



0340 Preliminary Stability Calculation Booklet

According ISO 12217-1:2002+A1:2009

Jetten 41 Sedan

6836 / Jetten Yachting



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Preface

The information presented in this report is based on a calculated Light Ship Weight, corresponding to Revision P0 of the Preliminary Weight Calculation. It contains the calculations made to show compliance with the stability criteria as known for design category B, as well as the hydrostatic properties and stability calculations.

Sneek, 12/08/2011



Identification And Approval

General information of the ship				
1	Ship's Name	-		
2	Type of ship	Jetten 41 Sedan		
3	Name of builders	Jetten Yachting		
4	HIN code	-		
5	CE design Category	B		
6	Test option	1		
7	Maximum load	1500 kg (including persons, excl. tanks)		
8	Crew Limit	10 persons		
9	Principal dimensions			
		Length hull	12.420	m
		Breadth hull	4.240	m

In order to obtain the light ship weight an inclining test will be held. The test has not been conducted yet, therefore the weights and their centres of mass have been estimated by means of a weight calculation.

Light Ship Particulars				
Item	Weight	LCG	TCG	VCG
	[kg]	[m]	[m]	[m]
Light ship	16483	5.018	0.000	1.602
Trimballast	0	0.000	0.000	0.000
Crew Limit (10 persons)	750	3.500	2.100	2.500
Maximum Total Load (pers. & tanks excl.)	750	4.000	0.000	2.000
Maximum Fuel Capacity	706	4.770	0.000	0.549
Maximum Fresh water Capacity	909	6.805	0.000	0.592

Note : All centres are measured from ship's origin

Based on the above mentioned data, the following information has become available :

Item		Weight	LCG	TCG	VCG
		[kg]	[m]	[m]	[m]
Minimum Operating mass	M _{MOC}	16672	5.256	0.000	1.684
Loaded displacement mass	M _{LDC}	19572	5.310	0.000	1.772

Note : All centres are measured from ship's origin

A detailed list of the loading conditions can be found in Appendix 1 – Loading Conditions.

Any opening that may admit water into the interior or bilge of a boat is defined as a down flooding point. Such openings are limiting the stability curves. The following down flooding points have been defined (Details can be found in Appendix 7):



Down flooding points			
Item	Longitudinal position [m]	Transverse position [m]	Vertical position [m]
ER VENTILATION PS	3.588	1.870	2.152
ER VENTILATION PS	3.588	-1.870	2.152

Note : All centres are measured from ship's origin

Stability Criteria

Down flooding height

According to ISO 12217-1 Chapter 6.1.2 sufficient freeboard margin has to be demonstrated before water is shipped on board. This test has to be conducted for the boat in the loaded displacement condition.

Criteria :

For category B, using test option 1: $HD > HD(R)$ where $HD(R) = LH / 17 = 0.731$ Or

0.4m Whichever is Greater

$HD(R) = 0.731 \quad LH =$

12.42 m

Attained :

$HD = 1.009 \text{ m}$

Conclusion :

$HD > HD(R)$. The down flooding heights comply with category B.



Offset-load test

The offset load angle (ϕ_0) is the angle of heel as a result of an offset load by all persons on board. In requirement 6.2 of the ISO 12217-1 assessment sufficient stability is to be demonstrated for the ship in loaded displacement condition, except when any tank has a maximum transverse dimension greater than 0.35BH, than the half loaded condition shall be applied.

Criteria :

For all categories :

$$\phi_0 < \phi_{0(R)}, \text{ where } \phi_{0(R)} = \frac{(24 - L_H)^3}{11.5^{+} \times 14.48^{\circ} \times 520} =$$

$$L_H = 12.42 \text{ m}$$

Required minimum heeled freeboard margin during offset-load test:

$$\text{Freeboard} > 0.145 \times BH \quad (= 0.615\text{m})$$

$$BH = 4.24 \text{ m}$$

The maximum righting moment occurring up to the downflooding angle is greater than the heeling moment (=1.881 tonm) at the resulting heel angle.

Attained (Using the simplified method):

LC1 (Crew in aft position)

$$\phi_0 = 5.22^{\circ}$$

Freeboard = 0.848 m

Downflooding angle = 0.286 degrees

Maximum Righting moment to
tonm

LC2 (Crew in fwd position)

$$\phi_0 = 5.38^{\circ}$$

Freeboard = 0.915 m

Downflooding angle = 0.32 degrees

Maximum Righting moment to
downflooding = 5.403 tonm

Maximum Righting moment to
downflooding = 6.045 tonm

Conclusion :

The offset load angle $\phi_0 < \phi_{0(R)}$, the minimum freeboard requirements and the downflooding righting moment requirements are met. The offset load test complies with category B.

Note :

Maximum transverse dimension of tanks = 1.85 m, which is more than 0.35BH, therefore the half filled tanks have been applied.



Resistance To Waves And Wind (Cat. B)

In assessment 6.3 of the ISO 12217-1 requirement, the stability in wind and waves is being tested. Sufficient stability has to be demonstrated.

The boat shall be assessed in the minimum operating as well as the loaded displacement condition.

The heeling moment due to wind, M_w , expressed in Newton metres, is assumed to be constant at all angles of heel and shall be calculated as follows :

$$M = 0.3 A_{LV} \left(\frac{L_{WL}}{10} + \frac{L_{WLV}}{10} \right) \left(\frac{V_w}{10} \right)^2 + T_m \left(\frac{V_w}{10} \right)^2$$

where A_{LV} shall be taken minimal 0.55 LHBH

The assumed roll angle ϕ_R for category B shall be calculated as follows :

$$\phi_R = 20 + \frac{20}{V_D}$$

Minimum operating condition :		
A_{LV} :	28.96	m ²
L_{WL} :	11.44	m
T_M :	1.079	m
V_w :	21	m/s
MOM_w	13836	Nm
V_D :	16672	m ³
ϕ_R :	21.17	°

Recesses

Recesses of boats using stability test option 1, shall comply with the plan area limitation:

Maximum plan area (0 m²) < 15.79824 m²

Maximum area in fwd half of the boat (0 m²) < 7.89912 m²

Loaded displacement condition :		
A_{LV}	28.96	m ²
L_{WL}	11.52	m
T_M	1.147	m
V_w	21	m/s
MOM_w	14029	Nm
V_D	19572	m ³
ϕ_R :	21.00	°

Criteria :

The righting moment curve and the wind heeling moment shall be plotted on the graph. The area representing the righting moment (A_2) shall be greater than the area representing the wind heeling moment (A_1).

Note: Area ratio's and area curves are shown in appendix 5

Attained :

A_2 is greater than A_1 in both conditions.

Conclusion :

The Resistance To Waves And Wind (Cat. B) complies with category B.



Conclusions

Based on the information presented in this report and other available data the ship is tested on all criteria, resulting in compliance of the ship with the criteria of design category B.

This means that the ship stability wise is a category B ship.

A boat given design category B is considered to be designed for waves of up to 4 m significant height and a wind of Beaufort force 8 or less. Such conditions may be encountered on offshore voyages of sufficient length or on coasts where shelter may not always be immediately available. These conditions may also be experienced on inland seas of sufficient size for the wave height to be generated. Winds are assumed to gust to 21 m/s.



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Appendices



Appendix 1 – Loading Conditions

INTACT STABILITY AT CONDITION 1
OPERATIONAL CONDITION : LIGHT CRAFT
CONDITION

SUMMARY OF LOADING					(0%) FRESH WATER	ATER		
0.0 Cu.M.		(0%) DIESEL OIL		0.0 Cu.M.				
0.0 Cu.M.		(0%) SEWAGE						
WEIGHT STATUS								
Trim: Fwd 0.045/11.100,				Heel: Port 0.01 deg.				
Part	Weight(MT)		LCG	TCG	VCG	FSM		
LIGHT SHIP	16.48		5.018f	0.000	1.602			
BALLAST	0.00							
Total Weight	16.48		5.018f	0.000	1.602			
Load		SpGr	Weight(MT)	LCG	TCG	VCG		
FO1.C	0.000	0.840	0.00			0.00		
FW1.C	0.000	1.000	0.00			0.00		
HO1.C	0.000	1.025	0.00			0.00		
Total Tanks			0.00			0.00		
Distances in METERS.				Moments in m.-MT.				
HYDROSTATIC PROPERTIES								
Trim: Fwd 0.045/11.100,				Heel: Port 0.01 deg.,		VCG = 1.602		
LCF	Displacement	Buoyancy-Ctr.		Weight/	Moment/			
Draft	Weight(MT)	LCB	VCB	cm	LCF	cm trim	GML	GMT
1.071	16.48	5.021f	0.777	0.36	4.516f	0.25	16.68	1.406
Distances in METERS.				Specific Gravity = 1.025.		Moment in m.-MT.		
Draft is from Baseline.				Trim is per 11.10m.				

CRITICAL POINT STATUS

Baseline draft: 1.098 @ 11.10f, 1.053 @ 0.00

Trim: Fwd 0.045/11.100,

Heel: Port 0.01 deg.

Critical Points	LCP	TCP	VCP	Height
(1) AFT DRAFT MARK FRAME 0	0.000	0.000	0.000	-1.053
(2) FWD DRAFT MARK FRAME 28	11.100f	0.000	0.000	-1.098

Distances in METERS.

RIGHTING ARMS vs HEEL ANGLE LCG = 5.018f TCG =

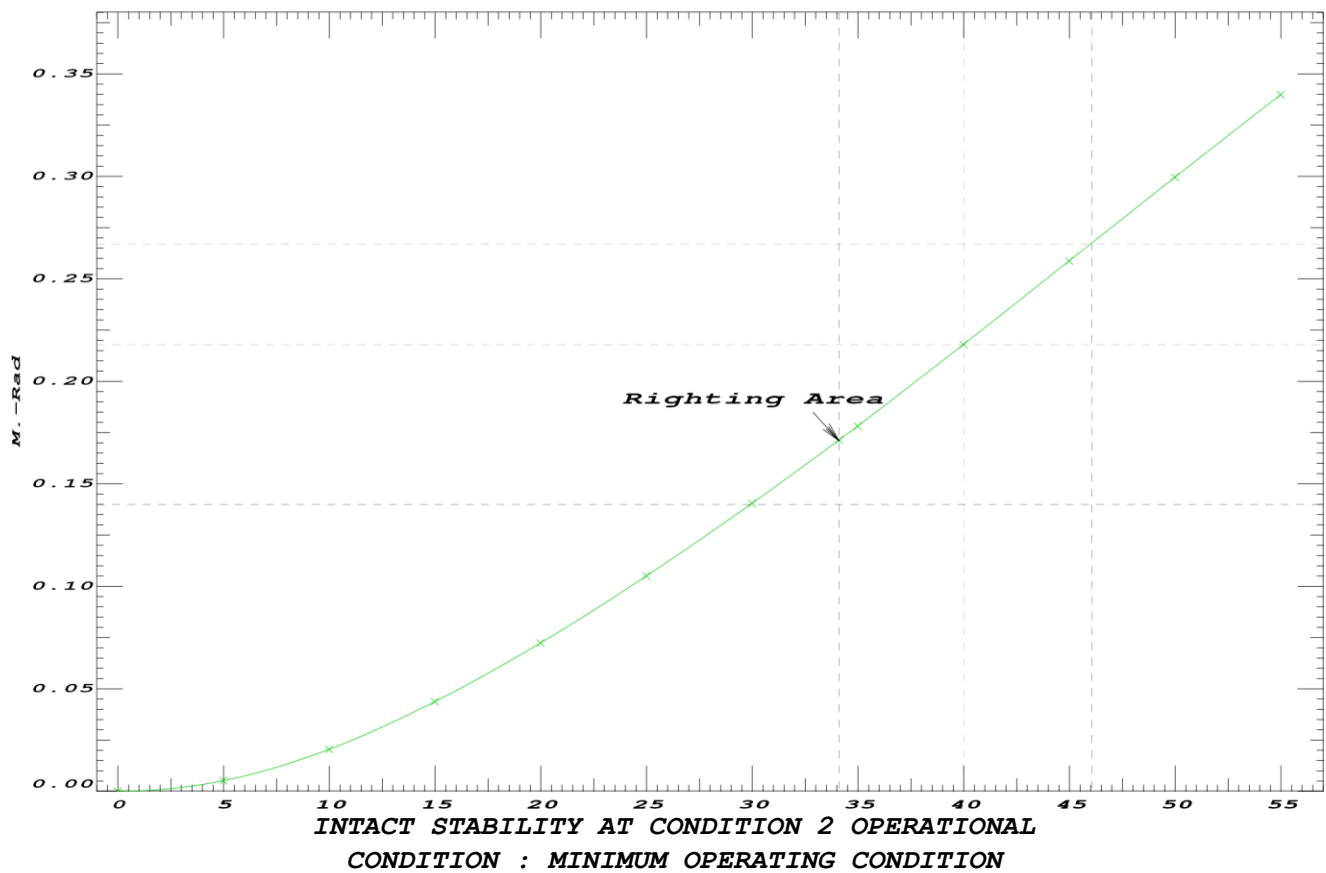
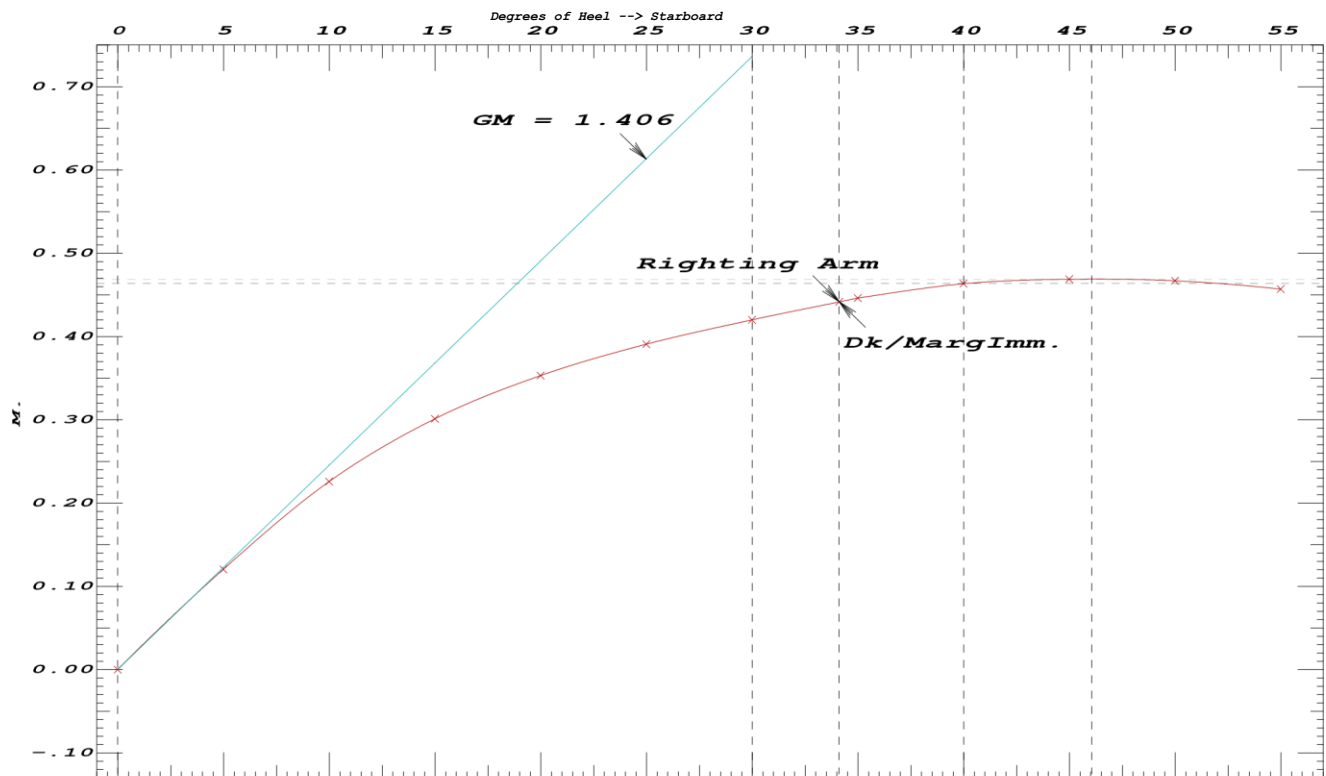
0.000 VCG = 1.602

Origin	Degrees of		Displacement	Righting Arms		Area	Freebd
Depth	Trim	Heel	Weight(MT)	in Trim	in Heel		(Extra)
1.053	0.23f	0.01p	16.481	0.000	0.000	0.0000	
1.042	0.28f	4.99s	16.483	0.000	0.120	0.0052	0.952
1.009	0.39f	9.99s	16.482	0.000	0.226	0.0205	0.773
0.951	0.57f	14.99s	16.480	0.000	0.301	0.0437	0.602
0.874	0.75f	19.99s	16.483	0.000	0.353	0.0724	0.436
0.781	0.92f	24.99s	16.484	0.000	0.391	0.1050	0.275
0.672	1.08f	29.99s	16.480	0.000	0.420	0.1404	0.121
0.571	1.21f	34.11s	16.483	0.000	0.442	0.1714	-0.001
0.548	1.23f	34.99s	16.483	0.000	0.446	0.1782	-0.026
0.414	1.39f	39.99s	16.482	0.000	0.464	0.2179	-0.166
0.270	1.57f	44.99s	16.483	0.000	0.469	0.2587	-0.303
0.249	1.59f	45.66s	16.483	0.000	0.469	0.2642	-0.321
0.115	1.80f	49.99s	16.481	0.000	0.467	0.2996	-0.437
-0.048	2.07f	54.99s	16.483	0.000	0.457	0.3400	-0.567

Distances in METERS.

Specific Gravity = 1.025.

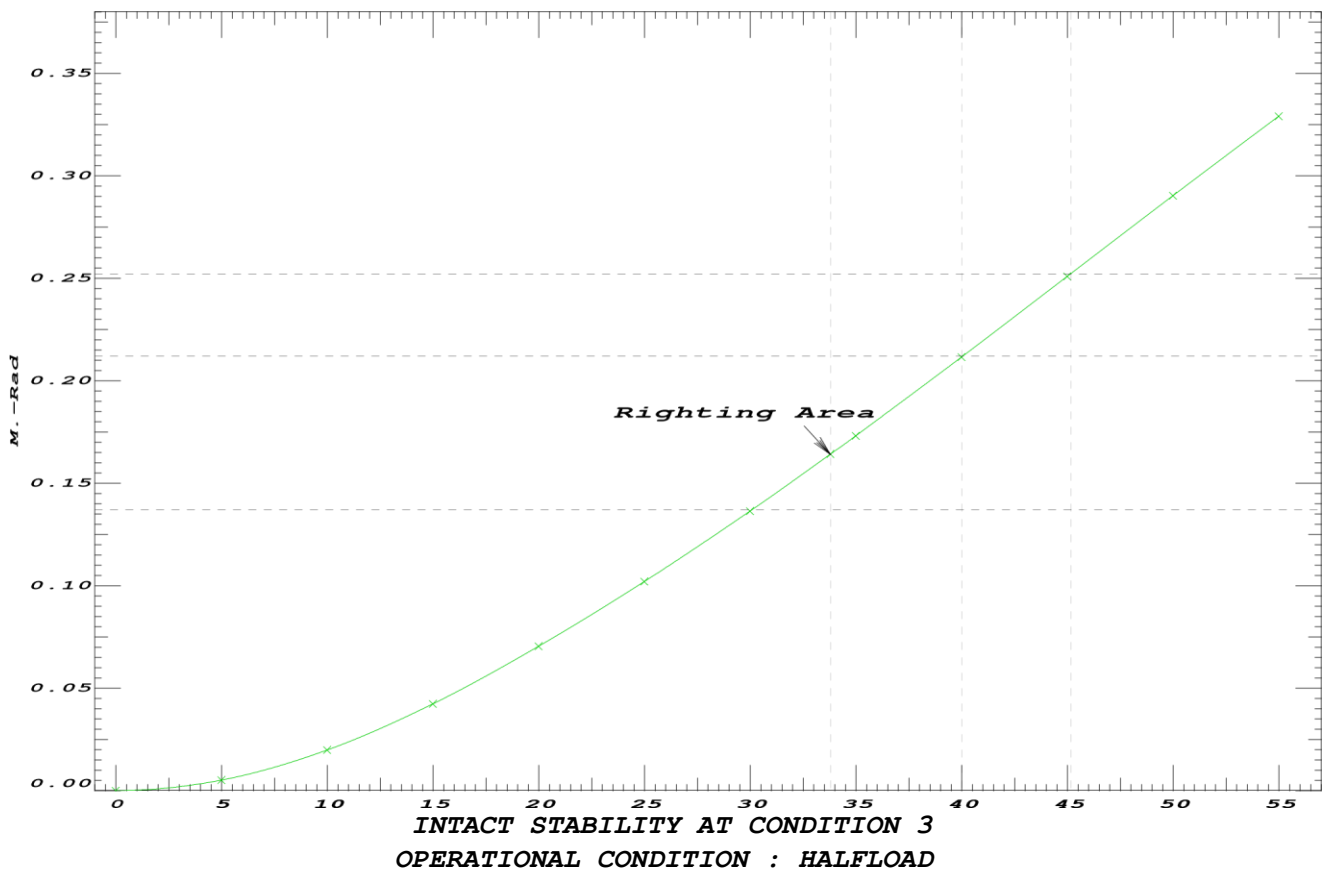
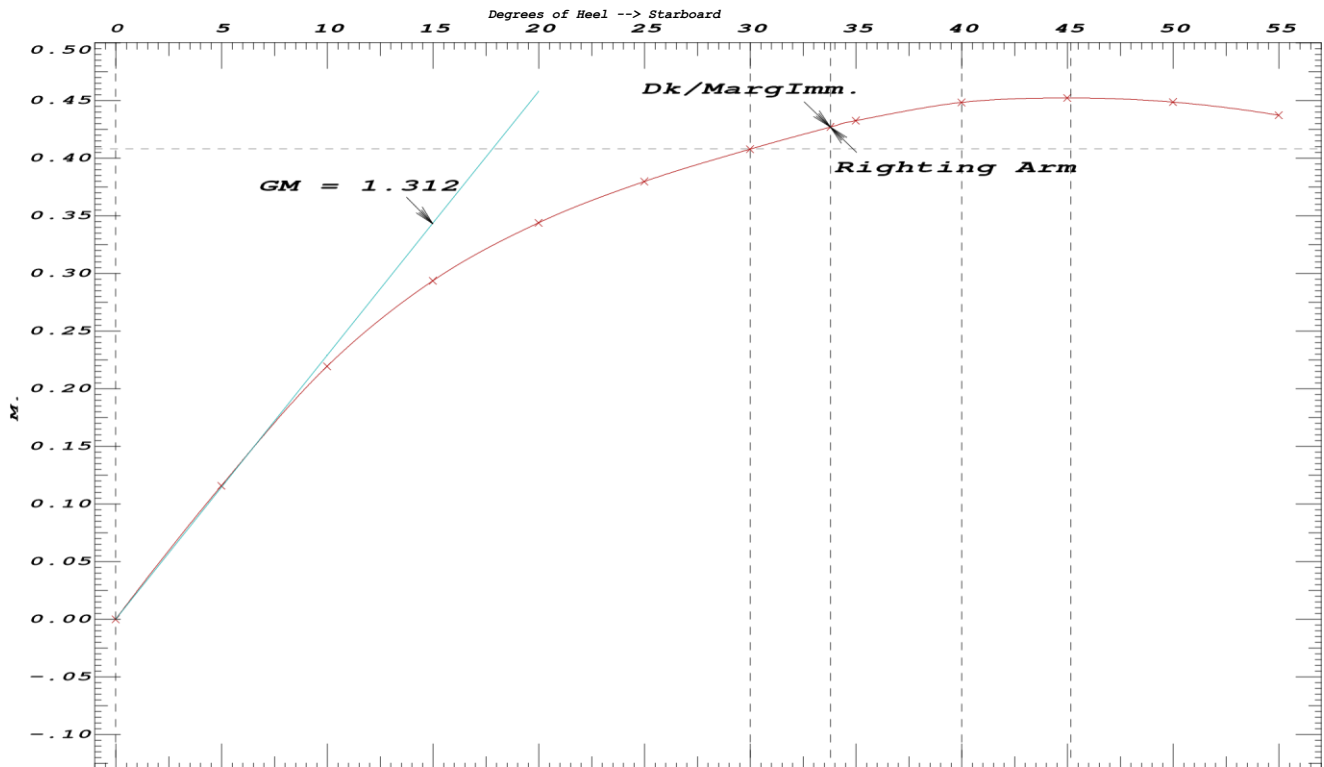
Area in m.-Rad.



SUMMARY OF LOADING							
0.0 Cu.M.		(2%) DIESEL OIL		0.0 Cu.M.		(2%) FRESH WATER	
0.0 Cu.M.		(2%) SEWAGE					
0.25 MT of Misc. Weights							
WEIGHT STATUS							
Trim: Fwd 0.034/11.100,				Heel: Port 0.01 deg.			
Part		Weight(MT)		LCG	TCG	VCG	
LIGHT SHIP		16.48		5.018f	0.000	1.602	
BALLAST		0.00					
CREW		0.15		2.800f	0.000	3.800	
NON CONSUMABLES		0.10		4.000f	0.000	2.000	
Total Fixed		16.73		4.992f	0.000	1.624	
	Load	SpGr	Weight(MT)	LCG	TCG	VCG	FSM
FO1.C	0.020	0.840	0.01	5.271f	0.003p	0.332	0.15
FW1.C	0.020	1.000	0.01	6.435f	0.000	0.329	0.01
HO1.C	0.020	1.025	0.01	4.674f	0.047p	1.644	0.88
Total Tanks			0.03	5.589f	0.011p	0.590	1.04
Total Weight			16.76	4.993f	0.000	1.622	
Free Surface Adjustment						0.062	
Adjusted CG				4.993f	0.000	1.684	
Distances in METERS.						Moments in m.-MT.	
HYDROSTATIC PROPERTIES							
Trim: Fwd 0.034/11.100,				Heel: Port 0.01 deg.,		VCG = 1.622	
LCF	Displacement	Buoyancy-Ctr.		Weight/		Moment/	
Draft	Weight(MT)	LCB	VCB	cm	LCF	cm trim	GML GMT
1.079	16.76	4.996f	0.782	0.36	4.500f	0.25	16.56 1.312
Distances in METERS.			Specific Gravity = 1.025.			Moment in m.-MT.	
				Trim is per 11.10m.			
Draft is from Baseline.				True Free Surface included.			

CRITICAL POINT STATUS							
Baseline draft: 1.099 @ 11.10f, 1.065 @ 0.00							
Trim: Fwd 0.034/11.100,				Heel: Port 0.01 deg.			
	Critical Points			LCP	TCP	VCP	Height
(1)	AFT DRAFT MARK FRAME 0			0.000	0.000	0.000	-1.065
(2)	FWD DRAFT MARK FRAME 28			11.100f	0.000	0.000	-1.099
Distances in METERS.							
RIGHTING ARMS vs HEEL ANGLE Fixed CG: LCG = 4.992f							
TCG = 0.000 VCG = 1.624							
Origin	Degrees of		Displacement	Righting Arms		Area	Freebd (Extra)
Depth	Trim	Heel	Weight(MT)	in Trim	in Heel		
1.065	0.18f	0.01p	16.763	0.000	0.000	0.0000	
1.055	0.22f	4.99s	16.765	0.000	0.116	0.0051	0.944

1.023	0.32f	9.99s	16.764	0.000	0.219	0.0198	0.764
0.967	0.48f	14.99s	16.761	0.000	0.293	0.0424	0.592
0.891	0.65f	19.99s	16.765	0.000	0.344	0.0704	0.426
0.799	0.81f	24.99s	16.761	0.000	0.380	0.1020	0.266
0.692	0.96f	29.99s	16.762	0.000	0.408	0.1364	0.111
0.600	1.07f	33.79s	16.765	0.000	0.427	0.1642	-0.001
0.569	1.11f	34.99s	16.764	0.000	0.433	0.1731	-0.035
0.435	1.26f	39.99s	16.763	0.000	0.448	0.2116	-0.176
0.291	1.44f	44.99s	16.764	0.000	0.452	0.2510	-0.312
0.254	1.49f	46.24s	16.764	0.000	0.452	0.2608	-0.346
0.137	1.67f	49.99s	16.763	0.000	0.449	0.2903	-0.445
-0.025	1.94f	54.99s	16.764	0.000	0.437	0.3291	-0.576
Distances in METERS. Specific Gravity = 1.025. Area in m.-Rad.							
Note: The Center of Gravity shown above is for the Fixed Weight of 16.73 MT. As the tank load centers shift with heel and trim, the total Center of Gravity varies. The righting arms shown above include the effect of the C.G. variation.							

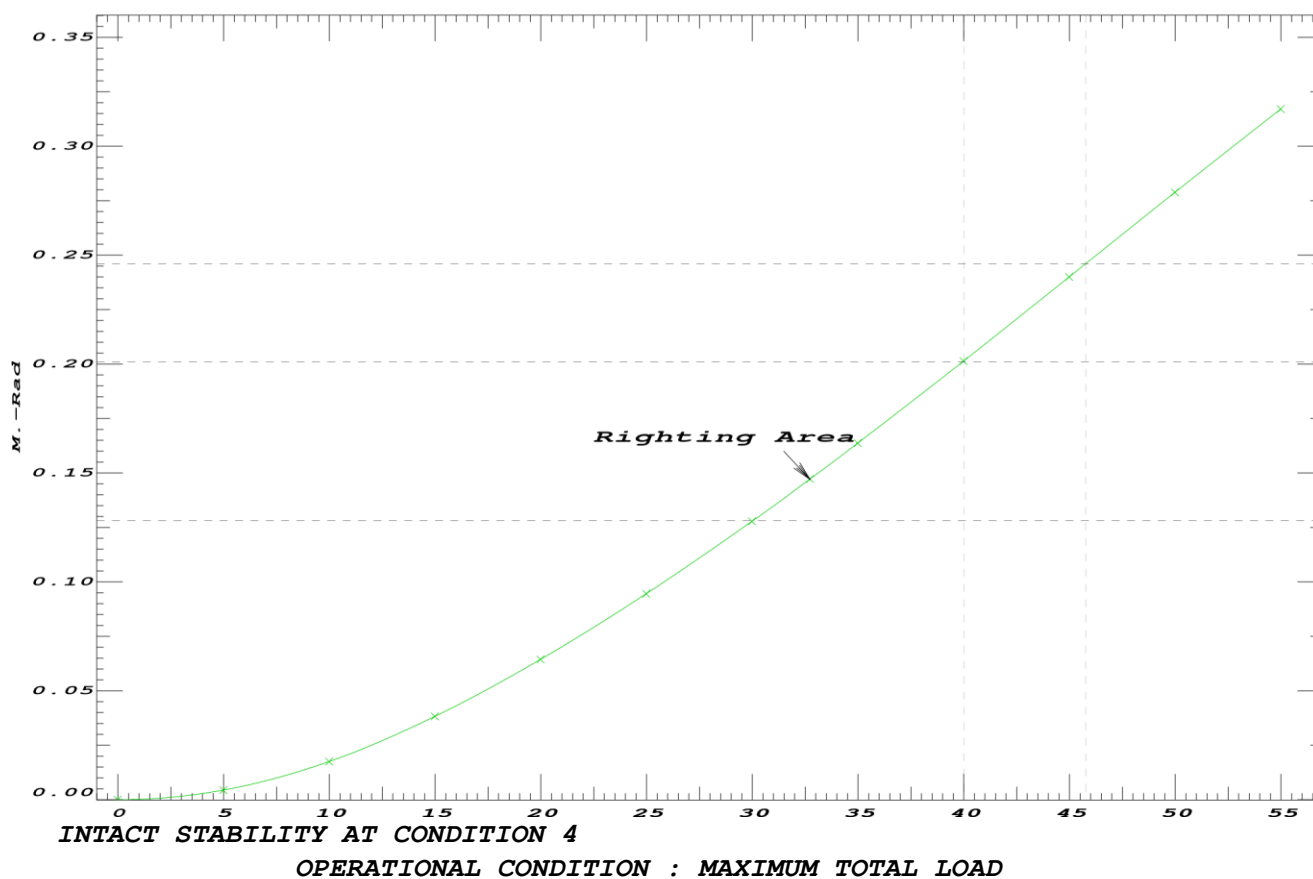
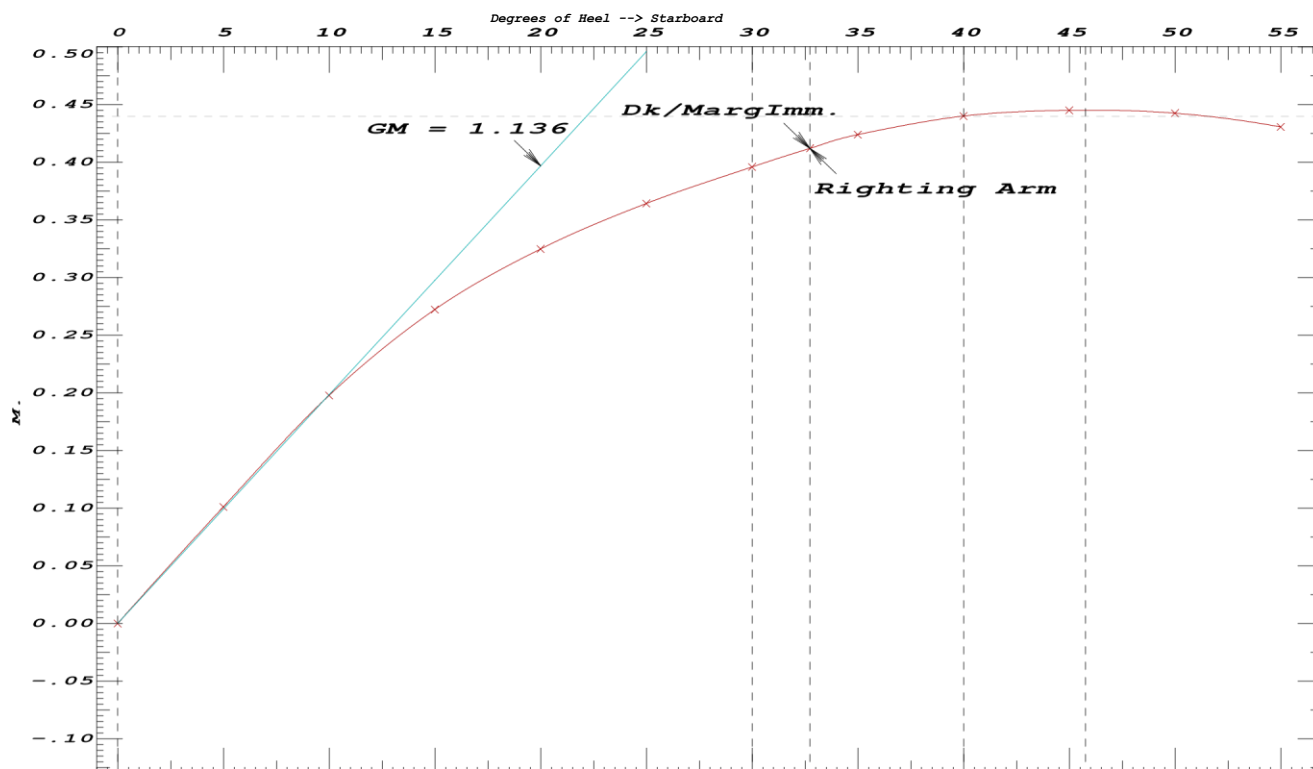


TANKLOAD OPTIMISED FOR MINIMUM TRIM

SUMMARY OF LOADING							
0.4 Cu.M. (50%) DIESEL OIL				0.3 Cu.M.		(50%) FRESH WATER	
0.0 Cu.M. (2%) SEWAGE							
0.30 MT of CREW				0.20 MT of STORES			
WEIGHT STATUS							
Trim: Fwd 0.050/11.100,				Heel: Port 0.02 deg.			
Part		Weight(MT)		LCG	TCG	VCG	
LIGHT SHIP		16.48		5.018f	0.000	1.602	
BALLAST		0.00					
CREW		0.30		2.800f	0.000	3.800	
STORES		0.20		4.000f	0.000	2.000	
Total Fixed		16.98		4.967f	0.000	1.646	
	Load	SpGr	Weight(MT)	LCG	TCG	VCG	FSM
FO1.C	0.500	0.840	0.35	4.831f	0.002p	0.479	2.18
FW1.C	0.500	1.000	0.31	6.487f	0.000	0.497	0.44
HO1.C	0.020	1.025	0.01	4.675f	0.051p	1.644	0.88
Total Tanks			0.67	5.596f	0.002p	0.498	3.51
Total Weight			17.65	4.991f	0.000	1.602	
Free Surface Adjustment						0.199	
Adjusted CG				4.990f	0.000	1.801	
Distances in METERS.						Moments in m.-MT.	
HYDROSTATIC PROPERTIES							
Trim: Fwd 0.050/11.100,				Heel: Port 0.02 deg.,		VCG = 1.602	
LCF	Displacement	Buoyancy-Ctr.		Weight/		Moment/	
Draft	Weight(MT)	LCB	VCB	cm	LCF	cm trim	GML GMT
1.103	17.65	4.994f	0.797	0.37	4.503f	0.26	16.08 1.136
Distances in METERS.			Specific Gravity = 1.025.			Moment in m.-MT.	
				Trim is per 11.10m.			
Draft is from Baseline.				True Free Surface included.			

CRITICAL POINT STATUS							
Baseline draft: 1.133 @ 11.10f, 1.083 @ 0.00							
Trim: Fwd 0.050/11.100,				Heel: Port 0.02 deg.			
	Critical Points			LCP	TCP	VCP	Height
(1)	AFT DRAFT MARK FRAME 0			0.000	0.000	0.000	-1.083
(2)	FWD DRAFT MARK FRAME 28			11.100f	0.000	0.000	-1.133
Distances in METERS.							
RIGHTING ARMS vs HEEL ANGLE Fixed CG: LCG = 4.967f							
TCG = 0.000 VCG = 1.646							
Origin	Degrees of		Displacement	Righting Arms		Area	Freebd (Extra)
Depth	Trim	Heel	Weight(MT)	in Trim	in Heel		
1.083	0.26f	0.02p	17.651	0.000	0.000	0.0000	

1.074	0.28f	4.98s	17.652	0.000	0.101	0.0044	0.919
1.045	0.37f	9.98s	17.652	0.000	0.198	0.0175	0.739
0.992	0.51f	14.98s	17.650	0.000	0.272	0.0382	0.565
0.919	0.65f	19.98s	17.650	0.000	0.325	0.0644	0.398
0.830	0.79f	24.98s	17.650	0.000	0.364	0.0945	0.236
0.725	0.92f	29.98s	17.650	0.000	0.396	0.1278	0.081
0.660	0.99f	32.73s	17.652	0.000	0.412	0.1471	-0.000
0.604	1.05f	34.98s	17.652	0.000	0.424	0.1636	-0.065
0.472	1.19f	39.98s	17.651	0.000	0.440	0.2013	-0.206
0.329	1.37f	44.98s	17.652	0.000	0.445	0.2400	-0.344
0.307	1.40f	45.73s	17.652	0.000	0.445	0.2458	-0.364
0.174	1.61f	49.98s	17.650	0.000	0.442	0.2788	-0.477
0.015	1.87f	54.98s	17.652	0.000	0.430	0.3169	-0.608
Distances in METERS.			Specific Gravity = 1.025.			Area in m.-Rad.	
Note: The Center of Gravity shown above is for the Fixed Weight of 16.98 MT. As the tank load centers shift with heel and trim, the total Center of Gravity varies. The righting arms shown above include the effect of the C.G. variation.							

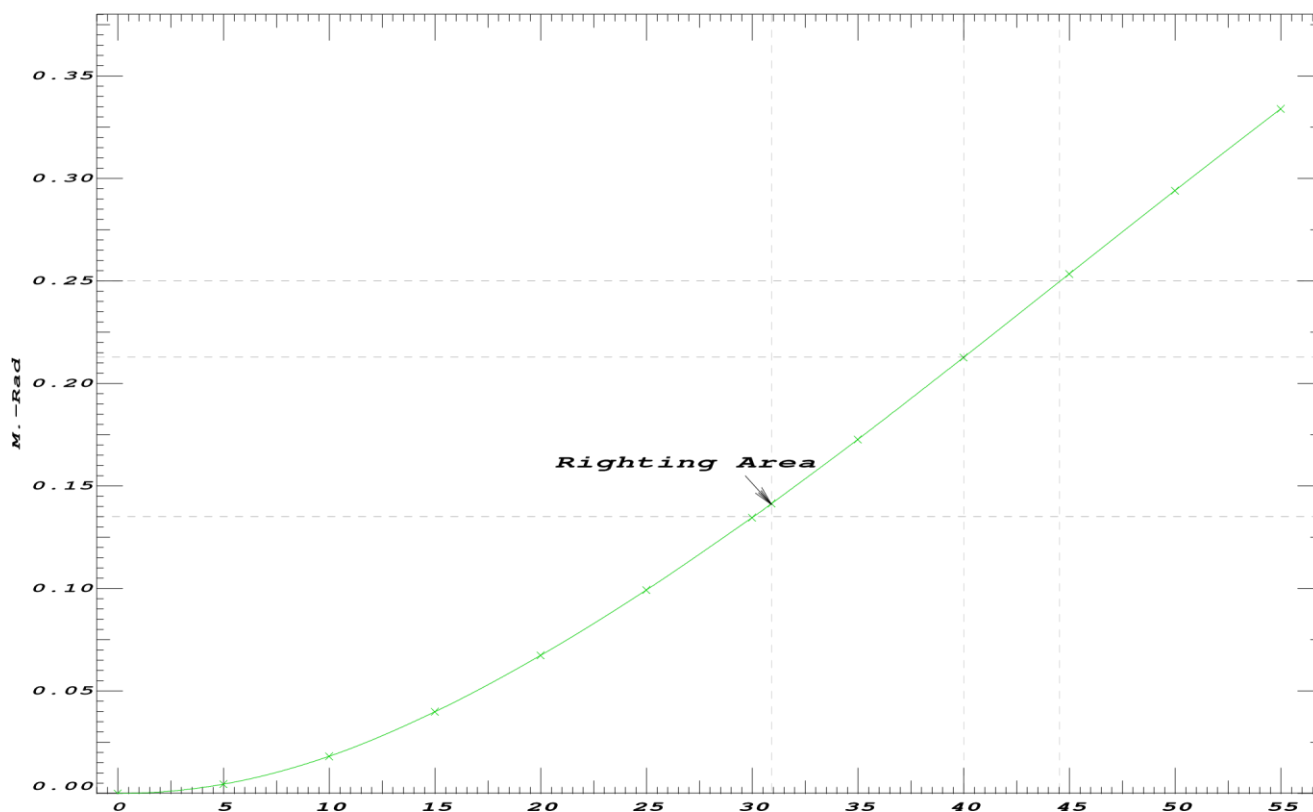
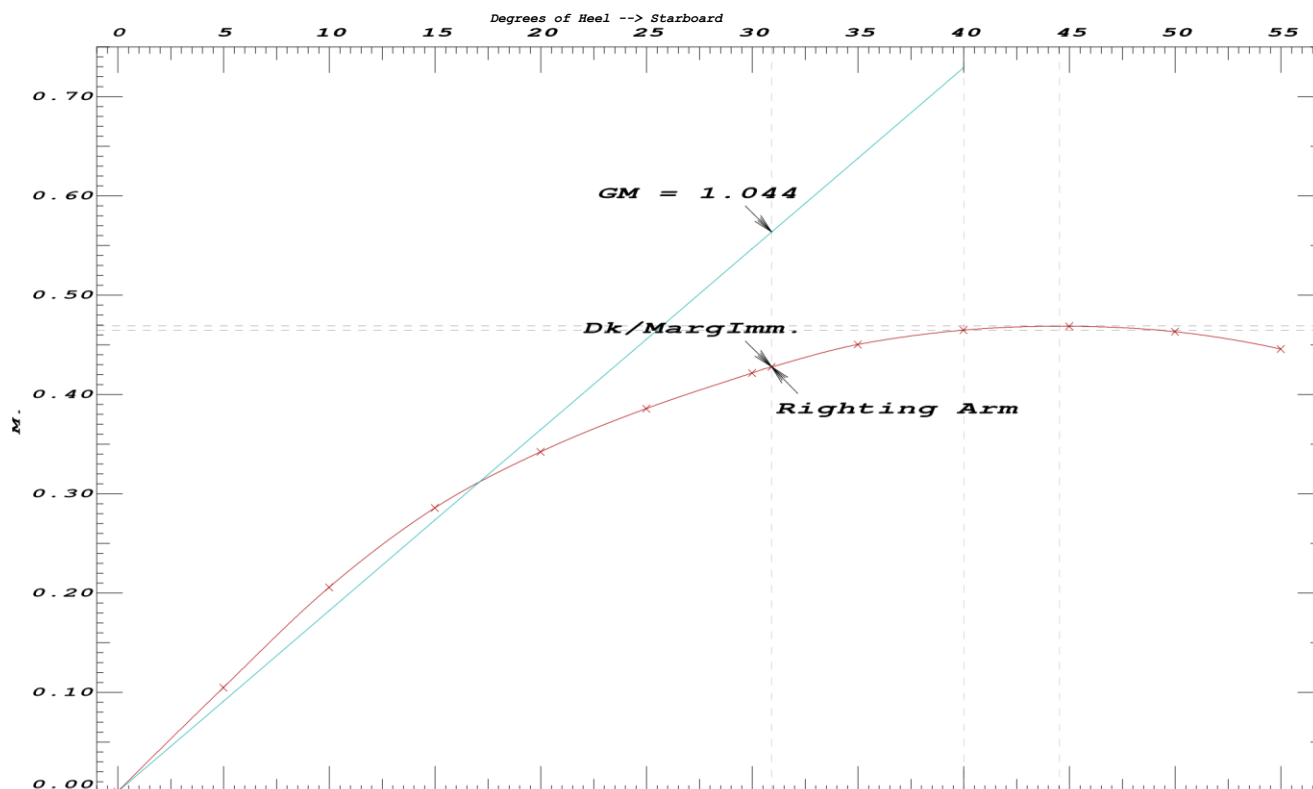


SUMMARY OF LOADING							
0.8 Cu.M. (98%) DIESEL OIL				0.6 Cu.M. (98%) FRESH WATER			
0.0 Cu.M. (2%) SEWAGE							
0.75 MT of CREWLIMIT				0.75 MT of MAXIMUM TOTAL LOAD			
Trim: Fwd 0.055/11.100,				Heel: Port 0.02 deg.			
Part		Weight(MT)		LCG	TCG	VCG	
LIGHT SHIP		16.48		5.018f	0.000	1.602	
BALLAST		0.00					
CREWLIMIT		0.75		3.500f	0.000	2.500	
MAXIMUM TOTAL LOAD		0.75		4.000f	0.000	2.000	
Total Fixed		17.98		4.912f	0.000	1.656	
	Load	SpGr	Weight(MT)	LCG	TCG	VCG	FSM
FO1.C	0.980	0.840	0.69	4.781f	0.001	0.547	2.12
FW1.C	0.980	1.000	0.61	6.494f	0.000	0.588	0.66
HO1.C	0.020	1.025	0.01	4.676f	0.052p	1.644	0.88
Total Tanks			1.31	5.577f	0.001	0.572	3.66
Total Weight			19.29	4.957f	0.000	1.583	
Free Surface Adjustment						0.190	
Adjusted CG				4.956f	0.000	1.772	
Distances in METERS.						Moments in m.-MT.	
HYDROSTATIC PROPERTIES							
Trim: Fwd 0.055/11.100,				Heel: Port 0.02 deg.,		VCG = 1.583	
LCF	Displacement	Buoyancy-Ctr.		Weight/		Moment/	
Draft	Weight(MT)	LCB	VCB	cm	LCF	cm trim	GML GMT
1.147	19.29	4.961f	0.825	0.37	4.530f	0.26	15.08 1.044
Distances in METERS.			Specific Gravity = 1.025.			Moment in m.-MT.	
				Trim is per 11.10m.			
Draft is from Baseline.				True Free Surface included.			

CRITICAL POINT STATUS					
Baseline draft: 1.180 @ 11.10f, 1.125 @ 0.00					
Trim: Fwd 0.055/11.100,			Heel: Port 0.02 deg.		
	Critical Points	LCP	TCP	VCP	Height
(1)	AFT DRAFT MARK FRAME 0	0.000	0.000	0.000	-1.125
(2)	FWD DRAFT MARK FRAME 28	11.100f	0.000	0.000	-1.180
Distances in METERS.					
RIGHTING ARMS vs HEEL ANGLE Fixed CG: LCG = 4.912f					
TCG = 0.000 VCG = 1.656					

Origin	Degrees of		Displacement	Righting Arms		Area	Freebd (Extra)
Depth	Trim	Heel	Weight(MT)	in Trim	in Heel		
1.125	0.28f	0.02p	19.288	0.000	0.000	0.0000	
1.119	0.28f	4.98s	19.290	0.000	0.105	0.0046	0.874

1.094	0.34f	9.98s	19.288	0.000	0.206	0.0182	0.692
1.047	0.43f	14.98s	19.288	0.000	0.286	0.0398	0.515
0.982	0.52f	19.98s	19.288	0.000	0.342	0.0673	0.345
0.897	0.62f	24.98s	19.288	0.000	0.386	0.0992	0.182
0.796	0.72f	29.98s	19.287	0.000	0.422	0.1345	0.027
0.775	0.74f	30.92s	19.288	0.000	0.428	0.1414	-0.000
0.679	0.82f	34.98s	19.288	0.000	0.450	0.1726	-0.120
0.551	0.94f	39.98s	19.289	0.000	0.465	0.2126	-0.262
0.409	1.13f	44.99s	19.288	0.000	0.469	0.2534	-0.400
0.401	1.14f	45.25s	19.289	0.000	0.469	0.2556	-0.408
0.255	1.36f	49.98s	19.289	0.000	0.463	0.2941	-0.534
0.100	1.59f	54.98s	19.289	0.000	0.446	0.3339	-0.666
Distances in METERS. Specific Gravity = 1.025. Area in m.-Rad. Note: The Center of Gravity shown above is for the Fixed Weight of 17.98 MT. As the tank load centers shift with heel and trim, the total Center of Gravity varies. The righting arms shown above include the effect of the C.G. variation.							

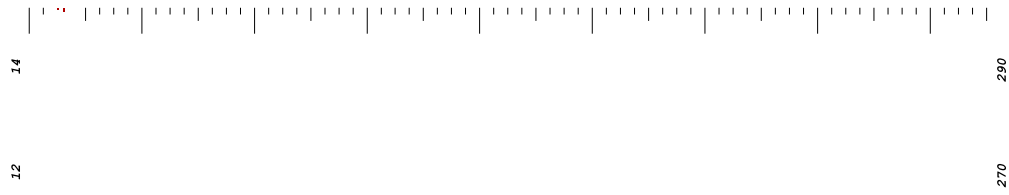




Appendix 2 – Hydrostatic Properties

A NEGATIVE SIGN IS ATTRIBUTED TO TRIM BY STEM
TRIM -1.00 DEGREE

HYDROSTATIC PROPERTIES									
Trim: Fwd 0.194/11.100, No Heel,					VCG = 0.000				
LCF	Displacement	Buoyancy-Ctr.		Weight/		Moment/			
Draft	Weight(MT)	LCB	VCB	cm	LCF	cm trim	KML	KMT	
1.032	15.00	5.304f	0.752	0.34	4.765f	0.24	17.70	3.024	
1.060	16.00	5.269f	0.771	0.35	4.706f	0.25	17.68	2.969	
1.087	17.00	5.234f	0.789	0.36	4.660f	0.27	17.54	2.917	
1.114	18.00	5.201f	0.806	0.37	4.626f	0.28	17.30	2.869	
1.141	19.00	5.170f	0.823	0.37	4.600f	0.29	17.01	2.825	
1.167	20.00	5.141f	0.839	0.37	4.587f	0.30	16.63	2.780	
1.194	21.00	5.115f	0.856	0.38	4.598f	0.30	16.07	2.722	
Distances in METERS.				Specific Gravity = 1.025.				Moment in m.-MT.	
Draft is from Baseline.				Trim is per 11.10m.					



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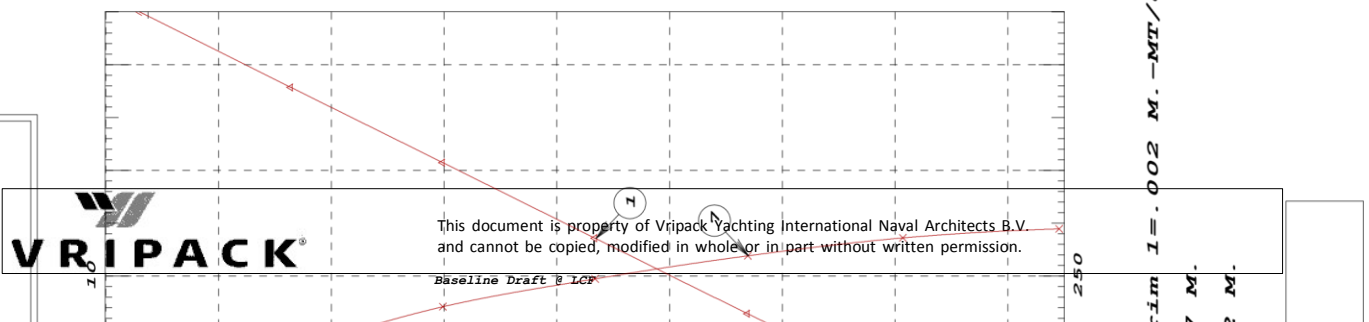
1
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3

1 = 0.02 M. - MT / cm

5 M.
2 M.

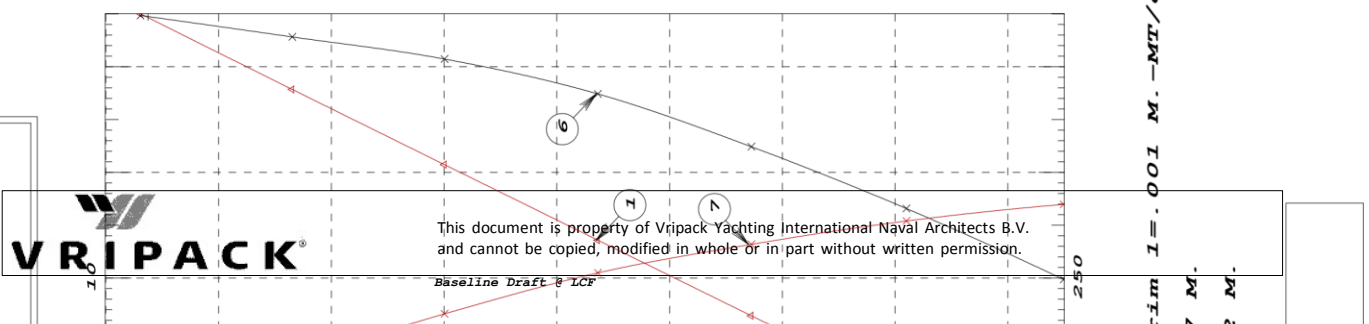
**A NEGATIVE SIGN IS ATTRIBUTED TO TRIM BY STEM
TRIM -0.75 DEGREE**

HYDROSTATIC PROPERTIES									
Trim: Fwd 0.145/11.100, No Heel,					VCG = 0.000				
LCF	Displacement	Buoyancy-Ctr.		Weight/		Moment/			
Draft	Weight(MT)	LCB	VCB	cm	LCF	cm trim	KML	KMT	
1.031	15.00	5.229f	0.751	0.35	4.692f	0.24	18.12	3.049	
1.059	16.00	5.194f	0.770	0.36	4.642f	0.26	18.01	2.992	
1.086	17.00	5.160f	0.787	0.36	4.605f	0.27	17.77	2.937	
1.113	18.00	5.129f	0.805	0.37	4.579f	0.28	17.46	2.887	
1.140	19.00	5.099f	0.822	0.37	4.562f	0.29	17.09	2.839	
1.167	20.00	5.073f	0.838	0.37	4.570f	0.30	16.53	2.778	
1.194	21.00	5.049f	0.855	0.38	4.585f	0.30	15.96	2.718	
Distances in METERS.				Specific Gravity = 1.025.				Moment in m.-MT.	
Draft is from Baseline.				Trim is per 11.10m.					



A NEGATIVE SIGN IS ATTRIBUTED TO TRIM BY STEM
TRIM -0.50 DEGREE

HYDROSTATIC PROPERTIES								
Trim: Fwd 0.097/11.100, No Heel,					VCG = 0.000			
LCF	Displacement	Buoyancy-Ctr.		Weight/		Moment/		
Draft	Weight(MT)	LCB	VCB	cm	LCF	cm trim	KML	KMT
1.030	15.00	5.153f	0.750	0.35	4.623f	0.25	18.48	3.074
1.058	16.00	5.118f	0.769	0.36	4.584f	0.26	18.26	3.014
1.086	17.00	5.086f	0.787	0.36	4.555f	0.27	17.95	2.957
1.113	18.00	5.056f	0.804	0.37	4.537f	0.28	17.57	2.903
1.140	19.00	5.028f	0.821	0.37	4.539f	0.29	17.03	2.841
1.167	20.00	5.004f	0.838	0.37	4.555f	0.30	16.41	2.773
1.194	21.00	4.983f	0.854	0.37	4.571f	0.30	15.84	2.713
Distances in METERS.			Specific Gravity = 1.025.				Moment in m.-MT.	
			Trim is per 11.10m.					
Draft is from Baseline.								



A NEGATIVE SIGN IS ATTRIBUTED TO TRIM BY STEM
TRIM -0.25 DEGREE

HYDROSTATIC PROPERTIES								
Trim: Fwd 0.048/11.100, No Heel,					VCG = 0.000			
LCF	Displacement	Buoyancy-Ctr.		Weight/		Moment/		
Draft	Weight(MT)	LCB	VCB	cm	LCF	cm trim	KML	KMT
1.030	15.00	5.075f	0.750	0.35	4.561f	0.25	18.76	3.099
1.058	16.00	5.041f	0.768	0.36	4.530f	0.27	18.45	3.036
1.085	17.00	5.011f	0.786	0.36	4.509f	0.28	18.07	2.976
1.113	18.00	4.983f	0.804	0.37	4.506f	0.28	17.55	2.912
1.140	19.00	4.958f	0.820	0.37	4.523f	0.29	16.88	2.836
1.167	20.00	4.937f	0.837	0.37	4.540f	0.29	16.28	2.769
1.194	21.00	4.918f	0.853	0.37	4.557f	0.30	15.72	2.709
Distances in METERS.			Specific Gravity = 1.025.				Moment in m.-MT.	
			Trim is per 11.10m.					
Draft is from Baseline.								

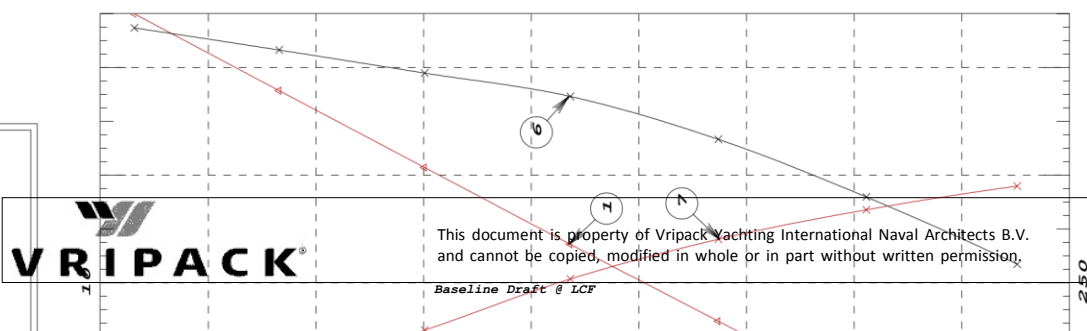


14

290

12

270



VRIPACK

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Baseline Draft @ LCF

250

1
2
3

1 = .001 M. - MT / cm

M.

M.

A NEGATIVE SIGN IS ATTRIBUTED TO TRIM BY STEM
TRIM 0.00 DEGREE

HYDROSTATIC PROPERTIES No Trim, No Heel, VCG = 0.000								
LCF	Displacement	Buoyancy-Ctr.		Weight/		Moment/		
Draft	Weight(MT)	LCB	VCB	cm	LCF	cm trim	KML	KMT
1.030	15.00	4.996f	0.750	0.35	4.503f	0.26	18.97	3.123
1.058	16.00	4.964f	0.768	0.36	4.481f	0.27	18.58	3.057
1.085	17.00	4.935f	0.786	0.36	4.471f	0.28	18.09	2.989
1.113	18.00	4.910f	0.803	0.37	4.489f	0.28	17.39	2.907
1.140	19.00	4.888f	0.820	0.37	4.507f	0.29	16.74	2.831
1.167	20.00	4.870f	0.837	0.37	4.525f	0.29	16.14	2.765
1.194	21.00	4.854f	0.853	0.37	4.542f	0.30	15.60	2.705
Distances in METERS. Draft is				Specific Gravity = 1.025.			Moment in m.-MT.	
from Baseline.				Trim is per 11.10m.				



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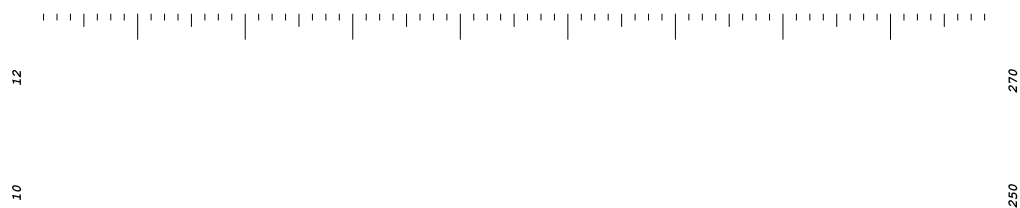
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2
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1 = 0.02 M. - MT / cm

230

A NEGATIVE SIGN IS ATTRIBUTED TO TRIM BY STEM
TRIM 0.25 DEGREE

HYDROSTATIC PROPERTIES								
Trim: Aft 0.048/11.100, No Heel,					VCG = 0.000			
LCF	Displacement	Buoyancy-Ctr.		Weight/		Moment/		
Draft	Weight(MT)	LCB	VCB	cm	LCF	cm trim	KML	KMT
1.030	15.00	4.916f	0.750	0.36	4.449f	0.26	19.11	3.146
1.058	16.00	4.886f	0.768	0.36	4.437f	0.27	18.64	3.075
1.085	17.00	4.860f	0.786	0.36	4.451f	0.27	17.94	2.987
1.113	18.00	4.838f	0.803	0.37	4.472f	0.28	17.23	2.902
1.140	19.00	4.819f	0.820	0.37	4.491f	0.28	16.59	2.827
1.167	20.00	4.803f	0.837	0.37	4.509f	0.29	16.00	2.761
1.194	21.00	4.790f	0.853	0.37	4.526f	0.29	15.47	2.702
Distances in METERS.			Specific Gravity = 1.025.				Moment in m.-MT.	
			Trim is per 11.10m.					
Draft is from Baseline.								



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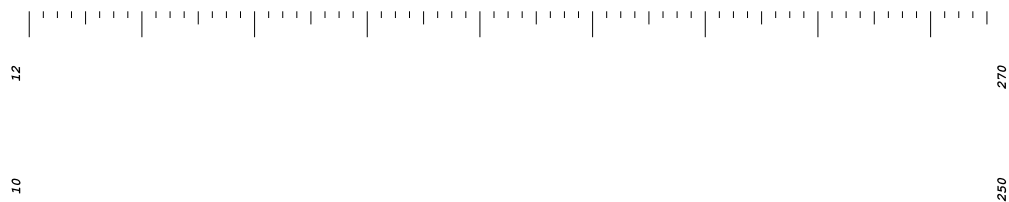
1
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1 = 0.02 M. - MT / cm

230

A NEGATIVE SIGN IS ATTRIBUTED TO TRIM BY STEM
TRIM 0.50 DEGREE

HYDROSTATIC PROPERTIES								
Trim: Aft 0.097/11.100, No Heel,					VCG = 0.000			
LCF	Displacement	Buoyancy-Ctr.		Weight/		Moment/		
Draft	Weight(MT)	LCB	VCB	cm	LCF	cm trim	KML	KMT
1.030	15.00	4.835f	0.750	0.36	4.400f	0.26	19.18	3.167
1.058	16.00	4.808f	0.769	0.36	4.409f	0.27	18.51	3.077
1.085	17.00	4.786f	0.787	0.36	4.432f	0.27	17.75	2.981
1.113	18.00	4.767f	0.804	0.36	4.454f	0.28	17.06	2.897
1.140	19.00	4.751f	0.821	0.37	4.474f	0.28	16.44	2.823
1.167	20.00	4.737f	0.838	0.37	4.493f	0.29	15.87	2.757
1.194	21.00	4.726f	0.854	0.37	4.511f	0.29	15.34	2.698
Distances in METERS.			Specific Gravity = 1.025.				Moment in m.-MT.	
			Trim is per 11.10m.					
Draft is from Baseline.								



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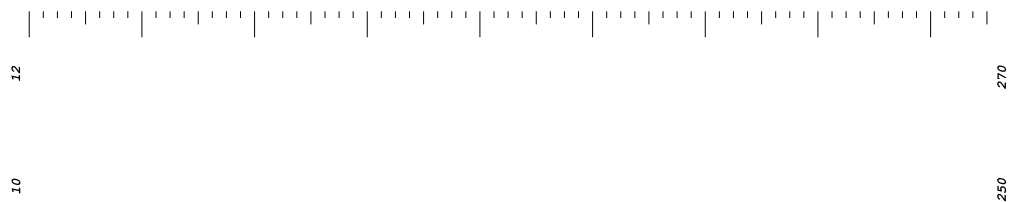
Baseline Draft @ LCF

1
2
3

1 = 0.02 M. - MT / cm

A NEGATIVE SIGN IS ATTRIBUTED TO TRIM BY STEM
TRIM 0.75 DEGREE

HYDROSTATIC PROPERTIES								
Trim: Aft 0.145/11.100, No Heel,					VCG = 0.000			
LCF	Displacement	Buoyancy-Ctr.		Weight/		Moment/		
Draft	Weight(MT)	LCB	VCB	cm	LCF	cm trim	KML	KMT
1.030	15.00	4.755f	0.751	0.36	4.363f	0.26	19.12	3.178
1.058	16.00	4.731f	0.770	0.36	4.389f	0.26	18.30	3.071
1.086	17.00	4.712f	0.787	0.36	4.413f	0.27	17.56	2.976
1.113	18.00	4.696f	0.805	0.36	4.436f	0.27	16.89	2.892
1.140	19.00	4.683f	0.822	0.37	4.456f	0.28	16.28	2.819
1.167	20.00	4.672f	0.838	0.37	4.476f	0.28	15.72	2.753
1.194	21.00	4.663f	0.855	0.37	4.495f	0.29	15.21	2.695
Distances in METERS.			Specific Gravity = 1.025.				Moment in m.-MT.	
			Trim is per 11.10m.					
Draft is from Baseline.								



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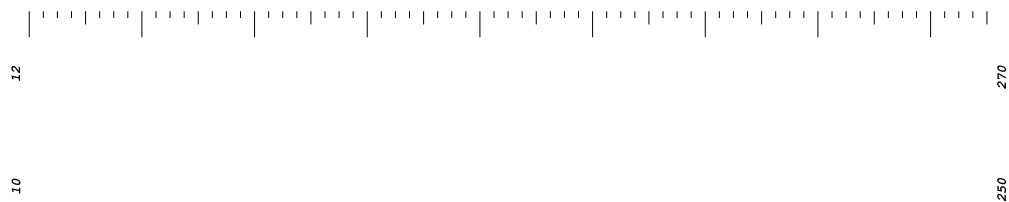
Baseline Draft @ LCF

1
2
3

1 = 0.02 M. - MT / cm

A NEGATIVE SIGN IS ATTRIBUTED TO TRIM BY STEM
TRIM 1.00 DEGREE

HYDROSTATIC PROPERTIES								
Trim: Aft 0.194/11.100, No Heel,					VCG = 0.000			
LCF	Displacement	Buoyancy-Ctr.		Weight/		Moment/		
Draft	Weight(MT)	LCB	VCB	cm	LCF	cm trim	KML	KMT
1.031	15.00	4.675f	0.752	0.35	4.340f	0.26	18.89	3.171
1.058	16.00	4.655f	0.771	0.36	4.368f	0.26	18.09	3.064
1.086	17.00	4.639f	0.789	0.36	4.393f	0.27	17.37	2.970
1.113	18.00	4.626f	0.806	0.36	4.416f	0.27	16.72	2.888
1.140	19.00	4.616f	0.823	0.36	4.439f	0.28	16.13	2.815
1.167	20.00	4.607f	0.839	0.37	4.459f	0.28	15.58	2.749
1.194	21.00	4.601f	0.855	0.37	4.478f	0.29	15.08	2.692
Distances in METERS.			Specific Gravity = 1.025.				Moment in m.-MT.	
			Trim is per 11.10m.					
Draft is from Baseline.								



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Baseline Draft @ LCF

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3

1 = 0.02 M. - MT / cm



Appendix 3 – Down Flooding Height

6.1.2 DOWNFLOODING HEIGHT (LOADED DISPLACEMENT CONDITION)

WEIGHT STATUS Trim: Fwd 0.46 deg., Heel: zero							
Part		Weight(MT)		LCG	TCG	VCG	
LIGHT SHIP		16.62		4.955f	0.000	1.656	
CREWLIMIT		0.75		5.000f	2.100s	2.500	
MAXIMUM TOTAL LOAD		0.75		5.000f	0.000	2.000	
Total Fixed		18.12		4.959f	0.087s	1.705	
	Ltrs.	SpGr	Weight(MT)	LCG	TCG	VCG	FSM
FO1.C	823.6	0.840	0.69	4.783f	0.000	0.547	1.79
FW1.C	607.4	1.000	0.61	6.495f	0.000	0.588	0.66
Total Tanks		1.30		5.583f	0.000	0.566	2.45
Total Weight		19.42		5.001f	0.081s	1.629	
Free Surface Adjustment						0.126	
Adjusted CG				5.000f	0.081s	1.755	
Distances in METERS.						Moments in m.-MT.	
HYDROSTATIC PROPERTIES Trim: Fwd 0.46 deg., No Heel, VCG = 1.629							
LCF	Displacement	Buoyancy-Ctr.		Weight/	Moment/		
Draft	Weight(MT)	LCB	VCB	cm	LCF	Deg trim	GML GMT
1.151	19.42	5.007f	0.828	0.37	4.543f	5.11	15.08 1.056
Distances in METERS. Specific Gravity = 1.025. Moment in m.-MT. Draft is from Baseline. True Free Surface included.							
CRITICAL POINT STATUS							
Baseline draft: 1.115 @ Origin							
Trim: Fwd 0.46 deg., Heel: zero							
	Critical Point			LCP	TCP	VCP	Height
(1)	ER VENTILATION PS		FLOOD	3.900f	1.950s	2.200	1.054
(1)	ER VENTILATION PS		FLOOD	3.900f	1.950p	2.200	1.054
Distances in METERS.							



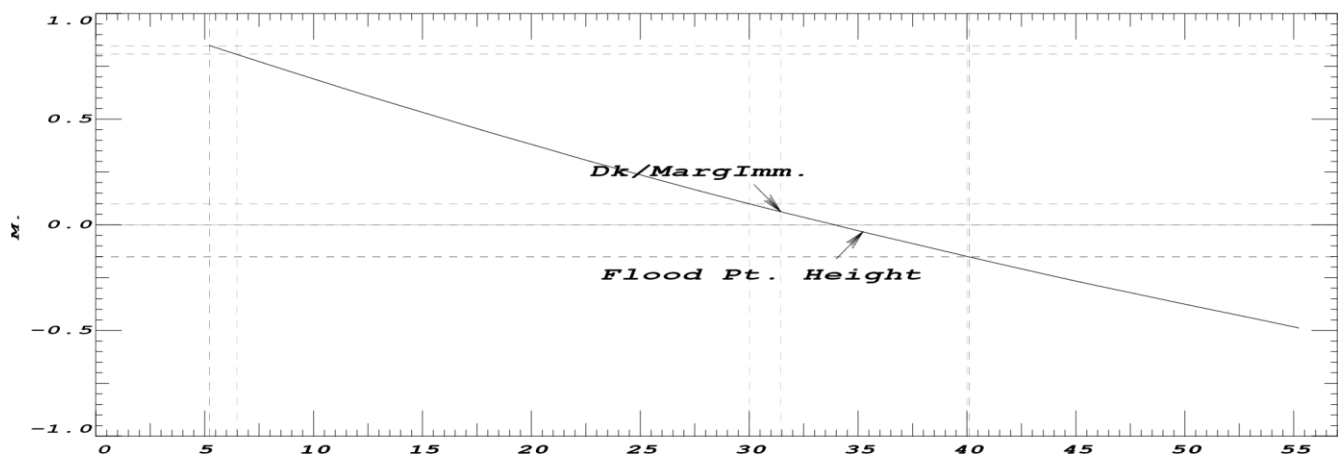
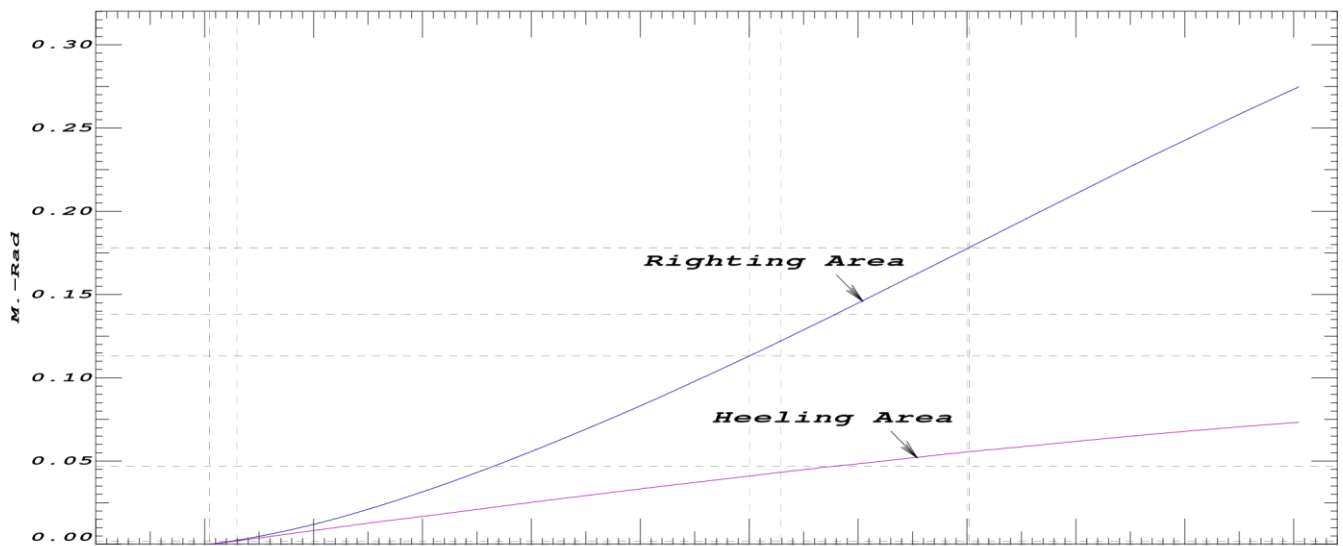
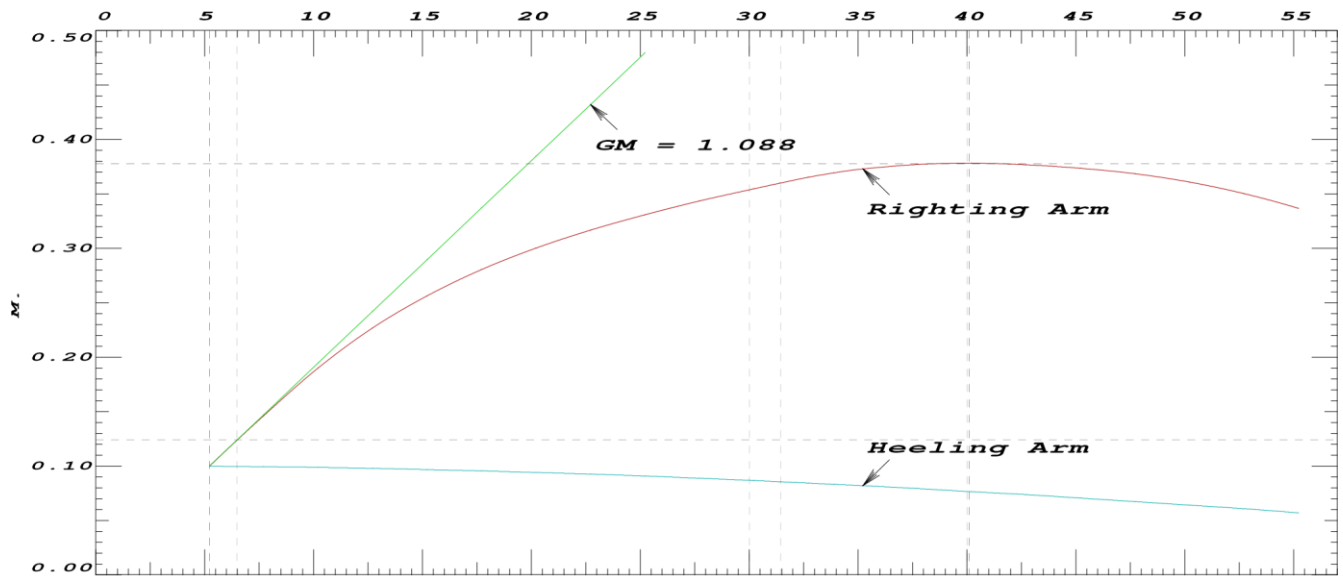
Appendix 4 – Offset Load Test

**6.2 A-SYMMETRIC LOADING AT LOADED
DISPLACEMENT**

LC1: CREW LOADED AT FWD POSITION 75%

WEIGHT STATUS							
Trim: Fwd 0.07 deg.,				Heel: Stbd 5.22 deg.			
Part	Weight(MT)		LCG	TCG	VCG		
LIGHT SHIP	16.48		5.018f	0.000	1.602		
MAXIMUM TOTAL LOAD	0.75		4.000f	0.000	2.000		
10 PERSONS (85kg)	0.85		3.105f	0.000	2.500		
Total Fixed	18.08		4.886f	0.000	1.661		
	Ltrs.	SpGr	Weight(MT)	LCG	TCG	VCG	FSM
FO1.C	420.2	0.840	0.35	4.813f	0.504s	0.501	1.54
FW1.C	309.8	1.000	0.31	6.486f	0.130s	0.502	0.41
Total Tanks			0.66	5.595f	0.329s	0.501	1.95
Total Weight			18.75	4.911f	0.012s	1.620	
Free Surface Adjustment						0.104	
Adjusted CG						1.723	
Distances in METERS.				Moments in m.-MT.			
HYDROSTATIC PROPERTIES							
Trim: Fwd 0.07 deg.,				Heel: Stbd 5.22 deg.,		VCG = 1.620	
LCF	Displacement	Buoyancy-Ctr.	Weight/		Moment/		
Draft	Weight(MT)	LCB	VCB	cm	LCF	Deg trim	GML GMT
1.131	18.75	4.911f	0.824	0.37	4.560f	4.84	14.78 1.097
Distances in METERS. Specific Gravity = 1.025. Moment in m.-MT. Draft is from Baseline. True Free Surface included.							
CRITICAL POINT STATUS							
Baseline draft: 1.126 @ Origin							
Trim: Fwd 0.07 deg.,				Heel: Stbd 5.22 deg.			
	Critical Points		LCP	TCP	VCP	Height	
(1)	ER VENTILATION PS		FLOOD	3.588f	1.870s	2.152	0.848
(1)	ER VENTILATION PS		FLOOD	3.588f	1.870p	2.152	1.188
(2)	ER VENTILATION PS		FLOOD	3.588f	1.870p	2.152	1.188
(2)	ER VENTILATION PS		FLOOD	3.588f	1.870s	2.152	0.848
Distances in METERS.							
FREEBOARD STATUS							
Baseline draft: 1.126 @ Origin Trim: Fwd 0.07 deg., Heel: Stbd 5.22 deg.							
Least freeboard is 0.878 m. located at 3.636f							

RESIDUAL RIGHTING ARMS vs HEEL ANGLE							
Total CG: LCG = 4.911f			TCG = 0.012s		VCG = 1.620		
Free Surface Adjustment: 0.104 Adjusted CG: LCG = 4.911f TCG = 0.002s VCG = 1.723							
Origin	Degrees of		Displacement	Residual Arms			Flood Pt Height
Depth	Trim	Heel	Weight(MT)	in Trim	in Heel	Area	
1.121	0.07f	5.22s	18.747	0.000	0.000	0.0000	0.848 (1)
1.111	0.09f	7.72s	18.746	0.000	0.047	0.0010	0.765 (1)
1.095	0.12f	10.22s	18.746	0.000	0.092	0.0041	0.684 (1)
1.073	0.17f	12.72s	18.746	0.000	0.129	0.0089	0.604 (1)
1.047	0.22f	15.22s	18.746	0.000	0.160	0.0152	0.525 (1)
1.016	0.27f	17.72s	18.746	0.000	0.185	0.0228	0.449 (1)
0.980	0.31f	20.22s	18.746	0.000	0.206	0.0313	0.374 (1)
0.940	0.36f	22.72s	18.746	0.000	0.224	0.0407	0.301 (1)
0.894	0.41f	25.22s	18.746	0.000	0.240	0.0508	0.230 (1)
0.845	0.47f	27.72s	18.745	0.000	0.255	0.0616	0.161 (1)
0.792	0.52f	30.22s	18.745	0.000	0.268	0.0730	0.094 (1)
	0.54f	31.44s		0.000	0.281	0.0788	Dk/MargImm.
0.734	0.57f	32.72s	18.746	0.000		0.0850	0.030 (1)
0.706	0.59f	33.91s	18.746	0.000	0.286	0.0909	-0.000 (1)
0.674	0.62f	35.22s	18.746	0.000	0.291	0.0975	-0.033 (1)
0.610	0.68f	37.72s	18.745	0.000	0.298	0.1103	-0.095 (1)
0.544	0.75f	40.22s	18.746	0.000	0.302	0.1234	-0.155 (1)
0.474	0.83f	42.72s	18.746	0.000	0.303	0.1366	-0.214 (1)
0.453	0.86f	43.44s	18.746	0.000	0.303	0.1404	-0.230 (1)
0.401	0.94f	45.22s	18.745	0.000	0.303	0.1498	-0.271 (1)
0.324	1.05f	47.72s	18.746	0.000	0.301	0.1630	-0.326 (1)
0.247	1.17f	50.22s	18.746	0.000	0.297	0.1761	-0.380 (1)
0.169	1.29f	52.72s	18.746	0.000	0.289	0.1889	-0.434 (1)
0.091	1.40f	55.22s	18.746	0.000	0.280	0.2013	-0.487 (1)
Distances in METERS.			Specific Gravity = 1.025.			Area in m.-Rad.	
Note:	The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 1.9 m.-MT was applied to artificially modify the CG.						
Note:	The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in m.-MT): Stbd. heeling moment = 1.88Cos(heel)						
Critical Point				LCP	TCP	VCP	
(1)	ER VENTILATION PS FLOOD			3.588f	1.870	2.152	
Degrees of Heel --> Starboard							

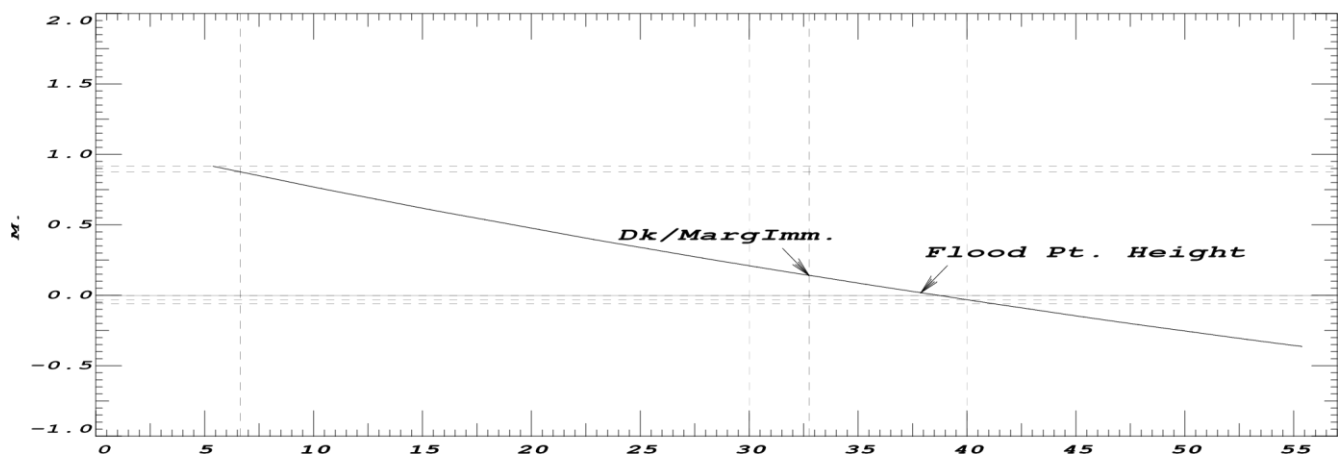
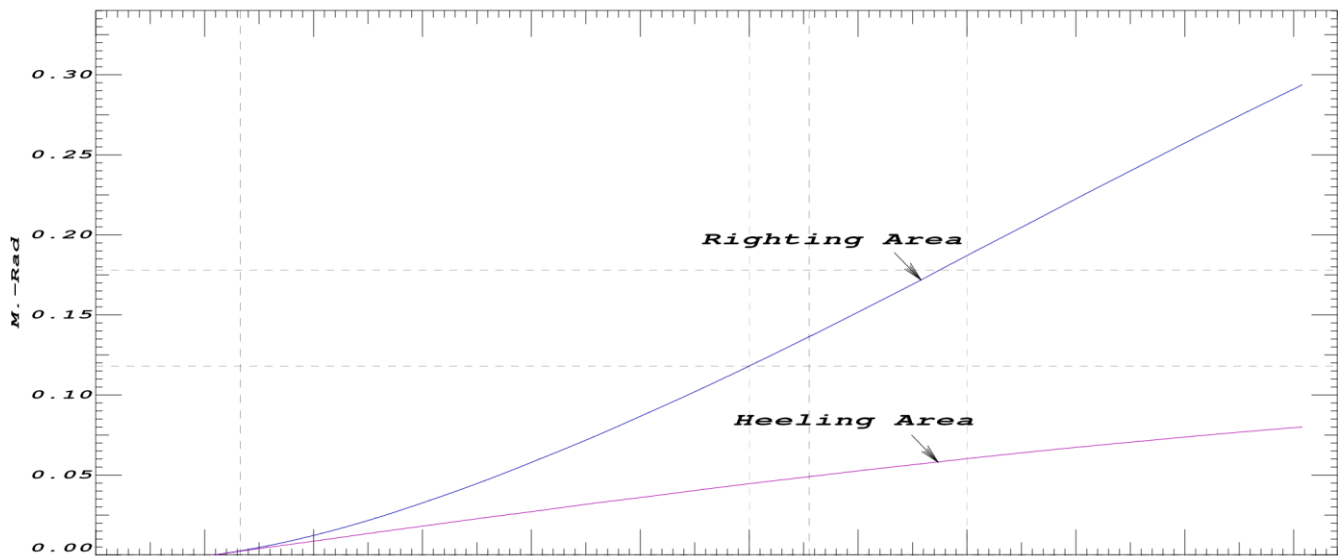
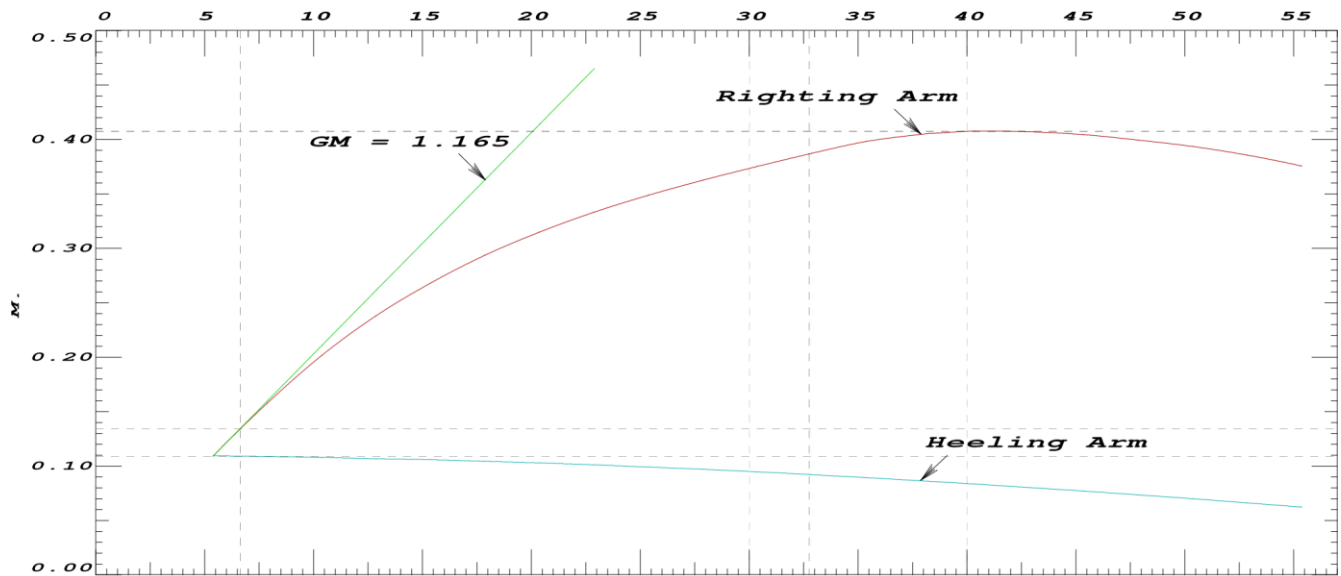


**6.2 A-SYMMETRIC LOADING AT LOADED
DISPLACEMENT**

LC2: CREW LOADED AT AFT POSITION 25%

WEIGHT STATUS								
Trim: Fwd 1.56 deg.,				Heel: Stbd 5.38 deg.				
Part	Weight(MT)		LCG	TCG	VCG			
LIGHT SHIP	14.88		5.179f	0.000	1.531			
MAXIMUM TOTAL LOAD	0.75		4.000f	0.000	2.000			
10 PERSONS (85kg)	0.85		9.315f	0.000	2.500			
Total Fixed	16.48		5.338f	0.000	1.602			
	Ltrs.	SpGr	Weight(MT)	LCG	TCG	VCG	FSM	
FO1.C	420.2	0.840	0.35	4.893f	0.509s	0.502	1.41	
FW1.C	309.8	1.000	0.31	6.503f	0.134s	0.503	0.41	
Total Tanks			0.66	5.645f	0.333s	0.503	1.82	
Total Weight			17.15	5.350f	0.013s	1.559		
Free Surface Adjustment						0.106		
Adjusted CG						1.665		
Distances in METERS.				Moments in m.-MT.				
HYDROSTATIC PROPERTIES								
Trim: Fwd 1.56 deg.,				Heel: Stbd 5.38 deg.,		VCG = 1.559		
LCF	Displacement	Buoyancy-Ctr.	Weight/		Moment/			
Draft	Weight(MT)	LCB	VCB	cm	LCF	Deg trim	GML	GMT
1.090	17.14	5.370f	0.803	0.35	4.804f	4.56	15.24	1.175
Distances in METERS. Specific Gravity = 1.025. Moment in m.-MT. Draft is from Baseline. True Free Surface included.								
CRITICAL POINT STATUS								
Baseline draft: 0.958 @ Origin								
Trim: Fwd 1.56 deg.,				Heel: Stbd 5.38 deg.				
	Critical Points			LCP	TCP	VCP	Height	
(1)	ER VENTILATION PS		FLOOD	3.588f	1.870s	2.152	0.915	
(1)	ER VENTILATION PS		FLOOD	3.588f	1.870p	2.152	1.266	
(2)	ER VENTILATION PS		FLOOD	3.588f	1.870p	2.152	1.266	
(2)	ER VENTILATION PS		FLOOD	3.588f	1.870s	2.152	0.915	
Distances in METERS.								
FREEBOARD STATUS								
Baseline draft: 0.958 @ Origin Trim: Fwd 1.56 deg.,								
Heel: Stbd 5.38 deg.								
Least freeboard is 0.920 m. located at 5.465f								

RESIDUAL RIGHTING ARMS vs HEEL ANGLE							
Total CG: LCG = 5.350f			TCG = 0.013s		VCG = 1.559		
Free Surface Adjustment: 0.106 Adjusted CG: LCG = 5.347f TCG = 0.003s VCG = 1.665							
Origin	Degrees of		Displacement	Residual Arms			Flood Pt Height
Depth	Trim	Heel	Weight(MT)	in Trim	in Heel	Area	
0.953	1.57f	5.38s	17.140	0.000	0.000	0.0000	0.915 (1)
0.936	1.65f	7.88s	17.145	0.000	0.049	0.0011	0.836 (1)
0.912	1.75f	10.38s	17.145	0.000	0.094	0.0042	0.758 (1)
0.882	1.85f	12.88s	17.145	0.000	0.131	0.0091	0.682 (1)
0.847	1.97f	15.38s	17.144	0.000	0.163	0.0156	0.608 (1)
0.807	2.09f	17.88s	17.144	0.000	0.189	0.0233	0.536 (1)
0.762	2.21f	20.38s	17.144	0.000	0.212	0.0320	0.465 (1)
0.713	2.32f	22.88s	17.144	0.000	0.232	0.0417	0.397 (1)
0.661	2.42f	25.38s	17.144	0.000	0.250	0.0522	0.329 (1)
0.605	2.52f	27.88s	17.145	0.000	0.266	0.0635	0.264 (1)
0.546	2.62f	30.38s	17.145	0.000	0.281	0.0754	0.200 (1)
	2.69f	32.75s		0.000	0.295	0.0873	Dk/MargImm.
0.484	2.70f	32.88s	17.146	0.000		0.0880	0.138 (1)
0.419	2.78f	35.38s	17.145	0.000	0.309	0.1012	0.078 (1)
0.352	2.86f	37.88s	17.145	0.000	0.318	0.1148	0.019 (1)
0.330	2.88f	38.68s	17.146	0.000	0.320	0.1193	-0.000 (1)
0.283	2.94f	40.38s	17.146	0.000	0.324	0.1289	-0.040 (1)
0.211	3.04f	42.88s	17.146	0.000	0.327	0.1431	-0.097 (1)
0.158	3.11f	44.68s	17.146	0.000	0.327	0.1533	-0.138 (1)
0.137	3.14f	45.38s	17.146	0.000	0.327	0.1573	-0.154 (1)
0.061	3.25f	47.88s	17.146	0.000	0.326	0.1716	-0.209 (1)
-0.018	3.38f	50.38s	17.146	0.000	0.323	0.1858	-0.262 (1)
-0.100	3.53f	52.88s	17.145	0.000	0.319	0.1998	-0.313 (1)
-0.183	3.68f	55.38s	17.146	0.000	0.313	0.2136	-0.363 (1)
Distances in METERS.			Specific Gravity = 1.025.			Area in m.-Rad.	
Note:	The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 1.8 m.-MT was applied to artificially modify the CG.						
Note:	The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in m.-MT): Stbd. heeling moment = 1.88Cos(heel)						
Critical Point				LCP	TCP	VCP	
(1)	ER VENTILATION PS FLOOD			3.588f	1.870	2.152	
Degrees of Heel --> Starboard							





Appendix 5 - Resistance To Waves And Wind (Cat. B)

6.3 RESISTANCE TO WAVES AND WIND AT MINIMUM LOADED DISPLACEMENT

SUMMARY OF LOADING								
0.0 Ltrs. (0%) DIESEL OIL			0.0 Ltrs. (0%) FRESH WATER					
0.0 Ltrs. (0%) SEWAGE								
0.25 MT of Misc. Weights								
WEIGHT STATUS								
Trim: Fwd 0.17 deg.,			Heel: zero					
Part	Weight(MT)		LCG	TCG	VCG	FSM		
LIGHT SHIP	16.48		5.018f	0.000	1.602			
CREW MASS	0.15		2.800f	0.000	3.800			
NON CONSUMABLES	0.10		4.000f	0.000	2.000			
Total Weight	16.73		4.992f	0.000	1.624			
Ltrs.		SpGr	Weight(MT)	LCG	TCG	VCG		
Total Tanks			0.00				0.00	
Distances in METERS.					Moments in m.-MT.			
HYDROSTATIC PROPERTIES Trim: Fwd 0.17 deg., No Heel, VCG = 1.624								
LCF	Displacement	Buoyancy-Ctr.		Weight/		Moment/		
Draft	Weight(MT)	LCB	VCB	cm	LCF	Deg trim	GML	GMT
1.078	16.73	4.995f	0.781	0.36	4.500f	4.84	16.59	1.374

Distances in METERS. Draft is from Baseline.	Specific Gravity = 1.025.	Moment in m.-MT.
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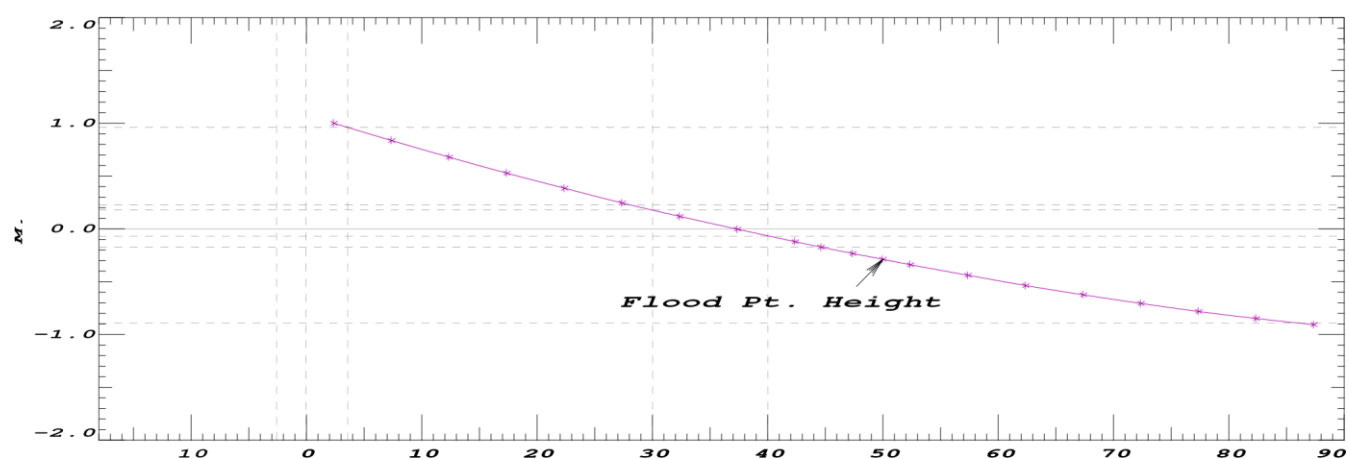
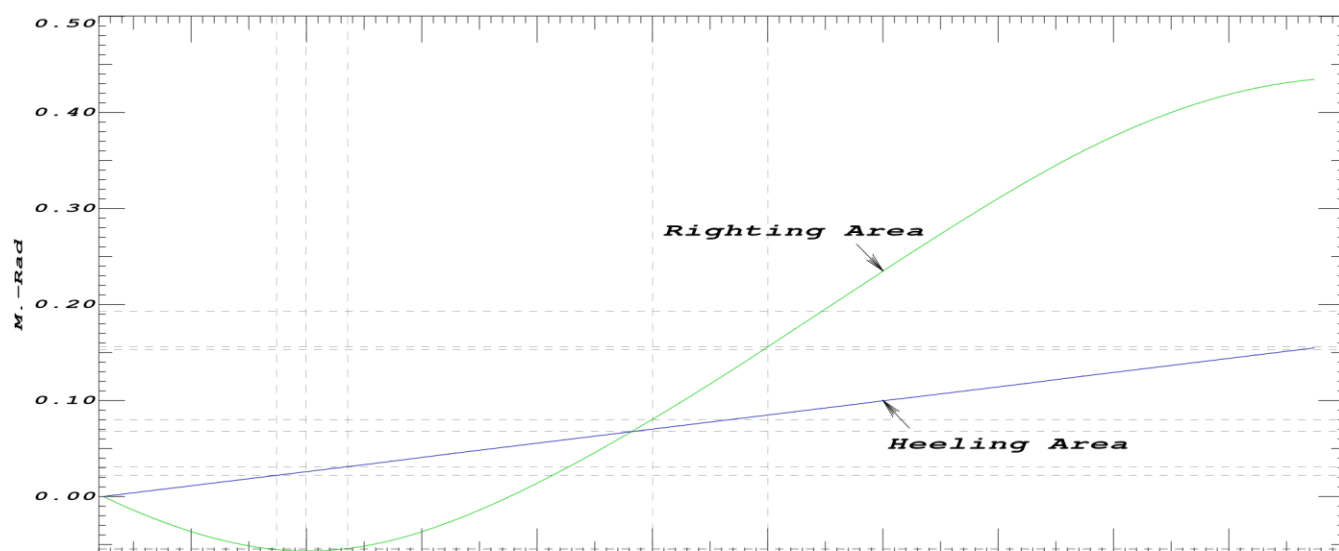
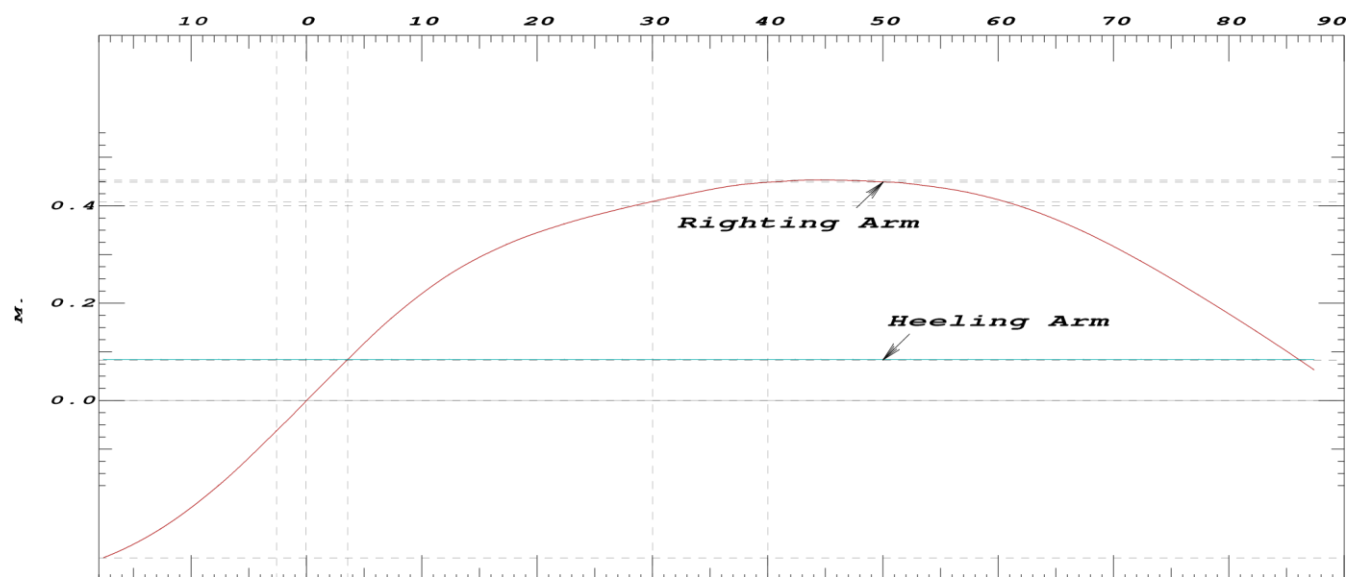
HEELING MOMENT specification	
Heeling Moment	
1.41s m.-MT	
Constant heeling moment to starboard	1.41

Roll angle = 21.17 degrees.

RESIDUAL RIGHTING ARMS vs HEEL ANGLE LCG = 4.992f TCG = 0.000 VCG = 1.624							
Origin Depth	Degrees of		Displacement	Residual Arms		Area	Flood Pt Height
	Trim	Heel	Weight(MT)	in Trim	in Heel		
0.928	0.57f	17.62p	16.731	0.000	-0.407	0.0000	
0.996	0.39f	12.62p	16.729	0.000	-0.347	-0.0329	
1.041	0.25f	7.62p	16.730	0.000	-0.259	-0.0595	
1.062	0.18f	2.62p	16.731	0.000	-0.147	-0.0774	
1.062	0.18f	2.38s	16.731	0.000	-0.027	-0.0850	0.999 (1)
1.059	0.19f	3.55s	16.731	0.000	0.000	-0.0853	0.961 (1)
1.042	0.25f	7.38s	16.731	0.000	0.085	-0.0824	0.836 (1)
0.999	0.39f	12.38s	16.730	0.000	0.175	-0.0709	0.678 (1)
0.932	0.56f	17.38s	16.729	0.000	0.237	-0.0528	0.528 (1)
0.849	0.72f	22.38s	16.732	0.000	0.279	-0.0301	0.384 (1)
0.749	0.88f	27.38s	16.728	0.000	0.311	-0.0043	0.247 (1)
0.634	1.03f	32.38s	16.729	0.000	0.337	0.0240	0.117 (1)
0.511	1.17f	37.20s	16.731	0.000	0.358	0.0533	-0.000 (1)
0.506	1.17f	37.38s	16.731	0.000	0.358	0.0544	-0.004 (1)
0.367	1.33f	42.38s	16.731	0.000	0.368	0.0862	-0.121 (1)
0.301	1.42f	44.64s	16.731	0.000	0.369	0.1007	-0.173 (1)
0.218	1.54f	47.38s	16.730	0.000	0.368	0.1183	-0.233 (1)
0.135	1.66f	50.00s	16.731	0.000	0.365	0.1351	-0.289 (1)
0.059	1.79f	52.38s	16.731	0.000	0.361	0.1502	-0.338 (1)
-0.104	2.06f	57.38s	16.732	0.000	0.344	0.1810	-0.440 (1)
-0.270	2.34f	62.38s	16.732	0.000	0.311	0.2096	-0.535 (1)
-0.436	2.60f	67.38s	16.727	0.000	0.263	0.2348	-0.624 (1)
-0.598	2.78f	72.38s	16.729	0.000	0.202	0.2551	-0.706 (1)
-0.755	2.91f	77.38s	16.730	0.000	0.132	0.2698	-0.780 (1)
-0.908	3.02f	82.38s	16.731	0.000	0.058	0.2781	-0.847 (1)
-1.017	3.07f	86.08s	16.731	0.000	0.000	0.2800	-0.891 (1)

-1.055	3.08f	87.38s	16.731	0.000	-0.021	0.2798	-0.906	(1)								
Distances in METERS.			Specific Gravity = 1.025.			Area in m.-Rad.										
Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes.																
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in m.-MT): Stbd heeling moment = 1.41																
<table><tr><td>Critical Point</td><td>LCP</td><td>TCP</td><td>VCP</td></tr><tr><td>(1) ER VENTILATION PS FLOOD</td><td>3.588f</td><td>1.870</td><td>2.152</td></tr></table>									Critical Point	LCP	TCP	VCP	(1) ER VENTILATION PS FLOOD	3.588f	1.870	2.152
Critical Point	LCP	TCP	VCP													
(1) ER VENTILATION PS FLOOD	3.588f	1.870	2.152													
LIM	STABILITY CRITERION					Min/Max		Attained								
(1)	Res. Ratio from Roll to abs 50 deg or Flood					> 1.000		1.625 P								
(2)	Res. Area Ratio from Roll to RAzero or Flood					> 1.000		1.625 P								

Degrees of Heel --> Starboard



6.3 RESISTANCE TO WAVES AND WIND AT MAXIMUM LOADED DISPLACEMENT

SUMMARY OF LOADING							
823.6 Ltrs. (98%) DIESEL OIL			607.4 Ltrs.		(98%) FRESH WATER		
0.0 Ltrs. (0%) SEWAGE							
0.75 MT of CREWLIMIT		0.75 MT of MAXIMUM TOTAL LOAD		WEIGHT STATUS			
Trim: Fwd 0.28 deg.,			Heel: zero				
Part	Weight(MT)		LCG	TCG	VCG		
LIGHT SHIP	16.48		5.018f	0.000	1.602		
CREWLIMIT	0.75		3.500f	0.000	2.500		
MAXIMUM TOTAL LOAD	0.75		4.000f	0.000	2.000		
Total Fixed	17.98		4.912f	0.000	1.656		
	Ltrs.	SpGr	Weight(MT)	LCG	TCG	VCG	FSM
FO1.C	823.6	0.840	0.69	4.781f	0.000	0.547	2.15
FW1.C	607.4	1.000	0.61	6.494f	0.000	0.588	0.66
Total Tanks			1.30	5.581f	0.000	0.566	2.80
Total Weight			19.28	4.957f	0.000	1.583	
Free Surface Adjustment						0.145	
Adjusted CG				4.957f	0.000	1.728	
Distances in METERS.						Moments in m.-MT.	
HYDROSTATIC PROPERTIES Trim: Fwd 0.28 deg., No Heel, VCG = 1.583							
LCF	Displacement	Buoyancy-Ctr.		Weight/		Moment/	
Draft	Weight(MT)	LCB	VCB	cm	LCF	Deg trim	GML GMT
1.147	19.28	4.961f	0.825	0.37	4.530f	5.08	15.08 1.089
Distances in METERS. Specific Gravity = 1.025. Moment in m.-MT. Draft is from Baseline. True Free Surface included.							
HEELING MOMENT specification							
Heeling Moment							
1.43s m.-MT							
Constant heeling moment to starboard 1.43							

Roll angle = 21.00 degrees.

RESIDUAL RIGHTING ARMS vs HEEL ANGLE								
Total CG: LCG = 4.957f			TCG = 0.001s		VCG = 1.583			
Free Surface Adjustment: 0.002 Adjusted CG: LCG = 4.957f TCG = 0.001s VCG = 1.585								
Origin	Degrees of		Displacement	Residual Arms		Area	Flood Pt Height	
Depth	Trim	Heel	Weight(MT)	in Trim	in Heel			
1.016	0.48f	17.50p	19.278	0.000	-0.393	0.0000		
1.073	0.39f	12.50p	19.281	0.000	-0.326	-0.0314		
1.109	0.30f	7.50p	19.282	0.000	-0.233	-0.0560		
1.124	0.28f	2.50p	19.282	0.000	-0.129	-0.0719		
1.124	0.28f	2.50s	19.282	0.000	-0.021	-0.0784	0.927	(1)
1.122	0.28f	3.50s	19.282	0.000	0.000	-0.0786	0.894	(1)

1.109	0.30f	7.50s	19.282	0.000	0.083	-0.0757	0.762 (1)
1.073	0.39f	12.50s	19.281	0.000	0.176	-0.0643	0.599 (1)
1.016	0.48f	17.50s	19.281	0.000	0.242	-0.0459	0.443 (1)
0.941	0.57f	22.50s	19.281	0.000	0.291	-0.0225	0.295 (1)
0.848	0.67f	27.50s	19.280	0.000	0.330	0.0047	0.155 (1)
0.738	0.77f	32.50s	19.281	0.000	0.363	0.0350	0.023 (1)
0.717	0.79f	33.42s	19.282	0.000	0.368	0.0408	0.000 (1)
0.616	0.88f	37.50s	19.281	0.000	0.385	0.0677	-0.102 (1)
0.480	1.03f	42.50s	19.282	0.000	0.393	0.1017	-0.222 (1)
0.421	1.11f	44.57s	19.282	0.000	0.394	0.1159	-0.269 (1)
0.332	1.25f	47.50s	19.281	0.000	0.392	0.1360	-0.335 (1)
0.254	1.37f	50.00s	19.282	0.000	0.388	0.1530	-0.389 (1)
0.177	1.48f	52.50s	19.282	0.000	0.381	0.1698	-0.443 (1)
0.023	1.70f	57.50s	19.289	0.000	0.358	0.2021	-0.551 (1)
-0.131	1.91f	62.50s	19.280	0.000	0.325	0.2320	-0.653 (1)
-0.289	2.14f	67.50s	19.275	0.000	0.280	0.2585	-0.749 (1)
-0.446	2.33f	72.50s	19.280	0.000	0.224	0.2805	-0.835 (1)
-0.600	2.47f	77.50s	19.281	0.000	0.159	0.2973	-0.913 (1)
-0.751	2.58f	82.50s	19.281	0.000	0.088	0.3081	-0.983 (1)
-0.896	2.65f	87.50s	19.282	0.000	0.014	0.3126	-1.043 (1)
-0.921	2.66f	88.41s	19.282	0.000	0.000	0.3127	-1.053 (1)
-1.033	2.68f	92.50s	19.282	0.000	-0.063	0.3105	-1.095 (1)

Distances in METERS.

Specific Gravity = 1.025.

Area in m.-Rad.

Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 0.0 m.-MT was applied to artificially modify the CG.

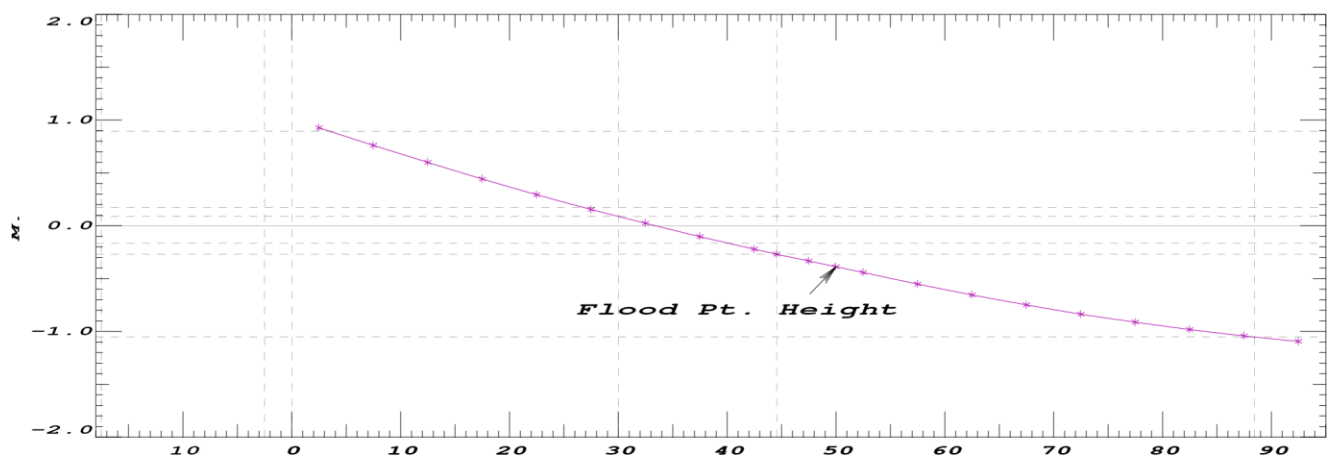
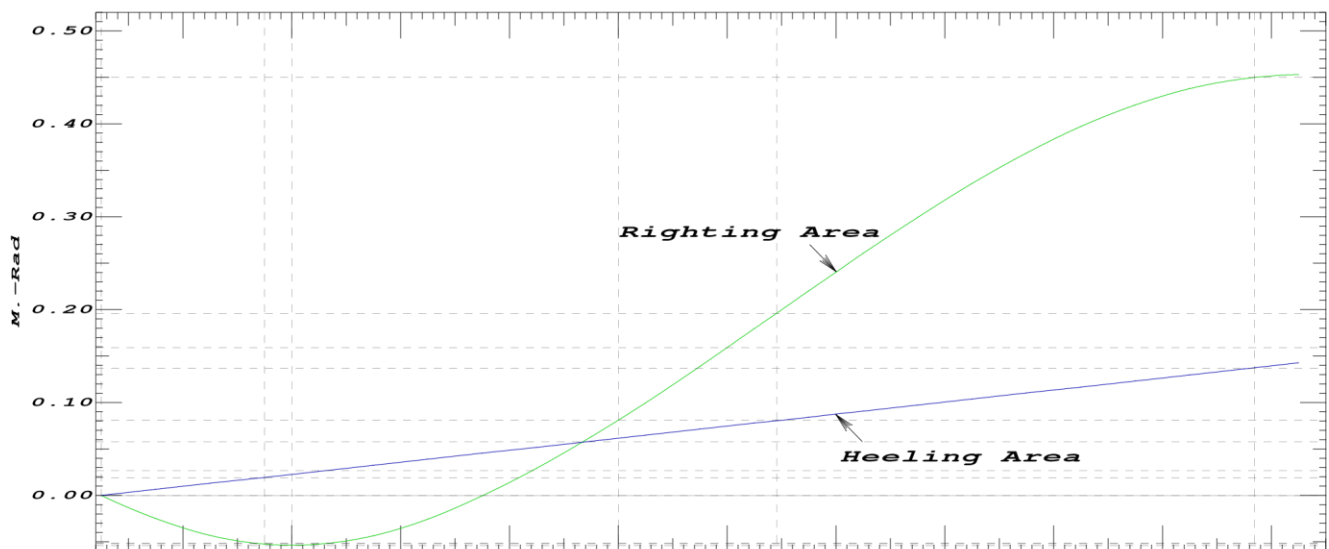
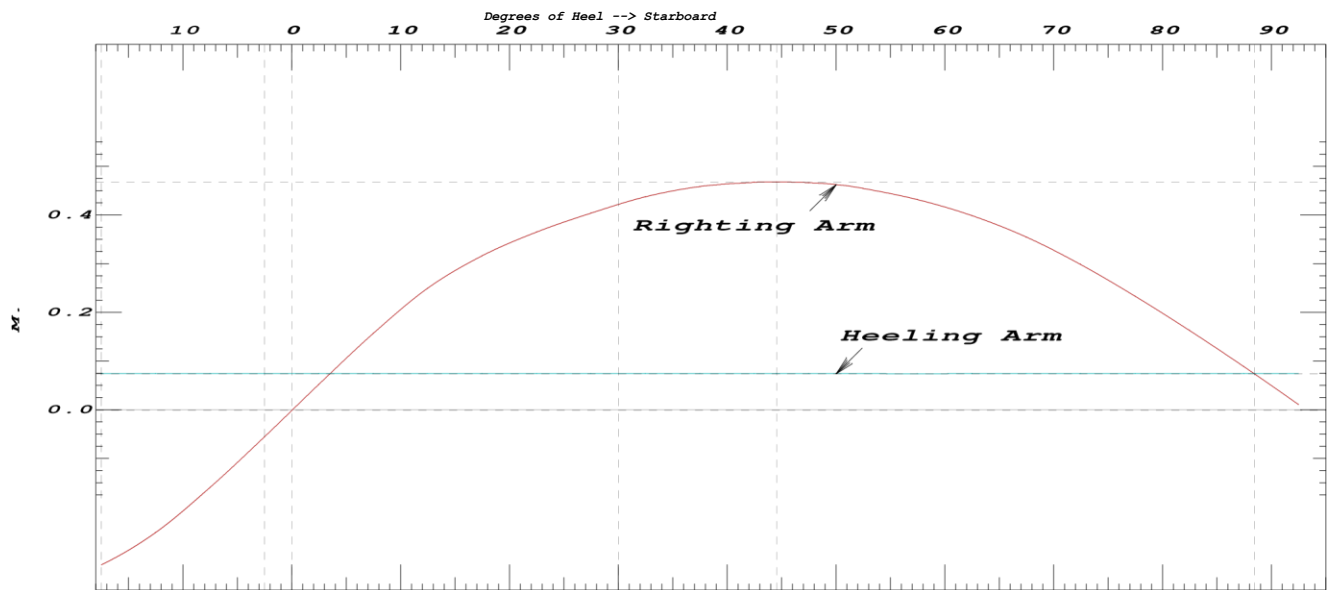
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in m.-MT): Stbd heeling moment = 1.43

Critical Point	LCP	TCP	VCP
(1) ER VENTILATION PS FLOOD	3.588f	1.870	2.152

continued next page

LIM	STABILITY CRITERION	Min/Max	Attained
(1)	Res. Ratio from Roll to abs 50 deg or Flood	> 1.000	1.519 P

(2)	Res. Area Ratio from Roll to RAzero or Flood	>	1.000	1.519 P
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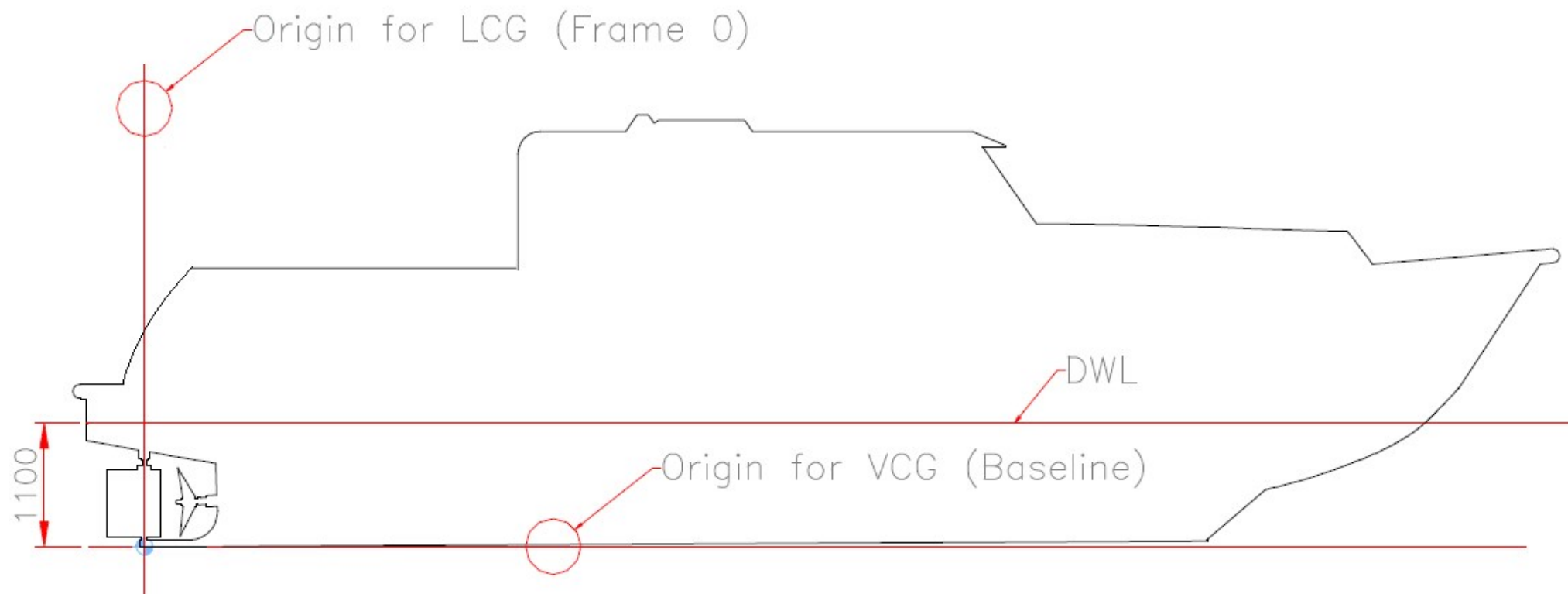


Appendix 6 – Basepoint Definition

Project : 6836

Date: 12/08/2011

Revision : P0





Appendix 7 – Tank arrangement

Maximum Storage Capacity

WEIGHT STATUS Trim: zero, Heel: zero							
Part	Weight(MT)			LCG	TCG	VCG	
	Ltrs.	SpGr	Weight(MT)	LCG	TCG	VCG	RefHt
FO1.C	840.3	0.840	0.71	4.769f	0.000	0.550	
Total Weight			0.71	4.769f	0.000	0.550	
Distances in METERS.							
WEIGHT STATUS Trim: zero, Heel: zero							
Part	Weight(MT)			LCG	TCG	VCG	
	Ltrs.	SpGr	Weight(MT)	LCG	TCG	VCG	RefHt
FW1.C	619.8	1.000	0.62	6.492f	0.000	0.591	
Total Weight			0.62	6.492f	0.000	0.591	
Distances in METERS.							
WEIGHT STATUS Trim: zero, Heel: zero							
Part	Weight(MT)			LCG	TCG	VCG	
	Ltrs.	SpGr	Weight(MT)	LCG	TCG	VCG	RefHt
HO1.C	317.6	1.025	0.33	5.078f	0.000	1.890	
Total Weight			0.33	5.078f	0.000	1.890	
Distances in METERS.							
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