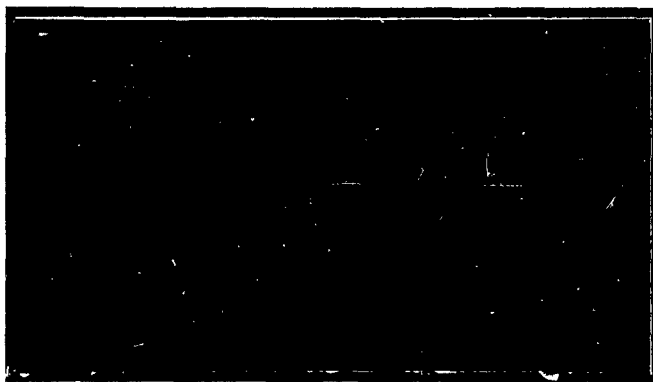


406132

DESIGN DIVISION TECHNICAL REPORT



PHILADELPHIA NAVAL SHIPYARD
PHILADELPHIA, PENNSYLVANIA

406 132



**Best
Available
Copy**

COLLECTION OF LETTER REPORTS
OF VIBRATION SURVEYS
ISSUED DURING 1962

F. A. HEINZE
AND
D. S. BROGDEN

Prepared by:
Code 261

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USS ROBERTS (DD823)	Post-Overhaul Hull Vibration Survey	24 January 1962
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USNS KINGSPORT (AGS164)	Hull Vibration Survey	16 November 1962
USS TACONIC (AGC17)	Vibration - Ship's Service Turbo-Generator No. 2	27 December 1962
USS LONG BEACH (CG(N)9)	Sea Trial Vibration Items	28 December 1962

SHOP REPORT
410-SHPYJ-8763

HANDLING

☐ ROU

☐ PRIORITY

☒ URGENT
(Send Copy)

SERIAL NO.

261

DATE PREPARED

24 January 1962

SHIP OR ACTIVITY

USS ROBERTS (DD823)

JOB ORDER NO.

12-13-90202

PLAN. & EST.

JOB TITLE

VIBRATION SURVEY
(Post-Overhaul)

Provide 3 copies for P & E Division, in addition to copies for addresses checked under "COPY DISTRIBUTION".

FROM		VIA			
SHIP	SECT.	TITLE	CODES	INITIALS	DATE
Code 261		ASST. P & E SUPT.	☐ 212 ☒ 213 ☐ 214 ☐ 215 ☐		
PREPARED BY (Name and Phone) P.D.DEAR 2948		ADVANCE PLANNING	227		
APPROVED BY H. L. COFFIN					

JOB PLANNING BRANCH
(Code 230)

PURPOSE (Check appropriate column)	ACTION	INFORMATION
Report of inspection in compliance with Job Order		☒
Request for further instructions.		
Report of new work changing scope of Job Order		
Other		

COPY DISTRIBUTION
(Check/write in as required)

☒ SHIP SUPT. OR ☐ CODE 355

☐ CODE 307

☐ REPAIR SUPT. OR ☐ SHOP SUPT.

☒ Code 244

☒ Code 213 (3)

☒ Code 261 (2)

☐

☐

COMMENTS:

RECOMMENDED ACTION:

(Use additional blank sheets if needed)

ASST. P & E SUPT. ACTION AND COMMENTS:

☐ CODE 226: Issue new Job Order

☐ CODE 227: Route

☐ CODE 240: Investigate and report

☐ CODE 236: ☐ Route as required

☐ Investigate and report

☐ File if acceptable

USS ROBERTS (DD823)

261-29

VIBRATION SURVEY

12-13-90202

24 January 1962

COMMENTS AND RECOMMENDED ACTION:

1. In accordance with the J.O. a hull vibration survey was conducted on the subject vessel on 11 January 1962 during Builder's Trial to determine whether hull vibration is excessive.
2. The main propulsion system consists of steam turbines driving through reduction gears. The shafts are fitted with four-bladed propellers.
3. All data were obtained while in water depths exceeding 80 ft. Hull vibrations measurements were obtained at the 5 inch Gun Director Barbette on the O2 level at frame 72 using General Radio vibration equipment and a Brush recorder.
4. Data was recorded over the speed range of 210 to 320 RPM at increments of 10 RPM with additional data recorded at 5 RPM increments in the vicinity of the critical speeds.
5. The results of the survey are presented on *sheet (3) of (3)*. Two distinct first order (one vibration cycle per shaft revolution) critical speeds are present. The lower critical speed was 240 RPM with a displacement amplitude of ± 8.7 mils. The upper critical speed was 315 RPM with a displacement amplitude of ± 14 mils.
6. Based on measurements on a great many vessels, the New York Naval Shipyard Material Laboratory has established the tolerable limit of ± 18 to ± 20 mils (measured on the O2 level approximately frame 74) for first order athwartship vibration on this class vessel. Therefore the hull vibration amplitudes measured on this vessel are considered acceptable.

K-E 10 X 10 TC-SHE 18" M 358-50
KEUFFEL & BROWER CO. MADE IN U.S.A.

USS ROBERTS (DD 823)

HULL VIBRATION SURVEY

OF 11 JANUARY 1962

GUN DIRECTOR BARBETTE

02 LEVEL FRAME 72

AFTWAIRSHIP VIBRATION

DISPLACEMENT AMPLITUDE
IN INCHES

0

200

220

240

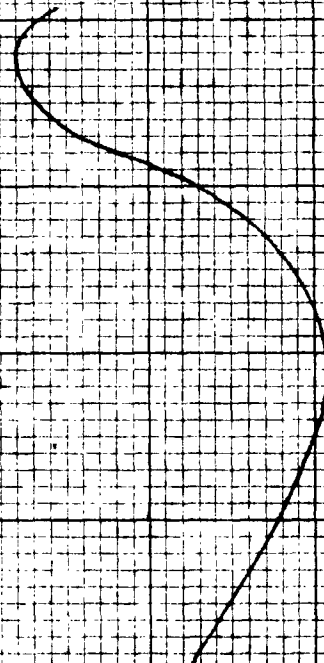
260

300

320

SHAFT SPEED
RPM

PHILADANVSHIRMD
SHIP REPORT 2651-29
SHEET 3 OF 3



SHOP REPORT
440-SHPYD-6763

HANDLING

☒ ROUTINE

☐ PRIORITY

☐ URGENT
(Band Carry)

SERIAL NO.

261-30

DATE PREPARED

7 February 1962

SHIP OR ACTIVITY

USS PRATT (DLG13)

JOB ORDER NO.

14-02-71032

PLAN & EST.

JOB TITLE

HULL VIBRATION SURVEY
(AFTER SHAFT RENEWAL)

Provide 3 copies for P & E Division, in addition to copies for addresses checked under "COPY DISTRIBUTION".

FROM

VIA

SHOP

Code 261

PREPARED BY (Name and phone)

P. D. Dear 2948

APPROVED BY

H. L. Coffin

TO

JOB PLANNING BRANCH
(Code 230)

PURPOSE
(Check appropriate column)

ACTION

INFORMATION

Report of inspection in compliance with Job Order

☒

Request for further instructions.

Report of new work changing scope of Job Order

Other

COPY DISTRIBUTION
(Check/write in as required)

☐ SHIP SUPT. OR ☐ CODE 366

☐ CODE 307

☐ REPAIR SUPT. OR ☐ SHOP SUPT.

☒ Code 244

☒ Code 211(4)

☒ Code 261(2)

ASST. P & E SUPT. ACTION AND COMMENTS:

☐ CODE 226: Issue new Job Order

☐ CODE 227: Route

☐ CODE 240: Investigate and report

☐ CODE 230: ☐ Route as required;

☐ Investigate and report;

☐ File if acceptable

COMMENTS:

1. A hull vibration survey was conducted on the subject vessel on 25 January 1962 during the special sea trial conducted after the main propulsion shafting renewal.

2. All data were obtained while in water depths exceeding 80 feet. Athwartship vibration measurements were recorded at the mast on the 02 level frame 80 over the speed range of 130 RPM to 280 RPM at increments of 10 shaft RPM.

3. The results of the survey are presented in graphical form on sheet 2 of 2 of this report. There does not appear to be any first order (one vibration cycle/shaft revolution) critical speed present. The maximum displacement amplitude of the first order vibration was ± 5.0 mils at 260 shaft RPM. Propeller blade frequency vibration (4th order) was observed from 130 to 250 RPM but never exceeded a displacement amplitude of ± 0.5 mils.

4. The most prevalent vibration observed throughout the speed range was a 1.7-1.8 cps constant frequency which is independent of shaft speed and most likely hydrodynamically excited. A critical occurred at 230 RPM with a displacement amplitude of ± 44.6 mils.

5. The hull vibration amplitudes measured on this vessel are considered to be acceptable.

(Use additional blank sheets if needed)

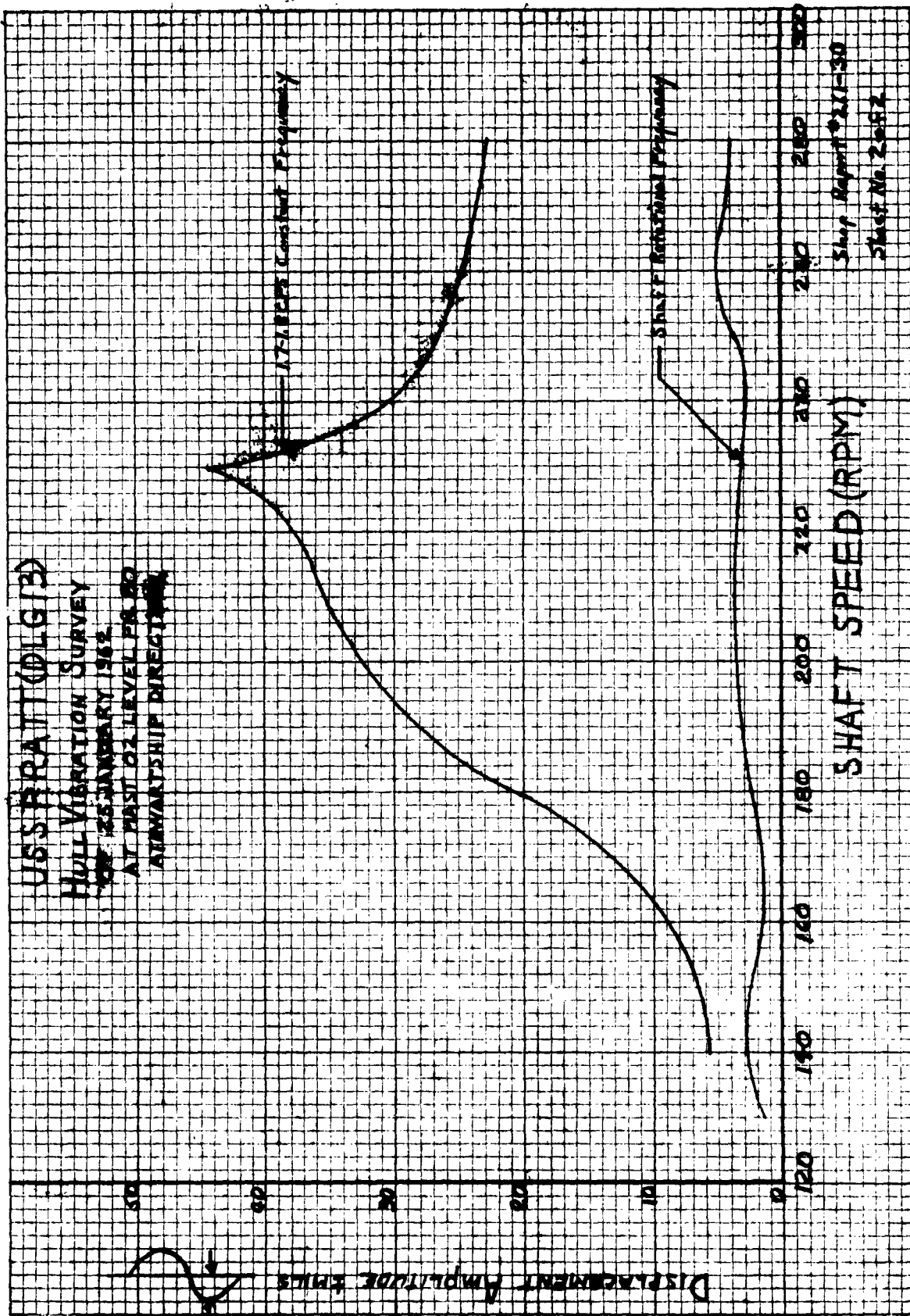
USS BRATT (DLG-13)

HULL VIBRATION SURVEY

25 JANUARY 1962

AT FAST 02 LEVEL PA 20

AIRWARTSHIP DIRECTION



Ship Report # 211-30
Sheet No. 2 of 2

Code 261
LPH-3

From: Commander, Philadelphia Naval Shipyard
To: Chief, Bureau of Ships

Subj: USS OKINAWA (LPH-3); Underway Vibration Survey

Ref: (a) BUSHIPS ltr Ser 345-59 of 21 Feb 1962

Encl: (1) Underway Vibration Data for USS OKINAWA (LPH-3)

1. A vibration survey was conducted on USS OKINAWA during builders trials on 9 May 1962. Displacement was 16,500 tons with a mean draft of 24'-6". Designed full load displacement of this class is 17,983 tons with a mean draft of 26'-1".
2. During the build up to full power, speeds were increased from 40 to 118 shaft RPM in increments of 10 RPM with 5 RPM increments at the higher speeds. Vertical and transverse vibration data were recorded on the towing pad on the main deck Frame 141g at each steady speed increment. CEC type 4-102A velocity pickups were used in conjunction with a Brush Mk II dual channel oscillograph. Conditions during the speed build up were sea state 3, wind speed 15 knots at 210 degrees relative bearing and intermittent 5 degree right and left rudder corrections.
3. At full power, measurements were taken at the bow and stern, several locations on the island and mast and on the main propulsion machinery. Vibration pickups had been mounted on the mast in the transverse direction, 30 and 58 feet above the 07 level prior to the trial. Measurements were also obtained on the mast, island and stern during hard right and left turns.
4. Results of the measurements at the towing pad, Frame 141, are plotted in figures 1 and 2 of enclosure (1). Data obtained on USS IWO JIMA (LPH-2) at 15,900 tons displacement on 10 January 1962 are plotted for comparison. It should be pointed out that vibration levels during hard turns are far from steady and the maximum amplitudes were found to vary considerably between various turns at the same rudder angle and speed. Therefore, the comparison between LPH-2 and LPH-3 in hard turns should not be given too much weight.
5. Extensive work was accomplished by the Shipyard to correct excessive local vibrations on LPH-3. Additional stiffening was installed in the island structure and the mast was extended down to the flight deck (03) level. While no measurements are available on the LPH-2 mast, visual observations of the two ships indicate that considerable improvement in mast vibration was achieved by the LPH-3 alterations. However, an examination of comparable island measurements indicates no improvement in that area.

Code 261
LPH-3

6. According to reference (a) the 10 January 1962 hull vibration measurements on LPH-2 were acceptable and satisfactory. This Shipyard concluded that the similar hull amplitudes on LPH-3 were also satisfactory.

Copy to:

COMPHIBLANT (w/1 copy encl. (1))

C.O. USS OKINAWA (LPH-3)(w/1 copy encl. (1))

BUSHIPS (Code 442)(w/1 copy encl. (1))

BUSHIPS (Code 436)(w/1 copy encl. (1))

Code 200

212 (w/1 copy encl. (1))

261

300 (w/1 copy encl. (1))

Prepared by: F. Heinse

Typed by: N. H. Emma

TEST DATA RECORD
AND-SHIPS-0421

SUBJECT VIBRATION TRIAL LPH TABLE I

SHEET NO.

DATE

LOCATION	RUDDER	DIRECTION	FREQ	MILS PEAK TO PEAK MAY 30		
			4TH ORD	LPH 2	LPH 3	LPH 3
BOW 01 LEVEL	0 DEG	TRANSVERSE		5	4	
"		VERTICAL		12	—	
"		FORE + AFT		—	5.5	
WLDK FR 141 &		TRANSV		6	5	6.5
		VERT		21	22	25
	Y	F & A		—	2.5	3.5
	RIGHT 40°	TRANSV		27	18.5	
	"	VERT		13	12	
	LEFT 40°	TRANSV		27	27	
Y	"	VERT		35	30	
03 LEVEL	FR 63	TRANS		—	2.5	06 LAGS
06 LEVEL MAST FR 63		TRANS		10	19	90°
MAST 30' ABV 07 LEV		TRANS		—	15	OUT OF
MAST 58' ABV 07 LEV (TOP)		TRANS		—	19	PHASE
06 LEVEL	FR 63	VERT	Y	4	4	

CALCULATED BY

CHECKED BY

1-800-4-A-STAR

CLASSIFIED BY

44-38861-4221

DATE _____

13 JAN 1968

DATE _____

TABLE III

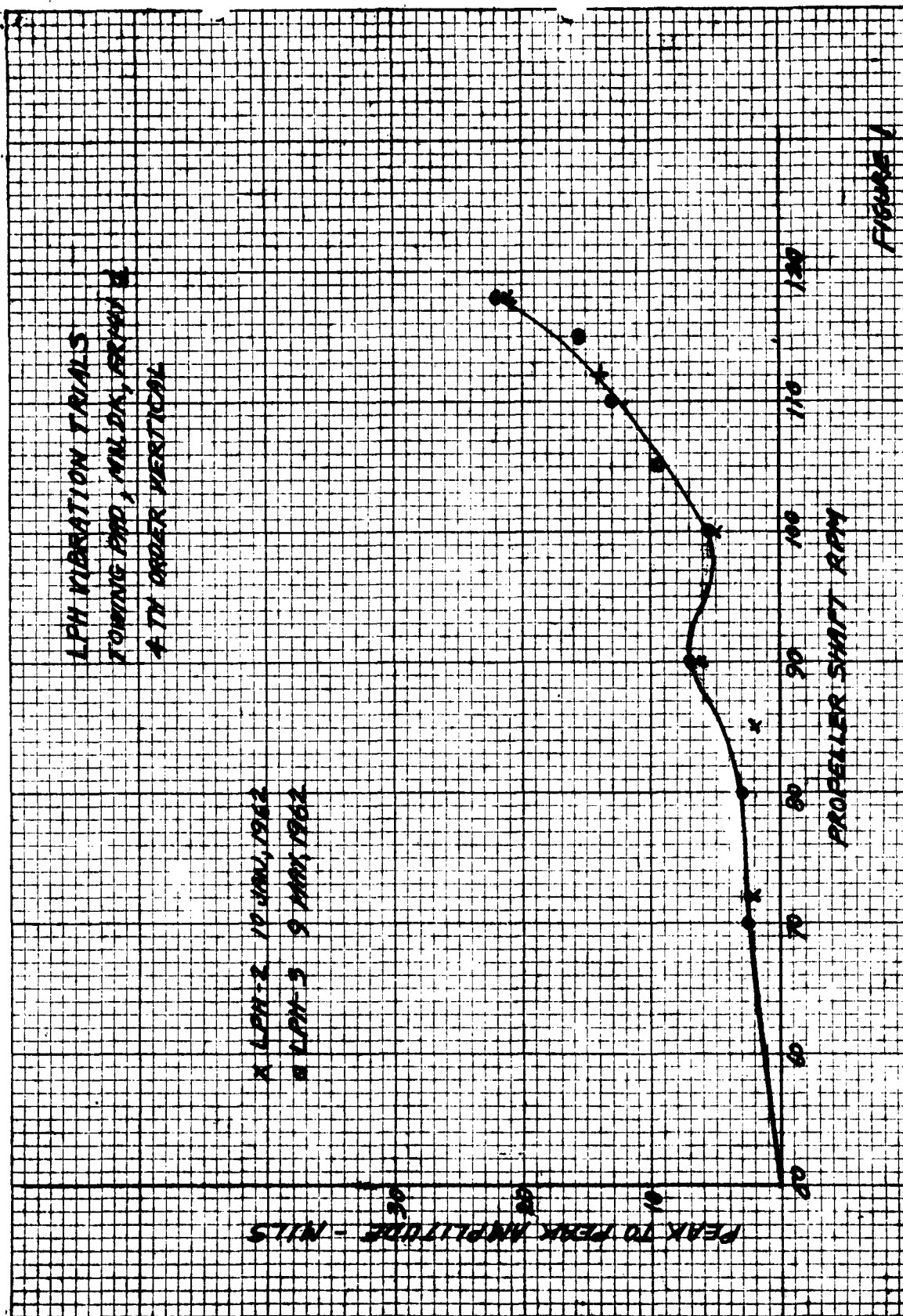
MACHINERY DATA

571415

PEAK TO PEAK

AD 6167183

ANALYSIS



LPH VIBRATION TRIALS
TOWING PAD, HANDED, FROM 1/2
4TH ORDER TRANSVERSE

X LPH-2 10 JAN, 1962

10 LPH-3 9 MAY, 1962

10 LPH-3 30 MAY, 1962 06 LEVEL FR 63 (ANALYST)

4 LPH-3 30 MAY, 1962 12 DIRECTOR PERESTAL 36' RM 06 LEVEL

PEAK TO PEAK AMPLITUDE - MILS

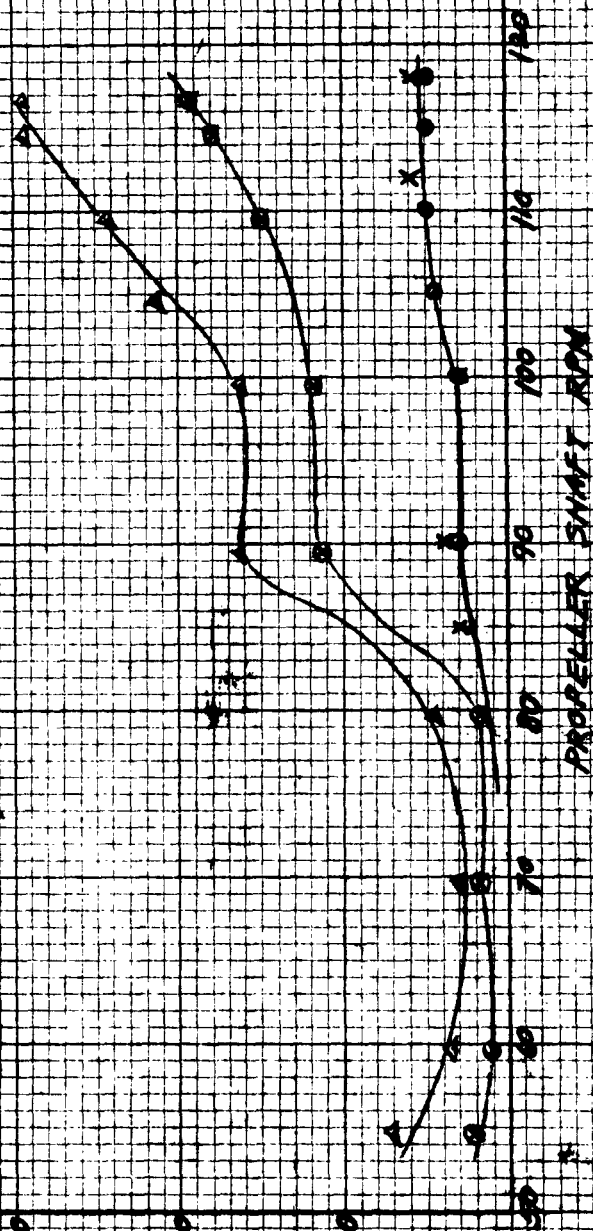


FIGURE 2

Code 261
12 April 1962

MEMORANDUM

From: Code 261
To: Code 214

Subj: USS SAILFISH (SSR572) Snorkel Exhaust System Noise and Vibration;
investigation of

Ref: (a) PHILANAVSHIPYD J.O. 16-345-4107

1. In accordance with reference (a) an investigation of the snorkel exhaust system on the USS SAILFISH (SS572) was made in order to determine the cause of the noise and vibration in the piping when the engines are exhausted through the snorkel exhaust mast or to the low pressure blow system.
2. The noise and vibration in the snorkel exhaust system has existed since the ship was built and the following work has been done in the past in an attempt to correct the condition:
 - a. The various valves in the snorkel exhaust system have been overhauled in order to eliminate any chatter or leakage.
 - b. Portsmouth Naval Shipyard installed 39 mild steel bands 4 inches wide spaced 18 to 36 inches apart around the piping in order to eliminate noise and vibration caused by pipe resonance.
 - c. During the ship's availability at Philadelphia in 1959, the low pressure blow take-off and the snorkel exhaust piping section, between frames 73 and 76 were modified in order to eliminate noise and vibration caused by suspected poor flow characteristics in this area. None of the above corrective actions were successful in reducing or eliminating the noise and vibration.
3. During the investigation conducted at dockside on the 29 January 1962, the #2 main engine was operated at 750 RPM and exhausted outboard through the muffler and low pressure blow system. The "Able" valve was inoperable and dogged shut and no attempt was made to exhaust through the snorkel exhaust mast. Tests were made to see what effect various conditions had on the generation of the noise. The results of the checks are as follows:
 - a. The engine and blower speeds were kept constant and the pressure in the exhaust duct was varied. Between 4.5 psig and 9 psig the noise was evident. At 10 psig (maximum pressure obtained during the test) the

noise generation stopped but as the pressure was lowered, the noise resumed.

b. With engine speed reduced to 650 RPM and the snorkel exhaust duct pressure maintained between 4.5 and 8 psig, the noise generation did not occur.

c. The valve to the low pressure blow system was secured but this did not stop the noise generation, although there was then no flow in the snorkel exhaust system.

4. Since the noise generation is independent of flow in the duct and dependent on pressure and engine speed, it is concluded that a standing wave is being excited in the snorkel exhaust duct air column by some harmonic of engine speed. This would also explain why all previous corrective action had no effect on the noise generation. The standing wave is being generated in the longrun (50') of snorkel exhaust duct between frames 77 and 97.

5. In order to correct this condition it would be necessary to detune the pipe by shortening it or lengthening it or in some manner to break up the standing wave in the duct. Bureau of Ships, Code 525, was consulted as to whether they had any objection to the installation of an enlarged section, with or without baffles, or the installation of bends in the straight duct. The installation of an enlarged section with or without baffles was not acceptable but there was no objection to the installation of bends in the straight duct.

6. Upon investigation of the possibility of the installing bends in the straight duct, it was found that not much change in the run of the duct could be made due to space limitations. With the modification of the duct that is possible, there is no assurance that it would be effective in reducing or eliminating the objectionable noise and vibration.

7. It was learned from Ship's Force that the other ship of this class, the USS SALMON (SS573) has a similar noise and vibration problem. San Francisco Naval Shipyard was contacted and it was found that in the past, corrective action had been taken on the USS SALMON similar to that already accomplished on the USS SAILFISH. During the USS SALMON's recently completed availability, no complaint about the problem was made. It is not known whether the problem has been solved or whether the Ship's Force does not consider it sufficiently serious to warrant corrective action.

8. Since it is not feasible to initiate corrective action which would have a reasonable chance of correcting the condition in the snorkel exhaust system, it is recommended that no corrective action be taken.

Code 261

Copy to:

Code 260

262

261 (2)

244

Prepared by: P. D. Dear

Typed by: M. L. Riets

SHOP REPORT
4ND-SHPYD-6763

HANDLING

☐ ROUTINE

☐ PRIORITY

☒ URGENT
(Send Garry).

SERIAL NO.

261-35

DATE PREPARED

16 May 1962

SHIP OR ACTIVITY

USS GALVESTON (CLG-3)

JOB ORDER NO.

16-15-30052

PLAN. & EST.

JOB TITLE

INVESTIGATION OF VIBRATION & NOISE
#4 SHIP'S SERVICE TURBO-GENERATOR

Provide 3 copies for P & E Division, in addition to copies for addresses checked under "COPY DISTRIBUTION".

FROM		VIA			
SEQ.	TITLE	CODES		INITIALS	DATE
1	ASST. P & E SUPT.	☒ 212	☐ 218	☐ 214	
		☐ 216	☐		
2	ADVANCE PLANNING	227			

JOB PLANNING BRANCH
(Code 230)

PURPOSE (Check appropriate column)	ACTION	INFORMATION
Report of inspection in compliance with Job Order		☒
Request for further instructions.		
Report of new work changing scope of Job Order		
Other		

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☐ CODE 307	
☐ REPAIR SUPT. OR	☐ SHOP SUPT.
☒ Code 244	
☒ Code 212 (2)	
☒ Code 261 (2)	
☒ Code 304A	
☒ C. O.	

COMMENTS:

1. In accordance with the ship's Trial Discr. Item the vibration and noise levels of the #4 Ship's Service Turbo-Generator were measured.

2. MILSTD 167, Mech. Vib. of Shipbd. Equip., establishes maximum allowable limits of vibration for new turbines. The limit for the subject unit (Instruction Book NAVSHIPS 361-0043) is $\pm \frac{1}{2}$ mils at 10,033 RPM (167 cps). The maximum measured amplitude of vibration, which was rotational frequency, was $\pm 1/8$ mils.

3. BUSHIPS Instruction 9610.12 provides instructions for measuring turbo-generator reduction gear noise in order to determine if replacement is required due to high noise levels. Noise level readings were recorded at three locations adjacent to the reduction gear and turbine, at the watch-stander's station and at a reference point adjacent to the #3 Ship's Service Turbo-Generator reduction gear. The predominate frequencies were the fundamental turbine rotational frequency (167cps) and (the 2nd, 3rd and 4th harmonics.) The gear mesh frequency (6000 cps) was at least 17 db below the broad band noise level and therefore insignificant. The noise levels are not considered excessive at any position.

RECOMMENDED ACTION:

1. No corrective action is recommended or required.

(Use additional blank sheets if needed)

ASST. P & E SUPT. ACTION AND COMMENTS:

☐ CODE 226: Issue new Job Order	☐ CODE 227: Route	☐ CODE 240: Investigate and report
☐ CODE 230:	☐ Route as required:	☐ Investigate and report:
	☐ File if acceptable	

PHILADELPHIA NAVAL SHIPYARD
NAVAL BASE

PHILADELPHIA 12. PA.

IN REPLY REFER TO
Code 261
DDG5
23 July 1962

From: Commander, Philadelphia Naval Shipyard
To: Commanding Officer, USS BIDDLE (DDG5)

Subj: USS BIDDLE (DDG5) Underway Vibration Surveys; results of

Ref: (a) PAT Item *1A3C (Machinery)
(b) PAT Item 1B23R (Weapons)
(c) DTMB Report 1451 "Ship Vibration" Dec 1960

Encl: (1) Plot of Hull Vibration - Main Dk Frame 182
(2) Plot of Missile Launcher Vibration - Arms In
(3) Plot of Missile Launcher Vibration - Arms Out
(4) Plot of After Gyro Compass Vibration

1. In response to references (a) and (b) vibration surveys were conducted on the USS BIDDLE (DDG5) while underway from Philadelphia Naval Shipyard to Yorktown, Virginia, 18 and 19 June 1962. The vibration surveys were conducted while the ship was operating in water over 120 feet deep. Sea state and wind conditions were mild throughout the surveys.

2. Four separate investigations were conducted as follows:

a. Tartar Missile Launcher

(1) It was learned that the Tartar Missile Launcher arm vibration of references (a) and (b) occurred with the launcher trained aft, with the arms retracted and with no missiles mounted on the arms. It was realized that the vibration characteristics could change considerably with missiles on the launcher, however, time considerations limited the scope of the survey to basically the conditions under which the complaint was noted. Vertical and transverse vibration measurements were recorded on the "A" and "B" arms approximately 18 inches from the loading end and on the main deck, Fr 182, at the starboard side of the launcher base using CEC Type 4-102A velocity pickups with a Brush Mk II oscillograph. Data was recorded for each position at every 10 shaft rpm from 150 to 295 rpm. Also, at each speed, the launcher arms were extended and additional data was recorded on the launcher arms.

(2) The results of the deck measurements are shown in enclosure (1). The major exciting frequency was 4th order (Propeller blade frequency) and the maximum displacement amplitude was +4.6 Mils, in the vertical direction, at 280 shaft rpm. Reference (c) includes a plot,

which was developed by Boston Naval Shipyard, showing a range of acceptable displacement amplitudes for hull vibration based on a constant velocity. The maximum acceptable amplitude of vibration at blade frequency is ± 4.9 Mils.

(3) Results of the launcher measurements are shown in enclosures (2) and (3). Curves were made of the vertical motion only as the amplitudes in the transverse direction were small (maximum ± 5 Mils at 280 rpm). The dominant frequency of vibration was propeller blade frequency except at 150-170 shaft rpm where eighth order of shaft frequency was dominant in the vertical direction on the "A" arm.

(4) With the ship operating at 295 shaft rpm, the launcher was trained to starboard and vibration readings were taken. The vertical displacement, amplitudes with the arms in the retracted position were ± 18 Mils on the "A" arm and ± 16 Mils on the "B" arm. With the arms in the extended position the amplitudes were ± 30 Mils on the "A" arm and ± 22 Mils on the "B" arm. It will be noted that, in this position, the amplitudes are larger than with launcher trained forward and aft. This can be attributed to the transverse hull motion tending to excite motion in elevation and depression of the arms which appear to have their C.G. below the axis of rotation.

b. After Gyro Compass

(1) The after gyro compass, 2nd Platform, Frame 182, was investigated using the same equipment that was used for the launcher. The vibration pickup was hand-held at the base of the compass and on the inner mounting frame. Motion in the vertical, longitudinal and transverse directions was recorded. Transverse motion proved to be the only one of interest. The results are shown in enclosure (4). It appears that the rubber mounted section of the gyro is approaching a fourth order resonance at 295 shaft rpm (19.6 cps). The vibration displacement amplitudes on the base reached a maximum of ± 2 Mils in the transverse direction at 295 shaft rpm. Displacement amplitudes in the transverse direction on the mounted gyro mechanism increased with shaft rpm to a maximum amplitude of ± 14 Mils at 295 shaft rpm. It was noted that objectionable vibration of selsyn indicators mounted in the gyro occurred from 190 to 295 shaft rpm.

c. Noise in F.O. Overflow Trunk, 5-149-O-F

(1) The noise produced by the swing check valve in the fuel oil overflow trunk was witnessed during high speed turns simulating the effect of rough seas. Investigation showed that the valve was properly installed and that the noise was produced by normal operation of the valve.

d. Noise in Vicinity of D.O. Tank, 5-199-O-F

(1) The noise reported in the vicinity of diesel oil tank 5-199-O-F was witnessed at high speeds and is believed to be associated with cavitation. It has been heard on many other ships at high speed and is considered normal.

3. Evaluation of the recorded data and consideration of vibration criteria leads to the following recommendations:

a. The tartar missile launcher amplitudes do not appear to be excessive for the conditions investigated. The operation of the launcher should be observed during simulated or actual missile firings at high speeds to ascertain whether any problem exists due to vibration.

b. Although an apparent resonant or near resonant condition exists in the after gyro compass at full power, the Bureau of Ships does not consider the amplitudes excessive. Therefore, it is recommended that ship's force continue to observe the gyro compass to determine whether any operation or maintenance problems exist due to vibration.

c. The noise in the fuel oil overflow trunk, 5-149-O-F, could be reduced by the installation of a non-metallic seat in the check valve. An investigation is being made in order to determine the feasibility of such an installation. If the check valve cannot be modified, then the valve and the fuel oil overflow piping in the berthing compartment should be lagged in order to reduce the noise transmission.

Code 261
DDG5

Copy to: (w/encl (1) thru (4))
BUSHIPS (Code 345)
BUSHIPS (Code 523)
BUWEPS (Code GTR)
BUWEPS (Code RMLG)
BUWEPS (Code FWAM 243)
Squat Officer, USS BIDDLE (DDG5)
INSURV Board, Wash., D. C.
SUPSHIP, Camden
Code 211
261
264
270
290
250
Prepared by: P. D. Dear
Typed by: N. A. DeSerio
22 April 1963

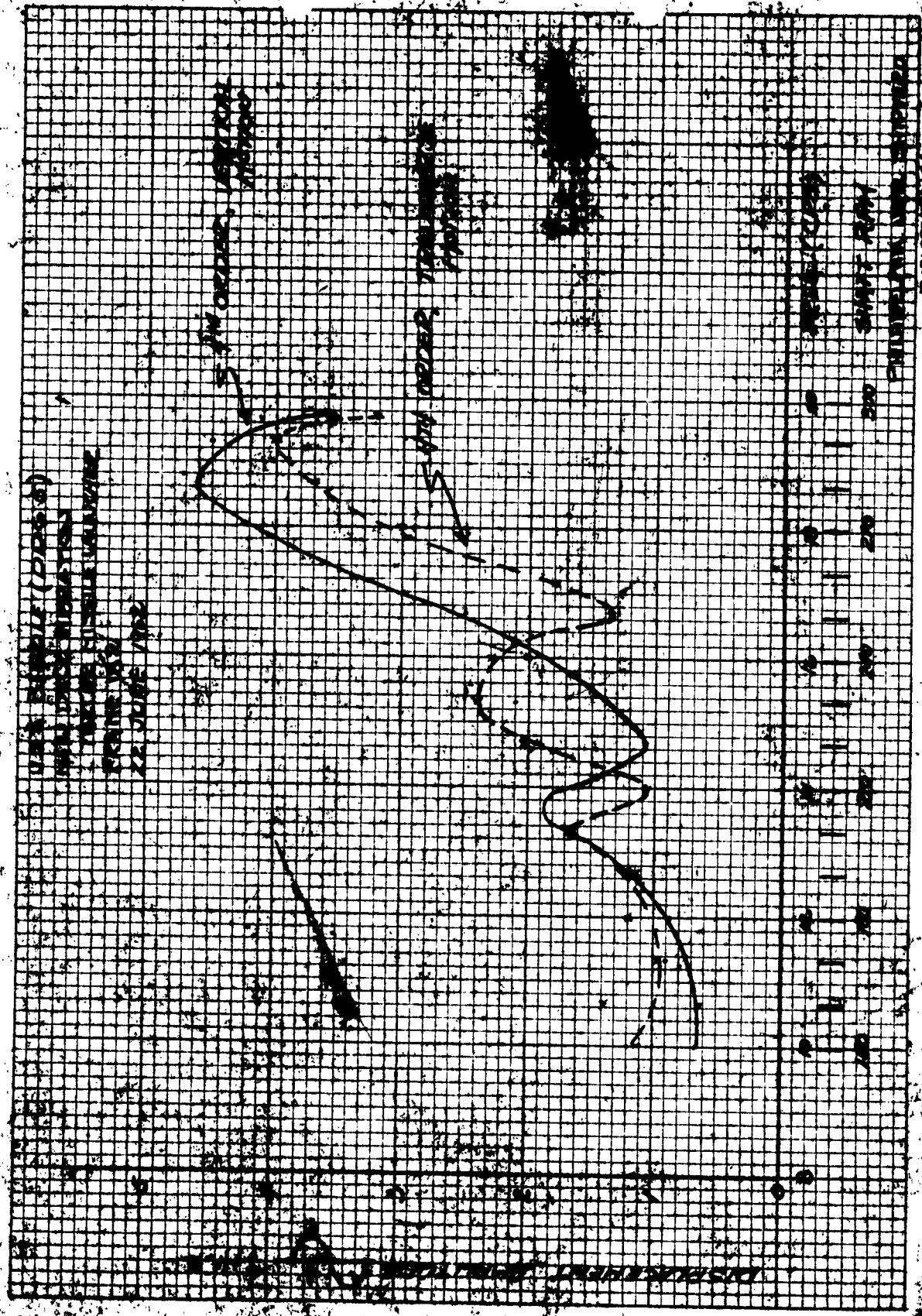
USA SAMPLE (1225-6)
 WITH DUCK WINGS
 AND THE USABLE INFORMATION
 FOR THE USA
 22 JULY 1962

5 IN ORDER, 10 IN
 ORDER

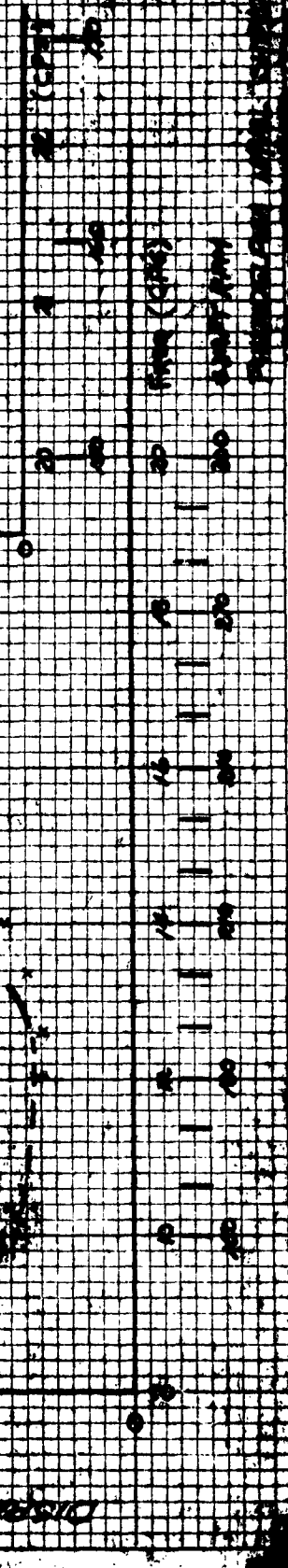
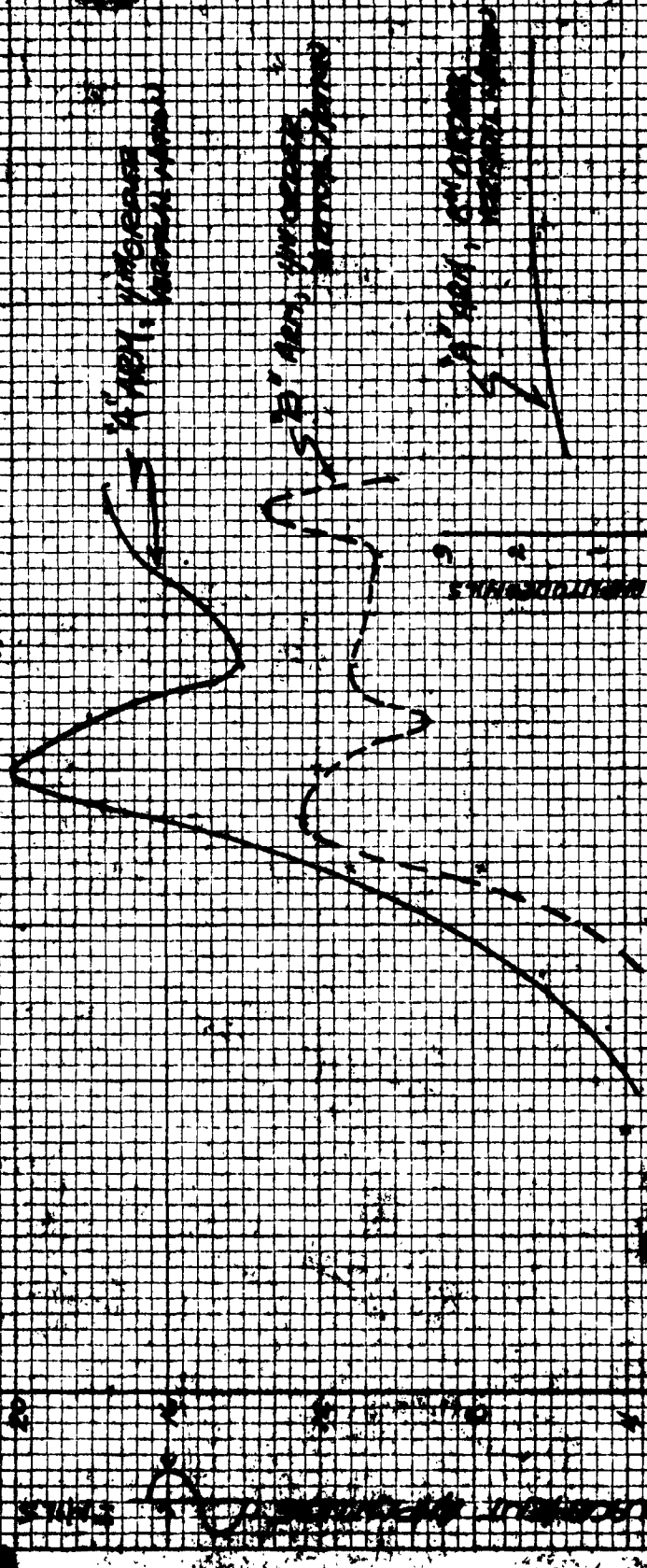
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 ORDER

5 IN ORDER, 10 IN
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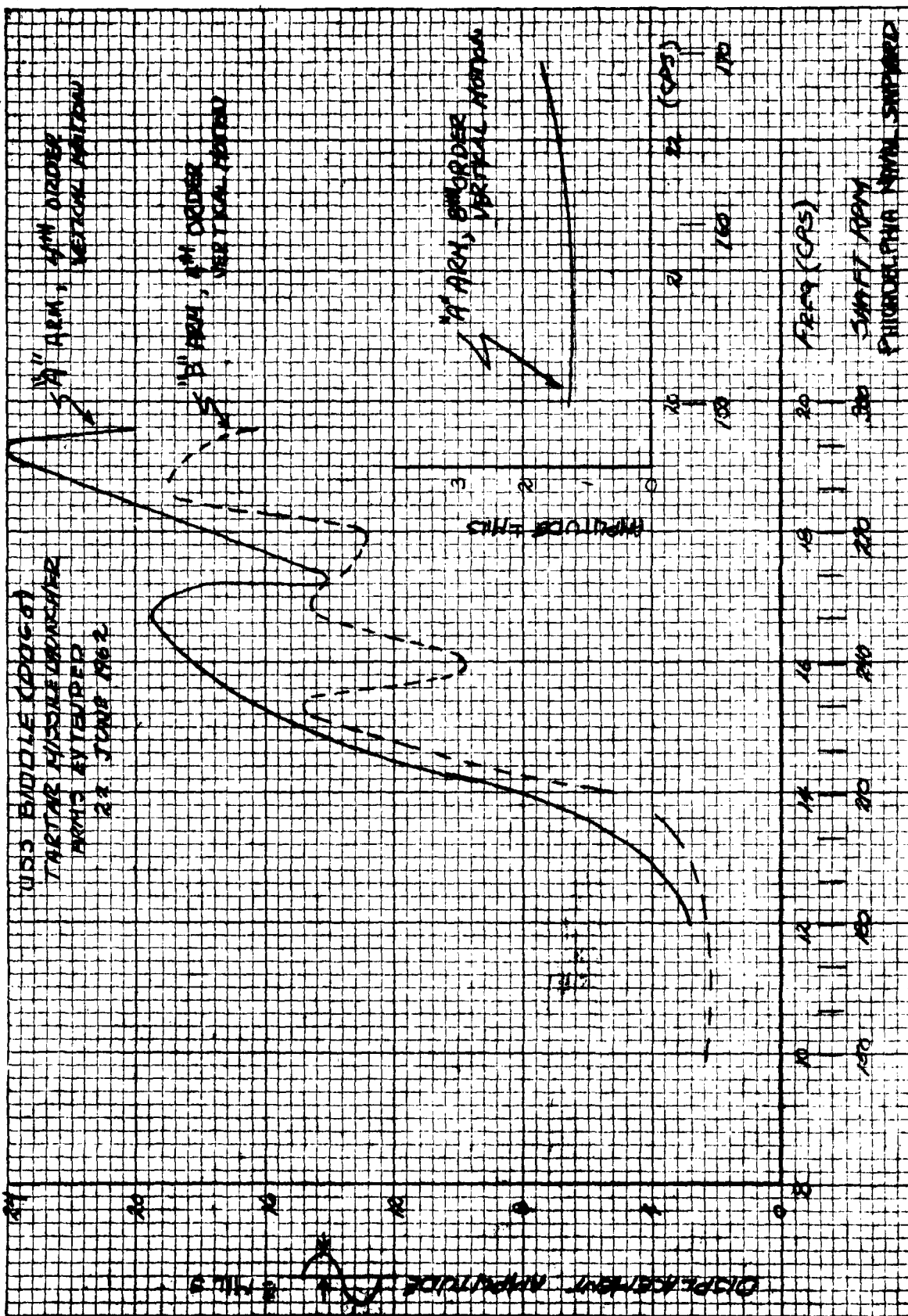
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WINDS (0000)
WINDS (0000)
WINDS (0000)
WINDS (0000)
WINDS (0000)



10 X 10 TO THE INCH 259-5G
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(3) ENCLOSURE

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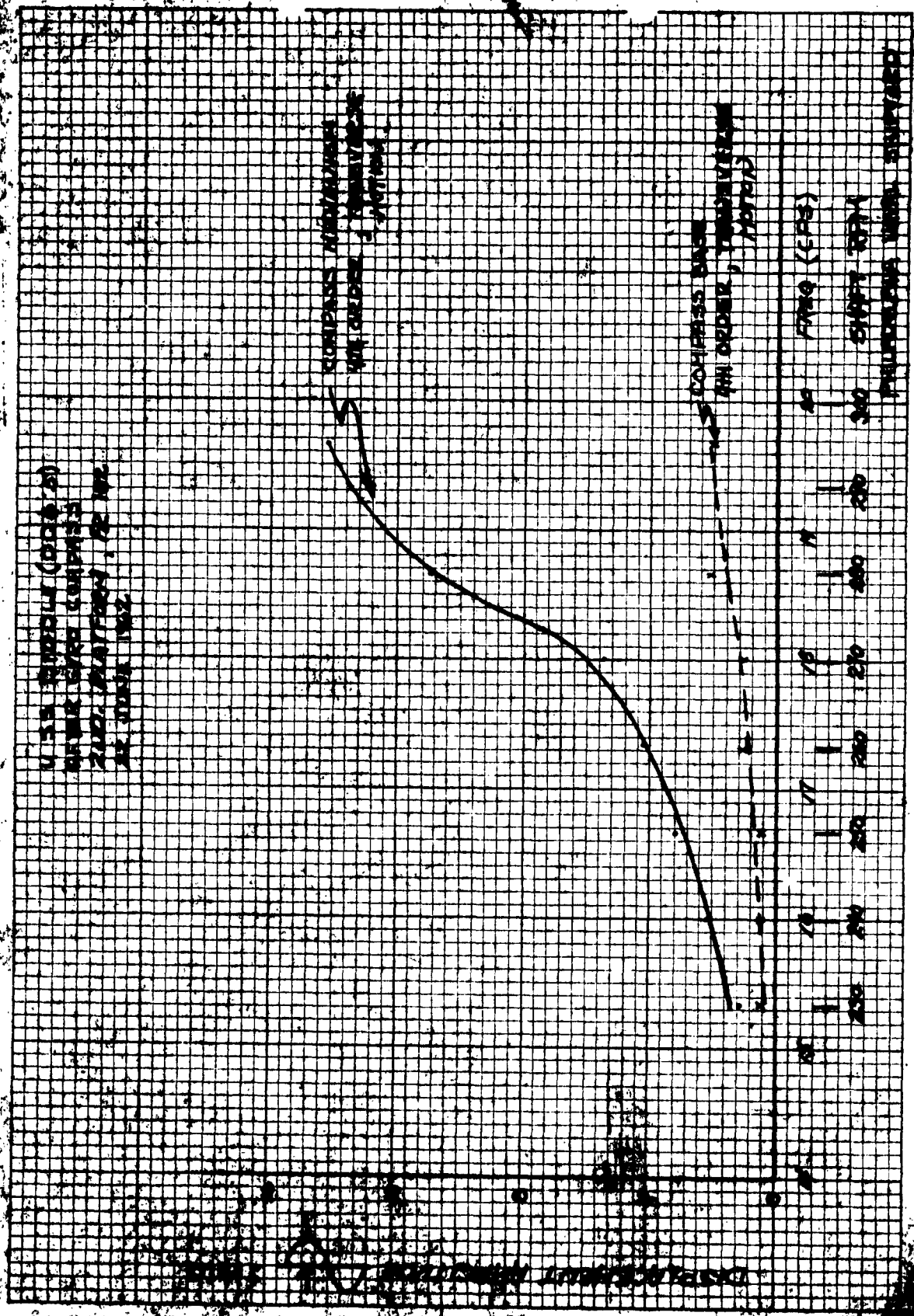
U.S. BUREAU OF
 RESEARCH
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 AT WASH DC

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ENCLOSURE (4)



SHOP REPORT
4ND-SHPYD-6763

HANDLING

☐ ROUTINE

☐ PRIORITY

☒ URGENT
(Send Copy)

SERIAL

261-38

DATE PREPARED

7 Aug 1962

SHIP OR ACTIVITY

USS PRATT (DLG13)

JOB ORDER NO.

14-371-8001

PLAN, & EST.

JOB TITLE

VIBRATION IN UNIT COMMANDERS' CABIN & LOWER CIC EXCITED
BY LAUNDRY EXTRACTOR

Provide 3 copies for P & E Division, in addition to copies for addresses checked under "COPY DISTRIBUTION".

FROM

SHOP

Code 261

PREPARED BY (Name and phone)

P. D. Dear 2948

APPROVED BY

H. L. Coffin

TO

JOB PLANNING BRANCH
(Code 230)

PURPOSE
(Check appropriate column)

ACTION

INFORMATION

Report of inspection in
compliance with Job Order

☒

Request for further
instructions.

Report of new work changing
scope of Job Order

Other

COPY DISTRIBUTION
(Check/write in as required)

☒ SHIP SUPT. OR ☐ CODE 366

☐ CODE 307

☐ REPAIR SUPT. OR ☐ SHOP SUPT.

☒ Code 212

☒ Code 244

☒ Code 261 (2)

☐

☐

COMMENTS:

1. An investigation was conducted of the reported vibration in the Unit Commander's Cabin 02-59-2-L, being caused by the 50 lb Laundry Extractor located at Frame 197 (8) on the 1st Platform. In addition to the vibration found in the Unit Commander's Cabin, the Wardroom, 01-59-0-L, and the CIC (Lower Level), 02-68-0-C, were also found to be affected.

2. The load in the extractor was deliberately made to be heavily unbalanced in order to produce a known vibratory condition which would be as severe a condition as could be expected to be encountered during normal operation. The maximum displacement amplitudes measured were + 5 mils on the deck and + 6 mils on the feet of the machine. These amplitudes of vibration in the laundry would not cause much concern but in the areas mentioned above where the vibration amplitudes are almost as large it is quite objectionable.

3. Upon examination of the laundry machine installation, the following deficiencies were noted:

RECOMMENDATION: The machine has worked loose on its foundation (explaining why the vibration problem has been increasing in the last 3 months) and this has been caused by the fwd. outboard end of the foundation not being made flat and level.

b. The flexible pipe connections on the hot water line and the steam line have been replaced by a coiled tubing section. While this is not likely to transmit a very large amount of vibration energy to the structure, it is

(Use additional blank sheets if needed)

ASST. P & E SUPT. ACTION AND COMMENTS:

☐ CODE 226: Issue new Job Order

☐ CODE 227: Route

☐ CODE 240: Investigate and report

☐ CODE 230: ☐ Route as required

☐ Investigate and report.

☐ File if acceptable

Serial No.
261-38
7 Aug 1962

a safety hazard because of the possible fatigue failure of the tubing.

RECOMMENDED ACTION:

1. The following corrective action is recommended:

a. Build-up the low sections of the foundation to make a flat surface so that contact will be made along the entire length of the machine mounting flanges and the foundation.

b. Install lock washers under machine hold down bolts and pull up hold down bolts to 400 inch-lbs (33 ft-lbs).

c. Reinstall flexible pipe connections in the hot water line in accordance with BUSHIPS Plan DLG9-509-1540419, Fresh Water System - Aft Arr. and in the steam line in accordance with BUSHIPS Plan DLG9-500-1540276, Steam Heating Sys. Aft of Fr. 148 First Platform and below.

Code 261
10 September 1962

MEMORANDUM

From: Code 261
To: Code 211

Subj: USS PRATT (DIG-13) Vibration of 30 KW, 400 cycle IC and FC M/G Set
#3 (FAT IA515E Port I-30)

Ref: (a) DDI 261-1643 of 5 July 1962

1. In response to FAT item IA515E vibration measurements were made on #3 IC and FC M/G set. Maximum vibration displacement measurements of ± 3.5 mils on the generator and ± 1.5 mils on the motor were recorded in the radial direction at the rotational frequency. These measurements indicated that the machine had excessive unbalance. Reference (a) was issued calling for a dynamic balance of the motor and generator.

2. Upon completion of the balancing work the vibration of the unit was rechecked. A maximum displacement amplitude of less than ± 0.25 mils was recorded on the generator. Operation of #3 IC and FC M/G set is considered excellent from a vibration standpoint.

Copy to:
C.O. USS PRATT (2)
Code 244
261 (2)
Prepared by: F. Heinze
Typed by: N. DeSerio

SHOP REPORT
4ND-SHPYD-6763

HANDLING



ROUTINE



PRIORITY



URGENT
(Hand Carry)

SERIAL

261-42

DATE PREPARED

20 September 1962

SHIP OR ACTIVITY

USS McNAIR (DD679)

JOB ORDER NO.

85-789-9101

PLAN & EST.

JOB TITLE

HULL VIBRATION SURVEY
(Pre Overhaul)

Provide 3 copies for P & E Division, in addition to copies for addresses checked under "COPY DISTRIBUTION".

FROM
SHOP Code 261
PREPARED BY (Name and Phone) H. I. Morrison-2948
APPROVED BY H. L. Coffin
TO

JOB PLANNING BRANCH
(Code 230)

PURPOSE (Check appropriate column)	ACTION	INFORMATION
Report of inspection in compliance with Job Order		
Request for further instructions.		
Report of new work changing scope of Job Order		
Other		

COPY DISTRIBUTION
(Check/write in as required)

☒ SHIP SUPT. OR	☐ CODE 355
☐ CODE 307	
☐ REPAIR SUPT. OR	☐ SHOP SUPT.
☒ Code 215 (2)	
☒ Code 244	
☒ Code 261 (2)	
☒ Code 1300 (2)	
☒ C.O. (2)	

VIA		INITIALS		DATE
SEQ.	TITLE	CODES		
1	ASST. P & E SUPT.	☐ 212 ☐ 213 ☐ 214 ☒ 215 ☐		
2	ADVANCE PLANNING	227		

COMMENTS:

1. A hull vibration survey was conducted on the subject vessel on 12 September 1962 enroute to Yorktown, Va.

2. All data were obtained while in water at least 80 feet in depth. Athwartship vibration measurements were recorded on the 02 level at the base of the 5" gun director, frame 67, over the speed range of 190 RPM to 290 RPM at increments of 10 shaft RPM.

3. The results of the survey are presented in graphical form on sheet 2 of this report. A first order critical appears at 225 shaft RPM with a displacement amplitude of +11.6 Mils. The maximum displacement amplitude recorded was +12.5 Mils at 290 shaft RPM. This appears to be approaching the upper first order critical at a shaft speed above 290 shaft RPM. More extensive data could not be taken due to operational limitations. Propeller blade frequency vibration (3rd order) was observed from 190 to 210 shaft RPM. The maximum displacement amplitude was +4.0 Mils at 190 RPM.

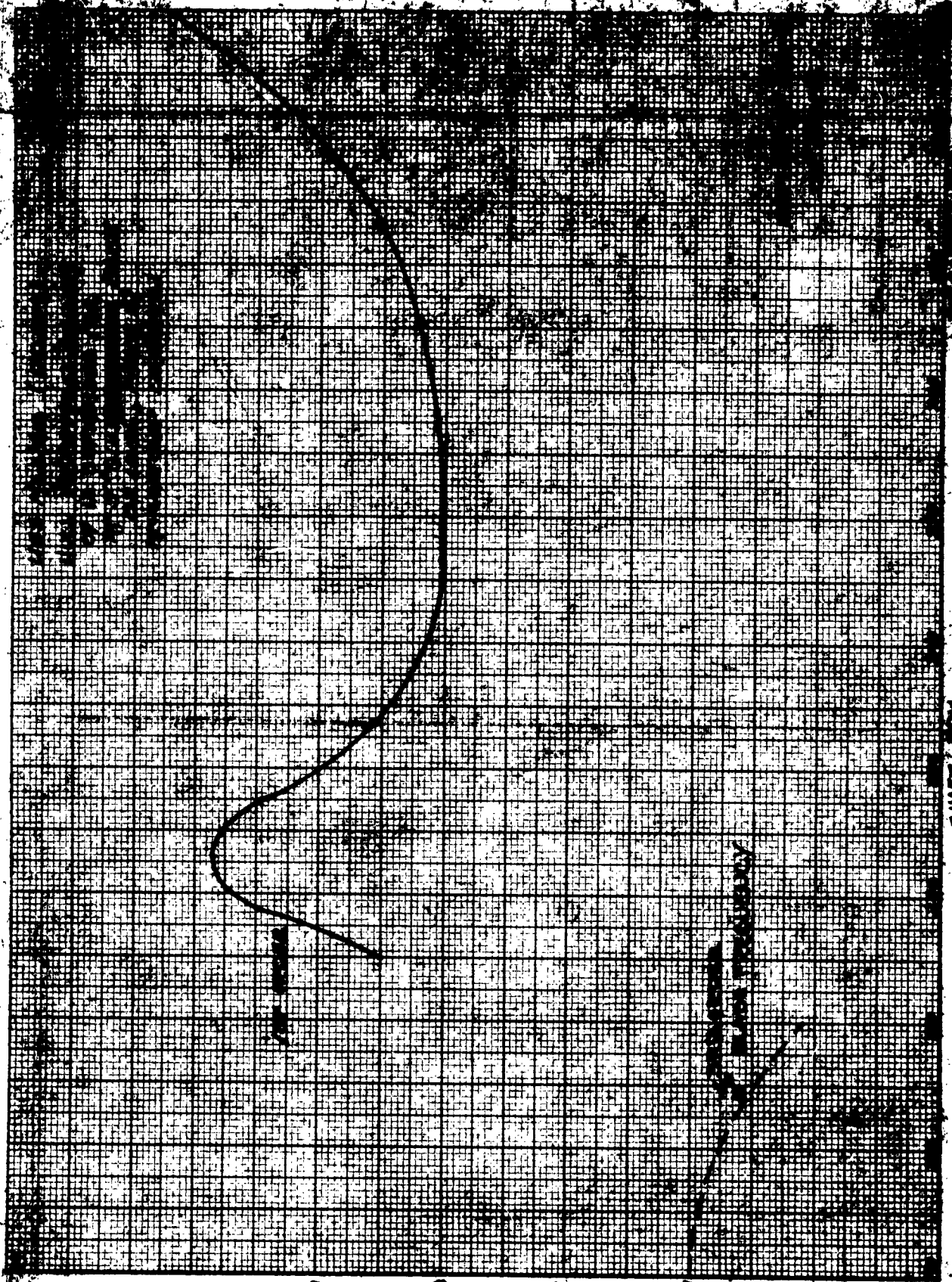
RECOMMENDED ACTION:

The Hull Vibration Displacement Amplitudes measured on this vessel are considered acceptable and no corrective action is required.

(Use additional blank sheets if needed)

ASST. P & E SUPT. ACTION AND COMMENTS:

☐ CODE 228: Issue new Job Order	☐ CODE 227: Route	☐ CODE 240: Investigate and report
☐ CODE 230: ☐ Route as required	☐ Investigate and report:	☐ File if acceptable



SHIFT 100

DISPLACEMENT AMPLITUDE 3.14 x 10⁻³

SHOP REPORT
4ND-SMPYD-6788

HANDLER

☐ ROUTINE

☐ PRIORITY

☒ URGENT
(Send Garry)

SEA J.

261-47

DATE PREPARED

1 November 1962

SHIP OR ACTIVITY

USS KING (DD661)

JOB ORDER NO.

85-812-9101

PLAN. & EST.

JOB TITLE

HULL VIBRATION SURVEY
(Pre-Overhaul)

Provide 3 copies for P & E Division, in addition to copies for addresses checked under "COPY DISTRIBUTION".

FROM

SHOP

Code 261

PREPARED BY (Name and Phone)

D. S. Bregdan - 2948

APPROVED BY

H. L. Coffin

TO

JOB PLANNING BRANCH
(Code 230)

PURPOSE
(Check appropriate column)

ACTION

INFORMATION

Report of inspection in compliance with Job Order

☒

Request for further instructions.

☐

Report of new work changing scope of Job Order

☐

Other

☐

COPY DISTRIBUTION
(Check/write in as required)

☒ SHIP SUPT. OR ☐ CODE 305

☐ CODE 307

☐ REPAIR SUPT. OR ☐ SHOP SUPT.

☒ Code 215 (2)

☒ Code 244

☒ Code 261 (2)

☒ Code 1300 (2)

☒ C.O. (2)

VIA

SEQ.

TITLE

CODES

INITIALS

DATE

1

ASST.
P & E
SUPT.

☐ 212

☐ 213

☐ 214

☒ 215

☐

2

ADVANCE
PLANNING

227

COMMENTS:

1. A hull vibration survey was conducted on the subject vessel on 29 October 1962 enroute from Yorktown, Virginia to Philadelphia.

2. All data were obtained in water at least 80 Ft. in depth. Aftership vibration measurements were recorded on the O2 Level at the base of the 5" gun director, Frame 67, over the speed range of 180 R.P.M. to 284 R.P.M. at increments of 10 shaft R.P.M. except near the hull critical where increments of 5 shaft R.P.M. were used.

3. The results of the survey are presented in graphical form on sheet 2 of this report. A first order critical appears at 225 shaft R.P.M. with a displacement amplitude of +10.4 mils. This was the highest displacement recorded. Due to operational limitations, no indication of the known second critical speed appeared.

RECOMMENDED ACTION:

The Hull Vibration Displacement amplitudes measured on this vessel are considered acceptable and no corrective action is required.

(Use additional blank sheets if needed)

*ASST. P & E SUPT. ACTION AND COMMENTS:

☐ CODE 226: Issue new Job Order

☐ CODE 227: Route

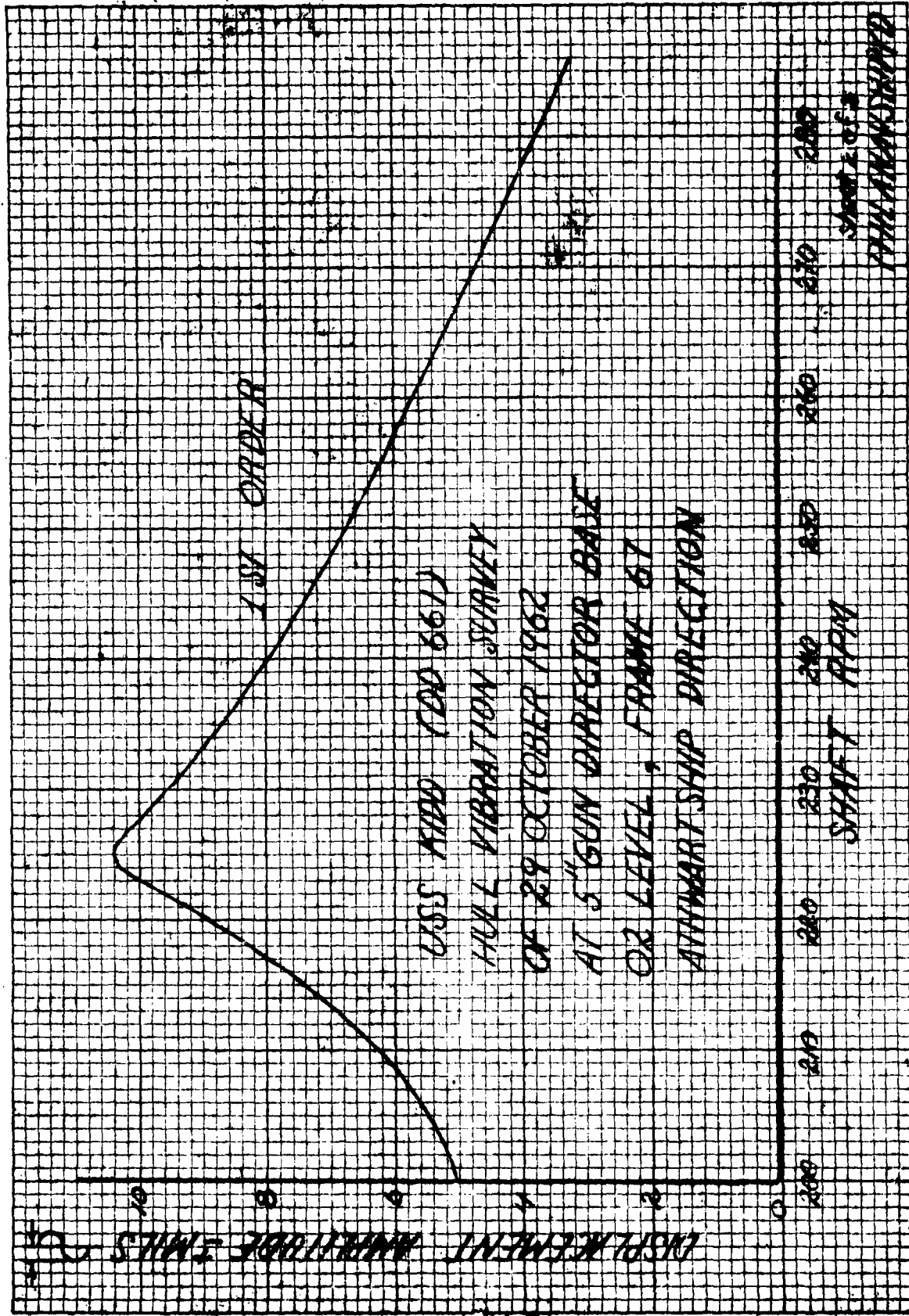
☐ CODE 240: Investigate and report

☐ CODE 230: ☐ Route as required;

☐ Investigate and report;

☐ File if acceptable

K-E 10 X 10 TO THE INCH \$50.50
 CONTROL & ENGINE CO. NEW YORK, N.Y.



SHOP REPORT
UND-SHPYD-6763

HANDLING

☒ ROUTINE

☐ PRIORITY

☐ URGENT
(Send Copy)

SERIAL NO.

261-49

DATE PREPARED

16 November 1962

SHIP OR ACTIVITY

USNS KINGSPORT (AGS-164)

JOB ORDER NO.

39-19-90202

PLAN & EST.

JOB TITLE

HULL VIBRATION SURVEY
(Results of)

Provide 3 copies for P & E Division, in addition to copies for addresses checked under "COPY DISTRIBUTION".

FROM

VIA

SHOP

Code 261

PREPARED BY (Name and Phone)

MORRISON X-2948

APPROVED BY

H. L. COFFIN

TO

JOB PLANNING BRANCH
(Code 230)

PURPOSE
(Check appropriate column)

ACTION

REPORT

Report of inspection in compliance with Job Order

X

Request for further instructions.

Report of new work changing scope of Job Order

Other

COPY DISTRIBUTION
(Check/write in as required)

☒ SHIP SUPT. OR ☐ CODE 366

☐ CODE 307

☐ REPAIR SUPT. OR ☐ SHOP SUPT.

☒ Code 213 (2)

☒ Code 261 (2)

☒ Code 244

☒ C.O.

☒ Kingsport Prog.Center

SEQ.	TITLE	CODES	INITIALS	DATE
1	ASST. P & E SUPT.	☐ 212 ☒ 213 ☐ 214 ☐ 215 ☐		
2	ADVANCE PLANNING	227		

COMMENTS:

1. A hull vibration survey was conducted on the subject vessel on 16 November 1962 during the builder's trials.
2. All data were obtained while in water at least 200 feet in depth. Athwartship and vertical vibration measurements were recorded on the main deck at the base of the centerline helicopter platform support, Frame 162.
3. The results of the survey are given on Sheet 2 of this report. The maximum displacement amplitude recorded was #23.5 mils at 3.5 pps in the ath. direction during the crash astern run. The maximum displacement amplitude recorded while running forward was ± 14 mils at 5.0 cps in the ath. direction at 75 shaft R.P.M.
4. The results of the deflection test are given in enclosure (1) (Memo from 294 to 261).

RECOMMENDED ACTION:

1. The hull vibration displacement amplitudes measured on this vessel are considered acceptable and no corrective action is required.
2. The deflections given in enclosure (1) are within the specified limits and no additional stiffening is required.

(Use additional blank sheets if needed)

ASST. P & E SUPT. ACTION AND COMMENTS:

☐ CODE 226: Issue new Job Order

☐ CODE 227: Route

☐ CODE 240: Investigate and report

☐ CODE 230: ☐ Route as required

☐ Investigate and report;

☐ File if acceptable

TEST DATA RECORD
 440-SHFTD-4421

SUBJECT: USNS K1160 REPORT (AGS-16) VIBRATION SURVEY SHEET NO. 1 DATE 10/10/68

SHAFT RPM	VIBRATION DIRECTION	VIBRATION FREQUENCY	AMPLITUDE (% MILS)	REMARKS
30	VERTICAL	5.33 cps	2.0	BLADE FREQUENCY
50	VERTICAL	5.33 cps	12.0	
75	VERTICAL	5.0 cps	12.0	
75	ATHWARTSHIP	5.0 cps	14.0	
70	ATHWARTSHIP	4.67 cps	4.5	
65	VERTICAL	4.33 cps	4.0	
65	ATHWARTSHIP	4.33 cps	3.0	
60	ATHWARTSHIP	4.0 cps	2.5	Y
60	VERTICAL	4.0 cps	13.5	SHAFT ROTATIONAL FREQUENCY
60	ATHWARTSHIP	7.0 cps	5.0	TWEE HULL NATURAL FREQUENCY
60	VERTICAL	1.0 cps	17.0	SHAFT ROTATIONAL FREQUENCY
CRAW	ATHWARTSHIP	3.5 cps	23.5	HULL NATURAL FREQUENCY
ASTERN	ATHWARTSHIP	7.0 cps	19.0	TWEE HULL NATURAL FREQUENCY

PHILADELPHIA NAVAL SHIPYARD
NAVAL BASE
PHILADELPHIA 12. PA.

IN REPLY REFER TO

Code 294
20 Nov 1962

MEMORANDUM

From: Code 294
To: Code 261

Subj: USS KINGSPORT (AG164); Deflection Test

1. Deflection between Gyro Compass Mk 19 Mod 4A and Triax Antenna:

a. Spindle mirror was mounted on top of gyro compass and alignment scope was mounted vertically on triax antenna and the following deflection readings were recorded:

- (1) Ship underway in river
stbd deflection .003"
fwd and aft .002"
Oscillation .010 (Defect in compass)
- (2) At sea during rough sea and high wind conditions
stbd deflection .011"
fwd .006"
- (3) High Speed Run (18 knots)
stbd deflection .012"
fwd deflection .012"
oscillation .010"
- (4) Full Astern
fwd deflection .018"
stbd .015"
oscillation .020"
- (5) Allowable maximum angular deflection was 45 sec.
Max. encountered during full astern
Fwd. - 38 Sec. Stbd. - 30 Sec Osc.- 40 Sec

J. A. Murphy
J. A. MURPHY

Copy to: Code 290
294 291

SHOP REPORT
440-SUPYB-6768

HANDLING

☐ ROUTINE

☐ PRIORITY

☒ URGENT
(Send Copy)

SERIAL NO.

261-53

DATE PREPARED

27 December 1962

SHIP OR ACTIVITY

TACONIC

JOB ORDER NO.

16-390-0801

PLAN & EST.

JOB TITLE

VIBRATION - SHIPS SERVICE TURBO-GENERATOR NO. 2

(Trial Discr. Item - Serial No. S-7)

*Provide 3 copies for P & E Division, in addition to copies for addresses checked under "COPY DISTRIBUTION".

FROM

SHOP

Des. Div. Code 261

PREPARED BY (Name and phone)

APPROVED BY

TO

JOB PLANNING BRANCH
(Code 230)

PURPOSE (Check appropriate column)	ACTION	INFORMATION
Report of inspection in compliance with Job Order	☒	
Request for further instructions.	☐	
Report of new work changing scope of Job Order	☐	
Other	☐	

COPY DISTRIBUTION
(Check/write in as required)

- ☒ SHIP SUPT. OR ☐ CODE 306
- ☐ CODE 307
- ☐ REPAIR SUPT. OR ☐ SHOP SUPT.
- ☒ Code 212
- ☒ Code 261 (2)
- ☒ Code 244
- ☒ C.O.
- ☐

VIA

SEQ.	TITLE	CODES	INITIALS	DATE
1	ASST. P & E SUPT.	☒ 212 ☐ 213 ☐ 214 ☐ 215 ☐		
2	ADVANCE PLANNING	227		

COMMENTS:

1. In compliance with Job Order No. 16-390-0801, vibration levels were checked on the #2 turbo-generator.
2. Vibration levels on the generator were satisfactory.
3. Vibration levels on the turbine, however, are considered very excessive. Mil Std. 167 requires Machinery rotating at 10,000 8 PM have vibration displacement amplitudes of less than + 0.25 mils. at the rotational frequency. On the forward turbine bearing, displacement amplitudes up to + 0.65 mils. at the rotational frequency were measured in the radial direction and indicates an urgent need for dynamic balancing.

RECOMMENDED ACTION:

Dynamically balance turbine rotor.

Notify Design Div. Code 261 Ext. 2948 when balance has been accomplished for final check of vibration levels.

(Use additional blank sheets if needed)

* ASST. P & E SUPT. ACTION AND COMMENTS:

- ☐ CODE 226: Issue new Job Order ☐ CODE 227: Route ☐ CODE 290: Investigate and report
- ☐ CODE 230: ☐ Route as required: ☐ Investigate and report: ☐ File if acceptable

MEMORANDUM

Code 261
28 December 1962

From: Code 261
To: Code 212

Subj: USS LONG BEACH CG(N)9
Sea Trial Vibration Items; Preliminary
Report of

Ref: (a) Job Order No. 14-16-90316

1. During the Post Repair Trials of the subject vessel Vibration Items were reported to the personnel from David Taylor Model Basin and Philadelphia Naval Shipyard by Ship's Force. The items were then investigated. The items requiring corrective action are given in the following paragraphs along with the recommended corrective action.
2. Compt. 6-104-O-2. The Gagevap Unit had large amplitudes of vibration at shaft RPM over 160. The motion was entirely in the Athwartships direction. The foundation of the unit should be stiffened in the Athwartship direction.
3. The Port and Stbd Antenna Platform on the after superstructure vibrated severely at high speed. The vibration is felt to be wind excited. Both Port and Stbd. Platforms are identical in structure and both should have additional lateral bracing on the upper supports.
4. The Port and Stbd. Fan Antenna Boxes should have additional vertical and longitudinal stiffening.
5. In Compt. 2-162-2-2, Crew's W.C. and Shwr., there was severe vibration of light metal bulkheads and partitions, rattling of soap dishes, mirrors and shelves. All light bulkheads and partitions should have additional stiffening. All objects attached to the bulkheads should be secured so that no relative motion between bulkheads and the object can exist. Code 254 is routing work to accomplish above as correction for discrepancy card.
6. The Crew's Living Space, Compt. 2-158-O-L, has essentially the same problem as the W.C. and Shwr. mentioned above. All butt kits, Bulletin Boards, mirrors, etc. should be attached firmly so that they cannot rattle. All locker doors should be fitted with rubber gromets to hold the doors firmly when closed. Close attention should be given by Ship's Force to keeping the number of loose and rattle-

prone items in the compartment to a minimum.

7. Passageway Compt. 3-160-1-L has the same type of problem as the foregoing two spaces. The hand rails on the ladder should be made to fit much tighter as should the hinge pins on the hatch.

8. Component CY-2543/SYQ-2 located in Compt. 4-82-0-0 should have the supporting shock mounts removed and the vertical foundation behind the cabinet should be extended to the overhead and tied into structure there.

9. The No. 1 S.B. Switchboard in Compt. 6-93-0-C should have support from the top of the cabinet to the overhead structure.

10. The sway bracing removed from equipment in Compt. 02-122-3-C to make way for Ventilation Duct Installation should be replaced.

11. The Reactor Compt. Blow Off Ducts in Compt's. 6-61-0-E, Aux. Mach. Rm. No. 1, and 4-93-0-E and 6-93-0-E, Aux. Mach. Rm. No. 2, should be stiffened. The stiffening should be along the length of the duct on all sides.

12. This Memorandum is in advance of David Taylor Model Basin Preliminary Speed Letter Report expected early January 1963

Copy to:
Code 261 (2)

244
254
263
105
336

Prepared by: R. Morrison
Typed by: M. Riets