LIFT AND DRAG PERFORMANCE OF A SYSTEMATIC SERIES OF YACHT HULL MODELS

by

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Chairman, Departmental Committee on Graduate Studies

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ABSTRACT

This paper deals with several aspects of the towing tank test results for a systematic series of sailing yacht hull models.

The data for tests under heel and leeway is reduced using a mathematical model which accounts for drag variations due to side force and heel angle.

Induced drag results are compared with the predictions of slender body theory.

A simple theory is developed to estimate the height of the center-of-effort for a keel-hull combination.

A preliminary investigation of drag due to heel is made.

The full computer output of the data reduction program and other materials describing the series are included.

Thesis Supervisor: Justin E. Kerwin

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Chapter 1
INTRODUCTION

This paper deals with several aspects of the towing tank test results for the Delft Model Series. This yacht hull model series comprises a total of nine models: A parent model and four two-fold variations; each of a specific form parameter. A series of this type is quite unprecedented, and the data from the towing tests will no doubt be bandied about for years to come. This treatment is by no means inclusive, and the purpose here is to present results in three specific areas:

- Induced drag
- Height of the center of effort
- Drag due to heel.

In an effort to provide some background information, two appendices have been included. They deal with tank data reduction procedures and details of the models.

Chapter 2
INDUCED DRAG

Perhaps the most unique requirement placed on a yacht hull is that it generate a side force equal to the lift on the sails. It is the purpose of this chapter to explore the induced drag associated with this side force.

In order to make straightforward progress with this problem it is necessary to assume that the free surface remains flat. This reflection plane model removes the complications of the free surface and it's associated nonlinear boundary conditions, and simplifies the problem to a symmetrical wing-body moving in an infinite fluid. See fig. (1). Various researchers have invoked this model to study the ship maneuvering problem, and more recent work by Letcher has provided justification for its use for yacht hulls (Ref. [3] and [4]).

Various aerodynamical theories can be applied to such a symmetrical wing-body, and it is our intention here to apply the results of the generalized slender-body theory developed by J.N. Newman and T.Y. Wu in refs. [5]and [6]. In particular we will apply their explicit results developed for a finned body of revolution such as that shown in fig. (2). Newman and Wu have shown that for such a slender body with abrupt trailing edges, the lift and drag are integral expressions, the integrands of which are functions of the parameters b_o, r_o, and b_T alone. These equations are most suscep-

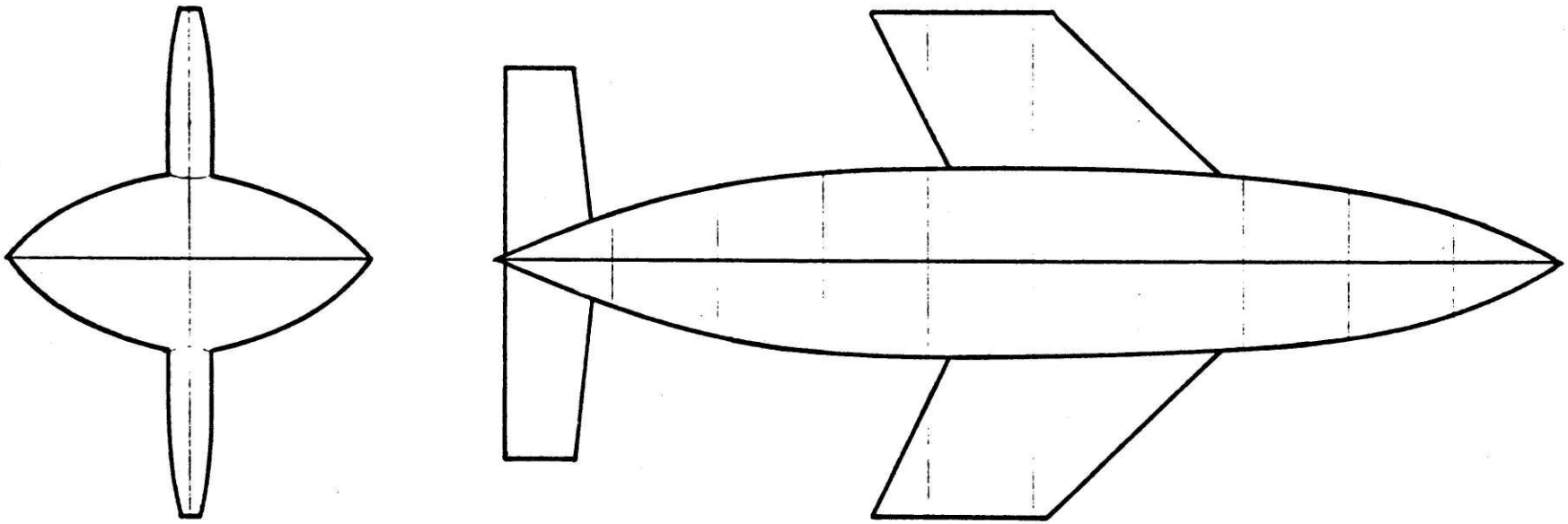


Fig. 1: Symmetrical wing-body resulting from application of the reflection plane model to Delft Model I.

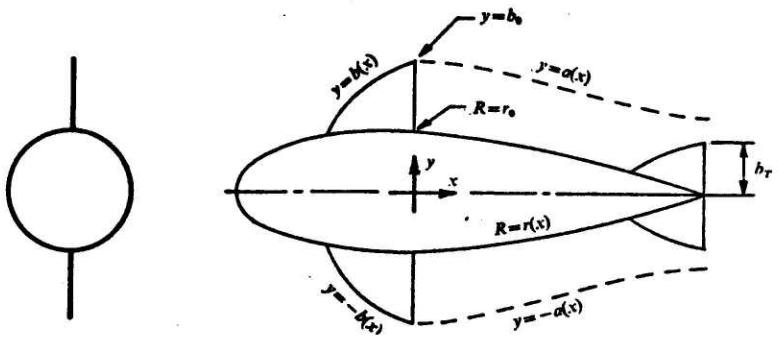


Fig. 2: A Finned body of revolution with abrupt trailing edges (from Ref.[5]).

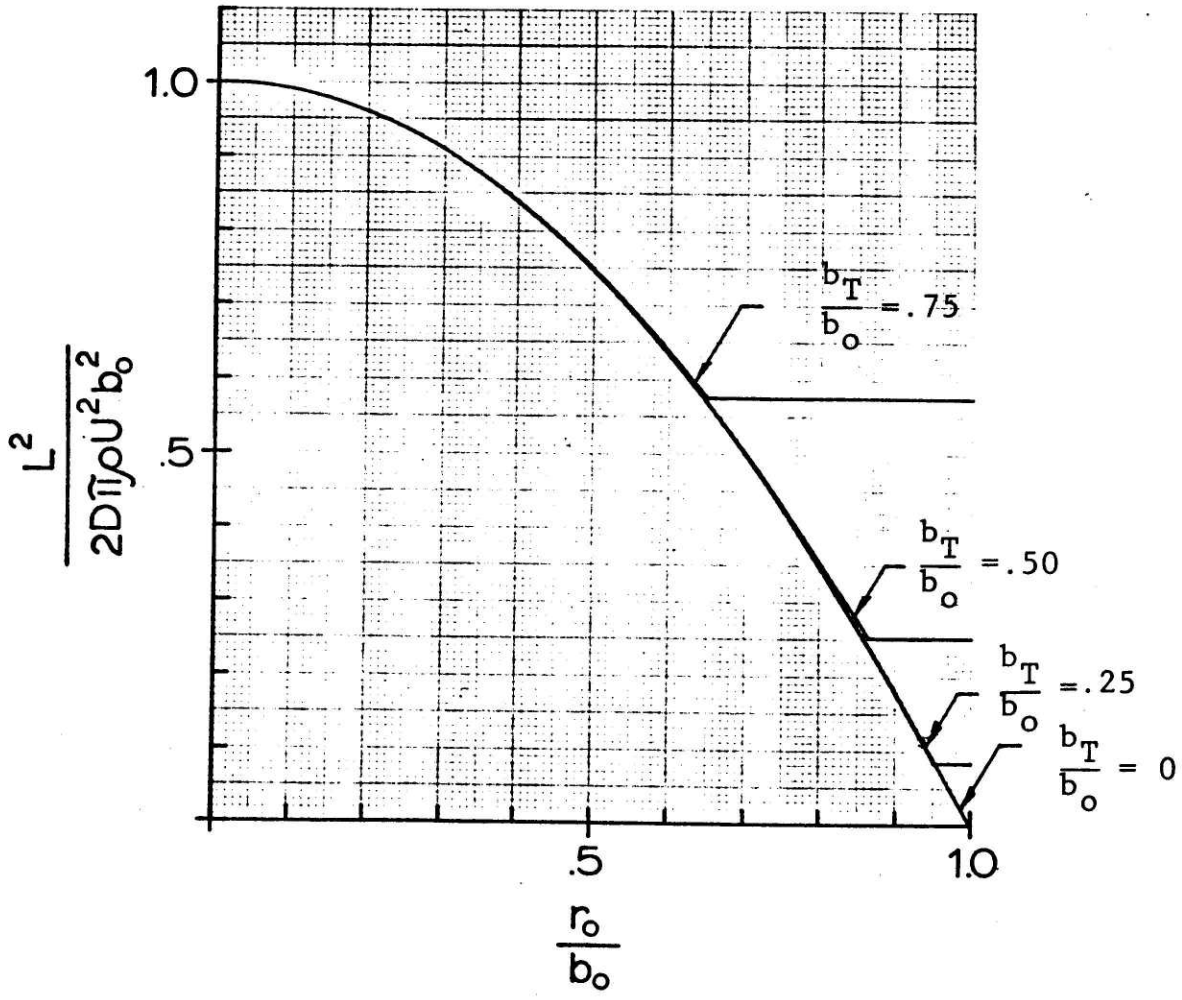


Fig. 3: Lift to drag ratio as a function of body geometry for the body shown in figure 2.

tible to numerical integration, and the results of their evaluation are given in ref. [5] and [6]. These same results can be presented in a more convenient way for our purpose here, and J.N. Newman has given permission to reproduce fig. (3) which displays the lift to drag ratio of the slender body shown in fig. (2) as a function of the ratios b_T/b_o and r_o/b_o. It is apparent that the results of fig. (3) can be summarized in the strikingly simple form

$$D = \frac{L^2}{2\pi\rho U^2 b_e^2} \tag{2.1}$$

where

$$b_e = \sqrt{b_o^2 - r_o^2} \tag{2.2}$$

or

$$b_e = b_T \text{ if } b_T > \sqrt{b_o^2 - r_o^2} \tag{2.3}$$

b_e can be thought of as the effective half span of the wing-body combination, and can be visualized as the span of the vortex wake far down stream. The expression (2.2) is a correction to the half span of the body plus fin (b_o) to account for the local streamline displacement due to body thickness (r_o). The condition (2.3) is for the case in which the tail fin is "reentrant", that is, the vortex wake of the tail fin is wider than the wake of the upstream fin. In the thin wing limit ($r_o=b_T=0$), the result (2.1) agrees with the drag of an eliptically loaded lifting surface of span $2b_o$. We will model

the symmetric wing body of fig. (1) as an appropriately dimensioned finned body of revolution. Naturally, most yacht hulls are not bodies of revolution, however, the primary effect of hull thickness will be approximated here by taking a body radius (r_o) which will equate the section areas.

$$r_o = \sqrt{\frac{2 S_{MAX}}{\pi}} \tag{2.4}$$

where S_{max} is the maximum section area of the yacht hull. By applying (2.2) and (2.3) an expression for the effective draft (Te) is obtained.

$$T_e = \sqrt{T^2 - \frac{2 S_{MAX}}{\pi}} \tag{2.5}$$

or

$$T_e = T_r \quad \text{if} \quad T_r > \sqrt{T^2 - \frac{2 S_{MAX}}{\pi}} \tag{2.6}$$

Applying this result, and the observation that lift and drag on the yacht are one half the total on the finned body, an expression for the induced drag on a yacht hull can be obtained.

$$D_i = \frac{L^2}{\pi \rho U^2 T_e^2} \tag{2.7}$$

where Te is defined in (2.5-6). This expression is justifiable only for the upright condition, however, there is some experimental and theoretical justification for expecting the effects of dihedral (induced in the finned body model by heel) to be

adequately modeled for moderate heel angles by simple cosine connections. See refs. [4] and [7]. Defining the side-force F_h perpendicular to the yacht centerline gives

$$L = F_h \cos\phi \tag{2.8}$$

Connecting Te by the cosine of the heel angle gives

$$Te \cos\phi \tag{2.9}$$

and (2.7) becomes

$$D_i = \frac{F_h^2}{\pi \rho U^2 Te^2} \tag{2.10}$$

which is the final result predicting induced drag as a function of F_h and Te.

Alternatively, Te can be evaluated from the induced drag behavior of model tests. Te has been determined from the tank data for the nine Delft models by a least squares fit to the tank data using equation (2.10) to model the induced drag behavior. (See Appendix A). These values of effective draft are plotted in fig. (4) against the effective draft predicted by the forgoing theory and the full measured draft of the keel. For models 1 through 9, the effective draft determined from tank test is observed to average 91% of the theoretical effective draft (dash line), and 78% of the full measured draft (dash-dot line). It is not supris-

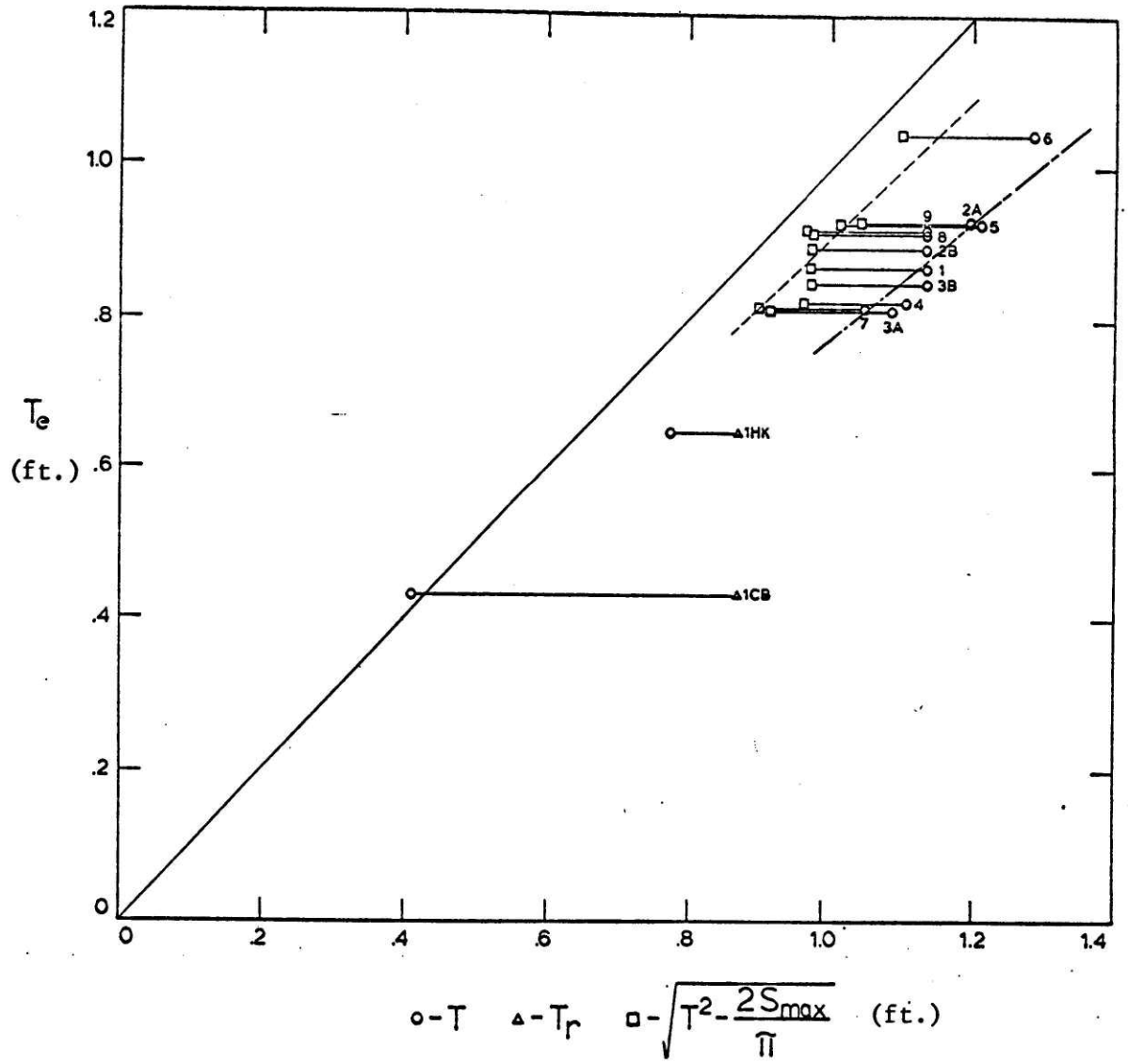


Figure 4: The experimentally determined effective draft of the Delft series versus measured draft (T) and theoretical effective draft. T_r is the rudder draft.

ing that the measured values fall below the theory, as the theory takes no account of viscous effects such as separation and roughness. (All tank tests with leeway were performed with double sand turbulence stimulators which import significant local roughness to the keel and hull). This theory also exploits the slender body limit of elliptical loading in the Treftz plane, and we can expect that this is not precisely the case. These effects act to reduce the effective draft, and a reduction of 9% seems quite plausible.

The theory provides less satisfactory results in the case of the re-entrant rudder. (Equation (2.6)). This is the case for the two draft variations of model 1:

1CB - the model 1 canoe body with rudder, without keel

1HK - the model 1 canoe body with rudder and half keel.

In this case, the rudder operates in the viscous wake of the canoe body, and the present theory makes no allowance for such an effect.

Chapter 3

HEIGHT OF THE CENTER OF EFFORT

In towing tank tests of yacht models where the rolling moment has been properly accounted for, the location of the apparent center of effort has been suprisingly high. For the Delft series, the experimentally determined center of effort is in the range of 30 to 37% of the upright draft for all models tested (measuring down from the LWL). This puts the center of pressure approximately at the keel root for most of the Delft series, and appears to contradict the conventional wisdom that most of the lift is carried by the keel. Figure (5) illustrates this for model I.

At least two investigators (refs.[1] and [4]) have attributed this effect to the pressure distribution associated with lift acting over the hull to produce a beneficial righting moment. This moment reduces the total hydrodynamic moment from what would be calculated by a simple spanwise integration of lift. The axisymmetric slender body model invoked elsewhere in this paper is of little help here as its circular "hull" can sustain no moment about the origin. As might be expected, the application of this model to the Antiope data by Letcher (ref. [4]) appears to overestimate the depth of the center of effort by about 28%. The results of the Standfast testing program also produced similar results (ref. [1]). Table (1) summarizes the experimental results for Antiope, Standfast, and the Delft Series.

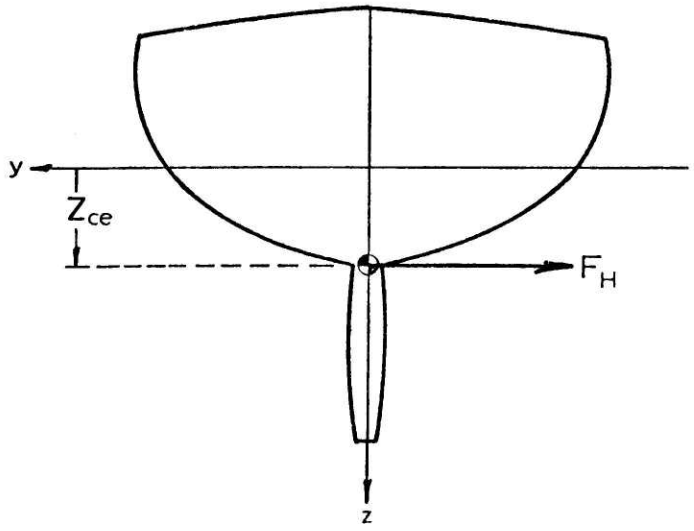


Fig. 5: Experimentally determined location of the vertical center of effort for Delft Model I.

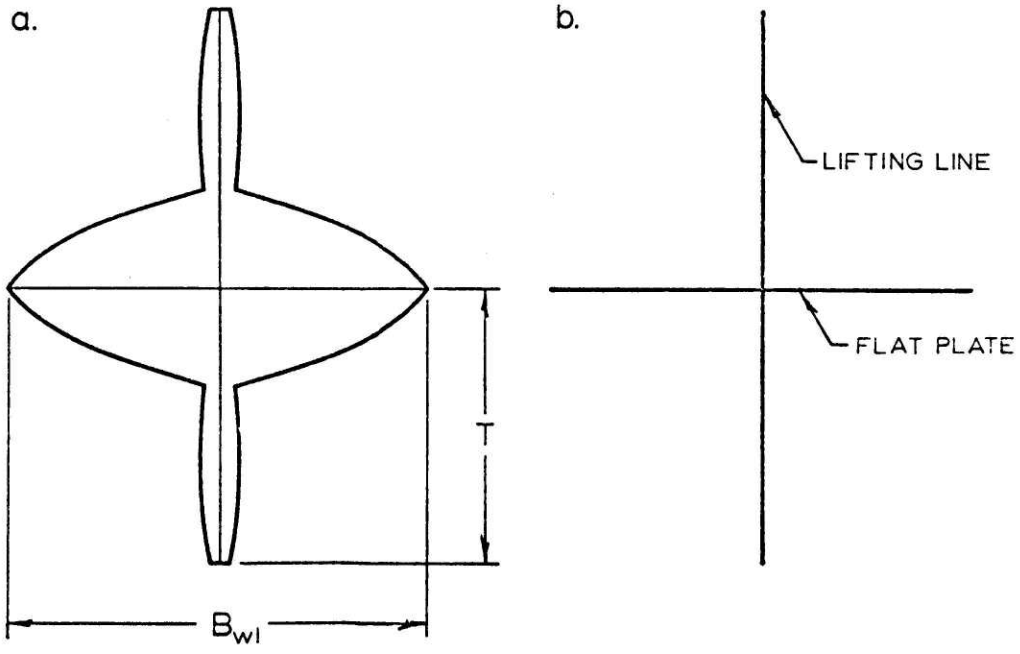


Fig. 6: a) Symmetric Midship section obtained by applying the reflection plane criteria to Model I.

b) The proposed model.

Table 1

Experimentally determined height of the center of effort for the Delft Model Series, Antiope, and the Standfast 40. Z_{ce} measured down from the LWL.

Hull Model		$\frac{Z_{ce}}{T}$	$\frac{B_{wl}}{T}$
Delft Model	1HK	.313	2.17
"	1(st)	.368	1.48
"	2A	.371	1.23
"	2B	.304	1.30
"	3A	.340	1.78
"	3B	.303	1.71
"	4	.341	1.38
"	5	.307	1.62
"	6	.357	1.31
"	7	.359	1.61
"	8	.344	1.43
"	9	.331	1.53
Antiope (Ref.[4])		.32	1.23
Standfast (Ref.[1])		.35	1.18

A simple theory will be developed here to estimate the moment due to the lift induced pressure distribution acting over the hull. Applying the reflection plane condition to model I results in the symmetric mid-ship section shown in Figure (6a). The proportions of this model suggest collapsing the section into a lifting line to represent the keel and a flat plate to represent the hull, Figure (6b). There remains the problem of deciding how to model the hull longitudinally. The simplification invoked here reduces the hull to a circular disk of radius B_{wl}. Figure (7) shows a "fish-eye" view of the hull with keel, and the proposed model. The model consists of a circular disk of radius B_{wl} pierced by a perpendicular lifting line of length 2T.

Any symmetrical distribution of lift on the lifting line satisfying (see Figure (8))

$$\left.\frac{dL}{dz}\right|_{z=0} = 0 \tag{3.1}$$

will also satisfy the reflection plane condition. Given such a distribution of lift, one can evaluate the total moment about the x-axis on one half of the model (one side of the disk plus one half of the lifting line). This moment consists of two parts. The moment due to one side of the lifting line is simply

$$M_{LL} = -\int_0^T z\, dL\, dz = -\rho U \int_0^T z\, \gamma(z)\, dz \tag{3.2}$$

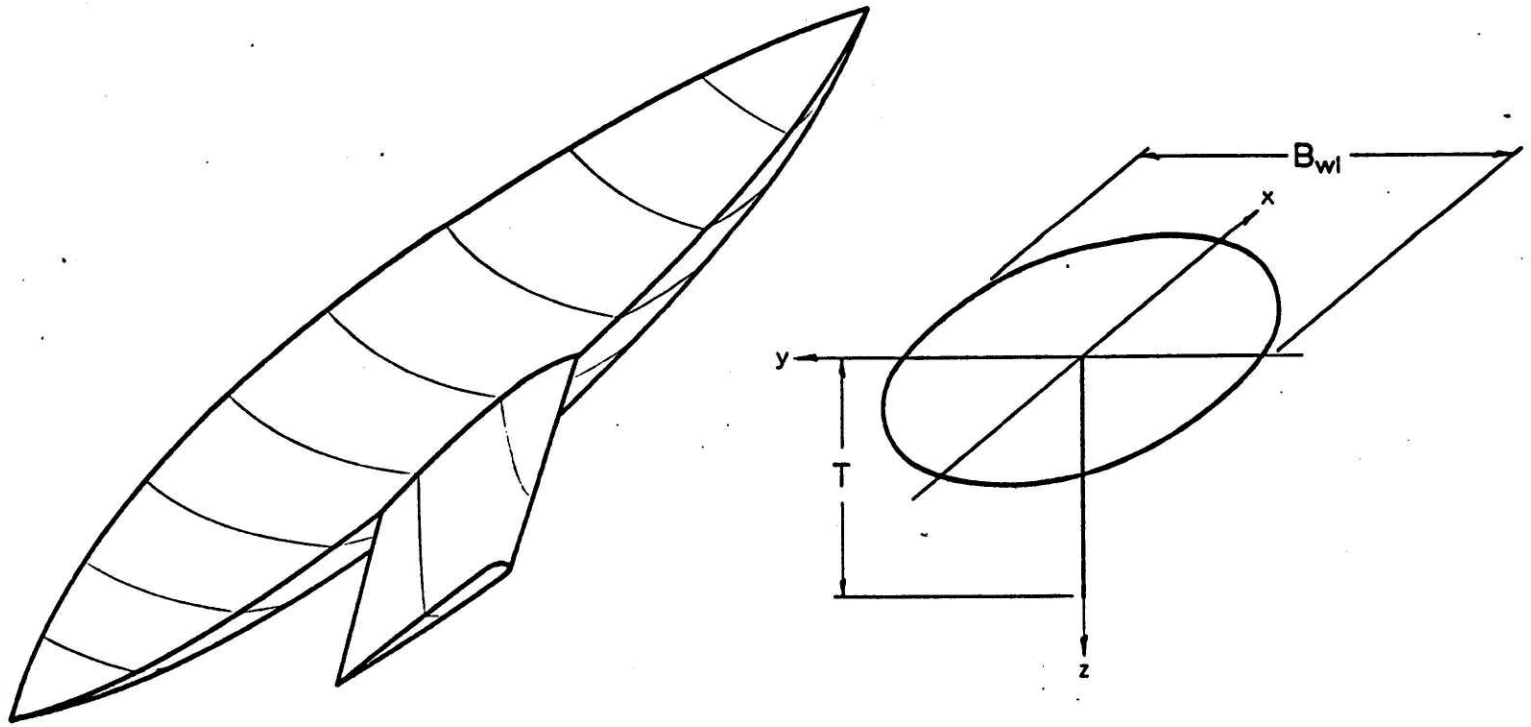


Figure 7: A fish-eye view of hull with keel, and the proposed model.

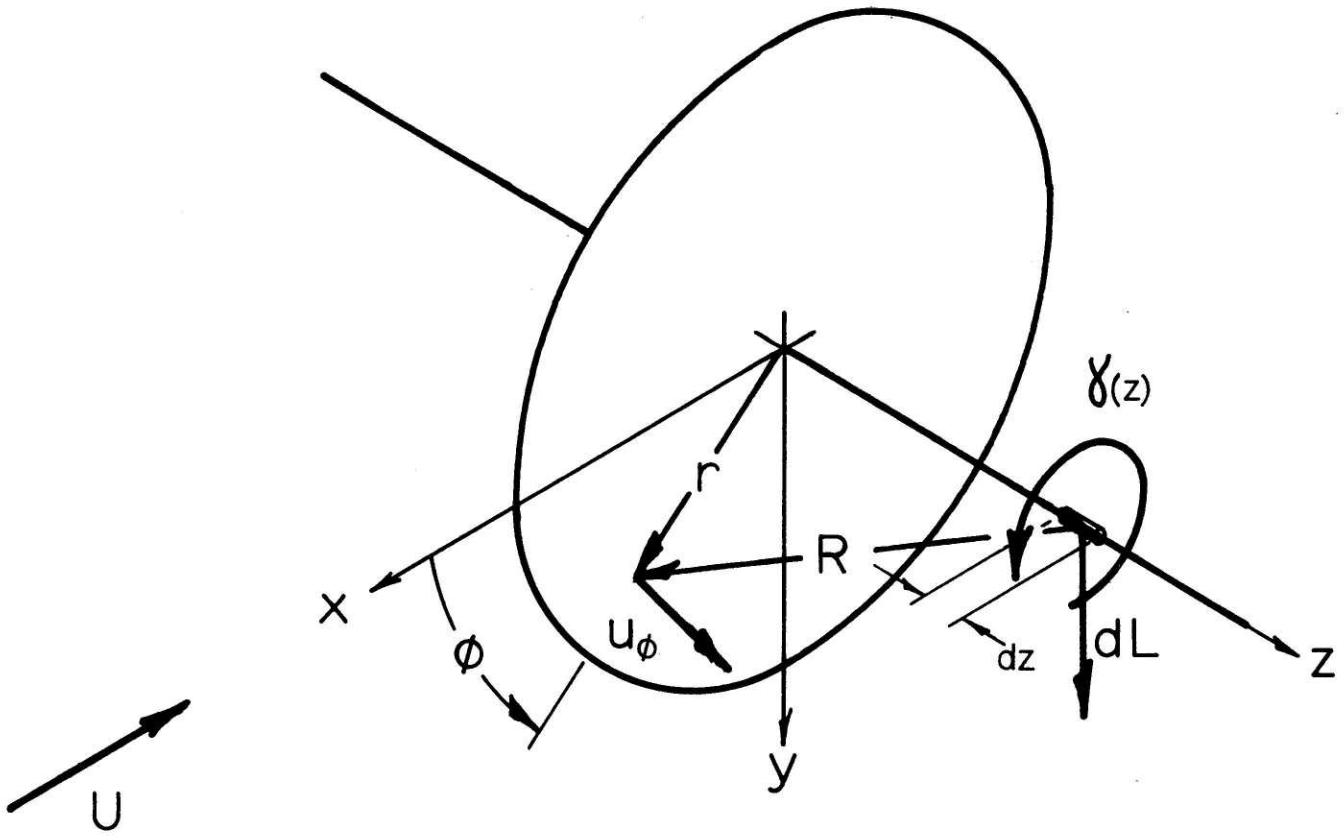


Figure 8: Details of the circular disk and lifting line model.

In order to evaluate the moment acting on the disk it is necessary to calculate the local pressure. First we solve for the tangential perturbation velocity on the disk induced by an assumed circulation $\gamma(z)$ at radius r by Biot-Savart's law

$$u_\phi(r) = \int_{-T}^{T} \frac{\gamma(z) R \times dz}{4\pi R^3} = 2\int_0^T \frac{\gamma(z) r\, dz}{4\pi (z^2+r^2)^{\frac{3}{2}}} \tag{3.3}$$

This integral is taken along the whole lifting line of length 2T. The local velocity is

$$\bar{V}(r,\phi) = \left(-U\cos\phi,\ U\sin\phi + u_\phi(r)\right) \tag{3.4}$$

And applying the steady Bernoulli equation gives

$$\begin{aligned} p - p_\infty &= -\tfrac{1}{2}\rho |\bar{V}|^2 \\ &= -\tfrac{1}{2}\rho \left(U^2 + 2U u_\phi(r)\sin\phi + u_\phi(r)^2\right) \end{aligned} \tag{3.5}$$

This pressure field is seen to contain only one antisymmetric term about the x-axis, the linearized hydrodynamic pressure

$$\Delta p = p - p_\infty = -\rho U u_\phi(r)\sin\phi \tag{3.6}$$

The pressure field induced by trailing vorticity need not be included here as it is also symmetric about the x-axis and contributes no net moment on the disk.

We can now write an integral expression for the moment

on one side of the disk about the x-axis

$$M_D = \oint \Delta p \cdot y \cdot dH \tag{3.7}$$

$$= \int_0^{\frac{B_{WL}}{2}} \int_0^{2\pi} \rho U U_\phi(r) \sin\phi \cdot r \sin\phi \cdot r\, d\theta\, dr$$

$$= 2\rho U \int_0^{\frac{B_{WL}}{2}} \int_0^{\pi} r^2 U_\phi(r) \sin^2\phi \, d\phi\, dr$$

Now, to look at the far field behavior of this let r>>T, which simplifies the expression for $U_\phi(r)$

$$U_\phi(r) = \frac{1}{2\pi r^2} \int_0^T \gamma(z)\, dz \tag{3.8}$$

applying the lifting line result

$$L = \rho U \int_0^T \gamma(z)\, dz \tag{3.9}$$

gives

$$U_\phi(r) = \frac{L}{2\pi\rho U r^2} \tag{3.10}$$

and substitution into (3.7) gives

$$\frac{\partial M_D}{\partial r} = \frac{L}{2} \tag{3.11}$$

This reveals the interesting result that in the far field (r>>T), the rate of change of M_D with respect to r is constant and equal to $\frac{L}{2}$. Therefore the disk moment must cancel the moment due to the lifting line for a sufficiently large disk radius. It is also interesting to note that the moment

induced on a disk of infinite radius by a finite amount of lift will be infinite.

Now we want to look at the height of the apparent center of effort of the disk and lifting line assembly. The total moment is the sum of the moments on the disk and the lifting line,

$$M_T = M_L + M_D \tag{3.12}$$

The apparent center of effort (Z_{ce}) is the point at which the lift would have to act in order to produce the total moment about the origin. Therefore

$$Z_{ce} = -\frac{M_T}{L} \tag{3.13}$$

Nondimensionalizing Z_{ce} on draft (T) gives

$$\frac{Z_{ce}}{T} = \frac{\int_0^T z\,dl\,dz}{T \cdot L} - \frac{M_D}{T \cdot L} \tag{3.14}$$

For a constant distribution of lift, the expression for $\frac{Z_{ce}}{T}$ obtained from (3.14), (3.7) and (3.6) is

$$\frac{Z_{ce}}{T} = 1 - \frac{1}{2}\sqrt{1 + \tilde{R}^2} \tag{3.15}$$

Where $\tilde{R}$ is the nondimensionalized disk radius,

$$\tilde{R} = \frac{B_{WL}}{2T} \tag{3.16}$$

For a semi-eliptical distribution of lift over the draft,

$$\gamma(z) = \frac{\gamma_0}{T}\sqrt{T^2 - z^2} \tag{3.17}$$

a similar result is obtained in the form:

$$\frac{Z_{ce}}{T} = 1 + \left(\frac{1-k^2}{4k^3}\right)K\left(k, \frac{\pi}{2}\right) + \left(\frac{1+k^2}{4k^3}\right)E\left(k, \frac{\pi}{2}\right) \tag{3.18}$$

where

$$k = \left(\tilde{R}^2 + 1\right)^{-\frac{1}{2}} \tag{3.19}$$

and K and E are complete eliptical integrals.

The draft-wise postion of the apparent center of effort versus $\tilde{R}$ is plotted in Figure (9) for these two cases. The asymptotic behavior of the slope for large $\tilde{R}$ is apparent and agrees with the earlier observation in equation (3.11). The theory also makes the interesting prediction that for a B_{wl}/T of about 2.9, and an eliptical loading, the two moments (disk and lifting line) are in equilibrium, with no net moment about Z=0, and the apparent center-of-effort is at the origin.

It is interesting to now compare the results of this theory with center-of-effort results obtained from tank tests. Figure (10) is a composite plot of the two theoretical results and the experimentally determined center-of-effort's for the nine Delft models plus Antiope and the Standfast 40. Tank results are plotted as % of total draft against B_{wl}/T. From this plot it appears that this theory provides

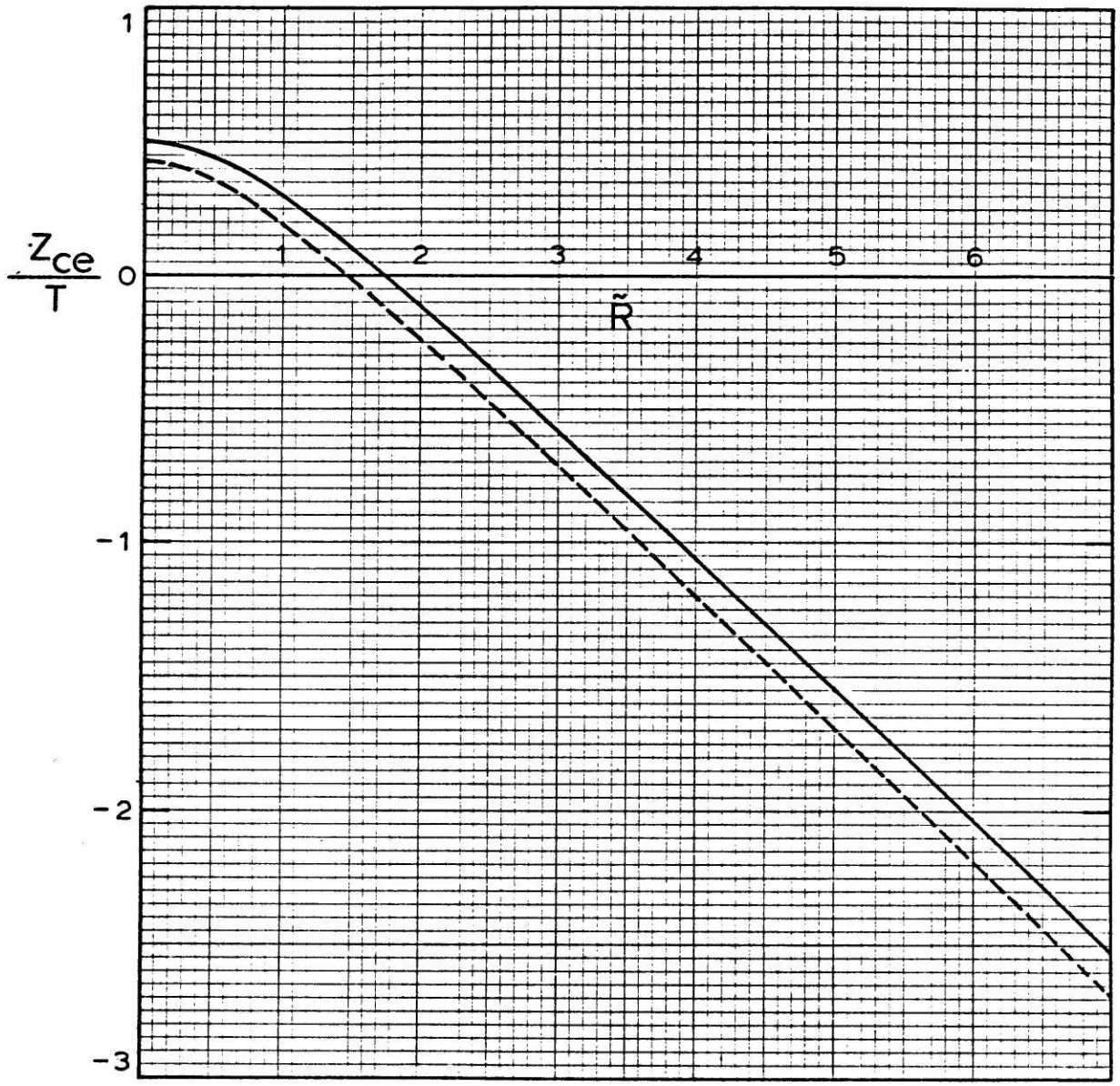


Fig. 9: Apparent center of effort for one side of the disk and lifting line assembly. Constant distribution of lift _____, semi-elliptical distribution - - - -.

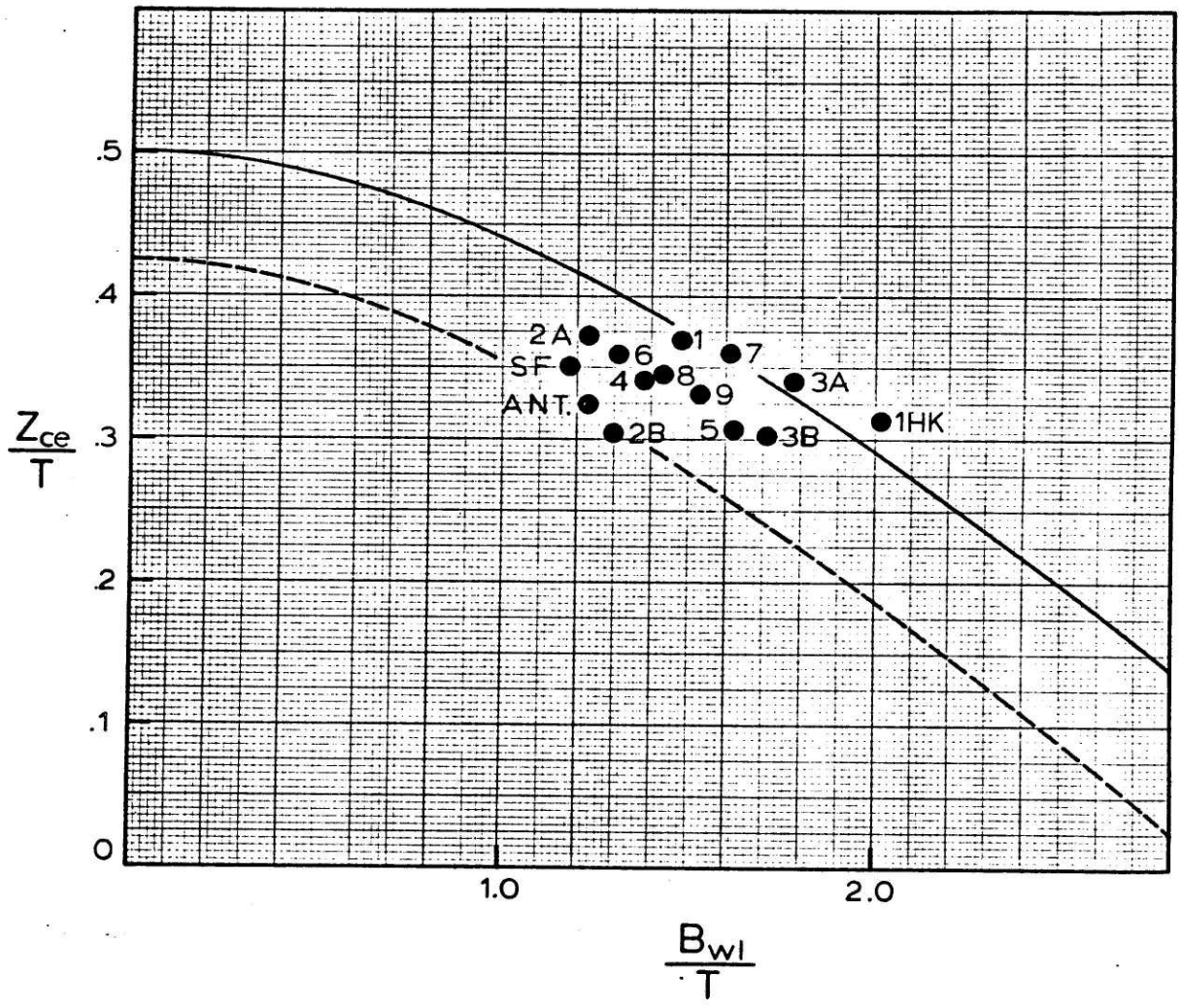


Fig. 10: The experimentally determined center of efforts for the Delft Series, Antiope, and the Standfast 40. Theoretical predictions for a constant loading _____, and semi-elliptical loading - - - -.

a correction to the center-of-effort position of the correct magnitude to account for experimentally observed center-of-effort positions.

Chapter 4
DRAG DUE TO HEEL

It seems logical to expect that the residuary resistance of most typical hull shapes will change as they move through the water at different angles of heel. In the case of an axisymmetric hull shape, heel does not change the underwater shape of the hull. However, for more general hull shapes, with each new heel angle, a different hull shape is presented to the water. Given that no satisfactory analytic theory exists to predict residuary resistance, we don't expect to develop an analytic theory to predict resistance due to heel. Consequently, recourse must be made to empirical methods.

The approach adopted here is based on the assumption that the additional drag due to heel will vary with speed-length-ratio in a way analogous to residuary resistance. Since we also expect the functional dependence of drag due to heel to be symmetric about zero heel, we expect the first term in a Taylor series expansion for the exact heel dependence to be quadratic. We might also expect that this first term will be the predominate term in such an expansion. These observations motivate the use of this expression to model the drag due to heel (R_ϕ) for typical hull shapes:

$$R_\phi = C_\phi (\nabla/\pi) \Delta \phi^2$$

We expect C_ϕ to be a function of the detailed hull shape, and the speed-length-ratio. We have nondimension-

alized C_ϕ on displacement as a matter of convenience.

Given a set of tank data, it is a straight forward process to determine the value of C_ϕ which minimizes the least square error. This has been done for the Delft Series and is described, along with detailed results, in Appendix A. The results of this effort are summarized in Figure (11).

In general, the value of C_ϕ is seen to increase with increasing speed-length-ratio. C_ϕ is also seen to vary significantly with hull shape. Although it is not obvious what parameters will most strongly affect resistance due to heel, a correlation with hull length-to-draft ratio has been observed. In Figure (12) C_ϕ is plotted against the length-to-canoe body draft ratio (L/Tc) for each of the Delft Series.

For the range of hull forms represented in the Delft Series the shallow hulls probably do change their underwater shape with heel in a more unfavorable way than the deeper hulls. This is reflected in the increase in C_ϕ observed with larger length-to-draft ratios. For deeper hulls C_ϕ is reduced, and in the limiting case of a very deep hull ($\frac{L}{Tc} \rightarrow 0$) we would expect residuary resistance to be essentially unchanged for moderate heel angles, and hence $C_\phi \rightarrow 0$.

For an extremely shallow hull shape such as a scow, we might expect that residuary resistance would actually decrease due to the reduction in beam with heel. In this case C_ϕ would be negative. There is no indication of this type

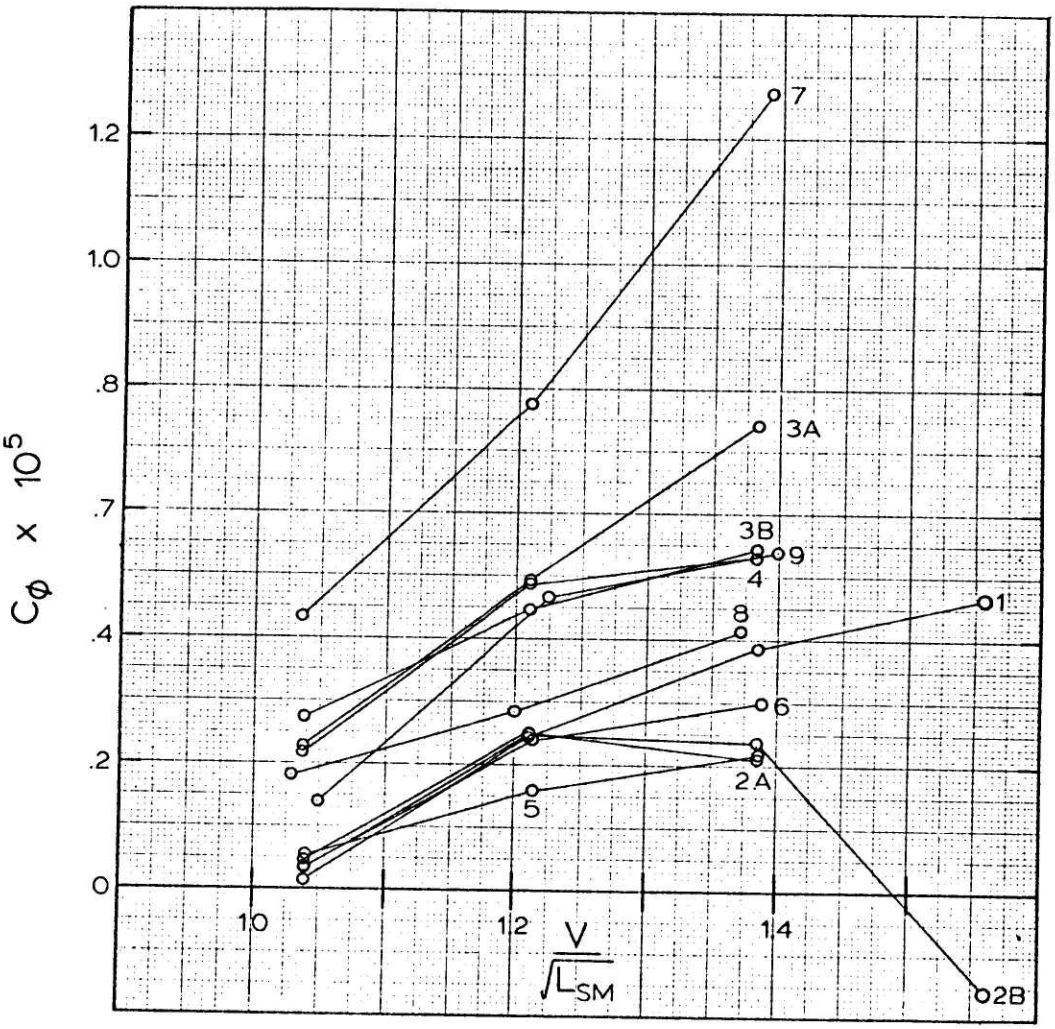


Fig. 11: C_ϕ as a function of model number and speed-length-ratio.

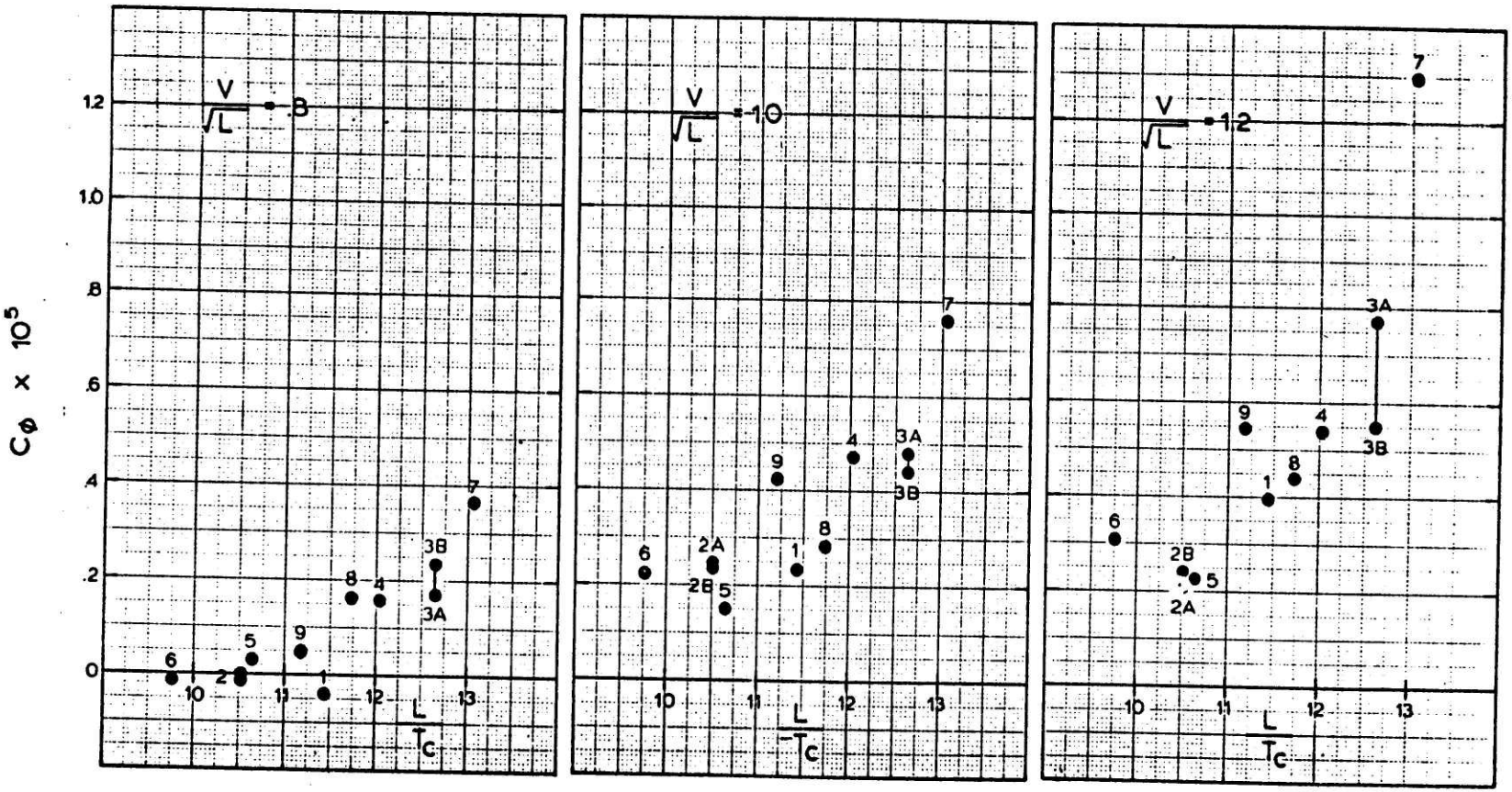


Figure 12: C_ϕ plotted against the length to canoe body draft ratio (L/Tc) for 3 speed length ratios.

of behavior for the shallow models of the Delft Series, and we must conclude that either it does not exist, or there are no sufficiently shallow forms in the series to exhibit it.

Appendix A

DATA REDUCTION

This appendix describes the data reduction program employed to reduce the Delft Series tank data to the form presented in Chapters 2 and 4. The complete computer output for all of the Delft Models is enclosed at the end of this appendix.

The Delft Series tank data is organized in two groups:

- Upright runs
- Runs with Leeway.

All models were tested with turbulence stimulators consisting of carborundum sand grains epoxied to the leading edge of the keel and bow. In particular, a complete set of upright runs was made (single sand), the amount of sand doubled, and the runs repeated (double sand). The primary objective of the data reduction applied to the Upright data is to correctly extrapolate to the "no sand" condition in order to establish the "bare hull" residuary resistance. The procedure used here is essentially identical to that described in Douglas Jenkin's thesis (Ref.[2]), and reference may be made to that paper for a description of the details.

The runs with leeway consist of two groups. Runs with leeway and heel were made at 2 or more heel angles for 3 speed-length-ratios (approximately 1.0, 1.2, and 1.4). Upright runs with leeway were made for 2 speed-length-ratios (approximately .7 and 1.2). (In addition most models had 4

or 5 runs at a single heel angle and speed-length-ratio of approximately .9. These runs are not included because they do not contain sufficient information to warrant application of this data reduction scheme.)

All of the runs with leeway for each model have been fit in the least squares sense by

$$R_T(V, F_H, \phi) = R_o(V) + R_i(V, F_H) + L_\phi(V, \phi)$$

The upright resistance is R_o. The induced drag is modeled in the form

$$R_i(V, F_H) = C_1 \times \frac{F_H^2}{\pi \rho U^2 T^2}$$

and the effective draft

$$T_e = \frac{T}{\sqrt{C_1}}$$

is the draft with which this induced drag behavior would be associated in the limit of elliptical loading. Induced drag is assumed to be independent of speed-length-ratio. Justification for this assumption is found in Figure (13) which presents a composite plot of upright with leeway runs for model I at two widely different speed-length-ratios. Also, Letcher's work in Ref. [4] shows no significant motivation to assume that induced drag depends upon speed-length-ratio.

The resistance due to heel is modeled by the equation

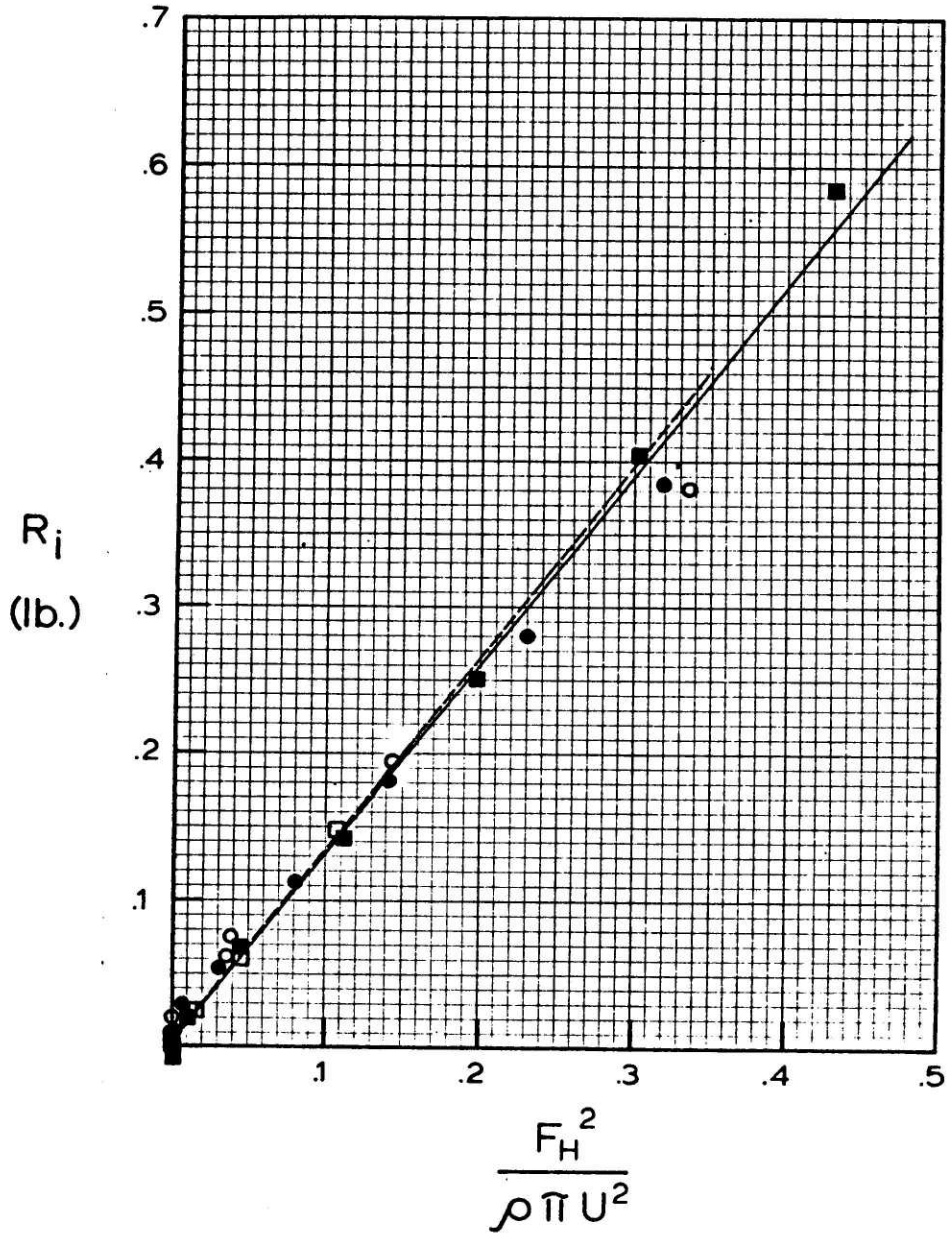


Fig.13: Induced drag (Ri) due to side force (F_H) for Model I. These tests were run with zero heel angle in two different size towing tanks at two different speed-length ratios.

V/√L	Small Tank	Large Tank
.69	o	●
1.20	□	■
Curve fit	- - - - -	————

The curve fit results plotted are for a curve fit to all the runs with leeway (with and without heel).

$$R_\phi(\phi,V) = C_\phi(V/\sqrt{L}) \times \Delta \times \phi^2$$

This assumed quadratic dependence of resistance due to heel could be regarded as the first term in a taylor series expansion for the resistance due to heel about $\phi=0$. An indication of how accurately this first term models the exact heel dependence might be obtained by comparing R_o with the upright resistance as determined by the double sand upright tests. This has been done and may be found on the line *RU* under heel and side force coefficients. Alternatively, the difference between R_o and *RU* might be attributed to measurement errors and lack of repeatability in the experiment. In the case of the upright tests with leeway, the extrapolation to zero side force is quite accurate, in particular because most of these tests contain some runs with essentially zero side force. The discrepancy found between R_o and *RU* is seen to be essentially comparable to the discrepancy seen in the heel with leeway tests. It thus appears that the assumption of quadratic heel dependence is satisfactory to deal with the data at hand.

MIT PRATT PROJECT DELFT SERIES MODEL I (CANOE BODY) 1976
LWL= 5.249FT, LSM= 5.249 FT, WETTED SURFACE= 6.985 FT**2, DRAFT= 0.410 FT, DISP=83.398 LB

UPRIGHT RESISTANCE WITH DOUBLE SAND RMS ERROR= 0.004 LB 0.4 PERCENT

V-KTS	V/RLT	FN	RF	RR	RU-LB	*RU-LB*	ERROR	E-PC	CF	CR	*CR*
0.986	0.430	0.128	0.098	0.034	0.132	0.133	0.000	0.2	0.00528	0.00182	0.00184
1.183	0.516	0.154	0.136	0.054	0.190	0.190	0.000	0.2	0.00506	0.00200	0.00201
1.380	0.602	0.179	0.179	0.084	0.262	0.260	-0.002	-0.9	0.00489	0.00229	0.00222
1.577	0.688	0.205	0.227	0.117	0.344	0.345	0.001	0.2	0.00475	0.00246	0.00247
1.775	0.775	0.231	0.280	0.166	0.445	0.446	0.001	0.2	0.00463	0.00274	0.00276
1.972	0.861	0.256	0.338	0.227	0.564	0.568	0.003	0.6	0.00453	0.00304	0.00309
2.070	0.904	0.269	0.368	0.267	0.635	0.637	0.002	0.4	0.00448	0.00324	0.00327
2.169	0.947	0.282	0.400	0.314	0.714	0.713	-0.001	-0.1	0.00444	0.00343	0.00347
2.267	0.990	0.295	0.433	0.369	0.802	0.797	-0.006	-0.7	0.00440	0.00374	0.00369
2.366	1.033	0.308	0.468	0.425	0.893	0.888	-0.005	-0.6	0.00436	0.00396	0.00391
2.465	1.076	0.320	0.503	0.485	0.988	0.988	0.000	0.0	0.00432	0.00416	0.00416
2.563	1.119	0.333	0.540	0.560	1.100	1.103	0.003	0.2	0.00428	0.00445	0.00447
2.662	1.162	0.346	0.578	0.657	1.235	1.240	0.005	0.4	0.00425	0.00484	0.00487
2.760	1.205	0.359	0.616	0.788	1.404	1.411	0.007	0.5	0.00422	0.00533	0.00544
2.859	1.248	0.372	0.657	0.979	1.636	1.633	-0.003	-0.2	0.00419	0.00625	0.00623
2.958	1.291	0.384	0.698	1.227	1.925	1.921	-0.004	-0.2	0.00416	0.00731	0.00729
3.056	1.334	0.397	0.740	1.544	2.284	2.282	-0.002	-0.1	0.00413	0.00862	0.00861
3.155	1.377	0.410	0.783	1.948	2.732	2.724	-0.007	-0.3	0.00411	0.01021	0.01017
3.253	1.420	0.423	0.828	2.426	3.254	3.253	-0.001	-0.0	0.00408	0.01195	0.01195
3.352	1.463	0.436	0.874	2.987	3.860	3.871	0.011	0.3	0.00406	0.01386	0.01391
3.451	1.506	0.448	0.920	3.656	4.577	4.580	0.003	0.1	0.00403	0.01602	0.01603
3.549	1.549	0.461	0.968	4.411	5.379	5.374	-0.005	-0.1	0.00401	0.01826	0.01824

UPRIGHT RESISTANCE WITH SINGLE SAND RMS ERROR= 0.008 LB 0.7 PERCENT

V-KTS	V/RLT	FN	RF	RR	RU-LB	*RU-LB*	ERROR	E-PC	CF	CR	*CR*
0.986	0.430	0.128	0.098	0.027	0.126	0.126	0.001	0.5	0.00528	0.00146	0.00150
1.183	0.516	0.154	0.136	0.045	0.181	0.180	-0.001	-0.3	0.00506	0.00167	0.00165
1.380	0.602	0.179	0.179	0.068	0.247	0.246	-0.001	-0.3	0.00489	0.00187	0.00185
1.577	0.688	0.205	0.227	0.102	0.328	0.326	-0.002	-0.7	0.00475	0.00213	0.00209
1.775	0.775	0.231	0.280	0.141	0.421	0.422	0.001	0.3	0.00463	0.00234	0.00236
1.972	0.861	0.256	0.338	0.196	0.534	0.538	0.004	0.8	0.00453	0.00263	0.00269
2.070	0.904	0.269	0.368	0.229	0.597	0.604	0.006	1.0	0.00448	0.00279	0.00286
2.169	0.947	0.282	0.400	0.274	0.675	0.676	0.001	0.2	0.00444	0.00304	0.00305
2.267	0.990	0.295	0.433	0.327	0.761	0.754	-0.006	-0.8	0.00440	0.00332	0.00325
2.366	1.033	0.308	0.468	0.383	0.851	0.840	-0.011	-1.3	0.00436	0.00357	0.00347
2.465	1.076	0.320	0.503	0.434	0.937	0.933	-0.004	-0.4	0.00432	0.00372	0.00369
2.563	1.119	0.333	0.540	0.501	1.041	1.040	-0.000	-0.0	0.00428	0.00398	0.00397
2.662	1.162	0.346	0.578	0.580	1.157	1.170	0.012	1.0	0.00425	0.00427	0.00436
2.760	1.205	0.359	0.616	0.702	1.318	1.334	0.016	1.2	0.00422	0.00480	0.00491
2.859	1.248	0.372	0.657	0.891	1.548	1.552	0.005	0.3	0.00419	0.00569	0.00572
2.958	1.291	0.384	0.698	1.159	1.856	1.840	-0.016	-0.9	0.00416	0.00691	0.00681
3.056	1.334	0.397	0.740	1.480	2.220	2.204	-0.016	-0.7	0.00413	0.00826	0.00817
3.155	1.377	0.410	0.783	1.869	2.652	2.650	-0.002	-0.1	0.00411	0.00979	0.00978
3.253	1.420	0.423	0.828	2.347	3.175	3.180	0.006	0.2	0.00408	0.01156	0.01159
3.352	1.463	0.436	0.874	2.912	3.785	3.793	0.007	0.2	0.00406	0.01351	0.01355
3.451	1.506	0.448	0.920	3.548	4.469	4.481	0.012	0.3	0.00403	0.01554	0.01559
3.549	1.549	0.461	0.968	4.274	5.243	5.232	-0.011	-0.2	0.00401	0.01770	0.01765

MIT PRATT PROJECT DELFT SERIES MODEL I (CANOE BODY) 1976
LWL= 5.249FT, LSM= 5.249 FT, WETTED SURFACE= 6.945 FT**2, DRAFT= 0.410 FT, DISP=83.398 LB

AVERAGE DELTA CT BETWEEN DOUBLE AND SINGLE SAND=.00049

RESIDUARY RESISTANCE COEFFICIENTS:

V/RTL:	0.40000	0.60000	0.80000	1.00000	1.20000	1.40000	1.60000	1.80000
CR:	0.00082	0.00126	0.00189	0.00278	0.00441	0.01014	0.01995	0.02845
RR/DISP:	0.00010	0.00055	0.00146	0.00335	0.00766	0.02398	0.06163	0.11124

HEEL AND SIDE FORCE RESISTANCE COEFFICIENTS

C1:	0.9005
TR/T:	1.054
TR:	0.432

	1	2	3	4	5
V/RTL:	1.033	1.205	1.377	0.682	1.194
CPHI:	0.3607E-06	0.8329E-06	-0.1724E-06		
CO:	0.5066E-02	0.9979E-02	0.2432E-01	0.1151E-02	0.8924E-02
RO:	0.890	1.449	2.811	0.319	1.351
RU:	0.888	1.411	2.724	0.338	1.363
EUP:	0.002	0.037	0.087	-0.019	-0.012
EUP-PC:	0.3	2.6	3.2	-5.6	-0.9

NIT PRATT PROJECT DELFT SERIES MODEL 1 (CANOE BODY) 1976
LWL= 5.249FT, LSM= 5.249 FT, WETTED SURFACE= 6.945 FT**2, DRAFT= 0.410 FT, DISP=83.398 LB

RUN	V/RTL	PHI	FH	*RU*	RO	EPC	RH	PRH	EPC	RT	PRT	ERR	EPC
1435	1.033	10.0	0.607	0.888	0.890	0.3	0.038	0.024	-37.1	0.928	0.914	-0.014	-1.5
1436	1.033	10.0	1.234	0.888	0.890	0.3	0.091	0.089	-1.7	0.981	0.980	-0.002	-0.2
1437	1.033	10.0	0.040	0.888	0.890	0.3	0.003	0.003	12.0	0.893	0.893	0.000	0.0
1438	1.205	10.0	1.166	1.411	1.449	2.6	0.077	0.064	-17.2	1.526	1.512	-0.013	-0.9
1439	1.205	10.0	0.609	1.411	1.449	2.6	0.004	0.022	433.1	1.453	1.471	0.018	1.3
1440	1.205	10.0	-0.365	1.411	1.449	2.6	-0.018	0.007	-139.9	1.431	1.456	0.025	1.7
1441	1.205	10.0	1.410	1.411	1.449	2.6	0.119	0.090	-24.3	1.568	1.539	-0.029	-1.8
1442	1.033	20.0	0.272	0.888	0.890	0.3	0.020	0.016	-23.4	0.911	0.906	-0.004	-0.5
1443	1.033	20.0	1.978	0.888	0.890	0.3	0.203	0.234	15.1	1.094	1.124	0.031	2.8
1444	1.033	20.0	1.241	0.888	0.890	0.3	0.102	0.100	-2.1	0.992	0.990	-0.002	-0.2
1445	1.205	20.0	1.119	1.411	1.449	2.6	0.095	0.080	-15.4	1.543	1.529	-0.015	-1.0
1446	1.205	20.0	1.929	1.411	1.449	2.6	0.203	0.183	-9.7	1.651	1.632	-0.020	-1.2
1447	1.205	20.0	0.448	1.411	1.449	2.6	0.020	0.036	84.1	1.468	1.485	0.017	1.1
1448	1.205	20.0	0.434	1.411	1.449	2.6	0.020	0.036	81.5	1.468	1.484	0.016	1.1
1449	1.377	20.0	0.457	2.724	2.811	3.2	-0.025	0.001	-103.8	2.787	2.812	0.026	0.9
1450	1.377	20.0	1.171	2.724	2.811	3.2	0.026	0.038	46.8	2.837	2.850	0.012	0.4
1451	1.377	20.0	1.879	2.724	2.811	3.2	0.145	0.107	-26.1	2.956	2.919	-0.038	-1.3
1452	1.033	30.0	2.357	0.888	0.890	0.3	0.342	0.343	0.1	1.232	1.233	0.000	0.0
1453	1.033	30.0	0.871	0.888	0.890	0.3	0.058	0.070	21.1	0.948	0.960	0.012	1.3
1454	1.033	30.0	2.128	0.888	0.890	0.3	0.289	0.284	-1.8	1.179	1.174	-0.005	-0.4
1455	1.033	30.0	1.581	0.888	0.890	0.3	0.186	0.169	-9.0	1.076	1.059	-0.017	-1.6
1456	1.205	30.0	1.469	1.411	1.449	2.6	0.145	0.153	5.0	1.594	1.601	0.007	0.5
1457	1.205	30.0	2.238	1.411	1.449	2.6	0.293	0.271	-7.4	1.742	1.720	-0.022	-1.2
1458	1.205	30.0	0.774	1.411	1.449	2.6	0.073	0.088	20.6	1.521	1.536	0.015	1.0
1459	1.377	30.0	0.929	2.724	2.811	3.2	-0.001	0.015	******	2.811	2.826	0.015	0.5
1460	1.377	30.0	1.591	2.724	2.811	3.2	0.044	0.068	56.0	2.855	2.879	0.024	0.9
1461	1.377	30.0	2.556	2.724	2.811	3.2	0.235	0.196	-16.8	3.047	3.007	-0.040	-1.3
1462	0.682	0.0	-0.412	0.338	0.319	-5.6	0.031	0.022	-29.6	0.351	0.341	-0.009	-2.6
1463	0.682	0.0	-0.891	0.338	0.319	-5.6	0.082	0.103	25.7	0.401	0.422	0.021	5.3
1464	0.682	0.0	-1.131	0.338	0.319	-5.6	0.137	0.166	21.2	0.456	0.486	0.029	6.4
1465	0.682	0.0	-0.655	0.338	0.319	-5.6	0.051	0.056	8.8	0.370	0.375	0.005	1.2
1466	0.682	0.0	-0.141	0.338	0.319	-5.6	0.018	0.003	-85.7	0.337	0.322	-0.016	-4.6
1467	0.682	0.0	0.031	0.338	0.319	-5.6	0.018	0.000	-99.3	0.337	0.319	-0.018	-5.3
1468	0.682	0.0	0.269	0.338	0.319	-5.6	0.023	0.009	-58.3	0.342	0.329	-0.013	-3.9
1469	0.682	0.0	-0.293	0.338	0.319	-5.6	0.018	0.011	-38.4	0.337	0.330	-0.007	-2.1
1470	0.682	0.0	-0.534	0.338	0.319	-5.6	0.038	0.037	-2.6	0.357	0.356	-0.001	-0.3
1471	0.682	0.0	-0.694	0.338	0.319	-5.6	0.053	0.063	17.4	0.373	0.382	0.009	2.5
1472	1.194	0.0	-0.390	1.363	1.351	-0.9	-0.050	0.006	-113.0	1.301	1.357	0.056	4.3
1473	1.194	0.0	-0.836	1.363	1.351	-0.9	0.047	0.030	-37.2	1.398	1.380	-0.018	-1.3
1474	1.194	0.0	-1.334	1.363	1.351	-0.9	0.105	0.076	-27.7	1.455	1.426	-0.029	-2.0
1475	1.194	0.0	-1.828	1.363	1.351	-0.9	0.164	0.142	-13.5	1.515	1.493	-0.022	-1.5
1476	1.194	0.0	-2.374	1.363	1.351	-0.9	0.257	0.240	-6.6	1.607	1.590	-0.017	-1.1
1477	1.194	0.0	-2.934	1.363	1.351	-0.9	0.358	0.366	2.2	1.709	1.717	0.008	0.5
1478	1.194	0.0	-3.477	1.363	1.351	-0.9	0.490	0.514	4.8	1.841	1.864	0.023	1.3
1479	1.194	0.0	0.044	1.363	1.351	-0.9	0.014	0.000	-99.4	1.365	1.351	-0.014	-1.0
1480	1.194	0.0	0.758	1.363	1.351	-0.9	0.021	0.024	17.6	1.371	1.375	0.004	0.3
1481	1.194	0.0	0.399	1.363	1.351	-0.9	0.010	0.007	-30.7	1.360	1.357	-0.003	-0.2
1482	1.194	0.0	-0.362	1.363	1.351	-0.9	-0.001	0.006	-542.8	1.349	1.356	0.007	0.5
1483	1.194	0.0	-0.855	1.363	1.351	-0.9	0.025	0.031	23.4	1.376	1.382	0.006	0.4
1484	1.194	0.0	-1.398	1.363	1.351	-0.9	0.096	0.083	-13.3	1.446	1.434	-0.013	-0.9
1485	1.194	0.0	-2.930	1.363	1.351	-0.9	0.354	0.365	3.2	1.704	1.715	0.011	0.7
RMS						3.0			400.7			0.019	2.1

MIT PRATT PROJECT DELFT SERIES MODEL I (HALF-KEEL, BASE BOAT) 1976
LWL= 5.249FT, LSM= 5.222 FT, WETTED SURFACE= 8.327 FT**2, DRAFT= 0.774 FT, DISP=86.921 LB

UPRIGHT RESISTANCE WITH DOUBLE SAND RMS ERROR= 0.008 LB 0.4 PERCENT

V-KTS	V/RLT	FN	RF	RR	RU-LB	*RU-LB*	ERROR	E-PC	CF	CR	*CR*
0.986	0.431	0.128	0.118	0.038	0.157	0.157	0.001	0.3	0.00530	0.00171	0.00173
1.183	0.518	0.154	0.163	0.061	0.225	0.224	-0.001	-0.3	0.00508	0.00191	0.00189
1.380	0.604	0.180	0.215	0.092	0.306	0.305	-0.001	-0.4	0.00491	0.00209	0.00206
1.577	0.690	0.206	0.273	0.129	0.401	0.402	0.000	0.1	0.00476	0.00225	0.00226
1.775	0.777	0.231	0.336	0.177	0.514	0.515	0.002	0.3	0.00464	0.00245	0.00247
1.972	0.863	0.257	0.406	0.242	0.648	0.650	0.002	0.2	0.00454	0.00271	0.00273
2.070	0.906	0.270	0.443	0.283	0.725	0.726	0.001	0.1	0.00449	0.00287	0.00288
2.169	0.949	0.283	0.481	0.330	0.811	0.810	-0.001	-0.1	0.00445	0.00305	0.00304
2.267	0.992	0.295	0.521	0.383	0.904	0.903	-0.001	-0.1	0.00441	0.00324	0.00323
2.366	1.035	0.308	0.562	0.447	1.010	1.006	-0.004	-0.4	0.00437	0.00348	0.00344
2.465	1.079	0.321	0.605	0.522	1.127	1.121	-0.005	-0.5	0.00433	0.00374	0.00370
2.563	1.122	0.334	0.649	0.608	1.257	1.255	-0.002	-0.1	0.00430	0.00402	0.00401
2.662	1.165	0.347	0.694	0.708	1.402	1.415	0.013	0.9	0.00426	0.00434	0.00442
2.760	1.208	0.360	0.741	0.862	1.603	1.613	0.010	0.6	0.00423	0.00492	0.00497
2.859	1.251	0.373	0.789	1.074	1.863	1.863	-0.000	-0.0	0.00420	0.00571	0.00571
2.958	1.294	0.385	0.839	1.344	2.183	2.179	-0.003	-0.2	0.00417	0.00668	0.00666
3.056	1.337	0.398	0.890	1.694	2.584	2.571	-0.013	-0.5	0.00414	0.00789	0.00793
3.155	1.381	0.411	0.942	2.112	3.053	3.046	-0.007	-0.2	0.00412	0.00923	0.00920
3.253	1.424	0.424	0.995	2.618	3.613	3.611	-0.003	-0.1	0.00409	0.01076	0.01075
3.352	1.467	0.437	1.050	3.211	4.262	4.269	0.008	0.2	0.00407	0.01243	0.01246
3.451	1.510	0.450	1.107	3.896	5.002	5.023	0.021	0.4	0.00404	0.01423	0.01431
3.549	1.553	0.462	1.164	4.722	5.886	5.872	-0.015	-0.3	0.00402	0.01631	0.01625

UPRIGHT RESISTANCE WITH SINGLE SAND RMS ERROR= 0.010 LB 0.6 PERCENT

V-KTS	V/RLT	FN	RF	RR	RU-LB	*RU-LB*	ERROR	E-PC	CF	CR	*CR*
0.986	0.431	0.128	0.118	0.032	0.150	0.150	-0.000	-0.0	0.00530	0.00141	0.00141
1.183	0.518	0.154	0.163	0.050	0.214	0.214	-0.000	-0.1	0.00508	0.00157	0.00156
1.380	0.604	0.180	0.215	0.076	0.291	0.290	-0.001	-0.2	0.00491	0.00174	0.00173
1.577	0.690	0.206	0.273	0.109	0.381	0.382	0.000	0.1	0.00476	0.00190	0.00191
1.775	0.777	0.231	0.336	0.149	0.485	0.490	0.005	0.9	0.00464	0.00205	0.00212
1.972	0.863	0.257	0.406	0.209	0.615	0.617	0.002	0.2	0.00454	0.00234	0.00236
2.070	0.906	0.270	0.443	0.247	0.690	0.689	-0.001	-0.2	0.00449	0.00251	0.00250
2.169	0.949	0.283	0.481	0.293	0.774	0.768	-0.006	-0.8	0.00445	0.00271	0.00265
2.267	0.992	0.295	0.521	0.343	0.864	0.854	-0.010	-1.2	0.00441	0.00290	0.00282
2.366	1.035	0.308	0.562	0.392	0.955	0.950	-0.005	-0.5	0.00437	0.00305	0.00301
2.465	1.079	0.321	0.605	0.447	1.052	1.056	0.005	0.5	0.00433	0.00320	0.00323
2.563	1.122	0.334	0.649	0.517	1.166	1.180	0.014	1.2	0.00430	0.00342	0.00352
2.662	1.165	0.347	0.694	0.628	1.323	1.330	0.007	0.5	0.00426	0.00386	0.00390
2.760	1.208	0.360	0.741	0.762	1.504	1.518	0.014	1.0	0.00423	0.00435	0.00443
2.859	1.251	0.373	0.789	0.974	1.764	1.762	-0.002	-0.1	0.00420	0.00518	0.00518
2.958	1.294	0.385	0.839	1.249	2.088	2.077	-0.010	-0.5	0.00417	0.00621	0.00616
3.056	1.337	0.398	0.890	1.606	2.496	2.472	-0.024	-0.9	0.00414	0.00748	0.00737
3.155	1.381	0.411	0.942	2.021	2.963	2.952	-0.011	-0.4	0.00412	0.00883	0.00878
3.253	1.424	0.424	0.995	2.517	3.512	3.520	0.008	0.2	0.00409	0.01034	0.01037
3.352	1.467	0.437	1.050	3.110	4.160	4.177	0.017	0.4	0.00407	0.01204	0.01210
3.451	1.510	0.450	1.107	3.794	4.901	4.918	0.017	0.3	0.00404	0.01386	0.01392
3.549	1.553	0.462	1.164	4.586	5.750	5.733	-0.017	-0.3	0.00402	0.01583	0.01577

MIT PRATT PROJECT DELFT SERIES MODEL I (HALF-KEEL, BASE BOAT) 1976
LWL= 5.249FT, LSH= 5.222 FT, WETTED SURFACE= 8.327 FT**2, DRAFT= 0.774 FT, DISP=86.921 LB

AVERAGE DELTA CT BETWEEN DOUBLE AND SINGLE SAND=.00049

RESIDUARY RESISTANCE COEFFICIENTS:

VRTL:	0.40000	0.60000	0.80000	1.00000	1.20000	1.40000	1.60000	1.80000
CR:	0.00070	0.00108	0.00156	0.00229	0.00388	0.00890	0.01746	0.02580
RR/DISP:	0.00016	0.00054	0.00138	0.00316	0.00772	0.02409	0.06174	0.11546

HEEL AND SIDE FORCE RESISTANCE COEFFICIENTS

C1:	1.4186
TE/T:	0.840
TS:	0.650

	1	2	3	4	5
V/RTL:	1.035	1.208	1.381	0.685	1.197
CPHI:	0.1040E-05	0.1964E-05	0.4245E-07		
CO:	0.5163E-02	0.1016E-01	0.2625E-01	0.1338E-02	0.9195E-02
HO:	1.011	1.625	3.224	0.385	1.528
RU:	1.006	1.613	3.946	0.395	1.557
RUP:	0.005	0.012	0.177	-0.010	-0.029
RUP-PC:	0.5	0.7	5.8	-2.6	-1.8

MIT PRATT PROJECT DELFT SERIES MODEL I (HALF-KEEL, BASE BOAT) 1976
LWL= 5.249FT, LSM= 5.222 FT, WETTED SURFACE= 8.327 FT**2, DRAFT= 0.774 FT, DISP=86.921 LB

RUN	V/RTL	PHI	FH	*RU*	RO	EPC	RH	PRH	EPC	RT	PRT	ERR	EPC
1386	1.035	10.0	3.327	1.006	1.011	0.5	0.288	0.287	-0.3	1.299	1.298	-0.001	-0.1
1387	1.035	10.0	0.833	1.006	1.011	0.5	0.038	0.026	-31.1	1.049	1.037	-0.012	-1.1
1388	1.035	10.0	2.245	1.006	1.011	0.5	0.151	0.136	-10.1	1.162	1.147	-0.015	-1.3
1389	1.035	10.0	-0.217	1.006	1.011	0.5	0.005	0.010	91.6	1.016	1.021	0.005	0.5
1390	1.208	10.0	2.183	1.613	1.625	0.7	0.111	0.105	-5.1	1.735	1.729	-0.006	-0.3
1391	1.208	10.0	0.822	1.613	1.625	0.7	0.002	0.0301085.0		1.627	1.654	0.027	1.7
1392	1.208	10.0	3.280	1.613	1.625	0.7	0.214	0.215	0.6	1.839	1.840	0.001	0.1
1393	1.035	20.0	2.534	1.006	1.011	0.5	0.210	0.197	-6.2	1.221	1.208	-0.013	-1.1
1394	1.035	20.0	4.425	1.006	1.011	0.5	0.504	0.528	4.8	1.515	1.539	0.024	1.6
1395	1.035	20.0	3.383	1.006	1.011	0.5	0.301	0.323	7.5	1.312	1.334	0.023	1.7
1396	1.035	20.0	2.020	1.006	1.011	0.5	0.135	0.139	2.3	1.146	1.150	0.003	0.3
1397	1.208	20.0	4.662	1.613	1.625	0.7	0.485	0.469	-3.4	2.110	2.094	-0.016	-0.8
1398	1.208	20.0	3.245	1.613	1.625	0.7	0.282	0.262	-7.1	1.907	1.887	-0.020	-1.1
1400	1.381	20.0	1.246	3.046	3.224	5.8	-0.009	0.023-355.9		3.214	3.247	0.033	1.0
1401	1.381	20.0	3.920	3.046	3.224	5.8	0.220	0.218	-0.8	3.444	3.442	-0.002	-0.0
1402	1.381	20.0	2.827	3.046	3.224	5.8	0.145	0.114	-21.3	3.369	3.338	-0.031	-0.9
1403	1.035	30.0	3.429	1.006	1.011	0.5	0.402	0.377	-6.4	1.413	1.388	-0.026	-1.8
1404	1.035	30.0	2.108	1.006	1.011	0.5	0.173	0.193	11.6	1.184	1.204	0.020	1.7
1405	1.035	30.0	5.029	1.006	1.011	0.5	0.724	0.716	-1.1	1.735	1.727	-0.008	-0.5
1406	1.208	30.0	4.791	1.613	1.625	0.7	0.624	0.577	-7.6	2.249	2.201	-0.047	-2.1
1407	1.208	30.0	3.409	1.613	1.625	0.7	0.357	0.368	2.9	1.992	1.992	0.010	0.5
1408	1.208	30.0	1.904	1.613	1.625	0.7	0.170	0.220	29.7	1.795	1.845	0.050	2.8
1409	1.381	30.0	1.741	3.046	3.224	5.8	0.008	0.046	442.8	3.232	3.270	0.038	1.2
1410	1.381	30.0	4.480	3.046	3.224	5.8	0.328	0.287	-12.6	3.552	3.510	-0.041	-1.2
1411	1.381	30.0	1.746	3.046	3.224	5.8	0.042	0.046	11.6	3.265	3.270	0.005	0.1
1412	1.381	30.0	3.208	3.046	3.224	5.8	0.150	0.149	-0.7	3.373	3.372	-0.001	-0.0
1413	0.685	0.0	-0.531	0.395	0.385	-2.6	0.029	0.016	-44.6	0.414	0.401	-0.013	-3.1
1414	0.685	0.0	-1.080	0.395	0.385	-2.6	0.071	0.067	-5.9	0.456	0.452	-0.004	-0.9
1415	0.685	0.0	-1.667	0.395	0.385	-2.6	0.159	0.159	-0.0	0.545	0.545	-0.000	-0.0
1416	0.685	0.0	-2.183	0.395	0.385	-2.6	0.232	0.273	17.7	0.617	0.658	0.041	6.7
1417	0.685	0.0	-2.211	0.395	0.385	-2.6	0.247	0.280	13.3	0.633	0.666	0.033	5.2
1418	0.685	0.0	-1.592	0.395	0.385	-2.6	0.148	0.145	-2.0	0.534	0.531	-0.003	-0.6
1419	0.685	0.0	-0.282	0.395	0.385	-2.6	0.018	0.005	-74.9	0.403	0.390	-0.014	-3.4
1420	0.685	0.0	0.271	0.395	0.385	-2.6	0.023	0.004	-81.3	0.408	0.389	-0.018	-4.5
1421	0.685	0.0	0.525	0.395	0.385	-2.6	0.029	0.016	-45.9	0.414	0.401	-0.013	-3.2
1422	0.685	0.0	-0.842	0.395	0.385	-2.6	0.049	0.041	-17.1	0.434	0.426	-0.008	-1.9
1423	1.197	0.0	-0.644	1.557	1.528	-1.8	0.011	0.008	-27.3	1.539	1.536	-0.003	-0.2
1424	1.197	0.0	-1.609	1.557	1.528	-1.8	0.070	0.049	-30.7	1.598	1.577	-0.022	-1.3
1425	1.197	0.0	-2.791	1.557	1.528	-1.8	0.185	0.146	-20.8	1.713	1.675	-0.039	-2.2
1426	1.197	0.0	-3.982	1.557	1.528	-1.8	0.313	0.298	-4.8	1.841	1.826	-0.015	-0.8
1427	1.197	0.0	-5.020	1.557	1.528	-1.8	0.456	0.473	3.8	1.984	2.002	0.017	0.9
1428	1.197	0.0	-6.122	1.557	1.528	-1.8	0.679	0.704	3.8	2.207	2.232	0.026	1.2
1429	1.197	0.0	0.564	1.557	1.528	-1.8	-0.007	0.006-186.4		1.521	1.534	0.013	0.8
1430	1.197	0.0	3.829	1.557	1.528	-1.8	-0.009	0.013-241.3		1.519	1.541	0.022	1.5
RMS						2.8			192.1			0.022	2.0

MIT PRATT PROJECT DELFT SERIES MODEL I (LARGE TANK, BASE BOAT) 1976
LWL= 5.249FT, LSM= 5.195 FT, WETTED SURFACE= 9.137 FT**2, DRAFT= 1.135 FT, DISP=89.198 LB

UPRIGHT RESISTANCE WITH DOUBLE SAND RMS ERROR= 0.018 LB 0.9 PERCENT

V-KTS	V/RLT	FN	RF	RR	RU-LB	*RU-LB*	ERROR	E-PC	CF	CR	*CR*
0.986	0.433	0.129	0.130	0.046	0.176	0.176	-0.000	-0.3	0.00530	0.00190	0.00188
1.183	0.519	0.155	0.179	0.074	0.254	0.253	-0.001	-0.2	0.00508	0.00210	0.00208
1.380	0.606	0.180	0.236	0.108	0.344	0.345	0.001	0.4	0.00491	0.00225	0.00228
1.577	0.692	0.206	0.299	0.151	0.450	0.453	0.004	0.8	0.00477	0.00240	0.00246
1.775	0.779	0.232	0.369	0.206	0.575	0.577	0.002	0.3	0.00465	0.00260	0.00262
1.972	0.865	0.258	0.445	0.280	0.725	0.718	-0.007	-1.0	0.00454	0.00285	0.00278
2.070	0.908	0.270	0.486	0.314	0.800	0.797	-0.004	-0.5	0.00449	0.00291	0.00287
2.169	0.952	0.283	0.528	0.349	0.877	0.882	0.004	0.5	0.00445	0.00294	0.00298
2.267	0.995	0.296	0.572	0.407	0.979	0.975	-0.003	-0.3	0.00441	0.00314	0.00311
2.366	1.038	0.309	0.617	0.474	1.091	1.080	-0.011	-1.0	0.00437	0.00336	0.00328
2.465	1.081	0.322	0.664	0.544	1.208	1.200	-0.009	-0.7	0.00433	0.00355	0.00350
2.563	1.125	0.335	0.712	0.611	1.323	1.339	0.016	1.2	0.00430	0.00368	0.00378
2.662	1.168	0.348	0.762	0.717	1.479	1.507	0.027	1.8	0.00426	0.00401	0.00416
2.760	1.211	0.361	0.813	0.871	1.684	1.712	0.028	1.6	0.00423	0.00453	0.00467
2.859	1.254	0.374	0.866	1.122	1.989	1.969	-0.020	-1.0	0.00420	0.00544	0.00535
2.958	1.298	0.386	0.921	1.416	2.337	2.289	-0.048	-2.0	0.00417	0.00642	0.00620
3.056	1.341	0.399	0.976	1.720	2.696	2.682	-0.015	-0.5	0.00414	0.00730	0.00724
3.155	1.384	0.412	1.034	2.081	3.115	3.153	0.038	1.2	0.00412	0.00829	0.00844
3.253	1.427	0.425	1.093	2.629	3.721	3.710	-0.011	-0.3	0.00409	0.00985	0.00980
3.352	1.471	0.438	1.153	3.199	4.352	4.356	0.004	0.1	0.00407	0.01129	0.01130
3.451	1.514	0.451	1.214	3.863	5.077	5.094	0.017	0.3	0.00404	0.01286	0.01292
3.549	1.557	0.464	1.278	4.657	5.935	5.922	-0.013	-0.2	0.00402	0.01466	0.01461

UPRIGHT RESISTANCE WITH SINGLE SAND RMS ERROR= 0.014 LB 0.8 PERCENT

V-KTS	V/RLT	FN	RF	RR	RU-LB	*RU-LB*	ERROR	E-PC	CF	CR	*CR*
0.986	0.433	0.129	0.130	0.033	0.163	0.164	0.001	0.7	0.00530	0.00136	0.00140
1.183	0.519	0.155	0.179	0.057	0.236	0.234	-0.002	-0.8	0.00508	0.00160	0.00155
1.380	0.606	0.180	0.236	0.084	0.320	0.318	-0.002	-0.6	0.00491	0.00174	0.00171
1.577	0.692	0.206	0.299	0.118	0.417	0.418	0.001	0.2	0.00477	0.00187	0.00189
1.775	0.779	0.232	0.369	0.162	0.531	0.535	0.004	0.7	0.00465	0.00204	0.00209
1.972	0.865	0.258	0.445	0.227	0.672	0.673	0.000	0.0	0.00454	0.00231	0.00232
2.070	0.908	0.270	0.486	0.264	0.750	0.750	0.001	0.1	0.00449	0.00244	0.00244
2.169	0.952	0.283	0.528	0.301	0.829	0.834	0.005	0.6	0.00445	0.00253	0.00258
2.267	0.995	0.296	0.572	0.359	0.930	0.926	-0.004	-0.5	0.00441	0.00276	0.00273
2.366	1.038	0.309	0.617	0.424	1.041	1.026	-0.015	-1.4	0.00437	0.00300	0.00289
2.465	1.081	0.322	0.664	0.476	1.140	1.136	-0.004	-0.3	0.00433	0.00311	0.00308
2.563	1.125	0.335	0.712	0.544	1.257	1.261	0.005	0.4	0.00430	0.00328	0.00331
2.662	1.168	0.348	0.762	0.631	1.393	1.411	0.018	1.3	0.00426	0.00353	0.00363
2.760	1.211	0.361	0.813	0.763	1.576	1.597	0.021	1.3	0.00423	0.00397	0.00408
2.859	1.254	0.374	0.866	0.983	1.850	1.837	-0.012	-0.7	0.00420	0.00477	0.00471
2.958	1.298	0.386	0.921	1.262	2.183	2.147	-0.036	-1.6	0.00417	0.00572	0.00556
3.056	1.341	0.399	0.976	1.566	2.542	2.535	-0.007	-0.3	0.00414	0.00664	0.00661
3.155	1.384	0.412	1.034	1.936	2.970	3.010	0.041	1.4	0.00412	0.00771	0.00787
3.253	1.427	0.425	1.093	2.497	3.589	3.580	-0.009	-0.3	0.00409	0.00935	0.00931
3.352	1.471	0.438	1.153	3.104	4.257	4.248	-0.009	-0.2	0.00407	0.01095	0.01092
3.451	1.514	0.451	1.214	3.795	5.009	5.016	0.007	0.1	0.00404	0.01263	0.01266
3.549	1.557	0.464	1.278	4.609	5.886	5.884	-0.003	-0.0	0.00402	0.01450	0.01449

MIT PRATT PROJECT DELFT SERIES MODEL I (LARGE TANK, BASE BOAT) 1976
LWL= 5.249FT, LSM= 5.195 FT, WETTED SURFACE= 9.137 FT**2, DRAFT= 1.135 FT, DISP=89.198 LB

AVERAGE DELTA CT BETWEEN DOUBLE AND SINGLE SAND=.00053

RESIDUARY RESISTANCE COEFFICIENTS:

VRTL:	0.40000	0.60000	0.80000	1.00000	1.20000	1.40000	1.60000	1.80000
CR:	0.00074	0.00121	0.00160	0.00207	0.00347	0.00786	0.01529	0.02265
RR/DISP:	0.00017	0.00064	0.00150	0.00304	0.00734	0.02265	0.05751	0.10785

HEEL AND SIDE FORCE RESISTANCE COEFFICIENTS

C1:	1.6720
TE/T:	0.773
TE:	0.878

	1	2	3	4	5
V/RTL:	1.038	1.211	1.384	0.686	1.200
CPHI:	0.2613E-06	0.2559E-05	0.5344E-05		
CO:	0.4844E-02	0.9045E-02	0.2210E-01	0.1541E-02	0.9243E-02
RO:	1.049	1.620	3.005	0.432	1.624
RO:	1.080	1.712	3.153	0.445	1.654
EOP:	-0.031	-0.092	-0.148	-0.013	-0.030
EOP-PC:	-2.9	-5.4	-4.7	-3.0	-1.8

MIT PRATT PROJECT DELFT SERIES MODEL I(LARGE TANK, BASE BOAT) 1976
LWL= 5.249FT, LSM= 5.195 FT, WETTED SURFACE= 9.137 FT**2, DRAFT= 1.135 FT, DISP=89.198 LB

RUN	V/RTL	PHI	PH	*RH*	RO	EPC	RH	PRH	EPC	RT	PRT	ERR	EPC
1303	1.038	10.0	1.451	1.080	1.049	-2.9	0.071	0.031	-55.8	1.120	1.080	-0.040	-3.5
1304	1.038	10.0	2.877	1.080	1.049	-2.9	0.130	0.116	-10.8	1.179	1.165	-0.014	-1.2
1305	1.038	10.0	2.145	1.080	1.049	-2.9	0.082	0.066	-19.8	1.131	1.115	-0.016	-1.4
1306	1.211	10.0	2.225	1.712	1.620	-5.4	0.082	0.073	-10.8	1.702	1.693	-0.009	-0.5
1307	1.211	10.0	1.480	1.712	1.620	-5.4	0.066	0.045	-32.2	1.687	1.665	-0.021	-1.3
1308	1.211	10.0	3.174	1.712	1.620	-5.4	0.168	0.125	-25.6	1.788	1.745	-0.043	-2.4
1309	1.038	20.0	4.099	1.080	1.049	-2.9	0.227	0.241	5.8	1.276	1.290	0.013	1.0
1310	1.038	20.0	6.140	1.080	1.049	-2.9	0.470	0.528	12.4	1.519	1.577	0.058	3.8
1311	1.038	20.0	2.839	1.080	1.049	-2.9	0.161	0.120	-25.4	1.210	1.169	-0.041	-3.4
1312	1.038	20.0	4.570	1.080	1.049	-2.9	0.274	0.297	8.5	1.323	1.346	0.023	1.8
1313	1.038	20.0	3.170	1.080	1.049	-2.9	0.150	0.148	-1.7	1.199	1.197	-0.003	-0.2
1314	1.038	20.0	6.008	1.080	1.049	-2.9	0.446	0.506	13.6	1.495	1.555	0.061	4.1
1315	1.211	20.0	6.119	1.712	1.620	-5.4	0.479	0.470	-1.8	2.099	2.090	-0.009	-0.4
1316	1.211	20.0	3.048	1.712	1.620	-5.4	0.157	0.185	18.2	1.777	1.805	0.029	1.6
1317	1.211	20.0	4.535	1.712	1.620	-5.4	0.265	0.299	13.1	1.885	1.920	0.035	1.8
1318	1.211	20.0	5.230	1.712	1.620	-5.4	0.351	0.368	4.9	1.971	1.988	0.017	0.9
1321	1.211	20.0	4.535	1.712	1.620	-5.4	0.254	0.299	18.0	1.874	1.920	0.046	2.4
1322	1.384	20.0	4.270	3.153	3.005	-4.7	0.331	0.332	0.4	3.336	3.337	0.001	0.0
1323	1.384	20.0	2.822	3.153	3.005	-4.7	0.198	0.252	27.2	3.203	3.257	0.054	1.7
1324	1.384	20.0	5.757	3.153	3.005	-4.7	0.503	0.447	-11.3	3.508	3.452	-0.055	-1.6
1325	1.038	30.0	5.295	1.080	1.049	-2.9	0.428	0.407	-4.9	1.477	1.456	-0.021	-1.4
1326	1.038	30.0	7.729	1.080	1.049	-2.9	0.847	0.843	-0.4	1.896	1.892	-0.004	-0.2
1327	1.038	30.0	6.563	1.080	1.049	-2.9	0.631	0.614	-2.7	1.680	1.663	-0.017	-1.0
1328	1.211	30.0	6.150	1.712	1.620	-5.4	0.587	0.588	0.2	2.207	2.208	0.001	0.1
1329	1.211	30.0	4.778	1.712	1.620	-5.4	0.448	0.436	-2.5	2.068	2.057	-0.011	-0.6
1330	1.211	30.0	4.783	1.712	1.620	-5.4	0.448	0.437	-2.4	2.068	2.057	-0.011	-0.5
1331	1.211	30.0	7.301	1.712	1.620	-5.4	0.767	0.744	-3.0	2.388	2.365	-0.023	-1.0
1332	1.384	30.0	8.355	3.153	3.005	-4.7	1.065	0.969	-9.0	4.070	3.974	-0.095	-2.3
1333	1.384	30.0	6.288	3.153	3.005	-4.7	0.701	0.735	4.9	3.706	3.740	0.034	0.9
1334	1.384	30.0	4.865	3.153	3.005	-4.7	0.551	0.612	11.1	3.556	3.617	0.061	1.7
1335	0.686	0.0	0.042	0.445	0.432	-3.0	0.009	0.000	-99.4	0.441	0.432	-0.009	-2.0
1336	0.686	0.0	-0.573	0.445	0.432	-3.0	0.029	0.010	-64.0	0.461	0.442	-0.018	-4.0
1337	0.686	0.0	-1.127	0.445	0.432	-3.0	0.053	0.040	-24.6	0.485	0.472	-0.013	-2.7
1338	0.686	0.0	-1.836	0.445	0.432	-3.0	0.113	0.106	-5.6	0.545	0.538	-0.006	-1.1
1339	0.686	0.0	-2.414	0.445	0.432	-3.0	0.181	0.184	1.5	0.613	0.616	0.003	0.5
1340	0.686	0.0	-3.084	0.445	0.432	-3.0	0.280	0.300	7.0	0.712	0.732	0.020	2.8
1341	0.686	0.0	-3.629	0.445	0.432	-3.0	0.384	0.415	8.2	0.816	0.847	0.031	3.8
1342	0.686	0.0	-0.315	0.445	0.432	-3.0	0.011	0.003	-71.9	0.443	0.435	-0.008	-1.8
1343	0.686	0.0	0.315	0.445	0.432	-3.0	0.002	0.003	34.8	0.434	0.435	0.001	0.2
1344	1.200	0.0	0.357	1.654	1.624	-1.8	-0.008	0.001	-115.7	1.616	1.626	0.010	0.6
1345	1.200	0.0	0.115	1.654	1.624	-1.8	-0.008	0.000	-101.6	1.616	1.624	0.008	0.5
1346	1.200	0.0	-0.575	1.654	1.624	-1.8	-0.008	0.003	-140.9	1.616	1.628	0.012	0.7
1347	1.200	0.0	-1.204	1.654	1.624	-1.8	0.020	0.015	-26.5	1.645	1.639	-0.005	-0.3
1348	1.200	0.0	-2.427	1.654	1.624	-1.8	0.058	0.061	5.0	1.662	1.685	0.003	0.2
1349	1.200	0.0	-3.741	1.654	1.624	-1.8	0.142	0.144	1.9	1.766	1.769	0.003	0.1
1350	1.200	0.0	-4.976	1.654	1.624	-1.8	0.250	0.255	2.2	1.874	1.879	0.005	0.3
1351	1.200	0.0	-6.173	1.654	1.624	-1.8	0.404	0.393	-2.8	2.028	2.017	-0.011	-0.6
1352	1.200	0.0	-7.361	1.654	1.624	-1.8	0.583	0.558	-4.2	2.207	2.183	-0.024	-1.1
RMS						3.8			39.3			0.030	1.8

MIT PRATT PROJECT DELFT SERIES MODEL I:1976 UPRIGHT,1975 HEELED
LWL= 5.249FT, LSM= 5.195 FT, WETTED SURFACE= 9.137 FT**2, DRAFT= 1.135 FT, DISP=89.198 LB

UPRIGHT RESISTANCE WITH DOUBLE SAND RMS ERROR= 0.004 LB 0.4 PERCENT

V-KTS	V/RLT	FN	RF	RR	RU-LB	*RU-LB*	ERROR	E-PC	CF	CR	*CL*
0.986	0.433	0.129	0.130	0.047	0.176	0.178	0.001	0.6	0.00530	0.00190	0.00194
1.183	0.519	0.155	0.179	0.076	0.256	0.254	-0.002	-0.6	0.00508	0.00216	0.00212
1.380	0.606	0.180	0.236	0.113	0.348	0.347	-0.002	-0.4	0.00491	0.00234	0.00231
1.577	0.692	0.206	0.299	0.157	0.456	0.457	0.000	0.1	0.00476	0.00251	0.00251
1.775	0.779	0.232	0.369	0.217	0.586	0.585	-0.001	-0.2	0.00464	0.00274	0.00272
1.972	0.865	0.258	0.445	0.284	0.730	0.734	0.005	0.6	0.00454	0.00290	0.00295
2.070	0.908	0.270	0.486	0.325	0.811	0.818	0.006	0.8	0.00449	0.00301	0.00307
2.169	0.952	0.283	0.528	0.378	0.906	0.908	0.002	0.2	0.00445	0.00319	0.00320
2.267	0.995	0.296	0.572	0.440	1.012	1.005	-0.007	-0.7	0.00441	0.00339	0.00334
2.366	1.038	0.309	0.617	0.503	1.120	1.111	-0.008	-0.8	0.00437	0.00356	0.00350
2.465	1.081	0.322	0.664	0.562	1.226	1.228	0.002	0.2	0.00433	0.00367	0.00368
2.563	1.125	0.335	0.712	0.648	1.360	1.362	0.002	0.1	0.00430	0.00391	0.00392
2.662	1.168	0.348	0.762	0.762	1.523	1.523	-0.001	-0.1	0.00426	0.00426	0.00426
2.760	1.211	0.361	0.813	0.911	1.724	1.725	0.001	0.0	0.00423	0.00474	0.00474
2.859	1.254	0.374	0.866	1.118	1.984	1.989	0.004	0.2	0.00420	0.00542	0.00544
2.958	1.298	0.386	0.920	1.416	2.337	2.331	-0.006	-0.2	0.00417	0.00642	0.00639
3.056	1.341	0.399	0.976	1.784	2.760	2.761	0.001	0.0	0.00414	0.00757	0.00757
3.155	1.384	0.412	1.034	2.240	3.274	3.283	0.009	0.3	0.00412	0.00892	0.00896
3.253	1.427	0.425	1.092	2.814	3.907	3.899	-0.008	-0.2	0.00409	0.01054	0.01051
3.352	1.471	0.438	1.153	3.455	4.608	4.607	-0.001	-0.0	0.00407	0.01219	0.01219
3.451	1.514	0.451	1.214	4.181	5.395	5.397	0.003	0.0	0.00404	0.01392	0.01393
3.549	1.557	0.464	1.277	4.980	6.257	6.256	-0.000	-0.0	0.00402	0.01567	0.01567

UPRIGHT RESISTANCE WITH SINGLE SAND RMS ERROR= 0.004 LB 0.3 PERCENT

V-KTS	V/RLT	FN	RF	RR	RU-LB	*RU-LB*	ERROR	E-PC	CF	CR	*CB*
0.986	0.433	0.129	0.130	0.038	0.168	0.168	0.000	0.2	0.00530	0.00154	0.00155
1.183	0.519	0.155	0.179	0.061	0.240	0.240	-0.001	-0.3	0.00508	0.00173	0.00171
1.380	0.606	0.180	0.236	0.090	0.326	0.326	-0.000	-0.0	0.00491	0.00188	0.00188
1.577	0.692	0.206	0.299	0.131	0.430	0.430	-0.000	-0.1	0.00476	0.00208	0.00208
1.775	0.779	0.232	0.369	0.182	0.551	0.552	0.000	0.1	0.00464	0.00229	0.00230
1.972	0.865	0.258	0.445	0.247	0.692	0.695	0.002	0.4	0.00454	0.00252	0.00254
2.070	0.908	0.270	0.486	0.288	0.774	0.775	0.001	0.2	0.00449	0.00266	0.00268
2.169	0.952	0.283	0.528	0.334	0.862	0.863	0.000	0.1	0.00445	0.00281	0.00282
2.267	0.995	0.296	0.572	0.390	0.961	0.957	-0.004	-0.4	0.00441	0.00300	0.00297
2.366	1.038	0.309	0.617	0.450	1.067	1.059	-0.008	-0.7	0.00437	0.00319	0.00313
2.465	1.081	0.322	0.664	0.507	1.171	1.171	0.001	0.1	0.00433	0.00331	0.00331
2.563	1.125	0.335	0.712	0.580	1.292	1.299	0.007	0.5	0.00430	0.00350	0.00354
2.662	1.168	0.348	0.762	0.684	1.446	1.452	0.006	0.4	0.00426	0.00383	0.00386
2.760	1.211	0.361	0.813	0.829	1.642	1.646	0.003	0.2	0.00423	0.00431	0.00433
2.859	1.254	0.374	0.866	1.039	1.905	1.900	-0.005	-0.2	0.00420	0.00504	0.00501
2.958	1.298	0.386	0.920	1.317	2.238	2.233	-0.005	-0.2	0.00417	0.00597	0.00595
3.056	1.341	0.399	0.976	1.683	2.659	2.653	-0.006	-0.2	0.00414	0.00714	0.00711
3.155	1.384	0.412	1.034	2.128	3.161	3.165	0.004	0.1	0.00412	0.00847	0.00849
3.253	1.427	0.425	1.092	2.678	3.770	3.773	0.003	0.1	0.00409	0.01003	0.01004
3.352	1.471	0.438	1.153	3.321	4.473	4.476	0.002	0.1	0.00407	0.01172	0.01172
3.451	1.514	0.451	1.214	4.053	5.267	5.265	-0.002	-0.0	0.00404	0.01349	0.01349
3.549	1.557	0.464	1.277	4.852	6.129	6.128	-0.001	-0.0	0.00402	0.01527	0.01527

MIT PRATT PROJECT DELFT SERIES MODEL I: 1976 UPRIGHT, 1975 HEELED
LWL= 5.249FT, LSM= 5.195 FT, WETTED SURFACE= 9.137 FT**2, DRAFT= 1.135 FT, DISP=89.198 LB

AVERAGE DELTA CT BETWEEN DOUBLE AND SINGLE SAND=.00041

RESIDUARY RESISTANCE COEFFICIENTS:

VRTL:	0.40000	0.60000	0.80000	1.00000	1.20000	1.40000	1.60000	1.80000
CR:	0.00107	0.00148	0.00196	0.00255	0.00379	0.00870	0.01650	0.02021
RR/DISP:	0.00025	0.00078	0.00184	0.00374	0.00801	0.02505	0.06208	0.09622

HEEL AND SIDE FORCE RESISTANCE COEFFICIENTS

C1:	1.7003
TE/T:	0.767
TE:	0.871

	1	2	3	4	5	6
V/RTL:	1.038	1.211	1.384	1.557	0.686	1.200
CPHI:	0.1580E-06	0.2427E-05	0.3872E-05	0.4648E-05		
CO:	0.5544E-02	0.1043E-01	0.2608E-01	0.5793E-01	0.1593E-02	0.1039E-01
EO:	1.111	1.744	3.360	6.445	0.437	1.726
EO:	1.111	1.725	3.283	6.256	0.448	1.667
EUP:	-0.000	0.019	0.077	0.189	-0.012	0.059
EUP-PC:	-0.0	1.1	2.3	3.0	-2.6	3.5

MIT PRATT PROJECT DELFT SERIES MODEL I:1976 UPRIGHT,1975 HEELED
LWL= 5.249FT, LSB= 5.195 FT, WETTED SURFACE= 9.137 FT**2, DRAFT= 1.135 FT, DISP=89.198 LB

RUN	V/RTL	PHI	FH	*RU*	RO	EPC	RH	PRH	EPC	RT	PRT	ERR	EPC
226	1.038	10.0	0.909	1.111	1.111	-0.0	0.022	0.013	-40.3	1.133	1.124	-0.009	-0.8
227	1.038	10.0	2.283	1.111	1.111	-0.0	0.099	0.074	-24.8	1.210	1.186	-0.025	-2.0
228	1.038	10.0	3.504	1.111	1.111	-0.0	0.176	0.173	-1.6	1.288	1.285	-0.003	-0.2
229	1.038	10.0	0.815	1.111	1.111	-0.0	0.028	0.011	-62.3	1.140	1.122	-0.018	-1.5
230	1.038	10.0	2.375	1.111	1.111	-0.0	0.108	0.080	-25.4	1.219	1.192	-0.027	-2.2
231	1.211	10.0	2.360	1.725	1.744	1.1	0.128	0.079	-38.2	1.872	1.823	-0.049	-2.6
232	1.211	10.0	1.101	1.725	1.744	1.1	0.068	0.034	-50.0	1.812	1.778	-0.034	-1.9
233	1.211	10.0	3.441	1.725	1.744	1.1	0.150	0.143	-4.3	1.894	1.887	-0.006	-0.3
234	1.211	10.0	1.202	1.725	1.744	1.1	0.033	0.037	10.8	1.777	1.781	0.004	0.2
235	1.211	10.0	1.213	1.725	1.744	1.1	0.026	0.037	39.7	1.770	1.781	0.010	0.6
236	1.211	10.0	1.169	1.725	1.744	1.1	0.029	0.035	24.3	1.773	1.779	0.007	0.4
237	1.211	10.0	1.160	1.725	1.744	1.1	0.042	0.035	-15.1	1.786	1.779	-0.006	-0.4
238	1.211	10.0	2.248	1.725	1.744	1.1	0.079	0.074	-7.1	1.823	1.818	-0.006	-0.3
239	1.211	10.0	2.295	1.725	1.744	1.1	0.075	0.076	1.3	1.819	1.820	0.001	0.1
240	1.211	10.0	3.477	1.725	1.744	1.1	0.161	0.146	-9.2	1.905	1.890	-0.015	-0.8
241	1.211	10.0	1.198	1.725	1.744	1.1	0.044	0.036	-17.2	1.788	1.780	-0.008	-0.4
242	1.211	10.0	2.465	1.725	1.744	1.1	0.112	0.084	-25.1	1.856	1.828	-0.028	-1.5
243	1.211	10.0	1.572	1.725	1.744	1.1	0.002	0.0047	162.8	1.746	1.791	0.045	2.6
244	1.211	10.0	2.836	1.725	1.744	1.1	0.088	0.104	18.5	1.832	1.848	0.016	0.9
245	1.211	10.0	1.305	1.725	1.744	1.1	0.022	0.039	78.7	1.766	1.783	0.017	1.0
246	1.384	10.0	1.258	3.283	3.360	2.3	0.042	0.047	11.7	3.402	3.407	0.005	0.1
247	1.384	10.0	2.348	3.283	3.360	2.3	0.069	0.078	13.7	3.428	3.438	0.009	0.3
248	1.384	10.0	3.380	3.283	3.360	2.3	0.124	0.125	0.7	3.483	3.484	0.001	0.0
249	1.557	10.0	3.416	6.256	6.445	3.0	0.138	0.114	-17.4	6.583	6.559	-0.024	-0.4
250	1.557	10.0	1.334	6.256	6.445	3.0	0.099	0.053	-46.6	6.543	6.498	-0.046	-0.7
251	1.557	10.0	2.344	6.256	6.445	3.0	0.001	0.0765	90.2	6.446	6.521	0.074	1.2
252	1.557	10.0	2.252	6.256	6.445	3.0	0.083	0.073	-12.1	6.523	6.518	-0.010	-0.2
253	1.557	10.0	1.265	6.256	6.445	3.0	0.046	0.051	12.9	6.491	6.496	0.006	0.1
254	1.038	20.0	4.469	1.111	1.111	-0.0	0.255	0.285	11.7	1.367	1.397	0.030	2.2
255	1.038	20.0	3.071	1.111	1.111	-0.0	0.143	0.138	-3.7	1.254	1.249	-0.005	-0.4
256	1.038	20.0	5.985	1.111	1.111	-0.0	0.447	0.507	13.4	1.559	1.618	0.060	3.8
257	1.038	20.0	4.587	1.111	1.111	-0.0	0.282	0.300	6.5	1.393	1.412	0.018	1.3
258	1.038	20.0	4.486	1.111	1.111	-0.0	0.260	0.287	10.6	1.371	1.399	0.027	2.0
259	1.211	20.0	4.300	1.725	1.744	1.1	0.236	0.277	17.4	1.980	2.021	0.041	2.1
260	1.211	20.0	2.902	1.725	1.744	1.1	0.178	0.173	-2.9	1.922	1.917	-0.005	-0.3
261	1.211	20.0	5.814	1.725	1.744	1.1	0.441	0.434	-1.5	2.185	2.178	-0.007	-0.3
262	1.211	20.0	4.366	1.725	1.744	1.1	0.273	0.283	3.4	2.017	2.027	0.009	0.5
263	1.211	20.0	4.336	1.725	1.744	1.1	0.249	0.280	12.4	1.993	2.024	0.031	1.5
264	1.211	20.0	2.909	1.725	1.744	1.1	0.161	0.174	8.0	1.905	1.918	0.013	0.7
265	1.384	20.0	2.839	3.283	3.360	2.3	0.183	0.202	10.1	3.543	3.561	0.018	0.5
266	1.384	20.0	5.694	3.283	3.360	2.3	0.421	0.393	-6.6	3.781	3.753	-0.028	-0.7
267	1.384	20.0	4.197	3.283	3.360	2.3	0.298	0.277	-7.0	3.658	3.637	-0.021	-0.6
268	1.384	20.0	4.204	3.283	3.360	2.3	0.260	0.277	6.5	3.620	3.637	0.017	0.5
269	1.384	20.0	5.645	3.283	3.360	2.3	0.404	0.389	-3.6	3.763	3.749	-0.015	-0.4
270	1.384	20.0	2.806	3.283	3.360	2.3	0.196	0.200	1.9	3.556	3.560	0.004	0.1
271	1.557	20.0	2.822	6.256	6.445	3.0	0.176	0.215	22.6	6.621	6.660	0.040	0.6
272	1.557	20.0	5.694	6.256	6.445	3.0	0.394	0.368	-6.7	6.839	6.812	-0.026	-0.4
273	1.557	20.0	4.308	6.256	6.445	3.0	0.295	0.281	-4.6	6.740	6.726	-0.013	-0.2
274	1.039	30.0	6.823	1.111	1.111	-0.0	0.683	0.664	-2.8	1.795	1.776	-0.019	-1.1
275	1.038	30.0	6.326	1.111	1.111	-0.0	0.582	0.573	-1.5	1.693	1.684	-0.009	-0.5
276	1.038	30.0	8.248	1.111	1.111	-0.0	0.961	0.965	0.4	2.072	2.076	0.004	0.2
277	1.038	30.0	5.309	1.111	1.111	-0.0	0.432	0.407	-5.7	1.543	1.518	-0.025	-1.6
288	1.211	30.0	4.936	1.725	1.744	1.1	0.452	0.445	-1.4	2.196	2.189	-0.006	-0.3
289	1.211	30.0	4.946	1.725	1.744	1.1	0.445	0.446	0.3	2.189	2.190	0.001	0.1

MIT PLATT PROJECT DELFT SERIES MODEL I:1976 UPRIGHT,1975 HEELED
LWL= 5.249FT, LSB= 5.195 FT, WETTED SURFACE= 9.137 FT**2, DRAFT= 1.135 FT, DISP=89.198 LB

RUN	V/RTL	PHI	FH	*RU*	RO	EPC	RH	PRH	EPC	RT	PRT	ERR	EPC
290	1.211	30.0	7.833	1.725	1.744	1.1	0.840	0.826	-1.7	2.584	2.570	-0.014	-0.5
291	1.211	30.0	5.993	1.725	1.744	1.1	0.575	0.564	-2.0	2.319	2.308	-0.012	-0.5
292	1.384	30.0	5.967	3.283	3.360	2.3	0.587	0.591	0.8	3.946	3.951	0.005	0.1
293	1.384	30.0	5.906	3.283	3.360	2.3	0.582	0.585	0.6	3.942	3.945	0.003	0.1
294	1.384	30.0	7.729	3.283	3.360	2.3	0.840	0.781	-7.0	4.200	4.141	-0.059	-1.4
295	1.384	30.0	4.939	3.283	3.360	2.3	0.446	0.503	12.9	3.805	3.863	0.057	1.5
296	1.384	30.0	4.969	3.283	3.360	2.3	0.472	0.505	7.0	3.832	3.865	0.033	0.9
297	1.384	30.0	5.914	3.283	3.360	2.3	0.565	0.586	3.8	3.924	3.946	0.022	0.6
298	1.384	30.0	7.770	3.283	3.360	2.3	0.838	0.786	-6.2	4.198	4.146	-0.052	-1.2
550	0.686	0.0	-0.031	0.448	0.437	-2.6	0.020	0.000	-99.8	0.456	0.437	-0.020	-4.3
551	0.696	0.0	-1.226	0.448	0.437	-2.6	0.062	0.048	-21.9	0.498	0.485	-0.014	-2.7
552	0.686	0.0	3.719	0.448	0.437	-2.6	0.381	0.443	16.3	0.818	0.880	0.062	7.6
553	0.686	0.0	2.427	0.448	0.437	-2.6	0.194	0.189	-2.6	0.631	0.625	-0.005	-0.8
554	0.686	0.0	1.265	0.448	0.437	-2.6	0.075	0.051	-31.5	0.511	0.488	-0.024	-4.6
555	1.200	0.0	1.179	1.667	1.726	3.5	0.015	0.015	-5.7	1.742	1.741	-0.001	-0.1
556	1.200	0.0	3.677	1.667	1.726	3.5	0.148	0.142	-4.1	1.874	1.868	-0.006	-0.3
557	1.200	0.0	-1.420	1.667	1.726	3.5	0.015	0.021	36.6	1.742	1.747	0.006	0.3
558	1.200	0.0	2.366	1.667	1.726	3.5	0.060	0.059	-1.6	1.786	1.785	-0.001	-0.1
559	1.200	0.0	-0.049	1.667	1.726	3.5	-0.002	0.000	-101.1	1.724	1.726	0.002	0.1
RMS						2.0			647.8			0.026	1.6

MIT PRATT PROJECT DELFT SERIES MODEL II-A (BASE KEEL) 1975
LWL= 5.249FT, LSM= 5.184 FT, WETTED SURFACE= 8.772 FT**2, DRAFT= 1.196 FT, DISP=89.344 LB

UPRIGHT RESISTANCE WITH DOUBLE SAND RMS ERROR= 0.010 LB 0.5 PERCENT

V-KTS	V/RLT	FN	RF	RR	RU-LB	*RU-LB*	ERROR	E-PC	CF	CR	*CR*
0.986	0.433	0.129	0.126	0.055	0.181	0.180	-0.001	-0.7	0.00535	0.00232	0.00227
1.183	0.520	0.155	0.174	0.077	0.251	0.253	0.001	0.6	0.00513	0.00220	0.00232
1.380	0.606	0.181	0.229	0.108	0.337	0.339	0.002	0.6	0.00496	0.00235	0.00239
1.577	0.693	0.206	0.290	0.151	0.441	0.441	-0.000	-0.0	0.00481	0.00250	0.00250
1.775	0.779	0.232	0.358	0.202	0.560	0.559	-0.001	-0.1	0.00469	0.00265	0.00264
1.972	0.866	0.258	0.432	0.269	0.701	0.699	-0.002	-0.4	0.00459	0.00286	0.00283
2.070	0.909	0.271	0.471	0.307	0.778	0.777	-0.001	-0.1	0.00454	0.00295	0.00295
2.169	0.953	0.284	0.512	0.354	0.866	0.864	-0.003	-0.3	0.00449	0.00311	0.00308
2.267	0.996	0.297	0.555	0.402	0.957	0.958	0.001	0.1	0.00445	0.00323	0.00323
2.366	1.039	0.309	0.599	0.469	1.067	1.061	-0.006	-0.6	0.00441	0.00345	0.00341
2.465	1.082	0.322	0.644	0.533	1.177	1.176	-0.002	-0.1	0.00437	0.00362	0.00361
2.563	1.126	0.335	0.691	0.610	1.301	1.309	0.008	0.6	0.00434	0.00383	0.00388
2.662	1.169	0.348	0.739	0.723	1.462	1.472	0.010	0.7	0.00430	0.00421	0.00427
2.760	1.212	0.361	0.789	0.880	1.669	1.682	0.013	0.8	0.00427	0.00477	0.00484
2.859	1.256	0.374	0.840	1.115	1.956	1.962	0.007	0.4	0.00424	0.00563	0.00567
2.958	1.299	0.387	0.893	1.460	2.352	2.333	-0.020	-0.8	0.00421	0.00689	0.00679
3.056	1.342	0.400	0.947	1.877	2.824	2.802	-0.022	-0.8	0.00418	0.00829	0.00820
3.155	1.386	0.413	1.002	2.384	3.386	3.377	-0.010	-0.3	0.00416	0.00988	0.00984
3.253	1.429	0.425	1.059	2.986	4.046	4.057	0.011	0.3	0.00413	0.01164	0.01169
3.352	1.472	0.438	1.118	3.706	4.824	4.839	0.015	0.3	0.00411	0.01361	0.01367
3.451	1.515	0.451	1.177	4.522	5.699	5.712	0.013	0.2	0.00408	0.01567	0.01572
3.549	1.559	0.464	1.239	5.433	6.671	6.656	-0.015	-0.2	0.00406	0.01780	0.01775

UPRIGHT RESISTANCE WITH SINGLE SAND RMS ERROR= 0.010 LB 0.6 PERCENT

V-KTS	V/RLT	FN	RF	RR	RU-LB	*RU-LB*	ERROR	E-PC	CF	CR	*CR*
0.986	0.433	0.129	0.126	0.013	0.139	0.139	0.001	0.4	0.00535	0.00054	0.00057
1.183	0.520	0.155	0.174	0.031	0.205	0.205	-0.000	-0.0	0.00513	0.00091	0.00091
1.380	0.606	0.181	0.229	0.060	0.289	0.287	-0.002	-0.8	0.00496	0.00130	0.00125
1.577	0.693	0.206	0.290	0.096	0.386	0.385	-0.001	-0.2	0.00481	0.00158	0.00157
1.775	0.779	0.232	0.358	0.142	0.500	0.501	0.001	0.1	0.00469	0.00187	0.00187
1.972	0.866	0.258	0.432	0.198	0.631	0.635	0.005	0.8	0.00459	0.00211	0.00216
2.070	0.909	0.271	0.471	0.234	0.705	0.710	0.005	0.7	0.00454	0.00225	0.00230
2.169	0.953	0.284	0.512	0.277	0.789	0.792	0.002	0.3	0.00449	0.00243	0.00245
2.267	0.996	0.297	0.555	0.334	0.888	0.880	-0.008	-0.9	0.00445	0.00268	0.00261
2.366	1.039	0.309	0.599	0.389	0.988	0.978	-0.010	-1.0	0.00441	0.00287	0.00280
2.465	1.082	0.322	0.644	0.452	1.096	1.088	-0.008	-0.7	0.00437	0.00307	0.00302
2.563	1.126	0.335	0.691	0.524	1.215	1.218	0.003	0.3	0.00434	0.00329	0.00331
2.662	1.169	0.348	0.739	0.628	1.367	1.379	0.012	0.9	0.00430	0.00366	0.00373
2.760	1.212	0.361	0.789	0.783	1.572	1.588	0.016	1.0	0.00427	0.00424	0.00433
2.859	1.256	0.374	0.840	1.018	1.859	1.865	0.006	0.3	0.00424	0.00514	0.00517
2.958	1.299	0.387	0.893	1.349	2.242	2.230	-0.012	-0.6	0.00421	0.00637	0.00631
3.056	1.342	0.400	0.947	1.765	2.712	2.691	-0.020	-0.8	0.00418	0.00780	0.00771
3.155	1.386	0.413	1.002	2.261	3.263	3.255	-0.008	-0.2	0.00416	0.00937	0.00934
3.253	1.429	0.425	1.059	2.861	3.920	3.922	0.002	0.1	0.00413	0.01115	0.01116
3.352	1.472	0.438	1.118	3.558	4.676	4.690	0.014	0.3	0.00411	0.01307	0.01312
3.451	1.515	0.451	1.177	4.352	5.529	5.547	0.018	0.3	0.00408	0.01508	0.01515
3.549	1.559	0.464	1.239	5.254	6.493	6.477	-0.016	-0.2	0.00406	0.01721	0.01716

MIT PRATT PROJECT DELFT SERIES MODEL II-A (BASE KEEL) 1975
LWL= 5.249FT, LSM= 5.184 FT, WETTED SURFACE= 8.772 FT**2, DRAFT= 1.196 FT, DISP=89.344 LB

AVERAGE DELTA CT BETWEEN DOUBLE AND SINGLE SAND=.00054

RESIDUARY RESISTANCE COEFFICIENTS:

VRTL:	0.40000	0.60000	0.80000	1.00000	1.20000	1.40000	1.60000	1.80000
CR:	0.00117	0.00130	0.00160	0.00217	0.00357	0.00936	0.01850	0.02225
RR/DISP:	0.00126	0.00066	0.00144	0.00305	0.00723	0.02578	0.06658	0.10138

HEEL AND SIDE FORCE RESISTANCE COEFFICIENTS

C1:	1.6069
TE/T:	0.789
TE:	0.943

	1	2	3	4	5	6	7	8	9	10
V/RTL:	1.039	1.212	1.386	1.559	0.687	0.689	0.688	0.688	1.202	1.201
CPHI:	0.4474E-06	0.2397E-05	0.3406E-05	0.1527E-05						
CO:	0.5077E-02	0.9997E-02	0.2653E-01	0.6122E-01	0.1144E-02	0.3661E-03	0.1094E-02	0.1234E-02	0.9076E-02	0.9294E-02
KO:	1.052	1.682	3.373	6.709	0.388	0.320	0.385	0.397	1.588	1.606
KO:	1.061	1.682	3.377	6.656	0.433	0.436	0.435	0.434	1.626	1.622
EUP:	-0.009	-0.000	-0.004	0.052	-0.045	-0.116	-0.051	-0.038	-0.039	-0.016
EUP-PC:	-0.8	-0.0	-0.1	0.8	-10.4	-26.6	-11.6	-8.7	-2.4	-1.0

MIT PRATT PROJECT DELFT SERIES MODEL II-A (BASE KEEL) 1975
LWL= 5.249FT, LSW= 5.184 FT, WETTED SURFACE= 8.772 FT**2, DRAFT= 1.196 FT, DISP=89.344 LB

RUN	V/RTL	PHI	FH	*RU*	RO	EPC	FH	PRH	EPC	RT	PRT	ERR	EPC
302	1.039	10.0	1.650	1.061	1.052	-0.8	0.039	0.036	-7.1	1.091	1.089	-0.003	-0.3
303	1.039	10.0	2.263	1.061	1.052	-0.8	0.074	0.065	-12.7	1.127	1.117	-0.009	-0.8
304	1.039	10.0	0.972	1.061	1.052	-0.8	0.030	0.015	-49.8	1.082	1.067	-0.015	-1.4
305	1.039	10.0	1.630	1.061	1.052	-0.8	0.048	0.036	-25.8	1.100	1.088	-0.012	-1.1
306	1.039	10.0	2.263	1.061	1.052	-0.8	0.077	0.065	-15.2	1.129	1.117	-0.012	-1.0
307	1.039	10.0	0.878	1.061	1.052	-0.8	0.017	0.013	-23.2	1.069	1.065	-0.004	-0.4
308	1.212	10.0	0.895	1.682	1.682	-0.0	0.035	0.028	-19.7	1.717	1.710	-0.007	-0.4
309	1.212	10.0	1.672	1.682	1.682	-0.0	0.057	0.046	-20.1	1.739	1.728	-0.012	-0.7
310	1.212	10.0	2.279	1.682	1.682	-0.0	0.062	0.067	8.1	1.744	1.749	0.005	0.3
311	1.212	10.0	1.645	1.682	1.682	-0.0	0.064	0.045	-29.6	1.746	1.727	-0.019	-1.1
312	1.386	10.0	1.657	3.377	3.373	-0.1	0.104	0.049	-52.9	3.477	3.422	-0.055	-1.6
313	1.386	10.0	0.992	3.377	3.373	-0.1	0.053	0.037	-30.1	3.426	3.410	-0.016	-0.5
314	1.386	10.0	2.212	3.377	3.373	-0.1	0.075	0.063	-15.7	3.448	3.436	-0.012	-0.3
315	1.386	10.0	1.516	3.377	3.373	-0.1	-0.009	0.046	-620.9	3.364	3.419	0.055	1.6
316	1.559	10.0	1.061	6.656	6.709	0.8	0.020	0.020	-2.6	6.729	6.728	-0.001	-0.0
317	1.559	10.0	1.833	6.656	6.709	0.8	0.029	0.031	8.7	6.737	6.740	0.003	0.0
318	1.559	10.0	2.442	6.656	6.709	0.8	0.038	0.045	19.8	6.746	6.754	0.007	0.1
319	1.559	10.0	1.051	6.656	6.709	0.8	0.029	0.019	-32.7	6.737	6.728	-0.009	-0.1
320	1.039	20.0	3.655	1.061	1.052	-0.8	0.141	0.175	24.6	1.193	1.227	0.035	2.9
321	1.039	20.0	1.997	1.061	1.052	-0.8	0.048	0.063	32.2	1.100	1.116	0.015	1.4
322	1.039	20.0	4.305	1.061	1.052	-0.8	0.227	0.237	4.5	1.279	1.289	0.010	0.8
323	1.039	20.0	3.174	1.061	1.052	-0.8	0.127	0.136	6.8	1.179	1.188	0.009	0.7
324	1.039	20.0	1.971	1.061	1.052	-0.8	0.059	0.062	5.5	1.111	1.114	0.003	0.3
325	1.039	20.0	4.193	1.061	1.052	-0.8	0.209	0.225	7.9	1.261	1.278	0.016	1.3
326	1.212	20.0	4.089	1.682	1.682	-0.0	0.227	0.232	2.1	1.909	1.914	0.005	0.3
327	1.212	20.0	1.882	1.682	1.682	-0.0	0.102	0.117	14.9	1.784	1.799	0.015	0.8
328	1.212	20.0	3.080	1.682	1.682	-0.0	0.161	0.169	4.7	1.843	1.851	0.008	0.4
329	1.212	20.0	3.986	1.682	1.682	-0.0	0.236	0.225	-4.8	1.918	1.907	-0.011	-0.6
330	1.212	20.0	2.813	1.682	1.682	-0.0	0.119	0.155	30.0	1.801	1.837	0.036	2.0
331	1.386	20.0	2.923	3.377	3.373	-0.1	0.179	0.179	0.2	3.552	3.552	0.000	0.0
332	1.386	20.0	2.015	3.377	3.373	-0.1	0.137	0.149	9.0	3.510	3.522	0.012	0.3
333	1.386	20.0	4.150	3.377	3.373	-0.1	0.201	0.237	18.2	3.574	3.610	0.037	1.0
334	1.386	20.0	3.568	3.377	3.373	-0.1	0.212	0.207	-2.2	3.585	3.580	-0.005	-0.1
335	1.559	20.0	4.601	6.656	6.709	0.8	0.196	0.167	-15.2	6.905	6.875	-0.030	-0.4
336	1.559	20.0	3.041	6.656	6.709	0.8	0.104	0.104	-0.4	6.812	6.812	-0.000	-0.0
337	1.559	20.0	2.243	6.656	6.709	0.8	0.051	0.081	59.3	6.759	6.790	0.030	0.4
338	1.039	30.0	5.035	1.061	1.052	-0.8	0.328	0.338	3.1	1.380	1.390	0.010	0.7
339	1.039	30.0	6.374	1.061	1.052	-0.8	0.511	0.520	1.8	1.563	1.572	0.009	0.6
340	1.039	30.0	3.470	1.061	1.052	-0.8	0.196	0.179	-8.3	1.248	1.232	-0.016	-1.3
341	1.039	30.0	6.339	1.061	1.052	-0.8	0.524	0.515	-1.8	1.576	1.567	-0.010	-0.6
342	1.039	30.0	4.875	1.061	1.052	-0.8	0.310	0.319	2.8	1.362	1.371	0.009	0.6
343	1.039	30.0	3.467	1.061	1.052	-0.8	0.202	0.179	-11.4	1.254	1.231	-0.023	-1.8
344	1.039	30.0	5.252	1.061	1.052	-0.8	0.377	0.365	-3.2	1.429	1.417	-0.012	-0.8
345	1.212	30.0	4.997	1.682	1.682	-0.0	0.386	0.411	6.6	2.068	2.093	0.025	1.2
346	1.212	30.0	3.337	1.682	1.682	-0.0	0.287	0.290	1.2	1.969	1.972	0.003	0.2
347	1.212	30.0	6.089	1.682	1.682	-0.0	0.540	0.517	-4.3	2.222	2.199	-0.023	-1.0
348	1.212	30.0	4.844	1.682	1.682	-0.0	0.423	0.398	-6.0	2.105	2.080	-0.025	-1.2
349	1.386	30.0	4.992	3.377	3.373	-0.1	0.412	0.441	6.9	3.785	3.814	0.029	0.8
350	1.386	30.0	6.201	3.377	3.373	-0.1	0.595	0.532	-10.7	3.968	3.905	-0.064	-1.6
351	1.386	30.0	3.493	3.377	3.373	-0.1	0.337	0.356	5.4	3.710	3.729	0.018	0.5
501	0.687	0.0	-0.031	0.433	0.388	-10.4	0.000	0.000	-0.2	0.388	0.388	-0.000	-0.0
502	0.689	0.0	3.695	0.436	0.320	-26.6	0.370	0.370	0.0	0.690	0.690	0.000	0.0
503	0.688	0.0	2.544	0.435	0.385	-11.6	0.160	0.176	10.0	0.545	0.561	0.016	2.9
504	0.688	0.0	1.318	0.435	0.385	-11.6	0.050	0.047	-4.7	0.434	0.432	-0.002	-0.5

MIT PRATT PROJECT DELFT SERIES MODEL II-A (BASE KEEL) 1975
LWL= 5.249FT, LSM= 5.184 FT, WETTED SURFACE= 8.772 FT**2, DRAFT= 1.196 FT, DISP=89.344 LB

RUN	V/RTL	PHI	FH	*RU*	RO	EPC	RH	PRH	EPC	RT	PRT	ERR	EPC
505	0.688	0.0	0.701	0.434	0.397	-8.7	0.013	0.013	-0.0	0.410	0.410	-0.000	-0.0
512	0.688	0.0	-0.322	0.435	0.385	-11.6	0.016	0.003	-82.9	0.401	0.388	-0.014	-3.4
506	1.202	0.0	-0.317	1.626	1.588	-2.4	0.011	0.001	-91.6	1.598	1.589	-0.010	-0.6
507	1.201	0.0	0.018	1.622	1.606	-1.0	-0.006	0.000	-100.0	1.601	1.606	0.006	0.3
508	1.201	0.0	0.692	1.622	1.606	-1.0	0.010	0.004	-56.6	1.616	1.610	-0.006	-0.3
509	1.202	0.0	1.270	1.626	1.588	-2.4	0.039	0.014	-63.5	1.627	1.602	-0.025	-1.5
510	1.202	0.0	2.456	1.626	1.588	-2.4	0.057	0.054	-5.8	1.645	1.641	-0.003	-0.2
511	1.202	0.0	3.695	1.626	1.588	-2.4	0.083	0.122	45.7	1.671	1.709	0.038	2.3
RMS						4.6			84.2			0.020	1.1

MIT PRATT PROJECT DELFT MODEL SERIES MODEL II-A (BASE KEEL) 1976
LWL= 5.250FT, LSM= 5.184 FT, WETTED SURFACE= 8.772 FT**2, DRAFT= 1.196 FT, DISP=89.344 LB

UPRIGHT RESISTANCE WITH DOUBLE SAND RMS ERROR= 0.005 LB 0.3 PERCENT

V-KTS	V/RLT	FN	RF	RR	RU-LB	*RU-LB*	ERROR	E-PC	CF	CR	*CR*
0.986	0.433	0.129	0.128	0.038	0.165	0.166	0.000	0.2	0.00541	0.00160	0.00162
1.183	0.520	0.155	0.176	0.062	0.238	0.238	0.000	0.1	0.00519	0.00183	0.00183
1.380	0.606	0.181	0.232	0.097	0.328	0.327	-0.002	-0.6	0.00501	0.00210	0.00206
1.577	0.693	0.206	0.294	0.139	0.432	0.432	-0.000	-0.0	0.00487	0.00230	0.00230
1.775	0.779	0.232	0.362	0.194	0.556	0.556	0.001	0.1	0.00474	0.00254	0.00254
1.972	0.866	0.258	0.437	0.262	0.699	0.701	0.002	0.3	0.00463	0.00278	0.00281
2.070	0.909	0.271	0.477	0.304	0.780	0.782	0.002	0.3	0.00459	0.00292	0.00294
2.169	0.953	0.284	0.518	0.355	0.873	0.870	-0.003	-0.3	0.00454	0.00311	0.00309
2.267	0.996	0.297	0.561	0.405	0.966	0.965	-0.000	-0.0	0.00450	0.00325	0.00325
2.366	1.039	0.309	0.605	0.462	1.067	1.069	0.002	0.1	0.00446	0.00340	0.00342
2.465	1.082	0.322	0.651	0.531	1.182	1.182	0.001	0.1	0.00442	0.00360	0.00361
2.563	1.126	0.335	0.698	0.614	1.312	1.314	0.002	0.1	0.00438	0.00385	0.00386
2.662	1.169	0.348	0.747	0.732	1.479	1.474	-0.005	-0.4	0.00435	0.00426	0.00423
2.760	1.212	0.361	0.797	0.892	1.689	1.681	-0.008	-0.5	0.00432	0.00483	0.00478
2.859	1.256	0.374	0.849	1.111	1.960	1.956	-0.004	-0.2	0.00428	0.00561	0.00558
2.958	1.299	0.387	0.902	1.404	2.306	2.319	0.013	0.6	0.00425	0.00662	0.00668
3.056	1.342	0.400	0.957	1.814	2.771	2.778	0.007	0.2	0.00423	0.00801	0.00804
3.155	1.386	0.413	1.013	2.323	3.336	3.334	-0.001	-0.0	0.00420	0.00963	0.00962
3.253	1.429	0.425	1.070	2.916	3.986	3.986	0.000	0.0	0.00417	0.01136	0.01136
3.352	1.472	0.438	1.129	3.597	4.727	4.724	-0.002	-0.0	0.00415	0.01321	0.01320
3.451	1.515	0.451	1.190	4.353	5.543	5.531	-0.011	-0.2	0.00412	0.01508	0.01504
3.549	1.559	0.464	1.251	5.120	6.371	6.379	0.008	0.1	0.00410	0.01676	0.01679

UPRIGHT RESISTANCE WITH SINGLE SAND RMS ERROR= 0.006 LB 0.3 PERCENT

V-KTS	V/RLT	FN	RF	RR	RU-LB	*RU-LB*	ERROR	E-PC	CF	CR	*CR*
0.986	0.433	0.129	0.128	0.033	0.161	0.161	0.000	0.2	0.00541	0.00142	0.00143
1.183	0.520	0.155	0.176	0.053	0.229	0.229	0.000	0.1	0.00519	0.00157	0.00157
1.380	0.606	0.181	0.232	0.082	0.313	0.312	-0.001	-0.4	0.00501	0.00177	0.00174
1.577	0.693	0.206	0.294	0.117	0.410	0.409	-0.001	-0.2	0.00487	0.00193	0.00192
1.775	0.779	0.232	0.362	0.160	0.523	0.525	0.002	0.4	0.00474	0.00210	0.00213
1.972	0.866	0.258	0.437	0.222	0.659	0.660	0.000	0.1	0.00463	0.00236	0.00236
2.070	0.909	0.271	0.477	0.258	0.734	0.735	0.001	0.2	0.00459	0.00248	0.00249
2.169	0.953	0.284	0.518	0.302	0.820	0.818	-0.003	-0.3	0.00454	0.00265	0.00263
2.267	0.996	0.297	0.561	0.345	0.906	0.907	0.001	0.1	0.00450	0.00277	0.00278
2.366	1.039	0.309	0.605	0.396	1.001	1.003	0.002	0.2	0.00446	0.00292	0.00293
2.465	1.082	0.322	0.651	0.458	1.109	1.110	0.001	0.1	0.00442	0.00311	0.00311
2.563	1.126	0.335	0.698	0.534	1.232	1.233	0.000	0.0	0.00438	0.00335	0.00335
2.662	1.169	0.348	0.747	0.646	1.393	1.385	-0.009	-0.6	0.00435	0.00376	0.00371
2.760	1.212	0.361	0.797	0.792	1.590	1.584	-0.005	-0.3	0.00432	0.00429	0.00426
2.859	1.256	0.374	0.849	1.001	1.850	1.856	0.006	0.3	0.00428	0.00505	0.00508
2.958	1.299	0.387	0.902	1.300	2.202	2.220	0.018	0.8	0.00425	0.00613	0.00622
3.056	1.342	0.400	0.957	1.739	2.696	2.684	-0.012	-0.5	0.00423	0.00768	0.00763
3.155	1.386	0.413	1.013	2.243	3.256	3.249	-0.007	-0.2	0.00420	0.00930	0.00927
3.253	1.429	0.425	1.070	2.836	3.907	3.911	0.004	0.1	0.00417	0.01105	0.01107
3.352	1.472	0.438	1.129	3.522	4.652	4.658	0.006	0.1	0.00415	0.01293	0.01295
3.451	1.515	0.451	1.190	4.287	5.476	5.469	-0.008	-0.1	0.00412	0.01485	0.01482
3.549	1.559	0.464	1.251	5.056	6.308	6.310	0.003	0.0	0.00410	0.01656	0.01656

MIT PRATT PROJECT DELFT MODEL SERIES MODEL II-A (BASE KEEL) 1976
LWL= 5.250FT, LSW= 5.184 FT, WETTED SURFACE= 8.772 FT**2, DRAFT= 1.196 FT, DISP=89.344 LB

AVERAGE DELTA CT BETWEEN DOUBLE AND SINGLE SAND=.00048

RESIDUARY RESISTANCE COEFFICIENTS:

VBTL:	0.40000	0.60000	0.80000	1.00000	1.20000	1.40000	1.60000	1.80000
CR:	0.00057	0.00107	0.00164	0.00229	0.00363	0.00922	0.01729	0.01747
RR/DISP:	0.00013	0.00054	0.00147	0.00322	0.00736	0.02541	0.06229	0.07962

HEEL AND SIDE FORCE RESISTANCE COEFFICIENTS

C1:	1.6535
TE/T:	0.778
TE:	0.930

	1	2	3	4	5
V/RTL:	1.039	1.212	1.386	0.687	1.201
CPHI:	0.4736E-06	0.2523E-05	0.2101E-05		
CO:	0.5119E-02	0.9902E-02	0.2683E-01	0.1345E-02	0.9471E-02
RO:	1.062	1.673	3.410	0.409	1.630
RU:	1.069	1.681	3.334	0.424	1.621
EUP:	-0.006	-0.008	0.076	-0.015	0.009
EUP-PC:	-0.6	-0.5	2.3	-3.5	0.5

MIT PRATT PROJECT DELFT MODEL SERIES MODEL II-A (BASE KEEL) 1976
LWL= 5.250FT, LSM= 5.184 FT, WETTED SURFACE= 8.772 FT**2, DRAFT= 1.196 FT, DISP=89.344 LB

RUN	V/RTL	PHI	FH	*RU*	RO	EPC	RH	PRH	EPC	RT	PST	EBR	EPC
1677	1.039	10.0	0.904	1.069	1.062	-0.6	0.027	0.004	-84.2	1.089	1.067	-0.023	-2.1
1678	1.039	10.0	1.301	1.069	1.062	-0.6	0.044	0.025	-43.8	1.107	1.087	-0.019	-1.8
1679	1.039	10.0	3.020	1.069	1.062	-0.6	0.106	0.116	9.3	1.168	1.178	0.010	0.8
1680	1.212	10.0	2.998	1.681	1.673	-0.5	0.082	0.103	26.2	1.755	1.776	0.021	1.2
1681	1.212	10.0	1.310	1.681	1.673	-0.5	0.040	0.038	-5.2	1.713	1.711	-0.002	-0.1
1682	1.212	10.0	0.074	1.681	1.673	-0.5	0.040	0.023	-43.6	1.713	1.696	-0.017	-1.0
1683	1.039	20.0	1.975	1.069	1.062	-0.6	0.055	0.065	16.8	1.118	1.127	0.009	0.8
1684	1.039	20.0	4.605	1.069	1.062	-0.6	0.247	0.277	12.1	1.310	1.339	0.030	2.3
1685	1.039	20.0	3.062	1.069	1.062	-0.6	0.119	0.132	10.4	1.182	1.194	0.012	1.1
1686	1.212	20.0	2.839	1.681	1.673	-0.5	0.166	0.163	-1.8	1.839	1.836	-0.003	-0.2
1687	1.212	20.0	4.535	1.681	1.673	-0.5	0.285	0.275	-3.3	1.958	1.948	-0.009	-0.5
1688	1.212	20.0	1.663	1.681	1.673	-0.5	0.093	0.115	23.8	1.766	1.788	0.022	1.3
1689	1.212	20.0	2.907	1.681	1.673	-0.5	0.179	0.166	-7.1	1.852	1.839	-0.013	-0.7
1690	1.386	20.0	1.797	3.334	3.410	2.3	0.095	0.097	2.3	3.505	3.508	0.002	0.1
1691	1.386	20.0	4.594	3.334	3.410	2.3	0.225	0.221	-2.1	3.635	3.631	-0.005	-0.1
1692	1.386	20.0	3.005	3.334	3.410	2.3	0.135	0.137	1.9	3.545	3.548	0.003	0.1
1693	1.039	30.0	5.657	1.069	1.062	-0.6	0.421	0.430	2.1	1.484	1.492	0.009	0.6
1694	1.039	30.0	4.577	1.069	1.062	-0.6	0.300	0.295	-1.8	1.362	1.357	-0.005	-0.4
1695	1.039	30.0	3.539	1.069	1.062	-0.6	0.214	0.192	-10.6	1.276	1.254	-0.023	-1.8
1696	1.212	30.0	3.340	1.681	1.673	-0.5	0.265	0.303	14.5	1.938	1.976	0.038	2.0
1697	1.212	30.0	5.455	1.681	1.673	-0.5	0.488	0.471	-3.5	2.161	2.144	-0.017	-0.8
1698	1.212	30.0	4.396	1.681	1.673	-0.5	0.397	0.377	-5.1	2.070	2.050	-0.020	-1.0
1699	1.386	30.0	5.575	3.334	3.410	2.3	0.421	0.383	-9.1	3.832	3.793	-0.038	-1.0
1700	1.386	30.0	3.477	3.334	3.410	2.3	0.230	0.252	9.9	3.640	3.663	0.023	0.6
1701	1.386	30.0	4.475	3.334	3.410	2.3	0.291	0.307	5.4	3.702	3.717	0.016	0.4
1702	0.687	0.0	-0.679	0.424	0.409	-3.5	0.027	0.013	-52.7	0.437	0.422	-0.014	-3.3
1703	0.687	0.0	-1.228	0.424	0.409	-3.5	0.047	0.042	-10.4	0.456	0.451	-0.005	-1.1
1704	0.687	0.0	-1.865	0.424	0.409	-3.5	0.100	0.098	-2.5	0.509	0.507	-0.003	-0.5
1705	0.687	0.0	-2.485	0.424	0.409	-3.5	0.149	0.173	16.5	0.558	0.582	0.025	4.4
1706	0.687	0.0	-0.044	0.424	0.409	-3.5	0.010	0.000	-99.4	0.419	0.409	-0.010	-2.3
1707	0.687	0.0	0.558	0.424	0.409	-3.5	0.016	0.009	-46.6	0.425	0.418	-0.008	-1.8
1708	0.687	0.0	1.773	0.424	0.409	-3.5	0.074	0.088	19.7	0.483	0.497	0.014	3.0
1709	1.201	0.0	-1.177	1.621	1.630	0.5	-0.005	0.013	-335.8	1.625	1.643	0.018	1.1
1710	1.201	0.0	-2.458	1.621	1.630	0.5	0.067	0.055	-17.7	1.698	1.686	-0.012	-0.7
1711	1.201	0.0	-4.897	1.621	1.630	0.5	0.244	0.220	-9.8	1.874	1.850	-0.024	-1.3
1712	1.201	0.0	-3.596	1.621	1.630	0.5	0.107	0.119	10.8	1.737	1.749	0.0	0.7
1713	1.201	0.0	1.651	1.621	1.630	0.5	0.019	0.025	32.6	1.649	1.655	0.006	0.4
RMS						1.8			62.3			0.017	1.5

MIT PRATT PROJECT DELFT SERIES MODEL 11-B (BASE DRAFT) 1975
LWL= 5.249FT, LSM= 5.184 FT, WETTED SURFACE= 8.660 FT**2, DRAFT= 1.135 FT, DISP=89.033 LB

UPRIGHT RESISTANCE WITH DOUBLE SAND RMS ERROR= 0.009 LB 0.3 PERCENT

V-KTS	V/RLT	FN	RF	RR	RU-LB	*RU-LB*	ERROR	E-PC	CF	CR	*CR*
0.986	0.433	0.129	0.124	0.039	0.163	0.162	-0.001	-0.6	0.00533	0.00169	0.00164
1.183	0.520	0.155	0.171	0.060	0.231	0.233	0.001	0.6	0.00511	0.00180	0.00184
1.380	0.606	0.181	0.225	0.092	0.317	0.319	0.001	0.3	0.00494	0.00203	0.00205
1.577	0.693	0.206	0.285	0.134	0.419	0.420	0.001	0.3	0.00479	0.00224	0.00227
1.775	0.779	0.232	0.352	0.188	0.540	0.539	-0.001	-0.3	0.00467	0.00250	0.00248
1.972	0.866	0.258	0.425	0.254	0.679	0.676	-0.003	-0.4	0.00457	0.00273	0.00271
2.070	0.909	0.271	0.463	0.293	0.756	0.753	-0.003	-0.4	0.00452	0.00286	0.00283
2.169	0.953	0.284	0.504	0.334	0.838	0.837	-0.001	-0.1	0.00447	0.00297	0.00296
2.267	0.996	0.297	0.545	0.383	0.928	0.928	-0.000	-0.0	0.00443	0.00311	0.00311
2.366	1.039	0.309	0.588	0.437	1.025	1.028	0.003	0.3	0.00439	0.00326	0.00328
2.465	1.082	0.322	0.633	0.505	1.138	1.140	0.003	0.2	0.00436	0.00347	0.00349
2.563	1.126	0.335	0.679	0.589	1.268	1.271	0.003	0.2	0.00432	0.00374	0.00376
2.662	1.169	0.348	0.727	0.700	1.426	1.430	0.004	0.3	0.00429	0.00413	0.00415
2.760	1.212	0.361	0.776	0.858	1.634	1.635	0.001	0.1	0.00425	0.00471	0.00471
2.859	1.256	0.374	0.826	1.088	1.914	1.905	-0.009	-0.5	0.00422	0.00556	0.00552
2.958	1.299	0.387	0.878	1.384	2.262	2.258	-0.003	-0.2	0.00419	0.00661	0.00660
3.056	1.342	0.400	0.931	1.781	2.712	2.706	-0.006	-0.2	0.00417	0.00797	0.00794
3.155	1.386	0.413	0.986	2.271	3.256	3.255	-0.002	-0.1	0.00414	0.00954	0.00953
3.253	1.429	0.425	1.042	2.841	3.882	3.909	0.026	0.7	0.00411	0.01122	0.01132
3.352	1.472	0.438	1.099	3.571	4.669	4.669	-0.001	-0.0	0.00409	0.01328	0.01328
3.451	1.515	0.451	1.158	4.398	5.556	5.530	-0.026	-0.5	0.00406	0.01544	0.01535
3.549	1.559	0.464	1.218	5.253	6.471	6.482	0.012	0.2	0.00404	0.01743	0.01747

UPRIGHT RESISTANCE WITH SINGLE SAND RMS ERROR= 0.008 LB 0.4 PERCENT

V-KTS	V/RLT	FN	RF	RR	RU-LB	*RU-LB*	ERROR	E-PC	CF	CR	*CR*
0.986	0.433	0.129	0.124	-0.003	0.121	0.122	0.001	0.5	0.00533	-0.00011	-0.00009
1.183	0.520	0.155	0.171	0.014	0.185	0.185	-0.000	-0.2	0.00511	0.00042	0.00041
1.380	0.606	0.181	0.225	0.042	0.267	0.265	-0.001	-0.5	0.00494	0.00092	0.00089
1.577	0.693	0.206	0.285	0.081	0.366	0.364	-0.002	-0.5	0.00479	0.00136	0.00132
1.775	0.779	0.232	0.352	0.126	0.478	0.480	0.002	0.3	0.00467	0.00168	0.00170
1.972	0.866	0.258	0.425	0.184	0.608	0.613	0.004	0.7	0.00457	0.00198	0.00202
2.070	0.909	0.271	0.463	0.220	0.683	0.686	0.002	0.3	0.00452	0.00215	0.00217
2.169	0.953	0.284	0.504	0.257	0.761	0.764	0.004	0.5	0.00447	0.00228	0.00232
2.267	0.996	0.297	0.545	0.315	0.860	0.850	-0.010	-1.1	0.00443	0.00256	0.00248
2.366	1.039	0.309	0.588	0.357	0.946	0.945	-0.001	-0.1	0.00439	0.00267	0.00266
2.465	1.082	0.322	0.633	0.421	1.054	1.052	-0.001	-0.1	0.00436	0.00290	0.00289
2.563	1.126	0.335	0.679	0.503	1.182	1.180	-0.002	-0.1	0.00432	0.00320	0.00319
2.662	1.169	0.348	0.727	0.603	1.329	1.338	0.009	0.6	0.00429	0.00356	0.00361
2.760	1.212	0.361	0.776	0.763	1.539	1.541	0.002	0.1	0.00425	0.00419	0.00420
2.859	1.256	0.374	0.826	0.991	1.817	1.808	-0.009	-0.5	0.00422	0.00507	0.00502
2.958	1.299	0.387	0.878	1.276	2.154	2.156	0.002	0.1	0.00419	0.00610	0.00611
3.056	1.342	0.400	0.931	1.671	2.601	2.596	-0.006	-0.2	0.00417	0.00748	0.00745
3.155	1.386	0.413	0.986	2.147	3.133	3.134	0.001	0.0	0.00414	0.00902	0.00902
3.253	1.429	0.425	1.042	2.715	3.757	3.776	0.019	0.5	0.00411	0.01072	0.01080
3.352	1.472	0.438	1.099	3.425	4.524	4.521	-0.003	-0.1	0.00409	0.01274	0.01273
3.451	1.515	0.451	1.158	4.230	5.388	5.367	-0.021	-0.4	0.00406	0.01485	0.01478
3.549	1.559	0.464	1.218	5.074	6.292	6.303	0.011	0.2	0.00404	0.01684	0.01688

MIT PRATT PROJECT DELFT SERIES MODEL 11-B (BASE DRAFT) 1975
LWL= 5.249FT, LSM= 5.184 FT, WETTED SURFACE= 8.660 FT**2, DRAFT= 1.135 FT, DISP=89.033 LB

AVERAGE DELTA CT BETWEEN DOUBLE AND SINGLE SAND=.00055

RESIDUARY RESISTANCE COEFFICIENTS:

V/RTL:	0.40000	0.60000	0.80000	1.00000	1.20000	1.40000	1.60000	1.80000
CR:	0.00047	0.00094	0.00144	0.00203	0.00344	0.00901	0.01837	0.02493
RR/DISP:	0.00011	0.00047	0.00128	0.00283	0.00689	0.02460	0.06551	0.11250

KEEL AND SIDE FORCE RESISTANCE COEFFICIENTS

C1:	1.6057
TE/T:	0.789
TE:	0.896

	1	2	3	4	5	6
V/RTL:	1.039	1.212	1.386	1.559	0.686	1.201
CPHI:	0.3515E-06	0.2462E-05	0.2383E-05	-0.1552E-05		
CO:	0.4914E-02	0.9482E-02	0.2621E-01	0.6091E-01	0.1306E-02	0.9068E-02
KO:	1.026	1.620	3.319	6.640	0.397	1.570
KU:	1.028	1.635	3.255	6.482	0.411	1.576
KUP:	-0.002	-0.015	0.064	0.158	-0.015	-0.006
KUP-PC:	-0.2	-0.9	2.0	2.4	-3.6	-0.4

MIT PRATT PROJECT DELFT SERIES MODEL II-B (BASE DRAFT) 1975

LWL= 5.249FT, LSM= 5.184 FT, WETTED SURFACE= 8.660 FT**2, DRAFT= 1.135 FT, DISP=89.033 LB

RUN	V/RTL	PHI	PH	*RU*	RO	EPC	RM	PRM	EPC	PT	PRT	ERR	EPC
356	1.039	10.0	2.507	1.028	1.026	-0.2	0.087	0.086	-1.5	1.113	1.112	-0.001	-0.1
357	1.039	10.0	1.632	1.028	1.026	-0.2	0.046	0.038	-16.0	1.071	1.064	-0.007	-0.7
358	1.039	10.0	0.909	1.028	1.026	-0.2	0.024	0.014	-40.4	1.049	1.040	-0.010	-0.9
359	1.212	10.0	0.949	1.635	1.620	-0.9	0.038	0.031	-19.6	1.658	1.650	-0.007	-0.5
360	1.212	10.0	1.630	1.635	1.620	-0.9	0.047	0.048	1.6	1.667	1.667	0.001	0.0
361	1.212	10.0	2.494	1.635	1.620	-0.9	0.089	0.082	-7.4	1.709	1.702	-0.007	-0.4
362	1.386	10.0	2.458	3.255	3.319	2.0	0.050	0.066	32.1	3.369	3.385	0.016	0.5
363	1.386	10.0	1.661	3.255	3.319	2.0	0.043	0.042	-3.9	3.362	3.360	-0.002	-0.1
364	1.386	10.0	0.882	3.255	3.319	2.0	0.037	0.027	-26.7	3.355	3.346	-0.010	-0.3
365	1.559	10.0	0.994	6.482	6.640	2.4	0.033	-0.008	-124.3	6.674	6.632	-0.041	-0.6
366	1.559	10.0	1.773	6.482	6.640	2.4	-0.002	0.005	-305.0	6.639	6.645	0.007	0.1
367	1.559	10.0	2.579	6.482	6.640	2.4	-0.009	0.025	-384.3	6.632	6.666	0.034	0.5
368	1.039	20.0	3.397	1.028	1.026	-0.2	0.158	0.165	4.4	1.184	1.191	0.007	0.6
369	1.039	20.0	1.896	1.028	1.026	-0.2	0.065	0.060	-8.3	1.091	1.086	-0.005	-0.5
370	1.039	20.0	4.446	1.028	1.026	-0.2	0.246	0.274	11.1	1.272	1.300	0.027	2.2
371	1.212	20.0	4.322	1.635	1.620	-0.9	0.265	0.269	1.4	1.885	1.889	0.004	0.2
372	1.212	20.0	3.376	1.635	1.620	-0.9	0.190	0.198	4.2	1.810	1.818	0.008	0.4
373	1.212	20.0	1.954	1.635	1.620	-0.9	0.115	0.125	8.2	1.735	1.745	0.009	0.5
374	1.386	20.0	2.053	3.255	3.319	2.0	0.114	0.116	1.9	3.433	3.435	0.002	0.1
375	1.386	20.0	3.522	3.255	3.319	2.0	0.178	0.177	-0.5	3.497	3.496	-0.001	-0.0
376	1.386	20.0	4.502	3.255	3.319	2.0	0.244	0.235	-3.5	3.563	3.554	-0.009	-0.2
377	1.559	20.0	4.676	6.482	6.640	2.4	0.095	0.073	-22.8	6.735	6.714	-0.022	-0.3
378	1.559	20.0	3.432	6.482	6.640	2.4	0.015	0.014	-9.5	6.656	6.654	-0.001	-0.0
379	1.559	20.0	2.168	6.482	6.640	2.4	-0.051	-0.028	-45.5	6.590	6.613	0.023	0.4
380	1.039	30.0	5.061	1.028	1.026	-0.2	0.372	0.367	-1.4	1.393	1.392	-0.005	-0.4
381	1.039	30.0	3.699	1.028	1.026	-0.2	0.229	0.209	-8.6	1.254	1.235	-0.020	-1.6
382	1.039	30.0	6.464	1.028	1.026	-0.2	0.566	0.580	2.5	1.592	1.606	0.014	0.9
383	1.212	30.0	4.847	1.635	1.620	-0.9	0.422	0.425	0.8	2.042	2.045	0.004	0.2
384	1.212	30.0	6.138	1.635	1.620	-0.9	0.576	0.563	-2.3	2.196	2.183	-0.013	-0.6
385	1.212	30.0	3.587	1.635	1.620	-0.9	0.307	0.322	4.9	1.927	1.942	0.015	0.8
386	1.212	30.0	4.827	1.635	1.620	-0.9	0.428	0.423	-1.2	2.048	2.043	-0.005	-0.2
387	1.212	30.0	3.582	1.635	1.620	-0.9	0.320	0.322	0.5	1.940	1.942	0.001	0.1
388	1.212	30.0	6.145	1.635	1.620	-0.9	0.574	0.564	-1.7	2.194	2.184	-0.010	-0.5
389	1.386	30.0	6.212	3.255	3.319	2.0	0.522	0.478	-8.5	3.841	3.796	-0.044	-1.2
390	1.386	30.0	4.822	3.255	3.319	2.0	0.361	0.364	0.8	3.680	3.682	0.003	0.1
391	1.386	30.0	3.778	3.255	3.319	2.0	0.253	0.297	17.4	3.572	3.616	0.0 .	1.2
524	0.686	0.0	-0.004	0.411	0.397	-3.6	0.002	0.000	-100.0	0.399	0.397	-0.002	-0.6
525	0.686	0.0	1.188	0.411	0.397	-3.6	0.040	0.043	7.6	0.437	0.440	0.003	0.7
526	0.686	0.0	-1.358	0.411	0.397	-3.6	0.064	0.056	-12.7	0.461	0.453	-0.008	-1.8
527	0.686	0.0	-2.524	0.411	0.397	-3.6	0.179	0.193	8.2	0.575	0.590	0.015	2.5
528	0.686	0.0	2.487	0.411	0.397	-3.6	0.174	0.188	7.6	0.571	0.584	0.013	2.3
529	0.686	0.0	0.538	0.411	0.397	-3.6	0.016	0.009	-43.5	0.412	0.406	-0.007	-1.6
530	0.686	0.0	-0.622	0.411	0.397	-3.6	0.027	0.012	-55.9	0.423	0.408	-0.015	-3.5
531	0.686	0.0	1.814	0.411	0.397	-3.6	0.095	0.100	5.2	0.492	0.497	0.005	1.0
532	0.686	0.0	-1.854	0.411	0.397	-3.6	0.108	0.104	-3.6	0.505	0.501	-0.004	-0.8
533	1.201	0.0	2.520	1.576	1.570	-0.4	0.053	0.063	19.3	1.623	1.633	0.010	0.6
534	1.201	0.0	3.803	1.576	1.570	-0.4	0.156	0.143	-8.5	1.726	1.713	-0.013	-0.8
535	1.201	0.0	1.241	1.576	1.570	-0.4	0.026	0.015	-41.8	1.596	1.585	-0.011	-0.7
536	1.201	0.0	-0.049	1.576	1.570	-0.4	-0.002	0.000	-100.9	1.568	1.570	0.002	0.2
537	1.201	0.0	-1.213	1.576	1.570	-0.4	0.017	0.015	-16.3	1.587	1.585	-0.003	-0.2
538	1.201	0.0	-2.454	1.576	1.570	-0.4	0.048	0.060	23.4	1.618	1.630	0.011	0.7
539	1.201	0.0	-3.726	1.576	1.570	-0.4	0.134	0.137	2.3	1.704	1.707	0.003	0.2
RMS						1.9			75.0			0.015	1.0

MIT PRATT PROJECT DELFT SERIES MODEL III-A (BASE KEEL) 1975 & 1976
LWL= 5.2497T, LSW= 5.206 FT, WETTED SURFACE= 9.759 FT**2, DRAFT= 1.086 FT, DISP=88.987 LB

UPRIGHT RESISTANCE WITH DOUBLE SAND RMS ERROR= 0.007 LB 0.6 PERCENT

V-KTS	V/RLT	FN	RF	RR	RU-LB	*RU-LB*	ERROR	E-PC	CF	CR	*CR*
0.986	0.432	0.129	0.141	0.042	0.183	0.185	0.002	1.0	0.00537	0.00161	0.00168
1.183	0.518	0.154	0.194	0.075	0.269	0.266	-0.003	-1.1	0.00515	0.00198	0.00190
1.380	0.605	0.180	0.255	0.113	0.368	0.365	-0.003	-0.8	0.00497	0.00220	0.00214
1.577	0.691	0.206	0.324	0.159	0.483	0.484	0.001	0.2	0.00483	0.00237	0.00239
1.775	0.778	0.232	0.399	0.218	0.617	0.624	0.006	1.0	0.00471	0.00257	0.00264
1.972	0.864	0.257	0.482	0.301	0.783	0.787	0.004	0.6	0.00460	0.00287	0.00291
2.070	0.907	0.270	0.526	0.349	0.875	0.879	0.004	0.4	0.00455	0.00302	0.00305
2.169	0.951	0.283	0.572	0.414	0.985	0.978	-0.007	-0.7	0.00451	0.00326	0.00321
2.267	0.994	0.296	0.619	0.481	1.100	1.086	-0.014	-1.3	0.00446	0.00347	0.00337
2.366	1.037	0.309	0.668	0.545	1.213	1.205	-0.008	-0.7	0.00442	0.00361	0.00356
2.465	1.080	0.322	0.718	0.611	1.329	1.335	0.006	0.5	0.00439	0.00373	0.00377
2.563	1.123	0.335	0.771	0.702	1.473	1.484	0.012	0.8	0.00435	0.00396	0.00403
2.662	1.167	0.347	0.825	0.822	1.647	1.661	0.014	0.8	0.00432	0.00431	0.00438
3.155	1.383	0.412	1.118	2.308	3.426	3.426	0.000	0.0	0.00417	0.00860	0.00860
2.760	1.210	0.360	0.880	0.996	1.876	1.876	0.000	0.0	0.00428	0.00485	0.00485
2.859	1.253	0.373	0.937	1.219	2.156	2.148	-0.008	-0.4	0.00425	0.00553	0.00550
2.958	1.296	0.386	0.996	1.504	2.500	2.492	-0.008	-0.3	0.00422	0.00638	0.00634
3.056	1.339	0.399	1.056	1.867	2.923	2.916	-0.008	-0.3	0.00419	0.00742	0.00739
3.253	1.426	0.425	1.182	2.840	4.021	4.028	0.007	0.2	0.00414	0.00995	0.00999
3.352	1.469	0.437	1.247	3.469	4.716	4.723	0.007	0.1	0.00412	0.01145	0.01148
3.451	1.512	0.450	1.313	4.196	5.509	5.507	-0.002	-0.0	0.00409	0.01307	0.01307
3.549	1.555	0.463	1.382	4.996	6.378	6.376	-0.003	-0.0	0.00407	0.01471	0.01471

UPRIGHT RESISTANCE WITH SINGLE SAND RMS ERROR= 0.011 LB 1.1 PERCENT

V-KTS	V/RLT	FN	RF	RR	RU-LB	*RU-LB*	ERROR	E-PC	CF	CR	*CR*
0.986	0.432	0.129	0.141	0.031	0.172	0.175	0.003	2.0	0.00537	0.00119	0.00132
1.183	0.518	0.154	0.194	0.064	0.258	0.254	-0.004	-1.6	0.00515	0.00169	0.00158
1.380	0.605	0.180	0.255	0.102	0.357	0.349	-0.008	-2.2	0.00497	0.00198	0.00183
1.577	0.691	0.206	0.324	0.137	0.461	0.463	0.002	0.5	0.00483	0.00204	0.00208
1.775	0.778	0.232	0.399	0.191	0.591	0.596	0.005	0.9	0.00471	0.00225	0.00231
1.972	0.864	0.257	0.482	0.254	0.736	0.749	0.013	1.7	0.00460	0.00243	0.00255
2.070	0.907	0.270	0.526	0.299	0.825	0.834	0.010	1.2	0.00455	0.00258	0.00267
2.169	0.951	0.283	0.572	0.359	0.930	0.926	-0.004	-0.4	0.00451	0.00283	0.00280
2.267	0.994	0.296	0.619	0.426	1.045	1.026	-0.019	-1.8	0.00446	0.00307	0.00294
2.366	1.037	0.309	0.668	0.485	1.153	1.137	-0.016	-1.4	0.00442	0.00322	0.00311
2.465	1.080	0.322	0.718	0.538	1.257	1.260	0.003	0.3	0.00439	0.00329	0.00331
2.563	1.123	0.335	0.771	0.616	1.387	1.402	0.015	1.1	0.00435	0.00348	0.00356
2.662	1.167	0.347	0.825	0.734	1.559	1.572	0.014	0.9	0.00432	0.00384	0.00391
2.760	1.210	0.360	0.880	0.917	1.797	1.784	-0.013	-0.7	0.00428	0.00446	0.00440
2.859	1.253	0.373	0.937	1.131	2.068	2.053	-0.015	-0.7	0.00425	0.00513	0.00506
2.958	1.296	0.386	0.996	1.385	2.381	2.395	0.014	0.6	0.00422	0.00587	0.00593
3.056	1.339	0.399	1.056	1.757	2.813	2.819	0.006	0.2	0.00419	0.00698	0.00700
3.155	1.383	0.412	1.118	2.211	3.329	3.330	0.001	0.0	0.00417	0.00824	0.00825
3.253	1.426	0.425	1.182	2.767	3.949	3.932	-0.017	-0.4	0.00414	0.00970	0.00964
3.352	1.469	0.437	1.247	3.365	4.612	4.623	0.011	0.2	0.00412	0.01111	0.01115
3.451	1.512	0.450	1.313	4.088	5.401	5.399	-0.002	-0.0	0.00409	0.01274	0.01273
3.549	1.555	0.463	1.382	4.868	6.250	6.250	0.000	0.0	0.00407	0.01434	0.01434

MIT PRATT PROJECT DELFT SERIES MODEL III-A (BASE KEEL) 1975 & 1976
LWL= 5.249FT, LSM= 5.206 FT, WETTED SURFACE= 9.759 FT**2, DRAFT= 1.086 FT, DISP=88.987 LB

AVERAGE DELTA CT BETWEEN DOUBLE AND SINGLE SAND=.00044

RESIDUARY RESISTANCE COEFFICIENTS:

VRTL:	0.40000	0.60000	0.80000	1.00000	1.20000	1.40000	1.60000	1.80000
CR:	0.00073	0.00125	0.00184	0.00252	0.00385	0.00826	0.01552	0.02109
RR/DISP:	0.00018	0.00071	0.00185	0.00298	0.00876	0.02555	0.06267	0.10780

HEEL AND SIDE FORCE RESISTANCE COEFFICIENTS

C1:	1.7824
TL/T:	0.749
TE:	0.813

	1	2	3	4
V/RTL:	1.037	1.210	1.383	0.684
CPHI:	0.2292E-05	0.4919E-05	0.7406E-05	
CO:	0.5234E-02	0.1085E-01	0.2635E-01	0.1509E-02
AO:	1.134	1.845	3.463	0.452
RU:	1.205	1.876	3.426	0.474
EUP:	-0.071	-0.031	0.037	-0.021
EUP-PC:	-5.9	-1.7	1.1	-4.5

MIT PRATT PROJECT DELFT SERIES MODEL III-A (BASE KEEL) 1975 & 1976
LWL= 5.249FT, LSM= 5.206 FT, WETTED SURFACE= 9.759 FT**2, DRAFT= 1.086 FT, DISP=88.987 LB

RUN	V/RTL	PHI	PH	*RU*	RO	EPC	RH	PRH	EPC	RT	PRT	ERR	EPC
429	1.037	10.0	4.135	1.205	1.134	-5.9	0.319	0.294	-7.8	1.453	1.428	-0.025	-1.7
430	1.037	10.0	2.763	1.205	1.134	-5.9	0.196	0.143	-27.2	1.329	1.276	-0.053	-4.0
431	1.037	10.0	1.621	1.205	1.134	-5.9	0.116	0.062	-46.4	1.250	1.196	-0.054	-4.3
432	1.037	10.0	-0.076	1.205	1.134	-5.9	0.072	0.020	-71.7	1.206	1.154	-0.052	-4.3
433	1.210	10.0	1.493	1.876	1.845	-1.7	0.093	0.070	-24.5	1.938	1.915	-0.023	-1.2
434	1.210	10.0	2.738	1.876	1.845	-1.7	0.174	0.132	-24.3	2.019	1.977	-0.042	-2.1
435	1.210	10.0	4.439	1.876	1.845	-1.7	0.333	0.276	-17.2	2.178	2.121	-0.057	-2.6
436	1.037	20.0	4.777	1.205	1.134	-5.9	0.388	0.447	15.4	1.521	1.581	0.060	3.9
437	1.037	20.0	3.543	1.205	1.134	-5.9	0.240	0.283	17.8	1.374	1.416	0.043	3.1
438	1.037	20.0	6.565	1.205	1.134	-5.9	0.676	0.772	14.1	1.810	1.906	0.096	5.3
439	1.037	20.0	3.515	1.205	1.134	-5.9	0.233	0.280	19.8	1.367	1.413	0.046	3.4
440	1.037	20.0	4.760	1.205	1.134	-5.9	0.394	0.445	12.8	1.528	1.578	0.050	3.3
441	1.210	20.0	3.306	1.876	1.845	-1.7	0.249	0.304	21.8	2.094	2.149	0.054	2.6
442	1.210	20.0	6.088	1.876	1.845	-1.7	0.565	0.611	8.3	2.410	2.457	0.047	1.9
443	1.210	20.0	4.718	1.876	1.845	-1.7	0.397	0.437	10.1	2.242	2.282	0.040	1.8
444	1.210	20.0	2.299	1.876	1.845	-1.7	0.183	0.237	29.6	2.028	2.082	0.054	2.7
445	1.383	20.0	4.631	3.426	3.463	1.1	0.461	0.457	-0.9	3.924	3.920	-0.004	-0.1
446	1.383	20.0	6.053	3.426	3.463	1.1	0.618	0.594	-3.9	4.081	4.057	-0.024	-0.6
447	1.383	20.0	3.402	3.426	3.463	1.1	0.340	0.368	8.2	3.803	3.831	0.028	0.7
448	1.037	30.0	6.667	1.205	1.134	-5.9	0.952	0.896	-5.9	2.086	2.029	-0.056	-2.7
449	1.037	30.0	5.532	1.205	1.134	-5.9	0.701	0.674	-3.8	1.834	1.807	-0.027	-1.5
450	1.037	30.0	7.411	1.205	1.134	-5.9	1.091	1.064	-2.5	2.225	2.197	-0.027	-1.2
451	1.210	30.0	6.140	1.876	1.845	-1.7	0.860	0.838	-2.6	2.705	2.683	-0.022	-0.8
452	1.210	30.0	5.041	1.876	1.845	-1.7	0.646	0.693	7.3	2.491	2.538	0.047	1.9
453	1.210	30.0	8.243	1.876	1.845	-1.7	1.292	1.194	-7.6	3.137	3.039	-0.098	-3.1
454	1.383	30.0	7.968	3.426	3.463	1.1	1.284	1.165	-9.2	4.747	4.629	-0.118	-2.5
455	1.383	30.0	6.346	3.426	3.463	1.1	0.937	0.956	2.0	4.401	4.419	0.019	0.4
456	1.383	30.0	4.824	3.426	3.463	1.1	0.704	0.803	14.1	4.167	4.266	0.099	2.4
513	0.684	0.0	-0.024	0.474	0.452	-4.5	0.030	0.000	-99.9	0.483	0.452	-0.030	-6.3
514	0.684	0.0	-0.293	0.474	0.452	-4.5	0.026	0.003	-87.8	0.478	0.456	-0.023	-4.8
515	0.684	0.0	-0.723	0.474	0.452	-4.5	0.044	0.019	-55.9	0.496	0.472	-0.024	-4.9
516	0.684	0.0	-1.446	0.474	0.452	-4.5	0.077	0.077	0.3	0.529	0.529	0.000	0.0
517	0.684	0.0	-1.900	0.474	0.452	-4.5	0.127	0.133	4.3	0.580	0.585	0.005	0.9
518	0.684	0.0	-2.637	0.474	0.452	-4.5	0.202	0.256	26.4	0.655	0.708	0.053	8.2
519	0.684	0.0	0.379	0.474	0.452	-4.5	0.022	0.005	-75.5	0.474	0.458	-0.016	-3.4
520	0.684	0.0	0.575	0.474	0.452	-4.5	0.022	0.012	-43.6	0.474	0.465	-0.009	-2.0
521	0.684	0.0	1.312	0.474	0.452	-4.5	0.061	0.063	3.3	0.514	0.516	0.002	0.4
522	0.684	0.0	1.936	0.474	0.452	-4.5	0.132	0.138	4.6	0.584	0.590	0.006	1.0
523	0.684	0.0	2.599	0.474	0.452	-4.5	0.194	0.249	25.6	0.650	0.701	0.051	7.8
1496	0.684	0.0	-0.564	0.474	0.452	-4.5	0.030	0.012	-61.5	0.483	0.464	-0.019	-3.9
1497	0.684	0.0	-1.274	0.474	0.452	-4.5	0.059	0.060	1.1	0.511	0.512	0.001	0.1
1498	0.684	0.0	-1.960	0.474	0.452	-4.5	0.127	0.141	10.9	0.580	0.594	0.014	2.4
1499	0.684	0.0	-2.520	0.474	0.452	-4.5	0.202	0.234	15.4	0.655	0.686	0.031	4.8
1500	0.684	0.0	-3.206	0.474	0.452	-4.5	0.291	0.378	30.1	0.743	0.830	0.087	11.8
1501	0.684	0.0	0.018	0.474	0.452	-4.5	0.013	0.000	-99.9	0.465	0.452	-0.013	-2.7
1502	0.684	0.0	0.677	0.474	0.452	-4.5	0.055	0.017	-69.2	0.507	0.469	-0.038	-7.5
1503	0.684	0.0	1.230	0.474	0.452	-4.5	0.086	0.056	-34.9	0.538	0.508	-0.030	-5.5
1504	0.684	0.0	1.876	0.474	0.452	-4.5	0.141	0.129	-7.9	0.593	0.582	-0.011	-1.9
1505	0.684	0.0	0.410	0.474	0.452	-4.5	0.044	0.006	-85.8	0.496	0.459	-0.037	-7.5
RMS						4.2			38.1			0.047	4.0

MIT PRATT PROJECT DELFT SERIES MODEL III-B (BASE DRAFT) 1975 & 1976
LWL= 5.249FT, LSM= 5.206 FT, WETTED SURFACE= 9.856 FT**2, DRAFT= 1.135 FT, DISP=89.298 LB

UPRIGHT RESISTANCE WITH DOUBLE SAND RMS ERROR= 0.016 LB 0.8 PERCENT

V-KTS	V/RLT	FN	RF	RR	RU-LB	*RU-LB*	ERROR	E-PC	CF	CR	*CR*
0.986	0.432	0.129	0.141	0.059	0.201	0.200	-0.001	-0.5	0.00534	0.00224	0.00220
1.183	0.518	0.154	0.195	0.089	0.284	0.285	0.000	0.1	0.00512	0.00234	0.00235
1.380	0.605	0.180	0.257	0.129	0.386	0.387	0.001	0.3	0.00495	0.00249	0.00252
1.577	0.691	0.206	0.325	0.180	0.505	0.508	0.003	0.6	0.00480	0.00265	0.00270
1.775	0.778	0.232	0.401	0.242	0.644	0.650	0.006	0.9	0.00468	0.00283	0.00290
1.972	0.864	0.257	0.484	0.336	0.820	0.815	-0.005	-0.6	0.00457	0.00317	0.00313
2.070	0.907	0.270	0.528	0.389	0.917	0.909	-0.008	-0.9	0.00453	0.00333	0.00326
2.169	0.951	0.283	0.574	0.444	1.019	1.010	-0.008	-0.8	0.00448	0.00347	0.00340
2.267	0.994	0.296	0.622	0.505	1.127	1.121	-0.005	-0.5	0.00444	0.00361	0.00357
2.366	1.037	0.309	0.671	0.579	1.250	1.243	-0.007	-0.6	0.00440	0.00380	0.00375
2.465	1.080	0.322	0.722	0.656	1.378	1.378	0.000	0.0	0.00436	0.00397	0.00397
2.563	1.123	0.335	0.774	0.736	1.510	1.532	0.022	1.4	0.00433	0.00411	0.00423
2.662	1.167	0.347	0.828	0.847	1.676	1.713	0.037	2.2	0.00429	0.00439	0.00458
2.760	1.210	0.360	0.884	1.043	1.927	1.933	0.006	0.3	0.00426	0.00503	0.00505
2.859	1.253	0.373	0.942	1.279	2.220	2.207	-0.013	-0.6	0.00423	0.00574	0.00569
2.958	1.296	0.386	1.001	1.574	2.575	2.551	-0.024	-0.9	0.00420	0.00661	0.00651
3.056	1.339	0.399	1.061	1.937	2.998	2.972	-0.026	-0.9	0.00417	0.00762	0.00751
3.155	1.383	0.412	1.124	2.360	3.483	3.476	-0.007	-0.2	0.00415	0.00871	0.00868
3.253	1.426	0.425	1.187	2.876	4.063	4.069	0.006	0.1	0.00412	0.00998	0.01000
3.352	1.469	0.437	1.253	3.474	4.727	4.751	0.024	0.5	0.00410	0.01136	0.01144
3.451	1.512	0.450	1.320	4.176	5.496	5.522	0.025	0.5	0.00407	0.01288	0.01296
3.549	1.555	0.463	1.388	5.012	6.400	6.375	-0.026	-0.4	0.00405	0.01461	0.01454

UPRIGHT RESISTANCE WITH SINGLE SAND RMS ERROR= 0.016 LB 0.9 PERCENT

V-KTS	V/RLT	FN	RF	RR	RU-LB	*RU-LB*	ERROR	E-PC	CF	CR	*CR*
0.986	0.432	0.129	0.141	0.048	0.190	0.191	0.001	0.7	0.00534	0.00183	0.00187
1.183	0.518	0.154	0.195	0.080	0.276	0.273	-0.003	-1.0	0.00512	0.00211	0.00204
1.380	0.605	0.180	0.257	0.118	0.375	0.371	-0.003	-0.9	0.00495	0.00228	0.00221
1.577	0.691	0.206	0.325	0.155	0.481	0.487	0.007	1.4	0.00480	0.00229	0.00239
1.775	0.778	0.232	0.401	0.216	0.617	0.621	0.004	0.7	0.00468	0.00252	0.00257
1.972	0.864	0.257	0.484	0.293	0.774	0.777	0.003	0.4	0.00457	0.00274	0.00276
2.070	0.907	0.270	0.528	0.338	0.866	0.864	-0.003	-0.3	0.00453	0.00290	0.00287
2.169	0.951	0.283	0.574	0.391	0.966	0.958	-0.008	-0.8	0.00448	0.00306	0.00300
2.267	0.994	0.296	0.622	0.448	1.069	1.061	-0.008	-0.7	0.00444	0.00320	0.00314
2.366	1.037	0.309	0.671	0.520	1.191	1.175	-0.015	-1.3	0.00440	0.00341	0.00331
2.465	1.080	0.322	0.722	0.583	1.305	1.303	-0.002	-0.2	0.00436	0.00353	0.00351
2.563	1.123	0.335	0.774	0.650	1.424	1.450	0.025	1.8	0.00433	0.00363	0.00378
2.662	1.167	0.347	0.828	0.759	1.587	1.625	0.037	2.4	0.00429	0.00393	0.00413
2.760	1.210	0.360	0.884	0.966	1.850	1.840	-0.010	-0.5	0.00426	0.00465	0.00461
2.859	1.253	0.373	0.942	1.190	2.132	2.112	-0.020	-0.9	0.00423	0.00535	0.00526
2.958	1.296	0.386	1.001	1.455	2.456	2.455	-0.001	-0.1	0.00420	0.00611	0.00610
3.056	1.339	0.399	1.061	1.825	2.886	2.876	-0.010	-0.4	0.00417	0.00717	0.00713
3.155	1.383	0.412	1.124	2.263	3.386	3.381	-0.006	-0.2	0.00415	0.00835	0.00833
3.253	1.426	0.425	1.187	2.805	3.993	3.973	-0.019	-0.5	0.00412	0.00973	0.00967
3.352	1.469	0.437	1.253	3.373	4.625	4.652	0.027	0.6	0.00410	0.01102	0.01111
3.451	1.512	0.450	1.320	4.068	5.388	5.414	0.026	0.5	0.00407	0.01255	0.01263
3.549	1.555	0.463	1.388	4.864	6.272	6.250	-0.023	-0.4	0.00405	0.01424	0.01417

MIT PRATT PROJECT DELFT SERIES MODEL III-B (BASE DRAFT) 1975 & 1976
LWL= 5.249FT, LSM= 5.206 FT, WETTED SURFACE= 9.856 FT**2, DRAFT= 1.135 FT, DISP=89.298 LB

AVERAGE DELTA CT BETWEEN DOUBLE AND SINGLE SAND=.00043

RESIDUARY RESISTANCE COEFFICIENTS:

VRTL:	0.40000	0.60000	0.80000	1.00000	1.20000	1.40000	1.60000	1.80000
CR:	0.00129	0.00164	0.00209	0.00273	0.00407	0.00833	0.01531	0.02087
RR/DISP:	0.00033	0.00094	0.00212	0.00433	0.00931	0.02592	0.06220	0.10736

HEEL AND SIDE FORCE RESISTANCE COEFFICIENTS

C1:	1.7859
TR/T:	0.748
TR:	0.849

	1	2	3	4	5	6
V/RTL:	1.037	1.210	1.383	0.684	1.199	1.199
CPdI:	0.2720E-05	0.4462E-05	0.5492E-05			
CO:	0.5514E-02	0.1146E-01	0.2801E-01	0.1798E-02	0.1142E-01	0.1121E-01
RO:	1.163	1.908	3.625	0.480	1.890	1.871
RO:	1.243	1.933	3.476	0.498	1.871	1.876
EUP:	-0.080	-0.025	0.148	-0.017	0.019	-0.004
EUP-PC:	-6.4	-1.3	4.3	-3.5	1.0	-0.2

MIT PRATT PROJECT DELFT SERIES MODEL III-B (BASE DRAFT) 1975 & 1976
LWL= 5.249FT, LSM= 5.206 FT, WETTED SURFACE= 9.856 FT**2, DRAFT= 1.135 FT, DISP=89.298 LB

RUN	V/RTL	PHI	PH	*RU*	RO	EPC	RM	PRM	EPC	RT	PMT	ERR	EPC
398	1.037	10.0	1.457	1.243	1.163	-6.4	0.100	0.055	-44.5	1.263	1.219	-0.045	-3.5
399	1.037	10.0	3.062	1.243	1.163	-6.4	0.206	0.162	-21.3	1.369	1.325	-0.044	-3.2
400	1.037	10.0	4.446	1.243	1.163	-6.4	0.336	0.315	-6.3	1.499	1.478	-0.021	-1.4
401	1.210	10.0	4.045	1.933	1.908	-1.3	0.255	0.217	-15.0	2.163	2.124	-0.038	-1.8
402	1.210	10.0	3.060	1.933	1.908	-1.3	0.134	0.141	5.5	2.042	2.049	0.007	0.4
403	1.210	10.0	1.350	1.933	1.908	-1.3	0.074	0.060	-19.6	1.982	1.967	-0.015	-0.7
404	1.210	10.0	4.321	1.933	1.908	-1.3	0.293	0.241	-14.9	2.191	2.149	-0.042	-1.9
405	1.210	10.0	2.968	1.933	1.908	-1.3	0.153	0.135	-12.0	2.061	2.043	-0.018	-0.9
406	1.210	10.0	1.334	1.933	1.908	-1.3	0.063	0.059	-6.3	1.971	1.967	-0.004	-0.2
407	1.037	20.0	4.981	1.243	1.163	-6.4	0.420	0.462	10.0	1.583	1.625	0.042	2.7
408	1.037	20.0	3.873	1.243	1.163	-6.4	0.281	0.318	13.1	1.444	1.481	0.037	2.5
409	1.037	20.0	6.365	1.243	1.163	-6.4	0.596	0.692	16.2	1.759	1.856	0.096	5.5
410	1.210	20.0	6.159	1.933	1.908	-1.3	0.502	0.569	13.4	2.410	2.477	0.067	2.8
411	1.210	20.0	5.157	1.933	1.908	-1.3	0.409	0.446	9.1	2.317	2.354	0.037	1.6
412	1.210	20.0	3.578	1.933	1.908	-1.3	0.226	0.298	31.6	2.134	2.206	0.071	3.3
413	1.383	20.0	3.402	3.476	3.625	4.3	0.229	0.292	27.4	3.854	3.917	0.063	1.6
414	1.383	20.0	4.732	3.476	3.625	4.3	0.377	0.381	1.2	4.001	4.006	0.004	0.1
415	1.383	20.0	5.943	3.476	3.625	4.3	0.555	0.488	-12.1	4.180	4.113	-0.067	-1.6
416	1.037	30.0	6.385	1.243	1.163	-6.4	0.861	0.818	-5.0	2.024	1.981	-0.043	-2.1
417	1.037	30.0	4.595	1.243	1.163	-6.4	0.521	0.529	1.5	1.684	1.692	0.008	0.5
418	1.037	30.0	7.344	1.243	1.163	-6.4	1.041	1.011	-2.9	2.205	2.174	-0.030	-1.4
419	1.210	30.0	6.359	1.933	1.908	-1.3	0.817	0.795	-2.7	2.725	2.703	-0.022	-0.8
420	1.210	30.0	4.600	1.933	1.908	-1.3	0.544	0.587	8.0	2.452	2.495	0.043	1.8
421	1.210	30.0	7.698	1.933	1.908	-1.3	1.086	0.998	-8.1	2.994	2.906	-0.088	-2.9
422	1.383	30.0	6.334	3.476	3.625	4.3	0.774	0.773	-0.1	4.398	4.398	-0.001	-0.0
423	1.383	30.0	7.800	3.476	3.625	4.3	1.007	0.944	-6.3	4.632	4.569	-0.063	-1.4
424	1.383	30.0	4.778	3.476	3.625	4.3	0.566	0.630	11.3	4.191	4.255	0.064	1.5
1507	0.684	0.0	-0.293	0.498	0.480	-3.5	0.023	0.003	-87.1	0.503	0.483	-0.020	-3.9
1508	0.684	0.0	-0.723	0.498	0.480	-3.5	0.040	0.018	-56.1	0.520	0.498	-0.023	-4.3
1509	0.684	0.0	-1.446	0.498	0.480	-3.5	0.073	0.071	-3.7	0.553	0.551	-0.003	-0.5
1510	0.684	0.0	-1.900	0.498	0.480	-3.5	0.124	0.122	-1.7	0.604	0.602	-0.002	-0.4
1511	0.684	0.0	-2.637	0.498	0.480	-3.5	0.199	0.235	17.9	0.679	0.715	0.036	5.2
1512	0.684	0.0	0.379	0.498	0.480	-3.5	0.018	0.005	-73.3	0.498	0.485	-0.013	-2.7
1513	0.684	0.0	0.575	0.498	0.480	-3.5	0.018	0.011	-38.4	0.498	0.491	-0.007	-1.4
1514	0.684	0.0	1.312	0.498	0.480	-3.5	0.058	0.058	0.4	0.538	0.538	0.000	0.0
1515	0.684	0.0	1.936	0.498	0.480	-3.5	0.128	0.126	-1.5	0.608	0.607	-0.0	-0.3
1516	0.684	0.0	2.599	0.498	0.480	-3.5	0.195	0.228	17.2	0.675	0.708	0.033	5.0
1517	1.199	0.0	0.075	1.871	1.890	1.0	-0.000	0.000	-120.2	1.889	1.890	0.000	0.0
1518	1.199	0.0	-1.612	1.871	1.890	1.0	0.046	0.029	-37.9	1.936	1.918	-0.017	-0.9
1519	1.199	0.0	-2.833	1.871	1.890	1.0	0.112	0.088	-21.3	2.002	1.978	-0.024	-1.2
1520	1.199	0.0	-4.171	1.876	1.871	-0.2	0.214	0.191	-10.8	2.086	2.063	-0.023	-1.1
1521	1.199	0.0	-5.190	1.871	1.890	1.0	0.308	0.296	-3.9	2.198	2.186	-0.012	-0.6
1522	1.199	0.0	-6.759	1.871	1.890	1.0	0.456	0.503	10.2	2.346	2.392	0.046	2.0
1523	1.199	0.0	1.195	1.871	1.890	1.0	-0.005	0.016	-433.0	1.885	1.905	0.020	1.1
1524	1.199	0.0	2.610	1.871	1.890	1.0	0.088	0.075	-14.7	1.978	1.965	-0.013	-0.7
1525	1.199	0.0	4.019	1.871	1.890	1.0	0.176	0.178	0.9	2.066	2.067	0.002	0.1
1526	1.199	0.0	5.254	1.871	1.890	1.0	0.306	0.304	-0.8	2.196	2.193	-0.003	-0.1
1527	1.199	0.0	6.532	1.876	1.871	-0.2	0.446	0.469	5.2	2.317	2.340	0.023	1.0
RMS						3.6			69.1			0.038	2.2

MIT PRATT PROJECT DELFT SERIES MODEL IV-A (BASE KEEL) 1976
LWL= 5.249FT, LSM= 5.203 FT, WETTED SURFACE= 8.484 FT**2, DRAFT= 1.105 FT, DISP=74.462 LB

UPRIGHT RESISTANCE WITH DOUBLE SAND RMS ERROR= 0.005 LB 0.5 PERCENT

V-KTS	V/RLT	FN	RF	RR	RU-LB	*RU-LB*	ERROR	E-PC	CF	CR	*CR*
0.986	0.432	0.129	0.121	0.047	0.168	0.168	0.000	0.0	0.00530	0.00206	0.00207
1.183	0.519	0.154	0.167	0.072	0.238	0.239	0.000	0.2	0.00508	0.00218	0.00220
1.380	0.605	0.180	0.219	0.107	0.326	0.323	-0.003	-0.9	0.00491	0.00240	0.00234
1.577	0.692	0.206	0.278	0.143	0.421	0.423	0.002	0.5	0.00476	0.00246	0.00250
1.775	0.778	0.232	0.343	0.193	0.536	0.539	0.003	0.6	0.00464	0.00262	0.00266
1.972	0.864	0.257	0.413	0.259	0.672	0.673	0.001	0.1	0.00454	0.00284	0.00285
2.070	0.908	0.270	0.451	0.298	0.750	0.749	-0.001	-0.1	0.00449	0.00297	0.00296
2.169	0.951	0.283	0.490	0.343	0.833	0.830	-0.004	-0.4	0.00445	0.00311	0.00308
2.267	0.994	0.296	0.531	0.393	0.924	0.918	-0.006	-0.6	0.00441	0.00326	0.00322
2.366	1.037	0.309	0.573	0.450	1.023	1.015	-0.008	-0.8	0.00437	0.00343	0.00337
2.465	1.080	0.322	0.616	0.499	1.116	1.122	0.006	0.6	0.00433	0.00351	0.00355
2.563	1.124	0.335	0.661	0.569	1.230	1.244	0.014	1.1	0.00430	0.00370	0.00379
2.662	1.167	0.347	0.707	0.675	1.382	1.389	0.007	0.5	0.00426	0.00407	0.00411
2.760	1.210	0.360	0.755	0.817	1.572	1.568	-0.004	-0.2	0.00423	0.00458	0.00455
2.859	1.253	0.373	0.804	0.995	1.799	1.796	-0.003	-0.2	0.00420	0.00520	0.00518
2.958	1.297	0.386	0.855	1.240	2.094	2.086	-0.008	-0.4	0.00417	0.00605	0.00601
3.056	1.340	0.399	0.906	1.541	2.447	2.445	-0.002	-0.1	0.00414	0.00704	0.00703
3.155	1.383	0.412	0.960	1.920	2.879	2.877	-0.002	-0.1	0.00412	0.00823	0.00822
3.253	1.426	0.425	1.014	2.366	3.380	3.383	0.003	0.1	0.00409	0.00954	0.00955
3.352	1.469	0.438	1.070	2.887	3.957	3.962	0.005	0.1	0.00407	0.01097	0.01099
3.451	1.513	0.450	1.127	3.478	4.606	4.609	0.003	0.1	0.00404	0.01247	0.01248
3.549	1.556	0.463	1.186	4.129	5.315	5.311	-0.004	-0.1	0.00402	0.01400	0.01398

UPRIGHT RESISTANCE WITH SINGLE SAND RMS ERROR= 0.006 LB 0.4 PERCENT

V-KTS	V/RLT	FN	RF	RR	RU-LB	*RU-LB*	ERROR	E-PC	CF	CR	*CR*
0.986	0.432	0.129	0.121	0.038	0.159	0.158	-0.000	-0.2	0.00530	0.00168	0.00166
1.183	0.519	0.154	0.167	0.058	0.225	0.224	-0.001	-0.2	0.00508	0.00178	0.00176
1.380	0.605	0.180	0.219	0.083	0.302	0.303	0.001	0.4	0.00491	0.00186	0.00189
1.577	0.692	0.206	0.278	0.117	0.395	0.397	0.002	0.6	0.00476	0.00201	0.00204
1.775	0.778	0.232	0.343	0.164	0.507	0.507	0.000	0.1	0.00464	0.00223	0.00223
1.972	0.864	0.257	0.413	0.228	0.642	0.638	-0.004	-0.6	0.00454	0.00250	0.00246
2.070	0.908	0.270	0.451	0.259	0.710	0.711	0.001	0.2	0.00449	0.00258	0.00259
2.169	0.951	0.283	0.490	0.306	0.796	0.791	-0.005	-0.6	0.00445	0.00277	0.00273
2.267	0.994	0.296	0.531	0.353	0.884	0.878	-0.006	-0.7	0.00441	0.00293	0.00288
2.366	1.037	0.309	0.573	0.399	0.972	0.972	0.000	0.0	0.00437	0.00305	0.00305
2.465	1.080	0.322	0.616	0.455	1.071	1.075	0.004	0.3	0.00433	0.00320	0.00322
2.563	1.124	0.335	0.661	0.521	1.182	1.191	0.010	0.8	0.00430	0.00338	0.00345
2.662	1.167	0.347	0.707	0.615	1.323	1.329	0.006	0.5	0.00426	0.00371	0.00374
2.760	1.210	0.360	0.755	0.744	1.499	1.499	0.000	0.0	0.00423	0.00417	0.00417
2.859	1.253	0.373	0.804	0.915	1.720	1.719	-0.001	-0.1	0.00420	0.00478	0.00478
2.958	1.297	0.386	0.855	1.149	2.004	2.000	-0.004	-0.2	0.00417	0.00561	0.00559
3.056	1.340	0.399	0.906	1.457	2.363	2.350	-0.013	-0.6	0.00414	0.00666	0.00660
3.155	1.383	0.412	0.960	1.818	2.778	2.773	-0.004	-0.2	0.00412	0.00780	0.00778
3.253	1.426	0.425	1.014	2.251	3.265	3.271	0.006	0.2	0.00409	0.00908	0.00910
3.352	1.469	0.438	1.070	2.766	3.836	3.842	0.006	0.1	0.00407	0.01051	0.01053
3.451	1.513	0.450	1.127	3.341	4.469	4.479	0.010	0.2	0.00404	0.01198	0.01202
3.549	1.556	0.463	1.186	3.993	5.179	5.170	-0.009	-0.2	0.00402	0.01353	0.01350

MIT PRATT PROJECT DELFT SERIES MODEL IV-A (BASE KEEL) 1976
LWL= 5.249FT, LSM= 5.203 FT, WETTED SURFACE= 8.484 FT**2, DRAFT= 1.105 FT, DISP=74.462 LB

AVERAGE DELTA CT BETWEEN DOUBLE AND SINGLE SAND=.00037

RESIDUARY RESISTANCE COEFFICIENTS:

VRTL:	0.40000	0.60000	0.80000	1.00000	1.20000	1.40000	1.60000	1.80000
CR:	0.00127	0.00158	0.00196	0.00249	0.00369	0.00798	0.01470	0.01820
RR/DISP:	0.00033	0.00093	0.00205	0.00407	0.00869	0.02561	0.06161	0.09652

KEEL AND SIDE FORCE RESISTANCE COEFFICIENTS

C1:	1.7950
TE/T:	0.746
TE:	0.825

	1	2	3	4	5
V/RTL:	1.037	1.210	1.383	0.685	1.199
CPHI:	0.2181E-05	0.4868E-05	0.5302E-05		
CO:	0.5620E-02	0.1053E-01	0.2611E-01	0.1628E-02	0.1025E-01
RO:	0.991	1.539	2.904	0.394	1.506
RU:	1.015	1.568	2.877	0.415	1.517
DUP:	-0.024	-0.029	0.027	-0.021	-0.011
DUP-PC:	-2.3	-1.8	0.9	-5.0	-0.7

MIT PRATT PROJECT DELFT SERIES MODEL IV-A (BASE KEEL) 1976
LWL= 5.249FT, LSW= 5.203 FT, WETTED SURFACE= 8.484 FT**2, DRAFT= 1.105 FT, DISP=74.462 LB

RUN	V/RTL	PHI	PH	*RU*	RO	EPC	RH	PRH	EPC	RT	PRT	ERR	EPC
725	1.037	10.0	1.753	1.015	0.991	-2.3	0.085	0.064	-24.1	1.076	1.055	-0.020	-1.9
726	1.037	10.0	2.633	1.015	0.991	-2.3	0.133	0.124	-6.6	1.124	1.116	-0.009	-0.8
727	1.037	10.0	1.939	1.015	0.991	-2.3	0.091	0.075	-17.9	1.082	1.066	-0.016	-1.5
728	1.037	10.0	1.032	1.015	0.991	-2.3	0.051	0.033	-36.2	1.043	1.024	-0.019	-1.8
729	1.210	10.0	1.146	1.568	1.539	-1.8	0.070	0.051	-26.6	1.609	1.591	-0.019	-1.2
730	1.210	10.0	1.847	1.568	1.539	-1.8	0.090	0.075	-16.1	1.629	1.615	-0.014	-0.9
731	1.210	10.0	2.440	1.568	1.539	-1.8	0.116	0.104	-10.1	1.656	1.644	-0.012	-0.7
732	1.037	20.0	3.451	1.015	0.991	-2.3	0.221	0.251	13.3	1.213	1.242	0.029	2.4
733	1.037	20.0	2.219	1.015	0.991	-2.3	0.120	0.142	18.3	1.111	1.133	0.022	2.0
734	1.037	20.0	4.387	1.015	0.991	-2.3	0.314	0.365	16.3	1.305	1.356	0.051	3.9
735	1.210	20.0	4.230	1.568	1.539	-1.8	0.334	0.350	4.6	1.874	1.889	0.016	0.8
736	1.210	20.0	3.282	1.568	1.539	-1.8	0.255	0.268	5.2	1.795	1.808	0.013	0.7
737	1.210	20.0	2.076	1.568	1.539	-1.8	0.152	0.194	28.3	1.691	1.734	0.043	2.5
738	1.383	20.0	2.088	2.877	2.904	0.9	0.163	0.196	20.4	3.067	3.100	0.033	1.1
739	1.383	20.0	3.221	2.877	2.904	0.9	0.249	0.249	-0.0	3.153	3.153	-0.000	-0.0
740	1.383	20.0	4.378	2.877	2.904	0.9	0.359	0.326	-9.2	3.263	3.230	-0.033	-1.0
741	1.037	30.0	4.852	1.015	0.991	-2.3	0.519	0.513	-1.1	1.510	1.505	-0.006	-0.4
742	1.037	30.0	3.740	1.015	0.991	-2.3	0.376	0.364	-3.0	1.367	1.356	-0.011	-0.8
743	1.037	30.0	5.819	1.015	0.991	-2.3	0.691	0.674	-2.4	1.682	1.666	-0.017	-1.0
744	1.037	30.0	3.253	1.015	0.991	-2.3	0.316	0.311	-1.5	1.307	1.302	-0.005	-0.4
745	1.210	30.0	3.034	1.568	1.539	-1.8	0.412	0.432	4.9	1.951	1.971	0.020	1.0
746	1.210	30.0	4.422	1.568	1.539	-1.8	0.544	0.550	1.2	2.083	2.090	0.006	0.3
747	1.210	30.0	5.878	1.568	1.539	-1.8	0.775	0.722	-6.9	2.315	2.262	-0.053	-2.3
748	1.383	30.0	5.909	2.877	2.904	0.9	0.732	0.662	-9.6	3.635	3.565	-0.070	-1.9
749	1.383	30.0	4.587	2.877	2.904	0.9	0.522	0.540	3.4	3.426	3.444	0.018	0.5
750	1.383	30.0	3.312	2.877	2.904	0.9	0.399	0.452	13.2	3.303	3.355	0.053	1.6
700	0.685	0.0	-0.020	0.415	0.394	-5.0	0.014	0.000	-99.9	0.408	0.394	-0.014	-3.4
701	0.685	0.0	-0.600	0.415	0.394	-5.0	0.023	0.013	-43.3	0.417	0.407	-0.010	-2.4
702	0.685	0.0	-1.301	0.415	0.394	-5.0	0.060	0.061	0.7	0.454	0.455	0.000	0.1
703	0.685	0.0	-1.870	0.415	0.394	-5.0	0.120	0.125	4.5	0.514	0.519	0.005	1.1
704	0.685	0.0	-2.533	0.415	0.394	-5.0	0.199	0.230	15.4	0.593	0.624	0.031	5.2
705	0.685	0.0	-0.326	0.415	0.394	-5.0	0.018	0.004	-79.2	0.412	0.398	-0.014	-3.5
706	0.685	0.0	0.260	0.415	0.394	-5.0	0.027	0.002	-91.1	0.421	0.396	-0.025	-5.9
707	0.685	0.0	0.542	0.415	0.394	-5.0	0.032	0.011	-66.6	0.425	0.405	-0.021	-4.9
708	0.685	0.0	1.160	0.415	0.394	-5.0	0.051	0.048	-6.3	0.445	0.442	-0.003	-0.7
709	0.685	0.0	1.843	0.415	0.394	-5.0	0.106	0.122	14.2	0.500	0.516	0. 5	3.0
710	0.685	0.0	2.419	0.415	0.394	-5.0	0.170	0.209	22.9	0.564	0.603	0.039	6.9
711	0.685	0.0	0.205	0.415	0.394	-5.0	0.005	0.002	-70.3	0.399	0.395	-0.004	-0.9
712	1.199	0.0	-0.053	1.517	1.506	-0.7	-0.005	0.000	-100.7	1.501	1.506	0.005	0.3
713	1.199	0.0	-1.279	1.517	1.506	-0.7	0.024	0.019	-20.2	1.530	1.525	-0.005	-0.3
714	1.199	0.0	-2.626	1.517	1.506	-0.7	0.092	0.080	-12.8	1.598	1.587	-0.012	-0.7
715	1.199	0.0	-3.911	1.517	1.506	-0.7	0.180	0.179	-1.1	1.687	1.685	-0.002	-0.1
716	1.199	0.0	-5.152	1.517	1.506	-0.7	0.269	0.310	15.3	1.775	1.816	0.041	2.3
717	1.199	0.0	1.195	1.517	1.506	-0.7	0.028	0.017	-41.2	1.534	1.523	-0.012	-0.8
718	1.199	0.0	2.560	1.517	1.506	-0.7	0.079	0.076	-3.2	1.585	1.583	-0.003	-0.2
719	1.199	0.0	3.402	1.517	1.506	-0.7	0.180	0.178	-1.5	1.687	1.684	-0.003	-0.2
720	1.199	0.0	5.013	1.517	1.506	-0.7	0.304	0.293	-3.5	1.810	1.799	-0.011	-0.6
RMS						2.9			34.3			0.025	2.3

MIT PRATT PROJECT DELFT SERIES MODEL V-A (BASE KEEL) 1976
LWL= 5.249FT, LSM= 5.182 FT, WETTED SURFACE=10.217 FT**2, DRAFT= 1.211 FT, DISP= 115.52 LB

UPRIGHT RESISTANCE WITH DOUBLE SAND RMS ERROR= 0.010 LB 0.4 PERCENT

V-KTS	V/RLT	FN	RF	RR	RU-LB	*RU-LB*	ERROR	E-PC	CF	CR	*CR*
0.986	0.433	0.129	0.147	0.069	0.216	0.215	-0.001	-0.4	0.00536	0.00251	0.00248
1.183	0.520	0.155	0.203	0.097	0.300	0.300	0.000	0.2	0.00514	0.00245	0.00246
1.380	0.606	0.181	0.267	0.132	0.399	0.401	0.002	0.5	0.00497	0.00246	0.00249
1.577	0.693	0.206	0.339	0.182	0.520	0.521	0.001	0.2	0.00482	0.00259	0.00260
1.775	0.780	0.232	0.418	0.250	0.668	0.666	-0.002	-0.2	0.00470	0.00282	0.00280
1.972	0.866	0.258	0.504	0.338	0.842	0.844	0.002	0.2	0.00459	0.00308	0.00310
2.070	0.909	0.271	0.550	0.400	0.950	0.948	-0.003	-0.3	0.00454	0.00331	0.00329
2.169	0.953	0.284	0.597	0.470	1.067	1.062	-0.005	-0.5	0.00450	0.00354	0.00350
2.267	0.996	0.297	0.647	0.548	1.195	1.189	-0.006	-0.5	0.00446	0.00378	0.00373
2.366	1.039	0.309	0.698	0.625	1.323	1.327	0.005	0.3	0.00442	0.00395	0.00398
2.465	1.083	0.322	0.751	0.733	1.484	1.480	-0.004	-0.2	0.00438	0.00427	0.00425
2.563	1.126	0.335	0.806	0.837	1.642	1.654	0.012	0.7	0.00434	0.00451	0.00458
2.662	1.169	0.348	0.862	0.986	1.848	1.864	0.016	0.9	0.00431	0.00493	0.00501
2.760	1.213	0.361	0.920	1.212	2.132	2.128	-0.004	-0.2	0.00428	0.00563	0.00562
2.859	1.256	0.374	0.980	1.496	2.476	2.473	-0.003	-0.1	0.00425	0.00648	0.00647
2.958	1.299	0.387	1.041	1.906	2.948	2.924	-0.024	-0.8	0.00422	0.00772	0.00763
3.056	1.342	0.400	1.104	2.381	3.486	3.495	0.010	0.3	0.00419	0.00903	0.00907
3.155	1.386	0.413	1.169	3.035	4.204	4.199	-0.006	-0.1	0.00416	0.01081	0.01079
3.253	1.429	0.426	1.235	3.793	5.029	5.044	0.015	0.3	0.00414	0.01270	0.01275
3.352	1.472	0.438	1.303	4.751	6.054	6.036	-0.018	-0.3	0.00411	0.01498	0.01492
3.451	1.516	0.451	1.373	5.763	7.156	7.178	0.021	0.3	0.00409	0.01721	0.01727
3.549	1.559	0.464	1.445	7.028	8.473	8.463	-0.010	-0.1	0.00406	0.01977	0.01974

UPRIGHT RESISTANCE WITH SINGLE SAND RMS ERROR= 0.006 LB 0.4 PERCENT

V-KTS	V/RLT	FN	RF	RR	RU-LB	*RU-LB*	ERROR	E-PC	CF	CR	*CR*
0.986	0.433	0.129	0.147	0.045	0.192	0.192	0.000	0.2	0.00536	0.00163	0.00165
1.183	0.520	0.155	0.203	0.070	0.273	0.273	-0.001	-0.2	0.00514	0.00178	0.00176
1.380	0.606	0.181	0.267	0.103	0.370	0.370	-0.000	-0.1	0.00497	0.00192	0.00192
1.577	0.693	0.206	0.339	0.149	0.487	0.487	-0.000	-0.0	0.00482	0.00212	0.00211
1.775	0.780	0.232	0.418	0.211	0.628	0.627	-0.001	-0.2	0.00470	0.00237	0.00236
1.972	0.866	0.258	0.504	0.294	0.798	0.795	-0.003	-0.4	0.00459	0.00268	0.00265
2.070	0.909	0.271	0.550	0.336	0.886	0.891	0.005	0.6	0.00454	0.00278	0.00282
2.169	0.953	0.284	0.597	0.388	0.985	0.996	0.011	1.1	0.00450	0.00292	0.00300
2.267	0.996	0.297	0.647	0.471	1.118	1.111	-0.007	-0.6	0.00446	0.00324	0.00320
2.366	1.039	0.309	0.698	0.543	1.241	1.236	-0.005	-0.4	0.00442	0.00344	0.00340
2.465	1.083	0.322	0.751	0.623	1.374	1.373	-0.000	-0.0	0.00438	0.00363	0.00363
2.563	1.126	0.335	0.806	0.727	1.532	1.531	-0.002	-0.1	0.00434	0.00392	0.00391
2.662	1.169	0.348	0.862	0.862	1.724	1.723	-0.001	-0.1	0.00431	0.00431	0.00431
2.760	1.213	0.361	0.920	1.042	1.962	1.971	0.009	0.5	0.00428	0.00485	0.00489
2.859	1.256	0.374	0.980	1.329	2.308	2.303	-0.005	-0.2	0.00425	0.00576	0.00574
2.958	1.299	0.387	1.041	1.712	2.754	2.744	-0.009	-0.3	0.00422	0.00694	0.00690
3.056	1.342	0.400	1.104	2.201	3.305	3.310	0.005	0.2	0.00419	0.00835	0.00837
3.155	1.386	0.413	1.169	2.826	3.995	4.010	0.016	0.4	0.00416	0.01006	0.01012
3.253	1.429	0.426	1.235	3.626	4.861	4.854	-0.007	-0.1	0.00414	0.01214	0.01211
3.352	1.472	0.438	1.303	4.545	5.849	5.844	-0.005	-0.1	0.00411	0.01433	0.01432
3.451	1.516	0.451	1.373	5.609	6.982	6.979	-0.004	-0.1	0.00409	0.01669	0.01669
3.549	1.559	0.464	1.445	6.799	8.243	8.247	0.004	0.0	0.00406	0.01912	0.01913

MIT PRATT PROJECT DELFT SERIES MODEL V-A (BASE KEEL) 1976
LWL= 5.249FT, LSW= 5.182 FT, WETTED SURFACE=10.217 FT**2, DRAFT= 1.211 FT, DISP=115.52 LB

AVERAGE DELTA CT BETWEEN DOUBLE AND SINGLE SAND=.00067

RESIDUARY RESISTANCE COEFFICIENTS:

V&TL:	0.40000	0.60000	0.80000	1.00000	1.20000	1.40000	1.60000	1.80000
CR:	0.00116	0.00114	0.00151	0.00241	0.00407	0.01005	0.02078	0.03081
RR/DISP:	0.00023	0.00052	0.00123	0.00305	0.00742	0.02495	0.06735	0.12641

KEEL AND SIDE FORCE RESISTANCE COEFFICIENTS

C1:	1.7056
TE/T:	0.766
TE:	0.927

	1	2	3	4	5
V/&TL:	1.039	1.213	1.386	0.687	1.201
CPHI:	0.5190E-06	0.1585E-05	0.2172E-05		
CO:	0.5228E-02	0.1048E-01	0.2688E-01	0.1427E-02	0.9848E-02
BO:	1.302	2.131	4.274	0.498	2.042
dJ:	1.327	2.128	4.199	0.512	2.052
EUP:	-0.025	0.004	0.076	-0.014	-0.010
EUP-PC:	-1.9	0.2	1.8	-2.7	-0.5

NIT PRATT PROJECT DELFT SERIES MODEL V-A (BASE KEEL) 1976
LWL= 5.249FT, LSM= 5.182 FT, WETTED SURFACE=10.217 FT**2, DRAFT= 1.211 FT, DISP=115.52 LB

RUN	V/RTL	PHI	FH	*RU*	RO	EPC	RH	PRH	EPC	RT	PRT	ERR	EPC
756	1.039	10.0	2.476	1.327	1.302	-1.9	0.118	0.082	-30.7	1.420	1.384	-0.036	-2.5
757	1.039	10.0	3.533	1.327	1.302	-1.9	0.168	0.160	-5.1	1.471	1.462	-0.009	-0.6
758	1.039	10.0	1.522	1.327	1.302	-1.9	0.058	0.035	-40.6	1.360	1.337	-0.024	-1.7
759	1.039	10.0	1.576	1.327	1.302	-1.9	0.056	0.037	-34.6	1.358	1.339	-0.019	-1.4
760	1.039	10.0	2.597	1.327	1.302	-1.9	0.094	0.089	-4.6	1.396	1.391	-0.004	-0.3
761	1.213	10.0	2.543	2.128	2.131	0.2	0.084	0.077	-8.9	2.216	2.208	-0.007	-0.3
762	1.213	10.0	1.565	2.128	2.131	0.2	0.043	0.041	-4.8	2.174	2.172	-0.002	-0.1
763	1.213	10.0	3.544	2.128	2.131	0.2	0.162	0.132	-18.2	2.293	2.263	-0.029	-1.3
764	1.039	20.0	5.368	1.327	1.302	-1.9	0.351	0.380	8.0	1.653	1.682	0.028	1.7
765	1.039	20.0	6.386	1.327	1.302	-1.9	0.475	0.527	11.0	1.777	1.829	0.052	2.9
766	1.039	20.0	3.446	1.327	1.302	-1.9	0.149	0.171	14.7	1.451	1.473	0.022	1.5
767	1.039	20.0	4.746	1.327	1.302	-1.9	0.257	0.302	17.6	1.559	1.604	0.045	2.9
768	1.213	20.0	4.380	2.128	2.131	0.2	0.226	0.247	9.6	2.357	2.378	0.022	0.9
769	1.213	20.0	6.421	2.128	2.131	0.2	0.413	0.447	8.3	2.544	2.578	0.034	1.3
770	1.213	20.0	3.210	2.128	2.131	0.2	0.170	0.167	-2.2	2.302	2.298	-0.004	-0.2
771	1.213	20.0	4.725	2.128	2.131	0.2	0.265	0.276	3.9	2.396	2.407	0.010	0.4
772	1.386	20.0	4.502	4.199	4.274	1.8	0.243	0.241	-0.8	4.517	4.515	-0.002	-0.0
773	1.386	20.0	6.377	4.199	4.274	1.8	0.402	0.383	-4.8	4.676	4.657	-0.019	-0.4
774	1.386	20.0	3.137	4.199	4.274	1.8	0.172	0.169	-2.2	4.447	4.443	-0.004	-0.1
775	1.386	20.0	4.749	4.199	4.274	1.8	0.232	0.257	10.7	4.506	4.531	0.025	0.6
776	1.039	30.0	5.188	1.327	1.302	-1.9	0.418	0.386	-7.6	1.720	1.688	-0.032	-1.8
778	1.039	30.0	6.466	1.327	1.302	-1.9	0.581	0.570	-1.9	1.883	1.872	-0.011	-0.6
779	1.039	30.0	9.119	1.327	1.302	-1.9	1.077	1.080	0.3	2.379	2.382	0.003	0.1
780	1.039	30.0	6.960	1.327	1.302	-1.9	0.658	0.652	-1.0	1.960	1.954	-0.006	-0.3
781	1.039	30.0	4.923	1.327	1.302	-1.9	0.363	0.353	-2.6	1.665	1.655	-0.009	-0.6
782	1.213	30.0	4.394	2.128	2.131	0.2	0.305	0.340	11.5	2.436	2.471	0.035	1.4
783	1.213	30.0	6.769	2.128	2.131	0.2	0.598	0.580	-3.0	2.729	2.711	-0.018	-0.7
784	1.213	30.0	8.780	2.128	2.131	0.2	0.900	0.864	-4.1	3.031	2.995	-0.037	-1.2
785	1.213	30.0	4.707	2.128	2.131	0.2	0.325	0.366	12.6	2.456	2.497	0.041	1.7
786	1.213	30.0	8.752	2.128	2.131	0.2	0.891	0.859	-3.6	3.023	2.990	-0.032	-1.1
787	1.213	30.0	6.777	2.128	2.131	0.2	0.594	0.581	-2.1	2.725	2.712	-0.013	-0.5
788	1.386	30.0	8.548	4.199	4.274	1.8	0.825	0.733	-11.2	5.099	5.007	-0.092	-1.8
789	1.386	30.0	6.586	4.199	4.274	1.8	0.525	0.527	0.3	4.800	4.801	0.002	0.0
790	1.386	30.0	4.875	4.199	4.274	1.8	0.300	0.391	30.1	4.575	4.665	0.090	2.0
791	0.687	0.0	0.051	0.512	0.498	-2.7	0.018	0.000	-99.6	0.516	0.498	-0.018	-3.4
792	0.687	0.0	-0.174	0.512	0.498	-2.7	0.022	0.001	-96.1	0.520	0.499	-0.021	-4.1
793	0.687	0.0	-0.516	0.512	0.498	-2.7	0.022	0.008	-66.1	0.520	0.506	-0.015	-2.8
794	0.687	0.0	-1.109	0.512	0.498	-2.7	0.046	0.035	-25.1	0.545	0.533	-0.012	-2.1
795	0.687	0.0	-1.755	0.512	0.498	-2.7	0.097	0.087	-10.4	0.595	0.585	-0.010	-1.7
796	0.687	0.0	-2.350	0.512	0.498	-2.7	0.148	0.156	5.6	0.646	0.654	0.008	1.3
797	0.687	0.0	-3.031	0.512	0.498	-2.7	0.247	0.260	5.1	0.745	0.758	0.013	1.7
798	0.687	0.0	-3.627	0.512	0.498	-2.7	0.357	0.372	4.0	0.855	0.870	0.014	1.7
799	0.687	0.0	-4.257	0.512	0.498	-2.7	0.479	0.512	7.0	0.977	1.010	0.034	3.4
800	0.687	0.0	0.392	0.512	0.498	-2.7	0.018	0.004	-75.5	0.516	0.502	-0.013	-2.6
801	0.687	0.0	0.717	0.512	0.498	-2.7	0.027	0.015	-45.4	0.525	0.513	-0.012	-2.3
802	0.687	0.0	1.272	0.512	0.498	-2.7	0.046	0.046	-1.5	0.545	0.544	-0.001	-0.1
803	0.687	0.0	1.953	0.512	0.498	-2.7	0.093	0.108	16.3	0.591	0.606	0.015	2.6
804	0.687	0.0	2.531	0.512	0.498	-2.7	0.163	0.181	10.9	0.661	0.679	0.018	2.7
805	1.201	0.0	0.112	2.052	2.042	-0.5	0.004	0.000	-96.7	2.046	2.043	-0.003	-0.2
806	1.201	0.0	-1.082	2.052	2.042	-0.5	0.032	0.011	-66.4	2.075	2.053	-0.021	-1.0
807	1.201	0.0	-2.421	2.052	2.042	-0.5	0.043	0.054	25.2	2.086	2.097	0.011	0.5
808	1.201	0.0	-3.818	2.052	2.042	-0.5	0.136	0.135	-0.9	2.178	2.177	-0.001	-0.1
809	1.201	0.0	-4.905	2.052	2.042	-0.5	0.244	0.222	-8.9	2.286	2.265	-0.022	-0.9
810	1.201	0.0	-6.453	2.052	2.042	-0.5	0.381	0.385	1.1	2.423	2.427	0.004	0.2

MIT PRATT PROJECT DELFT SERIES MODEL V-A (BASE KEEL) 1976
LWL= 5.249FT, LSM= 5.182 FT, WETTED SURFACE=10.217 FT**2, DRAFT= 1.211 FT, DISP=115.52 LB

RUN	V/aTL	PHI	FH	*RU*	RO	EPC	RH	PRH	EPC	RT	PRT	ERR	EPC
811	1.201	0.0	1.385	2.052	2.042	-0.5	0.015	0.018	21.6	2.057	2.060	0.003	0.2
812	1.201	0.0	2.729	2.052	2.042	-0.5	0.065	0.069	5.4	2.108	2.111	0.004	0.2
813	1.201	0.0	3.834	2.052	2.042	-0.5	0.142	0.136	-4.7	2.185	2.178	-0.007	-0.3
814	1.201	0.0	5.309	2.052	2.042	-0.5	0.257	0.260	1.2	2.299	2.303	0.003	0.1
815	1.201	0.0	6.369	2.052	2.042	-0.5	0.345	0.375	8.5	2.388	2.417	0.029	1.2
RMS						1.7			30.3			0.026	1.6

MIT PRATT PROJECT DELFT SERIES MODEL VI-A (BASE KEEL) 1976
LWL= 5.249FT, LSM= 5.170 FT, WETTED SURFACE= 9.769 FT**2, DRAFT= 1.284 FT, DISP= 116.76 LB

UPRIGHT RESISTANCE WITH DOUBLE SAND RMS ERROR= 0.007 LB 0.4 PERCENT

V-KTS	V/RLT	FN	RF	RR	RU-LB	*RU-LB*	ERROR	E-PC	CF	CR	*CR*
0.986	0.434	0.129	0.141	0.051	0.192	0.192	0.000	0.2	0.00537	0.00194	0.00195
1.183	0.520	0.155	0.195	0.081	0.276	0.274	-0.002	-0.6	0.00515	0.00214	0.00210
1.380	0.607	0.181	0.256	0.117	0.373	0.374	0.001	0.3	0.00498	0.00227	0.00229
1.577	0.694	0.207	0.324	0.169	0.494	0.494	0.001	0.1	0.00483	0.00252	0.00253
1.775	0.780	0.232	0.400	0.237	0.637	0.639	0.002	0.3	0.00471	0.00279	0.00281
1.972	0.867	0.258	0.483	0.331	0.814	0.813	-0.001	-0.1	0.00460	0.00315	0.00314
2.070	0.911	0.271	0.527	0.382	0.908	0.911	0.003	0.3	0.00455	0.00330	0.00332
2.169	0.954	0.284	0.572	0.455	1.027	1.019	-0.009	-0.9	0.00451	0.00358	0.00351
2.267	0.997	0.297	0.620	0.520	1.140	1.135	-0.005	-0.4	0.00447	0.00375	0.00371
2.366	1.041	0.310	0.669	0.592	1.261	1.261	-0.000	-0.0	0.00443	0.00392	0.00392
2.465	1.084	0.323	0.720	0.676	1.396	1.398	0.002	0.2	0.00439	0.00412	0.00414
2.563	1.127	0.336	0.772	0.771	1.543	1.556	0.012	0.8	0.00435	0.00435	0.00442
2.662	1.171	0.349	0.826	0.918	1.744	1.750	0.006	0.4	0.00432	0.00480	0.00483
2.760	1.214	0.362	0.881	1.127	2.008	2.006	-0.003	-0.1	0.00429	0.00549	0.00547
2.859	1.257	0.374	0.939	1.425	2.363	2.356	-0.008	-0.3	0.00426	0.00646	0.00642
2.958	1.301	0.387	0.998	1.844	2.842	2.830	-0.012	-0.4	0.00423	0.00781	0.00776
3.056	1.344	0.400	1.058	2.375	3.433	3.442	0.009	0.3	0.00420	0.00942	0.00946
3.155	1.388	0.413	1.120	3.080	4.200	4.201	0.001	0.0	0.00417	0.01147	0.01147
3.253	1.431	0.426	1.184	3.936	5.119	5.112	-0.007	-0.1	0.00414	0.01378	0.01375
3.352	1.474	0.439	1.249	4.907	6.155	6.172	0.016	0.3	0.00412	0.01618	0.01624
3.451	1.518	0.452	1.316	6.063	7.379	7.369	-0.010	-0.1	0.00409	0.01887	0.01884
3.549	1.561	0.465	1.384	7.296	8.680	8.681	0.002	0.0	0.00407	0.02146	0.02147

UPRIGHT RESISTANCE WITH SINGLE SAND RMS ERROR= 0.014 LB 0.6 PERCENT

V-KTS	V/RLT	FN	RF	RR	RU-LB	*RU-LB*	ERROR	E-PC	CF	CR	*CR*
0.986	0.434	0.129	0.141	0.046	0.187	0.188	0.001	0.5	0.00537	0.00177	0.00181
1.183	0.520	0.155	0.195	0.077	0.271	0.268	-0.003	-1.2	0.00515	0.00203	0.00194
1.380	0.607	0.181	0.256	0.108	0.364	0.364	0.000	0.1	0.00498	0.00210	0.00210
1.577	0.694	0.207	0.324	0.147	0.472	0.479	0.007	1.4	0.00483	0.00219	0.00230
1.775	0.780	0.232	0.400	0.217	0.617	0.614	-0.003	-0.5	0.00471	0.00256	0.00252
1.972	0.867	0.258	0.483	0.289	0.772	0.775	0.003	0.4	0.00460	0.00275	0.00278
2.070	0.911	0.271	0.527	0.342	0.869	0.866	-0.003	-0.3	0.00455	0.00296	0.00293
2.169	0.954	0.284	0.572	0.402	0.974	0.965	-0.009	-0.9	0.00451	0.00317	0.00309
2.267	0.997	0.297	0.620	0.458	1.078	1.074	-0.004	-0.4	0.00447	0.00330	0.00328
2.366	1.041	0.310	0.669	0.522	1.191	1.194	0.003	0.3	0.00443	0.00345	0.00349
2.465	1.084	0.323	0.720	0.597	1.316	1.327	0.011	0.8	0.00439	0.00364	0.00373
2.563	1.127	0.336	0.772	0.703	1.475	1.482	0.007	0.5	0.00435	0.00397	0.00401
2.662	1.171	0.349	0.826	0.854	1.680	1.676	-0.003	-0.2	0.00432	0.00447	0.00445
2.760	1.214	0.362	0.881	1.059	1.940	1.932	-0.008	-0.4	0.00429	0.00515	0.00511
2.859	1.257	0.374	0.939	1.348	2.286	2.281	-0.005	-0.2	0.00426	0.00611	0.00608
2.959	1.301	0.387	0.998	1.741	2.738	2.750	0.012	0.4	0.00423	0.00737	0.00742
3.056	1.344	0.400	1.058	2.289	3.347	3.355	0.008	0.2	0.00420	0.00908	0.00911
3.155	1.388	0.413	1.120	3.005	4.125	4.105	-0.020	-0.5	0.00417	0.01119	0.01111
3.253	1.431	0.426	1.184	3.817	5.000	5.006	0.006	0.1	0.00414	0.01336	0.01338
3.352	1.474	0.439	1.249	4.836	6.085	6.059	-0.025	-0.4	0.00412	0.01595	0.01587
3.451	1.518	0.452	1.316	5.896	7.211	7.256	0.045	0.6	0.00409	0.01835	0.01849
3.549	1.561	0.465	1.384	7.214	8.598	8.579	-0.019	-0.2	0.00407	0.02122	0.02117

M.I.T. PRATT PROJECT DELFT SERIES MODEL VI-A (BASE KEEL) 1976
LWL= 5.249FT, LSB= 5.170 FT, WETTED SURFACE= 9.769 FT**2, DRAFT= 1.284 FT, DISP= 116.76 LB

AVERAGE DELTA CT BETWEEN DOUBLE AND SINGLE SAND=.00039

RESIDUARY RESISTANCE COEFFICIENTS:

VBTL:	0.40000	0.60000	0.80000	1.00000	1.20000	1.40000	1.60000	1.80000
CR:	0.00113	0.00151	0.00211	0.00295	0.00446	0.01133	0.02299	0.02948
RR/DISP:	0.00022	0.00065	0.00162	0.00353	0.00767	0.02654	0.07032	0.11414

HEEL AND SIDE FORCE RESISTANCE COEFFICIENTS

C1:	1.5160
TZ/T:	0.812
TE:	1.043

	1	2	3	4	5
V/BTL:	1.041	1.214	1.388	0.688	1.203
CPHI:	0.3552E-06	0.2398E-05	0.2989E-05		
CO:	0.5106E-02	0.9576E-02	0.2640E-01	0.1287E-02	0.9329E-02
BO:	1.265	2.000	4.203	0.470	1.956
BO:	1.261	2.006	4.201	0.485	1.932
EUP:	0.004	-0.006	0.002	-0.016	0.024
EUP-PC:	0.3	-0.3	0.0	-3.2	1.3

MIT PRATT PROJECT DELFT SERIES MODEL V1-A (BASE KEEL) 1976
LWL= 5.249FT, LSM= 5.170 FT, WETTED SURFACE= 9.769 FT**2, DRAFT= 1.284 FT, DISP=116.76 LB

RUN	V/√L	PHI	FH	*RU*	RO	EPC	RH	PRH	EPC	RT	PRT	ERR	EPC
828	1.041	10.0	2.098	1.261	1.265	0.3	0.042	0.047	11.1	1.307	1.312	0.005	0.4
829	1.041	10.0	0.922	1.261	1.265	0.3	0.020	0.012	-38.7	1.285	1.277	-0.008	-0.6
830	1.041	10.0	3.293	1.261	1.265	0.3	0.111	0.110	-0.8	1.376	1.375	-0.001	-0.1
831	1.041	10.0	1.842	1.261	1.265	0.3	0.040	0.037	-7.3	1.305	1.302	-0.003	-0.2
832	1.041	10.0	0.907	1.261	1.265	0.3	0.014	0.012	-11.1	1.279	1.277	-0.002	-0.1
833	1.214	10.0	3.367	2.006	2.000	-0.3	0.108	0.109	1.0	2.108	2.109	0.001	0.1
834	1.214	10.0	2.192	2.006	2.000	-0.3	0.060	0.062	4.7	2.059	2.062	0.003	0.1
835	1.214	10.0	0.754	2.006	2.000	-0.3	0.029	0.032	11.8	2.028	2.032	0.003	0.2
836	1.214	10.0	1.838	2.006	2.000	-0.3	0.053	0.052	-1.5	2.053	2.052	-0.001	-0.0
837	1.041	20.0	4.305	1.261	1.265	0.3	0.186	0.197	6.2	1.451	1.462	0.012	0.8
838	1.041	20.0	5.464	1.261	1.265	0.3	0.307	0.307	0.2	1.572	1.572	0.001	0.0
839	1.041	20.0	2.867	1.261	1.265	0.3	0.095	0.097	1.5	1.360	1.362	0.001	0.1
840	1.214	20.0	2.858	2.006	2.000	-0.3	0.152	0.170	12.0	2.152	2.170	0.018	0.8
841	1.214	20.0	5.694	2.006	2.000	-0.3	0.355	0.344	-3.1	2.355	2.344	-0.011	-0.5
842	1.214	20.0	4.587	2.006	2.000	-0.3	0.276	0.263	-4.7	2.275	2.262	-0.013	-0.6
843	1.214	20.0	2.836	2.006	2.000	-0.3	0.174	0.170	-2.7	2.174	2.169	-0.005	-0.2
844	1.388	20.0	4.411	4.201	4.203	0.0	0.257	0.246	-4.4	4.460	4.449	-0.011	-0.3
845	1.388	20.0	5.985	4.201	4.203	0.0	0.376	0.336	-10.8	4.579	4.538	-0.041	-0.9
846	1.388	20.0	3.292	4.201	4.203	0.0	0.147	0.199	35.2	4.350	4.402	0.052	1.2
847	1.041	30.0	4.755	1.261	1.265	0.3	0.289	0.258	-10.9	1.554	1.523	-0.032	-2.0
848	1.041	30.0	6.446	1.261	1.265	0.3	0.430	0.442	2.7	1.695	1.707	0.012	0.7
849	1.041	30.0	8.164	1.261	1.265	0.3	0.675	0.690	2.2	1.940	1.955	0.015	0.8
850	1.214	30.0	7.777	2.006	2.000	-0.3	0.683	0.685	0.2	2.683	2.684	0.001	0.1
851	1.214	30.0	6.268	2.006	2.000	-0.3	0.514	0.533	3.8	2.513	2.533	0.019	0.8
852	1.214	30.0	4.997	2.006	2.000	-0.3	0.448	0.431	-3.8	2.447	2.430	-0.017	-0.7
853	1.388	30.0	6.173	4.201	4.203	0.0	0.546	0.523	-4.3	4.749	4.726	-0.023	-0.5
854	1.388	30.0	5.058	4.201	4.203	0.0	0.381	0.454	19.3	4.583	4.657	0.073	1.6
855	1.388	30.0	8.070	4.201	4.203	0.0	0.749	0.671	-10.4	4.952	4.874	-0.078	-1.6
856	1.388	30.0	5.033	4.201	4.203	0.0	0.425	0.453	6.6	4.628	4.656	0.028	0.6
800	0.688	0.0	-0.018	0.485	0.470	-3.2	0.011	0.000	-99.9	0.481	0.470	-0.011	-2.3
801	0.688	0.0	-0.196	0.485	0.470	-3.2	0.011	0.001	-92.2	0.481	0.470	-0.010	-2.1
802	0.688	0.0	-0.617	0.485	0.470	-3.2	0.018	0.009	-51.8	0.487	0.478	-0.009	-1.9
803	0.688	0.0	-1.213	0.485	0.470	-3.2	0.037	0.033	-12.5	0.507	0.502	-0.005	-0.9
804	0.688	0.0	-1.731	0.485	0.470	-3.2	0.077	0.067	-13.4	0.547	0.536	-0.010	-1.9
805	0.688	0.0	-2.216	0.485	0.470	-3.2	0.130	0.110	-15.8	0.600	0.579	-0.021	-3.4
806	0.688	0.0	-3.444	0.485	0.470	-3.2	0.254	0.265	4.3	0.723	0.734	0.011	1.5
807	0.688	0.0	-4.617	0.485	0.470	-3.2	0.450	0.475	5.7	0.919	0.945	0.026	2.8
808	0.688	0.0	-5.867	0.485	0.470	-3.2	0.712	0.768	7.8	1.182	1.237	0.056	4.7
809	0.688	0.0	0.688	0.485	0.470	-3.2	0.022	0.011	-52.1	0.492	0.480	-0.011	-2.3
810	0.688	0.0	1.290	0.485	0.470	-3.2	0.037	0.037	-1.0	0.507	0.507	-0.000	-0.1
811	0.688	0.0	1.790	0.485	0.470	-3.2	0.082	0.071	-12.3	0.551	0.541	-0.010	-1.8
812	0.688	0.0	2.419	0.485	0.470	-3.2	0.134	0.130	-3.0	0.604	0.600	-0.004	-0.7
813	0.688	0.0	3.594	0.485	0.470	-3.2	0.289	0.288	-0.2	0.758	0.758	-0.001	-0.1
814	1.203	0.0	0.062	1.932	1.956	1.3	-0.020	0.000	-100.1	1.936	1.956	0.020	1.1
815	1.203	0.0	-1.087	1.932	1.956	1.3	-0.020	0.009	-142.3	1.936	1.965	0.029	1.5
816	1.203	0.0	-2.535	1.932	1.956	1.3	0.028	0.047	66.5	1.984	2.003	0.019	0.9
817	1.203	0.0	-3.759	1.932	1.956	1.3	0.103	0.103	-0.1	2.059	2.059	-0.000	-0.0
818	1.203	0.0	-5.009	1.932	1.956	1.3	0.205	0.183	-10.5	2.161	2.139	-0.022	-1.0
819	1.203	0.0	-6.217	1.932	1.956	1.3	0.343	0.282	-17.9	2.299	2.238	-0.062	-2.7
820	1.203	0.0	-6.991	1.932	1.956	1.3	0.412	0.356	-13.4	2.368	2.312	-0.055	-2.3
821	1.203	0.0	1.226	1.932	1.956	1.3	-0.014	0.011	-179.8	1.942	1.967	0.025	1.3
822	1.203	0.0	2.335	1.932	1.956	1.3	-0.005	0.040	-909.6	1.951	1.996	0.045	2.3
823	1.203	0.0	3.576	1.932	1.956	1.3	0.092	0.093	1.3	2.048	2.049	0.001	0.1
RMS						1.8			132.0			0.026	1.5

MIT PRATT PROJECT DELFT SERIES MODEL VII-A (BASE KEEL) 1976
LWL= 5.249FT, LSM= 5.211 FT, WETTED SURFACE= 8.817 FT**2, DRAFT= 1.047 FT, DISP=72.639 LB

UPRIGHT RESISTANCE WITH DOUBLE SAND RMS ERROR= 0.003 LB 0.3 PERCENT

V-KTS	V/RLT	FN	RF	RR	RU-LB	*RU-LB*	ERROR	E-PC	CF	CR	*CR*
0.986	0.432	0.129	0.127	0.052	0.179	0.178	-0.000	-0.1	0.00535	0.00220	0.00219
1.183	0.518	0.154	0.175	0.079	0.254	0.253	-0.001	-0.2	0.00513	0.00231	0.00229
1.380	0.605	0.180	0.230	0.110	0.340	0.342	0.002	0.6	0.00495	0.00236	0.00241
1.577	0.691	0.206	0.291	0.154	0.445	0.446	0.001	0.1	0.00481	0.00254	0.00255
1.775	0.777	0.231	0.359	0.209	0.569	0.567	-0.001	-0.3	0.00469	0.00273	0.00271
1.972	0.864	0.257	0.434	0.276	0.710	0.708	-0.002	-0.2	0.00458	0.00292	0.00290
2.070	0.907	0.270	0.473	0.318	0.791	0.787	-0.004	-0.6	0.00453	0.00305	0.00301
2.169	0.950	0.283	0.514	0.359	0.873	0.872	-0.001	-0.1	0.00449	0.00313	0.00312
2.267	0.993	0.296	0.557	0.402	0.959	0.965	0.006	0.6	0.00445	0.00321	0.00326
2.366	1.036	0.309	0.601	0.457	1.058	1.065	0.007	0.6	0.00441	0.00335	0.00340
2.465	1.080	0.321	0.646	0.529	1.175	1.175	-0.000	-0.0	0.00437	0.00357	0.00357
2.563	1.123	0.334	0.693	0.612	1.305	1.299	-0.006	-0.5	0.00433	0.00382	0.00378
2.662	1.166	0.347	0.742	0.704	1.446	1.443	-0.003	-0.2	0.00430	0.00408	0.00406
2.760	1.209	0.360	0.792	0.824	1.616	1.618	0.002	0.1	0.00427	0.00444	0.00445
2.859	1.252	0.373	0.843	0.993	1.836	1.835	-0.001	-0.1	0.00424	0.00499	0.00498
2.958	1.296	0.386	0.896	1.211	2.108	2.107	-0.001	-0.0	0.00421	0.00569	0.00568
3.056	1.339	0.399	0.951	1.486	2.436	2.440	0.004	0.2	0.00418	0.00653	0.00655
3.155	1.382	0.412	1.006	1.827	2.833	2.838	0.005	0.2	0.00415	0.00754	0.00756
3.253	1.425	0.424	1.064	2.243	3.307	3.304	-0.003	-0.1	0.00413	0.00870	0.00869
3.352	1.468	0.437	1.122	2.721	3.843	3.839	-0.003	-0.1	0.00410	0.00994	0.00993
3.451	1.512	0.450	1.182	3.260	4.442	4.441	-0.002	-0.0	0.00408	0.01124	0.01124
3.549	1.555	0.463	1.244	3.856	5.099	5.102	0.002	0.0	0.00405	0.01257	0.01258

UPRIGHT RESISTANCE WITH SINGLE SAND RMS ERROR= 0.007 LB 0.6 PERCENT

V-KTS	V/RLT	FN	RF	RR	RU-LB	*RU-LB*	ERROR	E-PC	CF	CR	*CR*
0.986	0.432	0.129	0.127	0.037	0.163	0.163	0.000	0.1	0.00535	0.00154	0.00155
1.183	0.518	0.154	0.175	0.059	0.234	0.234	-0.000	-0.0	0.00513	0.00173	0.00173
1.380	0.605	0.180	0.230	0.088	0.317	0.318	0.001	0.3	0.00495	0.00189	0.00191
1.577	0.691	0.206	0.291	0.130	0.421	0.418	-0.003	-0.7	0.00481	0.00214	0.00209
1.775	0.777	0.231	0.359	0.178	0.538	0.534	-0.004	-0.7	0.00469	0.00233	0.00228
1.972	0.864	0.257	0.434	0.223	0.657	0.668	0.011	1.7	0.00458	0.00236	0.00248
2.070	0.907	0.270	0.473	0.265	0.739	0.743	0.004	0.6	0.00453	0.00254	0.00256
2.169	0.950	0.283	0.514	0.312	0.827	0.824	-0.003	-0.3	0.00449	0.00273	0.00270
2.267	0.993	0.296	0.557	0.363	0.919	0.912	-0.007	-0.8	0.00445	0.00289	0.00284
2.366	1.036	0.309	0.601	0.415	1.016	1.008	-0.008	-0.8	0.00441	0.00305	0.00299
2.465	1.080	0.321	0.646	0.469	1.116	1.116	0.000	0.0	0.00437	0.00317	0.00317
2.563	1.123	0.334	0.693	0.541	1.235	1.238	0.003	0.3	0.00433	0.00338	0.00340
2.662	1.166	0.347	0.742	0.632	1.374	1.381	0.008	0.6	0.00430	0.00366	0.00370
2.760	1.209	0.360	0.792	0.760	1.552	1.555	0.002	0.2	0.00427	0.00410	0.00411
2.859	1.252	0.373	0.843	0.923	1.766	1.770	0.004	0.2	0.00424	0.00463	0.00465
2.958	1.296	0.386	0.896	1.139	2.035	2.037	0.002	0.1	0.00421	0.00534	0.00535
3.056	1.339	0.399	0.951	1.422	2.372	2.362	-0.010	-0.4	0.00418	0.00625	0.00621
3.155	1.382	0.412	1.006	1.758	2.765	2.750	-0.014	-0.5	0.00415	0.00725	0.00719
3.253	1.425	0.424	1.064	2.142	3.206	3.204	-0.002	-0.1	0.00413	0.00831	0.00830
3.352	1.468	0.437	1.122	2.586	3.708	3.723	0.015	0.4	0.00410	0.00945	0.00950
3.451	1.512	0.450	1.182	3.113	4.295	4.306	0.011	0.3	0.00408	0.01073	0.01077
3.549	1.555	0.463	1.244	3.715	4.958	4.947	-0.011	-0.2	0.00405	0.01211	0.01207

MIT PRATT PROJECT DELFT SERIES MODEL VII-A (BASE KEEL) 1976
LWL= 5.249FT, LSH= 5.211 FT, WETTED SURFACE= 8.817 FT**2, DRAFT= 1.047 FT, DISP=72.639 LB

AVERAGE DELTA CT BETWEEN DOUBLE AND SINGLE SAND=.00037

RESIDUARY RESISTANCE COEFFICIENTS:

VRTL:	0.40000	0.60000	0.80000	1.00000	1.20000	1.40000	1.60000	1.80000
CR:	0.00142	0.00167	0.00203	0.00255	0.00363	0.00729	0.01324	0.01742
RR/DISP:	0.00040	0.00105	0.00227	0.00445	0.00912	0.02495	0.05920	0.09864

HEEL AND SIDE FORCE RESISTANCE COEFFICIENTS

C1:	1.6355
TZ/T:	0.782
TE:	0.618

	1	2	3	4	5
V/RTL:	1.036	1.209	1.382	0.685	1.198
CPHI:	0.4313E-05	0.7747E-05	0.1271E-04		
CO:	0.5522E-02	0.1073E-01	0.2363E-01	0.1720E-02	0.1116E-01
EO:	1.002	1.571	2.723	0.412	1.590
EO:	1.065	1.618	2.638	0.438	1.569
EUP:	-0.063	-0.046	-0.115	-0.026	0.021
EUP-PC:	-5.9	-2.9	-4.0	-6.0	1.3

MIT PRATT PROJECT DELFT SERIES MODEL VII-A (BASE KEEL) 1976
LWL= 5.249FT, LSM= 5.211 FT, WETTED SURFACE= 8.817 FT**2, DRAFT= 1.047 FT, DISP=72.639 LB

RUN	V/RTL	PHI	FH	*FU*	RO	EPC	RH	PRH	EPC	RT	PRT	ERR	EPC
884	1.036	10.0	1.466	1.065	1.002	-5.9	0.094	0.065	-30.2	1.096	1.067	-0.028	-2.6
885	1.036	10.0	2.364	1.065	1.002	-5.9	0.164	0.120	-27.1	1.166	1.122	-0.044	-3.8
886	1.036	10.0	3.378	1.065	1.002	-5.9	0.233	0.212	-8.9	1.235	1.214	-0.021	-1.7
887	1.209	10.0	3.606	1.618	1.571	-2.9	0.245	0.208	-15.4	1.817	1.779	-0.038	-2.1
888	1.209	10.0	1.238	1.618	1.571	-2.9	0.104	0.074	-28.8	1.676	1.646	-0.030	-1.8
889	1.209	10.0	2.460	1.618	1.571	-2.9	0.168	0.127	-24.6	1.739	1.698	-0.041	-2.4
890	1.036	20.0	2.996	1.065	1.002	-5.9	0.237	0.267	12.8	1.239	1.269	0.030	2.5
891	1.036	20.0	5.896	1.065	1.002	-5.9	0.610	0.676	10.8	1.612	1.678	0.066	4.1
892	1.036	20.0	4.505	1.065	1.002	-5.9	0.394	0.447	13.5	1.396	1.449	0.053	3.8
893	1.209	20.0	4.230	1.618	1.571	-2.9	0.384	0.433	12.8	1.956	2.005	0.049	2.5
894	1.209	20.0	5.478	1.618	1.571	-2.9	0.543	0.574	5.8	2.114	2.146	0.031	1.5
895	1.209	20.0	2.818	1.618	1.571	-2.9	0.247	0.317	28.3	1.819	1.889	0.070	3.8
896	1.209	20.0	5.525	1.618	1.571	-2.9	0.556	0.580	4.3	2.127	2.152	0.024	1.1
897	1.382	20.0	5.337	2.838	2.723	-4.0	0.659	0.623	-5.4	3.382	3.346	-0.036	-1.1
898	1.382	20.0	4.186	2.838	2.723	-4.0	0.529	0.525	-0.6	3.252	3.249	-0.003	-0.1
899	1.382	20.0	2.858	2.838	2.723	-4.0	0.403	0.442	9.7	3.126	3.165	0.039	1.2
900	1.036	30.0	4.641	1.065	1.002	-5.9	0.616	0.623	1.1	1.618	1.625	0.007	0.4
901	1.036	30.0	5.308	1.065	1.002	-5.9	0.746	0.728	-2.5	1.748	1.730	-0.018	-1.0
902	1.036	30.0	6.863	1.065	1.002	-5.9	1.051	1.028	-2.2	2.053	2.030	-0.023	-1.1
903	1.036	30.0	5.743	1.065	1.002	-5.9	0.826	0.804	-2.6	1.828	1.806	-0.022	-1.2
904	1.209	30.0	5.819	1.618	1.571	-2.9	0.904	0.900	-0.4	2.476	2.472	-0.004	-0.2
905	1.209	30.0	4.318	1.618	1.571	-2.9	0.680	0.723	6.4	2.251	2.295	0.044	1.9
906	1.209	30.0	7.688	1.618	1.571	-2.9	1.299	1.194	-8.1	2.870	2.765	-0.105	-3.7
907	1.382	30.0	7.614	2.838	2.723	-4.0	1.461	1.347	-7.8	4.184	4.071	-0.114	-2.7
908	1.382	30.0	5.939	2.838	2.723	-4.0	1.133	1.145	1.1	3.856	3.868	0.012	0.3
909	1.382	30.0	4.216	2.838	2.723	-4.0	0.888	0.989	11.4	3.611	3.713	0.101	2.8
860	0.685	0.0	0.037	0.438	0.412	-6.0	0.016	0.000	-99.7	0.428	0.412	-0.016	-3.7
861	0.685	0.0	-0.273	0.438	0.412	-6.0	0.020	0.003	-86.6	0.432	0.415	-0.018	-4.1
862	0.685	0.0	-0.604	0.438	0.412	-6.0	0.031	0.013	-57.7	0.443	0.425	-0.018	-4.1
863	0.685	0.0	-1.199	0.438	0.412	-6.0	0.069	0.052	-24.2	0.481	0.464	-0.017	-3.5
864	0.685	0.0	-1.896	0.438	0.412	-6.0	0.139	0.130	-6.5	0.551	0.542	-0.009	-1.6
865	0.685	0.0	-2.573	0.438	0.412	-6.0	0.225	0.240	6.5	0.637	0.652	0.015	2.3
866	0.685	0.0	-3.852	0.438	0.412	-6.0	0.444	0.538	21.2	0.855	0.950	0.094	11.0
867	0.685	0.0	0.386	0.438	0.412	-6.0	0.022	0.005	-76.0	0.434	0.417	-0.017	-3.9
868	0.685	0.0	0.624	0.438	0.412	-6.0	0.027	0.014	-47.5	0.439	0.426	-0.013	-2.9
869	0.685	0.0	1.265	0.438	0.412	-6.0	0.060	0.058	-3.2	0.472	0.470	-0.002	-0.4
870	1.198	0.0	0.112	1.569	1.590	1.3	0.004	0.000	-96.4	1.594	1.590	-0.004	-0.3
871	1.198	0.0	-1.312	1.569	1.590	1.3	0.020	0.020	3.9	1.609	1.610	0.001	0.0
872	1.198	0.0	-2.599	1.569	1.590	1.3	0.090	0.080	-11.2	1.680	1.670	-0.010	-0.6
873	1.198	0.0	-3.768	1.569	1.590	1.3	0.159	0.168	6.1	1.748	1.758	0.010	0.6
874	1.198	0.0	-5.214	1.569	1.590	1.3	0.313	0.322	3.0	1.903	1.912	0.009	0.5
875	1.198	0.0	-6.237	1.569	1.590	1.3	0.432	0.461	6.7	2.022	2.051	0.029	1.4
876	1.198	0.0	-0.622	1.569	1.590	1.3	0.004	0.005	9.1	1.594	1.594	0.000	0.0
877	1.198	0.0	0.743	1.569	1.590	1.3	0.004	0.007	55.7	1.594	1.596	0.002	0.1
878	1.198	0.0	1.413	1.569	1.590	1.3	0.066	0.024	-64.1	1.656	1.613	-0.042	-2.6
879	1.198	0.0	2.593	1.569	1.590	1.3	0.075	0.080	6.6	1.665	1.669	0.005	0.3
RMS						4.4			33.7			0.041	2.8

MIT PRATT PROJECT DELFT SERIES MODEL VIII-A (BASE KEEL) 1976
LWL= 5.249FT, LSM= 5.294 FT, WETTED SURFACE= 9.198 FT**2, DRAFT= 1.135 FT, DISP=89.198 LB

UPRIGHT RESISTANCE WITH DOUBLE SAND RMS ERROR= 0.004 LB 0.5 PERCENT

V-KTS	V/RLT	FN	RF	RR	RU-LB	*RU-LB*	ERROR	E-PC	CF	CR	*CR*
0.986	0.428	0.128	0.130	0.053	0.183	0.184	0.001	0.7	0.00525	0.00216	0.00221
1.183	0.514	0.153	0.179	0.081	0.260	0.260	-0.000	-0.0	0.00504	0.00228	0.00228
1.380	0.600	0.179	0.235	0.120	0.355	0.351	-0.004	-1.0	0.00487	0.00247	0.00239
1.577	0.686	0.204	0.299	0.167	0.465	0.461	-0.005	-1.0	0.00472	0.00264	0.00257
1.775	0.771	0.230	0.366	0.220	0.589	0.592	0.004	0.6	0.00461	0.00275	0.00290
1.972	0.857	0.255	0.445	0.298	0.743	0.750	0.007	1.0	0.00450	0.00302	0.00310
2.070	0.900	0.268	0.485	0.348	0.833	0.841	0.008	0.9	0.00446	0.00320	0.00327
2.169	0.943	0.281	0.527	0.410	0.937	0.940	0.003	0.3	0.00441	0.00343	0.00345
2.267	0.985	0.293	0.571	0.481	1.052	1.047	-0.005	-0.4	0.00437	0.00368	0.00365
2.366	1.028	0.306	0.616	0.559	1.175	1.163	-0.012	-1.1	0.00433	0.00393	0.00384
2.465	1.071	0.319	0.663	0.629	1.292	1.287	-0.005	-0.4	0.00430	0.00408	0.00405
2.563	1.114	0.332	0.711	0.713	1.424	1.425	0.001	0.1	0.00426	0.00427	0.00428
2.662	1.157	0.344	0.761	0.822	1.583	1.584	0.001	0.1	0.00423	0.00457	0.00458
2.760	1.200	0.357	0.812	0.960	1.773	1.775	0.003	0.2	0.00420	0.00496	0.00498
2.859	1.243	0.370	0.865	1.148	2.013	2.014	0.001	0.1	0.00417	0.00553	0.00554
2.958	1.285	0.383	0.919	1.393	2.313	2.315	0.002	0.1	0.00414	0.00627	0.00628
3.056	1.328	0.396	0.975	1.710	2.685	2.685	-0.000	-0.0	0.00411	0.00721	0.00721
3.155	1.371	0.408	1.032	2.101	3.133	3.133	-0.000	-0.0	0.00408	0.00831	0.00831
3.253	1.414	0.421	1.091	2.571	3.662	3.662	-0.000	-0.0	0.00406	0.00956	0.00956
3.352	1.457	0.434	1.151	3.124	4.275	4.276	0.002	0.0	0.00403	0.01095	0.01095
3.451	1.500	0.447	1.213	3.770	4.983	4.977	-0.006	-0.1	0.00401	0.01247	0.01245
3.549	1.542	0.459	1.276	4.480	5.756	5.760	0.003	0.1	0.00399	0.01401	0.01402

UPRIGHT RESISTANCE WITH SINGLE SAND RMS ERROR= 0.007 LB 0.7 PERCENT

V-KTS	V/RLT	FN	RF	RR	RU-LB	*RU-LB*	ERROR	E-PC	CF	CR	*CR*
0.986	0.428	0.128	0.130	0.045	0.174	0.176	0.002	1.3	0.00525	0.00181	0.00190
1.183	0.514	0.153	0.179	0.072	0.251	0.250	-0.002	-0.7	0.00504	0.00204	0.00199
1.380	0.600	0.179	0.235	0.106	0.342	0.338	-0.004	-1.1	0.00487	0.00220	0.00212
1.577	0.686	0.204	0.299	0.151	0.450	0.444	-0.005	-1.2	0.00472	0.00239	0.00231
1.775	0.771	0.230	0.368	0.210	0.569	0.572	0.003	0.5	0.00461	0.00251	0.00255
1.972	0.857	0.255	0.445	0.270	0.714	0.724	0.010	1.4	0.00450	0.00273	0.00283
2.070	0.900	0.268	0.485	0.317	0.802	0.811	0.009	1.1	0.00446	0.00292	0.00299
2.169	0.943	0.281	0.527	0.372	0.900	0.905	0.006	0.6	0.00441	0.00312	0.00316
2.267	0.985	0.293	0.571	0.439	1.010	1.006	-0.003	-0.3	0.00437	0.00336	0.00334
2.366	1.028	0.306	0.616	0.511	1.127	1.115	-0.012	-1.0	0.00433	0.00359	0.00351
2.465	1.071	0.319	0.663	0.578	1.241	1.231	-0.010	-0.8	0.00430	0.00375	0.00368
2.563	1.114	0.332	0.711	0.649	1.360	1.359	-0.002	-0.1	0.00426	0.00389	0.00388
2.662	1.157	0.344	0.761	0.745	1.506	1.506	-0.000	-0.0	0.00423	0.00414	0.00414
2.760	1.200	0.357	0.812	0.872	1.684	1.684	-0.000	-0.0	0.00420	0.00451	0.00451
2.859	1.243	0.370	0.865	1.044	1.909	1.910	0.001	0.0	0.00417	0.00503	0.00503
2.958	1.285	0.383	0.919	1.274	2.194	2.198	0.004	0.2	0.00414	0.00574	0.00576
3.056	1.328	0.396	0.975	1.574	2.549	2.557	0.008	0.3	0.00411	0.00663	0.00667
3.155	1.371	0.408	1.032	1.953	2.985	2.994	0.009	0.3	0.00408	0.00773	0.00776
3.253	1.414	0.421	1.091	2.425	3.516	3.516	-0.001	-0.0	0.00406	0.00902	0.00902
3.352	1.457	0.434	1.151	2.991	4.143	4.126	-0.017	-0.4	0.00403	0.01048	0.01042
3.451	1.500	0.447	1.213	3.615	4.828	4.826	-0.003	-0.1	0.00401	0.01196	0.01195
3.549	1.542	0.459	1.276	4.331	5.606	5.614	0.007	0.1	0.00399	0.01354	0.01356

SIT PRATT PROJECT DELFT SERIES MODEL VIII-A (BASE KEEL) 1976
LWL= 5.249FT, LSH= 5.294 FT, WETTED SURFACE= 9.198 FT**2, DRAFT= 1.135 FT, DISP=89.198 LB

AVERAGE DELTA CT BETWEEN DOUBLE AND SINGLE SAND=.00045

RESIDUARY RESISTANCE COEFFICIENTS:

VRTL:	0.40000	0.60000	0.80000	1.00000	1.20000	1.40000	1.60000	1.80000
CR:	0.00130	0.00150	0.00199	0.00281	0.00408	0.00824	0.01527	0.02132
RR/DISP:	0.00031	0.00081	0.00192	0.00424	0.00886	0.02435	0.05892	0.10411

HEEL AND SIDE FORCE RESISTANCE COEFFICIENTS

C1:	1.5392
TE/T:	0.806
TE:	0.915

	1	2	3	4	5
V/RTL:	1.028	1.200	1.371	0.680	1.189
CPHI:	0.1811E-05	0.2828E-05	0.4110E-05		
CO:	0.5769E-02	0.1083E-01	0.2350E-01	0.1580E-02	0.1045E-01
AO:	1.131	1.778	3.128	0.435	1.731
AU:	1.163	1.775	3.133	0.452	1.722
EUP:	-0.032	0.003	-0.004	-0.017	0.009
EUP-PC:	-2.7	0.1	-0.1	-3.9	0.5

MIT PRATT PROJECT DELFT SERIES MODEL VIII-A (BASE KEEL) 1976
LWL= 5.249FT, LSM= 5.294 FT, WETTED SURFACE= 9.198 FT**2, DRAFT= 1.135 FT, DISP=89.198 LB

RUN	V/RTL	PHI	FH	*RO*	RO	EPC	RH	PRH	EPC	RT	PRT	ERR	EPC
1531	1.028	10.0	3.703	1.163	1.131	-2.7	0.203	0.190	-6.5	1.334	1.321	-0.013	-1.0
1532	1.028	10.0	2.610	1.163	1.131	-2.7	0.141	0.102	-27.5	1.272	1.233	-0.039	-3.1
1533	1.028	10.0	1.330	1.163	1.131	-2.7	0.082	0.039	-52.9	1.213	1.169	-0.043	-3.6
1534	1.028	10.0	3.716	1.163	1.131	-2.7	0.192	0.191	-0.5	1.323	1.322	-0.001	-0.1
1535	1.200	10.0	1.289	1.775	1.778	0.1	0.056	0.041	-27.6	1.834	1.819	-0.016	-0.8
1536	1.200	10.0	2.579	1.775	1.778	0.1	0.107	0.087	-18.5	1.885	1.865	-0.020	-1.1
1537	1.200	10.0	3.707	1.775	1.778	0.1	0.175	0.153	-12.6	1.953	1.931	-0.022	-1.1
1538	1.028	20.0	6.048	1.163	1.131	-2.7	0.488	0.528	8.3	1.618	1.659	0.041	2.5
1539	1.028	20.0	4.204	1.163	1.131	-2.7	0.249	0.289	15.7	1.380	1.419	0.039	2.8
1540	1.028	20.0	5.206	1.163	1.131	-2.7	0.368	0.408	10.7	1.499	1.539	0.040	2.6
1541	1.028	20.0	3.430	1.163	1.131	-2.7	0.179	0.214	19.5	1.310	1.344	0.035	2.7
1542	1.200	20.0	3.393	1.775	1.778	0.1	0.158	0.208	31.9	1.936	1.986	0.050	2.6
1543	1.200	20.0	5.969	1.775	1.778	0.1	0.422	0.433	2.4	2.200	2.211	0.010	0.5
1544	1.200	20.0	4.692	1.775	1.778	0.1	0.275	0.306	11.4	2.053	2.084	0.031	1.5
1545	1.371	20.0	5.931	3.133	3.128	-0.1	0.467	0.397	-15.0	3.596	3.526	-0.070	-1.9
1546	1.371	20.0	3.486	3.133	3.128	-0.1	0.238	0.233	-2.1	3.367	3.362	-0.005	-0.1
1547	1.371	20.0	4.763	3.133	3.128	-0.1	0.307	0.308	0.6	3.435	3.437	0.002	0.1
1548	1.371	20.0	3.461	3.133	3.128	-0.1	0.159	0.232	46.1	3.287	3.360	0.073	2.2
1549	1.028	30.0	6.247	1.163	1.131	-2.7	0.642	0.640	-0.3	1.773	1.771	-0.002	-0.1
1550	1.028	30.0	5.585	1.163	1.131	-2.7	0.551	0.541	-2.0	1.682	1.671	-0.011	-0.6
1551	1.028	30.0	8.098	1.163	1.131	-2.7	0.992	0.976	-1.6	2.123	2.107	-0.016	-0.8
1552	1.029	30.0	7.189	1.163	1.131	-2.7	0.829	0.800	-3.5	1.960	1.931	-0.029	-1.5
1553	1.200	30.0	7.869	1.775	1.778	0.1	0.841	0.803	-4.5	2.619	2.581	-0.038	-1.4
1554	1.200	30.0	5.346	1.775	1.778	0.1	0.480	0.493	2.8	2.258	2.271	0.014	0.6
1555	1.200	30.0	6.670	1.775	1.778	0.1	0.652	0.641	-1.6	2.430	2.419	-0.010	-0.4
1556	1.371	30.0	6.680	3.133	3.128	-0.1	0.657	0.648	-1.4	3.785	3.776	-0.009	-0.2
1557	1.371	30.0	5.346	3.133	3.128	-0.1	0.478	0.534	11.5	3.607	3.662	0.055	1.5
1558	1.371	30.0	7.815	3.133	3.128	-0.1	0.811	0.765	-5.7	3.940	3.894	-0.046	-1.2
1559	0.680	0.0	0.015	0.452	0.435	-3.9	0.019	0.000	-100.0	0.454	0.435	-0.019	-4.3
1560	0.680	0.0	0.622	0.452	0.435	-3.9	0.028	0.011	-60.1	0.463	0.446	-0.017	-3.7
1561	0.680	0.0	-0.675	0.452	0.435	-3.9	0.033	0.013	-59.4	0.467	0.448	-0.019	-4.1
1562	0.680	0.0	-1.303	0.452	0.435	-3.9	0.055	0.049	-9.8	0.489	0.484	-0.005	-1.1
1563	0.680	0.0	-1.863	0.452	0.435	-3.9	0.101	0.101	-0.2	0.536	0.536	-0.000	-0.0
1564	0.680	0.0	-2.540	0.452	0.435	-3.9	0.169	0.187	10.6	0.604	0.622	0.018	3.0
1565	0.680	0.0	-3.142	0.452	0.435	-3.9	0.260	0.286	10.3	0.694	0.721	0.027	3.8
1566	0.680	0.0	-3.812	0.452	0.435	-3.9	0.405	0.422	4.1	0.840	0.856	0.016	2.0
1567	1.189	0.0	-0.033	1.722	1.731	0.5	-0.005	0.000	-100.2	1.726	1.731	0.005	0.3
1568	1.189	0.0	0.608	1.722	1.731	0.5	0.004	0.004	-10.7	1.735	1.735	-0.000	-0.0
1569	1.189	0.0	-0.571	1.722	1.731	0.5	0.013	0.003	-75.7	1.744	1.734	-0.010	-0.6
1570	1.189	0.0	-1.197	1.722	1.731	0.5	0.026	0.014	-47.7	1.757	1.745	-0.012	-0.7
1571	1.189	0.0	-1.892	1.722	1.731	0.5	0.039	0.034	-13.4	1.770	1.765	-0.005	-0.3
1572	1.189	0.0	-2.729	1.722	1.731	0.5	0.068	0.071	4.1	1.799	1.802	0.003	0.2
1573	1.189	0.0	-3.803	1.722	1.731	0.5	0.176	0.137	-22.0	1.907	1.868	-0.039	-2.0
1574	1.189	0.0	-5.263	1.722	1.731	0.5	0.240	0.262	9.4	1.971	1.994	0.023	1.1
1575	1.189	0.0	-6.614	1.722	1.731	0.5	0.379	0.415	9.5	2.110	2.146	0.036	1.7
RMS						2.2			31.9			0.029	1.9

MIT PRATT PROJECT DELFT SERIES MODEL IX-A (BASE KEEL) 1976
LWL= 5.249FT, LSM= 5.088 FT, WETTED SURFACE= 9.073 FT**2, DRAFT= 1.135 FT, DISP=89.198 LB

UPRIGHT RESISTANCE WITH DOUBLE SAND RMS ERROR= 0.008 LB 0.4 PERCENT

V-KTS	V/RLT	FN	RF	RR	RU-LB	*RU-LB*	ERROR	E-PC	CF	CR	*CR*
0.946	0.437	0.130	0.127	0.049	0.176	0.176	-0.000	-0.0	0.00522	0.00203	0.00203
1.183	0.524	0.156	0.175	0.078	0.254	0.253	-0.001	-0.3	0.00501	0.00223	0.00220
1.380	0.612	0.182	0.231	0.113	0.344	0.344	0.000	0.1	0.00484	0.00237	0.00238
1.577	0.699	0.208	0.293	0.157	0.450	0.452	0.002	0.5	0.00470	0.00252	0.00256
1.775	0.787	0.234	0.361	0.214	0.575	0.577	0.002	0.3	0.00458	0.00272	0.00274
1.972	0.874	0.260	0.436	0.285	0.721	0.721	0.000	0.0	0.00448	0.00293	0.00293
2.070	0.918	0.273	0.476	0.329	0.805	0.801	-0.004	-0.4	0.00443	0.00307	0.00303
2.169	0.962	0.286	0.517	0.376	0.893	0.888	-0.005	-0.6	0.00439	0.00319	0.00315
2.267	1.005	0.299	0.560	0.428	0.988	0.982	-0.005	-0.5	0.00435	0.00332	0.00328
2.366	1.049	0.312	0.604	0.485	1.089	1.086	-0.003	-0.2	0.00431	0.00346	0.00344
2.465	1.093	0.325	0.650	0.549	1.199	1.203	0.003	0.3	0.00427	0.00361	0.00363
2.563	1.136	0.338	0.697	0.630	1.327	1.338	0.011	0.8	0.00424	0.00383	0.00389
2.662	1.180	0.351	0.746	0.744	1.490	1.503	0.013	0.9	0.00421	0.00419	0.00427
2.760	1.224	0.364	0.796	0.919	1.715	1.715	-0.001	-0.0	0.00417	0.00482	0.00481
2.859	1.267	0.377	0.848	1.149	1.997	1.992	-0.005	-0.2	0.00414	0.00561	0.00559
2.958	1.311	0.390	0.902	1.455	2.357	2.355	-0.002	-0.1	0.00412	0.00664	0.00664
3.056	1.355	0.403	0.956	1.868	2.824	2.811	-0.013	-0.5	0.00409	0.00799	0.00793
3.155	1.399	0.416	1.012	2.363	3.375	3.366	-0.009	-0.3	0.00406	0.00943	0.00944
3.253	1.442	0.429	1.070	2.951	4.021	4.021	-0.000	-0.0	0.00404	0.01114	0.01114
3.352	1.486	0.442	1.129	3.631	4.760	4.773	0.014	0.3	0.00401	0.01291	0.01295
3.451	1.530	0.456	1.190	4.408	5.598	5.613	0.015	0.3	0.00399	0.01479	0.01484
3.549	1.573	0.469	1.251	5.285	6.537	6.523	-0.014	-0.2	0.00397	0.01676	0.01671

UPRIGHT RESISTANCE WITH SINGLE SAND RMS ERROR= 0.008 LB 0.4 PERCENT

V-KTS	V/RLT	FN	RF	RR	RU-LB	*RU-LB*	ERROR	E-PC	CF	CR	*CR*
0.946	0.437	0.130	0.127	0.038	0.165	0.165	0.000	0.1	0.00522	0.00158	0.00158
1.183	0.524	0.156	0.175	0.063	0.238	0.237	-0.001	-0.3	0.00501	0.00179	0.00177
1.380	0.612	0.182	0.231	0.093	0.324	0.324	-0.000	-0.1	0.00484	0.00196	0.00195
1.577	0.699	0.208	0.293	0.131	0.423	0.425	0.002	0.5	0.00470	0.00210	0.00213
1.775	0.787	0.234	0.361	0.179	0.540	0.543	0.003	0.5	0.00458	0.00227	0.00230
1.972	0.874	0.260	0.436	0.241	0.677	0.678	0.001	0.1	0.00448	0.00247	0.00248
2.070	0.918	0.273	0.476	0.281	0.756	0.753	-0.003	-0.4	0.00443	0.00261	0.00259
2.169	0.962	0.286	0.517	0.323	0.840	0.835	-0.005	-0.6	0.00439	0.00274	0.00270
2.267	1.005	0.299	0.560	0.371	0.930	0.925	-0.005	-0.6	0.00435	0.00288	0.00284
2.366	1.049	0.312	0.604	0.425	1.030	1.025	-0.004	-0.4	0.00431	0.00304	0.00300
2.465	1.093	0.325	0.650	0.488	1.138	1.138	0.001	0.1	0.00427	0.00321	0.00321
2.563	1.136	0.338	0.697	0.562	1.259	1.271	0.013	1.0	0.00424	0.00341	0.00349
2.662	1.180	0.351	0.746	0.676	1.422	1.436	0.013	0.9	0.00421	0.00381	0.00389
2.760	1.224	0.364	0.796	0.846	1.642	1.645	0.003	0.2	0.00417	0.00443	0.00445
2.859	1.267	0.377	0.848	1.081	1.929	1.921	-0.008	-0.4	0.00414	0.00528	0.00524
2.958	1.311	0.390	0.902	1.380	2.282	2.280	-0.002	-0.1	0.00412	0.00630	0.00629
3.056	1.355	0.403	0.956	1.789	2.745	2.731	-0.014	-0.5	0.00409	0.00765	0.00759
3.155	1.399	0.416	1.012	2.273	3.285	3.279	-0.006	-0.2	0.00406	0.00912	0.00910
3.253	1.442	0.429	1.070	2.861	3.931	3.927	-0.004	-0.1	0.00404	0.01080	0.01078
3.352	1.486	0.442	1.129	3.529	4.658	4.673	0.014	0.3	0.00401	0.01255	0.01260
3.451	1.530	0.456	1.190	4.300	5.490	5.507	0.017	0.3	0.00399	0.01442	0.01448
3.549	1.573	0.469	1.251	5.177	6.429	6.414	-0.015	-0.2	0.00397	0.01642	0.01637

MIT PRATT PROJECT DELFT SERIES MODEL IX-A (BASE KEEL) 1976
LWL= 5.249FT, LSM= 5.088 FT, WETTED SURFACE= 9.073 FT**2, DRAFT= 1.135 FT, DISP=89.198 LB

AVERAGE DELTA CT BETWEEN DOUBLE AND SINGLE SAND=.00039

RESIDUARY RESISTANCE COEFFICIENTS:

VBTL:	0.40000	0.60000	0.80000	1.00000	1.20000	1.40000	1.60000	1.80000
CR:	0.00119	0.00158	0.00199	0.00249	0.00372	0.00872	0.01704	0.02160
RR/DISP:	0.00027	0.00081	0.00182	0.00356	0.00765	0.02442	0.06230	0.09996

HEEL AND SIDE FORCE RESISTANCE COEFFICIENTS

C1:	1.5250
TE/T:	0.810
TE:	0.919

	1	2	3	4	5
V/RTL:	1.049	1.224	1.399	0.693	1.212
CPHI:	0.1380E-05	0.4660E-05	0.5394E-05		
CO:	0.5298E-02	0.1036E-01	0.2810E-01	0.1594E-02	0.9865E-02
RO:	1.077	1.720	3.519	0.430	1.663
RU:	1.086	1.715	3.366	0.444	1.654
EUP:	-0.010	0.006	0.153	-0.014	0.009
EUP-PC:	-0.9	0.3	4.5	-3.1	0.5

MIT PRATT PROJECT DELFT SERIES MODEL IX-A (BASE KEEL) 1976
LWL= 5.249FT, LSM= 5.088 FT, WETTED SURFACE= 9.073 FT**2, DRAFT= 1.135 FT, DISP=89.198 LB

RUN	V/RTL	PHI	FH	*RH*	RO	EPC	RH	PRH	EPC	RT	PRT	ERR	EPC
1580	1.049	10.0	1.598	1.086	1.077	-0.9	0.052	0.044	-14.8	1.129	1.121	-0.008	-0.7
1581	1.049	10.0	2.850	1.086	1.077	-0.9	0.118	0.114	-3.3	1.195	1.191	-0.004	-0.3
1582	1.049	10.0	2.299	1.086	1.077	-0.9	0.090	0.079	-12.2	1.166	1.155	-0.011	-0.9
1583	1.049	10.0	3.359	1.086	1.077	-0.9	0.160	0.154	-3.9	1.237	1.231	-0.006	-0.5
1584	1.049	10.0	3.060	1.086	1.077	-0.9	0.143	0.130	-8.8	1.219	1.207	-0.013	-1.0
1585	1.224	10.0	3.134	1.715	1.720	0.3	0.158	0.132	-16.4	1.878	1.852	-0.026	-1.4
1586	1.224	10.0	0.907	1.715	1.720	0.3	0.041	0.049	19.0	1.762	1.769	0.008	0.4
1587	1.224	10.0	2.111	1.715	1.720	0.3	0.085	0.083	-3.2	1.806	1.803	-0.003	-0.1
1588	1.049	20.0	4.500	1.086	1.077	-0.9	0.297	0.304	2.3	1.374	1.380	0.007	0.5
1589	1.049	20.0	3.484	1.086	1.077	-0.9	0.198	0.202	2.1	1.274	1.278	0.004	0.3
1590	1.049	20.0	5.502	1.086	1.077	-0.9	0.405	0.429	6.1	1.482	1.506	0.025	1.7
1591	1.049	20.0	4.491	1.086	1.077	-0.9	0.284	0.303	6.7	1.360	1.379	0.019	1.4
1592	1.049	20.0	4.265	1.086	1.077	-0.9	0.266	0.278	4.4	1.343	1.354	0.012	0.9
1593	1.224	20.0	4.160	1.715	1.720	0.3	0.321	0.326	1.4	2.042	2.046	0.005	0.2
1594	1.224	20.0	2.947	1.715	1.720	0.3	0.220	0.246	12.1	1.940	1.967	0.026	1.4
1595	1.224	20.0	5.347	1.715	1.720	0.3	0.434	0.430	-0.8	2.154	2.150	-0.004	-0.2
1596	1.224	20.0	4.636	1.715	1.720	0.3	0.359	0.365	1.6	2.079	2.085	0.006	0.3
1597	1.399	20.0	3.144	3.366	3.519	4.5	0.255	0.262	2.7	3.774	3.781	0.007	0.2
1598	1.399	20.0	5.551	3.366	3.519	4.5	0.436	0.410	-6.0	3.955	3.929	-0.026	-0.7
1599	1.399	20.0	4.265	3.366	3.519	4.5	0.302	0.321	6.4	3.821	3.840	0.019	0.5
1600	1.399	20.0	3.890	3.366	3.519	4.5	0.299	0.299	-0.0	3.818	3.818	-0.000	-0.0
1601	1.049	30.0	5.135	1.086	1.077	-0.9	0.445	0.442	-0.6	1.521	1.519	-0.003	-0.2
1602	1.049	30.0	7.405	1.086	1.077	-0.9	0.809	0.800	-1.1	1.885	1.876	-0.009	-0.5
1603	1.049	30.0	6.288	1.086	1.077	-0.9	0.621	0.607	-2.2	1.698	1.684	-0.014	-0.8
1604	1.224	30.0	4.460	1.715	1.720	0.3	0.531	0.559	5.4	2.251	2.280	0.029	1.3
1605	1.224	30.0	7.184	1.715	1.720	0.3	0.868	0.850	-4.2	2.608	2.571	-0.038	-1.4
1606	1.224	30.0	5.835	1.715	1.720	0.3	0.692	0.688	-0.5	2.412	2.408	-0.003	-0.1
1607	1.399	30.0	5.056	3.366	3.519	4.5	0.575	0.614	6.7	4.094	4.133	0.039	0.9
1608	1.399	30.0	7.243	3.366	3.519	4.5	0.851	0.804	-5.5	4.370	4.323	-0.047	-1.1
1609	1.399	30.0	6.153	3.366	3.519	4.5	0.692	0.700	1.2	4.211	4.219	0.009	0.2
1610	0.693	0.0	0.011	0.444	0.430	-3.1	0.017	0.000	-100.0	0.448	0.430	-0.017	-3.8
1612	0.693	0.0	-0.670	0.444	0.430	-3.1	0.024	0.013	-45.7	0.454	0.443	-0.011	-2.4
1611	0.693	0.0	0.615	0.444	0.430	-3.1	0.019	0.011	-43.9	0.450	0.441	-0.009	-1.9
1613	0.693	0.0	-1.226	0.444	0.430	-3.1	0.052	0.043	-17.6	0.483	0.474	-0.009	-1.9
1614	0.693	0.0	-1.905	0.444	0.430	-3.1	0.103	0.104	1.1	0.534	0.535	0.001	0.2
1615	0.693	0.0	-2.491	0.444	0.430	-3.1	0.178	0.179	0.2	0.608	0.609	0.000	0.1
1616	0.693	0.0	-3.155	0.444	0.430	-3.1	0.260	0.266	10.2	0.690	0.717	0.027	3.8
1617	0.693	0.0	-3.757	0.444	0.430	-3.1	0.374	0.406	8.4	0.805	0.836	0.032	3.9
1618	0.693	0.0	-0.342	0.444	0.430	-3.1	0.017	0.003	-80.5	0.448	0.434	-0.014	-3.1
1619	1.212	0.0	-0.018	1.654	1.663	0.5	0.006	0.000	-99.9	1.669	1.663	-0.006	-0.3
1620	1.212	0.0	0.483	1.654	1.663	0.5	-0.008	0.002	-129.2	1.656	1.665	0.010	0.6
1621	1.212	0.0	-0.688	1.654	1.663	0.5	-0.003	0.004	-243.2	1.660	1.668	0.008	0.5
1622	1.212	0.0	-1.268	1.654	1.663	0.5	0.045	0.015	-66.7	1.709	1.678	-0.030	-1.8
1623	1.212	0.0	-2.538	1.654	1.663	0.5	0.056	0.061	7.3	1.720	1.724	0.004	0.2
1624	1.212	0.0	-3.907	1.654	1.663	0.5	0.134	0.143	7.4	1.797	1.807	0.010	0.6
1625	1.212	0.0	-5.223	1.654	1.663	0.5	0.250	0.256	2.4	1.914	1.920	0.006	0.3
1626	1.212	0.0	-6.438	1.654	1.663	0.5	0.389	0.390	0.1	2.053	2.053	0.000	0.0
1627	1.212	0.0	-7.048	1.654	1.663	0.5	0.469	0.467	-0.3	2.132	2.130	-0.002	-0.1
RMS						2.3			48.5			0.017	1.4

Appendix B

MODEL DISCRIPTIONS

The Delft Model Series was designed and built under the H. Irving Pratt Ocean Race Handicapping Project of MIT during 1975 and 1976. Each hull consists of a faired canoe body to which a fin keel and spade rudder have been attached. The parent hull for the series is based on the "Standfast 43", a Frans Maas design. Eight additional canoe bodies in four pairs complete the series. Each pair possesses a variation in a specific form parameter which brackets the value of that parameter for the parent hull. These variations are summarized in Table 2.

The keels for all models possess a NACA 63_2-015 water line section, and the rudders are a NACA 0012 section. Attached at the end of this appendix are the full-scale body plans for the nine models. Station spacing is 1.640 ft. and the model scale ratio is 6.25. Also included are the results of processing each model through a hydrostatics program developed by the Pratt Project. Some further details of the series may be found in Ref. [2].

TABLE 2

NON-DIMENSIONAL HULL GEOMETRIC RATIOS FOR DELFT SERIES MODELS

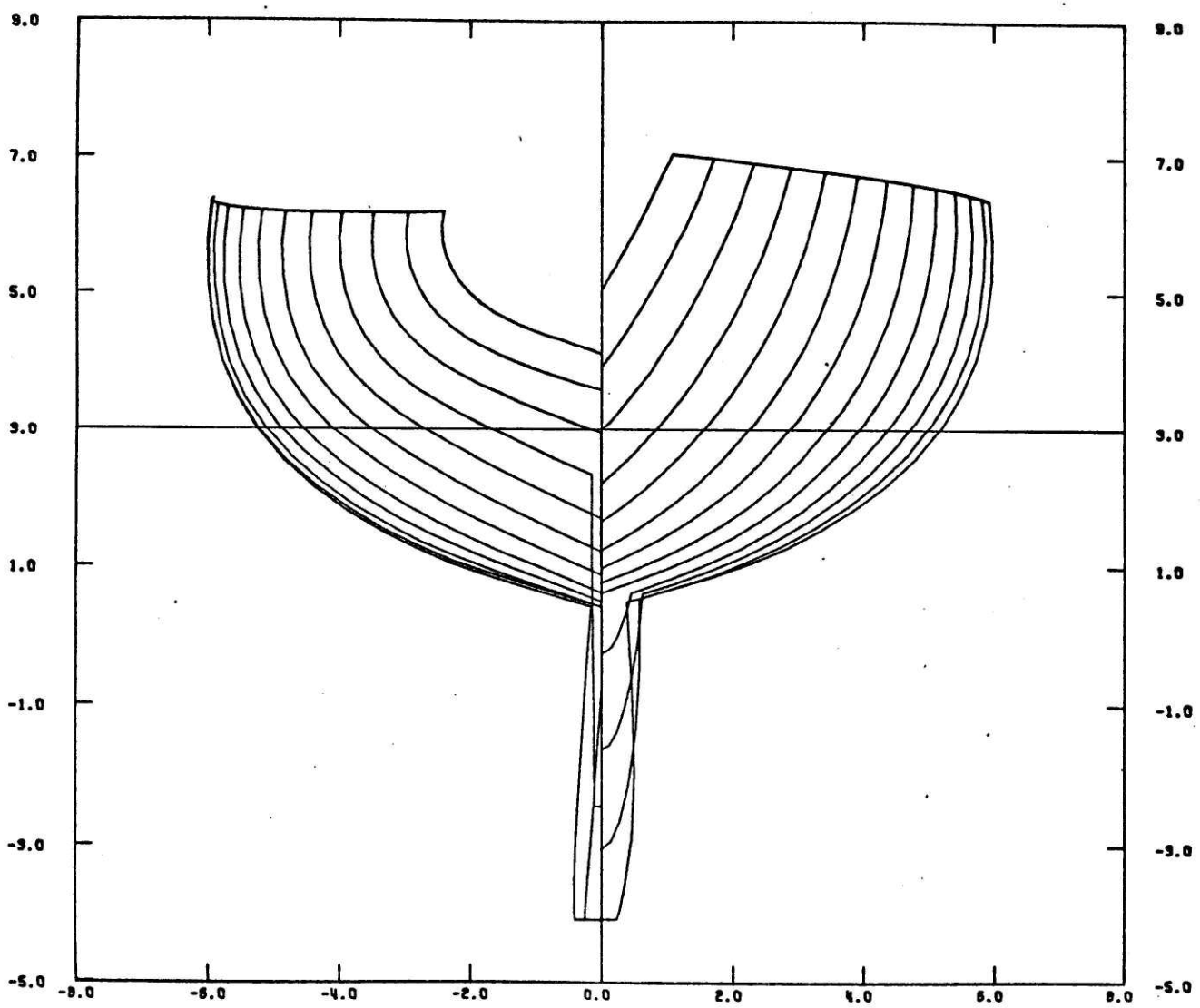
		MODEL NUMBER								
		1	2	3	4	5	6	7	8	9
Displacement/Length	Δ(Long tons)/(.01L)^3	283	283	282	236	366	370	230	283	283
Volumetric	$\nabla/L^3 \times 10^3$	9.91	9.92	9.88	8.27	12.83	12.96	8.06	9.91	9.91
Wetted Surface (Canoe Body)	Sc/L^2	.2520	.2389	.2746	.2283	.2912	.2750	.2404	.2543	.2497
(Total)	S/L^2	.3315	.3185	.3541	.3078	.3707	.3545	.3199	.3338	.3292
Length/Draft (Canoe Body)	L/T_c	12.51	10.95	14.47	13.79	10.81	9.38	15.63	12.51	12.51
Length/Draft (Total)	L/T	4.62	4.39	4.83	4.75	4.33	4.09	5.01	4.62	4.62
Length/Beam	L/BWL	3.12	3.57	2.71	3.45	2.68	3.12	3.12	3.22	3.01
Beam/Draft	BWL/T_c	4.00	3.06	5.35	4.00	4.00	3.00	5.00	3.89	4.16
Long Pos. of CB (% L Aft of FWL)	$x_B/L \times 100$	52.10	52.10	52.10	52.10	52.10	52.10	52.10	52.21	52.00
Vert. Pos. of CB (% L Below DWL)	$z_B/L \times 100$	2.68	3.08	2.32	2.43	3.11	3.57	2.13	2.68	2.71
Ht. of Metacenter (% L Above DWL)	$z_M/L \times 100$	10.21	5.58	17.49	8.93	12.13	6.40	13.50	10.00	10.52
Prismatic (Canoe Body)	$C_P=\nabla c/A_M L$	.573	.573	.573	.573	.573	.573	.573	.595	.551
Midships Section (Canoe Body)	$C_M=A_M/BWL \times T_c$	.637	.637	.637	.637	.637	.637	.637	.637	.637
Waterplane	$C_{WP}=AWP/L \times BWL$	.690	.690	.690	.690	.690	.690	.690	.724	.654

NOTES:

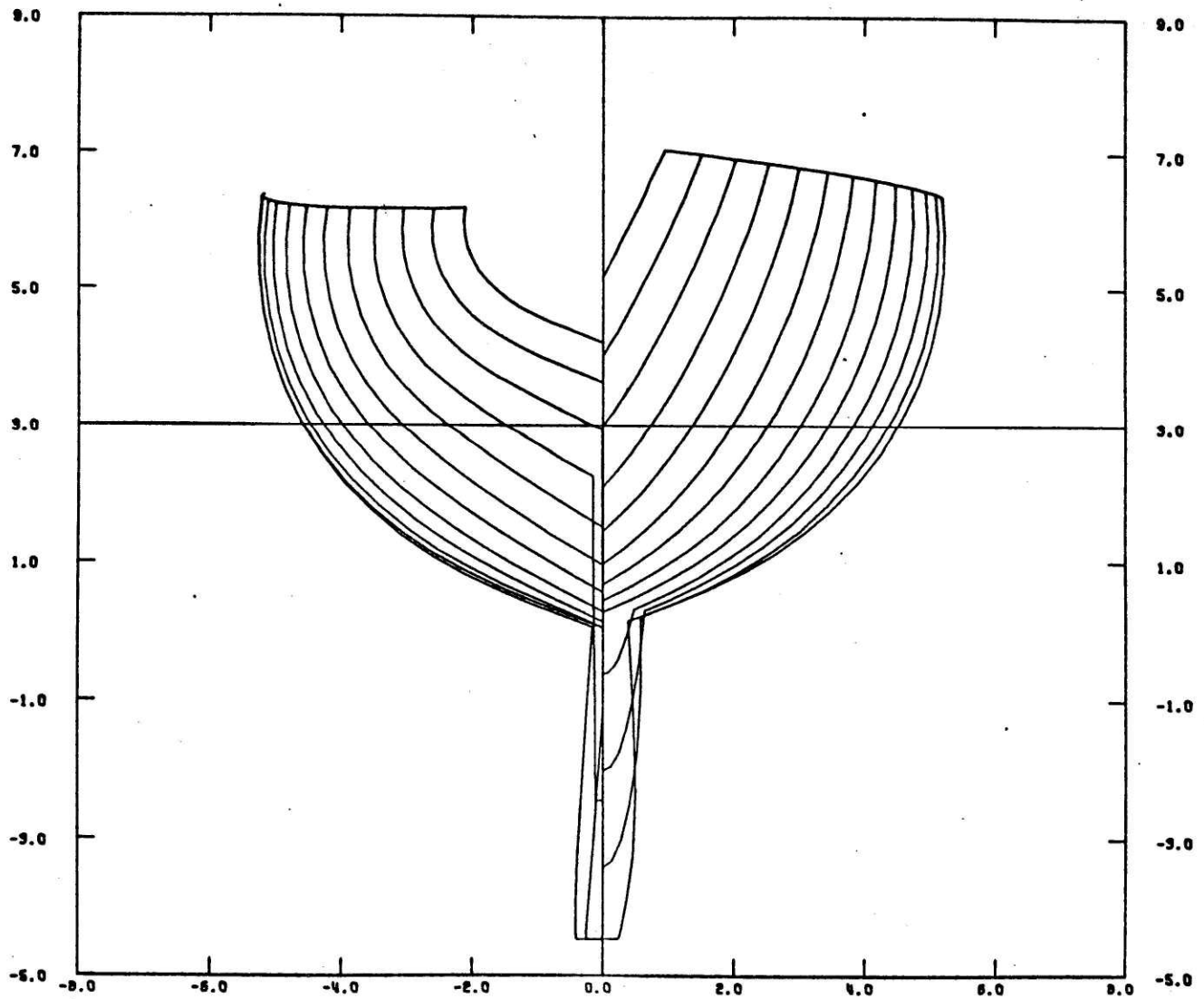
(1) Displacement/Length and Volumetric ratios are based on tested displacements reported by Delft. These differ slightly from design values, the largest deviation being 0.8 percent. All other ratios are based on design values.

(2) Prismatic coefficient is based on the midships section area, which is approximately 1.1% less than the maximum section area for all models. (The section with maximum area is located approximately .05L aft of amidships).

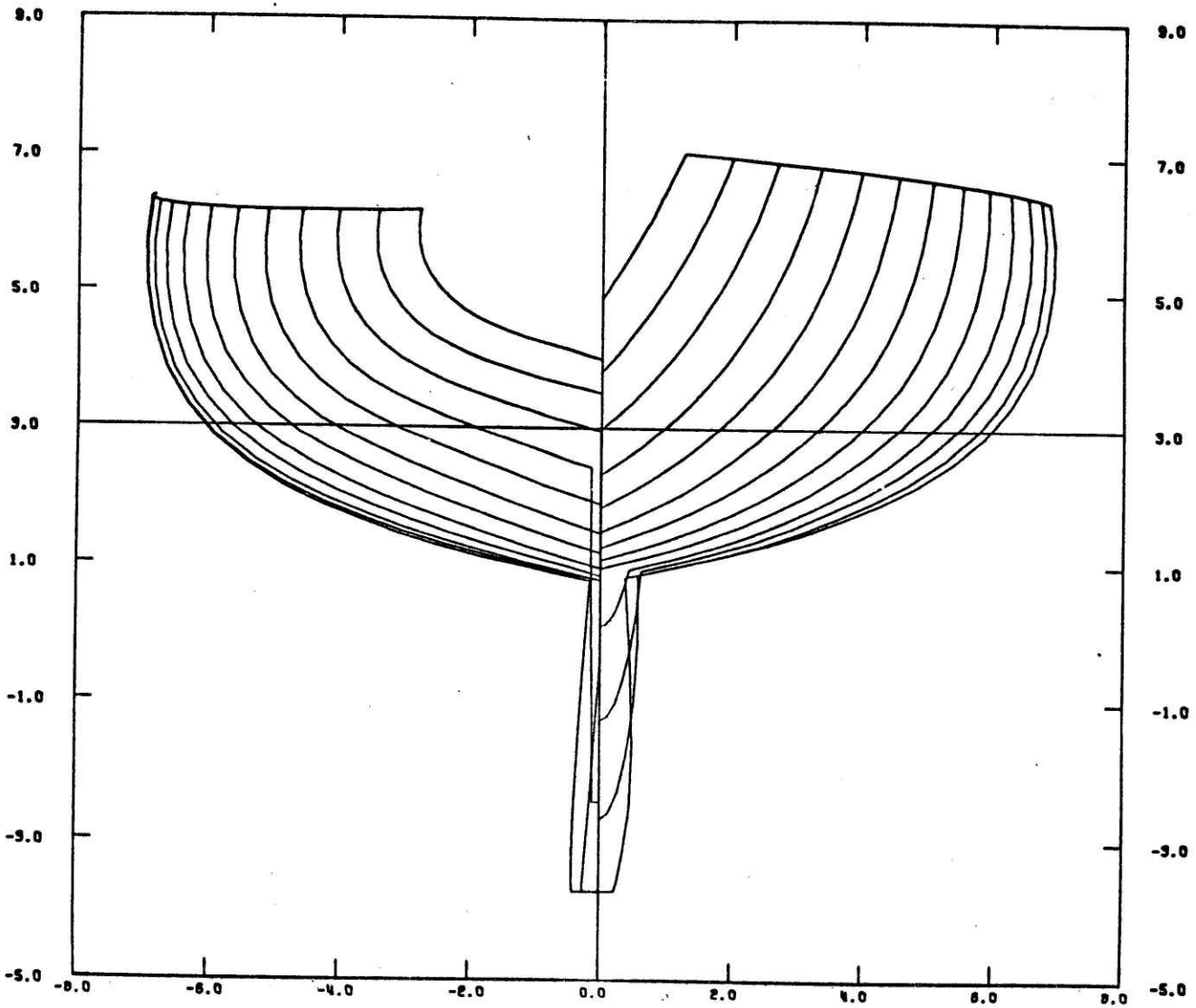
(3) The reference length L corresponds to the distance between stations 0-10 on the lines drawing. The actual waterline length exceeds this value by a small amount due to the extension of the immersed stern profile aft of station 10. This extension varies with model number with an average value of 0.6% of L.



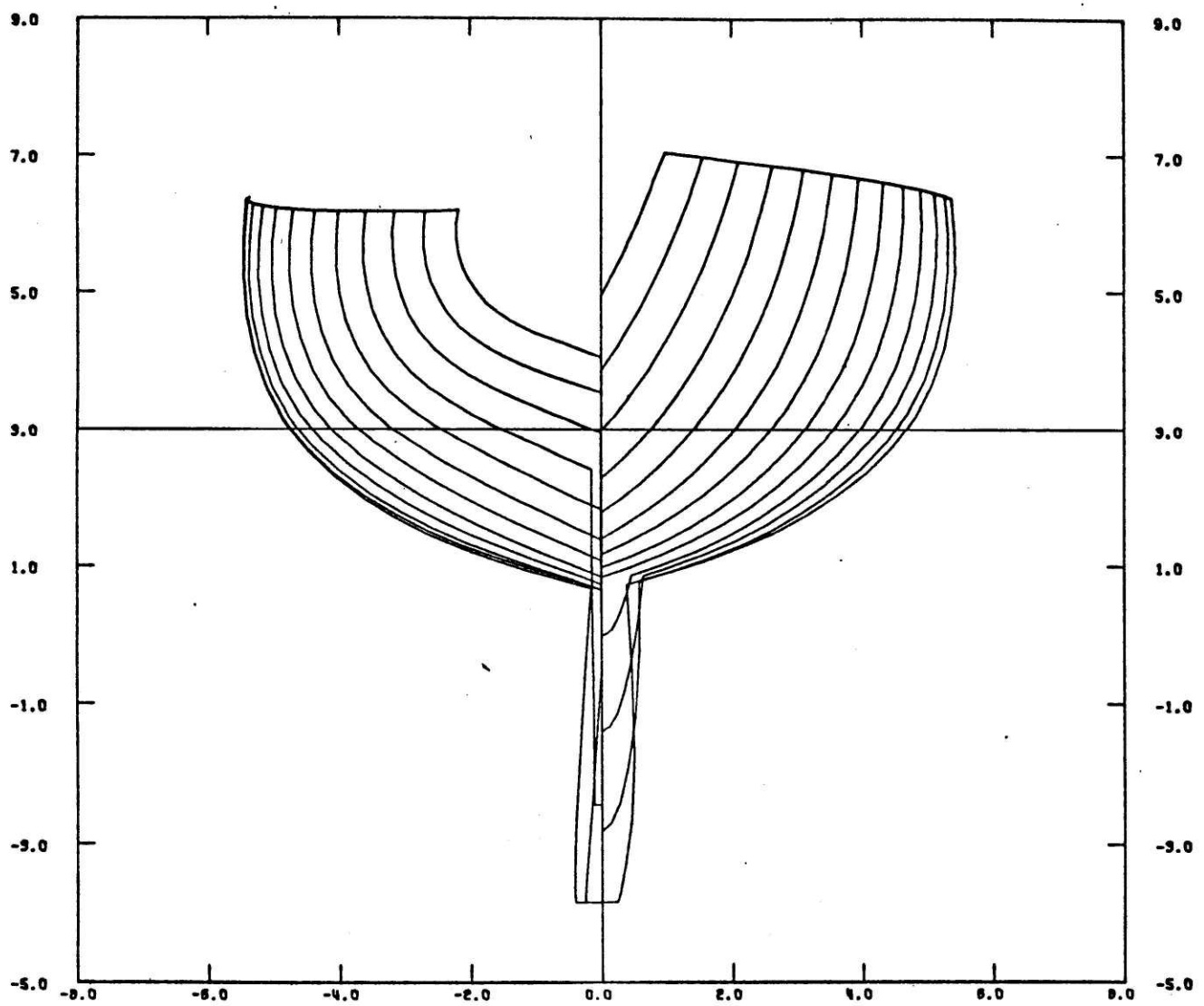
DELFT MODEL 1 WITH KEEL AND RUDDER



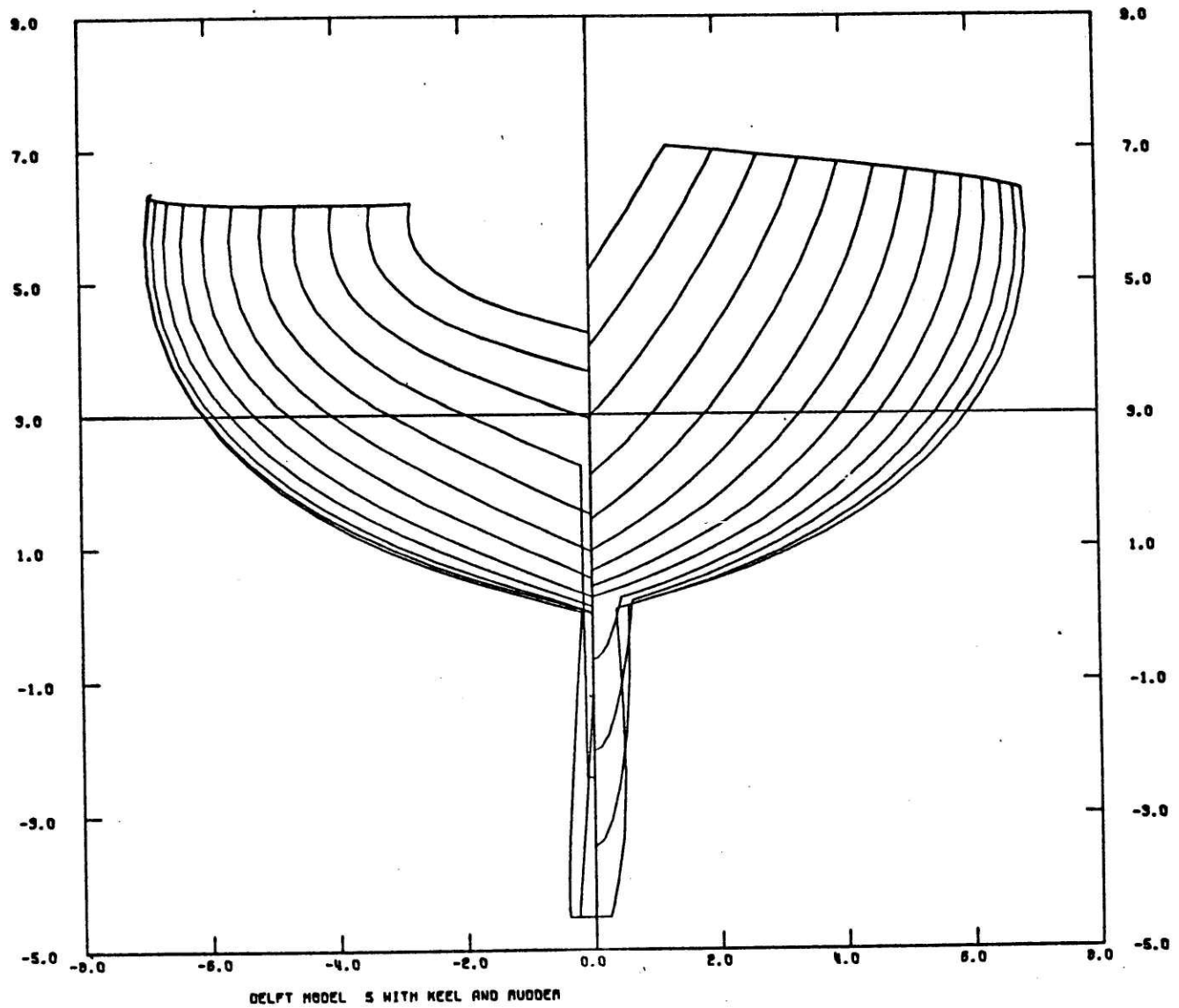
DELFT MODEL 2 WITH KEEL AND RUDDER



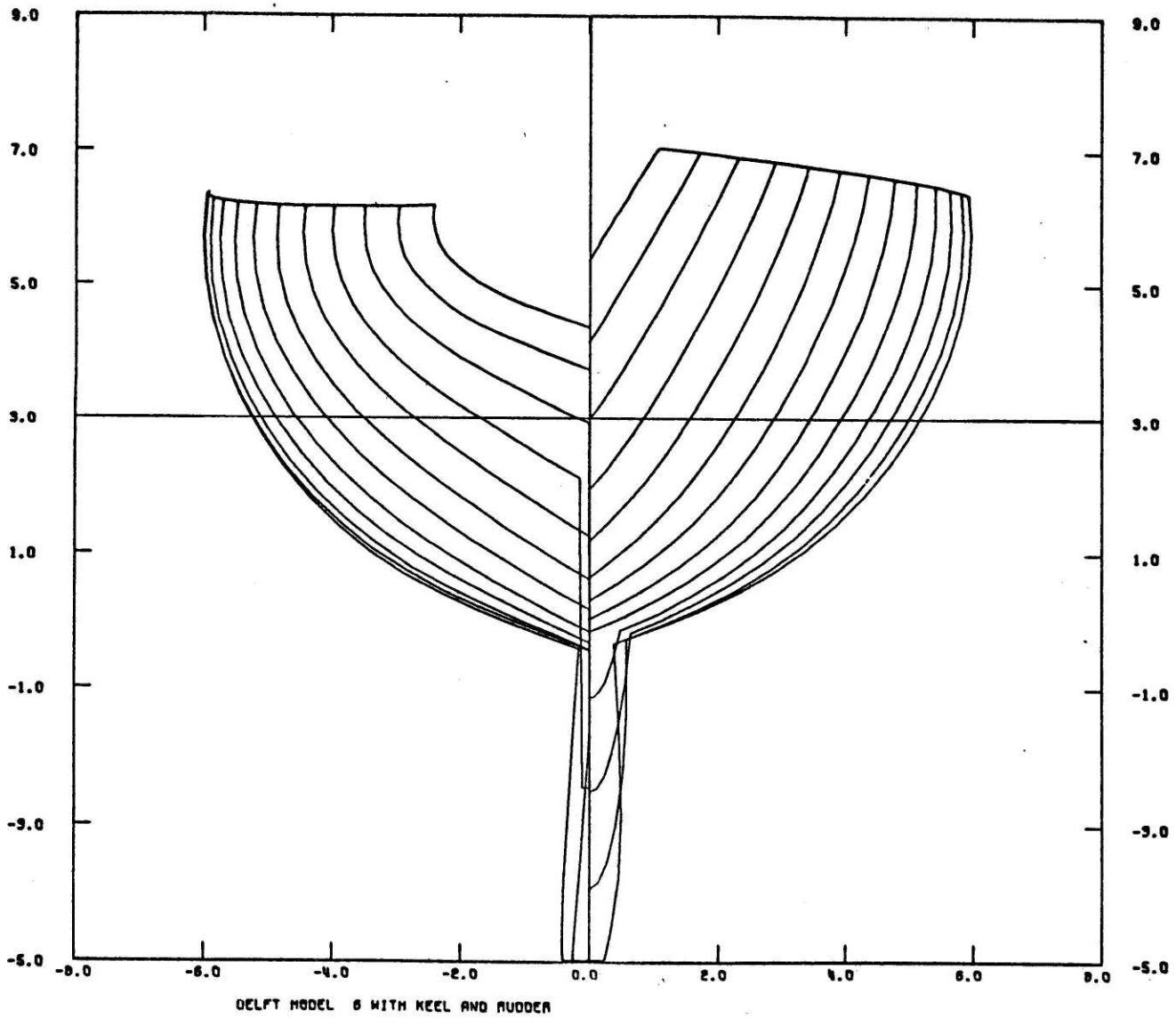
DELFT MODEL 3 WITH KEEL AND RUDDER



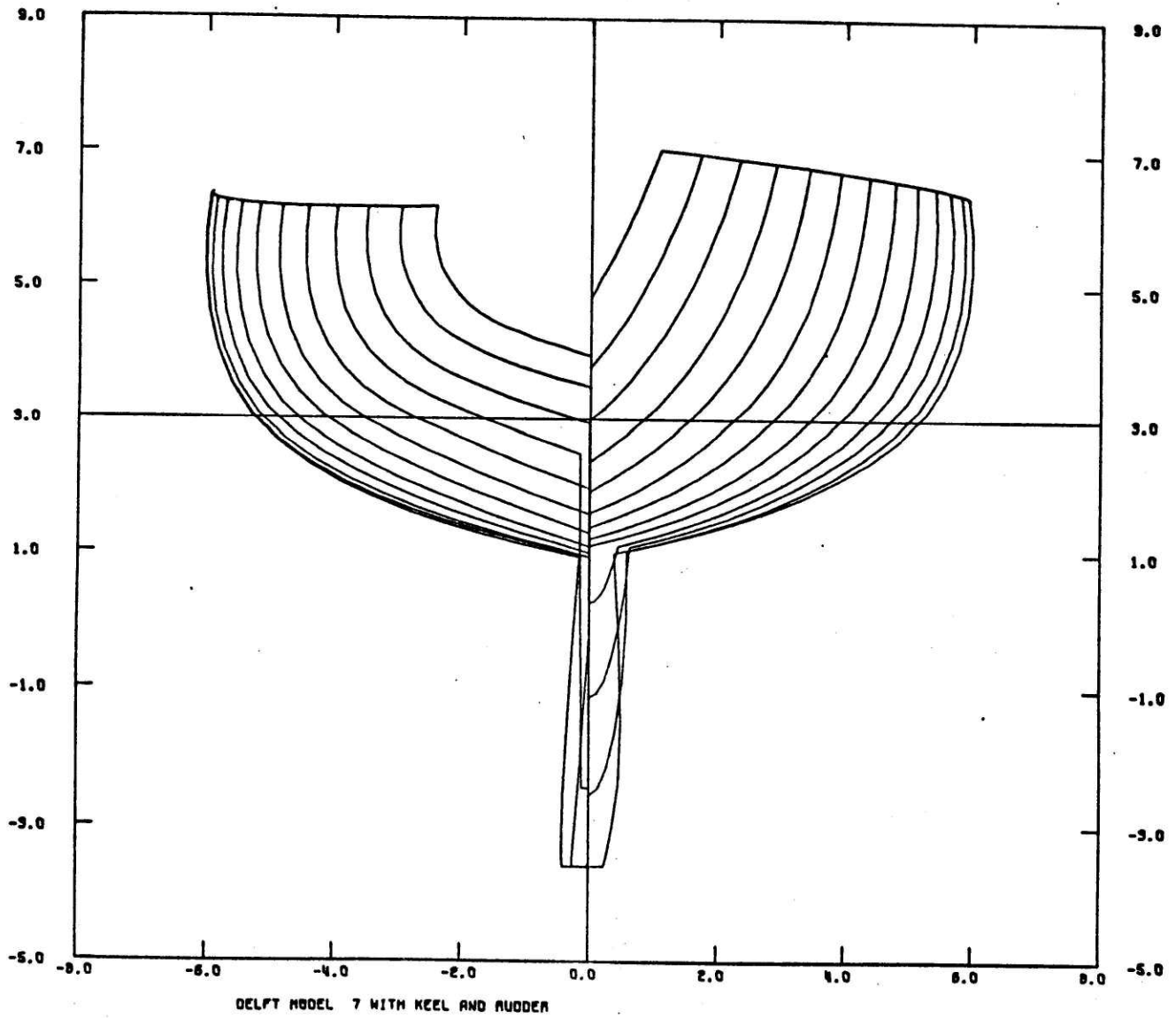
DELFT MODEL 4 WITH KEEL AND RUDDER



DELFT MODEL 5 WITH KEEL AND RUDDER



DELFT MODEL 6 WITH KEEL AND RUDDER


9.0
7.0
5.0
3.0
1.0
-1.0
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-5.0
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-6.0
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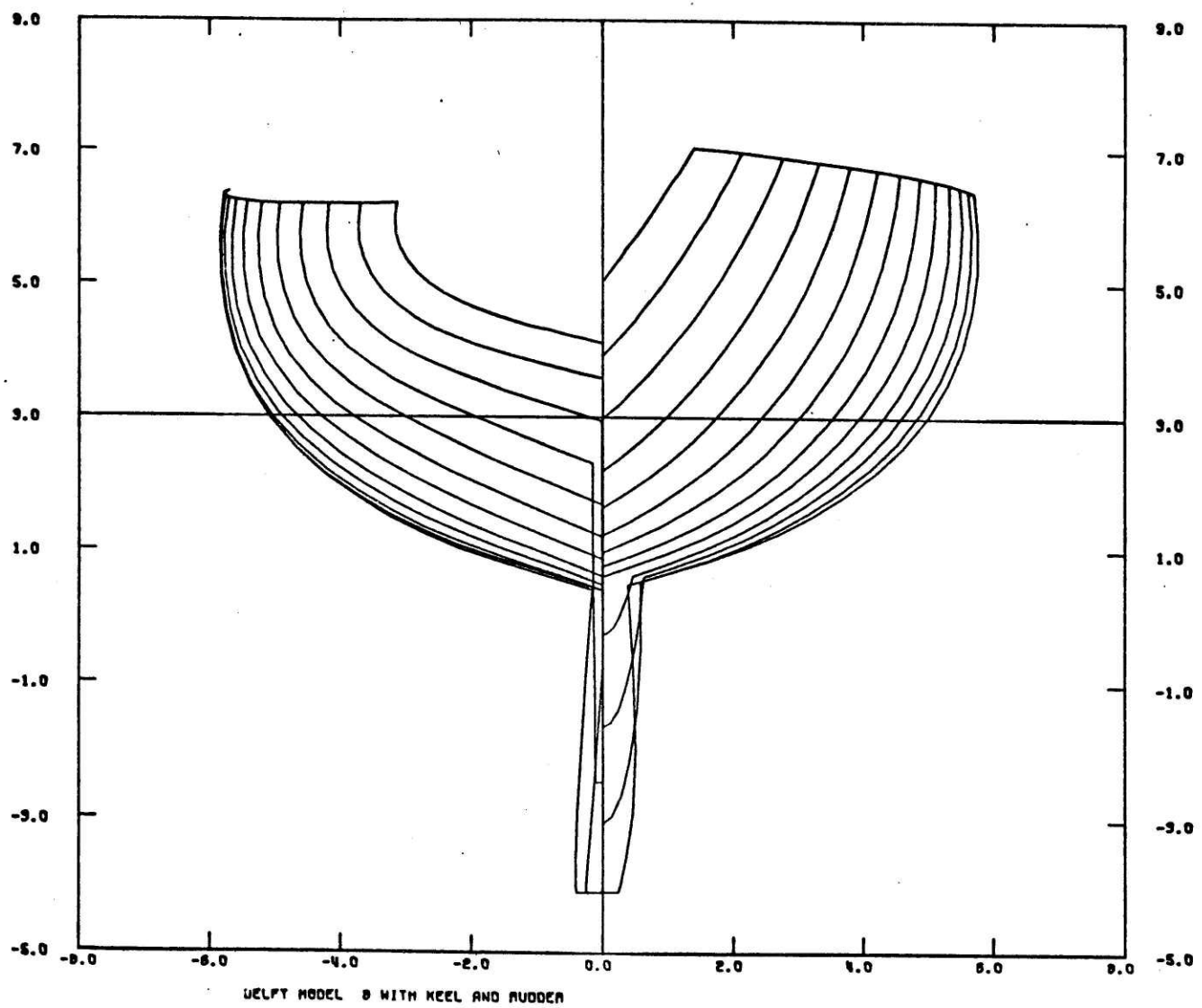
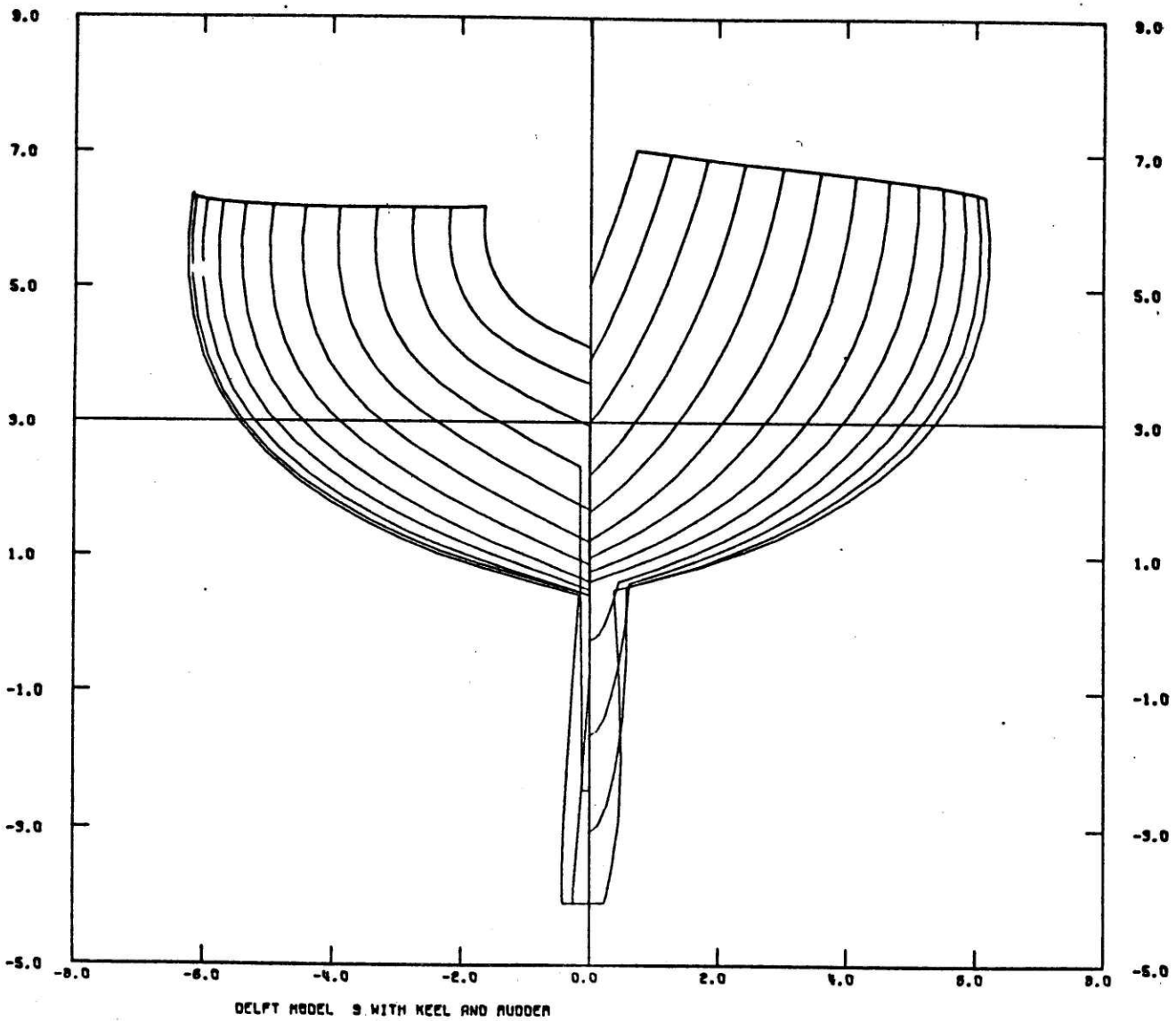
-2.0
0.0
2.0
4.0
6.0
8.0
DELFT MODEL 7 WITH KEEL AND RUDDER



DELFT MODEL 8 WITH KEEL AND RUDDER



DELFT MODEL 9 WITH KEEL AND RUDDER

MIT - H IRVING PRATT OCEAN RACE HANDICAPPING PROJECT
LINES PROCESSING PROGRAM - JAN 1978

DELFT MODEL 1 WITH KEEL

BEAM= 10.19 10.19 10.50 11.90

DRAFT= 7.09 7.10 6.26 8.17 MAX SECT AREA= 21.23

B/TC= 3.60 3.60 3.75 3.45

FREEBOARDS FROM: FREEBOARDS ASSUMED AS DESIGNED

'STEMHEAD' LOCATION: XMEAS= -1.00 XRLWL(1)= -4.24

'FGO'= 4.28 'LBG'=31.17 FF(1)= 3.91 FA(1)= 3.18

	1	2	3	4
HEEL DEGREES	0.0	2.000	25.000	0.0
FREEBOARD FWD (AT 0.0 FT)	3.911	3.912	4.136	3.101
FREEBOARD AFT (AT 33.009 FT)	3.175	3.178	3.669	1.960
DISPLACEMENT CUBIC FT	346.2	346.2	346.5	622.6
DISPLACEMENT POUNDS SW	22159	22159	22178	39844
LCB % AFT OF FWD END OF LWL(1)	51.87	51.87	51.89	54.11
VCB ABOVE WATERPLANE(1) FT	-1.11	-1.10	-0.73	-0.37
VCG ABOVE WATERPLANE(1) FT	-0.66	-0.66	-0.66	-0.66
RM/DEG HEEL LBS-FT/DEG	0.	1487.	1369.	0.
WETTED SURFACE SQ FT	350.0	349.8	344.8	450.0
LATERAL PLANE AREA SQ FT	104.7	104.6	86.3	140.7
PRISMATIC COEFFICIENT	0.503	0.503	0.509	0.521
LWL (AVG 32.78)	33.01	33.00	31.58	37.91
LSM (AVG 32.47)	32.39	32.38	31.61	36.88
L2M (AVG 32.05)	31.39	31.39	30.85	35.75

SECTION AREA CURVES - AREA IN SQ FT AT GIVEN POSITION IN FT AFT

	INPUT	REF LWL(1)	1	2	3	4
1	0.0	-3.244	0.0	0.0	0.0	0.0
2	1.640	-1.604	0.0	0.0	0.0	0.0
3	3.281	0.037	0.00	0.00	0.0	0.63
4	4.921	1.677	0.70	0.70	0.45	2.65
5	6.562	3.318	2.35	2.35	2.02	5.59
6	8.202	4.958	4.51	4.51	4.24	9.01
7	9.842	6.598	6.89	6.89	6.74	12.61
8	11.482	8.238	9.28	9.28	9.28	16.16
9	13.123	9.879	11.58	11.58	11.72	19.52
10	14.764	11.520	14.06	14.07	14.34	22.99
11	16.404	13.160	17.15	17.16	17.50	26.94
12	18.044	14.800	19.78	19.79	20.13	30.28
13	19.685	16.441	21.25	21.25	21.53	32.31
14	21.325	18.081	20.30	20.30	20.52	31.76
15	22.966	19.722	18.01	18.01	18.15	29.67
16	24.606	21.362	16.26	16.26	16.34	27.93
17	26.246	23.002	14.73	14.73	14.77	26.20
18	27.887	24.643	12.58	12.58	12.57	23.64
19	29.527	26.283	9.83	9.83	9.80	20.23
20	31.168	27.924	6.76	6.76	6.70	16.25
21	32.808	29.564	3.75	3.75	3.60	11.98
22	34.448	31.204	1.25	1.25	0.92	7.76
23	36.089	32.845	0.01	0.01	0.0	4.05
24	37.729	34.485	0.0	0.0	0.0	1.32
25	39.370	36.126	0.0	0.0	0.0	0.07

NOTE - TRAPEZOIDAL DISPLACEMENT IS 0.01 PER CENT LESS THAN SPLINE

MIT - H IRVING PRATT OCEAN RACE HANDICAPPING PROJECT
LINES PROCESSING PROGRAM - JAN 1978

DELFT MODEL 2 WITH KEEL
BEAM= 8.96 8.96 9.57 10.33
DRAFT= 7.47 7.48 6.70 8.55 MAX SECT AREA= 21.23
B/TC= 2.91 2.91 3.24 2.84
FREEBOARDS FROM: FREEBOARDS ASSUMED AS DESIGNED
'STEMHEAD' LOCATION: XMEAS= -1.00 XRLWL(1)= -4.25
'FGO'= 4.28 'LBG'=31.17 FF(1)= 3.91 FA(1)= 3.18

	1	2	3	4
HEEL DEGREES	0.0	2.000	25.000	0.0
FREEBOARD FWD (AT 0.0 FT)	3.910	3.911	4.065	3.101
FREEBOARD AFT (AT 33.012 FT)	3.175	3.177	3.525	1.960
DISPLACEMENT CUBIC FT	346.5	346.5	346.7	585.2
DISPLACEMENT POUNDS SW	22172	22172	22188	37449
LCB % AFT OF FWD END OF LWL(1)	51.84	51.84	51.86	53.84
VCB ABOVE WATERPLANE(1) FT	-1.25	-1.25	-0.98	-0.52
VCG ABOVE WATERPLANE(1) FT	-0.66	-0.66	-0.66	-0.66
RM/DEG HEEL LBS-FT/DEG	0.	883.	869.	0.
WETTED SURFACE SQ FT	336.5	336.4	337.8	427.7
LATERAL PLANE AREA SQ FT	114.0	114.0	96.6	149.8
PRISMATIC COEFFICIENT	0.504	0.504	0.508	0.520
LWL (AVG 32.79)	33.01	33.01	31.98	37.51
LSM (AVG 32.40)	32.39	32.38	31.86	36.40
L2M (AVG 31.95)	31.38	31.38	31.04	35.26

SECTION AREA CURVES - AREA IN SQ FT AT GIVEN POSITION IN FT AFT

	INPUT	REF LWL(1)	1	2	3	4
1	0.0	-3.248	0.0	0.0	0.0	0.0
2	1.640	-1.608	0.0	0.0	0.0	0.0
3	3.281	0.033	0.00	0.00	0.0	0.50
4	4.921	1.673	0.70	0.69	0.54	2.35
5	6.562	3.314	2.35	2.35	2.15	5.14
6	8.202	4.954	4.52	4.52	4.34	8.41
7	9.842	6.594	6.89	6.89	6.80	11.85
8	11.482	8.234	9.29	9.29	9.29	15.25
9	13.123	9.875	11.56	11.56	11.66	18.47
10	14.764	11.516	14.11	14.11	14.29	21.87
11	16.404	13.156	17.20	17.20	17.41	25.70
12	18.044	14.796	19.85	19.85	20.07	28.99
13	19.685	16.437	21.24	21.24	21.41	30.87
14	21.325	18.077	20.29	20.29	20.41	30.26
15	22.966	19.718	18.02	18.02	18.09	28.18
16	24.606	21.358	16.26	16.26	16.30	26.41
17	26.246	22.998	14.76	14.76	14.78	24.75
18	27.887	24.639	12.56	12.56	12.57	22.17
19	29.527	26.279	9.82	9.82	9.82	18.84
20	31.168	27.920	6.75	6.75	6.74	14.95
21	32.808	29.560	3.75	3.75	3.68	10.82
22	34.448	31.200	1.26	1.26	1.04	6.79
23	36.089	32.841	0.01	0.01	0.0	3.31
24	37.729	34.481	0.0	0.0	0.0	0.88
25	39.370	36.122	0.0	0.0	0.0	0.01

NOTE - TRAPEZOIDAL DISPLACEMENT IS 0.01 PER CENT LESS THAN SPLINE

MIT - H IRVING PRATT OCEAN RACE HANDICAPPING PROJECT
LINES PROCESSING PROGRAM - JAN 1978

DELFT MODEL 3 WITH KEEL
BEAM= 11.75 11.74 11.49 13.87
DRAFT= 6.74 6.75 5.79 7.82 MAX SECT AREA= 21.22
B/TC= 4.58 4.58 4.32 4.26
FREEBOARDS FROM: FREEBOARDS ASSUMED AS DESIGNED
'STEMHEAD' LOCATION: XMEAS= -1.00 XRLWL(1)= -4.24
'FGO'= 4.28 'LBG'=31.17 FF(1)= 3.91 FA(1)= 3.18

	1	2	3	4
HEEL DEGREES	0.0	2.000	25.000	0.0
FREEBOARD FWD (AT 0.0 FT)	3.910	3.912	4.245	3.101
FREEBOARD AFT (AT 33.007 FT)	3.175	3.179	3.878	1.960
DISPLACEMENT CUBIC FT	346.5	346.5	346.8	670.0
DISPLACEMENT POUNDS SW	22178	22178	22196	42879
LCB % AFT OF FWD END OF LWL(1)	51.90	51.90	51.91	54.42
VCB ABOVE WATERPLANE(1) FT	-0.97	-0.97	-0.46	-0.24
VCG ABOVE WATERPLANE(1) FT	-0.66	-0.66	-0.66	-0.66
RM/DEG HEEL LBS-FT/DEG	0.	2437.	2054.	0.
WETTED SURFACE SQ FT	374.0	373.7	355.3	485.9
LATERAL PLANE AREA SQ FT	95.8	95.7	77.9	132.2
PRISMATIC COEFFICIENT	0.504	0.504	0.511	0.524
LWL (AVG 32.84)	33.01	32.99	31.28	38.38
LSM (AVG 32.54)	32.40	32.39	31.27	37.42
L2M (AVG 32.12)	31.39	31.39	30.51	36.31

SECTION AREA CURVES - AREA IN SQ FT AT GIVEN POSITION IN FT AFT

	INPUT	REF LWL(1)	1	2	3	4
1	0.0	-3.240	0.0	0.0	0.0	0.0
2	1.640	-1.600	0.0	0.0	0.0	0.0
3	3.281	0.041	0.00	0.00	0.0	0.80
4	4.921	1.681	0.70	0.70	0.29	3.03
5	6.562	3.322	2.36	2.36	1.82	6.18
6	8.202	4.962	4.51	4.51	4.08	9.79
7	9.842	6.602	6.89	6.88	6.66	13.57
8	11.482	8.242	9.27	9.27	9.28	17.30
9	13.123	9.883	11.58	11.58	11.80	20.83
10	14.764	11.524	14.06	14.07	14.47	24.44
11	16.404	13.164	17.13	17.13	17.66	28.49
12	18.044	14.804	19.79	19.80	20.34	31.99
13	19.685	16.445	21.24	21.25	21.73	34.07
14	21.325	18.085	20.35	20.34	20.72	33.62
15	22.966	19.726	18.04	18.04	18.31	31.56
16	24.606	21.366	16.31	16.30	16.45	29.84
17	26.246	23.006	14.76	14.76	14.81	28.09
18	27.887	24.647	12.59	12.59	12.56	25.45
19	29.527	26.287	9.83	9.83	9.71	21.94
20	31.168	27.928	6.78	6.78	6.58	17.85
21	32.808	29.568	3.76	3.76	3.45	13.43
22	34.448	31.208	1.26	1.26	0.75	9.01
23	36.089	32.849	0.01	0.01	0.0	5.02
24	37.729	34.489	0.0	0.0	0.0	1.93
25	39.370	36.130	0.0	0.0	0.0	0.23

NOTE - TRAPEZOIDAL DISPLACEMENT IS 0.01 PER CENT LESS THAN SPLINE

MIT - H IRVING PRATT OCEAN RACE HANDICAPPING PROJECT
LINES PROCESSING PROGRAM - JAN 1978

DELFT MODEL 4 WITH KEEL
BEAM= 9.19 9.19 9.54 10.84
DRAFT= 6.85 6.86 6.08 7.92 MAX SECT AREA= 18.15
B/TC= 3.42 3.42 3.60 3.25
FREEBOARDS FROM: FREEBOARDS ASSUMED AS DESIGNED
'STEMHEAD' LOCATION: XMEAS= -1.00 XRLWL(1)= -4.24
'FGO'= 4.28 'LBG'=31.17 FF(1)= 3.91 FA(1)= 3.18

	1	2	3	4
HEEL DEGREES	0.0	2.000	25.000	0.0
FREEBOARD FWD (AT 0.0 FT)	3.911	3.912	4.112	3.103
FREEBOARD AFT (AT 33.001 FT)	3.175	3.178	3.618	1.963
DISPLACEMENT CUBIC FT	288.3	288.3	288.6	540.3
DISPLACEMENT POUNDS SW	18452	18452	18468	34581
LCB % AFT OF FWD END OF LWL(1)	51.85	51.85	51.87	54.29
VCB ABOVE WATERPLANE(1) FT	-1.06	-1.06	-0.72	-0.31
VCG ABOVE WATERPLANE(1) FT	-0.66	-0.66	-0.66	-0.66
RM/DEG HEEL LBS-FT/DEG	0.	1108.	1015.	0.
WETTED SURFACE SQ FT	324.6	324.5	319.6	422.6
LATERAL PLANE AREA SQ FT	98.6	98.5	81.7	134.7
PRISMATIC COEFFICIENT	0.491	0.491	0.497	0.514
LWL (AVG 32.86)	33.00	32.99	31.59	38.16
LSM (AVG 32.52)	32.32	32.31	31.55	37.17
L2M (AVG 32.01)	31.21	31.21	30.67	36.00

SECTION AREA CURVES - AREA IN SQ FT AT GIVEN POSITION IN FT AFT

	INPUT	REF LWL(1)	1	2	3	4
1	0.0	-3.242	0.0	0.0	0.0	0.0
2	1.640	-1.602	0.0	0.0	0.0	0.0
3	3.281	0.039	0.00	0.00	0.0	0.61
4	4.921	1.679	0.58	0.58	0.37	2.38
5	6.562	3.320	1.94	1.94	1.67	4.90
6	8.202	4.960	3.70	3.70	3.48	7.81
7	9.842	6.600	5.65	5.65	5.53	10.86
8	11.482	8.240	7.62	7.62	7.62	13.87
9	13.123	9.881	9.49	9.50	9.61	16.72
10	14.764	11.522	11.64	11.65	11.86	19.75
11	16.404	13.162	14.41	14.41	14.69	23.29
12	18.044	14.802	16.86	16.86	17.14	26.39
13	19.685	16.443	18.15	18.16	18.40	28.19
14	21.325	18.083	17.18	17.18	17.35	27.56
15	22.966	19.724	14.95	14.95	15.06	25.51
16	24.606	21.364	13.37	13.37	13.43	23.95
17	26.246	23.004	12.12	12.12	12.15	22.53
18	27.887	24.645	10.32	10.32	10.33	20.36
19	29.527	26.285	8.06	8.06	8.04	17.53
20	31.168	27.926	5.55	5.55	5.50	14.20
21	32.808	29.566	3.10	3.10	2.97	10.62
22	34.448	31.206	1.03	1.03	0.76	7.04
23	36.089	32.847	0.01	0.01	0.0	3.83
24	37.729	34.487	0.0	0.0	0.0	1.39
25	39.370	36.128	0.0	0.0	0.0	0.13

NOTE - TRAPEZOIDAL DISPLACEMENT IS 0.01 PER CENT LESS THAN SPLINE

MIT - H IRVING PRATT OCEAN RACE HANDICAPPING PROJECT
LINES PROCESSING PROGRAM - JAN 1978

DELFT MODEL 5 WITH KEEL
BEAM= 11.87 11.87 12.13 13.66
DRAFT= 7.52 7.53 6.59 8.60 MAX SECT AREA= 27.05
B/TC= 3.89 3.89 4.00 3.76
FREEBOARDS FROM: FREEBOARDS ASSUMED AS DESIGNED
'STEMHEAD' LOCATION: XMEAS= -1.00 XRLWL(1)= -4.25
'FGO'= 4.28 'LBG'=31.17 FF(1)= 3.91 FA(1)= 3.18

		1	2	3	4
HEEL DEGREES		0.0	2.000	25.000	0.0
FREEBOARD FWD (AT 0.0 FT)		3.910	3.912	4.175	3.098
FREEBOARD AFT (AT 33.010 FT)		3.175	3.179	3.753	1.957
DISPLACEMENT CUBIC FT		455.7	455.7	456.1	771.8
DISPLACEMENT POUNDS SW		29161	29161	29187	49397
LCB % AFT OF FWD END OF LWL(1)		51.90	51.90	51.92	53.88
VCB ABOVE WATERPLANE(1) FT		-1.21	-1.20	-0.76	-0.49
VCG ABOVE WATERPLANE(1) FT		-0.66	-0.66	-0.66	-0.66
RM/DEG HEEL LBS-FT/DEG		0.	2279.	2118.	0.
WETTED SURFACE SQ FT		392.7	392.8	387.5	495.3
LATERAL PLANE AREA SQ FT		115.0	114.9	94.1	150.9
PRISMATIC COEFFICIENT		0.518	0.518	0.523	0.530
LWL	(AVG 32.66)	33.01	33.00	31.59	37.50
LSM	(AVG 32.39)	32.49	32.48	31.71	36.44
L2M	(AVG 32.06)	31.60	31.60	31.06	35.38

SECTION AREA CURVES - AREA IN SQ FT AT GIVEN POSITION IN FT AFT

	INPUT	REF LWL(1)	1	2	3	4
1	0.0	-3.248	0.0	0.0	0.0	0.0
2	1.640	-1.608	0.0	0.0	0.0	0.0
3	3.281	0.033	0.00	0.00	0.0	0.66
4	4.921	1.673	0.93	0.93	0.59	3.13
5	6.562	3.314	3.16	3.15	2.71	6.85
6	8.202	4.954	6.05	6.04	5.67	11.20
7	9.842	6.594	9.21	9.20	9.02	15.77
8	11.482	8.234	12.41	12.41	12.42	20.31
9	13.123	9.875	15.47	15.47	15.67	24.60
10	14.764	11.516	18.68	18.69	19.06	28.95
11	16.404	13.156	22.34	22.34	22.81	33.61
12	18.044	14.796	25.37	25.37	25.83	37.49
13	19.685	16.437	27.07	27.08	27.46	39.86
14	21.325	18.077	26.18	26.18	26.46	39.40
15	22.966	19.718	23.79	23.79	23.96	37.25
16	24.606	21.358	21.75	21.75	21.85	35.22
17	26.246	22.998	19.72	19.72	19.75	32.95
18	27.887	24.639	16.78	16.78	16.78	29.51
19	29.527	26.279	13.11	13.11	13.08	25.06
20	31.168	27.920	9.02	9.02	8.93	19.86
21	32.808	29.560	5.01	5.01	4.83	14.37
22	34.448	31.200	1.68	1.68	1.24	9.00
23	36.089	32.841	0.02	0.02	0.0	4.36
24	37.729	34.481	0.0	0.0	0.0	1.15
25	39.370	36.122	0.0	0.0	0.0	0.01

NOTE - TRAPEZOIDAL DISPLACEMENT IS 0.01 PER CENT LESS THAN SPLINE

MIT - H IRVING PRATT OCEAN RACE HANDICAPPING PROJECT
LINES PROCESSING PROGRAM - JAN 1978

DELFT MODEL 6 WITH KEEL
BEAM= 10.32 10.33 10.98 11.73
DRAFT= 7.98 7.99 7.13 9.06 MAX SECT AREA= 26.95
B/TC= 3.10 3.10 3.43 3.06
FREEBOARDS FROM: FREEBOARDS ASSUMED AS DESIGNED
'STEMHEAD' LOCATION: XMEAS= -1.00 XRLWL(1)= -4.25
'FGO'= 4.28 'LBG'=31.17 FF(1)= 3.91 FA(1)= 3.18

	1	2	3	4
HEEL DEGREES	0.0	2.000	25.000	0.0
FREEBOARD FWD (AT 0.0 FT)	3.910	3.911	4.086	3.098
FREEBOARD AFT (AT 33.008 FT)	3.175	3.177	3.575	1.957
DISPLACEMENT CUBIC FT	454.2	454.2	454.6	724.1
DISPLACEMENT POUNDS SW	29071	29071	29091	46345
LCB % AFT OF FWD END OF LWL(1)	51.89	51.89	51.90	53.62
VCB ABOVE WATERPLANE(1) FT	-1.38	-1.38	-1.06	-0.66
VCG ABOVE WATERPLANE(1) FT	-0.66	-0.66	-0.66	-0.66
RM/DEG HEEL LBS-FT/DEG	0.	1293.	1290.	0.
WETTED SURFACE SQ FT	375.7	375.7	378.2	467.5
LATERAL PLANE AREA SQ FT	126.4	126.4	106.9	162.0
PRISMATIC COEFFICIENT	0.519	0.519	0.522	0.529
LWL (AVG 32.61)	33.01	33.00	31.99	36.97
LSM (AVG 32.31)	32.48	32.48	31.96	35.94
L2M (AVG 31.98)	31.60	31.60	31.26	34.91

SECTION AREA CURVES - AREA IN SQ FT AT GIVEN POSITION IN FT AFT

	INPUT	REF LWL(1)	1	2	3	4
1	0.0	-3.252	0.0	0.0	0.0	0.0
2	1.640	-1.612	0.0	0.0	0.0	0.0
3	3.281	0.029	0.00	0.00	0.0	0.51
4	4.921	1.669	0.93	0.93	0.72	2.77
5	6.562	3.310	3.14	3.13	2.86	6.26
6	8.202	4.950	6.03	6.03	5.80	10.43
7	9.842	6.590	9.18	9.18	9.04	14.79
8	11.482	8.230	12.38	12.38	12.37	19.15
9	13.123	9.871	15.41	15.42	15.55	23.26
10	14.764	11.512	18.65	18.66	18.89	27.48
11	16.404	13.152	22.31	22.31	22.60	32.00
12	18.044	14.792	25.33	25.33	25.62	35.75
13	19.685	16.433	26.98	26.98	27.22	37.97
14	21.325	18.073	26.07	26.07	26.23	37.46
15	22.966	19.714	23.68	23.68	23.78	35.28
16	24.606	21.354	21.69	21.68	21.73	33.27
17	26.246	22.994	19.64	19.64	19.67	31.02
18	27.887	24.635	16.75	16.75	16.76	27.69
19	29.527	26.275	13.06	13.06	13.07	23.30
20	31.168	27.916	8.98	8.98	8.98	18.25
21	32.808	29.556	4.99	4.99	4.89	12.93
22	34.448	31.196	1.67	1.67	1.39	7.81
23	36.089	32.837	0.02	0.02	0.0	3.46
24	37.729	34.477	0.0	0.0	0.0	0.68
25	39.370	36.118	0.0	0.0	0.0	0.0

NOTE - TRAPEZOIDAL DISPLACEMENT IS 0.01 PER CENT LESS THAN SPLINE

MIT - H IRVING PRATT OCEAN RACE HANDICAPPING PROJECT
LINES PROCESSING PROGRAM - JAN 1978

DELFT MODEL 7 WITH KEEL
BEAM= 10.10 10.10 10.12 12.05
DRAFT= 6.59 6.60 5.75 7.66 MAX SECT AREA= 17.81
B/TC= 4.08 4.08 4.00 3.80
FREEBOARDS FROM: FREEBOARDS ASSUMED AS DESIGNED
'STEMHEAD' LOCATION: XMEAS= -1.00 XRLWL(1)= -4.24
'FBO'= 4.28 'LBG'=31.17 FF(1)= 3.91 FA(1)= 3.18

	*	1	*	2	*	3	*	4	*
HEEL DEGREES	*	0.0	*	2.000	*	25.000	*	0.0	*
FREEBOARD FWD (AT 0.0 FT)	*	3.911	*	3.912	*	4.180	*	3.103	*
FREEBOARD AFT (AT 33.018 FT)	*	3.175	*	3.179	*	3.750	*	1.963	*
DISPLACEMENT CUBIC FT	*	281.6	*	281.6	*	281.9	*	562.5	*
DISPLACEMENT POUNDS SW	*	18024	*	18024	*	18039	*	36001	*
LCB % AFT OF FWD END OF LWL(1)	*	51.82	*	51.82	*	51.83	*	54.51	*
VCB ABOVE WATERPLANE(1) FT	*	-0.96	*	-0.95	*	-0.54	*	-0.21	*
VCG ABOVE WATERPLANE(1) FT	*	-0.66	*	-0.66	*	-0.66	*	-0.66	*
RM/DEG HEEL LBS-FT/DEG	*	0.	*	1565.	*	1340.	*	0.	*
WETTED SURFACE SQ FT	*	337.5	*	337.2	*	323.9	*	443.1	*
LATERAL PLANE AREA SQ FT	*	91.9	*	91.8	*	75.4	*	128.2	*
PRISMATIC COEFFICIENT	*	0.489	*	0.489	*	0.497	*	0.516	*
LWL (AVG 32.91)	*	33.02	*	33.00	*	31.35	*	38.52	*
LSM (AVG 32.57)	*	32.31	*	32.31	*	31.27	*	37.62	*
L2M (AVG 32.07)	*	31.19	*	31.18	*	30.39	*	36.47	*

SECTION AREA CURVES - AREA IN SQ FT AT GIVEN POSITION IN FT AFT

	INPUT	REF LWL(1)	*	1	*	2	*	3	*	4	*
1	0.0	-3.238	*	0.0	*	0.0	*	0.0	*	0.0	*
2	1.640	-1.598	*	0.0	*	0.0	*	0.0	*	0.0	*
3	3.281	0.043	*	0.00	*	0.00	*	0.0	*	0.73	*
4	4.921	1.683	*	0.56	*	0.56	*	0.27	*	2.61	*
5	6.562	3.324	*	1.89	*	1.88	*	1.50	*	5.21	*
6	8.202	4.964	*	3.62	*	3.62	*	3.31	*	8.21	*
7	9.842	6.604	*	5.51	*	5.51	*	5.33	*	11.30	*
8	11.482	8.244	*	7.44	*	7.44	*	7.43	*	14.38	*
9	13.123	9.885	*	9.26	*	9.26	*	9.42	*	17.27	*
10	14.764	11.526	*	11.34	*	11.34	*	11.64	*	20.33	*
11	16.404	13.166	*	14.09	*	14.09	*	14.48	*	23.93	*
12	18.044	14.806	*	16.51	*	16.52	*	16.91	*	27.07	*
13	19.685	16.447	*	17.81	*	17.81	*	18.16	*	28.91	*
14	21.325	18.087	*	16.84	*	16.84	*	17.11	*	28.32	*
15	22.966	19.728	*	14.59	*	14.59	*	14.78	*	26.28	*
16	24.606	21.368	*	13.03	*	13.04	*	13.15	*	24.74	*
17	26.246	23.008	*	11.81	*	11.81	*	11.85	*	23.34	*
18	27.887	24.649	*	10.06	*	10.06	*	10.05	*	21.19	*
19	29.527	26.289	*	7.86	*	7.86	*	7.78	*	18.36	*
20	31.168	27.930	*	5.42	*	5.42	*	5.29	*	15.03	*
21	32.808	29.570	*	3.01	*	3.01	*	2.80	*	11.43	*
22	34.448	31.210	*	1.01	*	1.00	*	0.62	*	7.78	*
23	36.089	32.851	*	0.01	*	0.01	*	0.0	*	4.46	*
24	37.729	34.491	*	0.0	*	0.0	*	0.0	*	1.82	*
25	39.370	36.132	*	0.0	*	0.0	*	0.0	*	0.28	*

NOTE - TRAPEZOIDAL DISPLACEMENT IS 0.01 PER CENT LESS THAN SPLINE

MIT - H IRVING PRATT OCEAN RACE HANDICAPPING PROJECT
LINES PROCESSING PROGRAM - JAN 1978

DELFT MODEL 8 WITH KEEL
BEAM= 10.01 10.01 10.32 11.80
DRAFT= 7.09 7.10 6.25 8.18 MAX SECT AREA= 20.61
B/TC= 3.58 3.58 3.76 3.49
FREEBOARDS FROM: FREEBOARDS ASSUMED AS DESIGNED
'STEMHEAD' LOCATION: XMEAS= -1.00 XRLWL(1)= -4.24
'FGO'= 4.28 'LBG'=31.17 FF(1)= 3.91 FA(1)= 3.18

	1	2	3	4
HEEL DEGREES	0.0	2.000	25.000	0.0
FREEBOARD FWD (AT 0.0 FT)	3.911	3.912	4.106	3.090
FREEBOARD AFT (AT 33.009 FT)	3.175	3.178	3.711	1.945
DISPLACEMENT CUBIC FT	346.2	346.2	346.5	633.2
DISPLACEMENT POUNDS SW	22157	22157	22174	40524
LCB % AFT OF FWD END OF LWL(1)	51.97	51.97	51.98	54.49
VCB ABOVE WATERPLANE(1) FT	-1.10	-1.10	-0.73	-0.35
VCG ABOVE WATERPLANE(1) FT	-0.66	-0.66	-0.66	-0.66
RM/DEG HEEL LBS-FT/DEG	0.	1462.	1352.	0.
WETTED SURFACE SQ FT	352.5	352.3	349.6	459.1
LATERAL PLANE AREA SQ FT	104.7	104.6	86.7	141.2
PRISMATIC COEFFICIENT	0.512	0.512	0.518	0.535
LWL (AVG 32.97)	33.01	33.00	32.06	38.03
LSM (AVG 33.09)	32.81	32.80	32.44	37.56
L2M (AVG 33.00)	32.09	32.09	31.99	36.83

SECTION AREA CURVES - AREA IN SQ FT AT GIVEN POSITION IN FT AFT

	INPUT	REF LWL(1)	1	2	3	4
1	0.0	-3.244	0.0	0.0	0.0	0.0
2	1.640	-1.604	0.0	0.0	0.0	0.0
3	3.281	0.037	0.00	0.00	0.0	0.78
4	4.921	1.677	0.81	0.81	0.60	3.09
5	6.562	3.318	2.62	2.62	2.44	6.27
6	8.202	4.958	4.86	4.86	4.81	9.78
7	9.842	6.598	7.21	7.21	7.28	13.28
8	11.482	8.238	9.48	9.48	9.64	16.60
9	13.123	9.879	11.58	11.58	11.79	19.64
10	14.764	11.520	13.85	13.85	14.08	22.75
11	16.404	13.160	16.75	16.75	16.93	26.38
12	18.044	14.800	19.22	19.22	19.34	29.50
13	19.685	16.441	20.62	20.62	20.62	31.42
14	21.325	18.081	19.70	19.70	19.61	30.91
15	22.966	19.722	17.54	17.54	17.39	29.04
16	24.606	21.362	16.00	16.00	15.84	27.64
17	26.246	23.002	14.76	14.76	14.63	26.41
18	27.887	24.643	12.84	12.84	12.78	24.28
19	29.527	26.283	10.29	10.29	10.33	21.34
20	31.168	27.924	7.28	7.29	7.42	17.65
21	32.808	29.564	4.17	4.17	4.32	13.45
22	34.448	31.204	1.44	1.44	1.41	9.06
23	36.089	32.845	0.01	0.01	0.0	4.95
24	37.729	34.485	0.0	0.0	0.0	1.72
25	39.370	36.126	0.0	0.0	0.0	0.11

NOTE - TRAPEZOIDAL DISPLACEMENT IS 0.01 PER CENT LESS THAN SPLINE

MIT - H IRVING PRATT OCEAN RACE HANDICAPPING PROJECT
LINES PROCESSING PROGRAM - JAN 1978

DELFT MODEL 9 WITH KEEL
BEAM= 10.42 10.43 10.72 12.08
DRAFT= 7.09 7.10 6.26 8.15 MAX SECT AREA= 21.92
B/TC= 3.65 3.65 3.76 3.47
FREEBOARDS FROM: FREEBOARDS ASSUMED AS DESIGNED
'STEMHEAD' LOCATION: XMEAS= -1.00 XRLWL(1)= -4.24
'FBO'= 4.28 'LBG'=31.17 FF(1)= 3.91 FA(1)= 3.18

		1	2	3	4
HEEL DEGREES		0.0	2.000	25.000	0.0
FREEBOARD FWD	(AT 0.0 FT)	3.911	3.912	4.165	3.113
FREEBOARD AFT	(AT 33.009 FT)	3.175	3.178	3.637	1.978
DISPLACEMENT	CUBIC FT	346.2	346.2	346.5	611.0
DISPLACEMENT	POUNDS SW	22158	22158	22174	39106
LCB % AFT OF FWD END OF LWL(1)		51.77	51.77	51.78	53.72
VCB ABOVE WATERPLANE(1)	FT	-1.11	-1.11	-0.73	-0.40
VCG ABOVE WATERPLANE(1)	FT	-0.66	-0.66	-0.66	-0.66
RM/DEG HEEL	LBS-FT/DEG	0.	1529.	1400.	0.
WETTED SURFACE	SQ FT	347.5	347.3	340.3	440.6
LATERAL PLANE AREA	SQ FT	104.7	104.6	86.0	140.1
PRISMATIC COEFFICIENT		0.495	0.495	0.500	0.509
LWL	(AVG 32.67)	33.01	33.00	31.34	37.79
LSM	(AVG 31.80)	31.91	31.90	30.81	36.06
L2M	(AVG 31.02)	30.62	30.61	29.69	34.53

SECTION AREA CURVES - AREA IN SQ FT AT GIVEN POSITION IN FT AFT

	INPUT	REF LWL(1)	1	2	3	4
1	0.0	-3.244	0.0	0.0	0.0	0.0
2	1.640	-1.604	0.0	0.0	0.0	0.0
3	3.281	0.037	0.00	0.00	0.0	0.48
4	4.921	1.677	0.59	0.59	0.32	2.19
5	6.562	3.318	2.07	2.06	1.63	4.86
6	8.202	4.958	4.14	4.13	3.67	8.19
7	9.842	6.598	6.53	6.53	6.17	11.87
8	11.482	8.238	9.07	9.06	8.89	15.67
9	13.123	9.879	11.56	11.56	11.63	19.38
10	14.764	11.520	14.30	14.30	14.60	23.23
11	16.404	13.160	17.60	17.60	18.08	27.51
12	18.044	14.800	20.39	20.39	20.97	31.11
13	19.685	16.441	21.93	21.93	22.50	33.25
14	21.325	18.081	20.93	20.93	21.45	32.62
15	22.966	19.722	18.51	18.51	18.91	30.32
16	24.606	21.362	16.54	16.54	16.82	28.22
17	26.246	23.002	14.73	14.73	14.86	26.02
18	27.887	24.643	12.29	12.29	12.27	22.92
19	29.527	26.283	9.33	9.33	9.17	19.05
20	31.168	27.924	6.20	6.19	5.90	14.74
21	32.808	29.564	3.30	3.30	2.88	10.41
22	34.448	31.204	1.05	1.05	0.53	6.39
23	36.089	32.845	0.01	0.01	0.0	3.12
24	37.729	34.485	0.0	0.0	0.0	0.93
25	39.370	36.126	0.0	0.0	0.0	0.04

NOTE - TRAPEZOIDAL DISPLACEMENT IS 0.01 PER CENT LESS THAN SPLINE

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