



# **0340 Preliminary Stability Calculation Booklet**

**According ISO 12217-1**

Bommelaer 47 Sedan

**5910 / Jetten Jachtbouw**



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## **Preface**

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

Sneek, 27/11/2007



## Identification And Approval

| General information of the ship |                      |                                          |        |   |
|---------------------------------|----------------------|------------------------------------------|--------|---|
| 1                               | Ship's Name          | -                                        |        |   |
| 2                               | Type of ship         | Bommelaer 47 Sedan                       |        |   |
| 3                               | Name of builders     | Jetten Jachtbouw                         |        |   |
| 4                               | HIN code             | -                                        |        |   |
| 5                               | CE design Category   | A                                        |        |   |
| 6                               | Maximum load         | 2000 kg (including persons, excl. tanks) |        |   |
| 7                               | Crew Limit           | 10 persons                               |        |   |
| 8                               | Principal dimensions |                                          |        |   |
|                                 |                      | Length hull                              | 13.590 | m |
|                                 |                      | Breadth hull                             | 4.228  | 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                               | 21984  | 6.321  | 0.000 | 1.668 |
| Trimballast                              | 800    | 12.850 | 0.000 | 1.000 |
| Crew Limit (10 persons)                  | 750    | 5.500  | 2.050 | 2.600 |
| Maximum Total Load (pers. & tanks excl.) | 1250   | 6.400  | 0.000 | 1.800 |
| Maximum Fuel Capacity                    | 1191   | 5.800  | 0.000 | 1.206 |
| Maximum Fresh water Capacity             | 988    | 7.825  | 0.000 | 0.600 |

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 <sub>MOC</sub> | 22987  | 6.538 | 0.000 | 1.658 |
| Loaded displacement mass | M <sub>LDC</sub> | 26929  | 6.522 | 0.000 | 1.682 |

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 :

| Down flooding points |                           |                         |                       |
|----------------------|---------------------------|-------------------------|-----------------------|
| Item                 | Longitudinal position [m] | Transverse position [m] | Vertical position [m] |
| ER VENTILATION PS    | 3.400                     | 1.421                   | 3.590                 |
| ER VENTILATION SB    | #####                     | #####                   | #####                 |

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 A :

$HD > HD(R)$ , where  $HD(R) = LH / 17 = 0.799 \text{ m}$

$LH = 13.59 \text{ m}$

Attained :

$HD = 2.318 \text{ m}$

Conclusion :

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

### Down flooding angle

The down flooding angle is the angle of heel at which down flooding openings first come immersed. In requirement 6.1.3 of the ISO 12217-1 assessment sufficient margin of heel angle has to be shown before significant quantities of water can enter the boat.

The boat shall be assessed in minimum operating condition, as well as in the loaded displacement condition when  $MLDC/MMOC > 1.15$ . (  $MLDC/MMOC = 1.17$  )

Criteria :

For category A :

$\emptyset D > \text{the greater of } (\emptyset 0 + 25) \text{ or } 30 = 30^\circ$

$\emptyset 0 = 3.05^\circ$

Attained :

Minimum operating condition :

$\emptyset D = 72.49^\circ$



Loaded displacement condition :

$$\phi_D = 68.2^\circ$$

Conclusion :

$\phi_D > \text{the greater of } (\phi_0 + 25) \text{ or } 30 = 30^\circ$ . The down flooding angle complies with category A.

### Offset-load test

The offset load angle ( $\phi_0$ ) 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.

Criteria : For all categories

:

$$(24 - L)^3 600$$

$$\phi_0 < \phi_{0(R)} , \text{ where } \phi_{0(R)} = 10 + \frac{(24 - L)^3 600}{LH} = 11.88^\circ H$$

$$LH = 13.59 \text{ m Attained}$$

:

$$\phi_0 = 3.05^\circ$$

Conclusion :

The offset load angle  $\phi_0 < \phi_{0(R)}$  . The offset load complies with category A.





## Conclusions

Based on the inclining report and other available data the ship is tested on all criteria, resulting in compliance of the ship with the criteria of design category A.

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

A boat given design category A is considered to be designed to operate in winds of Beaufort force 10 or less and the associated wave heights, and to survive in more severe conditions. Such conditions may be encountered on extended voyages, for example across oceans, or inshore when unsheltered from the wind and waves for several hundred nautical miles. Winds are assumed to gust to 28 m/s.



## Appendices



## Appendix 1 – Loading Conditions



## Preliminary Lightship, Deadweight and Trim Calculations

Project : Bommelaer 47 Sedan  
Project nr : 5910

Date : 27/11/2007  
Rev : A

### Principle dimensions

|                     |         |                          |
|---------------------|---------|--------------------------|
| Length over all :   | 14.33 m |                          |
| Length Hull :       | 13.59 m | (CE: $L_H$ )             |
| Beam waterline :    | 4.23 m  |                          |
| Beam Hull :         | 4.23 m  | (CE: $B_H$ )             |
| Draft (half load) : | 1.21 m  | (measured from baseline) |
| Draft (DWL) :       | 1.20 m  | (measured from baseline) |

### Light ship items

|                                              | Weight<br>[kg] | [%]   |
|----------------------------------------------|----------------|-------|
| Group 1 Hull construction                    | 12210          | 55.5% |
| Group 2 Superstructure construction          | 2729           | 12.4% |
| Group 3 Propulsion & Steering                | 1130           | 5.1%  |
| Group 4 Auxiliary systems                    | 832            | 3.8%  |
| Group 5 Electrical installation              | 978            | 4.4%  |
| Group 6 Electronics                          | 66             | 0.3%  |
| Group 7 Interior Joinery & Furniture         | 2131           | 9.7%  |
| Group 8 Interior Outfitting                  | 226            | 1.0%  |
| Group 9 Exterior Joinery                     | 130            | 0.6%  |
| Group 10 Exterior Outfitting                 | 1122           | 5.1%  |
| Group 11 Fairing & Paintwork                 | 299            | 1.4%  |
| Group 12 Customer Supplies                   | 79             | 0.4%  |
| Group 13 Safety & Fire Equipment             | 52             | 0.2%  |
| Group 14 Recreational equipment and handling | 0              | 0.0%  |
| Group 15 Miscellaneous                       | 0              | 0.0%  |

### Total light ship

---

|       |        |
|-------|--------|
| 21984 | 100.0% |
|-------|--------|

**Fixed deadweight items**Weight  
[kg]

|                    |      |                  |    |
|--------------------|------|------------------|----|
| Crew               | 150  | Number of crew : | 2  |
| Crew limit         | 750  | Crewlimit :      | 10 |
| Maximum total load | 1250 |                  |    |
| Ballast            | 800  |                  |    |

**Preliminary Lightship, Deadweight and Trim Calculations**

Project : Bommelaer 47 Sedan  
Project nr : 5910

Date : 27/11/2007  
Rev : A

|                            |                      |          | Condition 1 |        | Condition 2 |           | Condition 3 |             | Condition 4 |             |
|----------------------------|----------------------|----------|-------------|--------|-------------|-----------|-------------|-------------|-------------|-------------|
|                            |                      |          | Light craft |        | Minimum     |           | HALF LOAD   |             | Loaded      |             |
|                            |                      |          | 0% FO       |        | 2% FO       |           | 50% FO      |             | 98% FO      |             |
|                            |                      |          | 0% FW       |        | 2% FW       |           | 50% FW      |             | 98% FW      |             |
|                            |                      |          | 0% BA       |        | 2% HO       |           | 2% HO       |             | 2% HO       |             |
| <b>Liquid loads</b>        |                      |          |             |        |             |           |             |             |             |             |
| Tank                       | Discr.               | Capacity | Load        | Weight | Load        | Weight    | Load        | Weight      | Load        | Weight      |
| <b>Fuel tanks</b>          |                      |          | Ltr         | %      | kg          | %         | kg          | %           | kg          | %           |
| FO 01                      | Fuel Oil tank        | 1418     | 0.0%        | 0      | 2.0%        | 24        | 50.0%       | 596         | 98.0%       | 1167        |
| <b>Total Fuel tanks</b>    |                      |          | <b>1418</b> |        | <b>0</b>    | <b>24</b> |             | <b>596</b>  |             | <b>1167</b> |
| <b>Fresh water tanks</b>   |                      |          | Ltr         | %      | kg          | %         | kg          | %           | kg          | %           |
| FW 01                      | Fresh Water Tank fwd | 494      | 0.0%        | 0      | 2.0%        | 10        | 50.0%       | 247         | 98.0%       | 484         |
| FW 02                      | Fresh Water Tank fwd | 494      | 0.0%        | 0      | 2.0%        | 10        | 50.0%       | 247         | 98.0%       | 484         |
| <b>Total fresh water</b>   |                      |          | <b>988</b>  |        | <b>0</b>    | <b>20</b> |             | <b>494</b>  |             | <b>968</b>  |
| <b>Holding tanks</b>       |                      |          | Ltr         | %      | kg          | %         | kg          | %           | kg          | %           |
| HO 01                      | Holding Tank         | 487      | 0.0%        | 0      | 2.0%        | 10        | 2.0%        | 10          | 2.0%        | 10          |
| <b>Total holding tanks</b> |                      |          | <b>487</b>  |        | <b>0</b>    | <b>10</b> |             | <b>10</b>   |             | <b>10</b>   |
| <b>Total liquid loads</b>  |                      |          |             |        | <b>0</b>    | <b>53</b> |             | <b>1099</b> |             | <b>2145</b> |

|                              |     |      |   |      |   |        |     |        |      |
|------------------------------|-----|------|---|------|---|--------|-----|--------|------|
| Storages / Maximum total loa | 200 | 0.0% | 0 | 0.0% | 0 | 100.0% | 200 | 100.0% | 1250 |
|------------------------------|-----|------|---|------|---|--------|-----|--------|------|

|                                   |     |      |          |        |           |        |             |        |             |
|-----------------------------------|-----|------|----------|--------|-----------|--------|-------------|--------|-------------|
| <b>Total variable dead weight</b> |     |      | <b>0</b> |        | <b>53</b> |        | <b>1299</b> |        | <b>3395</b> |
| <b>Fixed dead weight items</b>    | kg  | %    | kg       | %      | kg        | %      | kg          | %      | kg          |
| Crew / Crew Limit                 | 150 | 0.0% | 0        | 100.0% | 150       | 100.0% | 150         | 100.0% | 750         |

|                                      |  |     |        |            |        |            |        |            |        |             |
|--------------------------------------|--|-----|--------|------------|--------|------------|--------|------------|--------|-------------|
| Ballast                              |  | 800 | 100.0% | 800        | 100.0% | 800        | 100.0% | 800        | 100.0% | 800         |
| <b>Total fixed dead weight items</b> |  |     |        | <b>800</b> |        | <b>950</b> |        | <b>950</b> |        | <b>1550</b> |

|                               |  |  |            |  |             |  |                 |  |             |
|-------------------------------|--|--|------------|--|-------------|--|-----------------|--|-------------|
| <b>TOTAL DEAD WEIGHT</b>      |  |  | <b>800</b> |  | <b>1003</b> |  | <b>2249</b>     |  | <b>4945</b> |
| <b>Hydrostatic properties</b> |  |  |            |  |             |  |                 |  |             |
| Draft at FRAME 0              |  |  | 1.20 m     |  | 1.20 m      |  | 1.22 m          |  | 1.27 m      |
| Draft at FRAME 33             |  |  | 1.15 m     |  | 1.16 m      |  | 1.20 m          |  | 1.28 m      |
| <b>DRAFT AVERAGE</b>          |  |  | 1.18 m     |  | 1.18 m      |  | <b>1.21</b> m   |  | 1.27 m      |
| <b>TRIM</b>                   |  |  | 0.05 m aft |  | 0.05 m aft  |  | <b>0.02</b> m   |  | -0.01 m fwd |
| Trim                          |  |  | 0.20 °     |  | 0.20 °      |  | 0.09 °          |  | -0.03 °     |
| <b>DISPLACEMENT</b>           |  |  | 22780 kg   |  | 22990 kg    |  | <b>24230</b> kg |  | 26930 kg    |
| VCG of fixed weights          |  |  | 1.65 m     |  | 1.65 m      |  | 1.65 m          |  | 1.68 m      |
| VCG total (with fluids)       |  |  | 1.65 m     |  | 1.66 m      |  | 1.67 m          |  | 1.68 m      |
| GM                            |  |  | 1.18 m     |  | 1.17 m      |  | 1.13 m          |  | 1.06 m      |

Distance between fwd/aft draftmarks 13.20 m

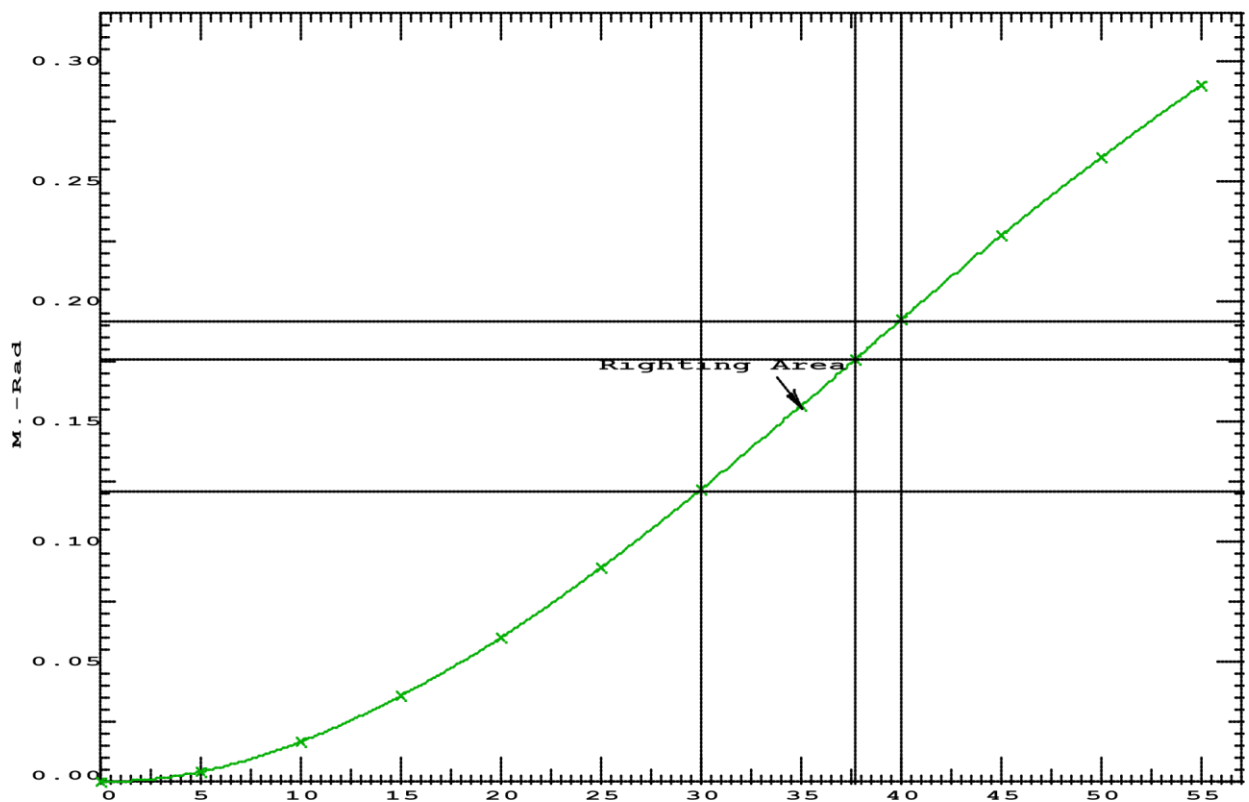
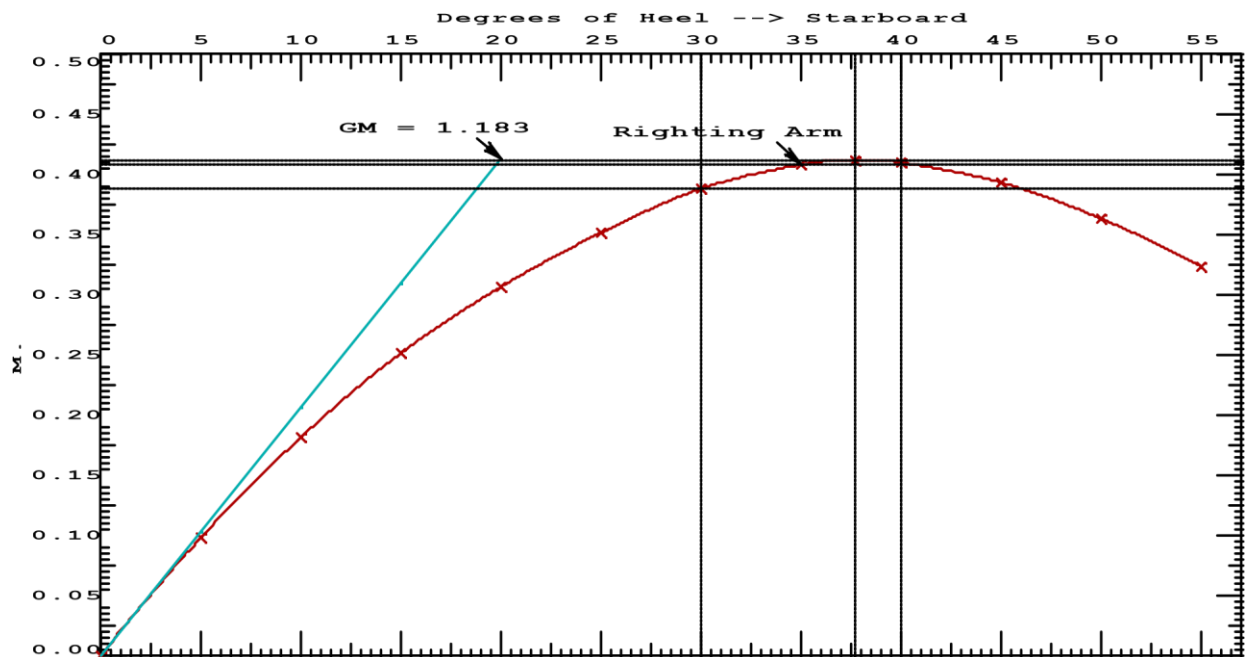
07-11-27 15:09:59 Vripack Yachting International Page 1 GHS 9.88B **5910 - Bommelaer 47 Sedan**

**INTACT STABILITY AT CONDITION 1**  
**OPERATIONAL CONDITION : LIGHT CRAFT CONDITION**

| SUMMARY OF LOADING      |            |                      |            |            |       |     |      |
|-------------------------|------------|----------------------|------------|------------|-------|-----|------|
| 0.0 Cu.M. (0%) FUEL     |            | 0.0 Cu.M. (0%) FRESH |            |            |       |     |      |
| 0.0 (0%) SEWAGE         |            |                      |            |            |       |     |      |
| .M.                     |            | 0.80 MT of BALLAST   |            |            |       |     |      |
| WEIGHT STATUS           |            |                      |            |            |       |     |      |
| Trim: Aft 0.046/13.200, |            |                      |            | Heel: zero |       |     |      |
| Part                    | Weight(MT) |                      | LCG        | TCG        | VCG   |     |      |
| LIGHT SHIP              | 21.98      |                      | 6.321f     | 0.000      | 1.668 |     |      |
| BALLAST                 | 0.80       |                      | 12.850f    | 0.000      | 1.000 |     |      |
| Total Fixed             | 22.78      |                      | 6.550f     | 0.000      | 1.645 |     |      |
|                         | Load       | SpGr                 | Weight(MT) | LCG        | TCG   | VCG | FSM  |
| FO1                     | 0.000      | 0.840                | 0.00       |            |       |     | 0.00 |
| FW1                     | 0.000      | 1.000                | 0.00       |            |       |     | 0.00 |
| FW2                     | 0.000      | 1.000                | 0.00       |            |       |     | 0.00 |
| HO1                     | 0.000      | 1.000                | 0.00       |            |       |     | 0.00 |

|                                              |              |               |                           |      |         |                   |       |       |
|----------------------------------------------|--------------|---------------|---------------------------|------|---------|-------------------|-------|-------|
| Total Tanks                                  |              |               | 0.00                      |      |         | 0.00              |       |       |
| Distances in METERS.                         |              |               |                           |      |         | Moments in M.-MT. |       |       |
| HYDROSTATIC PROPERTIES                       |              |               |                           |      |         |                   |       |       |
| Trim: Aft 0.046/13.200, No Heel, VCG = 1.645 |              |               |                           |      |         |                   |       |       |
| LCF                                          | Displacement | Buoyancy-Ctr. | Weight/                   |      | Moment/ |                   |       |       |
| Draft                                        | Weight(MT)   | LCB           | VCB                       | CM   | LCF     | CM trim           | GML   | GMT   |
| 1.178                                        | 22.78        | 6.547f        | 0.828                     | 0.43 | 5.938f  | 0.34              | 19.96 | 1.183 |
| Distances in METERS.                         |              |               | Specific Gravity = 1.000. |      |         | Moment in M.-MT.  |       |       |
| Draft is from Baseline.                      |              |               | Trim is per 13.20M.       |      |         |                   |       |       |

| CRITICAL POINT STATUS                                                                                    |                         |                         |        |                         |                                  |        |                         |
|----------------------------------------------------------------------------------------------------------|-------------------------|-------------------------|--------|-------------------------|----------------------------------|--------|-------------------------|
| Baseline draft: 1.153 @ 13.20f, 1.199 @ 0.00                                                             |                         |                         |        |                         |                                  |        |                         |
| Trim: Aft 0.046/13.200, Heel: zero                                                                       |                         |                         |        |                         |                                  |        |                         |
|                                                                                                          | Critical Points         |                         |        | LCP                     | TCP                              | VCP    | Height                  |
| (1)                                                                                                      | AFT DRAFT MARK FRAME 0  |                         |        | 0.000                   | 0.000                            | 0.000  | -1.199                  |
| (2)                                                                                                      | FWD DRAFT MARK FRAME 33 |                         |        | 13.200f                 | 0.000                            | 0.000  | -1.153                  |
| Distances in METERS.                                                                                     |                         |                         |        |                         |                                  |        |                         |
| RIGHTING ARMS vs HEEL ANGLE                                                                              |                         |                         |        |                         |                                  |        |                         |
| LCG = 6.550f    TCG = 0.000    VCG = 1.645                                                               |                         |                         |        |                         |                                  |        |                         |
|                                                                                                          | Origin Depth            | Degrees of Trim    Heel |        | Displacement Weight(MT) | Righting Arms in Trim    in Heel |        | Freeboard Area -(Extra) |
|                                                                                                          | 1.199                   | 0.20a                   | 0.00   | 22.78                   | 0.000                            | 0.000  | 0.0000                  |
|                                                                                                          | 1.185                   | 0.16a                   | 5.00s  | 22.78                   | 0.000                            | 0.098s | 0.0043                  |
|                                                                                                          | 1.146                   | 0.06a                   | 10.00s | 22.78                   | 0.000                            | 0.182s | 0.0166                  |
|                                                                                                          | 1.084                   | 0.10f                   | 15.00s | 22.78                   | 0.000                            | 0.252s | 0.0357                  |
|                                                                                                          | 0.999                   | 0.30f                   | 20.00s | 22.78                   | 0.000                            | 0.307s | 0.0602                  |
|                                                                                                          | 0.893                   | 0.53f                   | 25.00s | 22.78                   | 0.000                            | 0.352s | 0.0890                  |
|                                                                                                          | 0.768                   | 0.78f                   | 30.00s | 22.78                   | 0.000                            | 0.388s | 0.1214                  |
|                                                                                                          | 0.632                   | 1.04f                   | 35.00s | 22.78                   | 0.000                            | 0.409s | 0.1563                  |
|                                                                                                          | 0.557                   | 1.18f                   | 37.69s | 22.78                   | 0.000                            | 0.411s | 0.1756                  |
|                                                                                                          | 0.491                   | 1.30f                   | 40.00s | 22.78                   | 0.000                            | 0.409s | 0.1921                  |
|                                                                                                          | 0.346                   | 1.55f                   | 45.00s | 22.78                   | 0.000                            | 0.393s | 0.2272                  |
|                                                                                                          | 0.203                   | 1.76f                   | 50.00s | 22.79                   | 0.000                            | 0.363s | 0.2603                  |
|                                                                                                          | 0.064                   | 1.91f                   | 55.00s | 22.78                   | 0.000                            | 0.324s | 0.2903                  |
| Distances in METERS.                      Specific Gravity = 1.000.                      Area in M.-Rad. |                         |                         |        |                         |                                  |        |                         |



**INTACT STABILITY AT CONDITION 2**  
**OPERATIONAL CONDITION : MINIMUM OPERATING CONDITION**

| SUMMARY OF LOADING               |              |                           |            |                             |        |                   |             |
|----------------------------------|--------------|---------------------------|------------|-----------------------------|--------|-------------------|-------------|
| 0.0 Cu.M. (2%) FUEL              |              | 0.0 Cu.M. (2%) FRESH      |            |                             |        |                   |             |
| 0.0 Cu.M. (2%) SEWAGE            |              |                           |            |                             |        |                   |             |
| 0.80 MT of BALLAST               |              | 0.15 MT of CREW           |            |                             |        |                   |             |
| WEIGHT STATUS                    |              |                           |            |                             |        |                   |             |
| Trim: Aft 0.046/13.200,          |              |                           |            | Heel: zero                  |        |                   |             |
| Part                             | Weight(MT)   |                           | LCG        | TCG                         | VCG    |                   |             |
| LIGHT SHIP                       | 21.98        |                           | 6.321f     | 0.000                       | 1.668  |                   |             |
| BALLAST                          | 0.80         |                           | 12.850f    | 0.000                       | 1.000  |                   |             |
| CREW                             | 0.15         |                           | 5.500f     | 0.000                       | 2.600  |                   |             |
| Total Fixed                      | 22.93        |                           | 6.543f     | 0.000                       | 1.651  |                   |             |
|                                  | Load         | SpGr                      | Weight(MT) | LCG                         | TCG    | VCG               | FSM         |
| FO1                              | 0.020        | 0.840                     | 0.02       | 5.799f                      | 0.000  | 0.587             | 0.14        |
| FW1                              | 0.020        | 1.000                     | 0.01       | 7.748f                      | 0.402p | 0.393             | 0.01        |
| FW2                              | 0.020        | 1.000                     | 0.01       | 7.748f                      | 0.402s | 0.393             | 0.01        |
| HO1                              | 0.020        | 1.000                     | 0.01       | 9.568f                      | 0.000  | 0.441             | 0.07        |
| Total Tanks                      |              |                           | 0.05       | 7.211f                      | 0.000  | 0.488             | 0.22        |
| Total Weight                     |              |                           | 22.99      | 6.545f                      | 0.000  | 1.648             |             |
| Free Surface Adjustment          |              |                           |            |                             |        | 0.010             |             |
| Adjusted CG                      |              |                           |            | 6.545f                      | 0.000  | 1.658             |             |
| Distances in METERS.             |              |                           |            |                             |        | Moments in M.-MT. |             |
| HYDROSTATIC PROPERTIES           |              |                           |            |                             |        |                   |             |
| Trim: Aft 0.046/13.200, No Heel, |              |                           |            | VCG = 1.648                 |        |                   |             |
| LCF                              | Displacement | Buoyancy-Ctr.             |            | Weight/                     |        | Moment/           |             |
| Draft                            | Weight(MT)   | LCB                       | VCB        | CM                          | LCF    | CM trim           | GML GMT     |
| 1.183                            | 22.99        | 6.542f                    | 0.831      | 0.43                        | 5.935f | 0.35              | 19.85 1.168 |
| Distances in METERS.             |              | Specific Gravity = 1.000. |            |                             |        | Moment in M.-MT.  |             |
|                                  |              |                           |            | Trim is per 13.20M.         |        |                   |             |
| Draft is from Baseline.          |              |                           |            | True Free Surface included. |        |                   |             |

|                                                                                                                                        |                         |              |                 |               |        |
|----------------------------------------------------------------------------------------------------------------------------------------|-------------------------|--------------|-----------------|---------------|--------|
| <div>CRITICAL POINT STATUS</div> <div>Baseline draft: 1.158 @ 13.20f, 1.204 @ 0.00</div> <div>Trim: Aft 0.046/13.200, Heel: zero</div> |                         |              |                 |               |        |
|                                                                                                                                        | Critical Points         | LCP          | TCP             | VCP           | Height |
| (1)                                                                                                                                    | AFT DRAFT MARK FRAME 0  | 0.000        | 0.000           | 0.000         | -1.204 |
| (2)                                                                                                                                    | FWD DRAFT MARK FRAME 33 | 13.200f      | 0.000           | 0.000         | -1.158 |
| Distances in METERS.                                                                                                                   |                         |              |                 |               |        |
| <div>RIGHTING ARMS vs HEEL ANGLE Fixed</div> <div>CG: LCG = 6.543f TCG = 0.000 VCG = 1.651</div>                                       |                         |              |                 |               |        |
| Origin                                                                                                                                 | Degrees of              | Displacement | Righting Arms   | Freeboard     |        |
| Depth                                                                                                                                  | Trim Heel               | Weight(MT)   | in Trim in Heel | Area -(Extra) |        |

|       |       |        |       |       |        |        |
|-------|-------|--------|-------|-------|--------|--------|
| 1.204 | 0.20a | 0.00   | 22.99 | 0.000 | 0.000  | 0.0000 |
| 1.190 | 0.16a | 5.00s  | 22.99 | 0.000 | 0.097s | 0.0042 |
| 1.152 | 0.06a | 10.00s | 22.99 | 0.000 | 0.180s | 0.0164 |
| 1.090 | 0.09f | 15.00s | 22.99 | 0.000 | 0.250s | 0.0353 |
| 1.005 | 0.29f | 20.00s | 22.98 | 0.000 | 0.305s | 0.0596 |
| 0.899 | 0.52f | 25.00s | 22.99 | 0.000 | 0.349s | 0.0882 |
| 0.775 | 0.77f | 30.00s | 22.99 | 0.000 | 0.385s | 0.1202 |
| 0.640 | 1.03f | 35.00s | 22.99 | 0.000 | 0.404s | 0.1547 |
| 0.571 | 1.16f | 37.46s | 22.99 | 0.000 | 0.406s | 0.1722 |
| 0.499 | 1.29f | 40.00s | 22.99 | 0.000 | 0.404s | 0.1901 |
| 0.355 | 1.53f | 45.00s | 22.99 | 0.000 | 0.387s | 0.2248 |
| 0.212 | 1.74f | 50.00s | 22.99 | 0.000 | 0.356s | 0.2572 |
| 0.074 | 1.89f | 55.00s | 22.99 | 0.000 | 0.317s | 0.2866 |

Distances in METERS.                      Specific Gravity = 1.000.                      Area in M.-Rad.

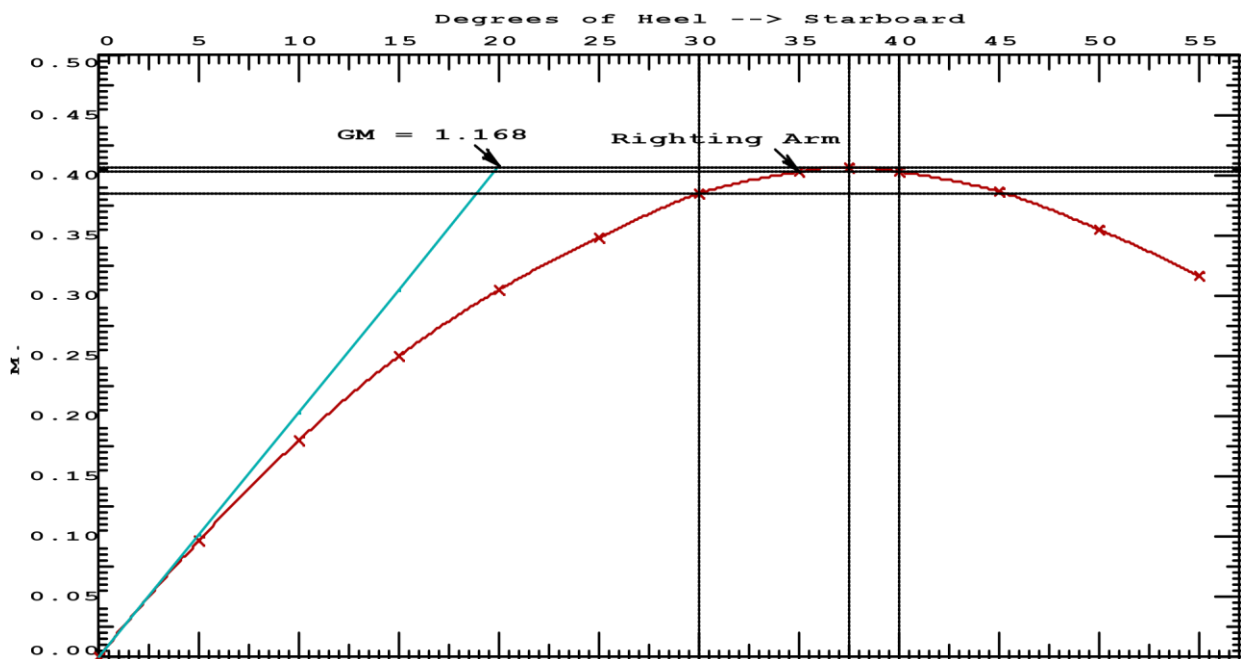
Note: The Center of Gravity shown above is for the Fixed Weight of 22.93 MT. As the tank load centers shift with heel and trim, the total Center of Gravity varies. The righting arms shown above include the effect of the C.G. variation.

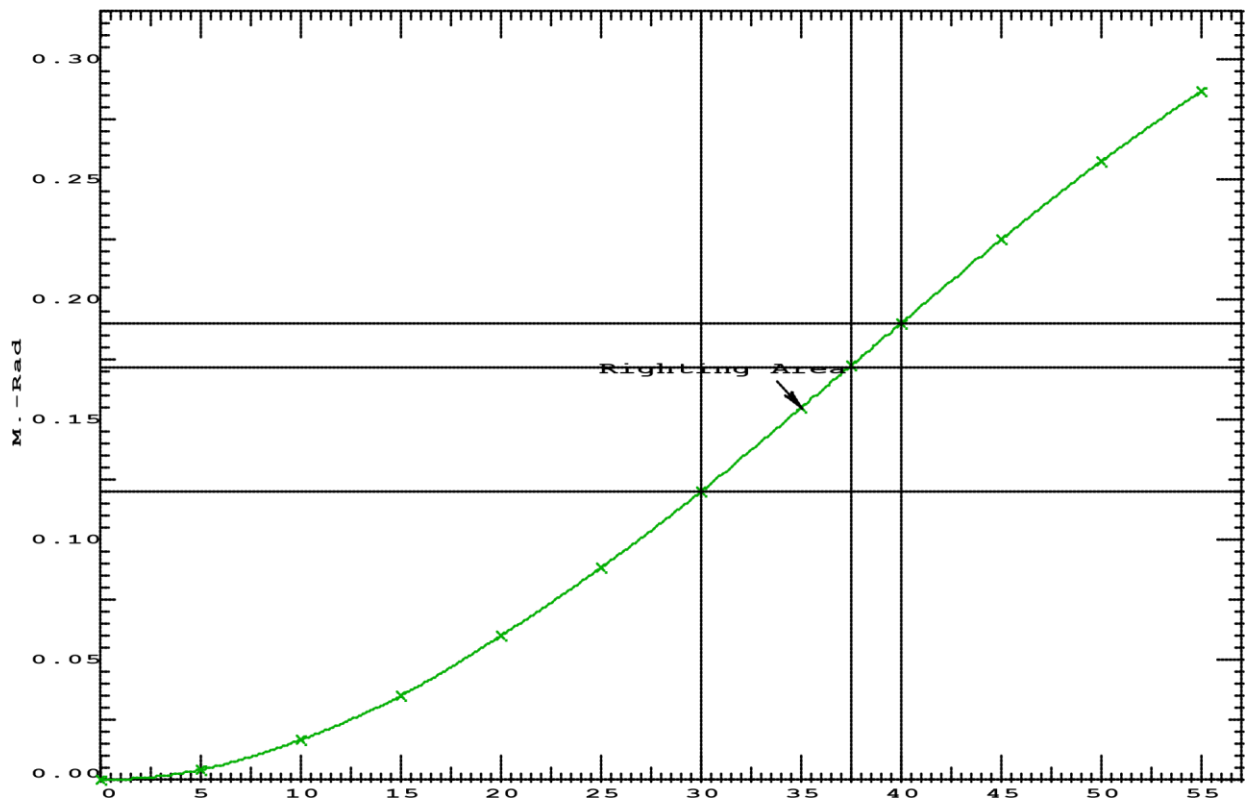
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INTACT STABILITY AT CONDITION 3  
OPERATIONAL CONDITION : HALFLoad  
TANKLOAD OPTIMISED FOR MINIMUM TRIM

Note: Weight item "CREW" replaced.

#### SUMMARY OF LOADING

0.7 Cu.M. (50%) FUEL                      0.5 Cu.M. (50%) FRESH  
0.0 Cu.M. (2%) SEWAGE  
0.80 MT of BALLAST                      0.35 MT of Misc. Weights

#### WEIGHT STATUS

Trim: Aft 0.020/13.200,      Heel: zero

| Part               | Weight(MT)   | LCG           | TCG          | VCG          |  |
|--------------------|--------------|---------------|--------------|--------------|--|
| LIGHT SHIP         | 21.98        | 6.321f        | 0.000        | 1.668        |  |
| BALLAST            | 0.80         | 12.850f       | 0.000        | 1.000        |  |
| CREW               | 0.15         | 5.500f        | 0.000        | 2.600        |  |
| STORES             | 0.20         | 6.400f        | 0.000        | 1.800        |  |
| <b>Total Fixed</b> | <b>23.13</b> | <b>6.542f</b> | <b>0.000</b> | <b>1.652</b> |  |

|                                | Load  | SpGr  | Weight(MT)   | LCG           | TCG          | VCG          | FSM         |
|--------------------------------|-------|-------|--------------|---------------|--------------|--------------|-------------|
| FO1                            | 0.500 | 0.840 | 0.60         | 5.800f        | 0.000        | 0.937        | 1.18        |
| FW1                            | 0.500 | 1.000 | 0.25         | 7.822f        | 0.514p       | 0.511        | 0.08        |
| FW2                            | 0.500 | 1.000 | 0.25         | 7.822f        | 0.514s       | 0.511        | 0.08        |
| HO1                            | 0.020 | 1.000 | 0.01         | 9.586f        | 0.000        | 0.441        | 0.07        |
| <b>Total Tanks</b>             |       |       | <b>1.10</b>  | <b>6.742f</b> | <b>0.000</b> | <b>0.741</b> | <b>1.41</b> |
| <b>Total Weight</b>            |       |       | <b>24.23</b> | <b>6.551f</b> | <b>0.000</b> | <b>1.611</b> |             |
| <b>Free Surface Adjustment</b> |       |       |              |               |              | <b>0.058</b> |             |
| <b>Adjusted CG</b>             |       |       |              | <b>6.551f</b> | <b>0.000</b> | <b>1.669</b> |             |

|                                              |                     |                      |                           |           |                   |                             |            |            |
|----------------------------------------------|---------------------|----------------------|---------------------------|-----------|-------------------|-----------------------------|------------|------------|
| Distances in METERS.                         |                     |                      |                           |           | Moments in M.-MT. |                             |            |            |
| <b>HYDROSTATIC PROPERTIES</b>                |                     |                      |                           |           |                   |                             |            |            |
| Trim: Aft 0.020/13.200, No Heel, VCG = 1.611 |                     |                      |                           |           |                   |                             |            |            |
| <b>LCF</b>                                   | <b>Displacement</b> | <b>Buoyancy-Ctr.</b> | <b>Weight/</b>            |           | <b>Moment/</b>    |                             |            |            |
| <b>Draft</b>                                 | <b>Weight(MT)</b>   | <b>LCB</b>           | <b>VCB</b>                | <b>CM</b> | <b>LCF</b>        | <b>CM trim</b>              | <b>GML</b> | <b>GMT</b> |
| 1.212                                        | 24.23               | 6.550f               | 0.849                     | 0.43      | 5.938f            | 0.35                        | 19.28      | 1.134      |
| Distances in METERS.                         |                     |                      | Specific Gravity = 1.000. |           |                   | Moment in M.-MT.            |            |            |
| Draft is from Baseline.                      |                     |                      | Trim is per 13.20M.       |           |                   | True Free Surface included. |            |            |

| CRITICAL POINT STATUS                        |                         |            |        |              |               |         |               |
|----------------------------------------------|-------------------------|------------|--------|--------------|---------------|---------|---------------|
| Baseline draft: 1.201 @ 13.20f, 1.221 @ 0.00 |                         |            |        |              |               |         |               |
| Trim: Aft 0.020/13.200, Heel: zero           |                         |            |        |              |               |         |               |
|                                              | Critical Points         |            |        | LCP          | TCP           | VCP     | Height        |
| (1)                                          | AFT DRAFT MARK FRAME 0  |            |        | 0.000        | 0.000         | 0.000   | -1.221        |
| (2)                                          | FWD DRAFT MARK FRAME 33 |            |        | 13.200f      | 0.000         | 0.000   | -1.201        |
| Distances in METERS.                         |                         |            |        |              |               |         |               |
| RIGHTING ARMS vs HEEL ANGLE Fixed            |                         |            |        |              |               |         |               |
| CG: LCG = 6.542f TCG = 0.000 VCG = 1.652     |                         |            |        |              |               |         |               |
|                                              | Origin                  | Degrees of |        | Displacement | Righting Arms |         | Freeboard     |
|                                              | Depth                   | Trim       | Heel   | Weight(MT)   | in Trim       | in Heel | Area -(Extra) |
|                                              | 1.221                   | 0.09a      | 0.00   | 24.23        | 0.000         | 0.000   | 0.0000        |
|                                              | 1.209                   | 0.06a      | 5.00s  | 24.23        | 0.000         | 0.094s  | 0.0041        |
|                                              | 1.173                   | 0.03f      | 10.00s | 24.23        | 0.000         | 0.175s  | 0.0159        |
|                                              | 1.112                   | 0.17f      | 15.00s | 24.23        | 0.000         | 0.243s  | 0.0342        |
|                                              | 1.029                   | 0.36f      | 20.00s | 24.23        | 0.000         | 0.299s  | 0.0580        |
|                                              | 0.925                   | 0.58f      | 25.00s | 24.23        | 0.000         | 0.345s  | 0.0861        |
|                                              | 0.803                   | 0.82f      | 30.00s | 24.23        | 0.000         | 0.382s  | 0.1179        |
|                                              | 0.671                   | 1.07f      | 35.00s | 24.23        | 0.000         | 0.401s  | 0.1522        |
|                                              | 0.606                   | 1.18f      | 37.37s | 24.23        | 0.000         | 0.403s  | 0.1688        |
|                                              | 0.533                   | 1.31f      | 40.00s | 24.23        | 0.000         | 0.400s  | 0.1872        |
|                                              | 0.393                   | 1.54f      | 45.00s | 24.23        | 0.000         | 0.383s  | 0.2215        |
|                                              | 0.253                   | 1.74f      | 50.00s | 24.23        | 0.000         | 0.353s  | 0.2538        |
| 0.116                                        | 1.90f                   | 55.00s     | 24.23  | 0.000        | 0.315s        | 0.2830  |               |

Distances in METERS.

Specific Gravity = 1.000.

Area in M.-Rad.

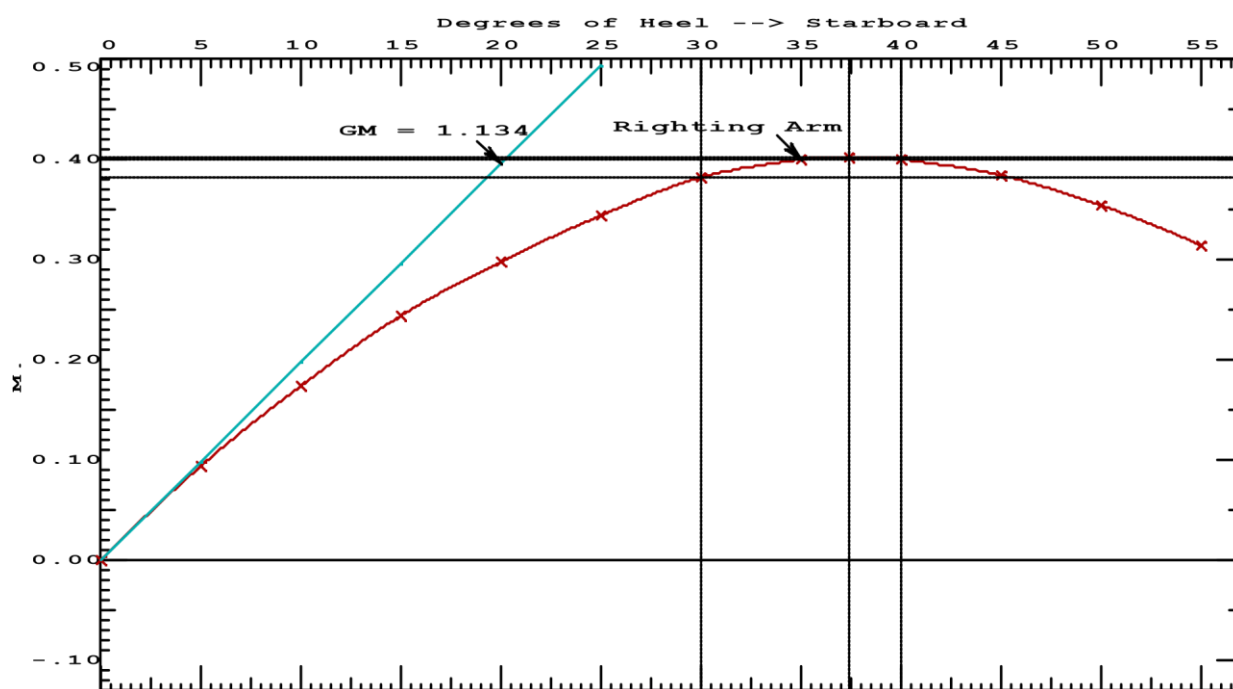
Note: The Center of Gravity shown above is for the Fixed Weight of 23.13 MT. As the tank load centers shift with heel and trim, the total Center of Gravity varies. The righting arms shown above include the effect of the C.G. variation.

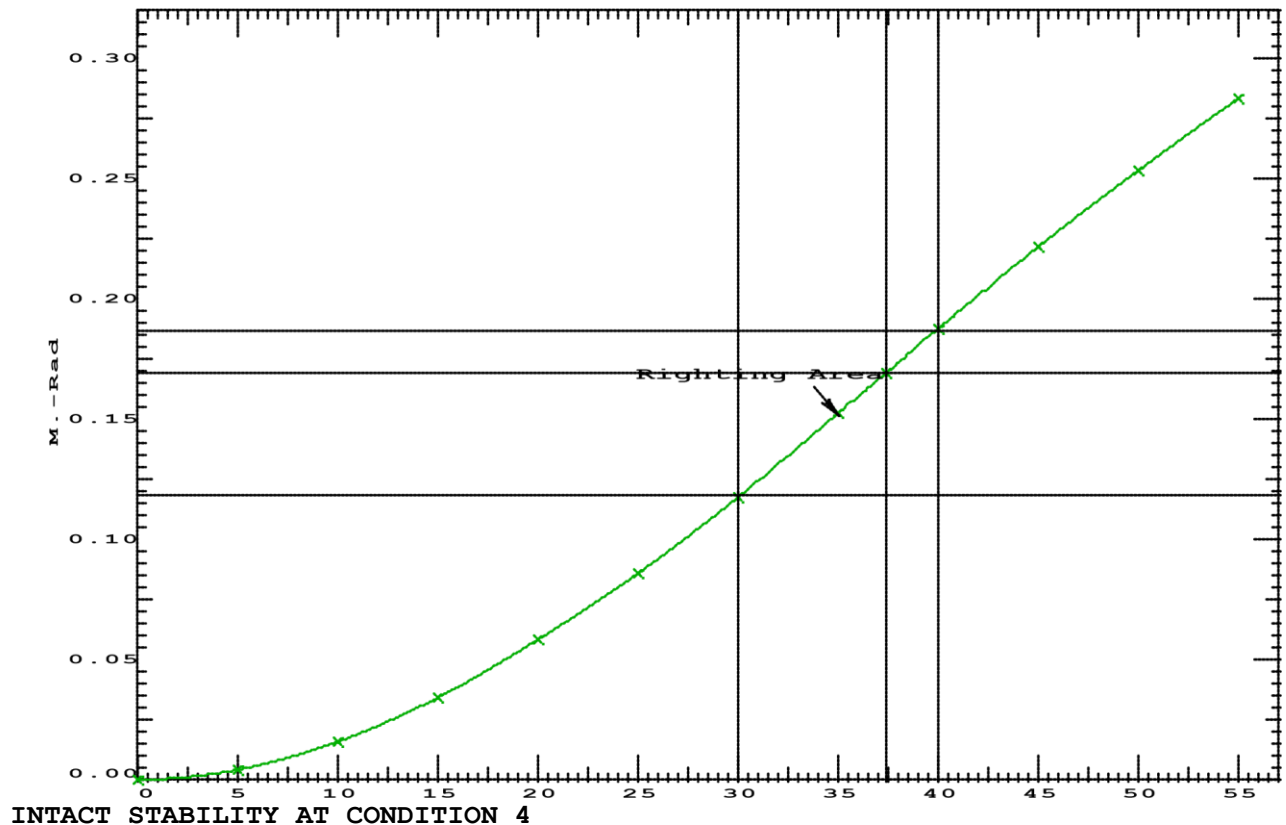
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**SUMMARY OF LOADING**

1.4 Cu.M. (98%) FUEL  
0.0 Cu.M. (2%) SEWAGE  
0.80 MT of BALLAST  
1.0 Cu.M. (98%) FRESH  
0.75 MT of CREWLIMIT  
1.25 MT of MAXIMUM TOTAL LOAD

**WEIGHT STATUS**

Trim: Fwd 0.009/13.200, Heel: zero

| Part               | Weight(MT)   | LCG           | TCG          | VCG          |
|--------------------|--------------|---------------|--------------|--------------|
| LIGHT SHIP         | 21.98        | 6.321f        | 0.000        | 1.668        |
| BALLAST            | 0.80         | 12.850f       | 0.000        | 1.000        |
| CREWLIMIT          | 0.75         | 5.500f        | 0.000        | 2.600        |
| MAXIMUM TOTAL LOAD | 1.25         | 6.400f        | 0.000        | 1.800        |
| <b>Total Fixed</b> | <b>24.78</b> | <b>6.511f</b> | <b>0.000</b> | <b>1.681</b> |

|                                | Load  | SpGr  | Weight(MT)   | LCG           | TCG          | VCG          | FSM         |
|--------------------------------|-------|-------|--------------|---------------|--------------|--------------|-------------|
| FO1                            | 0.980 | 0.840 | 1.17         | 5.800f        | 0.000        | 1.195        | 1.39        |
| FW1                            | 0.980 | 1.000 | 0.48         | 7.826f        | 0.568p       | 0.596        | 0.09        |
| FW2                            | 0.980 | 1.000 | 0.48         | 7.826f        | 0.568s       | 0.596        | 0.09        |
| HO1                            | 0.020 | 1.000 | 0.01         | 9.605f        | 0.000        | 0.441        | 0.07        |
| <b>Total Tanks</b>             |       |       | <b>2.15</b>  | <b>6.731f</b> | <b>0.000</b> | <b>0.922</b> | <b>1.65</b> |
| <b>Total Weight</b>            |       |       | <b>26.93</b> | <b>6.528f</b> | <b>0.000</b> | <b>1.621</b> |             |
| <b>Free Surface Adjustment</b> |       |       |              |               |              | <b>0.061</b> |             |
| <b>Adjusted CG</b>             |       |       |              | <b>6.528f</b> | <b>0.000</b> | <b>1.682</b> |             |

Distances in METERS. Moments in M.-MT.

| <b>HYDROSTATIC PROPERTIES</b>                |              |               |                           |         |        |                             |       |       |
|----------------------------------------------|--------------|---------------|---------------------------|---------|--------|-----------------------------|-------|-------|
| Trim: Fwd 0.009/13.200, No Heel, VCG = 1.621 |              |               |                           |         |        |                             |       |       |
| LCF                                          | Displacement | Buoyancy-Ctr. |                           | Weight/ |        | Moment/                     |       |       |
| Draft                                        | Weight(MT)   | LCB           | VCB                       | CM      | LCF    | CM trim                     | GML   | GMT   |
| 1.273                                        | 26.93        | 6.529f        | 0.889                     | 0.44    | 5.936f | 0.37                        | 18.11 | 1.057 |
| Distances in METERS.                         |              |               | Specific Gravity = 1.000. |         |        | Moment in M.-MT.            |       |       |
| Draft is from Baseline.                      |              |               | Trim is per 13.20M.       |         |        | True Free Surface included. |       |       |

|                                                                                                                                        |                         |         |       |       |        |
|----------------------------------------------------------------------------------------------------------------------------------------|-------------------------|---------|-------|-------|--------|
| <div>CRITICAL POINT STATUS</div> <div>Baseline draft: 1.278 @ 13.20f, 1.270 @ 0.00</div> <div>Trim: Fwd 0.009/13.200, Heel: zero</div> |                         |         |       |       |        |
|                                                                                                                                        | Critical Points         | LCP     | TCP   | VCP   | Height |
| (1)                                                                                                                                    | AFT DRAFT MARK FRAME 0  | 0.000   | 0.000 | 0.000 | -1.270 |
| (2)                                                                                                                                    | FWD DRAFT MARK FRAME 33 | 13.200f | 0.000 | 0.000 | -1.278 |
| Distances in METERS.                                                                                                                   |                         |         |       |       |        |

| <b>RIGHTING ARMS vs HEEL ANGLE</b> Fixed |            |        |              |               |         |               |  |
|------------------------------------------|------------|--------|--------------|---------------|---------|---------------|--|
| CG: LCG = 6.511f TCG = 0.000 VCG = 1.681 |            |        |              |               |         |               |  |
| Origin Depth                             | Degrees of |        | Displacement | Righting Arms |         | Freeboard     |  |
|                                          | Trim       | Heel   | Weight(MT)   | in Trim       | in Heel | Area -(Extra) |  |
| 1.270                                    | 0.04f      | 0.00   | 26.93        | 0.000         | 0.000   | 0.0000        |  |
| 1.260                                    | 0.05f      | 5.00s  | 26.93        | 0.000         | 0.092s  | 0.0040        |  |
| 1.229                                    | 0.11f      | 10.00s | 26.93        | 0.000         | 0.174s  | 0.0157        |  |
| 1.173                                    | 0.22f      | 15.00s | 26.93        | 0.000         | 0.245s  | 0.0340        |  |
| 1.095                                    | 0.39f      | 20.00s | 26.93        | 0.000         | 0.305s  | 0.0581        |  |
| 0.994                                    | 0.58f      | 25.00s | 26.93        | 0.000         | 0.354s  | 0.0869        |  |
| 0.878                                    | 0.80f      | 30.00s | 26.93        | 0.000         | 0.388s  | 0.1194        |  |
| 0.753                                    | 1.02f      | 35.00s | 26.93        | 0.000         | 0.400s  | 0.1540        |  |
| 0.740                                    | 1.04f      | 35.53s | 26.93        | 0.000         | 0.400s  | 0.1577        |  |
| 0.625                                    | 1.22f      | 40.00s | 26.93        | 0.000         | 0.393s  | 0.1887        |  |
| 0.494                                    | 1.42f      | 45.00s | 26.93        | 0.000         | 0.372s  | 0.2222        |  |
| 0.361                                    | 1.59f      | 50.00s | 26.93        | 0.000         | 0.338s  | 0.2533        |  |
| 0.228                                    | 1.74f      | 55.00s | 26.93        | 0.000         | 0.295s  | 0.2809        |  |

Distances in METERS.

Specific Gravity = 1.000.

Area in M.-Rad.

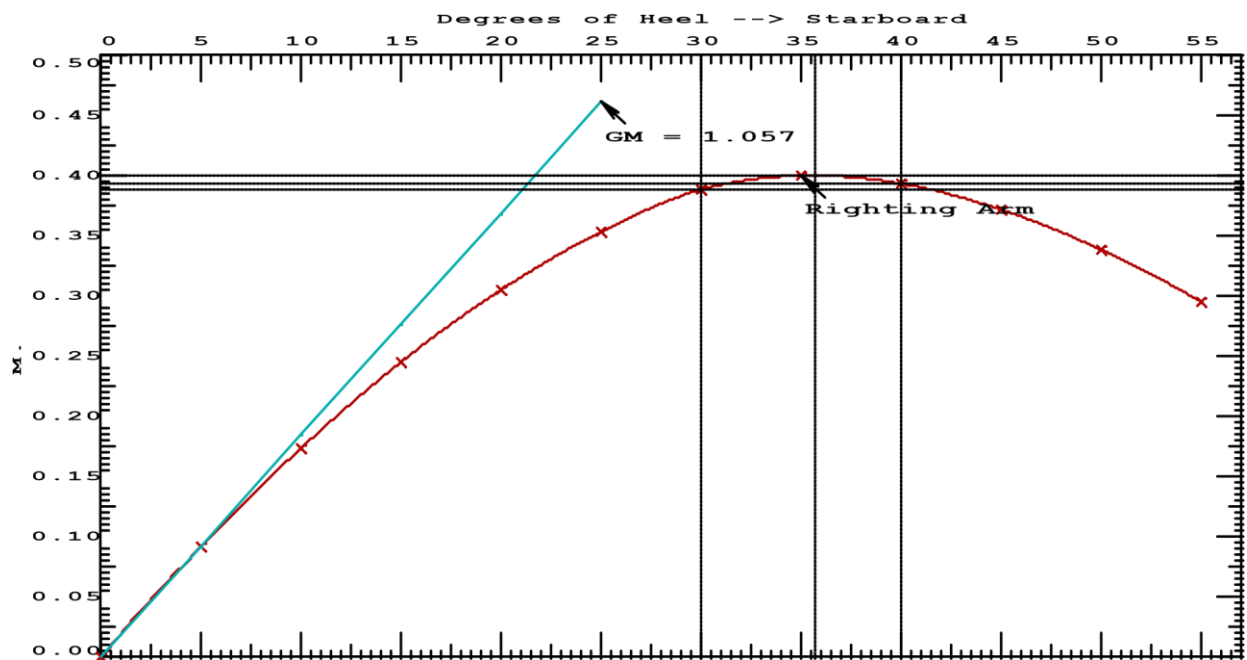
Note: The Center of Gravity shown above is for the Fixed Weight of 24.78 MT. As the tank load centers shift with heel and trim, the total Center of Gravity varies. The righting arms shown above include the effect of the C.G. variation.

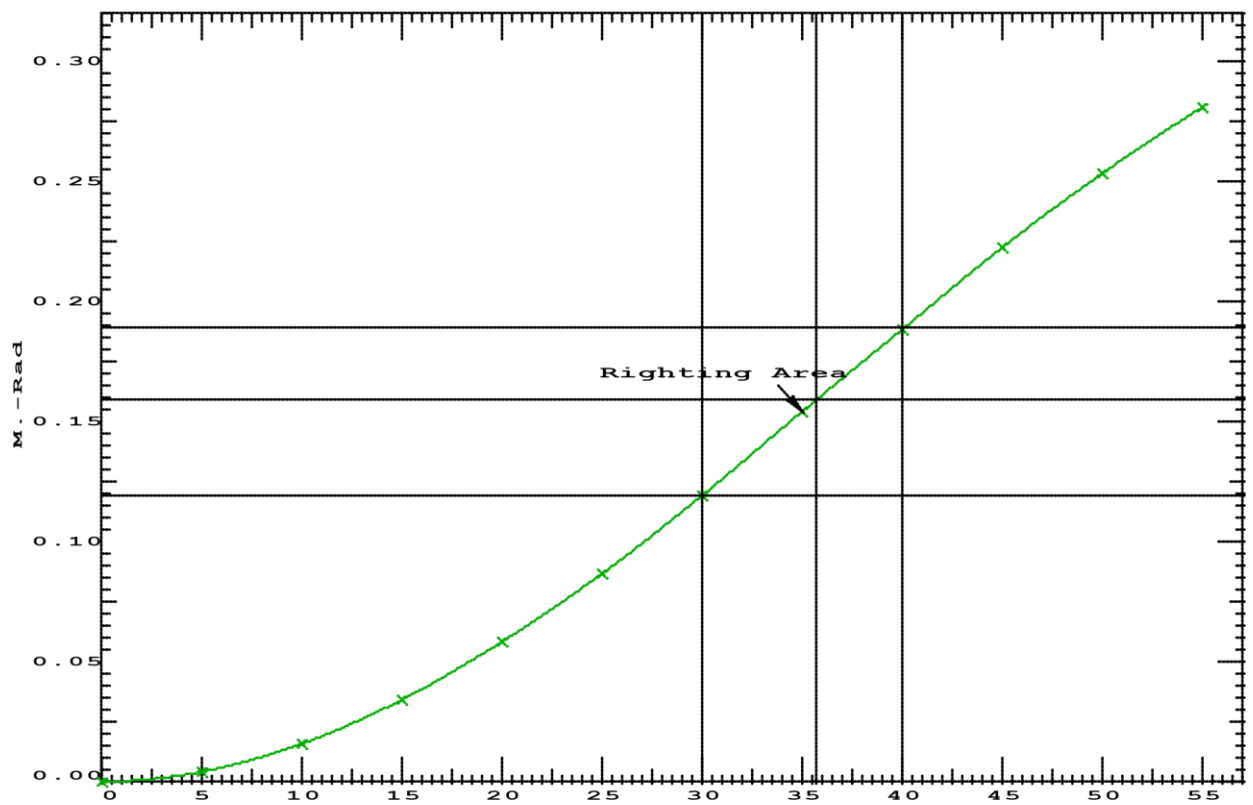
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## Appendix 2 – Hydrostatic Properties

Project : 5910

Date: 27/11/2007  
Revision : A

| <b>HYDROSTATIC</b><br><b>PROPERTIES</b> No Trim, No<br>Heel, VCG = 0.000 |              |               |       |         |        |          |       |       |
|--------------------------------------------------------------------------|--------------|---------------|-------|---------|--------|----------|-------|-------|
| LCF                                                                      | Displacement | Buoyancy-Ctr. |       | Weight/ |        | Moment/  |       |       |
| Draft                                                                    | Weight(MT)   | LCB           | VCB   | CM      | LCF    | Deg trim | KML   | KMT   |
| 0.900                                                                    | 12.33        | 6.937f        | 0.642 | 0.32    | 6.629f | 4.77     | 22.16 | 2.720 |
| 0.910                                                                    | 12.65        | 6.929f        | 0.649 | 0.32    | 6.605f | 4.89     | 22.12 | 2.720 |
| 0.920                                                                    | 12.98        | 6.921f        | 0.656 | 0.33    | 6.580f | 5.02     | 22.14 | 2.720 |
| 0.930                                                                    | 13.31        | 6.912f        | 0.662 | 0.33    | 6.554f | 5.15     | 22.16 | 2.720 |
| 0.940                                                                    | 13.64        | 6.903f        | 0.669 | 0.34    | 6.529f | 5.28     | 22.16 | 2.720 |
| 0.950                                                                    | 13.98        | 6.893f        | 0.676 | 0.34    | 6.502f | 5.41     | 22.18 | 2.721 |
| 0.960                                                                    | 14.32        | 6.884f        | 0.682 | 0.34    | 6.474f | 5.55     | 22.21 | 2.722 |
| 0.970                                                                    | 14.67        | 6.874f        | 0.689 | 0.35    | 6.446f | 5.70     | 22.26 | 2.724 |
| 0.980                                                                    | 15.02        | 6.863f        | 0.696 | 0.35    | 6.419f | 5.84     | 22.27 | 2.725 |
| 0.990                                                                    | 15.38        | 6.853f        | 0.702 | 0.36    | 6.390f | 5.99     | 22.32 | 2.727 |
| 1.000                                                                    | 15.74        | 6.842f        | 0.709 | 0.36    | 6.359f | 6.15     | 22.38 | 2.729 |
| 1.010                                                                    | 16.10        | 6.831f        | 0.716 | 0.36    | 6.331f | 6.30     | 22.41 | 2.732 |
| 1.020                                                                    | 16.47        | 6.819f        | 0.722 | 0.37    | 6.299f | 6.46     | 22.49 | 2.735 |
| 1.030                                                                    | 16.84        | 6.807f        | 0.729 | 0.37    | 6.265f | 6.64     | 22.58 | 2.739 |
| 1.040                                                                    | 17.21        | 6.795f        | 0.736 | 0.38    | 6.234f | 6.80     | 22.64 | 2.742 |
| 1.050                                                                    | 17.59        | 6.783f        | 0.743 | 0.38    | 6.199f | 6.99     | 22.76 | 2.747 |
| 1.060                                                                    | 17.98        | 6.770f        | 0.749 | 0.39    | 6.168f | 7.16     | 22.81 | 2.752 |
| 1.070                                                                    | 18.37        | 6.757f        | 0.756 | 0.39    | 6.143f | 7.30     | 22.76 | 2.757 |
| 1.080                                                                    | 18.76        | 6.744f        | 0.763 | 0.39    | 6.121f | 7.44     | 22.73 | 2.762 |
| 1.090                                                                    | 19.15        | 6.731f        | 0.769 | 0.40    | 6.100f | 7.58     | 22.66 | 2.768 |
| 1.100                                                                    | 19.55        | 6.718f        | 0.776 | 0.40    | 6.080f | 7.71     | 22.58 | 2.774 |
| 1.110                                                                    | 19.96        | 6.705f        | 0.783 | 0.40    | 6.062f | 7.83     | 22.47 | 2.779 |
| 1.120                                                                    | 20.36        | 6.692f        | 0.789 | 0.41    | 6.046f | 7.95     | 22.36 | 2.785 |
| 1.130                                                                    | 20.77        | 6.679f        | 0.796 | 0.41    | 6.030f | 8.06     | 22.24 | 2.790 |
| 1.140                                                                    | 21.19        | 6.666f        | 0.802 | 0.41    | 6.016f | 8.17     | 22.10 | 2.795 |
| 1.150                                                                    | 21.60        | 6.654f        | 0.809 | 0.42    | 6.003f | 8.28     | 21.96 | 2.800 |
| 1.160                                                                    | 22.02        | 6.641f        | 0.816 | 0.42    | 5.992f | 8.38     | 21.81 | 2.805 |
| 1.170                                                                    | 22.44        | 6.629f        | 0.822 | 0.42    | 5.982f | 8.48     | 21.64 | 2.809 |
| 1.180                                                                    | 22.87        | 6.617f        | 0.829 | 0.43    | 5.973f | 8.57     | 21.46 | 2.812 |
| 1.190                                                                    | 23.29        | 6.605f        | 0.835 | 0.43    | 5.966f | 8.65     | 21.28 | 2.809 |
| 1.200                                                                    | 23.72        | 6.594f        | 0.842 | 0.43    | 5.959f | 8.74     | 21.10 | 2.805 |
| 1.210                                                                    | 24.15        | 6.582f        | 0.848 | 0.43    | 5.953f | 8.82     | 20.92 | 2.800 |
| 1.220                                                                    | 24.59        | 6.571f        | 0.855 | 0.43    | 5.948f | 8.90     | 20.75 | 2.793 |
| 1.230                                                                    | 25.02        | 6.561f        | 0.861 | 0.44    | 5.943f | 8.98     | 20.57 | 2.785 |
| 1.240                                                                    | 25.46        | 6.550f        | 0.868 | 0.44    | 5.938f | 9.06     | 20.39 | 2.776 |
| 1.250                                                                    | 25.90        | 6.540f        | 0.874 | 0.44    | 5.935f | 9.14     | 20.22 | 2.767 |
| 1.260                                                                    | 26.34        | 6.530f        | 0.880 | 0.44    | 5.933f | 9.21     | 20.03 | 2.756 |
| 1.270                                                                    | 26.78        | 6.520f        | 0.887 | 0.44    | 5.931f | 9.27     | 19.83 | 2.744 |
| 1.280                                                                    | 27.22        | 6.510f        | 0.893 | 0.44    | 5.931f | 9.33     | 19.64 | 2.731 |
| 1.290                                                                    | 27.67        | 6.501f        | 0.899 | 0.45    | 5.932f | 9.39     | 19.44 | 2.718 |
| 1.300                                                                    | 28.11        | 6.492f        | 0.906 | 0.45    | 5.933f | 9.44     | 19.24 | 2.704 |
| 1.310                                                                    | 28.56        | 6.484f        | 0.912 | 0.45    | 5.935f | 9.49     | 19.04 | 2.690 |

|                         |       |        |                           |      |        |                  |       |       |
|-------------------------|-------|--------|---------------------------|------|--------|------------------|-------|-------|
| 1.320                   | 29.01 | 6.475f | 0.918                     | 0.45 | 5.936f | 9.54             | 18.84 | 2.677 |
| 1.330                   | 29.45 | 6.467f | 0.924                     | 0.45 | 5.937f | 9.59             | 18.65 | 2.663 |
| 1.340                   | 29.90 | 6.459f | 0.930                     | 0.45 | 5.938f | 9.64             | 18.47 | 2.651 |
| 1.350                   | 30.35 | 6.452f | 0.936                     | 0.45 | 5.939f | 9.69             | 18.29 | 2.638 |
| Distances in METERS.    |       |        | Specific Gravity = 1.000. |      |        | Moment in M.-MT. |       |       |
| Draft is from Baseline. |       |        |                           |      |        |                  |       |       |

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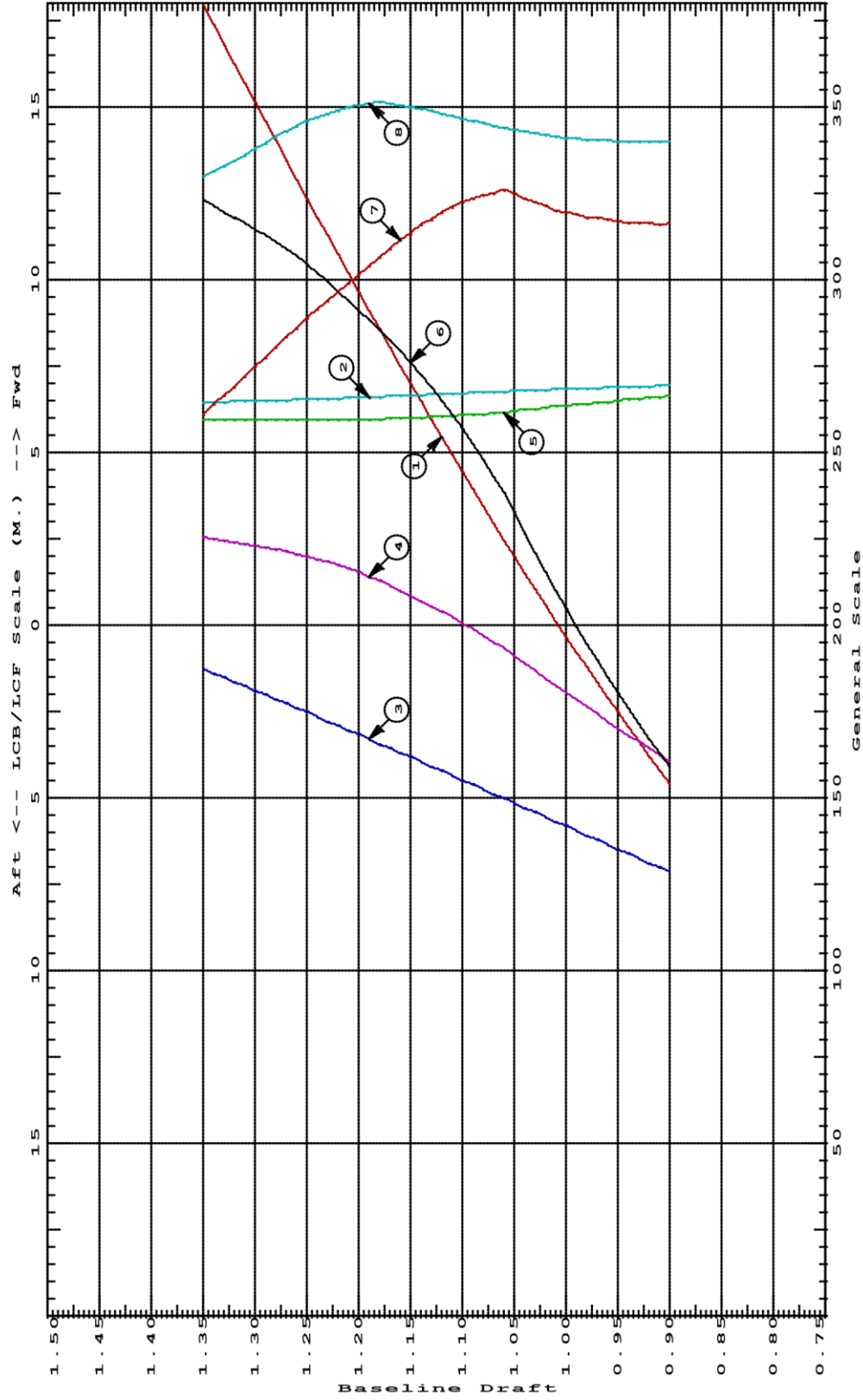
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# HYDROSTATIC PROPERTIES at LEVEL TRIM



- 1 Displacement 1=.08 MT
- 2 LCB (use top scale)
- 3 VCB (KB) 1=.005 M.
- 4 Immersion 1=.002 MT/CM
- 4 WPA 1=.2 Sq.M.
- 5 LCF (use top scale)
- 6 Moment/Trim 1=.03 M.-MT/Deg
- 7 KML 1=.07 M.
- 8 KMT 1=.008 M.

Specific Gravity = 1.000      Assumed KG = 0.00 M.  
 "K" = Baseline (BOK DWL-1200)



## Appendix 3 – Down Flooding Height

Project : 5910

Date: 27/11/2007  
Revision : A

**6.1.2 DOWNFLOODING HEIGHT (LOADED DISPLACEMENT CONDITION)**

| WEIGHT STATUS                       |                   |                             |            |                   |                  |          |             |
|-------------------------------------|-------------------|-----------------------------|------------|-------------------|------------------|----------|-------------|
| Trim: Fwd 0.03 deg.,                |                   |                             |            | Heel: zero        |                  |          |             |
| Part                                |                   |                             | Weight(MT) | LCG               | TCG              | VCG      |             |
| LIGHT SHIP                          |                   |                             | 21.98      | 6.321f            | 0.000            | 1.668    |             |
| CREWLIMIT                           |                   |                             | 0.75       | 5.500f            | 2.050s           | 2.600    |             |
| MAXIMUM TOTAL LOAD                  |                   |                             | 1.25       | 6.400f            | 0.000            | 1.800    |             |
| BALLAST                             |                   |                             | 0.80       | 12.850f           | 0.000            | 1.000    |             |
| Total Fixed                         |                   |                             | 24.78      | 6.511f            | 0.062s           | 1.681    |             |
|                                     | Ltrs.             | SpGr                        | Weight(MT) | LCG               | TCG              | VCG      | FSM         |
| FO1                                 | 1389.8            | 0.840                       | 1.17       | 5.800f            | 0.000            | 1.195    | 1.39        |
| FW1                                 | 484.0             | 1.000                       | 0.48       | 7.826f            | 0.568p           | 0.596    | 0.09        |
| FW2                                 | 484.0             | 1.000                       | 0.48       | 7.826f            | 0.568s           | 0.596    | 0.09        |
| Total Tanks                         |                   |                             | 2.14       | 6.718f            | 0.000            | 0.924    | 1.58        |
| Total Weight                        |                   |                             | 26.92      | 6.527f            | 0.057s           | 1.621    |             |
| Free Surface Adjustment             |                   |                             |            |                   |                  | 0.059    |             |
| Adjusted CG                         |                   |                             |            | 6.527f            | 0.057s           | 1.680    |             |
| Distances in METERS.                |                   |                             |            | Moments in M.-MT. |                  |          |             |
| HYDROSTATIC PROPERTIES              |                   |                             |            |                   |                  |          |             |
| Trim: Fwd 0.03 deg., No Heel, VCG = |                   |                             |            | .621              |                  |          |             |
| LCF                                 | Displacement      | Buoyancy-Ctr.               | Weight/    |                   | Moment/          |          |             |
| Draft                               | Weight(MT)        | LCB                         | VCB        | CM                | LCF              | Deg trim | GML GMT     |
| 1.273                               | 26.92             | 6.528f                      | 0.889      | 0.44              | 5.935f           | 8.51     | 18.11 1.059 |
| Distances in METERS.                |                   | Specific Gravity = 1.000.   |            |                   | Moment in M.-MT. |          |             |
| Draft is from Baseline.             |                   | True Free Surface included. |            |                   |                  |          |             |
| CRITICAL POINT STATUS               |                   |                             |            |                   |                  |          |             |
| Baseline draft: 1.270 @ Origin      |                   |                             |            |                   |                  |          |             |
| Trim: Fwd 0.03 deg.,                |                   |                             |            | Heel: zero        |                  |          |             |
|                                     | Critical Point    |                             |            | LCP               | TCP              | VCP      | Height      |
| (1)                                 | ER VENTILATION PS |                             | FLOOD      | 3.400f            | 1.421s           | 3.590    | 2.318       |
| (1)                                 | ER VENTILATION PS |                             | FLOOD      | 3.400f            | 1.421p           | 3.590    | 2.318       |
| Distances in METERS.                |                   |                             |            |                   |                  |          |             |



## Appendix 4 – Down Flooding Angle

Project : 5910

Date: 27/11/2007  
Revision : A

**6.1.3 DOWN FLOODING ANGLE AT MINIMUM OPERATING CONDITION**

| WEIGHT STATUS                        |              |                           |         |                   |         |                  |       |       |
|--------------------------------------|--------------|---------------------------|---------|-------------------|---------|------------------|-------|-------|
| Trim: Aft 0.21 deg.,      Heel: zero |              |                           |         |                   |         |                  |       |       |
| Part                                 | Weight(MT)   | LCG                       | TCG     | VCG               |         |                  |       |       |
| LIGHT SHIP                           | 21.98        | 6.321f                    | 0.000   | 1.668             |         |                  |       |       |
| CREW MASS                            | 0.15         | 5.500f                    | 0.000   | 2.600             |         |                  |       |       |
| BALLAST                              | 0.80         | 12.850f                   | 0.000   | 1.000             |         |                  |       |       |
| Total Fixed                          | 22.93        | 6.543f                    | 0.000   | 1.651             |         |                  |       |       |
| Ltrs.                                | SpGr         | Weight(MT)                | LCG     | TCG               | VCG     | FSM              |       |       |
| Total Tanks                          |              | 0.00                      |         |                   |         | 0.00             |       |       |
| Distances in METERS.                 |              |                           |         | Moments in M.-MT. |         |                  |       |       |
| HYDROSTATIC PROPERTIES Trim:         |              |                           |         |                   |         |                  |       |       |
| Aft 0.21 deg., No Heel, VCG = 1.651  |              |                           |         |                   |         |                  |       |       |
| LCF                                  | Displacement | Buoyancy-Ctr.             | Weight/ |                   | Moment/ |                  |       |       |
| Draft                                | Weight(MT)   | LCB                       | VCB     | CM                | LCF     | Deg trim         | GML   | GMT   |
| 1.182                                | 22.93        | 6.541f                    | 0.830   | 0.43              | 5.934f  | 7.96             | 19.90 | 1.176 |
| Distances in METERS.                 |              | Specific Gravity = 1.000. |         |                   |         | Moment in M.-MT. |       |       |
| Draft is from Baseline.              |              |                           |         |                   |         |                  |       |       |

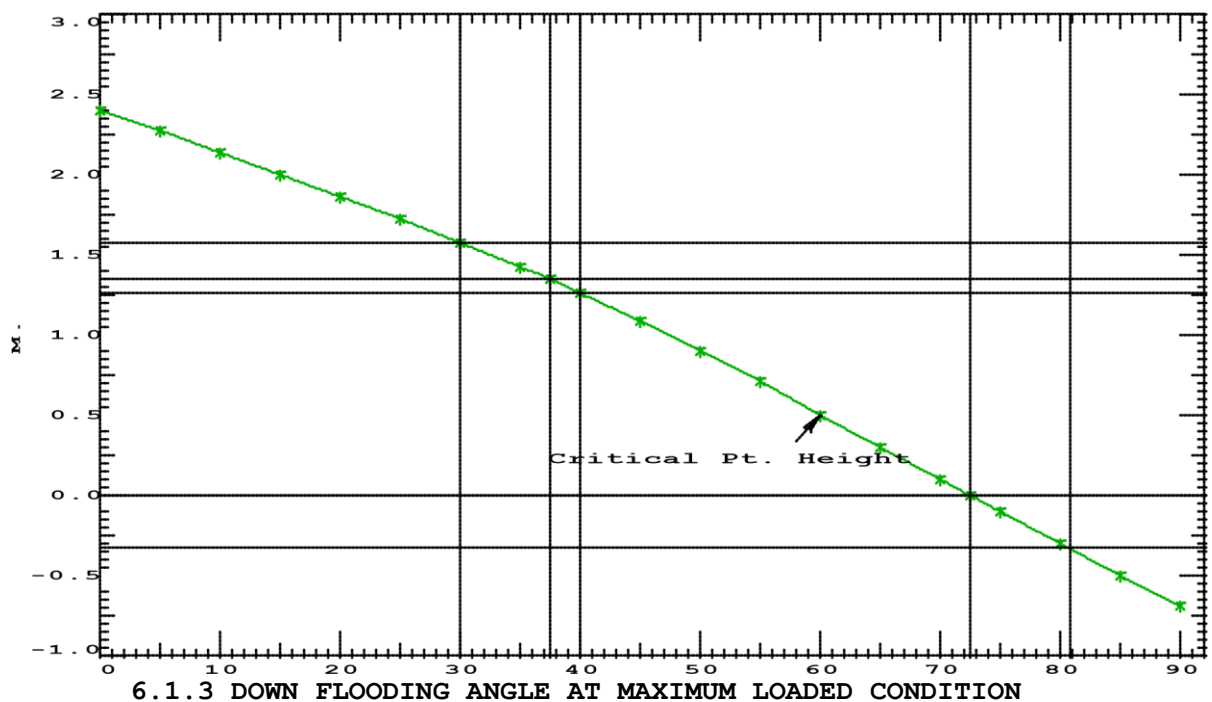
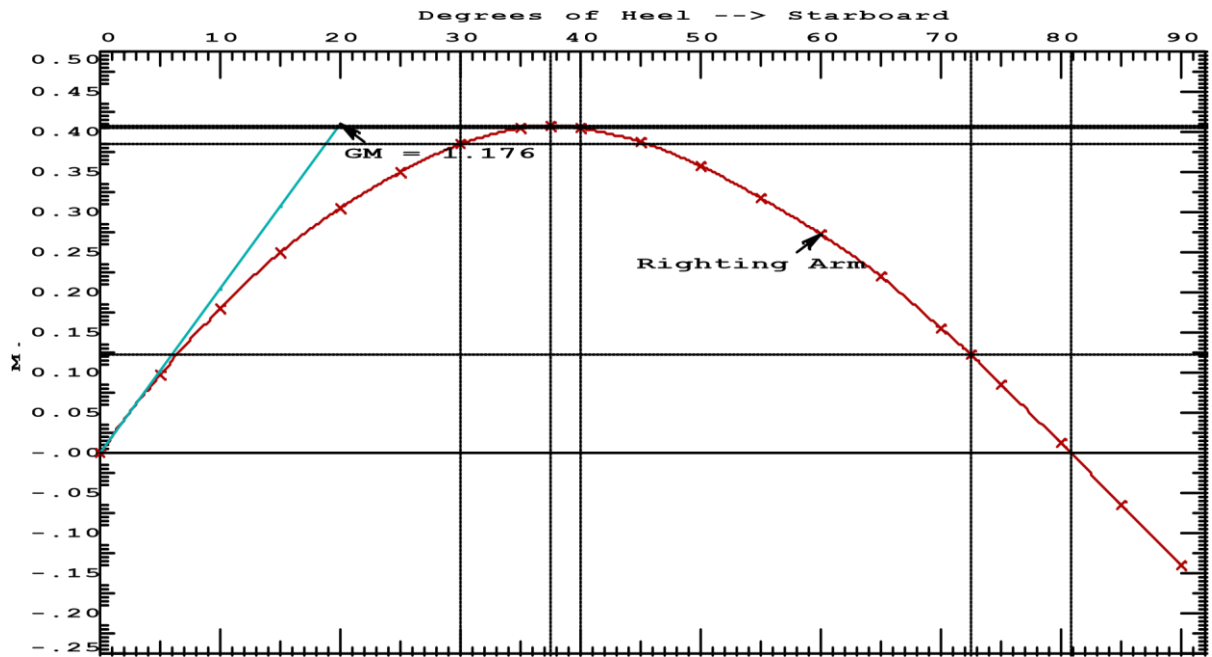
| <b>RIGHTING ARMS vs HEEL ANGLE</b>         |                    |        |                            |                           |               |                       |
|--------------------------------------------|--------------------|--------|----------------------------|---------------------------|---------------|-----------------------|
| LCG = 6.543f    TCG = 0.000    VCG = 1.651 |                    |        |                            |                           |               |                       |
| Origin<br>Depth                            | Degrees of<br>Trim | Heel   | Displacement<br>Weight(MT) | Righting Arms<br>in Trim  | in Heel       | Flood<br>Pt<br>Height |
| 1.203                                      | 0.21a              | 0.00   | 22.93                      | 0.000                     | 0.000         | 2.399 (1)             |
| 1.190                                      | 0.17a              | 5.00s  | 22.93                      | 0.000                     | 0.097s        | 2.273 (1)             |
| 1.151                                      | 0.07a              | 10.00s | 22.93                      | 0.000                     | 0.181s        | 2.141 (1)             |
| 1.089                                      | 0.09f              | 15.00s | 22.93                      | 0.000                     | 0.251s        | 2.006 (1)             |
| 1.004                                      | 0.28f              | 20.00s | 22.93                      | 0.000                     | 0.305s        | 1.866 (1)             |
| 0.899                                      | 0.51f              | 25.00s | 22.93                      | 0.000                     | 0.349s        | 1.724 (1)             |
| 0.774                                      | 0.76f              | 30.00s | 22.93                      | 0.000                     | 0.385s        | 1.579 (1)             |
| 0.639                                      | 1.02f              | 35.00s | 22.93                      | 0.000                     | 0.405s        | 1.426 (1)             |
| 0.570                                      | 1.15f              | 37.47s | 22.93                      | 0.000                     | <b>0.407s</b> | 1.346 (1)             |
| 0.498                                      | 1.28f              | 40.00s | 22.93                      | 0.000                     | 0.405s        | 1.263 (1)             |
| 0.354                                      | 1.52f              | 45.00s | 22.93                      | 0.000                     | 0.387s        | 1.089 (1)             |
| 0.211                                      | 1.73f              | 50.00s | 22.94                      | 0.000                     | 0.356s        | 0.905 (1)             |
| 0.073                                      | 1.89f              | 55.00s | 22.93                      | 0.000                     | 0.317s        | 0.710 (1)             |
| -0.060                                     | 1.99f              | 60.00s | 22.93                      | 0.000                     | 0.273s        | 0.505 (1)             |
| -0.198                                     | 2.13f              | 65.00s | 22.93                      | 0.000                     | 0.219s        | 0.301 (1)             |
| -0.343                                     | 2.30f              | 70.00s | 22.93                      | 0.000                     | 0.156s        | 0.100 (1)             |
| -0.416                                     | 2.38f              | 72.49s | 22.93                      | 0.000                     | 0.122s        | <b>-0.000</b> (1)     |
| -0.487                                     | 2.44f              | 75.00s | 22.93                      | 0.000                     | 0.085s        | <b>-0.100</b> (1)     |
| -0.626                                     | 2.54f              | 80.00s | 22.93                      | 0.000                     | 0.011s        | <b>-0.299</b> (1)     |
| -0.647                                     | 2.55f              | 80.76s | 22.94                      | 0.000                     | 0.000s        | <b>-0.330</b> (1)     |
| -0.759                                     | 2.59f              | 85.00s | 22.93                      | 0.000                     | -0.064s       | <b>-0.496</b> (1)     |
| -0.885                                     | 2.61f              | 90.00s | 22.93                      | 0.000                     | -0.140s       | <b>-0.690</b> (1)     |
| Distances in METERS.                       |                    |        |                            | Specific Gravity = 1.000. |               |                       |
| Critical Point                             |                    |        | LCP                        | TCP                       | VCP           |                       |
| (1) ER VENTILATION PS                      |                    |        | FLOOD 3.400f               | 1.421                     | 3.590         |                       |

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6.1.3 DOWN FLOODING ANGLE AT MAXIMUM LOADED CONDITION

| WEIGHT STATUS                   |            |        |        |       |
|---------------------------------|------------|--------|--------|-------|
| Trim: Fwd 0.03 deg., Heel: zero |            |        |        |       |
| Part                            | Weight(MT) | LCG    | TCG    | VCG   |
| LIGHT SHIP                      | 21.98      | 6.321f | 0.000  | 1.668 |
| CREWMASS                        | 0.75       | 5.500f | 2.050s | 2.600 |

|                                          |              |               |                             |         |         |                   |             |
|------------------------------------------|--------------|---------------|-----------------------------|---------|---------|-------------------|-------------|
| MAXIMUM TOTAL LOAD                       |              |               | 1.25                        | 6.400f  | 0.000   | 1.800             |             |
| BALLAST                                  |              |               | 0.80                        | 12.850f | 0.000   | 1.000             |             |
| Total Fixed                              |              |               | 24.78                       | 6.511f  | 0.062s  | 1.681             |             |
|                                          | Ltrs.        | SpGr          | Weight(MT)                  | LCG     | TCG     | VCG               | FSM         |
| FO1                                      | 1389.8       | 0.840         | 1.17                        | 5.800f  | 0.000   | 1.195             | 1.39        |
| FW1                                      | 484.0        | 1.000         | 0.48                        | 7.826f  | 0.568p  | 0.596             | 0.09        |
| FW2                                      | 484.0        | 1.000         | 0.48                        | 7.826f  | 0.568s  | 0.596             | 0.09        |
| Total Tanks                              |              |               | 2.14                        | 6.718f  | 0.000   | 0.924             | 1.58        |
| Total Weight                             |              |               | 26.92                       | 6.527f  | 0.057s  | 1.621             |             |
| Free Surface Adjustment                  |              |               |                             |         |         | 0.059             |             |
| Adjusted CG                              |              |               |                             | 6.527f  | 0.057s  | 1.680             |             |
| Distances in METERS.                     |              |               |                             |         |         | Moments in M.-MT. |             |
| HYDROSTATIC PROPERTIES                   |              |               |                             |         |         |                   |             |
| Trim: Fwd 0.03 deg., No Heel, VCG = .621 |              |               |                             |         |         |                   |             |
| LCF                                      | Displacement | Buoyancy-Ctr. | Weight/                     |         | Moment/ |                   |             |
| Draft                                    | Weight(MT)   | LCB           | VCB                         | CM      | LCF     | Deg trim          | GML GMT     |
| 1.273                                    | 26.92        | 6.528f        | 0.889                       | 0.44    | 5.935f  | 8.51              | 18.12 1.060 |
| Distances in METERS.                     |              |               | Specific Gravity = 1.000.   |         |         | Moment in M.-MT.  |             |
| Draft is from Baseline.                  |              |               | True Free Surface included. |         |         |                   |             |

|                                           |                   |                     |                      |               |               |       |     |
|-------------------------------------------|-------------------|---------------------|----------------------|---------------|---------------|-------|-----|
| <b>RIGHTING ARMS vs HEEL ANGLE Fixed</b>  |                   |                     |                      |               |               |       |     |
| CG: LCG = 6.511f TCG = 0.062s VCG = 1.681 |                   |                     |                      |               |               |       |     |
| <b>Origin</b>                             | <b>Degrees of</b> | <b>Displacement</b> | <b>Righting Arms</b> | <b>Flood</b>  |               |       |     |
| <b>Depth</b>                              | <b>Trim</b>       | <b>Weight(MT)</b>   | <b>in Trim</b>       | <b>Pt</b>     |               |       |     |
|                                           | <b>Heel</b>       |                     | <b>in Heel</b>       | <b>Height</b> |               |       |     |
| 1.270                                     | 0.03f             | 0.00                | 26.92                | 0.000         | -0.057s       | 2.318 | (1) |
| 1.266                                     | 0.04f             | 3.05s               | 26.92                | 0.000         | 0.000s        | 2.241 | (1) |
| 1.261                                     | 0.04f             | 5.00s               | 26.92                | 0.000         | 0.035s        | 2.189 | (1) |
| 1.229                                     | 0.10f             | 10.00s              | 26.92                | 0.000         | 0.118s        | 2.054 | (1) |
| 1.174                                     | 0.22f             | 15.00s              | 26.92                | 0.000         | 0.190s        | 1.913 | (1) |
| 1.095                                     | 0.38f             | 20.00s              | 26.92                | 0.000         | 0.251s        | 1.770 | (1) |
| 0.994                                     | 0.58f             | 25.00s              | 26.92                | 0.000         | 0.302s        | 1.624 | (1) |
| 0.878                                     | 0.79f             | 30.00s              | 26.92                | 0.000         | 0.339s        | 1.473 | (1) |
| 0.754                                     | 1.01f             | 35.00s              | 26.92                | 0.000         | 0.353s        | 1.312 | (1) |
| 0.719                                     | 1.07f             | 36.36s              | 26.92                | 0.000         | <b>0.354s</b> | 1.266 | (1) |
| 0.626                                     | 1.22f             | 40.00s              | 26.92                | 0.000         | 0.350s        | 1.139 | (1) |

|        |       |        |       |       |         |            |
|--------|-------|--------|-------|-------|---------|------------|
| 0.495  | 1.41f | 45.00s | 26.92 | 0.000 | 0.331s  | 0.955 (1)  |
| 0.362  | 1.58f | 50.00s | 26.92 | 0.000 | 0.301s  | 0.763 (1)  |
| 0.229  | 1.73f | 55.00s | 26.92 | 0.000 | 0.262s  | 0.563 (1)  |
| 0.101  | 1.82f | 60.00s | 26.92 | 0.000 | 0.217s  | 0.355 (1)  |
| -0.020 | 1.87f | 65.00s | 26.92 | 0.000 | 0.171s  | 0.138 (1)  |
| -0.098 | 1.90f | 68.20s | 26.92 | 0.000 | 0.139s  | -0.001 (1) |
| -0.143 | 1.92f | 70.00s | 26.92 | 0.000 | 0.120s  | -0.078 (1) |
| -0.274 | 2.01f | 75.00s | 26.92 | 0.000 | 0.063s  | -0.288 (1) |
| -0.409 | 2.11f | 80.00s | 26.92 | 0.000 | 0.002s  | -0.492 (1) |
| -0.412 | 2.12f | 80.12s | 26.92 | 0.000 | 0.000s  | -0.497 (1) |
| -0.539 | 2.17f | 85.00s | 26.92 | 0.000 | -0.063s | -0.692 (1) |
| -0.664 | 2.19f | 90.00s | 26.92 | 0.000 | -0.128s | -0.886 (1) |

Distances in METERS.

Specific Gravity = 1.000.

Note: The Center of Gravity shown above is for the Fixed Weight of 24.78 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.

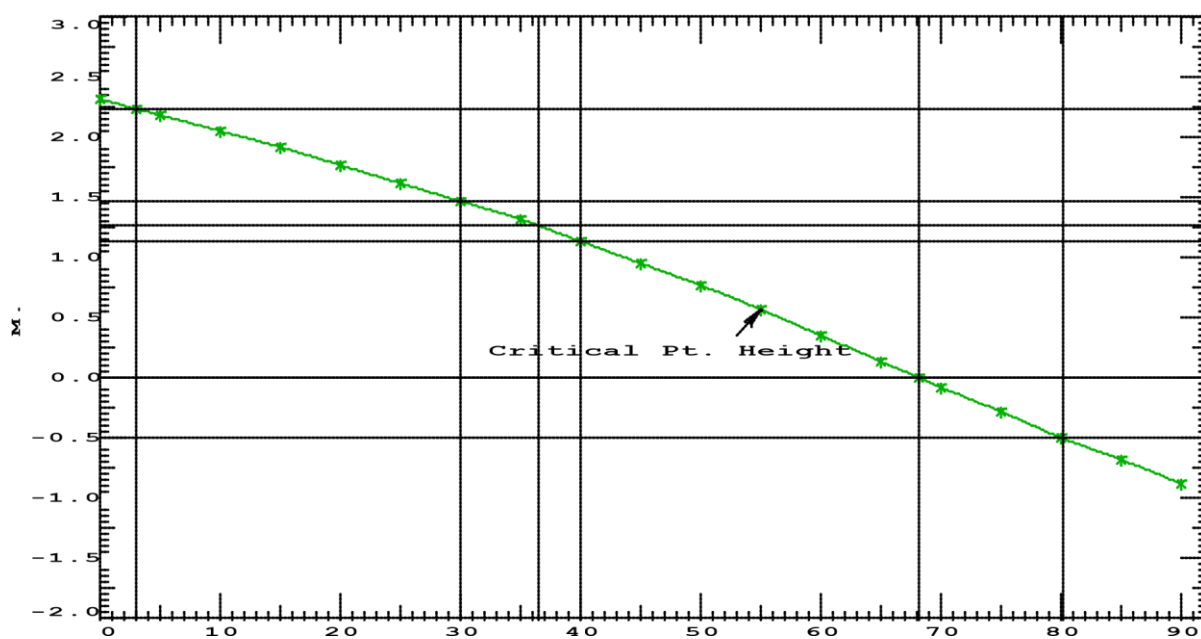
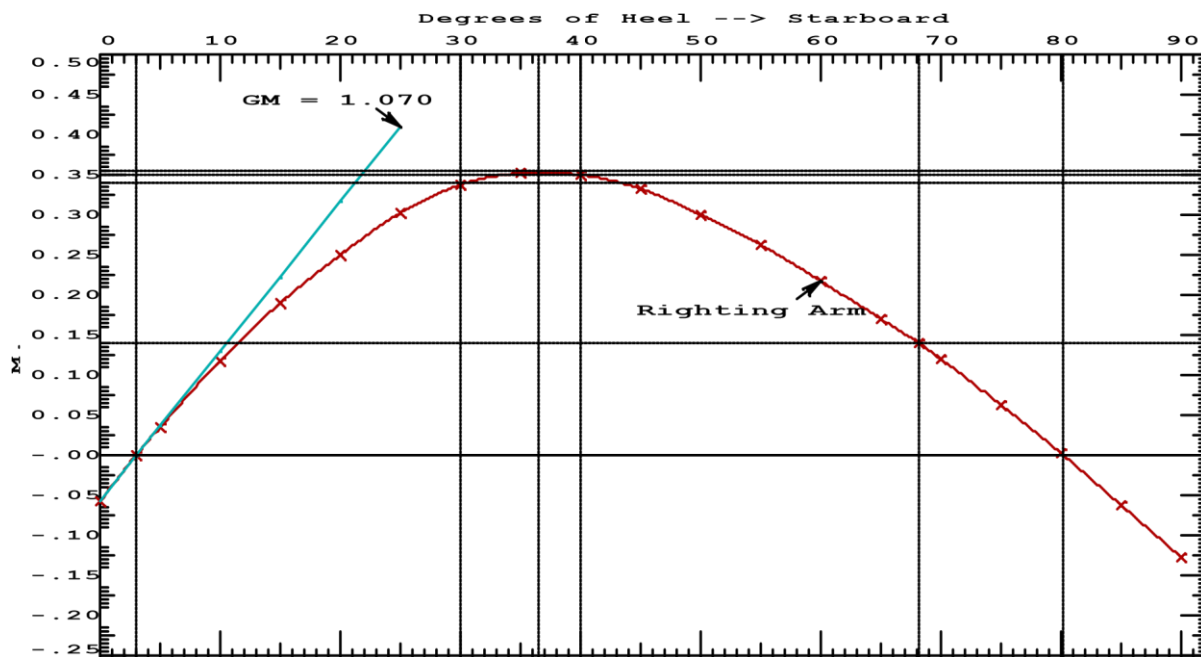
| Critical Point                     | LCP   | TCP   | VCP |
|------------------------------------|-------|-------|-----|
| (1) ER VENTILATION PS FLOOD 3.400f | 1.421 | 3.590 |     |

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## Appendix 5 – Offset Load Test

Project : 5910

Date: 27/11/2007  
Revision : A

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

| WEIGHT STATUS                                          |                   |               |            |                             |         |                   |             |
|--------------------------------------------------------|-------------------|---------------|------------|-----------------------------|---------|-------------------|-------------|
| Trim: Fwd 0.03 deg., Heel: Stbd 3.05 deg.              |                   |               |            |                             |         |                   |             |
| Part                                                   |                   |               | Weight(MT) | LCG                         | TCG     | VCG               |             |
| LIGHT SHIP                                             |                   |               | 21.98      | 6.321f                      | 0.000   | 1.668             |             |
| MAXIMUM TOTAL LOAD                                     |                   |               | 1.25       | 6.400f                      | 0.000   | 1.800             |             |
| BALLAST                                                |                   |               | 0.80       | 12.850f                     | 0.000   | 1.000             |             |
| 10 PERSONS                                             |                   |               | 0.75       | 5.500f                      | 2.050s  | 2.600             |             |
| Total Fixed                                            |                   |               | 24.78      | 6.511f                      | 0.062s  | 1.681             |             |
|                                                        | Ltrs.             | SpGr          | Weight(MT) | LCG                         | TCG     | VCG               | FSM         |
| FO1                                                    | 1389.6            | 0.840         | 1.17       | 5.800f                      | 0.027s  | 1.196             | 0.12        |
| FW1                                                    | 484.0             | 1.000         | 0.48       | 7.825f                      | 0.562p  | 0.596             | 0.01        |
| FW2                                                    | 484.0             | 1.000         | 0.48       | 7.825f                      | 0.574s  | 0.596             | 0.01        |
| Total Tanks                                            |                   |               | 2.14       | 6.718f                      | 0.017s  | 0.924             | 0.15        |
| Total Weight                                           |                   |               | 26.92      | 6.527f                      | 0.058s  | 1.621             |             |
| Free Surface Adjustment                                |                   |               |            |                             |         | 0.006             |             |
| Adjusted CG                                            |                   |               |            | 6.527f                      | 0.058s  | 1.627             |             |
| Distances in METERS.                                   |                   |               |            |                             |         | Moments in M.-MT. |             |
| HYDROSTATIC PROPERTIES                                 |                   |               |            |                             |         |                   |             |
| Trim: Fwd 0.03 deg., Heel: Stbd 3.05 deg., VCG = 1.621 |                   |               |            |                             |         |                   |             |
| LCF                                                    | Displacement      | Buoyancy-Ctr. | Weight/    |                             | Moment/ |                   |             |
| Draft                                                  | Weight(MT)        | LCB           | VCB        | CM                          | LCF     | Deg trim          | GML GMT     |
| 1.272                                                  | 26.92             | 6.527f        | 0.891      | 0.44                        | 5.960f  | 8.41              | 17.91 1.070 |
| Distances in METERS.                                   |                   |               |            | Specific Gravity = 1.000.   |         | Moment in M.-MT.  |             |
| Draft is from Baseline.                                |                   |               |            | True Free Surface included. |         |                   |             |
| CRITICAL POINT STATUS                                  |                   |               |            |                             |         |                   |             |
| Baseline draft: 1.269 @ Origin                         |                   |               |            |                             |         |                   |             |
| Trim: Fwd 0.03 deg., Heel: Stbd 3.05 deg.              |                   |               |            |                             |         |                   |             |
|                                                        | Critical Point    |               | LCP        | TCP                         | VCP     | Height            |             |
| (1)                                                    | ER VENTILATION PS | FLOOD         | 3.400f     | 1.421s                      | 3.590   | 2.240             |             |
| (1)                                                    | ER VENTILATION PS | FLOOD         | 3.400f     | 1.421p                      | 3.590   | 2.392             |             |
| Distances in METERS.                                   |                   |               |            |                             |         |                   |             |



## Appendix 6 – Resistance to Waves and Wind

Project : 5910

Date: 27/11/2007  
Revision : A

**6.3 RESISTANCE TO WAVES AND  
WIND**

| SUMMARY OF LOADING                  |              |                           |         |                    |         |                  |             |
|-------------------------------------|--------------|---------------------------|---------|--------------------|---------|------------------|-------------|
| 0.0 Ltrs. (0%) FUEL                 |              | 0.0 Ltrs. (0%) FRESH      |         |                    |         |                  |             |
| 0.0 Ltrs. (0%) SEWAGE               |              |                           |         |                    |         |                  |             |
| 0.15 MT of CREW MASS                |              |                           |         | 0.80 MT of BALLAST |         |                  |             |
| WEIGHT STATUS                       |              |                           |         |                    |         |                  |             |
| Trim: Aft 0.21 deg.,                |              |                           |         | Heel: zero         |         |                  |             |
| Part                                | Weight(MT)   | LCG                       | TCG     | VCG                |         |                  |             |
| LIGHT SHIP                          | 21.98        | 6.321f                    | 0.000   | 1.668              |         |                  |             |
| CREW MASS                           | 0.15         | 5.500f                    | 0.000   | 2.600              |         |                  |             |
| BALLAST                             | 0.80         | 12.850f                   | 0.000   | 1.000              |         |                  |             |
| Total Fixed                         | 22.93        | 6.543f                    | 0.000   | 1.651              |         |                  |             |
| Ltrs.                               | SpGr         | Weight(MT)                | LCG     | TCG                | VCG     | FSM              |             |
| Total Tanks                         |              | 0.00                      |         |                    |         | 0.00             |             |
| Distances in METERS.                |              |                           |         | Moments in M.-MT.  |         |                  |             |
| HYDROSTATIC PROPERTIES Trim:        |              |                           |         |                    |         |                  |             |
| Aft 0.21 deg., No Heel, VCG = 1.651 |              |                           |         |                    |         |                  |             |
| LCF                                 | Displacement | Buoyancy-Ctr.             | Weight/ |                    | Moment/ |                  |             |
| Draft                               | Weight(MT)   | LCB                       | VCB     | CM                 | LCF     | Deg trim         | GML GMT     |
| 1.182                               | 22.93        | 6.541f                    | 0.830   | 0.43               | 5.934f  | 7.96             | 19.90 1.176 |
| Distances in METERS.                |              | Specific Gravity = 1.000. |         |                    |         | Moment in M.-MT. |             |
| Draft is from Baseline.             |              |                           |         |                    |         |                  |             |

**AT MINIMUM LOADED DISPLACEMENT**

Roll angle = 25.87 degrees.

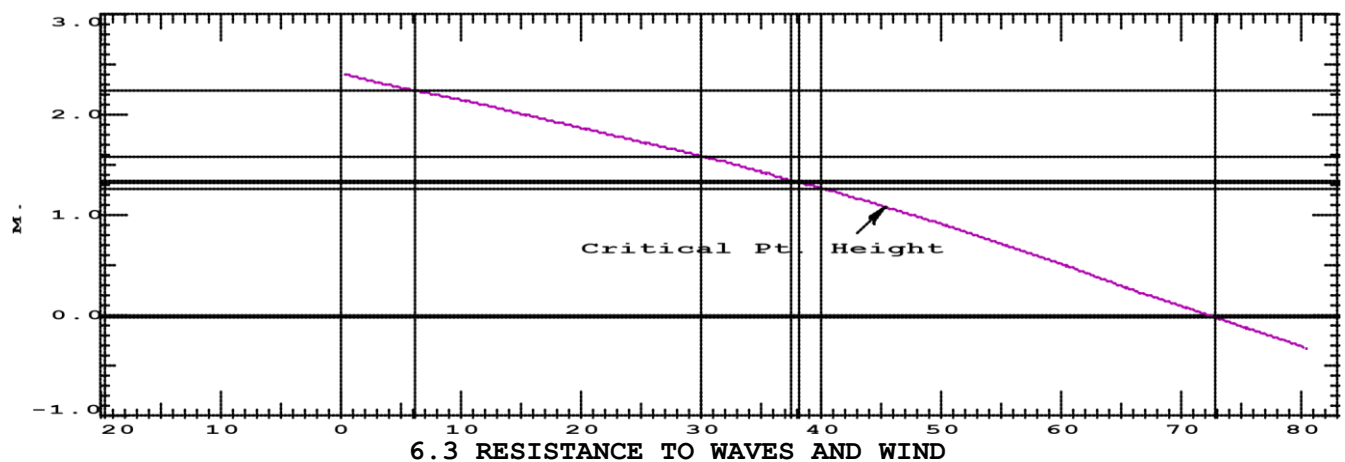
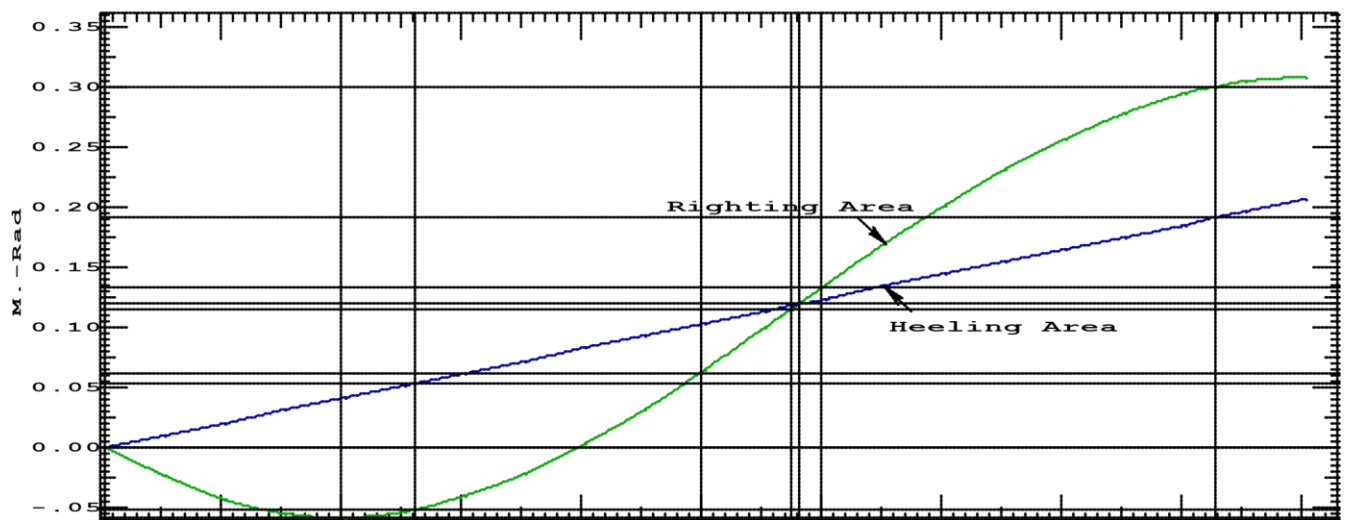
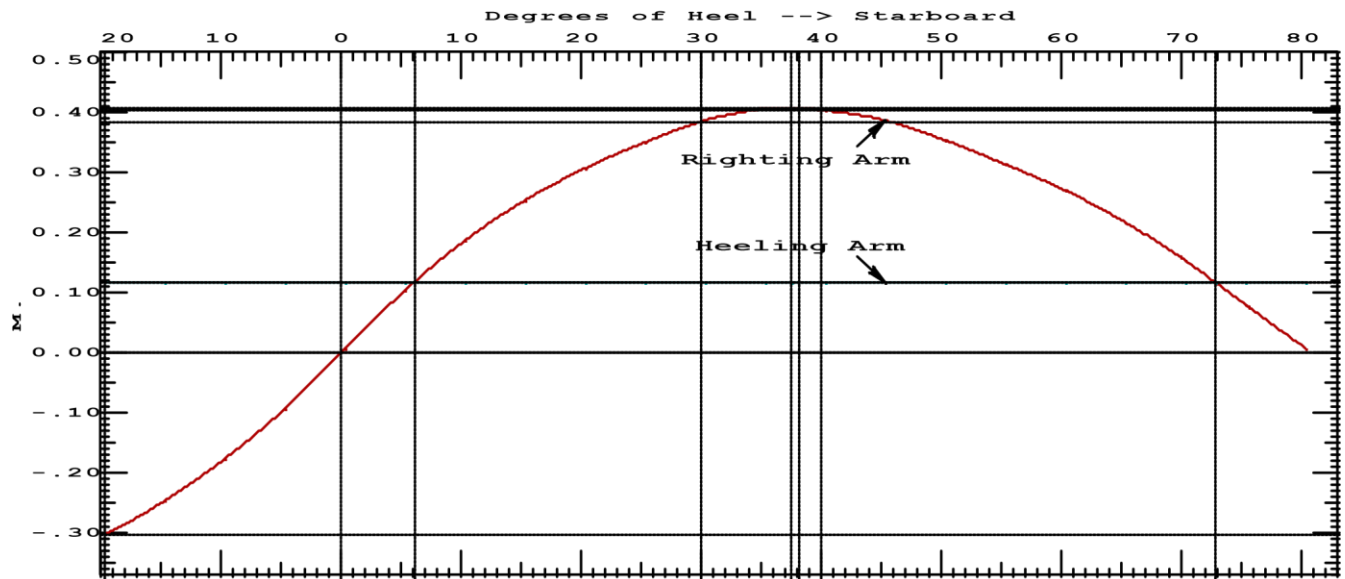
| RESIDUAL RIGHTING ARMS vs HEEL ANGLE                                                                                                                                             |                                             |        |                            |                          |         |                 |                       |     |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------|--------|----------------------------|--------------------------|---------|-----------------|-----------------------|-----|
| LCG = 6.543f TCG = 0.000 VCG = 1.651                                                                                                                                             |                                             |        |                            |                          |         |                 |                       |     |
| Origin<br>Depth                                                                                                                                                                  | Degrees of<br>Trim                          | Heel   | Displacement<br>Weight(MT) | Residual Arms<br>in Trim | in Heel | Area            | Flood<br>Pt<br>Height |     |
| 1.010                                                                                                                                                                            | 0.27f                                       | 19.72p | 22.93                      | 0.000                    | 0.420p  | 0.0000          |                       |     |
| 1.093                                                                                                                                                                            | 0.08f                                       | 14.72p | 22.93                      | 0.000                    | 0.365p  | -0.0342         |                       |     |
| 1.154                                                                                                                                                                            | 0.08a                                       | 9.72p  | 22.94                      | 0.000                    | 0.294p  | -0.0631         |                       |     |
| 1.191                                                                                                                                                                            | 0.17a                                       | 4.72p  | 22.93                      | 0.000                    | 0.210p  | -0.0852         |                       |     |
| 1.203                                                                                                                                                                            | 0.21a                                       | 0.28s  | 22.93                      | 0.000                    | -0.112s | -0.0994         | 2.392                 | (1) |
| 1.188                                                                                                                                                                            | 0.17a                                       | 5.28s  | 22.93                      | 0.000                    | -0.015s | -0.1049         | 2.266                 | (1) |
| 1.183                                                                                                                                                                            | 0.15a                                       | 6.15s  | 22.93                      | 0.000                    | 0.000s  | -0.1050         | 2.243                 | (1) |
| 1.149                                                                                                                                                                            | 0.06a                                       | 10.28s | 22.93                      | 0.000                    | 0.068s  | -0.1025         | 2.134                 | (1) |
| 1.085                                                                                                                                                                            | 0.10f                                       | 15.28s | 22.93                      | 0.000                    | 0.136s  | -0.0935         | 1.998                 | (1) |
| 0.999                                                                                                                                                                            | 0.29f                                       | 20.28s | 22.93                      | 0.000                    | 0.190s  | -0.0792         | 1.859                 | (1) |
| 0.892                                                                                                                                                                            | 0.52f                                       | 25.28s | 22.93                      | 0.000                    | 0.234s  | -0.0606         | 1.716                 | (1) |
| 0.767                                                                                                                                                                            | 0.77f                                       | 30.28s | 22.93                      | 0.000                    | 0.269s  | -0.0386         | 1.571                 | (1) |
| 0.631                                                                                                                                                                            | 1.03f                                       | 35.28s | 22.93                      | 0.000                    | 0.288s  | -0.0142         | 1.417                 | (1) |
| 0.570                                                                                                                                                                            | 1.15f                                       | 37.47s | 22.94                      | 0.000                    | 0.289s  | -0.0032         | 1.347                 | (1) |
| 0.490                                                                                                                                                                            | 1.29f                                       | 40.28s | 22.93                      | 0.000                    | 0.287s  | 0.0110          | 1.253                 | (1) |
| 0.346                                                                                                                                                                            | 1.53f                                       | 45.28s | 22.93                      | 0.000                    | 0.268s  | 0.0353          | 1.079                 | (1) |
| 0.211                                                                                                                                                                            | 1.73f                                       | 50.00s | 22.93                      | 0.000                    | 0.239s  | 0.0563          | 0.905                 | (1) |
| 0.203                                                                                                                                                                            | 1.74f                                       | 50.28s | 22.93                      | 0.000                    | 0.237s  | 0.0575          | 0.895                 | (1) |
| 0.065                                                                                                                                                                            | 1.89f                                       | 55.28s | 22.93                      | 0.000                    | 0.197s  | 0.0765          | 0.699                 | (1) |
| -0.067                                                                                                                                                                           | 2.00f                                       | 60.28s | 22.93                      | 0.000                    | 0.153s  | 0.0918          | 0.494                 | (1) |
| -0.206                                                                                                                                                                           | 2.14f                                       | 65.28s | 22.93                      | 0.000                    | 0.098s  | 0.1028          | 0.290                 | (1) |
| -0.351                                                                                                                                                                           | 2.31f                                       | 70.28s | 22.93                      | 0.000                    | 0.034s  | 0.1086          | 0.089                 | (1) |
| -0.416                                                                                                                                                                           | 2.38f                                       | 72.49s | 22.93                      | 0.000                    | 0.004s  | 0.1094          | -0.000                | (1) |
| -0.424                                                                                                                                                                           | 2.39f                                       | 72.77s | 22.94                      | 0.000                    | 0.000s  | 0.1094          | -0.011                | (1) |
| -0.495                                                                                                                                                                           | 2.45f                                       | 75.28s | 22.93                      | 0.000                    | -0.036s | 0.1086          | -0.111                | (1) |
| -0.634                                                                                                                                                                           | 2.54f                                       | 80.28s | 22.93                      | 0.000                    | -0.110s | 0.1022          | -0.310                | (1) |
| Distances in METERS.                                                                                                                                                             |                                             |        | Specific Gravity = 1.000.  |                          |         | 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 this moment (in M.-MT):<br>Stbd heeling moment = 2.70                            |                                             |        |                            |                          |         |                 |                       |     |
| Critical Point                                                                                                                                                                   |                                             |        |                            | LCP                      | TCP     | VCP             |                       |     |
| (1) ER VENTILATION PS                                                                                                                                                            |                                             |        |                            | FLOOD 3.400f             | 1.421   | 3.590           |                       |     |
| LIM                                                                                                                                                                              | STABILITY CRITERION                         |        |                            |                          | Min/Max | Attained        |                       |     |
| (1)                                                                                                                                                                              | Res. Ratio from Roll to abs 50 deg or Flood |        |                            |                          | >       | 1.000           | 1.536 P               |     |

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### 6.3 RESISTANCE TO WAVES AND WIND

| SUMMARY OF LOADING                       |              |                           |            |                               |         |                   |             |
|------------------------------------------|--------------|---------------------------|------------|-------------------------------|---------|-------------------|-------------|
| 1,389.8 Ltrs. (98%) FUEL                 |              |                           |            | 968.0 Ltrs. (98%) FRESH       |         |                   |             |
| 0.0 Ltrs. (0%) SEWAGE                    |              |                           |            |                               |         |                   |             |
| 0.75 MT of CREWLIMIT                     |              |                           |            | 1.25 MT of MAXIMUM TOTAL LOAD |         |                   |             |
| 0.80 MT of BALLAST                       |              |                           |            |                               |         |                   |             |
| WEIGHT STATUS                            |              |                           |            |                               |         |                   |             |
| Trim: Fwd 0.03 deg.,                     |              |                           |            | Heel: zero                    |         |                   |             |
| Part                                     | Weight(MT)   |                           |            | LCG                           | TCG     | VCG               |             |
| LIGHT SHIP                               | 21.98        |                           |            | 6.321f                        | 0.000   | 1.668             |             |
| CREWLIMIT                                | 0.75         |                           |            | 5.500f                        | 0.000   | 2.600             |             |
| MAXIMUM TOTAL LOAD                       | 1.25         |                           |            | 6.400f                        | 0.000   | 1.800             |             |
| BALLAST                                  | 0.80         |                           |            | 12.850f                       | 0.000   | 1.000             |             |
| Total Fixed                              | 24.78        |                           |            | 6.511f                        | 0.000   | 1.681             |             |
|                                          | Ltrs.        | SpGr                      | Weight(MT) | LCG                           | TCG     | VCG               | FSM         |
| FO1                                      | 1389.8       | 0.840                     | 1.17       | 5.800f                        | 0.000   | 1.195             | 1.39        |
| FW1                                      | 484.0        | 1.000                     | 0.48       | 7.826f                        | 0.568p  | 0.596             | 0.09        |
| FW2                                      | 484.0        | 1.000                     | 0.48       | 7.826f                        | 0.568s  | 0.596             | 0.09        |
| Total Tanks                              |              |                           | 2.14       | 6.718f                        | 0.000   | 0.924             | 1.58        |
| Total Weight                             |              |                           | 26.92      | 6.527f                        | 0.000   | 1.621             |             |
| Free Surface Adjustment                  |              |                           |            |                               |         | 0.059             |             |
| Adjusted CG                              |              |                           |            | 6.527f                        | 0.000   | 1.680             |             |
| Distances in METERS.                     |              |                           |            |                               |         | Moments in M.-MT. |             |
| HYDROSTATIC PROPERTIES                   |              |                           |            |                               |         |                   |             |
| Trim: Fwd 0.03 deg., No Heel, VCG = .621 |              |                           |            |                               |         |                   |             |
| LCF                                      | Displacement | Buoyancy-Ctr.             | Weight/    |                               | Moment/ |                   |             |
| Draft                                    | Weight(MT)   | LCB                       | VCB        | CM                            | LCF     | Deg trim          | GML GMT     |
| 1.273                                    | 26.92        | 6.528f                    | 0.889      | 0.44                          | 5.935f  | 8.51              | 18.12 1.060 |
| Distances in METERS.                     |              | Specific Gravity = 1.000. |            |                               |         | Moment in M.-MT.  |             |
| Draft is from Baseline.                  |              |                           |            | True Free Surface included.   |         |                   |             |
| AT MAXIMUM LOADED DISPLACEMENT           |              |                           |            |                               |         |                   |             |

Roll angle = 25.74 degrees.

| <b>RESIDUAL RIGHTING ARMS vs HEEL ANGLE</b>    |  |  |  |  |  |  |  |
|------------------------------------------------|--|--|--|--|--|--|--|
| Total CG: LCG = 6.527f TCG = 0.000 VCG = 1.621 |  |  |  |  |  |  |  |
| Free Surface Adjustment: 0.059 Adjusted        |  |  |  |  |  |  |  |
| CG: LCG = 6.527f TCG = 0.000 VCG = 1.680       |  |  |  |  |  |  |  |

| Origin<br>Depth | Degrees of<br>Trim | Heel   | Displacement<br>Weight(MT) | Residual Arms<br>in Trim | in Heel | Area    | Flood<br>Pt<br>Height |
|-----------------|--------------------|--------|----------------------------|--------------------------|---------|---------|-----------------------|
| 1.092           | 0.39f              | 20.14p | 26.92                      | 0.000                    | 0.390p  | 0.0000  |                       |
| 1.171           | 0.23f              | 15.14p | 26.92                      | 0.000                    | 0.336p  | -0.0317 |                       |
| 1.228           | 0.11f              | 10.14p | 26.92                      | 0.000                    | 0.270p  | -0.0582 |                       |
| 1.260           | 0.05f              | 5.14p  | 26.92                      | 0.000                    | 0.193p  | -0.0785 |                       |
| 1.270           | 0.03f              | 0.14p  | 26.92                      | 0.000                    | -0.105s | -0.0916 |                       |
| 1.261           | 0.04f              | 4.86s  | 26.92                      | 0.000                    | -0.016s | -0.0969 | 2.193 (1)             |
| 1.258           | 0.05f              | 5.60s  | 26.92                      | 0.000                    | -0.004s | -0.0971 | 2.173 (1)             |
| 1.257           | 0.05f              | 5.86s  | 26.92                      | 0.000                    | 0.000s  | -0.0971 | 2.166 (1)             |
| 1.230           | 0.10f              | 9.86s  | 26.92                      | 0.000                    | 0.061s  | -0.0949 | 2.058 (1)             |
| 1.175           | 0.22f              | 14.86s | 26.92                      | 0.000                    | 0.127s  | -0.0866 | 1.917 (1)             |
| 1.097           | 0.38f              | 19.86s | 26.92                      | 0.000                    | 0.182s  | -0.0730 | 1.774 (1)             |
| 0.997           | 0.57f              | 24.86s | 26.92                      | 0.000                    | 0.227s  | -0.0551 | 1.629 (1)             |
| 0.881           | 0.79f              | 29.86s | 26.92                      | 0.000                    | 0.257s  | -0.0338 | 1.478 (1)             |
| 0.757           | 1.01f              | 34.86s | 26.92                      | 0.000                    | 0.265s  | -0.0109 | 1.317 (1)             |
| 0.725           | 1.06f              | 36.11s | 26.92                      | 0.000                    | 0.264s  | -0.0051 | 1.274 (1)             |
| 0.628           | 1.22f              | 39.86s | 26.92                      | 0.000                    | 0.255s  | 0.0120  | 1.144 (1)             |
| 0.497           | 1.41f              | 44.86s | 26.92                      | 0.000                    | 0.230s  | 0.0332  | 0.961 (1)             |
| 0.364           | 1.59f              | 49.86s | 26.92                      | 0.000                    | 0.193s  | 0.0517  | 0.769 (1)             |
| 0.361           | 1.59f              | 50.00s | 26.92                      | 0.000                    | 0.191s  | 0.0522  | 0.763 (1)             |
| 0.232           | 1.73f              | 54.86s | 26.92                      | 0.000                    | 0.146s  | 0.0666  | 0.569 (1)             |
| 0.103           | 1.83f              | 59.86s | 26.92                      | 0.000                    | 0.095s  | 0.0772  | 0.361 (1)             |
| -0.018          | 1.88f              | 64.86s | 26.92                      | 0.000                    | 0.042s  | 0.0831  | 0.145 (1)             |
| -0.099          | 1.91f              | 68.20s | 26.92                      | 0.000                    | 0.004s  | 0.0845  | -0.000 (1)            |
| -0.108          | 1.91f              | 68.54s | 26.92                      | 0.000                    | 0.000s  | 0.0845  | -0.015 (1)            |
| -0.141          | 1.93f              | 69.86s | 26.92                      | 0.000                    | -0.016s | 0.0843  | -0.071 (1)            |
| -0.272          | 2.02f              | 74.86s | 26.92                      | 0.000                    | -0.079s | 0.0802  | -0.282 (1)            |

Distances in METERS. Specific Gravity = 1.000. 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 1.6 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 this moment (in M.-MT):  
Stbd heeling moment = 2.76

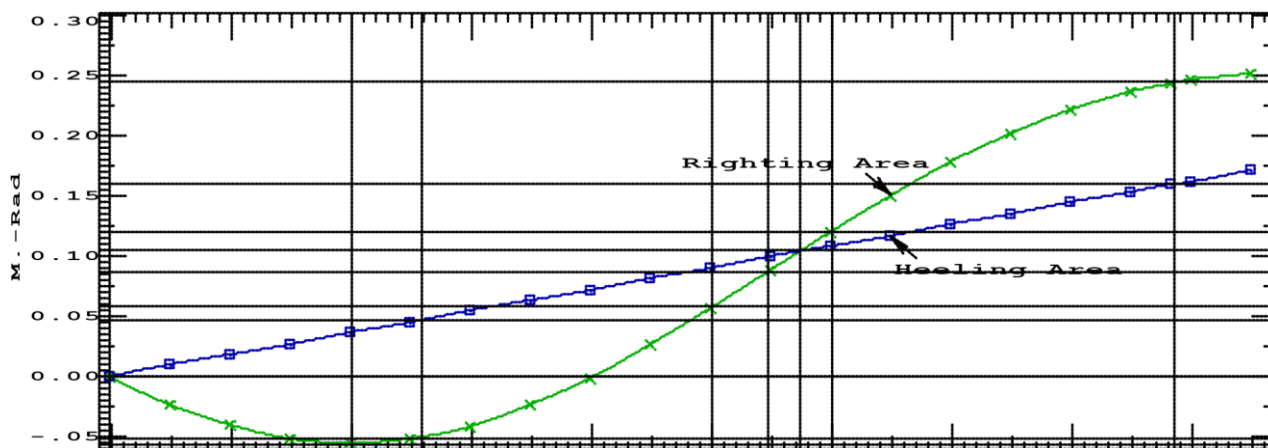
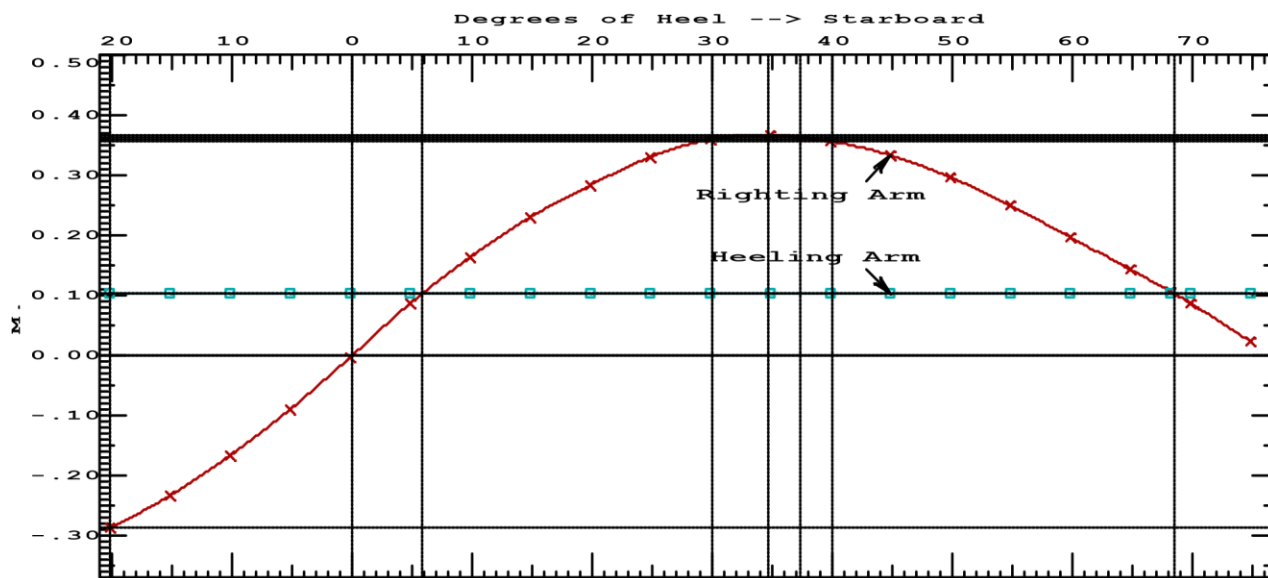
|     | Critical Point                               | LCP          | TCP      | VCP   |   |
|-----|----------------------------------------------|--------------|----------|-------|---|
|     | (1) ER VENTILATION PS                        | FLOOD 3.400f | 1.421    | 3.590 |   |
| LIM | STABILITY CRITERION                          | Min/Max      | Attained |       |   |
| (1) | Res. Ratio from Roll to abs 50 deg or Flood  | >            | 1.000    | 1.538 | P |
| (2) | Res. Area Ratio from Roll to RAzero or Flood | >            | 1.000    | 1.870 | P |

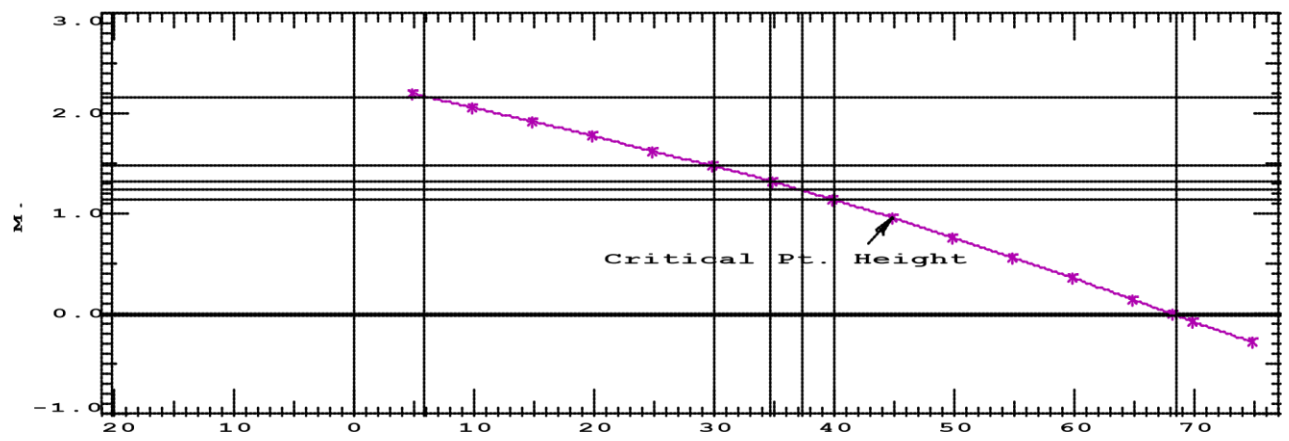
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## Appendix 7 – Basepoint Definition

Project : 5910

Date: 27/11/2007  
Revision : A

