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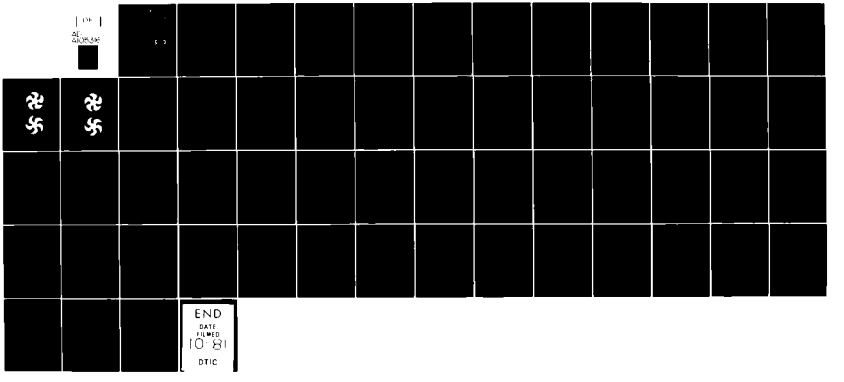

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FOUR QUADRANT OPEN WATER CHARACTERISTICS OF CONTROLLABLE PITCH PROPELLER 4837 DESIGNED FOR MCM (MODEL 5401) by Carmen C. Queen

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FOUR QUADRANT OPEN WATER CHARACTERISTICS OF CONTROLLABLE PITCH PROPELLER 4837 DESIGNED FOR MCM (Model 5401)

by

Carmen C. Queen

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SHIP PERFORMANCE DEPARTMENT
DEPARTMENTAL REPORT

OCTOBER 1981

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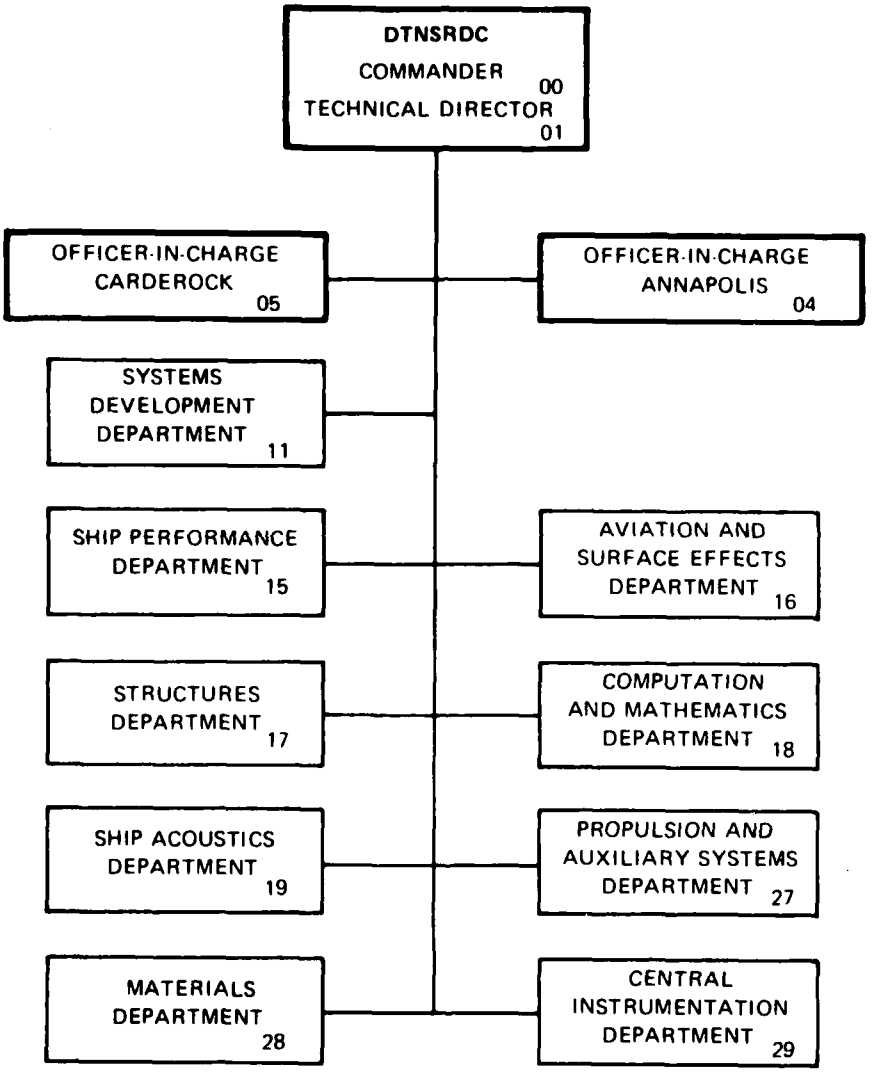

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NOTATION

c	Propeller blade section length
$c_{0.7}$	Propeller blade section length at 0.7R
C_Q	Modified torque coefficient, $Q/\rho D^3 (V_A^2 + n^2 D^2)$
C_T	Modified thrust coefficient, $T/\rho D^2 (V_A^2 + n^2 D^2)$
D	Propeller diameter
J	Advance coefficient of propeller, V_A/nD
K_Q	Torque coefficient, $Q/\rho n^2 D^5$
K_T	Thrust coefficient, $T/\rho n^2 D^4$
n	Rate of revolution
P	Propeller pitch
Q	Propeller torque
R	Radius of Propeller
R_n	Reynolds number for propeller, $c_{0.7}\sqrt{V_A^2 + (0.7\pi nD)^2}/\nu$
T	Propeller thrust
V_A	Propeller inflow velocity
μ	Modified advance coefficient, $V_A/\sqrt{V_A^2 + n^2 D^2}$
ν	Kinematic viscosity
ρ	Density

ABSTRACT

An experimental program was conducted at the David W. Taylor Naval Ship Research and Development Center (DTNSRDC) to predict the open water thrust and torque of the MCM design propeller over the four quadrants of operation. The analysis revealed no unusual results with regard to performance.

ADMINISTRATIVE INFORMATION

This work was sponsored by the Naval Sea Systems Command (NAVSEA 5213) under Task Area SO 857334, Task 23273, and Element 64567N. The work was performed under DTNSRDC work unit 1532-580.

INTRODUCTION

The Naval Sea Systems Command (Code 5213) has requested the David W. Taylor Naval Ship Research and Development Center to carry out the following work in support of the mine countermeasures ship (MCM) design:

Resistance and Powering Experiments (stock propellers)
Flow Visualization and Bilge "keel" Alignment Experiments
Wake Survey Experiment
Deck Wetness Assessment
Strut Alignment Experiment
Propeller Design
Determination of Optimum Rudder Angle
Four Quadrant Open Water Testing of Design Propeller
Resistance and Powering Experiments (design propellers)
Assume Technical Responsibility for Cavitation Testing and Model Propeller Construction

This report presents the results of a four quadrant open water test with the MCM design propeller. Propeller 4837 is a controllable reversible pitch propeller, designed and evaluated for open water performance at the David W. Taylor Naval Ship Research and Development Center. The split-hub propeller was manufactured by Hydronautics Inc. of Laurel, MD. The blades are adjustable so that various pitch angles can be set by wedging a pin in the desired hole drilled at the root of the blade and inserting the assembly into both halves of the hub. A schematic drawing of Propeller 4837 is shown in Figure 1 and studio photographs are presented in Figure 2. Listed below are model dimensions of the propeller.

Diameter	12.00 in (304.80 mm)
Chord Length at 0.7R	4.846 in (123.09 mm)
Design Pitch at 0.7R	24.641 in (625.89 mm)
Number of Blades	5
Linear Ratio	7.00
Rotation	L.H.

Open water experiments were performed using the DTNSRDC propeller boat, the Carriage I Towing Basin Facility and a 100 inch-pound transmission dynamometer for measuring propeller thrust and torque. All experiments were conducted in uniform flow with the propeller upstream of the boat and shafting. The propeller was tested at pitch ratios (P/D) of 2.464, 2.127, 2.053 (design), 1.643, 0.0, -0.4, -0.7, and -1.0.

Definitions of the various symbols used throughout this report are given in the notation section.

INSTRUMENTATION

A variable reluctance 100 inch-pound transmission dynamometer was used to measure propeller thrust and torque. The dynamometer was placed between the drive motor and the propeller shaft. Power to rotate the propeller was supplied by a single constant torque motor selected for its ability to maintain constant shaft rotation rate throughout the range of test speeds. Propeller depth of submergence during the entire experiment was approximately 13 inches (330.2 mm) at the shaft centerline.

The transmission dynamometer was calibrated over a range of -150 to +150 pounds (-667.23 to 667.23 N) for thrust and -150 to +150 in-lbs (-16.95 to 16.95 N·m) for torque. The response of the dynamometer for both thrust and torque remained linear with applied load. A check calibration was performed after the completion of the experiment. The before and after calibrations were in agreement and therefore confirmed the repeatability of dynamometer data.

EXPERIMENTAL PROCEDURE

Uniform flow into the propeller was achieved by driving the propeller from downstream for all test conditions over a range of positive and negative advance coefficients. The various modes of propeller operation including steady ahead with windmilling, steady backing with windmilling, crashback, and crashahead were

all run in one direction in the basin. Conditions with astern velocity on the ship (such as steady backing and crashahead) were simulated in the experiments by rotating the blades 180 degrees about the axis and reversing the direction of rotation. Quasi-steady simulation of the different modes of propeller operation were obtained by running each experimental condition at a constant pitch setting, speed of advance, and rotational speed. Table 1 lists the experimental conditions.

DATA ACQUISITION AND ANALYSIS

All data were digitized and analyzed by using an analog-to-digital converter and an Interdata minicomputer (Model 70). Thrust, torque, rotational speed, and speed of advance are averaged over a five second time interval. Computer programs developed for the Interdata minicomputer enable on-line data analysis including subtraction of "no loads", nondimensionalization by the appropriate factors, and a computer plotting option. A Control Data 6000 computer was used to fair K_T and K_Q against J.

RESULTS

There are several ways to present open water data over the complete range of advance coefficients from locked shaft ahead to locked shaft astern. All the data in this report is presented in two forms, the J - K_T - K_Q system and the μ - C_T - C_Q system. Further, whenever any value of J, K_T, or K_Q exceeds 1.0 conversion to $1/J$, $1/K_T$, or $1/K_Q$ is made in order to keep the graph size practical. This difficulty is overcome by use of the modified coefficients (μ, C_T, and C_Q) which have been used successfully in simulations of ship propulsion dynamics. This system for four-quadrant propeller data presentation is similar to one shown in Reference 1.

Tables 2 through 17 and Figures 3 through 10 are the results of the open water experiments. The tabulated data are faired values representing the experimental data points. The figures show both the experimental data points and the faired line. Unfaired experimental data points are tabulated in Appendix A. K_T, K_Q, and J were calculated from measured quantities (thrust, torque, speed, and rpm). K_T and K_Q were each faired independently against J using a standard least squares computer routine. The polynomial coefficients were then used to provide the tabulated data at even values of J. The values of C_T and C_Q were calculated from the faired K_T and K_Q values.

CONCLUSION

In conclusion, an inspection of the data reveals that there are no unusual results with regard to thrust and torque performance over the range of simulated operating conditions.

REFERENCES

1. Hampton, G., "Four Quadrant Open Water Characteristics of Controllable Pitch Propeller 4739 Designed for LSD-41 (Model 5367)", DTNSRDC/SPD-0049-12, (January 1980).

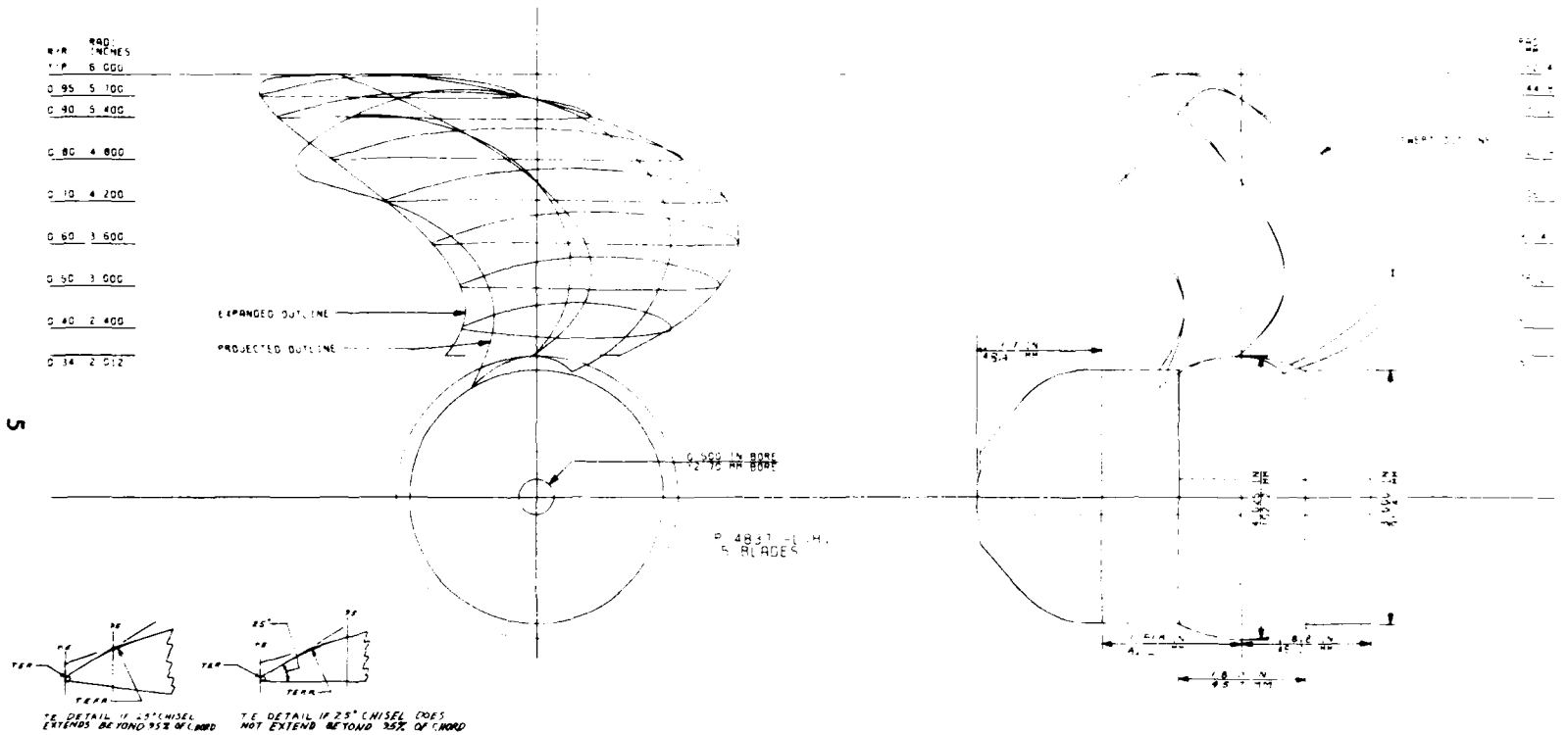

Figure 1- Schematic Drawing of Propeller 4837

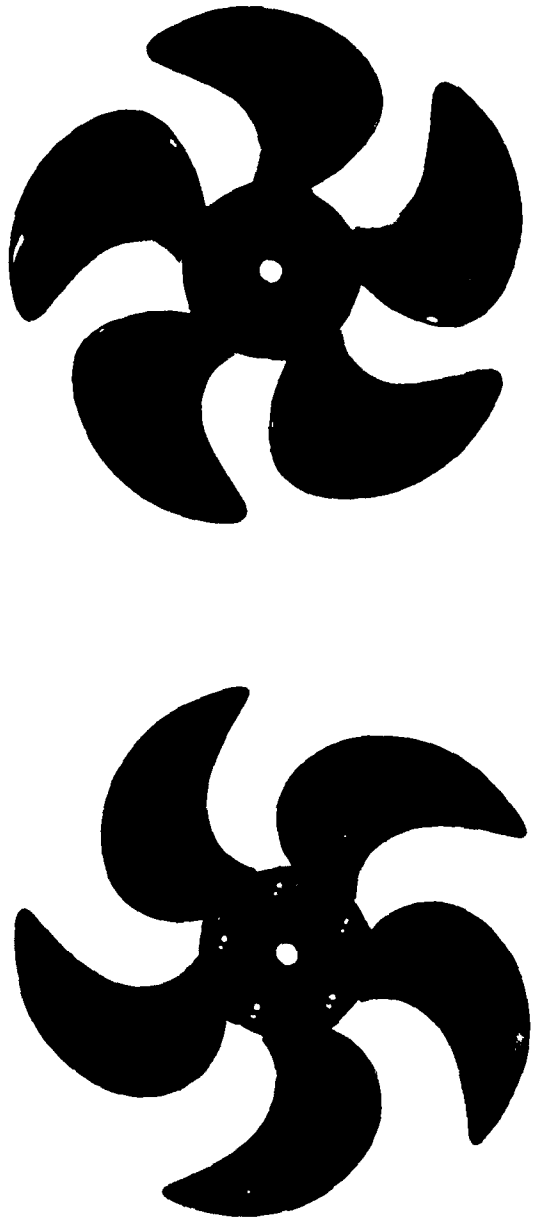

Figure 2- Studio Photographs of Propeller 4837; P/D= 2.053

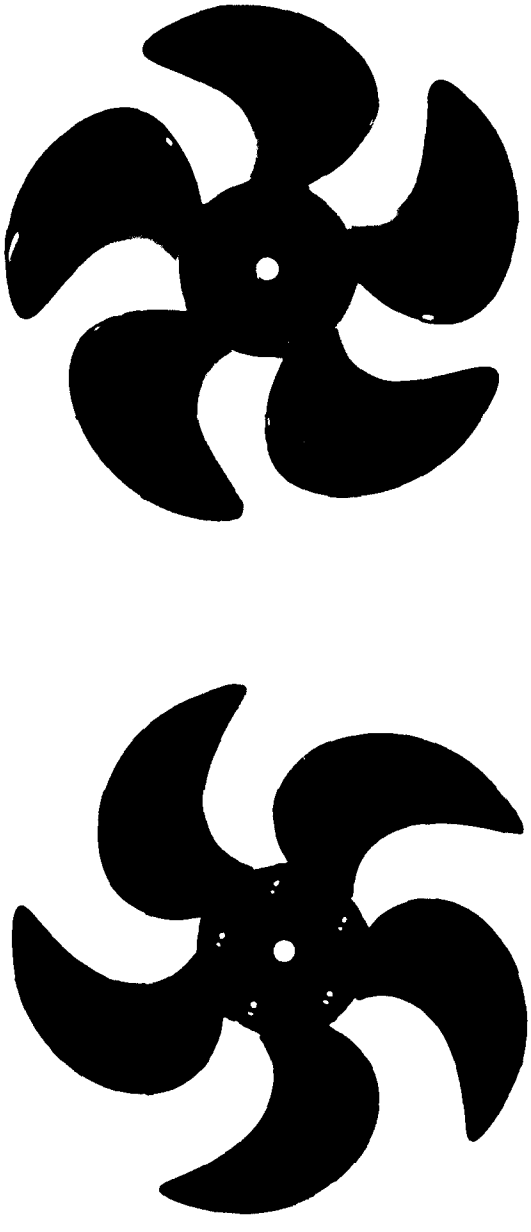

Figure 2- Studio Photographs of Propeller 4837; P/D= 2.053

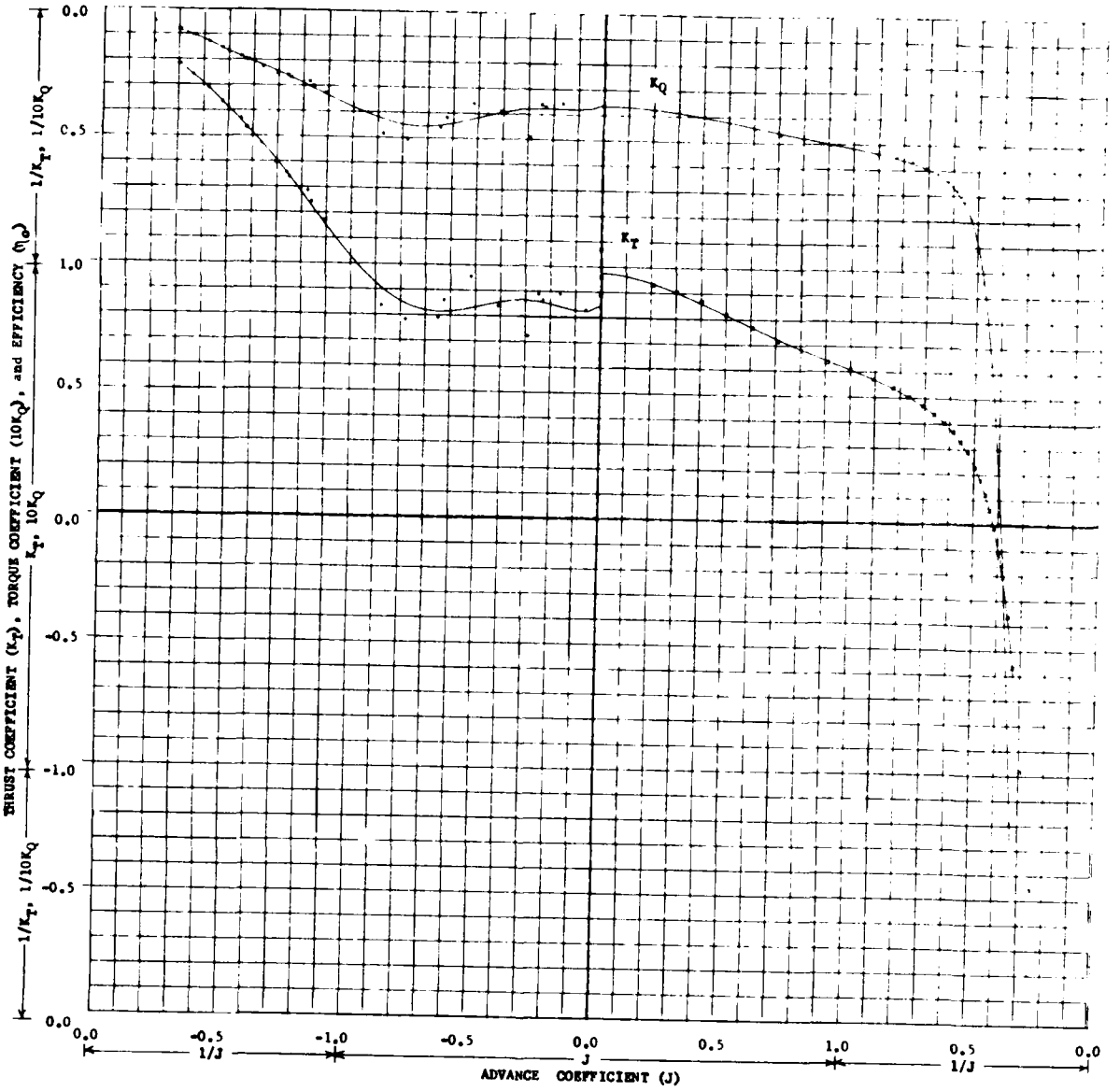

Figure 3- MCM Propeller 4837- Open Water Thrust and Torque; P/D= 2.464

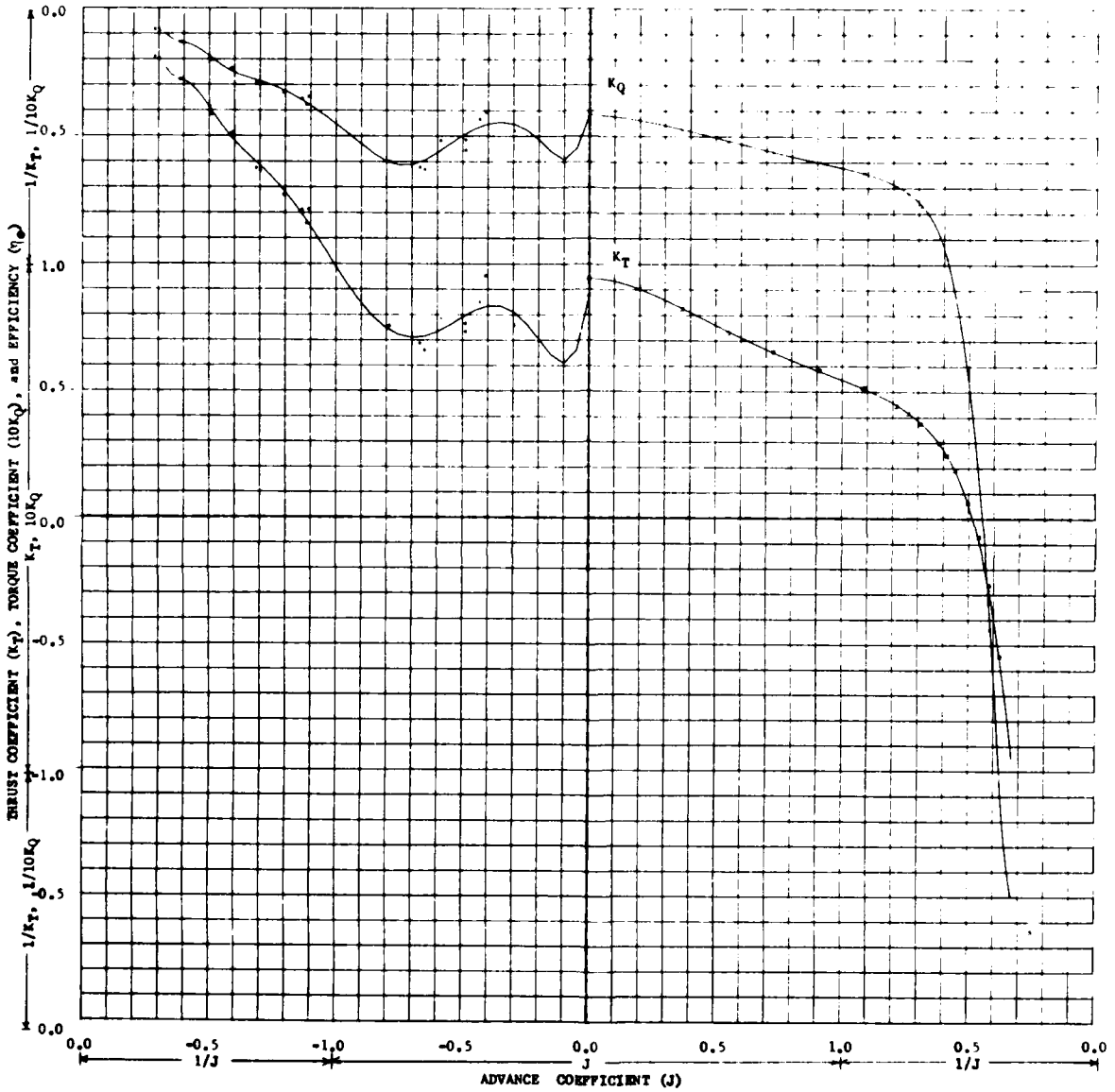

Figure 4- MCM Propeller 4837 - Open Water Thrust and Torque; P/D= 2.127

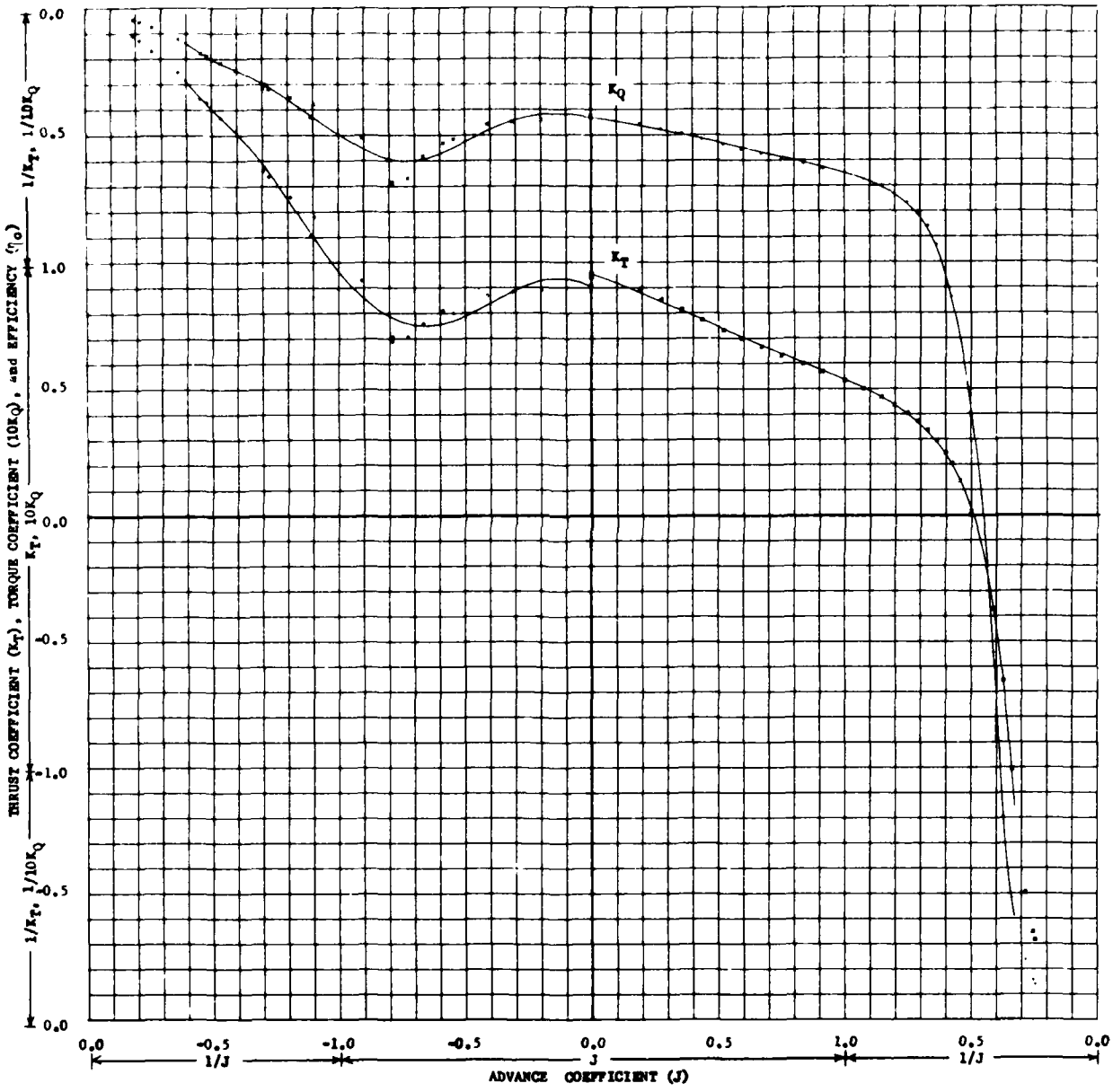

Figure 5- MCM Propeller 4837- Open Water Thrust and Torque; P/D= 2.053

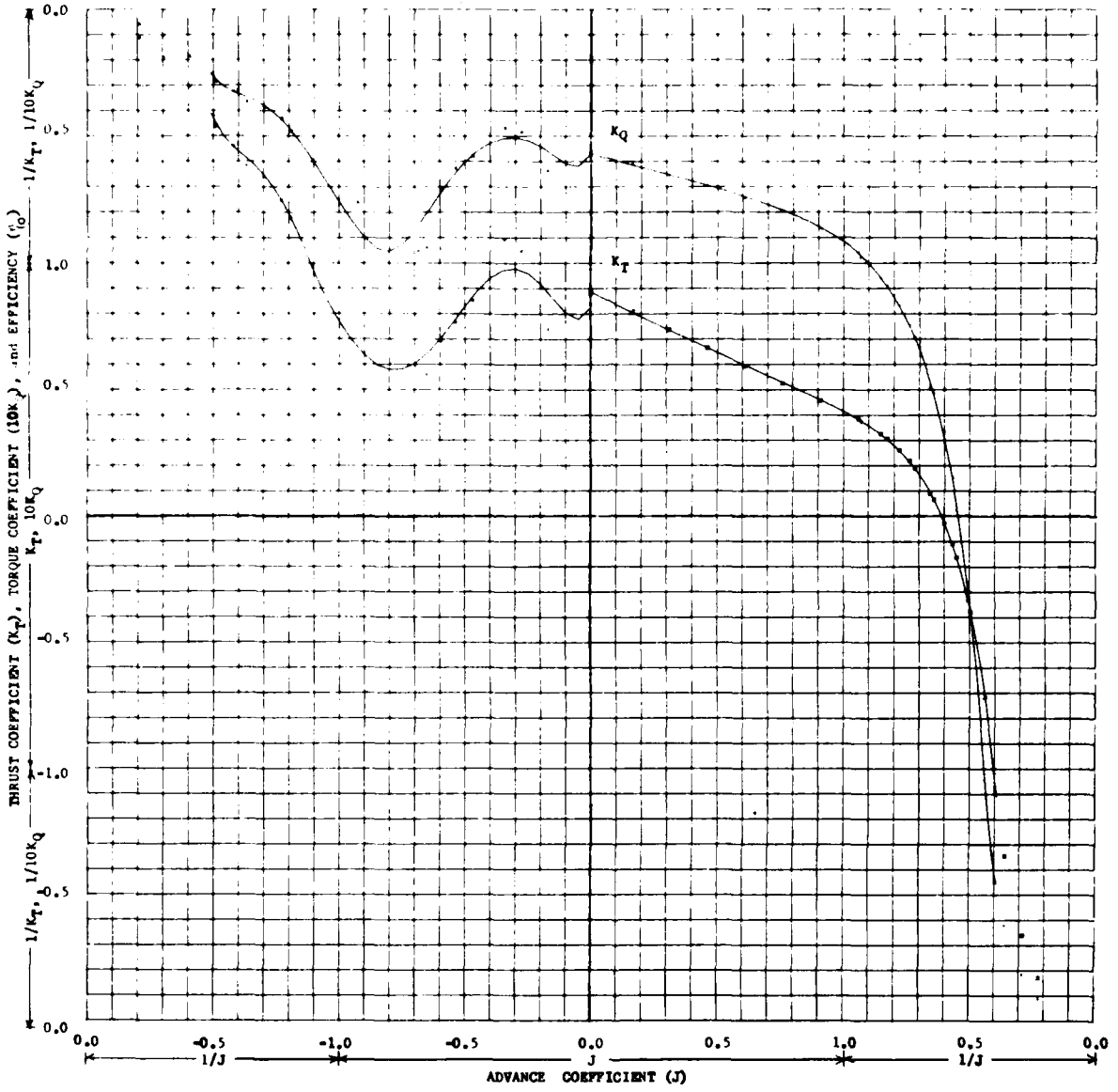

Figure 6- MCM Propeller 4837- Open Water Thrust and Torque; P/D= 1.643

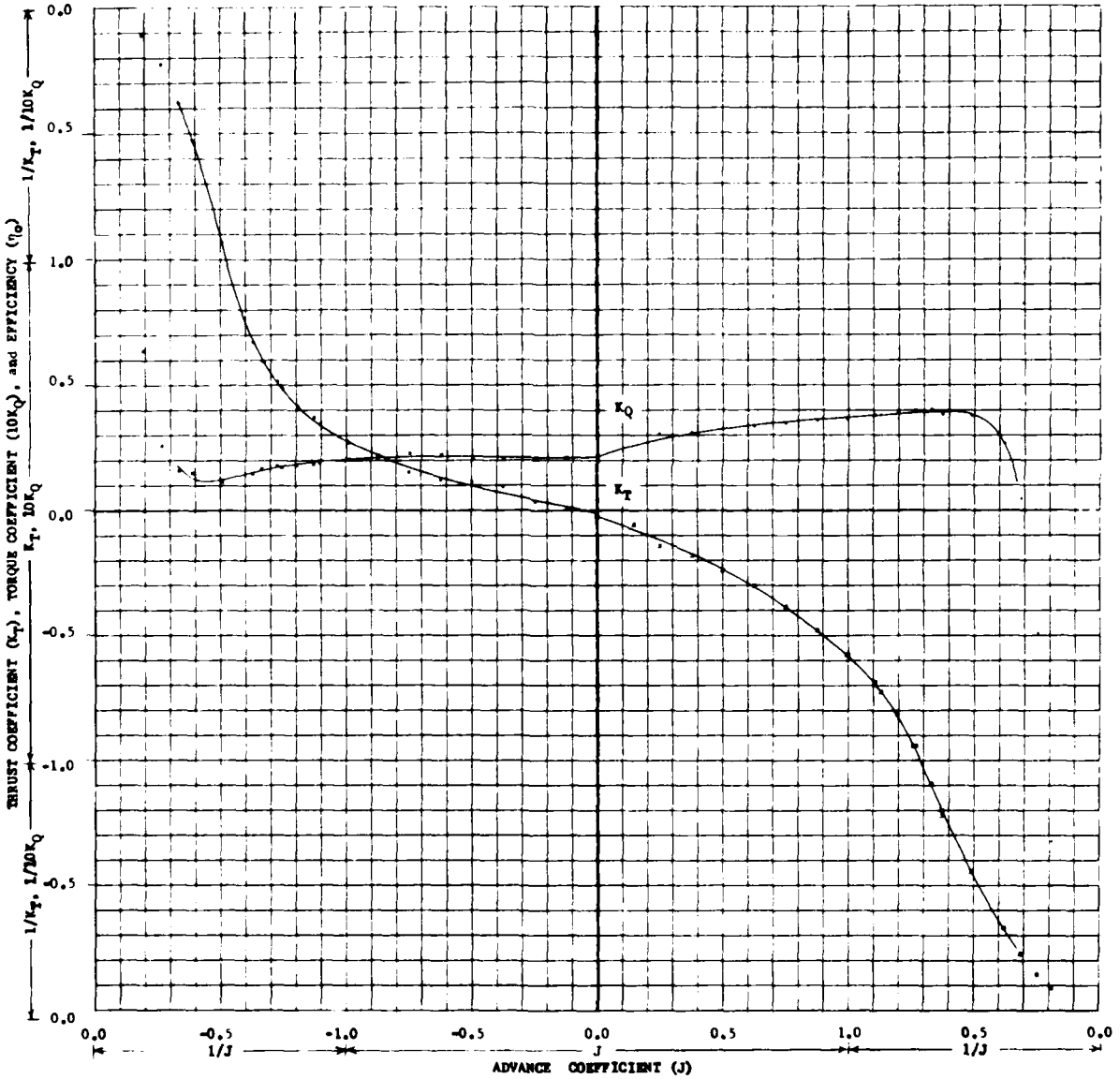

Figure 7- MEM Propeller 4837- Open Water Thrust and Torque; P/D= 0.0

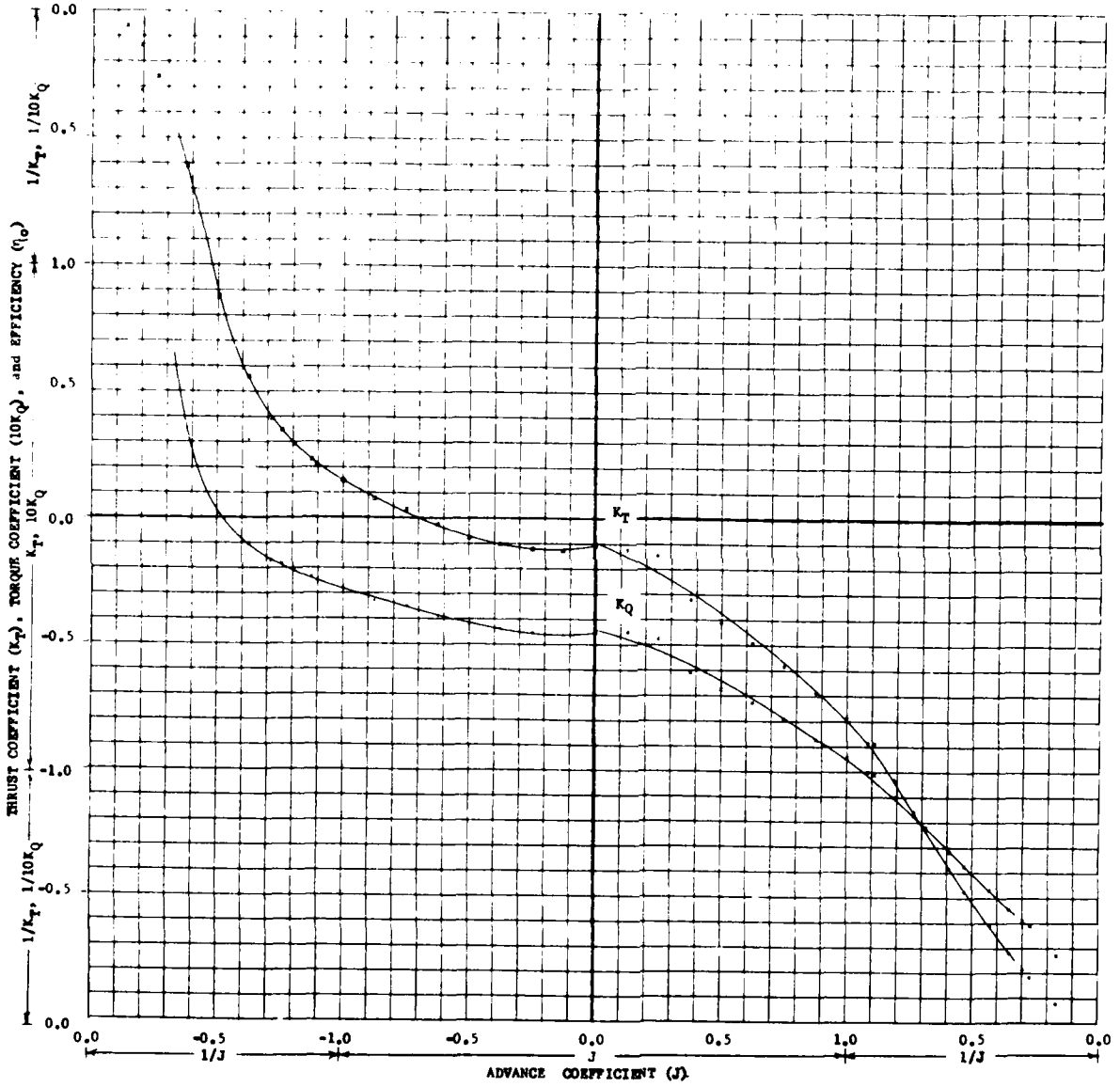

Figure 8- MCM Propeller 4837 - Open Water Thrust and Torque; P/D= -0.4

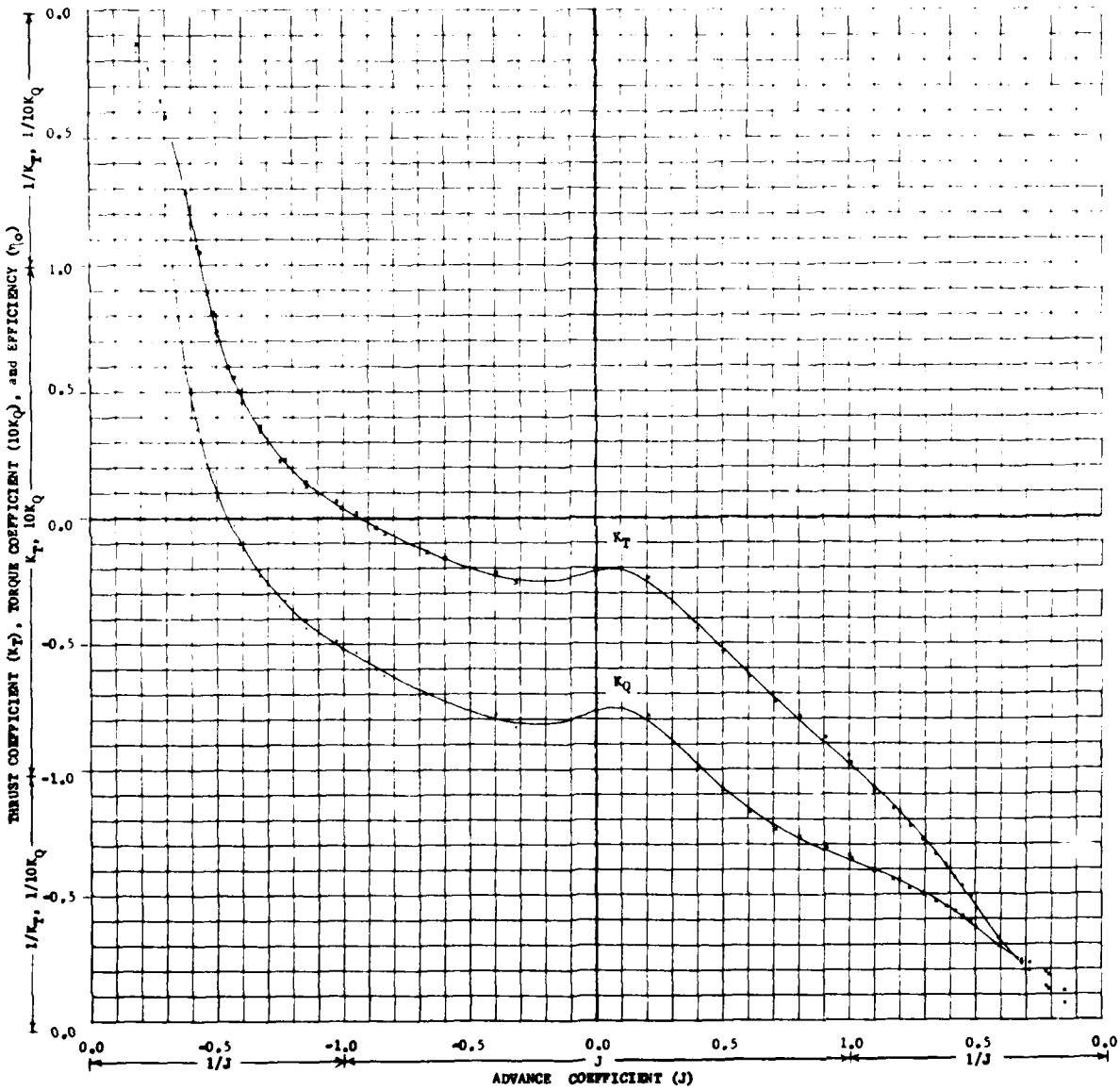

Figure 9- MEM Propeller 4837- Open Water Thrust and Torque; P/D= -0.7

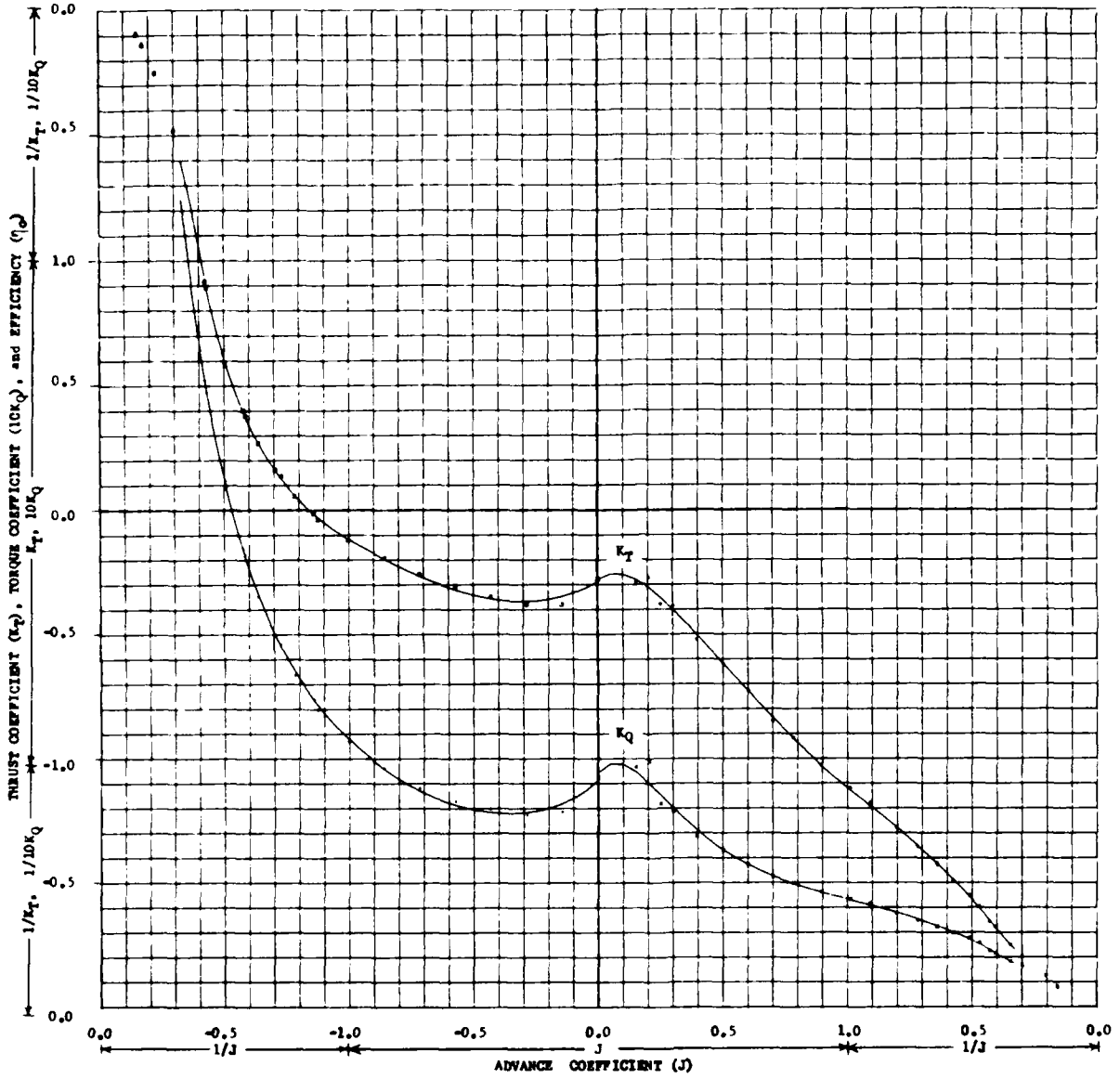

Figure 10- MCM Propeller 4837- Open Water Thrust and Torque; P/D= -1.0

TABLE 1

EXPERIMENTAL CONDITIONS

P/D	Condition	Speed (ft/sec)	RPS	J	Rn X 10-5	Table Number	Figure Number
2.464	Ahead	0 to +12.0	3.0 to 5.0	0 to +4.0	2.4 to 6.0	2	3
	Crashahead	0 to -8.5	1.5 to 5.4	0 to -4.9	2.2 to 4.6	3	3
2.127	Ahead	0 to +12.0	1.5 to 5.5	0 to +4.0	2.5 to 6.3	4	4
	Crashahead	0 to -8.0	1.5 to 6.2	0 to -3.5	2.2 to 5.2	5	4
2.053	Ahead	0 to +12.0	1.5 to 6.0	0 to +4.1	2.5 to 6.6	6	5
	Crashahead	0 to -8.0	1.0 to 5.5	0 to -4.6	2.1 to 5.0	7	5
1.643	Ahead	0 to +12.0	1.6 to 6.6	0 to +4.5	2.9 to 6.9	8	6
	Crashahead	0 to -8.0	1.0 to 6.6	0 to -4.8	2.0 to 5.7	9	6
0.0	Crashback	0 to +12.0	1.5 to 8.0	0 to +5.2	3.2 to 7.9	10	7
	Backing	0 to -12.0	1.5 to 8.1	0 to -5.3	3.2 to 7.8	11	7
-0.4	Crashback	0 to +9.0	1.2 to 8.1	0 to +6.0	2.8 to 7.3	12	8
	Backing	0 to -11.0	1.1 to 8.1	0 to -7.5	3.1 to 7.5	13	8
-0.7	Crashback	0 to +9.5	1.0 to 5.0	0 to +6.8	2.0 to 5.3	14	9
	Backing	0 to -12.0	1.0 to 6.0	0 to -5.4	2.1 to 6.6	15	9
-1.0	Crashback	0 to +9.0	1.1 to 5.1	0 to +6.3	2.7 to 4.5	16	10
	Backing	0 to -12.0	1.1 to 7.0	0 to -6.6	2.7 to 7.2	17	10

TABLE 2

Faired Open Water Characteristics- Propeller 4837
P/D= 2.464 Ahead and Windmilling

J	K_T	$10K_Q$	η	C_T	$10C_Q$
0.000	.975	2.741	0.000	.975	2.741
.050	.972	2.739	.050	.969	2.733
.100	.964	2.725	.100	.955	2.698
.150	.953	2.700	.148	.932	2.641
.200	.938	2.667	.196	.902	2.564
.250	.922	2.627	.243	.867	2.472
.300	.903	2.582	.287	.828	2.369
.350	.883	2.533	.330	.786	2.257
.400	.861	2.482	.371	.742	2.140
.450	.839	2.430	.410	.698	2.021
.500	.817	2.378	.447	.653	1.902
.550	.794	2.326	.482	.610	1.786
.600	.772	2.275	.514	.567	1.673
.650	.749	2.225	.545	.527	1.564
.700	.727	2.177	.573	.488	1.461
.750	.706	2.131	.600	.452	1.364
.800	.685	2.088	.625	.418	1.273
.850	.664	2.046	.648	.386	1.188
.900	.645	2.007	.669	.356	1.109
.950	.626	1.970	.689	.329	1.035
1.000	.607	1.935	.707	.304	.967
1.050	.589	1.902	.724	.280	.904
1.100	.572	1.870	.740	.259	.846
1.150	.555	1.839	.755	.239	.792
1.200	.538	1.809	.768	.220	.741
1.250	.521	1.780	.781	.203	.695
1.300	.505	1.751	.793	.188	.651
1.350	.489	1.721	.804	.173	.610
1.400	.473	1.691	.814	.160	.571
1.450	.456	1.659	.823	.147	.535
1.500	.440	1.626	.832	.135	.500
1.550	.423	1.592	.840	.124	.468
1.600	.405	1.555	.848	.114	.437
1.650	.387	1.515	.855	.104	.407
1.700	.368	1.472	.862	.095	.378
1.750	.349	1.426	.868	.086	.351
1.800	.328	1.376	.874	.077	.325
1.850	.307	1.322	.880	.069	.299
1.900	.285	1.264	.885	.062	.274
1.950	.261	1.202	.890	.054	.250
2.000	.236	1.135	.894	.047	.227
2.050	.210	1.063	.899	.040	.204
2.100	.183	.986	.903	.034	.182
2.150	.154	.904	.907	.027	.161
2.200	.123	.818	.910	.021	.140
2.250	.092	.726	.914	.015	.120
2.300	.059	.628	.917	.009	.100
2.350	.024	.526	.920	.004	.081
2.400	-.012	.419	.923	-.002	.062
2.450	-.049	.307	.926	-.007	.044
2.500	-.088	.190	.928	-.012	.026
2.550	-.129	.068	.931	-.017	.009
2.600	-.170	-.058	.933	-.022	-.007
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TABLE 3

Faired Open Water Characteristics- Propeller 4837
P/D= 2.464 Crashahead

J	K_T	$10K_Q$	μ	C_T	$10C_Q$
0.000	.845	2.779	0.000	.845	2.779
-.050	.823	2.664	-.050	.821	2.657
-.100	.825	2.634	-.100	.817	2.608
-.150	.837	2.643	-.148	.819	2.584
-.200	.851	2.657	-.196	.818	2.555
-.250	.861	2.659	-.243	.810	2.502
-.300	.865	2.641	-.287	.794	2.423
-.350	.863	2.601	-.330	.769	2.317
-.400	.856	2.543	-.371	.738	2.192
-.450	.845	2.473	-.410	.703	2.057
-.500	.833	2.399	-.447	.667	1.919
-.550	.823	2.328	-.482	.632	1.788
-.600	.816	2.269	-.514	.600	1.668
-.650	.814	2.226	-.545	.572	1.565
-.700	.819	2.205	-.573	.550	1.480
-.750	.832	2.210	-.600	.533	1.414
-.800	.854	2.241	-.625	.521	1.367
-.850	.885	2.300	-.648	.514	1.335
-.900	.925	2.384	-.669	.511	1.317
-.950	.973	2.492	-.689	.512	1.310
-1.000	1.029	2.622	-.707	.515	1.311
-1.050	1.092	2.768	-.724	.519	1.317
-1.100	1.160	2.928	-.740	.525	1.325
-1.150	1.233	3.098	-.755	.531	1.334
-1.200	1.309	3.274	-.768	.536	1.342
-1.250	1.388	3.452	-.781	.542	1.347
-1.300	1.468	3.631	-.793	.546	1.350
-1.350	1.549	3.808	-.804	.549	1.349
-1.400	1.630	3.982	-.814	.551	1.345
-1.450	1.710	4.152	-.823	.551	1.338
-1.500	1.790	4.318	-.832	.551	1.328
-1.550	1.869	4.480	-.840	.549	1.317
-1.600	1.948	4.640	-.848	.547	1.303
-1.650	2.025	4.800	-.855	.544	1.289
-1.700	2.103	4.961	-.862	.541	1.275
-1.750	2.181	5.125	-.868	.537	1.261
-1.800	2.259	5.294	-.874	.533	1.249
-1.850	2.337	5.470	-.880	.529	1.237
-1.900	2.417	5.654	-.885	.524	1.226
-1.950	2.498	5.848	-.890	.520	1.218
-2.000	2.580	6.051	-.894	.516	1.210
-2.050	2.663	6.265	-.899	.512	1.204
-2.100	2.748	6.487	-.903	.508	1.199
-2.150	2.833	6.718	-.907	.504	1.195
-2.200	2.919	6.956	-.910	.500	1.191
-2.250	3.005	7.199	-.914	.496	1.188
-2.300	3.091	7.445	-.917	.491	1.184
-2.350	3.176	7.692	-.920	.487	1.179
-2.400	3.260	7.938	-.923	.482	1.174
-2.450	3.342	8.180	-.926	.477	1.168
-2.500	3.422	8.419	-.928	.472	1.161
-2.550	3.501	8.654	-.931	.467	1.153
-2.600	3.577	8.884	-.933	.461	1.145
-2.650	3.652	9.111	-.936	.455	1.136
-2.700	3.726	9.338	-.938	.449	1.126
-2.750	3.799	9.567	-.940	.444	1.117
-2.800	3.873	9.801	-.942	.438	1.109
-2.850	3.949	10.044	-.944	.433	1.101
-2.900	4.026	10.300	-.945	.428	1.095
-2.950	4.107	10.570	-.947	.423	1.089
-3.000	4.190	10.856	-.949	.419	1.086
-3.050	4.276	11.153	-.950	.415	1.083

DEGREE OF POLYNOMIAL= 12

8.4502094396E-01	2.7792169646E+00
7.9823617927E-01	3.6095601209E+00
8.5919539747E+00	3.1074333112E+01
3.0894816393E+01	1.1176727270E+02
5.0981803034E+01	1.8641805945E+02
4.4183180383E+01	1.6462859999E+02
2.1762971110E+01	8.2801671434E+01
6.2357006709E+00	2.4279672932E+01
1.1223668567E+00	4.5071721660E+00
2.1027279588E-01	8.6605218436E-01
5.6243100641E-02	2.3006573788E-01
9.9922675767E-03	4.0631269843E-02
6.8828308123E-04	2.7972436702E-03

TABLE 4

Faired Open Water Characteristics- Propeller 4837
P/D= 2.127 Ahead and Windmilling

J	K_T	$10K_Q$	μ	C_T	$10C_Q$
0.000	.944	2.403	0.000	.944	2.403
.050	.941	2.388	.050	.939	2.382
.100	.932	2.362	.100	.923	2.338
.150	.919	2.326	.148	.898	2.275
.200	.901	2.283	.196	.867	2.195
.250	.881	2.236	.243	.829	2.104
.300	.859	2.185	.287	.788	2.005
.350	.835	2.134	.330	.744	1.901
.400	.810	2.082	.371	.699	1.794
.450	.785	2.030	.410	.653	1.688
.500	.760	1.980	.447	.608	1.584
.550	.736	1.932	.482	.565	1.483
.600	.711	1.686	.514	.523	1.387
.650	.688	1.843	.545	.484	1.296
.700	.665	1.803	.573	.446	1.210
.750	.643	1.765	.600	.412	1.129
.800	.622	1.729	.625	.379	1.054
.850	.602	1.696	.648	.350	.985
.900	.583	1.664	.669	.322	.920
.950	.564	1.634	.689	.296	.859
1.000	.546	1.605	.707	.273	.803
1.050	.528	1.577	.724	.251	.750
1.100	.510	1.546	.740	.231	.701
1.150	.492	1.519	.755	.212	.654
1.200	.474	1.489	.768	.194	.610
1.250	.456	1.458	.781	.178	.569
1.300	.438	1.424	.793	.163	.529
1.350	.419	1.388	.804	.148	.492
1.400	.399	1.348	.814	.135	.455
1.450	.378	1.305	.823	.122	.421
1.500	.355	1.259	.832	.109	.387
1.550	.332	1.208	.840	.098	.355
1.600	.307	1.153	.848	.086	.324
1.650	.281	1.093	.855	.076	.294
1.700	.253	1.028	.862	.065	.264
1.750	.224	.958	.868	.055	.236
1.800	.193	.882	.874	.046	.208
1.850	.160	.802	.880	.036	.181
1.900	.126	.717	.885	.027	.155
1.950	.090	.626	.890	.019	.130
2.000	.052	.531	.894	.010	.106
2.050	.013	.431	.899	.003	.083
2.100	-.028	.326	.903	-.005	.060
2.150	-.070	.218	.907	-.012	.039
2.200	-.113	.106	.910	-.019	.018
2.250	-.158	-.010	.914	-.026	-.002
2.300	-.204	-.128	.917	-.032	-.020
2.350	-.251	-.249	.920	-.038	-.038
2.400	-.298	-.372	.923	-.044	-.055
2.450	-.347	-.497	.926	-.050	-.071
2.500	-.396	-.623	.928	-.055	-.086
2.550	-.445	-.750	.931	-.059	-.100
2.600	-.495	-.877	.933	-.064	-.113
2.650	-.545	-1.004	.936	-.068	-.125
2.700	-.595	-1.131	.938	-.072	-.136
2.750	-.646	-1.258	.940	-.075	-.147
2.800	-.696	-1.383	.942	-.079	-.156
2.850	-.746	-1.508	.944	-.082	-.165
2.900	-.797	-1.633	.945	-.085	-.173
2.950	-.848	-1.756	.947	-.087	-.181
3.000	-.899	-1.880	.949	-.090	-.188
3.050	-.950	-2.003	.950	-.092	-.194

DEGREE OF POLYNOMIAL= 6

9.4372925064E-01	2.4033388433E+00
1.2414616022E-02	-1.6032945885E-01
-1.4578267306E+00	-2.9827541483E+00
1.8651089272E+00	4.3984752840E+00
-1.0606086962E+00	-2.6901821203E+00
2.6775174503E-01	7.0378637590E-01
-2.5064075617E-02	-6.6984008261E-02

TABLE 5

Faired Open Water Characteristics- Propeller 4837
P/D= 2.127 Crashahead

J	K_T	$10K_Q$	η	C_T	$10C_Q$
0.000	.874	2.406	0.000	.874	2.406
-.050	.660	1.821	-.050	.659	1.817
-.100	.609	1.688	-.100	.603	1.671
-.150	.641	1.780	-.148	.627	1.741
-.200	.704	1.950	-.196	.677	1.875
-.250	.767	2.109	-.243	.722	1.985
-.300	.812	2.213	-.287	.745	2.030
-.350	.835	2.245	-.330	.743	2.000
-.400	.835	2.211	-.371	.720	1.906
-.450	.818	2.125	-.410	.680	1.767
-.500	.790	2.009	-.447	.632	1.607
-.550	.760	1.884	-.482	.583	1.446
-.600	.733	1.770	-.514	.539	1.301
-.650	.715	1.683	-.545	.502	1.183
-.700	.710	1.634	-.573	.476	1.097
-.750	.720	1.630	-.600	.461	1.043
-.800	.747	1.672	-.625	.456	1.020
-.850	.789	1.759	-.648	.458	1.021
-.900	.845	1.882	-.669	.467	1.040
-.950	.912	2.036	-.689	.480	1.070
-1.000	.988	2.211	-.707	.494	1.105
-1.050	1.068	2.396	-.724	.508	1.140
-1.100	1.151	2.584	-.740	.521	1.169
-1.150	1.233	2.765	-.755	.531	1.191
-1.200	1.313	2.935	-.768	.538	1.203
-1.250	1.389	3.089	-.781	.542	1.205
-1.300	1.461	3.225	-.793	.543	1.199
-1.350	1.528	3.344	-.804	.541	1.185
-1.400	1.591	3.448	-.814	.537	1.165
-1.450	1.651	3.541	-.823	.532	1.141
-1.500	1.711	3.630	-.832	.526	1.117
-1.550	1.771	3.719	-.840	.520	1.093
-1.600	1.834	3.815	-.848	.515	1.072
-1.650	1.902	3.925	-.855	.511	1.054
-1.700	1.976	4.053	-.862	.508	1.042
-1.750	2.057	4.205	-.868	.506	1.035
-1.800	2.147	4.382	-.874	.506	1.033
-1.850	2.246	4.585	-.880	.508	1.037
-1.900	2.352	4.813	-.885	.510	1.044
-1.950	2.465	5.062	-.890	.513	1.054
-2.000	2.584	5.327	-.894	.517	1.065
-2.050	2.706	5.602	-.899	.520	1.077
-2.100	2.828	5.880	-.903	.523	1.087
-2.150	2.948	6.153	-.907	.524	1.094
-2.200	3.062	6.412	-.910	.524	1.098
-2.250	3.169	6.651	-.914	.523	1.097
-2.300	3.266	6.864	-.917	.519	1.091
-2.350	3.351	7.047	-.920	.514	1.080
-2.400	3.423	7.201	-.923	.506	1.065
-2.450	3.484	7.326	-.926	.497	1.046
-2.500	3.533	7.428	-.928	.487	1.025
-2.550	3.572	7.516	-.931	.476	1.002
-2.600	3.606	7.600	-.933	.465	.979
-2.650	3.638	7.693	-.936	.453	.953
-2.700	3.672	7.811	-.938	.443	.942
-2.750	3.713	7.966	-.940	.434	.930
-2.300	3.767	8.171	-.942	.426	.924
-2.850	3.836	8.437	-.944	.421	.925
-2.900	3.925	8.766	-.945	.417	.932
-2.950	4.035	9.155	-.947	.416	.944
-3.000	4.164	9.595	-.949	.416	.960
-3.050	4.310	10.065	-.950	.418	.977

DEGREE OF POLYNOMIAL= 12

8.740951969HE-01	2.4060851336E+00
6.606436588?E+00	1.8205196908E+01
5.49:01$012?E+01	1.5395042852E+02
1.810216176?E+02	5.1600035396E+02
3.033549837?E+02	8.6852854199E+02
2.870063120?E+02	8.1838448934E+02
1.598096189?E+02	4.4932042106E+02
5.135641525?E+01	1.3990204451E+02
8.290597541?E+00	2.1247507893E+01
2.730839150?E-01	7.0136790895E-01
-6.648175216?E-02	2.5637175282E-03
2.581245687?E-03	5.9545923960E-02
1.331617733?E-03	8.1536538179E-03

TABLE 6

Faired Open Water Characteristics- Propeller 4837
P/D= 2.053 Ahead and Windmilling

J	K_T	$10K_Q$	μ	C_T	$10C_Q$
0.000	.954	2.320	0.000	.954	2.320
.050	.937	2.281	.050	.935	2.276
.100	.918	2.240	.100	.904	2.217
.150	.898	2.196	.148	.878	2.148
.200	.877	2.152	.196	.843	2.069
.250	.856	2.107	.243	.805	1.982
.300	.834	2.062	.287	.765	1.892
.350	.812	2.018	.330	.723	1.798
.400	.790	1.975	.371	.681	1.702
.450	.767	1.932	.410	.638	1.607
.500	.745	1.891	.447	.596	1.513
.550	.723	1.851	.482	.555	1.421
.600	.702	1.812	.514	.516	1.333
.650	.680	1.775	.545	.479	1.248
.700	.659	1.739	.573	.442	1.167
.750	.638	1.703	.600	.408	1.090
.800	.617	1.669	.625	.376	1.018
.850	.596	1.635	.648	.346	.949
.900	.576	1.602	.669	.318	.885
.950	.556	1.569	.689	.292	.825
1.000	.536	1.536	.707	.268	.769
1.050	.516	1.503	.724	.245	.715
1.100	.495	1.469	.740	.224	.665
1.150	.475	1.434	.755	.205	.617
1.200	.455	1.397	.768	.186	.573
1.250	.434	1.360	.781	.169	.531
1.300	.413	1.320	.793	.153	.491
1.350	.391	1.278	.804	.139	.453
1.400	.369	1.234	.814	.125	.417
1.450	.346	1.187	.823	.112	.383
1.500	.323	1.137	.832	.099	.350
1.550	.298	1.084	.840	.088	.319
1.600	.273	1.028	.848	.077	.289
1.650	.246	.968	.855	.066	.260
1.700	.219	.904	.862	.056	.232
1.750	.190	.836	.868	.047	.206
1.800	.160	.763	.874	.038	.180
1.850	.128	.687	.880	.029	.155
1.900	.095	.606	.885	.021	.131
1.950	.061	.520	.890	.013	.108
2.000	.025	.430	.894	.005	.086
2.050	-.013	.335	.899	-.003	.064
2.100	-.053	.236	.903	-.010	.044
2.150	-.094	.132	.907	-.017	.023
2.200	-.138	.023	.910	-.024	.004
2.250	-.183	-.090	.914	-.030	-.015
2.300	-.230	-.208	.917	-.037	-.033
2.350	-.279	-.330	.920	-.043	-.051
2.400	-.330	-.456	.923	-.049	-.068
2.450	-.383	-.587	.926	-.055	-.084
2.500	-.438	-.722	.928	-.060	-.100
2.550	-.496	-.861	.931	-.066	-.115
2.600	-.555	-1.004	.933	-.072	-.129
2.650	-.617	-1.151	.936	-.077	-.143
2.700	-.680	-1.301	.938	-.082	-.157
2.750	-.746	-1.455	.940	-.087	-.170
2.800	-.813	-1.612	.942	-.092	-.182
2.850	-.883	-1.773	.944	-.097	-.194
2.900	-.955	-1.937	.945	-.101	-.206
2.950	-1.029	-2.105	.947	-.106	-.217
3.000	-1.105	-2.275	.949	-.110	-.228
3.050	-1.183	-2.449	.950	-.115	-.238

DEGREE OF POLYNOMIAL= 6

9.5437442988E-01	2.3204693152E+00
-3.3516082291E-01	-7.5289320067E-01
-3.3262792368E-01	-6.8957166925E-01
4.3876687659E-01	1.3479283519E+00
-2.3388406168E-01	-8.9452192687E-01
4.7775137515E-02	2.2470558120E-01
-3.5273469487E-03	-2.0126128915E-02

TABLE 7

Faired Open Water Characteristics- Propeller 4837
P/D= 2.053 Crashahead

J	K_T	$10K_Q$	η	C_T	$10C_Q$
0.000	.905	2.317	0.000	.909	2.317
-.050	.925	2.363	-.050	.922	2.359
-.100	.935	2.393	-.100	.925	2.370
-.150	.935	2.399	-.148	.915	2.346
-.200	.927	2.379	-.196	.891	2.287
-.250	.911	2.333	-.243	.854	2.196
-.300	.890	2.266	-.287	.816	2.079
-.350	.864	2.182	-.329	.770	1.944
-.400	.837	2.088	-.371	.724	1.807
-.450	.811	1.991	-.410	.684	1.688
-.500	.788	1.897	-.448	.651	1.591
-.550	.769	1.813	-.482	.630	1.532
-.600	.756	1.743	-.513	.625	1.502
-.650	.750	1.693	-.542	.627	1.490
-.700	.753	1.665	-.568	.636	1.496
-.750	.765	1.662	-.590	.649	1.504
-.800	.787	1.684	-.605	.660	1.527
-.850	.818	1.733	-.613	.675	1.566
-.900	.858	1.806	-.609	.691	.994
-.950	.907	1.901	-.593	.677	.999
-1.000	.964	2.017	-.567	.682	1.009
-1.050	1.029	2.151	-.534	.689	1.029
-1.100	1.098	2.298	-.500	.697	1.046
-1.150	1.174	2.457	-.465	.705	1.062
-1.200	1.253	2.622	-.428	.714	1.077
-1.250	1.335	2.791	-.391	.723	1.089
-1.300	1.419	2.961	-.353	.728	1.101
-1.350	1.504	3.129	-.314	.733	1.108
-1.400	1.590	3.292	-.274	.737	1.112
-1.450	1.674	3.451	-.235	.740	1.112
-1.500	1.758	3.603	-.192	.741	1.109
-1.550	1.840	3.743	-.150	.741	1.102
-1.600	1.920	3.867	-.106	.739	1.092
-1.650	1.994	4.021	-.065	.737	1.080
-1.700	2.076	4.151	-.062	.734	1.067
-1.750	2.152	4.275	-.058	.730	1.053
-1.800	2.227	4.406	-.054	.726	1.039
-1.850	2.301	4.536	-.050	.720	1.026
-1.900	2.376	4.672	-.045	.715	1.013
-1.950	2.451	4.815	-.040	.710	1.003
-2.000	2.528	4.968	-.034	.705	.994
-2.050	2.607	5.132	-.029	.701	.987
-2.100	2.688	5.310	-.023	.697	.982
-2.150	2.773	5.503	-.017	.693	.979
-2.200	2.861	5.710	-.010	.690	.978
-2.250	2.952	5.931	-.004	.687	.978
-2.300	3.048	6.166	-.017	.685	.980
-2.350	3.147	6.411	-.020	.682	.983
-2.400	3.250	6.666	-.023	.681	.986
-2.450	3.356	6.925	-.026	.679	.989
-2.500	3.464	7.186	-.028	.678	.991
-2.550	3.575	7.443	-.031	.676	.992

DEGREE OF POLYNOMIAL= 12

9.05[illegible]1731E-01	2.31[illegible]E+00
-4.70[illegible]E-01	-1.01[illegible]E+00
-1.55[illegible]E+00	-7.27[illegible]E-01
2.9[illegible]E+00	2.2[illegible]E+01
1.02[illegible]E+01	5.05[illegible]E+01
9.09[illegible]E+00	4.21[illegible]E+01
3.31[illegible]E-00	1.54[illegible]E+01
3.37[illegible]E-01	1.55[illegible]E+00
-4.89[illegible]E-02	-3.13[illegible]E-01
1.9813933780E-02	5.57[illegible]E-02
1.50[illegible]E-02	6.81[illegible]E-02
2.86[illegible]E-03	1.24[illegible]E-02
1.7300975098E-04	8.43[illegible]E-04

TABLE 8

Faired Open Water Characteristics- Propeller 4837
P/D= 1.643 Ahead and Windmilling

J	K_T	$10K_Q$	μ	C_T	$10C_Q$
0.000	.887	1.751	0.000	.887	1.751
.050	.862	1.711	.050	.860	1.707
.100	.837	1.673	.100	.829	1.657
.150	.812	1.637	.148	.795	1.601
.200	.788	1.602	.196	.758	1.541
.250	.764	1.569	.243	.719	1.477
.300	.740	1.537	.287	.678	1.410
.350	.716	1.505	.330	.638	1.341
.400	.692	1.475	.371	.597	1.272
.450	.669	1.445	.410	.557	1.202
.500	.646	1.416	.447	.517	1.132
.550	.624	1.386	.482	.479	1.064
.600	.601	1.357	.514	.442	.998
.650	.579	1.327	.545	.407	.933
.700	.556	1.297	.573	.373	.870
.750	.534	1.266	.600	.341	.810
.800	.511	1.234	.625	.311	.752
.850	.488	1.201	.648	.283	.697
.900	.464	1.166	.669	.256	.644
.950	.440	1.130	.689	.231	.594
1.000	.415	1.091	.707	.208	.546
1.050	.390	1.051	.724	.185	.500
1.100	.364	1.008	.740	.165	.456
1.150	.337	.963	.755	.145	.415
1.200	.308	.915	.768	.126	.375
1.250	.279	.864	.781	.109	.337
1.300	.248	.810	.793	.092	.301
1.350	.216	.752	.804	.077	.268
1.400	.183	.692	.814	.062	.234
1.450	.148	.627	.823	.048	.202
1.500	.111	.559	.832	.034	.172
1.550	.073	.488	.840	.021	.145
1.600	.033	.412	.848	.009	.118
1.650	-.010	.332	.855	-.003	.089
1.700	-.058	.248	.862	-.014	.064
1.750	-.109	.160	.868	-.024	.039
1.800	-.147	.067	.874	-.035	.016
1.850	-.198	-.030	.880	-.045	-.007
1.900	-.250	-.131	.885	-.054	-.029
1.950	-.304	-.236	.890	-.063	-.049
2.000	-.361	-.346	.894	-.072	-.069
2.050	-.419	-.461	.899	-.081	-.089
2.100	-.480	-.580	.903	-.089	-.107
2.150	-.543	-.703	.907	-.097	-.125
2.200	-.608	-.830	.910	-.104	-.142
2.250	-.676	-.962	.914	-.111	-.159
2.300	-.745	-1.098	.917	-.118	-.175
2.350	-.817	-1.239	.920	-.125	-.190
2.400	-.891	-1.383	.923	-.132	-.205
2.450	-.967	-1.532	.926	-.138	-.219
2.500	-1.045	-1.685	.928	-.144	-.232
2.550	-1.125	-1.842	.931	-.150	-.245

DEGREE OF POLYNOMIALS= 6

8.87[illegible]501361[illegible]E-01	1.75[illegible]E+00
-4.99[illegible]E-01	-8.08[illegible]E-01
-1.31[illegible]E-02	3.54[illegible]E-01
1.78[illegible]E-01	-9.92[illegible]E-02
-1.82[illegible]E-01	-1.64[illegible]E-01
4.92[illegible]E-02	5.91[illegible]E-02
-4.41[illegible]E-03	-5.90[illegible]E-03

TABLE 9

Faired Open Water Characteristics- Propeller 4837
P/D= 1.643 Crashahead

J	K_T	$10K_Q$	μ	C_T	$10C_Q$
0.000	.824	1.745	0.000	.824	1.745
-.050	.778	1.614	-.050	.776	1.610
-.100	.804	1.642	-.100	.796	1.626
-.150	.860	1.741	-.148	.841	1.703
-.200	.918	1.851	-.196	.883	1.780
-.250	.960	1.934	-.243	.904	1.822
-.300	.979	1.971	-.287	.898	1.808
-.350	.971	1.956	-.330	.865	1.743
-.400	.940	1.892	-.371	.810	1.631
-.450	.890	1.788	-.410	.740	1.487
-.500	.828	1.657	-.447	.662	1.324
-.550	.762	1.514	-.482	.585	1.162
-.600	.698	1.373	-.514	.513	1.010
-.650	.634	1.247	-.545	.453	.892
-.700	.603	1.146	-.573	.405	.769
-.750	.581	1.079	-.600	.372	.690
-.800	.579	1.050	-.625	.353	.640
-.850	.597	1.061	-.648	.347	.618
-.900	.636	1.112	-.669	.351	.614
-.950	.693	1.199	-.689	.365	.631
-1.000	.767	1.318	-.707	.383	.658
-1.050	.852	1.462	-.724	.405	.695
-1.100	.946	1.624	-.740	.428	.736
-1.150	1.045	1.795	-.755	.450	.773
-1.200	1.144	1.969	-.768	.469	.807
-1.250	1.241	2.138	-.781	.484	.835
-1.300	1.333	2.298	-.793	.496	.856
-1.350	1.418	2.442	-.804	.502	.865
-1.400	1.494	2.569	-.814	.505	.868
-1.450	1.561	2.678	-.823	.503	.863
-1.500	1.620	2.770	-.832	.498	.852
-1.550	1.672	2.847	-.840	.492	.837
-1.600	1.721	2.914	-.848	.483	.818
-1.650	1.767	2.975	-.855	.475	.799
-1.700	1.816	3.037	-.862	.467	.781
-1.750	1.870	3.107	-.868	.460	.765
-1.800	1.932	3.190	-.874	.456	.752
-1.850	2.005	3.294	-.880	.453	.746
-1.900	2.091	3.422	-.885	.454	.742
-1.950	2.192	3.578	-.890	.456	.745
-2.000	2.308	3.763	-.894	.462	.753
-2.050	2.437	3.974	-.899	.468	.764

DEGREE OF POLYNOMIAL= 10

8.249974921[illegible]E-01	1.745443[illegible]851E+00
2.009062826[illegible]E+00	4.9852427021E+00
2.598910938[illegible]E+01	5.6078165627E+01
9.209[illegible]821127E+01	1.9181630055E+02
1.3[illegible]3487223E+02	2.8532672706E+02
1.035[illegible]848000E+02	2.0944915475E+02
3.5424916153E+01	7.1548131824E+01
1.50[illegible]3119501E+00	3.5115234083E+00
-2.51281729[illegible]8E+00	-4.8302931514E+00
-6.8821441277E-01	-1.3181234725E+00
-5.5380944013E-02	-1.0603637263E-01

TABLE 10

Paired Open Water Characteristics- Propeller 4837
P/D= 0.0 Crashback

J	K_T	$10K_Q$	μ	C_T	$10C_Q$
0.000	-.023	.215	0.000	-.023	.215
.050	-.042	.232	.050	-.042	.231
.100	-.061	.247	.100	-.060	.245
.150	-.080	.261	.148	-.078	.255
.200	-.099	.273	.196	-.096	.262
.250	-.120	.284	.243	-.113	.267
.300	-.141	.294	.287	-.129	.270
.350	-.163	.303	.330	-.145	.270
.400	-.186	.311	.371	-.160	.268
.450	-.210	.319	.410	-.175	.265
.500	-.236	.325	.447	-.189	.260
.550	-.263	.332	.482	-.202	.255
.600	-.292	.338	.514	-.214	.248
.650	-.322	.343	.545	-.226	.241
.700	-.354	.348	.573	-.237	.233
.750	-.387	.353	.600	-.248	.226
.800	-.423	.357	.625	-.258	.218
.850	-.460	.361	.648	-.267	.210
.900	-.499	.365	.669	-.276	.202
.950	-.540	.369	.689	-.284	.194
1.000	-.583	.372	.707	-.292	.186
1.050	-.628	.375	.724	-.299	.179
1.100	-.675	.378	.740	-.306	.171
1.150	-.724	.381	.755	-.312	.164
1.200	-.775	.384	.768	-.318	.157
1.250	-.828	.386	.781	-.323	.151
1.300	-.883	.388	.793	-.328	.144
1.350	-.940	.390	.804	-.333	.138
1.400	-.999	.392	.814	-.337	.132
1.450	-1.060	.393	.823	-.342	.127
1.500	-1.123	.394	.832	-.345	.121
1.550	-1.188	.395	.840	-.349	.116
1.600	-1.255	.395	.848	-.352	.111
1.650	-1.323	.395	.855	-.356	.106
1.700	-1.394	.395	.862	-.358	.101
1.750	-1.467	.394	.868	-.361	.097
1.800	-1.542	.392	.874	-.364	.092
1.850	-1.618	.390	.880	-.366	.088
1.900	-1.697	.387	.885	-.368	.084
1.950	-1.777	.384	.890	-.370	.080
2.000	-1.860	.380	.894	-.372	.076
2.050	-1.944	.376	.899	-.374	.072
2.100	-2.030	.370	.903	-.375	.068
2.150	-2.118	.364	.907	-.377	.065
2.200	-2.208	.358	.910	-.378	.061
2.250	-2.300	.350	.914	-.379	.058
2.300	-2.394	.342	.917	-.381	.054
2.350	-2.489	.333	.920	-.382	.051
2.400	-2.587	.323	.923	-.383	.048
2.450	-2.686	.312	.926	-.384	.045
2.500	-2.788	.300	.928	-.385	.041
2.550	-2.891	.288	.931	-.385	.038
2.600	-2.996	.274	.933	-.386	.035
2.650	-3.103	.260	.936	-.387	.032
2.700	-3.212	.245	.938	-.388	.030
2.750	-3.323	.229	.940	-.388	.027
2.800	-3.436	.211	.942	-.389	.024
2.850	-3.551	.193	.944	-.389	.021
2.900	-3.668	.174	.945	-.390	.019
2.950	-3.787	.154	.947	-.390	.016
3.000	-3.909	.134	.949	-.391	.013
3.050	-4.032	.112	.950	-.391	.011

DEGREE OF POLYNOMIAL= 6

-2.3395422427E-02	2.1507681916E-01
-3.7334502961E-01	3.5468631405E-01
2.4647476698E-02	-3.7789184948E-01
-3.0864762782E-01	2.6755365216E-01
1.1761540773E-01	-1.0350403885E-01
-2.1922706160E-02	1.7160943934E-02
1.5732688972E-03	-1.0352789637E-03

TABLE 11

Faired Open Water Characteristics- Propeller 4837
P/D= 0.0 Backing

J	K_T	$10K_Q$	μ	C_T	$10C_Q$
0.000	-.011	.214	0.000	-.011	.214
-.050	.000	.212	-.050	.000	.211
-.100	.011	.211	-.100	.011	.208
-.150	.022	.210	-.148	.021	.205
-.200	.032	.210	-.196	.031	.202
-.250	.042	.211	-.243	.040	.198
-.300	.053	.212	-.287	.048	.194
-.350	.063	.213	-.330	.056	.190
-.400	.075	.214	-.371	.064	.184
-.450	.086	.215	-.410	.072	.179
-.500	.099	.216	-.447	.079	.173
-.550	.112	.216	-.482	.086	.166
-.600	.126	.217	-.514	.093	.159
-.650	.141	.216	-.545	.099	.152
-.700	.157	.216	-.573	.105	.145
-.750	.174	.215	-.600	.111	.138
-.800	.192	.214	-.625	.117	.130
-.850	.212	.212	-.648	.123	.123
-.900	.233	.210	-.669	.129	.116
-.950	.255	.207	-.689	.134	.109
-1.000	.279	.204	-.707	.139	.102
-1.050	.304	.201	-.724	.144	.096
-1.100	.330	.197	-.740	.149	.089
-1.150	.358	.193	-.755	.154	.083
-1.200	.388	.189	-.768	.159	.077
-1.250	.419	.184	-.781	.164	.072
-1.300	.453	.180	-.793	.168	.067
-1.350	.487	.175	-.804	.173	.062
-1.400	.524	.170	-.814	.177	.057
-1.450	.562	.165	-.823	.181	.053
-1.500	.602	.160	-.832	.185	.049
-1.550	.643	.155	-.840	.189	.046
-1.600	.687	.151	-.848	.193	.042
-1.650	.732	.146	-.855	.197	.039
-1.700	.779	.142	-.862	.200	.036
-1.750	.828	.138	-.868	.204	.034
-1.800	.879	.134	-.874	.207	.032
-1.850	.932	.130	-.880	.211	.029
-1.900	.987	.127	-.885	.214	.028
-1.950	1.043	.125	-.890	.217	.026
-2.000	1.101	.122	-.894	.220	.024
-2.050	1.162	.120	-.899	.223	.023
-2.100	1.224	.119	-.903	.226	.022
-2.150	1.288	.118	-.907	.229	.021
-2.200	1.354	.118	-.910	.232	.020
-2.250	1.422	.118	-.914	.235	.019
-2.300	1.492	.119	-.917	.237	.019
-2.350	1.563	.120	-.920	.240	.018
-2.400	1.637	.121	-.923	.242	.018
-2.450	1.713	.124	-.926	.245	.018
-2.500	1.790	.126	-.928	.247	.017
-2.550	1.870	.129	-.931	.249	.017
-2.600	1.951	.133	-.933	.251	.017
-2.650	2.034	.137	-.936	.254	.017
-2.700	2.120	.141	-.938	.256	.017
-2.750	2.207	.146	-.940	.258	.017
-2.800	2.296	.151	-.942	.260	.017
-2.850	2.387	.157	-.944	.262	.017
-2.900	2.481	.163	-.945	.264	.017
-2.950	2.576	.169	-.947	.265	.017
-3.000	2.673	.175	-.949	.267	.017
-3.050	2.772	.181	-.950	.269	.018

DEGREE OF POLYNOMIAL= 6

-1.0747739102E-02	2.1425196326E-01
-2.2883553118E-01	5.9737777522E-02
-1.2649156901E-01	2.6313986939E-01
-2.4588852070E-01	3.5386184342E-01
-6.8934273571E-02	1.7310452089E-01
-1.0660309730E-02	3.5248315311E-02
-7.0007949780E-04	2.5644744809E-03

TABLE 12

Faired Open Water Characteristics- Propeller 4837
P/D= 0.4 Crashback

J	K_T	$10K_Q$	μ	C_T	$10C_Q$
0.000	-.094	-.442	0.000	-.094	-.442
.050	-.116	-.455	.050	-.115	-.453
.100	-.139	-.469	.100	-.137	-.464
.150	-.163	-.485	.148	-.160	-.475
.200	-.189	-.503	.196	-.182	-.484
.250	-.217	-.523	.243	-.204	-.492
.300	-.245	-.544	.287	-.225	-.499
.350	-.276	-.566	.330	-.246	-.504
.400	-.307	-.590	.371	-.265	-.509
.450	-.340	-.615	.410	-.283	-.511
.500	-.375	-.641	.447	-.300	-.513
.550	-.411	-.669	.482	-.315	-.513
.600	-.448	-.697	.514	-.329	-.512
650	-.487	-.726	.545	-.342	-.510
.700	-.527	-.756	.573	-.354	-.508
.750	-.569	-.787	.600	-.364	-.504
.800	-.612	-.819	.625	-.373	-.500
.850	-.656	-.852	.648	-.381	-.494
.900	-.702	-.885	.669	-.388	-.489
.950	-.749	-.919	.689	-.394	-.483
1.000	-.798	-.953	.707	-.399	-.477
1.050	-.848	-.988	.724	-.403	-.470
1.100	-.899	-1.023	.740	-.407	-.463
1.150	-.952	-1.059	.755	-.410	-.456
1.200	-1.006	-1.094	.768	-.412	-.449
1.250	-1.062	-1.131	.781	.414	-.441
1.300	-1.119	-1.167	.793	-.416	-.434
1.350	-1.177	-1.203	.804	-.417	-.426
1.400	-1.237	-1.240	.814	-.418	-.419
1.450	-1.299	-1.277	.823	-.419	-.412
1.500	-1.361	-1.314	.832	-.419	-.404
1.550	-1.425	-1.350	.840	-.419	-.397
1.600	-1.491	-1.387	.848	-.419	-.390
1.650	-1.558	-1.424	.855	-.418	-.382
1.700	-1.626	-1.460	.862	-.418	-.375
1.750	-1.696	-1.496	.868	-.417	-.368
1.800	-1.767	-1.533	.874	-.417	-.361
1.850	-1.840	-1.568	.880	-.416	-.355
1.900	-1.913	-1.604	.885	-.415	-.348
1.950	-1.989	-1.639	.890	-.414	-.341
2.000	-2.066	-1.674	.894	-.413	-.335
2.050	-2.144	-1.709	.899	-.412	-.329
2.100	-2.223	-1.743	.903	-.411	-.322
2.150	-2.304	-1.777	.907	-.410	-.316
2.200	-2.386	-1.811	.910	-.409	-.310
2.250	-2.470	-1.844	.914	-.407	-.304
2.300	-2.555	-1.876	.917	-.406	-.298
2.350	-2.642	-1.908	.920	-.405	-.293
2.400	-2.730	-1.940	.923	-.404	-.287
2.450	-2.819	-1.971	.926	-.403	-.281
2.500	-2.910	-2.002	.928	-.401	-.276
2.550	-3.002	-2.032	.931	-.400	-.271
2.600	-3.096	-2.061	.933	-.399	-.266
2.650	-3.191	-2.090	.936	-.398	-.261
2.700	-3.287	-2.119	.938	-.397	-.256
2.750	-3.385	-2.146	.940	-.395	-.251
2.800	-3.484	-2.174	.942	-.394	-.246
2.850	-3.585	-2.200	.944	-.393	-.241
2.900	-3.687	-2.226	.945	-.392	-.237
2.950	-3.790	-2.252	.947	-.391	-.232
3.000	-3.895	-2.277	.949	-.389	-.228
3.050	-4.001	-2.301	.950	-.388	-.223

DEGREE OF POLYNOMIAL= 4

-9.4010141569E-02	-4.4172820729E-01
-4.1898733913E-01	-2.3681596943E-01
-2.8633253272E-01	-3.7912237258E-01
1.9739180911E-03	1.1462044327E-01
-2.4933352129E-04	-9.9683908145E-03

TABLE 13

Faired Open Water Characteristics- Propeller 4837
P/D= 0.4 Backing

J	K_T	$10K_Q$	η	C_T	$10C_Q$
0.000	-.108	-.455	0.000	-.108	-.455
-.050	-.117	-.460	-.050	-.116	-.459
-.100	-.122	-.463	-.100	-.121	-.458
-.150	-.125	-.463	-.148	-.122	-.453
-.200	-.124	-.461	-.196	-.120	-.443
-.250	-.121	-.457	-.243	-.114	-.430
-.300	-.116	-.451	-.287	-.106	-.414
-.350	-.108	-.444	-.330	-.096	-.395
-.400	-.097	-.435	-.371	-.084	-.375
-.450	-.085	-.426	-.410	-.071	-.354
-.500	-.071	-.415	-.447	-.057	-.332
-.550	-.056	-.404	-.482	-.043	-.310
-.600	-.038	-.392	-.514	-.028	-.288
-.650	-.019	-.379	-.545	-.014	-.267
-.700	.001	-.366	-.573	.001	-.246
-.750	.022	-.353	-.600	.014	-.226
-.800	.045	-.339	-.625	.028	-.207
-.850	.069	-.325	-.648	.040	-.189
-.900	.095	-.311	-.669	.052	-.172
-.950	.121	-.297	-.689	.064	-.156
-1.000	.148	-.282	-.707	.074	-.141
-1.050	.177	-.268	-.724	.084	-.127
-1.100	.206	-.253	-.740	.093	-.115
-1.150	.236	-.239	-.755	.102	-.103
-1.200	.267	-.225	-.768	.110	-.092
-1.250	.299	-.210	-.781	.117	-.082
-1.300	.332	-.195	-.793	.124	-.073
-1.350	.366	-.181	-.804	.130	-.064
-1.400	.401	-.166	-.814	.136	-.056
-1.450	.437	-.151	-.823	.141	-.049
-1.500	.474	-.136	-.832	.146	-.042
-1.550	.511	-.121	-.840	.150	-.036
-1.600	.550	-.106	-.848	.154	-.030
-1.650	.590	-.090	-.855	.158	-.024
-1.700	.630	-.074	-.862	.162	-.019
-1.750	.672	-.058	-.868	.165	-.014
-1.800	.715	-.041	-.874	.169	-.010
-1.850	.759	-.024	-.880	.172	-.005
-1.900	.804	-.006	-.885	.174	-.001
-1.950	.850	.012	-.890	.177	.002
-2.000	.898	.031	-.894	.180	.006
-2.050	.946	.050	-.899	.182	.010
-2.100	.996	.071	-.903	.184	.013
-2.150	1.048	.092	-.907	.186	.016
-2.200	1.100	.114	-.910	.188	.019
-2.250	1.155	.136	-.914	.190	.022
-2.300	1.210	.160	-.917	.192	.025
-2.350	1.267	.185	-.920	.194	.028
-2.400	1.326	.210	-.923	.196	.031
-2.450	1.386	.237	-.926	.198	.034
-2.500	1.448	.265	-.928	.200	.037
-2.550	1.511	.294	-.931	.201	.039
-2.600	1.576	.324	-.933	.203	.042
-2.650	1.643	.355	-.936	.205	.044
-2.700	1.711	.388	-.938	.206	.047
-2.750	1.781	.42[illegible]	-.940	.208	.049
-2.800	1.853	.457	-.942	.210	.052
-2.850	1.927	.493	-.944	.211	.054
-2.900	2.003	.531	-.945	.213	.056
-2.950	2.080	.570	-.947	.214	.059
-3.000	2.160	.610	-.949	.216	.061
-3.050	2.241	.652	-.950	.218	.063

DEGREE OF POLYNOMIAL= 6

-1.0777481259E-01	-4.5466802974E-01
2.1376021893E-01	1.3722968675E-01
7.2047533578E-01	6.1550394512E-01
3.4568326125E-01	4.3700126050E-01
1.0913860271E-01	1.5246708847E-01
1.4923094876E-02	2.2540069287E-02
7.4632194842E-04	1.1844160333E-03

TABLE 14

Faired Open Water Characteristics- Propeller 4837
P/D= 0.7 Crashback

J	K_T	$10K_Q$	μ	C_T	$10C_Q$
0.000	-.214	- 769	0.000	-.214	-.769
.050	-.208	-.756	.050	-.202	-.754
.100	-.208	-.759	.100	-.206	-.752
.150	-.226	-.777	.148	-.221	-.760
.200	-.254	-.805	.196	-.245	-.774
.250	-.290	-.841	.243	-.273	-.791
.300	-.331	-.883	.287	-.303	-.810
.350	-.376	-.930	.330	-.335	-.828
.400	-.423	-.979	.371	-.364	-.844
.450	-.471	-1.030	.410	-.392	-.856
.500	-.521	-1.082	.447	-.417	-.865
.550	-.570	-1.134	.482	-.438	-.870
.600	-.619	-1.185	.514	-.455	-.872
.650	-.667	-1.236	.545	-.469	-.869
.700	-.714	-1.286	.573	-.479	-.863
.750	-.760	-1.335	.600	-.486	-.855
.800	-.805	-1.383	.625	-.491	-.844
.850	-.850	-1.431	.648	-.493	-.831
.900	-.894	-1.477	.669	-.494	-.816
.950	-.937	-1.523	.689	-.493	-.801
1.000	-.980	-1.569	.707	-.490	-.785
1.050	-1.024	-1.615	.724	-.487	-.768
1.100	-1.068	-1.661	.740	-.483	-.752
1.150	-1.113	-1.707	.755	-.479	-.735
1.200	-1.160	-1.755	.768	-.475	-.719
1.250	-1.207	-1.803	.781	-.471	-.704
1.300	-1.257	-1.853	.793	-.467	-.689
1.350	-1.308	-1.904	.804	-.463	-.674
1.400	-1.362	-1.956	.814	-.460	-.661
1.450	-1.418	-2.011	.823	-.457	-.648
1.500	-1.476	-2.067	.832	-.454	-.636
1.550	-1.537	-2.125	.840	-.452	-.625
1.600	-1.602	-2.185	.848	-.450	-.614
1.650	-1.668	-2.247	.855	-.448	-.604
1.700	-1.738	-2.311	.862	-.447	-.594
1.750	-1.811	-2.377	.868	-.446	-.585
1.800	-1.887	-2.445	.874	-.445	-.577
1.850	-1.965	-2.514	.880	-.444	-.568
1.900	-2.046	-2.585	.885	-.444	-.561
1.950	-2.130	-2.657	.890	-.443	-.553
2.000	-2.216	-2.730	.894	-.443	-.546
2.050	-2.305	-2.805	.899	-.443	-.539
2.100	-2.395	-2.879	.903	-.443	-.532
2.150	-2.488	-2.955	.907	-.443	-.526
2.200	-2.582	-3.030	.910	-.442	-.519
2.250	-2.678	-3.106	.914	-.442	-.512
2.300	-2.776	-3.181	.917	-.441	-.506
2.350	-2.874	-3.255	.920	-.441	-.499
2.400	-2.973	-3.329	.923	-.440	-.492
2.450	-3.073	-3.401	.926	-.439	-.485
2.500	-3.174	-3.472	.928	-.438	-.479
2.550	-3.275	-3.542	.931	-.436	-.472
2.600	-3.376	-3.609	.933	-.435	-.465
2.650	-3.476	-3.675	.936	-.433	-.458
2.700	-3.577	-3.739	.938	-.431	-.451
2.750	-3.677	-3.800	.940	-.429	-.444
2.800	-3.777	-3.859	.942	-.427	-.437
2.850	-3.876	-3.915	.944	-.425	-.429
2.900	-3.975	-3.969	.945	-.422	-.422
2.950	-4.073	-4.020	.947	-.420	-.414
3.000	-4.170	-4.069	.949	-.417	-.407
3.050	-4.267	-4.115	.950	-.414	-.399

DEGREE OF POLYNOMIAL= 8

-2.1353394499E-01	-7.6897620228E-01
3.9413641275E-01	4.6082099800E-01
-3.9307842713E+00	-4.1854260738E+00
5.3914505120E+00	5.6624691575E+00
-3.7535007752E+00	-3.9354032420E+00
1.3795395920E+00	1.4625478677E+00
-2.7462340540E-01	-2.9402633038E-01
2.7962027254E-02	3.0134733856E-02
-1.1398275407E-03	-1.2332367011E-03

TABLE 15

Faired Open Water Characteristics- Propeller 4837
P/D= 0.7 Backing

J	K_T	$10K_Q$	μ	C_T	$10C_Q$
0.000	-.210	-.765	0.000	-.210	-.765
-.050	-.229	-.788	-.050	-.228	-.786
-.100	-.242	-.804	-.100	-.239	-.796
-.150	-.250	-.814	-.148	-.244	-.796
-.200	-.253	-.820	-.196	-.243	-.788
-.250	-.252	-.820	-.243	-.237	-.772
-.300	-.248	-.817	-.287	-.228	-.749
-.350	-.240	-.809	-.330	-.214	-.721
-.400	-.230	-.798	-.371	-.198	-.688
-.450	-.217	-.785	-.410	-.180	-.653
-.500	-.201	-.768	-.447	-.161	-.615
-.550	-.184	-.750	-.482	-.141	-.576
-.600	-.164	-.729	-.514	-.121	-.536
-.650	-.143	-.707	-.545	-.101	-.497
-.700	-.121	-.683	-.573	-.081	-.458
-.750	-.097	-.657	-.600	-.062	-.421
-.800	-.072	-.631	-.625	-.044	-.385
-.850	-.046	-.604	-.648	-.027	-.351
-.900	-.019	-.576	-.669	-.010	-.318
-.950	.009	-.547	-.689	.005	-.288
-1.000	.037	-.518	-.707	.019	-.259
-1.050	.066	-.489	-.724	.032	-.232
-1.100	.096	-.459	-.740	.043	-.208
-1.150	.126	-.429	-.755	.054	-.185
-1.200	.157	-.399	-.768	.064	-.163
-1.250	.189	-.368	-.781	.074	-.144
-1.300	.221	-.338	-.793	.082	-.126
-1.350	.253	-.307	-.804	.090	-.109
-1.400	.287	-.276	-.814	.097	-.093
-1.450	.320	-.246	-.823	.103	-.079
-1.500	.355	-.215	-.832	.109	-.066
-1.550	.390	-.184	-.840	.115	-.054
-1.600	.426	-.153	-.848	.120	-.043
-1.650	.462	-.122	-.855	.124	-.033
-1.700	.500	-.091	-.862	.128	-.023
-1.750	.538	-.059	-.868	.132	- 015
-1.800	.577	-.028	-.874	.136	-.007
-1.850	.617	.004	-.880	.139	.001
-1.900	.657	.037	-.885	.143	.008
-1.950	.699	.069	-.890	.146	.014
-2.000	.742	.103	-.894	.148	.021
-2.050	.786	.136	-.899	.151	.026
-2.100	.831	.171	-.903	.154	.032
-2.150	.878	.205	-.907	.156	.037
-2.200	.925	.241	-.910	.158	.041
-2.250	.974	.277	-.914	.161	.046
-2.300	1.025	.314	-.917	.163	.050
-2.350	1.076	.352	-.920	.165	.054
-2.400	1.129	.391	-.923	.167	.058
-2.450	1.184	.431	-.926	.169	.062
-2.500	1.239	.472	-.928	.171	.065
-2.550	1.297	.514	-.931	.173	.069
-2.600	1.356	.557	-.933	.175	.072
-2.650	1.416	.601	-.936	.177	.075
-2.700	1.478	.647	-.938	.178	.078
-2.750	1.541	.694	-.940	.180	.081
-2.800	1.606	.742	-.942	.182	.084
-2.850	1.673	.791	-.944	.183	.087
-2.900	1.741	.842	-.945	.185	.090
-2.950	1.810	.895	-.947	.187	.092
-3.000	1.881	.949	-.949	.188	.095
-3.050	1.954	1.004	-.950	.190	.097

DEGREE OF POLYNOMIAL= 6

-2.1047372159E-01	-7.6539841714E-01
4.2650405365E-01	5.1616736409E-01
1.2124229643E+00	1.3851146649E+00
7.7043739542E-01	8.5572169297E-01
2.7526224239E-01	2.7234696738E-01
4.6079340210E-02	4.0834345190E-02
2.9662015855E-03	2.4192962996E-03

TABLE 16

Faired Open Water Characteristics- Propeller 4837
P/D= -1.0 Crashback

J	K_T	$10K_Q$	μ	C_T	$10C_Q$
0.000	-.279	-1.059	0.000	-.279	-1.059
.050	-.257	-1.022	.050	-.257	-1.020
.100	-.259	-1.024	.100	-.257	-1.014
.150	-.279	-1.055	.148	-.272	-1.032
.200	-.311	-1.106	.196	-.299	-1.064
.250	-.353	-1.172	.243	-.332	-1.103
.300	-.401	-1.248	.287	-.368	-1.145
.350	-.453	-1.329	.330	-.403	-1.184
.400	-.507	-1.413	.371	-.437	-1.218
.450	-.562	-1.498	.410	-.468	-1.245
.500	-.618	-1.582	.447	-.494	-1.265
.550	-.673	-1.664	.482	-.517	-1.278
.600	-.728	-1.745	.514	-.535	-1.283
.650	-.781	-1.823	.545	-.549	-1.281
.700	-.834	-1.898	.573	-.560	-1.274
.750	-.885	-1.972	.600	-.567	-1.262
.800	-.936	-2.043	.625	-.571	-1.246
.850	-.987	-2.112	.648	-.573	-1.226
.900	-1.037	-2.180	.669	-.573	-1.204
.950	-1.086	-2.247	.689	-.571	-1.181
1.000	-1.136	-2.313	.707	-.568	-1.156
1.050	-1.186	-2.378	.724	-.564	-1.131
1.100	-1.236	-2.443	.740	-.559	-1.106
1.150	-1.286	-2.508	.755	-.554	-1.080
1.200	-1.337	-2.574	.768	-.548	-1.055
1.250	-1.389	-2.640	.781	-.542	-1.030
1.300	-1.442	-2.706	.793	-.536	-1.006
1.350	-1.496	-2.773	.804	-.530	-.982
1.400	-1.551	-2.841	.814	-.524	-.960
1.450	-1.606	-2.909	.823	-.518	-.938
1.500	-1.663	-2.979	.832	-.512	-.916
1.550	-1.722	-3.049	.840	-.506	-.896
1.600	-1.781	-3.120	.848	-.500	-.876
1.650	-1.842	-3.193	.855	-.495	-.858
1.700	-1.905	-3.267	.862	-.490	-.840
1.750	-1.969	-3.342	.868	-.485	-.823
1.800	-2.035	-3.418	.874	-.480	-.806
1.850	-2.102	-3.496	.880	-.475	-.791
1.900	-2.172	-3.576	.885	-.471	-.776
1.950	-2.244	-3.658	.890	-.467	-.762
2.000	-2.317	-3.741	.894	-.463	-.748
2.050	-2.394	-3.827	.899	-.460	-.736
2.100	-2.472	-3.915	.903	-.457	-.724
2.150	-2.553	-4.005	.907	-.454	-.712
2.200	-2.637	-4.098	.910	-.452	-.702
2.250	-2.724	-4.192	.914	-.449	-.692
2.300	-2.813	-4.290	.917	-.447	-.682
2.350	-2.904	-4.389	.920	-.445	-.673
2.400	-2.999	-4.490	.923	-.444	-.664
2.450	-3.095	-4.594	.926	-.442	-.656
2.500	-3.194	-4.699	.928	-.441	-.648
2.550	-3.296	-4.804	.931	-.439	-.640
2.600	-3.399	-4.911	.933	-.438	-.633
2.650	-3.503	-5.017	.936	-.437	-.625
2.700	-3.609	-5.123	.938	-.435	-.618
2.750	-3.716	-5.227	.940	-.434	-.610
2.800	-3.822	-5.328	.942	-.432	-.603
2.850	-3.928	-5.426	.944	-.431	-.595
2.900	-4.034	-5.520	.945	-.429	-.587
2.950	-4.137	-5.607	.947	-.426	-.578
3.000	-4.238	-5.687	.949	-.424	-.569
3.050	-4.335	-5.759	.950	-.421	-.559

DEGREE OF POLYNOMIAL= 9

-2.7840796773E-01	-1.0585003377E+00
7.1113121201E-01	1.1868409031E+00
-6.0764627280E+00	-1.0035934191E+01
1.0330920807E+01	1.7551712422E+01
-9.9525187526E+00	-1.6968564276E+01
5.7676533458E+00	9.8663648025E+00
-2.0546616603E+00	-3.5175898674E+00
4.3414583001E-01	7.4359035749E-01
-4.9258786821E-02	-8.4441040788E-02
2.2874602897E-03	3.9259043000E-03

TABLE 17

Faired Open Water Characteristics- Propeller 4837
P/D= -1.0 Backing

J	K_T	$10K_Q$	η	C_T	$10C_Q$
0.000	-.289	-1.095	0.000	-.289	-1.095
-.050	-.315	-1.148	-.050	-.314	-1.146
-.100	-.335	-1.192	-.100	-.332	-1.180
-.150	-.350	-1.226	-.148	-.343	-1.199
-.200	-.361	-1.251	-.196	-.347	-1.203
-.250	-.366	-1.269	-.243	-.345	-1.194
-.300	-.368	-1.279	-.287	-.338	-1.173
-.350	-.366	-1.282	-.330	-.326	-1.143
-.400	-.361	-1.280	-.371	-.311	-1.103
-.450	-.353	-1.272	-.410	-.293	-1.057
-.500	-.342	-1.258	-.447	-.273	-1.006
-.550	-.328	-1.240	-.482	-.252	-.952
-.600	-.311	-1.217	-.514	-.229	-.895
-.650	-.293	-1.191	-.545	-.206	-.837
-.700	-.273	-1.160	-.573	-.183	-.779
-.750	-.250	-1.127	-.600	-.160	-.721
-.800	-.226	-1.091	-.625	-.138	-.665
-.850	-.201	-1.052	-.648	-.117	-.611
-.900	-.174	-1.011	-.669	-.096	-.558
-.950	-.146	-.968	-.689	-.077	-.509
-1.000	-.117	-.923	-.707	-.059	-.461
-1.050	-.087	-.876	-.724	-.041	-.417
-1.100	-.056	-.828	-.740	-.025	-.375
-1.150	-.024	-.779	-.755	-.010	-.335
-1.200	.008	-.729	-.768	.003	-.299
-1.250	.042	-.678	-.781	.016	-.265
-1.300	.076	-.626	-.793	.028	-.233
-1.350	.110	-.574	-.804	.039	-.203
-1.400	.145	-.521	-.814	.049	-.176
-1.450	.181	-.468	-.823	.058	-.151
-1.500	.217	-.415	-.832	.067	-.128
-1.550	.254	-.361	-.840	.075	-.106
-1.600	.291	-.308	-.848	.082	-.086
-1.650	.329	-.254	-.855	.088	-.068
-1.700	.367	-.200	-.862	.094	-.051
-1.750	.405	-.146	-.868	.100	-.036
-1.800	.445	-.092	-.874	.105	-.022
-1.850	.484	-.038	-.880	.109	-.009
-1.900	.524	.016	-.885	.114	.003
-1.950	.565	.070	-.890	.118	.014
-2.000	.606	.123	-.894	.121	.025
-2.050	.648	.177	-.899	.125	.034
-2.100	.691	.231	-.903	.128	.043
-2.150	.734	.285	-.907	.131	.051
-2.200	.778	.339	-.910	.133	.058
-2.250	.823	.394	-.914	.136	.065
-2.300	.868	.448	-.917	.138	.071
-2.350	.914	.503	-.920	.140	.077
-2.400	.961	.558	-.923	.142	.082
-2.450	1.009	.613	-.926	.144	.088
-2.500	1.058	.669	-.928	.146	.092
-2.550	1.108	.725	-.931	.148	.097
-2.600	1.159	.781	-.933	.149	.101
-2.650	1.211	.839	-.936	.151	.105
-2.700	1.264	.896	-.938	.152	.108
-2.750	1.318	.955	-.940	.154	.112
-2.800	1.373	1.014	-.942	.155	.115
-2.850	1.430	1.075	-.944	.157	.118
-2.900	1.488	1.136	-.945	.158	.121
-2.950	1.546	1.198	-.947	.159	.123
-3.000	1.607	1.261	-.949	.161	.126
-3.050	1.668	1.325	-.950	.162	.129

DEGREE OF POLYNOMIAL= 6

-2.8935695025E-01	-1.0953703623E+00
5.7170563310E-01	1.1636829397E+00
1.1910933427E+00	2.1161548369E+00
5.8901562840E-01	9.9047051138E-01
1.6156378707E-01	2.3606781964E-01
2.0745712440E-02	2.6450761639E-02
1.0277506834E-03	1.1670407306E-03

APPENDIX A

UNFAIRED OPEN WATER CHARACTERISTICS

PROPELLER 4837

TABLE A-1

Unfaired Open Water Characteristics- Propeller 4837
P/D= 2.464 Ahead and Windmilling

J	K_T	$10K_Q$	μ	C_T	$10C_Q$
0.000	1.074	2.750	0.000	1.074	2.750
0.000	.890	2.731	0.000	.890	2.731
.207	.931	2.662	.203	.893	2.552
.401	.870	2.510	.372	.749	2.162
.605	.769	2.255	.518	.563	1.651
.801	.650	2.068	.625	.415	1.326
1.000	.518	1.923	.707	.304	.962
1.207	.518	1.822	.770	.213	.741
1.411	.470	1.702	.816	.157	.564
1.608	.403	1.560	.849	.112	.435
1.799	.331	1.387	.874	.078	.323
2.009	.228	1.101	.895	.045	.211
2.190	.121	.799	.910	.021	.137
2.397	-.010	.421	.925	-.002	.068
0.000	.961	2.728	0.000	.961	2.728
.201	.905	2.609	.288	.830	2.392
.401	.818	2.375	.448	.654	1.898
.608	.716	2.141	.578	.477	1.425
.809	.638	1.985	.673	.349	1.087
1.153	.572	1.867	.741	.258	.842
1.207	.564	1.767	.794	.186	.652
1.407	.496	1.633	.833	.123	.499
1.606	.369	1.473	.863	.094	.377
1.790	.291	1.267	.885	.063	.275
2.192	.177	.953	.903	.053	.179
2.394	.090	.631	.917	.010	.101
2.395	.081	.634	.917	.010	.101
2.592	-.108	.136	.930	-.015	.018
2.742	-.206	-.160	.935	-.026	-.023
2.828	-.365	-.636	.943	-.041	-.071
3.015	-.566	-1.238	.949	-.056	-.123
3.179	-.982	-2.479	.959	-.079	-.256
3.473	-1.856	-4.888	.970	-.109	-.291

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TABLE A-2

Unfaired Open Water Characteristics- Propeller 4837
P/D= 2.464 Crashahead

J	K_T	$10K_Q$	μ	C_T	$10C_Q$
0.000	.839	2.760	0.000	.839	2.760
-.131	.806	2.717	-.225	.822	2.579
-.310	.640	2.571	-.379	.719	2.202
-.426	.480	2.395	-.530	.618	1.721
-.534	.782	1.973	-.615	.486	1.228
-1.183	1.321	3.344	-.765	.547	1.385
-1.483	2.134	5.069	-.864	.590	1.254
-2.102	3.840	9.773	-.941	.434	1.111
-.252	.724	2.649	-.279	.668	1.889
-.519	.965	2.780	-.461	.752	2.184
-.694	.791	2.189	-.545	.557	1.540
-.877	.845	2.070	-.659	.472	1.170
-1.486	1.584	3.860	-.865	.548	1.361
-2.105	2.748	6.580	-.903	.506	1.211
-3.407	4.633	12.319	-.958	.382	1.015
-4.605	7.548	29.956	-.960	.303	.836
-.154	.889	2.814	-.162	.886	2.745
-.349	.899	2.780	-.241	.838	2.618
-1.114	1.284	3.060	-.747	.532	1.353
-1.312	1.401	3.560	-.771	.567	1.441
-1.433	1.515	3.759	-.800	.545	1.350
-1.529	1.655	3.978	-.821	.559	1.343
-1.676	1.895	4.448	-.844	.545	1.277
-1.723	2.144	5.035	-.865	.538	1.264
-1.841	2.318	5.401	-.876	.540	1.257
-2.009	2.601	6.088	-.895	.517	1.211
-2.383	3.233	7.809	-.922	.484	1.169
-3.254	4.594	12.241	-.956	.396	1.056

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TABLE A-3

Unfaired Open Water Characteristics- Propeller 4837
P/D= 2.127 Ahead and Windmilling

J	K_T	$10K_Q$	μ	C_T	$10C_Q$
0.000	.943	2.401	0.000	.943	2.401
0.000	.944	2.402	0.000	.944	2.402
.198	.905	2.294	.194	.871	2.208
.367	.825	2.115	.344	.727	1.864
.549	.731	1.920	.481	.562	1.475
.726	.656	1.779	.588	.429	1.163
.909	.584	1.667	.673	.320	.913
1.089	.514	1.561	.737	.235	.714
1.272	.444	1.440	.786	.170	.550
1.450	.374	1.295	.823	.121	.417
1.632	.297	1.120	.851	.082	.308
1.806	.191	.874	.875	.045	.205
1.989	.062	.553	.894	.012	.111
2.167	-.072	.202	.908	-.013	.036
2.347	-.264	-.263	.922	-.039	-.042
2.525	-.545	-1.009	.936	-.068	-.125
3.058	-2.768	-6.344	.970	-.166	-.381
2.345	-.331	-.439	.923	-.049	-.065
1.708	.249	1.021	.862	.064	.262
1.351	.415	1.385	.804	.147	.490
1.098	.513	1.559	.739	.233	.707

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TABLE A-4

Unfaired Open Water Characteristics- Propeller 4837
P/D= 2.127 Crashahead

J	K_T	$10K_Q$	μ	C_T	$10C_Q$
[illegible]	.874	2.417	0.000	.874	2.417
[illegible]	.876	2.399	0.000	.876	2.399
-.[illegible]	.869	2.303	-.397	.715	1.939
-.[illegible]	.953	2.455	-.379	.816	2.103
-.[illegible]	.784	1.930	-.506	.583	1.435
-.[illegible]	.659	1.584	-.545	.463	1.114
-1.[illegible]	1.187	2.645	-.749	.520	1.163
-1.[illegible]	1.547	3.412	-.825	.511	1.091
-1.[illegible]	2.[illegible]09	4.913	-.891	.496	1.015
-3.[illegible]	5.286	12.223	-.952	.394	.911
-.[illegible]	.759	2.090	-.284	.698	1.921
-.[illegible]	.716	1.944	-.439	.618	1.669
-.[illegible]	.734	1.801	-.439	.592	1.454
-.[illegible]69	.687	1.607	-.556	.474	1.110
-.[illegible]	.755	1.669	-.619	.469	1.039
-1.[illegible]	1.207	2.834	-.756	.543	1.275
-1.[illegible]10	2.000	4.220	-.863	.517	1.092
-2.[illegible]	3.578	7.530	-.933	.461	.971
-3.[illegible]	5.037	11.734	-.957	.420	.980
-2.[illegible]	3.546	7.577	-.930	.485	1.037
-1.[illegible]	2.547	5.346	-.894	.522	1.096
-1.[illegible]	2.003	4.215	-.861	.532	1.087
-1.[illegible]	1.551	3.375	-.819	.518	1.114
-1.[illegible]	1.369	3.031	-.784	.528	1.169
-1.[illegible]22	1.271	2.893	-.746	.563	1.281

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TABLE A-5

Unfaired Open Water Characteristics- Propeller 4837
P/D= 2.053 Ahead and Windmilling

J	K_T	$10K_Q$	η	C_T	$10C_Q$
0.000	.956	2.317	0.000	.956	2.317
0.000	.942	2.296	0.000	.942	2.296
.192	.895	2.200	.188	.863	2.122
.358	.814	2.031	.337	.721	1.801
.520	.732	1.863	.461	.576	1.467
.689	.666	1.745	.556	.460	1.205
.836	.599	1.636	.642	.352	.963
1.002	.532	1.538	.708	.266	.768
1.171	.467	1.433	.760	.197	.604
1.331	.403	1.306	.800	.145	.471
1.502	.337	1.167	.831	.104	.362
1.662	.246	.964	.857	.065	.256
1.831	.135	.701	.878	.031	.161
1.995	.014	.405	.894	.003	.081
2.324	-.371	-.543	.924	-.054	-.079
2.647	-1.008	-2.067	.947	-.104	-.213
3.151	-2.879	-6.371	.969	-.175	-.387
3.496	-1.983	-4.211	.962	-.149	-.317
2.181	-.816	-1.237	.937	-.080	-.151
.275	.854	2.102	.266	.794	1.954
.436	.773	1.940	.400	.650	1.630
.591	.698	1.796	.509	.518	1.331
.750	.632	1.683	.600	.404	1.076
.913	.567	1.581	.674	.309	.862
1.081	.501	1.483	.734	.231	.684
1.246	.436	1.369	.780	.171	.536
1.410	.371	1.236	.816	.124	.414
1.571	.296	1.072	.844	.085	.309
1.733	.204	.863	.866	.051	.216
4.000	-3.162	-7.190	.971	-.181	-.411

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TABLE A-6

Unfaired Open Water Characteristics- Propeller 4837
P/D= 2.053 Crashahead

J	K_T	$10K_Q$	μ	C_T	$10C_Q$
0.000	.903	2.024	0.000	.591	2.324
0.000	.911	2.33[illegible]	0.000	.911	2.[illegible]
-.197	.8[illegible]	2.268	-.1[illegible]	.85[illegible]	2.1[illegible]
-.411	.8[illegible]	2.184	-.[illegible]	.78[illegible]	1.[illegible]
-.586	.881	1.883	-.[illegible]	.6[illegible]	1.[illegible]
-.727	.7[illegible]	1.486	-.[illegible]	.[illegible]	.[illegible]
-.908	.92[illegible]	1.959	-.[illegible]	.[illegible]	1.073
-1.411	1.5[illegible]	3.335	-.[illegible]	.58[illegible]	1.11[illegible]
-2.196	2.8[illegible]	5.610	-.910	.4[illegible]	.92[illegible]
-.312	.6[illegible]	2.229	-.[illegible]	.[illegible]	2.08[illegible]
-.547	.8[illegible]	1.940	-.[illegible]	.[illegible]	1.49[illegible]
-.667	.7[illegible]	1.720	-.555	.52[illegible]	1.14[illegible]
-1.123	1.1[illegible]	2.326	-.747	.4[illegible]	1.02[illegible]
-1.378	1.5[illegible]	3.132	-.809	.5[illegible]	1.06[illegible]
-1.961	2.313	4.621	-.881	.515	1.03[illegible]
-.789	.65[illegible]	1.451	-.[illegible]	.4[illegible]	.89[illegible]
-.789	.708	1.460	-.[illegible]	.4[illegible]	.90[illegible]
-3.763	5.9[illegible]	13.434	-.9[illegible]	.3[illegible]	.[illegible]
-1.282	9.1[illegible]	21.766	-.[illegible]	.31[illegible]	.[illegible]
-1.107	1.221	2.945	-.742	.511	1.18[illegible]
-1.231	1.343	2.838	-.776	.53[illegible]	1.12[illegible]
-1.422	1.56[illegible]	3.172	-.[illegible]18	.51[illegible]	1.04[illegible]
-1.676	2.0[illegible]	4.084	-.859	.541	1.052
-2.078	2.702	5.312	-.901	.50[illegible]	.98[illegible]
-2.720	3.954	8.235	-.[illegible]39	.471	.983
-4.641	7.7[illegible]4	14.283	-.978	.345	.811

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TABLE A-7

Unfaired Open Water Characteristics- Propeller 4837
P/D= 1.643 Ahead and Windmilling

J	K_T	$10K_Q$	μ	C_T	$10C_Q$
0.[illegible]0	.[illegible]42	1.727	0.000	.882	1.727
0.[illegible]0	.[illegible]46	1.750	0.000	.886	1.750
0.[illegible]0	.889	1.758	0.000	.889	1.758
.[illegible]6	.811	1.640	.164	.789	1.596
.[illegible]8	.757	1.530	.296	.672	1.395
.[illegible]9	.695	1.438	.417	.549	1.187
.[illegible]0	.543	1.345	.519	.435	.980
.[illegible]1	.455	1.258	.605	.333	.796
.[illegible]0	.408	1.159	.673	.250	.633
1.[illegible]5	.355	1.045	.728	.181	.479
1.[illegible]2	.306	.911	.771	.124	.369
1.[illegible]5	.219	.754	.804	.077	.266
1.[illegible].2	.080	.512	.836	.027	.154
1.[illegible]6	-.028	.288	.858	-.008	.076
1.[illegible]4	-.105	.025	.876	-.036	.009
1.[illegible]2	-.383	-.300	.893	-.068	-.051
1.[illegible]2	.365	1.024	.731	.174	.479
1.[illegible]4	.326	.940	.761	.137	.396
1.[illegible]4	.281	.830	.789	.099	.313
1.[illegible]4	.168	.707	.813	.064	.240
1.[illegible]9	.066	.485	.842	.019	.142
1.[illegible]5	-.110	.152	.870	-.027	.037
2.[illegible]8	-.379	-.368	.896	-.075	-.073
2.[illegible]0	-.717	-1.045	.915	-.116	-.170
2.[illegible]9	-1.527	-2.632	.941	-.174	-.300
3.[illegible]7	-2.940	-5.429	.961	-.223	-.413
4.[illegible]3	-5.871	-11.257	.976	-.276	-.529

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TABLE A-8

Unfaired Open Water Characteristics- Propeller 4837
P/D= 1.643 Crashahead

J	K_T	$10K_Q$	μ	C_T	$10C_Q$
0.000	.838	1.774	0.000	.838	1.774
0.000	.838	1.759	0.000	.838	1.759
-.172	.740	1.571	-.169	.718	1.526
-.342	1.104	2.138	-.324	.988	1.913
-.537	.766	1.595	-.473	.594	1.238
-.653	.559	1.066	-.546	.392	.748
-.825	.762	1.314	-.679	.411	.708
-1.032	1.849	3.077	-.665	.466	.776
-1.407	2.156	3.498	-.891	.443	.719
-.277	1.050	2.068	-.267	.975	1.921
-.368	.853	1.723	-.424	.700	1.413
-.546	.694	1.416	-.512	.512	1.045
-.686	.509	1.051	-.566	.387	.715
-1.196	1.337	2.328	-.732	.495	.869
-1.582	1.617	2.742	-.845	.462	.783
-4.407	8.809	17.500	-.979	.369	.726
-3.296	5.210	9.580	-.957	.439	.808
-2.460	3.229	5.394	-.926	.458	.765
-2.003	2.374	3.895	-.895	.474	.777
-1.674	1.876	3.140	-.859	.493	.826
-1.427	1.516	2.603	-.819	.500	.858
-1.237	1.216	2.076	-.778	.480	.820

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TABLE A-9

Unfaired Open Water Characteristics- Propeller 4837
P/D= 0.0 Crashback

J	K_T	$10K_Q$	μ	C_T	$10C_Q$
0.[illegible]00	-.025	.219	0.000	-.025	.219
0.000	-.022	.215	0.000	-.022	.215
.146	-.057	.236	.144	-.056	.231
.248	-.143	.308	.241	-.135	.290
.377	-.181	.313	.353	-.158	.274
.[illegible]48	-.241	.323	.447	-.193	.258
.[illegible]25	-.301	.336	.530	-.217	.242
.[illegible]50	-.386	.347	.600	-.247	.222
.[illegible]76	-.479	.358	.659	-.271	.203
.[illegible]99	-.578	.370	.707	-.289	.185
1.11[illegible]	-.685	.380	.746	-.304	.169
1.245	-.815	.392	.780	-.320	.154
1.[illegible]67	-.943	.400	.807	-.329	.139
1.[illegible]83	-1.103	.406	.831	-.342	.126
1.[illegible]57	-1.252	.384	.848	-.352	.106
.[illegible]95	-.576	.366	.705	-.290	.183
1.158	-.725	.382	.754	-.313	.165
1.346	-.943	.398	.803	-.335	.142
1.[illegible]93	-1.283	.386	.847	-.363	.109
1.[illegible]41	-1.795	.380	.890	-.373	.079
2.[illegible]30	-3.036	.268	.935	-.382	.034
3.186	-4.400	.047	.954	-.395	.004
4.[illegible]62	-6.967	-.491	.971	-.398	-.028
5.240	-11.076	-1.477	.982	-.389	-.052

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TABLE A-10

Unfaired Open Water Characteristics- Propeller 4837
P/D= 0.6 Backing

J	K_T	$10K_Q$	μ	C_T	$10C_Q$
0.000	-.009	.217	0.000	-.009	.217
0.000	-.009	.215	0.000	-.009	.215
-.125	.004	.211	-.125	.004	.207
-.247	.016	.209	-.240	.034	.197
-.375	.044	.203	-.351	.082	.178
-.498	.113	.209	-.446	.091	.169
-.626	.163	.222	-.529	.088	.160
-.747	.153	.229	-.599	.098	.147
-.874	.209	.220	-.658	.119	.129
-.998	.275	.205	-.706	.138	.103
-1.115	.335	.190	-.745	.154	.085
-1.242	.416	.182	-.779	.163	.071
-1.377	.514	.178	-.809	.178	.061
-1.503	.597	.168	-.833	.183	.052
-.991	.271	.205	-.704	.137	.103
-1.117	.370	.184	-.754	.160	.080
-1.241	.487	.171	-.802	.174	.061
-1.379	.673	.147	-.846	.191	.042
-1.473	1.073	.114	-.892	.219	.023
-2.374	1.898	.151	-.932	.249	.020
-2.982	2.684	.159	-.948	.267	.016
-3.799	4.483	.258	-.967	.290	.017
-5.207	8.950	.638	-.983	.307	.022

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TABLE A-11

Unfaired Open Water Characteristics- Propeller 4837
P/D= -0.4 Crashback

J	K_T	$10K_Q$	μ	C_T	$10C_Q$
0.000	-.108	-.451	0.000	-.108	-.451
0.100	-.109	-.450	0.000	-.109	-.450
.127	-.123	-.450	.126	-.121	-.443
.245	-.146	-.477	.240	-.138	-.449
.350	-.382	-.610	.352	-.282	-.555
.448	-.412	-.676	.446	-.330	-.542
.537	-.441	-.728	.529	-.354	-.583
.619	-.583	-.793	.599	-.373	-.508
.679	-.667	-.872	.659	-.389	-.498
.744	-.756	-.944	.707	-.394	-.527
1.125	-.898	-1.012	.746	-.394	-.444
0.220	-12.369	-3.693	.986	-.346	-.099
3.290	-5.472	-2.563	.965	-.371	-.172
3.412	-4.679	-2.433	.958	-.382	-.199
2.530	-3.575	-2.204	.943	-.397	-.245
2.218	-2.593	-1.881	.918	-.400	-.295
1.759	-1.951	-1.597	.883	-.420	-.362
1.591	-1.625	-1.464	.861	-.421	-.374
1.341	-1.303	-1.284	.825	-.416	-.419
1.264	-1.167	-1.210	.807	-.415	-.428
1.232	-1.094	-1.112	.776	-.411	-.442
1.169	-.836	-1.002	.736	-.405	-.456

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TABLE A-12

Unfaired Open Water Characteristics- Propeller 4837
P/D= -0.4 Backing

J	K_T	$10K_Q$	μ	C_T	$10C_Q$
0.000	-.103	-.454	0.000	-.103	-.454
0.000	-.109	-.457	0.000	-.109	-.457
-.128	-.129	-.463	-.127	-.127	-.456
-.248	-.122	-.452	-.240	-.115	-.425
-.377	-.103	-.437	-.352	-.090	-.383
-.504	-.076	-.422	-.447	-.061	-.338
-.634	-.044	-.387	-.529	-.017	-.278
-.766	.004	-.349	-.599	.022	-.226
-.898	.076	-.330	-.659	.043	-.167
-1.027	.146	-.284	-.706	.073	-.142
-1.155	.211	-.248	-.745	.094	-.111
-1.284	.283	-.208	-.779	.115	-.080
-1.402	.150	-.280	-.706	.075	-.139
-1.532	.231	-.233	-.752	.100	-.101
-1.656	.337	-.181	-.797	.127	-.066
-1.780	.558	-.107	-.847	.157	-.060
-1.888	.877	.017	-.893	.178	.003
-2.033	1.625	.355	-.935	.205	.044
-3.033	3.649	1.513	-.968	.241	.096
-5.172	7.366	3.193	-.982	.266	.115
-7.181	16.679	6.885	-.991	.295	.122
-1.199	.343	-.174	-.814	.133	-.059

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TABLE A-13

Unfaired Open Water Characteristics- Propeller 4837
P/D= -0.7 Crashback

J	K_T	$10K_Q$	μ	C_T	$10C_Q$
0.000	-.217	-.773	0.000	-.217	-.773
.207	-.239	-.785	.203	-.229	-.753
.400	-.442	-1.002	.371	-.381	-.864
.605	-.642	-1.206	.519	-.462	-.882
.805	-.791	-1.370	.627	-.480	-.831
1.009	-.975	-1.549	.710	-.483	-.764
1.210	-1.186	-1.787	.771	-.481	-.725
1.415	-1.345	-2.001	.817	-.461	-.666
1.616	-1.616	-2.214	.850	-.447	-.613
1.815	-1.877	-2.431	.876	-.437	-.566
.501	-.542	-1.089	.448	-.425	-.871
.703	-.783	-1.320	.578	-.488	-.879
.904	-.807	-1.454	.675	-.480	-.796
1.110	-1.094	-1.678	.743	-.490	-.752
1.315	-1.294	-1.904	.796	-.474	-.698
1.518	-1.516	-2.121	.835	-.459	-.642
1.721	-1.768	-2.327	.865	-.446	-.587
1.924	-2.037	-2.570	.887	-.433	-.547
4.966	-8.350	-5.668	.979	-.352	-.239
2.448	-3.085	-3.428	.926	-.441	-.490
2.051	-1.207	-1.798	.781	-.471	-.701
.998	-.787	-1.522	.707	-.474	-.762
1.197	-1.018	-1.663	.742	-.484	-.747
1.407	-1.387	-1.978	.815	-.465	-.661
2.008	-2.204	-2.742	.895	-.450	-.545
3.154	-4.464	-4.209	.953	-.408	-.384
6.796	-15.267	-8.623	.989	-.324	-.183
4.581	-7.597	-5.309	.976	-.352	-.247
3.605	-5.128	-4.425	.962	-.386	-.333

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TABLE A-14

Unfaired Open Water Characteristics- Propeller 4837
P/D= -0.7 Backing

J	K_T	$10K_Q$	μ	C_T	$10C_Q$
0.000	-.209	-.767	0.000	-.209	-.767
-.217	-.258	-.830	-.302	-.234	-.756
-.[illegible]	-.219	-.778	-.368	-.189	-.672
-.[illegible]	-.170	-.713	-.514	-.118	-.525
-.[illegible]22	-.137	-.703	-.558	-.095	-.483
-.[illegible]	-.061	-.625	-.665	-.036	-.3[illegible]
-1.[illegible]	.050	-.518	-.709	.020	-.2[illegible]
-1.[illegible]	.127	-.436	-.761	.058	-.18[illegible]
-1.[illegible]	.224	-.349	-.801	.080	-.12[illegible]
-1.[illegible]	.346	-.228	-.832	.107	-.070
-1.[illegible]	.404	-.120	-.857	.123	-.032
-1.[illegible]	.509	-.002	-.878	.138	-.000
-1.[illegible]	.748	.106	-.894	.148	.021
-2.[illegible]72	.839	.216	-.909	.155	.038
-2.[illegible]6[illegible]	1.076	.352	-.922	.161	.058
-.[illegible]70	-.038	-.602	-.656	-.022	-.[illegible]
-.[illegible]49	.021	-.533	-.689	.011	-.280
-1.[illegible]	.067	-.487	-.717	.033	-.236
-1.[illegible]	.144	-.407	-.761	.050	-.171
-1.[illegible]01	.230	-.327	-.793	.086	-.121
-1.[illegible]	.306	-.200	-.832	.113	-.062
-1.[illegible]	.558	-.028	-.869	.137	-.007
-2.[illegible]	.810	.183	-.894	.155	.035
-2.[illegible]43	1.368	.581	-.935	.175	.071
-5.[illegible]	2.795	1.714	-.963	.202	.124
-5.[illegible]	7.440	6.059	-.983	.249	.206
-4.[illegible]	4.329	3.039	-.974	.218	.153
-3.[illegible]	2.380	1.305	-.957	.199	.109
-2.[illegible]03	1.052	.313	-.917	.167	.056
-1.[illegible]03	.502	-.105	-.862	.129	-.027

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TABLE A-15

Unfaired Open Water Characteristics- Propeller 4837
P/D= -1.0 Crashback

J	K_T	$10K_Q$	μ	C_T	$10C_Q$
0.000	-.2 4	-1.081	0.000	-.284	-1.081
.202	-.272	-1.012	.169	-.262	-.973
.398	-.320	-1.457	.367	-.490	-1.369
.601	-.7.7	-1.743	.515	-.534	-1.280
.802	-.7.7	-2.005	.616	-.5[illegible]	-1.2[illegible]
1.[illegible]	-1.[illegible]5	-2.299	.711	-.561	-1.337
1.[illegible]	-1 .8	-2.653	.779	-.545	-1.041
1.[illegible]	-1.728	-3.079	.841	-.504	-.869
1.[illegible]	-2 2.3	-3.609	.890	-.462	-.74[illegible]
2.[illegible]	-3.0 1	-4.[illegible]2	.926	-.441	-.65[illegible]
.[illegible]61	-.2 5	-1.268	.288	-.359	-1.16[illegible]
[illegible]	-.[illegible]3	-1.587	.449	-.497	-1.[illegible]
[illegible]	-.[illegible]8	-1.909	.574	-.569	-1.[illegible]
[illegible]	-1.[illegible]5	-2.162	.657	-.571	-1.[illegible]
1.[illegible]09	-1.217	-2.401	.740	-.[illegible]51	-1.[illegible]
1.[illegible]	-1.[illegible]4	-2.852	.812	-.[illegible]27	-.[illegible]
1.[illegible]	-1.[illegible]5	-3.340	.866	-.[illegible]	-.[illegible]
2.[illegible]	-2.1[illegible]	-3.870	.905	-.448	-.701
[illegible]21	-12.7[illegible]	-11.655	.988	-.312	-.285
[illegible]	-[illegible].[illegible]	-7.[illegible]	.980	-.[illegible]	-.[illegible]
[illegible]	-[illegible].7[illegible]	-5.943	.958	-.346	-.[illegible]
2.[illegible]	-4.0[illegible]4	-5.475	.945	-.429	-.586
2.[illegible]	-2.[illegible]4	-4.[illegible]21	.919	-.452	-.689
1.[illegible]	-1.[illegible]81	-3.338	.868	-.490	-.[illegible]
1.[illegible]	-1.750	-3.104	.843	-.507	-.[illegible]
.[illegible]52	-.2[illegible]8	-.034	.151	-.282	-1.011
.[illegible]51	-.[illegible]79	-1.223	.243	-.357	-1.[illegible]

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TABLE A-16

Unfaired Open Water Characteristics- Propeller 4837
P/D= -1.0 Backing

J	K_T	$10K_Q$	μ	C_T	$10C_Q$
0.000	-.281	-1.089	0.000	-.281	-1.089
0.000	-.276	-1.073	0.000	-.276	-1.073
-.146	-.380	-1.272	-.145	-.372	-1.245
-.287	-.380	-1.293	-.276	-.351	-1.195
-.432	-.388	-1.256	-.397	-.295	-1.056
-.573	-.311	-1.207	-.497	-.234	-.909
-.717	-.258	-1.135	-.563	-.171	-.750
-.858	-.193	-1.039	-.651	-.111	-.599
-1.004	-.120	-.929	-.709	-.060	-.462
-1.143	-.068	-.804	-.755	-.016	-.349
-1.279	.057	-.664	-.788	.022	-.252
-1.423	.113	-.502	-.818	.054	-.166
-1.572	.203	-.346	-.844	.078	-.107
-1.713	.379	-.182	-.864	.096	-.066
-1.881	.516	.117	-.893	.119	.024
-2.368	.917	.525	-.921	.139	.079
-6.438	10.354	12.001	-.969	.230	.266
-4.368	4.014	3.873	-.976	.191	.165
-3.650	2.080	1.734	-.958	.170	.142
-2.823	.811	.474	-.919	.139	.074
-1.737	.402	-.155	-.867	.100	-.039
-1.375	.197	-.539	-.809	.048	-.187
-1.165	-.012	-.760	-.759	-.005	-.323
-5.746	7.173	7.839	-.985	.211	.230

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DTNSRDC ISSUES THREE TYPES OF REPORTS

1. DTNSRDC REPORTS, A FORMAL SERIES, CONTAIN INFORMATION OF PERMANENT TECHNICAL VALUE. THEY CARRY A CONSECUTIVE NUMERICAL IDENTIFICATION REGARDLESS OF THEIR CLASSIFICATION OR THE ORIGINATING DEPARTMENT.

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