651                 | 14.644                 | 0.184                     | 1.661                 | 1.209                  |
| 285.0                                                                  | 9.9                | 287.8                      | 1.442                   | 6.689                 | 15.815                 | 0.274                     | 1.610                 | 1.261                  |
| 300.0                                                                  | 9.9                | 300.3                      | 1.133                   | 5.204                 | 13.322                 | 0.329                     | 1.374                 | 1.117                  |
| 315.0                                                                  | 9.8                | 314.3                      | 1.516                   | 4.774                 | 12.974                 | 0.356                     | 1.062                 | 1.025                  |
| 330.0                                                                  | 9.7                | 329.0                      | 1.559                   | 3.763                 | 12.458                 | 0.359                     | 0.721                 | 0.981                  |
| 345.0                                                                  | 9.7                | 343.9                      | 1.463                   | 2.605                 | 12.018                 | 0.354                     | 0.429                 | 0.947                  |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                            |                         |                       |                        |                           |                       |                        |

**Table V.18:** Accelerations at Flight Deck: JONSWAP Spectrum with  $H_s = 6.0$  m and  $T_p = 9.3$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 15.0               | -0.5                | 1.443                   | 1.837          | 12.415          | 0.382                     | 0.242          | 1.010           |
| 15.0                                                                   | 15.0               | 14.6                | 1.399                   | 2.078          | 12.633          | 0.384                     | 0.359          | 1.020           |
| 30.0                                                                   | 15.0               | 29.6                | 1.415                   | 2.791          | 12.581          | 0.387                     | 0.614          | 1.061           |
| 45.0                                                                   | 15.0               | 44.7                | 1.373                   | 3.840          | 12.762          | 0.378                     | 0.933          | 1.100           |
| 60.0                                                                   | 15.0               | 59.4                | 1.394                   | 6.177          | 14.205          | 0.345                     | 1.253          | 1.192           |
| 75.0                                                                   | 15.1               | 73.6                | 1.189                   | 7.474          | 15.826          | 0.267                     | 1.408          | 1.293           |
| 90.0                                                                   | 14.8               | 87.3                | 0.940                   | 9.618          | 16.330          | 0.093                     | 1.411          | 1.038           |
| 105.0                                                                  | 14.6               | 101.8               | 0.621                   | 10.998         | 14.032          | 0.109                     | 1.690          | 0.747           |
| 120.0                                                                  | 14.5               | 115.8               | 0.681                   | 11.115         | 14.138          | 0.092                     | 1.861          | 0.575           |
| 135.0                                                                  | 14.9               | 133.2               | 0.403                   | 5.594          | 11.347          | 0.078                     | 1.862          | 0.381           |
| 150.0                                                                  | 15.0               | 149.1               | 0.373                   | 4.403          | 10.696          | 0.090                     | 1.335          | 0.268           |
| 165.0                                                                  | 15.0               | 164.2               | 0.385                   | 3.606          | 10.545          | 0.089                     | 0.755          | 0.169           |
| 180.0                                                                  | 15.1               | 179.2               | 0.483                   | 3.415          | 10.428          | 0.095                     | 0.578          | 0.136           |
| 195.0                                                                  | 15.0               | 194.5               | 0.303                   | 4.735          | 10.139          | 0.099                     | 0.870          | 0.102           |
| 210.0                                                                  | 15.0               | 209.7               | 0.294                   | 4.626          | 10.229          | 0.082                     | 1.285          | 0.119           |
| 225.0                                                                  | 15.0               | 226.9               | 0.611                   | 7.473          | 12.798          | 0.085                     | 2.007          | 0.279           |
| 240.0                                                                  | 14.4               | 244.9               | 0.854                   | 10.070         | 13.066          | 0.111                     | 2.001          | 0.550           |
| 255.0                                                                  | 14.4               | 259.4               | 1.365                   | 11.895         | 17.034          | 0.126                     | 1.890          | 0.785           |
| 270.0                                                                  | 14.7               | 273.0               | 0.631                   | 9.459          | 15.156          | 0.086                     | 1.701          | 1.124           |
| 285.0                                                                  | 15.2               | 286.3               | 1.119                   | 6.936          | 15.433          | 0.266                     | 1.613          | 1.393           |
| 300.0                                                                  | 15.1               | 300.0               | 1.279                   | 5.974          | 14.161          | 0.344                     | 1.354          | 1.255           |
| 315.0                                                                  | 15.0               | 314.5               | 1.443                   | 4.120          | 12.901          | 0.379                     | 0.992          | 1.131           |
| 330.0                                                                  | 15.0               | 329.5               | 1.458                   | 3.333          | 12.768          | 0.390                     | 0.663          | 1.076           |
| 345.0                                                                  | 15.0               | 344.5               | 1.508                   | 2.324          | 12.492          | 0.385                     | 0.380          | 1.029           |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table V.19:** Accelerations at Flight Deck: JONSWAP Spectrum with  $H_s = 6.0$  m and  $T_p = 9.3$  s; Ship's speed is 20.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                            | <b>Absolute Maximum</b> |                       |                        | <b>Standard Deviation</b> |                       |                        |
|------------------------------------------------------------------------|--------------------|----------------------------|-------------------------|-----------------------|------------------------|---------------------------|-----------------------|------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts       | $\psi_{\text{MHP}}$<br>deg | Long<br>$\text{m/s}^2$  | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ | Long<br>$\text{m/s}^2$    | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ |
| 0.0                                                                    | 20.2               | -0.2                       | 1.386                   | 1.885                 | 13.346                 | 0.410                     | 0.262                 | 1.197                  |
| 15.0                                                                   | 20.2               | 14.8                       | 1.462                   | 2.484                 | 13.151                 | 0.412                     | 0.364                 | 1.203                  |
| 30.0                                                                   | 20.2               | 29.8                       | 1.505                   | 3.236                 | 13.294                 | 0.415                     | 0.612                 | 1.251                  |
| 45.0                                                                   | 20.2               | 44.9                       | 1.489                   | 4.814                 | 13.436                 | 0.403                     | 0.911                 | 1.296                  |
| 60.0                                                                   | 20.2               | 59.7                       | 1.216                   | 6.043                 | 14.231                 | 0.361                     | 1.212                 | 1.379                  |
| 75.0                                                                   | 20.3               | 74.2                       | 1.110                   | 7.243                 | 15.726                 | 0.268                     | 1.334                 | 1.416                  |
| 90.0                                                                   | 20.1               | 88.5                       | 0.789                   | 9.370                 | 15.862                 | 0.077                     | 1.357                 | 1.018                  |
| 105.0                                                                  | 20.1               | 103.6                      | 0.567                   | 10.848                | 13.615                 | 0.093                     | 1.722                 | 0.662                  |
| 120.0                                                                  | 20.1               | 118.8                      | 0.298                   | 7.050                 | 11.531                 | 0.066                     | 2.264                 | 0.525                  |
| 135.0                                                                  | 20.1               | 134.5                      | 0.310                   | 6.089                 | 10.818                 | 0.081                     | 1.979                 | 0.335                  |
| 150.0                                                                  | 20.2               | 149.6                      | 0.690                   | 4.073                 | 10.722                 | 0.110                     | 1.205                 | 0.191                  |
| 165.0                                                                  | 20.3               | 164.2                      | 0.669                   | 3.774                 | 10.248                 | 0.115                     | 0.691                 | 0.147                  |
| 180.0                                                                  | 20.6               | 179.6                      | 0.705                   | 3.829                 | 10.131                 | 0.105                     | 0.516                 | 0.107                  |
| 195.0                                                                  | 20.4               | 194.5                      | 0.746                   | 4.693                 | 9.967                  | 0.101                     | 0.929                 | 0.179                  |
| 210.0                                                                  | 20.2               | 210.0                      | 0.612                   | 6.607                 | 9.943                  | 0.095                     | 1.449                 | 0.228                  |
| 225.0                                                                  | 20.1               | 225.4                      | 0.356                   | 6.117                 | 10.970                 | 0.071                     | 2.032                 | 0.267                  |
| 240.0                                                                  | 20.1               | 241.3                      | 0.378                   | 7.133                 | 11.996                 | 0.076                     | 2.471                 | 0.366                  |
| 255.0                                                                  | 19.9               | 257.2                      | 0.794                   | 16.585                | 15.088                 | 0.106                     | 2.014                 | 0.666                  |
| 270.0                                                                  | 20.0               | 271.7                      | 1.237                   | 10.125                | 15.228                 | 0.083                     | 1.771                 | 1.115                  |
| 285.0                                                                  | 20.3               | 285.8                      | 1.216                   | 6.961                 | 15.857                 | 0.261                     | 1.650                 | 1.508                  |
| 300.0                                                                  | 20.3               | 300.0                      | 1.225                   | 5.484                 | 14.166                 | 0.356                     | 1.348                 | 1.438                  |
| 315.0                                                                  | 20.2               | 314.8                      | 1.414                   | 3.571                 | 13.399                 | 0.400                     | 0.972                 | 1.331                  |
| 330.0                                                                  | 20.2               | 329.8                      | 1.494                   | 2.886                 | 13.588                 | 0.414                     | 0.638                 | 1.273                  |
| 345.0                                                                  | 20.2               | 344.8                      | 1.485                   | 2.008                 | 13.447                 | 0.413                     | 0.378                 | 1.214                  |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                            |                         |                       |                        |                           |                       |                        |



**Table V.20:** Accelerations at Flight Deck: JONSWAP Spectrum with  $H_s = 6.0$  m and  $T_p = 9.3$  s; Ship's speed is 25.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                            | <b>Absolute Maximum</b> |                       |                        | <b>Standard Deviation</b> |                       |                        |
|------------------------------------------------------------------------|--------------------|----------------------------|-------------------------|-----------------------|------------------------|---------------------------|-----------------------|------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts       | $\psi_{\text{MHP}}$<br>deg | Long<br>$\text{m/s}^2$  | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ | Long<br>$\text{m/s}^2$    | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ |
| 0.0                                                                    | 25.4               | -0.1                       | 1.483                   | 2.270                 | 14.249                 | 0.429                     | 0.309                 | 1.482                  |
| 15.0                                                                   | 25.4               | 14.9                       | 1.497                   | 2.711                 | 14.229                 | 0.431                     | 0.381                 | 1.491                  |
| 30.0                                                                   | 25.4               | 29.9                       | 1.445                   | 3.889                 | 14.118                 | 0.434                     | 0.607                 | 1.530                  |
| 45.0                                                                   | 25.3               | 44.9                       | 1.502                   | 5.204                 | 14.265                 | 0.421                     | 0.895                 | 1.552                  |
| 60.0                                                                   | 25.3               | 59.8                       | 1.242                   | 5.395                 | 14.445                 | 0.373                     | 1.186                 | 1.585                  |
| 75.0                                                                   | 25.3               | 74.4                       | 1.220                   | 8.805                 | 16.756                 | 0.272                     | 1.302                 | 1.550                  |
| 90.0                                                                   | 25.2               | 89.0                       | 1.150                   | 9.637                 | 14.823                 | 0.077                     | 1.345                 | 1.011                  |
| 105.0                                                                  | 25.2               | 104.3                      | 0.575                   | 12.228                | 12.965                 | 0.089                     | 2.136                 | 0.633                  |
| 120.0                                                                  | 25.1               | 119.3                      | 0.421                   | 7.906                 | 12.433                 | 0.087                     | 2.741                 | 0.546                  |
| 135.0                                                                  | 25.1               | 134.7                      | 0.773                   | 5.653                 | 10.527                 | 0.106                     | 1.912                 | 0.276                  |
| 150.0                                                                  | 25.3               | 149.6                      | 0.923                   | 4.118                 | 10.292                 | 0.120                     | 1.035                 | 0.157                  |
| 165.0                                                                  | 25.7               | 164.6                      | 0.783                   | 3.567                 | 10.093                 | 0.115                     | 0.550                 | 0.121                  |
| 180.0                                                                  | 25.5               | 179.7                      | 0.821                   | 4.146                 | 10.136                 | 0.119                     | 0.653                 | 0.162                  |
| 195.0                                                                  | 25.7               | 195.1                      | 0.445                   | 4.053                 | 10.043                 | 0.108                     | 0.694                 | 0.133                  |
| 210.0                                                                  | 25.4               | 210.2                      | 0.779                   | 4.790                 | 9.983                  | 0.112                     | 1.133                 | 0.181                  |
| 225.0                                                                  | 25.0               | 225.8                      | 0.779                   | 7.805                 | 11.549                 | 0.114                     | 2.228                 | 0.378                  |
| 240.0                                                                  | 25.2               | 240.7                      | 0.397                   | 7.880                 | 10.966                 | 0.079                     | 3.049                 | 0.433                  |
| 255.0                                                                  | 25.2               | 256.0                      | 0.472                   | 10.857                | 13.204                 | 0.096                     | 2.165                 | 0.545                  |
| 270.0                                                                  | 25.2               | 271.1                      | 0.892                   | 10.971                | 14.453                 | 0.079                     | 1.820                 | 1.092                  |
| 285.0                                                                  | 25.4               | 285.6                      | 1.212                   | 8.700                 | 16.642                 | 0.259                     | 1.731                 | 1.625                  |
| 300.0                                                                  | 25.4               | 300.1                      | 1.194                   | 4.917                 | 14.832                 | 0.362                     | 1.377                 | 1.635                  |
| 315.0                                                                  | 25.4               | 314.9                      | 1.357                   | 3.724                 | 14.588                 | 0.413                     | 0.995                 | 1.589                  |
| 330.0                                                                  | 25.4               | 329.9                      | 1.502                   | 2.760                 | 14.400                 | 0.430                     | 0.665                 | 1.551                  |
| 345.0                                                                  | 25.4               | 344.9                      | 1.348                   | 2.257                 | 14.412                 | 0.429                     | 0.418                 | 1.498                  |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                            |                         |                       |                        |                           |                       |                        |

**Table V.21:** Accelerations at Flight Deck: JONSWAP Spectrum with  $H_s = 6.0$  m and  $T_p = 9.3$  s; Ship's speed is 30.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 30.5               | -0.0                | 1.309                   | 2.520          | 15.145          | 0.436                     | 0.378          | 1.805           |
| 15.0                                                                   | 30.5               | 14.9                | 1.414                   | 3.147          | 15.253          | 0.440                     | 0.418          | 1.817           |
| 30.0                                                                   | 30.5               | 29.9                | 1.392                   | 4.966          | 15.509          | 0.446                     | 0.621          | 1.849           |
| 45.0                                                                   | 30.5               | 44.9                | 1.401                   | 6.162          | 15.365          | 0.435                     | 0.896          | 1.844           |
| 60.0                                                                   | 30.4               | 59.8                | 1.413                   | 6.346          | 15.455          | 0.385                     | 1.173          | 1.809           |
| 75.0                                                                   | 30.4               | 74.5                | 1.023                   | 8.708          | 16.269          | 0.271                     | 1.277          | 1.657           |
| 90.0                                                                   | 30.4               | 89.3                | 0.930                   | 10.451         | 14.962          | 0.076                     | 1.395          | 1.004           |
| 105.0                                                                  | 30.3               | 104.5               | 0.490                   | 8.908          | 12.177          | 0.090                     | 2.379          | 0.583           |
| 120.0                                                                  | 30.1               | 119.4               | 0.515                   | 7.632          | 11.290          | 0.114                     | 2.756          | 0.485           |
| 135.0                                                                  | 30.2               | 134.6               | 0.576                   | 5.690          | 10.050          | 0.125                     | 1.761          | 0.259           |
| 150.0                                                                  | 31.0               | 149.1               | 0.658                   | 5.409          | 10.251          | 0.133                     | 0.991          | 0.215           |
| 165.0                                                                  | 30.1               | 164.8               | 1.108                   | 4.268          | 10.465          | 0.148                     | 0.763          | 0.216           |
| 180.0                                                                  | 30.6               | 179.4               | 1.140                   | 4.632          | 10.474          | 0.142                     | 0.906          | 0.269           |
| 195.0                                                                  | 30.2               | 194.5               | 1.182                   | 5.351          | 10.279          | 0.154                     | 1.056          | 0.275           |
| 210.0                                                                  | 31.1               | 210.4               | 1.098                   | 6.081          | 10.395          | 0.133                     | 1.257          | 0.210           |
| 225.0                                                                  | 30.4               | 225.3               | 0.459                   | 6.629          | 10.009          | 0.120                     | 1.672          | 0.263           |
| 240.0                                                                  | 29.9               | 241.2               | 0.678                   | 11.966         | 14.044          | 0.134                     | 3.303          | 0.596           |
| 255.0                                                                  | 30.3               | 255.5               | 0.408                   | 10.711         | 13.145          | 0.097                     | 2.568          | 0.527           |
| 270.0                                                                  | 30.4               | 270.7               | 0.717                   | 10.633         | 14.404          | 0.080                     | 1.792          | 1.070           |
| 285.0                                                                  | 30.5               | 285.4               | 1.070                   | 7.878          | 16.679          | 0.257                     | 1.841          | 1.737           |
| 300.0                                                                  | 30.5               | 300.1               | 1.243                   | 5.422          | 15.372          | 0.369                     | 1.461          | 1.850           |
| 315.0                                                                  | 30.5               | 315.1               | 1.429                   | 4.094          | 15.537          | 0.421                     | 1.079          | 1.872           |
| 330.0                                                                  | 30.5               | 330.1               | 1.430                   | 3.107          | 15.692          | 0.440                     | 0.723          | 1.873           |
| 345.0                                                                  | 30.5               | 345.0               | 1.357                   | 2.401          | 15.194          | 0.441                     | 0.488          | 1.823           |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table V.22:** Accelerations at Flight Deck: JONSWAP Spectrum with  $H_s = 6.0$  m and  $T_p = 13.6$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | -0.1               | -18.5               | 0.869                   | 3.698          | 11.157          | 0.201                     | 0.730          | 0.502           |
| 15.0                                                                   | -0.5               | -12.0               | 1.083                   | 3.271          | 11.270          | 0.202                     | 0.645          | 0.491           |
| 30.0                                                                   | -0.8               | -3.6                | 1.001                   | 3.225          | 11.152          | 0.201                     | 0.682          | 0.481           |
| 45.0                                                                   | -1.2               | -58.6               | 0.766                   | 5.497          | 12.093          | 0.148                     | 1.381          | 0.517           |
| 60.0                                                                   | -0.3               | 32.5                | 0.699                   | 4.404          | 11.739          | 0.190                     | 1.095          | 0.506           |
| 75.0                                                                   | -0.1               | 49.5                | 0.663                   | 4.924          | 12.445          | 0.170                     | 1.295          | 0.535           |
| 90.0                                                                   | 0.2                | 65.1                | 0.550                   | 4.735          | 12.244          | 0.130                     | 1.356          | 0.542           |
| 105.0                                                                  | -0.0               | 88.9                | 0.293                   | 5.595          | 12.052          | 0.034                     | 1.374          | 0.503           |
| 120.0                                                                  | -0.7               | 99.4                | 0.404                   | 5.477          | 11.900          | 0.060                     | 1.423          | 0.515           |
| 135.0                                                                  | -1.3               | 106.4               | 0.473                   | 5.921          | 12.283          | 0.089                     | 1.454          | 0.534           |
| 150.0                                                                  | -1.8               | 109.3               | 0.570                   | 7.110          | 12.256          | 0.105                     | 1.448          | 0.542           |
| 165.0                                                                  | -1.4               | 56.9                | 0.840                   | 4.618          | 11.805          | 0.154                     | 1.178          | 0.500           |
| 180.0                                                                  | -0.9               | 37.8                | 0.987                   | 4.357          | 11.748          | 0.190                     | 0.893          | 0.496           |
| 195.0                                                                  | -0.1               | 374.4               | 0.733                   | 4.083          | 11.512          | 0.192                     | 0.948          | 0.516           |
| 210.0                                                                  | 0.1                | 378.5               | 0.877                   | 4.661          | 11.573          | 0.180                     | 1.093          | 0.536           |
| 225.0                                                                  | 0.3                | 365.6               | 0.735                   | 4.801          | 11.781          | 0.163                     | 1.281          | 0.560           |
| 240.0                                                                  | 0.6                | 277.2               | 0.431                   | 5.721          | 11.847          | 0.062                     | 1.367          | 0.564           |
| 255.0                                                                  | 0.5                | 285.1               | 0.412                   | 5.589          | 12.375          | 0.093                     | 1.353          | 0.585           |
| 270.0                                                                  | 0.5                | 293.6               | 0.515                   | 5.662          | 12.615          | 0.128                     | 1.332          | 0.605           |
| 285.0                                                                  | 0.4                | 300.7               | 0.695                   | 5.235          | 12.593          | 0.153                     | 1.289          | 0.605           |
| 300.0                                                                  | 0.3                | 309.0               | 0.767                   | 5.028          | 12.346          | 0.172                     | 1.252          | 0.592           |
| 315.0                                                                  | 0.2                | 316.0               | 0.766                   | 4.825          | 12.302          | 0.184                     | 1.157          | 0.572           |
| 330.0                                                                  | 0.1                | 324.5               | 0.799                   | 4.934          | 11.707          | 0.191                     | 1.063          | 0.546           |
| 345.0                                                                  | 0.0                | 332.4               | 0.842                   | 3.956          | 11.571          | 0.197                     | 0.893          | 0.523           |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table V.23:** Accelerations at Flight Deck: JONSWAP Spectrum with  $H_s = 6.0$  m and  $T_p = 13.6$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 4.2                | -12.0               | 1.033                   | 3.573          | 11.352          | 0.236                     | 0.628          | 0.571           |
| 15.0                                                                   | 4.0                | -7.0                | 0.962                   | 3.432          | 11.302          | 0.236                     | 0.596          | 0.564           |
| 30.0                                                                   | 3.9                | 0.5                 | 1.015                   | 2.724          | 11.281          | 0.236                     | 0.610          | 0.561           |
| 45.0                                                                   | 3.9                | 11.1                | 1.022                   | 2.975          | 11.454          | 0.231                     | 0.709          | 0.560           |
| 60.0                                                                   | 4.0                | 29.4                | 0.955                   | 4.372          | 11.808          | 0.219                     | 1.029          | 0.585           |
| 75.0                                                                   | 4.1                | 49.3                | 0.756                   | 5.148          | 12.460          | 0.193                     | 1.253          | 0.612           |
| 90.0                                                                   | 4.2                | 61.7                | 0.642                   | 5.309          | 12.372          | 0.156                     | 1.355          | 0.617           |
| 105.0                                                                  | 4.3                | 78.3                | 0.383                   | 4.981          | 12.526          | 0.076                     | 1.332          | 0.569           |
| 120.0                                                                  | 4.1                | 92.0                | 0.373                   | 5.898          | 12.040          | 0.035                     | 1.331          | 0.528           |
| 135.0                                                                  | 4.0                | 100.0               | 0.479                   | 5.985          | 12.693          | 0.052                     | 1.362          | 0.516           |
| 150.0                                                                  | 3.9                | 53.6                | 0.852                   | 4.275          | 12.090          | 0.186                     | 1.244          | 0.587           |
| 165.0                                                                  | 4.0                | 54.1                | 0.826                   | 4.315          | 12.332          | 0.194                     | 1.195          | 0.592           |
| 180.0                                                                  | 4.0                | 63.4                | 0.714                   | 4.948          | 12.491          | 0.192                     | 1.221          | 0.590           |
| 195.0                                                                  | 4.7                | 195.6               | 0.563                   | 3.196          | 11.535          | 0.129                     | 0.709          | 0.307           |
| 210.0                                                                  | 4.4                | 219.3               | 0.631                   | 4.137          | 11.595          | 0.122                     | 1.034          | 0.376           |
| 225.0                                                                  | 4.3                | 251.8               | 0.520                   | 6.938          | 11.915          | 0.083                     | 1.368          | 0.512           |
| 240.0                                                                  | 4.3                | 260.6               | 0.428                   | 5.922          | 11.859          | 0.059                     | 1.384          | 0.534           |
| 255.0                                                                  | 4.4                | 270.2               | 0.298                   | 5.211          | 11.924          | 0.037                     | 1.374          | 0.558           |
| 270.0                                                                  | 4.6                | 280.1               | 0.368                   | 6.918          | 12.499          | 0.066                     | 1.351          | 0.601           |
| 285.0                                                                  | 4.8                | 290.4               | 0.634                   | 5.937          | 12.754          | 0.126                     | 1.332          | 0.645           |
| 300.0                                                                  | 4.9                | 302.4               | 0.681                   | 4.521          | 12.178          | 0.181                     | 1.251          | 0.654           |
| 315.0                                                                  | 4.8                | 314.6               | 0.892                   | 4.228          | 11.983          | 0.209                     | 1.086          | 0.628           |
| 330.0                                                                  | 4.8                | 327.8               | 0.815                   | 4.364          | 11.608          | 0.224                     | 0.895          | 0.601           |
| 345.0                                                                  | 4.5                | 339.9               | 0.982                   | 3.274          | 11.502          | 0.233                     | 0.704          | 0.584           |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table V.24:** Accelerations at Flight Deck: JONSWAP Spectrum with  $H_s = 6.0$  m and  $T_p = 13.6$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 9.8                | -1.3                | 1.135                   | 1.994          | 11.835          | 0.267                     | 0.242          | 0.658           |
| 15.0                                                                   | 9.8                | 13.7                | 1.339                   | 2.207          | 11.961          | 0.264                     | 0.447          | 0.662           |
| 30.0                                                                   | 9.8                | 28.7                | 1.213                   | 3.107          | 11.941          | 0.252                     | 0.737          | 0.664           |
| 45.0                                                                   | 9.9                | 43.8                | 0.875                   | 3.650          | 11.814          | 0.231                     | 0.976          | 0.673           |
| 60.0                                                                   | 9.9                | 58.5                | 0.644                   | 4.802          | 12.228          | 0.191                     | 1.159          | 0.688           |
| 75.0                                                                   | 10.0               | 73.1                | 0.557                   | 4.844          | 13.374          | 0.112                     | 1.153          | 0.648           |
| 90.0                                                                   | 9.9                | 87.8                | 0.136                   | 4.942          | 12.338          | 0.026                     | 1.152          | 0.563           |
| 105.0                                                                  | 9.9                | 102.5               | 0.247                   | 5.690          | 12.189          | 0.047                     | 1.202          | 0.507           |
| 120.0                                                                  | 9.5                | 116.3               | 0.385                   | 5.734          | 12.052          | 0.071                     | 1.234          | 0.452           |
| 135.0                                                                  | 9.5                | 131.2               | 0.473                   | 4.987          | 12.041          | 0.080                     | 1.125          | 0.373           |
| 150.0                                                                  | 9.6                | 147.0               | 0.410                   | 4.202          | 10.981          | 0.088                     | 1.043          | 0.300           |
| 165.0                                                                  | 9.7                | 162.7               | 0.503                   | 3.488          | 10.974          | 0.092                     | 0.935          | 0.251           |
| 180.0                                                                  | 9.8                | 178.5               | 0.508                   | 3.410          | 11.000          | 0.095                     | 0.744          | 0.209           |
| 195.0                                                                  | 9.9                | 194.5               | 0.548                   | 3.107          | 11.236          | 0.094                     | 0.698          | 0.188           |
| 210.0                                                                  | 9.9                | 210.9               | 0.433                   | 3.330          | 10.938          | 0.092                     | 1.048          | 0.230           |
| 225.0                                                                  | 9.7                | 227.5               | 0.501                   | 4.304          | 11.579          | 0.087                     | 1.308          | 0.305           |
| 240.0                                                                  | 9.6                | 243.5               | 0.429                   | 5.101          | 12.044          | 0.079                     | 1.452          | 0.405           |
| 255.0                                                                  | 9.8                | 257.7               | 0.357                   | 5.900          | 11.974          | 0.056                     | 1.438          | 0.478           |
| 270.0                                                                  | 10.0               | 272.0               | 0.163                   | 5.899          | 12.320          | 0.028                     | 1.374          | 0.569           |
| 285.0                                                                  | 10.1               | 286.1               | 0.504                   | 5.886          | 13.041          | 0.105                     | 1.302          | 0.668           |
| 300.0                                                                  | 10.1               | 300.2               | 0.731                   | 5.038          | 13.009          | 0.190                     | 1.209          | 0.708           |
| 315.0                                                                  | 10.0               | 314.4               | 0.814                   | 4.228          | 11.858          | 0.231                     | 0.980          | 0.679           |
| 330.0                                                                  | 9.9                | 329.0               | 0.980                   | 3.129          | 11.792          | 0.251                     | 0.711          | 0.663           |
| 345.0                                                                  | 9.9                | 343.8               | 1.084                   | 2.646          | 11.612          | 0.263                     | 0.413          | 0.660           |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table V.25:** Accelerations at Flight Deck: JONSWAP Spectrum with  $H_s = 6.0$  m and  $T_p = 13.6$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 15.0               | -0.5                | 1.219                   | 1.553          | 11.782          | 0.296                     | 0.194          | 0.734           |
| 15.0                                                                   | 15.0               | 14.6                | 1.141                   | 2.189          | 11.788          | 0.292                     | 0.411          | 0.728           |
| 30.0                                                                   | 15.0               | 29.7                | 1.132                   | 2.820          | 12.192          | 0.277                     | 0.691          | 0.730           |
| 45.0                                                                   | 15.1               | 44.7                | 0.904                   | 3.673          | 12.216          | 0.251                     | 0.927          | 0.744           |
| 60.0                                                                   | 15.1               | 59.5                | 0.712                   | 4.543          | 12.768          | 0.205                     | 1.125          | 0.763           |
| 75.0                                                                   | 15.2               | 74.2                | 0.462                   | 4.460          | 12.798          | 0.111                     | 1.066          | 0.684           |
| 90.0                                                                   | 15.2               | 89.0                | 0.125                   | 4.849          | 12.333          | 0.033                     | 1.060          | 0.566           |
| 105.0                                                                  | 15.2               | 104.0               | 0.314                   | 5.680          | 12.345          | 0.048                     | 1.151          | 0.480           |
| 120.0                                                                  | 15.0               | 118.3               | 0.301                   | 5.973          | 11.679          | 0.062                     | 1.420          | 0.444           |
| 135.0                                                                  | 15.0               | 133.7               | 0.328                   | 4.756          | 11.190          | 0.068                     | 1.499          | 0.370           |
| 150.0                                                                  | 15.3               | 149.5               | 0.267                   | 3.212          | 10.548          | 0.064                     | 0.917          | 0.240           |
| 165.0                                                                  | 15.2               | 164.4               | 0.345                   | 2.442          | 10.450          | 0.066                     | 0.527          | 0.193           |
| 180.0                                                                  | 15.2               | 179.3               | 0.327                   | 2.865          | 10.229          | 0.078                     | 0.467          | 0.170           |
| 195.0                                                                  | 15.1               | 194.5               | 0.346                   | 4.022          | 10.078          | 0.066                     | 0.618          | 0.131           |
| 210.0                                                                  | 15.1               | 209.9               | 0.453                   | 4.483          | 10.808          | 0.070                     | 1.117          | 0.134           |
| 225.0                                                                  | 15.0               | 225.9               | 0.446                   | 4.641          | 11.536          | 0.070                     | 1.609          | 0.226           |
| 240.0                                                                  | 15.0               | 241.5               | 0.354                   | 5.592          | 11.744          | 0.067                     | 1.716          | 0.325           |
| 255.0                                                                  | 15.1               | 256.2               | 0.344                   | 5.442          | 12.196          | 0.057                     | 1.530          | 0.413           |
| 270.0                                                                  | 15.2               | 270.9               | 0.162                   | 5.650          | 12.098          | 0.037                     | 1.413          | 0.557           |
| 285.0                                                                  | 15.2               | 285.4               | 0.416                   | 5.824          | 12.557          | 0.105                     | 1.313          | 0.706           |
| 300.0                                                                  | 15.2               | 299.9               | 0.695                   | 5.328          | 12.513          | 0.202                     | 1.177          | 0.792           |
| 315.0                                                                  | 15.1               | 314.5               | 0.889                   | 3.818          | 12.288          | 0.250                     | 0.896          | 0.755           |
| 330.0                                                                  | 15.0               | 329.4               | 1.057                   | 2.852          | 12.026          | 0.276                     | 0.622          | 0.732           |
| 345.0                                                                  | 15.0               | 344.4               | 1.268                   | 2.138          | 11.939          | 0.291                     | 0.344          | 0.727           |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table V.26:** Accelerations at Flight Deck: JONSWAP Spectrum with  $H_s = 6.0$  m and  $T_p = 13.6$  s; Ship's speed is 20.0 Knots

| <b>Cmd<br/>Heading</b>                                                 | <b>Actual<br/>Mean</b> |                     | <b>Absolute<br/>Maximum</b> |                |                 | <b>Standard<br/>Deviation</b> |                |                 |
|------------------------------------------------------------------------|------------------------|---------------------|-----------------------------|----------------|-----------------|-------------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts           | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$             | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$               | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 20.2                   | -0.2                | 1.270                       | 1.820          | 12.275          | 0.319                         | 0.217          | 0.848           |
| 15.0                                                                   | 20.2                   | 14.9                | 1.265                       | 2.299          | 12.271          | 0.314                         | 0.416          | 0.844           |
| 30.0                                                                   | 20.2                   | 29.9                | 1.176                       | 2.803          | 12.435          | 0.298                         | 0.677          | 0.848           |
| 45.0                                                                   | 20.2                   | 45.0                | 0.999                       | 3.735          | 12.431          | 0.269                         | 0.916          | 0.865           |
| 60.0                                                                   | 20.3                   | 59.8                | 0.747                       | 4.827          | 13.472          | 0.217                         | 1.118          | 0.872           |
| 75.0                                                                   | 20.3                   | 74.6                | 0.479                       | 4.376          | 13.167          | 0.116                         | 1.024          | 0.734           |
| 90.0                                                                   | 20.3                   | 89.5                | 0.161                       | 4.666          | 12.428          | 0.042                         | 1.009          | 0.562           |
| 105.0                                                                  | 20.3                   | 104.5               | 0.326                       | 5.589          | 11.867          | 0.055                         | 1.143          | 0.450           |
| 120.0                                                                  | 20.2                   | 119.3               | 0.380                       | 6.504          | 11.899          | 0.065                         | 1.715          | 0.435           |
| 135.0                                                                  | 20.2                   | 134.7               | 0.344                       | 4.914          | 11.003          | 0.069                         | 1.668          | 0.313           |
| 150.0                                                                  | 20.3                   | 149.7               | 0.255                       | 2.911          | 10.282          | 0.063                         | 0.747          | 0.167           |
| 165.0                                                                  | 20.2                   | 164.6               | 0.235                       | 2.523          | 10.244          | 0.071                         | 0.470          | 0.140           |
| 180.0                                                                  | 20.4                   | 179.8               | 0.361                       | 3.597          | 10.097          | 0.078                         | 0.405          | 0.121           |
| 195.0                                                                  | 20.3                   | 194.9               | 0.387                       | 5.216          | 10.073          | 0.087                         | 0.851          | 0.142           |
| 210.0                                                                  | 20.3                   | 210.0               | 0.290                       | 6.085          | 9.971           | 0.067                         | 1.117          | 0.150           |
| 225.0                                                                  | 20.3                   | 225.0               | 0.384                       | 6.137          | 10.469          | 0.055                         | 1.412          | 0.180           |
| 240.0                                                                  | 20.2                   | 240.7               | 0.472                       | 6.825          | 11.585          | 0.070                         | 2.004          | 0.281           |
| 255.0                                                                  | 20.3                   | 255.6               | 0.333                       | 6.824          | 11.832          | 0.060                         | 1.559          | 0.356           |
| 270.0                                                                  | 20.3                   | 270.4               | 0.211                       | 5.806          | 12.041          | 0.047                         | 1.403          | 0.541           |
| 285.0                                                                  | 20.3                   | 285.2               | 0.415                       | 7.057          | 12.629          | 0.108                         | 1.301          | 0.753           |
| 300.0                                                                  | 20.3                   | 299.9               | 0.717                       | 5.246          | 12.720          | 0.210                         | 1.148          | 0.901           |
| 315.0                                                                  | 20.2                   | 314.6               | 0.904                       | 4.108          | 12.608          | 0.266                         | 0.860          | 0.880           |
| 330.0                                                                  | 20.2                   | 329.6               | 1.177                       | 3.022          | 12.386          | 0.297                         | 0.567          | 0.855           |
| 345.0                                                                  | 20.2                   | 344.7               | 1.316                       | 2.228          | 12.517          | 0.314                         | 0.319          | 0.844           |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                        |                     |                             |                |                 |                               |                |                 |

**Table V.27:** Accelerations at Flight Deck: JONSWAP Spectrum with  $H_s = 6.0$  m and  $T_p = 13.6$  s; Ship's speed is 25.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 25.3               | -0.1                | 1.408                   | 2.170          | 13.005          | 0.339                     | 0.270          | 1.030           |
| 15.0                                                                   | 25.3               | 15.0                | 1.401                   | 2.507          | 13.297          | 0.334                     | 0.430          | 1.027           |
| 30.0                                                                   | 25.3               | 30.0                | 1.369                   | 3.321          | 12.963          | 0.317                     | 0.668          | 1.029           |
| 45.0                                                                   | 25.3               | 45.0                | 1.202                   | 3.956          | 13.202          | 0.285                     | 0.900          | 1.034           |
| 60.0                                                                   | 25.4               | 59.9                | 0.802                   | 5.185          | 13.930          | 0.230                     | 1.123          | 1.013           |
| 75.0                                                                   | 25.4               | 74.8                | 0.430                   | 4.523          | 13.318          | 0.120                     | 0.994          | 0.780           |
| 90.0                                                                   | 25.4               | 89.7                | 0.198                   | 4.625          | 12.436          | 0.051                     | 1.001          | 0.555           |
| 105.0                                                                  | 25.4               | 104.7               | 0.268                   | 5.685          | 11.611          | 0.064                     | 1.170          | 0.414           |
| 120.0                                                                  | 25.3               | 119.8               | 0.323                   | 6.468          | 10.843          | 0.079                     | 2.225          | 0.417           |
| 135.0                                                                  | 25.3               | 134.8               | 0.295                   | 5.302          | 10.395          | 0.086                     | 1.561          | 0.240           |
| 150.0                                                                  | 25.4               | 149.7               | 0.275                   | 3.167          | 10.007          | 0.084                     | 0.944          | 0.147           |
| 165.0                                                                  | 25.6               | 164.7               | 0.356                   | 2.683          | 10.049          | 0.098                     | 0.534          | 0.122           |
| 180.0                                                                  | 25.6               | 179.8               | 0.394                   | 3.385          | 10.155          | 0.106                     | 0.407          | 0.114           |
| 195.0                                                                  | 25.6               | 195.0               | 0.359                   | 3.741          | 10.052          | 0.095                     | 0.568          | 0.113           |
| 210.0                                                                  | 25.4               | 210.0               | 0.290                   | 4.431          | 9.954           | 0.069                     | 0.923          | 0.158           |
| 225.0                                                                  | 25.4               | 225.0               | 0.208                   | 5.644          | 9.939           | 0.057                     | 1.331          | 0.210           |
| 240.0                                                                  | 25.4               | 240.2               | 0.260                   | 7.646          | 9.945           | 0.066                     | 2.067          | 0.261           |
| 255.0                                                                  | 25.4               | 255.3               | 0.363                   | 7.842          | 11.671          | 0.067                     | 1.550          | 0.310           |
| 270.0                                                                  | 25.4               | 270.2               | 0.234                   | 5.834          | 12.188          | 0.056                     | 1.364          | 0.526           |
| 285.0                                                                  | 25.4               | 285.1               | 0.402                   | 6.859          | 12.862          | 0.111                     | 1.275          | 0.807           |
| 300.0                                                                  | 25.4               | 299.9               | 0.861                   | 5.209          | 14.049          | 0.220                     | 1.126          | 1.030           |
| 315.0                                                                  | 25.4               | 314.8               | 1.057                   | 3.873          | 13.188          | 0.279                     | 0.821          | 1.044           |
| 330.0                                                                  | 25.3               | 329.8               | 1.295                   | 3.281          | 12.948          | 0.313                     | 0.557          | 1.037           |
| 345.0                                                                  | 25.3               | 344.8               | 1.393                   | 2.505          | 13.338          | 0.334                     | 0.333          | 1.031           |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |



**Table V.28:** Accelerations at Flight Deck: JONSWAP Spectrum with  $H_s = 6.0$  m and  $T_p = 13.6$  s; Ship's speed is 30.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 30.5               | -0.0                | 1.561                   | 2.500          | 14.574          | 0.356                     | 0.333          | 1.264           |
| 15.0                                                                   | 30.5               | 15.0                | 1.540                   | 2.939          | 13.627          | 0.349                     | 0.454          | 1.260           |
| 30.0                                                                   | 30.4               | 30.1                | 1.374                   | 3.381          | 13.875          | 0.333                     | 0.662          | 1.243           |
| 45.0                                                                   | 30.4               | 45.1                | 1.196                   | 4.195          | 14.005          | 0.296                     | 0.907          | 1.219           |
| 60.0                                                                   | 30.4               | 60.0                | 0.846                   | 4.901          | 14.165          | 0.238                     | 1.131          | 1.156           |
| 75.0                                                                   | 30.5               | 74.9                | 0.441                   | 4.645          | 13.598          | 0.127                     | 0.991          | 0.858           |
| 90.0                                                                   | 30.5               | 89.8                | 0.233                   | 4.728          | 12.257          | 0.059                     | 1.028          | 0.546           |
| 105.0                                                                  | 30.5               | 104.8               | 0.330                   | 5.532          | 11.476          | 0.077                     | 1.277          | 0.381           |
| 120.0                                                                  | 30.3               | 119.9               | 0.496                   | 7.090          | 10.298          | 0.099                     | 2.353          | 0.378           |
| 135.0                                                                  | 30.4               | 134.8               | 0.407                   | 5.265          | 9.999           | 0.107                     | 1.576          | 0.216           |
| 150.0                                                                  | 30.7               | 149.7               | 0.424                   | 3.376          | 10.026          | 0.127                     | 0.973          | 0.160           |
| 165.0                                                                  | 31.0               | 164.7               | 0.539                   | 3.605          | 10.036          | 0.143                     | 0.589          | 0.116           |
| 180.0                                                                  | 30.6               | 179.7               | 0.633                   | 4.003          | 9.958           | 0.158                     | 0.587          | 0.123           |
| 195.0                                                                  | 31.0               | 195.0               | 0.484                   | 4.036          | 10.042          | 0.131                     | 0.704          | 0.119           |
| 210.0                                                                  | 30.7               | 210.2               | 0.535                   | 4.983          | 9.983           | 0.117                     | 1.049          | 0.173           |
| 225.0                                                                  | 30.4               | 225.2               | 0.429                   | 5.945          | 9.995           | 0.100                     | 1.588          | 0.286           |
| 240.0                                                                  | 30.4               | 240.2               | 0.469                   | 8.301          | 9.904           | 0.086                     | 2.230          | 0.360           |
| 255.0                                                                  | 30.5               | 255.2               | 0.344                   | 8.733          | 11.781          | 0.077                     | 1.500          | 0.286           |
| 270.0                                                                  | 30.5               | 270.1               | 0.267                   | 5.671          | 12.016          | 0.065                     | 1.273          | 0.515           |
| 285.0                                                                  | 30.5               | 285.1               | 0.469                   | 7.614          | 13.276          | 0.115                     | 1.232          | 0.868           |
| 300.0                                                                  | 30.5               | 299.9               | 0.760                   | 5.897          | 14.126          | 0.227                     | 1.098          | 1.174           |
| 315.0                                                                  | 30.5               | 314.9               | 1.145                   | 4.574          | 13.832          | 0.288                     | 0.824          | 1.230           |
| 330.0                                                                  | 30.5               | 329.9               | 1.296                   | 3.555          | 14.038          | 0.328                     | 0.574          | 1.253           |
| 345.0                                                                  | 30.4               | 344.9               | 1.400                   | 2.649          | 13.869          | 0.347                     | 0.405          | 1.258           |
| Wind at 28.0 knots (14.4 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table V.29:** Accelerations at Flight Deck: JONSWAP Spectrum with  $H_s = 9.0$  m and  $T_p = 11.0$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                            | <b>Absolute Maximum</b> |                       |                        | <b>Standard Deviation</b> |                       |                        |
|------------------------------------------------------------------------|--------------------|----------------------------|-------------------------|-----------------------|------------------------|---------------------------|-----------------------|------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts       | $\psi_{\text{MHP}}$<br>deg | Long<br>$\text{m/s}^2$  | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ | Long<br>$\text{m/s}^2$    | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ |
| 0.0                                                                    | -0.9               | -27.2                      | 2.245                   | 12.384                | 15.125                 | 0.379                     | 1.488                 | 0.995                  |
| 15.0                                                                   | -1.4               | -21.1                      | 1.713                   | 8.493                 | 13.106                 | 0.369                     | 1.431                 | 0.952                  |
| 30.0                                                                   | -3.4               | 33.0                       | 1.913                   | 13.623                | 15.580                 | 0.320                     | 2.253                 | 1.101                  |
| 45.0                                                                   | -4.5               | -99.2                      | 1.864                   | 12.546                | 15.578                 | 0.305                     | 2.441                 | 1.169                  |
| 60.0                                                                   | -5.1               | -111.1                     | 2.177                   | 14.641                | 15.157                 | 0.289                     | 2.610                 | 1.271                  |
| 75.0                                                                   | -0.6               | -51.8                      | 1.867                   | 13.921                | 16.389                 | 0.288                     | 2.558                 | 1.152                  |
| 90.0                                                                   | 0.2                | 7.1                        | 1.974                   | 17.942                | 17.059                 | 0.323                     | 2.557                 | 1.158                  |
| 105.0                                                                  | 0.4                | 50.3                       | 2.073                   | 16.972                | 18.045                 | 0.311                     | 2.442                 | 1.156                  |
| 120.0                                                                  | -0.6               | 93.8                       | 3.650                   | 15.458                | 15.653                 | 0.235                     | 2.630                 | 1.165                  |
| 135.0                                                                  | -3.6               | 82.6                       | 2.807                   | 12.626                | 15.633                 | 0.283                     | 2.706                 | 1.185                  |
| 150.0                                                                  | -3.7               | 46.3                       | 2.076                   | 13.385                | 16.479                 | 0.325                     | 2.397                 | 1.080                  |
| 165.0                                                                  | -2.8               | 41.1                       | 2.299                   | 13.326                | 15.573                 | 0.341                     | 1.998                 | 1.003                  |
| 180.0                                                                  | -1.1               | 19.7                       | 1.808                   | 14.691                | 14.500                 | 0.367                     | 1.700                 | 0.996                  |
| 195.0                                                                  | -0.6               | 31.3                       | 1.975                   | 8.254                 | 15.466                 | 0.372                     | 1.743                 | 1.041                  |
| 210.0                                                                  | 0.3                | 36.8                       | 1.855                   | 8.949                 | 15.473                 | 0.374                     | 1.839                 | 1.093                  |
| 225.0                                                                  | 0.9                | 387.4                      | 1.943                   | 14.672                | 16.757                 | 0.359                     | 2.073                 | 1.147                  |
| 240.0                                                                  | 0.8                | 281.2                      | 2.010                   | 19.421                | 15.453                 | 0.267                     | 2.568                 | 1.218                  |
| 255.0                                                                  | 0.6                | 284.9                      | 2.695                   | 20.265                | 17.840                 | 0.304                     | 2.533                 | 1.260                  |
| 270.0                                                                  | -2.0               | 276.9                      | 1.811                   | 10.984                | 15.748                 | 0.502                     | 3.426                 | 1.646                  |
| 285.0                                                                  | 0.2                | 292.5                      | 1.958                   | 14.090                | 16.469                 | 0.344                     | 2.276                 | 1.222                  |
| 300.0                                                                  | -0.9               | -202.8                     | 4.692                   | 26.275                | 16.069                 | 0.379                     | 2.334                 | 1.254                  |
| 315.0                                                                  | 0.3                | 306.3                      | 2.405                   | 11.077                | 15.584                 | 0.379                     | 1.969                 | 1.145                  |
| 330.0                                                                  | 0.4                | 314.6                      | 1.594                   | 9.991                 | 16.664                 | 0.389                     | 1.789                 | 1.116                  |
| 345.0                                                                  | 0.0                | 322.0                      | 1.634                   | 9.378                 | 14.497                 | 0.380                     | 1.593                 | 1.046                  |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                            |                         |                       |                        |                           |                       |                        |

**Table V.30:** Accelerations at Flight Deck: JONSWAP Spectrum with  $H_s = 9.0$  m and  $T_p = 11.0$  s; Ship's speed is 5.0 Knots

| <b>Cmd<br/>Heading</b>                                                 | <b>Actual<br/>Mean</b> |                            | <b>Absolute<br/>Maximum</b>   |                              |                               | <b>Standard<br/>Deviation</b> |                              |                               |
|------------------------------------------------------------------------|------------------------|----------------------------|-------------------------------|------------------------------|-------------------------------|-------------------------------|------------------------------|-------------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | <b>Speed</b><br>kts    | $\psi_{\text{MHP}}$<br>deg | <b>Long</b><br>$\text{m/s}^2$ | <b>Lat</b><br>$\text{m/s}^2$ | <b>Vert</b><br>$\text{m/s}^2$ | <b>Long</b><br>$\text{m/s}^2$ | <b>Lat</b><br>$\text{m/s}^2$ | <b>Vert</b><br>$\text{m/s}^2$ |
| 0.0                                                                    | 3.6                    | -26.8                      | 1.902                         | 7.340                        | 13.208                        | 0.431                         | 1.372                        | 1.116                         |
| 15.0                                                                   | 3.5                    | -19.4                      | 1.839                         | 6.428                        | 12.649                        | 0.431                         | 1.207                        | 1.087                         |
| 30.0                                                                   | 3.3                    | -13.2                      | 1.934                         | 5.353                        | 12.301                        | 0.433                         | 1.065                        | 1.072                         |
| 45.0                                                                   | 3.0                    | -8.2                       | 1.777                         | 5.706                        | 12.806                        | 0.427                         | 1.137                        | 1.059                         |
| 60.0                                                                   | 2.9                    | 2.2                        | 2.223                         | 5.388                        | 12.975                        | 0.418                         | 1.242                        | 1.044                         |
| 75.0                                                                   | 2.7                    | 8.1                        | 1.681                         | 6.911                        | 13.765                        | 0.412                         | 1.475                        | 1.060                         |
| 90.0                                                                   | 2.9                    | 14.0                       | 1.829                         | 16.938                       | 16.273                        | 0.398                         | 1.706                        | 1.080                         |
| 105.0                                                                  | 3.1                    | 24.7                       | 1.785                         | 11.602                       | 16.390                        | 0.390                         | 1.702                        | 1.093                         |
| 120.0                                                                  | 3.1                    | 21.7                       | 1.874                         | 13.007                       | 17.477                        | 0.412                         | 1.489                        | 1.096                         |
| 135.0                                                                  | 3.1                    | 26.2                       | 1.938                         | 15.433                       | 14.519                        | 0.410                         | 1.457                        | 1.104                         |
| 150.0                                                                  | 3.2                    | 33.4                       | 1.806                         | 9.606                        | 14.494                        | 0.410                         | 1.519                        | 1.104                         |
| 165.0                                                                  | 3.3                    | 38.7                       | 1.730                         | 9.144                        | 13.721                        | 0.409                         | 1.584                        | 1.118                         |
| 180.0                                                                  | 3.9                    | 146.8                      | 1.568                         | 7.894                        | 13.951                        | 0.279                         | 1.529                        | 0.711                         |
| 195.0                                                                  | 3.7                    | 23.7                       | 1.949                         | 9.119                        | 15.542                        | 0.414                         | 1.673                        | 1.128                         |
| 210.0                                                                  | 3.8                    | 388.6                      | 3.457                         | 7.502                        | 15.106                        | 0.414                         | 1.816                        | 1.154                         |
| 225.0                                                                  | 4.2                    | 359.3                      | 1.654                         | 16.391                       | 17.386                        | 0.376                         | 2.149                        | 1.204                         |
| 240.0                                                                  | 4.4                    | 283.9                      | 1.486                         | 17.657                       | 16.348                        | 0.275                         | 2.466                        | 1.299                         |
| 255.0                                                                  | 4.1                    | 286.1                      | 3.437                         | 19.079                       | 18.154                        | 0.319                         | 2.492                        | 1.354                         |
| 270.0                                                                  | 4.0                    | 291.3                      | 2.669                         | 14.411                       | 17.621                        | 0.357                         | 2.318                        | 1.344                         |
| 285.0                                                                  | 4.2                    | 295.7                      | 3.240                         | 11.420                       | 18.104                        | 0.381                         | 2.179                        | 1.324                         |
| 300.0                                                                  | 4.4                    | 301.0                      | 3.905                         | 8.616                        | 16.299                        | 0.394                         | 2.018                        | 1.245                         |
| 315.0                                                                  | 4.3                    | 310.6                      | 1.908                         | 7.877                        | 16.192                        | 0.405                         | 1.853                        | 1.207                         |
| 330.0                                                                  | 4.1                    | 318.7                      | 1.685                         | 9.914                        | 14.606                        | 0.422                         | 1.655                        | 1.171                         |
| 345.0                                                                  | 3.8                    | 324.2                      | 1.784                         | 8.536                        | 15.031                        | 0.428                         | 1.583                        | 1.152                         |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                        |                            |                               |                              |                               |                               |                              |                               |

**Table V.31:** Accelerations at Flight Deck: JONSWAP Spectrum with  $H_s = 9.0$  m and  $T_p = 11.0$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 8.8                | -5.3                | 2.337                   | 5.306          | 12.910          | 0.488                     | 0.759          | 1.216           |
| 15.0                                                                   | 8.4                | 6.8                 | 2.500                   | 4.148          | 13.065          | 0.484                     | 0.865          | 1.203           |
| 30.0                                                                   | 8.0                | 16.1                | 2.418                   | 4.585          | 13.374          | 0.475                     | 1.072          | 1.189           |
| 45.0                                                                   | 8.0                | 30.6                | 1.986                   | 6.764          | 13.306          | 0.455                     | 1.379          | 1.205           |
| 60.0                                                                   | 8.4                | 49.7                | 1.615                   | 7.525          | 15.164          | 0.414                     | 1.821          | 1.264           |
| 75.0                                                                   | 8.3                | 59.0                | 2.293                   | 14.581         | 17.106          | 0.384                     | 2.000          | 1.327           |
| 90.0                                                                   | 8.6                | 73.9                | 2.413                   | 10.811         | 17.636          | 0.293                     | 2.160          | 1.387           |
| 105.0                                                                  | 8.5                | 82.1                | 2.147                   | 17.919         | 16.351          | 0.193                     | 2.336          | 1.328           |
| 120.0                                                                  | 8.3                | 92.0                | 1.181                   | 21.429         | 15.811          | 0.149                     | 2.428          | 1.188           |
| 135.0                                                                  | 8.1                | 99.6                | 1.369                   | 17.051         | 15.163          | 0.149                     | 2.468          | 1.127           |
| 150.0                                                                  | 8.1                | 87.4                | 1.630                   | 16.469         | 17.675          | 0.280                     | 2.340          | 1.239           |
| 165.0                                                                  | 8.1                | 125.9               | 2.569                   | 9.741          | 15.474          | 0.236                     | 1.950          | 0.813           |
| 180.0                                                                  | 9.1                | 174.8               | 0.756                   | 5.479          | 11.426          | 0.162                     | 1.366          | 0.338           |
| 195.0                                                                  | 9.6                | 195.2               | 0.871                   | 5.461          | 11.739          | 0.164                     | 1.289          | 0.283           |
| 210.0                                                                  | 8.5                | 274.0               | 1.763                   | 19.766         | 17.224          | 0.218                     | 2.661          | 1.290           |
| 225.0                                                                  | 8.3                | 275.4               | 2.050                   | 20.864         | 17.709          | 0.217                     | 2.676          | 1.311           |
| 240.0                                                                  | 8.3                | 276.6               | 2.272                   | 20.993         | 17.467          | 0.214                     | 2.687          | 1.321           |
| 255.0                                                                  | 8.4                | 280.1               | 1.946                   | 17.128         | 18.139          | 0.239                     | 2.550          | 1.378           |
| 270.0                                                                  | 8.5                | 283.8               | 2.640                   | 17.214         | 18.623          | 0.282                     | 2.483          | 1.441           |
| 285.0                                                                  | 9.4                | 289.4               | 3.219                   | 11.874         | 16.464          | 0.341                     | 2.346          | 1.453           |
| 300.0                                                                  | 9.7                | 300.2               | 1.697                   | 8.578          | 15.689          | 0.400                     | 2.016          | 1.358           |
| 315.0                                                                  | 9.5                | 313.0               | 1.919                   | 7.973          | 14.764          | 0.444                     | 1.674          | 1.278           |
| 330.0                                                                  | 9.3                | 327.3               | 2.075                   | 6.853          | 13.961          | 0.473                     | 1.262          | 1.253           |
| 345.0                                                                  | 9.1                | 341.2               | 2.304                   | 5.985          | 12.905          | 0.485                     | 0.980          | 1.238           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table V.32:** Accelerations at Flight Deck: JONSWAP Spectrum with  $H_s = 9.0$  m and  $T_p = 11.0$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                            | <b>Absolute Maximum</b> |                       |                        | <b>Standard Deviation</b> |                       |                        |
|------------------------------------------------------------------------|--------------------|----------------------------|-------------------------|-----------------------|------------------------|---------------------------|-----------------------|------------------------|
| $\psi_{\text{MHP}}$<br>deg                                             | Speed<br>kts       | $\psi_{\text{MHP}}$<br>deg | Long<br>$\text{m/s}^2$  | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ | Long<br>$\text{m/s}^2$    | Lat<br>$\text{m/s}^2$ | Vert<br>$\text{m/s}^2$ |
| 0.0                                                                    | 14.7               | -1.3                       | 2.142                   | 3.435                 | 13.156                 | 0.528                     | 0.583                 | 1.357                  |
| 15.0                                                                   | 14.7               | 13.8                       | 2.193                   | 3.919                 | 13.319                 | 0.523                     | 0.747                 | 1.352                  |
| 30.0                                                                   | 14.6               | 29.0                       | 1.997                   | 5.377                 | 13.357                 | 0.507                     | 1.105                 | 1.366                  |
| 45.0                                                                   | 14.7               | 44.2                       | 1.922                   | 6.867                 | 13.731                 | 0.471                     | 1.484                 | 1.372                  |
| 60.0                                                                   | 14.8               | 58.9                       | 1.526                   | 9.949                 | 16.206                 | 0.412                     | 1.856                 | 1.443                  |
| 75.0                                                                   | 14.6               | 71.8                       | 3.795                   | 11.039                | 19.460                 | 0.342                     | 1.990                 | 1.544                  |
| 90.0                                                                   | 14.4               | 86.4                       | 1.104                   | 12.075                | 18.051                 | 0.134                     | 2.187                 | 1.317                  |
| 105.0                                                                  | 14.4               | 101.2                      | 1.621                   | 13.714                | 17.096                 | 0.130                     | 2.298                 | 1.042                  |
| 120.0                                                                  | 14.2               | 115.1                      | 1.352                   | 12.938                | 13.847                 | 0.136                     | 2.305                 | 0.840                  |
| 135.0                                                                  | 14.4               | 130.4                      | 1.616                   | 18.861                | 14.242                 | 0.126                     | 2.190                 | 0.671                  |
| 150.0                                                                  | 14.8               | 148.0                      | 0.781                   | 6.098                 | 12.239                 | 0.113                     | 1.473                 | 0.431                  |
| 165.0                                                                  | 14.7               | 162.9                      | 0.535                   | 4.700                 | 10.954                 | 0.127                     | 1.062                 | 0.353                  |
| 180.0                                                                  | 14.6               | 178.3                      | 0.651                   | 5.224                 | 10.833                 | 0.133                     | 0.925                 | 0.266                  |
| 195.0                                                                  | 14.8               | 193.9                      | 0.572                   | 6.052                 | 10.184                 | 0.120                     | 1.115                 | 0.209                  |
| 210.0                                                                  | 14.8               | 209.8                      | 0.893                   | 7.724                 | 11.472                 | 0.123                     | 1.627                 | 0.234                  |
| 225.0                                                                  | 14.1               | 234.1                      | 1.629                   | 17.490                | 14.172                 | 0.166                     | 2.698                 | 0.716                  |
| 240.0                                                                  | 13.4               | 253.5                      | 0.933                   | 16.855                | 15.080                 | 0.154                     | 2.861                 | 0.934                  |
| 255.0                                                                  | 13.3               | 265.5                      | 2.270                   | 17.920                | 17.865                 | 0.162                     | 2.845                 | 1.135                  |
| 270.0                                                                  | 13.9               | 276.0                      | 1.719                   | 21.856                | 17.485                 | 0.172                     | 2.734                 | 1.387                  |
| 285.0                                                                  | 14.8               | 287.1                      | 2.733                   | 10.445                | 18.020                 | 0.318                     | 2.440                 | 1.585                  |
| 300.0                                                                  | 15.0               | 299.9                      | 1.800                   | 9.025                 | 17.224                 | 0.413                     | 2.003                 | 1.495                  |
| 315.0                                                                  | 14.8               | 314.0                      | 1.701                   | 7.841                 | 14.338                 | 0.472                     | 1.540                 | 1.402                  |
| 330.0                                                                  | 14.7               | 328.7                      | 2.030                   | 6.216                 | 13.576                 | 0.508                     | 1.117                 | 1.380                  |
| 345.0                                                                  | 14.7               | 343.6                      | 2.009                   | 3.799                 | 13.069                 | 0.522                     | 0.750                 | 1.363                  |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                            |                         |                       |                        |                           |                       |                        |

**Table V.33:** Accelerations at Flight Deck: JONSWAP Spectrum with  $H_s = 9.0$  m and  $T_p = 11.0$  s; Ship's speed is 20.0 Knots

| <b>Cmd<br/>Heading</b>                                                 | <b>Actual<br/>Mean</b> |                     | <b>Absolute<br/>Maximum</b>     |                                |                                 | <b>Standard<br/>Deviation</b>   |                                |                                 |
|------------------------------------------------------------------------|------------------------|---------------------|---------------------------------|--------------------------------|---------------------------------|---------------------------------|--------------------------------|---------------------------------|
| $\psi_{MHP}$<br>deg                                                    | <b>Speed<br/>kts</b>   | $\psi_{MHP}$<br>deg | <b>Long<br/>m/s<sup>2</sup></b> | <b>Lat<br/>m/s<sup>2</sup></b> | <b>Vert<br/>m/s<sup>2</sup></b> | <b>Long<br/>m/s<sup>2</sup></b> | <b>Lat<br/>m/s<sup>2</sup></b> | <b>Vert<br/>m/s<sup>2</sup></b> |
| 0.0                                                                    | 20.0                   | -0.6                | 2.214                           | 3.261                          | 14.023                          | 0.559                           | 0.572                          | 1.564                           |
| 15.0                                                                   | 20.0                   | 14.6                | 2.256                           | 4.734                          | 14.060                          | 0.554                           | 0.747                          | 1.561                           |
| 30.0                                                                   | 20.0                   | 29.8                | 2.123                           | 5.782                          | 13.693                          | 0.536                           | 1.091                          | 1.567                           |
| 45.0                                                                   | 20.0                   | 44.8                | 1.869                           | 7.287                          | 14.508                          | 0.499                           | 1.443                          | 1.577                           |
| 60.0                                                                   | 20.0                   | 59.5                | 1.622                           | 9.544                          | 16.164                          | 0.432                           | 1.780                          | 1.640                           |
| 75.0                                                                   | 20.1                   | 73.8                | 1.493                           | 10.078                         | 18.522                          | 0.311                           | 1.937                          | 1.655                           |
| 90.0                                                                   | 19.8                   | 88.0                | 1.085                           | 14.050                         | 17.306                          | 0.122                           | 2.133                          | 1.302                           |
| 105.0                                                                  | 19.9                   | 103.3               | 1.139                           | 12.570                         | 14.390                          | 0.118                           | 2.299                          | 0.923                           |
| 120.0                                                                  | 19.9                   | 118.3               | 0.721                           | 8.957                          | 12.995                          | 0.107                           | 2.467                          | 0.742                           |
| 135.0                                                                  | 19.7                   | 133.8               | 0.868                           | 9.157                          | 12.342                          | 0.128                           | 2.358                          | 0.531                           |
| 150.0                                                                  | 19.6                   | 148.5               | 1.472                           | 8.908                          | 13.627                          | 0.164                           | 1.760                          | 0.424                           |
| 165.0                                                                  | 19.9                   | 163.9               | 0.832                           | 4.590                          | 11.054                          | 0.165                           | 1.047                          | 0.295                           |
| 180.0                                                                  | 20.3                   | 179.2               | 0.825                           | 4.984                          | 11.035                          | 0.164                           | 0.795                          | 0.225                           |
| 195.0                                                                  | 20.0                   | 194.7               | 0.717                           | 6.187                          | 10.567                          | 0.157                           | 1.214                          | 0.270                           |
| 210.0                                                                  | 19.8                   | 211.0               | 0.794                           | 8.236                          | 11.566                          | 0.143                           | 1.966                          | 0.349                           |
| 225.0                                                                  | 19.6                   | 228.0               | 0.750                           | 14.092                         | 14.578                          | 0.112                           | 2.562                          | 0.470                           |
| 240.0                                                                  | 19.5                   | 244.4               | 0.735                           | 16.572                         | 14.152                          | 0.127                           | 3.047                          | 0.662                           |
| 255.0                                                                  | 19.2                   | 259.4               | 1.554                           | 19.817                         | 14.554                          | 0.149                           | 3.018                          | 0.915                           |
| 270.0                                                                  | 19.4                   | 273.3               | 1.780                           | 20.650                         | 16.837                          | 0.163                           | 2.889                          | 1.362                           |
| 285.0                                                                  | 20.1                   | 286.3               | 1.573                           | 11.412                         | 17.819                          | 0.300                           | 2.525                          | 1.690                           |
| 300.0                                                                  | 20.1                   | 300.0               | 1.642                           | 8.192                          | 16.353                          | 0.423                           | 1.987                          | 1.687                           |
| 315.0                                                                  | 20.1                   | 314.4               | 1.872                           | 5.729                          | 14.377                          | 0.492                           | 1.469                          | 1.614                           |
| 330.0                                                                  | 20.1                   | 329.3               | 1.968                           | 4.390                          | 14.277                          | 0.534                           | 1.048                          | 1.596                           |
| 345.0                                                                  | 20.0                   | 344.3               | 2.186                           | 3.287                          | 14.249                          | 0.552                           | 0.719                          | 1.576                           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                        |                     |                                 |                                |                                 |                                 |                                |                                 |

**Table V.34:** Accelerations at Flight Deck: JONSWAP Spectrum with  $H_s = 9.0$  m and  $T_p = 11.0$  s; Ship's speed is 25.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 25.3               | -0.2                | 1.981                   | 3.855          | 15.781          | 0.580                     | 0.648          | 1.886           |
| 15.0                                                                   | 25.3               | 14.9                | 2.057                   | 5.368          | 15.188          | 0.576                     | 0.810          | 1.876           |
| 30.0                                                                   | 25.2               | 30.0                | 1.980                   | 7.205          | 15.239          | 0.562                     | 1.109          | 1.866           |
| 45.0                                                                   | 25.2               | 44.9                | 1.978                   | 7.044          | 15.055          | 0.518                     | 1.418          | 1.842           |
| 60.0                                                                   | 25.2               | 59.7                | 1.606                   | 10.122         | 16.264          | 0.445                     | 1.738          | 1.851           |
| 75.0                                                                   | 25.2               | 74.1                | 1.512                   | 10.274         | 17.929          | 0.312                     | 1.900          | 1.775           |
| 90.0                                                                   | 25.0               | 88.7                | 1.268                   | 16.955         | 16.726          | 0.116                     | 2.145          | 1.269           |
| 105.0                                                                  | 25.0               | 104.4               | 0.683                   | 9.207          | 13.998          | 0.121                     | 2.531          | 0.817           |
| 120.0                                                                  | 24.7               | 118.5               | 0.907                   | 15.206         | 13.990          | 0.145                     | 3.273          | 0.823           |
| 135.0                                                                  | 24.6               | 132.1               | 1.080                   | 22.172         | 14.253          | 0.172                     | 2.471          | 0.551           |
| 150.0                                                                  | 24.8               | 149.1               | 1.003                   | 6.562          | 10.804          | 0.188                     | 1.634          | 0.328           |
| 165.0                                                                  | 25.7               | 164.1               | 0.830                   | 4.772          | 10.563          | 0.180                     | 0.993          | 0.243           |
| 180.0                                                                  | 26.4               | 179.6               | 0.980                   | 4.899          | 10.121          | 0.183                     | 0.655          | 0.172           |
| 195.0                                                                  | 25.8               | 194.9               | 0.837                   | 5.079          | 10.055          | 0.176                     | 1.097          | 0.253           |
| 210.0                                                                  | 25.0               | 210.7               | 0.889                   | 8.870          | 10.543          | 0.191                     | 1.858          | 0.359           |
| 225.0                                                                  | 24.7               | 226.5               | 0.771                   | 8.233          | 12.284          | 0.159                     | 2.630          | 0.489           |
| 240.0                                                                  | 24.6               | 242.1               | 0.726                   | 15.409         | 13.522          | 0.138                     | 3.462          | 0.652           |
| 255.0                                                                  | 24.7               | 257.1               | 0.651                   | 16.525         | 13.692          | 0.143                     | 3.110          | 0.748           |
| 270.0                                                                  | 24.9               | 271.9               | 1.228                   | 16.881         | 16.200          | 0.133                     | 2.920          | 1.292           |
| 285.0                                                                  | 25.2               | 286.0               | 4.079                   | 12.447         | 17.027          | 0.306                     | 2.582          | 1.791           |
| 300.0                                                                  | 25.3               | 300.1               | 1.540                   | 8.649          | 16.370          | 0.431                     | 2.036          | 1.906           |
| 315.0                                                                  | 25.3               | 314.7               | 2.041                   | 5.563          | 15.207          | 0.508                     | 1.481          | 1.890           |
| 330.0                                                                  | 25.3               | 329.7               | 1.922                   | 4.720          | 15.490          | 0.552                     | 1.078          | 1.902           |
| 345.0                                                                  | 25.3               | 344.7               | 2.039                   | 3.384          | 15.994          | 0.572                     | 0.748          | 1.888           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table V.35:** Accelerations at Flight Deck: JONSWAP Spectrum with  $H_s = 9.0$  m and  $T_p = 11.0$  s; Ship's speed is 30.0 Knots

| <b>Cmd<br/>Heading</b>                                                 | <b>Actual<br/>Mean</b> |                     | <b>Absolute<br/>Maximum</b>     |                                |                                 | <b>Standard<br/>Deviation</b>   |                                |                                 |
|------------------------------------------------------------------------|------------------------|---------------------|---------------------------------|--------------------------------|---------------------------------|---------------------------------|--------------------------------|---------------------------------|
| $\psi_{MHP}$<br>deg                                                    | <b>Speed<br/>kts</b>   | $\psi_{MHP}$<br>deg | <b>Long<br/>m/s<sup>2</sup></b> | <b>Lat<br/>m/s<sup>2</sup></b> | <b>Vert<br/>m/s<sup>2</sup></b> | <b>Long<br/>m/s<sup>2</sup></b> | <b>Lat<br/>m/s<sup>2</sup></b> | <b>Vert<br/>m/s<sup>2</sup></b> |
| 0.0                                                                    | 30.4                   | 0.0                 | 2.003                           | 4.182                          | 16.529                          | 0.593                           | 0.752                          | 2.257                           |
| 15.0                                                                   | 30.4                   | 15.1                | 2.055                           | 6.262                          | 16.669                          | 0.592                           | 0.899                          | 2.238                           |
| 30.0                                                                   | 30.4                   | 30.1                | 1.949                           | 7.749                          | 16.017                          | 0.573                           | 1.161                          | 2.198                           |
| 45.0                                                                   | 30.4                   | 45.0                | 2.000                           | 7.269                          | 16.136                          | 0.535                           | 1.433                          | 2.146                           |
| 60.0                                                                   | 30.3                   | 59.7                | 1.734                           | 7.580                          | 16.450                          | 0.459                           | 1.691                          | 2.085                           |
| 75.0                                                                   | 30.3                   | 74.3                | 1.881                           | 11.367                         | 19.093                          | 0.317                           | 1.855                          | 1.887                           |
| 90.0                                                                   | 30.1                   | 89.0                | 1.026                           | 16.122                         | 16.526                          | 0.121                           | 2.216                          | 1.253                           |
| 105.0                                                                  | 30.0                   | 104.3               | 2.090                           | 20.345                         | 18.470                          | 0.152                           | 2.959                          | 0.833                           |
| 120.0                                                                  | 29.7                   | 118.6               | 1.261                           | 15.259                         | 12.365                          | 0.170                           | 3.013                          | 0.649                           |
| 135.0                                                                  | 29.9                   | 134.1               | 0.999                           | 8.274                          | 11.539                          | 0.209                           | 2.331                          | 0.425                           |
| 150.0                                                                  | 30.5                   | 147.4               | 1.063                           | 8.091                          | 11.450                          | 0.223                           | 1.624                          | 0.399                           |
| 165.0                                                                  | 31.0                   | 162.7               | 1.253                           | 6.235                          | 10.157                          | 0.250                           | 1.188                          | 0.365                           |
| 180.0                                                                  | 31.1                   | 178.6               | 1.341                           | 6.106                          | 10.351                          | 0.273                           | 1.172                          | 0.378                           |
| 195.0                                                                  | 31.4                   | 194.6               | 1.488                           | 6.559                          | 10.577                          | 0.264                           | 1.355                          | 0.363                           |
| 210.0                                                                  | 30.8                   | 211.0               | 1.221                           | 6.936                          | 10.511                          | 0.229                           | 1.852                          | 0.350                           |
| 225.0                                                                  | 29.7                   | 226.0               | 1.035                           | 8.912                          | 12.464                          | 0.228                           | 2.553                          | 0.530                           |
| 240.0                                                                  | 29.8                   | 240.9               | 0.599                           | 9.274                          | 12.203                          | 0.153                           | 3.349                          | 0.661                           |
| 255.0                                                                  | 29.9                   | 256.1               | 1.784                           | 24.275                         | 15.413                          | 0.163                           | 3.190                          | 0.750                           |
| 270.0                                                                  | 30.1                   | 271.2               | 1.347                           | 18.716                         | 15.910                          | 0.135                           | 2.915                          | 1.235                           |
| 285.0                                                                  | 30.3                   | 285.7               | 2.053                           | 13.250                         | 17.117                          | 0.298                           | 2.662                          | 1.917                           |
| 300.0                                                                  | 30.4                   | 300.1               | 1.662                           | 8.143                          | 16.718                          | 0.438                           | 2.121                          | 2.144                           |
| 315.0                                                                  | 30.4                   | 315.0               | 1.965                           | 5.611                          | 16.920                          | 0.518                           | 1.603                          | 2.198                           |
| 330.0                                                                  | 30.4                   | 329.9               | 1.919                           | 4.498                          | 16.667                          | 0.559                           | 1.165                          | 2.238                           |
| 345.0                                                                  | 30.4                   | 345.0               | 2.178                           | 3.996                          | 17.095                          | 0.582                           | 0.862                          | 2.251                           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                        |                     |                                 |                                |                                 |                                 |                                |                                 |



**Table V.36:** Accelerations at Flight Deck: JONSWAP Spectrum with  $H_s = 9.0$  m and  $T_p = 17.1$  s; Ship's speed is 0.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | -1.5               | -109.1              | 0.985                   | 4.531          | 11.789          | 0.193                     | 1.405          | 0.532           |
| 15.0                                                                   | -2.4               | -147.9              | 0.927                   | 4.628          | 12.344          | 0.184                     | 1.083          | 0.575           |
| 30.0                                                                   | -1.8               | -69.5               | 1.155                   | 5.619          | 12.234          | 0.187                     | 1.608          | 0.559           |
| 45.0                                                                   | -0.2               | 21.9                | 0.797                   | 4.194          | 12.226          | 0.204                     | 1.073          | 0.558           |
| 60.0                                                                   | 0.6                | 49.0                | 0.740                   | 5.003          | 11.996          | 0.159                     | 1.325          | 0.574           |
| 75.0                                                                   | 0.7                | 69.2                | 0.587                   | 5.332          | 12.445          | 0.093                     | 1.367          | 0.549           |
| 90.0                                                                   | 0.1                | 90.9                | 0.230                   | 5.336          | 12.114          | 0.031                     | 1.388          | 0.533           |
| 105.0                                                                  | -0.5               | 103.2               | 0.419                   | 5.717          | 12.043          | 0.053                     | 1.441          | 0.551           |
| 120.0                                                                  | -1.4               | 113.0               | 0.618                   | 6.182          | 12.886          | 0.085                     | 1.471          | 0.570           |
| 135.0                                                                  | -2.1               | 121.6               | 0.490                   | 6.079          | 12.228          | 0.117                     | 1.420          | 0.578           |
| 150.0                                                                  | -2.6               | 131.7               | 0.554                   | 5.435          | 11.747          | 0.149                     | 1.298          | 0.574           |
| 165.0                                                                  | -2.5               | 144.3               | 0.729                   | 4.502          | 12.083          | 0.176                     | 1.057          | 0.567           |
| 180.0                                                                  | -1.7               | 164.5               | 0.919                   | 3.647          | 12.337          | 0.195                     | 0.619          | 0.541           |
| 195.0                                                                  | 0.4                | 236.4               | 0.865                   | 6.413          | 12.220          | 0.126                     | 1.474          | 0.545           |
| 210.0                                                                  | 0.0                | 244.9               | 0.835                   | 7.227          | 12.007          | 0.104                     | 1.523          | 0.551           |
| 225.0                                                                  | -0.2               | 253.3               | 0.553                   | 6.126          | 11.948          | 0.078                     | 1.532          | 0.550           |
| 240.0                                                                  | -0.4               | 261.6               | 0.381                   | 6.042          | 11.844          | 0.052                     | 1.498          | 0.532           |
| 255.0                                                                  | -0.6               | 270.4               | 0.221                   | 6.076          | 11.901          | 0.033                     | 1.449          | 0.522           |
| 270.0                                                                  | -0.6               | 279.9               | 0.360                   | 6.363          | 12.110          | 0.047                     | 1.396          | 0.523           |
| 285.0                                                                  | -0.5               | 288.9               | 0.597                   | 5.890          | 12.476          | 0.080                     | 1.343          | 0.540           |
| 300.0                                                                  | -0.5               | 297.9               | 0.646                   | 6.068          | 12.383          | 0.114                     | 1.278          | 0.552           |
| 315.0                                                                  | -0.4               | 307.0               | 0.700                   | 5.736          | 12.112          | 0.144                     | 1.206          | 0.554           |
| 330.0                                                                  | -0.6               | 315.5               | 0.774                   | 5.284          | 11.796          | 0.169                     | 1.132          | 0.552           |
| 345.0                                                                  | -0.8               | 324.3               | 0.944                   | 5.033          | 11.780          | 0.187                     | 1.045          | 0.543           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table V.37:** Accelerations at Flight Deck: JONSWAP Spectrum with  $H_s = 9.0$  m and  $T_p = 17.1$  s; Ship's speed is 5.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 3.8                | -29.6               | 1.012                   | 5.722          | 11.699          | 0.229                     | 1.065          | 0.604           |
| 15.0                                                                   | 3.6                | -22.7               | 1.013                   | 4.503          | 11.781          | 0.238                     | 1.009          | 0.604           |
| 30.0                                                                   | 3.5                | -14.4               | 1.093                   | 4.040          | 11.605          | 0.241                     | 0.933          | 0.599           |
| 45.0                                                                   | 3.5                | -3.6                | 1.256                   | 3.915          | 11.402          | 0.246                     | 0.874          | 0.606           |
| 60.0                                                                   | 3.8                | 26.6                | 0.908                   | 4.658          | 12.208          | 0.226                     | 1.063          | 0.630           |
| 75.0                                                                   | 4.3                | 58.4                | 0.684                   | 5.443          | 12.642          | 0.139                     | 1.318          | 0.621           |
| 90.0                                                                   | 4.5                | 79.9                | 0.361                   | 5.407          | 12.392          | 0.047                     | 1.285          | 0.569           |
| 105.0                                                                  | 4.4                | 95.6                | 0.222                   | 5.867          | 12.143          | 0.025                     | 1.324          | 0.555           |
| 120.0                                                                  | 4.1                | 107.0               | 0.299                   | 6.383          | 12.618          | 0.049                     | 1.345          | 0.558           |
| 135.0                                                                  | 3.8                | 115.4               | 0.392                   | 6.589          | 12.125          | 0.071                     | 1.356          | 0.555           |
| 150.0                                                                  | 3.5                | 124.8               | 0.649                   | 5.993          | 12.280          | 0.095                     | 1.304          | 0.532           |
| 165.0                                                                  | 3.4                | 134.5               | 0.769                   | 5.858          | 12.347          | 0.116                     | 1.196          | 0.500           |
| 180.0                                                                  | 3.3                | 146.5               | 0.936                   | 5.138          | 12.018          | 0.133                     | 1.027          | 0.456           |
| 195.0                                                                  | 3.4                | 162.2               | 0.870                   | 5.943          | 12.012          | 0.144                     | 0.897          | 0.408           |
| 210.0                                                                  | 4.4                | 216.2               | 0.757                   | 5.474          | 11.679          | 0.131                     | 1.202          | 0.393           |
| 225.0                                                                  | 4.3                | 237.0               | 0.656                   | 6.109          | 11.948          | 0.100                     | 1.428          | 0.460           |
| 240.0                                                                  | 4.4                | 250.4               | 0.489                   | 6.182          | 12.286          | 0.071                     | 1.498          | 0.483           |
| 255.0                                                                  | 4.5                | 262.4               | 0.291                   | 6.465          | 11.672          | 0.040                     | 1.499          | 0.493           |
| 270.0                                                                  | 4.6                | 274.8               | 0.158                   | 5.960          | 12.078          | 0.023                     | 1.452          | 0.512           |
| 285.0                                                                  | 4.7                | 287.5               | 0.421                   | 7.319          | 12.316          | 0.068                     | 1.404          | 0.544           |
| 300.0                                                                  | 4.7                | 299.8               | 0.541                   | 5.653          | 12.140          | 0.131                     | 1.320          | 0.582           |
| 315.0                                                                  | 4.5                | 310.0               | 0.732                   | 6.164          | 12.680          | 0.175                     | 1.238          | 0.596           |
| 330.0                                                                  | 4.1                | 317.1               | 0.869                   | 6.054          | 11.853          | 0.198                     | 1.192          | 0.601           |
| 345.0                                                                  | 3.9                | 323.5               | 0.988                   | 6.045          | 11.764          | 0.216                     | 1.134          | 0.604           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table V.38:** Accelerations at Flight Deck: JONSWAP Spectrum with  $H_s = 9.0$  m and  $T_p = 17.1$  s; Ship's speed is 10.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 9.4                | -3.6                | 1.327                   | 3.781          | 11.637          | 0.285                     | 0.564          | 0.698           |
| 15.0                                                                   | 9.5                | 11.9                | 1.159                   | 3.356          | 11.744          | 0.281                     | 0.674          | 0.715           |
| 30.0                                                                   | 9.6                | 27.4                | 1.085                   | 3.831          | 11.904          | 0.262                     | 0.892          | 0.726           |
| 45.0                                                                   | 9.7                | 42.7                | 0.834                   | 4.384          | 12.694          | 0.221                     | 1.081          | 0.718           |
| 60.0                                                                   | 9.8                | 57.5                | 0.616                   | 4.903          | 12.687          | 0.158                     | 1.171          | 0.680           |
| 75.0                                                                   | 9.9                | 72.9                | 0.365                   | 4.792          | 12.754          | 0.080                     | 1.101          | 0.622           |
| 90.0                                                                   | 9.9                | 88.0                | 0.138                   | 5.148          | 12.347          | 0.031                     | 1.092          | 0.569           |
| 105.0                                                                  | 9.9                | 103.1               | 0.233                   | 5.785          | 12.253          | 0.041                     | 1.157          | 0.546           |
| 120.0                                                                  | 9.5                | 116.4               | 0.455                   | 6.073          | 12.711          | 0.063                     | 1.173          | 0.531           |
| 135.0                                                                  | 9.2                | 130.3               | 0.640                   | 5.550          | 12.667          | 0.079                     | 1.060          | 0.471           |
| 150.0                                                                  | 9.1                | 144.4               | 0.587                   | 4.887          | 12.000          | 0.090                     | 1.005          | 0.403           |
| 165.0                                                                  | 9.0                | 159.4               | 0.516                   | 4.149          | 11.384          | 0.103                     | 1.018          | 0.351           |
| 180.0                                                                  | 9.4                | 176.8               | 0.522                   | 4.408          | 10.694          | 0.107                     | 0.960          | 0.280           |
| 195.0                                                                  | 9.7                | 193.7               | 0.677                   | 4.944          | 10.959          | 0.108                     | 0.963          | 0.212           |
| 210.0                                                                  | 9.6                | 211.3               | 0.789                   | 5.921          | 11.803          | 0.099                     | 1.202          | 0.262           |
| 225.0                                                                  | 9.5                | 228.4               | 0.668                   | 7.881          | 11.606          | 0.092                     | 1.533          | 0.332           |
| 240.0                                                                  | 9.5                | 243.7               | 0.505                   | 6.738          | 11.936          | 0.075                     | 1.657          | 0.398           |
| 255.0                                                                  | 9.8                | 257.4               | 0.435                   | 6.703          | 12.100          | 0.054                     | 1.628          | 0.433           |
| 270.0                                                                  | 9.9                | 271.7               | 0.214                   | 7.898          | 11.967          | 0.034                     | 1.599          | 0.488           |
| 285.0                                                                  | 10.0               | 285.8               | 0.395                   | 8.455          | 12.175          | 0.064                     | 1.500          | 0.547           |
| 300.0                                                                  | 9.9                | 300.0               | 0.601                   | 5.526          | 12.317          | 0.142                     | 1.383          | 0.612           |
| 315.0                                                                  | 9.8                | 313.7               | 0.783                   | 5.135          | 12.248          | 0.206                     | 1.154          | 0.644           |
| 330.0                                                                  | 9.6                | 327.5               | 1.033                   | 4.747          | 12.060          | 0.250                     | 0.914          | 0.667           |
| 345.0                                                                  | 9.4                | 341.6               | 1.147                   | 4.403          | 11.631          | 0.274                     | 0.736          | 0.683           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table V.39:** Accelerations at Flight Deck: JONSWAP Spectrum with  $H_s = 9.0$  m and  $T_p = 17.1$  s; Ship's speed is 15.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 14.9               | -1.1                | 1.469                   | 3.182          | 11.853          | 0.317                     | 0.456          | 0.773           |
| 15.0                                                                   | 14.9               | 14.1                | 1.311                   | 3.380          | 12.182          | 0.311                     | 0.657          | 0.790           |
| 30.0                                                                   | 14.9               | 29.2                | 1.249                   | 4.282          | 12.298          | 0.286                     | 0.912          | 0.796           |
| 45.0                                                                   | 15.0               | 44.2                | 0.881                   | 4.828          | 13.099          | 0.240                     | 1.093          | 0.781           |
| 60.0                                                                   | 15.0               | 59.0                | 0.745                   | 5.475          | 13.582          | 0.165                     | 1.210          | 0.732           |
| 75.0                                                                   | 15.1               | 74.0                | 0.357                   | 5.027          | 12.805          | 0.082                     | 1.007          | 0.638           |
| 90.0                                                                   | 15.1               | 89.0                | 0.167                   | 4.827          | 12.477          | 0.045                     | 0.994          | 0.569           |
| 105.0                                                                  | 15.1               | 104.1               | 0.390                   | 5.294          | 12.029          | 0.057                     | 1.079          | 0.518           |
| 120.0                                                                  | 14.9               | 118.3               | 0.468                   | 5.955          | 12.563          | 0.074                     | 1.281          | 0.537           |
| 135.0                                                                  | 14.9               | 133.5               | 0.508                   | 5.429          | 11.904          | 0.085                     | 1.261          | 0.461           |
| 150.0                                                                  | 14.9               | 148.6               | 0.496                   | 4.324          | 11.442          | 0.094                     | 0.990          | 0.376           |
| 165.0                                                                  | 15.0               | 163.8               | 0.389                   | 3.745          | 10.734          | 0.088                     | 0.632          | 0.289           |
| 180.0                                                                  | 14.9               | 178.9               | 0.510                   | 4.166          | 10.326          | 0.105                     | 0.739          | 0.252           |
| 195.0                                                                  | 15.0               | 194.3               | 0.389                   | 5.049          | 10.137          | 0.078                     | 0.814          | 0.198           |
| 210.0                                                                  | 15.0               | 209.9               | 0.545                   | 5.746          | 10.656          | 0.087                     | 1.289          | 0.173           |
| 225.0                                                                  | 14.8               | 226.2               | 0.518                   | 5.802          | 11.106          | 0.090                     | 1.767          | 0.234           |
| 240.0                                                                  | 14.9               | 241.8               | 0.637                   | 7.113          | 11.789          | 0.079                     | 1.940          | 0.327           |
| 255.0                                                                  | 15.1               | 256.1               | 0.441                   | 7.050          | 11.975          | 0.064                     | 1.830          | 0.380           |
| 270.0                                                                  | 15.1               | 270.8               | 0.260                   | 7.955          | 12.072          | 0.048                     | 1.743          | 0.471           |
| 285.0                                                                  | 15.2               | 285.4               | 0.387                   | 7.721          | 12.467          | 0.066                     | 1.671          | 0.563           |
| 300.0                                                                  | 15.1               | 299.9               | 0.652                   | 6.531          | 12.581          | 0.150                     | 1.480          | 0.651           |
| 315.0                                                                  | 15.0               | 314.3               | 0.867                   | 5.243          | 12.160          | 0.226                     | 1.172          | 0.700           |
| 330.0                                                                  | 14.9               | 328.9               | 1.182                   | 4.085          | 12.065          | 0.276                     | 0.861          | 0.732           |
| 345.0                                                                  | 14.9               | 343.8               | 1.285                   | 3.801          | 12.223          | 0.307                     | 0.561          | 0.757           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table V.40:** Accelerations at Flight Deck: JONSWAP Spectrum with  $H_s = 9.0$  m and  $T_p = 17.1$  s; Ship's speed is 20.0 Knots

| <b>Cmd<br/>Heading</b>                                                 | <b>Actual<br/>Mean</b> |                     | <b>Absolute<br/>Maximum</b> |                |                 | <b>Standard<br/>Deviation</b> |                |                 |
|------------------------------------------------------------------------|------------------------|---------------------|-----------------------------|----------------|-----------------|-------------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts           | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$             | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$               | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 20.1                   | -0.5                | 1.450                       | 3.316          | 12.154          | 0.344                         | 0.489          | 0.884           |
| 15.0                                                                   | 20.1                   | 14.7                | 1.492                       | 3.669          | 12.431          | 0.337                         | 0.724          | 0.896           |
| 30.0                                                                   | 20.1                   | 29.8                | 1.324                       | 4.331          | 12.773          | 0.310                         | 1.008          | 0.899           |
| 45.0                                                                   | 20.1                   | 44.8                | 0.976                       | 5.158          | 12.907          | 0.258                         | 1.208          | 0.866           |
| 60.0                                                                   | 20.2                   | 59.6                | 0.619                       | 6.094          | 12.958          | 0.175                         | 1.365          | 0.800           |
| 75.0                                                                   | 20.2                   | 74.4                | 0.352                       | 5.390          | 12.769          | 0.086                         | 1.027          | 0.666           |
| 90.0                                                                   | 20.3                   | 89.4                | 0.223                       | 4.698          | 12.530          | 0.059                         | 0.978          | 0.561           |
| 105.0                                                                  | 20.3                   | 104.5               | 0.383                       | 5.308          | 12.277          | 0.074                         | 1.027          | 0.480           |
| 120.0                                                                  | 20.1                   | 119.2               | 0.351                       | 5.882          | 11.562          | 0.092                         | 1.669          | 0.537           |
| 135.0                                                                  | 20.1                   | 134.3               | 0.408                       | 5.468          | 11.196          | 0.099                         | 1.303          | 0.407           |
| 150.0                                                                  | 20.2                   | 149.3               | 0.446                       | 3.948          | 10.626          | 0.101                         | 0.781          | 0.289           |
| 165.0                                                                  | 20.1                   | 164.3               | 0.584                       | 3.353          | 10.920          | 0.131                         | 0.649          | 0.298           |
| 180.0                                                                  | 20.3                   | 179.4               | 0.447                       | 3.701          | 10.250          | 0.101                         | 0.547          | 0.209           |
| 195.0                                                                  | 20.2                   | 194.8               | 0.541                       | 6.220          | 10.128          | 0.112                         | 1.025          | 0.252           |
| 210.0                                                                  | 20.1                   | 210.0               | 0.600                       | 7.297          | 10.028          | 0.103                         | 1.418          | 0.276           |
| 225.0                                                                  | 20.1                   | 225.1               | 0.542                       | 7.524          | 10.179          | 0.089                         | 1.775          | 0.270           |
| 240.0                                                                  | 20.1                   | 240.8               | 0.498                       | 7.974          | 10.833          | 0.092                         | 2.190          | 0.282           |
| 255.0                                                                  | 20.2                   | 255.5               | 0.508                       | 8.562          | 11.406          | 0.077                         | 1.908          | 0.359           |
| 270.0                                                                  | 20.3                   | 270.4               | 0.318                       | 8.356          | 12.076          | 0.060                         | 1.849          | 0.471           |
| 285.0                                                                  | 20.3                   | 285.2               | 0.328                       | 7.594          | 12.080          | 0.070                         | 1.712          | 0.588           |
| 300.0                                                                  | 20.2                   | 299.9               | 0.677                       | 7.733          | 12.833          | 0.159                         | 1.522          | 0.709           |
| 315.0                                                                  | 20.2                   | 314.5               | 0.916                       | 5.752          | 12.401          | 0.246                         | 1.169          | 0.790           |
| 330.0                                                                  | 20.1                   | 329.3               | 1.275                       | 4.240          | 12.434          | 0.303                         | 0.819          | 0.843           |
| 345.0                                                                  | 20.1                   | 344.4               | 1.347                       | 3.489          | 12.355          | 0.333                         | 0.530          | 0.866           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                        |                     |                             |                |                 |                               |                |                 |

**Table V.41:** Accelerations at Flight Deck: JONSWAP Spectrum with  $H_s = 9.0$  m and  $T_p = 17.1$  s; Ship's speed is 25.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 25.2               | -0.2                | 1.454                   | 3.561          | 13.367          | 0.366                     | 0.565          | 1.066           |
| 15.0                                                                   | 25.2               | 14.9                | 1.461                   | 4.189          | 13.085          | 0.360                     | 0.795          | 1.074           |
| 30.0                                                                   | 25.2               | 30.0                | 1.349                   | 5.042          | 13.231          | 0.332                     | 1.078          | 1.061           |
| 45.0                                                                   | 25.2               | 45.0                | 1.051                   | 5.277          | 13.056          | 0.275                     | 1.314          | 0.991           |
| 60.0                                                                   | 25.3               | 59.8                | 0.665                   | 6.480          | 13.825          | 0.188                     | 1.492          | 0.886           |
| 75.0                                                                   | 25.3               | 74.6                | 0.379                   | 5.289          | 13.314          | 0.092                     | 1.105          | 0.689           |
| 90.0                                                                   | 25.3               | 89.6                | 0.279                   | 4.616          | 12.396          | 0.072                     | 1.039          | 0.553           |
| 105.0                                                                  | 25.3               | 104.6               | 0.408                   | 5.273          | 11.993          | 0.094                     | 1.038          | 0.437           |
| 120.0                                                                  | 25.2               | 119.6               | 0.403                   | 5.937          | 10.817          | 0.112                     | 1.866          | 0.477           |
| 135.0                                                                  | 25.2               | 134.6               | 0.443                   | 5.854          | 10.726          | 0.120                     | 1.469          | 0.324           |
| 150.0                                                                  | 25.3               | 149.5               | 0.590                   | 4.978          | 10.460          | 0.140                     | 1.195          | 0.280           |
| 165.0                                                                  | 25.4               | 164.5               | 0.669                   | 4.011          | 10.517          | 0.132                     | 0.580          | 0.206           |
| 180.0                                                                  | 25.8               | 179.8               | 0.476                   | 3.208          | 10.178          | 0.135                     | 0.345          | 0.168           |
| 195.0                                                                  | 25.6               | 194.9               | 0.684                   | 4.401          | 10.126          | 0.121                     | 0.696          | 0.187           |
| 210.0                                                                  | 25.3               | 210.1               | 0.611                   | 6.468          | 10.105          | 0.126                     | 1.339          | 0.318           |
| 225.0                                                                  | 25.3               | 225.0               | 0.333                   | 6.875          | 10.021          | 0.096                     | 1.476          | 0.335           |
| 240.0                                                                  | 25.2               | 240.3               | 0.512                   | 9.030          | 10.121          | 0.100                     | 2.194          | 0.328           |
| 255.0                                                                  | 25.3               | 255.2               | 0.471                   | 9.271          | 11.264          | 0.089                     | 1.867          | 0.368           |
| 270.0                                                                  | 25.3               | 270.2               | 0.324                   | 7.886          | 12.014          | 0.071                     | 1.830          | 0.484           |
| 285.0                                                                  | 25.3               | 285.1               | 0.352                   | 8.558          | 12.309          | 0.076                     | 1.808          | 0.623           |
| 300.0                                                                  | 25.3               | 299.9               | 0.664                   | 8.027          | 12.763          | 0.169                     | 1.541          | 0.786           |
| 315.0                                                                  | 25.3               | 314.7               | 0.997                   | 6.065          | 12.698          | 0.262                     | 1.162          | 0.923           |
| 330.0                                                                  | 25.2               | 329.6               | 1.350                   | 4.882          | 13.294          | 0.323                     | 0.834          | 1.015           |
| 345.0                                                                  | 25.2               | 344.7               | 1.578                   | 3.647          | 13.044          | 0.355                     | 0.573          | 1.051           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

**Table V.42:** Accelerations at Flight Deck: JONSWAP Spectrum with  $H_s = 9.0$  m and  $T_p = 17.1$  s; Ship's speed is 30.0 Knots

| <b>Cmd Heading</b>                                                     | <b>Actual Mean</b> |                     | <b>Absolute Maximum</b> |                |                 | <b>Standard Deviation</b> |                |                 |
|------------------------------------------------------------------------|--------------------|---------------------|-------------------------|----------------|-----------------|---------------------------|----------------|-----------------|
| $\psi_{MHP}$<br>deg                                                    | Speed<br>kts       | $\psi_{MHP}$<br>deg | Long<br>$m/s^2$         | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ | Long<br>$m/s^2$           | Lat<br>$m/s^2$ | Vert<br>$m/s^2$ |
| 0.0                                                                    | 30.4               | -0.0                | 1.546                   | 4.579          | 14.260          | 0.385                     | 0.673          | 1.303           |
| 15.0                                                                   | 30.4               | 15.1                | 1.607                   | 5.211          | 13.878          | 0.379                     | 0.874          | 1.304           |
| 30.0                                                                   | 30.4               | 30.1                | 1.368                   | 5.830          | 13.963          | 0.350                     | 1.134          | 1.274           |
| 45.0                                                                   | 30.4               | 45.1                | 1.145                   | 6.042          | 14.426          | 0.294                     | 1.375          | 1.175           |
| 60.0                                                                   | 30.4               | 60.0                | 0.803                   | 6.750          | 14.006          | 0.200                     | 1.599          | 0.981           |
| 75.0                                                                   | 30.4               | 74.7                | 0.345                   | 5.321          | 12.966          | 0.099                     | 1.213          | 0.718           |
| 90.0                                                                   | 30.4               | 89.7                | 0.338                   | 4.896          | 12.111          | 0.085                     | 1.167          | 0.549           |
| 105.0                                                                  | 30.4               | 104.7               | 0.466                   | 4.830          | 11.293          | 0.113                     | 1.093          | 0.402           |
| 120.0                                                                  | 30.3               | 119.7               | 0.496                   | 6.824          | 10.575          | 0.139                     | 2.240          | 0.458           |
| 135.0                                                                  | 30.2               | 134.5               | 0.709                   | 6.780          | 10.769          | 0.174                     | 1.884          | 0.354           |
| 150.0                                                                  | 30.3               | 149.2               | 0.823                   | 7.110          | 10.189          | 0.225                     | 1.462          | 0.321           |
| 165.0                                                                  | 30.8               | 164.0               | 0.858                   | 4.219          | 10.109          | 0.198                     | 0.692          | 0.219           |
| 180.0                                                                  | 31.2               | 179.7               | 0.615                   | 4.469          | 9.954           | 0.190                     | 0.547          | 0.173           |
| 195.0                                                                  | 30.9               | 194.7               | 0.840                   | 4.263          | 9.976           | 0.188                     | 0.771          | 0.204           |
| 210.0                                                                  | 30.5               | 210.3               | 0.789                   | 7.427          | 10.151          | 0.203                     | 1.460          | 0.355           |
| 225.0                                                                  | 30.4               | 225.1               | 0.552                   | 6.769          | 10.028          | 0.134                     | 1.661          | 0.411           |
| 240.0                                                                  | 30.4               | 240.1               | 0.501                   | 8.751          | 9.966           | 0.117                     | 2.170          | 0.466           |
| 255.0                                                                  | 30.4               | 255.1               | 0.510                   | 8.813          | 11.527          | 0.107                     | 1.704          | 0.384           |
| 270.0                                                                  | 30.4               | 270.1               | 0.320                   | 7.830          | 11.937          | 0.084                     | 1.734          | 0.506           |
| 285.0                                                                  | 30.4               | 285.1               | 0.363                   | 8.408          | 11.978          | 0.083                     | 1.746          | 0.670           |
| 300.0                                                                  | 30.4               | 299.9               | 0.643                   | 8.061          | 13.010          | 0.180                     | 1.526          | 0.877           |
| 315.0                                                                  | 30.4               | 314.8               | 1.045                   | 6.903          | 13.501          | 0.280                     | 1.138          | 1.110           |
| 330.0                                                                  | 30.4               | 329.8               | 1.337                   | 5.184          | 13.865          | 0.341                     | 0.832          | 1.237           |
| 345.0                                                                  | 30.4               | 344.9               | 1.357                   | 4.352          | 13.947          | 0.372                     | 0.653          | 1.281           |
| Wind at 38.7 knots (19.9 m/s) is from the starboard beam in all cases. |                    |                     |                         |                |                 |                           |                |                 |

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# Annex W

## NATO Sea State Table

**Table W.1:** NATO Sea State Table (After Table D-1 in NATO STANAG 4194)

| Sea State Number                                                                                                                                                                                                                                                                                                                                                                                               | Significant Wave Height (m) |         | Sustained Wind Speed (Knots)* |        | % Prob. of Sea State | Wave Period (s) |             |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|---------|-------------------------------|--------|----------------------|-----------------|-------------|
|                                                                                                                                                                                                                                                                                                                                                                                                                | Range                       | Mean    | Range                         | Mean   |                      | Range†          | Most Prob.‡ |
| 0 - 1                                                                                                                                                                                                                                                                                                                                                                                                          | 0.00 - 0.10                 | 0.05    | 0 - 6                         | 3.0    | 0.70                 | —               | —           |
| 2                                                                                                                                                                                                                                                                                                                                                                                                              | 0.10 - 0.50                 | 0.30    | 7 - 10                        | 8.5    | 6.80                 | 3.3 - 12.8      | 7.5         |
| 3                                                                                                                                                                                                                                                                                                                                                                                                              | 0.50 - 1.25                 | 0.88    | 11 - 16                       | 13.5   | 23.70                | 5.0 - 14.8      | 7.5         |
| 4                                                                                                                                                                                                                                                                                                                                                                                                              | 1.25 - 2.50                 | 1.88    | 17 - 21                       | 19.0   | 27.80                | 6.1 - 15.2      | 8.8         |
| 5                                                                                                                                                                                                                                                                                                                                                                                                              | 2.50 - 4.00                 | 3.25    | 22 - 27                       | 24.5   | 20.64                | 8.3 - 15.5      | 9.7         |
| 6                                                                                                                                                                                                                                                                                                                                                                                                              | 4.00 - 6.00                 | 5.00    | 28 - 47                       | 37.5   | 13.15                | 9.8 - 16.2      | 12.4        |
| 7                                                                                                                                                                                                                                                                                                                                                                                                              | 6.00 - 9.00                 | 7.50    | 48 - 55                       | 51.5   | 6.05                 | 11.8 - 18.5     | 15.0        |
| 8                                                                                                                                                                                                                                                                                                                                                                                                              | 9.00 - 14.00                | 11.50   | 56 - 63                       | 59.5   | 1.11                 | 14.2 - 18.6     | 16.4        |
| > 8                                                                                                                                                                                                                                                                                                                                                                                                            | > 14.00                     | > 14.00 | > 63                          | > 63.0 | 0.05                 | 15.7 - 23.7     | 20.0        |
| <p>*Ambient wind sustained at 19.5 m above surface to generate fully-developed seas.<br/>           To convert to another altitude, <math>H_2</math>, apply <math>V_2 = V_1 (H_2/19.5)^{1/7}</math><br/>           †Min. is 5 percentile and max. is 95 percentile for periods give wave height range.<br/>           ‡Based on periods associated with central frequencies incl. in Hindcast Climatology.</p> |                             |         |                               |        |                      |                 |             |

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In support of procurement of new maritime helicopters, DRDC Atlantic was tasked to simulate motions of the HALIFAX class in seaways. The data produced will aid in the determination of helicopter securing loads, which are highly dependent upon the motions of the ship. The present work reports a systematic series of simulations modelling a HALIFAX class frigate with nominally steady speed and heading (course-keeping) in a variety of seaway conditions. This memorandum provides the data in a tabulated format for quick reference. A companion report (DRDC TM 2004-043) describes the simulation conditions and key results.

14. KEYWORDS, DESCRIPTORS or IDENTIFIERS (technically meaningful terms or short phrases that characterize a document and could be helpful in cataloguing the document. They should be selected so that no security classification is required. Identifiers, such as equipment model designation, trade name, military project code name, geographic location may also be included. If possible keywords should be selected from a published thesaurus. e.g. Thesaurus of Engineering and Scientific Terms (TEST) and that thesaurus-identified. If it not possible to select indexing terms which are Unclassified, the classification of each should be indicated as with the title).

Ship motions  
Helicopter securing loads  
Open waters  
Coastal waters  
Heave  
Roll angles  
Pitch angles  
Longitudinal force estimator  
Lateral force estimator  
Vertical force estimator

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