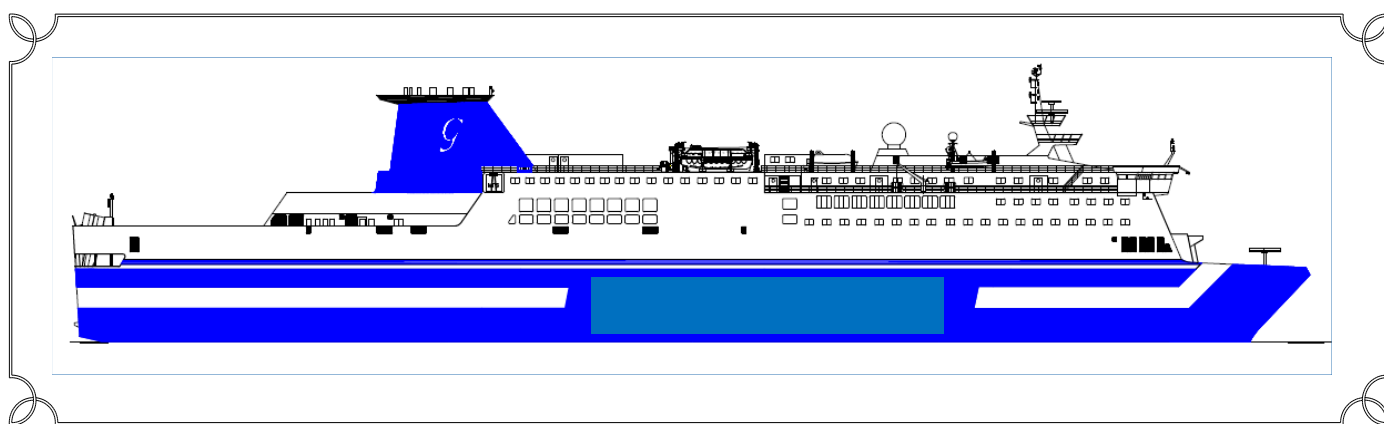


TRIM AND STABILITY BOOKLET

(including Loading Information)



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EXPLANATION OF ABBREVIATION USED IN THIS BOOKLET

FP	: Forward Perpendicular according to ILLC 1966
AP	: Aft Perpendicular according to ILLC 1966
f	: Shows forward from AP
a	: Shows aftward from AP
MT (or t)	: Metric tons
d	: Draught above baseline (m)
do	: Draught above baseline corresponding to the displacement (m)
DraftFP (dFP)	: Draught above baseline at "FP" (m)
DraftAP (dAP)	: Draught above baseline at "AP" (m)
DraftMS (dMS)	: Draught above baseline at Midship (m)
dM	: Draught mean above baseline (m)
t (or TRIM)	: Trim (m): (+) by stern, (-) by bow
V	: Moulded volume (m ³)
Disp.	: Displacement (MT)
Spgr. (or S.G.)	: Specific gravity (MT/m ³)
TPcm	: Tons per cm immersion (MT/cm)
MTcm	: Moment to change trim per cm (MT-m/deg)
Cb	: Block Coefficient
L.C.B.	: Center of buoyancy from aft perpendicular (m), (-) shows aft from aft perpendicular, (+) shows forward from aft perpendicular.
L.C.F.	: Center of floatation from aft perpendicular (m)
KMT	: Transverse metacentric height above baseline (m)
KML	: Longitudinal metacentric height above baseline (m)
A	: Lateral area for wind pressure (m ²)
AL	: Area of Center line plane below water line (m ²)
Z	: Vertical distance of c.g. A and c.g. AL
V.C.G.	: Center of gravity above baseline (m)
L.C.G.	: Center of gravity from aft perpendicular (m)
KG	: Center of gravity of the whole ship above baseline (m)
KGo	: Center of gravity of whole ship above baseline with free surface correction (m)
GM(solid) or GM	: Initial transverse metacentric height without free surface correction (m)
F/S Cor or GG ₀	: Free surface correction due to liquid in tank (m)
FSMt	: Transversal free surface moment (MT-m)
FSMI	: Longitudinal free surface moment (MT-m)
GM(fluid) or G ₀ M	: Initial transverse metacentric height with free surface correction (m)
GZ (or G ₀ Z)	: Righting lever (m)
θ	: Heeling angle (degree)
θ _f	: Flooding angle (degree)
θ _U	: The less angle of 40 degree or flooding angle (degree)
θ _{max}	: The angle corresponding to max. value of GZ curve (degree)
I _x	: Transverse moment of inertia of free surface (m ⁴)
lw ₁	: The heeling moment lever caused by steady wind (m)
lw ₂	: The heeling moment lever caused by gust wind (m)
θ ₀	: The heeling angle heel cause by steady wind (degree)
θ ₁	: The rolling angle due to wave action (degree)
θ ₂	: The heeling angle to be taken of whichever the least, θ _f , 50° or θ _c
θ _c	: Heeling angle at second intersection point between 1,5 lwl lever and stability curve

PREFACE

This booklet is composed of Stability Information and Loading Manual.

Stability Information contains necessary data and information to determine the scheme of loading from the viewpoint of stability while the Loading Manual from the viewpoint of hull strenght.

All the calculations in this manual have been performed using an electronic calculator.

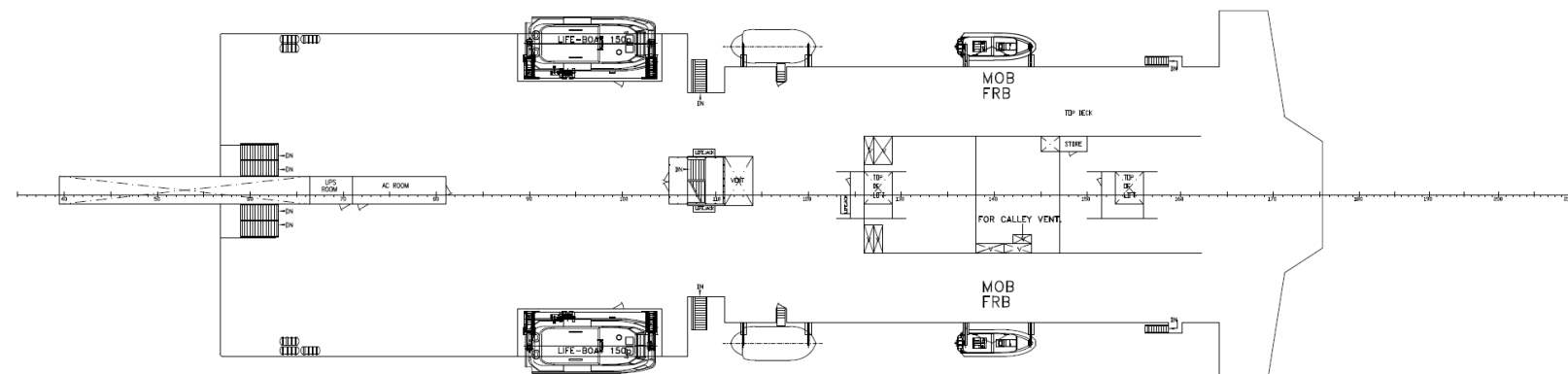
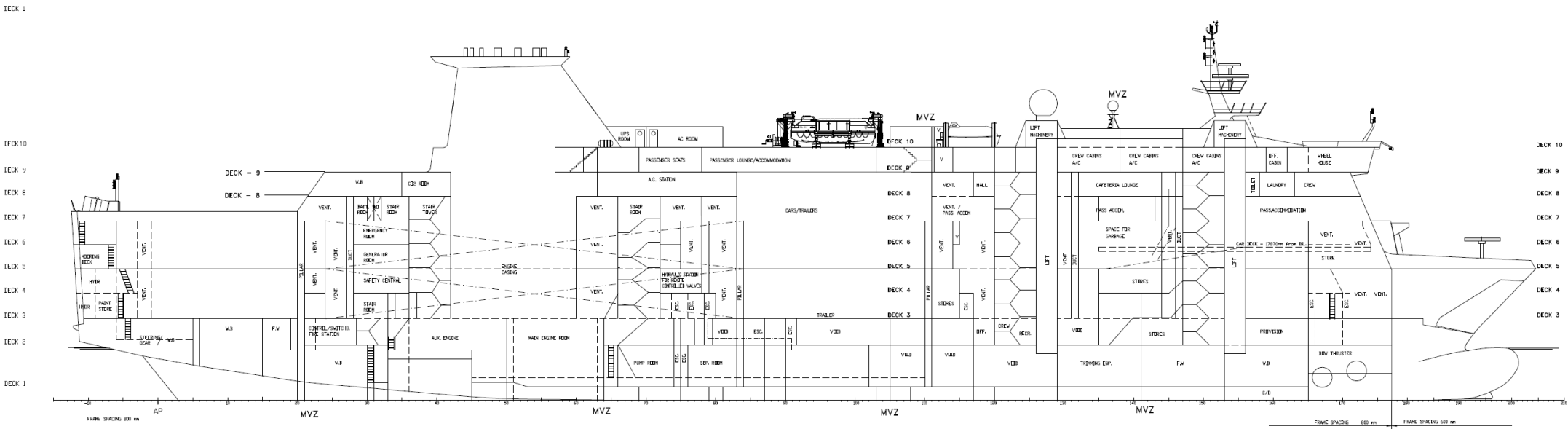
This booklet is to be placed on board the vessel and, if required, must be produced for inspection by the appropriate Authorities at port of landing.

The Stability Calculations, have been carried out referring to "Inclining Test report" approved by RINA on 17-07-2013 with n. CDST0000013236.

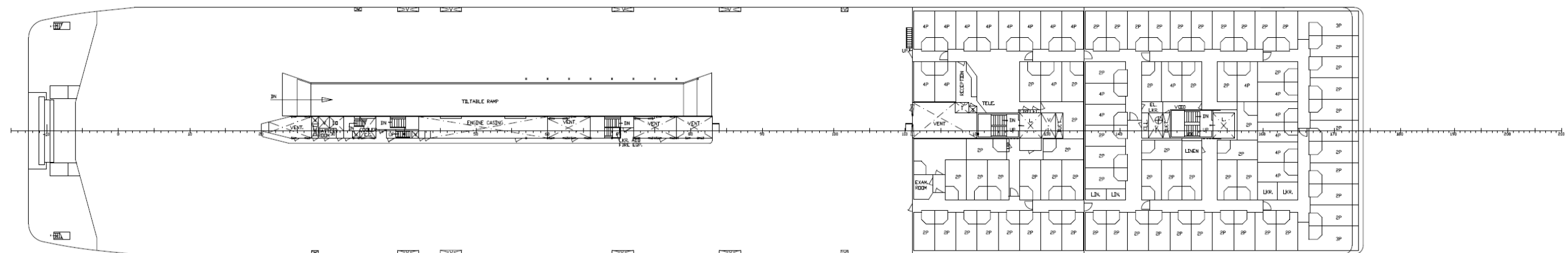
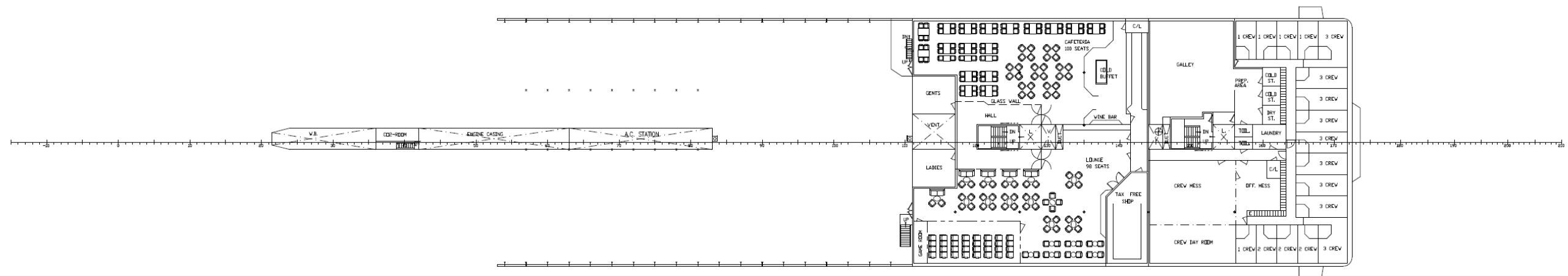
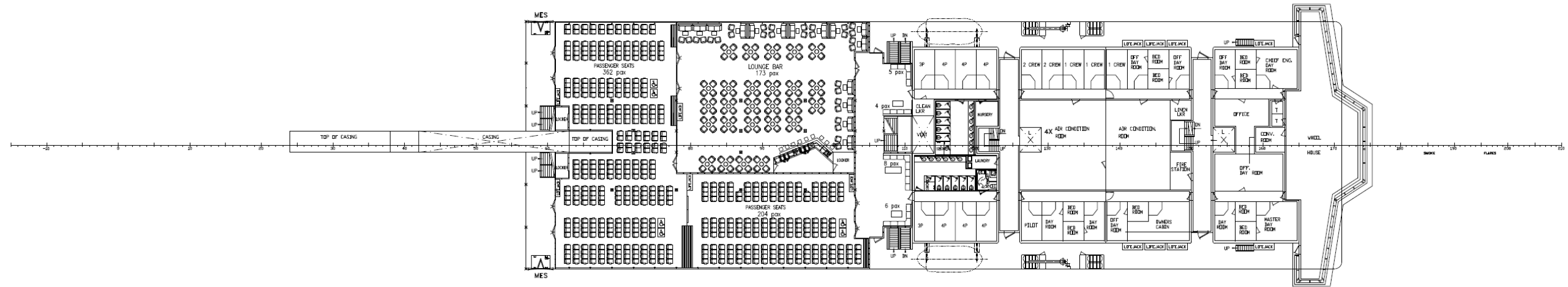
1. GENERAL

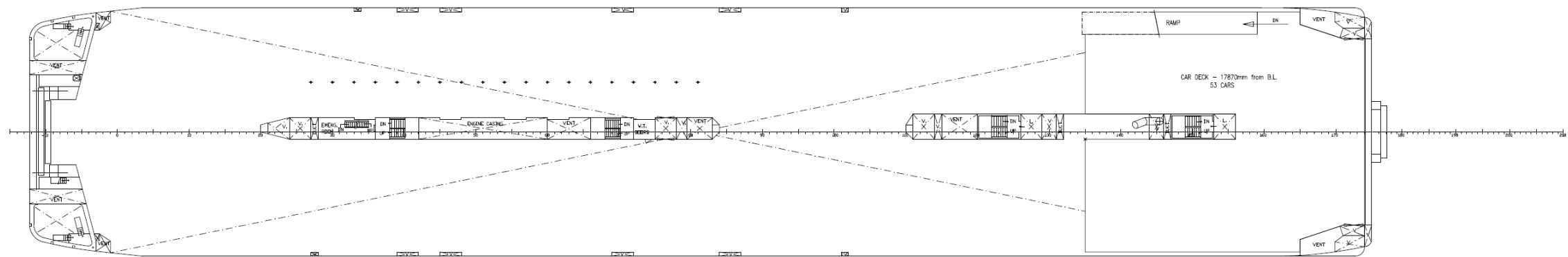
1.2 Principal Dimensions

Length Overall	168.00m
Length Between Perpendiculars	150.00 m
Breadth Molded	27.70 m
Depth Molded (Deck 3)	9.30 m
Summer Draft	6.50 m
Displacement (at summer draft)	17690 t

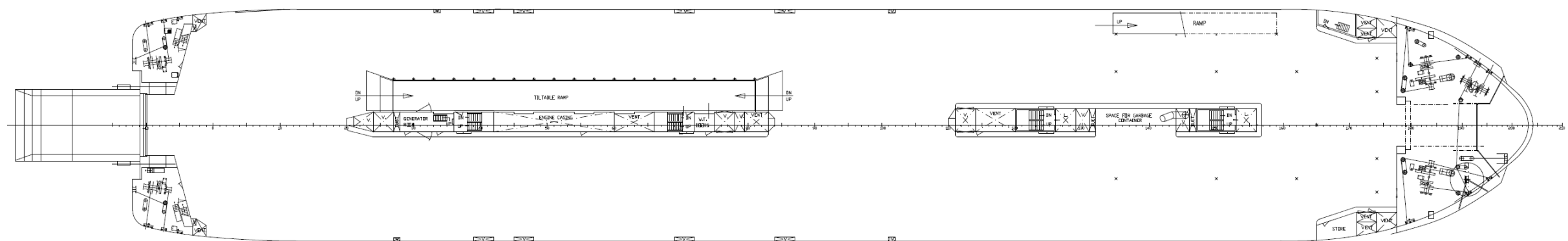


DECK – 10

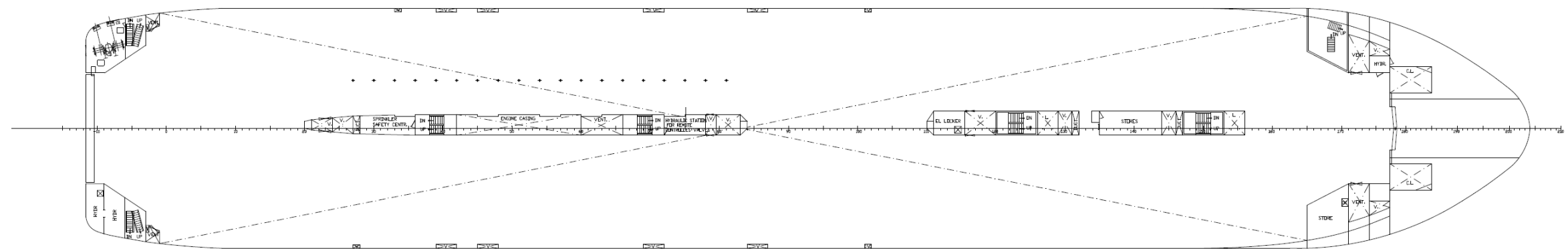




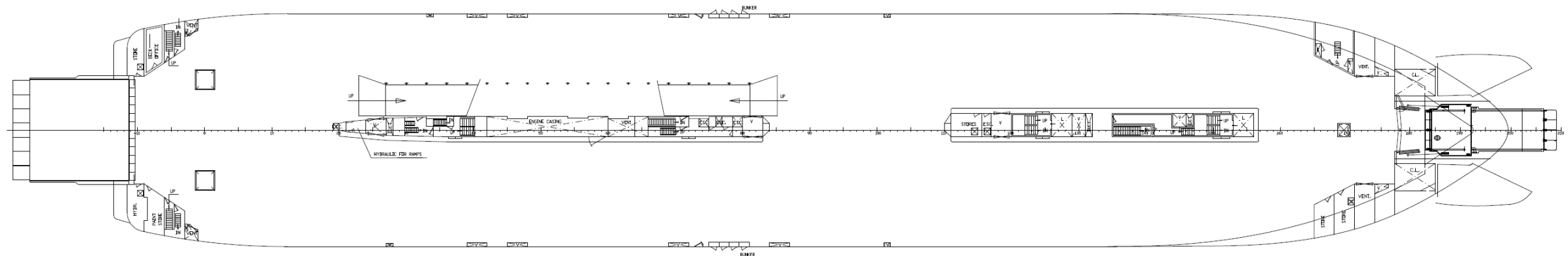
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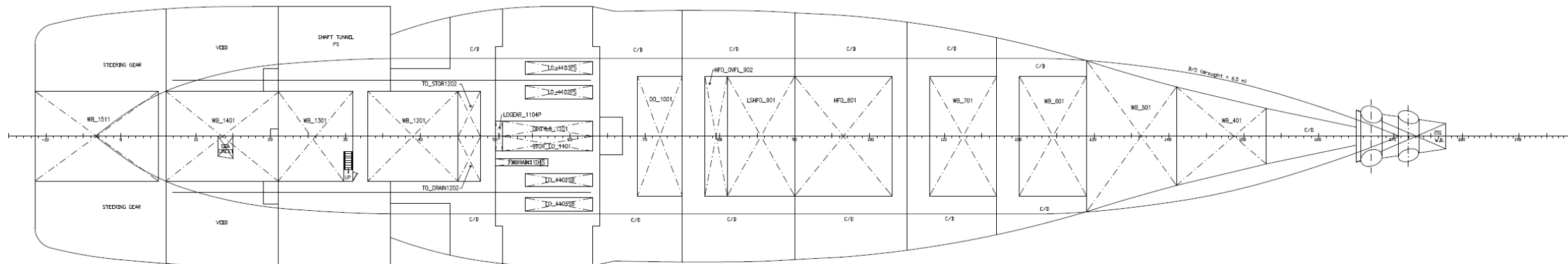
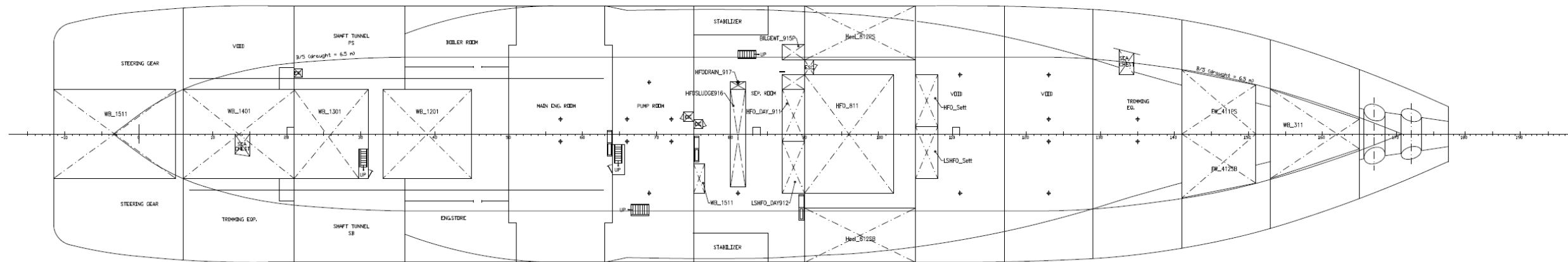
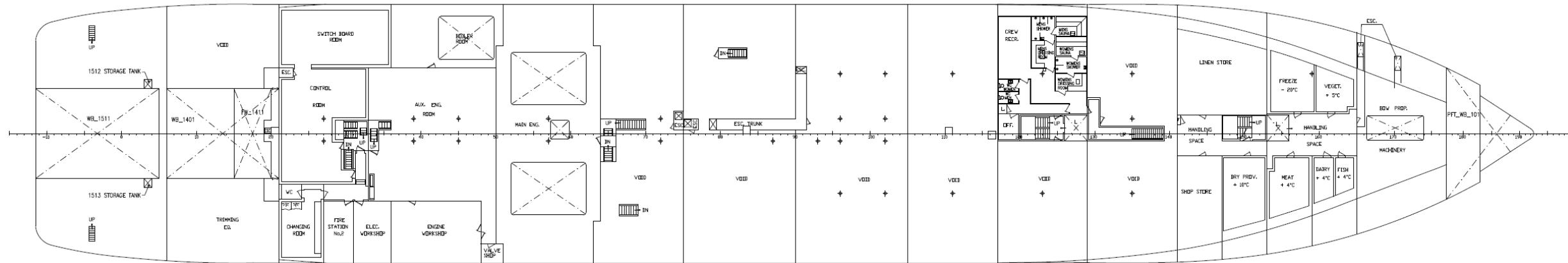
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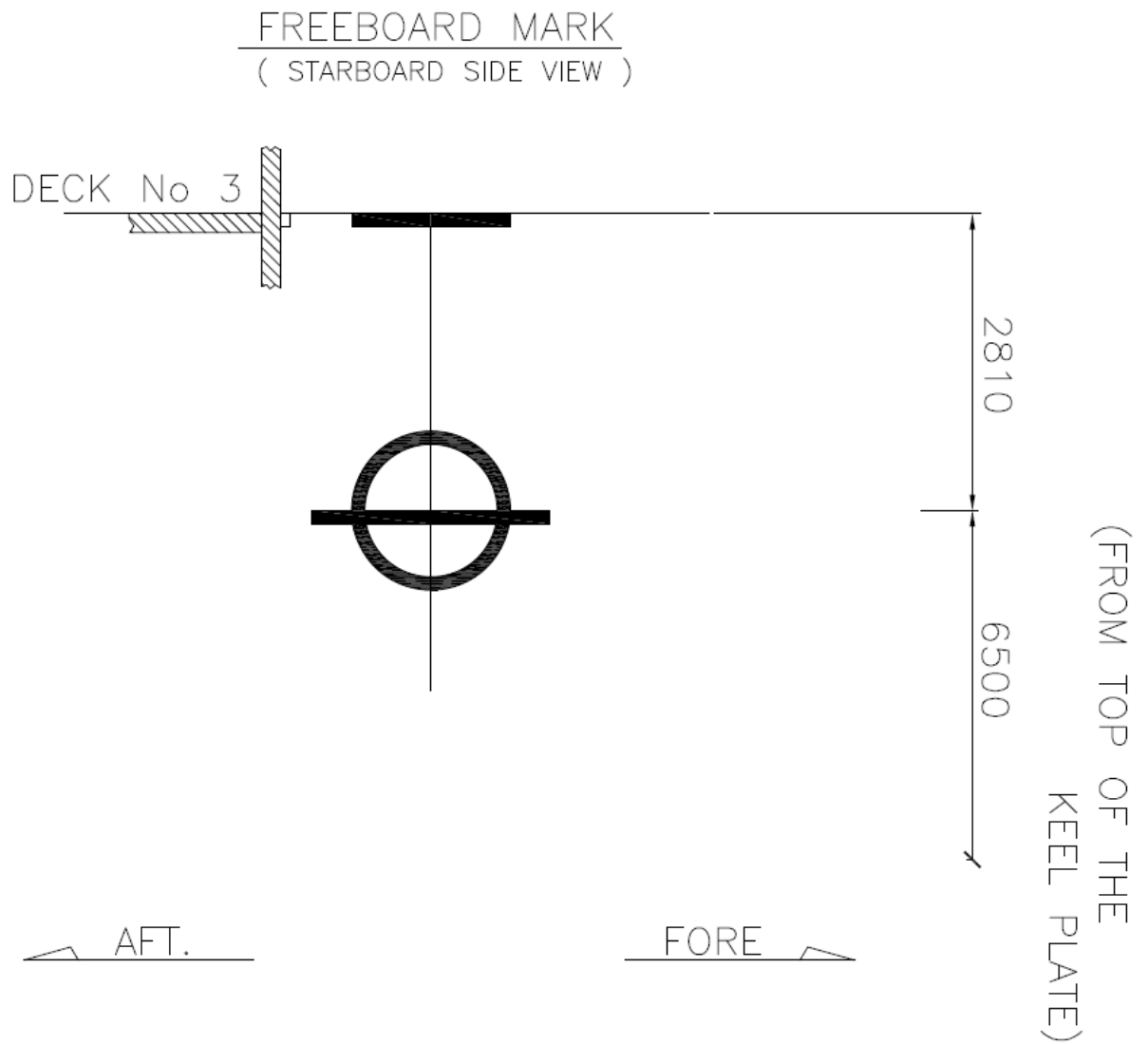
DECK - 4



DECK - 3



1.4 Freeboard mark



1.5 Results of Inclining Test

Lightship Weight:	11244.06	t	
LCG	70.05	m	from A.P.
TCG	0.00	m	
VCG	13.381	m	

2. MASTER'S INSTRUCTION

2.1 General

1. The master of the vessel should entirely read this booklet and be well familiar with characteristic of the vessel before placing it into service. Any ignorance of the instructions in this booklet may jeopardize the safety of both vessel and persons on board.
2. This booklet is made for the guidance to the master in order to have safe operation and proper loading of the vessel.
3. This booklet contains necessary data and instructions for arranging passengers, cargoes, oil fuel, water ballast, etc. in such a way that the vessel can maintain sufficient stability in any service loading condition.
4. The vessel is designed to be suitable for short international voyages carrying passengers, cars and trailers.

2.2 Stability Guidance

The loading conditions given in this booklet are sample conditions, as required by Regulations, just to illustrate the features of the vessel representing the whole range of operation. Of course they comply with Regulations that are required for the ship.

In general they are:

- Freeboard
- Longitudinal strength
- Intact and damage stability criteria

An existing loading condition that differs from those in this booklet should be investigated to check whether these criteria are met. This can be done with the aid of a loading computer which can get reliable results. However if the computer fails or what ever happens that precludes its usage, then the following should be done:

- Freeboard check can be done by reading of draft marks;
- Longitudinal strength and immersion angle of openings can not be determined with the aid of this manual;
- For checking the stability there are two possibilities: The easiest way is to determine the center of gravity, correcting it by the effect of free surfaces, if any, and see whether this value is in the acceptable zone of diagrams in chapter "4.6 Stability Limiting Curves and Tables". This diagram takes into account intact, damage and windage stability. Alternatively, in case of doubt or if otherwise required, a curve of righting arms can be calculated and drawn to check intact stability criteria (see chapter "3.2 Trim and Stability Calculation"). Damage stability can be checked via required KGmin values (see chapter "4.6 Stability Limiting Curves and Tables").

2.3 Precautions against capsizing and notice on operation of the ship

1. The compliance with the required minimum stability criteria does not insure immunity against capsizing, regardless of the circumstances, or absolve the Master from his responsibilities. Master should therefore exercise prudence and good seamanship, having regard to the seasons of the year, weather forecast, the navigation zone, and should take appropriate action as to speed and course warranted by the prevailing circumstances as well as **SOLAS Regulation** for subdivision and damage stability.
2. Care should be taken to ensure that cargo, allocated to the ship is capable of being stowed, so that compliance with the stability criteria can be achieved. If necessary, the amount of cargo should be limited considering that some ballast weight may be required.
3. Before a voyage commences, care should be taken to ensure that the cargo and sizeable pieces of equipment have been properly stowed or lashed throughout all navigation in order to maintain the expected stability.
4. The number of partially filled or slack tanks should be kept to a minimum because of their adverse effect on stability. ***Free surface of liquids in tanks should be minimized as far as possible.***
5. The stability criteria used set minimum values, but no maximum values are recommended. It is advisable to avoid excessive values of metacentric height, since it might lead to acceleration forces which could be prejudicial to the ship, its complement, its equipment and to safe carriage of the cargo. Slack tanks may, in exceptional cases, be used as a mean of reducing excessive values of metacentric height. In such cases, due consideration should be given to sloshing effects.
6. Weathertight or watertight closing devices such as doors, hatches, etc. must be kept closed during navigation.
7. Master should note that stability can be adversely affected by such influences as beam wind on ships with large windage area, icing on top sides and deck cargo, water trapped on deck and in deck cargo, rolling characteristics and following seas.
8. Stability for all standard loading condition is in the allowable range, but in case of other loading condition that might significantly differ from those of this booklet, it is necessary to check the stability before leaving.

2.4 Loading Criteria and Instruction

The standard loading conditions reported in this booklet cover all normal conditions of trim, stability and longitudinal strength. If the ship is in a loading condition different from those described in this manual, the master should comply with the criteria of stability and longitudinal strength in any condition. It is recommended to carefully follow the below instructions.

1) To comply with the criteria given by intact stability, damage stability (2 compartments) and Stockholm Agreement (with a significant wave height of 4.00 m) the ship must be loaded in such a way to have the condition VCG, corrected for the free surface effect due to partially full tanks, always lower than the Max VCG curves given at the end pages of this manual.
To comply with these curves, **in any loading condition the ship must have the Heeling Tanks 812 PS and 812 SB always full at least at 50% of their capacity.**

2) To minimize as much as possible the adverse effect on stability of the free surfaces it must be avoided to have all the tanks and especially the HFO tanks partially full all at the same time.

Therefore the **HFO must be taken at first from the HFO 811 tank and then, once completely empty, it can be allowed the transfer from the HFO 801 tank or vice-versa.**

3) In all the loading conditions where the number of passengers is such that, in case of a ship evacuation the use of the MES is necessary, **it is to be checked that the distance from the PS/SB MES to the sea surface is always less than 20 m during the voyage.**

In the present booklet this check is made verifying that the two ideal points placed at 20 m distance below the PS/SB MES and below reported are, for the considered loading condition, under the water.

Name:	MES Height Limiting Point PS/SB
Longitudinal:	47.200 m fwd of Aft Perpendicular
Transverse:	13.850 m off center line PS/SB
Vertical:	5.900 m above base line

4) Shell doors to the ro-ro spaces such as crew entries, bow and stern ramps, pilot doors etc. are to be closed and secured before the vessel goes to sea.

5) As shown in the “*Watertight Subdivision Plan*”, the ship has watertight bulkheads at the following positions:

Frames: 6, 21, 33/36, 50/51, 63/64, 75, 90, 105, 117, 129, 141, 153, 165 and 177.

6) The ship has the following openings, which must be kept closed at sea:

Watertight doors:

- Deck No 1: frames 64, 75 and 90.
- Deck No 2: frames 33, 51, 129, 153 and 165.

Doors to stairs leading below the 3rd deck:

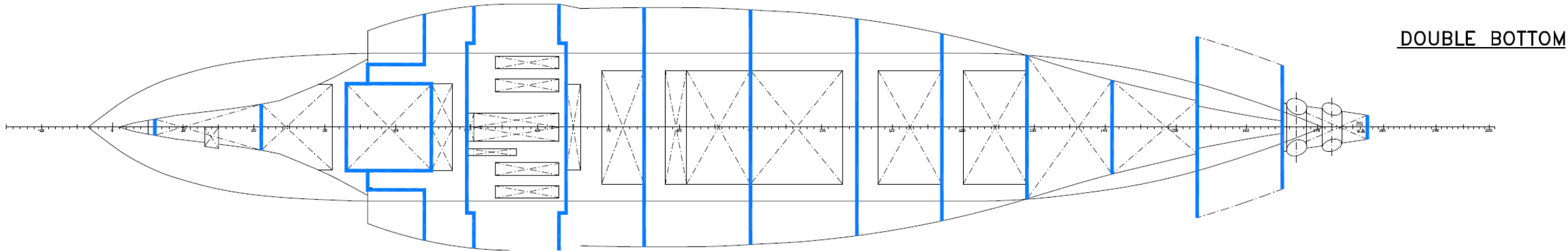
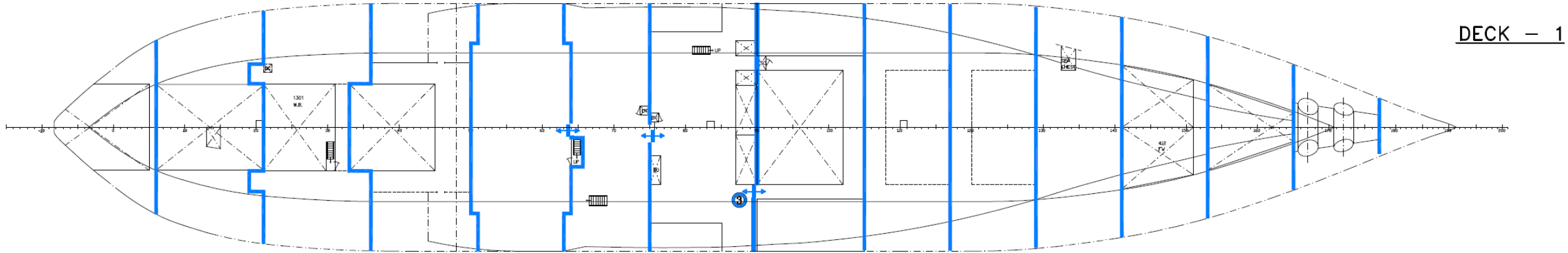
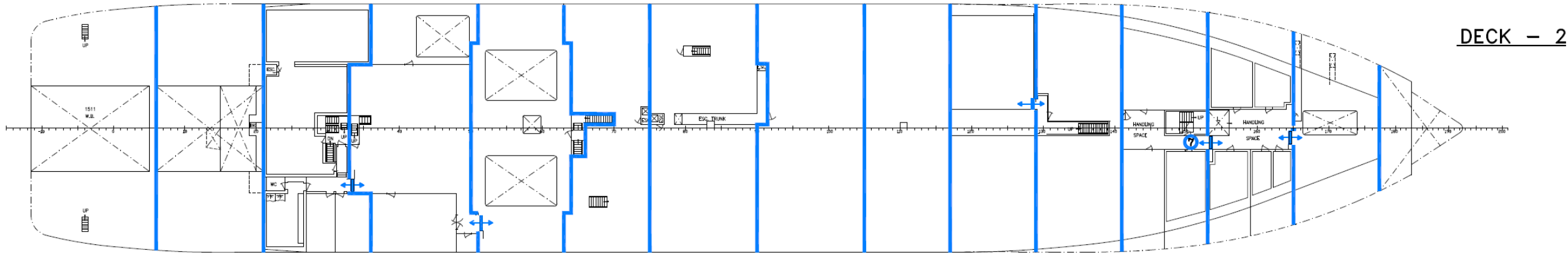
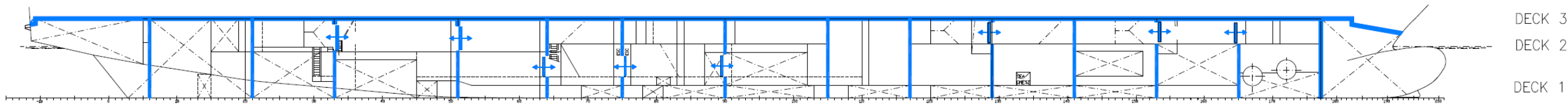
- Hinged door in sidecasing aft PS frame 5, deck 3.
- Hinged door in sidecasing aft SB frame 5, deck 3.
- Hinged door in center casing PS frame 32, deck 3.
- Sliding door in center casing SB frame 37, deck 3.
- Hinged door to engine casing DB frame 58, deck 3.
- Hinged door in center casing PS frame 70, deck 3.
- Sliding door in center casing SB frame 71, deck 3.
- Hinged door in center casing PS frame 116, deck 3.
- Sliding door in center casing PS & SB frame 125, deck 3.
- Hinged door in center casing frame 135, deck 3.
- Sliding door in center casing PS & SB frame 152, deck 3.
- Hinged door in center casing frame 157, deck 3.

Doors to escape trunks:

- Hinged door in sidecasing fwd PS frame 166, deck 3.
- Hinged door in sidecasing fwd PS frame 170, deck 3.
- Hinged door frame 91.5, deck 2.

2.5 Watertight subdivision plan

LONGITUDINAL SECTION



2.6 Stability Criteria and Evaluation

The following stability criteria are recommended by **IMO (Resolution A.749(18))**

- (a) A_1 is to be not less than 0.055 m-rad.
- (b) A_2 is to be not less than 0.03 m-rad.
- (c) $(A_1 + A_2)$ is to be not less than 0.09 m-rad.
- (d) GZ at angle 30° is to be at least 0.2m.
- (e) θ_{max} is to be preferably exceeding 30° but not less than 25° .
- (f) GoM is to be not less than 0.15 m.

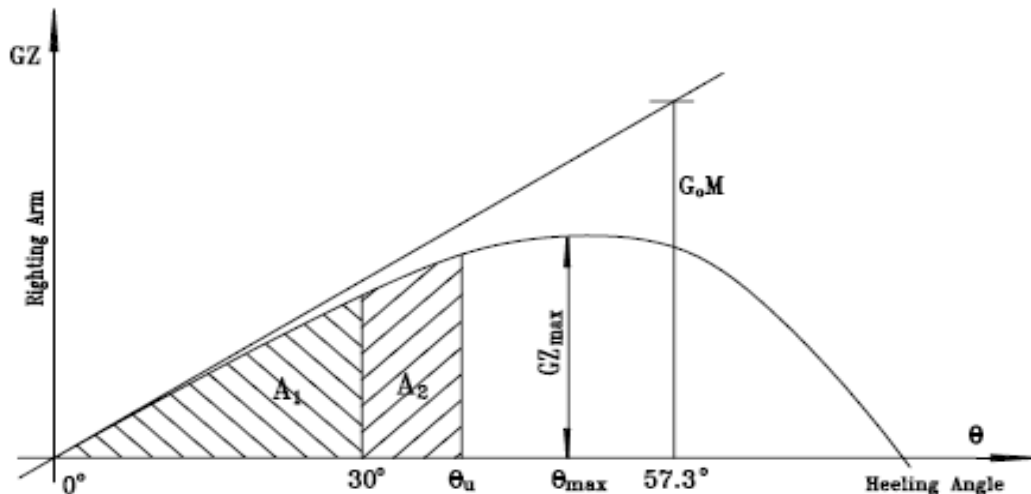


Fig.1 Stability Curve (General Stability Requirements)

- A_1 = Area under stability curve between 0° and 30° (m-rad)
- A_2 = Area under stability curve between 30° and θ_u (m-rad)
- θ_u = Heeling angle ($^\circ$) to be taken the lesser of 40° and the downflooding angle
- G_{zmax} = Maximum righting lever (m)
- θ_{max} = Heeling angle at which righting arm reaches maximum ($^\circ$)
- GoM = Initial metacentric height corrected by free surface effect (m)

In case of ships with a particular design, if θ_{max} is less than 25° may be adopted the following additional criteria:

- (e') θ_{max} is not to be less than 15°
- (e'') Area under stability curve is not to be less than the value A , calculated as follow

$$A = 0.055 + 0.001 \cdot (30^\circ - \theta_{max})$$

Stability Requirement in Wind and Waves

Stability Curves and wind-heeling moment lever curves of the ship are to comply with the following requirement in Fig.2

- (a) Heeling angle caused by steady wind is to be less than 16° or an angle corresponding to 80% of immersing angle of deck edge, whichever is less, in general, deck edge means the point of intersection between the continuation of top of freeboard deck at ship's side of lowest point of freeboard deck and the outside of side shell.
- (b) Area "b" is to be not less than area "a".

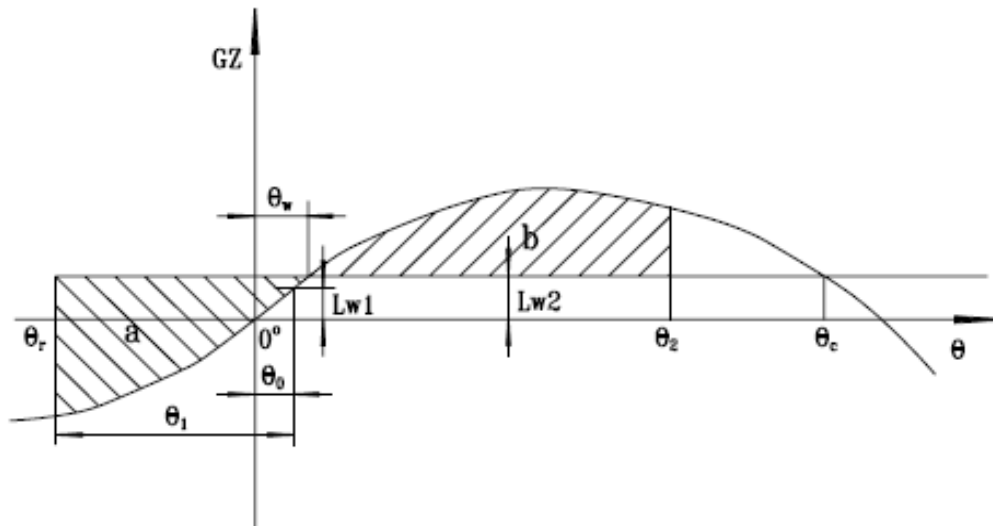


Fig.2 Stability and Wind-heeling Moment Lever Curve
(Stability Requirement in Wind and Waves)

where: $lw1$ = Heeling moment lever caused by steady wind (m) given by the following formula:

$$lw1 = 0.0514 \times A \times Z / D$$

A = Projected lateral area of hull and cargoes on deck above waterline (m^2)

Z = Vertical distance between the center of " A " and the center of underwater projected lateral area of hull (m). In general, the center of underwater projected lateral area may be approximated to locate at half of the draught.

D = displacement (ext.) (t)

$lw2$ = Heeling moment lever caused by gust (m) given by the following formula: $lw2 = 1.5 lw1$

a = Area encircled by stability curve, $lw2$ and θ_r (m-rad)

b = Area encircled by stability curve, $lw2$ and θ_2 (m-rad)

θ_r = Angle of rolling stop motion ($^\circ$). In general, it may be given by the formula $(\theta_0 - \theta_1)$

θ_c = Heeling angle at the second intersection between heeling moment lever and stability curve ($^\circ$)

θ_2 = Heeling angle ($^\circ$) to be taken of whichever is least, downflooding angle, θ_c or 50° .

θ_0 = Angle of heel under action of steady wind (°)

θ_1 = Angle of roll to windward due to wave action (°) given by the following formula:

$$\theta_1 = 109kX_1X_2 (rs)^{1/2}$$

X_1 = Values obtained from Table 1 according to the value of B/d' . In case the value of B/d becomes intermediate, value are to be determined by interpolation.

B = Moulded breadth of the ship (m)

d' = Corresponding draught of the ship (mld.) (m)

Table 1 values of factor X_1

B/d	≤ 2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	3.2	3.4	≥ 3.5
X_1	1.00	0.98	0.96	0.95	0.93	0.91	0.90	0.88	0.86	0.82	0.80

X_2 = Values obtained from Table 2 according to C_b .
In case C_b becomes intermediate, values are to be determined by interpolation.

C_b = Block coefficient given by the following formula: $D/(1.029 L'Bd')$

L' = Length at waterline (m)

Table 2 values of X_2

C_b	≤ 0.45	0.50	0.55	0.60	0.65	≥ 0.70
X_2	0.75	0.82	0.89	0.95	0.97	1.00

L' = Length at waterline (m)

K = Values determined as follows:

(a). For round-bilged ships having neither bilge keels nor bar keels : 1.0

(b). For ships with sharp bilges : 0.7

(c). For ships with bilge keel and/or bar keels :

Values obtained from Table 3 according to the value of $100A_k / L'B$.

In case $100A_k / L'B$ becomes intermediate, values are to be determined by interpolation.

A_k = Total area of bilge keels, projected lateral area of bar keels or sum of those areas (m^2).

Table 3 values of factor K

$100A_x/L'B$	0	1.0	1.5	2.0	2.5	3.0	3.5	≥ 4.0
K	1.0	0.98	0.95	0.88	0.79	0.74	0.72	0.70

r = Values obtained from the following formula. However, the value of r need not be taken over than 1.0.

$$r = 0.73 + 0.6OG/d'$$

OG = Distance between the center of gravity and the waterline (m), and is taken as positive when the center of gravity is above waterline.

s = Values obtained from Table 4 according to the value of T.

In case T becomes intermediate, values are to be determined by interpolation.

Table 4 values of factor s

T	≤ 6	7	8	12	14	16	18	≥ 20
s	0.100	0.098	0.093	0.065	0.053	0.044	0.038	0.035

Tr = Rolling period (sec.) obtained from the following formula.

$$Tr = [2B/(GoM)^{1/2}] (0.373 + 0.023B/d' - 0.043L'/100)$$

GoM = Initial metacentric height corrected by free surface effect (m)

Additional intact stability criteria

The following additional stability criteria are required for passenger ships and ro-ro passenger ships by the International Intact Stability Code.

Crowding of passengers

The angle of heel due to crowding of passengers on one side shall not exceed 10° .

To find the heeling moment due to the crowding of passengers the following assumptions are to be made:

- four persons per m^2 ;
- a mass of 75 kg for each passenger. This value may be reduced to not less than 60 kg where this can be justified;
- passengers are to be distributed on the available deck areas towards one side of the ship on the decks where muster stations are located and in such a way that they produce the most adverse heeling moment;
- the height of the centre of gravity for passengers is to be assumed equal to 1.0 m above the deck level for standing passengers (account may be taken, if necessary, of camber and sheer of deck), 0.30 m above the seat for seated passengers.

As shown in the calculation sketch the heeling moment due to crowding of passengers is

$$\text{HEELING MOMENT} = 914.8 \text{ tm}$$

Maximum turning angle

The angle of heel due to turning shall not exceed 10° when calculated using the following formula:

$$M_R = 0.02 \frac{V_0^2}{L_S} \Delta \left(KG - \frac{T_1}{2} \right)$$

where:

- M_R : Heeling moment, in t.m
- V_0 : Service speed, in m/s
- T_1 : Mean draught, in m
- KG : Height of centre of gravity above keel, in m.

To calculate M_R the speed is considered equal to 21.15 kn.

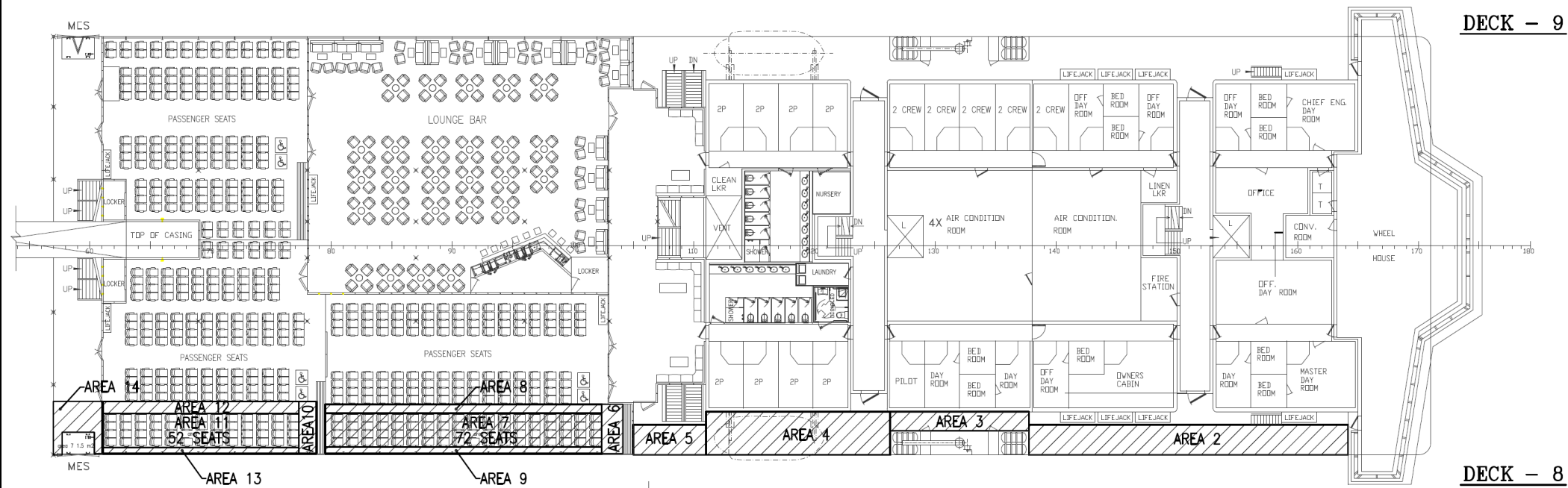
2.7 Longitudinal strength

In any loading condition the Still Water Bending Moment and Shearing Force must not exceed the maximum permissible values reported in the below table.

Allowable Still Water Bending Moment (Ms) in MT-m and Shearing Force (Fs) in MT

		<i>Bending Moment</i>		<i>Shearing Force</i>	
		<i>Seagoing Condition</i>		<i>Seagoing Condition</i>	
FR	X (m)	Ms (+) (MT-m)	Ms (-) (MT-m)	Fs (+) (MT)	Fs (-) (MT)
0	0.00	14801	-3998	972	-972
10	8.00	27265	-7364	1750	-1750
20	16.00	39729	-10731	1750	-1750
30	24.00	52193	-14097	1750	-1750
40	32.00	64657	-17464	1750	-1750
50	40.00	77122	-20830	1750	-1750
60	48.00	84600	-22850	1750	-1750
70	56.00	84600	-22850	1750	-1750
80	64.00	84600	-22850	1750	-1750
90	72.00	84600	-22850	1750	-1750
100	80.00	84600	-22850	1750	-1750
110	88.00	84600	-22850	1750	-1750
120	96.00	84600	-22850	1750	-1750
130	104.00	84600	-22850	1750	-1750
140	112.00	74247	-20054	1750	-1750
150	120.00	61307	-16559	1750	-1750
160	128.00	48366	-13064	1381	-1381
170	136.00	35425	-9568	1011	-1011
180	143.40	23455	-6335	670	-670
190	149.40	13750	-3714	393	-393

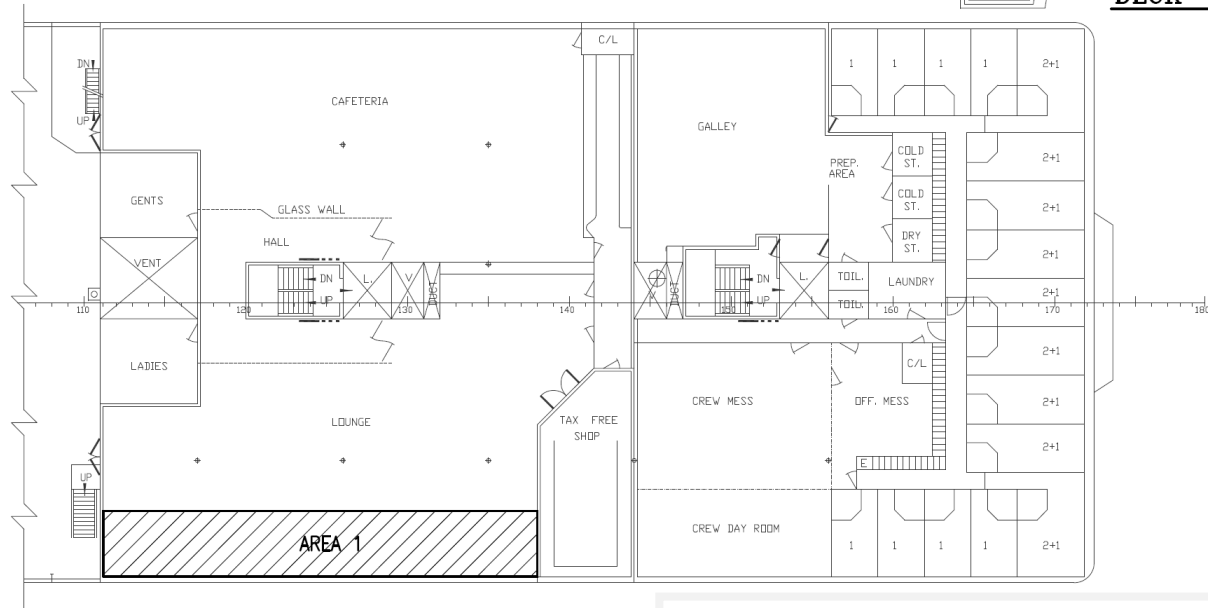
2.8 Heeling moment due to crowding of passengers



CALCULATIONS ACCORDING TO RINA RULES 2009

NAME	AREA [m ²]	N° PAX	WEIGHT [kg]	TCG [m]	MS [t+m]	VCG [m]
Area 1 deck 8	69.71	279	20913	11.92	249.3	24.3
Area 2 deck 9	42.26	169	12678	12.85	162.9	27.1
Area 3 deck 9	11.47	46	3441	11.85	40.8	27.1
Area 4 deck 9	34.77	139	10431	12.43	129.6	27.1
Area 5 deck 9	9.59	38	2877	12.85	37.0	27.1
Area 6 deck 9	4.59	18	1377	12.14	16.7	27.1
Area 7 deck 9	—	72	5400	12.21	65.9	27.1
Area 8 deck 9	10.80	43	3240	10.80	35.0	27.1
Area 9 deck 9	8.17	33	2451	13.55	33.2	27.1
Area 10 deck 9	3.97	16	1191	12.04	14.3	27.1
Area 11 deck 9	—	52	3900	12.22	47.7	27.1
Area 12 deck 9	10.31	41	3093	10.71	33.1	27.1
Area 13 deck 9	5.24	21	1572	13.57	21.3	27.1
Area 14 deck 9	8.13	33	2439	11.45	27.9	27.1

TOTAL	1000	75003		914.8	
ARM OF THE FORCE				12.19 m	
MOMENT DUE TO THE CROWDING OF PASSENGERS				914.8 t*m	



Description	CROWDING OF PASSENGERS CALUCATIONS for INTACT STABILITY
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3. CALCULATION METHOD FOR LOADING CONDITION

Hydrostatic data and Cross Curves of Stability are calculated for the ship even keel (trim=0). However they may be used also for the moderately heeled and trimmed ship. The inaccuracy arising is believed to be within reasonable limits.

On condition that the displacement should be determined by reading of draft marks, it becomes necessary to calculate an equivalent upright draft from the measured ones. This is the draft at LCF; which fits a slightly heeled and trimmed ship.

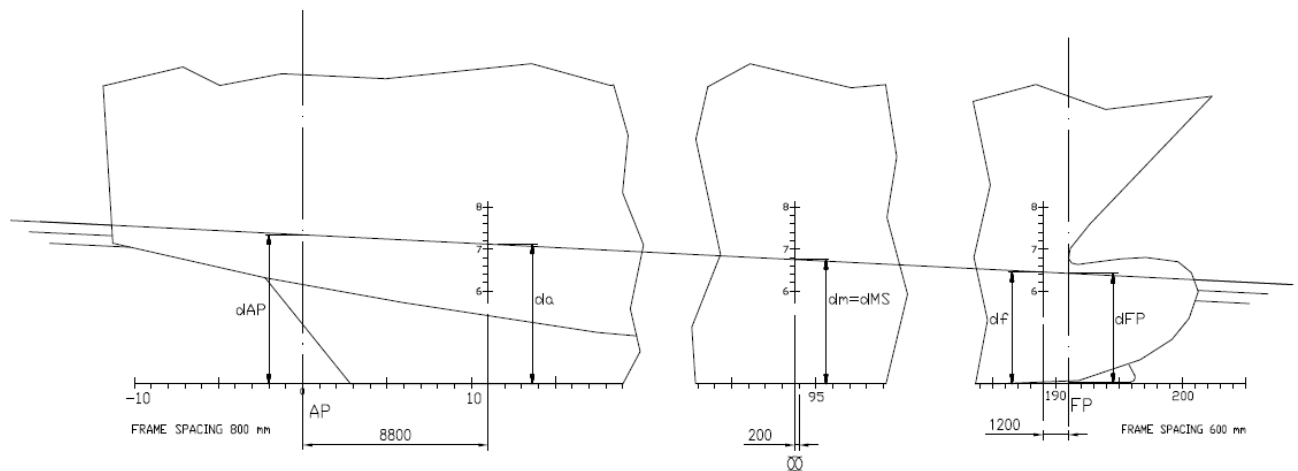
3.1 Displacement Calculation from Draft Reading

The ship's displacement can be calculated from the draft measured at fore, midship and aft draft marks using the following procedures and corrections:

1. Read the Draft at fore, midship and aft draft marks. (df, dm, da)

Draft mark position:

FORE	Fr.189
MID	Fr.94 – 200 mm
AFT	Fr. 11



Calculate the draught at "FP" (dFP), "AP" (dAP) and midship (dMS).

$$\begin{aligned}dFP &= df - [1.200 * ((da - df) / 140)] \\dMS &= dm \\dAP &= da + [8.800 * ((da - df) / 140)]\end{aligned}$$

Where:

df : fore draught at draft mark (m)
dm : mid draught at draft mark (m)
da : aft draught at draft mark (m)

dFP: fore draught at FP (m)
dMS: mid draught at midship (m)
dAP: aft draught at AP (m)

Trim (t), Mean draught above base line without deflection (dM), Mean draught (d) and Deflection (δd) are obtained as follows:

$$\begin{aligned} t &= dAP - dFP && \text{in meter} \\ dM &= (dAP + dFP) / 2 && \text{in meter} \\ d &= (dFP + 6*dMS + dAP) / 8 && \text{in meter} \\ \delta d &= dM - dMS && \text{in meter} \end{aligned}$$

Where:

dM : Mean draft without correction for deflection	t > 0 : Trim by stern
d : Mean draft with correction for deflection	t < 0 : Trim by bow
t : Trim	$\delta d > 0$: Hogging condition
δd : Deflection	$\delta d < 0$: Sagging condition

2. Displacement (D_1), Moment to change trim per cm (MTcm), Tons per cm immersion (TPcm) and Center of flotation (LCF) corresponding to **Mean draft corrected for deflection “d”** should be read from “HYDROSTATIC PROPERTIES”.

3. Displacement correction due to trim (D_2):

$$D_2 = [t * TPcm * 100 * (Lpp/2 - L.C.F.)] / Lpp \quad \text{in tons}$$

4. Displacement correction due to specific gravity of sea water (D_3):
When the specific gravity of sea water differs from standard of 1.025, displacement should also be corrected by following formula:

$$D_3 = (D_1 + D_2) * (S.G. - 1.025) / 1.025 \quad \text{in tons}$$

5. Final displacement will be determined as follows.

$$\text{Disp.} = D_1 + D_2 + D_3 \quad \text{in tons}$$

The calculations is made with use of “**DISPLACEMENT CALCULATION SHEET No1**”.

3.2 Trim and Stability Calculation

Ship's condition such as displacement, draft, trim and metacentric height etc. at departure and arrival shall be determined by following method.

The calculations is made with use of **"TRIM AND STABILITY CALCULATION SHEET No.1 to 4"**.

1. Put the "weight" of cargo, fuel oil, diesel oil, fresh water and ballast etc. into column (1), and also put the center of gravity of each loading weight above base line (V.C.G.) and from aft perpendicular (L.C.G.) into column (2) and (4) respectively.

V.C.G. and L.C.G. corresponding to loading weight for each tank or space are to be calculated from "Tank Capacity data" [par. 5.3] and from "Deadweight details" [par. 5.1] respectively.

2. Multiply the value in columns (1) and (2) (or (4)), put the results into column (3) (or (5)) as the vertical moment and longitudinal moment for each loading weight.
3. Put "FSMt" (free surface moment of each tank) into column (6).
FSMt corresponding to loading weight of each tank is also to be obtained from "TANK CAPACITY DATA".
4. The "total weight", vertical moment, longitudinal moment and free surface moment are to be put into each column in the **"TRIM AND STABILITY CALCULATION SHEET No.2"**. Then sum up the columns (1), (3), (5) and (6) respectively and the results of grand total are to be written in the bottom line. These figures mean displacement (Disp), vertical moment above base line, longitudinal moment about aft perpendicular and total of free surface effect of liquid in tanks respectively.
5. The **center of gravity** corresponding to the calculated condition can be obtained as follows.

$$V.C.G. = KG = \frac{(3)'}{(1)'} \quad \text{in meter}$$

$$L.C.G. = \frac{(5)'}{(1)'} \quad \text{in meter}$$

6. **Trim and draft** corresponding to the displacement are to be calculated as follows:

Trim :	$t = [\text{Disp.} * (L.C.G. - L.C.B.)] / (100 * MT_{cm})$	in meter
draft at FP :	$d_{FP} = d_o - t * [(L_{pp} - L.C.F.) / L_{pp}]$	in meter
draft at AP :	$d_{AP} = d_{FP} + t$	in meter
mean draft :	$dM = (d_{AP} + d_{FP}) / 2$	in meter

Where : d_o = draft corresponding to the displacement (m)

LCB = center of buoyancy from aft perpendicular at d_o (m)

LCF = Center of floatation from aft perpendicular at d_o (m)

MT_{cm} = moment to change trim 1 cm at d_o (MT-m/cm)

d_o , MT_{cm} , LCB and LCF correspond to the corrected displacement ($\text{Disp}' = \text{Disp} * S.G. / 1.025$) in "HYDROSTATIC PROPERTIES" when the specific gravity (Spgr) of seawater differs from standard of 1.025.

When the trim is positive, i.e. " d_{AP} " is greater than " d_{FP} ", the ship is trimmed by the stern, and when negative, trimmed by bow.

7. Ship's **initial metacentric height GoM** is calculated as follows:

$$GoM = GM \text{ (Fluid)} = GM - GGo \quad \text{in meter}$$

$$GM = GM (\text{Solid}) = KMT - KG \quad \text{in meter}$$

$$GGo = \Sigma (FSMt) / \text{Disp.} \quad \text{in meter}$$

Note: The value of FSMt for each tank are listed in "TANK CAPACITY DATA" with weight value calculated using following formula:

$$\text{weight} = (\text{tank full weight}) * (\% \text{ of fitting}) \quad \text{usually } \% = 0.95$$

Where:

- KMT : Transverse metacenter above base line corresponding to displacement in "HYDROSTATIC PROPERTIES".
- KG : Vertical position of center of gravity of the ship above base line (V.C.G) obtained from the result of "TRIM AND STABILITY CALCULATION SHEET No.2".
- $\Sigma (FSMt)$: total of free surface moment obtained from the result of "TRIM AND STABILITY CALCULATION SHEET No.2".
- GM : Metacentric height before correction of free surface effect.
- GGo : Free surface correction to the initial stability (the loss of GM due to the existence of free surface).
- GM : Initial metacentric height without correction due to free surface effect
- GoM : Initial metacentric height with correction due to free surface effect

8. Ship's **heeling angle** can be calculated as follows.

$$\text{Heeling angle} = \arctg (\Sigma(FSMt) / (\text{Disp} * GoM)) = \arctg (T.C.G./GoM) \quad \text{in degree}$$

9. Ship's **statical stability curve** (righting lever vs heeling angle) can be obtained by following method.

$$GZ = KN - KGo * \sin \theta \quad \text{in meter}$$

$$KGo = KG + GGo \quad \text{in meter}$$

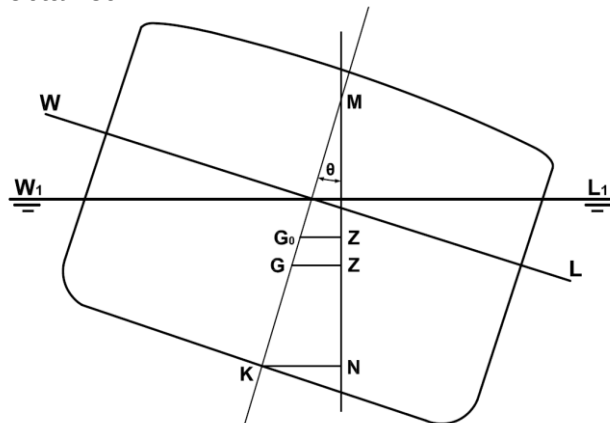
$$GGo = \Sigma (FSMt) / \text{Disp.} \quad \text{in meter}$$

Where:

- GZ : Righting lever
- KN : Righting lever when center of gravity of the ship is assumed on the base line (shown in "CROSS CURVE OF STABILITY").
- KG : Vertical position of center of gravity of the ship above base line (V.C.G) obtained from the result of "TRIM AND STABILITY CALCULATION SHEET No.2".
- KGo : Vertical position of center of gravity of the ship above base line with correction due to free surface effect.
- θ : Angle of inclination (degree).

10. Ship's **propeller immersion** is to be calculated according the PROPELLER TIP IMMERSION calculation sheet

Stability curve calculation to be performed using “**TRIM AND STABILITY CALCULATION Sheet No.3**” Plot point (GZ vs θ). GZ in ordinate and θ in abscissa, and connect these points by a fair curve. Thus the statical stability curve is obtained.



11. About free surface correction

For all loading conditions, the initial metacentric height and the righting lever curve should be corrected due to free surface of liquids in tanks.

For calculating the free surface effects in tanks containing consumable liquids, it should be assumed that each type of liquids at least one transverse pair or a single center line tank has a free surface and the tank or combination of tanks taken into account should be those where the effects of free surface is the greatest.

Where water ballast tanks are to be filled or discharged during the course of a voyage, the free surface effects should be calculated to take account of the most onerous transitory stage related to such operations. It assumes only one ballast tank or pair of tanks is allowed to have a free surface at any moment.

3.3 Method of Stability Evaluation

- Refer to “3.2 Trim and stability calculation (1)-(7)”.
Calculate the displacement (Disp), draught corresponding to the displacement (do), initial metacentric height with correction due to free surface effect (GoM) and etc. in actual loading condition.
- Refer to “3.2 Trim and stability calculation (10)”.
Draw the statical stability curve in actual loading condition.
- Refer to “2.7 (1) General Stability Requirements (IMO Resolution A.749(18))”.
Fill up “IMO A.749(18) Stability Criteria Calculation Sheet 1/3”.
Check if the requirements of General Stability Requirements (A.749(18)) are satisfied or not.
- Refer to “4.3 Wind Area Table”.
Find out the projected lateral area above the water line (A) and vertical distance (Z) from the center of (A) to the center of underwater lateral area. In case Disp. becomes intermediate values are to be determined by interpolation. Calculate I_{w1} and I_{w2} using “IMO A.749(18) Stability Criteria Calculation Sheet 2/3” and draw them in the statical stability curve.
- Refer to “2.7 (2) Stability Requirement in Wind and Waves (IMO Resolution A.749 (18))”.
Find out θ_0 , θ_w , θ_c (θ_w : Angle of heel under action of gust).
Find out θ_2 to be taken of whichever is least down flooding angle θ_f or 50° .
- Refer to “2.7 (2) Stability Requirement in Wind and Waves (IMO Resolution A.749(18))”.
Calculate θ_1 by “IMO A.749(18) Stability Criteria Calculation Sheet 2/3” and draw it in the statical stability curve.
- Fill up “IMO A.749(18) Stability Criteria Calculation Sheet 3/3”
- Check whether Stability Requirement in Wind and Waves (A.749(18)) are satisfied or not.

3.4 Blank Forms

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DISPLACEMENT CALCULATION SHEET

SHEET No.1/1

ITEM			FORE	MID.	AFT
Measured draft at draft mark In meter			Port side		
			Starb. side		
Mean Draft	[1]	Mean Draft (measured)	(df)	(dm)	(da)
	[2]	Apparent trim = da – df	m (by the stern)		
	[3]	Draft calculate at FP, midship and AP	(dFP)	(dMS)	(dAP)
	[4]	Factor	1	6	1
	[5]	[3] * [4]			
	[6]	Meadn draft d = $\Sigma[5] / 8$	m		
Disp.	[7]	Displacement at mean draft D_1 (from Hydrostatic table)	MT		
	[8]	Actual trim $t = dAP - dFP$	m (by the stern)		
	[9]	Correction due to trim D_2	MT		
	[10]	Disp. after correction by trim $(D_1 + D_2) = [7] + [9]$	MT		
	[11]	Measured S.G. of sea water	MT/m ³		
	[12]	Correction due to S.G. of sea water D_3	MT		
	[13]	Actual displacement Disp. = [10] + [12]	MT		

Where:

Trim : _____ (m)
 TPcm : _____ (MT/cm) (from Hydrostatic table)
 MTcm : _____ (MT-m/deg) (from Hydrostatic table)
 LCF : _____ (m) (from Hydrostatic table)

$$D_2 = [t * TPcm * 100 * (Lpp/2 - L.C.F.)] / Lpp \quad (MT)$$

$$D_3 = (D_1 + D_2) * (S.G. - 1.025) / 1.025 \quad (MT)$$

BLANK FORM**TRIM AND STABILITY CALCULATION
DETAIL OF DEADWEIGHT DISTRIBUTION****SHEET No.1/5**

ITEMS	Weight (MT) (1)	VCG (m) (2)	V. MOMENT (MT-m) (3)	LCG (m) (4)	L. MOMENT (MT-m) (5)	FSM (MT-m)) (6)
BALLAST (SpGr 1.025)						
PFT_WB_101.C						
WB_201.C						
WB_311.C						
WB_401.C						
WB_501.C						
WB_601.C						
WB_701.C						
WB_1201.C						
WB_1301.C						
WB_1401.C						
WB_1511.C						
TOTAL						
FRESH WATER (SpGr 1.000)						
FW_1411.C						
FW_411PS.P						
FW_412SB.S						
TOTAL						
HEELING (SpGr 1.025)						
HEEL_812PS.P						
HEEL_812SB.S						
TOTAL						
HEAVY FUEL OIL (SpGr 0.980)						
HFO_801.C						
HFO_811.C						
HFO_OVFL_902.C						
HFO_DAY_911.P						
HFO_SETT.P						
SLUDGE_913.P						
TOTAL						
DIESEL OIL (SpGr 0.860)						
DO_1001.C						
DO_DAY_914.S						
TOTAL						
THERMAL OIL (SpGr 0.861)						
TO_STOR1202.P						
TO_DRAIN1202.S						
TOTAL						
LOW SULPHURE HFO (SpGr 0.980)						
LSHFO_901.C						
LSHFO_DAY912.S						
LSHFO_SETT.S						
TOTAL						

BLANK FORM**TRIM AND STABILITY CALCULATION
DETAIL OF DEADWEIGHT DISTRIBUTION****SHEET No.2/5**

ITEMS	Weight (MT) (1)	VCG (m) (2)	V. MOMENT (MT-m) (3)	LCG (m) (4)	L. MOMENT (MT-m) (5)	FSM (MT-m) (6)
LUBE OIL (SpGr 0.910)						
LO_1102PS.P						
LO_1102SB.S						
LO_1103PS.P						
LO_1103SB.S						
DIRTYLO_1101.P						
STOR_LO_1101.S						
TOTAL						
MISCELLANEOUS (SpGr 1.000)						
BILGEWT_915P.P						
HFODRAIN_917.P						
HFOSLUDGE916.S						
LOGEAR_1104P.C						
FWDRAIN1104S.S						
TOTAL						
ALL TANKS						
TOTAL						
PASSENGERS						
PASS. ACCOMODATION – DECK 7						
PASS. DECK8, CAFE AND LOUNGE						
PASS. ACCOMODATION – DECK 9						
PASS. LOUNGE BAR – DECK 9						
TOTAL						
CREW						
CREW ACC. – DECK 8						
CREW MESS, DAY ROOM – DECK 8						
CREW ACC. – DECK 9						
TOTAL						
TRAILERS						
TRAILERS ON DECK 3						
TRAILERS ON DECK 5						
TRAILERS ON DECK 7						
TOTAL						
CARS						
CARS ON DECK 3						
CARS ON DECK 5						
CARS ON CAR-DECK 6						
CARS ON DECK 7						
TOTAL						

BLANK FORM**TRIM AND STABILITY CALCULATION
DETAIL OF DEADWEIGHT DISTRIBUTION****SHEET No.3/5**

ITEMS	Weight (MT) (1)	VCG (m) (2)	V. MOMENT (MT-m) (3)	LCG (m) (4)	L. MOMENT (MT-m) (5)	FSM (MT-m) (6)
PROVISIONS						
DRY PROVISIONS SD – DECK 2						
MEAT STORES SB – DECK 2						
DAIRY STORE SB – DECK 2						
FISH STORE SB – DECK 2						
FREEZER STORE PS – DECK 2						
VEGETABLES STORE PS – DECK 2						
GALLEY STORE PS – DECK 8						
TOTAL						
STORE						
LINEN STORE PS – DECK 2						
DECK STORE PS – DECK 3						
PAINT STORE SB – DECK 3						
DECK STORE CENTRE – DECK 3						
DECK STORE PS – DECK 3						
DECK STORE PS – DECK 4						
DECK STORE CENTRE – DECK 4						
DECK STORE SB – DECK 5						
TAX FREE SHOP SB – DECK 8						
SHOP STORE SB – DECK 2						
TOTAL						

BLANK FORM

TRIM AND STABILITY CALCULATION
SUMMARY OF DEADWEIGHT DISTRIBUTION

SHEET No.4/5

ITEMS	Weight (MT) (1)'	VCG (m) (2)'	V. MOMENT (MT-m) (3)'	LCG (m) (4)'	L. MOMENT (MT-m) (5)'	FSM (MT-m) (6)'
BALLAST TOTAL						
FRESH WATER TOTAL						
HEAVY FUEL OIL TOTAL						
DIESEL OIL TOTAL						
LUBE OIL TOTAL						
MISCELLANEOUS TOTAL						
COOLING WATER TOTAL						
PASSENGERS TOTAL						
CREW TOTAL						
TRAILERS TOTAL						
CARS TOTAL						
PROVISIONS TOTAL						
STORE TOTAL						
DEADWEIGHT						
LIGHTSHIP						
DISPLACEMENT						

Loading condition: _____

Displacement (Disp.)	(MT)	Trim by AP (t)	(m)
V.C.G. (KG)	(m)	Draft FP (dFP)	(m)
L.C.G.	(m)	Draft AP (dAP)	(m)
Σ (FSMt)	(MT-m)	Mean Draft (dM)	(m)
Draft corr. (do)	(m)		
L.C.B.	(m)	GM(Solid) (GM)	(m)
L.C.F.	(m)	F/S Corr (GG ₀)	(m)
TPcm	(MT/cm)	GM (Fluid) (GoM)	(m)
MTcm	(MT-m/deg)		
KMT	(m)	PROP. TIP IMMERS. (I)	(m)

BLANK FORM**TRIM AND STABILITY CALCULATION
STATICAL STABILITY CURVE****SHEET No.5/5****Loading condition:** _____

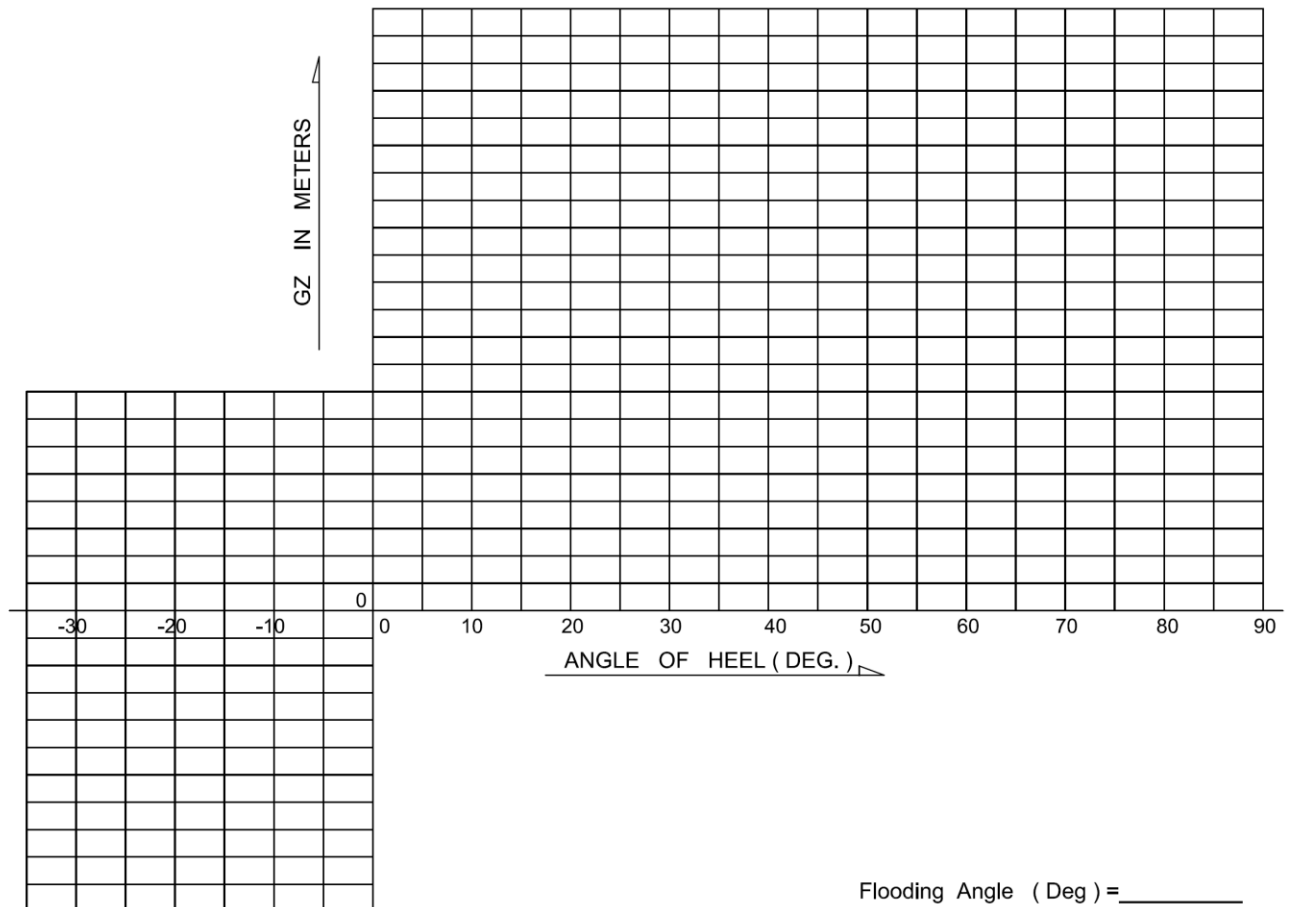
Displ. = _____ (MT)

GG₀ = Σ (FSMt) / Displ. = _____ (m)

KG = _____ (m)

KGo = KG + GG₀ = _____ (m)

θ (deg)	[1] sin θ	[2] KN (m) From CROSS CURVE	[3] KG ₀ * sin θ (m) KG ₀ * [1]	[4] GZ (m) [2] - [3]
0.01	0.0002			
5	0.0872			
10	0.1736			
12	0.2079			
15	0.2588			
20	0.3420			
25	0.4226			
30	0.5000			
35	0.5736			
40	0.6428			
45	0.7071			
50	0.7660			
60	0.8660			
70	0.9397			



Loading condition: _____

Disp =	(MT)
KMT =	(m)
$\Sigma(\text{FSMt}) =$	(MT-m)
GGo =	(m)

KG =	(m)
GM =	(m)
KGo =	(m)
GoM =	(m)

	θ	0°	10°	20°	30°	40°
	Sin θ	0.0000	0.1736	0.3420	0.5000	0.6428
(1)	KN					
(2)	KGo x Sin θ					
(3)	GZ=(1)-(2)					
(4)	Coeff	1	3	3	1	—
(5)	(3) x (4)					—
(6)	Coeff	1	4	2	4	1
(7)	(3) x (6)					

(8)	$\Sigma(5) =$
(9)	$\Sigma(7) =$

(10)	$(8) \times \pi/48 =$
(11)	$(9) \times \pi/54 =$

Area (0°- 30°) = (10) =	$\geq 0.055 \text{ m-rad}$
Area (0°- 40°) = (11) - (12) =	$\geq 0.09 \text{ m-rad}$
Area (30°- 40°) = (11) - (10) - (12) =	$\geq 0.03 \text{ m-rad}$

In case down flooding angle (θ_f) is 40° over (12) is taken 0.In case down flooding angle (θ_f) is less than 40°, the correction (12) is taken as follows:

θ	40°	θ_f (°)
GZ	a	b
(12)	$\Delta\text{Area} = (a + b) * (40 - \theta_f) * \pi / 360 =$	

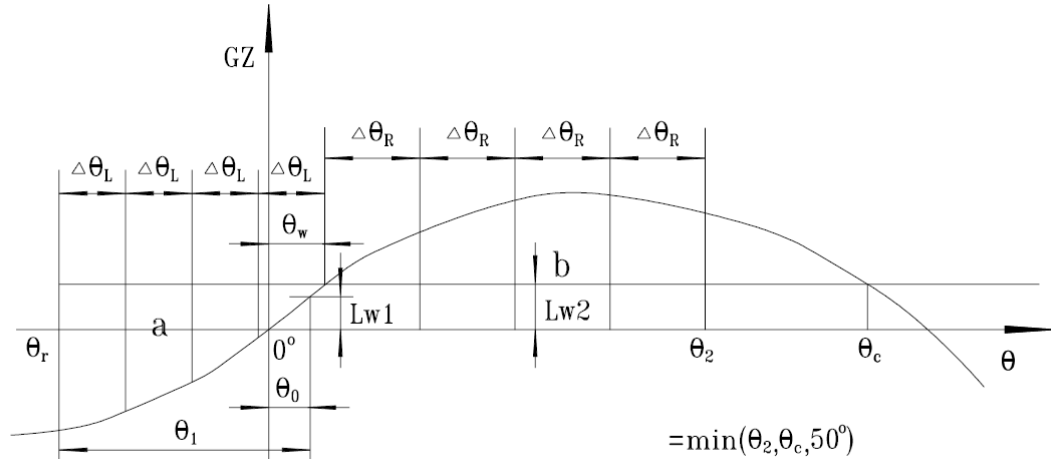
The following criteria is found by using GZ curve.

GZ _{30°} =	$\geq 0.2 \text{ m}$
$\theta_{\max}$ =	$\geq 25^\circ$

Loading condition: _____

Displacement		Disp = _____	(MT)
Mean draught of the ship (mld.)		d' = _____	(m)
Metacentric height (corrected by free surface effect)		GoM = _____	(m)
Center of gravity		KG = _____	(m)
Center of gravity (corrected by free surface effect)		KG' = _____	(m)
Water line length		L' = _____	(m)
Breadth (mld.)		B = _____	(m)
Depth (mld.)		D = _____	(m)
Bilge keel area		A _K = _____	(m ²)
Projected lateral area		A = _____	(m ²)
Vertical distance		Z = _____	(m)
P * A * Z / Disp	(P = 0.0514 MT/m ²)	lw ₁ = _____	(m)
1.5 * lw ₁		lw ₂ = _____	(m)
Flooding angle		θ _f = _____	(°)
Min. (θ _f , θ _c , 50°)		θ ₂ = _____	(°)
B / d'		= _____	
X ₁	(from Table 1)	X ₁ = _____	
C _b = Disp / (1.025 L' B d')		C _b = _____	
X ₂	(from Table 2)	X ₂ = _____	
100 A _k / (L' B)		= _____	
k	(from Table 3)	k = _____	
OG = KG – d'		OG = _____	(m)
r = 0.73 + 0.6 * OG / d'		r = _____	
Rolling period T = [2 B / (GoM) ^{1/2}] * [0.373 + 0.023(B/d') - 0.013(L'/100)]		T = _____	(sec)
s	(from Table 4)	s = _____	
θ ₁ = 109 * k * X ₁ * X ₂ * (r * s) ^{1/2}		θ ₁ = _____	(°)
80% of immersing angle of deck edge			
(0.8 θ _d) = [arctan (2 * (D' - d') / B')] * 0.8		= _____	(°)
D' (from top of keel to the top of freeboard deck at ship's side)			
B' (from the outside of side shell to outside of another side shell)			

Loading condition: _____



$\theta_w =$ _____ ($^\circ$) $\theta_2 =$ _____ ($^\circ$) $\Delta\theta_R = (\theta_2 - \theta_w)/4 =$ _____ ($^\circ$)
 $\theta_1 =$ _____ ($^\circ$) $\theta_r =$ _____ ($^\circ$) $\Delta\theta_L = (\theta_w - \theta_r)/4 =$ _____ ($^\circ$)

Area "b":

(1)	(deg.)	θ_w	$\theta_w + \Delta\theta_R$	$\theta_w + 2\Delta\theta_R$	$\theta_w + 3\Delta\theta_R$	$\theta_w + 4\Delta\theta_R$
(2)	GZ	—				
(3)	$(GZ - l_{w2})$	0				
(4)	Simpson's F	1	4	2	4	1
(5)	(3) x (4)	0				

$\Sigma (5) =$ _____ (m)

$b = 1/3 * \Delta\theta_R * \Sigma(5) * \pi / 180 =$ _____ (m-rad)

Area "a":

(1)	(deg.)	θ_w	$\theta_w - \Delta\theta_L$	$\theta_w - 2\Delta\theta_L$	$\theta_w - 3\Delta\theta_L$	$\theta_w - 4\Delta\theta_L$
(2)	GZ	—				
(3)	l_{w2}	—				
(4)	$(l_{w2} - GZ)$	0				
(5)	Simpson's F	1	4	2	4	1
(6)	(4) x (5)	0				

$\Sigma (6) =$ _____ (m)

$a = 1/3 * \Delta\theta_L * \Sigma(6) * \pi / 180 =$ _____ (m-rad)

Criteria:

$b =$ _____ (m-rad) $> a =$ _____ (m-rad)

$\theta_0 =$ _____ ($^\circ$) $< \text{Min.}(16^\circ, 0.8 \theta_d)$

Loading condition: _____

Position of propeller tip

Longitudinal: 3.000 m fwd of Aft Perpendicular
Transverse: 6.000 m off center line PS/SB
Vertical: 4.700 m above base line

Displacement	Disp = _____	(MT)
Mean draught of the ship (Draft MS.)	d = _____	(m)
Longitudinal centre of floatation LCF (from Hydrostatics)	LCF = _____	(m)
Draft at Aft Perpendicular (Draft AP)	dAP= _____	(m)
Heel Angle	θ = _____	(°)

Draft MS – 4.7	Vertical distance between mean draft and propeller tip	d1= _____	(m)
dAP - MS	Difference of draft between Aft Perpendicular and midship (>0 for trim by stern)	d = _____	(m)
LCF - 3	Distance between Longitudinal centre of floatation and propeller	Dcfp = _____	(m)
(d *Dcfp)/LCF	Correction for trim (>0 for trim by stern)	C_trim= _____	(m)
6*sen θ	Correction for heel (always <0 - for the rising propeller)	C_heel= _____	(m)

D1 + C_trim – C_heel	Propeller Tip Immersion	Imm_prop	(m)
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4. STABILITY DATA

4.1 Hydrostatic Properties

Length Between Perpendiculars	150.00 m
Breadth Molded	27.70 m
Depth Molded	14.90 m
Design Draft	6.50 m
Displacement (at design draft)	17690 t
Water Specific Gravity	1.025 MT/m ³

Draft (m): Draft misured from base line.

Displ (MT): Displacement.

LCB (m): Longitudinal centre of buoyancy from A.P.

VCB (m): Vertical center of buoyancy above base line.

LCF (m): Longitudinal centre of floatation from A.P.

TPcm (MT /cm): Tons per one centimeter immersion.

MTcm (MT-m /cm): Moment to change trim one centimeter.

KML (m): Longitudinal metacenter height above base line.

KMT (m): Transverse metacenter height above base line.

Hydrostatic Properties

Draft is from Baseline.

No Trim, No heel, VCG = 0.000

LCF Draft (m)	Displ (MT)	LCB (m)	VCB (m)	LCF (m)	TPcm (MT/cm)	MTcm (MT-m /deg)	KML (m)	KMT (m)
0.500	742.803	70.333f	0.263	70.282f	16.86	18078.85	1 394.363	76.886
0.550	827.906	70.326f	0.290	70.248f	17.18	18779.63	1 299.524	71.336
0.600	914.594	70.317f	0.317	70.209f	17.49	19466.87	1 219.401	66.644
0.650	1002.808	70.306f	0.344	70.171f	17.79	20146.71	1 150.972	62.660
0.700	1092.525	70.293f	0.371	70.134f	18.09	20818.06	1 091.660	59.268
0.750	1183.718	70.279f	0.398	70.099f	18.38	21484.33	1 039.806	56.302
0.800	1276.349	70.265f	0.426	70.066f	18.67	22144.60	993.978	53.689
0.850	1370.385	70.250f	0.453	70.032f	18.95	22798.11	953.092	51.366
0.900	1465.797	70.235f	0.481	69.999f	19.22	23448.31	916.466	49.305
0.950	1562.574	70.219f	0.508	69.965f	19.49	24098.29	883.536	47.467
1.000	1660.696	70.203f	0.536	69.934f	19.76	24743.57	853.593	45.802
1.050	1760.140	70.187f	0.563	69.906f	20.02	25387.73	826.333	44.292
1.100	1860.884	70.171f	0.591	69.878f	20.28	26025.25	801.224	42.905
1.150	1962.896	70.155f	0.619	69.855f	20.53	26658.99	778.081	41.621
1.200	2066.153	70.140f	0.647	69.835f	20.77	27289.36	756.675	40.444
1.250	2170.636	70.125f	0.674	69.819f	21.02	27916.45	736.804	39.356
1.300	2276.323	70.110f	0.702	69.794f	21.25	28510.59	717.548	38.346
1.350	2383.141	70.095f	0.730	69.746f	21.47	29034.92	697.991	37.400
1.400	2491.051	70.079f	0.758	69.712f	21.69	29581.04	680.314	36.518
1.450	2600.073	70.063f	0.786	69.693f	21.91	30157.09	664.481	35.688
1.500	2710.188	70.048f	0.814	69.674f	22.13	30732.35	649.643	34.912
1.550	2821.395	70.033f	0.842	69.652f	22.35	31305.53	635.676	34.188
1.600	2933.681	70.018f	0.870	69.628f	22.56	31875.32	622.472	33.513
1.650	3047.038	70.003f	0.898	69.604f	22.78	32447.61	610.075	32.879

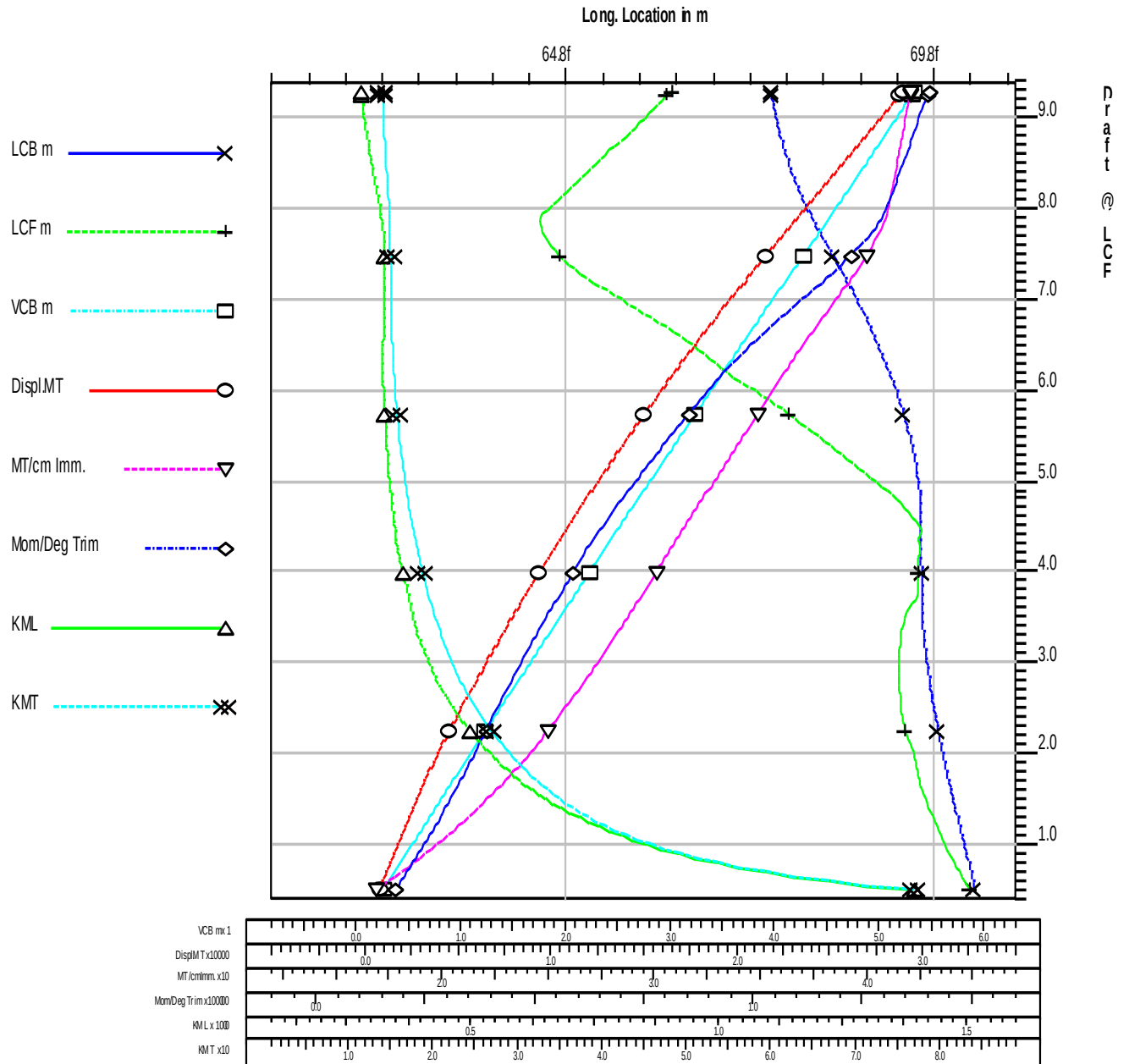
LCF Draft (m)	Displ (MT)	LCB (m)	VCB (m)	LCF (m)	TPcm (MT/cm)	MTcm (MT-m /deg)	KML (m)	KMT (m)
1.700	3161.455	69.988f	0.926	69.589f	22.99	33028.56	598.524	32.265
1.750	3276.901	69.974f	0.955	69.576f	23.19	33601.19	587.449	31.673
1.800	3393.357	69.960f	0.983	69.565f	23.39	34168.06	576.859	31.104
1.850	3510.806	69.946f	1.011	69.553f	23.59	34732.64	566.773	30.562
1.900	3629.226	69.934f	1.039	69.543f	23.78	35292.07	557.111	30.040
1.950	3748.605	69.921f	1.067	69.532f	23.97	35850.31	547.901	29.541
2.000	3868.923	69.909f	1.096	69.522f	24.15	36403.09	539.047	29.051
2.050	3990.147	69.897f	1.124	69.503f	24.33	36924.18	530.152	28.574
2.100	4112.214	69.885f	1.152	69.462f	24.50	37372.40	520.660	28.116
2.150	4235.101	69.872f	1.180	69.433f	24.66	37849.76	512.009	27.673
2.200	4358.821	69.859f	1.209	69.418f	24.83	38365.31	504.253	27.247
2.250	4483.370	69.847f	1.237	69.404f	24.99	38875.78	496.767	26.837
2.300	4608.741	69.834f	1.265	69.390f	25.15	39382.79	489.556	26.446
2.350	4734.916	69.822f	1.293	69.375f	25.32	39891.95	482.671	26.072
2.400	4861.895	69.811f	1.321	69.361f	25.47	40399.18	476.042	25.711
2.450	4989.661	69.799f	1.350	69.352f	25.63	40921.28	469.847	25.362
2.500	5118.213	69.788f	1.378	69.343f	25.79	41441.91	463.874	25.028
2.550	5247.550	69.777f	1.406	69.339f	25.95	41975.33	458.264	24.707
2.600	5377.664	69.766f	1.435	69.334f	26.10	42508.70	452.859	24.400
2.650	5508.558	69.756f	1.463	69.330f	26.26	43039.72	447.621	24.106
2.700	5640.218	69.746f	1.491	69.327f	26.41	43569.93	442.557	23.821
2.750	5772.637	69.736f	1.519	69.323f	26.56	44100.73	437.673	23.547
2.800	5905.812	69.727f	1.548	69.320f	26.71	44634.74	432.984	23.284
2.850	6039.731	69.718f	1.576	69.318f	26.86	45174.48	428.503	23.024
2.900	6174.386	69.709f	1.604	69.315f	27.00	45714.64	424.170	22.774
2.950	6309.773	69.700f	1.633	69.313f	27.15	46250.32	419.933	22.530
3.000	6445.876	69.692f	1.661	69.315f	27.29	46800.29	415.954	22.295
3.050	6582.712	69.684f	1.689	69.318f	27.44	47357.54	412.157	22.070
3.100	6720.271	69.677f	1.718	69.321f	27.58	47915.07	408.473	21.850
3.150	6858.553	69.670f	1.746	69.325f	27.73	48473.33	404.901	21.637
3.200	6997.542	69.663f	1.775	69.328f	27.87	49031.78	401.431	21.427
3.250	7137.230	69.656f	1.803	69.332f	28.01	49591.84	398.070	21.224
3.300	7277.613	69.650f	1.831	69.339f	28.15	50164.32	394.898	21.026
3.350	7418.698	69.644f	1.860	69.346f	28.29	50735.49	391.798	20.835
3.400	7560.482	69.639f	1.888	69.364f	28.43	51336.67	389.006	20.649
3.450	7702.974	69.634f	1.917	69.384f	28.57	51947.61	386.354	20.469
3.500	7846.185	69.630f	1.945	69.402f	28.71	52563.39	383.799	20.292
3.550	7990.088	69.626f	1.974	69.421f	28.85	53177.94	381.293	20.120
3.600	8134.700	69.622f	2.002	69.440f	28.99	53795.51	378.864	19.952
3.650	8280.016	69.619f	2.030	69.486f	29.14	54501.71	377.101	19.788
3.700	8426.125	69.618f	2.059	69.555f	29.30	55289.41	375.918	19.630
3.750	8573.004	69.617f	2.088	69.579f	29.44	55934.33	373.787	19.476
3.800	8720.539	69.616f	2.116	69.582f	29.57	56513.52	371.268	19.327
3.850	8868.730	69.616f	2.145	69.583f	29.70	57093.04	368.808	19.179
3.900	9017.556	69.615f	2.173	69.585f	29.83	57673.58	366.409	19.035
3.950	9167.016	69.615f	2.202	69.585f	29.96	58257.07	364.082	18.894
4.000	9317.114	69.614f	2.230	69.585f	30.08	58841.96	361.813	18.758
4.050	9467.846	69.614f	2.259	69.583f	30.21	59430.72	359.615	18.626
4.100	9619.207	69.613f	2.288	69.581f	30.34	60020.08	357.467	18.497
4.150	9771.210	69.613f	2.316	69.585f	30.46	60642.11	355.553	18.371
4.200	9923.851	69.612f	2.345	69.589f	30.59	61278.82	353.760	18.247
4.250	10077.150	69.612f	2.373	69.591f	30.72	61926.89	352.063	18.128

LCF Draft (m)	Displ (MT)	LCB (m)	VCB (m)	LCF (m)	TPcm (MT/cm)	MTcm (MT-m /deg)	KML (m)	KMT (m)
4.300	10231.100	69.612f	2.402	69.588f	30.86	62588.39	350.469	18.012
4.350	10385.730	69.611f	2.431	69.581f	30.99	63264.48	348.981	17.900
4.400	10541.030	69.611f	2.459	69.594f	31.14	64047.06	348.093	17.792
4.450	10697.120	69.611f	2.488	69.624f	31.30	64927.95	347.731	17.686
4.500	10853.960	69.611f	2.517	69.604f	31.44	65667.83	346.611	17.583
4.550	11011.480	69.610f	2.545	69.559f	31.57	66352.39	345.215	17.483
4.600	11169.670	69.609f	2.574	69.509f	31.70	67047.52	343.891	17.385
4.650	11328.520	69.608f	2.603	69.457f	31.84	67751.34	342.628	17.290
4.700	11488.050	69.605f	2.632	69.400f	31.97	68468.41	341.446	17.198
4.750	11648.250	69.602f	2.660	69.341f	32.11	69195.20	340.325	17.108
4.800	11809.140	69.598f	2.689	69.279f	32.25	69933.82	339.272	17.021
4.850	11970.710	69.593f	2.718	69.215f	32.38	70680.08	338.264	16.937
4.900	12132.970	69.588f	2.747	69.148f	32.52	71432.53	337.293	16.855
4.950	12295.930	69.581f	2.776	69.079f	32.66	72194.38	336.373	16.775
5.000	12459.550	69.574f	2.805	69.007f	32.79	72964.00	335.494	16.695
5.050	12623.870	69.566f	2.834	68.934f	32.93	73743.54	334.665	16.619
5.100	12788.880	69.558f	2.862	68.859f	33.07	74526.80	333.856	16.544
5.150	12954.570	69.548f	2.891	68.780f	33.21	75327.10	333.125	16.472
5.200	13120.960	69.538f	2.920	68.701f	33.35	76129.41	332.403	16.402
5.250	13288.040	69.527f	2.949	68.623f	33.49	76931.80	331.683	16.335
5.300	13455.810	69.515f	2.978	68.546f	33.62	77741.73	330.996	16.268
5.350	13624.270	69.503f	3.007	68.466f	33.76	78557.31	330.333	16.205
5.400	13793.430	69.490f	3.036	68.384f	33.90	79379.37	329.696	16.143
5.450	13963.270	69.476f	3.065	68.303f	34.04	80199.34	329.050	16.083
5.500	14133.810	69.461f	3.095	68.220f	34.18	81029.68	328.446	16.025
5.550	14305.020	69.446f	3.124	68.135f	34.31	81864.91	327.859	15.969
5.600	14476.950	69.430f	3.153	68.051f	34.45	82710.30	327.311	15.914
5.650	14649.550	69.413f	3.182	67.969f	34.59	83571.74	326.824	15.862
5.700	14822.860	69.396f	3.211	67.888f	34.73	84436.30	326.344	15.810
5.750	14996.860	69.378f	3.240	67.808f	34.87	85318.16	325.927	15.760
5.800	15171.570	69.359f	3.269	67.724f	35.01	86199.05	325.500	15.712
5.850	15346.970	69.340f	3.299	67.637f	35.15	87074.70	325.048	15.666
5.900	15523.070	69.320f	3.328	67.546f	35.29	87944.41	324.571	15.621
5.950	15699.850	69.300f	3.357	67.453f	35.42	88803.25	324.050	15.578
6.000	15877.310	69.278f	3.386	67.359f	35.56	89655.05	323.502	15.535
6.050	16055.440	69.257f	3.416	67.256f	35.69	90472.73	322.830	15.494
6.100	16234.230	69.234f	3.445	67.144f	35.82	91250.23	322.019	15.455
6.150	16413.660	69.211f	3.474	67.057f	35.96	92181.14	321.747	15.417
6.200	16593.830	69.187f	3.504	66.984f	36.11	93192.59	321.746	15.380
6.250	16774.730	69.163f	3.533	66.909f	36.25	94214.71	321.767	15.344
6.300	16956.350	69.138f	3.562	66.833f	36.40	95244.82	321.801	15.310
6.350	17138.710	69.113f	3.592	66.756f	36.55	96283.55	321.849	15.277
6.400	17321.810	69.088f	3.621	66.677f	36.69	97331.88	321.914	15.246
6.450	17505.640	69.062f	3.651	66.595f	36.84	98396.35	322.018	15.216
6.500	17690.220	69.036f	3.680	66.512f	36.99	99473.98	322.148	15.188
6.550	17875.550	69.009f	3.709	66.427f	37.14	100566.50	322.309	15.162
6.600	18061.630	68.982f	3.739	66.339f	37.29	101673.40	322.500	15.137
6.650	18248.460	68.955f	3.769	66.247f	37.44	102798.60	322.730	15.114
6.700	18436.080	68.927f	3.798	66.152f	37.60	103943.00	323.002	15.093
6.750	18624.460	68.898f	3.828	66.054f	37.75	105107.00	323.315	15.074
6.800	18813.630	68.869f	3.857	65.953f	37.91	106289.20	323.665	15.056
6.850	19003.580	68.839f	3.887	65.850f	38.07	107478.40	324.015	15.041

LCF Draft (m)	Displ (MT)	LCB (m)	VCB (m)	LCF (m)	TPcm (MT/cm)	MTcm (MT-m /deg)	KML (m)	KMT (m)
6.900	19194.300	68.809f	3.917	65.747f	38.23	108677.30	324.373	15.027
6.950	19385.860	68.778f	3.946	65.644f	38.39	109877.10	324.714	15.015
7.000	19578.160	68.747f	3.976	65.541f	38.54	111085.30	325.060	15.005
7.050	19771.270	68.715f	4.006	65.439f	38.70	112283.80	325.358	14.996
7.100	19965.160	68.683f	4.036	65.340f	38.85	113470.70	325.604	14.988
7.150	20159.800	68.650f	4.066	65.244f	39.01	114643.60	325.793	14.981
7.200	20355.200	68.617f	4.095	65.153f	39.16	115800.60	325.922	14.976
7.250	20551.350	68.583f	4.125	65.065f	39.30	116940.60	325.989	14.972
7.300	20748.200	68.550f	4.155	64.982f	39.45	118063.30	325.997	14.969
7.350	20945.790	68.516f	4.185	64.904f	39.59	119166.50	325.939	14.966
7.400	21144.070	68.482f	4.215	64.830f	39.73	120248.50	325.814	14.963
7.450	21343.030	68.447f	4.245	64.761f	39.86	121304.40	325.611	14.961
7.500	21542.650	68.413f	4.275	64.697f	39.99	122338.00	325.342	14.959
7.550	21742.910	68.378f	4.305	64.638f	40.12	123344.10	324.997	14.956
7.600	21943.810	68.344f	4.335	64.587f	40.24	124316.80	324.561	14.954
7.650	22145.290	68.310f	4.365	64.542f	40.36	125256.70	324.040	14.950
7.700	22347.350	68.276f	4.395	64.507f	40.47	126155.60	323.414	14.946
7.750	22549.960	68.242f	4.425	64.476f	40.58	127028.60	322.726	14.940
7.800	22753.110	68.208f	4.454	64.452f	40.69	127869.60	321.962	14.933
7.850	22956.760	68.175f	4.484	64.440f	40.78	128659.20	321.077	14.920
7.900	23160.870	68.142f	4.514	64.436f	40.87	129408.40	320.100	14.905
7.950	23365.370	68.110f	4.544	64.475f	40.93	129940.90	318.604	14.873
8.000	23570.130	68.078f	4.574	64.542f	40.98	130335.00	316.795	14.830
8.050	23775.100	68.048f	4.604	64.609f	41.02	130728.50	315.012	14.788
8.100	23980.310	68.019f	4.633	64.676f	41.07	131121.30	313.254	14.747
8.150	24185.740	67.991f	4.663	64.742f	41.11	131512.60	311.520	14.707
8.200	24391.380	67.964f	4.693	64.807f	41.16	131903.00	309.811	14.668
8.250	24597.250	67.938f	4.722	64.872f	41.20	132291.30	308.122	14.630
8.300	24803.350	67.913f	4.752	64.937f	41.25	132679.00	306.458	14.593
8.350	25009.640	67.889f	4.781	65.001f	41.29	133065.30	304.815	14.557
8.400	25216.170	67.865f	4.811	65.065f	41.33	133452.00	303.197	14.521
8.450	25422.890	67.843f	4.840	65.129f	41.37	133838.60	301.602	14.487
8.500	25629.840	67.822f	4.869	65.192f	41.42	134225.00	300.031	14.453
8.550	25837.010	67.801f	4.899	65.255f	41.46	134612.50	298.484	14.420
8.600	26044.380	67.781f	4.928	65.319f	41.50	134999.30	296.959	14.388
8.650	26251.960	67.762f	4.957	65.382f	41.54	135386.50	295.456	14.357
8.700	26459.760	67.743f	4.986	65.444f	41.59	135773.30	293.973	14.326
8.750	26667.760	67.726f	5.016	65.547f	41.61	135944.30	292.047	14.292
8.800	26875.900	67.709f	5.045	65.610f	41.65	136332.90	290.614	14.263
8.850	27084.260	67.693f	5.074	65.672f	41.69	136723.30	289.204	14.235
8.900	27292.820	67.678f	5.103	65.734f	41.73	137112.80	287.812	14.207
8.950	27501.580	67.664f	5.132	65.796f	41.77	137502.30	286.438	14.181
9.000	27710.560	67.650f	5.161	65.858f	41.82	137897.60	285.095	14.155
9.050	27919.750	67.636f	5.190	65.919f	41.86	138292.00	283.768	14.129
9.100	28129.160	67.624f	5.219	65.980f	41.90	138689.60	282.466	14.105
9.150	28338.760	67.612f	5.248	66.041f	41.94	139089.40	281.185	14.081
9.200	28548.600	67.601f	5.276	66.102f	41.99	139488.70	279.919	14.058
9.250	28758.630	67.590f	5.305	66.162f	42.03	139884.20	278.663	14.036
9.300	28968.870	67.580f	5.334	66.223f	42.07	140277.30	277.418	14.014

Water Specific Gravity = 1.025.

Hydrostatic Properties at Trim = 0.00, Heel = 0.00



4.2 Cross Curve of Stability

Righting Arms(heel) for VCG = 0.00
Trim zero at heel = 0 (RA Trim = 0)

Displ (MT)	5.000s	10.000s	15.000s	20.000s	25.000s	30.000s
600.000	6.006s	8.305s	9.355s	9.938s	10.254s	10.385s
800.000	5.398s	7.867s	9.044s	9.700s	10.075s	10.258s
1000.000	4.928s	7.449s	8.766s	9.492s	9.918s	10.146s
1200.000	4.545s	7.069s	8.507s	9.304s	9.777s	10.045s
1400.000	4.221s	6.750s	8.265s	9.130s	9.648s	9.953s
1600.000	3.941s	6.475s	8.029s	8.962s	9.528s	9.868s
1800.000	3.700s	6.233s	7.800s	8.800s	9.414s	9.789s
2000.000	3.494s	6.019s	7.588s	8.645s	9.306s	9.715s
2200.000	3.318s	5.825s	7.398s	8.497s	9.199s	9.644s
2400.000	3.167s	5.648s	7.225s	8.352s	9.093s	9.577s
2600.000	3.036s	5.486s	7.067s	8.210s	8.991s	9.511s
2800.000	2.920s	5.335s	6.923s	8.075s	8.893s	9.446s
3000.000	2.818s	5.195s	6.789s	7.947s	8.799s	9.382s
3200.000	2.726s	5.065s	6.665s	7.828s	8.708s	9.318s
3400.000	2.643s	4.942s	6.550s	7.717s	8.617s	9.256s
3600.000	2.568s	4.827s	6.441s	7.614s	8.529s	9.196s
3800.000	2.499s	4.718s	6.339s	7.518s	8.443s	9.138s
4000.000	2.436s	4.615s	6.242s	7.427s	8.360s	9.082s
4200.000	2.377s	4.519s	6.151s	7.342s	8.282s	9.028s
4400.000	2.323s	4.428s	6.064s	7.262s	8.209s	8.974s
4600.000	2.273s	4.342s	5.981s	7.186s	8.139s	8.921s
4800.000	2.226s	4.262s	5.901s	7.113s	8.074s	8.869s
5000.000	2.182s	4.186s	5.826s	7.045s	8.012s	8.820s
5200.000	2.141s	4.115s	5.753s	6.979s	7.954s	8.773s
5400.000	2.102s	4.048s	5.683s	6.917s	7.899s	8.727s
5600.000	2.066s	3.985s	5.616s	6.857s	7.846s	8.683s
5800.000	2.031s	3.926s	5.551s	6.799s	7.797s	8.642s
6000.000	1.998s	3.869s	5.489s	6.744s	7.750s	8.603s
6200.000	1.967s	3.815s	5.429s	6.692s	7.706s	8.566s
6400.000	1.937s	3.764s	5.370s	6.641s	7.664s	8.530s
6600.000	1.909s	3.715s	5.314s	6.592s	7.624s	8.496s
6800.000	1.882s	3.669s	5.260s	6.545s	7.586s	8.464s
7000.000	1.857s	3.625s	5.208s	6.500s	7.549s	8.433s
7200.000	1.832s	3.582s	5.158s	6.456s	7.514s	8.404s
7400.000	1.809s	3.542s	5.109s	6.414s	7.480s	8.375s
7600.000	1.787s	3.503s	5.062s	6.373s	7.448s	8.348s
7800.000	1.766s	3.466s	5.017s	6.335s	7.416s	8.321s
8000.000	1.745s	3.430s	4.974s	6.297s	7.386s	8.296s
8200.000	1.726s	3.396s	4.932s	6.261s	7.356s	8.271s
8400.000	1.708s	3.363s	4.892s	6.226s	7.328s	8.248s
8600.000	1.690s	3.331s	4.853s	6.192s	7.300s	8.225s
8800.000	1.673s	3.301s	4.816s	6.160s	7.273s	8.202s
9000.000	1.656s	3.271s	4.781s	6.128s	7.246s	8.181s
9200.000	1.641s	3.243s	4.747s	6.097s	7.221s	8.159s
9400.000	1.626s	3.216s	4.714s	6.066s	7.196s	8.139s
9600.000	1.611s	3.190s	4.682s	6.037s	7.171s	8.119s
9800.000	1.597s	3.165s	4.652s	6.008s	7.147s	8.100s
10000.000	1.584s	3.141s	4.623s	5.980s	7.124s	8.081s
10200.000	1.571s	3.117s	4.595s	5.953s	7.101s	8.062s
10400.000	1.559s	3.095s	4.568s	5.926s	7.079s	8.044s

Displ (MT)	5.000s	10.000s	15.000s	20.000s	25.000s	30.000s
10600.000	1.547s	3.073s	4.543s	5.900s	7.057s	8.027s
10800.000	1.535s	3.052s	4.518s	5.875s	7.036s	8.010s
11000.000	1.524s	3.032s	4.494s	5.850s	7.015s	7.993s
11200.000	1.514s	3.013s	4.471s	5.826s	6.994s	7.976s
11400.000	1.504s	2.995s	4.449s	5.802s	6.974s	7.960s
11600.000	1.494s	2.977s	4.427s	5.779s	6.954s	7.945s
11800.000	1.485s	2.960s	4.406s	5.756s	6.935s	7.929s
12000.000	1.476s	2.944s	4.386s	5.735s	6.916s	7.914s
12200.000	1.467s	2.928s	4.367s	5.713s	6.897s	7.900s
12400.000	1.459s	2.913s	4.348s	5.692s	6.879s	7.885s
12600.000	1.451s	2.898s	4.330s	5.672s	6.861s	7.871s
12800.000	1.443s	2.884s	4.312s	5.652s	6.843s	7.857s
13000.000	1.436s	2.871s	4.295s	5.633s	6.825s	7.844s
13200.000	1.429s	2.858s	4.278s	5.614s	6.808s	7.830s
13400.000	1.422s	2.846s	4.262s	5.595s	6.791s	7.817s
13600.000	1.415s	2.834s	4.246s	5.577s	6.775s	7.804s
13800.000	1.409s	2.823s	4.231s	5.560s	6.758s	7.792s
14000.000	1.403s	2.812s	4.216s	5.543s	6.742s	7.779s
14200.000	1.397s	2.802s	4.201s	5.526s	6.726s	7.767s
14400.000	1.392s	2.792s	4.187s	5.509s	6.711s	7.755s
14600.000	1.387s	2.783s	4.173s	5.493s	6.695s	7.744s
14800.000	1.382s	2.774s	4.160s	5.477s	6.680s	7.732s
15000.000	1.377s	2.765s	4.146s	5.462s	6.665s	7.721s
15200.000	1.372s	2.757s	4.133s	5.446s	6.650s	7.709s
15400.000	1.368s	2.748s	4.121s	5.431s	6.636s	7.698s
15600.000	1.363s	2.741s	4.108s	5.417s	6.622s	7.688s
15800.000	1.359s	2.733s	4.096s	5.403s	6.608s	7.677s
16000.000	1.355s	2.726s	4.085s	5.388s	6.594s	7.667s
16200.000	1.352s	2.719s	4.073s	5.375s	6.580s	7.656s
16400.000	1.348s	2.712s	4.062s	5.361s	6.567s	7.646s
16600.000	1.345s	2.705s	4.051s	5.348s	6.554s	7.636s
16800.000	1.342s	2.699s	4.040s	5.335s	6.541s	7.626s
17000.000	1.339s	2.692s	4.030s	5.322s	6.528s	7.616s
17200.000	1.336s	2.686s	4.019s	5.309s	6.516s	7.607s
17400.000	1.334s	2.680s	4.009s	5.297s	6.504s	7.597s
17600.000	1.331s	2.674s	3.999s	5.285s	6.492s	7.588s
17800.000	1.329s	2.668s	3.990s	5.273s	6.480s	7.578s
18000.000	1.327s	2.663s	3.980s	5.261s	6.468s	7.569s
18200.000	1.325s	2.657s	3.971s	5.250s	6.457s	7.560s
18400.000	1.323s	2.652s	3.962s	5.238s	6.445s	7.551s
18600.000	1.321s	2.646s	3.953s	5.227s	6.434s	7.543s
18800.000	1.320s	2.641s	3.944s	5.216s	6.423s	7.534s
19000.000	1.318s	2.636s	3.935s	5.205s	6.413s	7.525s
19200.000	1.317s	2.631s	3.927s	5.195s	6.402s	7.517s
19400.000	1.315s	2.626s	3.918s	5.184s	6.391s	7.508s
19600.000	1.314s	2.621s	3.910s	5.174s	6.381s	7.500s
19800.000	1.313s	2.616s	3.902s	5.164s	6.371s	7.492s
20000.000	1.311s	2.611s	3.894s	5.154s	6.361s	7.484s
20200.000	1.310s	2.606s	3.886s	5.144s	6.351s	7.476s
20400.000	1.308s	2.602s	3.879s	5.134s	6.341s	7.468s
20600.000	1.307s	2.597s	3.871s	5.125s	6.332s	7.460s
20800.000	1.305s	2.593s	3.864s	5.115s	6.322s	7.453s
21000.000	1.303s	2.588s	3.857s	5.106s	6.313s	7.445s
21200.000	1.302s	2.584s	3.850s	5.097s	6.304s	7.437s
21400.000	1.300s	2.579s	3.843s	5.088s	6.295s	7.430s
21600.000	1.298s	2.575s	3.836s	5.080s	6.286s	7.423s

Displ (MT)	5.000s	10.000s	15.000s	20.000s	25.000s	30.000s
21800.000	1.297s	2.571s	3.829s	5.071s	6.277s	7.416s
22000.000	1.295s	2.567s	3.823s	5.063s	6.268s	7.408s
22200.000	1.293s	2.562s	3.816s	5.054s	6.260s	7.401s
22400.000	1.291s	2.558s	3.810s	5.046s	6.251s	7.394s
22600.000	1.290s	2.554s	3.804s	5.038s	6.243s	7.386s
22800.000	1.288s	2.550s	3.797s	5.030s	6.235s	7.378s
23000.000	1.286s	2.546s	3.791s	5.023s	6.227s	7.369s
23200.000	1.284s	2.542s	3.785s	5.015s	6.219s	7.360s
23400.000	1.282s	2.538s	3.779s	5.007s	6.211s	7.351s
23600.000	1.280s	2.534s	3.774s	5.000s	6.203s	7.342s
23800.000	1.278s	2.531s	3.768s	4.993s	6.196s	7.332s
24000.000	1.276s	2.527s	3.762s	4.986s	6.188s	7.322s
24200.000	1.274s	2.523s	3.757s	4.979s	6.181s	7.311s
24400.000	1.272s	2.519s	3.751s	4.972s	6.174s	7.300s
24600.000	1.270s	2.516s	3.746s	4.965s	6.167s	7.289s
24800.000	1.268s	2.512s	3.741s	4.959s	6.159s	7.278s
25000.000	1.266s	2.508s	3.736s	4.952s	6.153s	7.266s
25200.000	1.264s	2.505s	3.730s	4.946s	6.146s	7.254s
25400.000	1.261s	2.501s	3.725s	4.939s	6.139s	7.241s
25600.000	1.259s	2.498s	3.720s	4.933s	6.132s	7.229s
25800.000	1.257s	2.494s	3.716s	4.927s	6.126s	7.216s
26000.000	1.255s	2.491s	3.711s	4.921s	6.120s	7.203s
26200.000	1.253s	2.487s	3.706s	4.915s	6.113s	7.189s
26400.000	1.251s	2.484s	3.702s	4.910s	6.107s	7.176s
26600.000	1.248s	2.481s	3.697s	4.904s	6.101s	7.162s
26800.000	1.246s	2.477s	3.692s	4.899s	6.095s	7.148s
27000.000	1.244s	2.474s	3.688s	4.893s	6.089s	7.133s
27200.000	1.242s	2.471s	3.684s	4.888s	6.083s	7.119s
27400.000	1.240s	2.468s	3.680s	4.883s	6.076s	7.104s
27600.000	1.237s	2.464s	3.675s	4.878s	6.069s	7.089s
27800.000	1.235s	2.461s	3.671s	4.873s	6.062s	7.073s
28000.000	1.233s	2.458s	3.667s	4.868s	6.054s	7.058s
28200.000	1.231s	2.455s	3.663s	4.863s	6.046s	7.042s
28400.000	1.229s	2.452s	3.659s	4.858s	6.038s	7.026s
28600.000	1.227s	2.449s	3.655s	4.854s	6.030s	7.010s
28800.000	1.225s	2.446s	3.652s	4.849s	6.021s	6.994s
29000.000	1.223s	2.443s	3.648s	4.845s	6.012s	6.978s

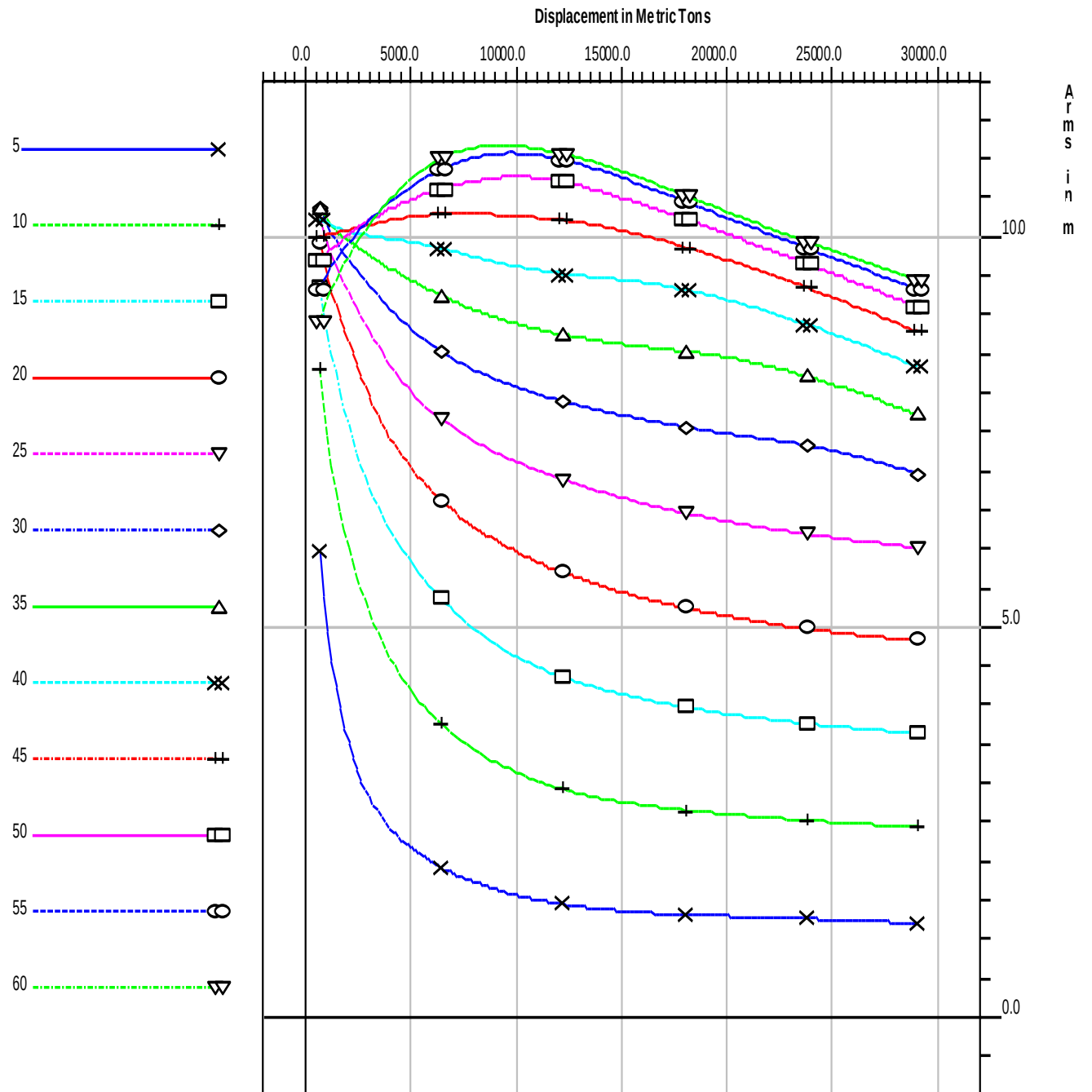
Displ (MT)	35.000s	40.000s	45.000s	50.000s	55.000s	60.000s
600.000	10.373s	10.244s	10.017s	9.708s	9.335s	8.915s
800.000	10.293s	10.209s	10.026s	9.763s	9.437s	9.067s
1000.000	10.222s	10.179s	10.036s	9.814s	9.530s	9.204s
1200.000	10.160s	10.153s	10.047s	9.862s	9.616s	9.330s
1400.000	10.103s	10.130s	10.059s	9.908s	9.696s	9.448s
1600.000	10.051s	10.110s	10.071s	9.952s	9.773s	9.558s
1800.000	10.003s	10.092s	10.083s	9.994s	9.846s	9.662s
2000.000	9.958s	10.077s	10.095s	10.035s	9.916s	9.760s
2200.000	9.917s	10.063s	10.108s	10.075s	9.982s	9.852s
2400.000	9.877s	10.050s	10.121s	10.113s	10.046s	9.940s
2600.000	9.840s	10.038s	10.134s	10.151s	10.107s	10.022s
2800.000	9.805s	10.028s	10.148s	10.188s	10.165s	10.100s
3000.000	9.771s	10.018s	10.161s	10.223s	10.219s	10.174s
3200.000	9.738s	10.009s	10.175s	10.256s	10.272s	10.244s
3400.000	9.706s	10.000s	10.188s	10.288s	10.321s	10.311s
3600.000	9.674s	9.993s	10.201s	10.319s	10.369s	10.376s
3800.000	9.641s	9.985s	10.213s	10.348s	10.414s	10.437s
4000.000	9.610s	9.978s	10.224s	10.375s	10.457s	10.496s
4200.000	9.579s	9.971s	10.234s	10.402s	10.499s	10.553s
4400.000	9.549s	9.963s	10.244s	10.427s	10.539s	10.608s
4600.000	9.519s	9.955s	10.252s	10.450s	10.577s	10.660s
4800.000	9.490s	9.946s	10.260s	10.473s	10.614s	10.710s
5000.000	9.461s	9.937s	10.267s	10.495s	10.650s	10.757s
5200.000	9.433s	9.927s	10.274s	10.516s	10.684s	10.801s
5400.000	9.405s	9.917s	10.280s	10.535s	10.717s	10.843s
5600.000	9.378s	9.906s	10.285s	10.554s	10.750s	10.882s
5800.000	9.350s	9.894s	10.289s	10.573s	10.781s	10.918s
6000.000	9.322s	9.881s	10.293s	10.590s	10.811s	10.951s
6200.000	9.295s	9.869s	10.296s	10.607s	10.839s	10.982s
6400.000	9.268s	9.856s	10.299s	10.623s	10.866s	11.011s
6600.000	9.241s	9.843s	10.301s	10.639s	10.892s	11.036s
6800.000	9.215s	9.830s	10.303s	10.654s	10.916s	11.060s
7000.000	9.190s	9.817s	10.304s	10.668s	10.938s	11.081s
7200.000	9.166s	9.804s	10.305s	10.682s	10.959s	11.099s
7400.000	9.142s	9.790s	10.305s	10.695s	10.978s	11.116s
7600.000	9.119s	9.777s	10.304s	10.708s	10.996s	11.130s
7800.000	9.097s	9.763s	10.303s	10.719s	11.011s	11.142s
8000.000	9.076s	9.750s	10.301s	10.731s	11.026s	11.152s
8200.000	9.056s	9.736s	10.299s	10.741s	11.038s	11.160s
8400.000	9.036s	9.723s	10.297s	10.750s	11.049s	11.166s
8600.000	9.017s	9.709s	10.294s	10.759s	11.058s	11.171s
8800.000	8.999s	9.697s	10.292s	10.766s	11.066s	11.175s
9000.000	8.981s	9.684s	10.289s	10.772s	11.072s	11.177s
9200.000	8.964s	9.672s	10.286s	10.778s	11.076s	11.177s
9400.000	8.948s	9.660s	10.283s	10.782s	11.079s	11.177s
9600.000	8.932s	9.648s	10.279s	10.785s	11.080s	11.175s
9800.000	8.917s	9.637s	10.276s	10.787s	11.080s	11.172s
10000.000	8.902s	9.626s	10.272s	10.787s	11.079s	11.168s
10200.000	8.888s	9.616s	10.268s	10.786s	11.077s	11.163s
10400.000	8.874s	9.606s	10.264s	10.784s	11.073s	11.157s
10600.000	8.860s	9.597s	10.260s	10.781s	11.068s	11.151s
10800.000	8.847s	9.588s	10.255s	10.776s	11.062s	11.143s
11000.000	8.834s	9.579s	10.251s	10.771s	11.055s	11.135s
11200.000	8.822s	9.570s	10.246s	10.765s	11.048s	11.126s
11400.000	8.810s	9.562s	10.241s	10.757s	11.039s	11.116s

Displ (MT)	35.000s	40.000s	45.000s	50.000s	55.000s	60.000s
11600.000	8.798s	9.555s	10.236s	10.749s	11.029s	11.106s
11800.000	8.787s	9.547s	10.230s	10.740s	11.019s	11.095s
12000.000	8.776s	9.540s	10.224s	10.730s	11.007s	11.083s
12200.000	8.766s	9.534s	10.218s	10.720s	10.995s	11.071s
12400.000	8.755s	9.527s	10.211s	10.708s	10.982s	11.058s
12600.000	8.745s	9.521s	10.204s	10.696s	10.968s	11.045s
12800.000	8.735s	9.515s	10.197s	10.683s	10.953s	11.031s
13000.000	8.726s	9.509s	10.189s	10.670s	10.938s	11.017s
13200.000	8.716s	9.504s	10.181s	10.656s	10.922s	11.002s
13400.000	8.707s	9.499s	10.172s	10.641s	10.906s	10.987s
13600.000	8.698s	9.493s	10.163s	10.627s	10.889s	10.971s
13800.000	8.690s	9.488s	10.153s	10.611s	10.872s	10.955s
14000.000	8.681s	9.483s	10.143s	10.596s	10.855s	10.938s
14200.000	8.673s	9.478s	10.133s	10.580s	10.837s	10.921s
14400.000	8.665s	9.473s	10.122s	10.564s	10.819s	10.903s
14600.000	8.657s	9.467s	10.111s	10.547s	10.800s	10.884s
14800.000	8.649s	9.462s	10.100s	10.530s	10.781s	10.866s
15000.000	8.642s	9.456s	10.088s	10.513s	10.762s	10.847s
15200.000	8.634s	9.450s	10.076s	10.496s	10.742s	10.827s
15400.000	8.627s	9.444s	10.063s	10.479s	10.723s	10.808s
15600.000	8.620s	9.437s	10.050s	10.461s	10.703s	10.788s
15800.000	8.613s	9.430s	10.037s	10.444s	10.683s	10.768s
16000.000	8.607s	9.423s	10.024s	10.426s	10.662s	10.748s
16200.000	8.600s	9.415s	10.010s	10.408s	10.642s	10.728s
16400.000	8.594s	9.407s	9.996s	10.390s	10.622s	10.707s
16600.000	8.587s	9.398s	9.982s	10.372s	10.601s	10.686s
16800.000	8.581s	9.389s	9.968s	10.353s	10.580s	10.665s
17000.000	8.575s	9.380s	9.953s	10.335s	10.559s	10.644s
17200.000	8.569s	9.370s	9.938s	10.316s	10.539s	10.623s
17400.000	8.563s	9.360s	9.923s	10.298s	10.518s	10.602s
17600.000	8.558s	9.349s	9.908s	10.279s	10.497s	10.581s
17800.000	8.552s	9.338s	9.892s	10.260s	10.476s	10.559s
18000.000	8.546s	9.327s	9.877s	10.241s	10.455s	10.538s
18200.000	8.539s	9.316s	9.861s	10.222s	10.434s	10.517s
18400.000	8.533s	9.304s	9.844s	10.204s	10.414s	10.495s
18600.000	8.526s	9.292s	9.828s	10.184s	10.393s	10.474s
18800.000	8.519s	9.279s	9.812s	10.165s	10.372s	10.452s
19000.000	8.512s	9.266s	9.795s	10.146s	10.351s	10.431s
19200.000	8.505s	9.253s	9.778s	10.127s	10.331s	10.409s
19400.000	8.497s	9.240s	9.761s	10.108s	10.310s	10.388s
19600.000	8.488s	9.226s	9.744s	10.088s	10.289s	10.367s
19800.000	8.479s	9.212s	9.726s	10.069s	10.269s	10.346s
20000.000	8.470s	9.198s	9.709s	10.049s	10.248s	10.325s
20200.000	8.460s	9.183s	9.691s	10.030s	10.228s	10.304s
20400.000	8.450s	9.169s	9.673s	10.010s	10.207s	10.283s
20600.000	8.440s	9.154s	9.656s	9.991s	10.187s	10.262s
20800.000	8.429s	9.139s	9.637s	9.971s	10.166s	10.241s
21000.000	8.418s	9.123s	9.619s	9.951s	10.146s	10.221s
21200.000	8.407s	9.107s	9.601s	9.931s	10.125s	10.200s
21400.000	8.395s	9.091s	9.582s	9.912s	10.105s	10.180s
21600.000	8.383s	9.075s	9.564s	9.892s	10.084s	10.160s
21800.000	8.370s	9.059s	9.545s	9.872s	10.064s	10.139s
22000.000	8.357s	9.042s	9.526s	9.852s	10.044s	10.119s
22200.000	8.344s	9.025s	9.507s	9.832s	10.023s	10.099s
22400.000	8.331s	9.008s	9.488s	9.812s	10.003s	10.079s

Displ (MT)	35.000s	40.000s	45.000s	50.000s	55.000s	60.000s
22600.000	8.317s	8.991s	9.469s	9.791s	9.983s	10.059s
22800.000	8.302s	8.973s	9.450s	9.771s	9.962s	10.039s
23000.000	8.288s	8.956s	9.430s	9.751s	9.942s	10.020s
23200.000	8.273s	8.938s	9.411s	9.731s	9.922s	10.000s
23400.000	8.258s	8.919s	9.391s	9.711s	9.902s	9.980s
23600.000	8.243s	8.901s	9.371s	9.690s	9.882s	9.961s
23800.000	8.227s	8.883s	9.351s	9.670s	9.861s	9.941s
24000.000	8.211s	8.864s	9.331s	9.649s	9.841s	9.922s
24200.000	8.195s	8.845s	9.311s	9.629s	9.821s	9.903s
24400.000	8.178s	8.826s	9.291s	9.608s	9.801s	9.883s
24600.000	8.162s	8.806s	9.271s	9.588s	9.781s	9.864s
24800.000	8.145s	8.787s	9.250s	9.567s	9.761s	9.845s
25000.000	8.127s	8.767s	9.229s	9.547s	9.741s	9.826s
25200.000	8.110s	8.747s	9.209s	9.526s	9.720s	9.807s
25400.000	8.092s	8.727s	9.188s	9.505s	9.700s	9.788s
25600.000	8.074s	8.707s	9.167s	9.484s	9.680s	9.769s
25800.000	8.056s	8.687s	9.146s	9.463s	9.660s	9.750s
26000.000	8.038s	8.666s	9.124s	9.442s	9.640s	9.731s
26200.000	8.020s	8.646s	9.103s	9.421s	9.620s	9.712s
26400.000	8.001s	8.625s	9.082s	9.400s	9.599s	9.693s
26600.000	7.982s	8.604s	9.060s	9.379s	9.579s	9.674s
26800.000	7.963s	8.583s	9.038s	9.358s	9.559s	9.656s
27000.000	7.944s	8.561s	9.017s	9.336s	9.539s	9.637s
27200.000	7.924s	8.540s	8.995s	9.315s	9.519s	9.618s
27400.000	7.905s	8.519s	8.973s	9.294s	9.498s	9.600s
27600.000	7.885s	8.497s	8.951s	9.272s	9.478s	9.581s
27800.000	7.866s	8.475s	8.929s	9.251s	9.458s	9.562s
28000.000	7.846s	8.453s	8.907s	9.229s	9.437s	9.543s
28200.000	7.825s	8.431s	8.884s	9.207s	9.417s	9.525s
28400.000	7.805s	8.409s	8.862s	9.186s	9.397s	9.506s
28600.000	7.785s	8.387s	8.839s	9.164s	9.376s	9.487s
28800.000	7.764s	8.364s	8.817s	9.142s	9.356s	9.469s
29000.000	7.744s	8.342s	8.794s	9.120s	9.335s	9.450s

Water Specific Gravity = 1.025.

Cross Curves



4.3 Wind Area Table

Draft (m)	LATERAL PLANES		CENTROIDS	
	Under Water (m2)	Above Water (m2)	Under Water LP (m below WL)	Above Water LP (m above WL)
4.500	684.240	3807.511	2.236	12.450
4.600	699.998	3791.753	2.285	12.402
4.700	715.774	3775.977	2.333	12.353
4.800	731.571	3760.179	2.382	12.305
4.900	747.393	3744.357	2.430	12.257
5.000	763.240	3728.511	2.479	12.209
5.100	779.100	3712.652	2.527	12.161
5.200	794.997	3696.753	2.576	12.113
5.300	810.920	3680.830	2.624	12.065
5.400	826.872	3664.880	2.673	12.017
5.500	842.852	3648.900	2.721	11.970
5.600	858.855	3632.896	2.769	11.922
5.700	874.882	3616.867	2.818	11.875
5.800	890.939	3600.812	2.866	11.827
5.900	907.014	3584.737	2.914	11.780
6.000	923.108	3568.646	2.963	11.733
6.100	939.177	3552.573	3.011	11.686
6.200	955.109	3536.641	3.060	11.638
6.300	971.061	3520.691	3.109	11.591
6.400	987.050	3504.703	3.158	11.544
6.500	1003.069	3488.682	3.206	11.496

4.4 Downflooding Points and Curve

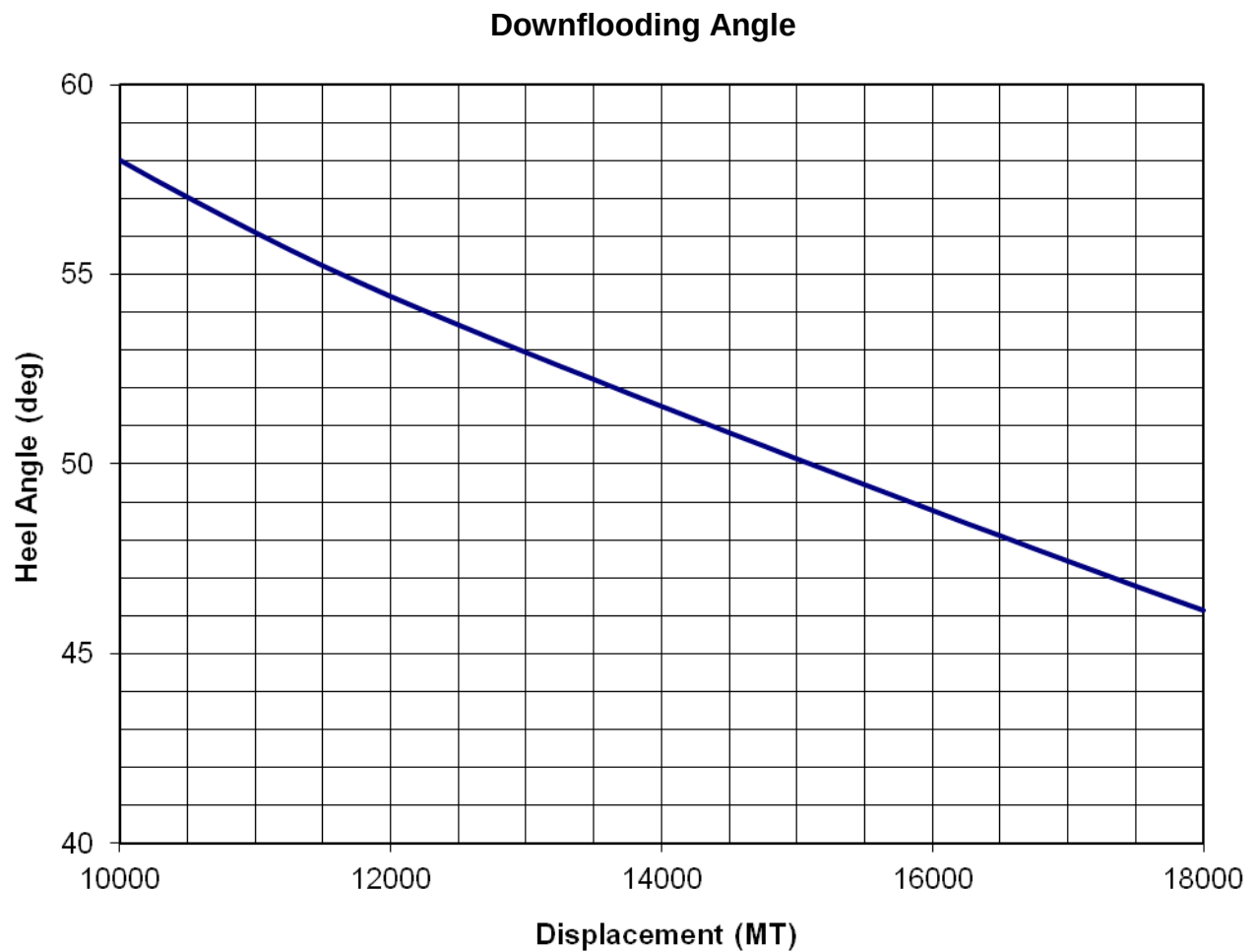
a) Downflooding point.

The position of unprotected openings through which a progressive flooding may take place is given below.

Name:	Aft Ventilation PS/SB
Longitudinal:	2.150 m aft of Aft Perpendicular
Transverse:	13.300 m off center line PS/SB
Vertical:	18.100 m above base line

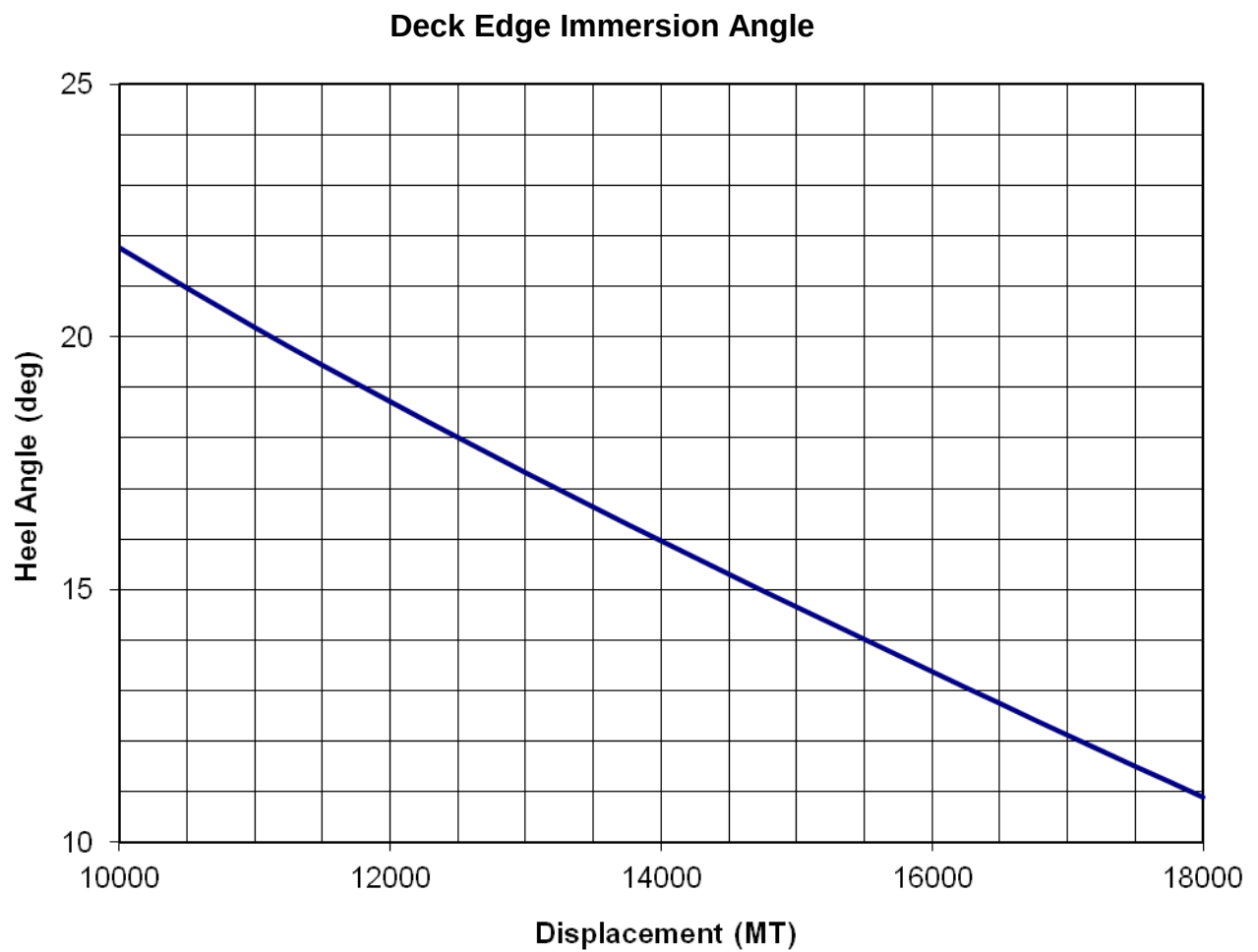
Name:	Fwd Ventilation PS/SB
Longitudinal:	139.200 m fwd of Aft Perpendicular
Transverse:	12.800 m off center line PS/SB
Vertical:	18.100 m above base line

b) Downflooding angle curve.



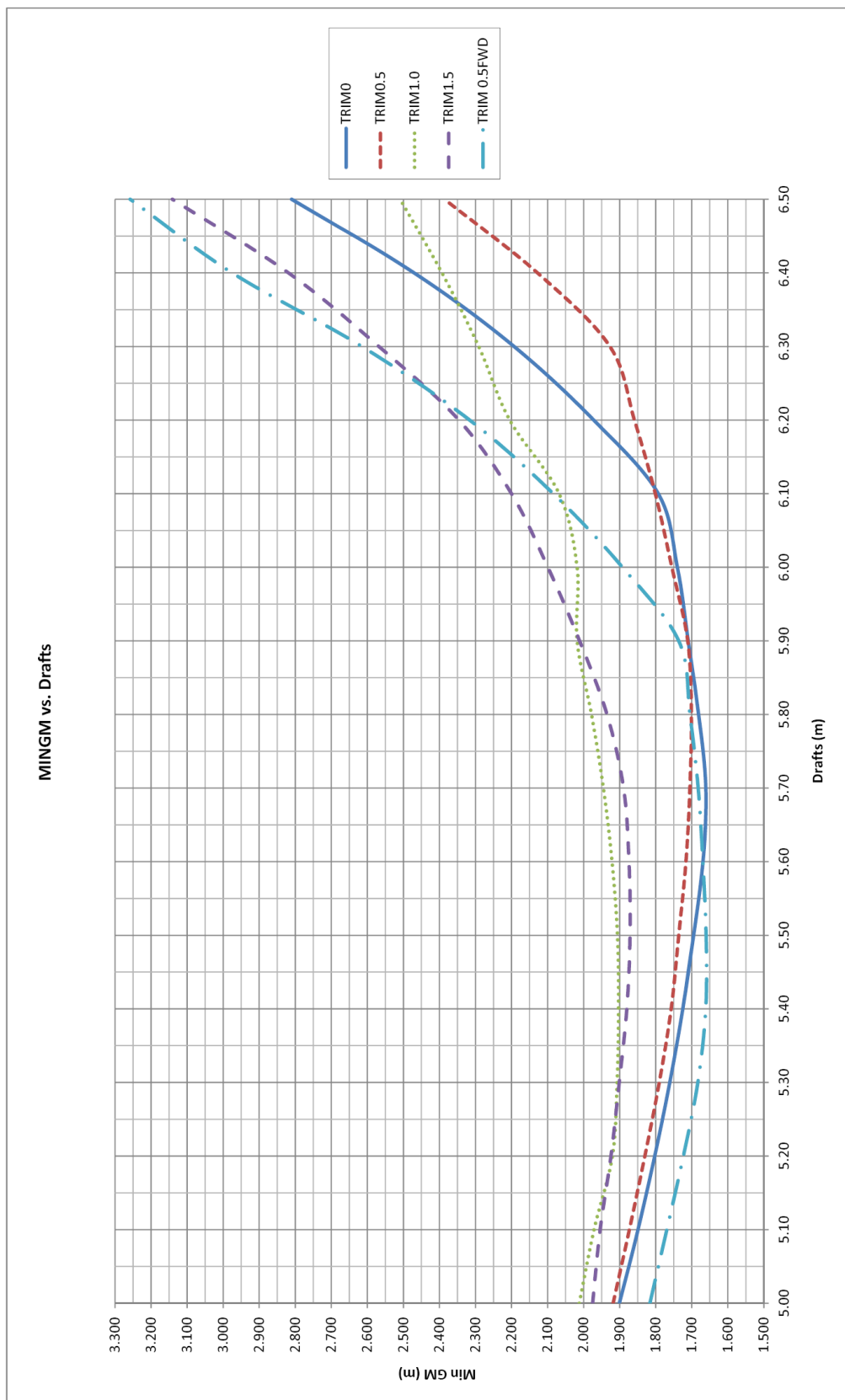
4.5 Curve of Deck Edge Immersion Angle

The angles of Deck Edge Immersion (Deck 3) is given, at the various displacements, by the below curve:

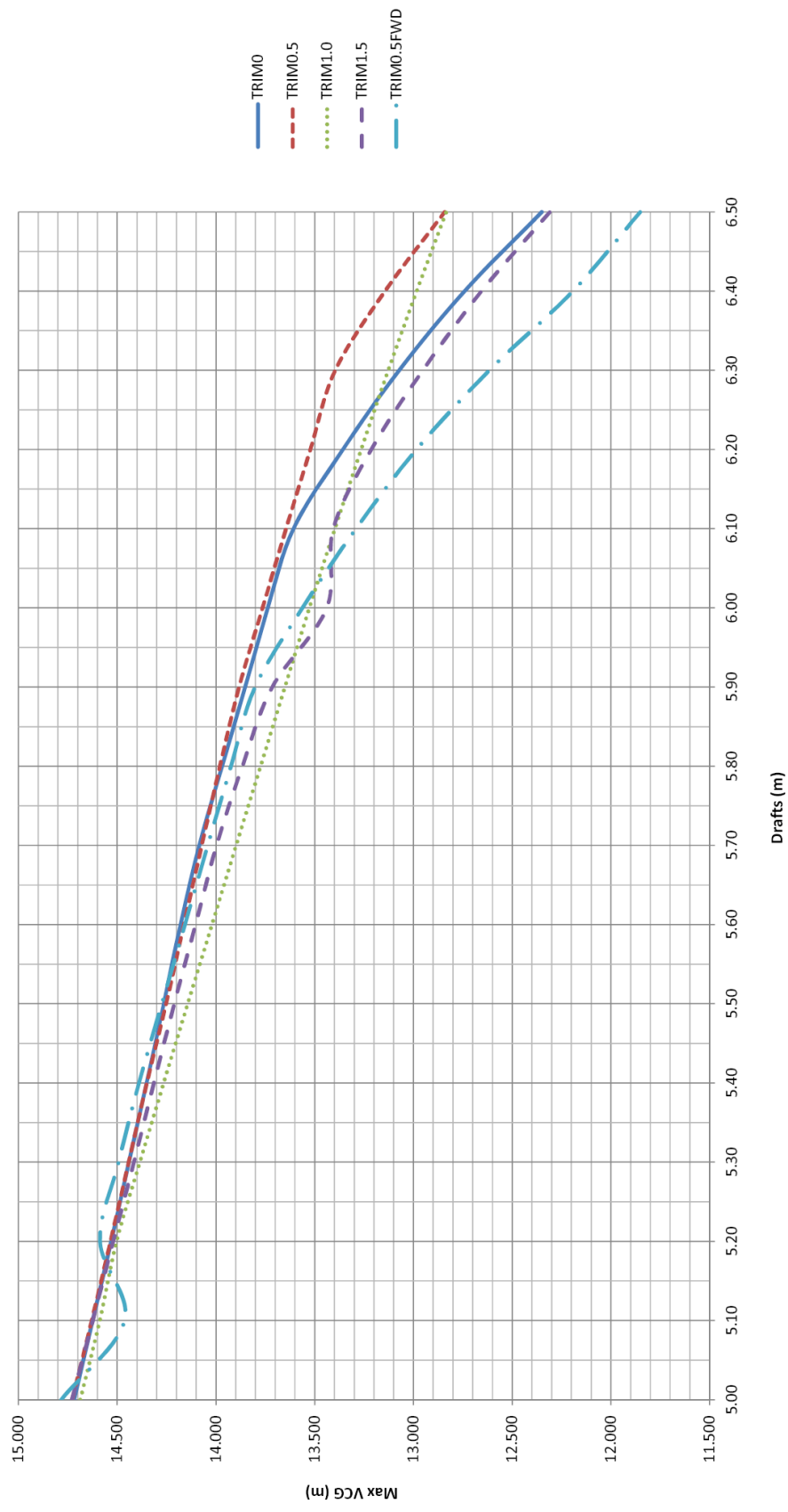


4.6 Stability Limiting Curves and Tables

The following MAXVCG / MINGM tables and curves comply with all the intact and damage (2 compartments) stability criteria and with the Italian Decree n.65 of 14th March 2005 / European Directive 2003/25/EC (Stockholm Agreement) for a significant wave height of 4.0 m.



MAXVCG vs. Drafts



hw=4.0	TRIM 0	
T (m)	MIN GM (m)	MAX VCG (m)
5.00	1.901	14.718
5.10	1.849	14.624
5.20	1.803	14.530
5.30	1.761	14.440
5.40	1.725	14.351
5.50	1.695	14.264
5.60	1.669	14.179
5.70	1.661	14.084
5.80	1.681	13.969
5.90	1.710	13.851
6.00	1.740	13.737
6.10	1.793	13.607
6.20	1.972	13.357
6.30	2.193	13.072
6.40	2.470	12.741
6.50	2.810	12.350

hw=4.0	TRIM 0.5 AFT	
T (m)	MIN GM (m)	MAX VCG (m)
5.00	1.918	14.728
5.10	1.873	14.629
5.20	1.830	14.534
5.30	1.790	14.442
5.40	1.757	14.350
5.50	1.736	14.252
5.60	1.716	14.162
5.70	1.705	14.072
5.80	1.701	13.980
5.90	1.711	13.883
6.00	1.755	13.764
6.10	1.801	13.645
6.20	1.859	13.522
6.30	1.927	13.396
6.40	2.128	13.144
6.50	2.386	12.842

hw=4.0	TRIM 1.0 AFT	
T (m)	MIN GM (m)	MAX VCG (m)
5.00	2.012	14.687
5.10	1.971	14.588
5.20	1.920	14.503
5.30	1.907	14.385
5.40	1.903	14.265
5.50	1.906	14.143
5.60	1.921	14.020
5.70	1.945	13.898
5.80	1.978	13.774
5.90	2.018	13.651
6.00	2.018	13.527
6.10	2.068	13.398
6.20	2.205	13.265
6.30	2.291	13.128
6.40	2.393	12.984
6.50	2.509	12.834

hw=4.0	TRIM 1.5 AFT	
T (m)	MIN GM (m)	MAX VCG (m)
5.00	1.975	14.729
5.10	1.954	14.623
5.20	1.924	14.520
5.30	1.901	14.415
5.40	1.880	14.314
5.50	1.871	14.211
5.60	1.874	14.103
5.70	1.889	13.997
5.80	1.935	13.866
5.90	2.011	13.715
6.00	2.099	13.439
6.10	2.200	13.406
6.20	2.346	13.214
6.30	2.568	12.953
6.40	2.819	12.656
6.50	3.141	12.310

hw=4.0	TRIM 0.5 FORE	
T (m)	MIN GM (m)	MAX VCG (m)
5.00	1.816	14.784
5.10	1.769	14.463
5.20	1.723	14.587
5.30	1.683	14.493
5.40	1.661	14.390
5.50	1.660	14.274
5.60	1.669	14.157
5.70	1.682	14.042
5.80	1.705	13.924
5.90	1.736	13.802
6.00	1.892	13.562
6.10	2.084	13.291
6.20	2.316	12.985
6.30	2.615	12.616
6.40	2.975	12.193
6.50	3.258	11.852

5. DEADWEIGHT AND CAPACITY DATA

5.1 Cargo details

PASSENGERS

COMPARTMENT	LOCATION FR	VCG (m)	LCG (m)	Persons	WEIGHT (t)
Passengers accommodation - Deck 7	111-173	21.00	114.24	50	5.00
Passengers deck 8, cafeteria and lounge	111-144	24.30	102.40	188	18.80
Passengers Accomodation - Deck 9	61-111	27.10	63.30	589	58.90
Passengers lounge bar - Deck 9	78-103	27.10	72.40	173	17.30
TOTAL PASSENGERS		26.27	74.77	1000	100.0

CREW

COMPARTMENT	LOCATION FR	VCG (m)	LCG (m)	Persons	WEIGHT (t)
Crew accommodation - Deck 8	157-172	24.30	132.00	20	2.00
Crew mess and day room - Deck 8	144-157	24.30	120.40	10	1.00
Crew accommodation - Deck 9	111-165	27.10	112.00	24	2.40
TOTAL CREW		25.54	120.96	54	5.40

TRAILERS

COMPARTMENT	LOCATION FR	VCG (m)	LCG (m)	LAIN (m)	MAX WEIGHT (t)
Trailers on Deck 3	-11-177	11.20	64.30	920	2000.00
Trailers on Deck 5	-6-135	16.80	49.70	670	1200.00
Trailers on Deck 7	-11-111	22.70	27.41	460	800.00

CARS

COMPARTMENT	LOCATION FR	VCG (m)	LCG (m)	NUMBER OF CARS	MAX WEIGHT (t)
Cars on Deck 3	-11-177	9.90	66.68	295	445.00
Cars on Deck 5	-6-177	15.50	68.93	305	460.00
Cars on Car-Deck 6	135-173	18.47	123.25	50	75.00
Cars on Deck 7	-11-111	21.10	39.68	183	275.00

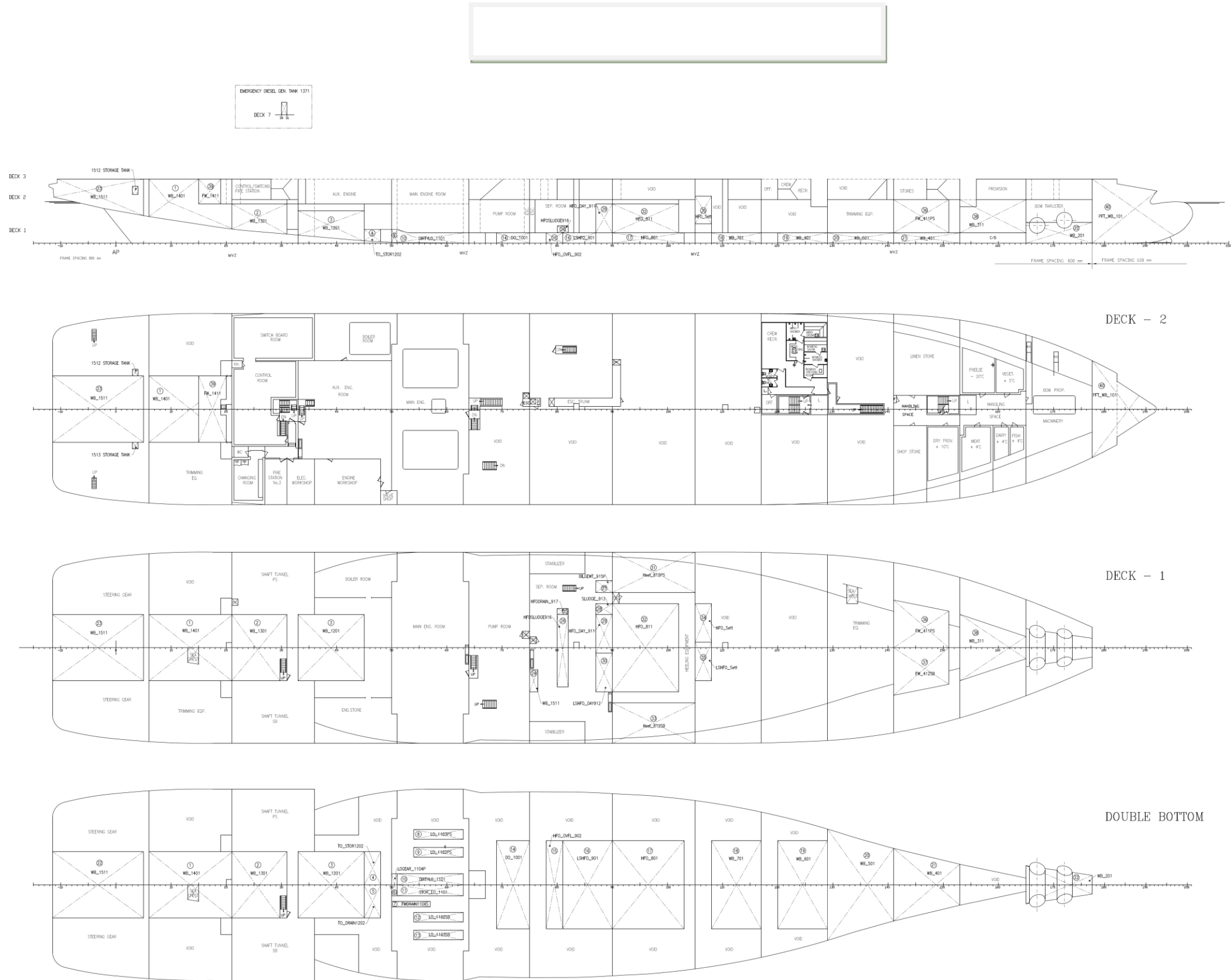
PROVISIONS

COMPARTMENT	LOCATION FR	VCG (m)	LCG (m)	WEIGHT (t)	
				Departure	Arrival
Dry provisions SD - Deck 2	147-153	7.50	120.00	7.0	0.7
Meat stores SB - Deck 2	153-159	7.50	124.80	7.0	0.7
Dairy store SB - Deck 2	159-162	7.50	128.40	7.0	0.7
Fish store SB - Deck 2	162-165	7.50	130.80	4.0	0.4
Freezer store PS - Deck 2	153-159	7.50	124.80	10.0	1.0
Vegetables store PS - Deck 2	159-165	7.50	129.60	3.0	0.3
Galley store PS - Deck 8	160-162	24.30	116.00	7.0	0.7
TOTAL DEPARTURE		10.11	124.10	45.0	
TOTAL ARRIVAL		10.11	124.10	4.5	

STORE

COMPARTMENT	LOCATION FR	VCG (m)	LCG (m)	WEIGHT (t)
Linen store PS - Deck 2	141-153	7.50	117.60	10.0
Deck store PS - Deck 3	-11- -9	9.80	-8.00	2.0
Paint store SB - Deck 3	-11- -6	9.80	-6.80	3.0
Deck store Centre - Deck 3	111-116	9.80	9.80	1.0
Deck store PS - Deck 3	165-171	9.80	134.40	1.0
Deck store PS - Deck 4	-11- -5	12.60	-6.40	1.0
Deck store Centre - Deck 4	135-144	12.60	111.60	1.0
Deck store SB - Deck 4	165-171	12.60	134.40	2.0
Deck store SB - Deck 5	165-171	15.40	134.40	2.0
Tax free shop SB - Deck 8	138-144	24.30	112.80	7.0
Shop store SB - Deck 2	141-147	7.50	114.80	15.0
TOTAL		11.28	98.63	45.0

5.2 Capacity Plan



BALLAST Sprng 1.025 t/m³

N°	TANK NAME	VOLUME [m ³]	WEIGHT [t]	LCG [m]	TCC [m]	VCG [m]	FSM [m ²]
40	PFT_WL_101	261.3	267.87	146.342	0.000	5.636	508.84
3	WL_1201	372.1	381.41	31.289	0.000	2.544	684.30
2	WL_1301	331.7	339.89	21.086	0.000	2.169	514.98
1	WL_1401	626.6	642.30	10.077	0.000	5.095	956.26
23	WL_1511	438.0	438.79	-1.706	0.000	7.457	160.81
22	WL_201	40.7	41.75	137.005	0.000	1.702	16.81
38	WL_311	273.5	280.34	129.402	-0.017	3.939	108.43
21	WL_401	75.4	77.31	117.171	0.000	0.887	372.90
20	WL_501	134.8	138.19	107.479	0.000	0.852	1773.86
19	WL_601	126.9	130.04	99.547	0.000	0.779	1240.68
18	WL_701	126.4	130.76	99.588	0.000	0.750	1243.89
SUBTOTALS		2804.5	2874.68	53.746	0.007	4.054	8581.58

FRESH WATER Sprng 1.000 t/m³

N°	TANK NAME	VOLUME [m ³]	WEIGHT [t]	LCG [m]	TCC [m]	VCG [m]	FSM [m ²]
30	FW_1411	139.4	139.41	13.930	-0.011	7.400	355.87
36	FW_411PS	131.0	131.00	116.609	2.981	4.087	135.52
17	FW_412SB	134.5	134.50	116.609	-2.981	4.087	135.17
SUBTOTALS		405.4	405.40	81.183	-0.003	5.330	630.81

HEATING TANK Sprng 1.000 t/m³

N°	TANK NAME	VOLUME [m ³]	WEIGHT [t]	LCG [m]	TCC [m]	VCG [m]	FSM [m ²]
33	Hmt_R12PS	320.7	320.67	77.969	10.872	3.940	194.40
33	Hmt_R12SB	320.7	320.67	77.969	-10.872	3.940	194.40
SUBTOTALS		641.3	641.33	77.969	0.000	3.940	388.81

DIESEL OIL Sprng 0.880 t/m³

N°	TANK NAME	VOLUME [m ³]	WEIGHT [t]	LCG [m]	TCC [m]	VCG [m]	FSM [m ²]
14	DO_1001	95.3	77.67	57.600	0.000	0.750	706.96
24	DO_DMT_914	15.1	13.01	60.800	-4.750	3.500	2.85
SUBTOTALS		105.4	90.67	58.059	-0.081	1.144	709.81

THERMAL OIL Sprng 0.861 t/m³

N°	TANK NAME	VOLUME [m ³]	WEIGHT [t]	LCG [m]	TCC [m]	VCG [m]	FSM [m ²]
5	TOLDRMT1002	22.8	19.82	37.215	-2.311	1.219	17.52
4	TOLDRMT1001	22.8	19.82	37.215	2.311	1.219	17.52
SUBTOTALS		45.6	39.23	37.215	0.000	1.219	35.04

HEAVY FUEL OIL Sprng 0.880 t/m³

N°	TANK NAME	VOLUME [m ³]	WEIGHT [t]	LCG [m]	TCC [m]	VCG [m]	FSM [m ²]
17	HFO_R01	195.7	191.76	77.200	0.000	0.750	1745.49
30	HFO_R11	481.7	472.08	78.800	0.000	3.500	1611.26
30	HFO_DMT_911	52.7	51.63	70.800	2.000	3.500	33.75
15	HFO_DMT_902	45.2	44.25	63.800	0.000	0.750	402.80
34	HFO_Set	52.7	51.63	85.200	3.800	4.800	33.75
16	LHFO_R01	135.5	132.76	68.400	0.000	0.750	1208.45
32	LHFO_DMT912	52.7	51.64	70.800	-2.800	3.500	33.75
35	LHFO_Set	52.7	51.63	85.200	-2.000	4.800	33.75
26	SLUDGE_913	15.1	14.75	70.800	5.800	3.500	0.79
SUBTOTALS		1083.8	1062.16	75.422	0.078	2.672	5103.71

LUBE OIL Sprng 0.910 t/m³

N°	TANK NAME	VOLUME [m ³]	WEIGHT [t]	LCG [m]	TCC [m]	VCG [m]	FSM [m ²]
10	DRYFLD_1101	24.2	22.03	45.600	0.800	0.810	2.90
8	LC_1102PS	15.0	13.66	46.800	4.899	0.840	1.33
12	LC_1102SB	15.0	13.66	46.800	-4.899	0.840	1.33
8	LC_1103PS	13.4	12.21	46.864	7.388	0.939	1.14
13	LC_1103SB	13.4	12.21	46.864	-7.388	0.939	1.14
11	SPR_LC_1101	24.2	22.03	45.600	-0.800	0.810	2.90
SUBTOTALS		105.3	95.81	46.265	0.000	0.851	10.73

MISCELLANEOUS Sprng 1.000 t/m³

N°	TANK NAME	VOLUME [m ³]	WEIGHT [t]	LCG [m]	TCC [m]	VCG [m]	FSM [m ²]
27	BLDRMT_91SP	15.1	15.08	70.800	8.800	3.450	0.82
7	FRDRMT_104S	5.2	5.19	42.800	-2.800	0.965	0.14
25	HFDRMT_917	1.6	1.63	64.800	5.100	2.000	0.05
28	HFDRMT_918	17.5	17.51	64.800	-2.000	2.000	188.83
6	LOCAR_1104P	6.4	6.45	40.400	0.000	1.049	2.82
SUBTOTALS		45.9	45.86	60.856	2.416	2.226	183.27

ALL TANKS

TOTALS	VOLUME [m ³]	WEIGHT [t]	LCG [m]	TCC [m]	VCG [m]	FSM [m ²]
TOTALS	5522.1	5542.25	65.944	0.023	3.752	15951.18

CAPACITY PLAN

5.3 Summary of Tanks

BALLAST (S.G. 1.025 t/m³)

Tank Name	Load (%)	Volume (m ³)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	Max FSM (MT-m)
PFT_WB_101.C	100.00%	259.7	266.16	146.333f	0.000	5.614	499.4
WB_201.C	100.00%	40.7	41.70	137.000f	0.000	1.702	16.5
WB_401.C	100.00%	75.4	77.29	117.171f	0.000	0.887	373.0
WB_501.C	100.00%	134.8	138.17	107.479f	0.000	0.852	1 773.9
WB_601.C	100.00%	126.9	130.02	99.547f	0.000	0.779	1 240.7
WB_701.C	100.00%	135.4	138.76	89.998f	0.000	0.750	1 263.9
WB_1201.C	100.00%	372.1	381.44	31.268f	0.000	2.545	684.1
WB_1301.C	100.00%	331.0	339.22	21.058f	0.085p	3.167	512.2
WB_1401.C	100.00%	626.7	642.35	10.017f	0.000	5.095	956.2
WB_1511.C	100.00%	426.0	436.64	1.706a	0.000	7.457	960.8
WB_311.C	100.00%	276.2	283.14	126.489f	0.017s	3.951	290.7
Subtotals:	100.00%	2 804.8	2 874.90	53.766f	0.008p	4.052	8 571.5

FRESH WATER (S.G. 1.000 t/m³)

Tank Name	Load (%)	Volume (m ³)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	Max FSM (MT-m)
FW_1411.C	100.00%	139.9	139.89	13.936f	0.010s	7.400	355.9
FW_411PS.P	100.00%	131.0	131.01	116.609f	2.991p	4.087	135.5
FW_412SB.S	100.00%	134.5	134.54	116.609f	2.991s	4.087	139.2
Subtotals:	100.00%	405.4	405.43	81.183f	0.030s	5.230	630.6

HW (S.G. 1.000 t/m³)

Tank Name	Load (%)	Volume (m ³)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	Max FSM (MT-m)
HEEL_812PS.P	100.00%	320.7	320.69	77.968f	10.872p	3.939	194.4
HEEL_812SB.S	100.00%	323.7	323.67	77.968f	10.872s	3.939	196.2
Subtotals:	100.00%	644.4	644.36	77.968f	0.050s	3.939	390.6

DIESEL OIL (S.G. 0.860 t/m³)

Tank Name	Load (%)	Volume (m ³)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	Max FSM (MT-m)
DO_1001.C	100.00%	90.3	77.67	57.600f	0.000	0.750	707.0
DO_DAY_914.S	100.00%	15.1	13.01	60.800f	4.750s	3.500	3.0
Subtotals:	100.00%	105.4	90.67	58.059f	0.681s	1.144	709.9

TO (S.G. 0.861 t/m³)

Tank Name	Load (%)	Volume (m ³)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	Max FSM (MT-m)
TO_STOR1202.P	100.00%	22.8	19.63	37.215f	2.311p	1.219	17.5
TO_DRAIN1202.S	100.00%	22.8	19.63	37.215f	2.311s	1.219	17.5
Subtotals:	100.00%	45.6	39.25	37.215f	0.000	1.219	35.0

HFO (S.G. 0.980 t/m³)

Tank Name	Load (%)	Volume (m ³)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	Max FSM (MT-m)
HFO_801.C	100.00%	195.7	191.75	77.200f	0.000	0.750	1 745.4
HFO_811.C	100.00%	481.7	472.07	76.800f	0.000	3.500	1 611.2
HFO_OVFL_902.C	100.00%	45.2	44.25	63.600f	0.000	0.750	402.8
HFO_DAY_911.P	100.00%	52.7	51.63	70.800f	2.000p	3.500	33.7
HFO_SETT.P	100.00%	52.7	51.63	85.200f	3.600p	4.800	33.7
SLUDGE_913.P	100.00%	15.1	14.75	70.800f	5.600p	3.500	0.8
Subtotals:	100.00%	843.0	826.09	76.229f	0.450p	2.796	3 827.7

LSHFO (S.G. 0.980 t/m³)

Tank Name	Load (%)	Volume (m3)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	Max FSM (MT-m)
LSHFO_901.C	100.00%	135.5	132.76	68.400f	0.000	0.750	1 208.4
LSHFO_DAY912.S	100.00%	52.7	51.63	70.800f	3.600s	3.500	33.7
LSHFO_SETT.S	100.00%	52.7	51.63	85.200f	2.000s	4.800	33.7
Subtotals:	100.00%	240.8	236.03	72.600f	1.225s	2.238	1 275.9

LUBE OIL (S.G. 0.910 t/m³)

Tank Name	Load (%)	Volume (m3)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	Max FSM (MT-m)
LO_1102PS.P	100.00%	15.0	13.67	46.801f	4.500p	0.840	1.3
LO_1102SB.S	100.00%	15.0	13.67	46.801f	4.500s	0.840	1.3
LO_1103PS.P	100.00%	13.4	12.21	46.865f	7.388p	0.939	1.1
LO_1103SB.S	100.00%	13.4	12.21	46.865f	7.388s	0.939	1.1
DIRTYLO_1101.P	100.00%	24.2	22.03	45.600f	0.800p	0.810	2.9
STOR_LO_1101.S	100.00%	24.2	22.03	45.600f	0.800s	0.810	2.9
Subtotals:	100.00%	105.3	95.82	46.265f	0.000	0.852	10.7

MISCELLANEOUS (S.G. 1.000 t/m³)

Tank Name	Load (%)	Volume (m3)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	Max FSM (MT-m)
BILGEWT_915P.P	100.00%	15.1	15.08	70.800f	8.800p	3.450	0.8
HFODRAIN_917.P	100.00%	1.6	1.63	64.800f	5.100p	2.000	0.0
HFOSLUDGE916.S	100.00%	17.5	17.51	64.800f	0.900s	2.000	189.6
LOGEAR_1104P.C	100.00%	6.4	6.45	40.400f	0.000	1.050	2.6
FWDRAIN1104S.S	100.00%	5.2	5.19	42.800f	2.800s	0.965	0.1
Subtotals:	100.00%	45.9	45.86	60.853f	2.415p	2.226	193.3

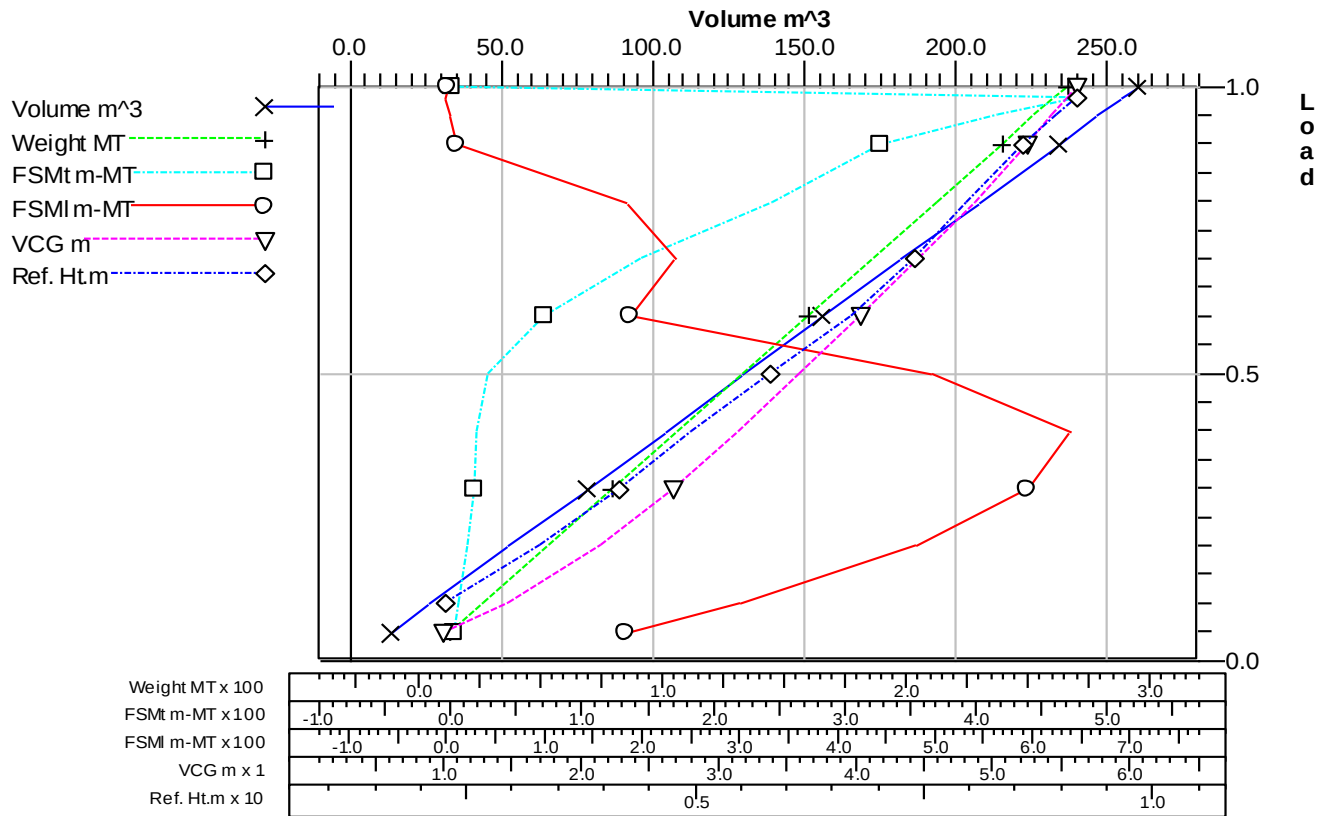
5.4 Capacity Tables

Tank Capacities for PFT_WB_101.C containing BALLAST (1.025)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
5.00%	12.98	13.31	147.017f	0.000	0.997	2.42	182.14
10.00%	25.97	26.62	147.429f	0.000	1.467	5.72	300.68
20.00%	51.93	53.23	147.946f	0.000	2.139	12.73	481.18
30.00%	77.90	79.85	148.270f	0.000	2.670	18.22	594.69
40.00%	103.87	106.47	148.400f	0.000	3.141	19.70	637.15
50.00%	129.84	133.08	148.248f	0.000	3.589	28.23	494.06
60.00%	155.80	159.70	147.755f	0.000	4.034	71.11	186.62
70.00%	181.77	186.31	147.350f	0.000	4.465	145.58	233.76
80.00%	207.74	212.93	147.036f	0.000	4.867	245.11	182.84
90.00%	233.70	239.55	146.693f	0.000	5.244	327.69	10.38
95.00%	246.69	252.85	146.504f	0.000	5.429	417.50	1.74
98.00%	254.48	260.84	146.399f	0.000	5.540	478.43	-2.29
100.00%	259.67	266.16	146.333f	0.000	5.614		

Tank Characteristics

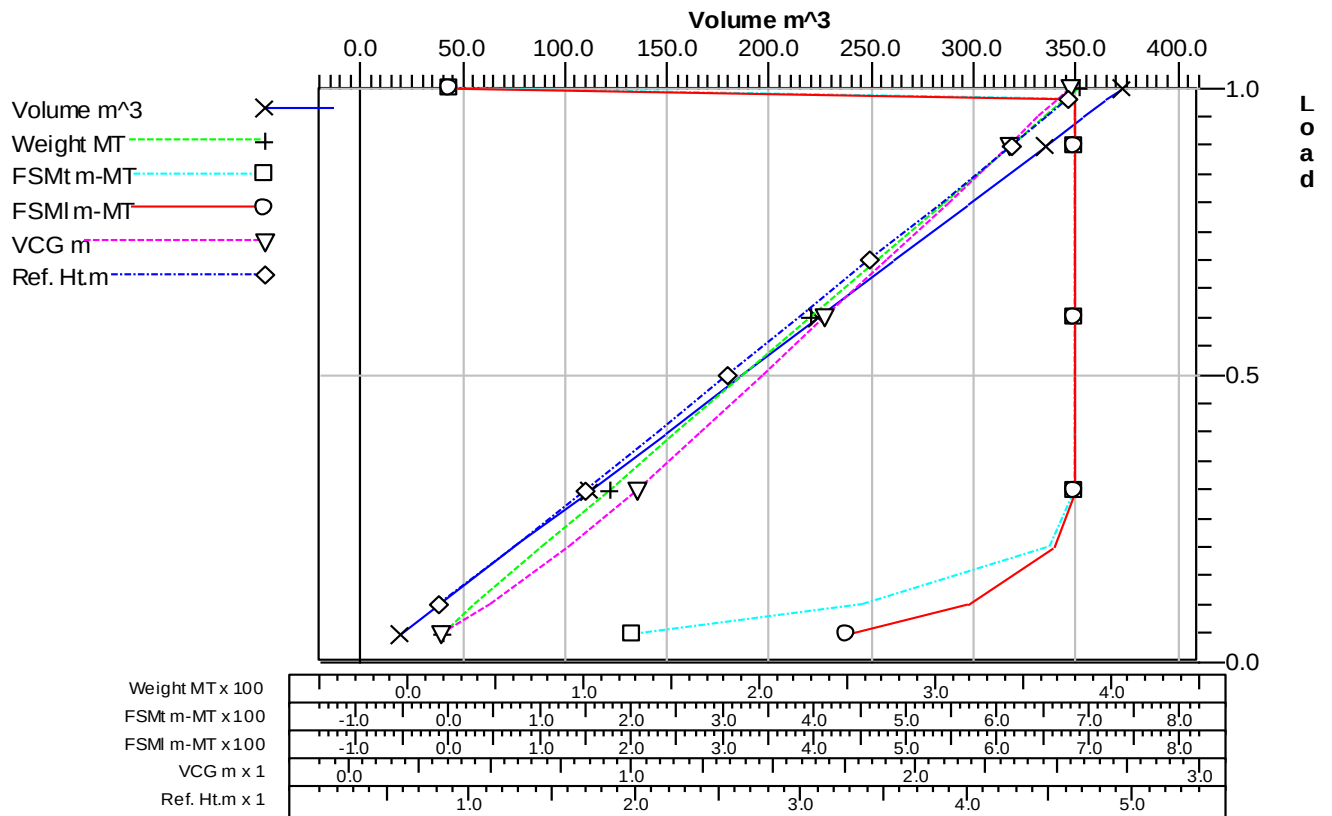


Tank Capacities for WB_1201.C containing BALLAST (1.025)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMl (MT-m)
5.00%	18.61	19.07	31.700f	0.000	0.322	201.85	434.87
10.00%	37.21	38.14	31.678f	0.000	0.502	452.19	567.36
20.00%	74.43	76.29	31.536f	0.000	0.776	656.87	662.49
30.00%	111.64	114.43	31.428f	0.000	1.013	684.12	684.14
40.00%	148.86	152.58	31.371f	0.000	1.239	684.12	684.14
50.00%	186.07	190.72	31.337f	0.000	1.460	684.12	684.14
60.00%	223.28	228.87	31.314f	0.000	1.679	684.12	684.14
70.00%	260.50	267.01	31.298f	0.000	1.897	684.12	684.14
80.00%	297.71	305.15	31.286f	0.000	2.113	684.12	684.14
90.00%	334.92	343.30	31.276f	0.000	2.329	684.12	684.14
95.00%	353.53	362.37	31.272f	0.000	2.437	684.12	684.14
98.00%	364.70	373.81	31.270f	0.000	2.502	684.12	684.14
100.00%	372.14	381.44	31.268f	0.000	2.545		

Tank Characteristics

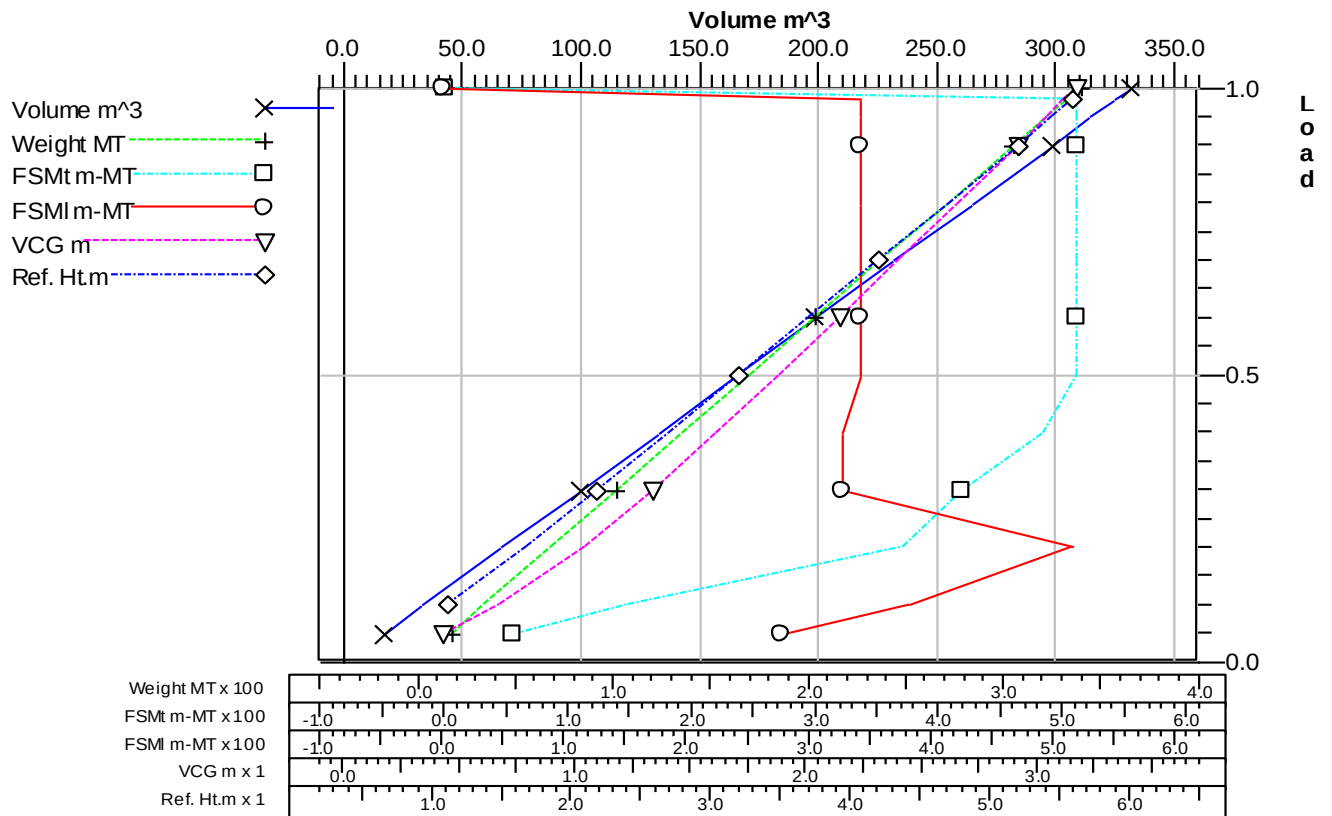


Tank Capacities for WB_1301.C containing BALLAST (1.025)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMl (MT-m)
5.00%	16.55	16.96	21.933f	0.000	0.426	55.71	278.49
10.00%	33.10	33.92	22.000f	0.000	0.677	148.01	382.32
20.00%	66.19	67.84	22.031f	0.000	1.045	370.64	516.16
30.00%	99.29	101.77	21.918f	0.000	1.338	418.17	327.40
40.00%	132.38	135.69	21.644f	0.031p	1.614	484.86	327.38
50.00%	165.47	169.61	21.452f	0.049p	1.883	512.20	341.82
60.00%	198.57	203.53	21.321f	0.061p	2.145	512.17	341.75
70.00%	231.66	237.46	21.227f	0.070p	2.403	512.15	341.69
80.00%	264.76	271.38	21.157f	0.076p	2.659	512.12	341.63
90.00%	297.85	305.30	21.102f	0.081p	2.914	512.09	341.57
95.00%	314.40	322.26	21.079f	0.083p	3.041	512.08	341.54
98.00%	324.33	332.44	21.066f	0.084p	3.117	512.07	341.51
100.00%	330.95	339.22	21.058f	0.085p	3.167		

Tank Characteristics

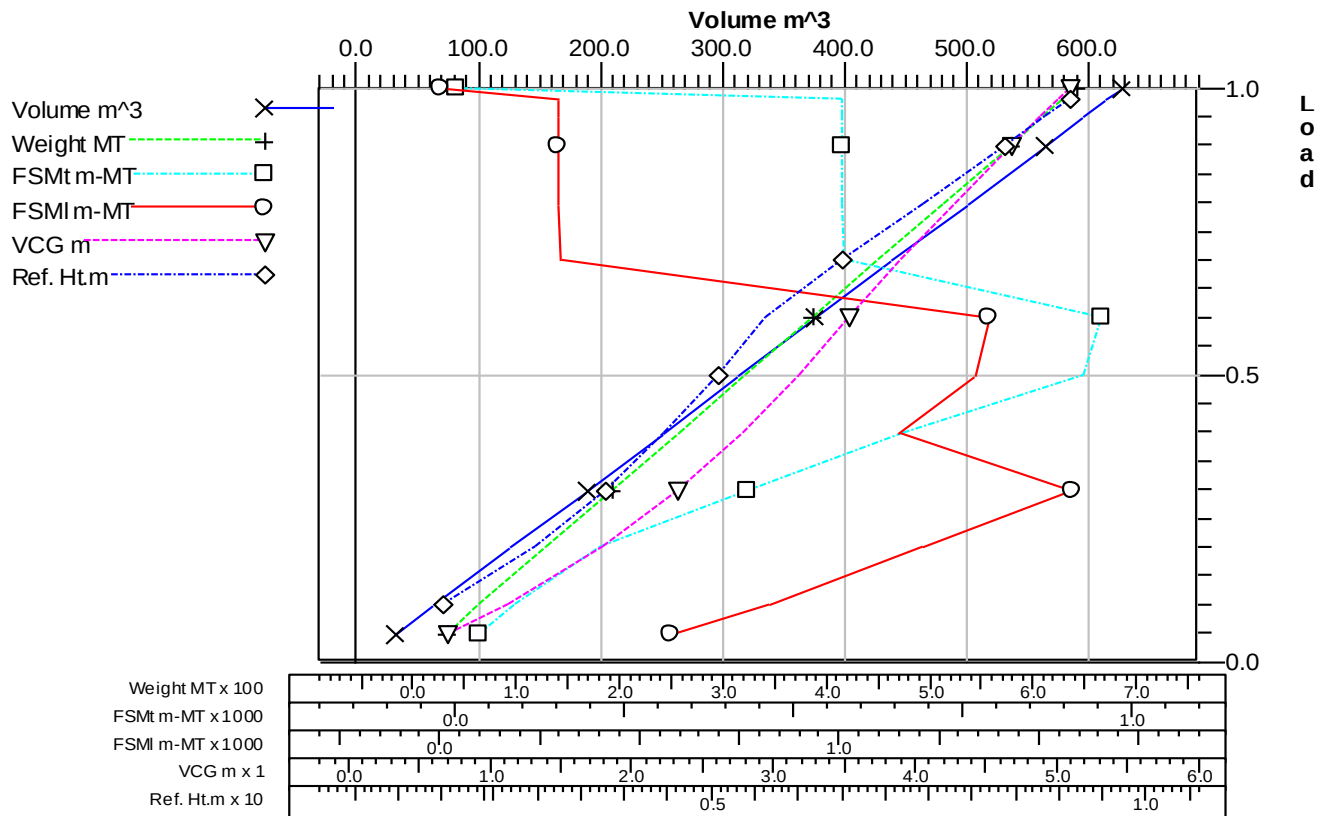


Tank Capacities for WB_1401.C containing BALLAST (1.025)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
5.00%	31.34	32.12	10.946f	0.000	0.690	34.41	576.47
10.00%	62.67	64.24	11.043f	0.000	1.133	89.25	824.35
20.00%	125.34	128.47	11.060f	0.000	1.799	214.92	1 208.78
30.00%	188.01	192.71	11.053f	0.000	2.328	431.46	1 583.90
40.00%	250.67	256.94	11.071f	0.000	2.776	663.24	1 150.43
50.00%	313.34	321.18	11.084f	0.000	3.174	930.42	1 341.46
60.00%	376.01	385.41	11.038f	0.000	3.535	956.21	1 376.76
70.00%	438.68	449.65	10.710f	0.000	3.893	573.85	297.56
80.00%	501.35	513.88	10.421f	0.000	4.277	573.74	297.40
90.00%	564.02	578.12	10.197f	0.000	4.680	573.63	297.24
95.00%	595.35	610.23	10.102f	0.000	4.886	573.58	297.15
98.00%	614.15	629.50	10.050f	0.000	5.011	573.55	297.10
100.00%	626.69	642.35	10.017f	0.000	5.095		

Tank Characteristics

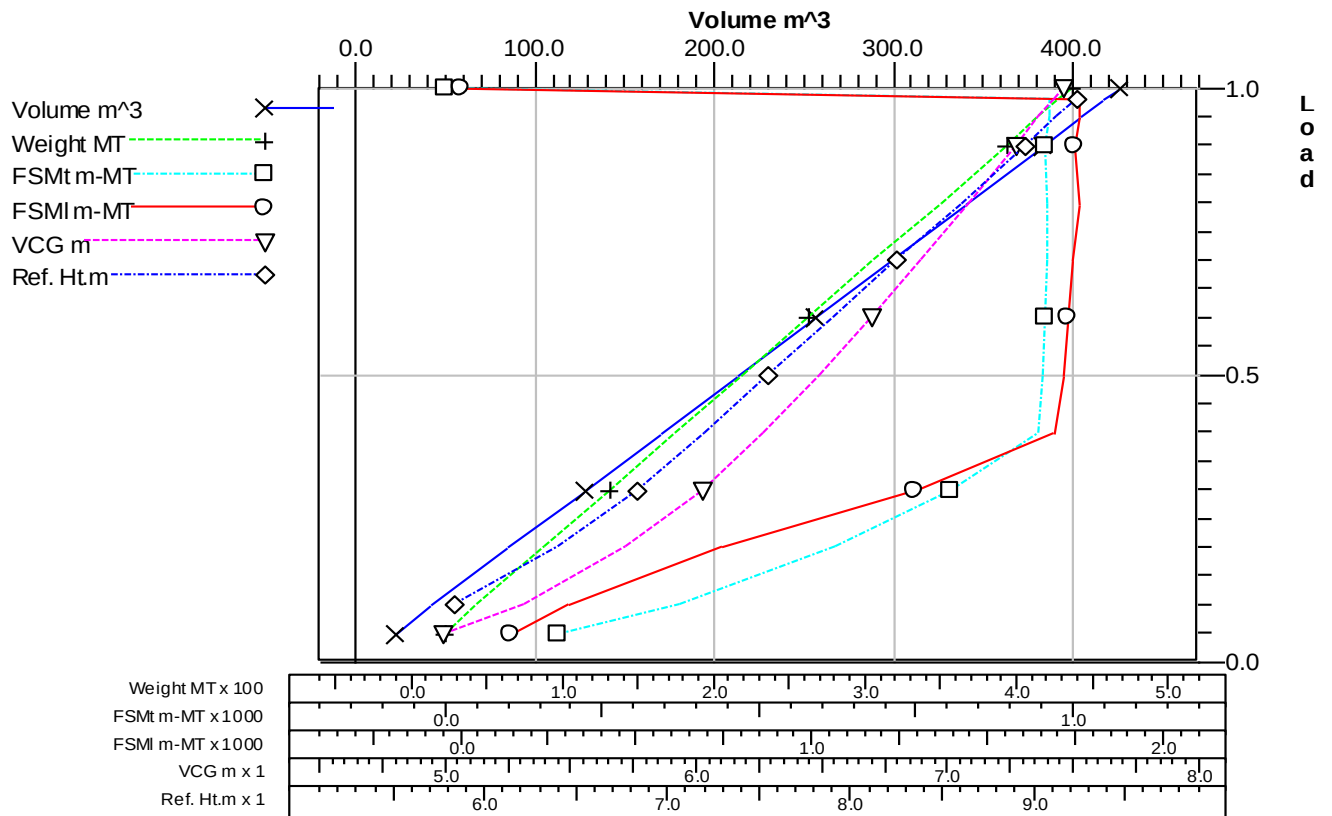


Tank Capacities for WB_1511.C containing BALLAST (1.025)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMl (MT-m)
5.00%	21.30	21.83	1.854f	0.000	4.984	178.90	143.05
10.00%	42.60	43.66	1.398f	0.000	5.307	371.98	308.84
20.00%	85.20	87.33	0.613f	0.000	5.718	622.09	741.46
30.00%	127.80	130.99	0.037a	0.000	6.018	805.60	1 291.02
40.00%	170.39	174.65	0.572a	0.000	6.266	942.72	1 686.15
50.00%	212.99	218.32	0.942a	0.000	6.487	951.76	1 712.63
60.00%	255.59	261.98	1.192a	0.000	6.693	954.42	1 727.00
70.00%	298.19	305.64	1.373a	0.000	6.891	957.07	1 741.41
80.00%	340.79	349.31	1.511a	0.000	7.083	959.71	1 755.87
90.00%	383.39	392.97	1.618a	0.000	7.271	954.29	1 746.43
95.00%	404.69	414.80	1.664a	0.000	7.364	960.81	1 761.91
98.00%	417.47	427.90	1.690a	0.000	7.420	960.81	1 761.91
100.00%	425.99	436.64	1.706a	0.000	7.457		

Tank Characteristics

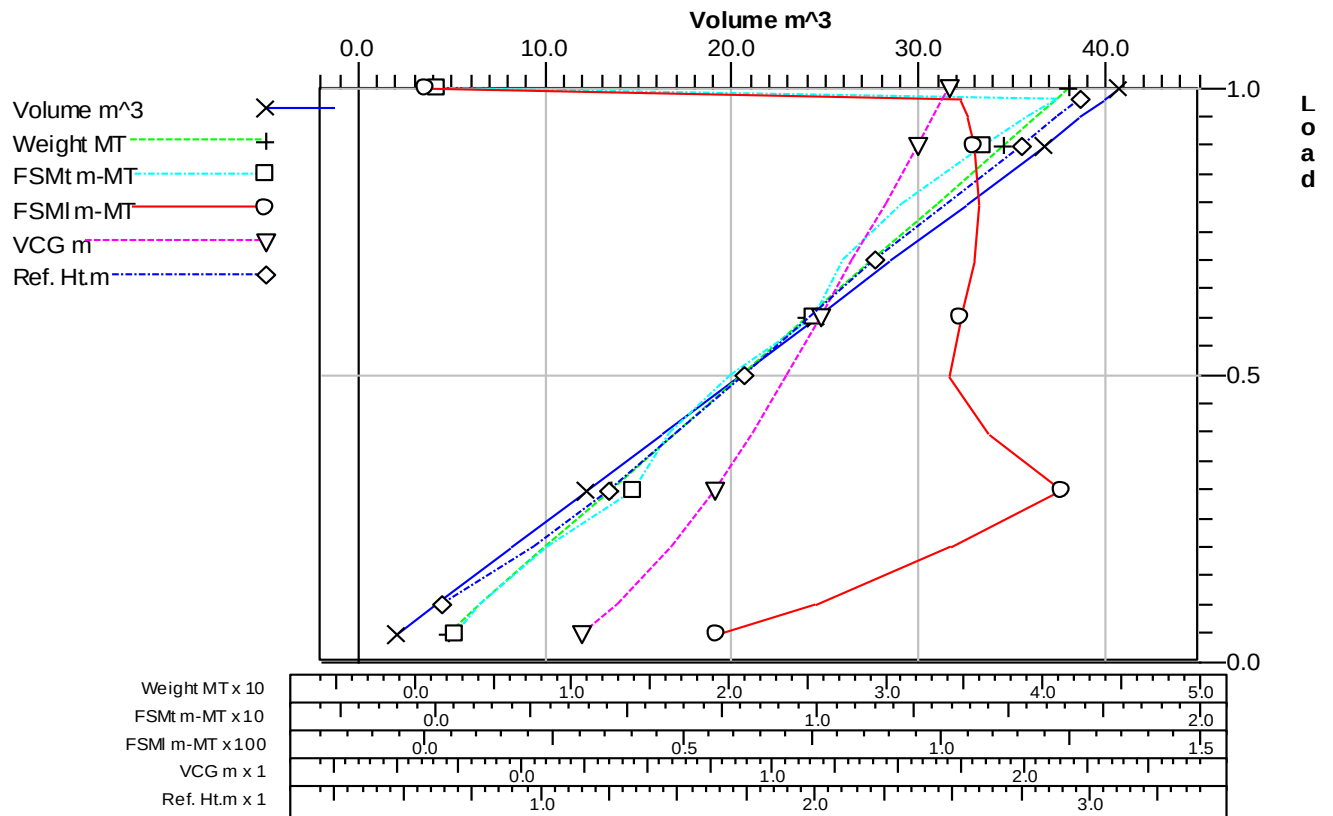


Tank Capacities for WB_201.C containing BALLAST (1.025)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMl (MT-m)
5.00%	2.03	2.08	136.213f	0.000	0.237	0.51	56.56
10.00%	4.07	4.17	136.243f	0.000	0.381	1.18	75.59
20.00%	8.14	8.34	136.273f	0.000	0.598	2.95	101.83
30.00%	12.20	12.51	136.288f	0.000	0.770	5.19	123.27
40.00%	16.27	16.68	136.371f	0.000	0.919	6.09	108.88
50.00%	20.34	20.85	136.520f	0.000	1.057	7.71	101.57
60.00%	24.41	25.02	136.646f	0.000	1.190	9.89	103.68
70.00%	28.48	29.19	136.751f	0.000	1.318	10.66	106.11
80.00%	32.54	33.36	136.840f	0.000	1.445	12.22	107.28
90.00%	36.61	37.53	136.921f	0.000	1.573	14.31	106.28
95.00%	38.65	39.61	136.961f	0.000	1.638	15.51	104.95
98.00%	39.87	40.86	136.985f	0.000	1.676	16.27	103.69
100.00%	40.68	41.70	137.000f	0.000	1.702		

Tank Characteristics

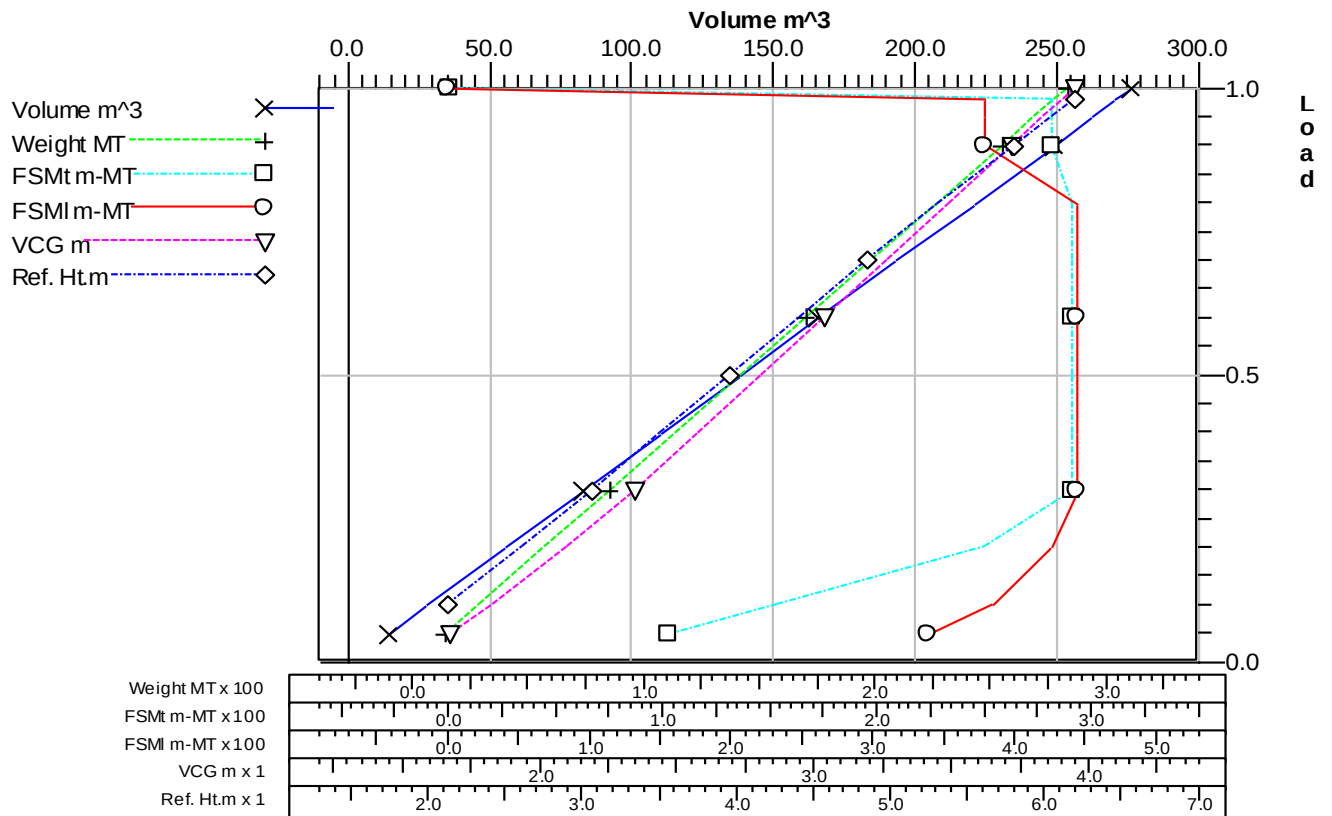


Tank Capacities for WB_311.C containing BALLAST (1.025)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMl (MT-m)
5.00%	13.81	14.16	126.584f	0.000	1.672	102.75	338.04
10.00%	27.62	28.31	126.601f	0.000	1.826	152.88	384.68
20.00%	55.25	56.63	126.578f	0.000	2.097	250.19	425.87
30.00%	82.87	84.94	126.521f	0.000	2.343	290.75	443.77
40.00%	110.49	113.25	126.485f	0.000	2.578	290.75	443.77
50.00%	138.12	141.57	126.463f	0.000	2.809	290.75	443.77
60.00%	165.74	169.88	126.448f	0.000	3.037	290.75	443.77
70.00%	193.36	198.20	126.438f	0.000	3.263	290.75	443.77
80.00%	220.98	226.51	126.430f	0.000	3.489	290.75	443.77
90.00%	248.61	254.82	126.463f	0.009s	3.718	281.89	378.26
95.00%	262.42	268.98	126.477f	0.013s	3.834	281.89	378.26
98.00%	270.71	277.47	126.485f	0.016s	3.904	281.89	378.26
100.00%	276.23	283.14	126.489f	0.017s	3.951		

Tank Characteristics

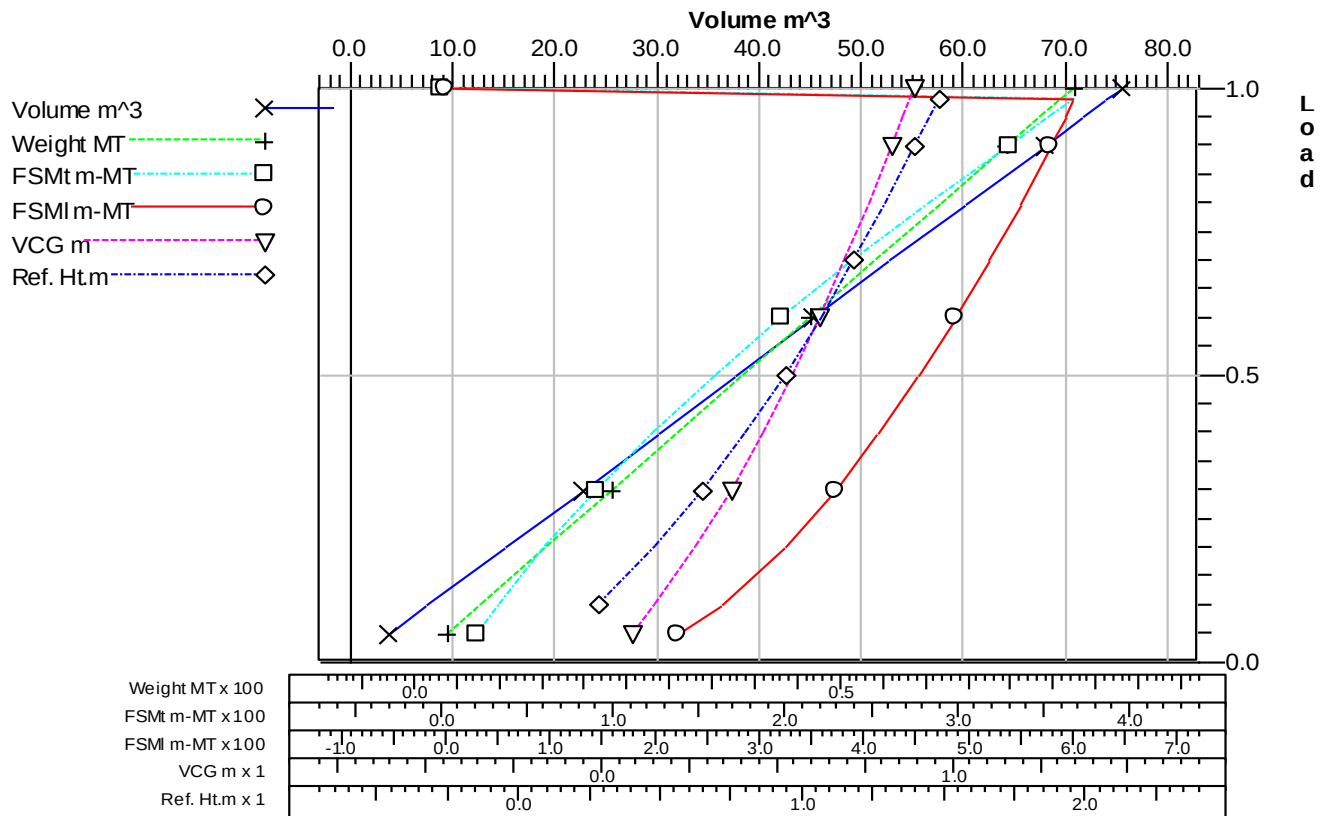


Tank Capacities for WB_401.C containing BALLAST (1.025)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMl (MT-m)
5.00%	3.77	3.87	117.006f	0.000	0.086	20.43	221.97
10.00%	7.54	7.73	117.035f	0.000	0.154	33.47	264.09
20.00%	15.08	15.46	117.070f	0.000	0.269	60.56	324.12
30.00%	22.62	23.19	117.092f	0.000	0.369	90.26	372.31
40.00%	30.16	30.92	117.110f	0.000	0.459	123.10	414.00
50.00%	37.70	38.65	117.124f	0.000	0.541	159.05	451.87
60.00%	45.25	46.38	117.136f	0.000	0.618	197.82	486.39
70.00%	52.79	54.11	117.147f	0.000	0.691	239.19	518.89
80.00%	60.33	61.84	117.156f	0.000	0.759	283.09	549.35
90.00%	67.87	69.56	117.164f	0.000	0.825	329.40	577.82
95.00%	71.64	73.43	117.167f	0.000	0.856	353.41	591.75
98.00%	73.90	75.75	117.170f	0.000	0.875	368.08	599.92
100.00%	75.41	77.29	117.171f	0.000	0.887		

Tank Characteristics

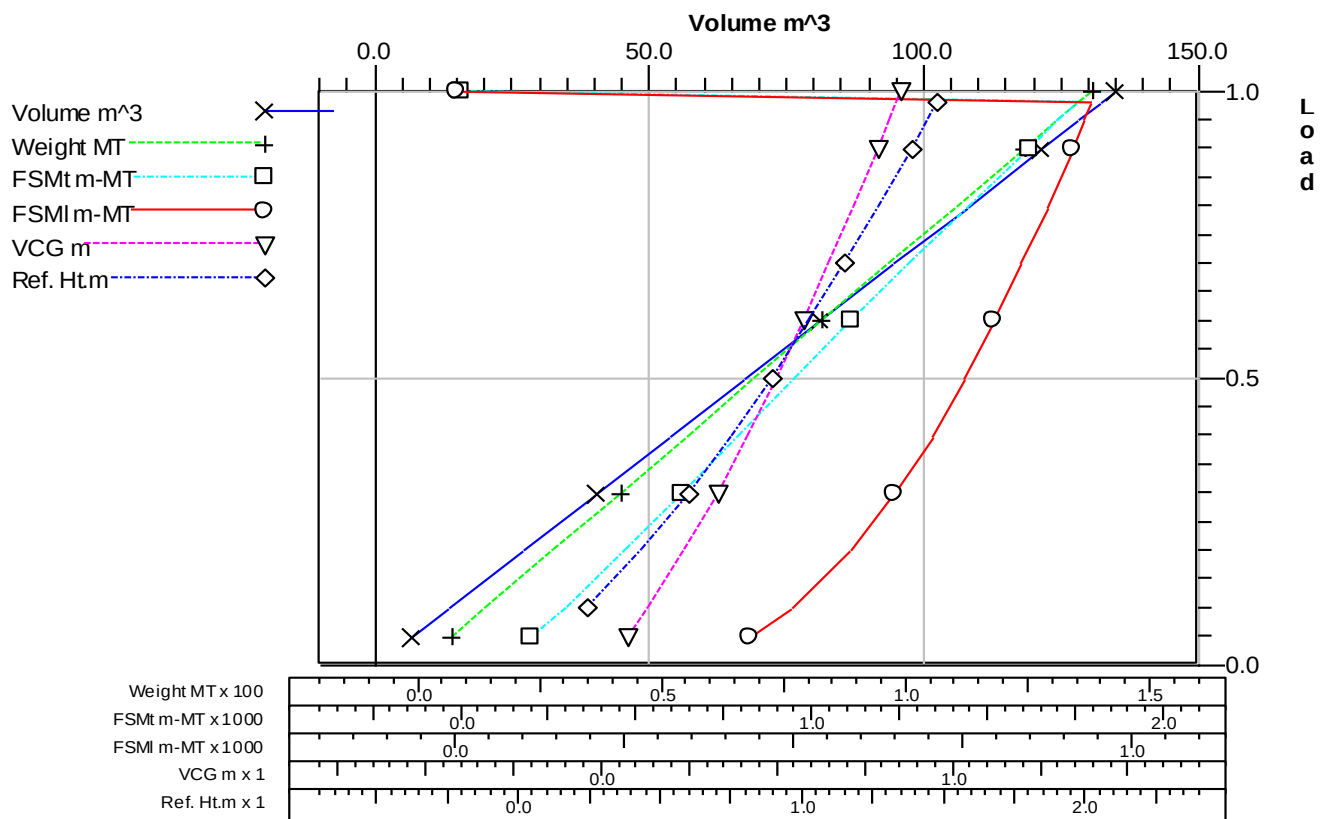


Tank Capacities for WB_501.C containing BALLAST (1.025)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMl (MT-m)
5.00%	6.74	6.91	107.338f	0.000	0.072	201.61	435.49
10.00%	13.48	13.82	107.357f	0.000	0.131	298.62	498.67
20.00%	26.96	27.63	107.381f	0.000	0.236	468.62	584.67
30.00%	40.44	41.45	107.398f	0.000	0.329	629.43	649.55
40.00%	53.92	55.27	107.413f	0.000	0.416	788.47	704.05
50.00%	67.40	69.09	107.426f	0.000	0.497	949.03	752.67
60.00%	80.88	82.90	107.438f	0.000	0.574	1 110.05	796.25
70.00%	94.36	96.72	107.449f	0.000	0.647	1 275.26	836.88
80.00%	107.84	110.54	107.460f	0.000	0.718	1 443.90	874.86
90.00%	121.32	124.35	107.469f	0.000	0.786	1 614.89	911.15
95.00%	128.06	131.26	107.474f	0.000	0.819	1 702.72	928.54
98.00%	132.10	135.41	107.477f	0.000	0.839	1 756.05	938.65
100.00%	134.80	138.17	107.479f	0.000	0.852		

Tank Characteristics

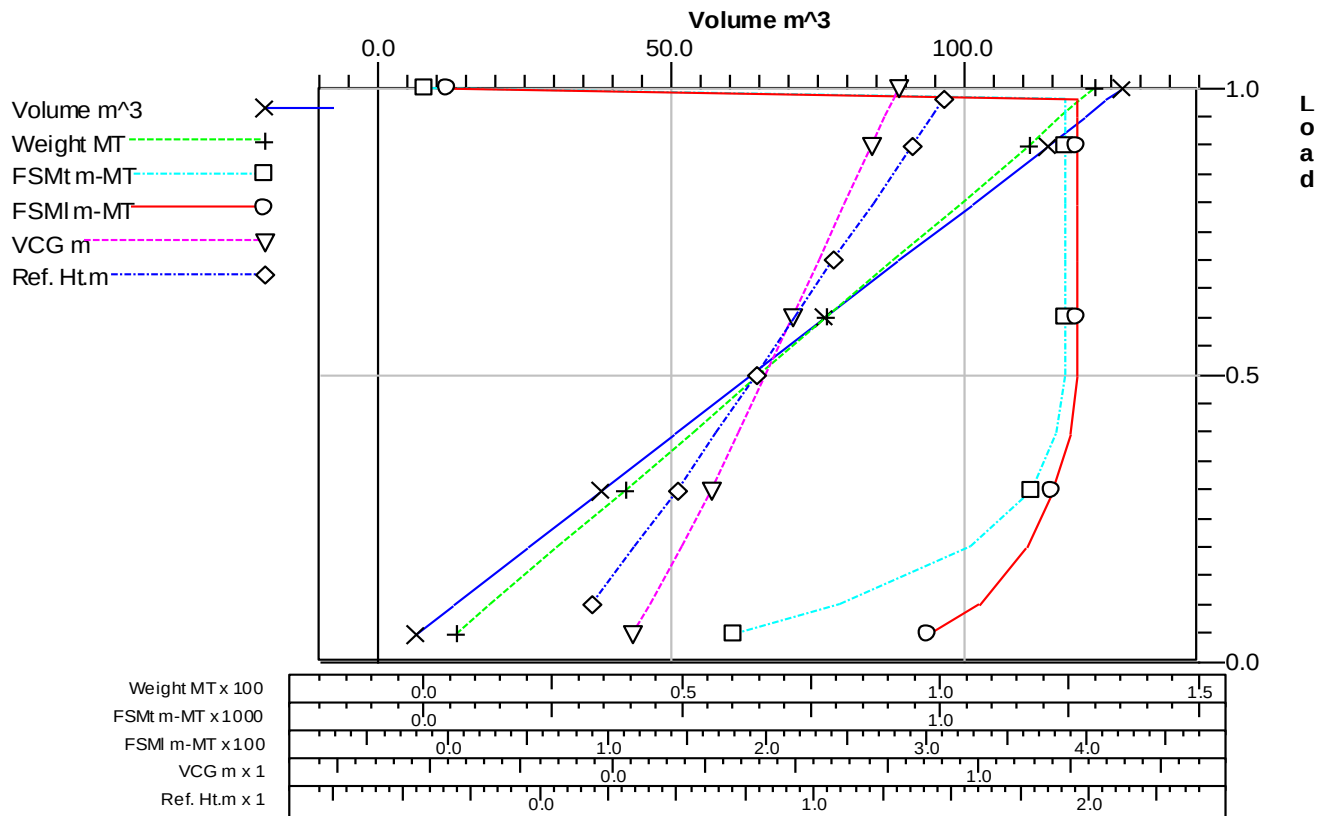


Tank Capacities for WB_601.C containing BALLAST (1.025)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMl (MT-m)
5.00%	6.34	6.50	99.354f	0.000	0.054	598.67	300.97
10.00%	12.69	13.00	99.366f	0.000	0.101	806.35	332.54
20.00%	25.37	26.01	99.396f	0.000	0.186	1 059.15	362.00
30.00%	38.06	39.01	99.435f	0.000	0.265	1 175.92	378.49
40.00%	50.74	52.01	99.469f	0.000	0.341	1 226.41	389.10
50.00%	63.43	65.01	99.494f	0.000	0.415	1 240.67	392.88
60.00%	76.11	78.01	99.512f	0.000	0.489	1 240.67	392.88
70.00%	88.80	91.02	99.524f	0.000	0.562	1 240.67	392.88
80.00%	101.48	104.02	99.534f	0.000	0.634	1 240.67	392.88
90.00%	114.17	117.02	99.541f	0.000	0.707	1 240.67	392.88
95.00%	120.51	123.52	99.544f	0.000	0.743	1 240.67	392.88
98.00%	124.32	127.42	99.546f	0.000	0.764	1 240.67	392.88
100.00%	126.85	130.02	99.547f	0.000	0.779		

Tank Characteristics

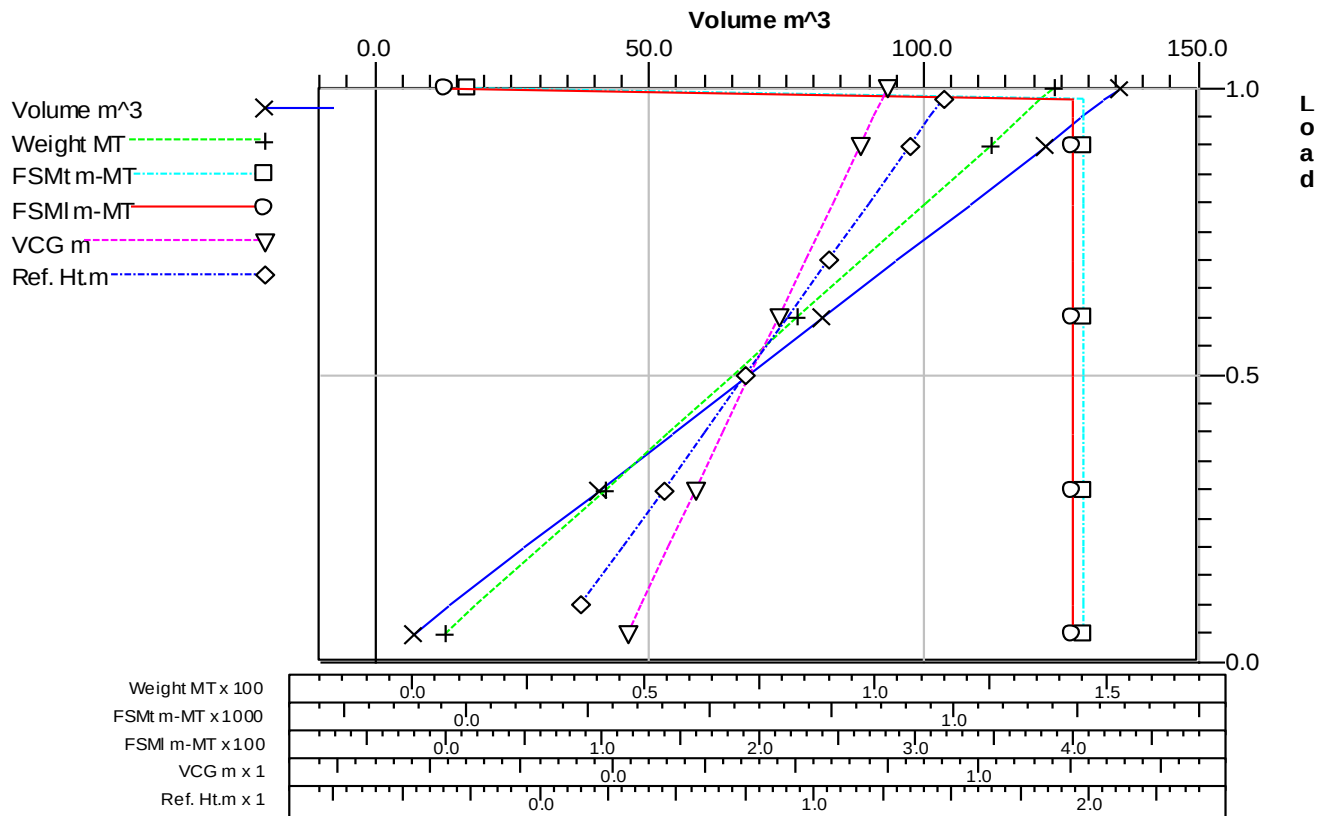


Tank Capacities for WB_701.C containing BALLAST (1.025)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
5.00%	6.77	6.94	89.965f	0.000	0.038	1 262.65	399.57
10.00%	13.54	13.88	89.983f	0.000	0.076	1 263.88	399.91
20.00%	27.07	27.75	89.991f	0.000	0.151	1 263.88	399.91
30.00%	40.61	41.63	89.994f	0.000	0.226	1 263.88	399.91
40.00%	54.15	55.50	89.996f	0.000	0.301	1 263.88	399.91
50.00%	67.69	69.38	89.997f	0.000	0.376	1 263.88	399.91
60.00%	81.22	83.25	89.997f	0.000	0.451	1 263.88	399.91
70.00%	94.76	97.13	89.998f	0.000	0.526	1 263.88	399.91
80.00%	108.30	111.01	89.998f	0.000	0.601	1 263.88	399.91
90.00%	121.84	124.88	89.998f	0.000	0.676	1 263.88	399.91
95.00%	128.60	131.82	89.998f	0.000	0.713	1 263.88	399.91
98.00%	132.67	135.98	89.998f	0.000	0.735	1 263.88	399.91
100.00%	135.37	138.76	89.998f	0.000	0.750		

Tank Characteristics

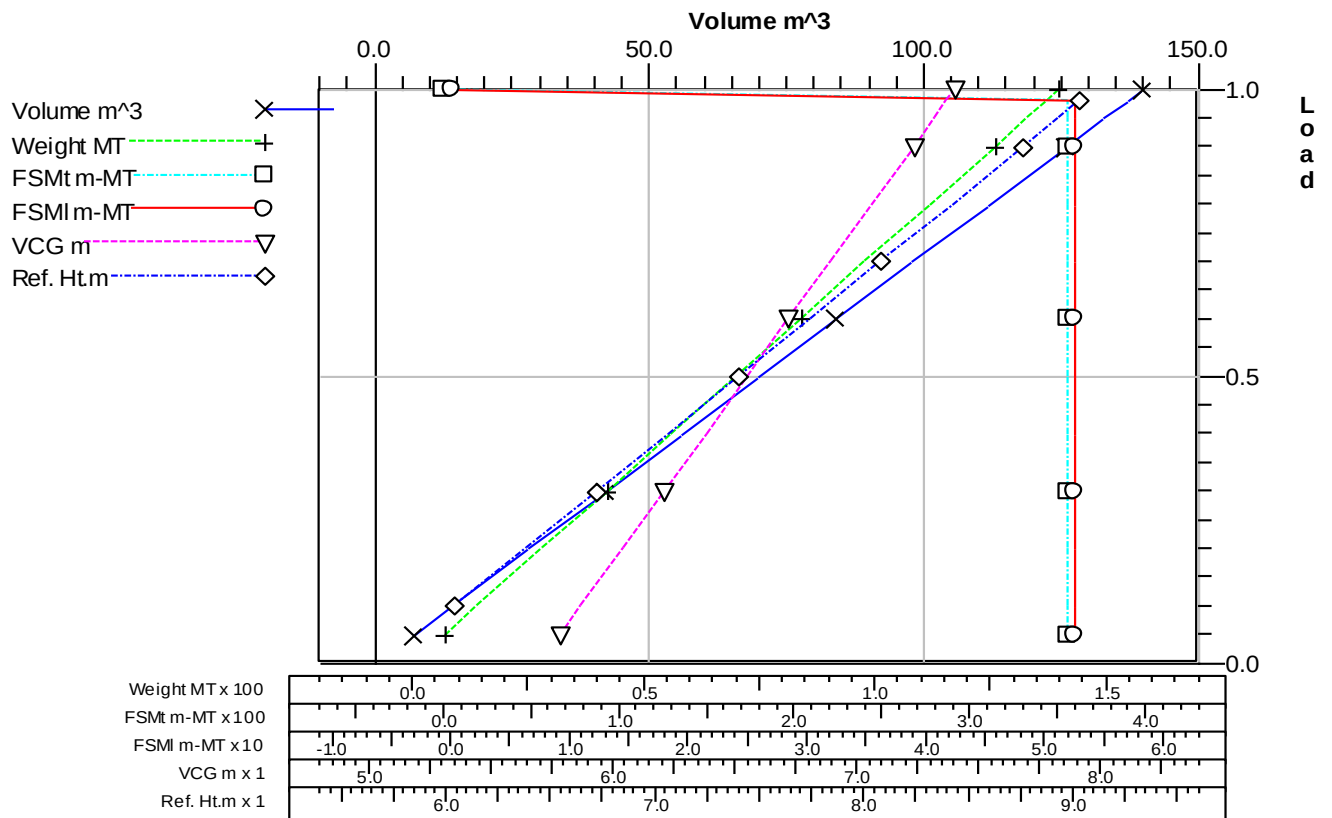


Tank Capacities for FW_1411.C containing FRESH WATER (1.000)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
5.00%	6.99	6.99	13.936f	0.010s	5.785	355.93	52.57
10.00%	13.99	13.99	13.936f	0.010s	5.870	355.93	52.57
20.00%	27.98	27.98	13.936f	0.010s	6.040	355.93	52.57
30.00%	41.97	41.97	13.936f	0.010s	6.210	355.93	52.57
40.00%	55.96	55.96	13.936f	0.010s	6.380	355.93	52.57
50.00%	69.95	69.95	13.936f	0.010s	6.550	355.93	52.57
60.00%	83.93	83.93	13.936f	0.010s	6.720	355.93	52.57
70.00%	97.92	97.92	13.936f	0.010s	6.890	355.93	52.57
80.00%	111.91	111.91	13.936f	0.010s	7.060	355.93	52.57
90.00%	125.90	125.90	13.936f	0.010s	7.230	355.93	52.57
95.00%	132.90	132.90	13.936f	0.010s	7.315	355.93	52.57
98.00%	137.09	137.09	13.936f	0.010s	7.366	355.93	52.57
100.00%	139.89	139.89	13.936f	0.010s	7.400		

Tank Characteristics

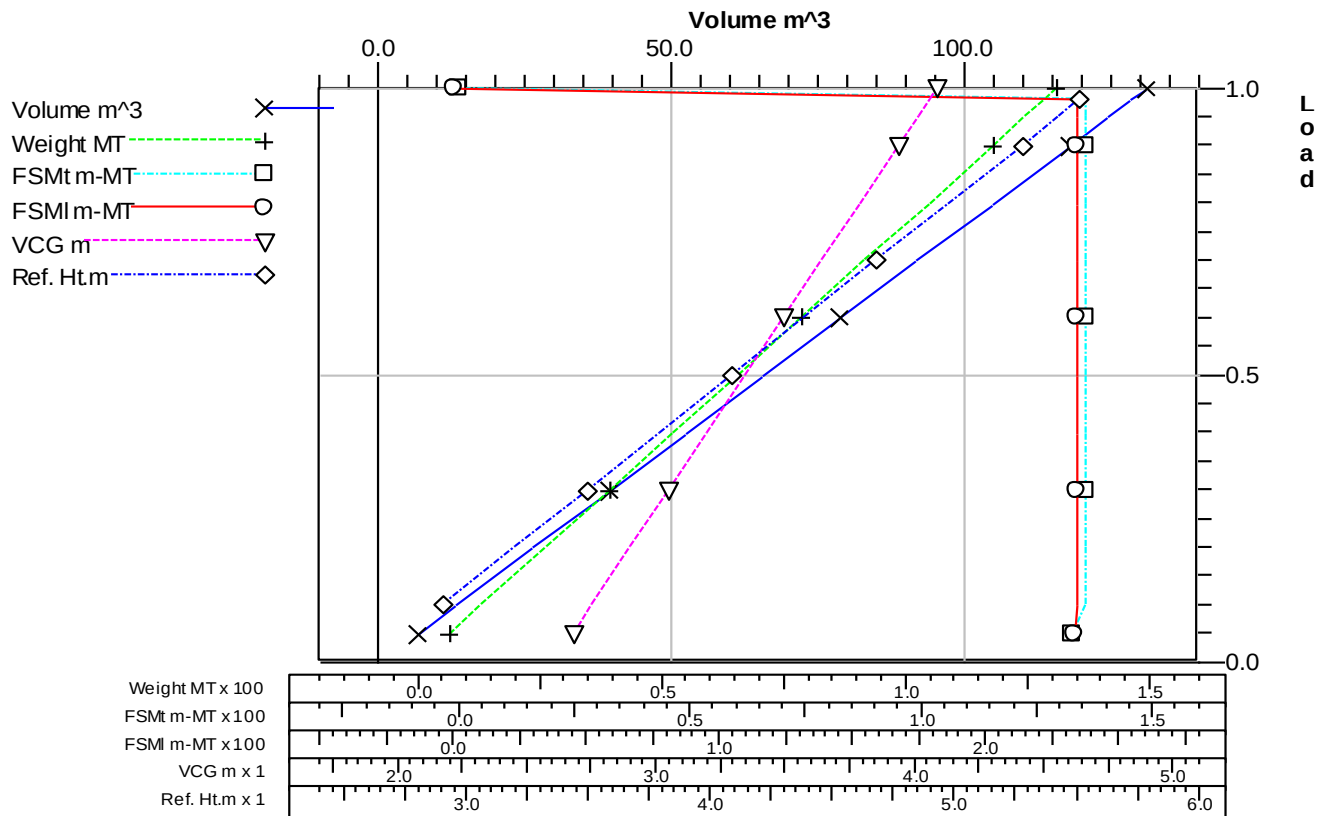


Tank Capacities for FW_411PS.P containing FRESH WATER (1.000)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMl (MT-m)
5.00%	6.55	6.55	116.600f	2.917p	2.677	132.86	233.46
10.00%	13.10	13.10	116.605f	2.955p	2.752	135.52	234.05
20.00%	26.20	26.20	116.607f	2.975p	2.900	135.52	234.05
30.00%	39.30	39.30	116.608f	2.982p	3.049	135.52	234.05
40.00%	52.40	52.40	116.608f	2.985p	3.197	135.52	234.05
50.00%	65.50	65.50	116.609f	2.987p	3.345	135.52	234.05
60.00%	78.60	78.60	116.609f	2.988p	3.494	135.52	234.05
70.00%	91.70	91.70	116.609f	2.989p	3.642	135.52	234.05
80.00%	104.81	104.81	116.609f	2.990p	3.790	135.52	234.05
90.00%	117.91	117.91	116.609f	2.990p	3.939	135.52	234.05
95.00%	124.46	124.46	116.609f	2.991p	4.013	135.52	234.05
98.00%	128.39	128.39	116.609f	2.991p	4.057	135.52	234.05
100.00%	131.01	131.01	116.609f	2.991p	4.087		

Tank Characteristics

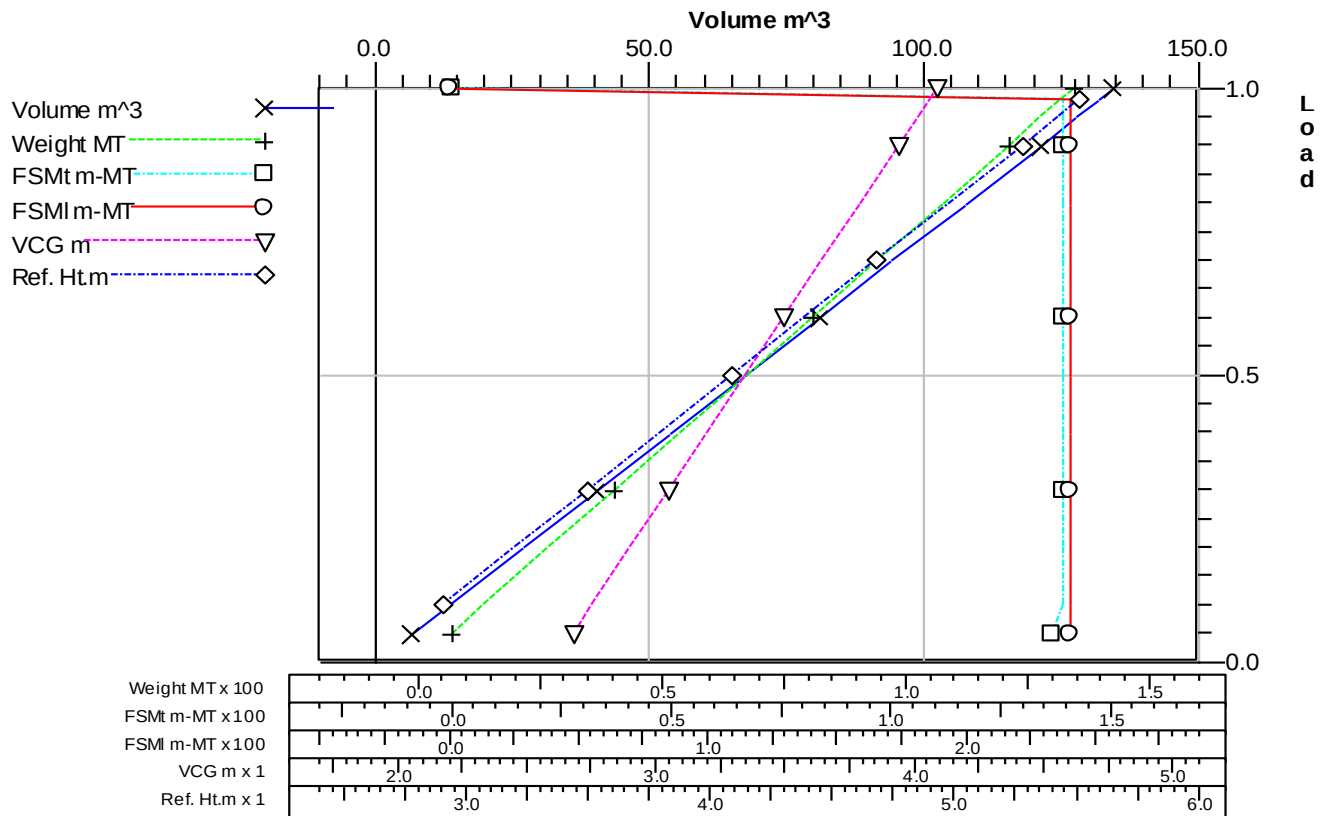


Tank Capacities for FW_412SB.S containing FRESH WATER (1.000)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
5.00%	6.73	6.73	116.600f	2.917s	2.677	136.44	239.88
10.00%	13.45	13.45	116.605f	2.955s	2.752	139.17	240.29
20.00%	26.91	26.91	116.607f	2.975s	2.900	139.17	240.29
30.00%	40.36	40.36	116.608f	2.982s	3.049	139.17	240.29
40.00%	53.81	53.81	116.608f	2.985s	3.197	139.17	240.29
50.00%	67.27	67.27	116.609f	2.987s	3.345	139.17	240.29
60.00%	80.72	80.72	116.609f	2.988s	3.494	139.17	240.29
70.00%	94.17	94.17	116.609f	2.989s	3.642	139.17	240.29
80.00%	107.63	107.63	116.609f	2.990s	3.790	139.17	240.29
90.00%	121.08	121.08	116.609f	2.990s	3.939	139.17	240.29
95.00%	127.81	127.81	116.609f	2.991s	4.013	139.17	240.29
98.00%	131.84	131.84	116.609f	2.991s	4.057	139.17	240.29
100.00%	134.54	134.54	116.609f	2.991s	4.087		

Tank Characteristics

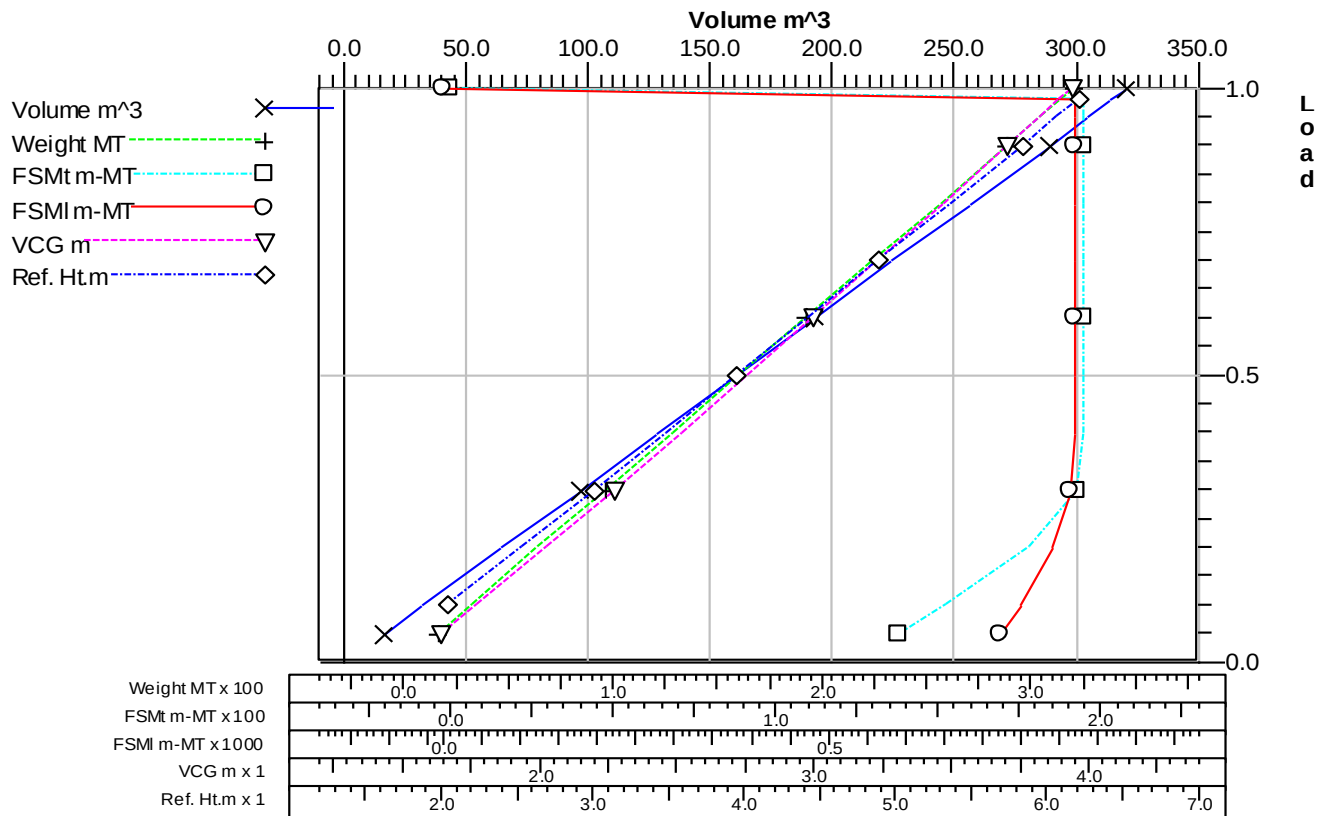


Tank Capacities for HEEL_812PS.P containing HW (1.000)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMl (MT-m)
5.00%	16.04	16.04	77.820f	10.543p	1.637	137.37	721.36
10.00%	32.07	32.07	77.838f	10.596p	1.769	152.55	748.87
20.00%	64.14	64.14	77.867f	10.683p	2.026	177.70	790.16
30.00%	96.21	96.21	77.896f	10.750p	2.274	192.41	812.52
40.00%	128.28	128.28	77.921f	10.793p	2.516	194.40	817.89
50.00%	160.35	160.35	77.937f	10.820p	2.755	194.40	817.89
60.00%	192.42	192.42	77.947f	10.837p	2.993	194.40	817.89
70.00%	224.49	224.49	77.955f	10.850p	3.230	194.40	817.89
80.00%	256.55	256.55	77.961f	10.859p	3.467	194.40	817.89
90.00%	288.62	288.62	77.965f	10.866p	3.703	194.40	817.89
95.00%	304.66	304.66	77.967f	10.870p	3.821	194.40	817.89
98.00%	314.28	314.28	77.968f	10.871p	3.892	194.40	817.89
100.00%	320.69	320.69	77.968f	10.872p	3.939		

Tank Characteristics

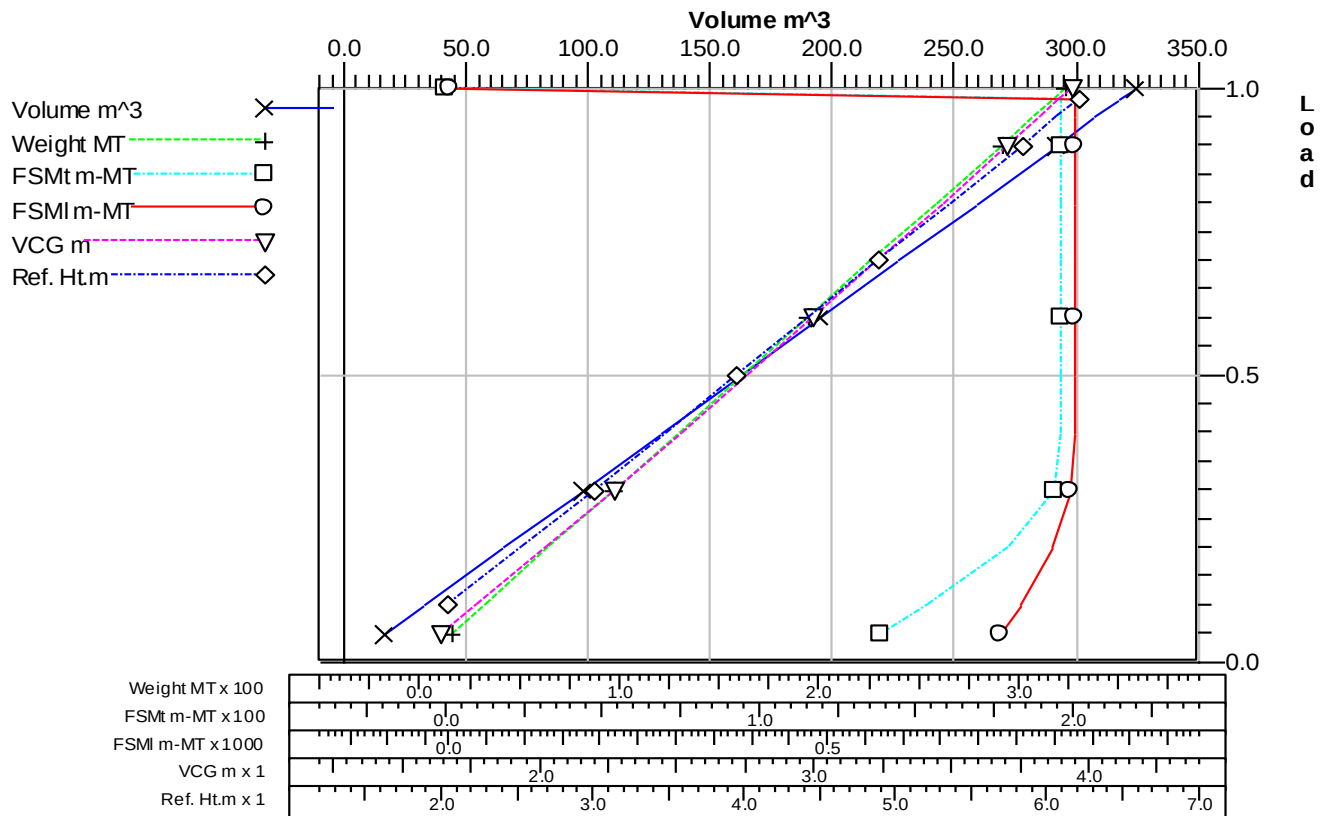


Tank Capacities for HEEL_812SB.S containing HW (1.000)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMl (MT-m)
5.00%	16.18	16.18	77.820f	10.543s	1.637	138.64	727.99
10.00%	32.37	32.37	77.838f	10.596s	1.769	153.97	755.78
20.00%	64.73	64.73	77.867f	10.683s	2.026	179.35	797.49
30.00%	97.10	97.10	77.896f	10.750s	2.274	194.19	820.04
40.00%	129.47	129.47	77.921f	10.793s	2.516	196.20	825.47
50.00%	161.83	161.83	77.937f	10.820s	2.755	196.20	825.47
60.00%	194.20	194.20	77.947f	10.837s	2.993	196.20	825.47
70.00%	226.57	226.57	77.955f	10.850s	3.230	196.20	825.47
80.00%	258.93	258.93	77.961f	10.859s	3.467	196.20	825.47
90.00%	291.30	291.30	77.965f	10.866s	3.703	196.20	825.47
95.00%	307.48	307.48	77.967f	10.870s	3.821	196.20	825.47
98.00%	317.19	317.19	77.968f	10.871s	3.892	196.20	825.47
100.00%	323.67	323.67	77.968f	10.872s	3.939		

Tank Characteristics

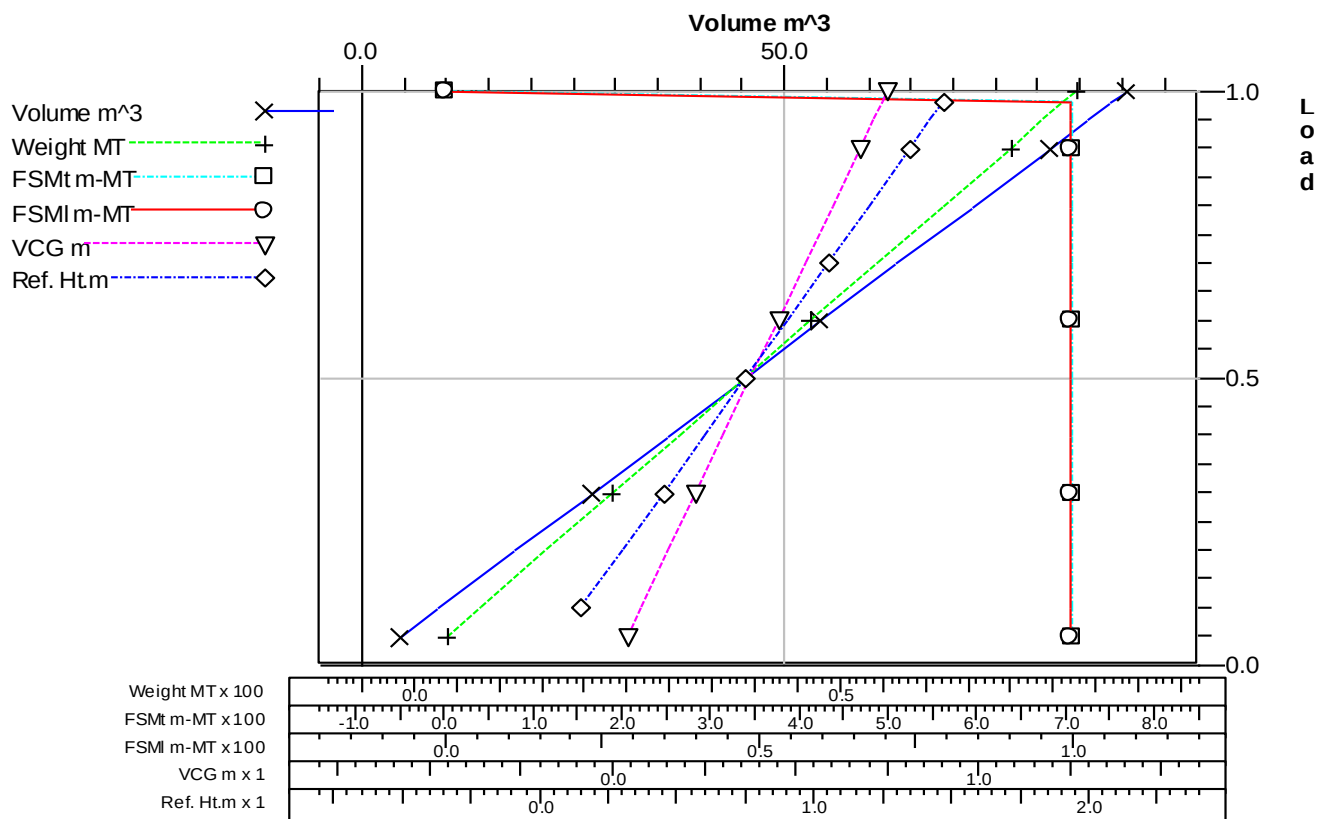


Tank Capacities for DO_1001.C containing DIESEL OIL (0.860)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMl (MT-m)
5.00%	4.52	3.88	57.600f	0.000	0.037	706.95	99.38
10.00%	9.03	7.77	57.600f	0.000	0.075	706.95	99.38
20.00%	18.06	15.53	57.600f	0.000	0.150	706.95	99.38
30.00%	27.09	23.30	57.600f	0.000	0.225	706.95	99.38
40.00%	36.12	31.07	57.600f	0.000	0.300	706.95	99.38
50.00%	45.16	38.83	57.600f	0.000	0.375	706.95	99.38
60.00%	54.19	46.60	57.600f	0.000	0.450	706.95	99.38
70.00%	63.22	54.37	57.600f	0.000	0.525	706.95	99.38
80.00%	72.25	62.13	57.600f	0.000	0.600	706.95	99.38
90.00%	81.28	69.90	57.600f	0.000	0.675	706.95	99.38
95.00%	85.79	73.78	57.600f	0.000	0.712	706.95	99.38
98.00%	88.50	76.11	57.600f	0.000	0.735	706.95	99.38
100.00%	90.31	77.67	57.600f	0.000	0.750		

Tank Characteristics

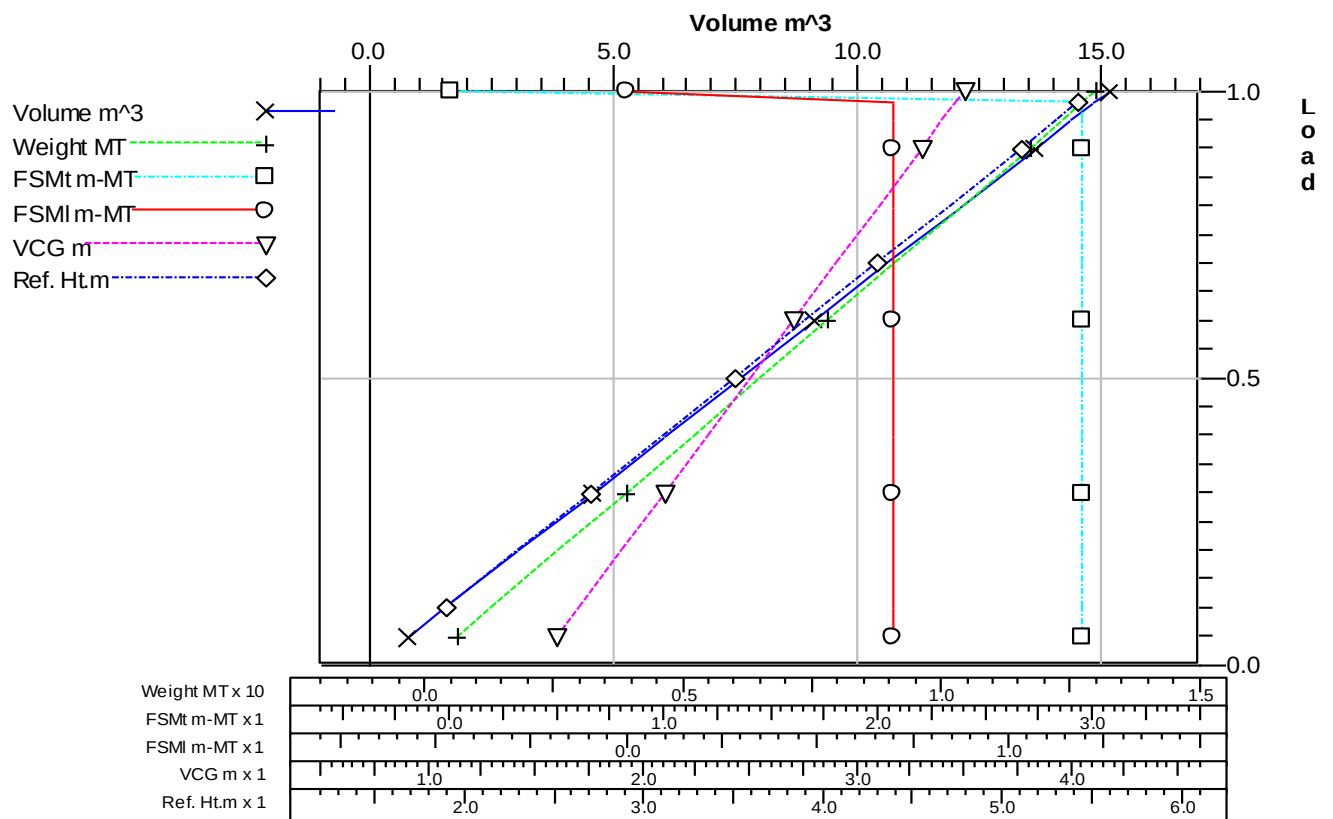


Tank Capacities for DO_DAY_914.S containing DIESEL OIL (0.860)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMl (MT-m)
5.00%	0.76	0.65	60.800f	4.750s	1.600	2.95	0.69
10.00%	1.51	1.30	60.800f	4.750s	1.700	2.95	0.69
20.00%	3.02	2.60	60.800f	4.750s	1.900	2.95	0.69
30.00%	4.54	3.90	60.800f	4.750s	2.100	2.95	0.69
40.00%	6.05	5.20	60.800f	4.750s	2.300	2.95	0.69
50.00%	7.56	6.50	60.800f	4.750s	2.500	2.95	0.69
60.00%	9.07	7.80	60.800f	4.750s	2.700	2.95	0.69
70.00%	10.59	9.10	60.800f	4.750s	2.900	2.95	0.69
80.00%	12.10	10.40	60.800f	4.750s	3.100	2.95	0.69
90.00%	13.61	11.71	60.800f	4.750s	3.300	2.95	0.69
95.00%	14.37	12.36	60.800f	4.750s	3.400	2.95	0.69
98.00%	14.82	12.75	60.800f	4.750s	3.460	2.95	0.69
100.00%	15.12	13.01	60.800f	4.750s	3.500		

Tank Characteristics

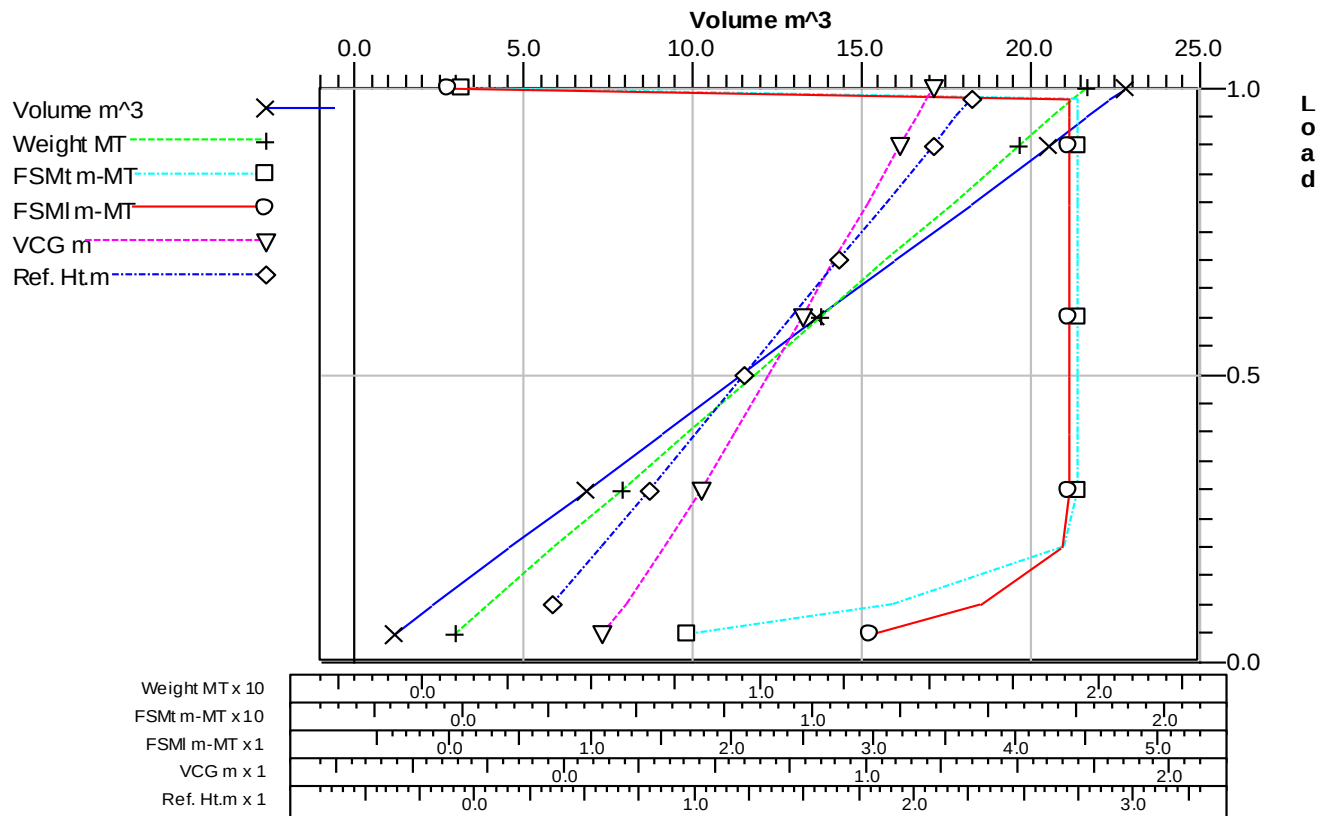


Tank Capacities for TO_DRAIN1202.S containing TO (0.861)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMl (MT-m)
5.00%	1.14	0.98	37.339f	1.316s	0.123	6.45	2.97
10.00%	2.28	1.96	37.314f	1.615s	0.205	12.26	3.75
20.00%	4.56	3.93	37.275f	1.950s	0.337	17.13	4.32
30.00%	6.84	5.89	37.250f	2.102s	0.454	17.52	4.38
40.00%	9.12	7.85	37.237f	2.177s	0.566	17.52	4.38
50.00%	11.39	9.81	37.230f	2.222s	0.676	17.52	4.38
60.00%	13.67	11.78	37.225f	2.252s	0.786	17.52	4.38
70.00%	15.95	13.74	37.221f	2.273s	0.895	17.52	4.38
80.00%	18.23	15.70	37.219f	2.289s	1.003	17.52	4.38
90.00%	20.51	17.66	37.217f	2.301s	1.111	17.52	4.38
95.00%	21.65	18.64	37.216f	2.306s	1.165	17.52	4.38
98.00%	22.33	19.23	37.215f	2.309s	1.198	17.52	4.38
100.00%	22.79	19.63	37.215f	2.311s	1.219		

Tank Characteristics

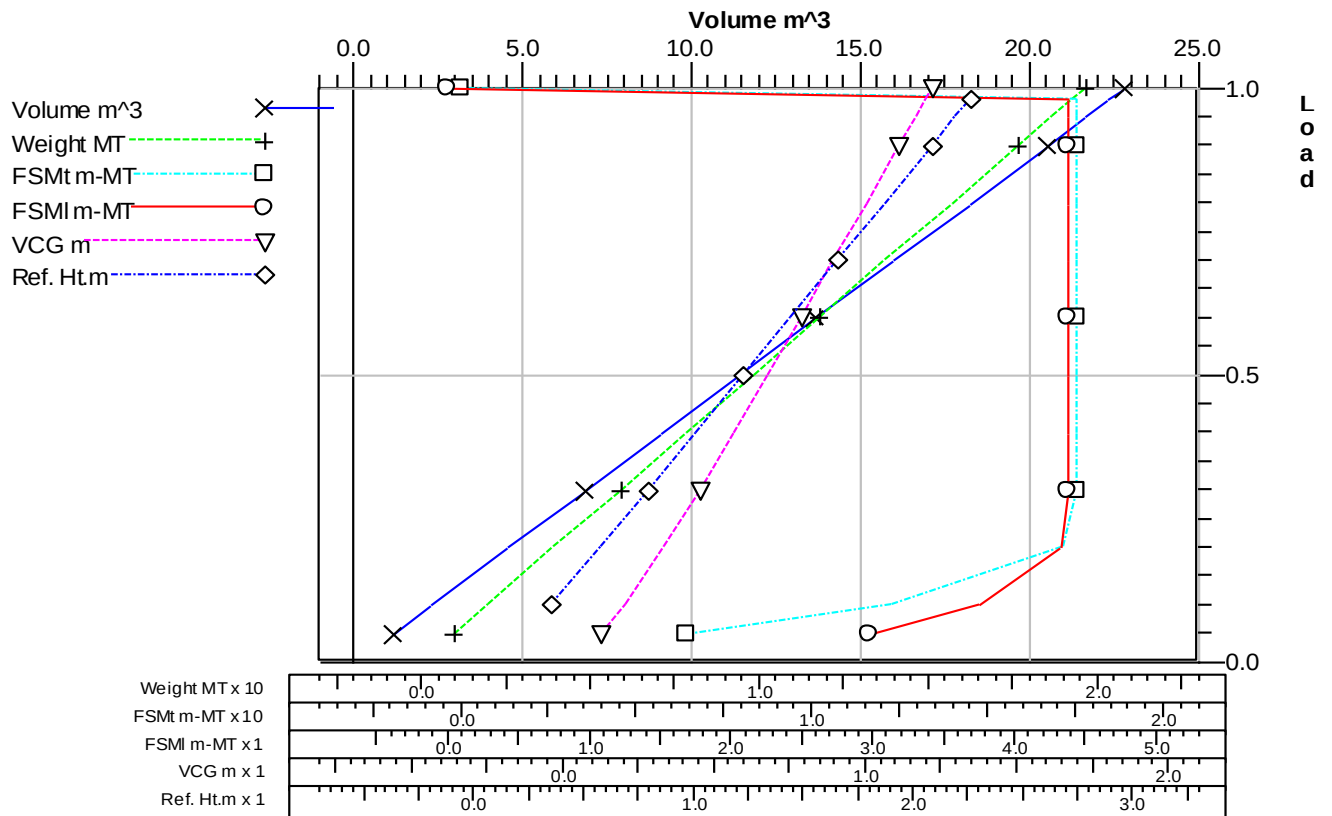


Tank Capacities for TO_STOR1202.P containing TO (0.861)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMl (MT-m)
5.00%	1.14	0.98	37.339f	1.316p	0.123	6.45	2.97
10.00%	2.28	1.96	37.314f	1.615p	0.205	12.26	3.75
20.00%	4.56	3.93	37.275f	1.950p	0.337	17.13	4.32
30.00%	6.84	5.89	37.250f	2.102p	0.454	17.52	4.38
40.00%	9.12	7.85	37.237f	2.177p	0.566	17.52	4.38
50.00%	11.39	9.81	37.230f	2.222p	0.676	17.52	4.38
60.00%	13.67	11.78	37.225f	2.252p	0.786	17.52	4.38
70.00%	15.95	13.74	37.221f	2.273p	0.895	17.52	4.38
80.00%	18.23	15.70	37.219f	2.289p	1.003	17.52	4.38
90.00%	20.51	17.66	37.217f	2.301p	1.111	17.52	4.38
95.00%	21.65	18.64	37.216f	2.306p	1.165	17.52	4.38
98.00%	22.33	19.23	37.215f	2.309p	1.198	17.52	4.38
100.00%	22.79	19.63	37.215f	2.311p	1.219		

Tank Characteristics

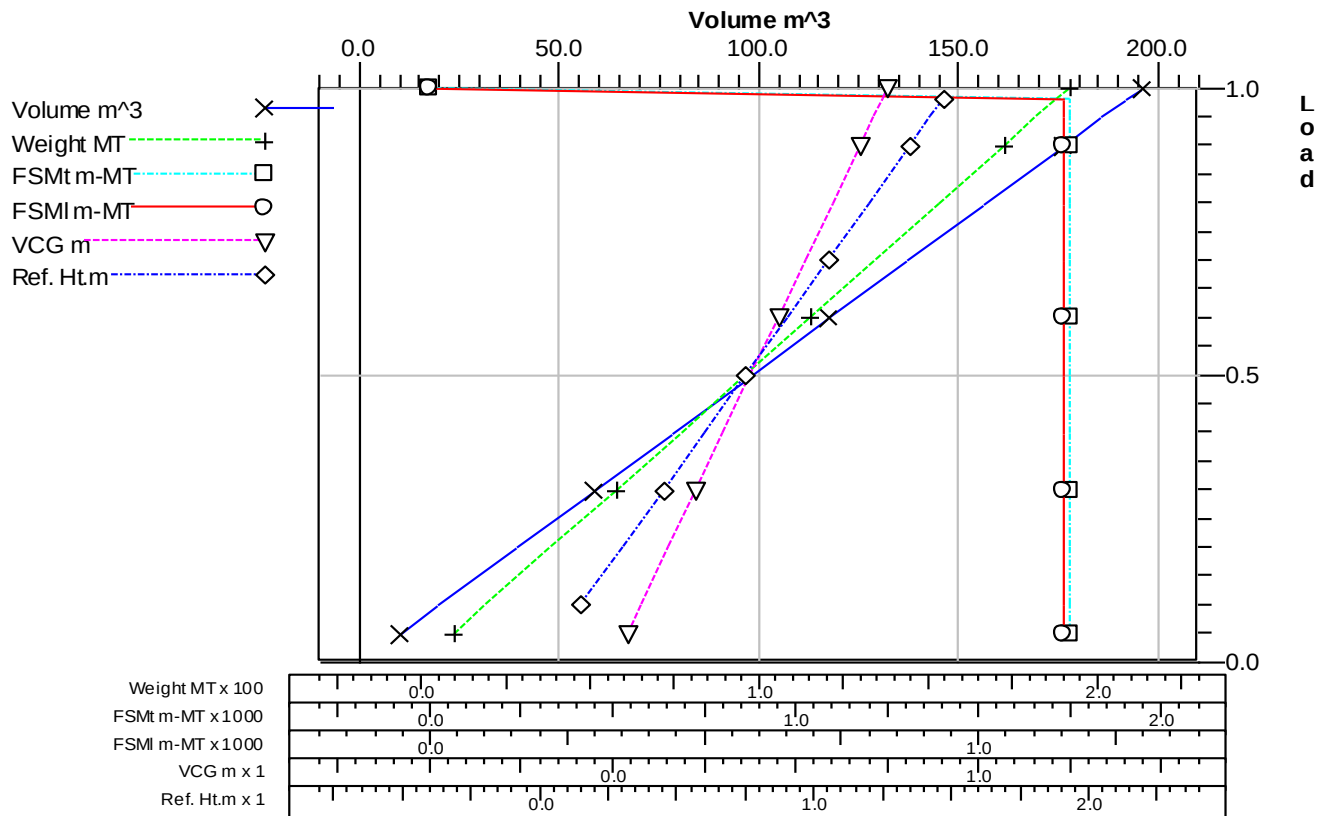


Tank Capacities for HFO_801.C containing HFO (0.980)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMl (MT-m)
5.00%	9.78	9.59	77.200f	0.000	0.037	1 745.42	1 152.28
10.00%	19.57	19.18	77.200f	0.000	0.075	1 745.42	1 152.28
20.00%	39.13	38.35	77.200f	0.000	0.150	1 745.42	1 152.28
30.00%	58.70	57.53	77.200f	0.000	0.225	1 745.42	1 152.28
40.00%	78.27	76.70	77.200f	0.000	0.300	1 745.42	1 152.28
50.00%	97.83	95.88	77.200f	0.000	0.375	1 745.42	1 152.28
60.00%	117.40	115.05	77.200f	0.000	0.450	1 745.42	1 152.28
70.00%	136.97	134.23	77.200f	0.000	0.525	1 745.42	1 152.28
80.00%	156.53	153.40	77.200f	0.000	0.600	1 745.42	1 152.28
90.00%	176.10	172.58	77.200f	0.000	0.675	1 745.42	1 152.28
95.00%	185.88	182.17	77.200f	0.000	0.712	1 745.42	1 152.28
98.00%	191.75	187.92	77.200f	0.000	0.735	1 745.42	1 152.28
100.00%	195.67	191.75	77.200f	0.000	0.750		

Tank Characteristics

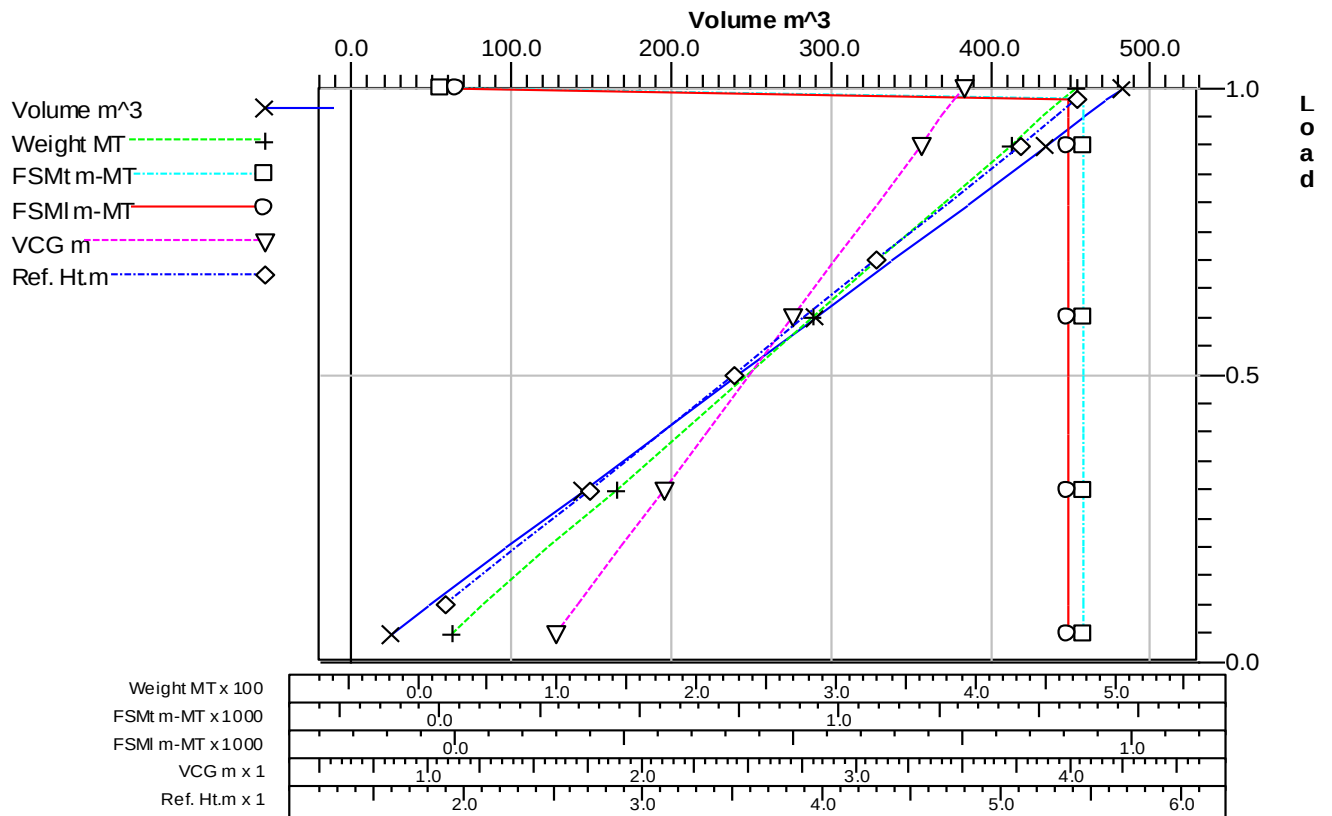


Tank Capacities for HFO_811.C containing HFO (0.980)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMl (MT-m)
5.00%	24.09	23.60	76.800f	0.000	1.600	1 611.19	906.43
10.00%	48.17	47.21	76.800f	0.000	1.700	1 611.19	906.43
20.00%	96.34	94.41	76.800f	0.000	1.900	1 611.19	906.43
30.00%	144.51	141.62	76.800f	0.000	2.100	1 611.19	906.43
40.00%	192.68	188.83	76.800f	0.000	2.300	1 611.19	906.43
50.00%	240.85	236.03	76.800f	0.000	2.500	1 611.19	906.43
60.00%	289.02	283.24	76.800f	0.000	2.700	1 611.19	906.43
70.00%	337.19	330.45	76.800f	0.000	2.900	1 611.19	906.43
80.00%	385.36	377.66	76.800f	0.000	3.100	1 611.19	906.43
90.00%	433.53	424.86	76.800f	0.000	3.300	1 611.19	906.43
95.00%	457.62	448.47	76.800f	0.000	3.400	1 611.19	906.43
98.00%	472.07	462.63	76.800f	0.000	3.460	1 611.19	906.43
100.00%	481.70	472.07	76.800f	0.000	3.500		

Tank Characteristics

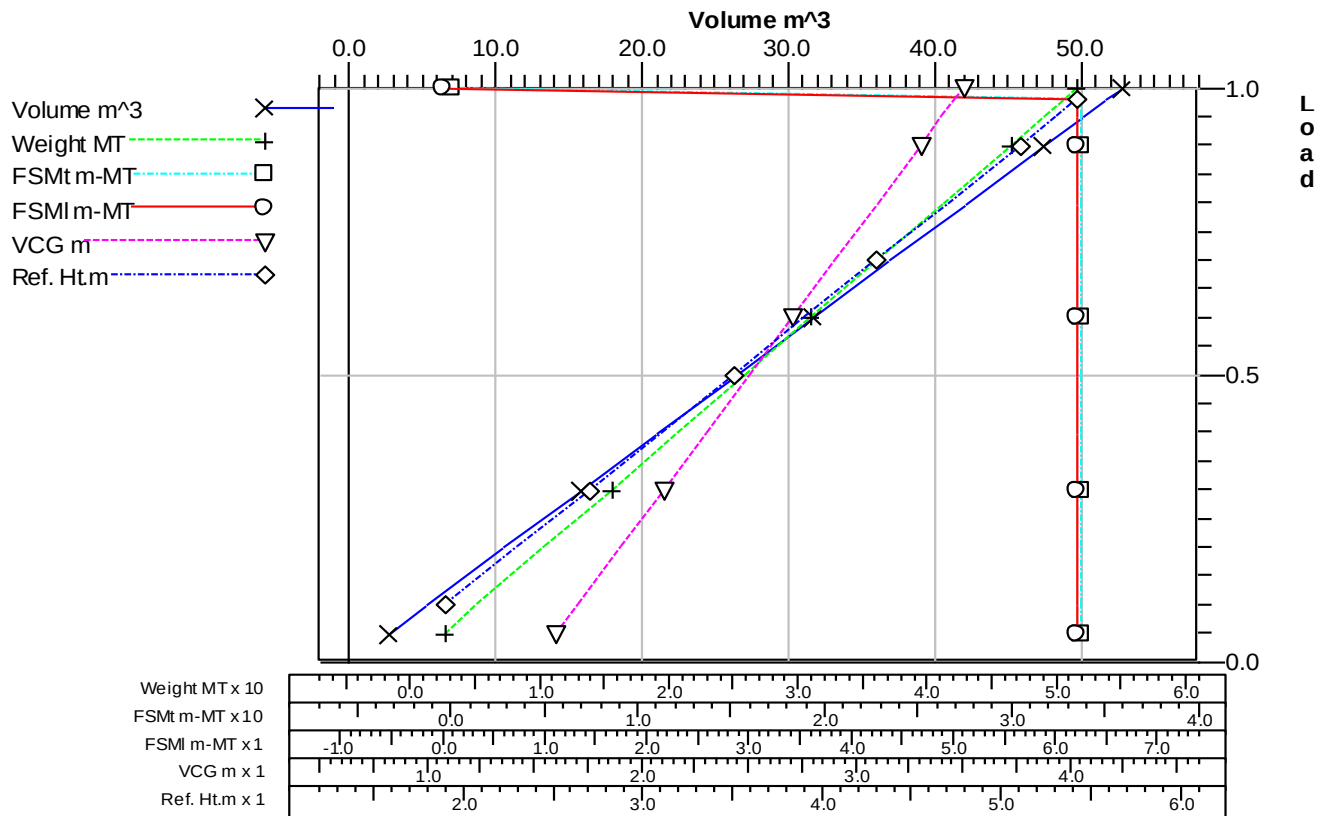


Tank Capacities for HFO_DAY_911.P containing HFO (0.980)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMl (MT-m)
5.00%	2.63	2.58	70.800f	2.000p	1.600	33.73	6.20
10.00%	5.27	5.16	70.800f	2.000p	1.700	33.73	6.20
20.00%	10.54	10.33	70.800f	2.000p	1.900	33.73	6.20
30.00%	15.81	15.49	70.800f	2.000p	2.100	33.73	6.20
40.00%	21.08	20.65	70.800f	2.000p	2.300	33.73	6.20
50.00%	26.34	25.82	70.800f	2.000p	2.500	33.73	6.20
60.00%	31.61	30.98	70.800f	2.000p	2.700	33.73	6.20
70.00%	36.88	36.14	70.800f	2.000p	2.900	33.73	6.20
80.00%	42.15	41.31	70.800f	2.000p	3.100	33.73	6.20
90.00%	47.42	46.47	70.800f	2.000p	3.300	33.73	6.20
95.00%	50.05	49.05	70.800f	2.000p	3.400	33.73	6.20
98.00%	51.63	50.60	70.800f	2.000p	3.460	33.73	6.20
100.00%	52.69	51.63	70.800f	2.000p	3.500		

Tank Characteristics

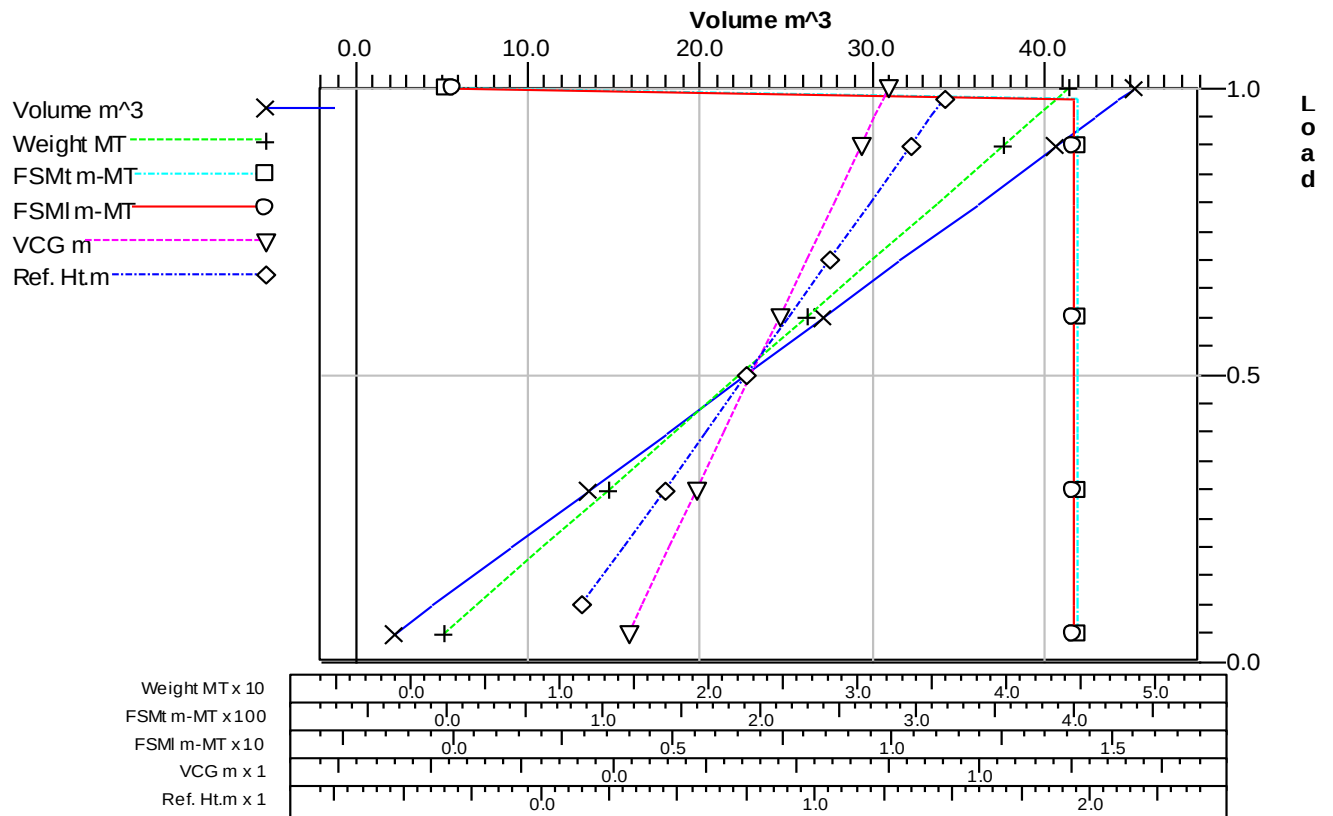


Tank Capacities for HFO_OVFL_902.C containing HFO (0.980)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMl (MT-m)
5.00%	2.26	2.21	63.600f	0.000	0.037	402.80	14.14
10.00%	4.52	4.43	63.600f	0.000	0.075	402.80	14.14
20.00%	9.03	8.85	63.600f	0.000	0.150	402.80	14.14
30.00%	13.55	13.28	63.600f	0.000	0.225	402.80	14.14
40.00%	18.06	17.70	63.600f	0.000	0.300	402.80	14.14
50.00%	22.58	22.13	63.600f	0.000	0.375	402.80	14.14
60.00%	27.09	26.55	63.600f	0.000	0.450	402.80	14.14
70.00%	31.61	30.98	63.600f	0.000	0.525	402.80	14.14
80.00%	36.12	35.40	63.600f	0.000	0.600	402.80	14.14
90.00%	40.64	39.83	63.600f	0.000	0.675	402.80	14.14
95.00%	42.90	42.04	63.600f	0.000	0.712	402.80	14.14
98.00%	44.25	43.37	63.600f	0.000	0.735	402.80	14.14
100.00%	45.16	44.25	63.600f	0.000	0.750		

Tank Characteristics

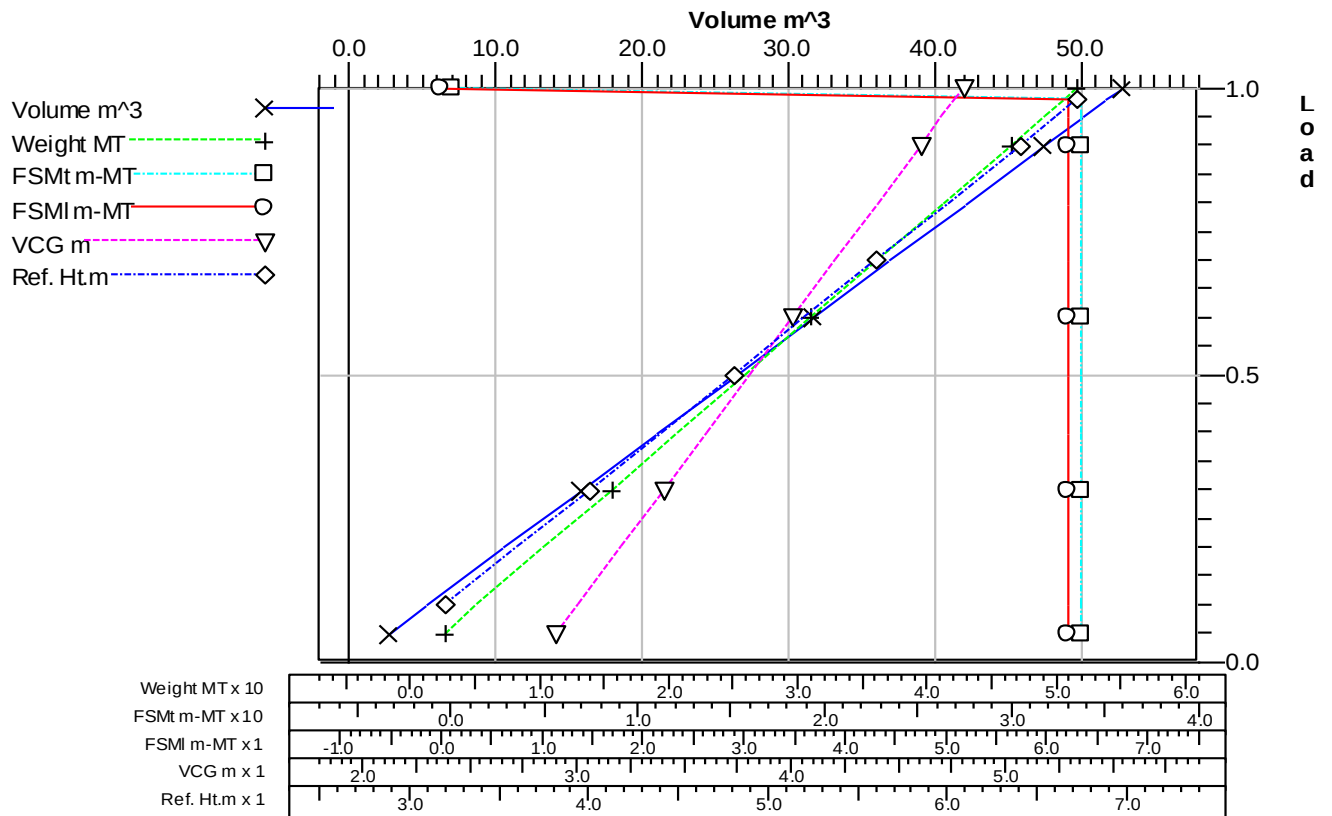


Tank Capacities for HFO_SETT.P containing HFO (0.980)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMl (MT-m)
5.00%	2.63	2.58	85.200f	3.600p	2.900	33.73	6.21
10.00%	5.27	5.16	85.200f	3.600p	3.000	33.73	6.21
20.00%	10.54	10.33	85.200f	3.600p	3.200	33.73	6.21
30.00%	15.81	15.49	85.200f	3.600p	3.400	33.73	6.21
40.00%	21.07	20.65	85.200f	3.600p	3.600	33.73	6.21
50.00%	26.34	25.82	85.200f	3.600p	3.800	33.73	6.21
60.00%	31.61	30.98	85.200f	3.600p	4.000	33.73	6.21
70.00%	36.88	36.14	85.200f	3.600p	4.200	33.73	6.21
80.00%	42.15	41.31	85.200f	3.600p	4.400	33.73	6.21
90.00%	47.42	46.47	85.200f	3.600p	4.600	33.73	6.21
95.00%	50.05	49.05	85.200f	3.600p	4.700	33.73	6.21
98.00%	51.63	50.60	85.200f	3.600p	4.760	33.73	6.21
100.00%	52.69	51.63	85.200f	3.600p	4.800		

Tank Characteristics

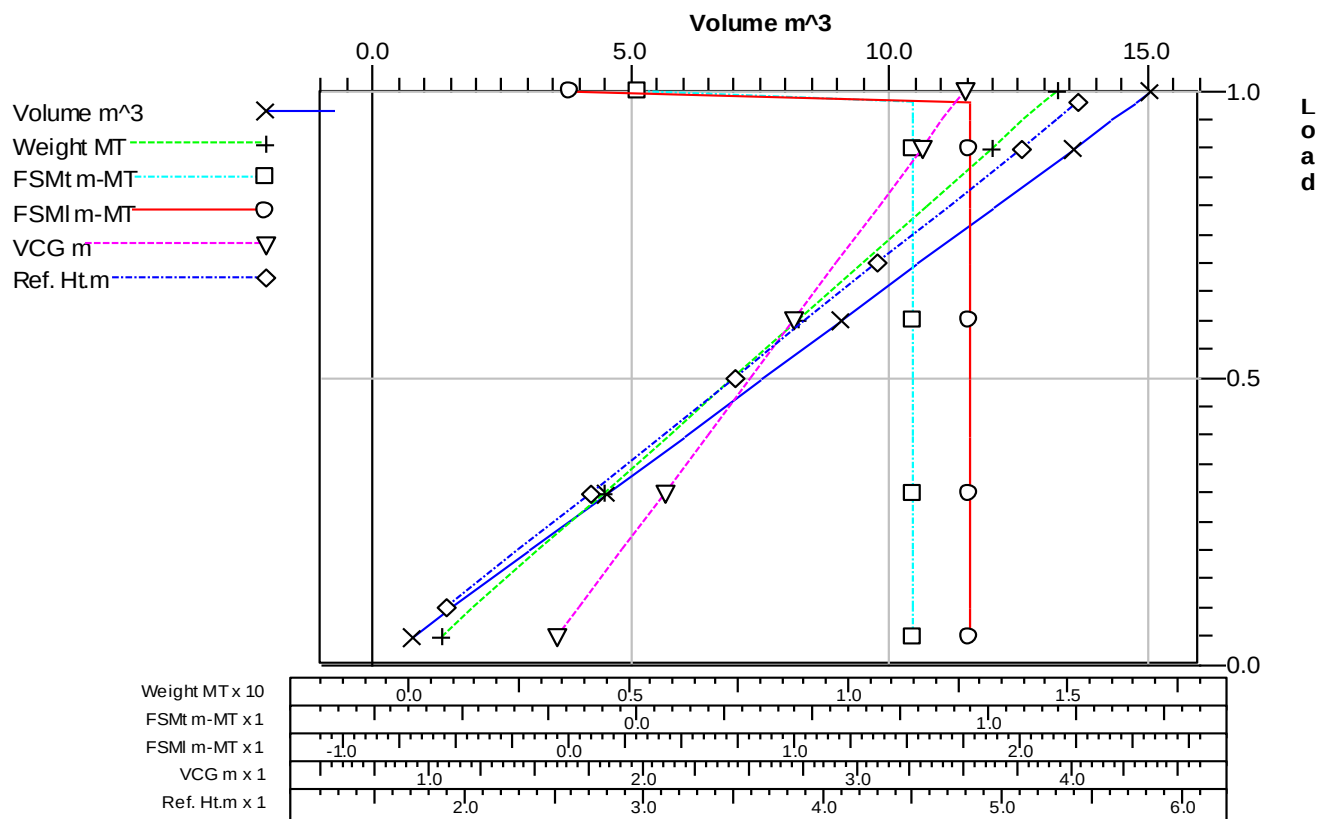


Tank Capacities for SLUDGE_913.P containing HFO (0.980)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMl (MT-m)
5.00%	0.75	0.74	70.800f	5.600p	1.600	0.79	1.77
10.00%	1.51	1.48	70.800f	5.600p	1.700	0.79	1.77
20.00%	3.01	2.95	70.800f	5.600p	1.900	0.79	1.77
30.00%	4.52	4.43	70.800f	5.600p	2.100	0.79	1.77
40.00%	6.02	5.90	70.800f	5.600p	2.300	0.79	1.77
50.00%	7.53	7.38	70.800f	5.600p	2.500	0.79	1.77
60.00%	9.03	8.85	70.800f	5.600p	2.700	0.79	1.77
70.00%	10.54	10.33	70.800f	5.600p	2.900	0.79	1.77
80.00%	12.04	11.80	70.800f	5.600p	3.100	0.79	1.77
90.00%	13.55	13.28	70.800f	5.600p	3.300	0.79	1.77
95.00%	14.30	14.01	70.800f	5.600p	3.400	0.79	1.77
98.00%	14.75	14.46	70.800f	5.600p	3.460	0.79	1.77
100.00%	15.05	14.75	70.800f	5.600p	3.500		

Tank Characteristics

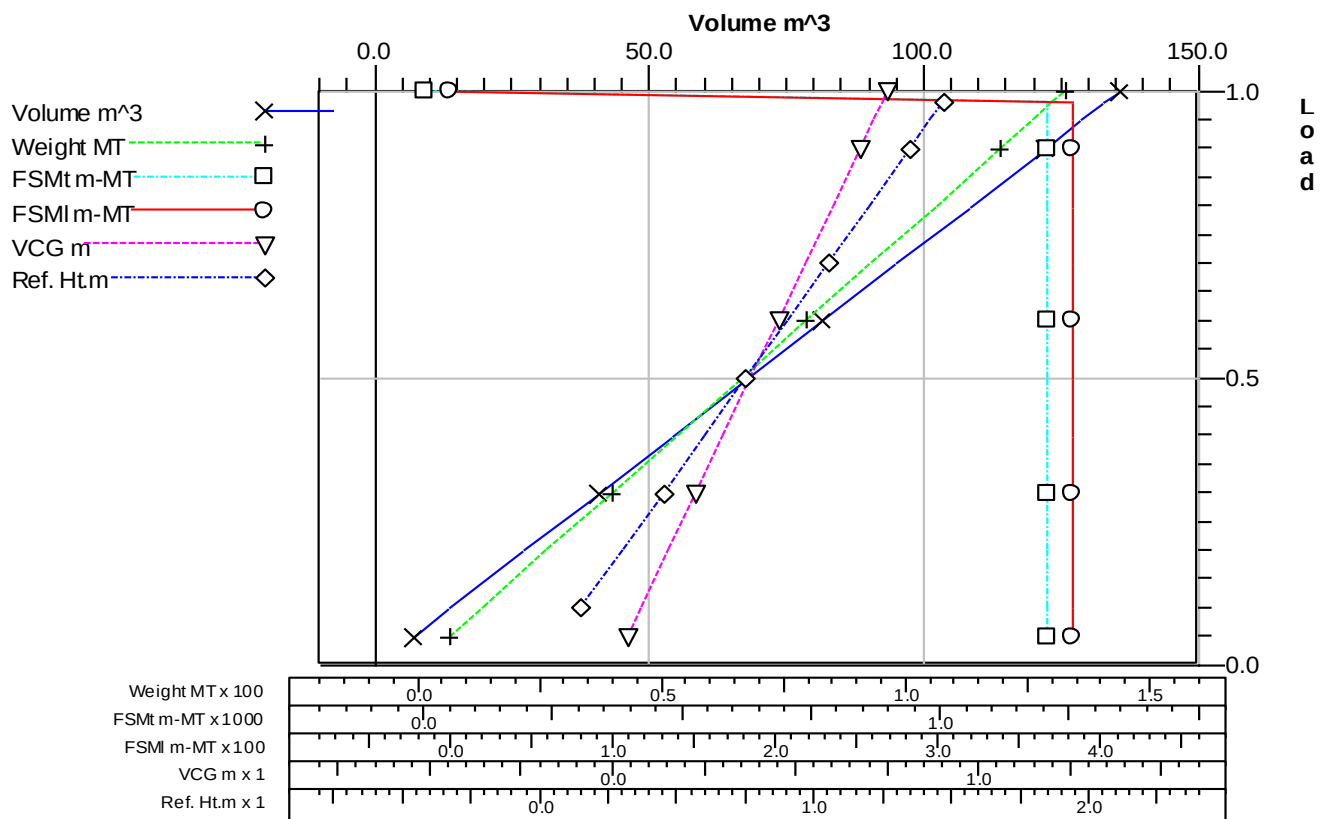


Tank Capacities for LSHFO_901.C containing LSHFO (0.980)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMl (MT-m)
5.00%	6.77	6.64	68.400f	0.000	0.037	1 208.44	382.44
10.00%	13.55	13.28	68.400f	0.000	0.075	1 208.44	382.44
20.00%	27.09	26.55	68.400f	0.000	0.150	1 208.44	382.44
30.00%	40.64	39.83	68.400f	0.000	0.225	1 208.44	382.44
40.00%	54.19	53.10	68.400f	0.000	0.300	1 208.44	382.44
50.00%	67.74	66.38	68.400f	0.000	0.375	1 208.44	382.44
60.00%	81.28	79.66	68.400f	0.000	0.450	1 208.44	382.44
70.00%	94.83	92.93	68.400f	0.000	0.525	1 208.44	382.44
80.00%	108.38	106.21	68.400f	0.000	0.600	1 208.44	382.44
90.00%	121.92	119.49	68.400f	0.000	0.675	1 208.44	382.44
95.00%	128.70	126.12	68.400f	0.000	0.712	1 208.44	382.44
98.00%	132.76	130.11	68.400f	0.000	0.735	1 208.44	382.44
100.00%	135.47	132.76	68.400f	0.000	0.750		

Tank Characteristics

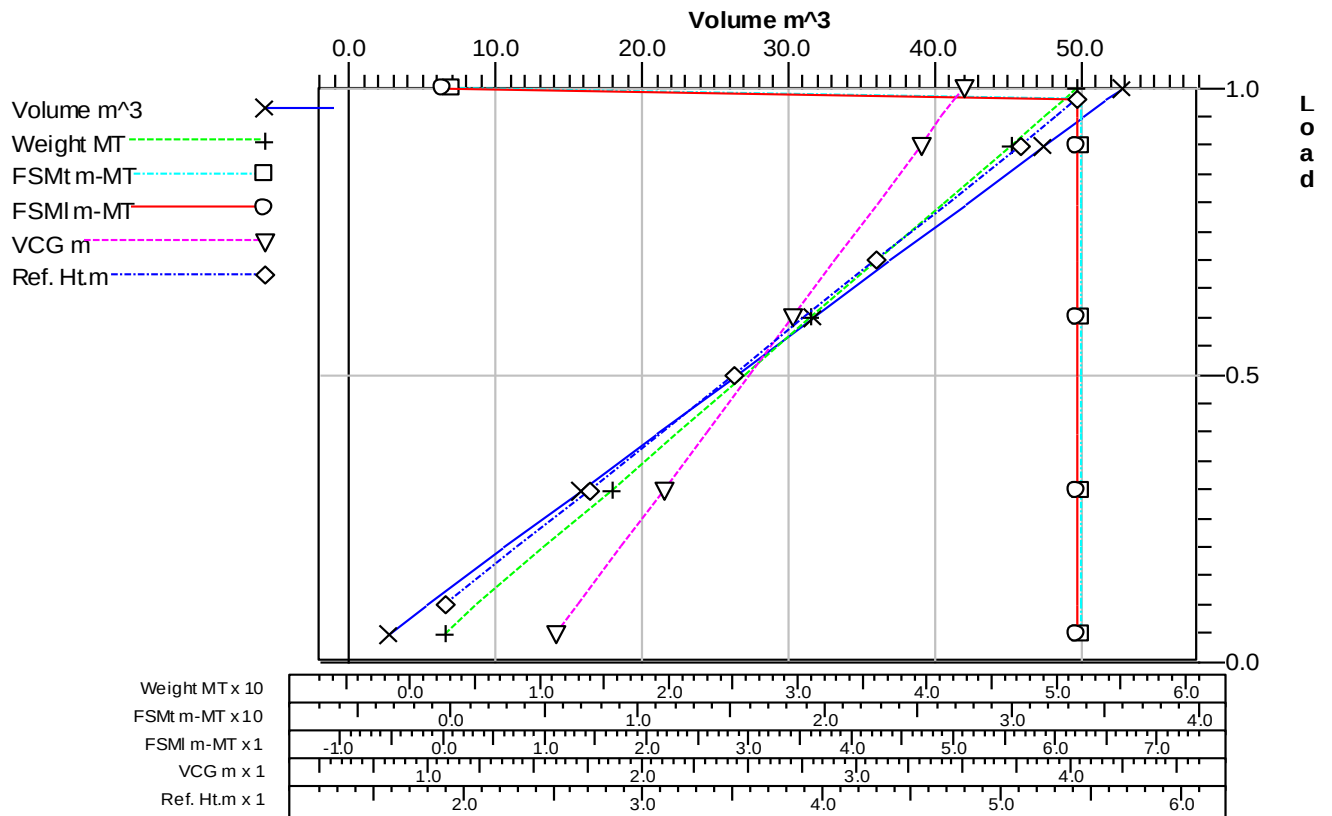


Tank Capacities for LSHFO_DAY912.S containing LSHFO (0.980)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMl (MT-m)
5.00%	2.63	2.58	70.800f	3.600s	1.600	33.73	6.19
10.00%	5.27	5.16	70.800f	3.600s	1.700	33.73	6.19
20.00%	10.54	10.33	70.800f	3.600s	1.900	33.73	6.19
30.00%	15.81	15.49	70.800f	3.600s	2.100	33.73	6.19
40.00%	21.07	20.65	70.800f	3.600s	2.300	33.73	6.19
50.00%	26.34	25.82	70.800f	3.600s	2.500	33.73	6.19
60.00%	31.61	30.98	70.800f	3.600s	2.700	33.73	6.19
70.00%	36.88	36.14	70.800f	3.600s	2.900	33.73	6.19
80.00%	42.15	41.31	70.800f	3.600s	3.100	33.73	6.19
90.00%	47.42	46.47	70.800f	3.600s	3.300	33.73	6.19
95.00%	50.05	49.05	70.800f	3.600s	3.400	33.73	6.19
98.00%	51.63	50.60	70.800f	3.600s	3.460	33.73	6.19
100.00%	52.69	51.63	70.800f	3.600s	3.500		

Tank Characteristics

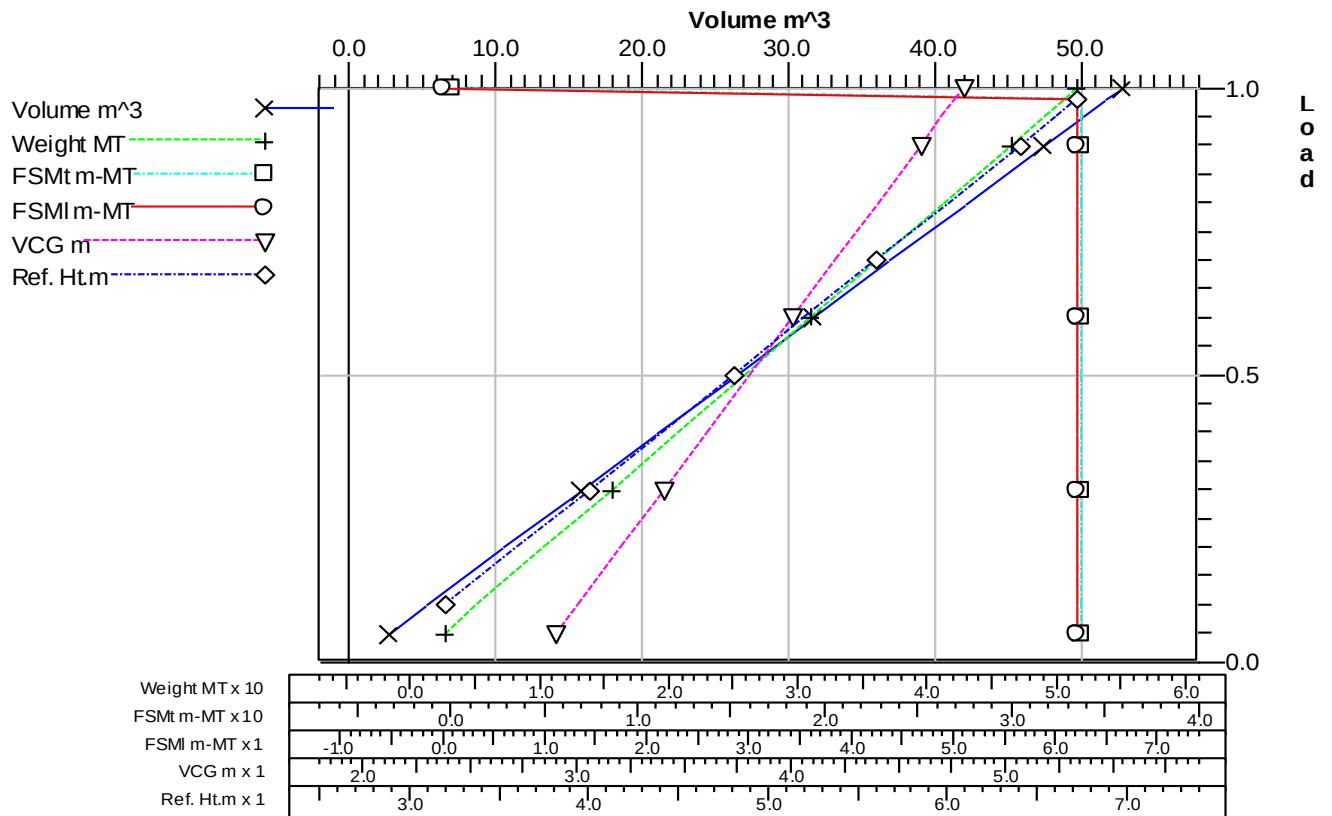


Tank Capacities for LSHFO_SETT.S containing LSHFO (0.980)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMl (MT-m)
5.00%	2.63	2.58	85.200f	2.000s	2.900	33.73	6.20
10.00%	5.27	5.16	85.200f	2.000s	3.000	33.73	6.20
20.00%	10.54	10.33	85.200f	2.000s	3.200	33.73	6.20
30.00%	15.81	15.49	85.200f	2.000s	3.400	33.73	6.20
40.00%	21.08	20.65	85.200f	2.000s	3.600	33.73	6.20
50.00%	26.34	25.82	85.200f	2.000s	3.800	33.73	6.20
60.00%	31.61	30.98	85.200f	2.000s	4.000	33.73	6.20
70.00%	36.88	36.14	85.200f	2.000s	4.200	33.73	6.20
80.00%	42.15	41.31	85.200f	2.000s	4.400	33.73	6.20
90.00%	47.42	46.47	85.200f	2.000s	4.600	33.73	6.20
95.00%	50.05	49.05	85.200f	2.000s	4.700	33.73	6.20
98.00%	51.63	50.60	85.200f	2.000s	4.760	33.73	6.20
100.00%	52.69	51.63	85.200f	2.000s	4.800		

Tank Characteristics

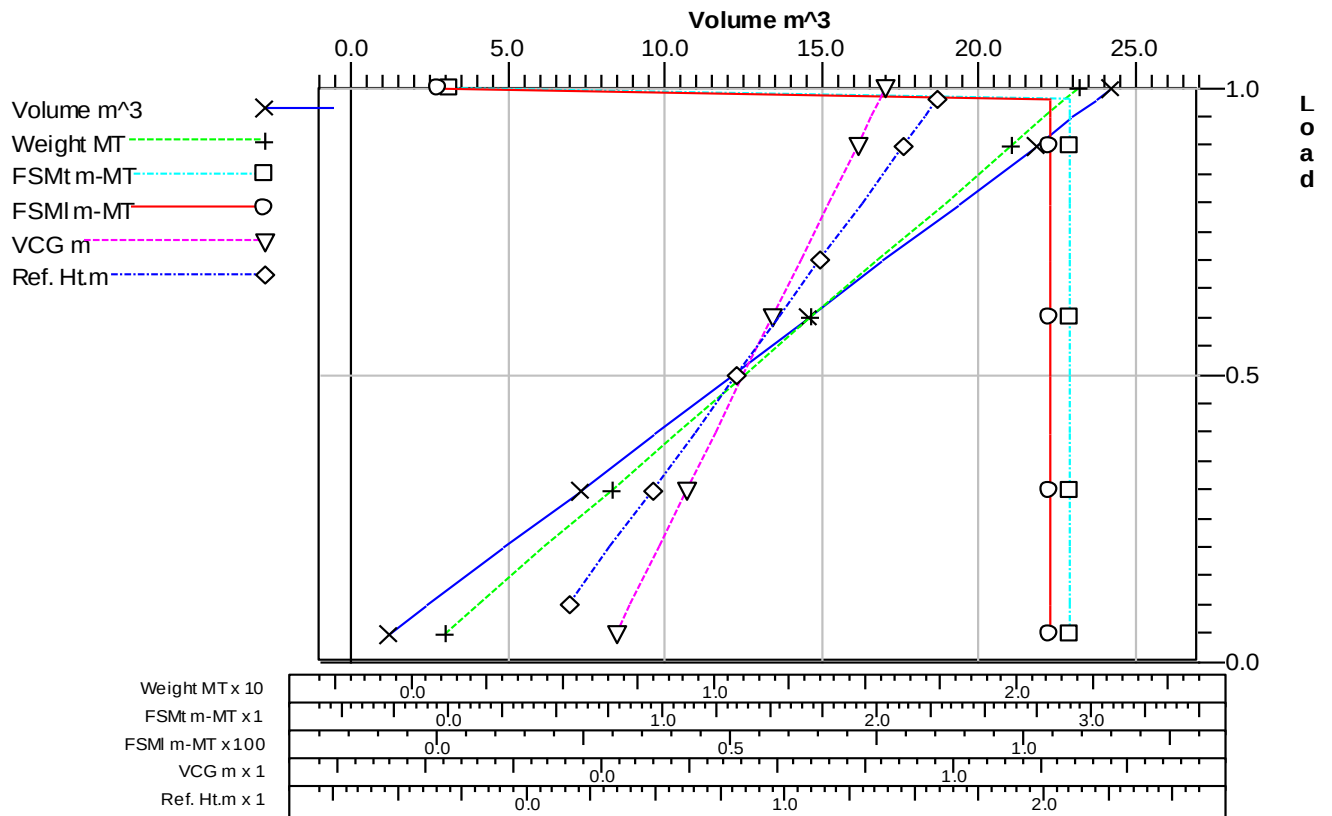


Tank Capacities for DIRTYLO_1101.P containing LUBE OIL (0.910)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMl (MT-m)
5.00%	1.21	1.10	45.600f	0.800p	0.041	2.90	104.44
10.00%	2.42	2.20	45.600f	0.800p	0.081	2.90	104.44
20.00%	4.84	4.41	45.600f	0.800p	0.162	2.90	104.44
30.00%	7.26	6.61	45.600f	0.800p	0.243	2.90	104.44
40.00%	9.68	8.81	45.600f	0.800p	0.324	2.90	104.44
50.00%	12.10	11.02	45.600f	0.800p	0.405	2.90	104.44
60.00%	14.53	13.22	45.600f	0.800p	0.486	2.90	104.44
70.00%	16.95	15.42	45.600f	0.800p	0.567	2.90	104.44
80.00%	19.37	17.62	45.600f	0.800p	0.648	2.90	104.44
90.00%	21.79	19.83	45.600f	0.800p	0.729	2.90	104.44
95.00%	23.00	20.93	45.600f	0.800p	0.770	2.90	104.44
98.00%	23.73	21.59	45.600f	0.800p	0.794	2.90	104.44
100.00%	24.21	22.03	45.600f	0.800p	0.810		

Tank Characteristics

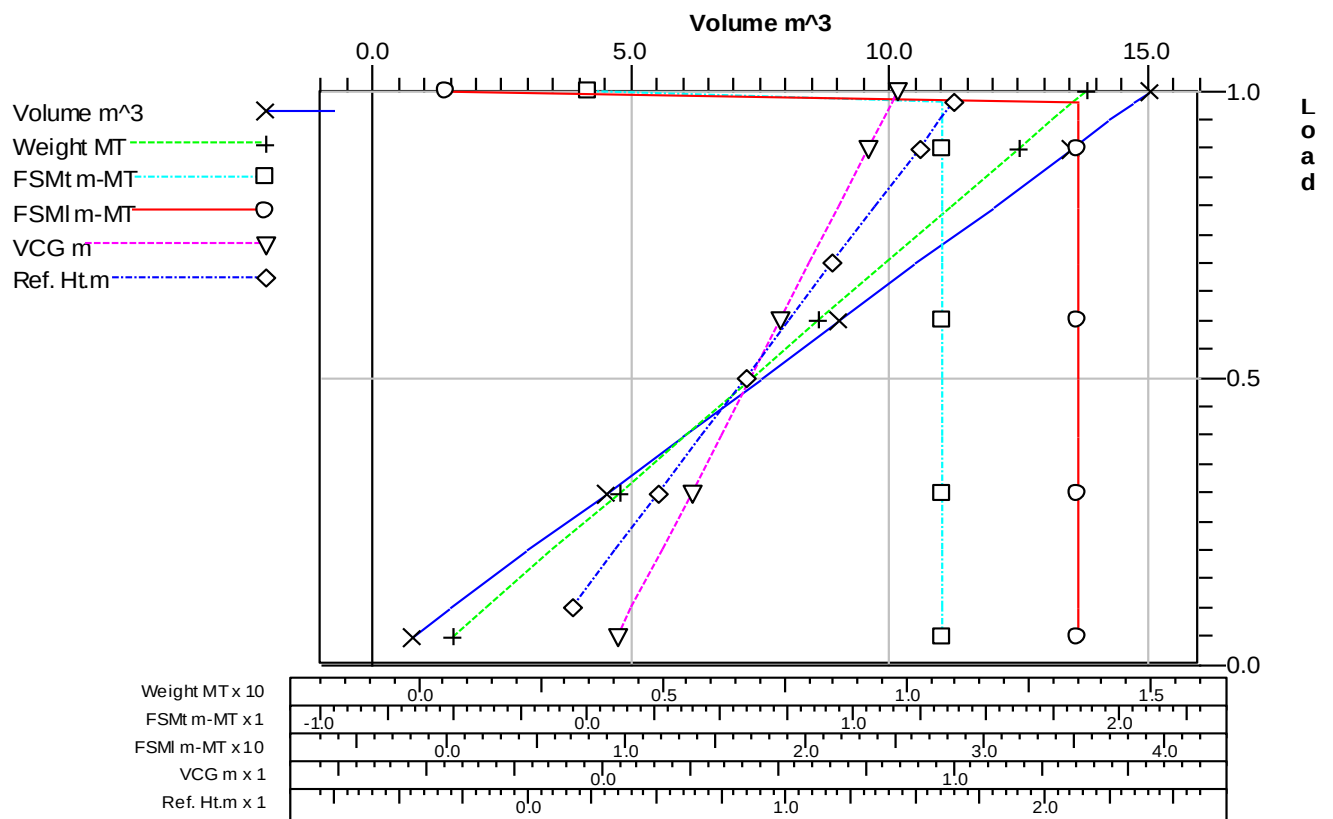


Tank Capacities for LO_1102PS.P containing LUBE OIL (0.910)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMl (MT-m)
5.00%	0.75	0.68	46.817f	4.500p	0.042	1.33	35.15
10.00%	1.50	1.37	46.808f	4.500p	0.084	1.33	35.15
20.00%	3.00	2.73	46.804f	4.500p	0.168	1.33	35.15
30.00%	4.51	4.10	46.803f	4.500p	0.252	1.33	35.15
40.00%	6.01	5.47	46.802f	4.500p	0.336	1.33	35.15
50.00%	7.51	6.83	46.802f	4.500p	0.420	1.33	35.15
60.00%	9.01	8.20	46.801f	4.500p	0.504	1.33	35.15
70.00%	10.51	9.57	46.801f	4.500p	0.588	1.33	35.15
80.00%	12.01	10.93	46.801f	4.500p	0.672	1.33	35.15
90.00%	13.52	12.30	46.801f	4.500p	0.756	1.33	35.15
95.00%	14.27	12.98	46.801f	4.500p	0.798	1.33	35.15
98.00%	14.72	13.39	46.801f	4.500p	0.823	1.33	35.15
100.00%	15.02	13.67	46.801f	4.500p	0.840		

Tank Characteristics

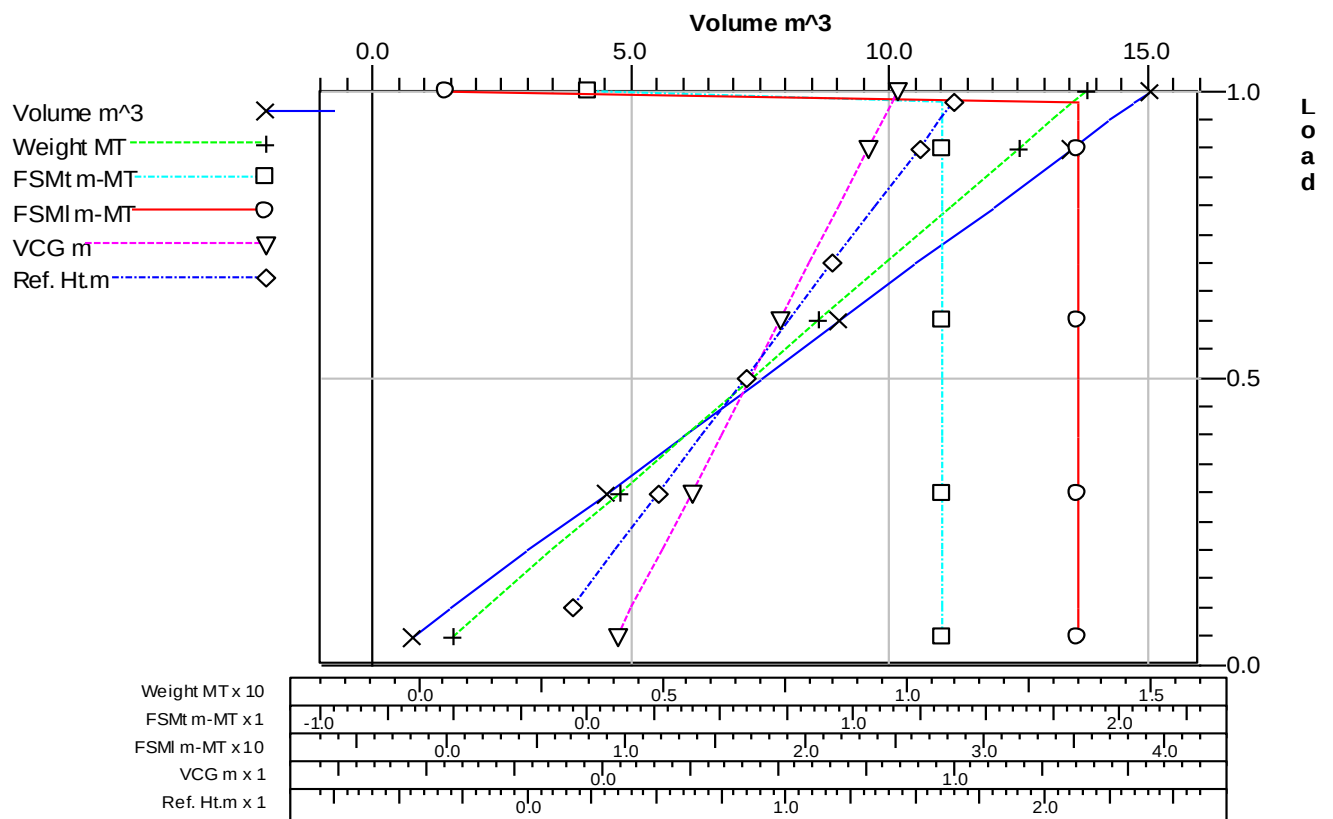


Tank Capacities for LO_1102SB.S containing LUBE OIL (0.910)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMl (MT-m)
5.00%	0.75	0.68	46.817f	4.500s	0.042	1.33	35.15
10.00%	1.50	1.37	46.808f	4.500s	0.084	1.33	35.15
20.00%	3.00	2.73	46.804f	4.500s	0.168	1.33	35.15
30.00%	4.51	4.10	46.803f	4.500s	0.252	1.33	35.15
40.00%	6.01	5.47	46.802f	4.500s	0.336	1.33	35.15
50.00%	7.51	6.83	46.802f	4.500s	0.420	1.33	35.15
60.00%	9.01	8.20	46.801f	4.500s	0.504	1.33	35.15
70.00%	10.51	9.57	46.801f	4.500s	0.588	1.33	35.15
80.00%	12.01	10.93	46.801f	4.500s	0.672	1.33	35.15
90.00%	13.52	12.30	46.801f	4.500s	0.756	1.33	35.15
95.00%	14.27	12.98	46.801f	4.500s	0.798	1.33	35.15
98.00%	14.72	13.39	46.801f	4.500s	0.823	1.33	35.15
100.00%	15.02	13.67	46.801f	4.500s	0.840		

Tank Characteristics

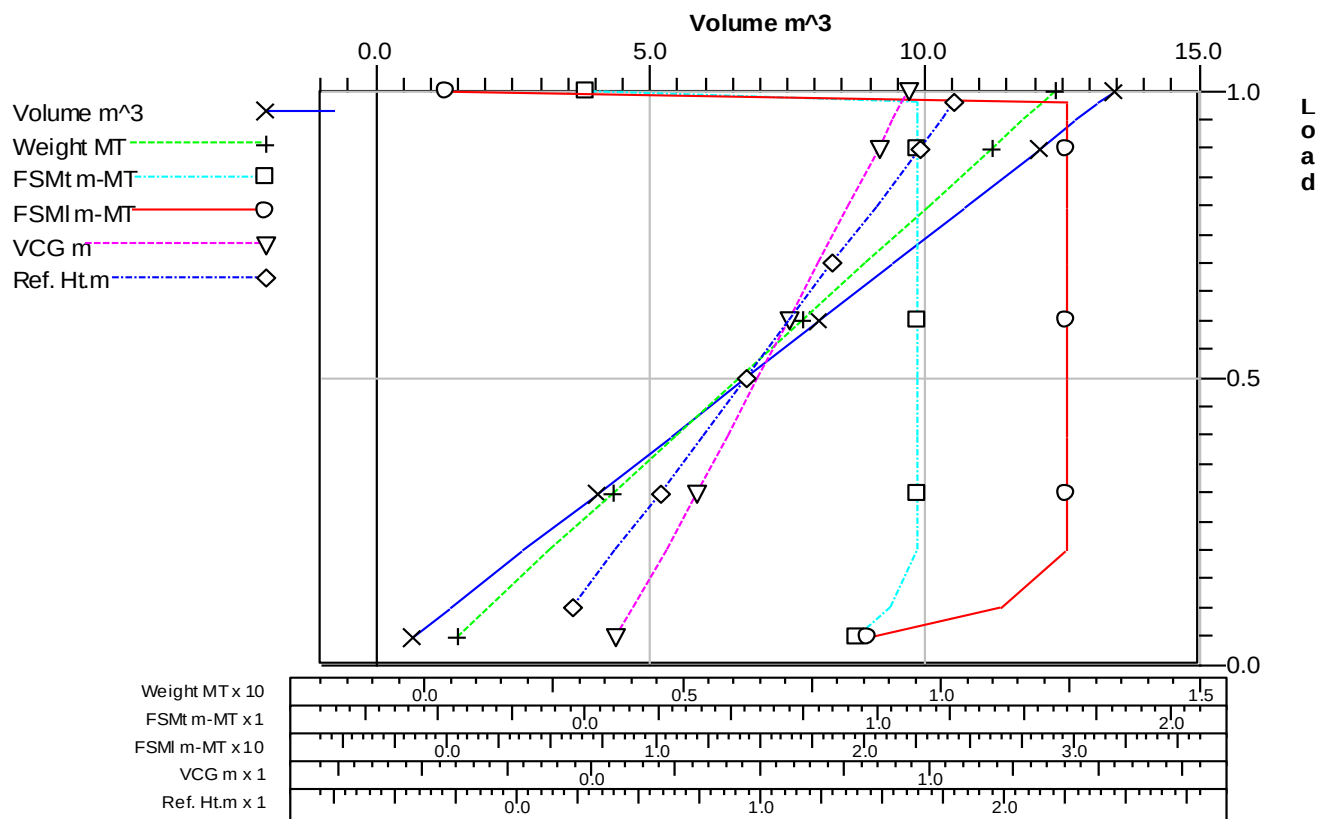


Tank Capacities for LO_1103PS.P containing LUBE OIL (0.910)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMl (MT-m)
5.00%	0.67	0.61	47.733f	7.307p	0.071	0.93	20.12
10.00%	1.34	1.22	47.413f	7.331p	0.125	1.04	26.49
20.00%	2.68	2.44	47.124f	7.361p	0.221	1.14	29.65
30.00%	4.03	3.66	47.016f	7.373p	0.313	1.14	29.65
40.00%	5.37	4.88	46.962f	7.378p	0.403	1.14	29.65
50.00%	6.71	6.11	46.930f	7.382p	0.493	1.14	29.65
60.00%	8.05	7.33	46.908f	7.384p	0.582	1.14	29.65
70.00%	9.39	8.55	46.893f	7.386p	0.672	1.14	29.65
80.00%	10.74	9.77	46.881f	7.387p	0.761	1.14	29.65
90.00%	12.08	10.99	46.872f	7.388p	0.850	1.14	29.65
95.00%	12.75	11.60	46.868f	7.388p	0.894	1.14	29.65
98.00%	13.15	11.97	46.866f	7.388p	0.921	1.14	29.65
100.00%	13.42	12.21	46.865f	7.388p	0.939		

Tank Characteristics

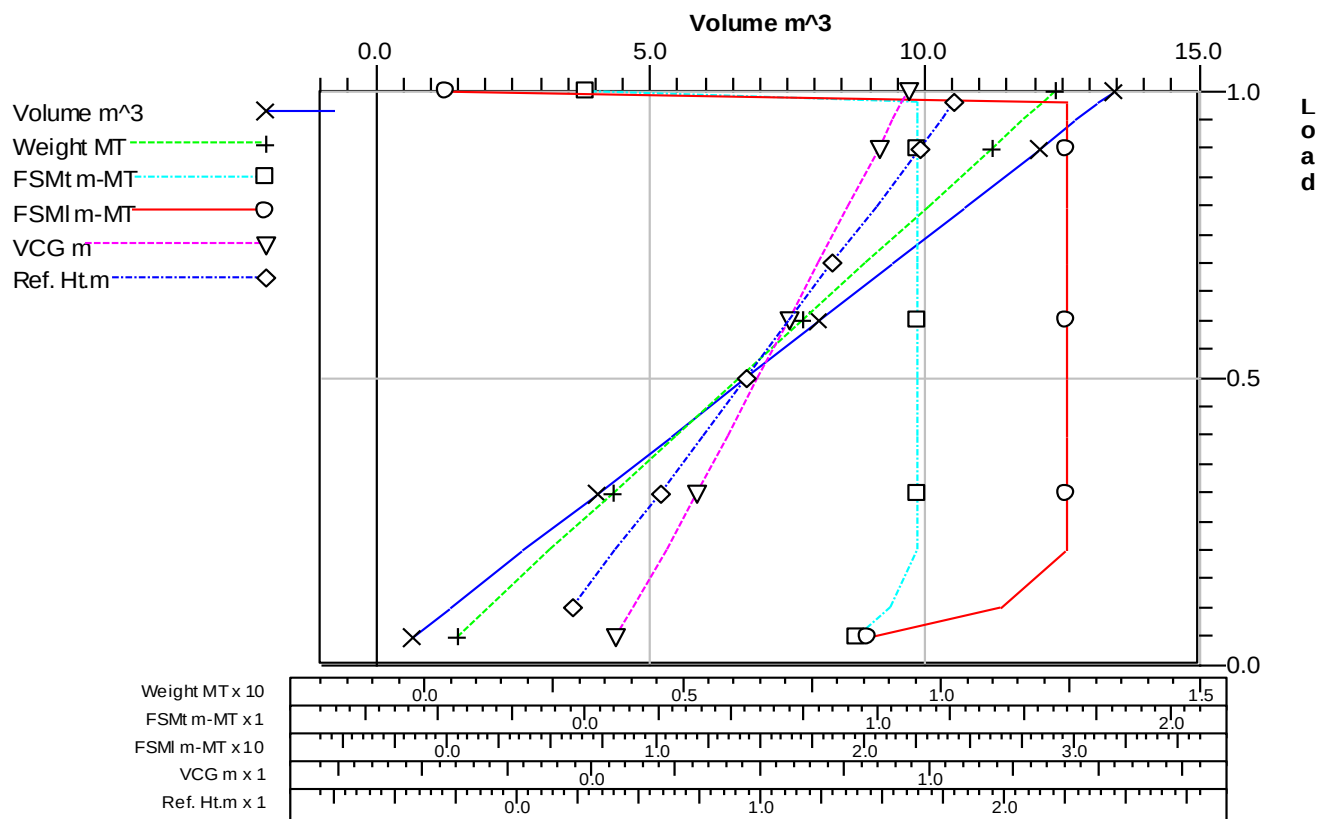


Tank Capacities for LO_1103SB.S containing LUBE OIL (0.910)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMl (MT-m)
5.00%	0.67	0.61	47.733f	7.307s	0.071	0.93	20.12
10.00%	1.34	1.22	47.413f	7.331s	0.125	1.04	26.49
20.00%	2.68	2.44	47.124f	7.361s	0.221	1.14	29.65
30.00%	4.03	3.66	47.016f	7.373s	0.313	1.14	29.65
40.00%	5.37	4.88	46.962f	7.378s	0.403	1.14	29.65
50.00%	6.71	6.11	46.930f	7.382s	0.493	1.14	29.65
60.00%	8.05	7.33	46.908f	7.384s	0.582	1.14	29.65
70.00%	9.39	8.55	46.893f	7.386s	0.672	1.14	29.65
80.00%	10.74	9.77	46.881f	7.387s	0.761	1.14	29.65
90.00%	12.08	10.99	46.872f	7.388s	0.850	1.14	29.65
95.00%	12.75	11.60	46.868f	7.388s	0.894	1.14	29.65
98.00%	13.15	11.97	46.866f	7.388s	0.921	1.14	29.65
100.00%	13.42	12.21	46.865f	7.388s	0.939		

Tank Characteristics

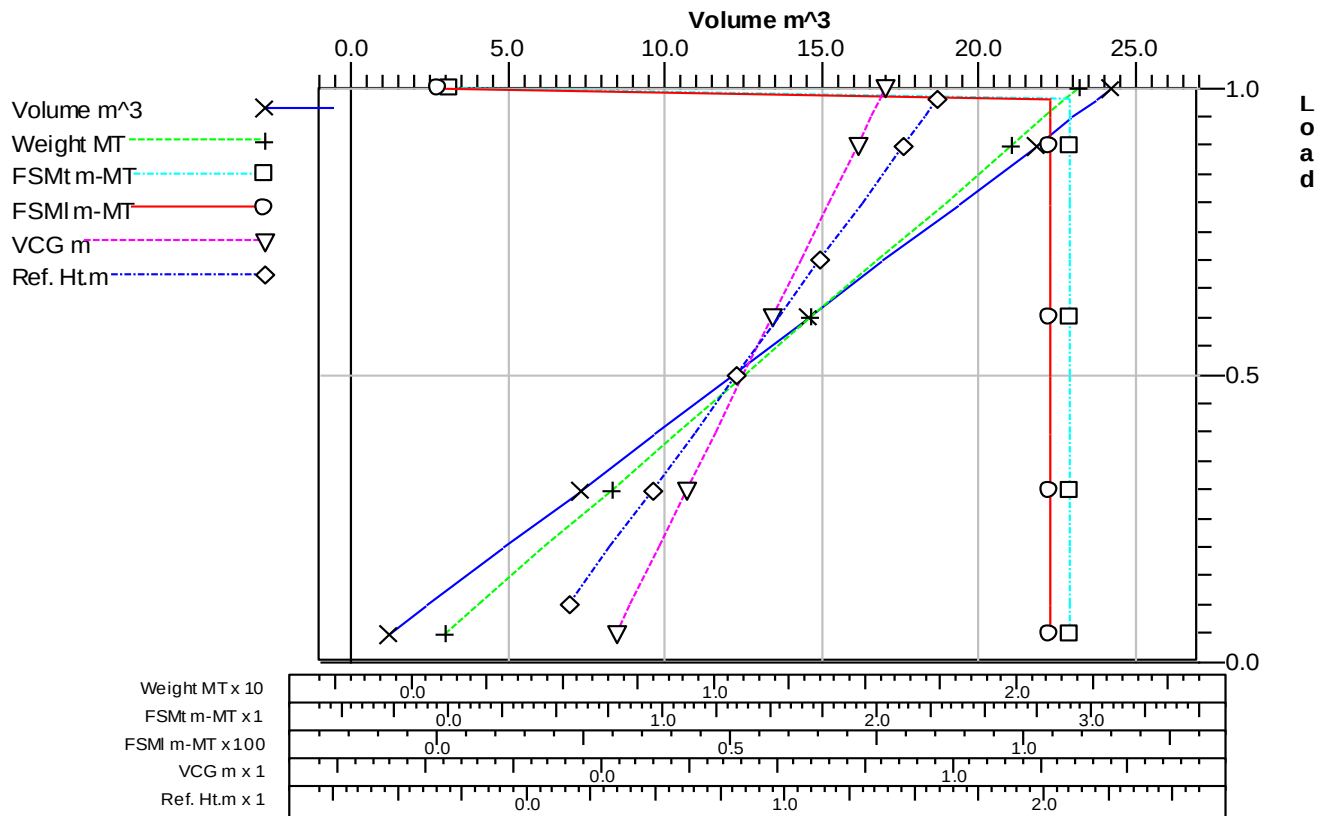


Tank Capacities for STOR_LO_1101.S containing LUBE OIL (0.910)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMl (MT-m)
5.00%	1.21	1.10	45.600f	0.800s	0.041	2.90	104.44
10.00%	2.42	2.20	45.600f	0.800s	0.081	2.90	104.44
20.00%	4.84	4.41	45.600f	0.800s	0.162	2.90	104.44
30.00%	7.26	6.61	45.600f	0.800s	0.243	2.90	104.44
40.00%	9.68	8.81	45.600f	0.800s	0.324	2.90	104.44
50.00%	12.10	11.02	45.600f	0.800s	0.405	2.90	104.44
60.00%	14.53	13.22	45.600f	0.800s	0.486	2.90	104.44
70.00%	16.95	15.42	45.600f	0.800s	0.567	2.90	104.44
80.00%	19.37	17.62	45.600f	0.800s	0.648	2.90	104.44
90.00%	21.79	19.83	45.600f	0.800s	0.729	2.90	104.44
95.00%	23.00	20.93	45.600f	0.800s	0.770	2.90	104.44
98.00%	23.73	21.59	45.600f	0.800s	0.794	2.90	104.44
100.00%	24.21	22.03	45.600f	0.800s	0.810		

Tank Characteristics

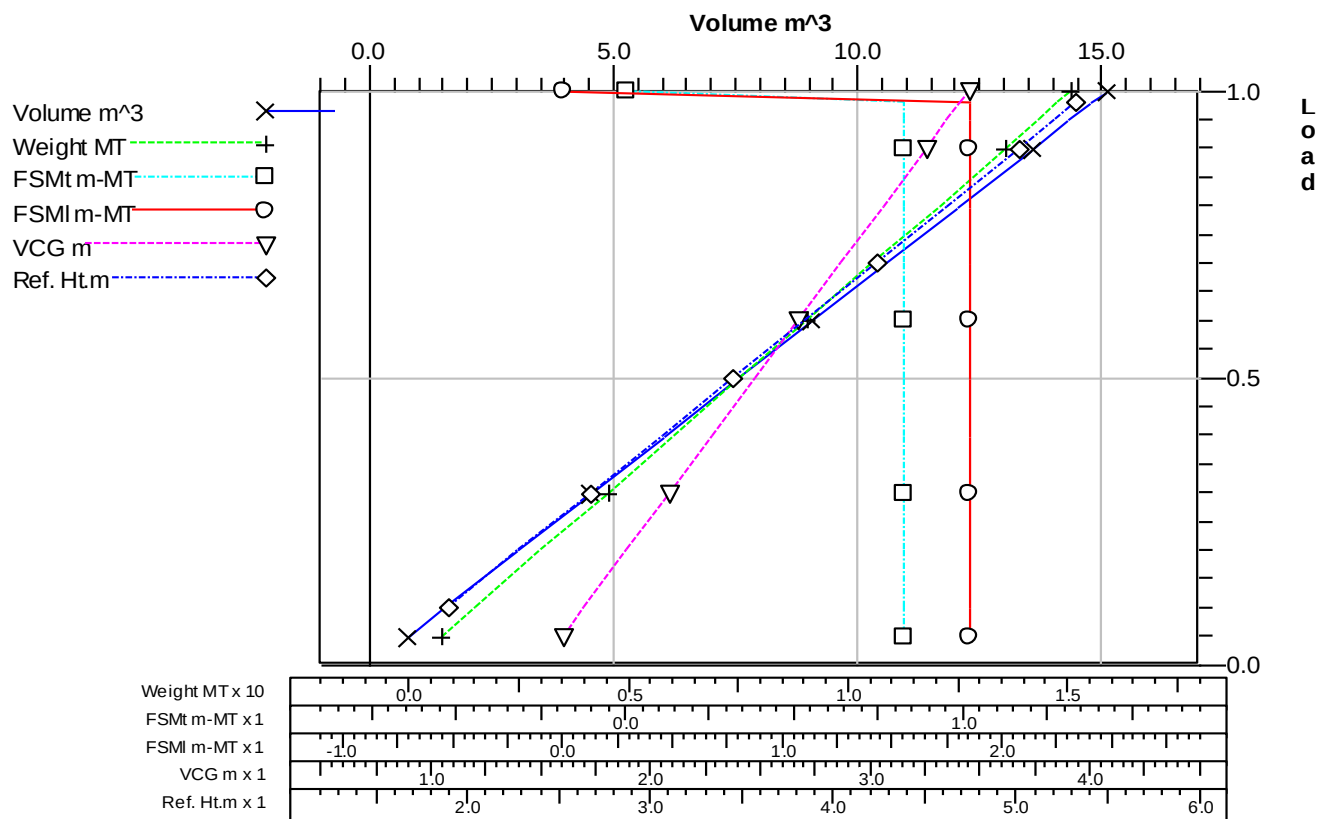


Tank Capacities for BILGEWT_915P.P containing MISCELLANEOUS (1.000)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMl (MT-m)
5.00%	0.75	0.75	70.800f	8.800p	1.597	0.82	1.85
10.00%	1.51	1.51	70.800f	8.800p	1.695	0.82	1.85
20.00%	3.02	3.02	70.800f	8.800p	1.890	0.82	1.85
30.00%	4.52	4.52	70.800f	8.800p	2.085	0.82	1.85
40.00%	6.03	6.03	70.800f	8.800p	2.280	0.82	1.85
50.00%	7.54	7.54	70.800f	8.800p	2.475	0.82	1.85
60.00%	9.05	9.05	70.800f	8.800p	2.670	0.82	1.85
70.00%	10.56	10.56	70.800f	8.800p	2.865	0.82	1.85
80.00%	12.06	12.06	70.800f	8.800p	3.060	0.82	1.85
90.00%	13.57	13.57	70.800f	8.800p	3.255	0.82	1.85
95.00%	14.33	14.33	70.800f	8.800p	3.353	0.82	1.85
98.00%	14.78	14.78	70.800f	8.800p	3.411	0.82	1.85
100.00%	15.08	15.08	70.800f	8.800p	3.450		

Tank Characteristics

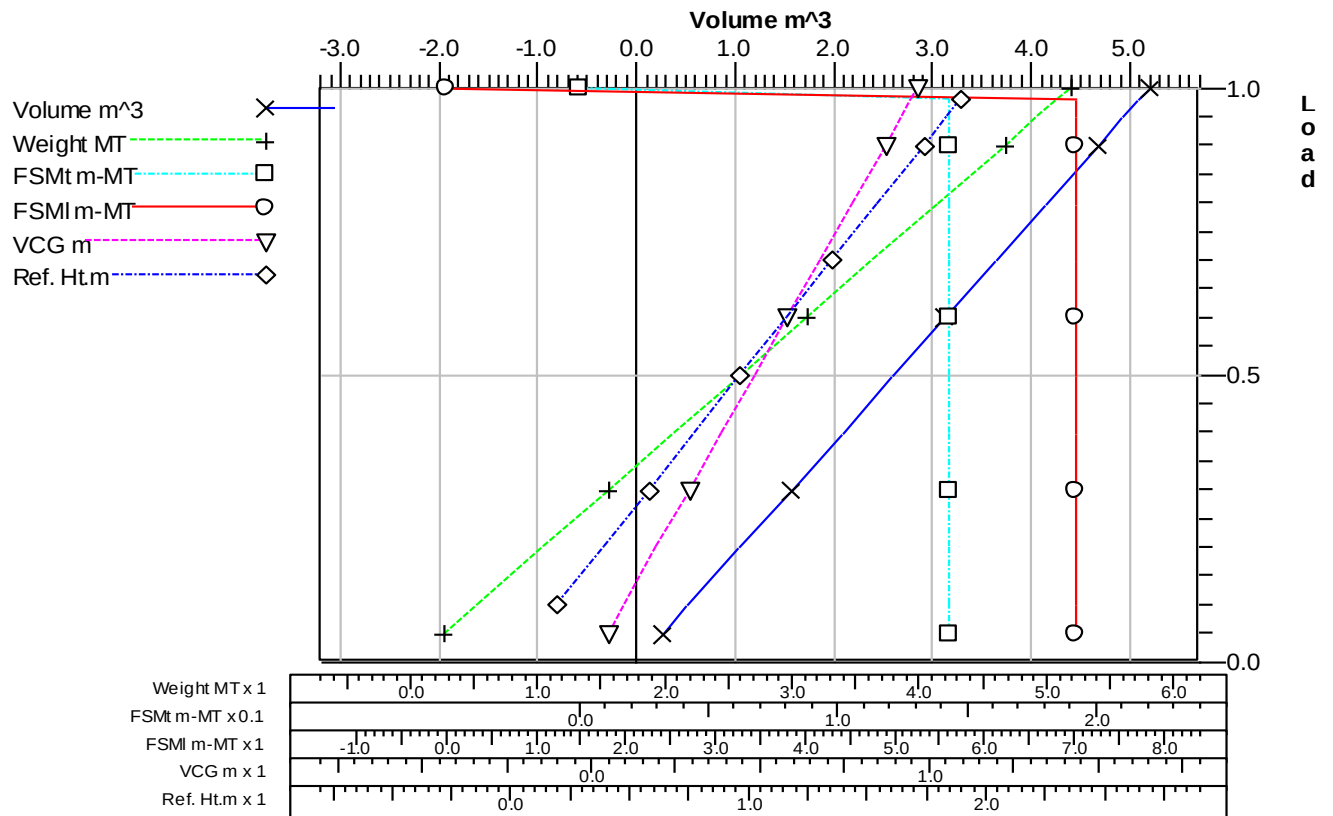


Tank Capacities for FWDRAIN1104S.S containing MISCELLANEOUS (1.000)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMl (MT-m)
5.00%	0.26	0.26	42.799f	2.800s	0.048	0.14	7.03
10.00%	0.52	0.52	42.800f	2.800s	0.096	0.14	7.03
20.00%	1.04	1.04	42.800f	2.800s	0.193	0.14	7.03
30.00%	1.56	1.56	42.800f	2.800s	0.289	0.14	7.03
40.00%	2.08	2.08	42.800f	2.800s	0.386	0.14	7.03
50.00%	2.59	2.59	42.800f	2.800s	0.482	0.14	7.03
60.00%	3.11	3.11	42.800f	2.800s	0.579	0.14	7.03
70.00%	3.63	3.63	42.800f	2.800s	0.675	0.14	7.03
80.00%	4.15	4.15	42.800f	2.800s	0.772	0.14	7.03
90.00%	4.67	4.67	42.800f	2.800s	0.868	0.14	7.03
95.00%	4.93	4.93	42.800f	2.800s	0.917	0.14	7.03
98.00%	5.08	5.08	42.800f	2.800s	0.946	0.14	7.03
100.00%	5.19	5.19	42.800f	2.800s	0.965		

Tank Characteristics

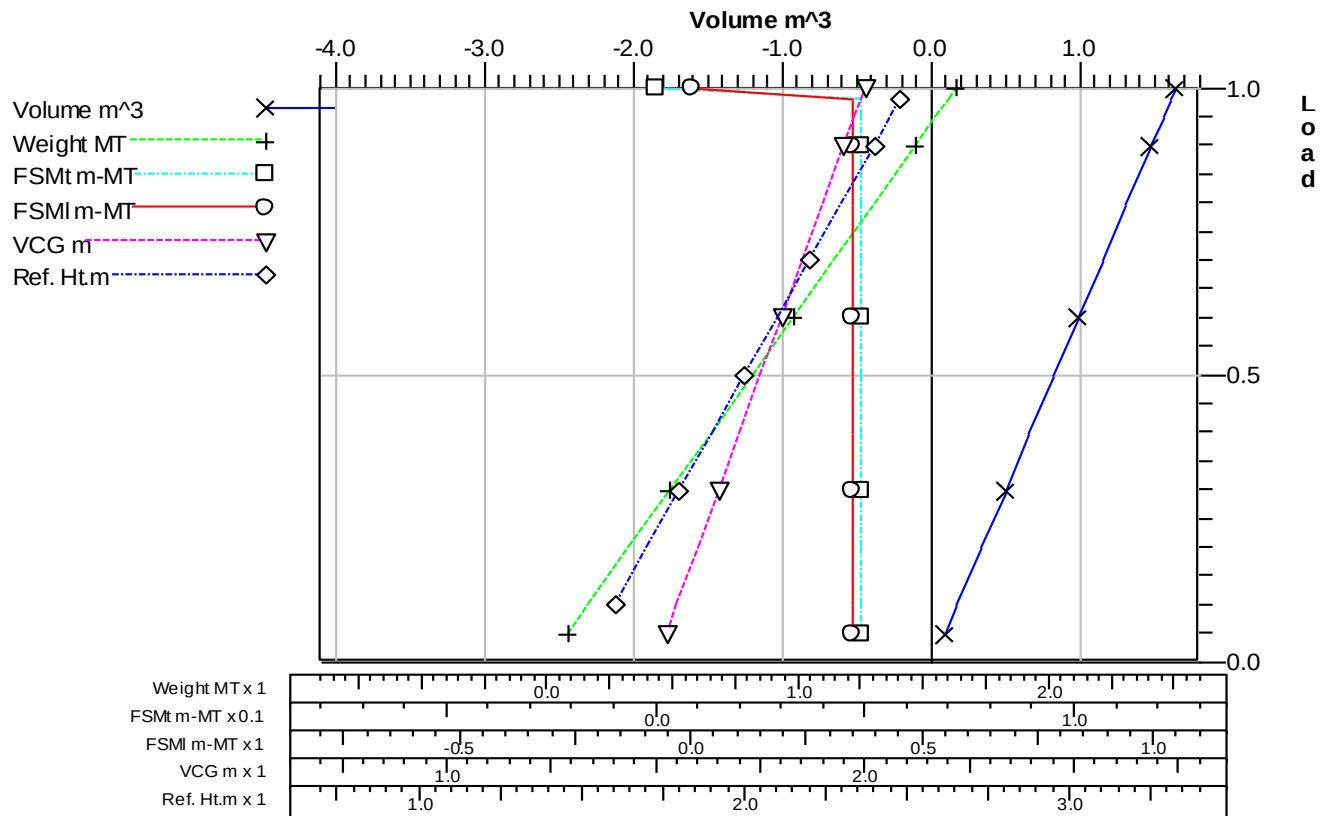


Tank Capacities for HFODRAIN_917.P containing MISCELLANEOUS (1.000)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMl (MT-m)
5.00%	0.08	0.08	64.800f	5.100p	1.525	0.05	0.35
10.00%	0.16	0.16	64.800f	5.100p	1.550	0.05	0.35
20.00%	0.33	0.33	64.800f	5.100p	1.600	0.05	0.35
30.00%	0.49	0.49	64.800f	5.100p	1.650	0.05	0.35
40.00%	0.65	0.65	64.800f	5.100p	1.700	0.05	0.35
50.00%	0.82	0.82	64.800f	5.100p	1.750	0.05	0.35
60.00%	0.98	0.98	64.800f	5.100p	1.800	0.05	0.35
70.00%	1.14	1.14	64.800f	5.100p	1.850	0.05	0.35
80.00%	1.31	1.31	64.800f	5.100p	1.900	0.05	0.35
90.00%	1.47	1.47	64.800f	5.100p	1.950	0.05	0.35
95.00%	1.55	1.55	64.800f	5.100p	1.975	0.05	0.35
98.00%	1.60	1.60	64.800f	5.100p	1.990	0.05	0.35
100.00%	1.63	1.63	64.800f	5.100p	2.000		

Tank Characteristics

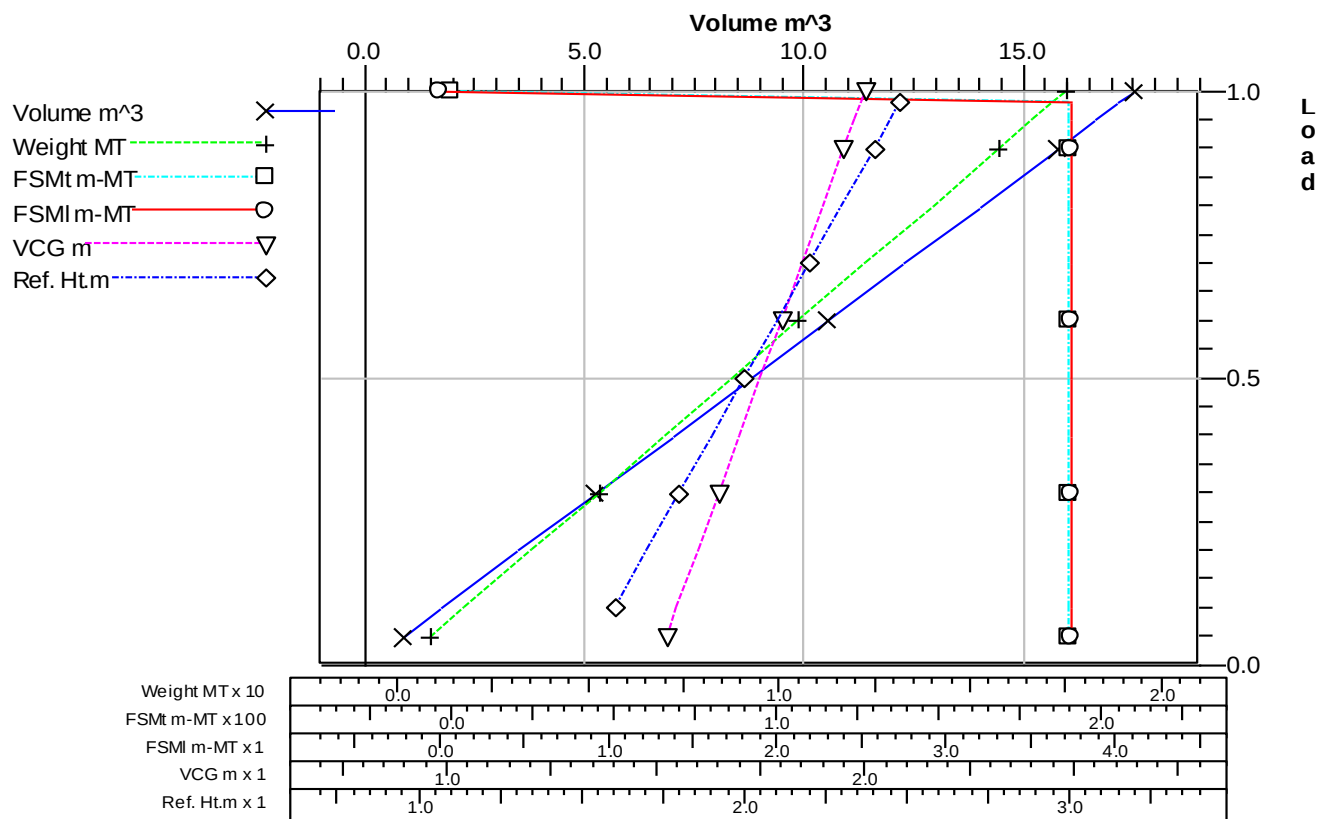


Tank Capacities for HFOSLUDGE916.S containing MISCELLANEOUS (1.000)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMl (MT-m)
5.00%	0.88	0.88	64.800f	0.900s	1.525	189.63	3.73
10.00%	1.75	1.75	64.800f	0.900s	1.550	189.63	3.73
20.00%	3.50	3.50	64.800f	0.900s	1.600	189.63	3.73
30.00%	5.25	5.25	64.800f	0.900s	1.650	189.63	3.73
40.00%	7.00	7.00	64.800f	0.900s	1.700	189.63	3.73
50.00%	8.76	8.76	64.800f	0.900s	1.750	189.63	3.73
60.00%	10.51	10.51	64.800f	0.900s	1.800	189.63	3.73
70.00%	12.26	12.26	64.800f	0.900s	1.850	189.63	3.73
80.00%	14.01	14.01	64.800f	0.900s	1.900	189.63	3.73
90.00%	15.76	15.76	64.800f	0.900s	1.950	189.63	3.73
95.00%	16.63	16.63	64.800f	0.900s	1.975	189.63	3.73
98.00%	17.16	17.16	64.800f	0.900s	1.990	189.63	3.73
100.00%	17.51	17.51	64.800f	0.900s	2.000		

Tank Characteristics

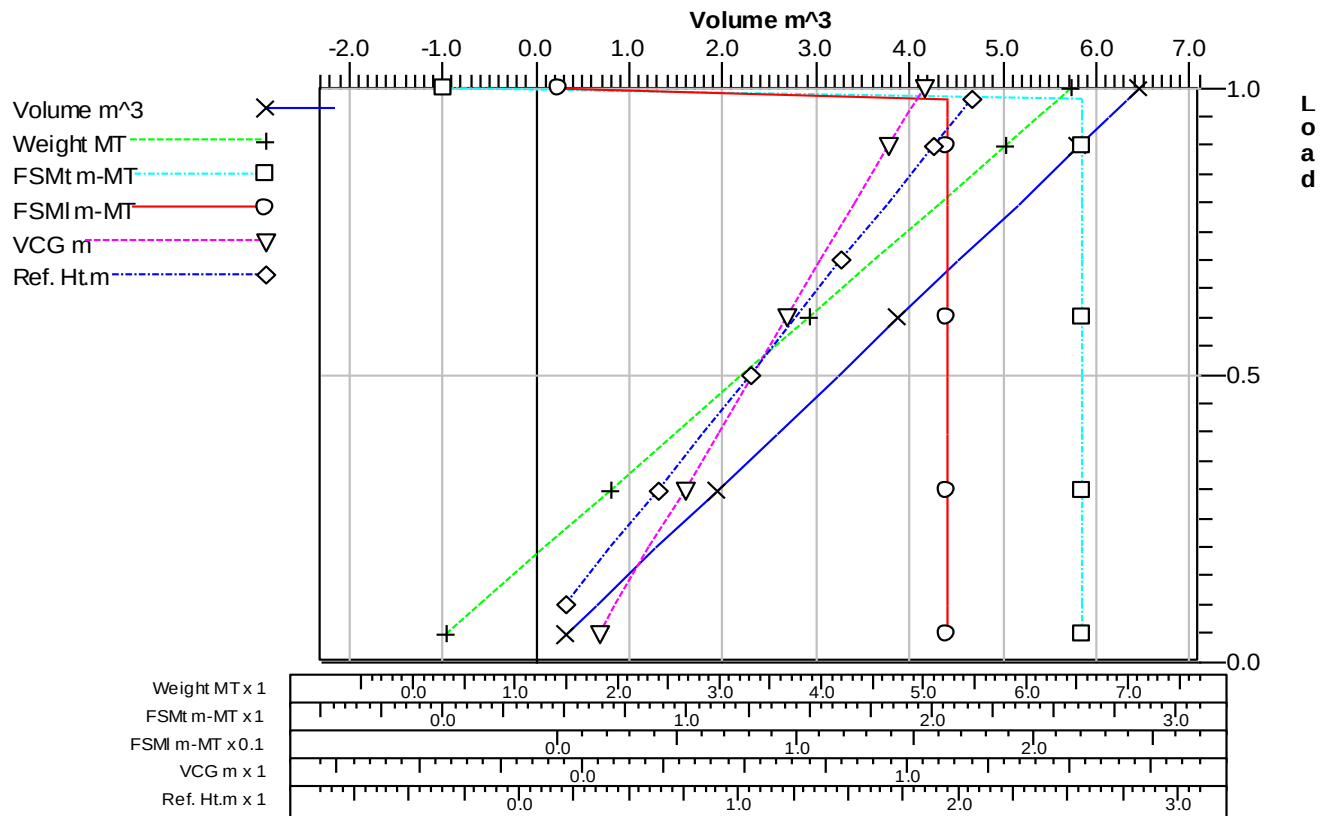


Tank Capacities for LOGEAR_1104P.C containing MISCELLANEOUS (1.000)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMl (MT-m)
5.00%	0.32	0.32	40.400f	0.000	0.053	2.62	0.16
10.00%	0.64	0.64	40.400f	0.000	0.105	2.62	0.16
20.00%	1.29	1.29	40.400f	0.000	0.210	2.62	0.16
30.00%	1.93	1.93	40.400f	0.000	0.315	2.62	0.16
40.00%	2.58	2.58	40.400f	0.000	0.420	2.62	0.16
50.00%	3.22	3.22	40.400f	0.000	0.525	2.62	0.16
60.00%	3.87	3.87	40.400f	0.000	0.630	2.62	0.16
70.00%	4.51	4.51	40.400f	0.000	0.735	2.62	0.16
80.00%	5.16	5.16	40.400f	0.000	0.840	2.62	0.16
90.00%	5.80	5.80	40.400f	0.000	0.945	2.62	0.16
95.00%	6.13	6.13	40.400f	0.000	0.998	2.62	0.16
98.00%	6.32	6.32	40.400f	0.000	1.029	2.62	0.16
100.00%	6.45	6.45	40.400f	0.000	1.050		

Tank Characteristics



6. LOADING CONDITIONS

6.1 Typical Loading Conditions

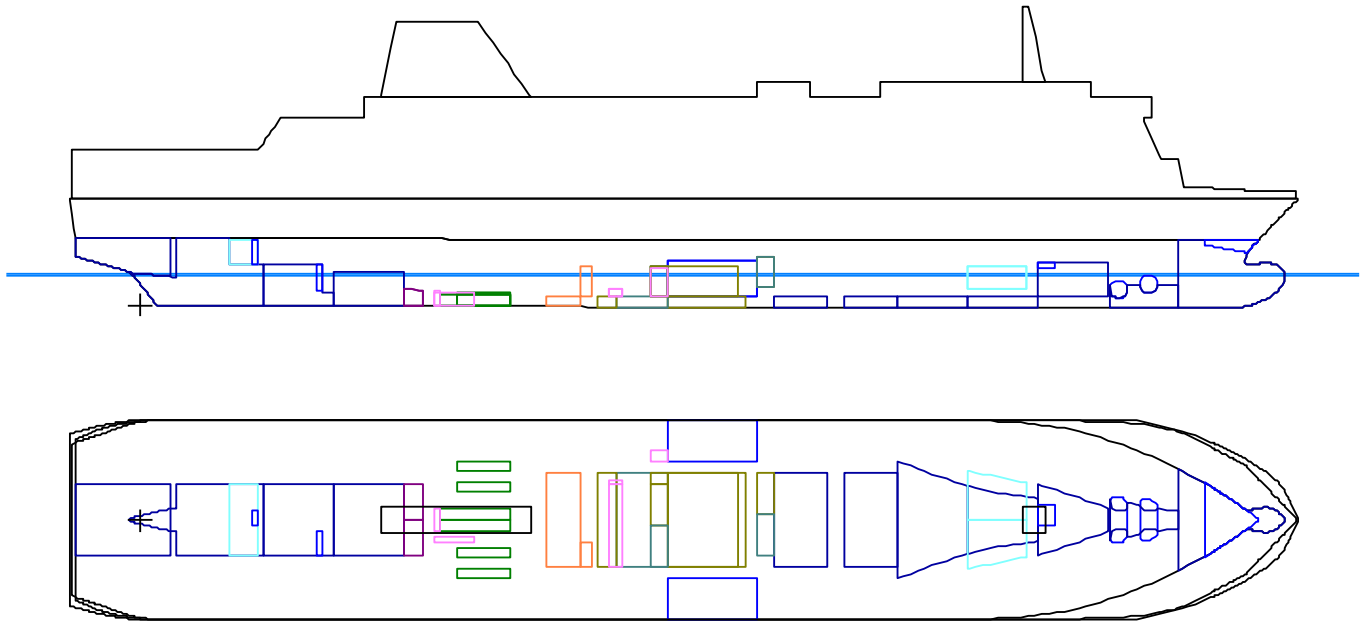
- CASE 1 - *Light Ship*
- CASE 2 - *Ship in Ballast Conditions*
 - (2-1) Departure (100% Consumables)
 - (2-2) Arrival (10% Consumables)
- CASE 3 - *Ship with 1000 Passengers – No Trailers and Cars*
 - (3-1) Departure (100% Consumables)
 - (3-2) Arrival (10% Consumables)
- CASE 4 - *Ship with 1000 Passengers – Trailers on Decks 3, 5, 7 – Cars on Decks 5 and 6*
 - (4-1) Departure (100% Consumables)
 - (4-2) Mid voyage – Start ballasting Heeling Tanks
 - (4-3) Mid voyage – End ballasting Heeling Tanks
 - ..(4-4) Mid voyage – Start ballasting Tank 201
 - (4-5) Mid voyage – End ballasting Tank 201
 - (4-6) Arrival (10% Consumables)
- CASE 5 - *Ship with 1000 Passengers – Trailers on Decks 3 and 5 – Cars on Decks 5 ,6 and 7*
 - (5-1) Departure (100% Consumables)
 - (5-2) Arrival (10% Consumables)
- CASE 6 - *Ship with 1000 Passengers – Trailers on Deck 3 – Cars on Decks 5 , 6 and 7*
 - (6-1) Departure (100% Consumables)
 - (6-2) Arrival (10% Consumables)
- CASE 7 - *Ship with 1000 Passengers – Full Cars on Decks 3, 5, 6 and 7*
 - (7-1) Departure (100% Consumables)
 - (7-2) Arrival (10% Consumables)
- CASE 8 - *Ship with 1000 Passengers – Trailers on Deck 3, Cars on Deck 5*
 - (8-1) Departure (100% Consumables)
 - (8-2) Arrival (10% Consumables)
- CASE 9 - *Ship with 1000 Passengers – Trailers and Cars on Deck 3*
 - (9-1) Departure (100% Consumables)
 - (9-2) Arrival (10% Consumables)
- CASE 10 - *Docking*

6.2 Summary of Loading Conditions Main Data

Loading Case	DISPL (MT)	LCG (m)	FP Draft (m)	AP Draft (m)	Shear Force (MT)	Shear Force Location (m)	Bending Moment (MT-m)	Bending Moment Location (m)
1	11244.1	70.053	4.732	4.529	-1454.1	111.909	70707	73.000
2.1	15082.0	67.985	5.415	6.066	-1524.8	111.909	73141	62.400
2.2	13664.7	67.177	4.773	5.844	-1537.5	105.000	80030	65.600
3.1	15984.0	66.875	5.405	6.524	1724.7	19.000	78108	61.600
3.2	15140.1	66.429	5.033	6.393	1706.5	22.000	81453	62.907
4.1	17827.7	67.762	6.200	6.800	-1530.6	112.800	68806	63.000
4.2	16955.3	67.723	5.921	6.598	-1581.2	112.800	74119	66.000
4.3	17265.7	67.908	6.066	6.636	-1516.5	112.800	70898	64.000
4.4	17283.1	67.933	6.078	6.635	-1515.5	112.800	70843	64.000
4.5	17319.8	68.079	6.128	6.613	-1532.2	112.800	71505	64.000
4.6	16808.5	67.446	5.802	6.619	-1492.3	112.000	73741	65.600
5.1	17035.4	68.781	6.229	6.396	-1552.0	112.800	66642	63.000
5.2	15650.9	68.135	5.628	6.185	-1560.8	111.909	74040	68.000
6.1	17057.4	68.338	6.117	6.495	-1606.5	111.909	70583	64.000
6.2	15673.0	67.654	5.509	6.289	-1645.2	105.000	78299	69.000
7.1	16516.9	67.871	5.827	6.458	-1574.7	111.909	74063	62.000
7.2	15132.5	67.120	5.206	6.256	-1584.7	111.000	80870	65.600
8.1	16596.3	68.239	5.940	6.395	-1621.8	112.800	69628	64.000
8.2	15184.8	67.524	5.326	6.189	-1628.4	111.909	77158	69.000
9.1	16785.0	66.944	5.667	6.711	-1630.1	112.800	73624	63.000
9.2	15400.6	66.123	5.033	6.522	-1636.2	111.909	80848	67.000
10	11959.1	69.761	4.888	4.811	-1405.3	111.909	68041	69.000

6.3 Loading Conditions

CASE 1 - LIGHTSHIP



Floating Status

Draft FP	4.732 m	Heel	0.00 deg	GM(Solid)	3.940 m
Draft MS	4.631 m	Equil	Yes	F/S Corr.	0.000 m
Draft AP	4.529 m	Wind	Off	GM(Fluid)	3.940 m
Trim	0.20f m	Wave	No	KMT	17.321 m
LCG	70.053f m	VCG-Solid	13.381 m	TPcm	31.72
Displacement	11244.1 MT	WaterSpgr	1.025		

Draft At Draft Marks

FORE.p	4.730(m)	FORE.s	4.730(m)
MID.p	4.631(m)	MID.s	4.631(m)
AFT.p	4.541(m)	AFT.s	4.541(m)

TRIM (Referred to Draft Marks) fwd 0.19/140.00f m

Fixed Weight Status

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	11 244.06	70.053f	0.000	13.381u
Total Weight:	11 244.06	70.053f	0.000	13.381u

Tank Status

BALLAST

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
PFT_WB_101.C	1.025	<empty>					0.0
WB_201.C	1.025	<empty>					0.0
WB_401.C	1.025	<empty>					0.0
WB_501.C	1.025	<empty>					0.0
WB_601.C	1.025	<empty>					0.0
WB_701.C	1.025	<empty>					0.0
WB_1201.C	1.025	<empty>					0.0
WB_1301.C	1.025	<empty>					0.0
WB_1401.C	1.025	<empty>					0.0
WB_1511.C	1.025	<empty>					0.0
WB_311.C	1.025	<empty>					0.0

FRESH WATER

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
FW_1411.C	1.000	<empty>					0.0
FW_411PS.P	1.000	<empty>					0.0
FW_412SB.S	1.000	<empty>					0.0

HW

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
HEEL_812PS.P	1.000	<empty>					0.0
HEEL_812SB.S	1.000	<empty>					0.0

DIESEL OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
DO_1001.C	0.860	<empty>					0.0
DO_DAY_914.S	0.860	<empty>					0.0

TO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
TO_STOR1202.P	0.861	<empty>					0.0
TO_DRAIN1202.S	0.861	<empty>					0.0

HFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
HFO_801.C	0.980	<empty>					0.0
HFO_811.C	0.980	<empty>					0.0
HFO_OVFL_902.C	0.980	<empty>					0.0
HFO_DAY_911.P	0.980	<empty>					0.0
HFO_SETT.P	0.980	<empty>					0.0
SLUDGE_913.P	0.980	<empty>					0.0

LUBE OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LO_1102PS.P	0.910	<empty>					0.0
LO_1102SB.S	0.910	<empty>					0.0
LO_1103PS.P	0.910	<empty>					0.0
LO_1103SB.S	0.910	<empty>					0.0
DIRTYLO_1101.P	0.910	<empty>					0.0
STOR_LO_1101.S	0.910	<empty>					0.0

MISCELLANEOUS

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
BILGEWT_915P.P	1.000	<empty>					0.0
HFODRAIN_917.P	1.000	<empty>					0.0
HFOSLUDGE916.S	1.000	<empty>					0.0
LOGEAR_1104P.C	1.000	<empty>					0.0
FWDRAIN1104S.S	1.000	<empty>					0.0

LSHFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LSHFO_901.C	0.980	<empty>					0.0
LSHFO_DAY912.S	0.980	<empty>					0.0
LSHFO_SETT.S	0.980	<empty>					0.0

All Tanks

	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
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Displacer Status

Item	Status	Spgr	Displ (MT)	LCB (m)	TCB (m)	VCB (m)	Eff /Perm
HULL	Intact	1.025	11 244.07	70.068f	0.000	2.588	1.000
SubTotals:			11 244.07	70.068f	0.000	2.588	

Immersion of propeller tip -0.167 m

Current Rolling Period is : 11.26 second

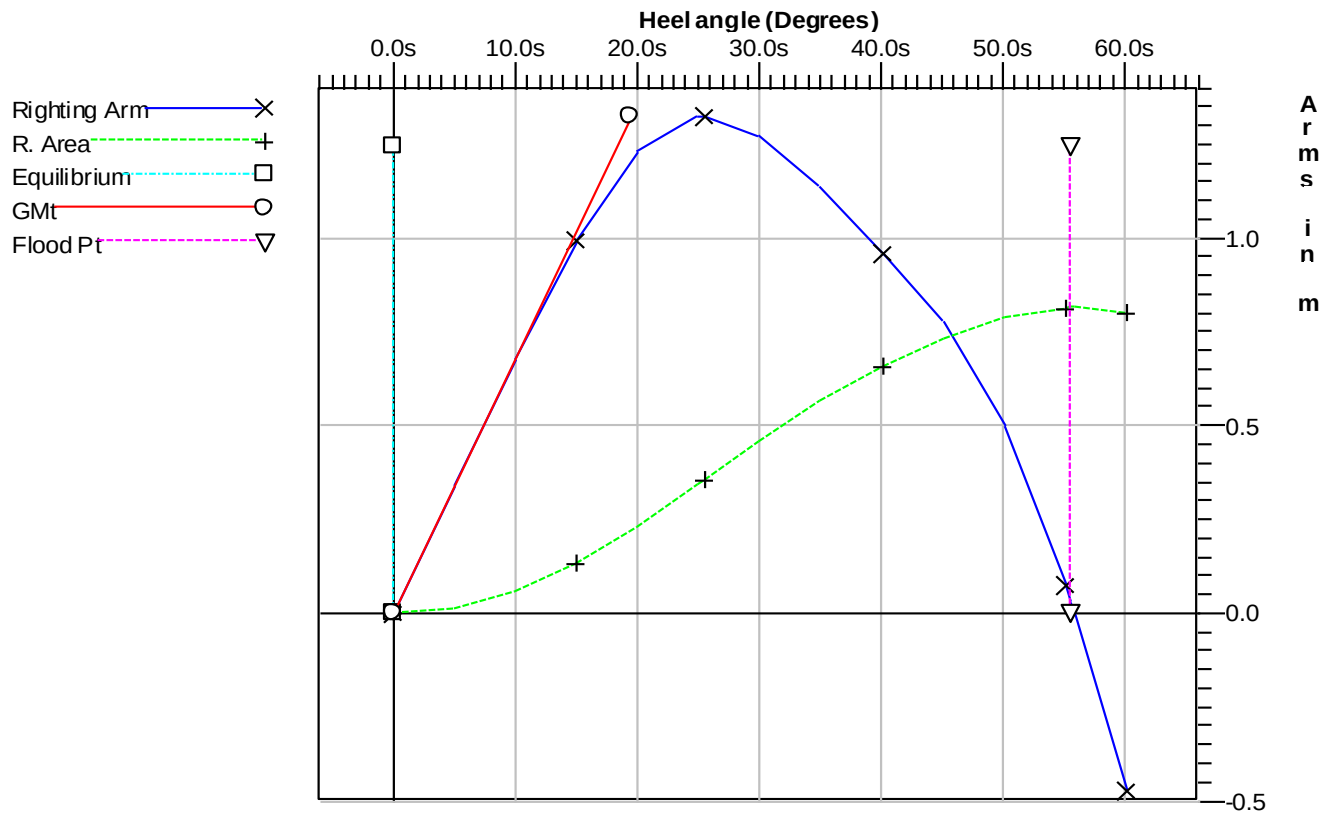
Righting Arms vs. Heel - IMO RES. A.749 (18)

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Righting Arm (m)	Area (m-Rad)	Flood Pt Height (m)	Notes
0.00	0.08f	4.529	0.000	0.000	13.383 (3)	Equil
5.00s	0.09f	4.478	0.344	0.015	12.228 (4)	
10.00s	0.11f	4.322	0.682	0.060	11.009 (4)	
15.00s	0.16f	4.040	0.996	0.133	9.741 (4)	
20.00s	0.24f	3.609	1.236	0.231	8.439 (4)	
25.00s	0.32f	3.055	1.327	0.344	7.153 (4)	
25.40s	0.33f	3.005	1.327	0.353	7.051 (4)	MaxRa
30.00s	0.40f	2.396	1.275	0.459	5.904 (4)	
35.00s	0.47f	1.648	1.138	0.564	4.696 (4)	
40.00s	0.53f	0.823	0.962	0.656	3.532 (4)	
45.00s	0.58f	-0.078	0.777	0.732	2.410 (4)	
50.00s	0.68f	-1.084	0.501	0.789	1.265 (4)	
55.00s	0.79f	-2.135	0.075	0.815	0.107 (4)	
55.47s	0.80f	-2.234	0.028	0.815	0.000 (4)	FldPt
55.74s	0.81f	-2.290	0.000	0.815	-0.061 (4)	RaZero
60.00s	0.88f	-3.166	-0.472	0.798	-1.008 (4)	

Unprotected Flood Points

Name	L,T,V (m)	Height (m)
(3) Fwd Ventilation Opening PS	139.200f, 12.800p, 18.100	13.383
(4) Fwd Ventilation Opening SB	139.200f, 12.800s, 18.100	12.228

Righting Arms vs. Heel - IMO RES. A.749 (18)



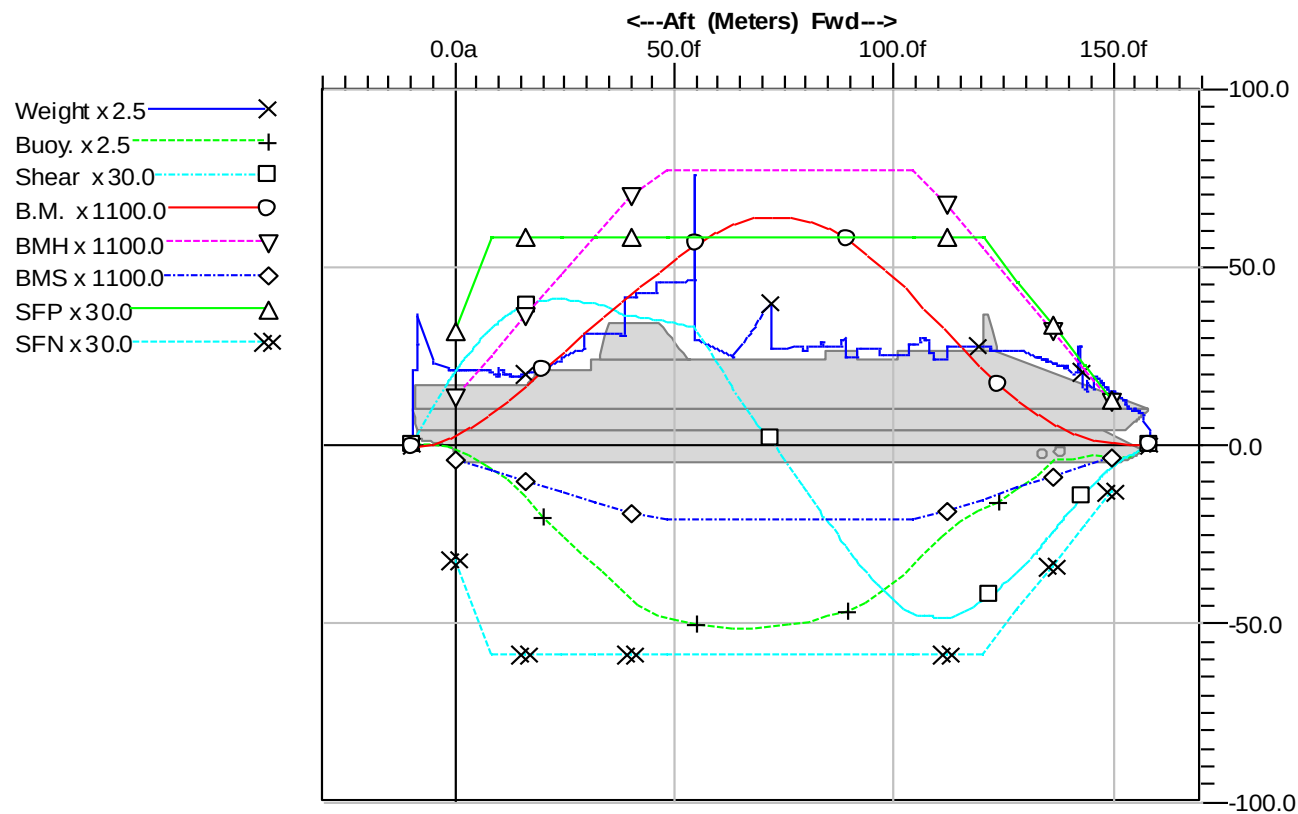
IMO RES. A.749 (18)

Limit	Min/Max	Actual	Margin	Pass
(1) GM at Equilibrium	>0.150 m	3.940	3.790	Yes
(2) Area from 0.00 deg to 30.00	>0.0550 m-R	0.459	0.404	Yes
(3) Area from 0.00 deg to 40.00 or Flood	>0.0900 m-R	0.656	0.566	Yes
(4) Area from 30.00 deg to 40.00 or Flood	>0.0300 m-R	0.198	0.168	Yes
(5) Righting Arm at 30.00 deg	>0.200 m	1.275	1.075	Yes
(6) Angle from 0.00 deg to MaxRA	>25.00 deg	25.40	0.40	Yes

LONGITUDINAL STRENGTH

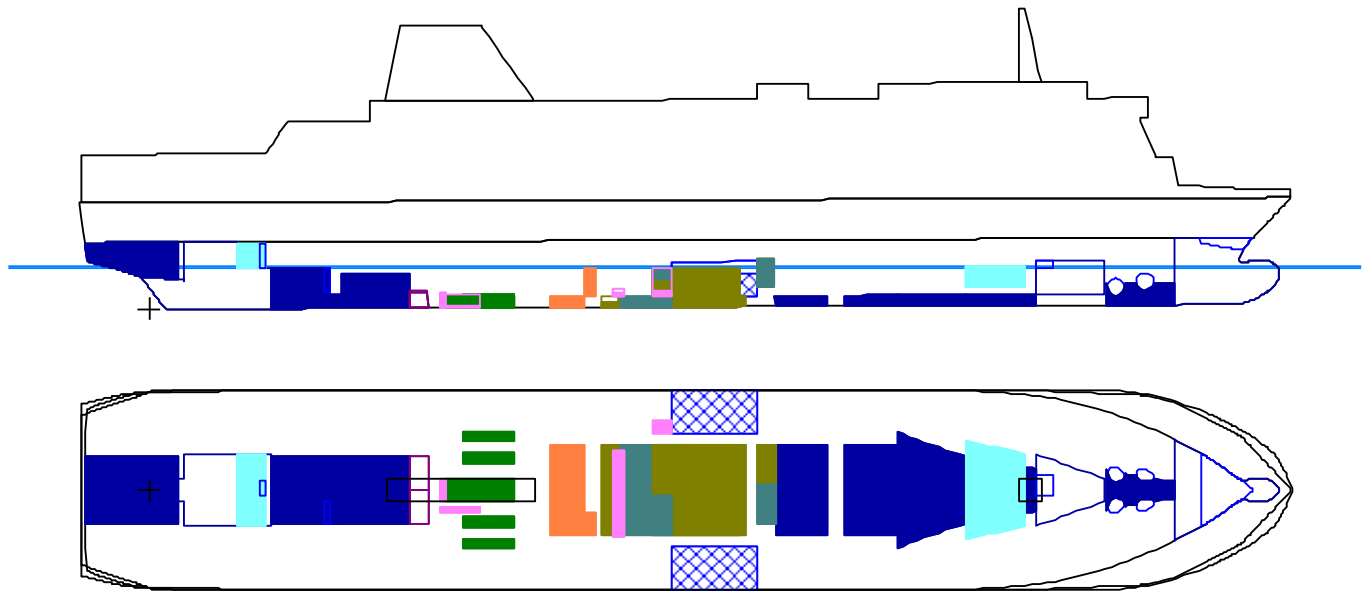
Frame No.	Location (m)	Weight (MT/m)	Buoyancy (MT/m)	Shear (MT)	Bending (MT-m)	Shear (%/Max)	Bending (%/Max)
FR -10	8.000a	85.6	<und>	124.3	182	undef	undef
FR 0	0.000	53.3	1.0	621.7	3277	63.96	22.14
BKHD FR 6	4.800f	53.3	10.1	850.2	6824	59.09	30.63
FR 10	8.000f	51.9	16.5	977.9	9752	55.88	35.77
FR 20	16.000f	50.9	36.0	1178.7	18487	67.35	46.53
BKHD FR 21	16.800f	51.8	38.6	1189.9	19433	67.99	47.43
FR 30	24.000f	62.7	62.4	1226.1	28193	70.06	54.02
BKHD FR 33	26.400f	65.5	69.3	1221.6	31129	69.81	55.66
BKHD FR 36	28.800f	68.3	76.1	1207.6	34044	69.01	57.05
FR 40	32.000f	78.3	85.1	1195.4	37888	68.31	58.60
BKHD FR 50	40.000f	104.4	107.9	1088.2	47015	62.18	60.96
BKHD FR 51	40.800f	104.4	109.7	1084.5	47883	61.97	61.49
FR 60	48.000f	115.5	121.0	1041.5	55530	59.52	65.64
BKHD FR 63	50.400f	115.6	123.1	1025.6	58009	58.61	68.57
BKHD FR 64	51.200f	115.6	123.7	1019.4	58826	58.25	69.53
FR 70	56.000f	72.5	126.3	906.0	63557	51.77	75.13
BKHD FR 75	60.000f	66.5	127.8	675.1	66725	38.58	78.87
FR 80	64.000f	66.8	128.1	422.8	68885	24.16	81.42
BKHD FR 90	72.000f	68.6	127.1	60.5	70676	3.46	83.54
FR 100	80.000f	69.2	123.5	-394.3	69315	22.53	81.93
BKHD FR 105	84.000f	69.7	120.8	-602.3	67313	34.42	79.57
FR 110	88.000f	75.1	117.1	-798.3	64502	45.62	76.24
BKHD FR 117	93.600f	68.0	109.7	-1063.0	59263	60.74	70.05
FR 120	96.000f	68.1	105.5	-1158.4	56598	66.19	66.90
BKHD FR 129	103.200f	71.0	87.8	-1398.7	47306	79.92	55.92
FR 130	103.200f	71.0	87.8	-1398.7	47306	79.92	55.92
FR 140	112.000f	69.8	60.3	-1453.2	34672	83.04	46.70
BKHD FR 141	112.800f	69.8	58.2	-1444.5	33513	82.54	45.94
FR 150	120.000f	69.9	44.4	-1305.3	23546	74.59	38.41
BKHD FR 153	112.400f	69.8	59.2	-1448.9	34092	82.79	46.32
FR 160	128.000f	66.5	30.9	-1072.5	13974	77.66	28.89
BKHD FR 165	132.000f	63.0	22.8	-918.7	9982	76.81	23.83
FR 170	136.000f	58.2	16.3	-734.4	6680	72.64	18.86
BKHD FR 177	141.600f	52.2	9.6	-482.2	3298	64.05	12.48
FR 180	143.400f	39.4	8.0	-403.3	2507	60.19	10.65
FR 190	149.400f	36.7	8.0	-187.9	743	47.82	5.40
FR 200	155.400f	24.2	2.7	-50.0	61	undef	undef

Longitudinal Strength At Sea Condition



Max. Shear	-1454.1 MT	at	111.909f
Max. Bending Moment	70707 MT-m	at	73.000f (Hogging)
Max% Shear	83.09%	at	111.909f
Max% Bending Moment	83.58%	at	73.000f

CASE 2.1 - SHIP IN BALLAST CONDITIONS
SHIP AT DEPARTURE (100% CONSUMABLES)



Fluid Legend

Fluid Name	Legend	Weight (MT)	Load%
BALLAST		1 683.24	58.55%
FRESH WATER		402.63	99.31%
HW		418.82	65.00%
DIESEL OIL		88.86	98.00%
TO		38.47	98.00%
HFO		785.08	95.04%
LUBE OIL		74.51	77.77%
MISCELLANEOUS		19.58	42.70%
LSHFO		231.31	98.00%

Floating Status

Draft FP	5.415 m	Heel	0.01p deg	GM(Solid)	4.963 m
Draft MS	5.740 m	Equil	Yes	F/S Corr.	0.335 m
Draft AP	6.066 m	Wind	Off	GM(Fluid)	4.629 m
Trim	0.65a m	Wave	No	KMT	15.814 m
LCG	67.985f m	VCG-Solid	10.851 m	TPcm	35.20
Displacement	15082.0 MT	WaterSpgr	1.025		

Draft At Draft Marks

FORE.p	5.420(m)	FORE.s	5.420(m)
MID.p	5.743(m)	MID.s	5.738(m)
AFT.p	6.029(m)	AFT.s	6.025(m)

TRIM (Referred to Draft Marks) aft 0.61/140.00a m

Fixed Weight Status

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	11 244.06	70.053f	0.000	13.381u
1) CREW	5.40	120.960f	0.000	25.540u
2) PROVISIONS	45.00	124.100f	0.000	10.110u
3) STORES INCL. SHOP STORES	45.00	98.630f	0.000	11.280u
Total Fixed:	11 339.47	70.405f	0.000	13.366u

Tank Status**BALLAST**

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
PFT_WB_101.C	1.025	<empty>					0.0
WB_201.C	1.025	100.00%	41.70	137.000f	0.000	1.702	0.0
WB_401.C	1.025	100.00%	77.29	117.171f	0.000	0.887	0.0
WB_501.C	1.025	100.00%	138.17	107.479f	0.000	0.852	0.0
WB_601.C	1.025	100.00%	130.02	99.547f	0.000	0.779	0.0
WB_701.C	1.025	100.00%	138.76	89.998f	0.000	0.750	0.0
WB_1201.C	1.025	100.00%	381.44	31.268f	0.000	2.545	0.0
WB_1301.C	1.025	100.00%	339.22	21.058f	0.085p	3.167	0.0
WB_1401.C	1.025	<empty>					0.0
WB_1511.C	1.025	100.00%	436.64	1.706a	0.000	7.457	0.0
WB_311.C	1.025	<empty>					0.0
Subtotals:		58.55%	1 683.24	43.592f	0.017p	3.424	0.0

FRESH WATER

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
FW_1411.C	1.000	98.00%	137.09	13.934f	0.010s	7.366	355.9
FW_411PS.P	1.000	100.00%	131.01	116.609f	2.991p	4.087	0.0
FW_412SB.S	1.000	100.00%	134.54	116.609f	2.991s	4.087	0.0
Subtotals:		99.31%	402.63	81.649f	0.029s	5.203	355.9

HW

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
HEEL_812PS.P	1.000	65.50%	210.05	77.935f	10.845p	3.123	194.4
HEEL_812SB.S	1.000	64.50%	208.76	77.934f	10.843s	3.100	196.2
Subtotals:		65.00%	418.82	77.934f	0.034p	3.112	390.6

DIESEL OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
DO_1001.C	0.860	98.00%	76.11	57.594f	0.002p	0.735	707.0
DO_DAY_914.S	0.860	98.00%	12.75	60.800f	4.750s	3.460	3.0
Subtotals:		98.00%	88.86	58.054f	0.680s	1.126	709.9

TO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
TO_STOR1202.P	0.861	98.00%	19.23	37.214f	2.310p	1.198	17.5
TO_DRAIN1202.S	0.861	98.00%	19.23	37.214f	2.309s	1.198	17.5
Subtotals:		98.00%	38.47	37.214f	0.000	1.198	35.0

HFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
HFO_801.C	0.980	100.00%	191.75	77.200f	0.000	0.750	0.0
HFO_811.C	0.980	98.00%	462.63	76.792f	0.000	3.460	1 611.2
HFO_OVFL_902.C	0.980	50.00%	22.13	63.597f	0.004p	0.375	402.8
HFO_DAY_911.P	0.980	98.00%	50.60	70.800f	2.000p	3.460	33.7
HFO_SETT.P	0.980	98.00%	50.60	85.200f	3.600p	4.760	33.7
SLUDGE_913.P	0.980	50.00%	7.38	70.799f	5.600p	2.500	0.8
Subtotals:		95.04%	785.08	76.619f	0.414p	2.786	2 082.3

LUBE OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LO_1102PS.P	0.910	98.00%	13.39	46.789f	4.500p	0.823	1.3
LO_1102SB.S	0.910	98.00%	13.39	46.789f	4.500s	0.823	1.3
LO_1103PS.P	0.910	98.00%	11.97	46.855f	7.388p	0.921	1.1
LO_1103SB.S	0.910	98.00%	11.97	46.855f	7.388s	0.921	1.1
DIRTYLO_1101.P	0.910	10.00%	2.20	45.394f	0.800p	0.081	2.9
STOR_LO_1101.S	0.910	98.00%	21.59	45.579f	0.800s	0.794	2.9
Subtotals:		77.77%	74.51	46.419f	0.208s	0.824	10.7

MISCELLANEOUS

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
BILGEWT_915P.P	1.000	20.00%	3.02	70.798f	8.800p	1.890	0.8
HFODRAIN_917.P	1.000	20.00%	0.33	64.795f	5.100p	1.600	0.0
HFOSLUDGE916.S	1.000	50.00%	8.76	64.798f	0.896s	1.750	189.6
LOGEAR_1104P.C	1.000	100.00%	6.45	40.400f	0.000	1.050	0.0
FWDRAIN1104S.S	1.000	20.00%	1.04	42.770f	2.800s	0.193	0.1
Subtotals:		42.70%	19.58	56.521f	0.891p	1.456	190.7

LSHFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LSHFO_901.C	0.980	98.00%	130.11	68.387f	0.002p	0.735	1 208.5
LSHFO_DAY912.S	0.980	98.00%	50.60	70.800f	3.600s	3.460	33.7
LSHFO_SETT.S	0.980	98.00%	50.60	85.200f	2.000s	4.760	33.7
Subtotals:		98.00%	231.31	72.593f	1.224s	2.212	1 275.9

All Tanks

	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
Totals:		69.93%	3 742.51	60.652f	0.004p	3.232	5 051.1

Displacer Status

Item	Status	Spgr	Displ (MT)	LCB (m)	TCB (m)	VCB (m)	Eff /Perm
HULL	Intact	1.025	15 081.97	67.952f	0.003p	3.257	1.000
SubTotals:			15 081.97	67.952f	0.003p	3.257	

Immersion of propeller tip 1.353 m

Current Rolling Period is : 9.49 second

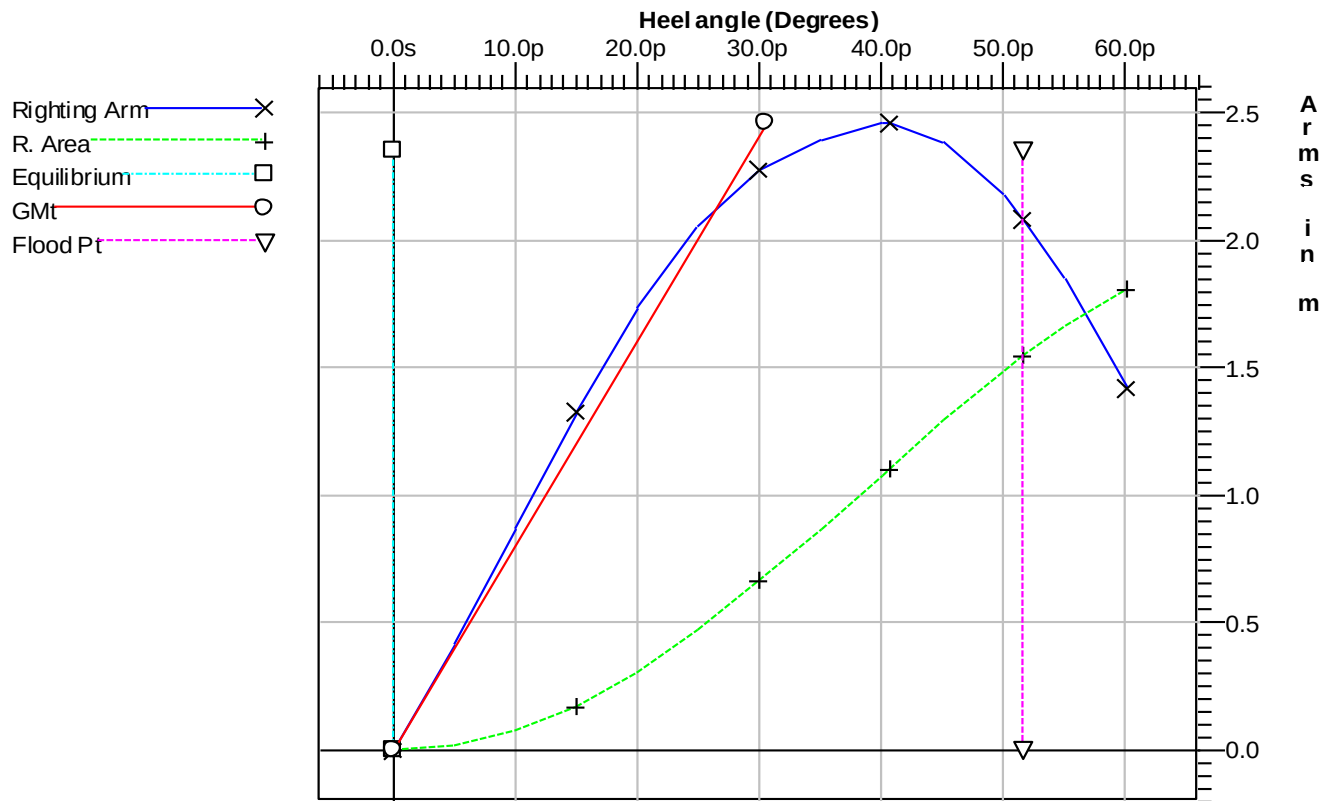
Righting Arms vs. Heel - IMO RES. A.749 (18)

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Righting Arm (m)	Area (m-Rad)	Flood Pt Height (m)	Notes
0.01p	0.25a	6.065	0.000	0.000	12.022 (1)	Equil
5.01p	0.23a	6.003	0.425	0.019	10.857 (1)	
10.01p	0.18a	5.801	0.879	0.075	9.705 (1)	
15.01p	0.11a	5.488	1.332	0.172	8.545 (1)	
20.01p	0.04a	5.085	1.740	0.306	7.369 (1)	
25.01p	0.02f	4.581	2.065	0.473	6.199 (1)	
30.01p	0.09f	3.966	2.278	0.663	5.058 (1)	
35.01p	0.14f	3.248	2.398	0.868	3.886 (3)	
40.01p	0.19f	2.436	2.463	1.080	2.727 (3)	
40.61p	0.20f	2.332	2.464	1.106	2.588 (3)	MaxRa
45.01p	0.25f	1.572	2.394	1.293	1.558 (3)	
50.01p	0.31f	0.705	2.176	1.494	0.368 (3)	
51.55p	0.33f	0.439	2.086	1.551	0.000 (3)	FldPt
55.01p	0.37f	-0.166	1.849	1.670	-0.834 (3)	
60.01p	0.43f	-1.050	1.427	1.814	-2.031 (3)	

Unprotected Flood Points

Name	L,T,V (m)	Height (m)
(1) Aft Ventilation Opening PS	2.150a, 13.300p, 18.100	12.022
(3) Fwd Ventilation Opening PS	139.200f, 12.800p, 18.100	3.886

Righting Arms vs. Heel - IMO RES. A.749 (18)



IMO RES. A.749 (18)

Limit	Min/Max	Actual	Margin	Pass
(1) GM at Equilibrium	>0.150 m	4.629	4.479	Yes
(2) Area from 0.00 deg to 30.00	>0.0550 m-R	0.663	0.608	Yes
(3) Area from 0.00 deg to 40.00 or Flood	>0.0900 m-R	1.080	0.990	Yes
(4) Area from 30.00 deg to 40.00 or Flood	>0.0300 m-R	0.417	0.387	Yes
(5) Righting Arm at 30.00 deg	>0.200 m	2.278	2.078	Yes
(6) Angle from 0.00 deg to MaxRA	>25.00 deg	40.60	15.60	Yes

Current VCG Fluid 11.186 m < Max Allowable VCG 13.979 m - PASS

IMO Res. A.749 (18), SEVERE WIND AND ROLLING CRITERION (WEATHER CRITERION)

Wind speed 53.4 kn

Wind pressure 504 N /m²Under Water Lateral Plane 881.591 m²Above Water Lateral Plane 3608.402 m²

Under Water Lateral Plane Centroid 2.834 m below water line

Above Water Lateral Plane Centroid 11.841 m above water line

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)	Area (m-Rad)	Flood Pt Height (m)	Notes
23.29p	0.00f	4.766	-2.236	0.000	6.599 (1)	Roll
18.29p	0.06a	5.235	-1.879	-0.180	7.773 (1)	
13.29p	0.13a	5.605	-1.451	-0.325	8.947 (1)	
8.29p	0.20a	5.886	-0.992	-0.432	10.098 (1)	
3.29p	0.24a	6.039	-0.548	-0.499	11.258 (1)	
1.71s	0.25a	6.058	-0.129	-0.529	11.628 (2)	
3.22s	0.24a	6.040	0.000	-0.530	11.275 (2)	Equil
6.71s	0.22a	5.951	0.306	-0.521	10.463 (2)	
11.71s	0.16a	5.705	0.765	-0.474	9.314 (2)	
16.71s	0.09a	5.362	1.208	-0.388	8.147 (2)	
21.71s	0.02a	4.926	1.591	-0.266	6.971 (2)	
26.71s	0.05f	4.385	1.881	-0.114	5.808 (2)	
31.71s	0.11f	3.734	2.057	0.059	4.679 (4)	
36.71s	0.16f	2.983	2.155	0.243	3.488 (4)	MaxRa
41.71s	0.21f	2.144	2.189	0.433	2.334 (4)	
46.71s	0.27f	1.278	2.064	0.620	1.156 (4)	
50.00s	0.31f	0.706	1.906	0.734	0.370 (4)	
51.54s	0.33f	0.438	1.816	0.785	0.000 (4)	FldPt
55.00s	0.37f	-0.164	1.579	0.887	-0.831 (4)	

Note:

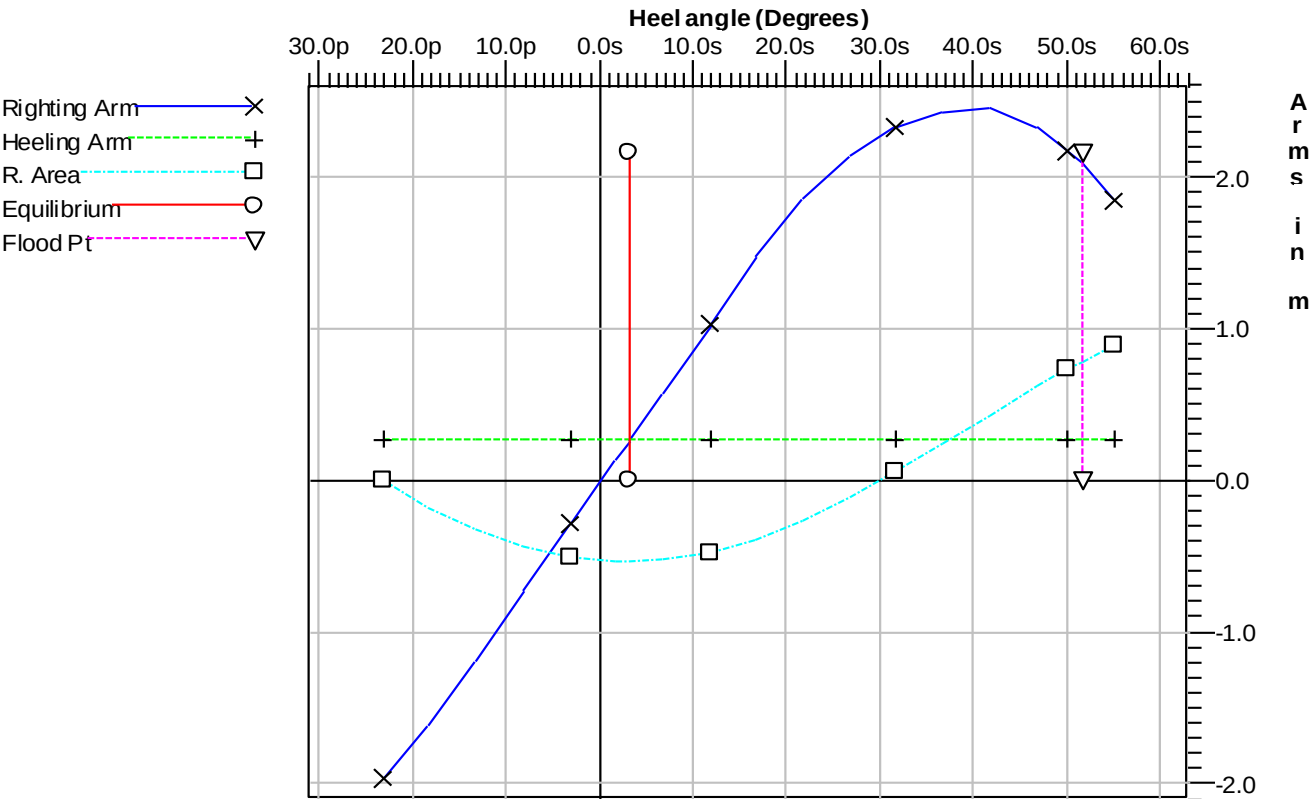
Roll angle is 25.46

Equilibrium for load condition without gust is 2.17s

Unprotected Flood Points

Name	L,T,V (m)	Height (m)
(1) Aft Ventilation Opening PS	2.150a, 13.300p, 18.100	6.599
(2) Aft Ventilation Opening SB	2.150a, 13.300s, 18.100	11.628
(4) Fwd Ventilation Opening SB	139.200f, 12.800s, 18.100	4.679

Righting Arms vs. Heel - IMO SEVERE WIND & ROLLING



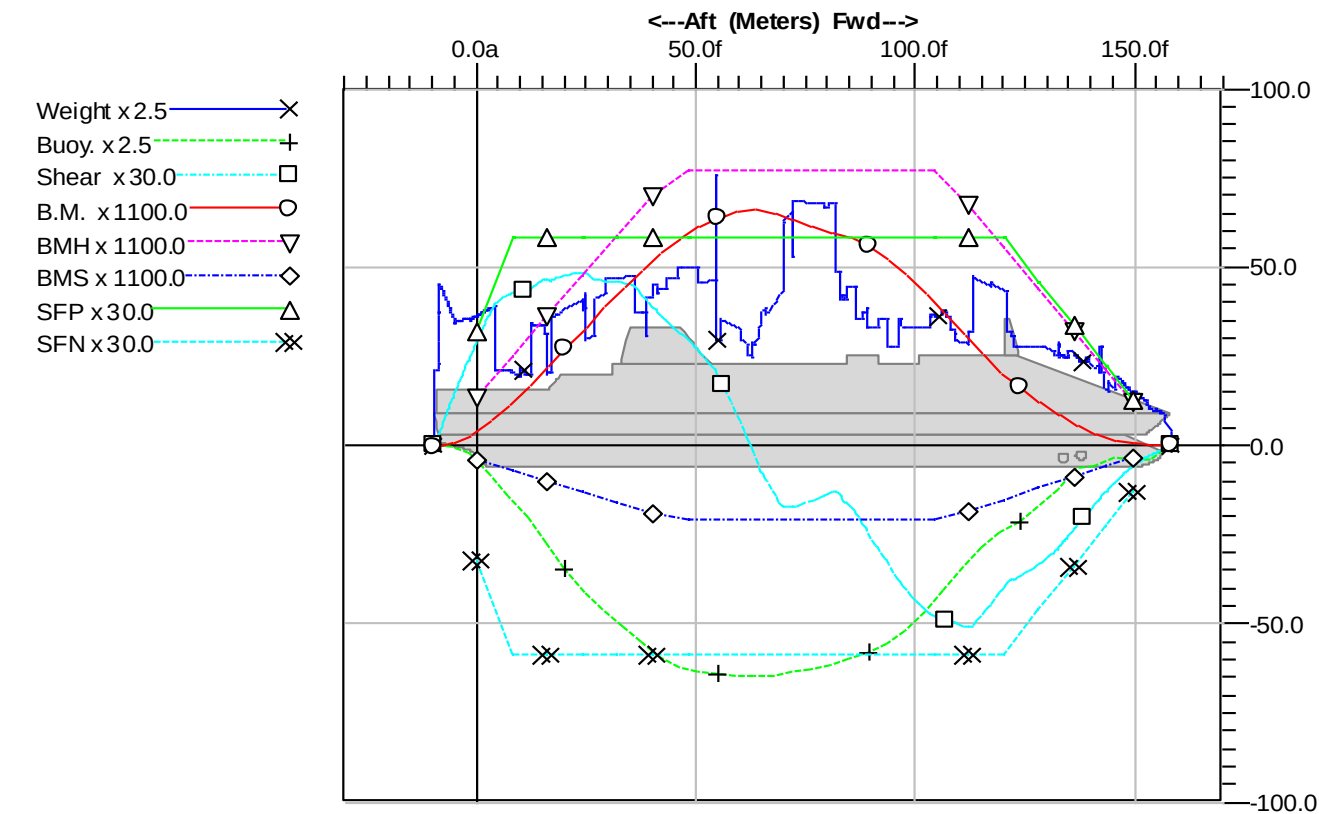
IMO SEVERE WIND & ROLLING

Limit	Min/Max	Actual	Margin	Pass
(1) Res. Ratio from Roll to Abs 50.00 deg or Flood	>1.000	2.385	1.385	Yes

LONGITUDINAL STRENGTH

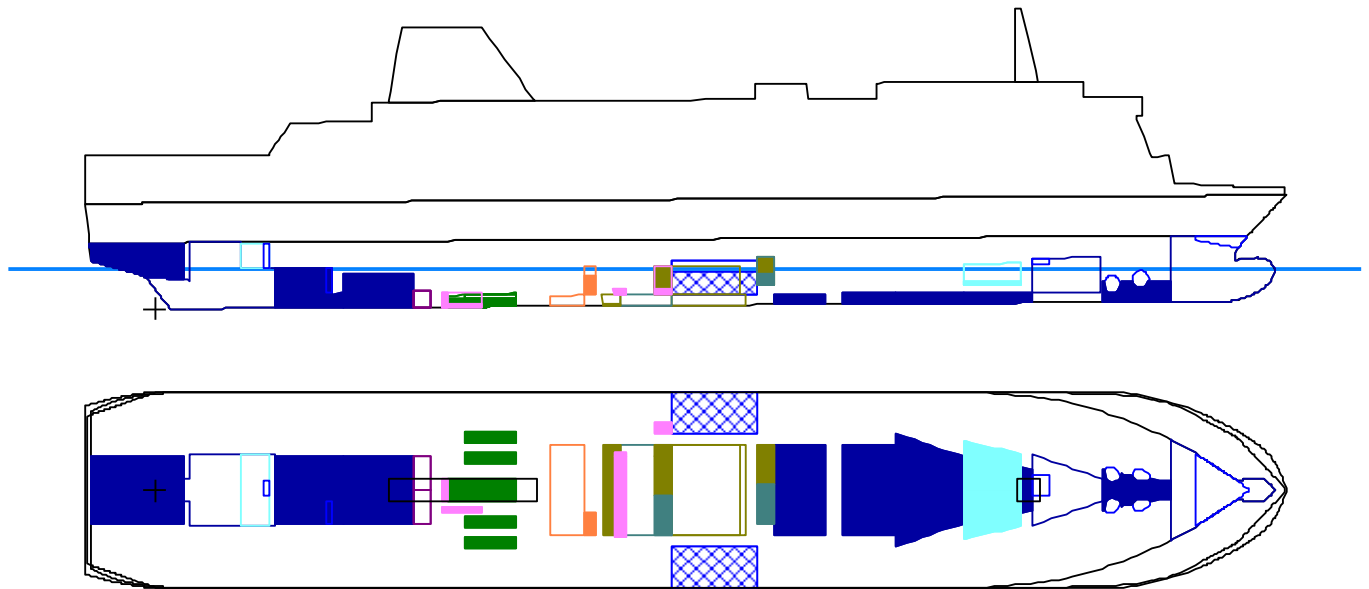
Frame No.	Location (m)	Weight (MT/m)	Buoyancy (MT/m)	Shear (MT)	Bending (MT-m)	Shear (%/Max)	Bending (%/Max)
FR -10	8.000a	108.9	<und>	153.2	130	undef	undef
FR 0	0.000	91.8	8.5	872.9	4373	89.81	29.55
BKHD FR 6	4.800f	53.3	26.3	1211.2	9483	84.18	42.56
FR 10	8.000f	51.9	37.3	1279.7	13488	73.12	49.47
FR 20	16.000f	79.5	68.9	1402.9	24159	80.16	60.81
BKHD FR 21	16.800f	89.8	72.5	1387.4	25278	79.28	61.69
FR 30	24.000f	103.3	100.6	1454.5	35594	83.12	68.20
BKHD FR 33	26.400f	103.2	107.8	1402.6	39045	80.15	69.81
BKHD FR 36	28.800f	107.2	114.7	1388.1	42402	79.32	71.06
FR 40	32.000f	118.3	123.5	1379.2	46840	78.81	72.44
BKHD FR 50	40.000f	112.7	145.0	1170.9	57335	66.91	74.34
BKHD FR 51	40.800f	112.7	146.8	1144.3	58263	65.39	74.82
FR 60	48.000f	125.1	156.9	891.2	65567	50.93	77.50
BKHD FR 63	50.400f	125.1	158.6	812.7	67619	46.44	79.93
BKHD FR 64	51.200f	115.6	159.0	778.0	68254	44.46	80.68
FR 70	56.000f	88.4	160.8	509.5	71449	29.12	84.45
BKHD FR 75	60.000f	82.2	161.7	205.1	72899	11.72	86.17
FR 80	64.000f	81.7	161.4	-156.3	73008	8.93	86.30
BKHD FR 90	72.000f	171.4	159.1	-519.5	69858	29.68	82.57
FR 100	80.000f	170.3	154.1	-409.3	66156	23.39	78.20
BKHD FR 105	84.000f	111.9	150.8	-481.3	64505	27.50	76.25
FR 110	88.000f	94.3	146.5	-664.2	62262	37.95	73.60
BKHD FR 117	93.600f	89.4	138.2	-972.2	57676	55.55	68.17
FR 120	96.000f	89.0	133.5	-1129.8	55158	64.56	65.20
BKHD FR 129	103.200f	92.4	112.9	-1417.2	45928	80.98	54.29
FR 130	103.200f	92.4	112.9	-1417.2	45928	80.98	54.29
FR 140	112.000f	80.6	79.9	-1524.8	32971	87.13	44.41
BKHD FR 141	112.800f	118.7	77.2	-1523.4	31754	87.05	43.53
FR 150	120.000f	109.5	60.0	-1193.4	21954	68.20	35.81
BKHD FR 153	112.400f	80.3	78.5	-1524.1	32363	87.09	43.97
FR 160	128.000f	69.8	42.3	-1004.7	13238	72.75	27.37
BKHD FR 165	132.000f	63.2	31.5	-880.2	9475	73.60	22.61
FR 170	136.000f	65.0	22.7	-708.4	6308	70.07	17.81
BKHD FR 177	141.600f	56.5	12.9	-458.4	3077	60.88	11.64
FR 180	143.400f	39.4	10.3	-384.4	2334	57.37	9.91
FR 190	149.400f	36.7	9.1	-177.8	676	45.25	4.92
FR 200	155.400f	24.2	3.7	-49.8	51	undef	undef

Longitudinal Strength At Sea Condition (0.01 deg.)



Max. Shear	-1524.8 MT	at	111.909f
Max. Bending Moment	73141 MT-m	at	62.400f (Hogging)
Max% Shear	89.81%	at	0.000
Max% Bending Moment	86.46%	at	62.400f

CASE 2.2 - SHIP IN BALLAST CONDITIONS
SHIP AT ARRIVAL (10% CONSUMABLES)



Fluid Legend

Fluid Name	Legend	Weight (MT)	Load%
BALLAST		1 683.24	58.55%
FRESH WATER		41.16	10.15%
HW		418.92	65.01%
DIESEL OIL		9.04	9.97%
TO		38.47	98.00%
HFO		82.39	9.97%
LUBE OIL		48.68	50.80%
MISCELLANEOUS		19.58	42.70%
LSHFO		24.27	10.28%

Floating Status

Draft FP	4.773 m	Heel	0.00 deg	GM(Solid)	4.705 m
Draft MS	5.308 m	Equil	Yes	F/S Corr.	0.106 m
Draft AP	5.844 m	Wind	Off	GM(Fluid)	4.600 m
Trim	1.07a m	Wave	No	KMT	16.329 m
LCG	67.177f m	VCG-Solid	11.624 m	TPcm	34.20
Displacement	13664.7 MT	WaterSpgr	1.025		

Draft At Draft Marks

FORE.p	4.781(m)	FORE.s	4.781(m)
MID.p	5.308(m)	MID.s	5.308(m)
AFT.p	5.781(m)	AFT.s	5.781(m)

TRIM (Referred to Draft Marks) aft 1.00/140.00a m

Fixed Weight Status

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	11 244.06	70.053f	0.000	13.381u
1) CREW	5.40	120.960f	0.000	25.540u
2) PROVISIONS	4.50	124.100f	0.000	10.110u
3) STORES INCL. SHOP STORES	45.00	98.630f	0.000	11.280u
Total Fixed:	11 298.97	70.213f	0.000	13.377u

Tank Status**BALLAST**

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
PFT_WB_101.C	1.025	<empty>					0.0
WB_201.C	1.025	100.00%	41.70	137.000f	0.000	1.702	0.0
WB_401.C	1.025	100.00%	77.29	117.171f	0.000	0.887	0.0
WB_501.C	1.025	100.00%	138.17	107.479f	0.000	0.852	0.0
WB_601.C	1.025	100.00%	130.02	99.547f	0.000	0.779	0.0
WB_701.C	1.025	100.00%	138.76	89.998f	0.000	0.750	0.0
WB_1201.C	1.025	100.00%	381.44	31.268f	0.000	2.545	0.0
WB_1301.C	1.025	100.00%	339.22	21.058f	0.085p	3.167	0.0
WB_1401.C	1.025	<empty>					0.0
WB_1511.C	1.025	100.00%	436.64	1.706a	0.000	7.457	0.0
WB_311.C	1.025	<empty>					0.0
Subtotals:		58.55%	1 683.24	43.592f	0.017p	3.424	0.0

FRESH WATER

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
FW_1411.C	1.000	<empty>					0.0
FW_411PS.P	1.000	15.50%	20.31	116.524f	2.978p	2.834	135.5
FW_412SB.S	1.000	15.50%	20.85	116.524f	2.978s	2.834	139.2
Subtotals:		10.15%	41.16	116.524f	0.040s	2.834	274.7

HW

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
HEEL_812PS.P	1.000	62.00%	198.83	77.920f	10.840p	3.040	194.4
HEEL_812SB.S	1.000	68.00%	220.09	77.927f	10.848s	3.183	196.2
Subtotals:		65.01%	418.92	77.923f	0.554s	3.115	390.6

DIESEL OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
DO_1001.C	0.860	<empty>					0.0
DO_DAY_914.S	0.860	69.50%	9.04	60.799f	4.750s	2.890	3.0
Subtotals:		9.97%	9.04	60.799f	4.750s	2.890	3.0

TO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
TO_STOR1202.P	0.861	98.00%	19.23	37.214f	2.309p	1.198	17.5
TO_DRAIN1202.S	0.861	98.00%	19.23	37.214f	2.309s	1.198	17.5
Subtotals:		98.00%	38.47	37.214f	0.000	1.198	35.0

HFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
HFO_801.C	0.980	<empty>					0.0
HFO_811.C	0.980	<empty>					0.0
HFO_OVFL_902.C	0.980	10.00%	4.43	63.577f	0.000	0.075	402.8
HFO_DAY_911.P	0.980	33.00%	17.04	70.798f	2.000p	2.160	33.7
HFO_SETT.P	0.980	90.00%	46.47	85.199f	3.600p	4.600	33.7
SLUDGE_913.P	0.980	98.00%	14.46	70.799f	5.600p	3.460	0.8
Subtotals:		9.97%	82.39	78.533f	3.427p	3.652	471.1

LUBE OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LO_1102PS.P	0.910	60.00%	8.20	46.771f	4.500p	0.504	1.3
LO_1102SB.S	0.910	60.00%	8.20	46.771f	4.500s	0.504	1.3
LO_1103PS.P	0.910	60.00%	7.33	46.879f	7.384p	0.582	1.1
LO_1103SB.S	0.910	60.00%	7.33	46.879f	7.384s	0.582	1.1
DIRTYLO_1101.P	0.910	70.00%	15.42	45.552f	0.800p	0.567	2.9
STOR_LO_1101.S	0.910	10.00%	2.20	45.261f	0.800s	0.082	2.9
Subtotals:		50.80%	48.68	46.349f	0.217p	0.529	10.7

MISCELLANEOUS

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
BILGEWT_915P.P	1.000	20.00%	3.02	70.796f	8.800p	1.890	0.8
HFODRAIN_917.P	1.000	20.00%	0.33	64.792f	5.100p	1.600	0.0
HFOSLUDGE916.S	1.000	50.00%	8.76	64.797f	0.900s	1.750	189.6
LOGEAR_1104P.C	1.000	100.00%	6.45	40.400f	0.000	1.050	0.0
FWDRAIN1104S.S	1.000	20.00%	1.04	42.752f	2.800s	0.193	0.1
Subtotals:		42.70%	19.58	56.519f	0.890p	1.456	190.7

LSHFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LSHFO_901.C	0.980	<empty>					0.0
LSHFO_DAY912.S	0.980	10.00%	5.16	70.792f	3.600s	1.700	33.7
LSHFO_SETT.S	0.980	37.00%	19.10	85.198f	2.000s	3.540	33.7
Subtotals:		10.28%	24.27	82.133f	2.340s	3.148	67.5

All Tanks

	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
Totals:		44.20%	2 365.75	52.678f	0.002p	3.250	1 443.2

Displacer Status

Item	Status	Spgr	Displ (MT)	LCB (m)	TCB (m)	VCB (m)	Eff /Perm
HULL	Intact	1.025	13 664.71	67.116f	0.000	3.023	1.000
SubTotals:			13 664.71	67.116f	0.000	3.023	

Immersion of propeller tip 1.122 m

Current Rolling Period is : 9.78 second

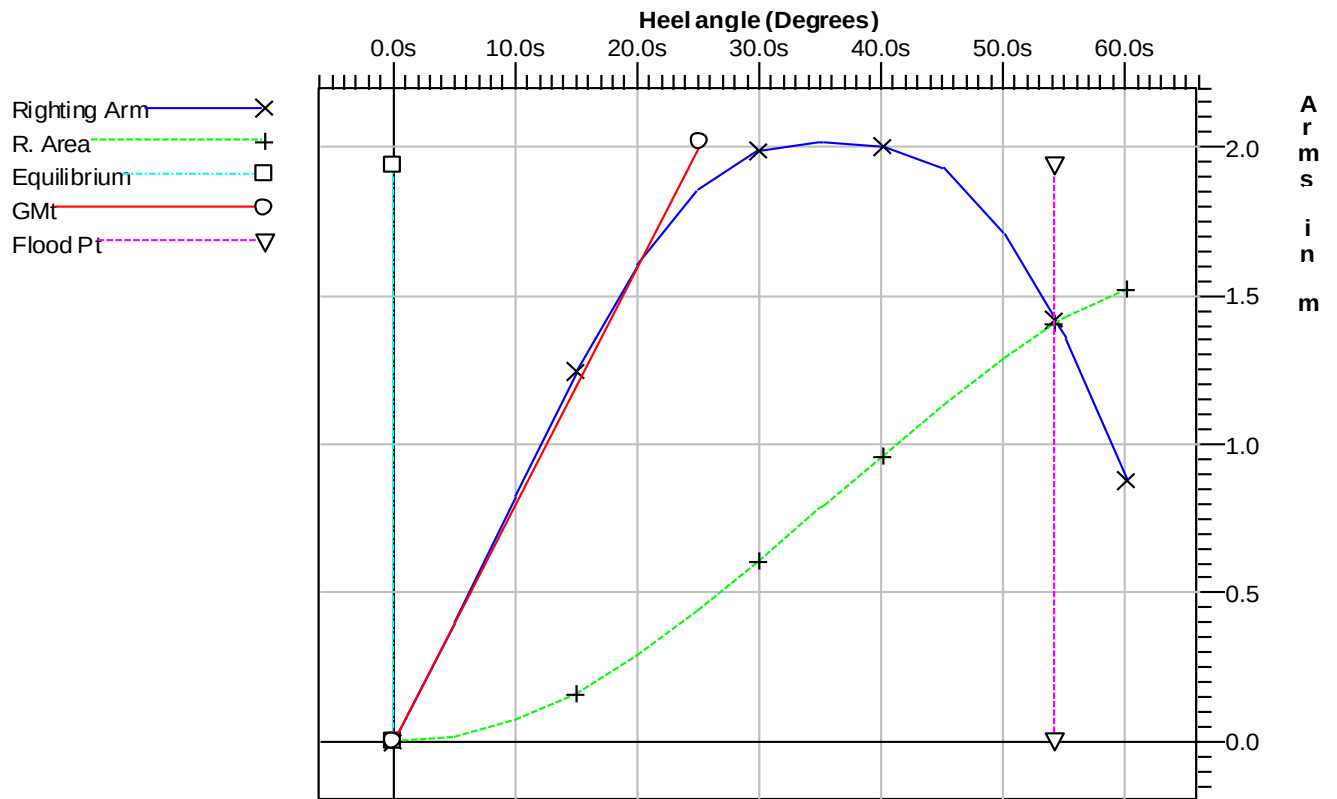
Righting Arms vs. Heel - IMO RES. A.749 (18)

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Righting Arm (m)	Area (m-Rad)	Flood Pt Height (m)	Notes
0.00	0.41a	5.843	0.000	0.000	12.241 (1)	Equil
5.00s	0.39a	5.782	0.405	0.018	11.075 (2)	
10.00s	0.34a	5.583	0.829	0.071	9.919 (2)	
15.00s	0.26a	5.258	1.251	0.162	8.773 (2)	
20.00s	0.18a	4.836	1.610	0.287	7.616 (2)	
25.00s	0.10a	4.311	1.864	0.440	6.468 (2)	
30.00s	0.02a	3.677	1.988	0.609	5.347 (2)	
35.00s	0.04f	2.944	2.020	0.784	4.256 (2)	
35.20s	0.04f	2.912	2.020	0.791	4.213 (2)	MaxRa
40.00s	0.10f	2.124	2.006	0.960	3.196 (2)	
45.00s	0.16f	1.234	1.932	1.133	2.134 (4)	
50.00s	0.21f	0.334	1.709	1.293	0.974 (4)	
54.17s	0.26f	-0.420	1.424	1.407	0.000 (4)	FldPt
55.00s	0.27f	-0.572	1.357	1.427	-0.194 (4)	
60.00s	0.32f	-1.483	0.884	1.526	-1.328 (4)	

Unprotected Flood Points

Name	L,T,V (m)	Height (m)
(1) Aft Ventilation Opening PS	2.150a, 13.300p, 18.100	12.241
(2) Aft Ventilation Opening SB	2.150a, 13.300s, 18.100	11.075
(4) Fwd Ventilation Opening SB	139.200f, 12.800s, 18.100	2.134

Righting Arms vs. Heel - IMO RES. A.749 (18)



IMO RES. A.749 (18)

Limit	Min/Max	Actual	Margin	Pass
(1) GM at Equilibrium	>0.150 m	4.600	4.450	Yes
(2) Area from 0.00 deg to 30.00	>0.0550 m-R	0.609	0.554	Yes
(3) Area from 0.00 deg to 40.00 or Flood	>0.0900 m-R	0.960	0.870	Yes
(4) Area from 30.00 deg to 40.00 or Flood	>0.0300 m-R	0.352	0.322	Yes
(5) Righting Arm at 30.00 deg	>0.200 m	1.988	1.788	Yes
(6) Angle from 0.00 deg to MaxRA	>25.00 deg	35.20	10.20	Yes

Current VCG Fluid 11.730 m < Max Allowable VCG 14.380 m - PASS

IMO Res. A.749 (18), SEVERE WIND AND ROLLING CRITERION (WEATHER CRITERION)

Wind speed 53.4 kn

Wind pressure 504 N /m²Under Water Lateral Plane 811.482 m²Above Water Lateral Plane 3676.310 m²

Under Water Lateral Plane Centroid 2.629 m below water line

Above Water Lateral Plane Centroid 12.040 m above water line

Righting Arms vs. Heel - IMO SEVERE WIND & ROLLING

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)	Area (m-Rad)	Flood Pt Height (m)	Notes
24.03p	0.11a	4.422	-2.131	0.000	6.690 (1)	Roll
19.03p	0.19a	4.926	-1.853	-0.174	7.842 (1)	
14.03p	0.27a	5.329	-1.478	-0.320	8.997 (1)	
9.03p	0.35a	5.634	-1.050	-0.431	10.142 (1)	
4.03p	0.40a	5.804	-0.631	-0.504	11.302 (1)	
0.97s	0.41a	5.841	-0.228	-0.541	12.014 (2)	
3.80s	0.40a	5.807	0.000	-0.547	11.357 (2)	Equil
5.97s	0.39a	5.755	0.178	-0.544	10.848 (2)	
10.97s	0.32a	5.528	0.607	-0.509	9.697 (2)	
15.97s	0.24a	5.184	1.021	-0.438	8.548 (2)	
20.97s	0.16a	4.743	1.362	-0.334	7.392 (2)	
25.97s	0.08a	4.196	1.591	-0.204	6.248 (2)	
30.97s	0.01a	3.541	1.693	-0.060	5.133 (2)	
35.97s	0.05f	2.791	1.713	0.089	4.047 (2)	MaxRa
40.97s	0.11f	1.954	1.694	0.238	2.994 (2)	
45.97s	0.17f	1.059	1.593	0.382	1.910 (4)	
50.00s	0.21f	0.334	1.402	0.488	0.974 (4)	
54.17s	0.26f	-0.420	1.117	0.580	0.000 (4)	FldPt
55.00s	0.27f	-0.572	1.050	0.596	-0.194 (4)	

Note:

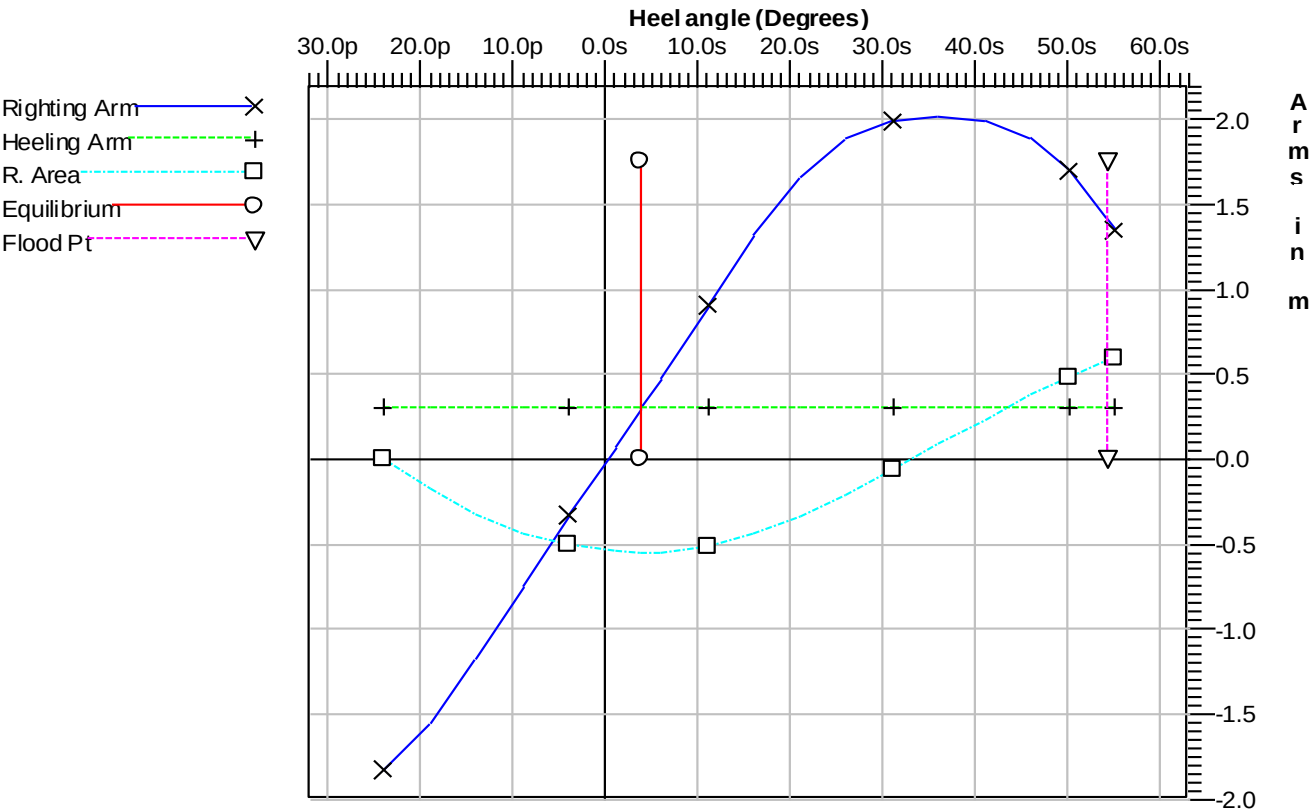
Roll angle is 26.57

Equilibrium for load condition without gust is 2.54s

Unprotected Flood Points

Name	L,T,V (m)	Height (m)
(1) Aft Ventilation Opening PS	2.150a, 13.300p, 18.100	6.690
(2) Aft Ventilation Opening SB	2.150a, 13.300s, 18.100	12.014
(4) Fwd Ventilation Opening SB	139.200f, 12.800s, 18.100	1.910

Righting Arms vs. Heel - IMO SEVERE WIND & ROLLING



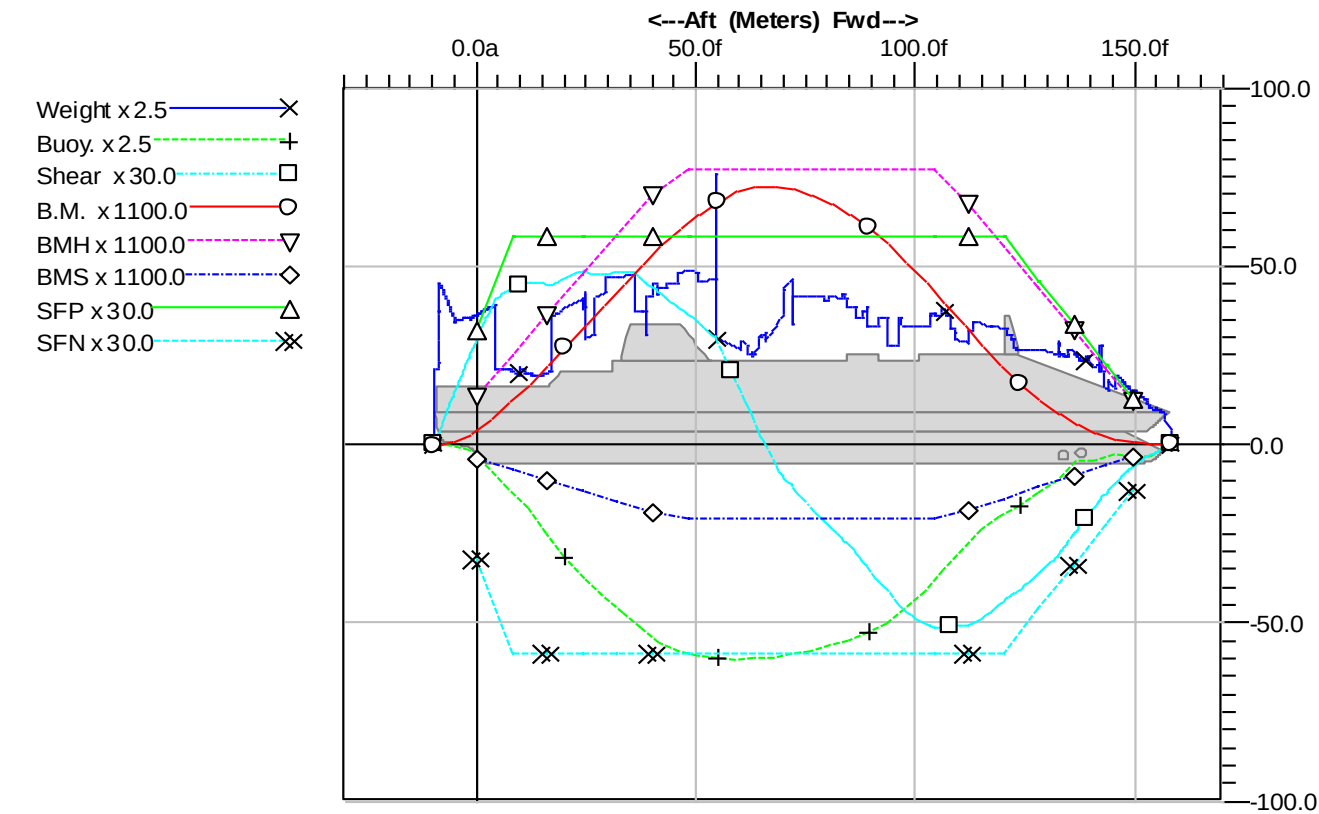
IMO SEVERE WIND & ROLLING

Limit	Min/Max	Actual	Margin	Pass
(1) Res. Ratio from Roll to Abs 50.00 deg or Flood	>1.000	1.892	0.892	Yes

LONGITUDINAL STRENGTH

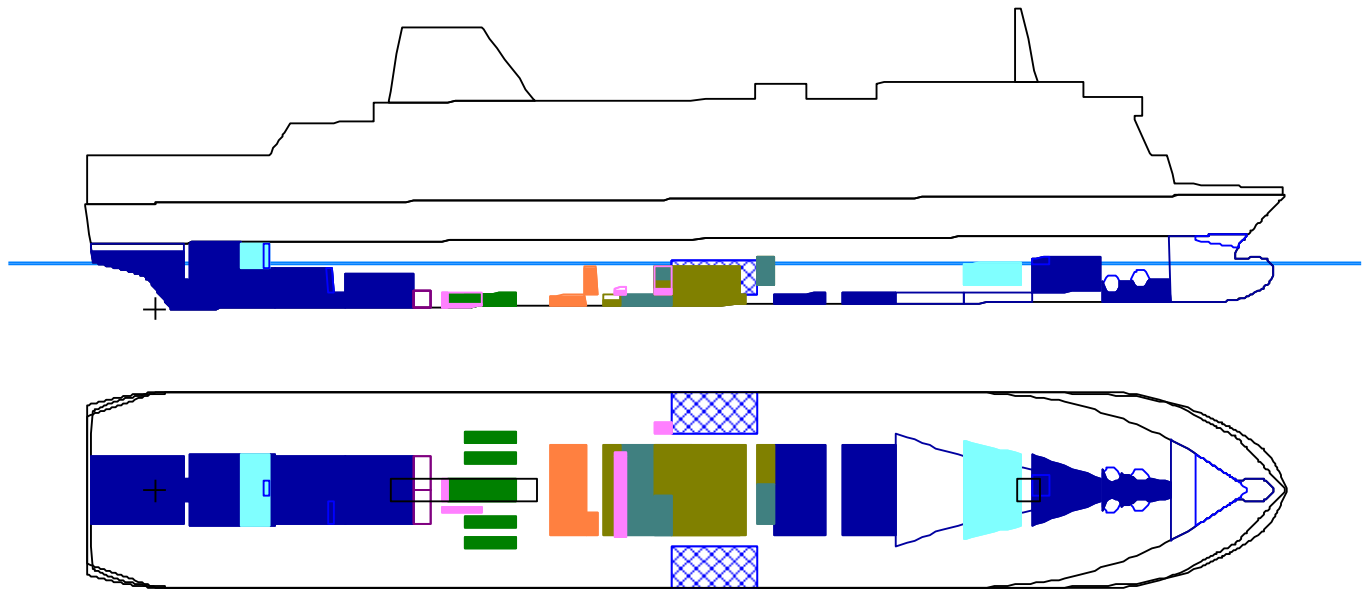
Frame No.	Location (m)	Weight (MT/m)	Buoyancy (MT/m)	Shear (MT)	Bending (MT-m)	Shear (%/Max)	Bending (%/Max)
FR -10	8.000a	108.9	<und>	153.2	135	undef	undef
FR 0	0.000	91.8	6.2	879.9	4408	90.53	29.78
BKHD FR 6	4.800f	53.3	22.4	1233.0	9594	85.70	43.06
FR 10	8.000f	51.9	32.7	1315.1	13696	75.15	50.23
FR 20	16.000f	50.9	62.1	1346.9	24554	76.96	61.80
BKHD FR 21	16.800f	89.8	65.5	1336.9	25632	76.39	62.55
FR 30	24.000f	103.3	92.5	1458.9	35792	83.37	68.58
BKHD FR 33	26.400f	103.2	99.4	1426.9	39282	81.54	70.23
BKHD FR 36	28.800f	107.2	106.1	1432.7	42727	81.87	71.60
FR 40	32.000f	118.3	114.6	1451.8	47358	82.96	73.25
BKHD FR 50	40.000f	112.7	135.6	1316.8	58739	75.25	76.16
BKHD FR 51	40.800f	112.7	137.2	1297.8	59789	74.16	76.78
FR 60	48.000f	121.6	146.8	1098.0	68418	62.74	80.87
BKHD FR 63	50.400f	121.6	148.3	1035.7	70991	59.18	83.91
BKHD FR 64	51.200f	115.6	148.6	1009.4	71811	57.68	84.88
FR 70	56.000f	72.5	150.1	778.8	76240	44.51	90.12
BKHD FR 75	60.000f	72.2	150.6	454.7	78736	25.98	93.07
FR 80	64.000f	74.3	150.0	122.8	79920	7.02	94.47
BKHD FR 90	72.000f	104.7	147.1	-354.5	78789	20.26	93.13
FR 100	80.000f	103.8	141.5	-678.3	74679	38.76	88.27
BKHD FR 105	84.000f	103.0	137.8	-820.5	71696	46.88	84.75
FR 110	88.000f	94.3	133.2	-986.4	68110	56.36	80.51
BKHD FR 117	93.600f	89.4	124.4	-1218.6	61941	69.63	73.22
FR 120	96.000f	89.0	119.6	-1343.0	58877	76.74	69.59
BKHD FR 129	103.200f	92.4	99.2	-1529.7	48489	87.41	57.32
FR 130	103.200f	92.4	99.2	-1529.7	48489	87.41	57.32
FR 140	112.000f	80.6	68.0	-1524.2	35070	87.10	47.23
BKHD FR 141	112.800f	87.0	65.5	-1513.4	33859	86.48	46.41
FR 150	120.000f	81.6	49.6	-1317.2	23659	75.27	38.59
BKHD FR 153	112.400f	80.3	66.7	-1518.8	34464	86.79	46.83
FR 160	128.000f	67.0	33.9	-1094.2	14046	79.23	29.04
BKHD FR 165	132.000f	63.2	24.8	-948.6	9973	79.31	23.81
FR 170	136.000f	65.0	17.5	-752.9	6591	74.47	18.61
BKHD FR 177	141.600f	56.5	10.0	-480.5	3191	63.82	12.07
FR 180	143.400f	39.4	8.3	-402.1	2416	60.01	10.26
FR 190	149.400f	36.7	8.1	-187.6	691	47.74	5.03
FR 200	155.400f	24.2	2.7	-50.1	46	undef	undef

Longitudinal Strength At Sea Condition



Max. Shear	-1537.5 MT	at	105.000f
Max. Bending Moment	80030 MT-m	at	65.600f (Hogging)
Max% Shear	90.53%	at	0.000
Max% Bending Moment	94.60%	at	65.600f

CASE 3.1 - SHIP WITH 1000 PASSENGERS - NO TRAILERS AND CARS
SHIP AT DEPARTURE (100% CONSUMABLES)



Fluid Legend

Fluid Name	Legend	Weight (MT)	Load%
BALLAST		2 256.63	78.49%
FRESH WATER		400.12	98.69%
HW		644.36	100.00%
DIESEL OIL		88.86	98.00%
TO		38.47	98.00%
HFO		790.69	95.71%
LUBE OIL		74.51	77.77%
MISCELLANEOUS		19.58	42.70%
LSHFO		231.31	98.00%

Floating Status

Draft FP	5.405 m	Heel	0.03s deg	GM(Solid)	4.994 m
Draft MS	5.965 m	Equil	Yes	F/S Corr.	0.340 m
Draft AP	6.524 m	Wind	Off	GM(Fluid)	4.653 m
Trim	1.12a m	Wave	No	KMT	15.665 m
LCG	66.875f m	VCG-Solid	10.671 m	TPcm	36.15
Displacement	15984.0 MT	WaterSpgr	1.025		

Draft At Draft Marks

FORE.p	5.414(m)	FORE.s	5.415(m)
MID.p	5.957(m)	MID.s	5.972(m)
AFT.p	6.452(m)	AFT.s	6.464(m)

TRIM (Referred to Draft Marks) aft 1.04/140.00a m

Fixed Weight Status

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	11 244.06	70.053f	0.000	13.381u
1) CREW	5.40	120.960f	0.000	25.540u
2) PROVISIONS	45.00	124.100f	0.000	10.110u
3) STORES INCL. SHOP STORES	45.00	98.630f	0.000	11.280u
4) 1000 PASSENGERS	100.00	74.770f	0.000	26.270u
Total Fixed:	11 439.47	70.443f	0.000	13.478u

Tank Status**BALLAST**

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
PFT_WB_101.C	1.025	<empty>					0.0
WB_201.C	1.025	100.00%	41.70	137.000f	0.000	1.702	0.0
WB_401.C	1.025	<empty>					0.0
WB_501.C	1.025	<empty>					0.0
WB_601.C	1.025	100.00%	130.02	99.547f	0.000	0.779	0.0
WB_701.C	1.025	100.00%	138.76	89.998f	0.000	0.750	0.0
WB_1201.C	1.025	100.00%	381.44	31.268f	0.000	2.545	0.0
WB_1301.C	1.025	100.00%	339.22	21.058f	0.085p	3.167	0.0
WB_1401.C	1.025	100.00%	642.35	10.017f	0.000	5.095	0.0
WB_1511.C	1.025	68.71%	300.00	1.395a	0.002s	6.866	957.1
WB_311.C	1.025	100.00%	283.14	126.489f	0.017s	3.951	0.0
Subtotals:		78.49%	2 256.63	40.788f	0.010p	3.888	957.1

FRESH WATER

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
FW_1411.C	1.000	100.00%	139.89	13.936f	0.010s	7.400	0.0
FW_411PS.P	1.000	98.00%	128.39	116.596f	2.992p	4.057	135.5
FW_412SB.S	1.000	98.00%	131.84	116.596f	2.993s	4.057	139.2
Subtotals:		98.69%	400.12	80.704f	0.030s	5.226	274.7

HW

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
HEEL_812PS.P	1.000	100.00%	320.69	77.968f	10.872p	3.939	0.0
HEEL_812SB.S	1.000	100.00%	323.67	77.968f	10.872s	3.939	0.0
Subtotals:		100.00%	644.36	77.968f	0.050s	3.939	0.0

DIESEL OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
DO_1001.C	0.860	98.00%	76.11	57.590f	0.005s	0.735	707.0
DO_DAY_914.S	0.860	98.00%	12.75	60.800f	4.750s	3.460	3.0
Subtotals:		98.00%	88.86	58.051f	0.686s	1.126	709.9

TO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
TO_STOR1202.P	0.861	98.00%	19.23	37.214f	2.309p	1.198	17.5
TO_DRAIN1202.S	0.861	98.00%	19.23	37.214f	2.310s	1.198	17.5
Subtotals:		98.00%	38.47	37.214f	0.000	1.198	35.0

HFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
HFO_801.C	0.980	98.00%	187.92	77.156f	0.004s	0.735	1 514.5
HFO_811.C	0.980	100.00%	472.07	76.800f	0.000	3.500	0.0
HFO_OVFL_902.C	0.980	50.00%	22.13	63.595f	0.009s	0.375	402.8
HFO_DAY_911.P	0.980	98.00%	50.60	70.799f	2.000p	3.460	33.7
HFO_SETT.P	0.980	98.00%	50.60	85.199f	3.600p	4.760	33.7
SLUDGE_913.P	0.980	50.00%	7.38	70.798f	5.600p	2.500	0.8
Subtotals:		95.71%	790.69	76.613f	0.409p	2.824	1 985.5

LUBE OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LO_1102PS.P	0.910	98.00%	13.39	46.781f	4.500p	0.824	1.3
LO_1102SB.S	0.910	98.00%	13.39	46.781f	4.500s	0.824	1.3
LO_1103PS.P	0.910	98.00%	11.97	46.848f	7.388p	0.921	1.1
LO_1103SB.S	0.910	98.00%	11.97	46.848f	7.388s	0.921	1.1
DIRTYLO_1101.P	0.910	10.00%	2.20	45.246f	0.799p	0.082	2.9
STOR_LO_1101.S	0.910	98.00%	21.59	45.564f	0.800s	0.794	2.7
Subtotals:		77.77%	74.51	46.405f	0.208s	0.824	10.5

MISCELLANEOUS

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
BILGEWT_915P.P	1.000	20.00%	3.02	70.796f	8.800p	1.890	0.8
HFODRAIN_917.P	1.000	20.00%	0.33	64.792f	5.100p	1.600	0.0
HFOSLUDGE916.S	1.000	50.00%	8.76	64.797f	0.911s	1.750	189.6
LOGEAR_1104P.C	1.000	100.00%	6.45	40.400f	0.000	1.050	0.0
FWDRAIN1104S.S	1.000	20.00%	1.04	42.749f	2.800s	0.193	0.1
Subtotals:		42.70%	19.58	56.518f	0.884p	1.456	190.7

LSHFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LSHFO_901.C	0.980	98.00%	130.11	68.378f	0.005s	0.735	1 207.2
LSHFO_DAY912.S	0.980	98.00%	50.60	70.799f	3.600s	3.460	33.7
LSHFO_SETT.S	0.980	98.00%	50.60	85.199f	2.000s	4.760	33.7
Subtotals:		98.00%	231.31	72.588f	1.228s	2.212	1 274.6

All Tanks

	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
Totals:		84.91%	4 544.54	57.893f	0.009s	3.605	5 438.1

Displacer Status

Item	Status	Spgr	Displ (MT)	LCB (m)	TCB (m)	VCB (m)	Eff /Perm
HULL	Intact	1.025	15 983.98	66.822f	0.006s	3.413	1.000
SubTotals:			15 983.98	66.822f	0.006s	3.413	

Critical points

Name	L,T,V (m)	Height (m)
(1) MES Height Limiting Point PS	47.200f, 13.850p, 5.900	-0.265
(2) MES Height Limiting Point SB	47.200f, 13.850s, 5.900	-0.279

Immersion of propeller tip 1.801 m

Current Rolling Period is : 9.40 second

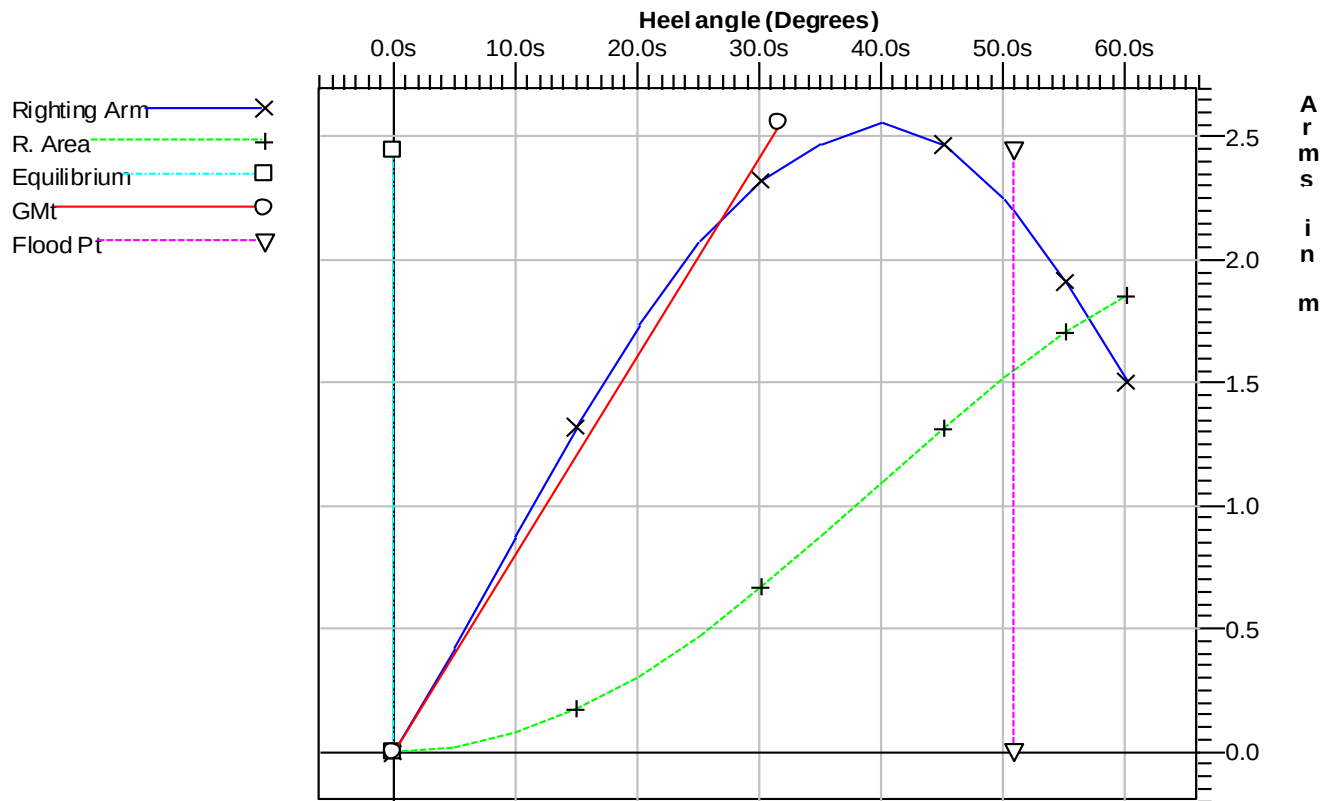
Righting Arms vs. Heel - IMO RES. A.749 (18)

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Righting Arm (m)	Area (m-Rad)	Flood Pt Height (m)	Notes
0.03s	0.43a	6.524	0.000	0.000	11.553 (2)	Equil
5.03s	0.41a	6.451	0.430	0.019	10.397 (2)	
10.03s	0.35a	6.238	0.884	0.076	9.256 (2)	
15.03s	0.28a	5.938	1.327	0.173	8.083 (2)	
20.03s	0.22a	5.548	1.738	0.306	6.893 (2)	
25.03s	0.16a	5.056	2.081	0.474	5.711 (2)	
30.03s	0.10a	4.450	2.325	0.667	4.560 (2)	
35.03s	0.04a	3.734	2.476	0.877	3.451 (2)	
40.03s	0.01f	2.929	2.557	1.097	2.377 (2)	MaxRa
45.03s	0.05f	2.101	2.471	1.317	1.283 (2)	
50.03s	0.10f	1.273	2.243	1.524	0.165 (2)	
50.76s	0.10f	1.150	2.200	1.553	0.000 (2)	FldPt
55.03s	0.13f	0.445	1.915	1.706	-0.965 (2)	
60.03s	0.17f	-0.383	1.505	1.856	-2.090 (2)	

Unprotected Flood Points

Name	L,T,V (m)	Height (m)
(2) Aft Ventilation Opening SB	2.150a, 13.300s, 18.100	11.553

Righting Arms vs. Heel - IMO RES. A.749 (18)



IMO RES. A.749 (18)

Limit	Min/Max	Actual	Margin	Pass
(1) GM at Equilibrium	>0.150 m	4.653	4.503	Yes
(2) Area from 0.00 deg to 30.00	>0.0550 m-R	0.667	0.612	Yes
(3) Area from 0.00 deg to 40.00 or Flood	>0.0900 m-R	1.097	1.007	Yes
(4) Area from 30.00 deg to 40.00 or Flood	>0.0300 m-R	0.430	0.400	Yes
(5) Righting Arm at 30.00 deg	>0.200 m	2.325	2.125	Yes
(6) Angle from 0.00 deg to MaxRA	>25.00 deg	40.00	15.00	Yes

Current VCG Fluid 11.011 m < Max Allowable VCG 13.563 m - PASS

MAXIMUM TURNING ANGLE VERIFICATION

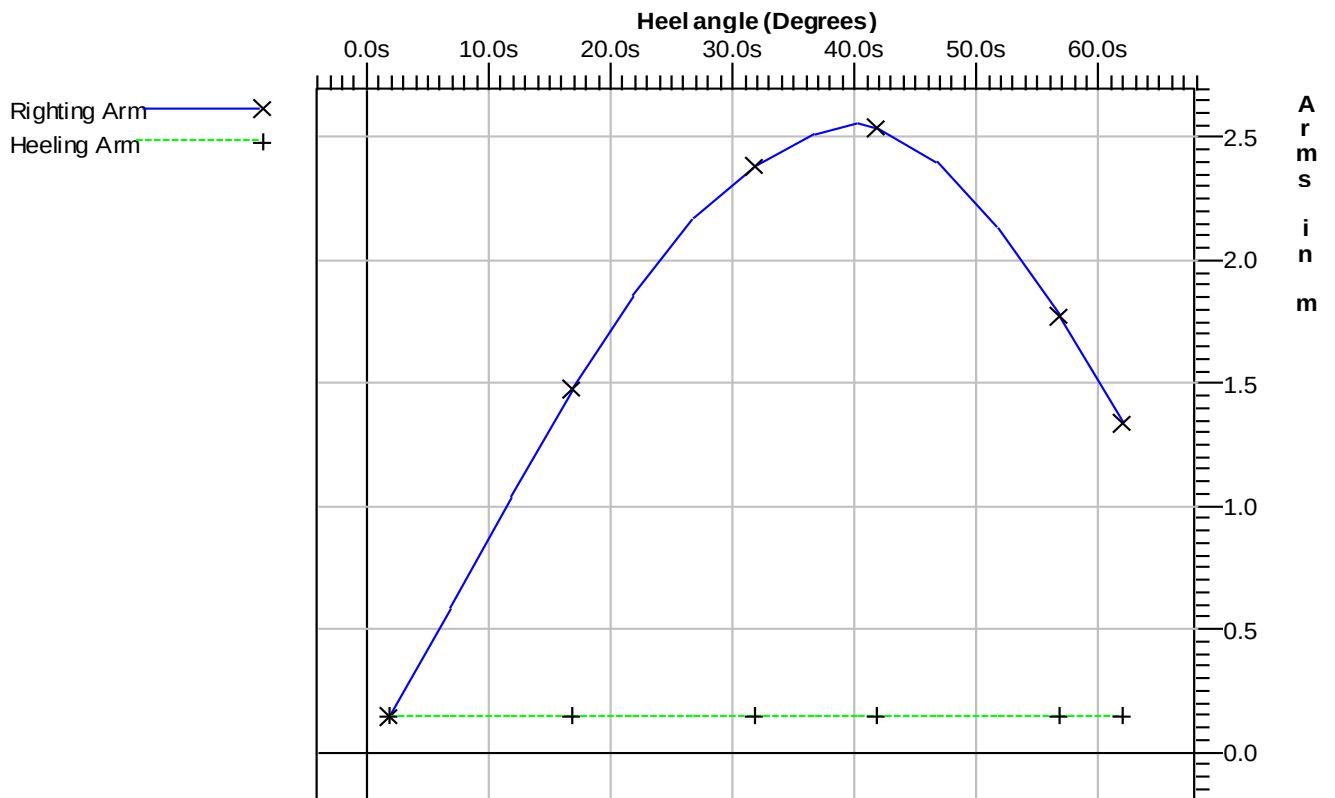
Cruising speed 21.15 knots

MOMENT DUE TO MAXIMUM TURNING ANGLE 2348.529 tm

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)
1.79s	0.42a	6.515	0.001
6.79s	0.39a	6.389	0.442
11.79s	0.32a	6.142	0.895
16.79s	0.26a	5.812	1.330
21.79s	0.20a	5.387	1.721
26.79s	0.14a	4.856	2.032
31.79s	0.08a	4.210	2.239
36.79s	0.03a	3.459	2.368
40.19s	0.01f	2.903	2.410
41.79s	0.02f	2.638	2.399
46.79s	0.07f	1.810	2.257
51.79s	0.11f	0.981	1.991
56.79s	0.15f	0.155	1.633
61.79s	0.18f	-0.673	1.194

Righting Arms vs. Heel - IMO RES. A.749 (18)



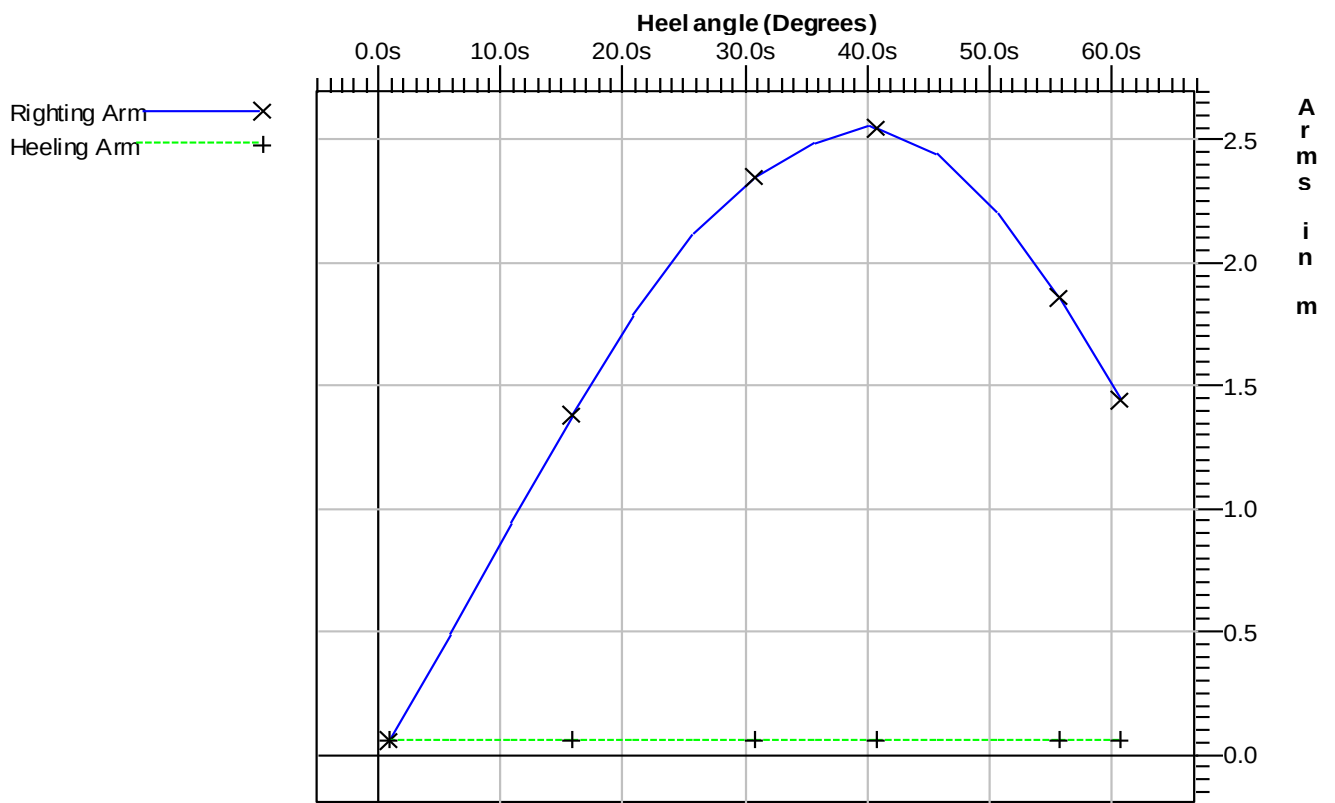
HEELING ANGLE DUE TO TURNING 1.79s deg

1000 PASSENGERS CROWDING VERIFICATION

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)
0.72s	0.43a	6.523	0.000
5.72s	0.40a	6.429	0.435
10.72s	0.34a	6.201	0.889
15.72s	0.27a	5.889	1.330
20.72s	0.21a	5.487	1.733
25.72s	0.15a	4.979	2.064
30.72s	0.09a	4.357	2.293
35.72s	0.04a	3.627	2.434
40.12s	0.01f	2.913	2.499
40.72s	0.01f	2.814	2.498
45.72s	0.06f	1.987	2.389
50.72s	0.10f	1.158	2.146
55.72s	0.14f	0.331	1.806
60.72s	0.18f	-0.498	1.385

Righting Arms vs. Heel - IMO RES. A.749 (18)



HEELING ANGLE DUE TO PASSENGERS CROWDING 0.72s deg

IMO Res. A.749 (18), SEVERE WIND AND ROLLING CRITERION (WEATHER CRITERION)

Wind speed 53.4 kn

Wind pressure 504 N /m²Under Water Lateral Plane 918.724 m²Above Water Lateral Plane 3574.583 m²

Under Water Lateral Plane Centroid 2.942 m below water line

Above Water Lateral Plane Centroid 11.730 m above water line

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)	Area (m-Rad)	Flood Pt Height (m)	Notes
23.16p	0.18a	5.253	-2.220	0.000	6.150 (1)	Roll
18.16p	0.24a	5.706	-1.848	-0.178	7.337 (1)	
13.16p	0.31a	6.060	-1.421	-0.321	8.524 (1)	
8.16p	0.37a	6.330	-0.972	-0.425	9.685 (1)	
3.16p	0.42a	6.496	-0.523	-0.490	10.827 (1)	
1.84s	0.42a	6.514	-0.101	-0.517	11.133 (2)	
3.01s	0.42a	6.499	0.000	-0.518	10.861 (2)	Equil
6.84s	0.39a	6.387	0.341	-0.507	9.986 (2)	
11.84s	0.32a	6.139	0.794	-0.458	8.835 (2)	
16.84s	0.26a	5.808	1.229	-0.369	7.654 (2)	
21.84s	0.20a	5.383	1.619	-0.245	6.463 (2)	
26.84s	0.14a	4.850	1.929	-0.089	5.290 (2)	
31.84s	0.08a	4.203	2.135	0.089	4.155 (2)	
36.84s	0.02a	3.451	2.263	0.281	3.060 (2)	MaxRa
41.84s	0.02f	2.630	2.292	0.481	1.984 (2)	
46.84s	0.07f	1.802	2.150	0.676	0.881 (2)	
50.00s	0.10f	1.278	1.992	0.790	0.172 (2)	
50.76s	0.10f	1.151	1.948	0.817	0.000 (2)	FldPt
55.00s	0.13f	0.450	1.664	0.951	-0.958 (2)	

Note:

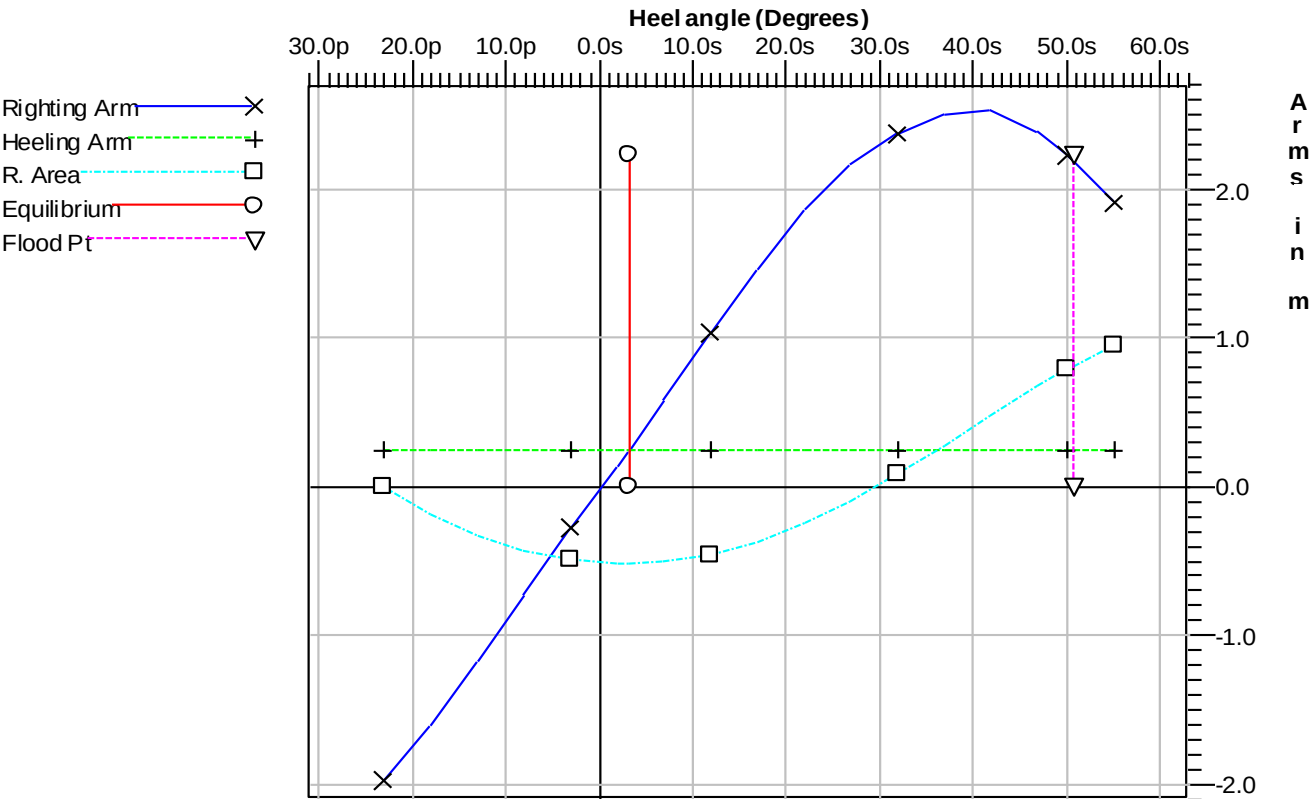
Roll angle is 25.20

Equilibrium for load condition without gust is 2.04s

Unprotected Flood Points

Name	L,T,V (m)	Height (m)
(1) Aft Ventilation Opening PS	2.150a, 13.300p, 18.100	6.150
(2) Aft Ventilation Opening SB	2.150a, 13.300s, 18.100	11.133

Righting Arms vs. Heel - IMO SEVERE WIND & ROLLING



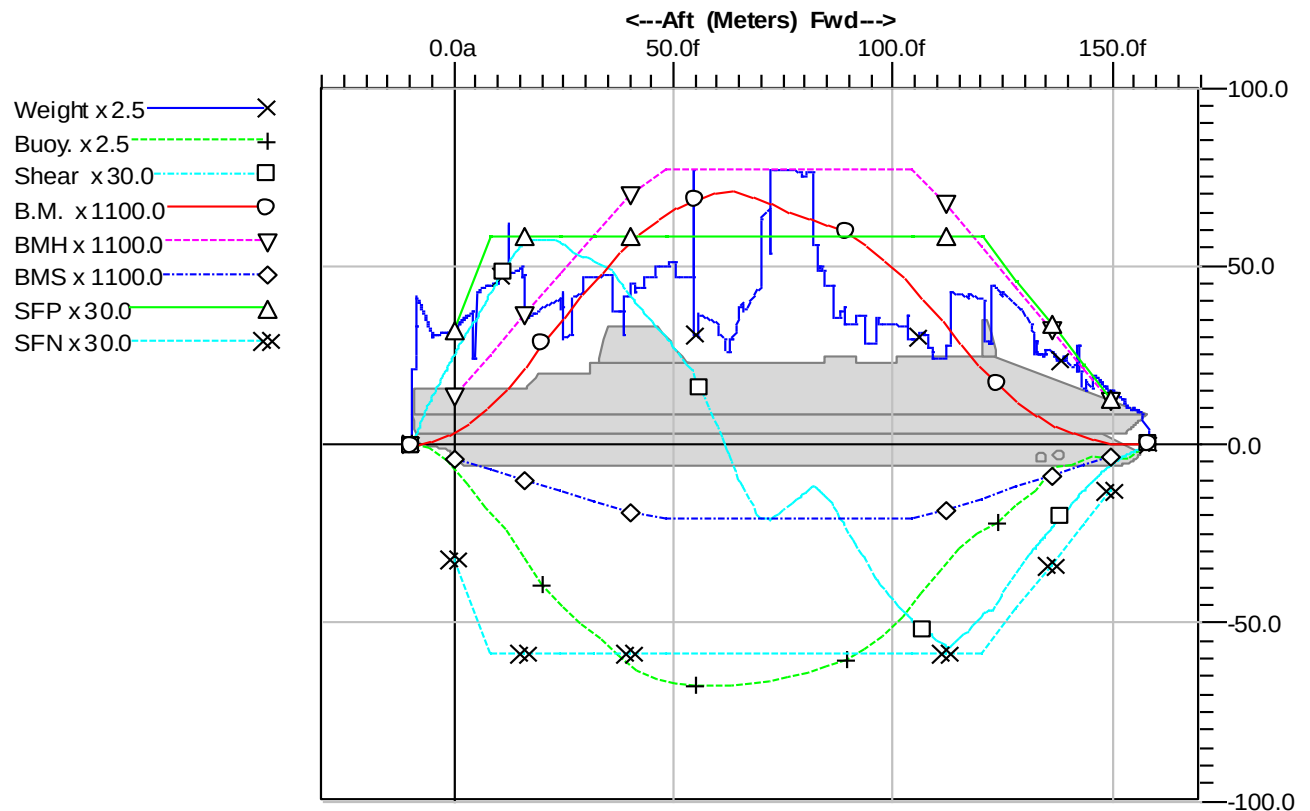
IMO SEVERE WIND & ROLLING

Limit	Min/Max	Actual	Margin	Pass
(1) Res. Ratio from Roll to Abs 50.00 deg or Flood	>1.000	2.525	1.525	Yes

LONGITUDINAL STRENGTH

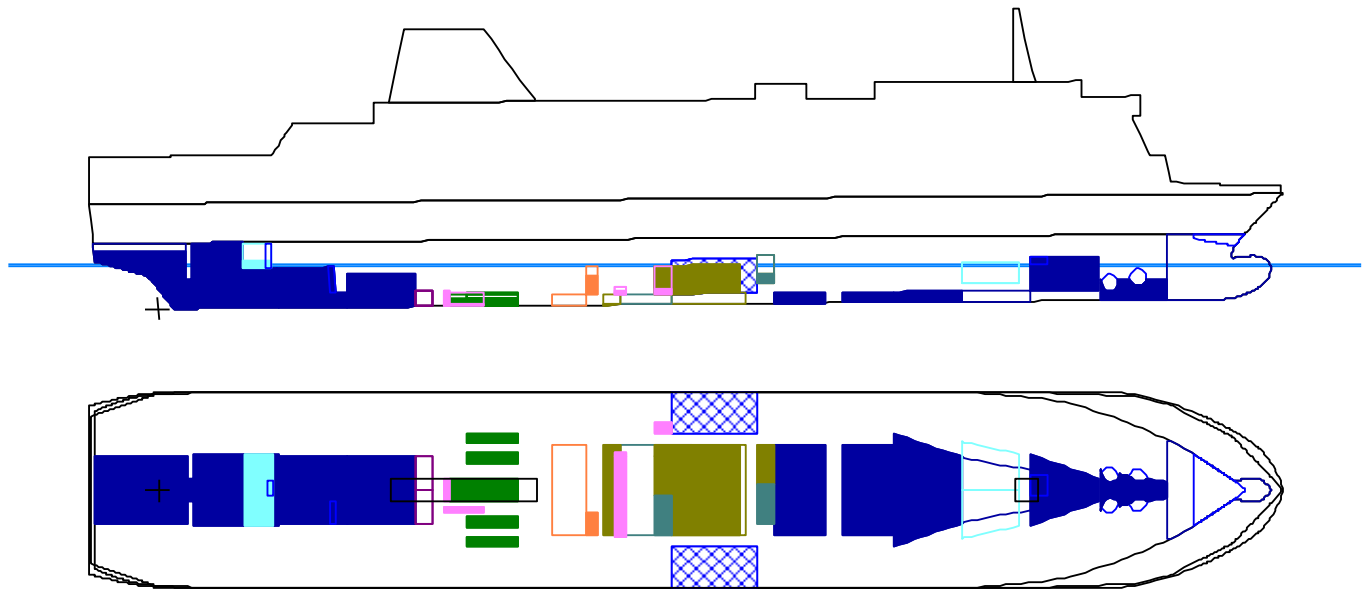
Frame No.	Location (m)	Weight (MT/m)	Buoyancy (MT/m)	Shear (MT)	Bending (MT-m)	Shear (%/Max)	Bending (%/Max)
FR -10	8.000a	98.8	0.0	143.4	130	undef	undef
FR 0	0.000	81.9	14.9	754.0	3913	77.57	26.44
BKHD FR 6	4.800f	61.0	34.7	1034.6	8297	71.91	37.24
FR 10	8.000f	112.4	46.5	1256.5	11985	71.80	43.96
FR 20	16.000f	119.9	79.6	1708.2	24005	97.61	60.42
BKHD FR 21	16.800f	92.4	83.3	1716.2	25379	98.07	61.94
FR 30	24.000f	103.3	111.5	1704.4	37796	97.40	72.42
BKHD FR 33	26.400f	103.2	118.5	1626.7	41820	92.95	74.77
BKHD FR 36	28.800f	107.2	125.2	1586.8	45689	90.67	76.57
FR 40	32.000f	118.3	133.6	1544.9	50717	88.28	78.44
BKHD FR 50	40.000f	112.7	154.5	1257.9	62236	71.88	80.70
BKHD FR 51	40.800f	112.7	156.2	1223.8	63233	69.93	81.20
FR 60	48.000f	125.0	165.6	905.5	70887	51.74	83.79
BKHD FR 63	50.400f	127.7	167.1	810.5	72958	46.31	86.24
BKHD FR 64	51.200f	118.3	167.5	771.3	73591	44.07	86.99
FR 70	56.000f	91.0	168.9	475.8	76698	27.19	90.66
BKHD FR 75	60.000f	84.6	169.4	149.9	77980	8.57	92.17
FR 80	64.000f	84.1	168.7	-231.8	77835	13.25	92.00
BKHD FR 90	72.000f	192.7	165.7	-632.9	73945	36.17	87.41
FR 100	80.000f	191.6	160.1	-401.8	69835	22.96	82.55
BKHD FR 105	84.000f	122.3	156.4	-417.6	68337	23.86	80.78
FR 110	88.000f	94.3	151.7	-622.1	66314	35.55	78.39
BKHD FR 117	93.600f	90.1	142.9	-954.4	61905	54.54	73.17
FR 120	96.000f	89.7	138.0	-1121.4	59424	64.08	70.24
BKHD FR 129	103.200f	90.8	116.6	-1434.1	50175	81.95	59.31
FR 130	103.200f	90.8	116.6	-1434.1	50175	81.95	59.31
FR 140	112.000f	70.5	82.4	-1694.1	36355	96.80	48.96
BKHD FR 141	112.800f	108.1	79.6	-1702.5	35000	97.28	47.98
FR 150	120.000f	102.1	61.7	-1449.8	23631	82.85	38.55
BKHD FR 153	112.400f	70.5	81.0	-1698.3	35677	97.04	48.47
FR 160	128.000f	98.1	43.2	-1088.2	13319	78.80	27.54
BKHD FR 165	132.000f	78.6	32.1	-879.0	9416	73.50	22.48
FR 170	136.000f	65.2	23.0	-707.9	6261	70.02	17.67
BKHD FR 177	141.600f	56.5	12.9	-458.5	3044	60.89	11.51
FR 180	143.400f	39.4	10.4	-384.5	2304	57.39	9.79
FR 190	149.400f	36.7	9.1	-178.0	658	45.30	4.79
FR 200	155.400f	24.2	3.7	-49.8	45	undef	undef

Longitudinal Strength At Sea Condition (stbd 0.03 deg.)



Max. Shear	1724.7 MT	at	19.000f
Max. Bending Moment	78108 MT-m	at	61.600f (Hogging)
Max% Shear	98.56%	at	19.000f
Max% Bending Moment	92.33%	at	61.600f

CASE 3.2 - SHIP WITH 1000 PASSENGERS - NO TRAILERS AND CARS
SHIP AT ARRIVAL (10% CONSUMABLES)



Fluid Legend

Fluid Name	Legend	Weight (MT)	Load%
BALLAST		2 394.81	83.30%
FRESH WATER		42.00	10.36%
HW		644.36	100.00%
DIESEL OIL		9.04	9.97%
TO		38.47	98.00%
HFO		519.95	62.94%
LUBE OIL		48.68	50.80%
MISCELLANEOUS		19.58	42.70%
LSHFO		24.27	10.28%

Floating Status

Draft FP	5.033 m	Heel	0.07p deg	GM(Solid)	4.850 m
Draft MS	5.713 m	Equil	Yes	F/S Corr.	0.138 m
Draft AP	6.393 m	Wind	Off	GM(Fluid)	4.712 m
Trim	1.36a m	Wave	No	KMT	15.910 m
LCG	66.429f m	VCG-Solid	11.060 m	TPcm	35.56
Displacement	15140.1 MT	WaterSpgr	1.025		

Draft At Draft Marks

FORE.p	5.045(m)	FORE.s	5.043(m)
MID.p	5.731(m)	MID.s	5.695(m)
AFT.p	6.327(m)	AFT.s	6.300(m)

TRIM (Referred to Draft Marks) aft 1.27/140.00a m

Fixed Weight Status

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	11 244.06	70.053f	0.000	13.381u
1) CREW	5.40	120.960f	0.000	25.540u
2) PROVISIONS	4.50	124.100f	0.000	10.110u
3) STORES INCL. SHOP STORES	45.00	98.630f	0.000	11.280u
4) 1000 PASSENGERS	100.00	74.770f	0.000	26.270u
Total Fixed:	11 398.97	70.253f	0.000	13.490u

Tank Status**BALLAST**

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
PFT_WB_101.C	1.025	<empty>					0.0
WB_201.C	1.025	100.00%	41.70	137.000f	0.000	1.702	0.0
WB_401.C	1.025	<empty>					0.0
WB_501.C	1.025	100.00%	138.17	107.479f	0.000	0.852	0.0
WB_601.C	1.025	100.00%	130.02	99.547f	0.000	0.779	0.0
WB_701.C	1.025	100.00%	138.76	89.998f	0.000	0.750	0.0
WB_1201.C	1.025	100.00%	381.44	31.268f	0.000	2.545	0.0
WB_1301.C	1.025	100.00%	339.22	21.058f	0.085p	3.167	0.0
WB_1401.C	1.025	100.00%	642.35	10.017f	0.000	5.095	0.0
WB_1511.C	1.025	68.71%	300.00	1.405a	0.004p	6.866	957.2
WB_311.C	1.025	100.00%	283.14	126.489f	0.017s	3.951	0.0
Subtotals:		83.30%	2 394.81	44.635f	0.011p	3.712	957.2

FRESH WATER

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
FW_1411.C	1.000	30.02%	42.00	13.924f	0.001p	6.211	355.9
FW_411PS.P	1.000	<empty>					0.0
FW_412SB.S	1.000	<empty>					0.0
Subtotals:		10.36%	42.00	13.924f	0.001p	6.211	355.9

HW

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
HEEL_812PS.P	1.000	100.00%	320.69	77.968f	10.872p	3.939	0.0
HEEL_812SB.S	1.000	100.00%	323.67	77.968f	10.872s	3.939	0.0
Subtotals:		100.00%	644.36	77.968f	0.050s	3.939	0.0

DIESEL OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
DO_1001.C	0.860	<empty>					0.0
DO_DAY_914.S	0.860	69.50%	9.04	60.799f	4.750s	2.890	3.0
Subtotals:		9.97%	9.04	60.799f	4.750s	2.890	3.0

TO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
TO_STOR1202.P	0.861	98.00%	19.23	37.213f	2.311p	1.198	17.5
TO_DRAIN1202.S	0.861	98.00%	19.23	37.213f	2.308s	1.198	17.5
Subtotals:		98.00%	38.47	37.213f	0.001p	1.198	35.1

HFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
HFO_801.C	0.980	<empty>					0.0
HFO_811.C	0.980	100.00%	472.07	76.800f	0.000	3.500	0.0
HFO_OVFL_902.C	0.980	10.00%	4.43	63.571f	0.118p	0.075	402.8
HFO_DAY_911.P	0.980	19.37%	10.00	70.795f	2.004p	1.887	33.7
HFO_SETT.P	0.980	36.80%	19.00	85.197f	3.602p	3.536	33.7
SLUDGE_913.P	0.980	98.00%	14.46	70.799f	5.600p	3.460	0.8
Subtotals:		62.94%	519.95	76.712f	0.327p	3.440	471.1

LUBE OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LO_1102PS.P	0.910	60.00%	8.20	46.762f	4.500p	0.504	1.3
LO_1102SB.S	0.910	60.00%	8.20	46.762f	4.500s	0.504	1.3
LO_1103PS.P	0.910	60.00%	7.33	46.871f	7.384p	0.582	1.1
LO_1103SB.S	0.910	60.00%	7.33	46.871f	7.384s	0.582	1.1
DIRTYLO_1101.P	0.910	70.00%	15.42	45.539f	0.800p	0.567	2.9
STOR_LO_1101.S	0.910	10.00%	2.20	45.170f	0.798s	0.083	2.9
Subtotals:		50.80%	48.68	46.335f	0.218p	0.529	10.7

MISCELLANEOUS

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
BILGEWT_915P.P	1.000	20.00%	3.02	70.795f	8.800p	1.890	0.8
HFODRAIN_917.P	1.000	20.00%	0.33	64.790f	5.100p	1.600	0.0
HFOSLUDGE916.S	1.000	50.00%	8.76	64.796f	0.872s	1.750	189.6
LOGEAR_1104P.C	1.000	100.00%	6.45	40.400f	0.000	1.050	0.0
FWDRAIN1104S.S	1.000	20.00%	1.04	42.738f	2.800s	0.193	0.1
Subtotals:		42.70%	19.58	56.517f	0.902p	1.456	190.7

LSHFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LSHFO_901.C	0.980	<empty>					0.0
LSHFO_DAY912.S	0.980	10.00%	5.16	70.789f	3.592s	1.700	33.7
LSHFO_SETT.S	0.980	37.00%	19.10	85.197f	1.998s	3.540	33.7
Subtotals:		10.28%	24.27	82.132f	2.337s	3.148	67.5

All Tanks

	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
Totals:		69.90%	3 741.15	54.780f	0.024p	3.657	2 091.1

Displacer Status

Item	Status	Spgr	Displ (MT)	LCB (m)	TCB (m)	VCB (m)	Eff /Perm
HULL	Intact	1.025	15 140.13	66.360f	0.016p	3.278	1.000
SubTotals:			15 140.13	66.360f	0.016p	3.278	

Critical points

Name	L,T,V (m)	Height (m)
(1) MES Height Limiting Point PS	47.200f, 13.850p, 5.900	-0.083
(2) MES Height Limiting Point SB	47.200f, 13.850s, 5.900	-0.047

Immersion of propeller tip 1.666 m
Current Rolling Period is : 9.47 second

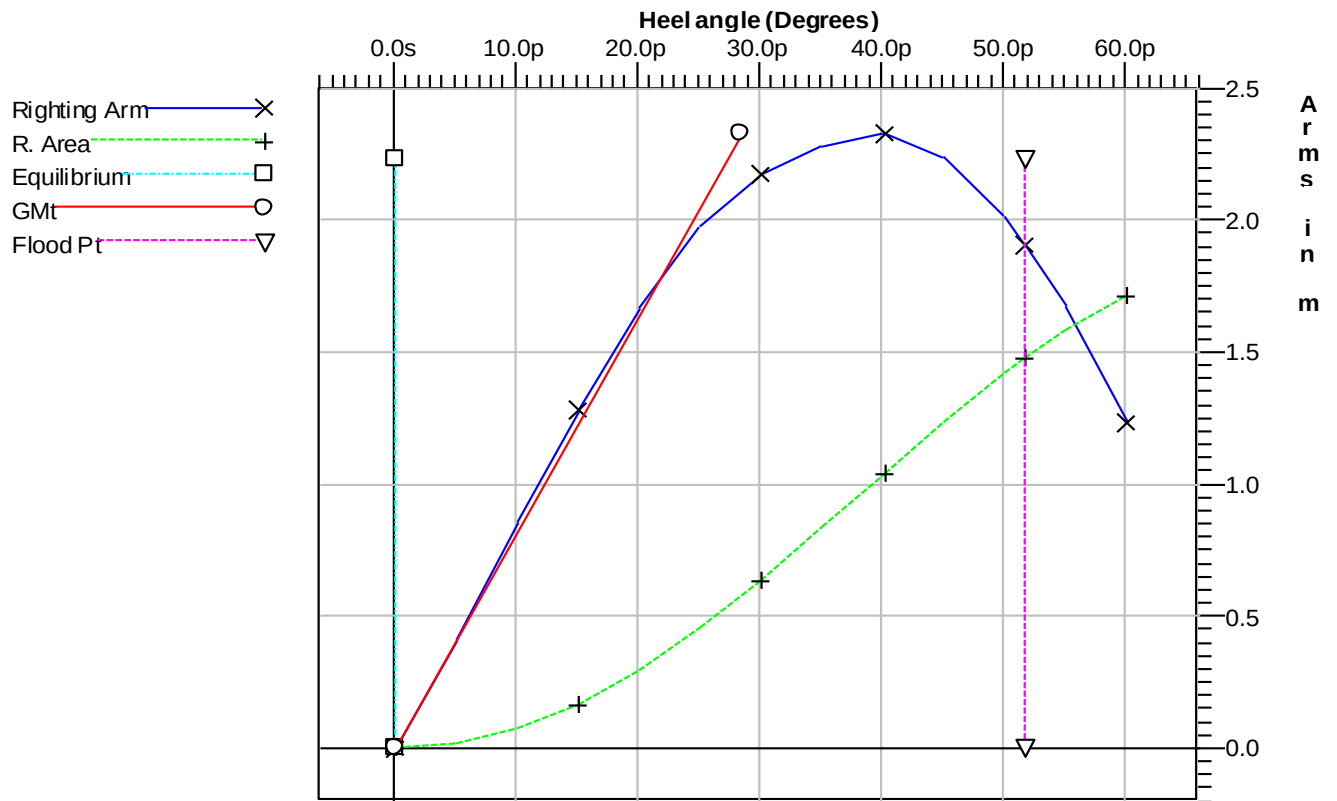
Righting Arms vs. Heel - IMO RES. A.749 (18)

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Righting Arm (m)	Area (m-Rad)	Flood Pt Height (m)	Notes
0.07p	0.52a	6.393	0.000	0.000	11.670 (1)	Equil
5.07p	0.50a	6.321	0.418	0.018	10.512 (1)	
10.07p	0.43a	6.104	0.859	0.074	9.374 (1)	
15.07p	0.36a	5.794	1.287	0.168	8.210 (1)	
20.07p	0.30a	5.394	1.672	0.297	7.030 (1)	
25.07p	0.23a	4.888	1.979	0.457	5.861 (1)	
30.07p	0.16a	4.270	2.175	0.639	4.723 (1)	
35.07p	0.10a	3.545	2.278	0.834	3.622 (1)	
40.07p	0.04a	2.728	2.329	1.035	2.559 (1)	
40.27p	0.04a	2.694	2.329	1.043	2.517 (1)	MaxRa
45.07p	0.01f	1.880	2.243	1.236	1.485 (1)	
50.07p	0.05f	1.032	2.012	1.423	0.387 (1)	
51.81p	0.06f	0.738	1.905	1.482	0.000 (1)	FldPt
55.07p	0.09f	0.188	1.673	1.584	-0.727 (1)	
60.07p	0.11f	-0.653	1.239	1.712	-1.840 (1)	

Unprotected Flood Points

Name	L,T,V (m)	Height (m)
(1) Aft Ventilation Opening PS	2.150a, 13.300p, 18.100	11.670

Righting Arms vs. Heel - IMO RES. A.749 (18)



IMO RES. A.749 (18)

Limit	Min/Max	Actual	Margin	Pass
(1) GM at Equilibrium	>0.150 m	4.712	4.562	Yes
(2) Area from 0.00 deg to 30.00	>0.0550 m-R	0.639	0.584	Yes
(3) Area from 0.00 deg to 40.00 or Flood	>0.0900 m-R	1.035	0.945	Yes
(4) Area from 30.00 deg to 40.00 or Flood	>0.0300 m-R	0.396	0.366	Yes
(5) Righting Arm at 30.00 deg	>0.200 m	2.175	1.975	Yes
(6) Angle from 0.00 deg to MaxRA	>25.00 deg	40.20	15.20	Yes

Current VCG Fluid 11.199 m < Max Allowable VCG 13.953 m - PASS

MAXIMUM TURNING ANGLE VERIFICATION

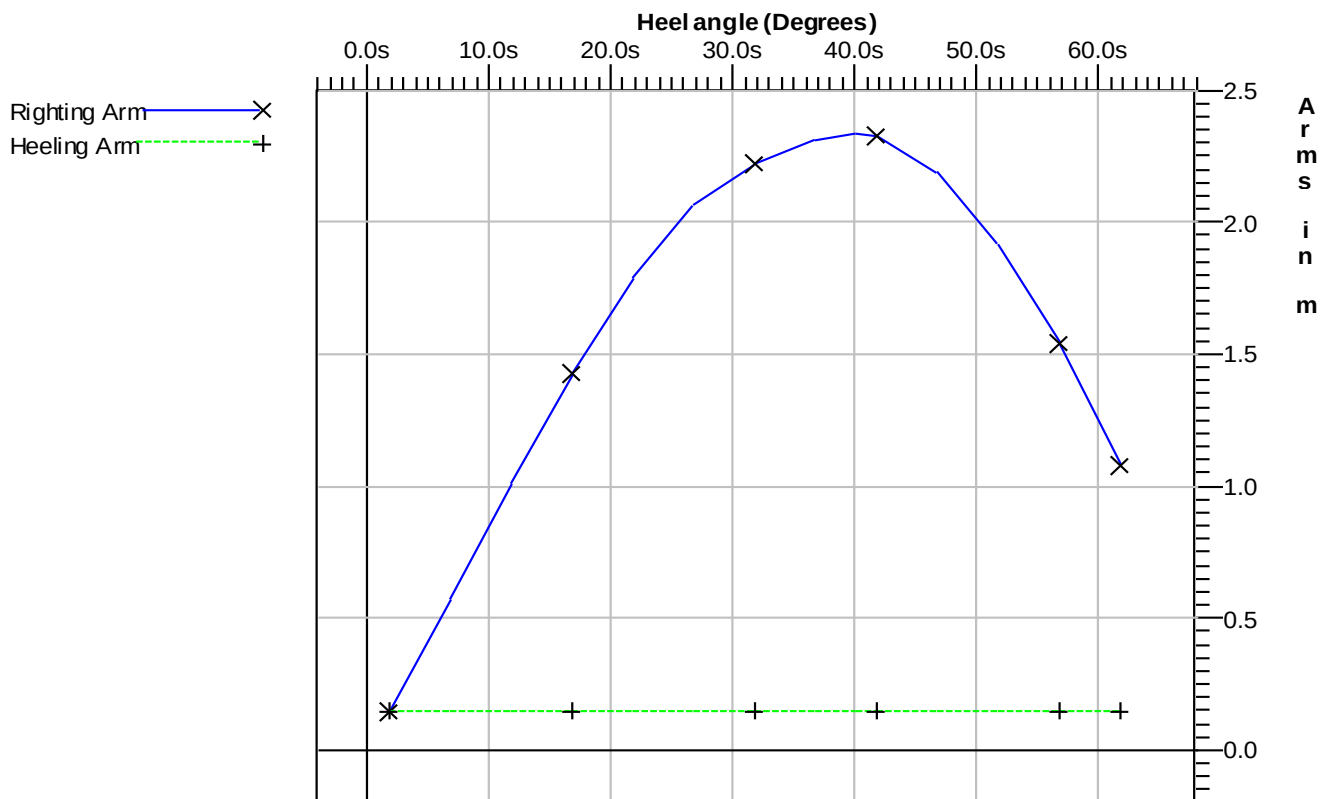
Cruising speed 21.15 knots

MOMENT DUE TO MAXIMUM TURNING ANGLE 2253.786 tm

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)
1.74s	0.52a	6.385	0.000
6.74s	0.48a	6.263	0.427
11.74s	0.41a	6.010	0.867
16.74s	0.34a	5.672	1.284
21.74s	0.27a	5.238	1.647
26.74s	0.20a	4.695	1.919
31.74s	0.14a	4.039	2.078
36.74s	0.08a	3.282	2.161
40.14s	0.04a	2.717	2.189
41.74s	0.03a	2.446	2.180
46.74s	0.02f	1.597	2.039
51.74s	0.06f	0.750	1.768
56.74s	0.10f	-0.093	1.397
61.74s	0.12f	-0.934	0.930

Righting Arms vs. Heel - IMO RES. A.749 (18)



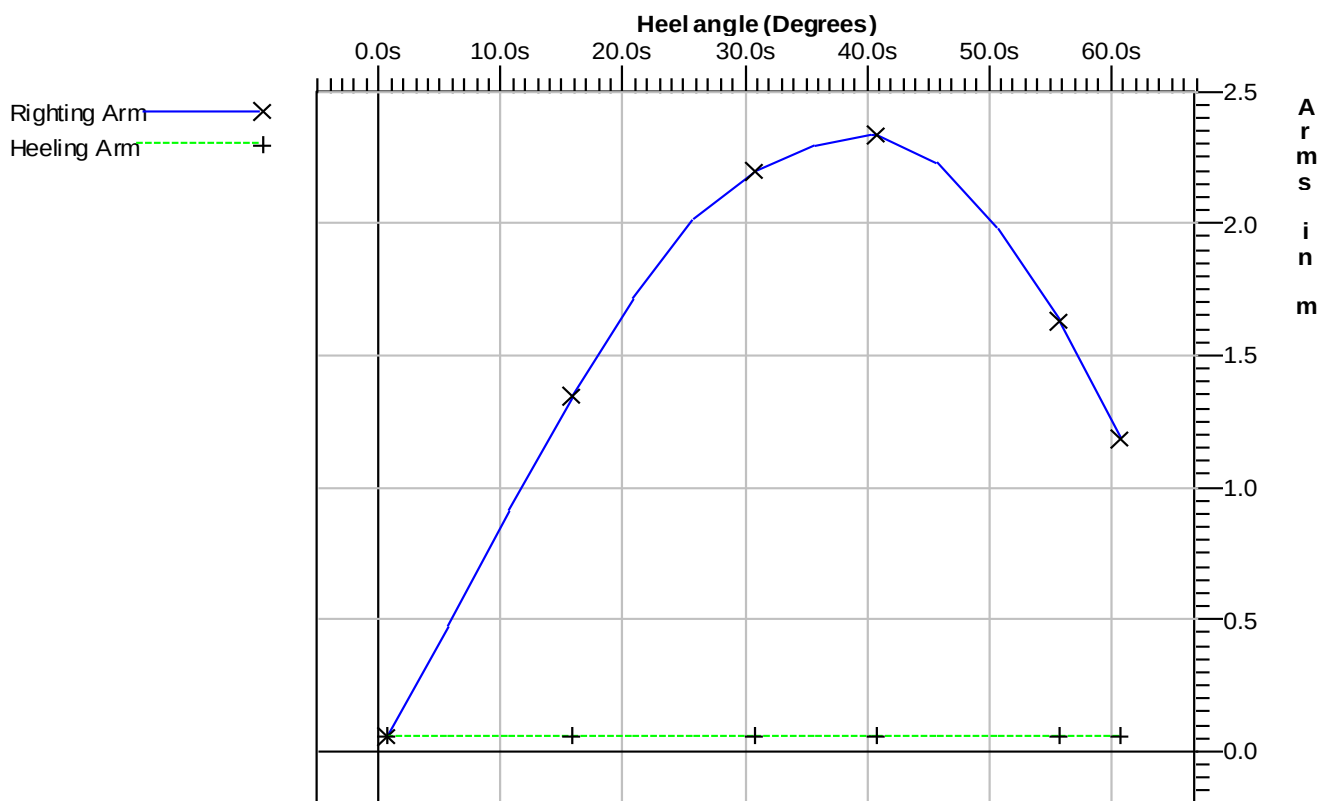
HEELING ANGLE DUE TO TURNING 1.74s deg

1000 PASSENGERS CROWDING VERIFICATION

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)
0.67s	0.52a	6.392	0.000
5.67s	0.49a	6.303	0.421
10.67s	0.42a	6.071	0.862
15.67s	0.36a	5.752	1.286
20.67s	0.29a	5.340	1.664
25.67s	0.22a	4.821	1.958
30.67s	0.15a	4.189	2.141
35.67s	0.09a	3.452	2.236
40.27s	0.04a	2.695	2.278
40.67s	0.04a	2.628	2.277
45.67s	0.01f	1.780	2.170
50.67s	0.05f	0.932	1.924
55.67s	0.09f	0.088	1.573
60.67s	0.12f	-0.753	1.127

Righting Arms vs. Heel - IMO RES. A.749 (18)



HEELING ANGLE DUE TO PASSENGERS CROWDING 0.67s deg

IMO Res. A.749 (18), SEVERE WIND AND ROLLING CRITERION (WEATHER CRITERION)

Wind speed 53.4 kn

Wind pressure 504 N /m²Under Water Lateral Plane 878.248 m²Above Water Lateral Plane 3623.105 m²

Under Water Lateral Plane Centroid 2.826 m below water line

Above Water Lateral Plane Centroid 11.839 m above water line

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)	Area (m-Rad)	Flood Pt Height (m)	Notes
23.77p	0.24a	5.031	-2.179	0.000	6.164 (1)	Roll
18.77p	0.31a	5.508	-1.848	-0.176	7.338 (1)	
13.77p	0.38a	5.883	-1.448	-0.320	8.516 (1)	
8.77p	0.45a	6.172	-1.014	-0.428	9.672 (1)	
3.77p	0.51a	6.354	-0.578	-0.497	10.812 (1)	
1.23s	0.52a	6.389	-0.163	-0.529	11.401 (2)	
3.19s	0.51a	6.365	0.000	-0.532	10.946 (2)	Equil
6.23s	0.49a	6.283	0.260	-0.525	10.248 (2)	
11.23s	0.42a	6.039	0.701	-0.483	9.108 (2)	
16.23s	0.35a	5.710	1.122	-0.404	7.938 (2)	
21.23s	0.28a	5.287	1.492	-0.289	6.758 (2)	
26.23s	0.21a	4.755	1.775	-0.146	5.595 (2)	
31.23s	0.14a	4.111	1.945	0.017	4.465 (2)	
36.23s	0.08a	3.363	2.033	0.191	3.373 (2)	
41.23s	0.03a	2.532	2.064	0.370	2.313 (2)	
46.23s	0.02f	1.684	1.939	0.546	1.233 (2)	
50.00s	0.05f	1.045	1.753	0.668	0.403 (2)	
51.82s	0.06f	0.737	1.641	0.722	0.000 (2)	FldPt
55.00s	0.09f	0.201	1.415	0.807	-0.710 (2)	

Note:

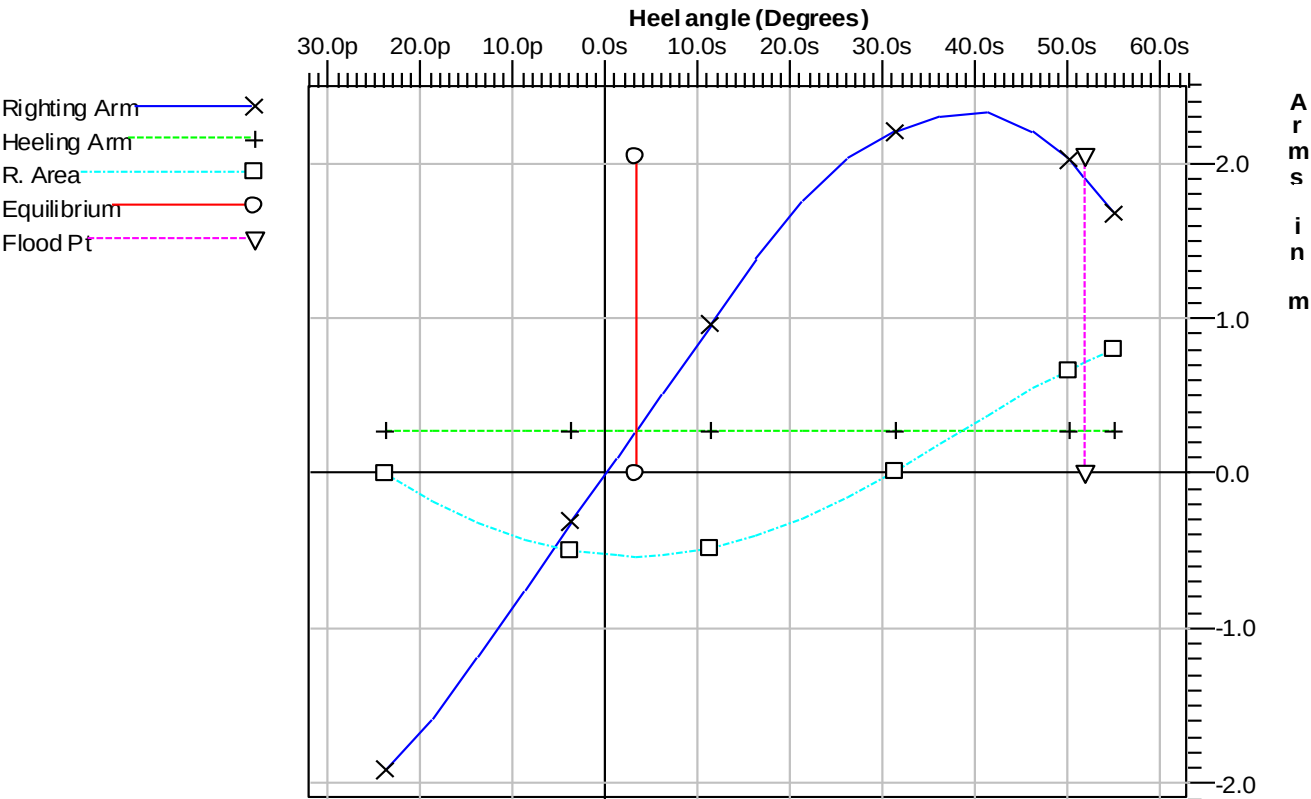
Roll angle is 25.89

Equilibrium for load condition without gust is 2.12s

Unprotected Flood Points

Name	L,T,V (m)	Height (m)
(1) Aft Ventilation Opening PS	2.150a, 13.300p, 18.100	6.164
(2) Aft Ventilation Opening SB	2.150a, 13.300s, 18.100	11.401

Righting Arms vs. Heel - IMO SEVERE WIND & ROLLING



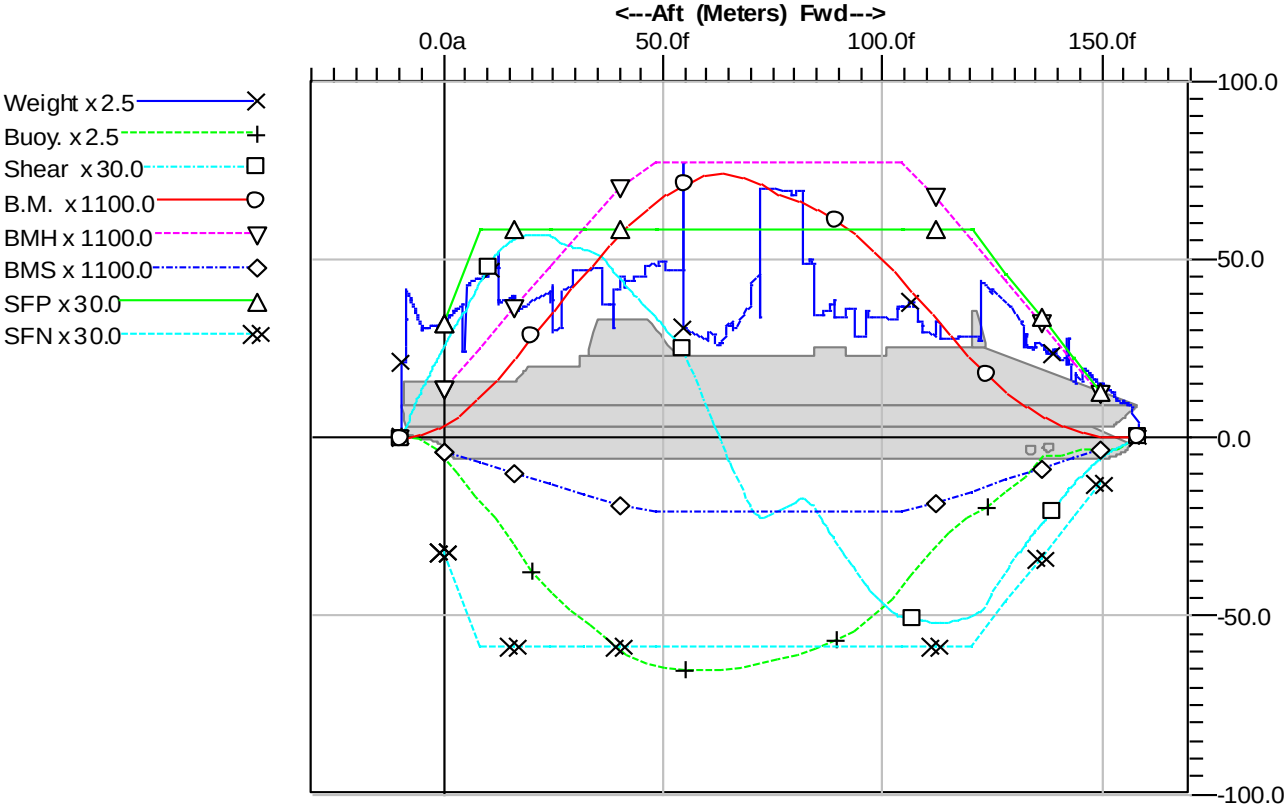
IMO SEVERE WIND & ROLLING

Limit	Min/Max	Actual	Margin	Pass
(1) Res. Ratio from Roll to Abs 50.00 deg or Flood	>1.000	2.255	1.255	Yes

LONGITUDINAL STRENGTH

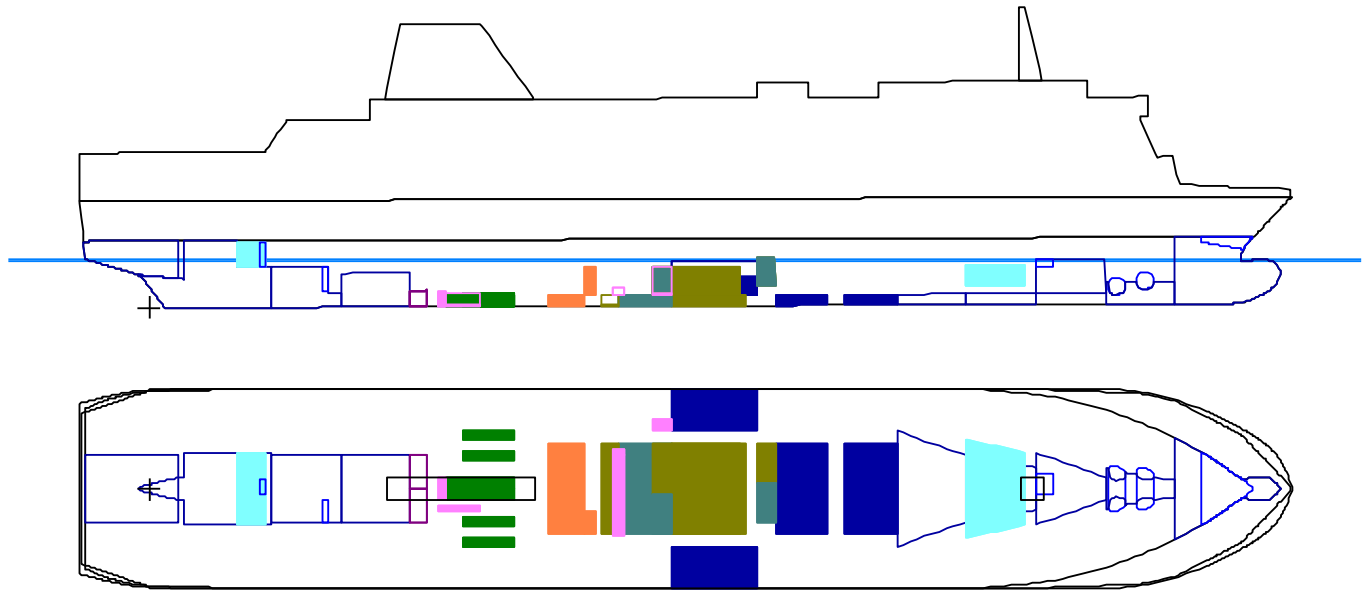
Frame No.	Location (m)	Weight (MT/m)	Buoyancy (MT/m)	Shear (MT)	Bending (MT-m)	Shear (%/Max)	Bending (%/Max)
FR -10	8.000a	98.9	<und>	143.5	133	undef	undef
FR 0	0.000	81.9	12.9	763.2	3953	78.52	26.70
BKHD FR 6	4.800f	61.0	31.9	1055.3	8412	73.34	37.76
FR 10	8.000f	112.4	43.4	1286.7	12185	73.52	44.69
FR 20	16.000f	99.2	75.5	1669.9	24367	95.42	61.33
BKHD FR 21	16.800f	92.4	79.0	1681.3	25713	96.07	62.75
FR 30	24.000f	103.3	106.7	1702.4	38003	97.28	72.81
BKHD FR 33	26.400f	103.2	113.6	1636.3	42039	93.50	75.16
BKHD FR 36	28.800f	107.2	120.1	1608.3	45948	91.90	77.00
FR 40	32.000f	118.3	128.5	1582.8	51075	90.44	78.99
BKHD FR 50	40.000f	112.7	149.0	1338.7	63076	76.49	81.79
BKHD FR 51	40.800f	112.7	150.6	1309.0	64140	74.80	82.37
FR 60	48.000f	121.6	159.7	1014.3	72517	57.96	85.72
BKHD FR 63	50.400f	124.3	161.1	925.4	74858	52.88	88.49
BKHD FR 64	51.200f	118.3	161.4	891.0	75587	50.92	89.35
FR 70	56.000f	75.1	162.6	612.3	79340	34.99	93.78
BKHD FR 75	60.000f	74.6	163.0	248.6	81096	14.21	95.86
FR 80	64.000f	76.7	162.1	-122.5	81382	7.00	96.20
BKHD FR 90	72.000f	174.3	158.7	-684.0	77981	39.09	92.18
FR 100	80.000f	173.8	152.7	-540.9	73113	30.91	86.42
BKHD FR 105	84.000f	122.3	148.8	-569.4	71005	32.54	83.93
FR 110	88.000f	94.3	144.0	-806.4	68264	46.08	80.69
BKHD FR 117	93.600f	90.1	134.9	-1094.7	62952	62.55	74.41
FR 120	96.000f	89.7	129.9	-1242.4	60161	71.00	71.11
BKHD FR 129	103.200f	93.0	108.6	-1496.3	50261	85.50	59.41
FR 130	103.200f	93.0	108.6	-1496.3	50261	85.50	59.41
FR 140	112.000f	81.1	75.3	-1559.6	36832	89.12	49.61
BKHD FR 141	112.800f	80.5	72.7	-1554.1	35592	88.81	48.79
FR 150	120.000f	70.7	55.4	-1500.5	24565	85.74	40.07
BKHD FR 153	112.400f	80.8	74.0	-1556.8	36212	88.96	49.20
FR 160	128.000f	95.2	38.2	-1137.9	13787	82.40	28.50
BKHD FR 165	132.000f	78.6	28.0	-919.8	9706	76.90	23.17
FR 170	136.000f	65.2	19.9	-734.2	6423	72.63	18.13
BKHD FR 177	141.600f	56.5	11.2	-471.2	3106	62.58	11.75
FR 180	143.400f	39.4	9.1	-394.6	2348	58.90	9.97
FR 190	149.400f	36.7	8.6	-183.4	666	46.68	4.84
FR 200	155.400f	24.2	3.2	-49.9	42	undef	undef

Longitudinal Strength At Sea Condition (port 0.07 deg.)



Max. Shear	1706.5 MT	at	22.000f
Max. Bending Moment	81453 MT-m	at	62.907f (Hogging)
Max% Shear	97.51%	at	22.000f
Max% Bending Moment	96.28%	at	62.907f

CASE 4.1 - SHIP WITH 1000 PASSENGERS
TRAILERS ON DECKS 3, 5, 7 - CARS ON DECKS 5 AND 6
SHIP AT DEPARTURE (100% CONSUMABLES)



Fluid Legend

Fluid Name	Legend	Weight (MT)	Load%
BALLAST		605.59	17.13%
FRESH WATER		402.63	99.31%
DIESEL OIL		88.86	98.00%
TO		38.47	98.00%
HFO		761.48	92.18%
LUBE OIL		74.51	77.77%
MISCELLANEOUS		10.39	22.66%
LSHFO		231.31	98.00%

Floating Status

Draft FP	6.200 m	Heel	0.00 deg	GM(Solid)	2.721 m
Draft MS	6.500 m	Equil	Yes	F/S Corr.	0.284 m
Draft AP	6.800 m	Wind	Off	GM(Fluid)	2.437 m
Trim	0.60a m	Wave	No	KMT	15.270 m
LCG	67.762f m	VCG-Solid	12.550 m	TPcm	37.38
Displacement	17827.7 MT	WaterSpgr	1.025		

Draft At Draft Marks

FORE.p	6.205(m)	FORE.s	6.205(m)
MID.p	6.500(m)	MID.s	6.500(m)
AFT.p	6.765(m)	AFT.s	6.765(m)

TRIM (Referred to Draft Marks) aft 0.56/140.00a m

Fixed Weight Status

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	11 244.06	70.053f	0.000	13.381u
1) CREW	5.40	120.960f	0.000	25.540u
2) PROVISIONS	45.00	124.100f	0.000	10.110u
3) STORES INCL. SHOP STORES	45.00	98.630f	0.000	11.280u
4) 1000 PASSENGERS	100.00	74.770f	0.000	26.270u
5) TRAILERS ON DECK 3	2 000.00	64.300f	0.000	11.200u
6) TRAILERS ON DECK 5	1 200.00	49.700f	0.000	16.800u
7) CARS ON DECK 5	100.00	122.800f	0.000	15.500u
8) CARS ON CAR DECK 6	75.00	123.250f	0.000	18.470u
9) TRAILERS ON DECK 7	800.00	27.412f	0.000	22.400u
Total Fixed:	15 614.47	66.447f	0.000	13.936u

Tank Status

BALLAST

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
PFT_WB_101.C	1.025	<empty>					0.0
WB_201.C	1.025	<empty>					0.0
WB_401.C	1.025	<empty>					0.0
WB_501.C	1.025	<empty>					0.0
WB_601.C	1.025	100.00%	130.02	99.547f	0.000	0.779	0.0
WB_701.C	1.025	100.00%	138.76	89.998f	0.000	0.750	0.0
WB_1201.C	1.025	<empty>					0.0
WB_1301.C	1.025	<empty>					0.0
WB_1401.C	1.025	<empty>					0.0
WB_1511.C	1.025	<empty>					0.0
WB_311.C	1.025	<empty>					0.0
HEEL_812PS.P	1.025	52.00%	170.93	77.920f	10.824p	2.803	199.3
HEEL_812SB.S	1.025	50.00%	165.88	77.916f	10.820s	2.755	201.1
Subtotals:		17.13%	605.59	85.330f	0.091p	1.885	400.4

FRESH WATER

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
FW_1411.C	1.000	98.00%	137.09	13.934f	0.010s	7.366	355.9
FW_411PS.P	1.000	100.00%	131.01	116.609f	2.991p	4.087	0.0
FW_412SB.S	1.000	100.00%	134.54	116.609f	2.991s	4.087	0.0
Subtotals:		99.31%	402.63	81.649f	0.030s	5.203	355.9

DIESEL OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
DO_1001.C	0.860	98.00%	76.11	57.595f	0.000	0.735	707.0
DO_DAY_914.S	0.860	98.00%	12.75	60.800f	4.750s	3.460	3.0
Subtotals:		98.00%	88.86	58.054f	0.681s	1.126	709.9

TO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
TO_STOR1202.P	0.861	98.00%	19.23	37.214f	2.309p	1.198	17.5
TO_DRAIN1202.S	0.861	98.00%	19.23	37.214f	2.309s	1.198	17.5
Subtotals:		98.00%	38.47	37.214f	0.000	1.198	35.0

HFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
HFO_801.C	0.980	100.00%	191.75	77.200f	0.000	0.750	0.0
HFO_811.C	0.980	98.00%	462.63	76.792f	0.000	3.460	1 611.2
HFO_OVFL_902.C	0.980	10.00%	4.43	63.587f	0.000	0.075	402.8
HFO_DAY_911.P	0.980	98.00%	50.60	70.800f	2.000p	3.460	33.7
HFO_SETT.P	0.980	98.00%	50.60	85.200f	3.600p	4.760	33.7
SLUDGE_913.P	0.980	10.00%	1.48	70.795f	5.600p	1.700	0.8
Subtotals:		92.18%	761.48	76.967f	0.383p	2.841	2 082.3

LUBE OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LO_1102PS.P	0.910	98.00%	13.39	46.790f	4.500p	0.823	1.3
LO_1102SB.S	0.910	98.00%	13.39	46.790f	4.500s	0.823	1.3
LO_1103PS.P	0.910	98.00%	11.97	46.856f	7.388p	0.921	1.1
LO_1103SB.S	0.910	98.00%	11.97	46.856f	7.388s	0.921	1.1
DIRTYLO_1101.P	0.910	10.00%	2.20	45.410f	0.800p	0.081	2.9
STOR_LO_1101.S	0.910	98.00%	21.59	45.581f	0.800s	0.794	2.9
Subtotals:		77.77%	74.51	46.420f	0.208s	0.824	10.7

MISCELLANEOUS

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
BILGEWT_915P.P	1.000	10.00%	1.51	70.795f	8.800p	1.695	0.8
HFODRAIN_917.P	1.000	10.00%	0.16	64.791f	5.100p	1.550	0.0
HFOSLUDGE916.S	1.000	10.00%	1.75	64.791f	0.900s	1.550	189.6
LOGEAR_1104P.C	1.000	100.00%	6.45	40.400f	0.000	1.050	0.0
FWDRAIN1104S.S	1.000	10.00%	0.52	42.745f	2.800s	0.097	0.1
Subtotals:		22.66%	10.39	49.422f	1.066p	1.188	190.7

LSHFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LSHFO_901.C	0.980	98.00%	130.11	68.388f	0.000	0.735	1 208.5
LSHFO_DAY912.S	0.980	98.00%	50.60	70.800f	3.600s	3.460	33.7
LSHFO_SETT.S	0.980	98.00%	50.60	85.200f	2.000s	4.760	33.7
Subtotals:		98.00%	231.31	72.593f	1.225s	2.212	1 275.9

All Tanks

	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
Totals:		41.23%	2 213.24	77.042f	0.006s	2.770	5 060.8

Displacer Status

Item	Status	Spgr	Displ (MT)	LCB (m)	TCB (m)	VCB (m)	Eff /Perm
HULL	Intact	1.025	17 827.71	67.727f	0.000	3.704	1.000
CARDECK.C	Intact	1.025	0.00	0.000	0.000	0.000	1.000
SubTotals:			17 827.71	67.727f	0.000	3.704	

Critical points

Name	L,T,V (m)	Height (m)
(1) MES Height Limiting Point PS	47.200f, 13.850p, 5.900	-0.711
(2) MES Height Limiting Point SB	47.200f, 13.850s, 5.900	-0.711

Immersion of propeller tip 2.088 m

Current Rolling Period is : 13.89 second

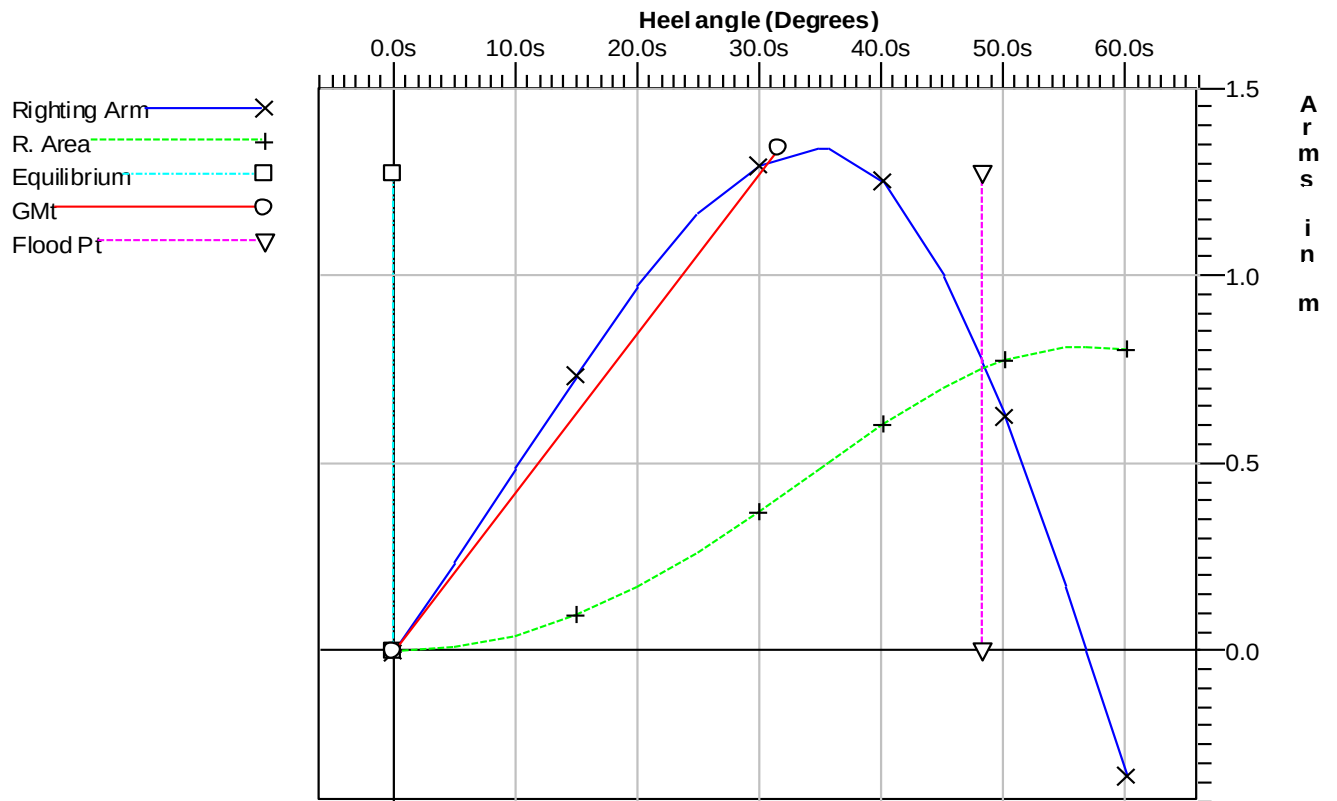
Righting Arms vs. Heel - IMO RES. A.749 (18)

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Righting Arm (m)	Area (m-Rad)	Flood Pt Height (m)	Notes
0.00	0.23a	6.800	0.000	0.000	11.291 (1)	Equil
5.00s	0.21a	6.724	0.236	0.010	10.140 (2)	
10.00s	0.16a	6.523	0.489	0.042	8.987 (2)	
15.00s	0.11a	6.240	0.738	0.095	7.797 (2)	
20.00s	0.06a	5.872	0.973	0.170	6.585 (2)	
25.00s	0.02a	5.403	1.167	0.264	5.380 (2)	
30.00s	0.03f	4.821	1.292	0.372	4.205 (2)	
35.00s	0.07f	4.122	1.340	0.487	3.078 (2)	
35.60s	0.08f	4.031	1.341	0.501	2.946 (2)	MaxRa
40.00s	0.12f	3.351	1.257	0.602	1.970 (2)	
45.00s	0.16f	2.568	0.999	0.701	0.789 (4)	
48.22s	0.19f	2.061	0.769	0.751	0.000 (4)	FldPt
50.00s	0.20f	1.781	0.625	0.773	-0.436 (4)	
55.00s	0.23f	0.993	0.172	0.808	-1.665 (4)	
56.76s	0.25f	0.716	0.000	0.811	-2.096 (4)	RaZero
60.00s	0.27f	0.205	-0.332	0.801	-2.890 (4)	

Unprotected Flood Points

Name	L,T,V (m)	Height (m)
(1) Aft Ventilation Opening PS	2.150a, 13.300p, 18.100	11.291
(2) Aft Ventilation Opening SB	2.150a, 13.300s, 18.100	10.140
(4) Fwd Ventilation Opening SB	139.200f, 12.800s, 18.100	0.789

Righting Arms vs. Heel - IMO RES. A.749 (18)



IMO RES. A.749 (18)

Limit	Min/Max	Actual	Margin	Pass
(1) GM at Equilibrium	>0.150 m	2.437	2.287	Yes
(2) Area from 0.00 deg to 30.00	>0.0550 m-R	0.372	0.317	Yes
(3) Area from 0.00 deg to 40.00 or Flood	>0.0900 m-R	0.602	0.512	Yes
(4) Area from 30.00 deg to 40.00 or Flood	>0.0300 m-R	0.230	0.200	Yes
(5) Righting Arm at 30.00 deg	>0.200 m	1.292	1.092	Yes
(6) Angle from 0.00 deg to MaxRA	>25.00 deg	35.60	10.60	Yes

Current VCG Fluid 12.833 m < Max Allowable VCG 12.840 m - PASS

MAXIMUM TURNING ANGLE VERIFICATION

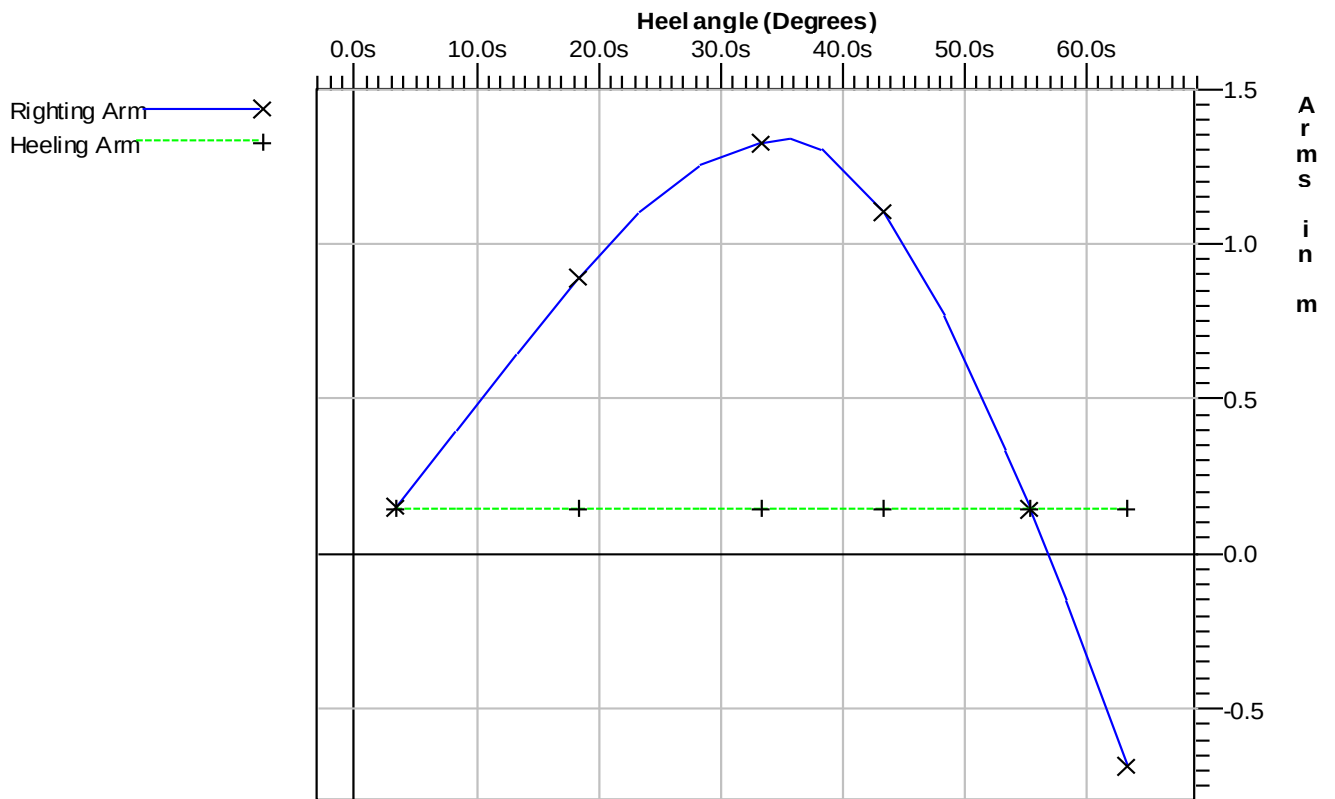
Cruising speed 21.15 knots

MOMENT DUE TO MAXIMUM TURNING ANGLE 2667.095 tm

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)
3.27s	0.22a	6.768	0.000
8.27s	0.17a	6.602	0.253
13.27s	0.13a	6.347	0.503
18.27s	0.08a	6.010	0.745
23.27s	0.04a	5.577	0.957
28.27s	0.01f	5.035	1.109
33.27s	0.06f	4.376	1.181
35.67s	0.08f	4.020	1.192
38.27s	0.10f	3.619	1.159
43.27s	0.15f	2.840	0.954
48.27s	0.19f	2.054	0.615
53.27s	0.22f	1.266	0.186
55.23s	0.24f	0.956	0.000
58.27s	0.26f	0.478	-0.302
63.27s	0.29f	-0.317	-0.833

Righting Arms vs. Heel - IMO RES. A.749 (18)



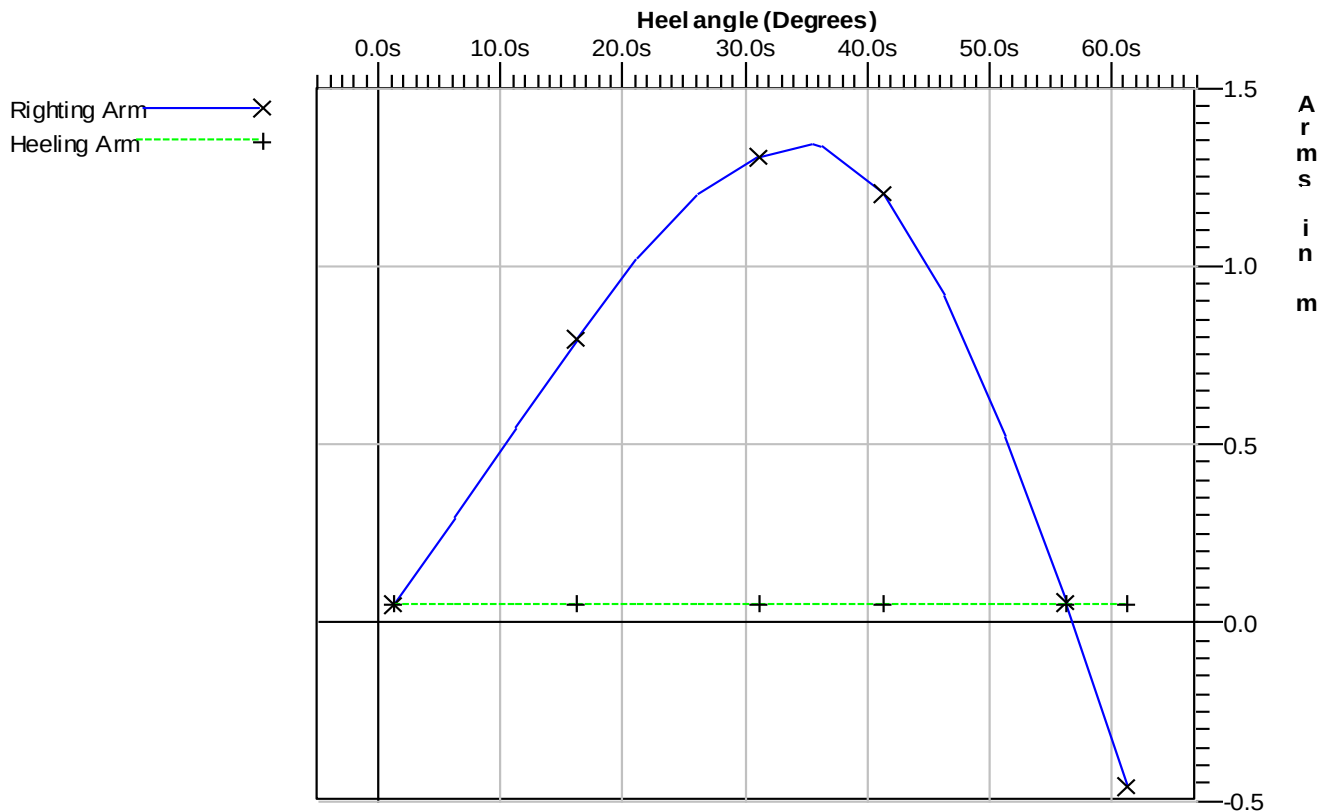
HEELING ANGLE DUE TO TURNING 3.27s deg

1000 PASSENGERS CROWDING VERIFICATION

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)
1.20s	0.23a	6.796	0.000
6.20s	0.20a	6.683	0.246
11.20s	0.15a	6.462	0.498
16.20s	0.10a	6.160	0.745
21.20s	0.05a	5.769	0.973
26.20s	0.01a	5.274	1.153
31.20s	0.04f	4.664	1.259
35.60s	0.08f	4.032	1.290
36.20s	0.08f	3.940	1.288
41.20s	0.13f	3.164	1.157
46.20s	0.17f	2.380	0.867
51.20s	0.21f	1.593	0.471
56.20s	0.24f	0.805	0.004
56.24s	0.24f	0.797	0.000
61.20s	0.28f	0.015	-0.510

Righting Arms vs. Heel - IMO RES. A.749 (18)



HEELING ANGLE DUE TO PASSENGERS CROWDING 1.20s deg

IMO Res. A.749 (18), SEVERE WIND AND ROLLING CRITERION (WEATHER CRITERION)

Wind speed 53.4 kn

Wind pressure 504 N /m²Under Water Lateral Plane 1005.182 m²Above Water Lateral Plane 3486.223 m²

Under Water Lateral Plane Centroid 3.199 m below water line

Above Water Lateral Plane Centroid 11.487 m above water line

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)	Area (m-Rad)	Flood Pt Height (m)	Notes
18.57p	0.08a	5.986	-1.130	0.000	6.933 (1)	Roll
13.57p	0.12a	6.329	-0.888	-0.088	8.141 (1)	
8.57p	0.17a	6.589	-0.639	-0.155	9.321 (1)	
3.57p	0.22a	6.762	-0.386	-0.200	10.467 (1)	
1.43s	0.23a	6.794	-0.157	-0.223	10.959 (2)	
4.68s	0.21a	6.733	0.000	-0.228	10.213 (2)	Equil
6.43s	0.19a	6.675	0.089	-0.226	9.814 (2)	
11.43s	0.14a	6.450	0.341	-0.208	8.650 (2)	
16.43s	0.10a	6.144	0.587	-0.167	7.451 (2)	
21.43s	0.05a	5.749	0.814	-0.106	6.238 (2)	
26.43s	0.01a	5.248	0.991	-0.027	5.039 (2)	
31.43s	0.04f	4.632	1.093	0.065	3.878 (2)	
35.63s	0.08f	4.027	1.121	0.146	2.940 (2)	MaxRa
36.43s	0.08f	3.904	1.118	0.162	2.764 (2)	
41.43s	0.13f	3.127	0.978	0.254	1.647 (2)	
46.43s	0.17f	2.343	0.682	0.328	0.439 (4)	
48.22s	0.19f	2.061	0.548	0.347	0.000 (4)	FldPt
50.00s	0.20f	1.781	0.404	0.362	-0.436 (4)	
54.50s	0.23f	1.071	0.000	0.378	-1.542 (4)	RaZero
55.00s	0.23f	0.993	-0.048	0.378	-1.665 (4)	

Note:

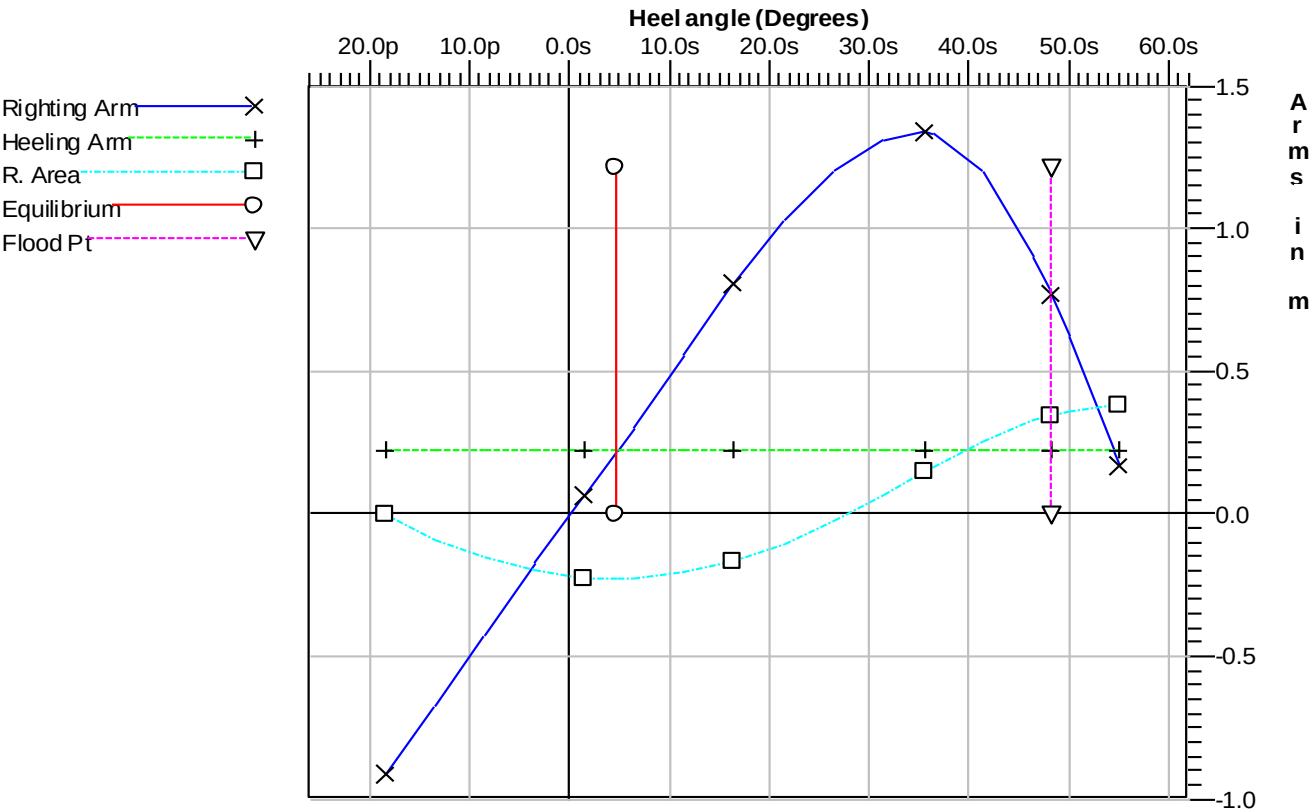
Roll angle is 21.78

Equilibrium for load condition without gust is 3.21s

Unprotected Flood Points

Name	L,T,V (m)	Height (m)
(1) Aft Ventilation Opening PS	2.150a, 13.300p, 18.100	6.933
(2) Aft Ventilation Opening SB	2.150a, 13.300s, 18.100	10.959
(4) Fwd Ventilation Opening SB	139.200f, 12.800s, 18.100	0.439

Righting Arms vs. Heel - IMO SEVERE WIND & ROLLING



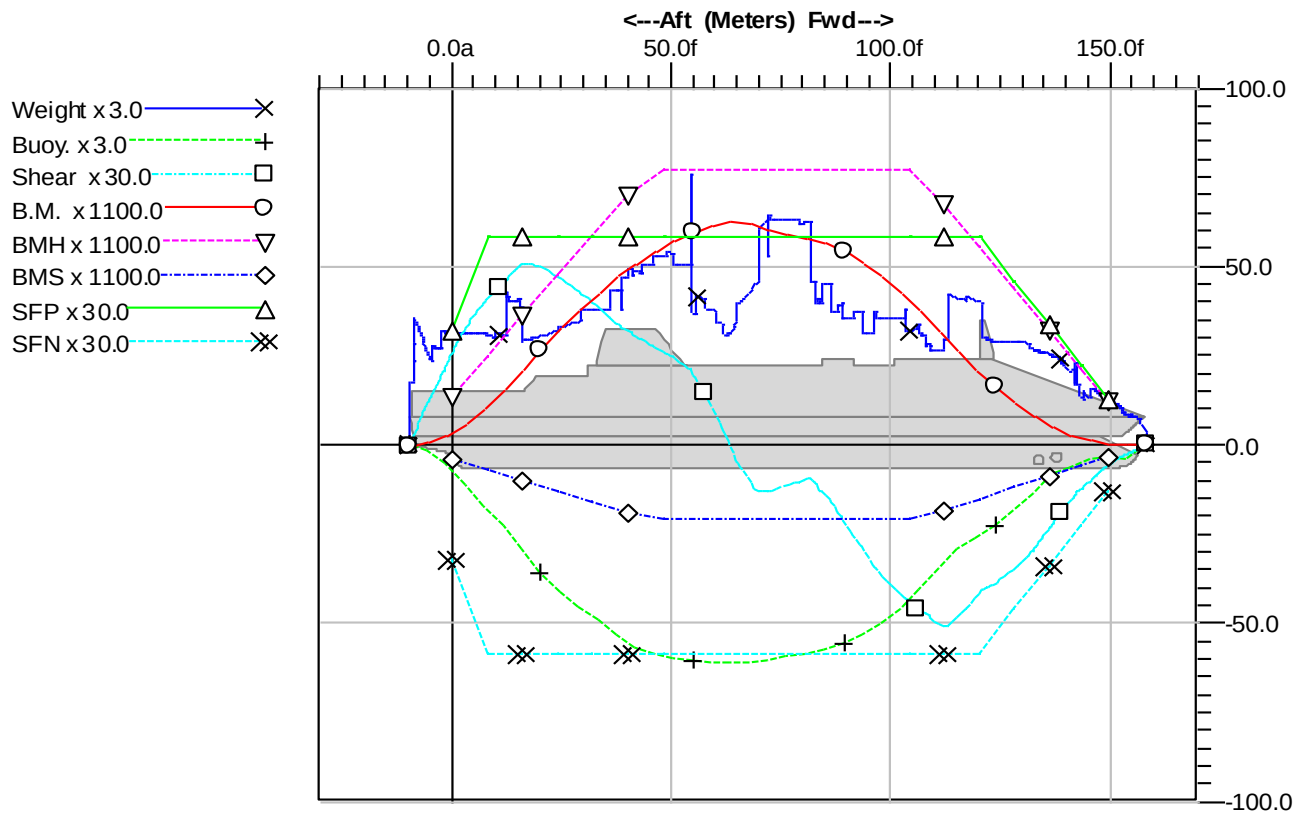
IMO SEVERE WIND & ROLLING

Limit	Min/Max	Actual	Margin	Pass
(1) Res. Ratio from Roll to Abs 50.00 deg or Flood	>1.000	2.526	1.526	Yes

LONGITUDINAL STRENGTH

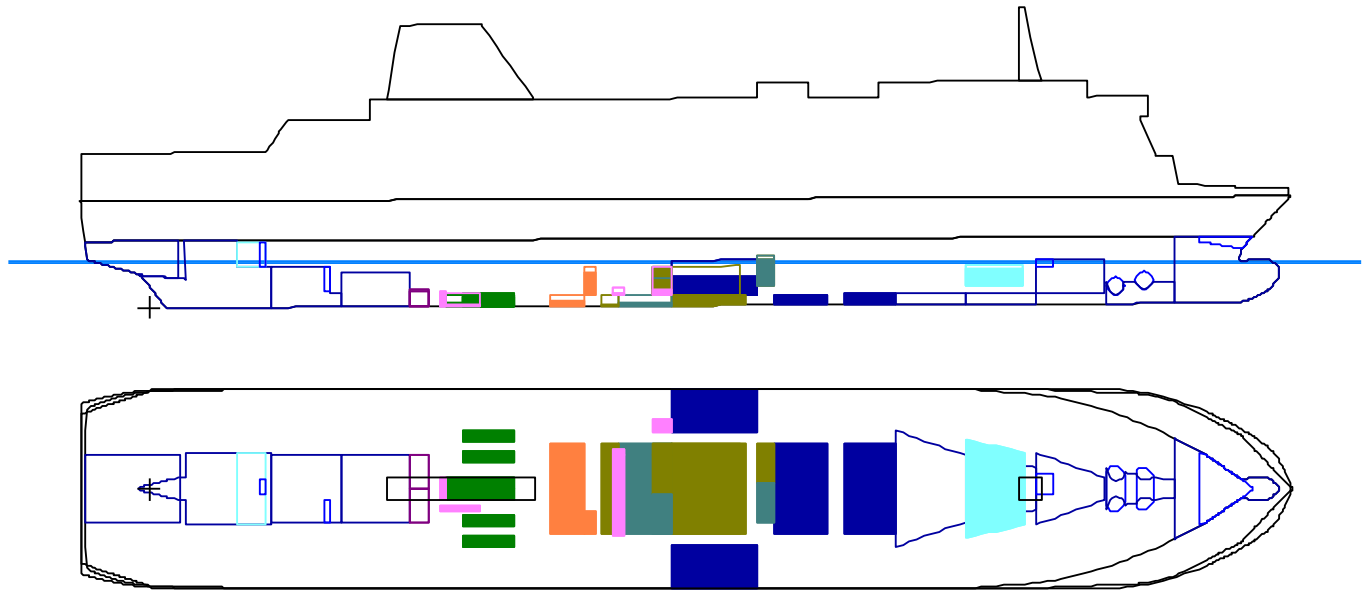
Frame No.	Location (m)	Weight (MT/m)	Buoyancy (MT/m)	Shear (MT)	Bending (MT-m)	Shear (%/Max)	Bending (%/Max)
FR -10	8.000a	100.0	0.5	144.0	126	undef	undef
FR 0	0.000	95.0	19.7	772.6	3880	79.48	26.21
BKHD FR 6	4.800f	94.9	41.0	1080.0	8385	75.07	37.64
FR 10	8.000f	93.3	53.7	1231.4	12106	70.36	44.40
FR 20	16.000f	116.8	88.6	1526.8	23133	87.25	58.23
BKHD FR 21	16.800f	89.0	92.4	1525.2	24357	87.15	59.44
FR 30	24.000f	99.8	121.7	1415.8	35062	80.90	67.18
BKHD FR 33	26.400f	102.5	128.9	1357.3	38397	77.56	68.65
BKHD FR 36	28.800f	105.2	135.8	1288.8	41584	73.65	69.69
FR 40	32.000f	115.1	144.6	1203.7	45587	68.78	70.51
BKHD FR 50	40.000f	149.2	166.3	956.7	54204	54.67	70.28
BKHD FR 51	40.800f	149.2	168.0	942.3	54966	53.85	70.59
FR 60	48.000f	159.4	178.2	787.5	61183	45.00	72.32
BKHD FR 63	50.400f	162.1	179.9	744.7	63028	42.56	74.50
BKHD FR 64	51.200f	152.6	180.3	722.7	63616	41.29	75.20
FR 70	56.000f	125.2	182.2	528.7	66725	30.21	78.87
BKHD FR 75	60.000f	112.1	183.2	269.2	68357	15.38	80.80
FR 80	64.000f	99.5	182.8	-70.7	68781	4.04	81.30
BKHD FR 90	72.000f	193.7	180.6	-390.8	66471	22.33	78.57
FR 100	80.000f	188.9	175.8	-300.6	63731	17.18	75.33
BKHD FR 105	84.000f	135.3	172.5	-389.5	62487	22.26	73.86
FR 110	88.000f	117.7	168.2	-565.5	60627	32.32	71.66
BKHD FR 117	93.600f	113.3	160.0	-861.5	56628	49.23	66.94
FR 120	96.000f	112.8	155.3	-1014.1	54383	57.95	64.28
BKHD FR 129	103.200f	113.8	134.3	-1287.4	46039	73.57	54.42
FR 130	103.200f	113.8	134.3	-1287.4	46039	73.57	54.42
FR 140	112.000f	88.6	98.2	-1524.1	33625	87.09	45.29
BKHD FR 141	112.800f	126.6	95.3	-1530.6	32406	87.46	44.42
FR 150	120.000f	121.0	76.0	-1251.1	22352	71.49	36.46
BKHD FR 153	112.400f	88.6	96.7	-1527.3	33016	87.28	44.86
FR 160	128.000f	88.0	55.1	-1048.7	13172	75.94	27.23
BKHD FR 165	132.000f	81.3	42.0	-898.1	9284	75.09	22.16
FR 170	136.000f	76.4	30.7	-708.0	6087	70.03	17.18
BKHD FR 177	141.600f	64.4	17.4	-433.0	2944	57.50	11.14
FR 180	143.400f	39.4	13.7	-366.0	2241	54.62	9.52
FR 190	149.400f	36.7	10.2	-171.7	653	43.70	4.75
FR 200	155.400f	24.2	3.9	-49.7	50	undef	undef

Longitudinal Strength At Sea Condition (stbd 0.02 deg.)



Max. Shear	-1530.6 MT	at	112.800f
Max. Bending Moment	68806 MT-m	at	63.000f (Hogging)
Max% Shear	87.46%	at	112.800f
Max% Bending Moment	81.33%	at	63.000f

**CASE 4.2 - SHIP WITH 1000 PASSENGERS -
TRAILERS ON DECKS 3, 5, 7 - CARS ON DECKS 5 AND 6
SHIP AT MID VOYAGE - START BALLASTING HEELING TANKS**



Fluid Legend

Fluid Name	Legend	Weight (MT)	Load%
BALLAST		605.62	17.13%
FRESH WATER		201.81	49.78%
DIESEL OIL		45.35	50.02%
TO		38.47	98.00%
HFO		286.91	34.73%
LUBE OIL		53.52	55.86%
MISCELLANEOUS		14.33	31.25%
LSHFO		117.28	49.69%

Floating Status

Draft FP	5.921 m	Heel	0.08p deg	GM(Solid)	2.416 m
Draft MS	6.260 m	Equil	Yes	F/S Corr.	0.302 m
Draft AP	6.598 m	Wind	Off	GM(Fluid)	2.114 m
Trim	0.68a m	Wave	No	KMT	15.405 m
LCG	67.723f m	VCG-Solid	12.989 m	TPcm	36.72
Displacement	16955.3 MT	WaterSpgr	1.025		

Draft At Draft Marks

FORE.p	5.927(m)	FORE.s	5.925(m)
MID.p	6.279(m)	MID.s	6.240(m)
AFT.p	6.574(m)	AFT.s	6.543(m)

TRIM (Referred to Draft Marks) aft 0.63/140.00a m

Fixed Weight Status

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	11 244.06	70.053f	0.000	13.381u
1) CREW	5.40	120.960f	0.000	25.540u
2) PROVISIONS	22.50	124.100f	0.000	10.110u
3) STORES INCL. SHOP STORES	45.00	98.630f	0.000	11.280u
4) 1000 PASSENGERS	100.00	74.770f	0.000	26.270u
5) TRAILERS ON DECK 3	2 000.00	64.300f	0.000	11.200u
6) TRAILERS ON DECK 5	1 200.00	49.700f	0.000	16.800u
7) CARS ON DECK 5	100.00	122.800f	0.000	15.500u
8) CARS ON CAR DECK 6	75.00	123.250f	0.000	18.470u
9) TRAILERS ON DECK 7	800.00	27.412f	0.000	22.400u
Total Fixed:	15 591.97	66.363f	0.000	13.941u

Tank Status

BALLAST

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
PFT_WB_101.C	1.025	<empty>					0.0
WB_201.C	1.025	<empty>					0.0
WB_401.C	1.025	<empty>					0.0
WB_501.C	1.025	<empty>					0.0
WB_601.C	1.025	100.00%	130.02	99.547f	0.000	0.779	0.0
WB_701.C	1.025	100.00%	138.76	89.998f	0.000	0.750	0.0
WB_1201.C	1.025	<empty>					0.0
WB_1301.C	1.025	<empty>					0.0
WB_1401.C	1.025	<empty>					0.0
WB_1511.C	1.025	<empty>					0.0
WB_311.C	1.025	<empty>					0.0
HEEL_812PS.P	1.025	51.00%	167.64	77.915f	10.823p	2.779	199.3
HEEL_812SB.S	1.025	51.00%	169.20	77.915f	10.820s	2.779	201.1
Subtotals:		17.13%	605.62	85.328f	0.027s	1.885	400.4

FRESH WATER

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
FW_1411.C	1.000	<empty>					0.0
FW_411PS.P	1.000	76.00%	99.56	116.598f	2.993p	3.731	135.5
FW_412SB.S	1.000	76.00%	102.25	116.599f	2.989s	3.731	139.2
Subtotals:		49.78%	201.81	116.598f	0.038s	3.731	274.7

DIESEL OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
DO_1001.C	0.860	45.00%	34.95	57.587f	0.028p	0.338	707.0
DO_DAY_914.S	0.860	80.00%	10.40	60.800f	4.750s	3.100	3.0
Subtotals:		50.02%	45.35	58.324f	1.068s	0.971	709.9

TO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
TO_STOR1202.P	0.861	98.00%	19.23	37.214f	2.311p	1.198	17.5
TO_DRAIN1202.S	0.861	98.00%	19.23	37.214f	2.308s	1.198	17.5
Subtotals:		98.00%	38.47	37.214f	0.001p	1.198	35.0

HFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
HFO_801.C	0.980	95.00%	182.17	77.171f	0.013p	0.713	1 745.4
HFO_811.C	0.980	<empty>					0.0
HFO_OVFL_902.C	0.980	10.00%	4.43	63.585f	0.127p	0.075	402.8
HFO_DAY_911.P	0.980	90.00%	46.47	70.800f	2.001p	3.300	33.7
HFO_SETT.P	0.980	90.00%	46.47	85.200f	3.601p	4.600	33.7
SLUDGE_913.P	0.980	50.00%	7.38	70.799f	5.600p	2.500	0.8
Subtotals:		34.73%	286.91	77.066f	1.062p	1.797	2 216.5

LUBE OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LO_1102PS.P	0.910	80.00%	10.93	46.786f	4.500p	0.672	1.3
LO_1102SB.S	0.910	80.00%	10.93	46.786f	4.500s	0.672	1.3
LO_1103PS.P	0.910	80.00%	9.77	46.867f	7.387p	0.761	1.1
LO_1103SB.S	0.910	80.00%	9.77	46.867f	7.387s	0.761	1.1
DIRTYLO_1101.P	0.910	35.00%	7.71	45.539f	0.800p	0.284	2.9
STOR_LO_1101.S	0.910	20.00%	4.41	45.493f	0.799s	0.162	2.9
Subtotals:		55.86%	53.52	46.530f	0.050p	0.607	10.7

MISCELLANEOUS

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
BILGEWT_915P.P	1.000	20.00%	3.02	70.797f	8.800p	1.890	0.8
HFODRAIN_917.P	1.000	20.00%	0.33	64.795f	5.100p	1.600	0.0
HFOSLUDGE916.S	1.000	20.00%	3.50	64.795f	0.825s	1.600	189.6
LOGEAR_1104P.C	1.000	100.00%	6.45	40.400f	0.000	1.050	0.0
FWDRAIN1104S.S	1.000	20.00%	1.04	42.769f	2.800s	0.193	0.1
Subtotals:		31.25%	14.33	53.486f	1.564p	1.312	190.7

LSHFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LSHFO_901.C	0.980	30.00%	39.83	68.357f	0.042p	0.225	1 208.5
LSHFO_DAY912.S	0.980	60.00%	30.98	70.799f	3.598s	2.700	33.7
LSHFO_SETT.S	0.980	90.00%	46.47	85.200f	1.999s	4.600	33.7
Subtotals:		49.69%	117.28	75.676f	1.728s	2.612	1 275.9

All Tanks

	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
Totals:		25.40%	1 363.29	83.274f	0.040p	2.096	5 113.8

Displacer Status

Item	Status	Spgr	Displ (MT)	LCB (m)	TCB (m)	VCB (m)	Eff /Perm
HULL	Intact	1.025	16 955.31	67.681f	0.016p	3.565	1.000
CARDECK.C	Intact	1.025	0.00	0.000	0.000	0.000	1.000
SubTotals:			16 955.31	67.681f	0.016p	3.565	

Critical points

Name	L,T,V (m)	Height (m)
(1) MES Height Limiting Point PS	47.200f, 13.850p, 5.900	-0.504
(2) MES Height Limiting Point SB	47.200f, 13.850s, 5.900	-0.466

Immersion of propeller tip 1.885 m

Current Rolling Period is : 15.15 second

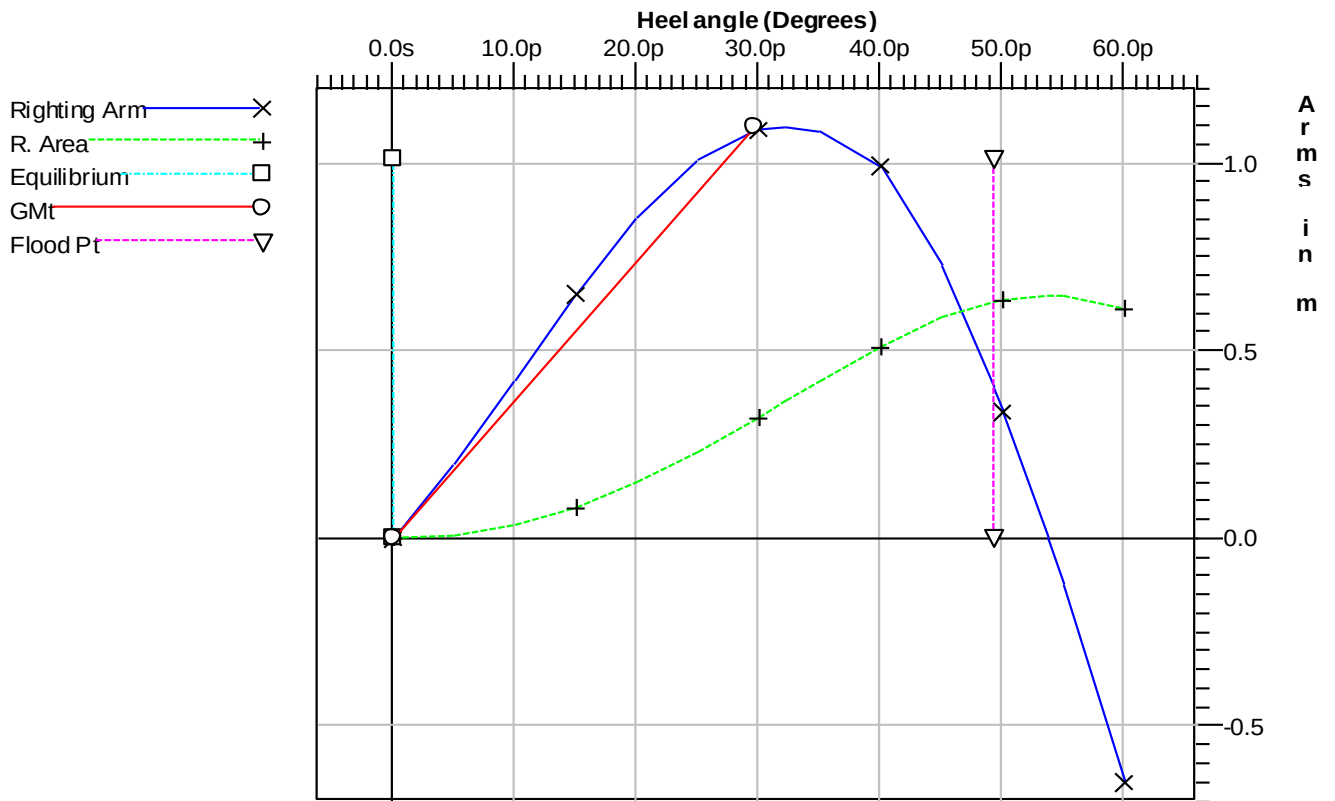
Righting Arms vs. Heel - IMO RES. A.749 (18)

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Righting Arm (m)	Area (m-Rad)	Flood Pt Height (m)	Notes
0.08p	0.26a	6.598	0.000	0.000	11.473 (1)	Equil
5.08p	0.24a	6.524	0.200	0.009	10.318 (1)	
10.08p	0.18a	6.315	0.427	0.036	9.171 (1)	
15.08p	0.13a	6.021	0.651	0.083	7.990 (1)	
20.08p	0.08a	5.641	0.858	0.149	6.789 (1)	
25.08p	0.02a	5.159	1.013	0.231	5.596 (1)	
30.08p	0.03f	4.565	1.091	0.323	4.432 (1)	
32.28p	0.05f	4.268	1.097	0.365	3.934 (1)	MaxRa
35.08p	0.08f	3.859	1.088	0.419	3.313 (1)	
40.08p	0.13f	3.067	0.993	0.510	2.224 (1)	
45.08p	0.17f	2.258	0.727	0.587	1.034 (3)	
49.34p	0.21f	1.567	0.403	0.629	0.000 (3)	FldPt
50.08p	0.22f	1.447	0.340	0.634	-0.179 (3)	
53.79p	0.25f	0.845	0.000	0.645	-1.084 (3)	RaZero
55.08p	0.26f	0.636	-0.126	0.644	-1.399 (3)	
60.08p	0.30f	-0.178	-0.646	0.610	-2.617 (3)	

Unprotected Flood Points

Name	L,T,V (m)	Height (m)
(1) Aft Ventilation Opening PS	2.150a, 13.300p, 18.100	11.473
(3) Fwd Ventilation Opening PS	139.200f, 12.800p, 18.100	1.034

Righting Arms vs. Heel - IMO RES. A.749 (18)



IMO RES. A.749 (18)

Limit	Min/Max	Actual	Margin	Pass
(1) GM at Equilibrium	>0.150 m	2.114	1.964	Yes
(2) Area from 0.00 deg to 30.00	>0.0550 m-R	0.323	0.268	Yes
(3) Area from 0.00 deg to 40.00 or Flood	>0.0900 m-R	0.510	0.420	Yes
(4) Area from 30.00 deg to 40.00 or Flood	>0.0300 m-R	0.187	0.157	Yes
(5) Righting Arm at 30.00 deg	>0.200 m	1.091	0.891	Yes
(6) Angle from 0.00 deg to MaxRA	>25.00 deg	32.20	7.20	Yes

Current VCG Fluid 13.291 m < Max Allowable VCG 13.354 m - PASS

MAXIMUM TURNING ANGLE VERIFICATION

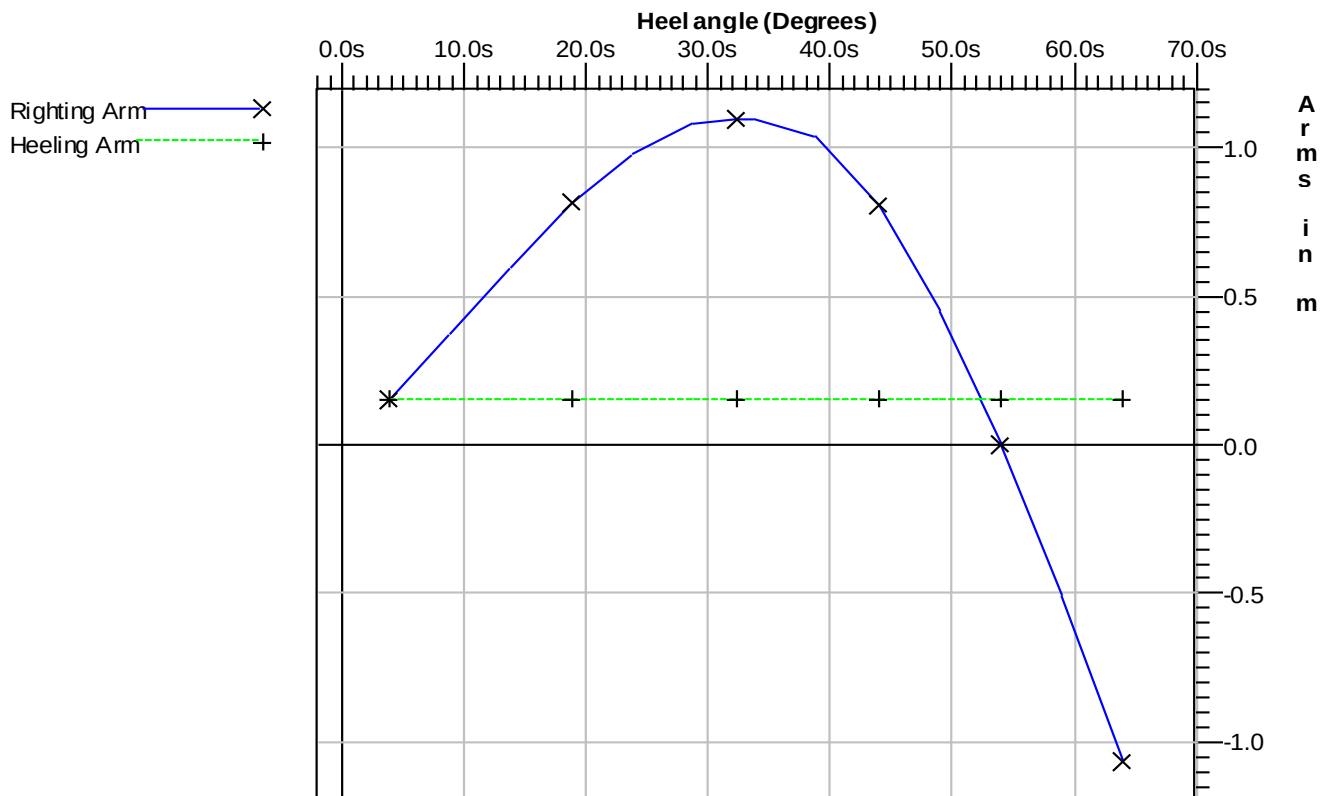
Cruising speed 21.15 knots

MOMENT DUE TO MAXIMUM TURNING ANGLE 2566.253 tm

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)
3.82s	0.25a	6.557	0.001
8.82s	0.20a	6.376	0.224
13.82s	0.14a	6.103	0.450
18.82s	0.09a	5.746	0.664
23.82s	0.04a	5.291	0.834
28.82s	0.02f	4.726	0.933
32.22s	0.05f	4.276	0.951
33.82s	0.07f	4.047	0.948
38.82s	0.11f	3.270	0.887
43.82s	0.16f	2.463	0.660
48.82s	0.21f	1.652	0.299
52.23s	0.24f	1.099	0.000
53.82s	0.25f	0.841	-0.150
58.82s	0.29f	0.029	-0.659
63.82s	0.33f	-0.794	-1.215

Righting Arms vs. Heel - IMO RES. A.749 (18)



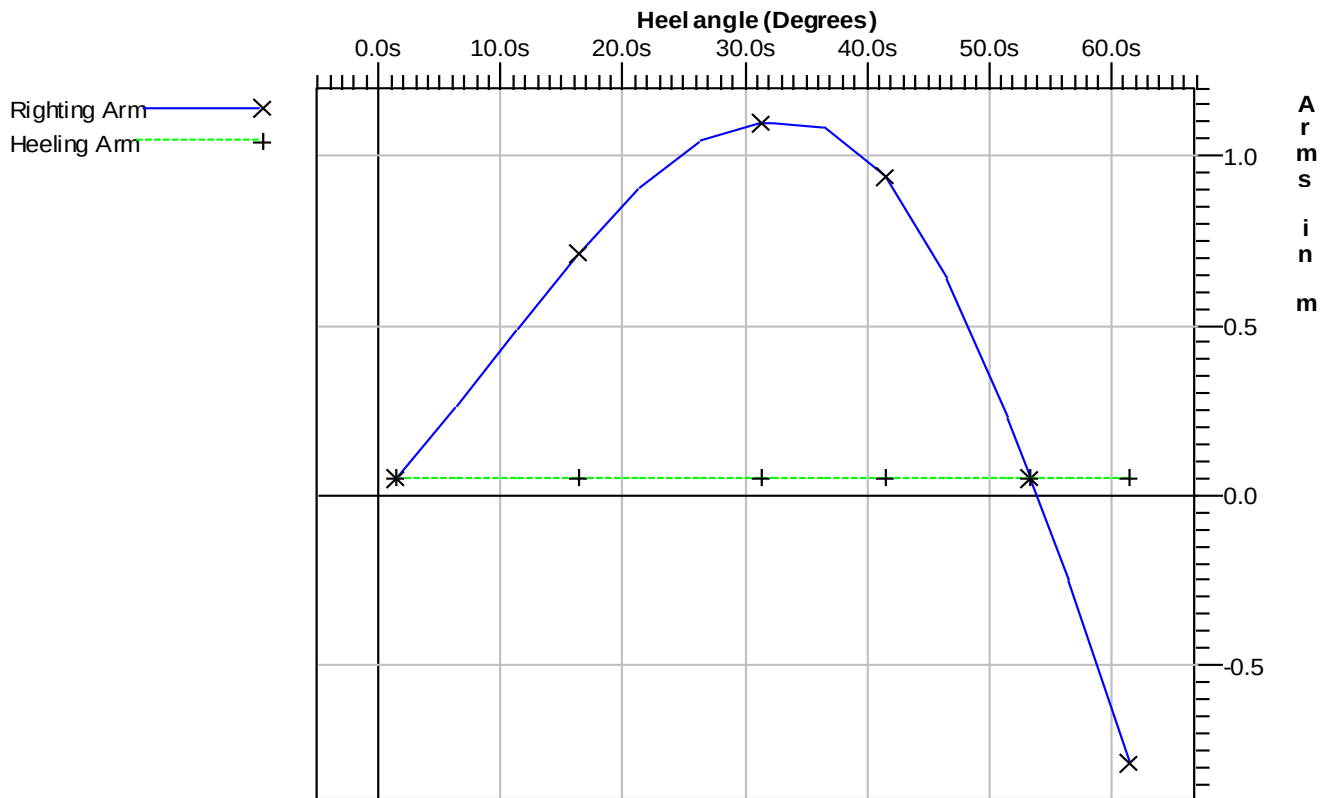
HEELING ANGLE DUE TO TURNING 3.82s deg

1000 PASSENGERS CROWDING VERIFICATION

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)
1.38s	0.26a	6.593	0.000
6.38s	0.23a	6.480	0.210
11.38s	0.17a	6.246	0.437
16.38s	0.11a	5.932	0.660
21.38s	0.06a	5.527	0.856
26.38s	0.01a	5.016	0.993
31.38s	0.04f	4.392	1.047
32.18s	0.05f	4.282	1.048
36.38s	0.09f	3.658	1.030
41.38s	0.14f	2.857	0.888
46.38s	0.19f	2.048	0.586
51.38s	0.23f	1.236	0.175
53.26s	0.24f	0.930	0.000
56.38s	0.27f	0.426	-0.307
61.38s	0.31f	-0.391	-0.841

Righting Arms vs. Heel - IMO RES. A.749 (18)



HEELING ANGLE DUE TO PASSENGERS CROWDING 1.38s deg

IMO Res. A.749 (18), SEVERE WIND AND ROLLING CRITERION (WEATHER CRITERION)

Wind speed 53.4 kn

Wind pressure 504 N /m²Under Water Lateral Plane 966.788 m²Above Water Lateral Plane 3535.386 m²

Under Water Lateral Plane Centroid 3.084 m below water line

Above Water Lateral Plane Centroid 11.589 m above water line

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)	Area (m-Rad)	Flood Pt Height (m)	Notes
17.03p	0.11a	5.884	-0.971	0.000	7.522 (1)	Roll
12.03p	0.16a	6.210	-0.750	-0.075	8.713 (1)	
7.03p	0.22a	6.454	-0.523	-0.131	9.873 (1)	
2.03p	0.26a	6.587	-0.309	-0.167	11.020 (1)	
2.97s	0.25a	6.574	-0.117	-0.185	10.804 (2)	
5.72s	0.23a	6.504	0.000	-0.188	10.172 (2)	Equil
7.97s	0.21a	6.415	0.102	-0.186	9.659 (2)	
12.97s	0.15a	6.155	0.328	-0.167	8.493 (2)	
17.97s	0.10a	5.814	0.546	-0.129	7.298 (2)	
22.97s	0.05a	5.376	0.726	-0.073	6.098 (2)	
27.97s	0.01f	4.830	0.840	-0.005	4.919 (2)	
32.17s	0.05f	4.283	0.868	0.058	3.960 (2)	MaxRa
32.97s	0.06f	4.170	0.867	0.070	3.780 (2)	
37.97s	0.11f	3.406	0.825	0.145	2.686 (2)	
42.97s	0.16f	2.600	0.626	0.209	1.543 (4)	
47.97s	0.20f	1.790	0.284	0.250	0.335 (4)	
49.34s	0.21f	1.567	0.172	0.256	0.000 (4)	FldPt
50.00s	0.22f	1.460	0.116	0.257	-0.160 (4)	
51.32s	0.23f	1.246	0.000	0.259	-0.481 (4)	RaZero
55.00s	0.26f	0.649	-0.349	0.248	-1.379 (4)	

Note:

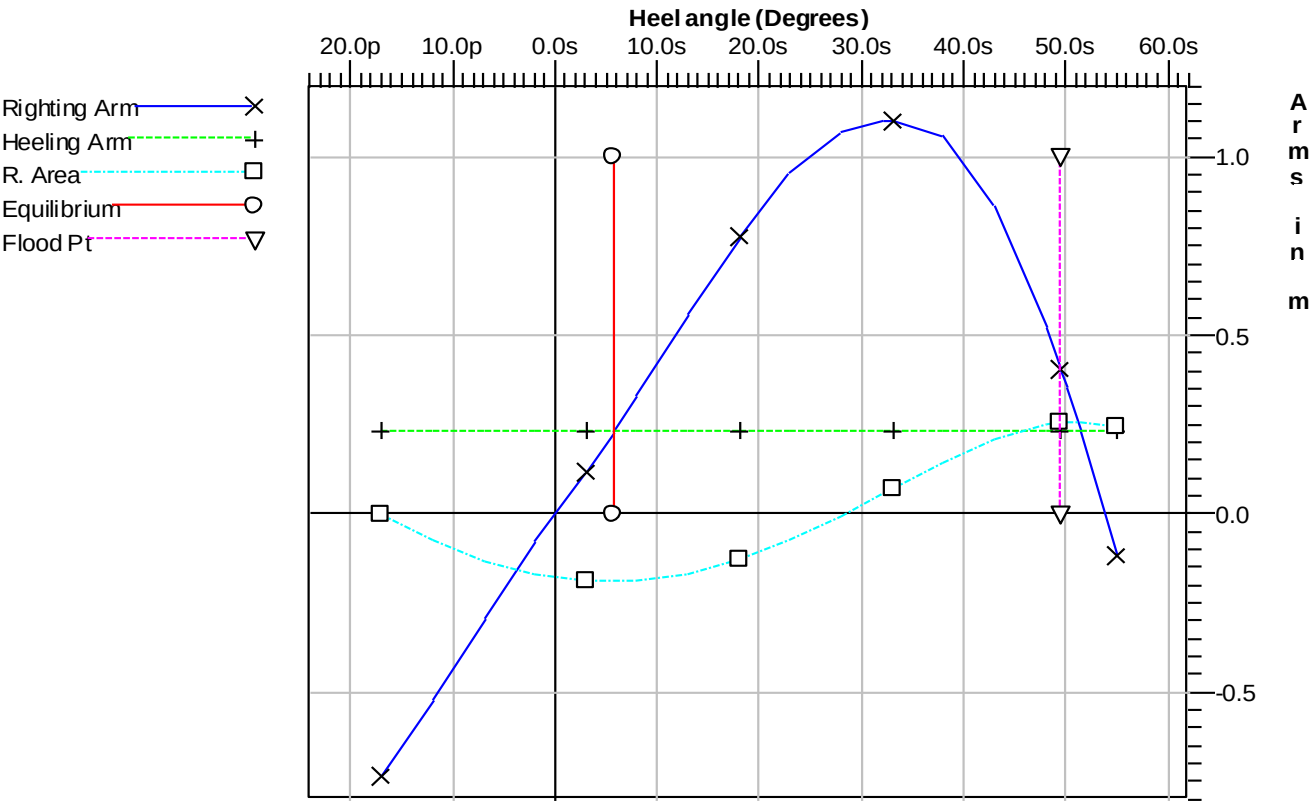
Roll angle is 20.97

Equilibrium for load condition without gust is 3.94s

Unprotected Flood Points

Name	L,T,V (m)	Height (m)
(1) Aft Ventilation Opening PS	2.150a, 13.300p, 18.100	7.522
(2) Aft Ventilation Opening SB	2.150a, 13.300s, 18.100	10.804
(4) Fwd Ventilation Opening SB	139.200f, 12.800s, 18.100	1.543

Righting Arms vs. Heel - IMO SEVERE WIND & ROLLING



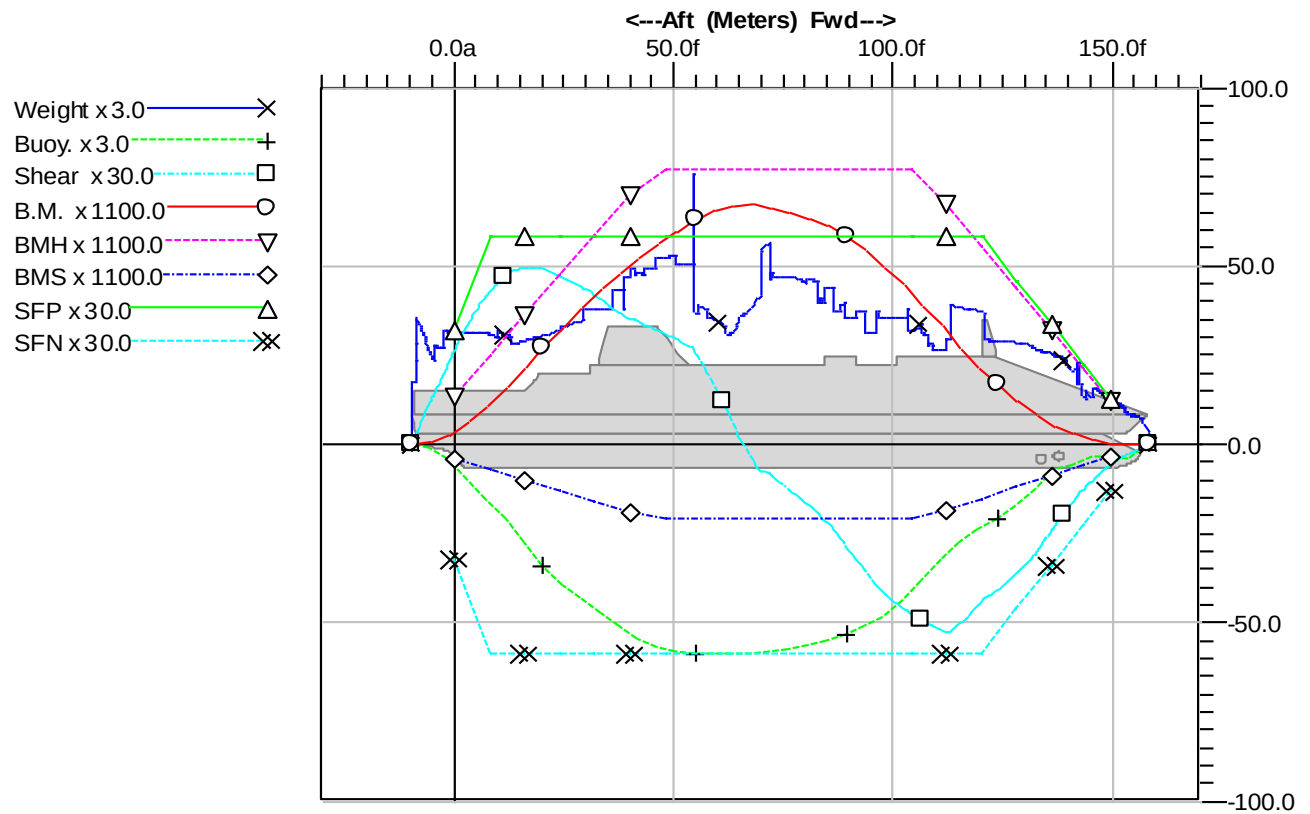
IMO SEVERE WIND & ROLLING

Limit	Min/Max	Actual	Margin	Pass
(1) Res. Ratio from Roll to Abs 50.00 deg or Flood	>1.000	2.358	1.358	Yes

LONGITUDINAL STRENGTH

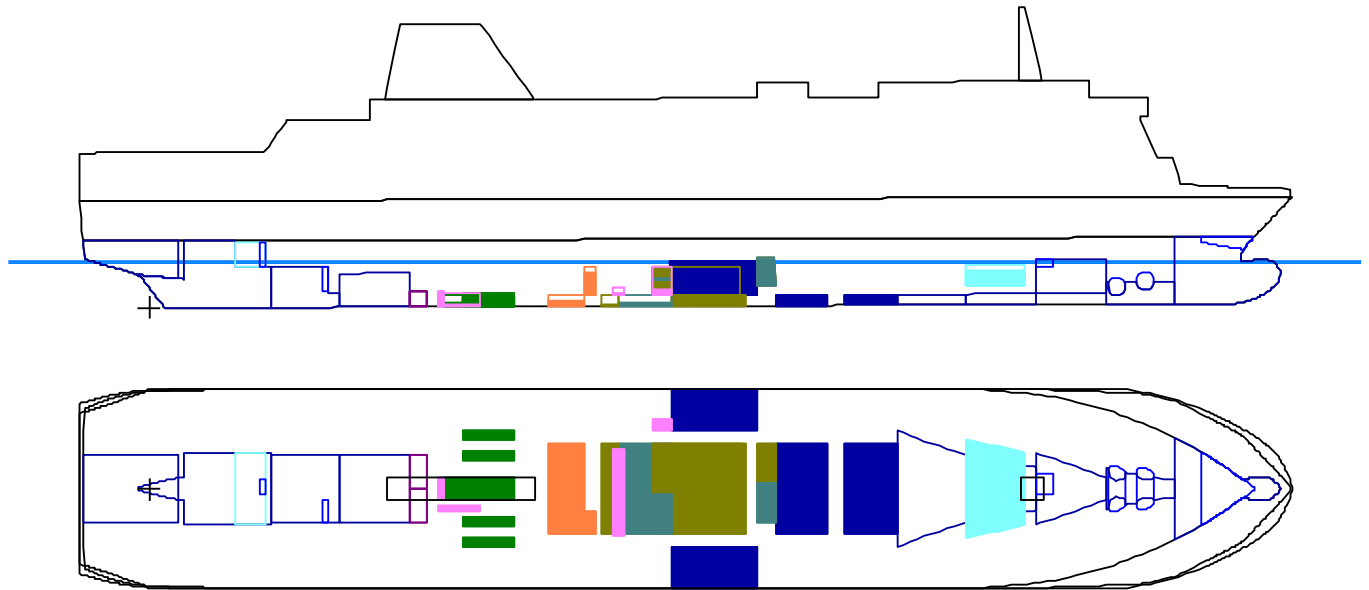
Frame No.	Location (m)	Weight (MT/m)	Buoyancy (MT/m)	Shear (MT)	Bending (MT-m)	Shear (%/Max)	Bending (%/Max)
FR -10	8.000a	100.0	0.0	144.2	129	undef	undef
FR 0	0.000	95.0	16.1	791.4	3950	81.42	26.69
BKHD FR 6	4.800f	94.9	36.5	1118.5	8596	77.74	38.58
FR 10	8.000f	93.3	48.8	1284.9	12467	73.43	45.73
FR 20	16.000f	88.1	82.9	1485.6	23812	84.89	59.94
BKHD FR 21	16.800f	89.0	86.6	1488.6	25005	85.06	61.02
FR 30	24.000f	99.8	115.7	1422.2	35607	81.27	68.22
BKHD FR 33	26.400f	102.5	122.8	1378.4	38978	78.76	69.69
BKHD FR 36	28.800f	105.2	129.7	1324.5	42235	75.69	70.78
FR 40	32.000f	115.1	138.4	1259.2	46386	71.95	71.74
BKHD FR 50	40.000f	149.3	160.0	1062.2	55653	60.70	72.16
BKHD FR 51	40.800f	149.3	161.7	1052.9	56502	60.17	72.56
FR 60	48.000f	156.9	171.8	929.5	63643	53.11	75.23
BKHD FR 63	50.400f	159.6	173.4	896.1	65843	51.21	77.83
BKHD FR 64	51.200f	152.6	173.9	879.2	66555	50.24	78.67
FR 70	56.000f	116.6	175.7	709.6	70491	40.55	83.32
BKHD FR 75	60.000f	103.5	176.5	442.2	72835	25.27	86.09
FR 80	64.000f	100.7	176.2	126.5	74000	7.23	87.47
BKHD FR 90	72.000f	144.7	173.9	-244.5	73158	13.97	86.48
FR 100	80.000f	139.8	168.9	-492.1	70242	28.12	83.03
BKHD FR 105	84.000f	131.9	165.5	-632.9	68041	36.16	80.43
FR 110	88.000f	117.7	161.2	-789.2	65244	45.10	77.12
BKHD FR 117	93.600f	113.3	152.8	-1045.5	60109	59.74	71.05
FR 120	96.000f	112.8	148.2	-1181.0	57445	67.49	67.90
BKHD FR 129	103.200f	113.8	127.1	-1402.6	48091	80.15	56.85
FR 130	103.200f	113.8	127.1	-1402.6	48091	80.15	56.85
FR 140	112.000f	88.6	91.9	-1579.7	34940	90.27	47.06
BKHD FR 141	112.800f	117.7	89.0	-1581.2	33679	90.35	46.17
FR 150	120.000f	112.2	70.4	-1321.8	23200	75.53	37.84
BKHD FR 153	112.400f	88.6	90.5	-1580.4	34310	90.31	46.62
FR 160	128.000f	86.5	50.5	-1095.9	13541	79.36	28.00
BKHD FR 165	132.000f	81.3	38.1	-933.5	9490	78.06	22.65
FR 170	136.000f	76.4	27.7	-729.9	6183	72.19	17.45
BKHD FR 177	141.600f	64.4	15.6	-441.6	2964	58.65	11.21
FR 180	143.400f	39.4	12.4	-371.9	2249	55.51	9.55
FR 190	149.400f	36.7	9.7	-172.8	648	43.97	4.71
FR 200	155.400f	24.2	3.9	-49.7	47	undef	undef

Longitudinal Strength At Sea Condition (port 0.08 deg.)



Max. Shear	-1581.2 MT	at	112.800f
Max. Bending Moment	74119 MT-m	at	66.000f (Hogging)
Max% Shear	90.35%	at	112.800f
Max% Bending Moment	87.61%	at	66.000f

**CASE 4.3 - SHIP WITH 1000 PASSENGERS -
TRAILERS ON DECKS 3, 5, 7 - CARS ON DECKS 5 AND 6
SHIP AT MID VOYAGE - END BALLASTING HEELING TANKS**



Fluid Legend

Fluid Name	Legend	Weight (MT)	Load%
BALLAST		916.04	25.91%
FRESH WATER		201.81	49.78%
DIESEL OIL		45.35	50.02%
TO		38.47	98.00%
HFO		286.91	34.73%
LUBE OIL		53.52	55.86%
MISCELLANEOUS		14.33	31.25%
LSHFO		117.28	49.69%

Floating Status

Draft FP	6.066 m	Heel	0.05p deg	GM(Solid)	2.490 m
Draft MS	6.351 m	Equil	Yes	F/S Corr.	0.296 m
Draft AP	6.636 m	Wind	Off	GM(Fluid)	2.194 m
Trim	0.57a m	Wave	No	KMT	15.337 m
LCG	67.908f m	VCG-Solid	12.847 m	TPcm	36.91
Displacement	17265.7 MT	WaterSpgr	1.025		

Draft At Draft Marks

FORE.p	6.071(m)	FORE.s	6.069(m)
MID.p	6.363(m)	MID.s	6.339(m)
AFT.p	6.612(m)	AFT.s	6.593(m)

TRIM (Referred to Draft Marks) aft 0.53/140.00a m

Fixed Weight Status

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	11 244.06	70.053f	0.000	13.381u
1) CREW	5.40	120.960f	0.000	25.540u
2) PROVISIONS	22.50	124.100f	0.000	10.110u
3) STORES INCL. SHOP STORES	45.00	98.630f	0.000	11.280u
4) 1000 PASSENGERS	100.00	74.770f	0.000	26.270u
5) TRAILERS ON DECK 3	2 000.00	64.300f	0.000	11.200u
6) TRAILERS ON DECK 5	1 200.00	49.700f	0.000	16.800u
7) CARS ON DECK 5	100.00	122.800f	0.000	15.500u
8) CARS ON CAR DECK 6	75.00	123.250f	0.000	18.470u
9) TRAILERS ON DECK 7	800.00	27.412f	0.000	22.400u
Total Fixed:	15 591.97	66.363f	0.000	13.941u

Tank Status

BALLAST

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
PFT_WB_101.C	1.025	<empty>					0.0
WB_201.C	1.025	<empty>					0.0
WB_401.C	1.025	<empty>					0.0
WB_501.C	1.025	<empty>					0.0
WB_601.C	1.025	100.00%	130.02	99.547f	0.000	0.779	0.0
WB_701.C	1.025	100.00%	138.76	89.998f	0.000	0.750	0.0
WB_1201.C	1.025	<empty>					0.0
WB_1301.C	1.025	<empty>					0.0
WB_1401.C	1.025	<empty>					0.0
WB_1511.C	1.025	<empty>					0.0
WB_311.C	1.025	<empty>					0.0
HEEL_812PS.P	1.025	98.00%	322.14	77.958f	10.872p	3.892	199.3
HEEL_812SB.S	1.025	98.00%	325.12	77.958f	10.871s	3.892	201.1
Subtotals:		25.91%	916.04	82.846f	0.035s	2.974	400.4

FRESH WATER

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
FW_1411.C	1.000	<empty>					0.0
FW_411PS.P	1.000	76.00%	99.56	116.600f	2.992p	3.731	135.5
FW_412SB.S	1.000	76.00%	102.25	116.600f	2.989s	3.731	139.2
Subtotals:		49.78%	201.81	116.600f	0.039s	3.731	274.7

DIESEL OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
DO_1001.C	0.860	45.00%	34.95	57.589f	0.018p	0.338	707.0
DO_DAY_914.S	0.860	80.00%	10.40	60.800f	4.750s	3.100	3.0
Subtotals:		50.02%	45.35	58.326f	1.076s	0.971	709.9

TO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
TO_STOR1202.P	0.861	98.00%	19.23	37.214f	2.310p	1.198	17.5
TO_DRAIN1202.S	0.861	98.00%	19.23	37.214f	2.309s	1.198	17.5
Subtotals:		98.00%	38.47	37.214f	0.000	1.198	35.0

HFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
HFO_801.C	0.980	95.00%	182.17	77.176f	0.008p	0.713	1 745.4
HFO_811.C	0.980	<empty>					0.0
HFO_OVFL_902.C	0.980	10.00%	4.43	63.588f	0.080p	0.075	402.8
HFO_DAY_911.P	0.980	90.00%	46.47	70.800f	2.001p	3.300	33.7
HFO_SETT.P	0.980	90.00%	46.47	85.200f	3.601p	4.600	33.7
SLUDGE_913.P	0.980	50.00%	7.38	70.799f	5.600p	2.500	0.8
Subtotals:		34.73%	286.91	77.069f	1.058p	1.797	2 216.5

LUBE OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LO_1102PS.P	0.910	80.00%	10.93	46.789f	4.500p	0.672	1.3
LO_1102SB.S	0.910	80.00%	10.93	46.789f	4.500s	0.672	1.3
LO_1103PS.P	0.910	80.00%	9.77	46.869f	7.387p	0.761	1.1
LO_1103SB.S	0.910	80.00%	9.77	46.869f	7.387s	0.761	1.1
DIRTYLO_1101.P	0.910	35.00%	7.71	45.548f	0.800p	0.284	2.9
STOR_LO_1101.S	0.910	20.00%	4.41	45.510f	0.799s	0.162	2.9
Subtotals:		55.86%	53.52	46.534f	0.050p	0.607	10.7

MISCELLANEOUS

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
BILGEWT_915P.P	1.000	20.00%	3.02	70.798f	8.800p	1.890	0.8
HFODRAIN_917.P	1.000	20.00%	0.33	64.796f	5.100p	1.600	0.0
HFOSLUDGE916.S	1.000	20.00%	3.50	64.796f	0.853s	1.600	189.6
LOGEAR_1104P.C	1.000	100.00%	6.45	40.400f	0.000	1.050	0.0
FWDRAIN1104S.S	1.000	20.00%	1.04	42.774f	2.800s	0.193	0.1
Subtotals:		31.25%	14.33	53.486f	1.557p	1.312	190.7

LSHFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LSHFO_901.C	0.980	30.00%	39.83	68.364f	0.027p	0.225	1 208.5
LSHFO_DAY912.S	0.980	60.00%	30.98	70.799f	3.599s	2.700	33.7
LSHFO_SETT.S	0.980	90.00%	46.47	85.200f	1.999s	4.600	33.7
Subtotals:		49.69%	117.28	75.678f	1.734s	2.612	1 275.9

All Tanks

	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
Totals:		31.18%	1 673.71	82.298f	0.022p	2.653	5 113.8

Displacer Status

Item	Status	Spgr	Displ (MT)	LCB (m)	TCB (m)	VCB (m)	Eff /Perm
HULL	Intact	1.025	17 265.69	67.873f	0.010p	3.614	1.000
CARDECK.C	Intact	1.025	0.00	0.000	0.000	0.000	1.000
SubTotals:			17 265.69	67.873f	0.010p	3.614	

Critical points

Name	L,T,V (m)	Height (m)
(1) MES Height Limiting Point PS	47.200f, 13.850p, 5.900	-0.569
(2) MES Height Limiting Point SB	47.200f, 13.850s, 5.900	-0.544

Immersion of propeller tip 1.925 m

Current Rolling Period is : 14.79 second

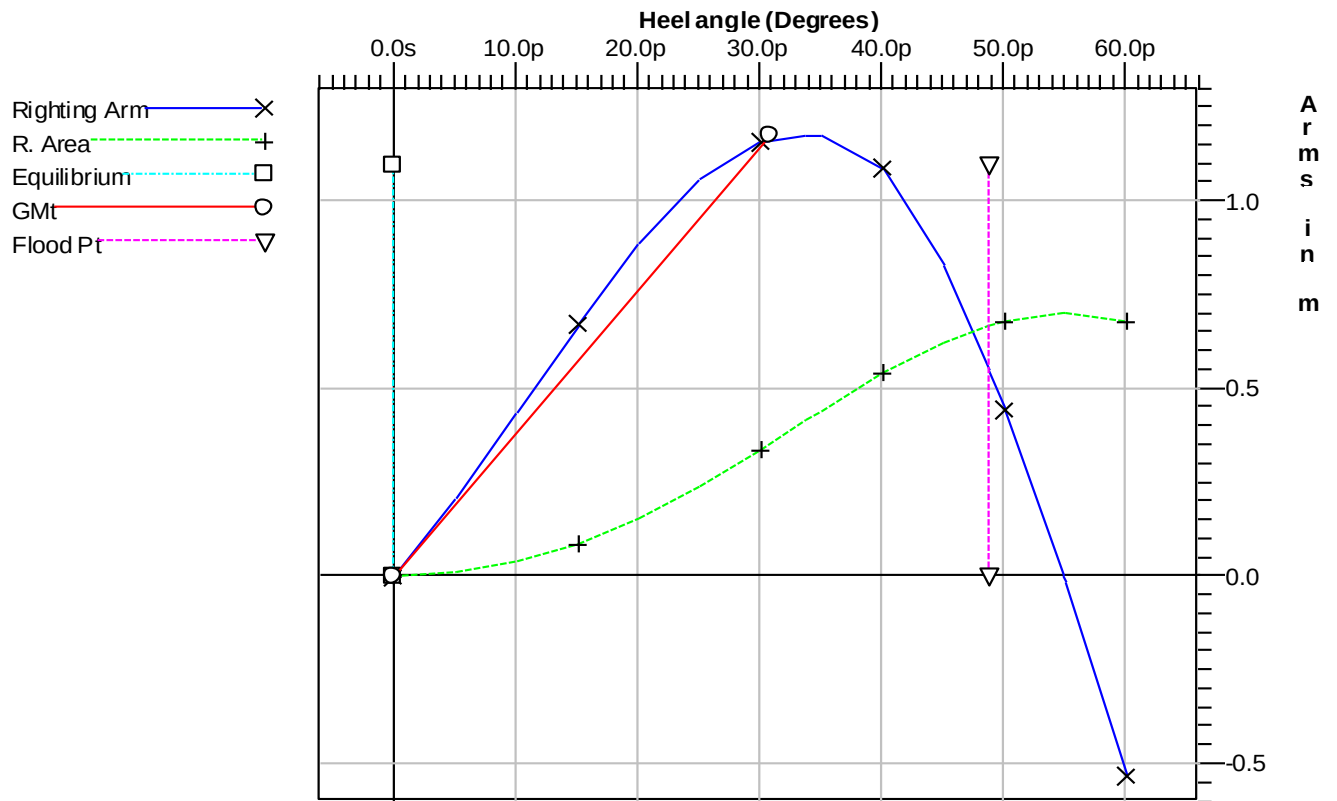
Righting Arms vs. Heel - IMO RES. A.749 (18)

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Righting Arm (m)	Area (m-Rad)	Flood Pt Height (m)	Notes
0.05p	0.22a	6.636	0.000	0.000	11.444 (1)	Equil
5.05p	0.20a	6.562	0.208	0.009	10.289 (1)	
10.05p	0.14a	6.355	0.441	0.037	9.141 (1)	
15.05p	0.09a	6.065	0.674	0.086	7.957 (1)	
20.05p	0.04a	5.689	0.892	0.154	6.753 (1)	
25.05p	0.01f	5.212	1.061	0.240	5.555 (1)	
30.05p	0.06f	4.622	1.157	0.337	4.387 (1)	
33.85p	0.09f	4.098	1.176	0.415	3.529 (1)	MaxRa
35.05p	0.10f	3.919	1.175	0.439	3.264 (1)	
40.05p	0.15f	3.132	1.086	0.539	2.114 (3)	
45.05p	0.20f	2.331	0.825	0.623	0.910 (3)	
48.79p	0.23f	1.731	0.549	0.669	0.000 (3)	FldPt
50.05p	0.24f	1.527	0.444	0.680	-0.309 (3)	
54.89p	0.28f	0.748	0.000	0.699	-1.494 (3)	RaZero
55.05p	0.28f	0.723	-0.016	0.699	-1.532 (3)	
60.05p	0.32f	-0.084	-0.530	0.676	-2.755 (3)	

Unprotected Flood Points

Name	L,T,V (m)	Height (m)
(1) Aft Ventilation Opening PS	2.150a, 13.300p, 18.100	11.444
(3) Fwd Ventilation Opening PS	139.200f, 12.800p, 18.100	2.114

Righting Arms vs. Heel - IMO RES. A.749 (18)



IMO RES. A.749 (18)

Limit	Min/Max	Actual	Margin	Pass
(1) GM at Equilibrium	>0.150 m	2.194	2.044	Yes
(2) Area from 0.00 deg to 30.00	>0.0550 m-R	0.337	0.282	Yes
(3) Area from 0.00 deg to 40.00 or Flood	>0.0900 m-R	0.539	0.449	Yes
(4) Area from 30.00 deg to 40.00 or Flood	>0.0300 m-R	0.202	0.172	Yes
(5) Righting Arm at 30.00 deg	>0.200 m	1.157	0.957	Yes
(6) Angle from 0.00 deg to MaxRA	>25.00 deg	33.80	8.80	Yes

Current VCG Fluid 13.143 m < Max Allowable VCG 13.238 m - PASS

MAXIMUM TURNING ANGLE VERIFICATION

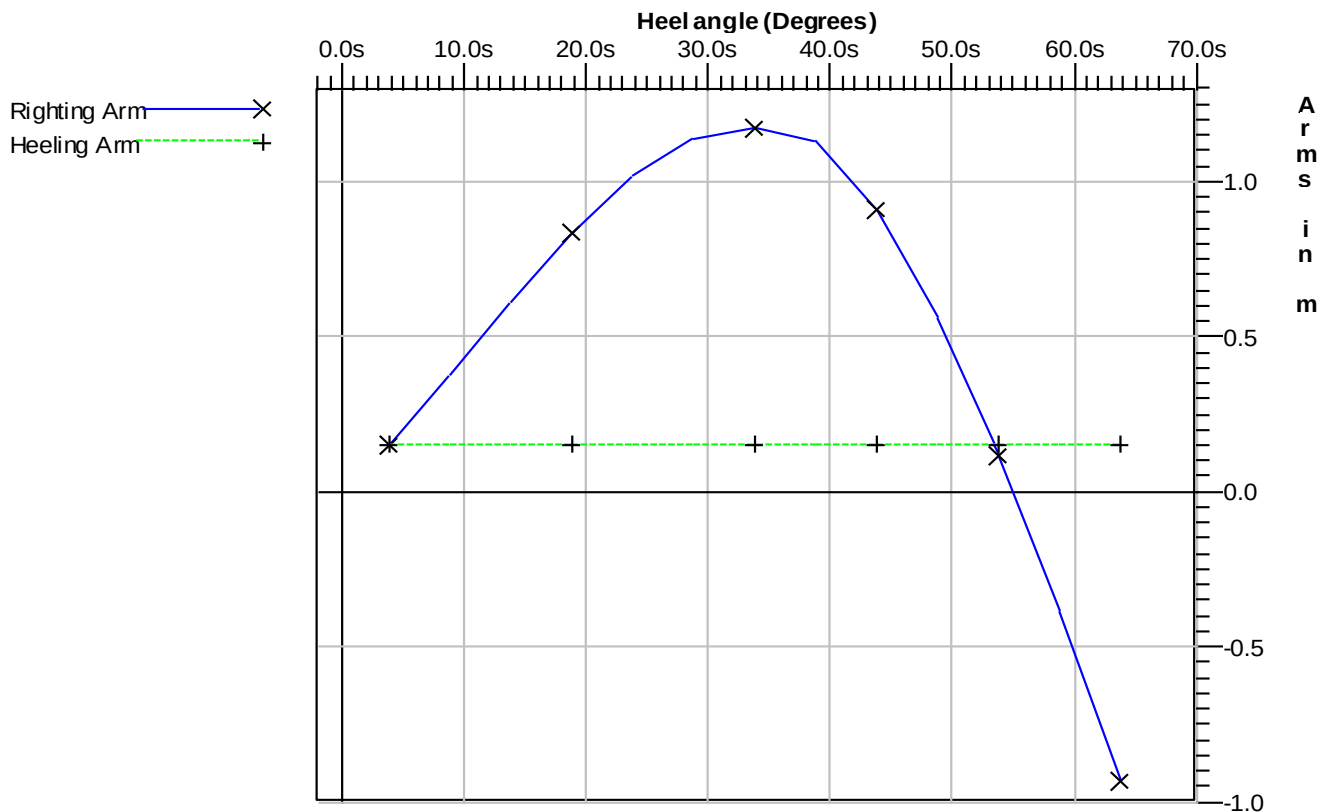
Cruising speed 21.15 knots

MOMENT DUE TO MAXIMUM TURNING ANGLE 2602.114 tm

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)
3.69s	0.21a	6.597	0.001
8.69s	0.16a	6.420	0.231
13.69s	0.10a	6.152	0.464
18.69s	0.05a	5.801	0.689
23.69s	0.01a	5.352	0.874
28.69s	0.04f	4.794	0.993
33.69s	0.09f	4.121	1.028
33.89s	0.09f	4.092	1.028
38.69s	0.14f	3.349	0.982
43.69s	0.19f	2.550	0.762
48.69s	0.23f	1.746	0.409
53.34s	0.27f	0.998	0.000
53.69s	0.27f	0.941	-0.033
58.69s	0.31f	0.137	-0.535
63.69s	0.36f	-0.680	-1.082

Righting Arms vs. Heel - IMO RES. A.749 (18)



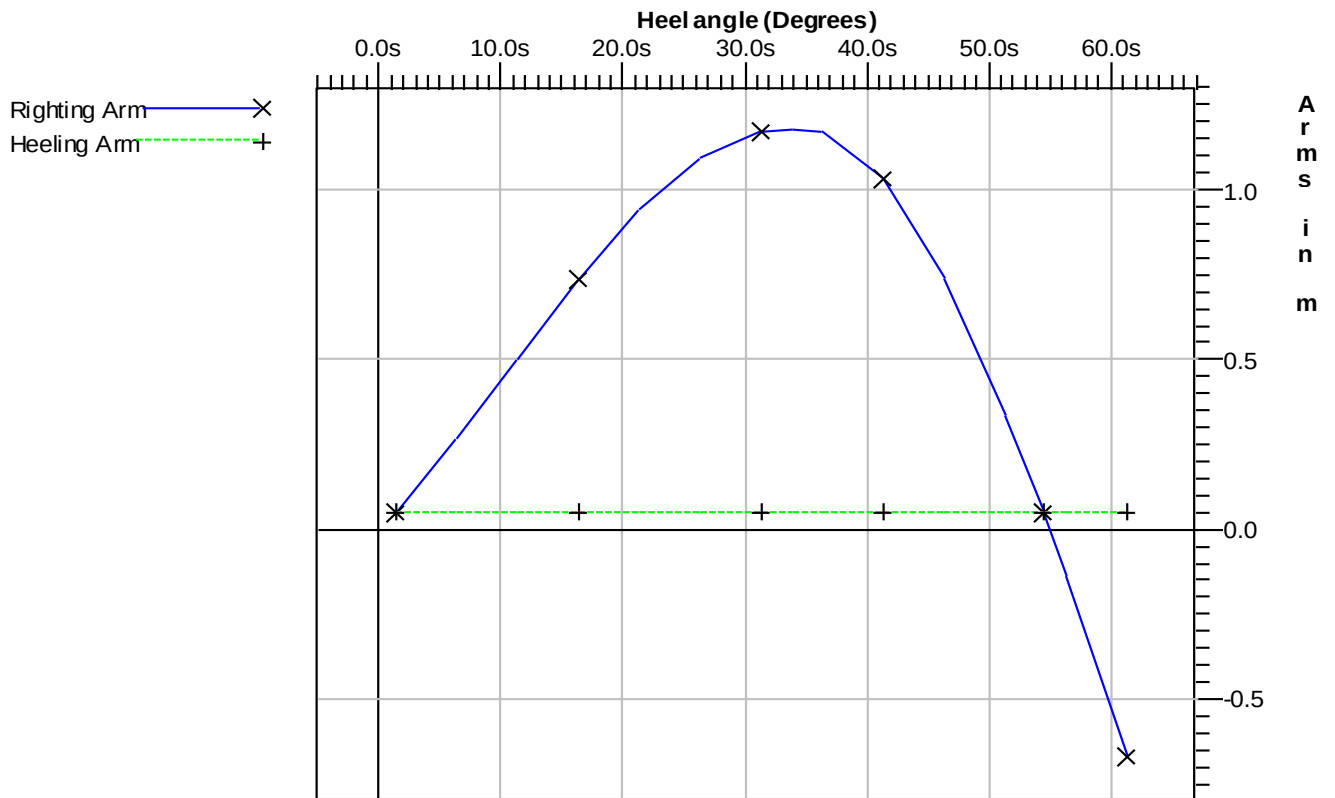
HEELING ANGLE DUE TO TURNING 3.69s deg

1000 PASSENGERS CROWDING VERIFICATION

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)
1.33s	0.22a	6.631	0.000
6.33s	0.18a	6.519	0.217
11.33s	0.13a	6.289	0.452
16.33s	0.08a	5.977	0.683
21.33s	0.03a	5.577	0.891
26.33s	0.02f	5.072	1.044
31.33s	0.07f	4.453	1.118
33.93s	0.09f	4.086	1.126
36.33s	0.12f	3.722	1.120
41.33s	0.17f	2.928	0.984
46.33s	0.21f	2.126	0.687
51.33s	0.25f	1.322	0.282
54.36s	0.28f	0.834	0.000
56.33s	0.29f	0.517	-0.194
61.33s	0.33f	-0.292	-0.720

Righting Arms vs. Heel - IMO RES. A.749 (18)



HEELING ANGLE DUE TO PASSENGERS CROWDING 1.33s deg

IMO Res. A.749 (18), SEVERE WIND AND ROLLING CRITERION (WEATHER CRITERION)

Wind speed 53.4 kn

Wind pressure 504 N /m²Under Water Lateral Plane 981.186 m²Above Water Lateral Plane 3515.693 m²

Under Water Lateral Plane Centroid 3.128 m below water line

Above Water Lateral Plane Centroid 11.552 m above water line

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)	Area (m-Rad)	Flood Pt Height (m)	Notes
17.41p	0.07a	5.899	-1.010	0.000	7.391 (1)	Roll
12.41p	0.12a	6.228	-0.781	-0.078	8.587 (1)	
7.41p	0.17a	6.476	-0.547	-0.136	9.752 (1)	
2.41p	0.21a	6.620	-0.323	-0.174	10.898 (1)	
2.59s	0.21a	6.617	-0.124	-0.193	10.854 (2)	
5.45s	0.19a	6.549	0.000	-0.196	10.200 (2)	Equil
7.59s	0.17a	6.468	0.101	-0.194	9.709 (2)	
12.59s	0.12a	6.217	0.335	-0.176	8.542 (2)	
17.59s	0.07a	5.885	0.563	-0.136	7.345 (2)	
22.59s	0.02a	5.460	0.760	-0.078	6.141 (2)	
27.59s	0.03f	4.926	0.895	-0.006	4.955 (2)	
32.59s	0.08f	4.278	0.948	0.075	3.810 (2)	
33.99s	0.09f	4.076	0.950	0.098	3.497 (2)	MaxRa
37.59s	0.13f	3.523	0.928	0.158	2.698 (4)	
42.59s	0.18f	2.726	0.745	0.232	1.504 (4)	
47.59s	0.22f	1.922	0.417	0.283	0.291 (4)	
48.79s	0.23f	1.731	0.322	0.291	0.000 (4)	FldPt
50.00s	0.24f	1.535	0.222	0.297	-0.296 (4)	
52.50s	0.26f	1.134	0.000	0.302	-0.906 (4)	RaZero
55.00s	0.28f	0.731	-0.238	0.297	-1.520 (4)	

Note:

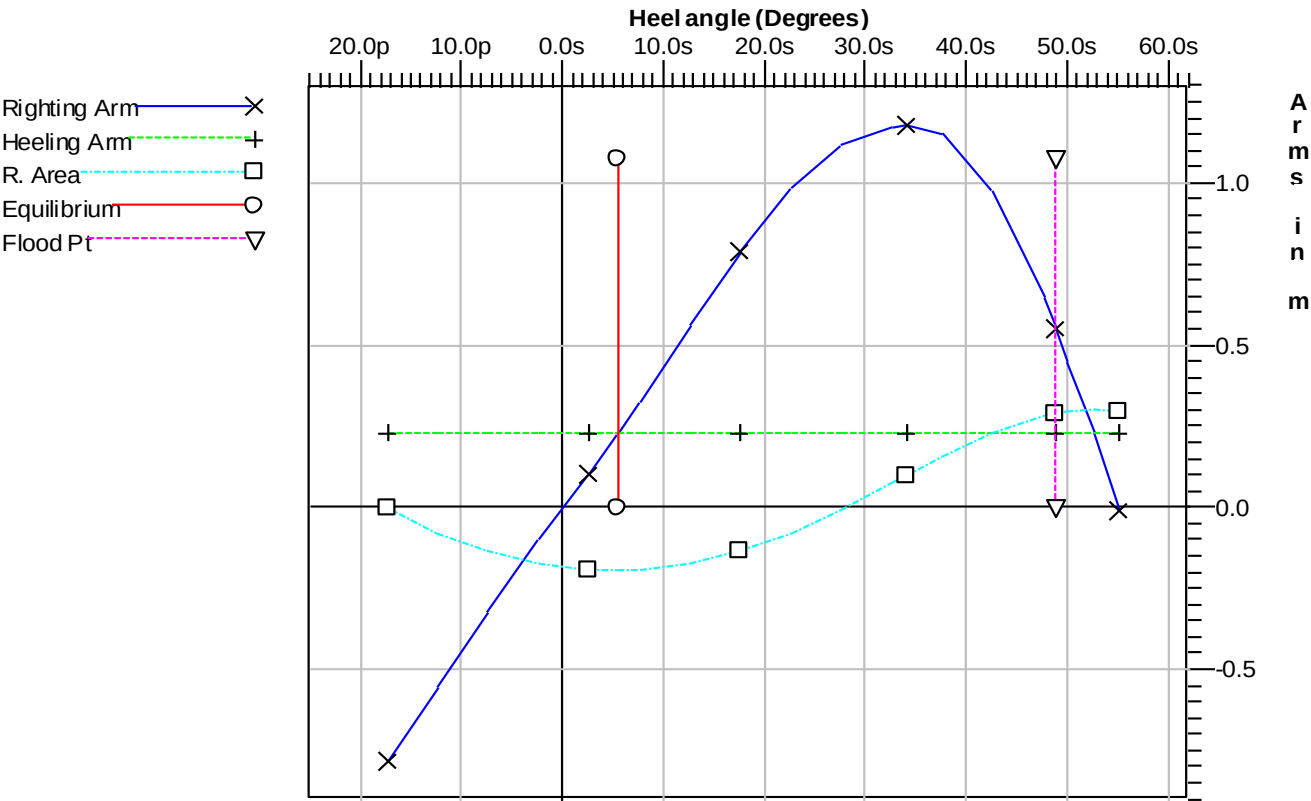
Roll angle is 21.15

Equilibrium for load condition without gust is 3.74s

Unprotected Flood Points

Name	L,T,V (m)	Height (m)
(1) Aft Ventilation Opening PS	2.150a, 13.300p, 18.100	7.391
(2) Aft Ventilation Opening SB	2.150a, 13.300s, 18.100	10.854
(4) Fwd Ventilation Opening SB	139.200f, 12.800s, 18.100	2.698

Righting Arms vs. Heel - IMO SEVERE WIND & ROLLING



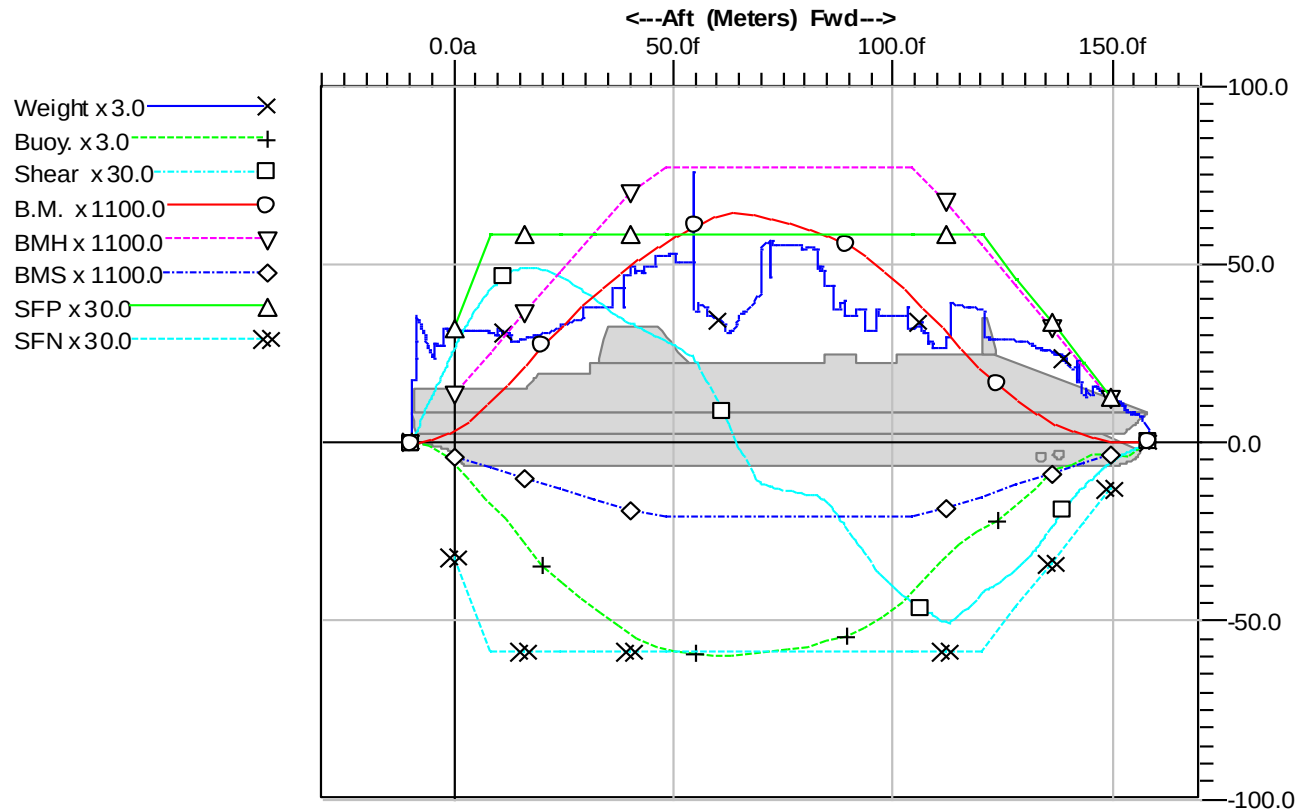
IMO SEVERE WIND & ROLLING

Limit	Min/Max	Actual	Margin	Pass
(1) Res. Ratio from Roll to Abs 50.00 deg or Flood	>1.000	2.482	1.482	Yes

LONGITUDINAL STRENGTH

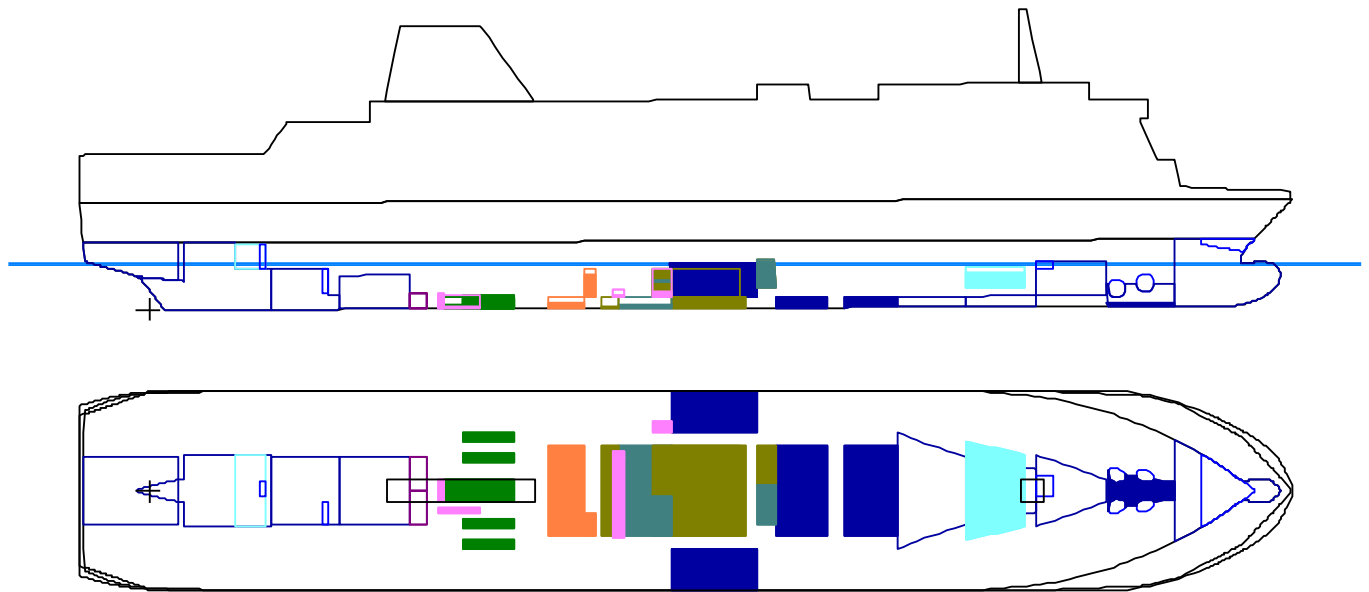
Frame No.	Location (m)	Weight (MT/m)	Buoyancy (MT/m)	Shear (MT)	Bending (MT-m)	Shear (%/Max)	Bending (%/Max)
FR -10	8.000a	100.0	0.1	144.1	126	undef	undef
FR 0	0.000	95.0	16.8	788.4	3933	81.11	26.58
BKHD FR 6	4.800f	94.9	37.4	1111.9	8553	77.28	38.39
FR 10	8.000f	93.3	49.8	1275.2	12396	72.87	45.46
FR 20	16.000f	88.1	84.2	1466.6	23622	83.81	59.46
BKHD FR 21	16.800f	89.0	88.0	1468.5	24799	83.92	60.52
FR 30	24.000f	99.8	117.2	1391.6	35215	79.52	67.47
BKHD FR 33	26.400f	102.5	124.4	1344.0	38506	76.80	68.84
BKHD FR 36	28.800f	105.2	131.3	1286.2	41674	73.50	69.84
FR 40	32.000f	115.1	140.1	1215.5	45692	69.46	70.67
BKHD FR 50	40.000f	149.3	161.9	1004.1	54548	57.38	70.73
BKHD FR 51	40.800f	149.3	163.6	993.4	55349	56.76	71.08
FR 60	48.000f	156.9	173.8	855.8	62005	48.90	73.29
BKHD FR 63	50.400f	159.6	175.5	817.4	64021	46.71	75.67
BKHD FR 64	51.200f	152.6	176.0	798.9	64669	45.65	76.44
FR 70	56.000f	116.6	177.9	619.0	68192	35.37	80.61
BKHD FR 75	60.000f	103.6	178.8	342.5	70152	19.57	82.92
FR 80	64.000f	100.7	178.5	17.6	70898	1.00	83.80
BKHD FR 90	72.000f	170.5	176.4	-373.0	69102	21.32	81.68
FR 100	80.000f	165.7	171.6	-434.7	65898	24.84	77.89
BKHD FR 105	84.000f	145.7	168.3	-482.7	64107	27.58	75.78
FR 110	88.000f	117.7	164.0	-650.3	61885	37.16	73.15
BKHD FR 117	93.600f	113.3	155.8	-922.9	57479	52.74	67.94
FR 120	96.000f	112.8	151.2	-1065.6	55099	60.89	65.13
BKHD FR 129	103.200f	113.8	130.2	-1309.4	46492	74.82	54.96
FR 130	103.200f	113.8	130.2	-1309.4	46492	74.82	54.96
FR 140	112.000f	88.6	94.7	-1512.8	34038	86.44	45.84
BKHD FR 141	112.800f	117.7	91.9	-1516.5	32829	86.66	45.00
FR 150	120.000f	112.2	73.0	-1276.7	22740	72.95	37.09
BKHD FR 153	112.400f	88.6	93.3	-1514.6	33434	86.55	45.43
FR 160	128.000f	86.5	52.7	-1070.3	13356	77.50	27.62
BKHD FR 165	132.000f	81.3	40.0	-916.0	9389	76.59	22.41
FR 170	136.000f	76.4	29.2	-718.9	6136	71.11	17.32
BKHD FR 177	141.600f	64.4	16.5	-437.1	2955	58.05	11.18
FR 180	143.400f	39.4	13.1	-368.7	2245	55.03	9.54
FR 190	149.400f	36.7	9.9	-172.0	651	43.77	4.73
FR 200	155.400f	24.2	3.9	-49.7	49	undef	undef

Longitudinal Strength At Sea Condition (port 0.05 deg.)



Max. Shear	-1516.5 MT	at	112.800f
Max. Bending Moment	70898 MT-m	at	64.000f (Hogging)
Max% Shear	86.66%	at	112.800f
Max% Bending Moment	83.80%	at	64.000f

**CASE 4.4 - SHIP WITH 1000 PASSENGERS -
TRAILERS ON DECKS 3, 5, 7 - CARS ON DECKS 5 AND 6
SHIP AT MID VOYAGE - START BALLASTING TANK 201**



Fluid Legend

Fluid Name	Legend	Weight (MT)	Load%
BALLAST		933.42	26.40%
FRESH WATER		201.81	49.78%
DIESEL OIL		45.35	50.02%
TO		38.47	98.00%
HFO		286.91	34.73%
LUBE OIL		53.52	55.86%
MISCELLANEOUS		14.33	31.25%
LSHFO		117.28	49.69%

Floating Status

Draft FP	6.078 m	Heel	0.05p deg	GM(Solid)	2.494 m
Draft MS	6.356 m	Equil	Yes	F/S Corr.	0.273 m
Draft AP	6.635 m	Wind	Off	GM(Fluid)	2.221 m
Trim	0.56a m	Wave	No	KMT	15.333 m
LCG	67.933f m	VCG-Solid	12.839 m	TPcm	36.91
Displacement	17283.1 MT	WaterSpgr	1.025		

Draft At Draft Marks

FORE.p	6.083(m)	FORE.s	6.081(m)
MID.p	6.368(m)	MID.s	6.345(m)
AFT.p	6.612(m)	AFT.s	6.593(m)

TRIM (Referred to Draft Marks) aft 0.52/140.00a m

Fixed Weight Status

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	11 244.06	70.053f	0.000	13.381u
1) CREW	5.40	120.960f	0.000	25.540u
2) PROVISIONS	22.50	124.100f	0.000	10.110u
3) STORES INCL. SHOP STORES	45.00	98.630f	0.000	11.280u
4) 1000 PASSENGERS	100.00	74.770f	0.000	26.270u
5) TRAILERS ON DECK 3	2 000.00	64.300f	0.000	11.200u
6) TRAILERS ON DECK 5	1 200.00	49.700f	0.000	16.800u
7) CARS ON DECK 5	100.00	122.800f	0.000	15.500u
8) CARS ON CAR DECK 6	75.00	123.250f	0.000	18.470u
9) TRAILERS ON DECK 7	800.00	27.412f	0.000	22.400u
Total Fixed:	15 591.97	66.363f	0.000	13.941u

Tank Status

BALLAST

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
PFT_WB_101.C	1.025	<empty>					0.0
WB_201.C	1.025	10.00%	4.17	136.176f	0.000	0.381	1.2
WB_401.C	1.025	<empty>					0.0
WB_501.C	1.025	<empty>					0.0
WB_601.C	1.025	100.00%	130.02	99.547f	0.000	0.779	0.0
WB_701.C	1.025	100.00%	138.76	89.998f	0.000	0.750	0.0
WB_1201.C	1.025	<empty>					0.0
WB_1301.C	1.025	<empty>					0.0
WB_1401.C	1.025	<empty>					0.0
WB_1511.C	1.025	<empty>					0.0
WB_311.C	1.025	<empty>					0.0
HEEL_812PS.P	1.025	100.00%	328.71	77.968f	10.872p	3.939	0.0
HEEL_812SB.S	1.025	100.00%	331.76	77.968f	10.872s	3.939	0.0
Subtotals:		26.40%	933.42	83.023f	0.035s	3.009	1.2

FRESH WATER

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
FW_1411.C	1.000	<empty>					0.0
FW_411PS.P	1.000	76.00%	99.56	116.600f	2.992p	3.731	135.5
FW_412SB.S	1.000	76.00%	102.25	116.601f	2.989s	3.731	139.2
Subtotals:		49.78%	201.81	116.600f	0.039s	3.731	274.7

DIESEL OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
DO_1001.C	0.860	45.00%	34.95	57.589f	0.017p	0.338	707.0
DO_DAY_914.S	0.860	80.00%	10.40	60.800f	4.750s	3.100	3.0
Subtotals:		50.02%	45.35	58.326f	1.076s	0.971	709.9

TO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
TO_STOR1202.P	0.861	98.00%	19.23	37.214f	2.310p	1.198	17.5
TO_DRAIN1202.S	0.861	98.00%	19.23	37.214f	2.309s	1.198	17.5
Subtotals:		98.00%	38.47	37.214f	0.000	1.198	35.0

HFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
HFO_801.C	0.980	95.00%	182.17	77.177f	0.008p	0.713	1 745.4
HFO_811.C	0.980	<empty>					0.0
HFO_OVFL_902.C	0.980	10.00%	4.43	63.588f	0.077p	0.075	402.8
HFO_DAY_911.P	0.980	90.00%	46.47	70.800f	2.001p	3.300	33.7
HFO_SETT.P	0.980	90.00%	46.47	85.200f	3.601p	4.600	33.7
SLUDGE_913.P	0.980	50.00%	7.38	70.799f	5.600p	2.500	0.8
Subtotals:		34.73%	286.91	77.070f	1.057p	1.797	2 216.5

LUBE OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LO_1102PS.P	0.910	80.00%	10.93	46.789f	4.500p	0.672	1.3
LO_1102SB.S	0.910	80.00%	10.93	46.789f	4.500s	0.672	1.3
LO_1103PS.P	0.910	80.00%	9.77	46.870f	7.387p	0.761	1.1
LO_1103SB.S	0.910	80.00%	9.77	46.870f	7.387s	0.761	1.1
DIRTYLO_1101.P	0.910	35.00%	7.71	45.550f	0.800p	0.284	2.9
STOR_LO_1101.S	0.910	20.00%	4.41	45.512f	0.799s	0.162	2.9
Subtotals:		55.86%	53.52	46.535f	0.050p	0.607	10.7

MISCELLANEOUS

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
BILGEWT_915P.P	1.000	20.00%	3.02	70.798f	8.800p	1.890	0.8
HFODRAIN_917.P	1.000	20.00%	0.33	64.796f	5.100p	1.600	0.0
HFOSLUDGE916.S	1.000	20.00%	3.50	64.796f	0.854s	1.600	189.6
LOGEAR_1104P.C	1.000	100.00%	6.45	40.400f	0.000	1.050	0.0
FWDRAIN1104S.S	1.000	20.00%	1.04	42.775f	2.800s	0.193	0.1
Subtotals:		31.25%	14.33	53.486f	1.557p	1.312	190.7

LSHFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LSHFO_901.C	0.980	30.00%	39.83	68.364f	0.026p	0.225	1 208.5
LSHFO_DAY912.S	0.980	60.00%	30.98	70.799f	3.599s	2.700	33.7
LSHFO_SETT.S	0.980	90.00%	46.47	85.200f	1.999s	4.600	33.7
Subtotals:		49.69%	117.28	75.678f	1.734s	2.612	1 275.9

All Tanks

	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
Totals:		31.50%	1 691.09	82.401f	0.021p	2.676	4 714.6

Displacer Status

Item	Status	Spgr	Displ (MT)	LCB (m)	TCB (m)	VCB (m)	Eff /Perm
HULL	Intact	1.025	17 283.07	67.899f	0.010p	3.617	1.000
CARDECK.C	Intact	1.025	0.00	0.000	0.000	0.000	1.000
SubTotals:			17 283.07	67.899f	0.010p	3.617	

Critical points

Name	L,T,V (m)	Height (m)
(1) MES Height Limiting Point PS	47.200f, 13.850p, 5.900	-0.571
(2) MES Height Limiting Point SB	47.200f, 13.850s, 5.900	-0.548

Immersion of propeller tip 1.924 m

Current Rolling Period is : 14.70 second

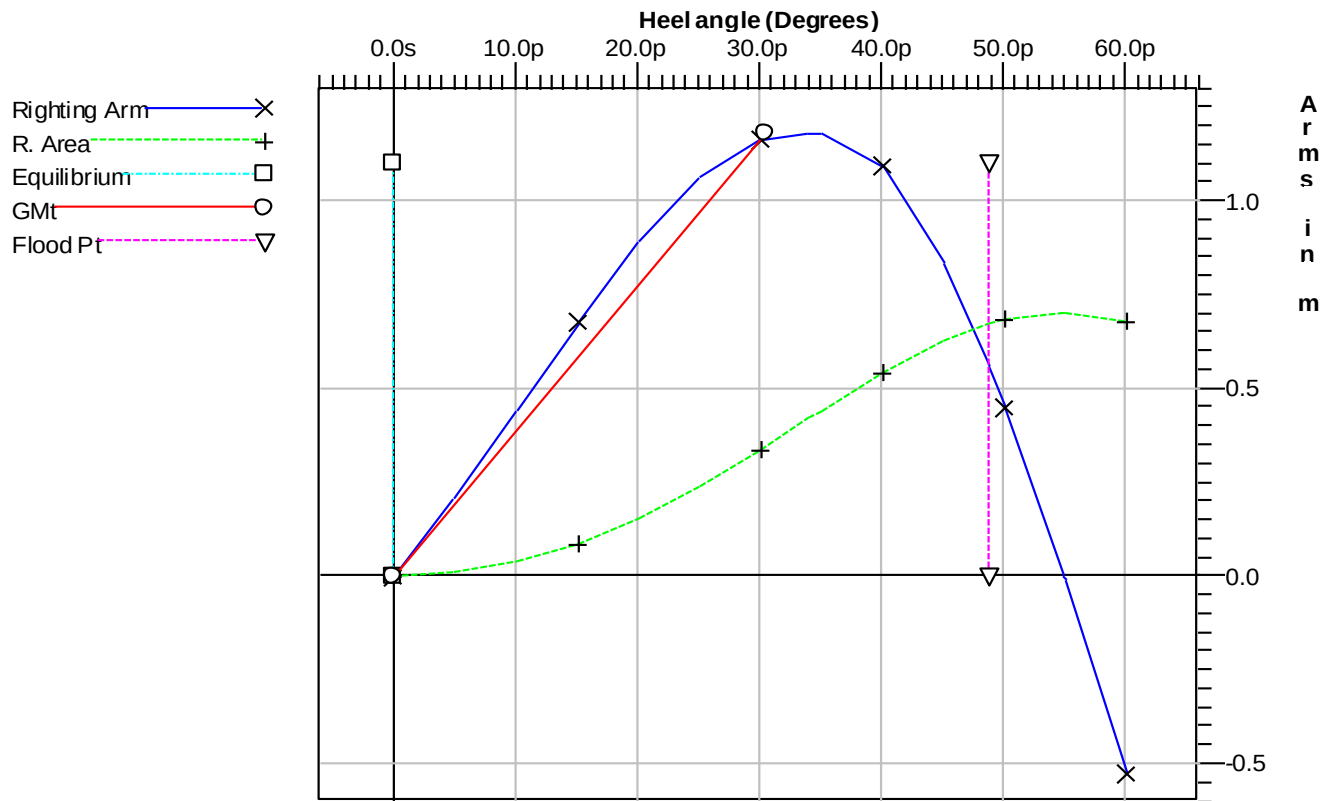
Righting Arms vs. Heel - IMO RES. A.749 (18)

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Righting Arm (m)	Area (m-Rad)	Flood Pt Height (m)	Notes
0.05p	0.21a	6.635	0.000	0.000	11.446 (1)	Equil
5.05p	0.19a	6.561	0.209	0.009	10.291 (1)	
10.05p	0.14a	6.355	0.443	0.037	9.142 (1)	
15.05p	0.09a	6.064	0.677	0.086	7.959 (1)	
20.05p	0.04a	5.689	0.895	0.155	6.754 (1)	
25.05p	0.01f	5.212	1.065	0.241	5.555 (1)	
30.05p	0.06f	4.623	1.162	0.339	4.387 (1)	
34.05p	0.10f	4.069	1.181	0.421	3.485 (1)	MaxRa
35.05p	0.11f	3.920	1.180	0.441	3.264 (1)	
40.05p	0.16f	3.133	1.092	0.541	2.105 (3)	
45.05p	0.20f	2.333	0.831	0.626	0.900 (3)	
48.74p	0.24f	1.738	0.559	0.671	0.000 (3)	FldPt
50.05p	0.25f	1.529	0.450	0.683	-0.319 (3)	
54.95p	0.29f	0.741	0.000	0.703	-1.519 (3)	RaZero
55.05p	0.29f	0.724	-0.010	0.703	-1.543 (3)	
60.05p	0.33f	-0.082	-0.524	0.680	-2.765 (3)	

Unprotected Flood Points

Name	L,T,V (m)	Height (m)
(1) Aft Ventilation Opening PS	2.150a, 13.300p, 18.100	11.446
(3) Fwd Ventilation Opening PS	139.200f, 12.800p, 18.100	2.105

Righting Arms vs. Heel - IMO RES. A.749 (18)



IMO RES. A.749 (18)

Limit	Min/Max	Actual	Margin	Pass
(1) GM at Equilibrium	>0.150 m	2.221	2.071	Yes
(2) Area from 0.00 deg to 30.00	>0.0550 m-R	0.339	0.284	Yes
(3) Area from 0.00 deg to 40.00 or Flood	>0.0900 m-R	0.541	0.451	Yes
(4) Area from 30.00 deg to 40.00 or Flood	>0.0300 m-R	0.203	0.173	Yes
(5) Righting Arm at 30.00 deg	>0.200 m	1.162	0.962	Yes
(6) Angle from 0.00 deg to MaxRA	>25.00 deg	34.00	9.00	Yes

Current VCG Fluid 13.112 m < Max Allowable VCG 13.231 m - PASS

MAXIMUM TURNING ANGLE VERIFICATION

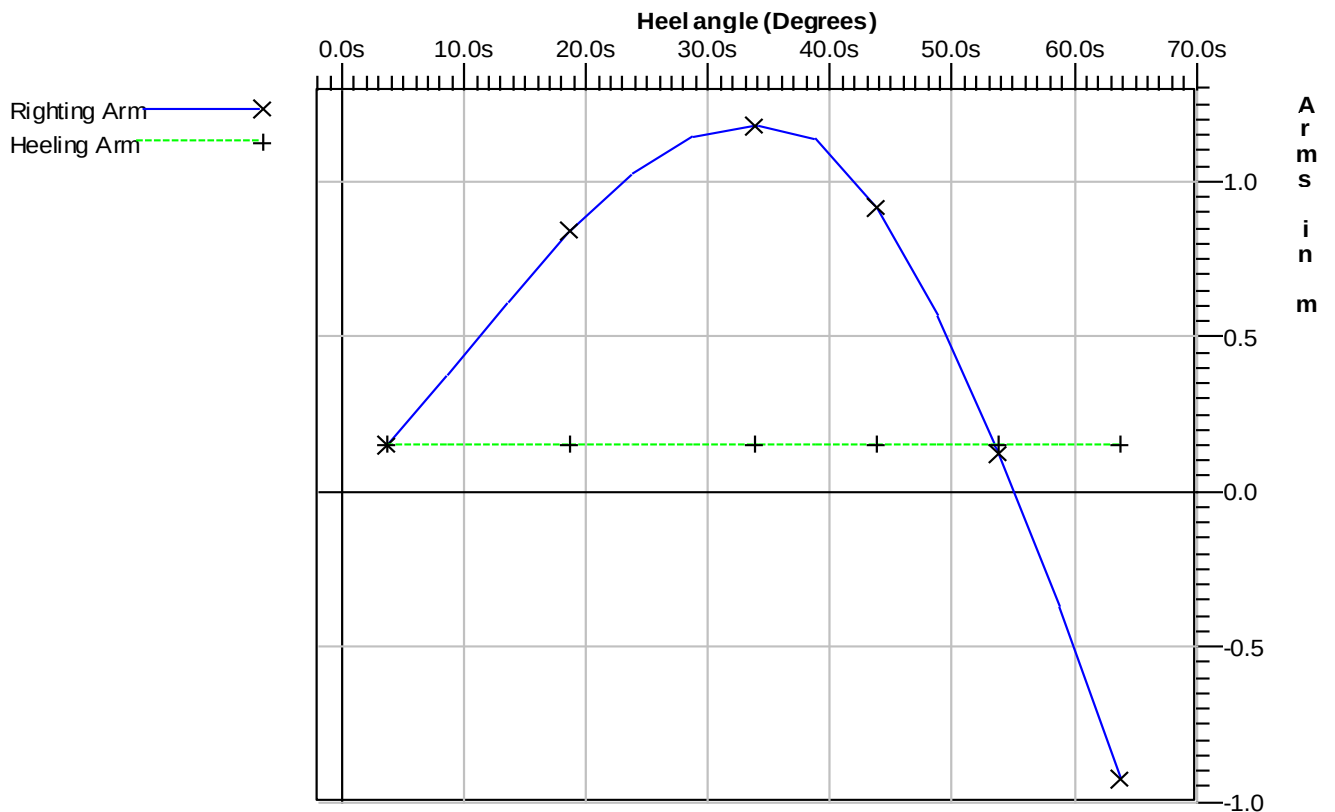
Cruising speed 21.15 knots

MOMENT DUE TO MAXIMUM TURNING ANGLE 2604.252 tm

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)
3.66s	0.20a	6.597	0.001
8.66s	0.15a	6.421	0.231
13.66s	0.10a	6.153	0.465
18.66s	0.05a	5.803	0.690
23.66s	0.00a	5.355	0.877
28.66s	0.05f	4.798	0.996
33.66s	0.09f	4.126	1.033
34.06s	0.10f	4.067	1.034
38.66s	0.14f	3.354	0.988
43.66s	0.19f	2.556	0.770
48.66s	0.24f	1.752	0.417
53.40s	0.27f	0.989	0.000
53.66s	0.28f	0.948	-0.024
58.66s	0.31f	0.143	-0.525
63.66s	0.36f	-0.673	-1.072

Righting Arms vs. Heel - IMO RES. A.749 (18)



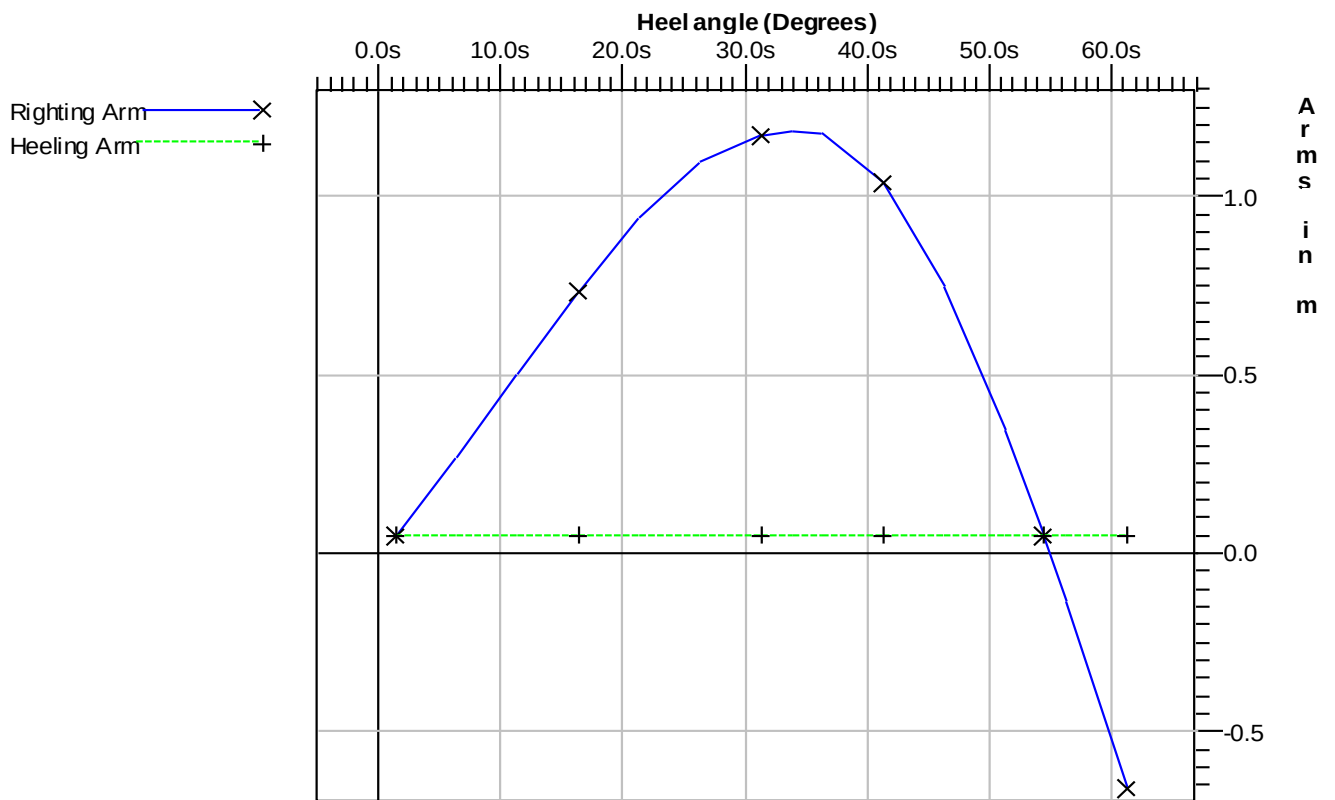
HEELING ANGLE DUE TO TURNING 3.66s deg

1000 PASSENGERS CROWDING VERIFICATION

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)
1.30s	0.21a	6.630	0.000
6.30s	0.18a	6.519	0.218
11.30s	0.13a	6.289	0.453
16.30s	0.07a	5.979	0.684
21.30s	0.03a	5.579	0.894
26.30s	0.02f	5.075	1.048
31.30s	0.07f	4.456	1.123
33.90s	0.10f	4.090	1.131
36.30s	0.12f	3.726	1.126
41.30s	0.17f	2.933	0.990
46.30s	0.22f	2.131	0.694
51.30s	0.26f	1.326	0.290
54.42s	0.28f	0.825	0.000
56.30s	0.30f	0.523	-0.186
61.30s	0.34f	-0.287	-0.712

Righting Arms vs. Heel - IMO RES. A.749 (18)



HEELING ANGLE DUE TO PASSENGERS CROWDING 1.30s deg

IMO Res. A.749 (18), SEVERE WIND AND ROLLING CRITERION (WEATHER CRITERION)

Wind speed 53.4 kn

Wind pressure 504 N /m²Under Water Lateral Plane 982.043 m²Above Water Lateral Plane 3514.538 m²

Under Water Lateral Plane Centroid 3.130 m below water line

Above Water Lateral Plane Centroid 11.550 m above water line

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)	Area (m-Rad)	Flood Pt Height (m)	Notes
17.54p	0.06a	5.888	-1.018	0.000	7.360 (1)	Roll
12.54p	0.11a	6.220	-0.789	-0.079	8.557 (1)	
7.54p	0.17a	6.470	-0.554	-0.137	9.723 (1)	
2.54p	0.21a	6.617	-0.329	-0.176	10.869 (1)	
2.46s	0.21a	6.618	-0.128	-0.196	10.886 (2)	
5.39s	0.19a	6.550	0.000	-0.199	10.213 (2)	Equil
7.46s	0.17a	6.473	0.097	-0.197	9.740 (2)	
12.46s	0.11a	6.224	0.331	-0.179	8.574 (2)	
17.46s	0.06a	5.895	0.560	-0.140	7.378 (2)	
22.46s	0.01a	5.472	0.759	-0.082	6.172 (2)	
27.46s	0.04f	4.942	0.897	-0.009	4.986 (2)	
32.46s	0.08f	4.297	0.953	0.072	3.839 (2)	
34.06s	0.10f	4.067	0.955	0.099	3.482 (2)	MaxRa
37.46s	0.13f	3.544	0.936	0.155	2.719 (4)	
42.46s	0.18f	2.747	0.758	0.230	1.525 (4)	
47.46s	0.23f	1.944	0.433	0.283	0.313 (4)	
48.74s	0.24f	1.738	0.332	0.291	0.000 (4)	FldPt
50.00s	0.25f	1.536	0.228	0.297	-0.307 (4)	
52.56s	0.27f	1.124	0.000	0.303	-0.934 (4)	RaZero
55.00s	0.29f	0.732	-0.232	0.298	-1.531 (4)	

Note:

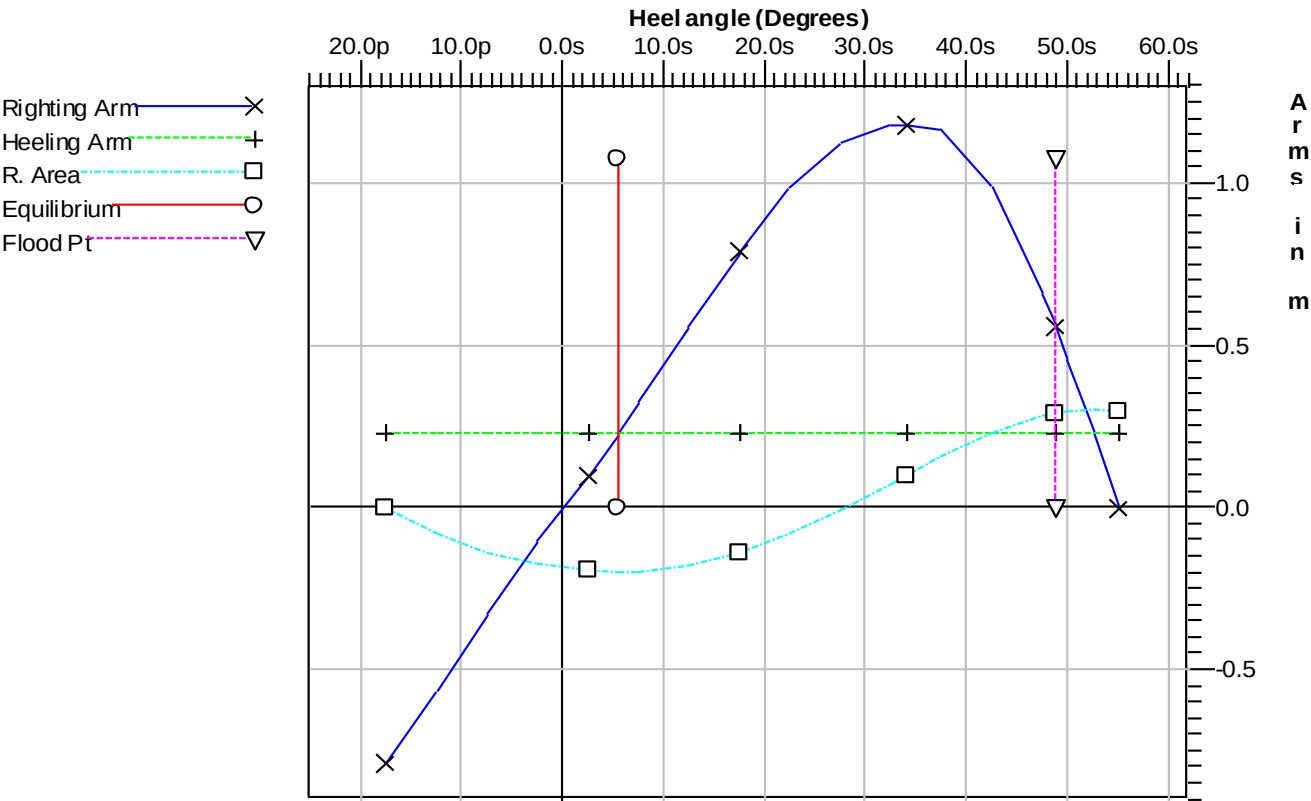
Roll angle is 21.24

Equilibrium for load condition without gust is 3.71s

Unprotected Flood Points

Name	L,T,V (m)	Height (m)
(1) Aft Ventilation Opening PS	2.150a, 13.300p, 18.100	7.360
(2) Aft Ventilation Opening SB	2.150a, 13.300s, 18.100	10.886
(4) Fwd Ventilation Opening SB	139.200f, 12.800s, 18.100	2.719

Righting Arms vs. Heel - IMO SEVERE WIND & ROLLING



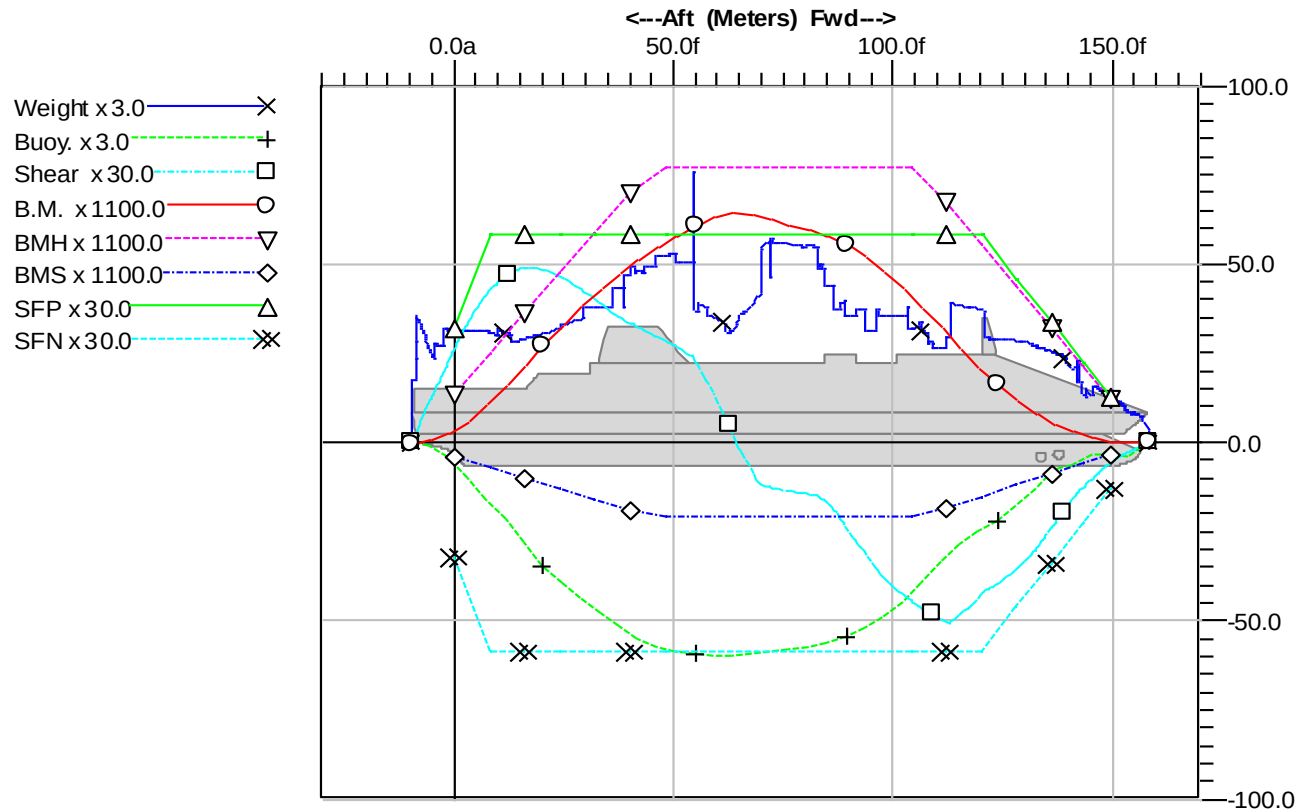
IMO SEVERE WIND & ROLLING

Limit	Min/Max	Actual	Margin	Pass
(1) Res. Ratio from Roll to Abs 50.00 deg or Flood	>1.000	2.464	1.464	Yes

LONGITUDINAL STRENGTH

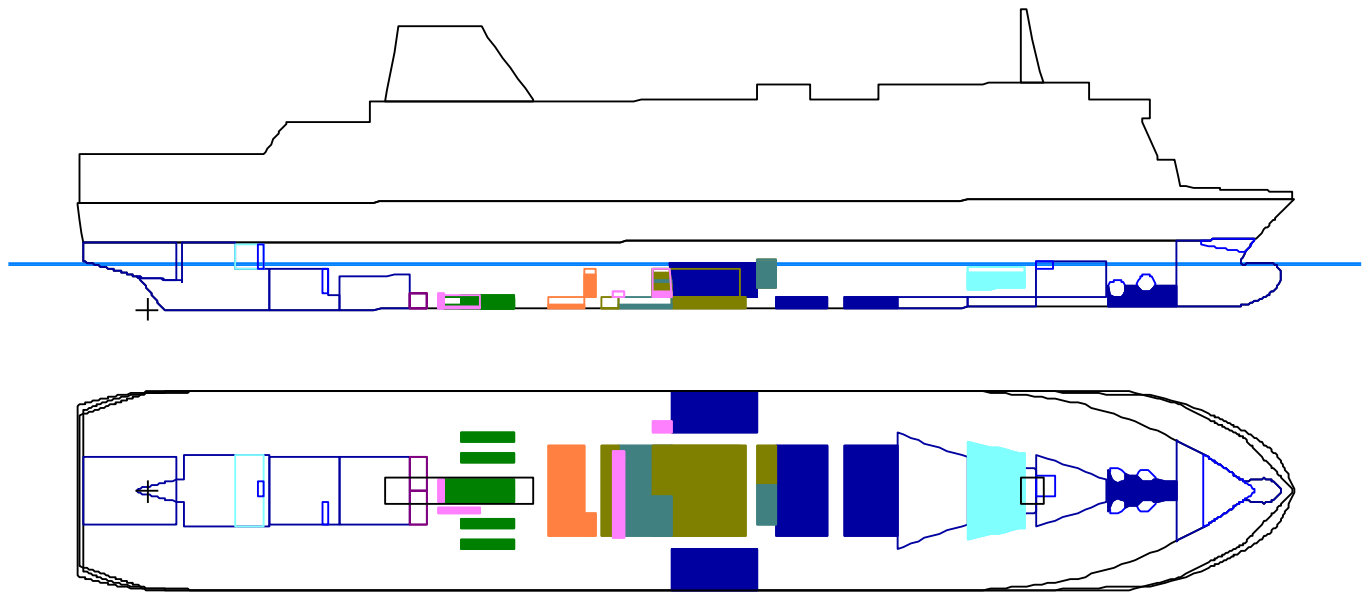
Frame No.	Location (m)	Weight (MT/m)	Buoyancy (MT/m)	Shear (MT)	Bending (MT-m)	Shear (%/Max)	Bending (%/Max)
FR -10	8.000a	100.0	0.1	144.2	126	undef	undef
FR 0	0.000	95.0	16.7	788.5	3932	81.13	26.57
BKHD FR 6	4.800f	94.9	37.4	1112.1	8552	77.29	38.38
FR 10	8.000f	93.3	49.8	1275.5	12394	72.89	45.46
FR 20	16.000f	88.1	84.2	1466.9	23621	83.82	59.46
BKHD FR 21	16.800f	89.0	88.0	1468.8	24798	83.93	60.52
FR 30	24.000f	99.8	117.2	1391.7	35214	79.53	67.47
BKHD FR 33	26.400f	102.5	124.5	1344.0	38505	76.80	68.84
BKHD FR 36	28.800f	105.2	131.4	1286.2	41672	73.50	69.84
FR 40	32.000f	115.1	140.2	1215.3	45689	69.45	70.66
BKHD FR 50	40.000f	149.3	161.9	1003.5	54540	57.34	70.72
BKHD FR 51	40.800f	149.3	163.7	992.7	55341	56.72	71.07
FR 60	48.000f	156.9	173.9	854.5	61988	48.83	73.27
BKHD FR 63	50.400f	159.6	175.6	815.9	64000	46.63	75.65
BKHD FR 64	51.200f	152.6	176.1	797.3	64646	45.56	76.41
FR 70	56.000f	116.6	178.0	616.9	68160	35.25	80.57
BKHD FR 75	60.000f	103.6	178.9	340.0	70109	19.43	82.87
FR 80	64.000f	100.7	178.6	14.5	70843	0.83	83.74
BKHD FR 90	72.000f	171.3	176.5	-377.2	69017	21.55	81.58
FR 100	80.000f	166.9	171.7	-432.1	65803	24.69	77.78
BKHD FR 105	84.000f	147.1	168.5	-475.7	64030	27.18	75.69
FR 110	88.000f	117.7	164.2	-644.0	61835	36.80	73.09
BKHD FR 117	93.600f	113.3	156.0	-917.7	57460	52.44	67.92
FR 120	96.000f	112.8	151.4	-1060.9	55091	60.62	65.12
BKHD FR 129	103.200f	113.8	130.4	-1306.2	46511	74.64	54.98
FR 130	103.200f	113.8	130.4	-1306.2	46511	74.64	54.98
FR 140	112.000f	88.6	94.9	-1511.6	34074	86.38	45.89
BKHD FR 141	112.800f	117.7	92.1	-1515.5	32866	86.60	45.05
FR 150	120.000f	112.2	73.2	-1277.2	22776	72.98	37.15
BKHD FR 153	112.400f	88.6	93.5	-1513.5	33470	86.49	45.48
FR 160	128.000f	86.5	52.9	-1072.4	13381	77.65	27.67
BKHD FR 165	132.000f	81.3	40.1	-918.7	9402	76.81	22.44
FR 170	136.000f	76.8	29.3	-720.0	6141	71.21	17.34
BKHD FR 177	141.600f	64.7	16.6	-436.7	2957	58.00	11.19
FR 180	143.400f	39.4	13.1	-368.5	2248	54.99	9.55
FR 190	149.400f	36.7	10.0	-172.0	653	43.76	4.75
FR 200	155.400f	24.2	3.9	-49.7	50	undef	undef

Longitudinal Strength At Sea Condition (port 0.05 deg.)



Max. Shear	-1515.5 MT	at	112.800f
Max. Bending Moment	70843 MT-m	at	64.000f (Hogging)
Max% Shear	86.60%	at	112.800f
Max% Bending Moment	83.74%	at	64.000f

**CASE 4.5 - SHIP WITH 1000 PASSENGERS -
TRAILERS ON DECKS 3, 5, 7 - CARS ON DECKS 5 AND 6
SHIP AT MID VOYAGE - END BALLASTING TANK 201**



Fluid Legend

Fluid Name	Legend	Weight (MT)	Load%
BALLAST		970.11	27.44%
FRESH WATER		201.81	49.78%
DIESEL OIL		45.35	50.02%
TO		38.47	98.00%
HFO		286.91	34.73%
LUBE OIL		53.52	55.86%
MISCELLANEOUS		14.33	31.25%
LSHFO		117.28	49.69%

Floating Status

Draft FP	6.128 m	Heel	0.05p deg	GM(Solid)	2.499 m
Draft MS	6.371 m	Equil	Yes	F/S Corr.	0.273 m
Draft AP	6.613 m	Wind	Off	GM(Fluid)	2.226 m
Trim	0.49a m	Wave	No	KMT	15.315 m
LCG	68.079f m	VCG-Solid	12.816 m	TPcm	36.89
Displacement	17319.8 MT	WaterSpgr	1.025		

Draft At Draft Marks

FORE.p	6.133(m)	FORE.s	6.131(m)
MID.p	6.382(m)	MID.s	6.359(m)
AFT.p	6.594(m)	AFT.s	6.576(m)

TRIM (Referred to Draft Marks) aft 0.45/140.00a m

Fixed Weight Status

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	11 244.06	70.053f	0.000	13.381u
1) CREW	5.40	120.960f	0.000	25.540u
2) PROVISIONS	22.50	124.100f	0.000	10.110u
3) STORES INCL. SHOP STORES	45.00	98.630f	0.000	11.280u
4) 1000 PASSENGERS	100.00	74.770f	0.000	26.270u
5) TRAILERS ON DECK 3	2 000.00	64.300f	0.000	11.200u
6) TRAILERS ON DECK 5	1 200.00	49.700f	0.000	16.800u
7) CARS ON DECK 5	100.00	122.800f	0.000	15.500u
8) CARS ON CAR DECK 6	75.00	123.250f	0.000	18.470u
9) TRAILERS ON DECK 7	800.00	27.412f	0.000	22.400u
Total Fixed:	15 591.97	66.363f	0.000	13.941u

Tank Status**BALLAST**

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
PFT_WB_101.C	1.025	<empty>					0.0
WB_201.C	1.025	98.00%	40.86	136.977f	0.000	1.676	16.2
WB_401.C	1.025	<empty>					0.0
WB_501.C	1.025	<empty>					0.0
WB_601.C	1.025	100.00%	130.02	99.547f	0.000	0.779	0.0
WB_701.C	1.025	100.00%	138.76	89.998f	0.000	0.750	0.0
WB_1201.C	1.025	<empty>					0.0
WB_1301.C	1.025	<empty>					0.0
WB_1401.C	1.025	<empty>					0.0
WB_1511.C	1.025	<empty>					0.0
WB_311.C	1.025	<empty>					0.0
HEEL_812PS.P	1.025	100.00%	328.71	77.968f	10.872p	3.939	0.0
HEEL_812SB.S	1.025	100.00%	331.76	77.968f	10.872s	3.939	0.0
Subtotals:		27.44%	970.11	85.067f	0.034s	2.964	16.2

FRESH WATER

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
FW_1411.C	1.000	<empty>					0.0
FW_411PS.P	1.000	76.00%	99.56	116.601f	2.992p	3.731	135.5
FW_412SB.S	1.000	76.00%	102.25	116.602f	2.989s	3.731	139.2
Subtotals:		49.78%	201.81	116.601f	0.039s	3.731	274.7

DIESEL OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
DO_1001.C	0.860	45.00%	34.95	57.591f	0.017p	0.338	707.0
DO_DAY_914.S	0.860	80.00%	10.40	60.800f	4.750s	3.100	3.0
Subtotals:		50.02%	45.35	58.327f	1.077s	0.971	709.9

TO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
TO_STOR1202.P	0.861	98.00%	19.23	37.215f	2.310p	1.198	17.5
TO_DRAIN1202.S	0.861	98.00%	19.23	37.215f	2.309s	1.198	17.5
Subtotals:		98.00%	38.47	37.215f	0.000	1.198	35.0

HFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
HFO_801.C	0.980	95.00%	182.17	77.180f	0.008p	0.712	1 745.4
HFO_811.C	0.980	<empty>					0.0
HFO_OVFL_902.C	0.980	10.00%	4.43	63.590f	0.076p	0.075	402.8
HFO_DAY_911.P	0.980	90.00%	46.47	70.800f	2.001p	3.300	33.7
HFO_SETT.P	0.980	90.00%	46.47	85.200f	3.601p	4.600	33.7
SLUDGE_913.P	0.980	50.00%	7.38	70.799f	5.600p	2.500	0.8
Subtotals:		34.73%	286.91	77.072f	1.057p	1.797	2 216.5

LUBE OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LO_1102PS.P	0.910	80.00%	10.93	46.791f	4.500p	0.672	1.3
LO_1102SB.S	0.910	80.00%	10.93	46.791f	4.500s	0.672	1.3
LO_1103PS.P	0.910	80.00%	9.77	46.871f	7.387p	0.761	1.1
LO_1103SB.S	0.910	80.00%	9.77	46.871f	7.387s	0.761	1.1
DIRTYLO_1101.P	0.910	35.00%	7.71	45.556f	0.800p	0.284	2.9
STOR_LO_1101.S	0.910	20.00%	4.41	45.523f	0.799s	0.162	2.9
Subtotals:		55.86%	53.52	46.538f	0.050p	0.607	10.7

MISCELLANEOUS

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
BILGEWT_915P.P	1.000	20.00%	3.02	70.798f	8.800p	1.890	0.8
HFODRAIN_917.P	1.000	20.00%	0.33	64.797f	5.100p	1.600	0.0
HFOSLUDGE916.S	1.000	20.00%	3.50	64.797f	0.855s	1.600	189.6
LOGEAR_1104P.C	1.000	100.00%	6.45	40.400f	0.000	1.050	0.0
FWDRAIN1104S.S	1.000	20.00%	1.04	42.778f	2.800s	0.193	0.1
Subtotals:		31.25%	14.33	53.487f	1.557p	1.312	190.7

LSHFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LSHFO_901.C	0.980	30.00%	39.83	68.369f	0.025p	0.225	1 208.5
LSHFO_DAY912.S	0.980	60.00%	30.98	70.800f	3.599s	2.700	33.7
LSHFO_SETT.S	0.980	90.00%	46.47	85.200f	1.999s	4.600	33.7
Subtotals:		49.69%	117.28	75.680f	1.734s	2.612	1 275.9

All Tanks

	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
Totals:		32.19%	1 727.78	83.563f	0.020p	2.658	4 729.7

Displacer Status

Item	Status	Spgr	Displ (MT)	LCB (m)	TCB (m)	VCB (m)	Eff /Perm
HULL	Intact	1.025	17 319.77	68.050f	0.010p	3.622	1.000
CARDECK.C	Intact	1.025	0.00	0.000	0.000	0.000	1.000
SubTotals:			17 319.77	68.050f	0.010p	3.622	

Critical points

Name	L,T,V (m)	Height (m)
(1) MES Height Limiting Point PS	47.200f, 13.850p, 5.900	-0.572
(2) MES Height Limiting Point SB	47.200f, 13.850s, 5.900	-0.549

Immersion of propeller tip 1.904 m

Current Rolling Period is : 14.67 second

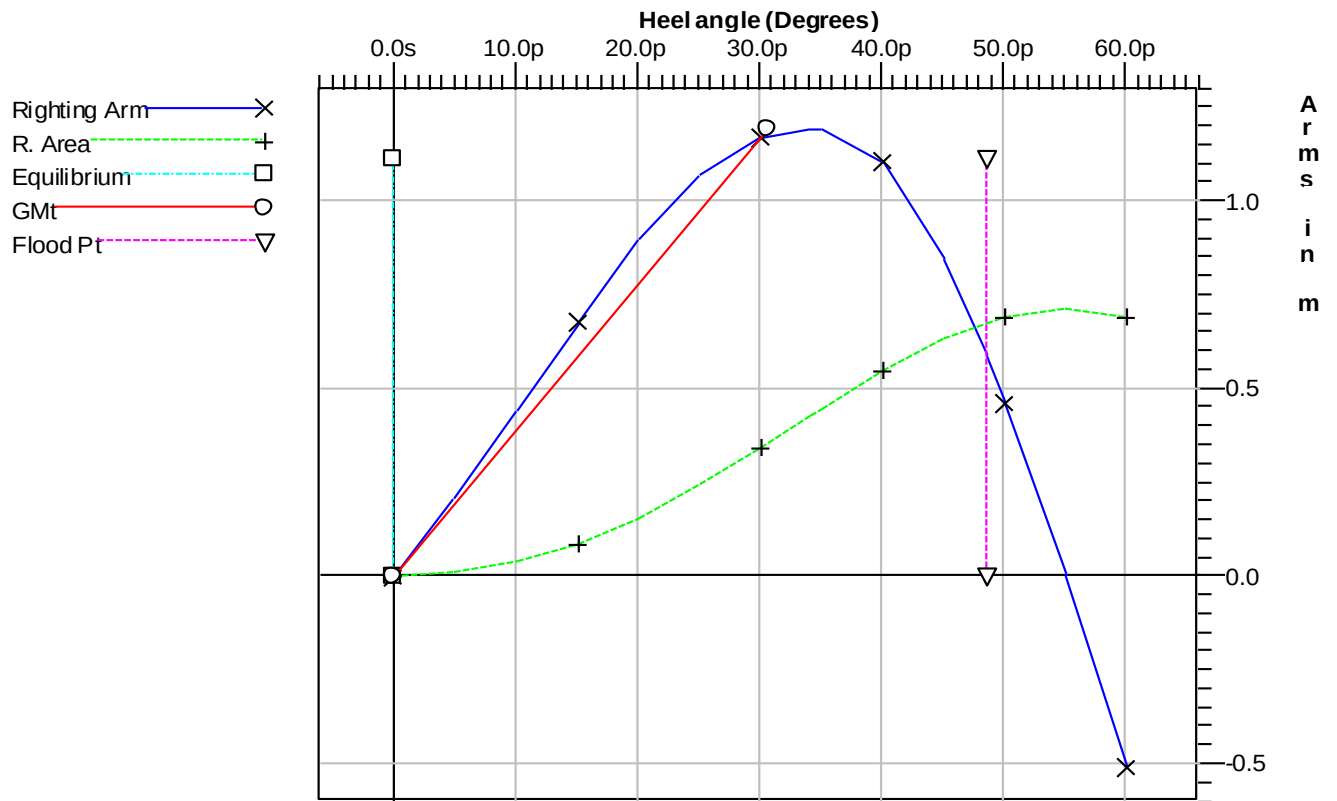
Righting Arms vs. Heel - IMO RES. A.749 (18)

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Righting Arm (m)	Area (m-Rad)	Flood Pt Height (m)	Notes
0.05p	0.19a	6.613	0.000	0.000	11.468 (1)	Equil
5.05p	0.17a	6.540	0.210	0.009	10.313 (1)	
10.05p	0.11a	6.334	0.445	0.038	9.164 (1)	
15.05p	0.06a	6.044	0.679	0.087	7.980 (1)	
20.05p	0.01a	5.668	0.899	0.156	6.775 (1)	
25.05p	0.04f	5.192	1.071	0.242	5.577 (1)	
30.05p	0.09f	4.603	1.170	0.340	4.408 (1)	
34.25p	0.12f	4.021	1.192	0.427	3.436 (3)	MaxRa
35.05p	0.13f	3.901	1.191	0.444	3.247 (3)	
40.05p	0.18f	3.115	1.104	0.545	2.065 (3)	
45.05p	0.23f	2.313	0.843	0.631	0.858 (3)	
48.56p	0.26f	1.748	0.586	0.675	0.001 (3)	FldPt
50.05p	0.27f	1.509	0.463	0.689	-0.363 (3)	
55.05p	0.31f	0.704	0.004	0.710	-1.588 (3)	
55.09p	0.31f	0.698	0.000	0.710	-1.598 (3)	RaZero
60.05p	0.35f	-0.103	-0.509	0.688	-2.812 (3)	

Unprotected Flood Points

Name	L,T,V (m)	Height (m)
(1) Aft Ventilation Opening PS	2.150a, 13.300p, 18.100	11.468
(3) Fwd Ventilation Opening PS	139.200f, 12.800p, 18.100	3.436

Righting Arms vs. Heel - IMO RES. A.749 (18)



IMO RES. A.749 (18)

Limit	Min/Max	Actual	Margin	Pass
(1) GM at Equilibrium	>0.150 m	2.226	2.076	Yes
(2) Area from 0.00 deg to 30.00	>0.0550 m-R	0.340	0.285	Yes
(3) Area from 0.00 deg to 40.00 or Flood	>0.0900 m-R	0.545	0.455	Yes
(4) Area from 30.00 deg to 40.00 or Flood	>0.0300 m-R	0.204	0.174	Yes
(5) Righting Arm at 30.00 deg	>0.200 m	1.170	0.970	Yes
(6) Angle from 0.00 deg to MaxRA	>25.00 deg	34.20	9.20	Yes

Current VCG Fluid 13.089 m < Max Allowable VCG 13.207 m - PASS

MAXIMUM TURNING ANGLE VERIFICATION

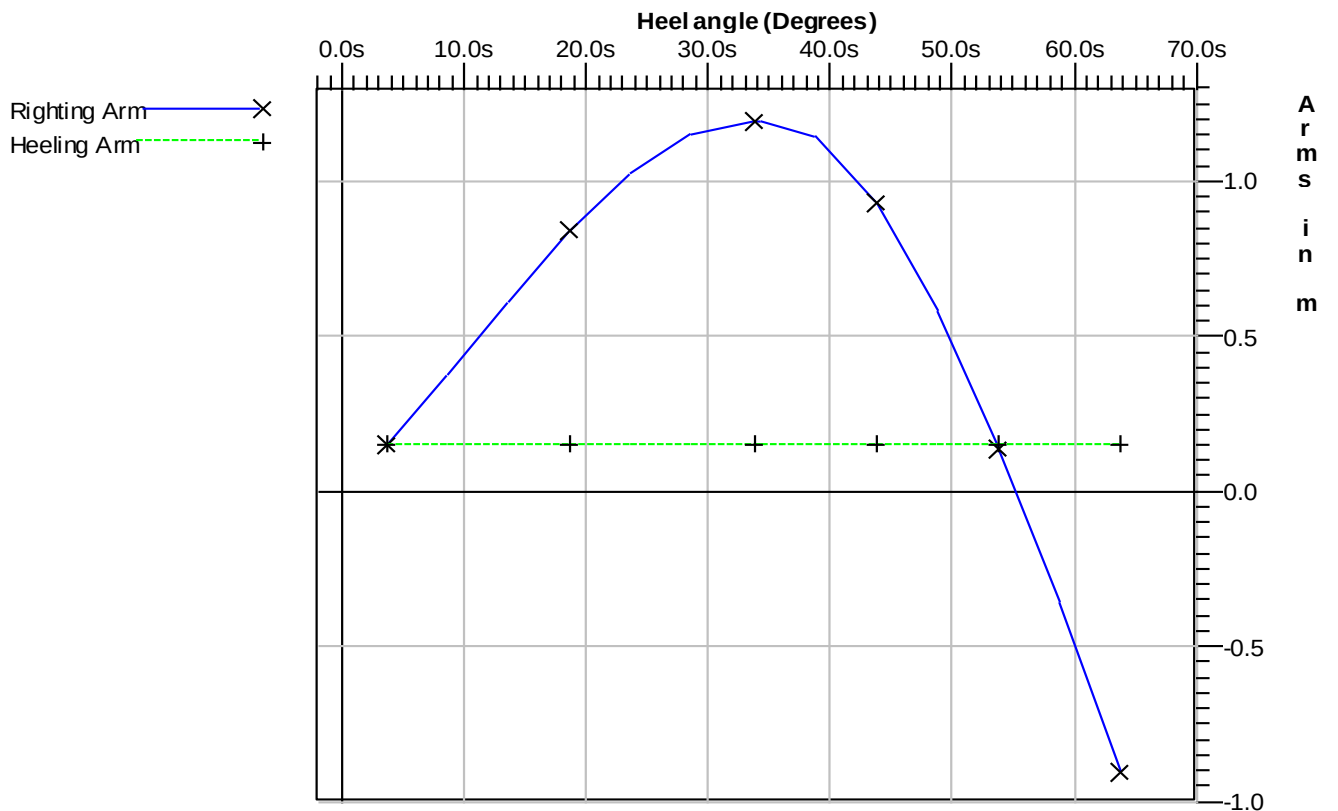
Cruising speed 21.15 knots

MOMENT DUE TO MAXIMUM TURNING ANGLE 2607.843 tm

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)
3.65s	0.18a	6.576	0.001
8.65s	0.13a	6.401	0.232
13.65s	0.07a	6.133	0.467
18.65s	0.02a	5.783	0.694
23.65s	0.02f	5.336	0.882
28.65s	0.07f	4.780	1.004
33.65s	0.12f	4.108	1.044
34.25s	0.12f	4.020	1.044
38.65s	0.17f	3.337	1.000
43.65s	0.22f	2.538	0.782
48.65s	0.26f	1.734	0.431
53.55s	0.30f	0.946	0.000
53.65s	0.30f	0.929	-0.010
58.65s	0.34f	0.124	-0.509
63.65s	0.39f	-0.694	-1.055

Righting Arms vs. Heel - IMO RES. A.749 (18)



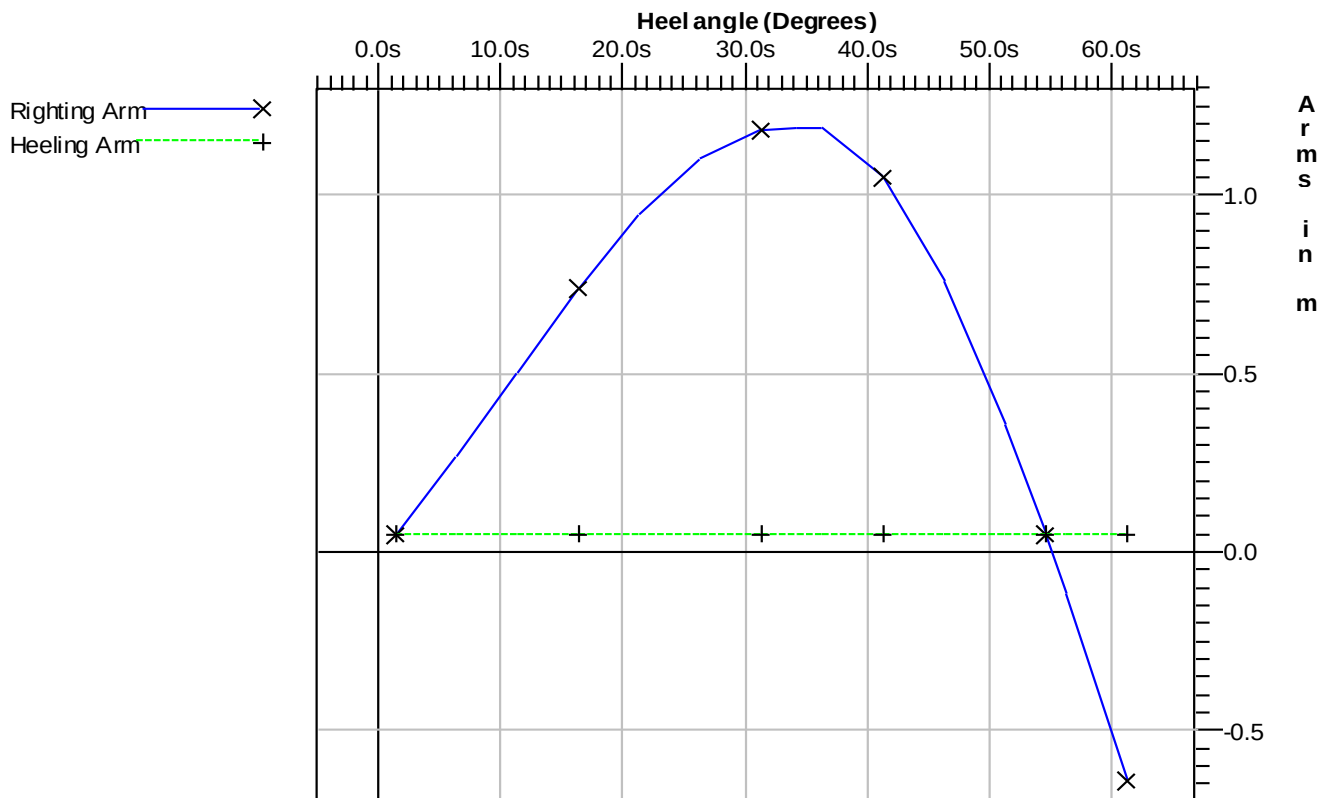
HEELING ANGLE DUE TO TURNING 3.65s deg

1000 PASSENGERS CROWDING VERIFICATION

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)
1.30s	0.18a	6.609	0.000
6.30s	0.15a	6.498	0.218
11.30s	0.10a	6.269	0.454
16.30s	0.05a	5.958	0.687
21.30s	0.00	5.559	0.898
26.30s	0.05f	5.055	1.055
31.30s	0.10f	4.438	1.132
34.30s	0.12f	4.013	1.142
36.30s	0.14f	3.709	1.137
41.30s	0.19f	2.915	1.003
46.30s	0.24f	2.112	0.707
51.30s	0.28f	1.307	0.304
54.57s	0.31f	0.781	0.000
56.30s	0.32f	0.503	-0.170
61.30s	0.37f	-0.308	-0.696

Righting Arms vs. Heel - IMO RES. A.749 (18)



HEELING ANGLE DUE TO PASSENGERS CROWDING 1.30s deg

IMO Res. A.749 (18), SEVERE WIND AND ROLLING CRITERION (WEATHER CRITERION)

Wind speed 53.4 kn

Wind pressure 504 N /m²Under Water Lateral Plane 984.214 m²Above Water Lateral Plane 3512.329 m²

Under Water Lateral Plane Centroid 3.138 m below water line

Above Water Lateral Plane Centroid 11.543 m above water line

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)	Area (m-Rad)	Flood Pt Height (m)	Notes
17.55p	0.03a	5.867	-1.021	0.000	7.380 (1)	Roll
12.55p	0.09a	6.199	-0.791	-0.079	8.577 (1)	
7.55p	0.14a	6.449	-0.555	-0.138	9.743 (1)	
2.55p	0.18a	6.595	-0.329	-0.176	10.889 (1)	
2.45s	0.18a	6.596	-0.128	-0.196	10.910 (2)	
5.37s	0.16a	6.530	0.000	-0.199	10.239 (2)	Equil
7.45s	0.14a	6.453	0.097	-0.198	9.763 (2)	
12.45s	0.09a	6.204	0.333	-0.179	8.598 (2)	
17.45s	0.04a	5.875	0.564	-0.140	7.401 (2)	
22.45s	0.01f	5.452	0.765	-0.082	6.196 (2)	
27.45s	0.06f	4.923	0.905	-0.008	5.009 (2)	
32.45s	0.11f	4.279	0.963	0.074	3.861 (2)	
34.25s	0.12f	4.020	0.967	0.104	3.434 (4)	MaxRa
37.45s	0.15f	3.527	0.948	0.158	2.682 (4)	
42.45s	0.21f	2.730	0.771	0.234	1.486 (4)	
47.45s	0.25f	1.926	0.447	0.288	0.271 (4)	
48.57s	0.26f	1.747	0.360	0.296	0.000 (4)	FldPt
50.00s	0.27f	1.516	0.241	0.303	-0.351 (4)	
52.72s	0.29f	1.079	0.000	0.309	-1.017 (4)	RaZero
55.00s	0.31f	0.712	-0.217	0.305	-1.577 (4)	

Note:

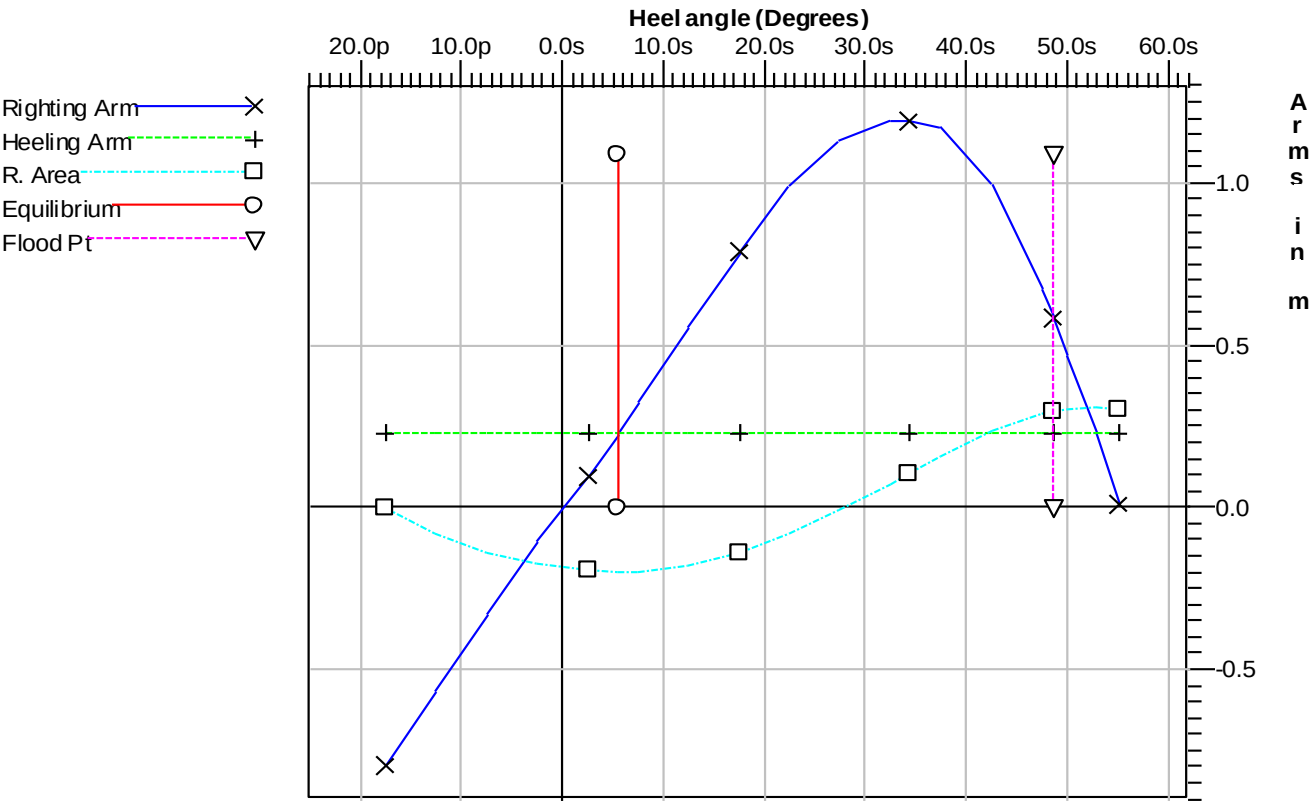
Roll angle is 21.24

Equilibrium for load condition without gust is 3.69s

Unprotected Flood Points

Name	L,T,V (m)	Height (m)
(1) Aft Ventilation Opening PS	2.150a, 13.300p, 18.100	7.380
(2) Aft Ventilation Opening SB	2.150a, 13.300s, 18.100	10.910
(4) Fwd Ventilation Opening SB	139.200f, 12.800s, 18.100	3.434

Righting Arms vs. Heel - IMO SEVERE WIND & ROLLING



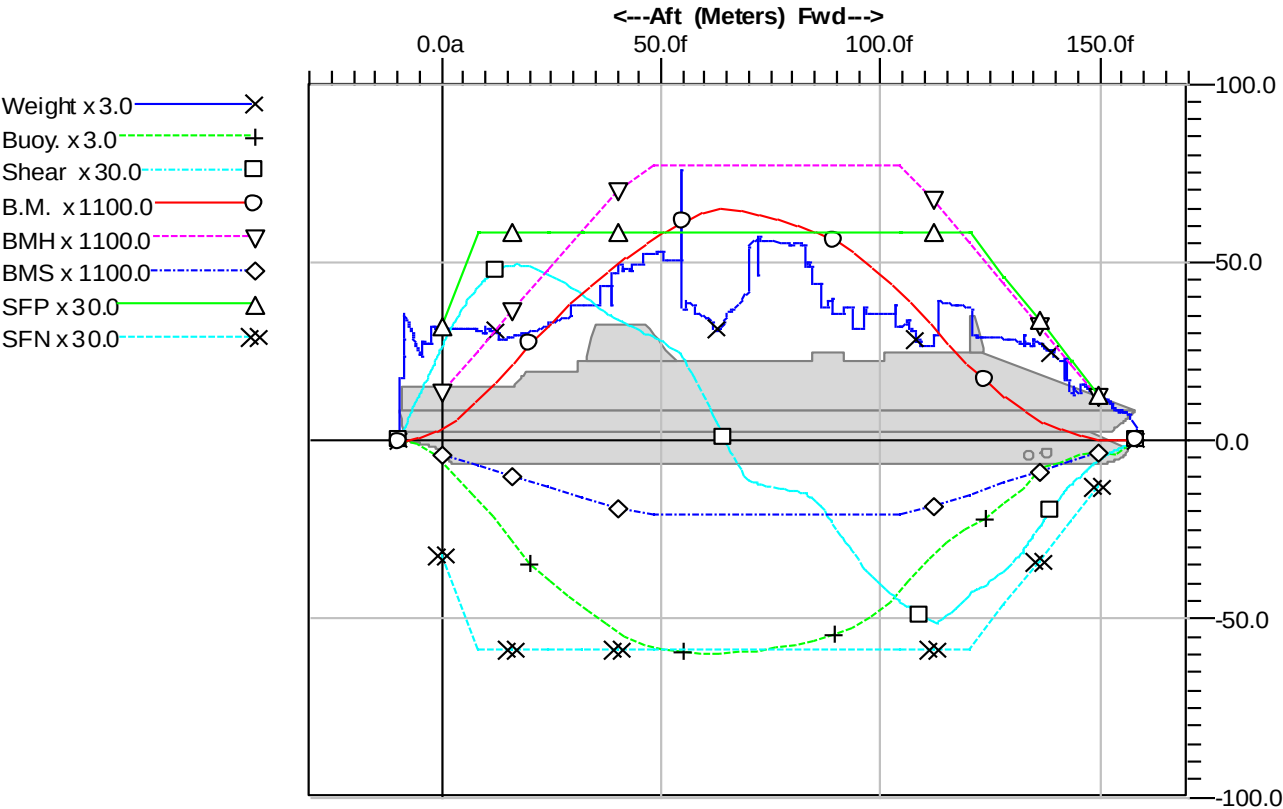
IMO SEVERE WIND & ROLLING

Limit	Min/Max	Actual	Margin	Pass
(1) Res. Ratio from Roll to Abs 50.00 deg or Flood	>1.000	2.484	1.484	Yes

LONGITUDINAL STRENGTH

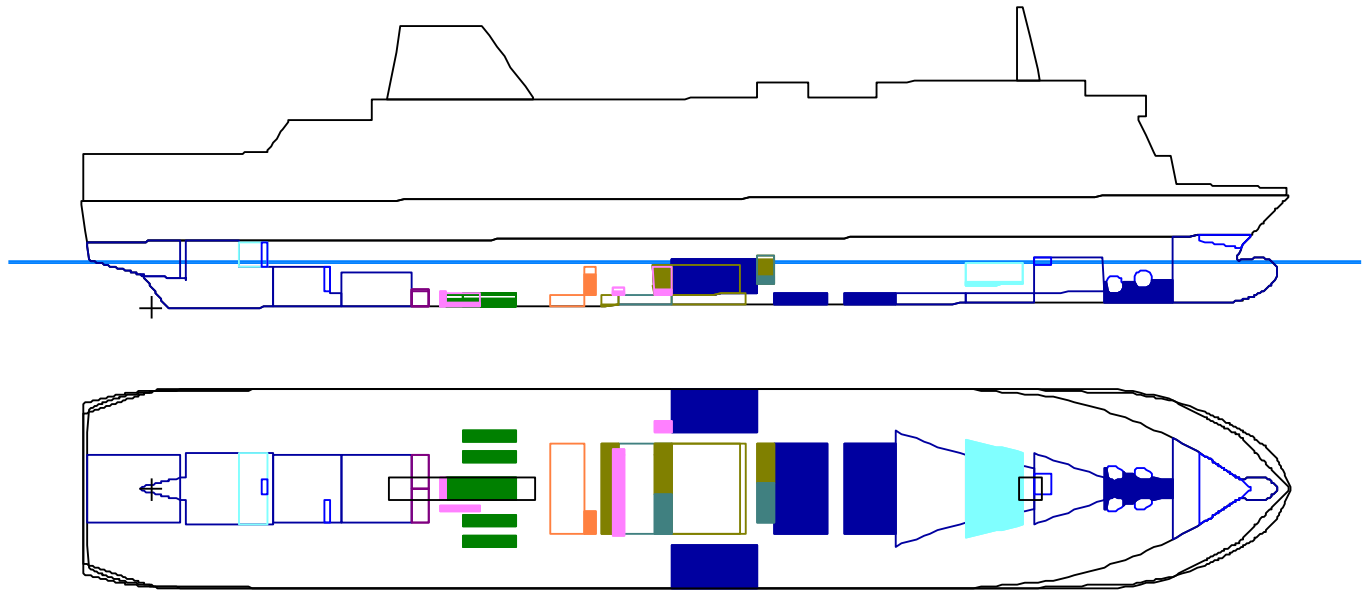
Frame No.	Location (m)	Weight (MT/m)	Buoyancy (MT/m)	Shear (MT)	Bending (MT-m)	Shear (%/Max)	Bending (%/Max)
FR -10	8.000a	100.0	0.1	144.2	126	undef	undef
FR 0	0.000	95.0	16.4	790.5	3934	81.33	26.58
BKHD FR 6	4.800f	94.9	37.0	1116.0	8566	77.56	38.45
FR 10	8.000f	93.3	49.4	1280.7	12421	73.18	45.56
FR 20	16.000f	88.1	83.9	1475.3	23699	84.30	59.65
BKHD FR 21	16.800f	89.0	87.6	1477.5	24883	84.43	60.73
FR 30	24.000f	99.8	117.0	1402.8	35367	80.16	67.76
BKHD FR 33	26.400f	102.5	124.2	1355.8	38684	77.47	69.16
BKHD FR 36	28.800f	105.2	131.2	1298.5	41879	74.20	70.18
FR 40	32.000f	115.1	140.0	1228.3	45935	70.19	71.04
BKHD FR 50	40.000f	149.3	161.9	1017.4	54890	58.14	71.17
BKHD FR 51	40.800f	149.3	163.6	1006.6	55702	57.52	71.53
FR 60	48.000f	156.9	173.9	868.5	62448	49.63	73.82
BKHD FR 63	50.400f	159.6	175.7	829.8	64492	47.42	76.23
BKHD FR 64	51.200f	152.6	176.2	811.1	65149	46.35	77.01
FR 70	56.000f	116.6	178.1	630.1	68725	36.01	81.24
BKHD FR 75	60.000f	103.6	179.2	352.5	70725	20.14	83.60
FR 80	64.000f	100.7	178.9	26.1	71505	1.49	84.52
BKHD FR 90	72.000f	171.3	176.9	-368.1	69758	21.03	82.46
FR 100	80.000f	166.9	172.2	-426.5	66599	24.37	78.72
BKHD FR 105	84.000f	147.1	169.0	-472.0	64844	26.97	76.65
FR 110	88.000f	117.7	164.8	-642.6	62656	36.72	74.06
BKHD FR 117	93.600f	113.3	156.7	-919.8	58277	52.56	68.88
FR 120	96.000f	112.8	152.1	-1064.6	55900	60.84	66.08
BKHD FR 129	103.200f	113.8	131.2	-1315.4	47271	75.16	55.88
FR 130	103.200f	113.8	131.2	-1315.4	47271	75.16	55.88
FR 140	112.000f	88.6	95.7	-1527.7	34718	87.30	46.76
BKHD FR 141	112.800f	117.6	92.9	-1532.2	33497	87.55	45.92
FR 150	120.000f	112.3	74.0	-1299.5	23263	74.26	37.95
BKHD FR 153	112.400f	88.6	94.3	-1529.9	34108	87.43	46.34
FR 160	128.000f	86.5	53.6	-1100.7	13661	79.70	28.24
BKHD FR 165	132.000f	81.3	40.7	-949.6	9562	79.40	22.82
FR 170	136.000f	82.8	29.8	-738.4	6195	73.03	17.49
BKHD FR 177	141.600f	68.5	16.9	-435.2	2959	57.81	11.19
FR 180	143.400f	39.4	13.4	-367.5	2251	54.85	9.56
FR 190	149.400f	36.7	10.1	-171.8	657	43.73	4.77
FR 200	155.400f	24.2	3.9	-49.7	51	undef	undef

Longitudinal Strength At Sea Condition (port 0.05 deg.)



Max. Shear	-1532.2 MT	at	112.800f
Max. Bending Moment	71505 MT-m	at	64.000f (Hogging)
Max% Shear	87.55%	at	112.800f
Max% Bending Moment	84.52%	at	64.000f

**CASE 4.6 - SHIP WITH 1000 PASSENGERS -
TRAILERS ON DECKS 3, 5, 7 - CARS ON DECKS 5 AND 6
SHIP AT ARRIVAL (10% CONSUMABLES)**



Fluid Legend

Fluid Name	Legend	Weight (MT)	Load%
BALLAST		970.95	27.46%
FRESH WATER		41.16	10.15%
DIESEL OIL		9.04	9.97%
TO		38.47	98.00%
HFO		82.39	9.97%
LUBE OIL		48.68	50.80%
MISCELLANEOUS		19.58	42.70%
LSHFO		24.27	10.28%

Floating Status

Draft FP	5.802 m	Heel	0.27p deg	GM(Solid)	2.326 m
Draft MS	6.211 m	Equil	Yes	F/S Corr.	0.063 m
Draft AP	6.619 m	Wind	Off	GM(Fluid)	2.263 m
Trim	0.82a m	Wave	No	KMT	15.454 m
LCG	67.446f m	VCG-Solid	13.129 m	TPcm	36.68
Displacement	16808.5 MT	WaterSpgr	1.025		

Draft At Draft Marks

FORE.p	5.813(m)	FORE.s	5.805(m)
MID.p	6.275(m)	MID.s	6.147(m)
AFT.p	6.624(m)	AFT.s	6.520(m)

TRIM (Referred to Draft Marks) aft 0.76/140.00a m

Fixed Weight Status

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	11 244.06	70.053f	0.000	13.381u
1) CREW	5.40	120.960f	0.000	25.540u
2) PROVISIONS	4.50	124.100f	0.000	10.110u
3) STORES INCL. SHOP STORES	45.00	98.630f	0.000	11.280u
4) 1000 PASSENGERS	100.00	74.770f	0.000	26.270u
5) TRAILERS ON DECK 3	2 000.00	64.300f	0.000	11.200u
6) TRAILERS ON DECK 5	1 200.00	49.700f	0.000	16.800u
7) CARS ON DECK 5	100.00	122.800f	0.000	15.500u
8) CARS ON CAR DECK 6	75.00	123.250f	0.000	18.470u
9) TRAILERS ON DECK 7	800.00	27.412f	0.000	22.400u
Total Fixed:	15 573.97	66.297f	0.000	13.946u

Tank Status

BALLAST

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
PFT_WB_101.C	1.025	<empty>					0.0
WB_201.C	1.025	100.00%	41.70	137.000f	0.000	1.702	0.0
WB_401.C	1.025	<empty>					0.0
WB_501.C	1.025	<empty>					0.0
WB_601.C	1.025	100.00%	130.02	99.547f	0.000	0.779	0.0
WB_701.C	1.025	100.00%	138.76	89.998f	0.000	0.750	0.0
WB_1201.C	1.025	<empty>					0.0
WB_1301.C	1.025	<empty>					0.0
WB_1401.C	1.025	<empty>					0.0
WB_1511.C	1.025	<empty>					0.0
WB_311.C	1.025	<empty>					0.0
HEEL_812PS.P	1.025	100.00%	328.71	77.968f	10.872p	3.939	0.0
HEEL_812SB.S	1.025	100.00%	331.76	77.968f	10.872s	3.939	0.0
Subtotals:		27.46%	970.95	85.112f	0.034s	2.964	0.0

FRESH WATER

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
FW_1411.C	1.000	<empty>					0.0
FW_411PS.P	1.000	15.50%	20.31	116.538f	3.007p	2.834	135.5
FW_412SB.S	1.000	15.50%	20.85	116.550f	2.945s	2.834	139.2
Subtotals:		10.15%	41.16	116.544f	0.009s	2.834	274.7

DIESEL OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
DO_1001.C	0.860	<empty>					0.0
DO_DAY_914.S	0.860	69.50%	9.04	60.800f	4.748s	2.890	3.0
Subtotals:		9.97%	9.04	60.800f	4.748s	2.890	3.0

TO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
TO_STOR1202.P	0.861	98.00%	19.23	37.214f	2.314p	1.198	17.5
TO_DRAIN1202.S	0.861	98.00%	19.23	37.214f	2.305s	1.198	17.5
Subtotals:		98.00%	38.47	37.214f	0.004p	1.198	35.1

HFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
HFO_801.C	0.980	<empty>					0.0
HFO_811.C	0.980	<empty>					0.0
HFO_OVFL_902.C	0.980	10.00%	4.43	63.582f	0.423p	0.076	402.8
HFO_DAY_911.P	0.980	33.00%	17.04	70.798f	2.009p	2.160	33.7
HFO_SETT.P	0.980	90.00%	46.47	85.199f	3.603p	4.600	33.7
SLUDGE_913.P	0.980	98.00%	14.46	70.800f	5.600p	3.460	0.8
Subtotals:		9.97%	82.39	78.533f	3.453p	3.652	471.1

LUBE OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LO_1102PS.P	0.910	60.00%	8.20	46.778f	4.501p	0.504	1.3
LO_1102SB.S	0.910	60.00%	8.20	46.778f	4.499s	0.504	1.3
LO_1103PS.P	0.910	60.00%	7.33	46.886f	7.385p	0.582	1.1
LO_1103SB.S	0.910	60.00%	7.33	46.886f	7.383s	0.582	1.1
DIRTYLO_1101.P	0.910	70.00%	15.42	45.563f	0.801p	0.567	2.9
STOR_LO_1101.S	0.910	10.00%	2.20	45.342f	0.794s	0.082	2.9
Subtotals:		50.80%	48.68	46.361f	0.218p	0.529	10.7

MISCELLANEOUS

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
BILGEWT_915P.P	1.000	20.00%	3.02	70.797f	8.801p	1.890	0.8
HFODRAIN_917.P	1.000	20.00%	0.33	64.794f	5.101p	1.600	0.0
HFOSLUDGE916.S	1.000	50.00%	8.76	64.798f	0.799s	1.750	189.6
LOGEAR_1104P.C	1.000	100.00%	6.45	40.400f	0.000	1.050	0.0
FWDRAIN1104S.S	1.000	20.00%	1.04	42.763f	2.799s	0.193	0.1
Subtotals:		42.70%	19.58	56.520f	0.935p	1.456	190.7

LSHFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LSHFO_901.C	0.980	<empty>					0.0
LSHFO_DAY912.S	0.980	20.00%	10.33	70.797f	3.585s	1.900	33.7
LSHFO_SETT.S	0.980	27.00%	13.94	85.198f	1.989s	3.340	33.7
Subtotals:		10.28%	24.27	79.070f	2.668s	2.727	67.5

All Tanks

	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
Totals:		23.00%	1 234.53	81.950f	0.140p	2.826	1 052.6

Displacer Status

Item	Status	Spgr	Displ (MT)	LCB (m)	TCB (m)	VCB (m)	Eff /Perm
HULL	Intact	1.025	16 808.51	67.395f	0.055p	3.543	1.000
CARDECK.C	Intact	1.025	0.00	0.000	0.000	0.000	1.000
SubTotals:			16 808.51	67.395f	0.055p	3.543	

Critical points

Name	L,T,V (m)	Height (m)
(1) MES Height Limiting Point PS	47.200f, 13.850p, 5.900	-0.526
(2) MES Height Limiting Point SB	47.200f, 13.850s, 5.900	-0.398

Immersion of propeller tip 1.903 m

Current Rolling Period is : 14.72 second

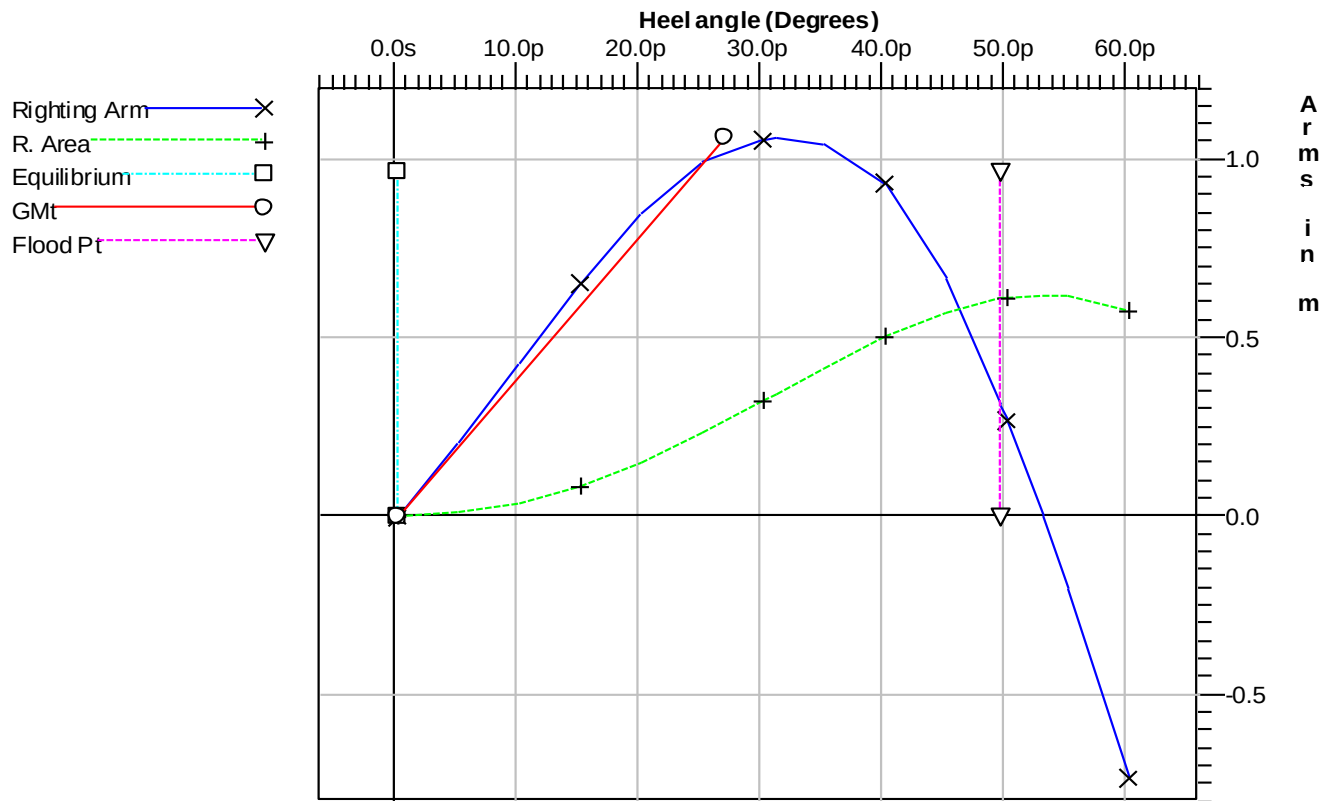
Righting Arms vs. Heel - IMO RES. A.749 (18)

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Righting Arm (m)	Area (m-Rad)	Flood Pt Height (m)	Notes
0.27p	0.31a	6.619	0.000	0.000	11.407 (1)	Equil
5.27p	0.29a	6.538	0.208	0.009	10.254 (1)	
10.27p	0.23a	6.324	0.434	0.037	9.107 (1)	
15.27p	0.18a	6.027	0.653	0.084	7.926 (1)	
20.27p	0.12a	5.642	0.851	0.150	6.726 (1)	
25.27p	0.07a	5.154	0.995	0.231	5.535 (1)	
30.27p	0.01a	4.554	1.059	0.321	4.375 (1)	
31.47p	0.00a	4.393	1.061	0.344	4.103 (1)	MaxRa
35.27p	0.04f	3.841	1.043	0.414	3.260 (1)	
40.27p	0.09f	3.046	0.938	0.501	2.172 (1)	
45.27p	0.13f	2.236	0.663	0.572	1.060 (1)	
49.78p	0.17f	1.503	0.311	0.611	0.000 (3)	FldPt
50.27p	0.17f	1.424	0.268	0.613	-0.118 (3)	
53.18p	0.20f	0.951	0.000	0.620	-0.826 (3)	RaZero
55.27p	0.21f	0.612	-0.205	0.616	-1.334 (3)	
60.27p	0.25f	-0.202	-0.734	0.576	-2.548 (3)	

Unprotected Flood Points

Name	L,T,V (m)	Height (m)
(1) Aft Ventilation Opening PS	2.150a, 13.300p, 18.100	11.407
(3) Fwd Ventilation Opening PS	139.200f, 12.800p, 18.100	0.000

Righting Arms vs. Heel - IMO RES. A.749 (18)



IMO RES. A.749 (18)

Limit	Min/Max	Actual	Margin	Pass
(1) GM at Equilibrium	>0.150 m	2.263	2.113	Yes
(2) Area from 0.00 deg to 30.00	>0.0550 m-R	0.321	0.266	Yes
(3) Area from 0.00 deg to 40.00 or Flood	>0.0900 m-R	0.501	0.411	Yes
(4) Area from 30.00 deg to 40.00 or Flood	>0.0300 m-R	0.179	0.149	Yes
(5) Righting Arm at 30.00 deg	>0.200 m	1.059	0.859	Yes
(6) Angle from 0.00 deg to MaxRA	>25.00 deg	31.20	6.20	Yes

Current VCG Fluid 13.192 m < Max Allowable VCG 13.345 m - PASS

MAXIMUM TURNING ANGLE VERIFICATION

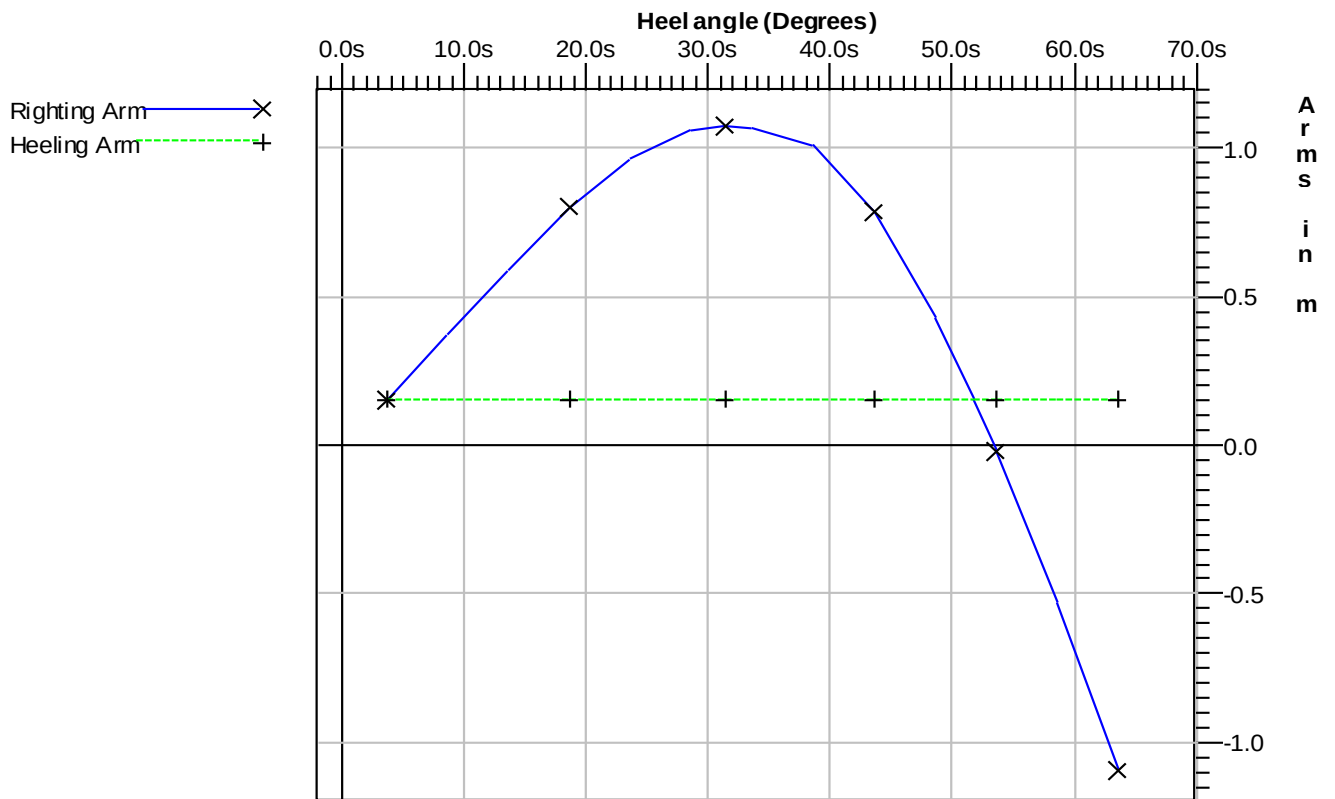
Cruising speed 21.15 knots

MOMENT DUE TO MAXIMUM TURNING ANGLE 2550.858 tm

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)
3.52s	0.30a	6.584	0.000
8.52s	0.25a	6.409	0.223
13.52s	0.19a	6.140	0.445
18.52s	0.14a	5.788	0.654
23.52s	0.09a	5.337	0.819
28.52s	0.03a	4.777	0.913
31.32s	0.00a	4.413	0.926
33.52s	0.02f	4.102	0.920
38.52s	0.07f	3.327	0.859
43.52s	0.12f	2.520	0.638
48.52s	0.16f	1.708	0.278
51.70s	0.18f	1.192	0.000
53.52s	0.20f	0.896	-0.172
58.52s	0.24f	0.084	-0.685
63.52s	0.28f	-0.737	-1.247

Righting Arms vs. Heel - IMO RES. A.749 (18)



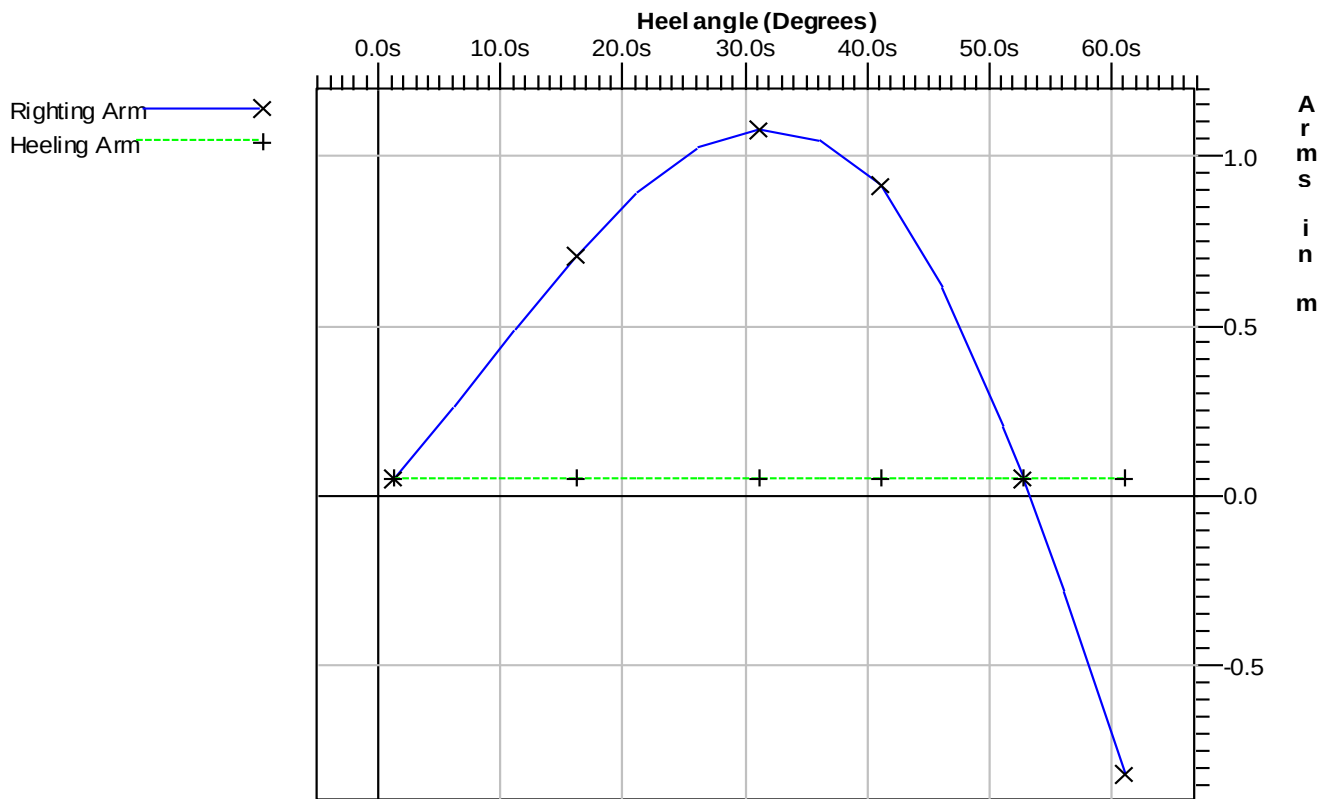
HEELING ANGLE DUE TO TURNING 3.52s deg

1000 PASSENGERS CROWDING VERIFICATION

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)
1.12s	0.31a	6.616	0.000
6.12s	0.28a	6.509	0.212
11.12s	0.22a	6.279	0.437
16.12s	0.17a	5.968	0.654
21.12s	0.11a	5.566	0.845
26.12s	0.06a	5.060	0.976
31.12s	0.01a	4.440	1.023
31.32s	0.00a	4.412	1.023
36.12s	0.04f	3.709	0.997
41.12s	0.09f	2.907	0.862
46.12s	0.14f	2.097	0.562
51.12s	0.18f	1.285	0.150
52.74s	0.19f	1.023	0.000
56.12s	0.22f	0.474	-0.335
61.12s	0.26f	-0.343	-0.874

Righting Arms vs. Heel - IMO RES. A.749 (18)



HEELING ANGLE DUE TO PASSENGERS CROWDING 1.12s deg

IMO Res. A.749 (18), SEVERE WIND AND ROLLING CRITERION (WEATHER CRITERION)

Wind speed 53.4 kn

Wind pressure 504 N /m²Under Water Lateral Plane 960.661 m²Above Water Lateral Plane 3574.006 m²

Under Water Lateral Plane Centroid 3.066 m below water line

Above Water Lateral Plane Centroid 11.585 m above water line

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)	Area (m-Rad)	Flood Pt Height (m)	Notes
18.02p	0.15a	5.827	-1.004	0.000	7.264 (1)	Roll
13.02p	0.20a	6.171	-0.793	-0.078	8.459 (1)	
8.02p	0.26a	6.431	-0.570	-0.138	9.625 (1)	
3.02p	0.30a	6.593	-0.349	-0.178	10.768 (1)	
1.98s	0.31a	6.608	-0.149	-0.200	11.011 (2)	
5.47s	0.29a	6.531	0.000	-0.204	10.207 (2)	Equil
6.98s	0.27a	6.476	0.068	-0.203	9.865 (2)	
11.98s	0.21a	6.232	0.292	-0.188	8.706 (2)	
16.98s	0.16a	5.906	0.507	-0.153	7.516 (2)	
21.98s	0.10a	5.488	0.689	-0.100	6.316 (2)	
26.98s	0.05a	4.962	0.808	-0.035	5.134 (2)	
31.38s	0.00a	4.405	0.841	0.029	4.124 (2)	MaxRa
31.98s	0.00f	4.322	0.840	0.038	3.989 (2)	
36.98s	0.05f	3.574	0.805	0.110	2.889 (2)	
41.98s	0.10f	2.769	0.638	0.174	1.795 (2)	
46.98s	0.15f	1.959	0.316	0.217	0.674 (2)	
49.78s	0.17f	1.503	0.086	0.227	0.000 (4)	FldPt
50.00s	0.17f	1.467	0.067	0.227	-0.054 (4)	
50.76s	0.18f	1.343	0.000	0.228	-0.239 (4)	RaZero
55.00s	0.21f	0.655	-0.404	0.213	-1.270 (4)	

Note:

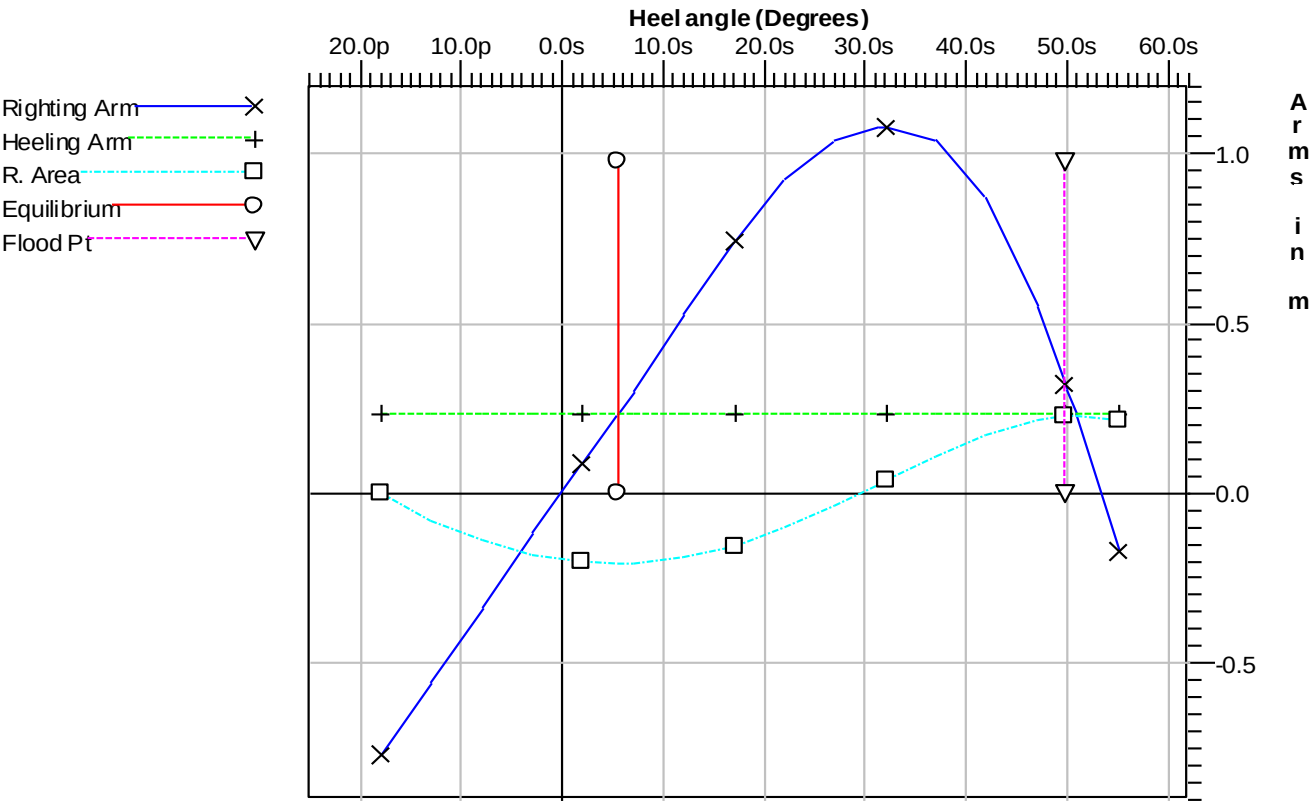
Roll angle is 21.69

Equilibrium for load condition without gust is 3.67s

Unprotected Flood Points

Name	L,T,V (m)	Height (m)
(1) Aft Ventilation Opening PS	2.150a, 13.300p, 18.100	7.264
(2) Aft Ventilation Opening SB	2.150a, 13.300s, 18.100	11.011
(4) Fwd Ventilation Opening SB	139.200f, 12.800s, 18.100	0.000

Righting Arms vs. Heel - IMO SEVERE WIND & ROLLING



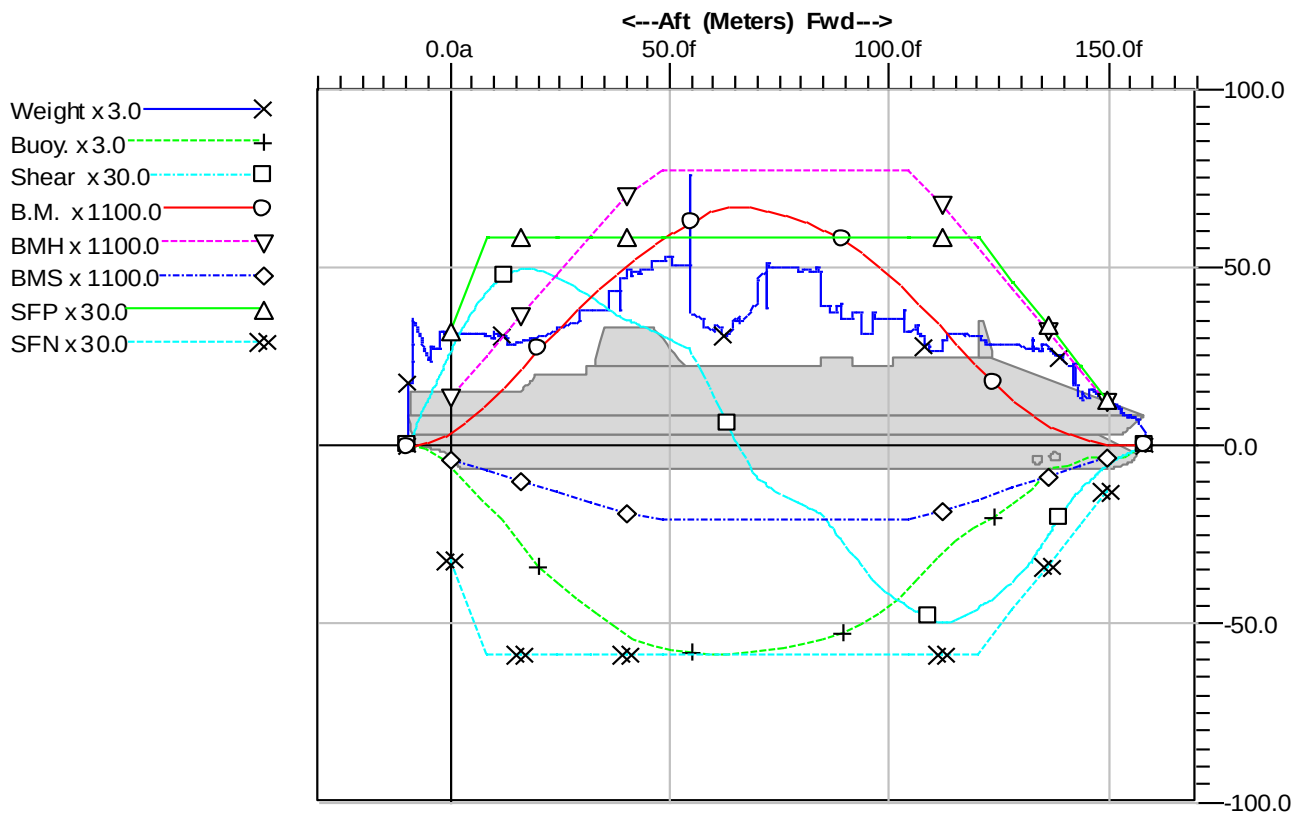
IMO SEVERE WIND & ROLLING

Limit	Min/Max	Actual	Margin	Pass
(1) Res. Ratio from Roll to Abs 50.00 deg or Flood	>1.000	2.112	1.112	Yes

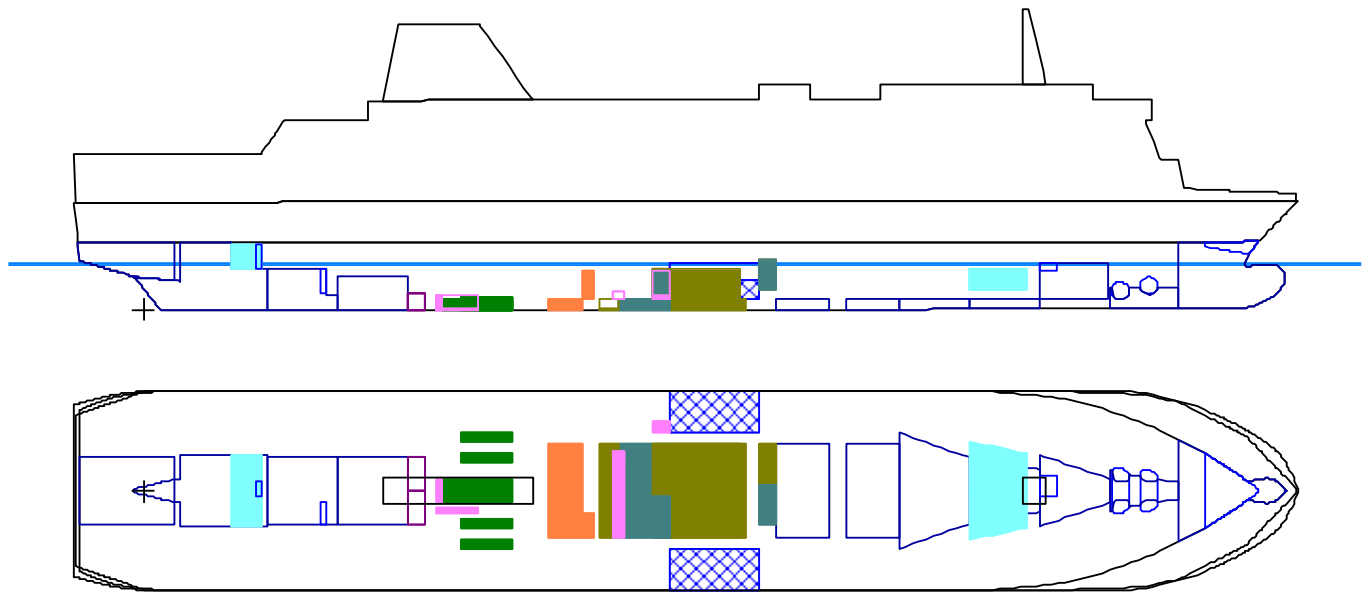
LONGITUDINAL STRENGTH

Frame No.	Location (m)	Weight (MT/m)	Buoyancy (MT/m)	Shear (MT)	Bending (MT-m)	Shear (%/Max)	Bending (%/Max)
FR -10	8.000a	100.0	0.1	144.2	130	undef	undef
FR 0	0.000	95.0	16.5	789.4	3952	81.22	26.70
BKHD FR 6	4.800f	94.9	36.9	1114.8	8589	77.48	38.55
FR 10	8.000f	93.3	49.1	1280.1	12449	73.15	45.66
FR 20	16.000f	88.1	83.1	1478.9	23754	84.51	59.79
BKHD FR 21	16.800f	89.0	86.8	1481.8	24943	84.67	60.87
FR 30	24.000f	99.8	115.6	1415.1	35501	80.86	68.02
BKHD FR 33	26.400f	102.5	122.7	1371.4	38857	78.37	69.47
BKHD FR 36	28.800f	105.2	129.5	1317.9	42099	75.31	70.55
FR 40	32.000f	115.1	138.2	1253.2	46233	71.61	71.51
BKHD FR 50	40.000f	149.3	159.5	1059.2	55471	60.52	71.93
BKHD FR 51	40.800f	149.3	161.2	1050.3	56319	60.02	72.32
FR 60	48.000f	156.1	171.1	928.4	63460	53.05	75.01
BKHD FR 63	50.400f	158.7	172.7	894.5	65659	51.12	77.61
BKHD FR 64	51.200f	152.6	173.1	878.3	66371	50.19	78.45
FR 70	56.000f	109.2	174.8	706.8	70314	40.39	83.11
BKHD FR 75	60.000f	102.0	175.5	414.0	72598	23.66	85.81
FR 80	64.000f	104.0	175.1	101.2	73659	5.78	87.07
BKHD FR 90	72.000f	153.6	172.5	-337.8	72501	19.30	85.70
FR 100	80.000f	149.5	167.3	-499.8	69183	28.56	81.78
BKHD FR 105	84.000f	147.1	163.9	-567.0	67067	32.40	79.28
FR 110	88.000f	117.7	159.5	-749.2	64460	42.81	76.19
BKHD FR 117	93.600f	113.3	151.0	-995.4	59582	56.88	70.43
FR 120	96.000f	112.8	146.2	-1126.3	57046	64.36	67.43
BKHD FR 129	103.200f	113.8	125.0	-1333.2	48145	76.19	56.91
FR 130	103.200f	113.8	125.0	-1333.2	48145	76.19	56.91
FR 140	112.000f	88.6	89.9	-1492.3	35693	85.27	48.07
BKHD FR 141	112.800f	94.8	87.1	-1492.2	34503	85.27	47.29
FR 150	120.000f	93.1	68.5	-1369.5	24166	78.26	39.42
BKHD FR 153	112.400f	88.6	88.5	-1492.2	35098	85.27	47.69
FR 160	128.000f	85.2	48.9	-1153.3	14045	83.51	29.04
BKHD FR 165	132.000f	81.3	36.8	-988.9	9771	82.69	23.32
FR 170	136.000f	83.0	26.6	-763.2	6285	75.49	17.74
BKHD FR 177	141.600f	68.6	15.0	-445.4	2967	59.15	11.23
FR 180	143.400f	39.4	11.9	-374.7	2248	55.92	9.55
FR 190	149.400f	36.7	9.6	-173.7	643	44.20	4.67
FR 200	155.400f	24.2	3.9	-49.7	45	undef	undef

Longitudinal Strength At Sea Condition (port 0.25 deg.)



Max. Shear	-1492.3 MT	at	112.000f
Max. Bending Moment	73741 MT-m	at	65.600f (Hogging)
Max% Shear	85.27%	at	112.000f
Max% Bending Moment	87.16%	at	65.600f

CASE 5.1 - SHIP WITH 1000 PASSENGERS**TRAILERS ON DECKS 3 AND 5 - CARS ON DECKS 5, 6 AND 7****SHIP AT DEPARTURE (100% CONSUMABLES)****Fluid Legend**

Fluid Name	Legend	Weight (MT)	Load%
FRESH WATER		402.63	99.31%
HW		338.26	52.50%
DIESEL OIL		88.86	98.00%
TO		38.47	98.00%
HFO		761.48	92.18%
LUBE OIL		74.51	77.77%
MISCELLANEOUS		10.39	22.66%
LSHFO		231.31	98.00%

Floating Status

Draft FP	6.229 m	Heel	0.00 deg	GM(Solid)	2.905 m
Draft MS	6.312 m	Equil	Yes	F/S Corr.	0.297 m
Draft AP	6.396 m	Wind	Off	GM(Fluid)	2.608 m
Trim	0.17a m	Wave	No	KMT	15.315 m
LCG	68.781f m	VCG-Solid	12.411 m	TPcm	36.53
Displacement	17035.4 MT	WaterSpgr	1.025		

Draft At Draft Marks

FORE.p	6.230(m)	FORE.s	6.230(m)
MID.p	6.312(m)	MID.s	6.312(m)
AFT.p	6.386(m)	AFT.s	6.386(m)

TRIM (Referred to Draft Marks) aft 0.16/140.00a m

Fixed Weight Status

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	11 244.06	70.053f	0.000	13.381u
1) CREW	5.40	120.960f	0.000	25.540u
2) PROVISIONS	45.00	124.100f	0.000	10.110u
3) STORES INCL. SHOP STORES	45.00	98.630f	0.000	11.280u
4) 1000 PASSENGERS	100.00	74.770f	0.000	26.270u
5) TRAILERS ON DECK 3	2 000.00	64.300f	0.000	11.200u
6) TRAILERS ON DECK 5	1 200.00	49.700f	0.000	16.800u
7) CARS ON DECK 5	100.00	122.800f	0.000	15.500u
8) CARS ON CAR DECK 6	75.00	123.250f	0.000	18.470u
9) CARS ON DECK 7	275.00	39.680f	0.000	21.100u
Total Fixed:	15 089.47	68.028f	0.000	13.618u

Tank Status**BALLAST**

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
PFT_WB_101.C	1.025	<empty>					0.0
WB_201.C	1.025	<empty>					0.0
WB_401.C	1.025	<empty>					0.0
WB_501.C	1.025	<empty>					0.0
WB_601.C	1.025	<empty>					0.0
WB_701.C	1.025	<empty>					0.0
WB_1201.C	1.025	<empty>					0.0
WB_1301.C	1.025	<empty>					0.0
WB_1401.C	1.025	<empty>					0.0
WB_1511.C	1.025	<empty>					0.0
WB_311.C	1.025	<empty>					0.0

FRESH WATER

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
FW_1411.C	1.000	98.00%	137.09	13.935f	0.010s	7.366	355.9
FW_411PS.P	1.000	100.00%	131.01	116.609f	2.991p	4.087	0.0
FW_412SB.S	1.000	100.00%	134.54	116.609f	2.991s	4.087	0.0
Subtotals:		99.31%	402.63	81.650f	0.030s	5.203	355.9

HW

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
HEEL_812PS.P	1.000	53.50%	171.57	77.936f	10.826p	2.838	194.4
HEEL_812SB.S	1.000	51.50%	166.69	77.933f	10.823s	2.791	196.2
Subtotals:		52.50%	338.26	77.934f	0.158p	2.815	390.6

DIESEL OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
DO_1001.C	0.860	98.00%	76.11	57.598f	0.000	0.735	707.0
DO_DAY_914.S	0.860	98.00%	12.75	60.800f	4.750s	3.460	3.0
Subtotals:		98.00%	88.86	58.058f	0.681s	1.126	709.9

TO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
TO_STOR1202.P	0.861	98.00%	19.23	37.215f	2.309p	1.198	17.5
TO_DRAIN1202.S	0.861	98.00%	19.23	37.215f	2.309s	1.198	17.5
Subtotals:		98.00%	38.47	37.215f	0.000	1.198	35.0

HFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
HFO_801.C	0.980	100.00%	191.75	77.200f	0.000	0.750	0.0
HFO_811.C	0.980	98.00%	462.63	76.798f	0.000	3.460	1 611.2
HFO_OVFL_902.C	0.980	10.00%	4.43	63.596f	0.000	0.075	402.8
HFO_DAY_911.P	0.980	98.00%	50.60	70.800f	2.000p	3.460	33.7
HFO_SETT.P	0.980	98.00%	50.60	85.200f	3.600p	4.760	33.7
SLUDGE_913.P	0.980	10.00%	1.48	70.799f	5.600p	1.700	0.8
Subtotals:		92.18%	761.48	76.971f	0.383p	2.841	2 082.2

LUBE OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LO_1102PS.P	0.910	98.00%	13.39	46.798f	4.500p	0.823	1.3
LO_1102SB.S	0.910	98.00%	13.39	46.798f	4.500s	0.823	1.3
LO_1103PS.P	0.910	98.00%	11.97	46.863f	7.388p	0.921	1.1
LO_1103SB.S	0.910	98.00%	11.97	46.863f	7.388s	0.921	1.1
DIRTYLO_1101.P	0.910	10.00%	2.20	45.547f	0.800p	0.081	2.9
STOR_LO_1101.S	0.910	98.00%	21.59	45.595f	0.800s	0.794	2.9
Subtotals:		77.77%	74.51	46.433f	0.208s	0.824	10.7

MISCELLANEOUS

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
BILGEWT_915P.P	1.000	10.00%	1.51	70.799f	8.800p	1.695	0.8
HFODRAIN_917.P	1.000	10.00%	0.16	64.798f	5.100p	1.550	0.0
HFOSLUDGE916.S	1.000	10.00%	1.75	64.798f	0.900s	1.550	189.6
LOGEAR_1104P.C	1.000	100.00%	6.45	40.400f	0.000	1.050	0.0
FWDRAIN1104S.S	1.000	10.00%	0.52	42.785f	2.800s	0.096	0.1
Subtotals:		22.66%	10.39	49.426f	1.066p	1.188	190.6

LSHFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LSHFO_901.C	0.980	98.00%	130.11	68.397f	0.000	0.735	1 208.4
LSHFO_DAY912.S	0.980	98.00%	50.60	70.800f	3.600s	3.460	33.7
LSHFO_SETT.S	0.980	98.00%	50.60	85.200f	2.000s	4.760	33.7
Subtotals:		98.00%	231.31	72.598f	1.225s	2.212	1 275.9

All Tanks

	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
Totals:		36.36%	1 945.91	74.621f	0.008s	3.054	5 051.0

Displacer Status

Item	Status	Spgr	Displ (MT)	LCB (m)	TCB (m)	VCB (m)	Eff /Perm
HULL	Intact	1.025	17 035.39	68.771f	0.000	3.575	1.000
SubTotals:			17 035.39	68.771f	0.000	3.575	

Critical points

Name	L,T,V (m)	Height (m)
(1) MES Height Limiting Point PS	47.200f, 13.850p, 5.900	-0.443
(2) MES Height Limiting Point SB	47.200f, 13.850s, 5.900	-0.443

Immersion of propeller tip 1.693 m

Current Rolling Period is : 13.36 second

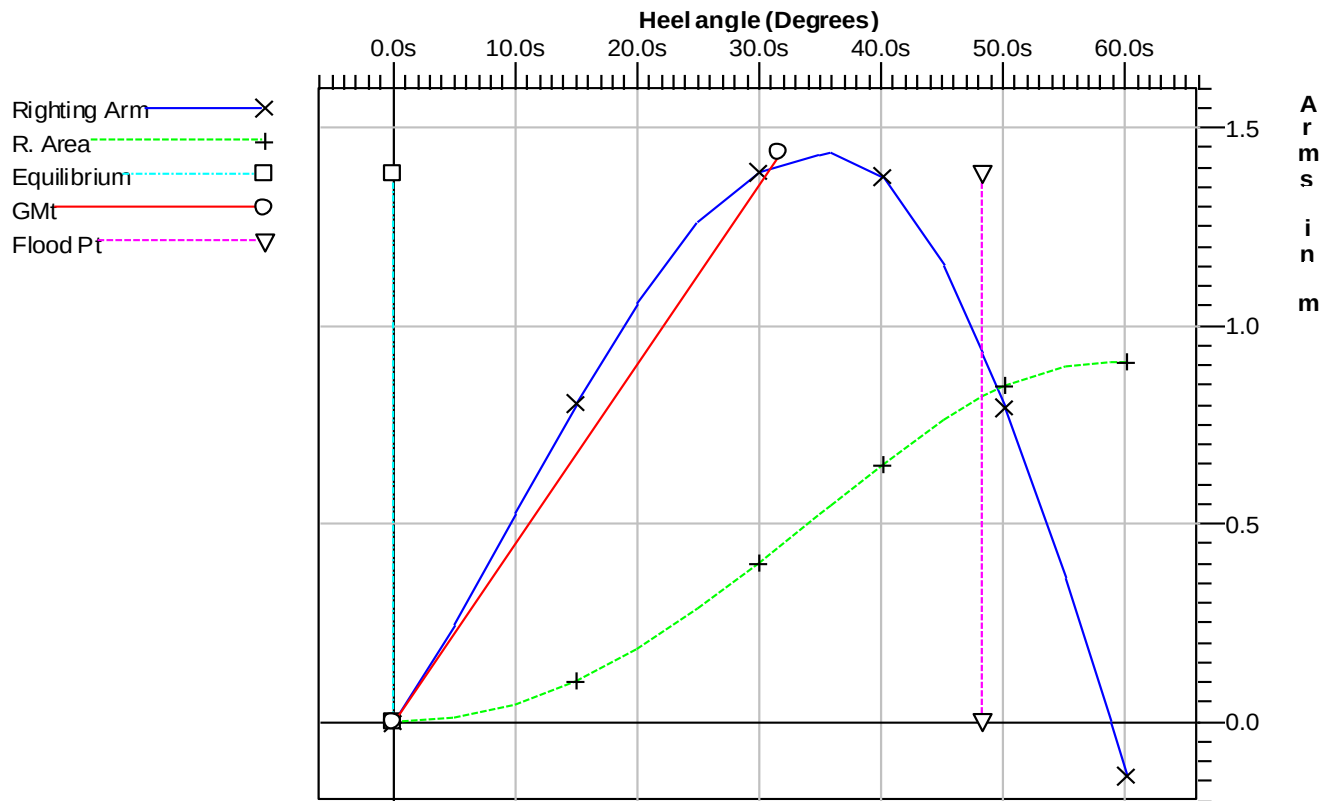
Righting Arms vs. Heel - IMO RES. A.749 (18)

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Righting Arm (m)	Area (m-Rad)	Flood Pt Height (m)	Notes
0.00	0.06a	6.396	0.000	0.000	11.702 (1)	Equil
5.00s	0.05a	6.330	0.250	0.011	10.540 (2)	
10.00s	0.00f	6.127	0.528	0.045	9.389 (2)	
15.00s	0.06f	5.832	0.804	0.103	8.197 (4)	
20.00s	0.11f	5.453	1.061	0.184	6.914 (4)	
25.00s	0.16f	4.974	1.265	0.286	5.638 (4)	
30.00s	0.20f	4.385	1.390	0.403	4.392 (4)	
35.00s	0.25f	3.685	1.434	0.526	3.195 (4)	
35.80s	0.26f	3.564	1.436	0.546	3.008 (4)	MaxRa
40.00s	0.30f	2.891	1.377	0.650	2.014 (4)	
45.00s	0.36f	2.074	1.149	0.761	0.806 (4)	
48.30s	0.39f	1.531	0.928	0.821	0.000 (4)	FldPt
50.00s	0.41f	1.253	0.797	0.847	-0.416 (4)	
55.00s	0.46f	0.433	0.362	0.898	-1.643 (4)	
58.69s	0.49f	-0.176	0.000	0.910	-2.550 (4)	RaZero
60.00s	0.51f	-0.394	-0.135	0.909	-2.871 (4)	

Unprotected Flood Points

Name	L,T,V (m)	Height (m)
(1) Aft Ventilation Opening PS	2.150a, 13.300p, 18.100	11.702
(2) Aft Ventilation Opening SB	2.150a, 13.300s, 18.100	10.540
(4) Fwd Ventilation Opening SB	139.200f, 12.800s, 18.100	8.197

Righting Arms vs. Heel - IMO RES. A.749 (18)



IMO RES. A.749 (18)

Limit	Min/Max	Actual	Margin	Pass
(1) GM at Equilibrium	>0.150 m	2.608	2.458	Yes
(2) Area from 0.00 deg to 30.00	>0.0550 m-R	0.403	0.348	Yes
(3) Area from 0.00 deg to 40.00 or Flood	>0.0900 m-R	0.650	0.560	Yes
(4) Area from 30.00 deg to 40.00 or Flood	>0.0300 m-R	0.247	0.217	Yes
(5) Righting Arm at 30.00 deg	>0.200 m	1.390	1.190	Yes
(6) Angle from 0.00 deg to MaxRA	>25.00 deg	35.80	10.80	Yes

Current VCG Fluid 12.707 m < Max Allowable VCG 13.142 m - PASS

MAXIMUM TURNING ANGLE VERIFICATION

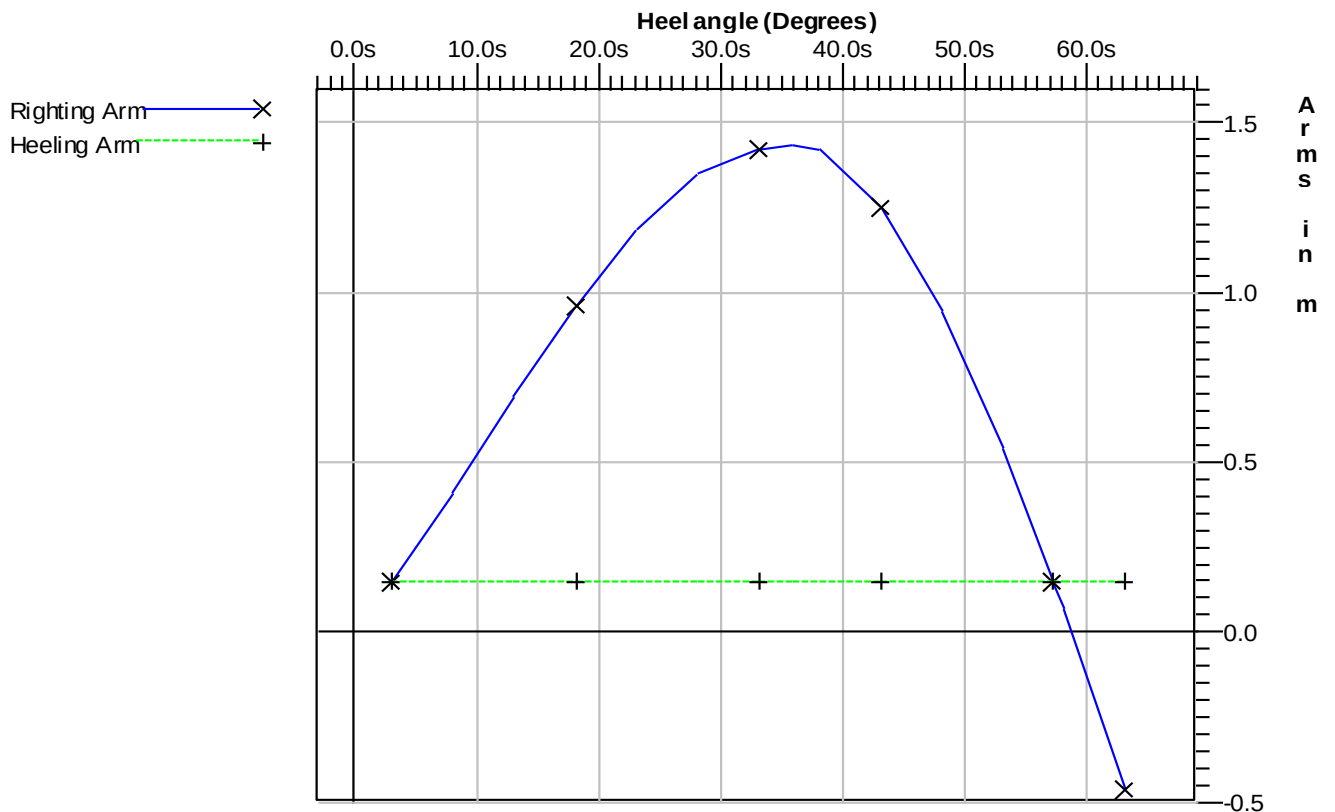
Cruising speed 21.15 knots

MOMENT DUE TO MAXIMUM TURNING ANGLE 2495.141 tm

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)
3.04s	0.06a	6.372	0.001
8.04s	0.02a	6.220	0.271
13.04s	0.04f	5.957	0.551
18.04s	0.09f	5.612	0.819
23.04s	0.14f	5.174	1.047
28.04s	0.19f	4.629	1.206
33.04s	0.23f	3.972	1.278
35.84s	0.26f	3.557	1.289
38.04s	0.28f	3.208	1.275
43.04s	0.34f	2.395	1.110
48.04s	0.39f	1.575	0.800
53.04s	0.44f	0.754	0.394
57.23s	0.48f	0.065	0.000
58.04s	0.49f	-0.068	-0.080
63.04s	0.54f	-0.907	-0.607

Righting Arms vs. Heel - IMO RES. A.749 (18)



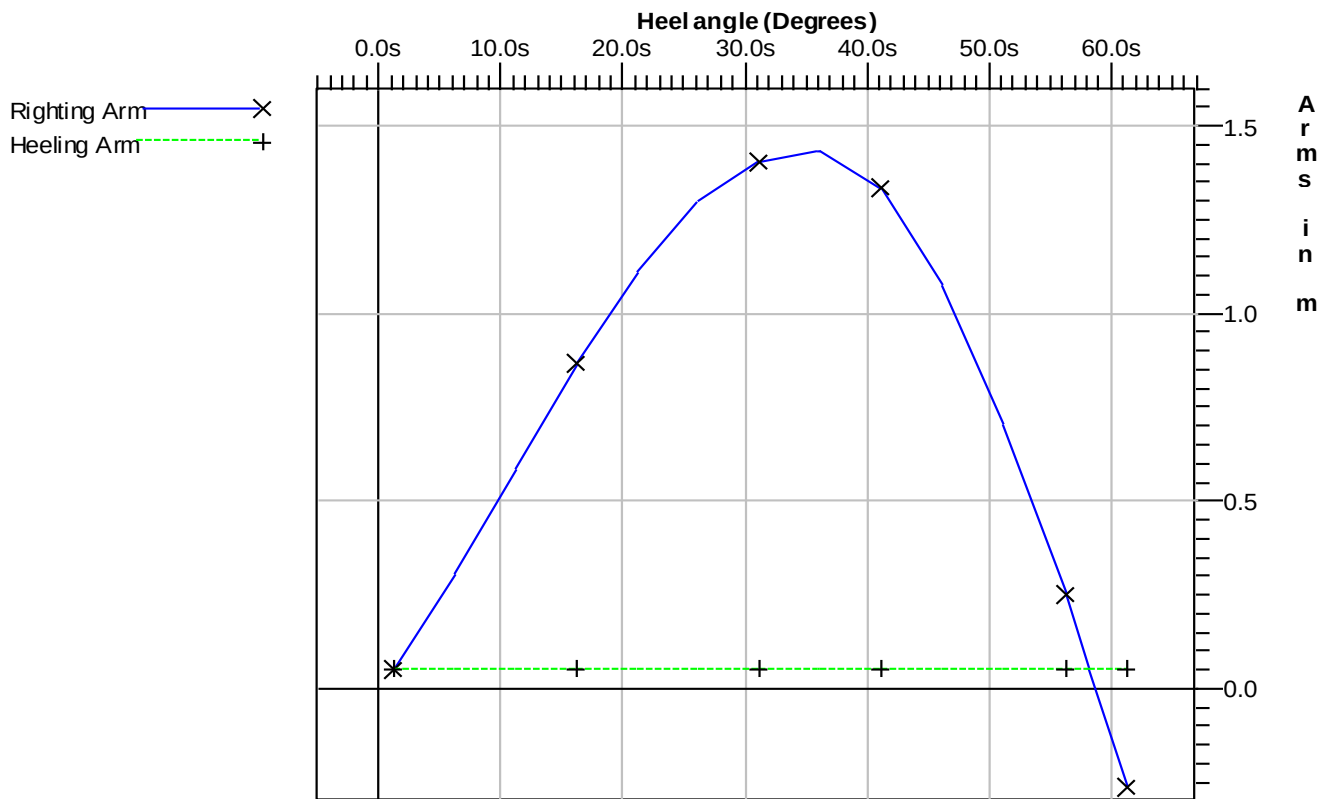
HEELING ANGLE DUE TO TURNING 3.04s deg

1000 PASSENGERS CROWDING VERIFICATION

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)
1.16s	0.06a	6.393	0.000
6.16s	0.04a	6.294	0.259
11.16s	0.02f	6.065	0.539
16.16s	0.07f	5.751	0.813
21.16s	0.12f	5.351	1.061
26.16s	0.17f	4.847	1.249
31.16s	0.22f	4.232	1.353
35.96s	0.26f	3.538	1.382
36.16s	0.26f	3.507	1.382
41.16s	0.31f	2.701	1.284
46.16s	0.37f	1.882	1.023
51.16s	0.42f	1.062	0.648
56.16s	0.47f	0.242	0.197
58.17s	0.49f	-0.088	0.000
61.16s	0.52f	-0.589	-0.311

Righting Arms vs. Heel - IMO RES. A.749 (18)



HEELING ANGLE DUE TO PASSENGERS CROWDING 1.16s deg

IMO Res. A.749 (18), SEVERE WIND AND ROLLING CRITERION (WEATHER CRITERION)

Wind speed 53.4 kn

Wind pressure 504 N /m²Under Water Lateral Plane 973.669 m²

Above Water Lateral Plane

Under Water Lateral Plane Centroid m below water line

Above Water Lateral Plane Centroid m above water line

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)	Area (m-Rad)	Flood Pt Height (m)	Notes
19.07p	0.10f	5.531	-1.251	0.000	7.153 (3)	Roll
14.07p	0.05f	5.893	-0.988	-0.098	8.434 (1)	
9.07p	0.01a	6.172	-0.710	-0.172	9.606 (1)	
4.07p	0.05a	6.353	-0.435	-0.222	10.756 (1)	
0.93s	0.06a	6.394	-0.191	-0.249	11.485 (2)	
4.69s	0.05a	6.338	0.000	-0.255	10.611 (2)	Equil
5.93s	0.04a	6.302	0.067	-0.255	10.325 (2)	
10.93s	0.01f	6.078	0.347	-0.237	9.172 (2)	
15.93s	0.07f	5.768	0.622	-0.194	7.958 (4)	
20.93s	0.12f	5.371	0.871	-0.129	6.675 (4)	
25.93s	0.17f	4.873	1.062	-0.044	5.403 (4)	
30.93s	0.21f	4.263	1.171	0.054	4.165 (4)	
35.93s	0.26f	3.543	1.202	0.158	2.977 (4)	MaxRa
40.93s	0.31f	2.739	1.113	0.260	1.790 (4)	
45.93s	0.37f	1.920	0.858	0.347	0.579 (4)	
48.30s	0.39f	1.531	0.695	0.379	0.000 (4)	FldPt
50.00s	0.41f	1.253	0.564	0.398	-0.416 (4)	
55.00s	0.46f	0.433	0.128	0.429	-1.643 (4)	

Note:

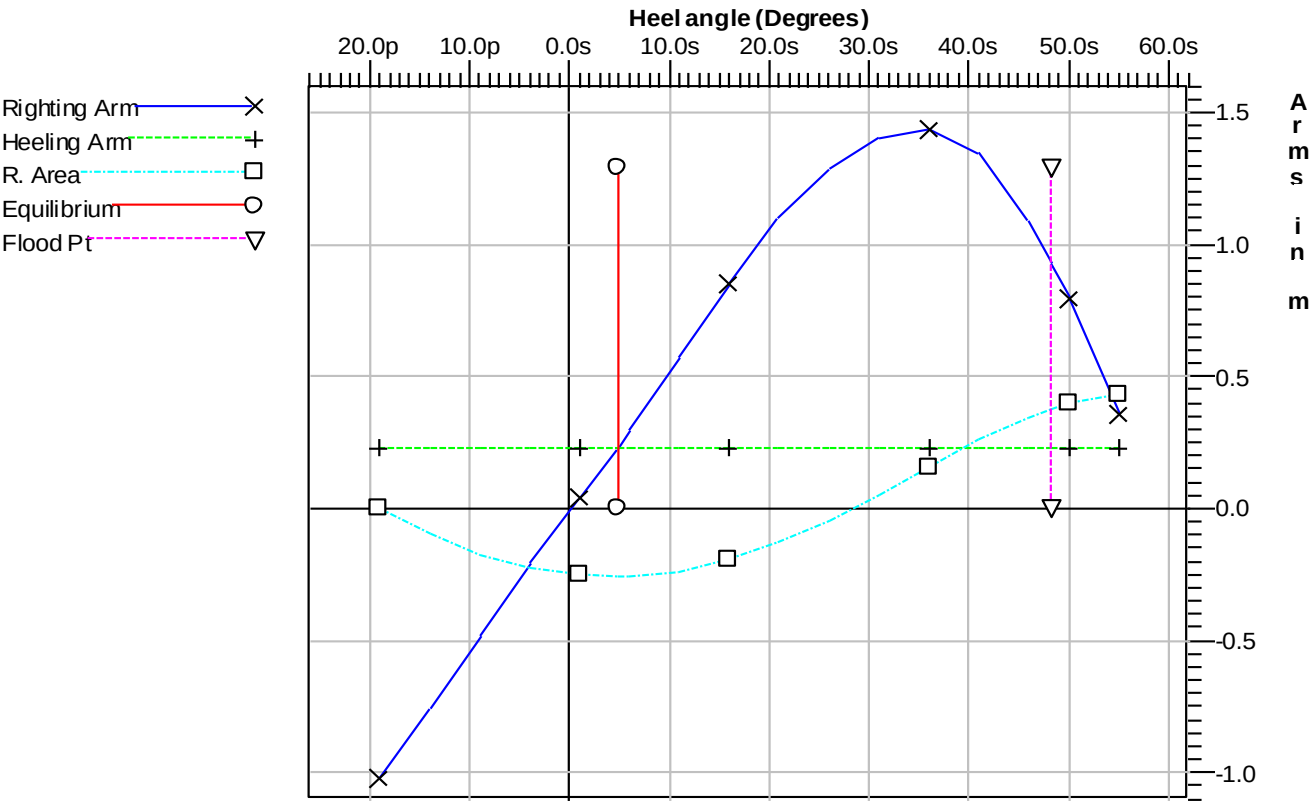
Roll angle is 22.28

Equilibrium for load condition without gust is 3.22s

Unprotected Flood Points

Name	L,T,V (m)	Height (m)
(1) Aft Ventilation Opening PS	2.150a, 13.300p, 18.100	8.434
(2) Aft Ventilation Opening SB	2.150a, 13.300s, 18.100	11.485
(3) Fwd Ventilation Opening PS	139.200f, 12.800p, 18.100	7.153
(4) Fwd Ventilation Opening SB	139.200f, 12.800s, 18.100	7.958

Righting Arms vs. Heel - IMO SEVERE WIND & ROLLING



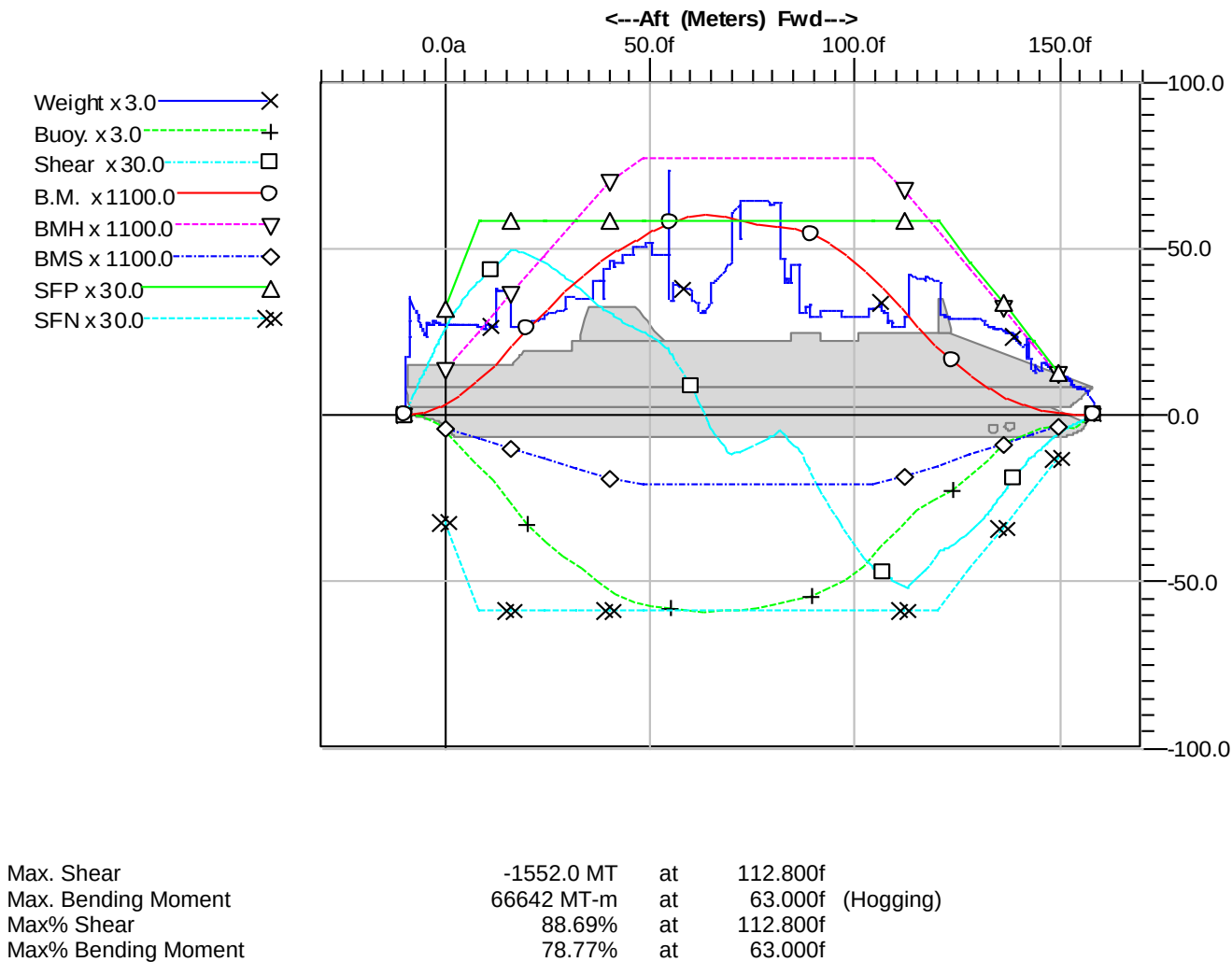
IMO SEVERE WIND & ROLLING

Limit	Min/Max	Actual	Margin	Pass
(1) Res. Ratio from Roll to Abs 50.00 deg or Flood	>1.000	2.485	1.485	Yes

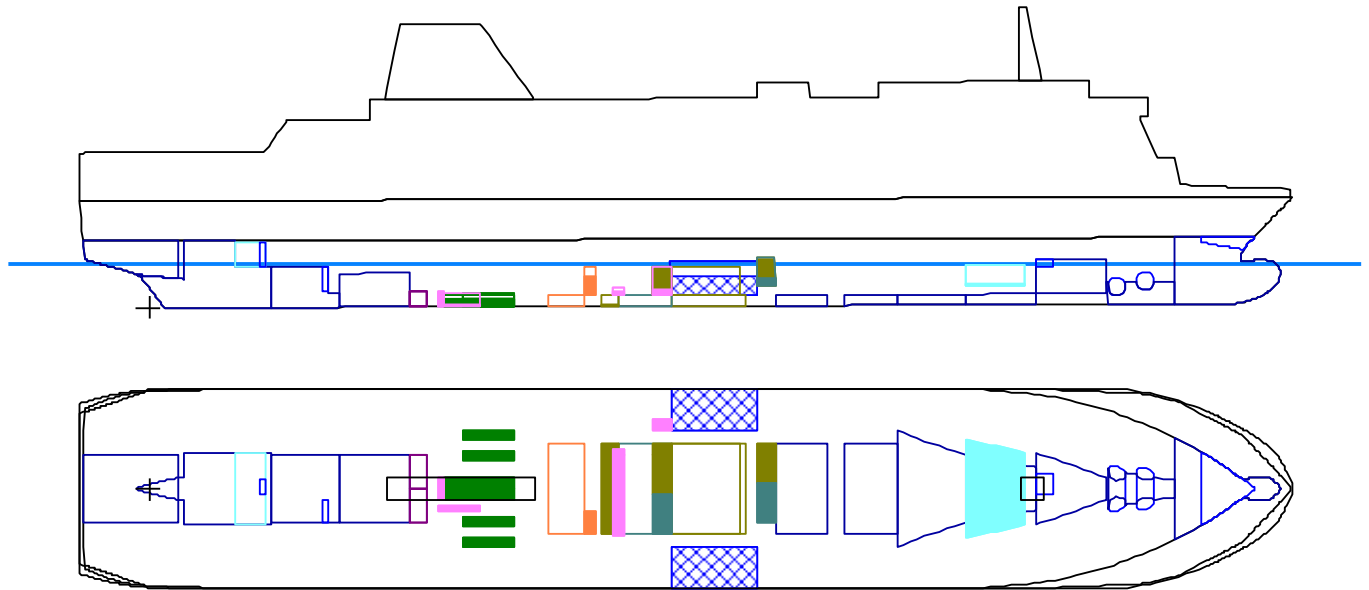
LONGITUDINAL STRENGTH

Frame No.	Location (m)	Weight (MT/m)	Buoyancy (MT/m)	Shear (MT)	Bending (MT-m)	Shear (%/Max)	Bending (%/Max)
FR -10	8.000a	100.0	<und>	142.7	138	undef	undef
FR 0	0.000	82.2	12.9	778.3	3930	80.08	26.55
BKHD FR 6	4.800f	82.1	32.7	1061.4	8389	73.77	37.65
FR 10	8.000f	80.5	44.8	1199.5	12020	68.54	44.09
FR 20	16.000f	108.1	78.9	1480.8	22679	84.62	57.08
BKHD FR 21	16.800f	80.2	82.7	1479.9	23864	84.57	58.24
FR 30	24.000f	91.0	112.2	1377.2	34250	78.70	65.62
BKHD FR 33	26.400f	93.7	119.6	1320.2	37488	75.44	67.02
BKHD FR 36	28.800f	96.4	126.7	1252.7	40581	71.59	68.01
FR 40	32.000f	106.3	135.8	1168.3	44461	66.76	68.76
BKHD FR 50	40.000f	140.4	158.1	919.3	52769	52.53	68.42
BKHD FR 51	40.800f	140.4	159.9	904.4	53499	51.68	68.70
FR 60	48.000f	152.7	170.7	753.4	59431	43.05	70.25
BKHD FR 63	50.400f	155.4	172.6	712.3	61191	40.70	72.33
BKHD FR 64	51.200f	145.8	173.1	690.7	61751	39.47	72.99
FR 70	56.000f	118.3	175.3	498.1	64698	28.46	76.48
BKHD FR 75	60.000f	112.1	176.6	254.5	66216	14.54	78.27
FR 80	64.000f	99.4	176.6	-60.3	66622	3.45	78.75
BKHD FR 90	72.000f	193.3	175.1	-334.1	64562	19.09	76.31
FR 100	80.000f	192.4	170.8	-178.0	62512	10.17	73.89
BKHD FR 105	84.000f	135.3	167.9	-238.8	61810	13.64	73.06
FR 110	88.000f	98.4	163.9	-427.9	60554	24.45	71.58
BKHD FR 117	93.600f	94.1	156.1	-808.9	57067	46.22	67.45
FR 120	96.000f	94.1	151.7	-952.8	54960	54.45	64.96
BKHD FR 129	103.200f	96.7	131.3	-1332.0	46649	76.12	55.14
FR 130	103.200f	96.7	131.3	-1332.0	46649	76.12	55.14
FR 140	112.000f	88.6	96.2	-1547.1	33923	88.40	45.69
BKHD FR 141	112.800f	126.6	93.4	-1552.0	32684	88.69	44.80
FR 150	120.000f	121.0	74.8	-1261.2	22501	72.07	36.70
BKHD FR 153	112.400f	88.6	94.8	-1549.5	33304	88.55	45.25
FR 160	128.000f	88.0	54.5	-1051.4	13253	76.13	27.40
BKHD FR 165	132.000f	81.3	41.6	-898.8	9348	75.15	22.31
FR 170	136.000f	76.4	30.6	-707.8	6140	70.01	17.33
BKHD FR 177	141.600f	64.4	17.4	-432.5	2985	57.45	11.29
FR 180	143.400f	39.4	13.8	-365.6	2277	54.57	9.67
FR 190	149.400f	36.7	10.2	-171.7	675	43.69	4.91
FR 200	155.400f	24.2	3.9	-49.7	57	undef	undef

Longitudinal Strength At Sea Condition (stbd 0.02 deg.)



**CASE 5.2 - SHIP WITH 1000 PASSENGERS -
TRAILERS ON DECKS 3 AND 5 - CARS ON DECKS 5, 6 AND 7
SHIP AT ARRIVAL (10% CONSUMABLES)**



Fluid Legend

Fluid Name	Legend	Weight (MT)	Load%
FRESH WATER		41.16	10.15%
HW		338.36	52.51%
DIESEL OIL		9.04	9.97%
TO		38.47	98.00%
HFO		82.39	9.97%
LUBE OIL		48.68	50.80%
MISCELLANEOUS		19.58	42.70%
LSHFO		24.27	10.28%

Floating Status

Draft FP	5.628 m	Heel	0.00 deg	GM(Solid)	2.452 m
Draft MS	5.906 m	Equil	Yes	F/S Corr.	0.092 m
Draft AP	6.185 m	Wind	Off	GM(Fluid)	2.360 m
Trim	0.56a m	Wave	No	KMT	15.655 m
LCG	68.135f m	VCG-Solid	13.203 m	TPcm	35.62
Displacement	15650.9 MT	WaterSpgr	1.025		

Draft At Draft Marks

FORE.p	5.632(m)	FORE.s	5.632(m)
MID.p	5.906(m)	MID.s	5.906(m)
AFT.p	6.152(m)	AFT.s	6.152(m)

TRIM (Referred to Draft Marks) aft 0.52/140.00a m

Fixed Weight Status

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	11 244.06	70.053f	0.000	13.381u
1) CREW	5.40	120.960f	0.000	25.540u
2) PROVISIONS	4.50	124.100f	0.000	10.110u
3) STORES INCL. SHOP STORES	45.00	98.630f	0.000	11.280u
4) 1000 PASSENGERS	100.00	74.770f	0.000	26.270u
5) TRAILERS ON DECK 3	2 000.00	64.300f	0.000	11.200u
6) TRAILERS ON DECK 5	1 200.00	49.700f	0.000	16.800u
7) CARS ON DECK 5	100.00	122.800f	0.000	15.500u
8) CARS ON CAR DECK 6	75.00	123.250f	0.000	18.470u
9) CARS ON DECK 7	275.00	39.680f	0.000	21.100u
Total Fixed:	15 048.97	67.877f	0.000	13.627u

Tank Status**BALLAST**

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
PFT_WB_101.C	1.025	<empty>					0.0
WB_201.C	1.025	<empty>					0.0
WB_401.C	1.025	<empty>					0.0
WB_501.C	1.025	<empty>					0.0
WB_601.C	1.025	<empty>					0.0
WB_701.C	1.025	<empty>					0.0
WB_1201.C	1.025	<empty>					0.0
WB_1301.C	1.025	<empty>					0.0
WB_1401.C	1.025	<empty>					0.0
WB_1511.C	1.025	<empty>					0.0
WB_311.C	1.025	<empty>					0.0

FRESH WATER

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
FW_1411.C	1.000	<empty>					0.0
FW_411PS.P	1.000	15.50%	20.31	116.564f	2.973p	2.834	135.5
FW_412SB.S	1.000	15.50%	20.85	116.564f	2.973s	2.834	139.2
Subtotals:		10.15%	41.16	116.564f	0.040s	2.834	274.7

HW

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
HEEL_812PS.P	1.000	50.00%	160.35	77.918f	10.820p	2.755	194.4
HEEL_812SB.S	1.000	55.00%	178.02	77.925f	10.829s	2.874	196.2
Subtotals:		52.51%	338.36	77.922f	0.570s	2.818	390.6

DIESEL OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
DO_1001.C	0.860	<empty>					0.0
DO_DAY_914.S	0.860	69.50%	9.04	60.800f	4.750s	2.890	3.0
Subtotals:		9.97%	9.04	60.800f	4.750s	2.890	3.0

TO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
TO_STOR1202.P	0.861	98.00%	19.23	37.214f	2.309p	1.198	17.5
TO_DRAIN1202.S	0.861	98.00%	19.23	37.214f	2.309s	1.198	17.5
Subtotals:		98.00%	38.47	37.214f	0.000	1.198	35.0

HFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
HFO_801.C	0.980	<empty>					0.0
HFO_811.C	0.980	<empty>					0.0
HFO_OVFL_902.C	0.980	10.00%	4.43	63.588f	0.000	0.075	402.8
HFO_DAY_911.P	0.980	33.00%	17.04	70.799f	2.000p	2.160	33.7
HFO_SETT.P	0.980	90.00%	46.47	85.200f	3.600p	4.600	33.7
SLUDGE_913.P	0.980	98.00%	14.46	70.800f	5.600p	3.460	0.8
Subtotals:		9.97%	82.39	78.534f	3.427p	3.652	471.1

LUBE OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LO_1102PS.P	0.910	60.00%	8.20	46.785f	4.500p	0.504	1.3
LO_1102SB.S	0.910	60.00%	8.20	46.785f	4.500s	0.504	1.3
LO_1103PS.P	0.910	60.00%	7.33	46.893f	7.384p	0.582	1.1
LO_1103SB.S	0.910	60.00%	7.33	46.893f	7.384s	0.582	1.1
DIRTYLO_1101.P	0.910	70.00%	15.42	45.575f	0.800p	0.567	2.9
STOR_LO_1101.S	0.910	10.00%	2.20	45.424f	0.800s	0.081	2.9
Subtotals:		50.80%	48.68	46.373f	0.217p	0.529	10.7

MISCELLANEOUS

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
BILGEWT_915P.P	1.000	20.00%	3.02	70.798f	8.800p	1.890	0.8
HFODRAIN_917.P	1.000	20.00%	0.33	64.796f	5.100p	1.600	0.0
HFOSLUDGE916.S	1.000	50.00%	8.76	64.798f	0.900s	1.750	189.6
LOGEAR_1104P.C	1.000	100.00%	6.45	40.400f	0.000	1.050	0.0
FWDRAIN1104S.S	1.000	20.00%	1.04	42.775f	2.800s	0.193	0.1
Subtotals:		42.70%	19.58	56.521f	0.890p	1.456	190.7

LSHFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LSHFO_901.C	0.980	<empty>					0.0
LSHFO_DAY912.S	0.980	20.00%	10.33	70.798f	3.600s	1.900	33.7
LSHFO_SETT.S	0.980	27.00%	13.94	85.198f	2.000s	3.340	33.7
Subtotals:		10.28%	24.27	79.071f	2.681s	2.727	67.5

All Tanks

	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
Totals:		11.25%	601.95	74.588f	0.013p	2.597	1 443.2

Displacer Status

Item	Status	Spgr	Displ (MT)	LCB (m)	TCB (m)	VCB (m)	Eff /Perm
HULL	Intact	1.025	15 650.92	68.099f	0.000	3.351	1.000
SubTotals:			15 650.92	68.099f	0.000	3.351	

Critical points

Name	L,T,V (m)	Height (m)
(1) MES Height Limiting Point PS	47.200f, 13.850p, 5.900	-0.110
(2) MES Height Limiting Point SB	47.200f, 13.850s, 5.900	-0.110

Immersion of propeller tip 1.474 m

Current Rolling Period is : 14.45 second

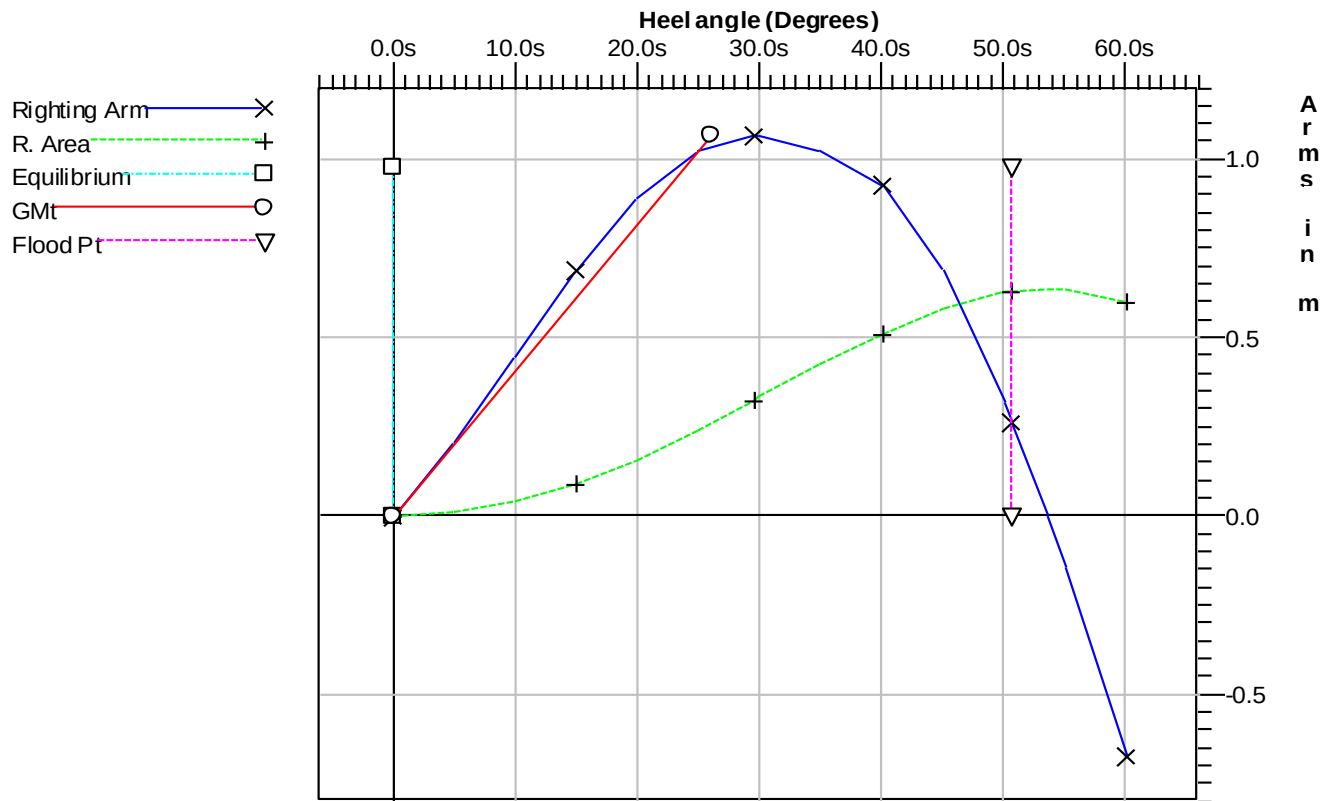
Righting Arms vs. Heel - IMO RES. A.749 (18)

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Righting Arm (m)	Area (m-Rad)	Flood Pt Height (m)	Notes
0.00	0.21a	6.185	0.000	0.000	11.907 (1)	Equil
5.00s	0.20a	6.122	0.212	0.009	10.743 (2)	
10.00s	0.14a	5.917	0.450	0.038	9.593 (2)	
15.00s	0.08a	5.609	0.687	0.088	8.429 (2)	
20.00s	0.01a	5.214	0.892	0.157	7.245 (2)	
25.00s	0.05f	4.716	1.029	0.241	6.069 (2)	
29.60s	0.10f	4.162	1.070	0.326	5.005 (4)	MaxRa
30.00s	0.11f	4.109	1.069	0.333	4.906 (4)	
35.00s	0.16f	3.396	1.026	0.425	3.700 (4)	
40.00s	0.21f	2.588	0.929	0.511	2.539 (4)	
45.00s	0.27f	1.738	0.688	0.583	1.358 (4)	
50.00s	0.32f	0.885	0.317	0.627	0.159 (4)	
50.66s	0.33f	0.772	0.261	0.631	0.000 (4)	FldPt
53.54s	0.36f	0.282	0.000	0.637	-0.695 (4)	RaZero
55.00s	0.38f	0.031	-0.143	0.636	-1.050 (4)	
60.00s	0.44f	-0.836	-0.675	0.600	-2.260 (4)	

Unprotected Flood Points

Name	L,T,V (m)	Height (m)
(1) Aft Ventilation Opening PS	2.150a, 13.300p, 18.100	11.907
(2) Aft Ventilation Opening SB	2.150a, 13.300s, 18.100	10.743
(4) Fwd Ventilation Opening SB	139.200f, 12.800s, 18.100	5.005

Righting Arms vs. Heel - IMO RES. A.749 (18)



IMO RES. A.749 (18)

Limit	Min/Max	Actual	Margin	Pass
(1) GM at Equilibrium	>0.150 m	2.360	2.210	Yes
(2) Area from 0.00 deg to 30.00	>0.0550 m-R	0.333	0.278	Yes
(3) Area from 0.00 deg to 40.00 or Flood	>0.0900 m-R	0.511	0.421	Yes
(4) Area from 30.00 deg to 40.00 or Flood	>0.0300 m-R	0.178	0.148	Yes
(5) Righting Arm at 30.00 deg	>0.200 m	1.069	0.869	Yes
(6) Angle from 0.00 deg to MaxRA	>25.00 deg	29.60	4.60	Yes

Current VCG Fluid 13.295 m < Max Allowable VCG 13.849 m - PASS

MAXIMUM TURNING ANGLE VERIFICATION

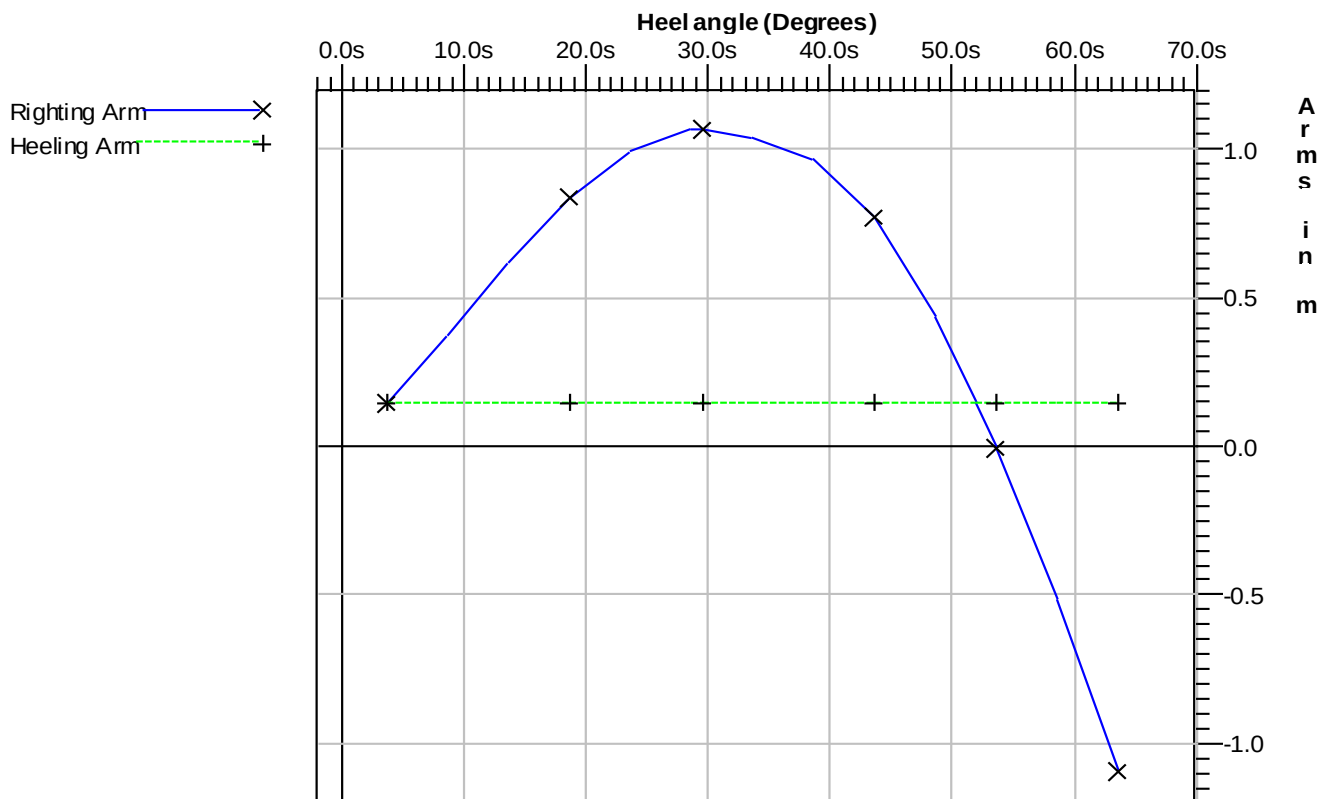
Cruising speed 21.15 knots

MOMENT DUE TO MAXIMUM TURNING ANGLE 2338.808 tm

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)
3.58s	0.21a	6.153	0.000
8.58s	0.16a	5.989	0.230
13.58s	0.10a	5.706	0.472
18.58s	0.03a	5.336	0.690
23.58s	0.03f	4.869	0.849
28.58s	0.09f	4.294	0.919
29.58s	0.10f	4.165	0.920
33.58s	0.15f	3.609	0.895
38.58s	0.19f	2.827	0.817
43.58s	0.25f	1.981	0.623
48.58s	0.31f	1.128	0.284
51.92s	0.34f	0.557	0.000
53.58s	0.36f	0.275	-0.154
58.58s	0.42f	-0.587	-0.666
63.58s	0.48f	-1.461	-1.244

Righting Arms vs. Heel - IMO RES. A.749 (18)



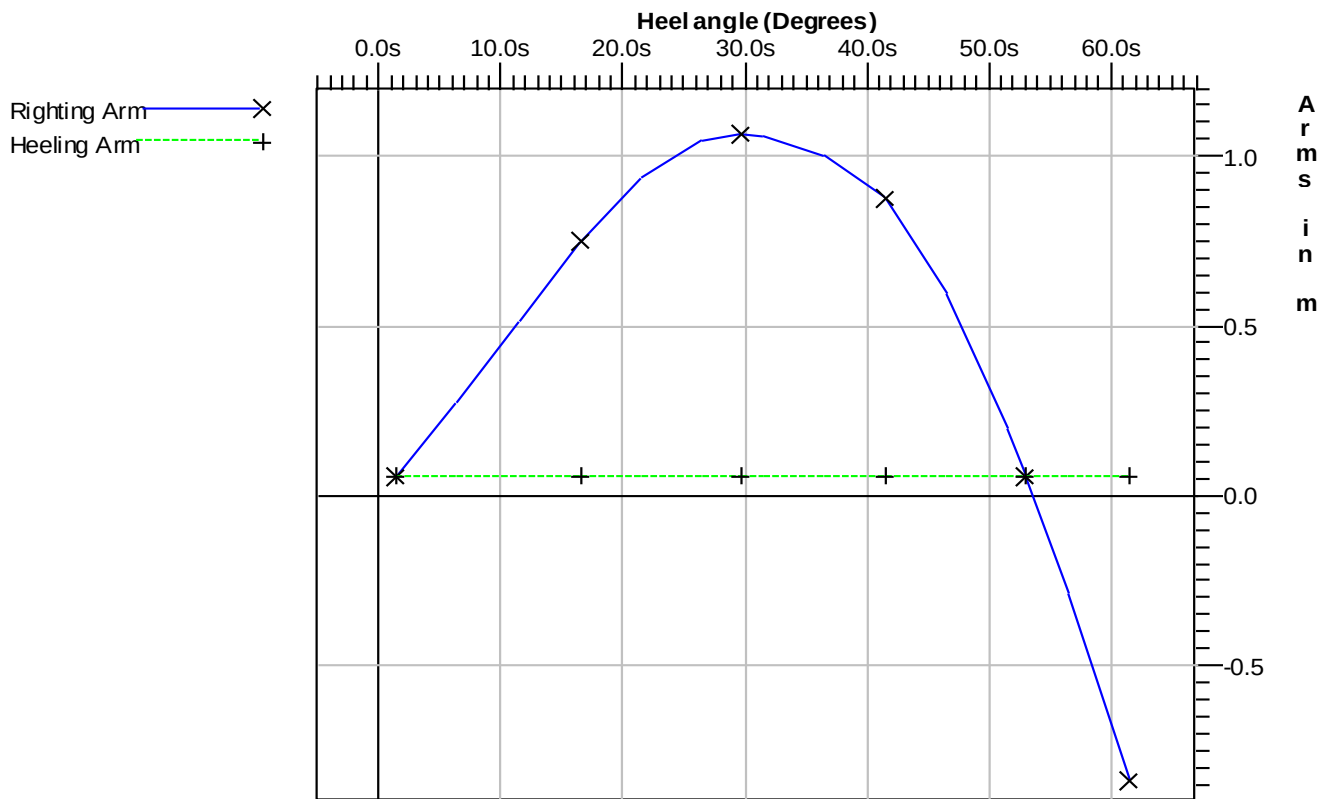
HEELING ANGLE DUE TO TURNING 3.58s deg

1000 PASSENGERS CROWDING VERIFICATION

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)
1.41s	0.21a	6.180	0.000
6.41s	0.19a	6.078	0.218
11.41s	0.12a	5.839	0.460
16.41s	0.06a	5.507	0.692
21.41s	0.00f	5.084	0.880
26.41s	0.06f	4.557	0.992
29.61s	0.10f	4.160	1.011
31.41s	0.12f	3.918	1.005
36.41s	0.17f	3.177	0.946
41.41s	0.23f	2.348	0.819
46.41s	0.28f	1.496	0.536
51.41s	0.34f	0.643	0.136
52.91s	0.35f	0.389	0.000
56.41s	0.39f	-0.213	-0.346
61.41s	0.45f	-1.084	-0.895

Righting Arms vs. Heel - IMO RES. A.749 (18)



HEELING ANGLE DUE TO PASSENGERS CROWDING 1.41s deg

IMO Res. A.749 (18), SEVERE WIND AND ROLLING CRITERION (WEATHER CRITERION)

Wind speed 53.4 kn

Wind pressure 504 N /m²Under Water Lateral Plane 908.353 m²Above Water Lateral Plane 3579.439 m²

Under Water Lateral Plane Centroid 2.913 m below water line

Above Water Lateral Plane Centroid 11.766 m above water line

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)	Area (m-Rad)	Flood Pt Height (m)	Notes
18.08p	0.04a	5.378	-1.078	0.000	7.701 (1)	Roll
13.08p	0.10a	5.738	-0.856	-0.084	8.880 (1)	
8.08p	0.17a	6.011	-0.614	-0.149	10.034 (1)	
3.08p	0.21a	6.162	-0.387	-0.192	11.191 (1)	
1.92s	0.21a	6.176	-0.179	-0.217	11.459 (2)	
6.05s	0.19a	6.091	0.000	-0.223	10.500 (2)	Equil
6.92s	0.18a	6.059	0.041	-0.223	10.298 (2)	
11.92s	0.12a	5.809	0.284	-0.209	9.148 (2)	
16.92s	0.05a	5.468	0.513	-0.174	7.974 (2)	
21.92s	0.01f	5.035	0.695	-0.121	6.791 (2)	
26.92s	0.07f	4.496	0.797	-0.055	5.622 (2)	
29.52s	0.10f	4.172	0.810	-0.019	5.023 (4)	MaxRa
31.92s	0.13f	3.847	0.801	0.015	4.436 (4)	
36.92s	0.18f	3.096	0.737	0.083	3.251 (4)	
41.92s	0.23f	2.261	0.596	0.141	2.087 (4)	
46.92s	0.29f	1.409	0.299	0.181	0.898 (4)	
50.00s	0.32f	0.884	0.058	0.191	0.159 (4)	
50.66s	0.33f	0.772	0.002	0.192	0.000 (4)	FldPt
50.67s	0.33f	0.769	0.000	0.192	-0.004 (4)	RaZero
55.00s	0.38f	0.031	-0.403	0.177	-1.050 (4)	

Note:

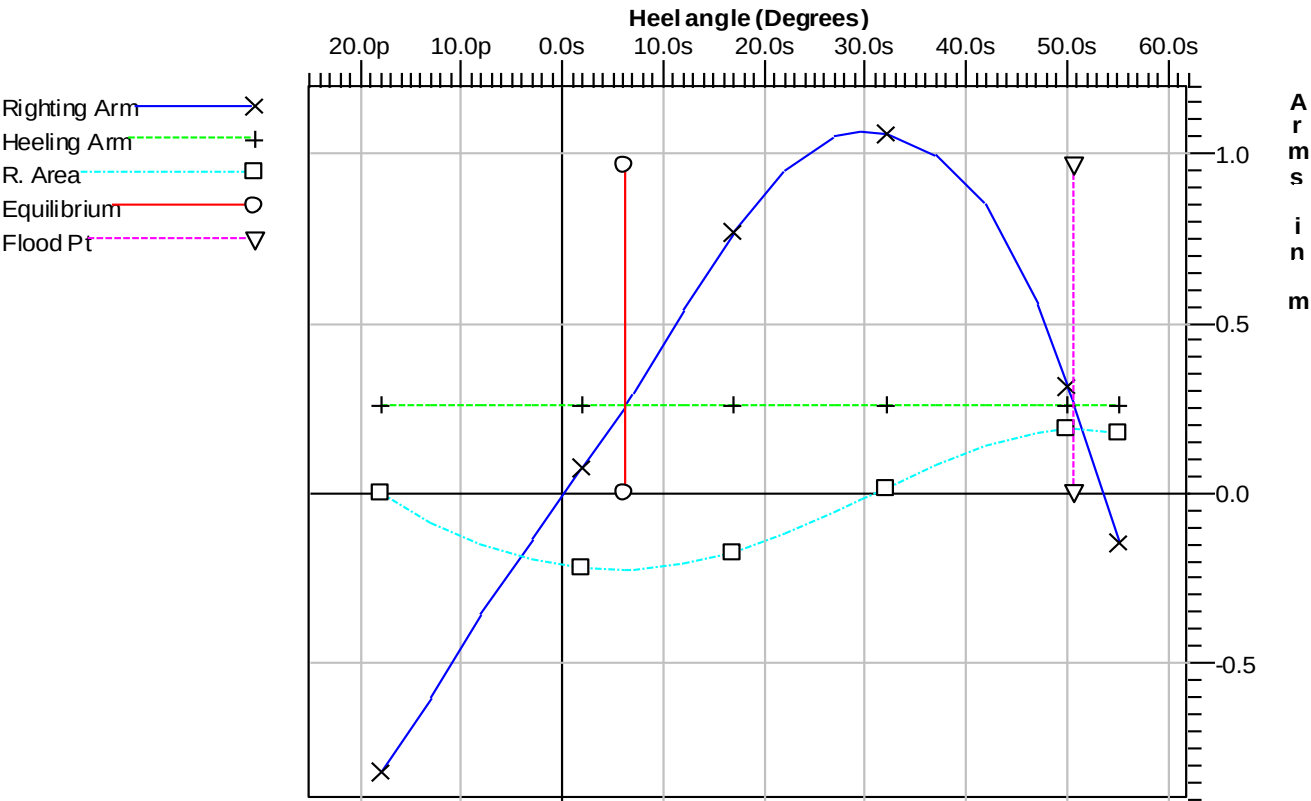
Roll angle is 22.20

Equilibrium for load condition without gust is 4.12s

Unprotected Flood Points

Name	L,T,V (m)	Height (m)
(1) Aft Ventilation Opening PS	2.150a, 13.300p, 18.100	7.701
(2) Aft Ventilation Opening SB	2.150a, 13.300s, 18.100	11.459
(4) Fwd Ventilation Opening SB	139.200f, 12.800s, 18.100	5.023

Righting Arms vs. Heel - IMO SEVERE WIND & ROLLING



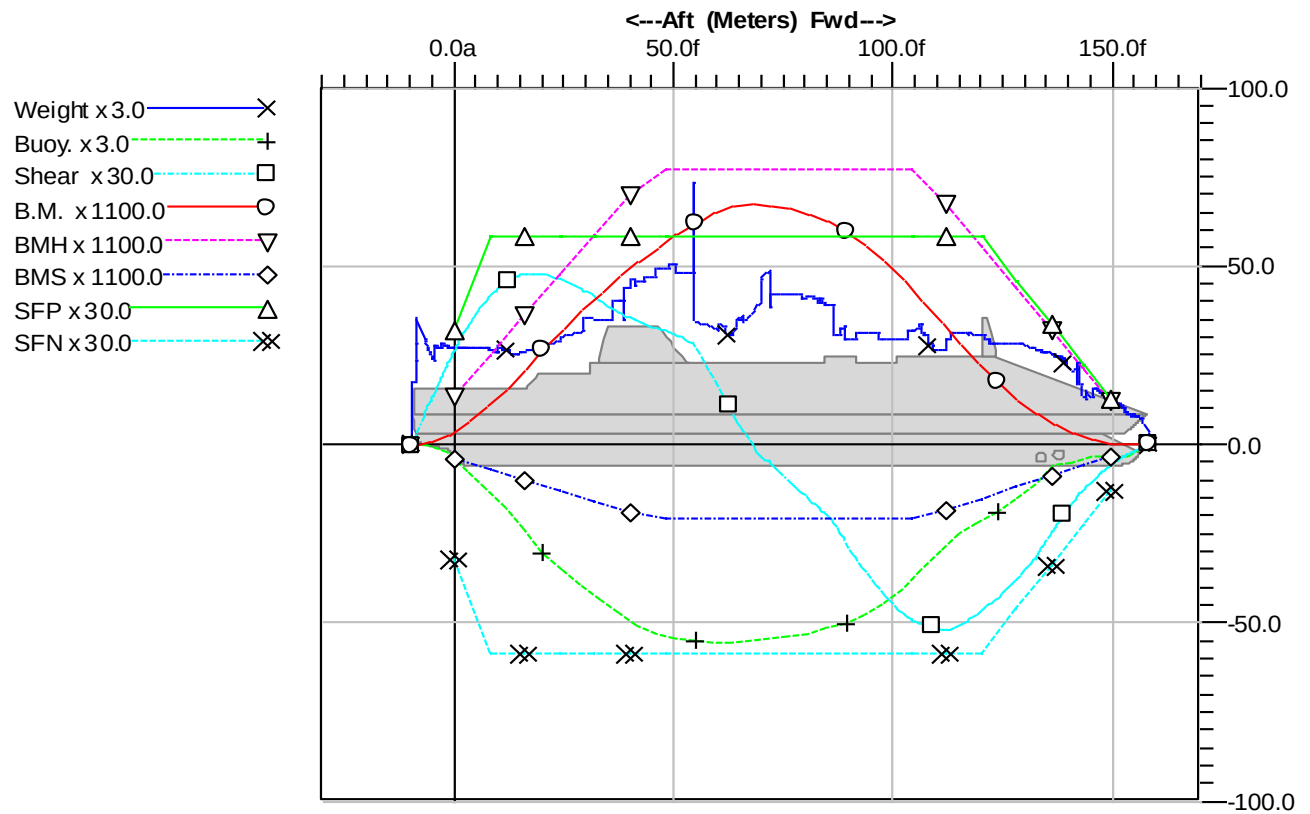
IMO SEVERE WIND & ROLLING

Limit	Min/Max	Actual	Margin	Pass
(1) Res. Ratio from Roll to Abs 50.00 deg or Flood	>1.000	1.856	0.856	Yes

LONGITUDINAL STRENGTH

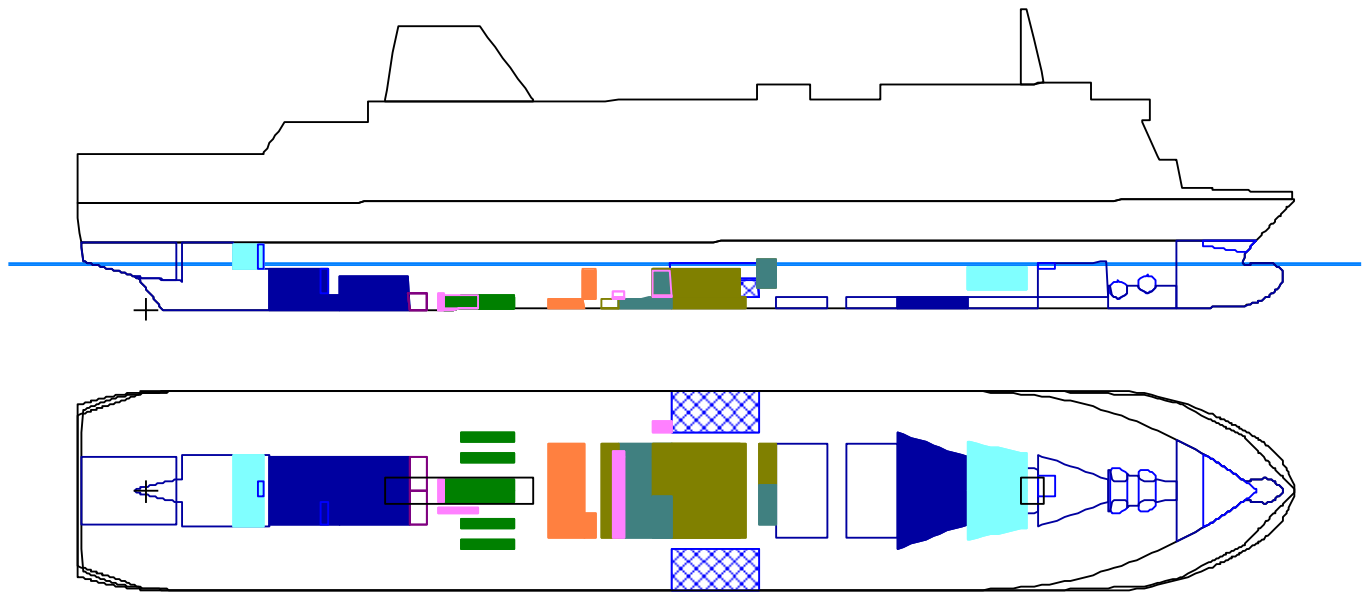
Frame No.	Location (m)	Weight (MT/m)	Buoyancy (MT/m)	Shear (MT)	Bending (MT-m)	Shear (%/Max)	Bending (%/Max)
FR -10	8.000a	100.0	<und>	140.6	163	undef	undef
FR 0	0.000	82.2	10.0	789.4	3981	81.22	26.90
BKHD FR 6	4.800f	82.1	28.4	1089.9	8545	75.75	38.35
FR 10	8.000f	80.5	39.8	1242.7	12298	71.01	45.11
FR 20	16.000f	79.3	72.3	1433.6	23218	81.92	58.44
BKHD FR 21	16.800f	80.2	75.9	1438.2	24370	82.18	59.47
FR 30	24.000f	91.0	104.5	1388.5	34660	79.34	66.41
BKHD FR 33	26.400f	93.7	111.7	1350.4	37954	77.16	67.86
BKHD FR 36	28.800f	96.4	118.6	1302.1	41148	74.41	68.96
FR 40	32.000f	106.3	127.4	1244.0	45236	71.09	69.96
BKHD FR 50	40.000f	140.5	149.1	1064.2	54444	60.81	70.59
BKHD FR 51	40.800f	140.5	150.9	1056.5	55295	60.37	71.01
FR 60	48.000f	149.3	161.1	955.1	62532	54.58	73.92
BKHD FR 63	50.400f	152.0	162.8	928.9	64800	53.08	76.60
BKHD FR 64	51.200f	145.8	163.3	915.1	65539	52.29	77.47
FR 70	56.000f	102.5	165.2	757.5	69684	43.29	82.37
BKHD FR 75	60.000f	101.9	166.2	491.6	72205	28.09	85.35
FR 80	64.000f	103.9	165.9	215.4	73641	12.31	87.05
BKHD FR 90	72.000f	126.8	163.8	-152.6	73667	8.72	87.08
FR 100	80.000f	125.8	158.9	-436.2	71325	24.93	84.31
BKHD FR 105	84.000f	120.0	155.7	-570.5	69329	32.60	81.95
FR 110	88.000f	98.4	151.5	-751.1	66740	42.92	78.89
BKHD FR 117	93.600f	94.1	143.2	-1060.9	61657	60.62	72.88
FR 120	96.000f	94.1	138.6	-1173.7	58986	67.07	69.72
BKHD FR 129	103.200f	96.7	118.0	-1457.1	49448	83.26	58.45
FR 130	103.200f	96.7	118.0	-1457.1	49448	83.26	58.45
FR 140	112.000f	88.6	84.2	-1560.4	36143	89.17	48.68
BKHD FR 141	112.800f	94.7	81.5	-1555.8	34899	88.90	47.84
FR 150	120.000f	93.2	63.9	-1396.7	24224	79.81	39.51
BKHD FR 153	112.400f	88.6	82.9	-1558.1	35521	89.04	48.26
FR 160	128.000f	85.2	45.4	-1147.7	14008	83.11	28.96
BKHD FR 165	132.000f	81.3	34.1	-971.1	9774	81.20	23.33
FR 170	136.000f	76.4	24.6	-753.1	6343	74.49	17.91
BKHD FR 177	141.600f	64.4	13.9	-451.4	3030	59.95	11.46
FR 180	143.400f	39.4	11.2	-379.0	2298	56.57	9.76
FR 190	149.400f	36.7	9.3	-175.3	665	44.61	4.83
FR 200	155.400f	24.2	3.9	-49.7	50	undef	undef

Longitudinal Strength At Sea Condition (port 0.01 deg.)



Max. Shear	-1560.8 MT	at	111.909f
Max. Bending Moment	74040 MT-m	at	68.000f (Hogging)
Max% Shear	89.19%	at	111.909f
Max% Bending Moment	87.52%	at	68.000f

CASE 6.1 - SHIP WITH 1000 PASSENGERS
TRAILERS ON DECK 3 - CARS ON DECKS 5, 6 AND 7
SHIP AT DEPARTURE (100% CONSUMABLES)



Fluid Legend

Fluid Name	Legend	Weight (MT)	Load%
BALLAST		858.84	29.87%
FRESH WATER		402.63	99.31%
HW		341.48	53.00%
DIESEL OIL		88.86	98.00%
TO		38.47	98.00%
HFO		761.48	92.18%
LUBE OIL		74.51	77.77%
MISCELLANEOUS		10.39	22.66%
LSHFO		231.31	98.00%

Floating Status

Draft FP	6.117 m	Heel	0.00 deg	GM(Solid)	3.672 m
Draft MS	6.306 m	Equil	Yes	F/S Corr.	0.296 m
Draft AP	6.495 m	Wind	Off	GM(Fluid)	3.376 m
Trim	0.38a m	Wave	No	KMT	15.340 m
LCG	68.338f m	VCG-Solid	11.668 m	TPcm	36.63
Displacement	17057.4 MT	WaterSpgr	1.025		

Draft At Draft Marks

FORE.p	6.120(m)	FORE.s	6.120(m)
MID.p	6.306(m)	MID.s	6.306(m)
AFT.p	6.473(m)	AFT.s	6.473(m)

TRIM (Referred to Draft Marks) aft 0.35/140.00a m

Fixed Weight Status

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	11 244.06	70.053f	0.000	13.381u
1) CREW	5.40	120.960f	0.000	25.540u
2) PROVISIONS	45.00	124.100f	0.000	10.110u
3) STORES INCL. SHOP STORES	45.00	98.630f	0.000	11.280u
4) 1000 PASSENGERS	100.00	74.770f	0.000	26.270u
5) TRAILERS ON DECK 3	2 000.00	64.300f	0.000	11.200u
6) CARS ON DECK 5	460.00	68.930f	0.000	15.500u
7) CARS ON CAR DECK 6	75.00	123.250f	0.000	18.470u
8) CARS ON DECK 7	275.00	39.680f	0.000	21.100u
Total Fixed:	14 249.47	69.217f	0.000	13.397u

Tank Status**BALLAST**

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
PFT_WB_101.C	1.025	<empty>					0.0
WB_201.C	1.025	<empty>					0.0
WB_401.C	1.025	<empty>					0.0
WB_501.C	1.025	100.00%	138.17	107.479f	0.000	0.852	0.0
WB_601.C	1.025	<empty>					0.0
WB_701.C	1.025	<empty>					0.0
WB_1201.C	1.025	100.00%	381.44	31.268f	0.000	2.545	0.0
WB_1301.C	1.025	100.00%	339.22	21.058f	0.085p	3.167	0.0
WB_1401.C	1.025	<empty>					0.0
WB_1511.C	1.025	<empty>					0.0
WB_311.C	1.025	<empty>					0.0
Subtotals:		29.87%	858.84	39.496f	0.034p	2.518	0.0

FRESH WATER

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
FW_1411.C	1.000	98.00%	137.09	13.935f	0.010s	7.366	355.9
FW_411PS.P	1.000	100.00%	131.01	116.609f	2.991p	4.087	0.0
FW_412SB.S	1.000	100.00%	134.54	116.609f	2.991s	4.087	0.0
Subtotals:		99.31%	402.63	81.650f	0.030s	5.203	355.9

HW

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
HEEL_812PS.P	1.000	54.00%	173.17	77.930f	10.827p	2.850	194.4
HEEL_812SB.S	1.000	52.00%	168.31	77.927f	10.824s	2.803	196.2
Subtotals:		53.00%	341.48	77.928f	0.156p	2.827	390.6

DIESEL OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
DO_1001.C	0.860	98.00%	76.11	57.597f	0.000	0.735	707.0
DO_DAY_914.S	0.860	98.00%	12.75	60.800f	4.750s	3.460	3.0
Subtotals:		98.00%	88.86	58.056f	0.681s	1.126	709.9

TO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
TO_STOR1202.P	0.861	98.00%	19.23	37.215f	2.309p	1.198	17.5
TO_DRAIN1202.S	0.861	98.00%	19.23	37.215f	2.309s	1.198	17.5
Subtotals:		98.00%	38.47	37.215f	0.000	1.198	35.0

HFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
HFO_801.C	0.980	100.00%	191.75	77.200f	0.000	0.750	0.0
HFO_811.C	0.980	98.00%	462.63	76.795f	0.000	3.460	1 611.2
HFO_OVFL_902.C	0.980	10.00%	4.43	63.592f	0.000	0.075	402.8
HFO_DAY_911.P	0.980	98.00%	50.60	70.800f	2.000p	3.460	33.7
HFO_SETT.P	0.980	98.00%	50.60	85.200f	3.600p	4.760	33.7
SLUDGE_913.P	0.980	10.00%	1.48	70.797f	5.600p	1.700	0.8
Subtotals:		92.18%	761.48	76.969f	0.383p	2.841	2 082.2

LUBE OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LO_1102PS.P	0.910	98.00%	13.39	46.794f	4.500p	0.823	1.3
LO_1102SB.S	0.910	98.00%	13.39	46.794f	4.500s	0.823	1.3
LO_1103PS.P	0.910	98.00%	11.97	46.860f	7.388p	0.921	1.1
LO_1103SB.S	0.910	98.00%	11.97	46.860f	7.388s	0.921	1.1
DIRTYLO_1101.P	0.910	10.00%	2.20	45.481f	0.800p	0.081	2.9
STOR_LO_1101.S	0.910	98.00%	21.59	45.588f	0.800s	0.794	2.9
Subtotals:		77.77%	74.51	46.427f	0.208s	0.824	10.7

MISCELLANEOUS

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
BILGEWT_915P.P	1.000	10.00%	1.51	70.797f	8.800p	1.695	0.8
HFODRAIN_917.P	1.000	10.00%	0.16	64.795f	5.100p	1.550	0.0
HFOSLUDGE916.S	1.000	10.00%	1.75	64.795f	0.900s	1.550	189.6
LOGEAR_1104P.C	1.000	100.00%	6.45	40.400f	0.000	1.050	0.0
FWDRAIN1104S.S	1.000	10.00%	0.52	42.766f	2.800s	0.097	0.1
Subtotals:		22.66%	10.39	49.424f	1.066p	1.188	190.6

LSHFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LSHFO_901.C	0.980	98.00%	130.11	68.393f	0.000	0.735	1 208.4
LSHFO_DAY912.S	0.980	98.00%	50.60	70.800f	3.600s	3.460	33.7
LSHFO_SETT.S	0.980	98.00%	50.60	85.200f	2.000s	4.760	33.7
Subtotals:		98.00%	231.31	72.596f	1.225s	2.212	1 275.9

All Tanks

	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
Totals:		52.46%	2 807.97	63.880f	0.005p	2.891	5 051.0

Displacer Status

Item	Status	Spgr	Displ (MT)	LCB (m)	TCB (m)	VCB (m)	Eff /Perm
HULL	Intact	1.025	17 057.48	68.318f	0.000	3.580	1.000
SubTotals:			17 057.48	68.318f	0.000	3.580	

Critical points

Name	L,T,V (m)	Height (m)
(1) MES Height Limiting Point PS	47.200f, 13.850p, 5.900	-0.476
(2) MES Height Limiting Point SB	47.200f, 13.850s, 5.900	-0.476

Immersion of propeller tip 1.787 m

Current Rolling Period is : 11.43 second

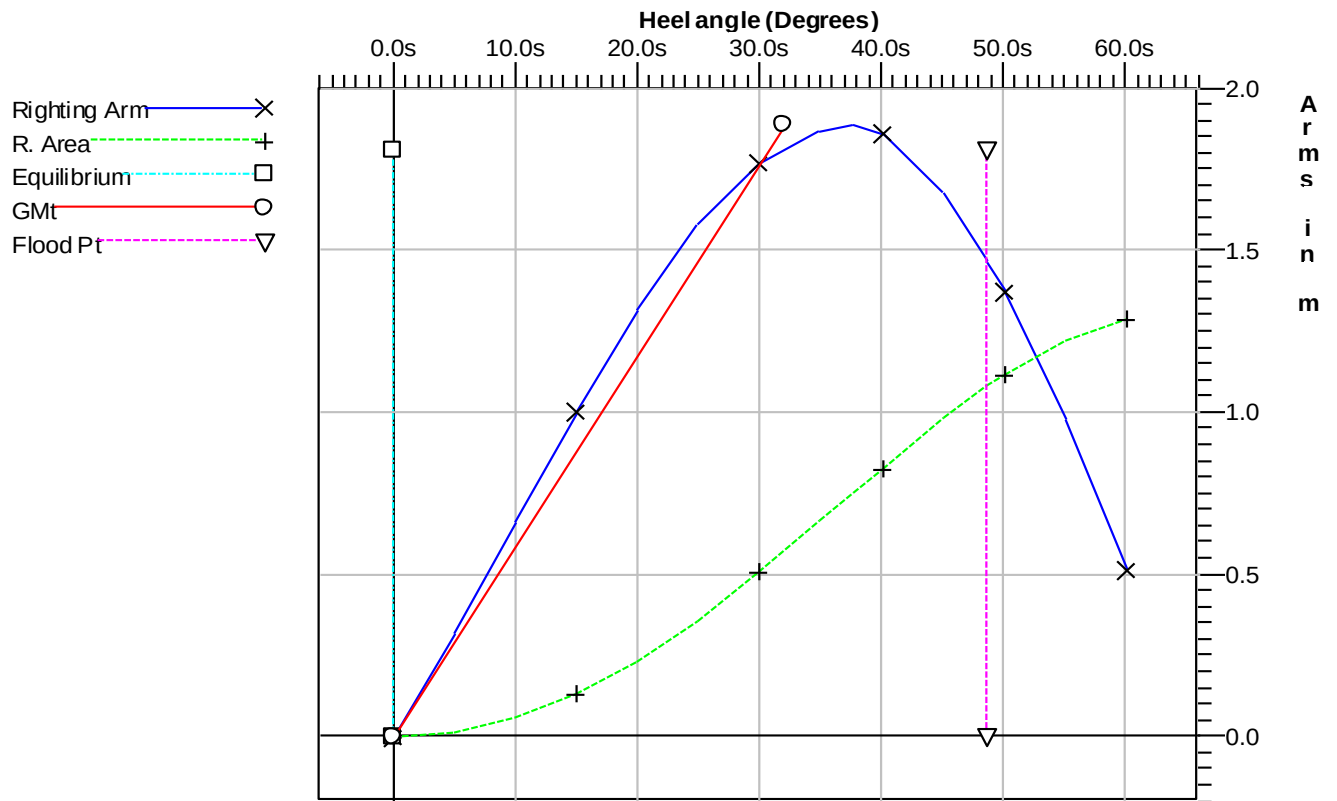
Righting Arms vs. Heel - IMO RES. A.749 (18)

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Righting Arm (m)	Area (m-Rad)	Flood Pt Height (m)	Notes
0.00	0.14a	6.495	0.000	0.000	11.600 (1)	Equil
5.00s	0.13a	6.426	0.319	0.014	10.441 (2)	
10.00s	0.07a	6.221	0.663	0.057	9.292 (2)	
15.00s	0.02a	5.928	1.002	0.129	8.112 (2)	
20.00s	0.03f	5.550	1.320	0.231	6.911 (2)	
25.00s	0.08f	5.071	1.584	0.358	5.715 (2)	
30.00s	0.13f	4.482	1.767	0.505	4.477 (4)	
35.00s	0.18f	3.780	1.865	0.664	3.277 (4)	
37.60s	0.20f	3.374	1.886	0.749	2.668 (4)	MaxRa
40.00s	0.23f	2.988	1.860	0.827	2.098 (4)	
45.00s	0.28f	2.176	1.679	0.983	0.894 (4)	
48.67s	0.31f	1.579	1.462	1.084	0.000 (4)	FldPt
50.00s	0.33f	1.361	1.370	1.117	-0.325 (4)	
55.00s	0.37f	0.547	0.973	1.220	-1.550 (4)	
60.00s	0.42f	-0.273	0.512	1.285	-2.775 (4)	

Unprotected Flood Points

Name	L,T,V (m)	Height (m)
(1) Aft Ventilation Opening PS	2.150a, 13.300p, 18.100	11.600
(2) Aft Ventilation Opening SB	2.150a, 13.300s, 18.100	10.441
(4) Fwd Ventilation Opening SB	139.200f, 12.800s, 18.100	4.477

Righting Arms vs. Heel - IMO RES. A.749 (18)



IMO RES. A.749 (18)

Limit	Min/Max	Actual	Margin	Pass
(1) GM at Equilibrium	>0.150 m	3.376	3.226	Yes
(2) Area from 0.00 deg to 30.00	>0.0550 m-R	0.505	0.450	Yes
(3) Area from 0.00 deg to 40.00 or Flood	>0.0900 m-R	0.827	0.737	Yes
(4) Area from 30.00 deg to 40.00 or Flood	>0.0300 m-R	0.323	0.293	Yes
(5) Righting Arm at 30.00 deg	>0.200 m	1.767	1.567	Yes
(6) Angle from 0.00 deg to MaxRA	>25.00 deg	37.60	12.60	Yes

Current VCG Fluid 11.964 m < Max Allowable VCG 13.301 m - PASS

MAXIMUM TURNING ANGLE VERIFICATION

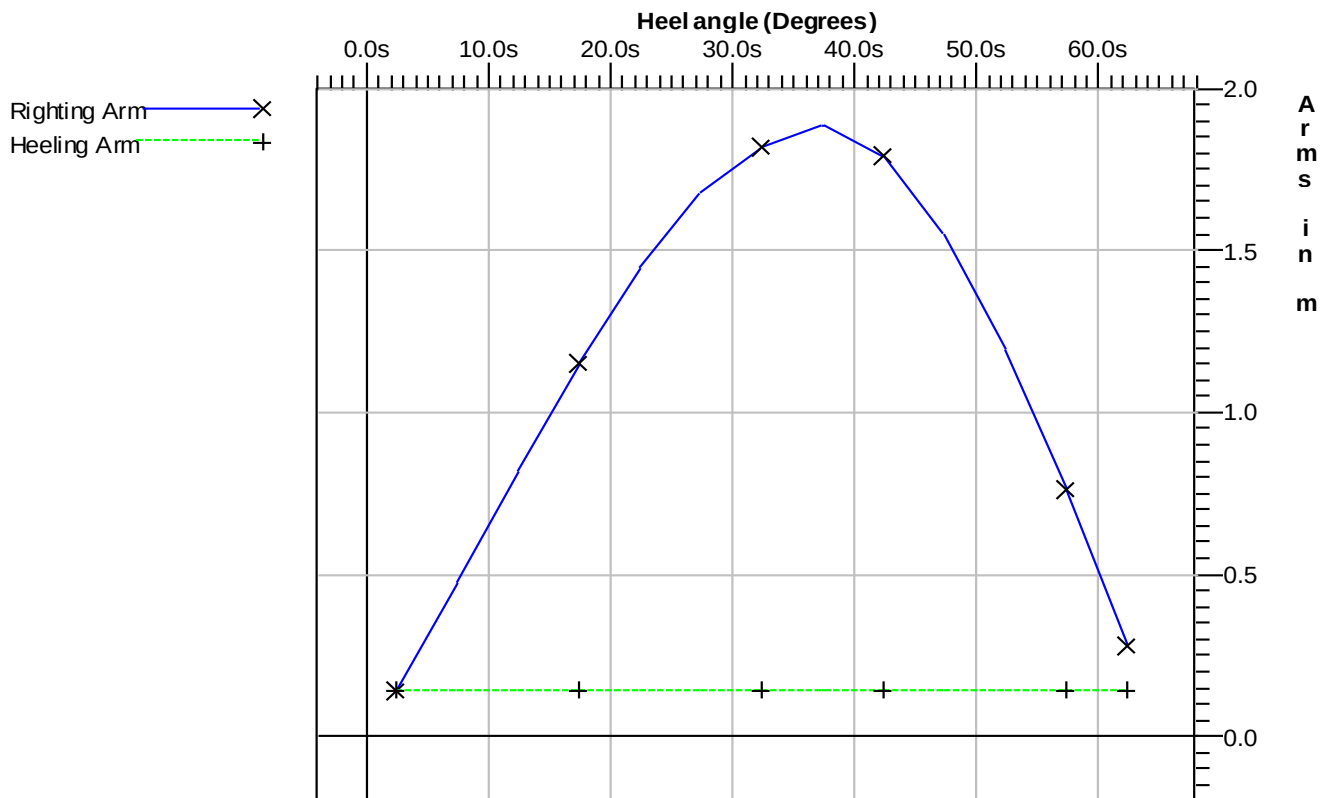
Cruising speed 21.15 knots

MOMENT DUE TO MAXIMUM TURNING ANGLE 2446.304 tm

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)
2.32s	0.14a	6.481	0.001
7.32s	0.10a	6.344	0.335
12.32s	0.05a	6.095	0.678
17.32s	0.00f	5.764	1.011
22.32s	0.05f	5.341	1.307
27.32s	0.10f	4.812	1.537
32.32s	0.15f	4.169	1.677
37.32s	0.20f	3.418	1.742
37.52s	0.20f	3.386	1.743
42.32s	0.25f	2.612	1.652
47.32s	0.30f	1.797	1.405
52.32s	0.35f	0.983	1.051
57.32s	0.39f	0.168	0.623
62.32s	0.44f	-0.659	0.136

Righting Arms vs. Heel - IMO RES. A.749 (18)



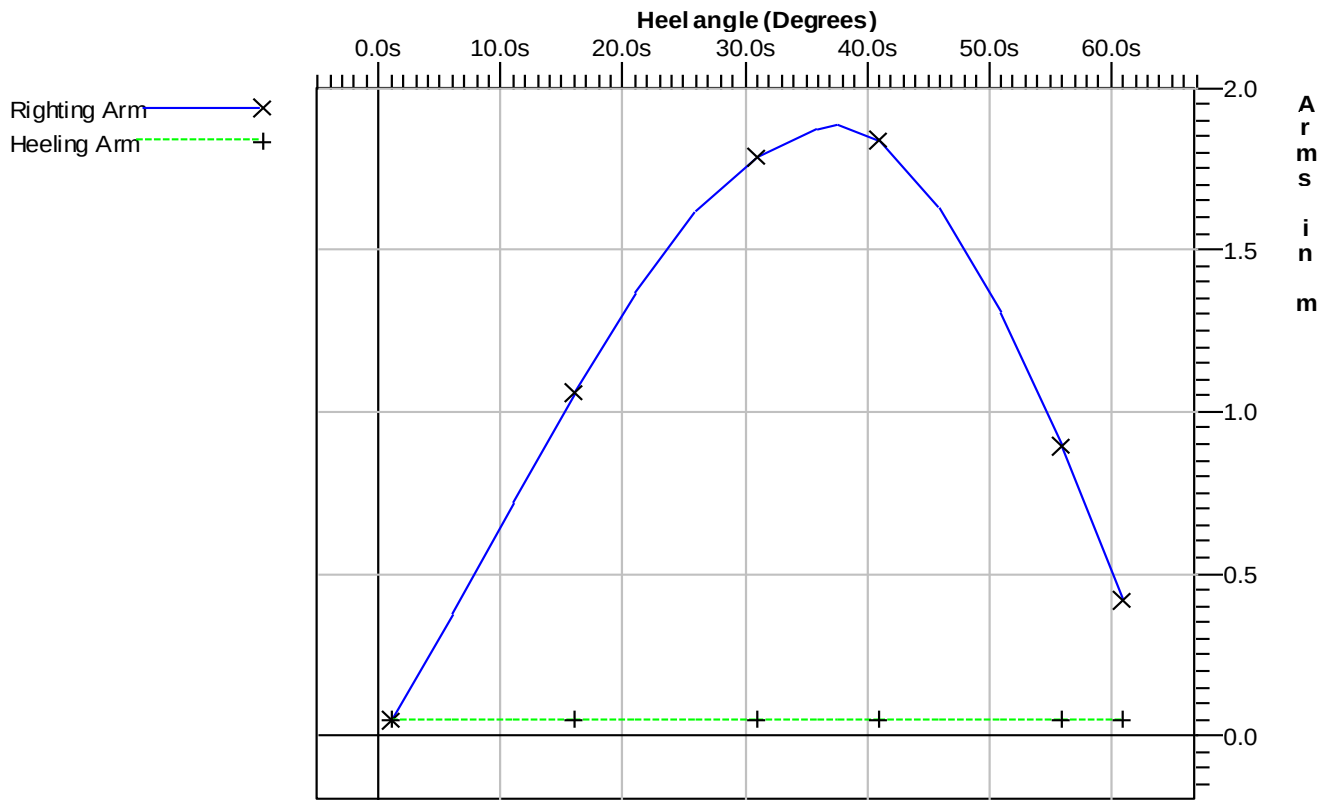
HEELING ANGLE DUE TO TURNING 2.32s deg

1000 PASSENGERS CROWDING VERIFICATION

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)
0.89s	0.14a	6.493	0.001
5.89s	0.12a	6.399	0.326
10.89s	0.06a	6.175	0.670
15.89s	0.01a	5.867	1.007
20.89s	0.04f	5.472	1.318
25.89s	0.09f	4.975	1.569
30.89s	0.14f	4.364	1.736
35.89s	0.18f	3.644	1.822
37.49s	0.20f	3.391	1.832
40.89s	0.24f	2.844	1.786
45.89s	0.29f	2.031	1.578
50.89s	0.33f	1.216	1.251
55.89s	0.38f	0.401	0.842
60.89s	0.43f	-0.421	0.371

Righting Arms vs. Heel - IMO RES. A.749 (18)



HEELING ANGLE DUE TO PASSENGERS CROWDING 0.89s deg

IMO Res. A.749 (18), SEVERE WIND AND ROLLING CRITERION (WEATHER CRITERION)

Wind speed 53.4 kn

Wind pressure 504 N /m²Under Water Lateral Plane 973.041 m²Above Water Lateral Plane 3514.750 m²

Under Water Lateral Plane Centroid 3.106 m below water line

Above Water Lateral Plane Centroid 11.582 m above water line

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)	Area (m-Rad)	Flood Pt Height (m)	Notes
21.24p	0.04f	5.441	-1.623	0.000	6.613 (1)	Roll
16.24p	0.01a	5.843	-1.315	-0.128	7.816 (1)	
11.24p	0.06a	6.155	-0.979	-0.228	9.003 (1)	
6.24p	0.12a	6.386	-0.634	-0.299	10.156 (1)	
1.24p	0.14a	6.491	-0.307	-0.340	11.312 (1)	
3.76s	0.13a	6.457	0.004	-0.353	10.727 (2)	Equil
8.76s	0.09a	6.281	0.345	-0.338	9.579 (2)	
13.76s	0.03a	6.008	0.686	-0.293	8.408 (2)	
18.76s	0.02f	5.652	1.012	-0.219	7.209 (2)	
23.76s	0.07f	5.200	1.292	-0.118	6.010 (2)	
28.76s	0.12f	4.639	1.497	0.004	4.783 (4)	
33.76s	0.17f	3.964	1.614	0.141	3.570 (4)	
38.76s	0.21f	3.188	1.647	0.284	2.394 (4)	MaxRa
43.76s	0.27f	2.378	1.505	0.422	1.194 (4)	
48.67s	0.31f	1.579	1.229	0.540	0.000 (4)	FldPt
48.76s	0.32f	1.563	1.223	0.542	-0.023 (4)	
50.00s	0.33f	1.361	1.137	0.568	-0.325 (4)	
55.00s	0.37f	0.547	0.740	0.651	-1.550 (4)	

Note:

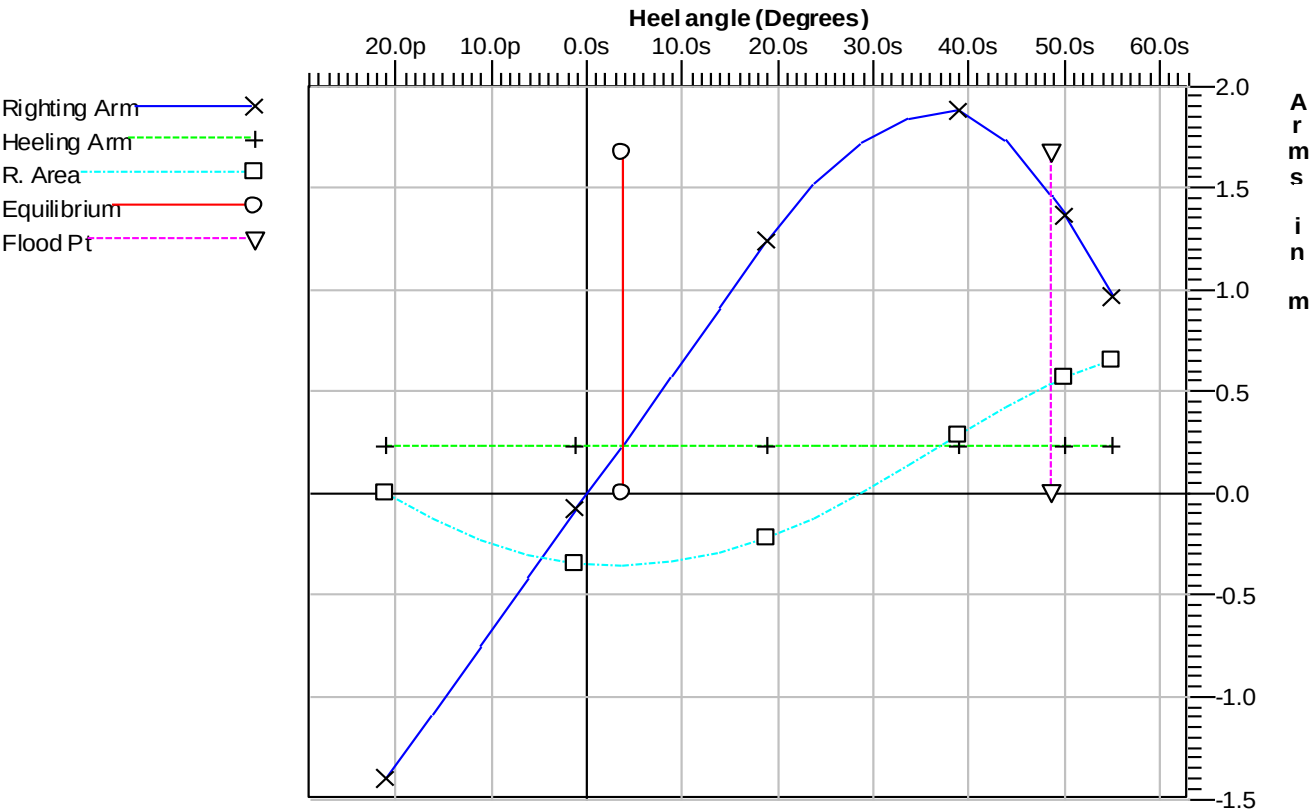
Roll angle is 23.75

Equilibrium for load condition without gust is 2.51s

Unprotected Flood Points

Name	L,T,V (m)	Height (m)
(1) Aft Ventilation Opening PS	2.150a, 13.300p, 18.100	6.613
(2) Aft Ventilation Opening SB	2.150a, 13.300s, 18.100	10.727
(4) Fwd Ventilation Opening SB	139.200f, 12.800s, 18.100	4.783

Righting Arms vs. Heel - IMO SEVERE WIND & ROLLING



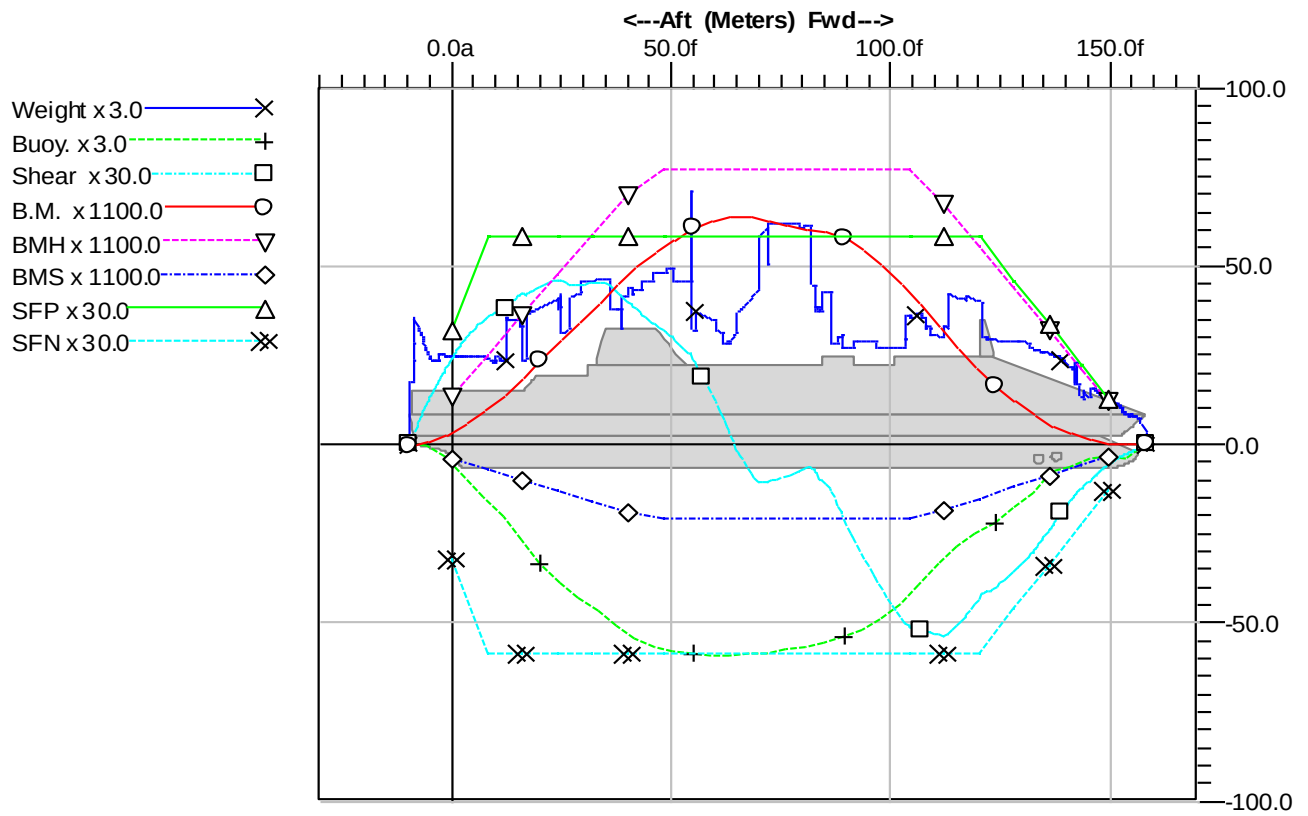
IMO SEVERE WIND & ROLLING

Limit	Min/Max	Actual	Margin	Pass
(1) Res. Ratio from Roll to Abs 50.00 deg or Flood	>1.000	2.531	1.531	Yes

LONGITUDINAL STRENGTH

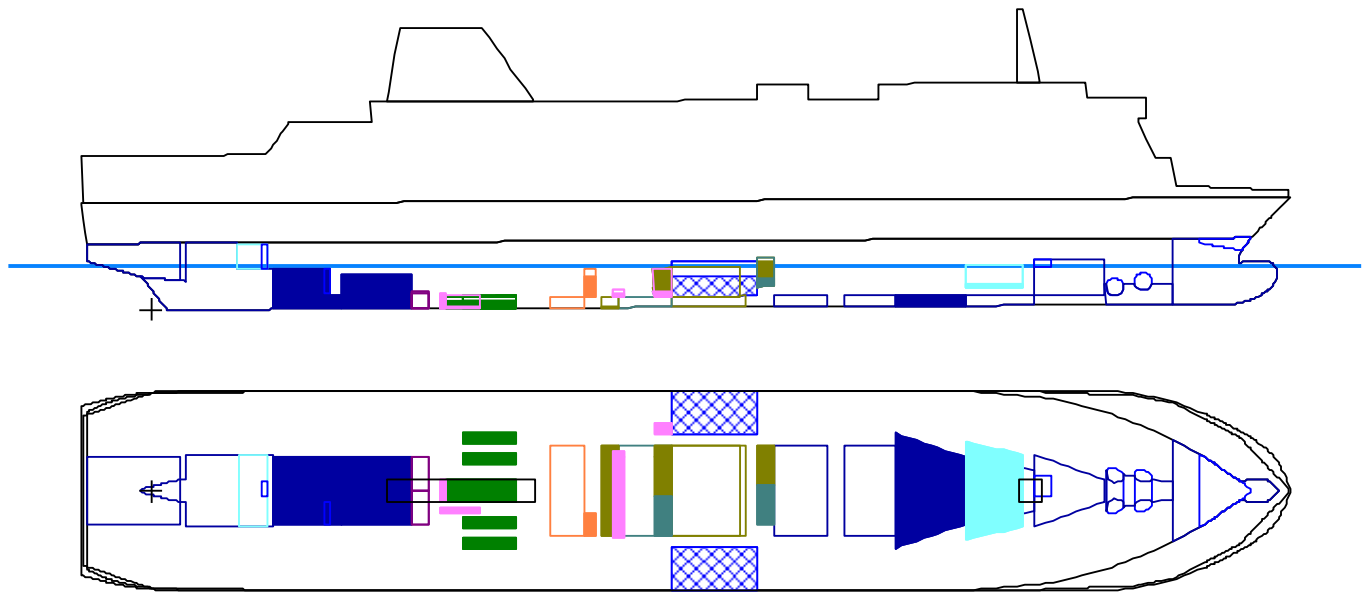
Frame No.	Location (m)	Weight (MT/m)	Buoyancy (MT/m)	Shear (MT)	Bending (MT-m)	Shear (%/Max)	Bending (%/Max)
FR -10	8.000a	100.0	<und>	143.9	127	undef	undef
FR 0	0.000	74.0	14.4	726.5	3805	74.74	25.71
BKHD FR 6	4.800f	74.0	34.6	962.1	7907	66.87	35.49
FR 10	8.000f	72.5	46.8	1068.0	11173	61.03	40.98
FR 20	16.000f	100.0	81.0	1268.8	20468	72.50	51.52
BKHD FR 21	16.800f	110.3	84.7	1259.9	21481	71.99	52.42
FR 30	24.000f	123.6	114.1	1380.4	31071	78.88	59.53
BKHD FR 33	26.400f	123.5	121.4	1344.9	34361	76.85	61.43
BKHD FR 36	28.800f	127.5	128.4	1346.4	37597	76.93	63.01
FR 40	32.000f	138.5	137.3	1358.3	41931	77.61	64.85
BKHD FR 50	40.000f	132.7	159.3	1198.8	52448	68.50	68.01
BKHD FR 51	40.800f	132.7	161.1	1176.8	53400	67.24	68.58
FR 60	48.000f	145.1	171.6	963.2	61074	55.04	72.19
BKHD FR 63	50.400f	147.8	173.4	901.7	63316	51.52	74.84
BKHD FR 64	51.200f	138.2	173.8	873.3	64025	49.90	75.68
FR 70	56.000f	110.8	175.9	641.2	67760	36.64	80.09
BKHD FR 75	60.000f	104.6	177.0	365.5	69791	20.88	82.49
FR 80	64.000f	91.9	176.8	19.5	70583	1.11	83.43
BKHD FR 90	72.000f	186.4	175.0	-314.3	68929	17.96	81.48
FR 100	80.000f	185.4	170.5	-212.4	66829	12.14	78.99
BKHD FR 105	84.000f	128.1	167.3	-299.5	65942	17.12	77.95
FR 110	88.000f	91.2	163.2	-515.0	64395	29.43	76.12
BKHD FR 117	93.600f	87.0	155.2	-931.3	60326	53.22	71.31
FR 120	96.000f	87.0	150.7	-1090.0	57911	62.28	68.45
BKHD FR 129	103.200f	109.0	130.0	-1511.8	48470	86.39	57.29
FR 130	103.200f	109.0	130.0	-1511.8	48470	86.39	57.29
FR 140	112.000f	99.4	94.8	-1606.1	34694	91.77	46.73
BKHD FR 141	112.800f	126.7	92.0	-1601.5	33413	91.51	45.80
FR 150	120.000f	121.1	73.3	-1299.1	22923	74.23	37.39
BKHD FR 153	112.400f	99.1	93.4	-1603.8	34054	91.64	46.27
FR 160	128.000f	88.2	53.1	-1076.2	13434	77.93	27.78
BKHD FR 165	132.000f	81.4	40.4	-917.8	9446	76.74	22.55
FR 170	136.000f	76.5	29.6	-721.7	6178	71.38	17.44
BKHD FR 177	141.600f	64.4	16.7	-435.7	2976	57.86	11.26
FR 180	143.400f	39.4	13.3	-367.7	2266	54.89	9.63
FR 190	149.400f	36.7	10.0	-171.9	665	43.73	4.84
FR 200	155.400f	24.2	3.9	-49.7	54	undef	undef

Longitudinal Strength At Sea Condition



Max. Shear	-1606.5 MT	at	111.909f
Max. Bending Moment	70583 MT-m	at	64.000f (Hogging)
Max% Shear	91.80%	at	111.909f
Max% Bending Moment	83.43%	at	64.000f

**CASE 6.2 - SHIP WITH 1000 PASSENGERS -
TRAILERS ON DECK 3 - CARS ON DECKS 5, 6 AND 7
SHIP AT ARRIVAL (10% CONSUMABLES)**



Fluid Legend

Fluid Name	Legend	Weight (MT)	Load%
BALLAST		858.84	29.87%
FRESH WATER		41.16	10.15%
HW		341.60	53.01%
DIESEL OIL		9.04	9.97%
TO		38.47	98.00%
HFO		82.39	9.97%
LUBE OIL		48.68	50.80%
MISCELLANEOUS		19.58	42.70%
LSHFO		24.27	10.28%

Floating Status

Draft FP	5.509 m	Heel	0.00 deg	GM(Solid)	3.287 m
Draft MS	5.899 m	Equil	Yes	F/S Corr.	0.092 m
Draft AP	6.289 m	Wind	Off	GM(Fluid)	3.195 m
Trim	0.78a m	Wave	No	KMT	15.680 m
LCG	67.654f m	VCG-Solid	12.393 m	TPcm	35.74
Displacement	15673.0 MT	WaterSpgr	1.025		

Draft At Draft Marks

FORE.p	5.516(m)	FORE.s	5.516(m)
MID.p	5.899(m)	MID.s	5.899(m)
AFT.p	6.244(m)	AFT.s	6.244(m)

TRIM (Referred to Draft Marks) aft 0.73/140.00a m

Fixed Weight Status

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	11 244.06	70.053f	0.000	13.381u
1) CREW	5.40	120.960f	0.000	25.540u
2) PROVISIONS	4.50	124.100f	0.000	10.110u
3) STORES INCL. SHOP STORES	45.00	98.630f	0.000	11.280u
4) 1000 PASSENGERS	100.00	74.770f	0.000	26.270u
5) TRAILERS ON DECK 3	2 000.00	64.300f	0.000	11.200u
6) CARS ON DECK 5	460.00	68.930f	0.000	15.500u
7) CARS ON CAR DECK 6	75.00	123.250f	0.000	18.470u
8) CARS ON DECK 7	275.00	39.680f	0.000	21.100u
Total Fixed:	14 208.97	69.060f	0.000	13.407u

Tank Status**BALLAST**

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
PFT_WB_101.C	1.025	<empty>					0.0
WB_201.C	1.025	<empty>					0.0
WB_401.C	1.025	<empty>					0.0
WB_501.C	1.025	100.00%	138.17	107.479f	0.000	0.852	0.0
WB_601.C	1.025	<empty>					0.0
WB_701.C	1.025	<empty>					0.0
WB_1201.C	1.025	100.00%	381.44	31.268f	0.000	2.545	0.0
WB_1301.C	1.025	100.00%	339.22	21.058f	0.085p	3.167	0.0
WB_1401.C	1.025	<empty>					0.0
WB_1511.C	1.025	<empty>					0.0
WB_311.C	1.025	<empty>					0.0
Subtotals:		29.87%	858.84	39.496f	0.034p	2.518	0.0

FRESH WATER

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
FW_1411.C	1.000	<empty>					0.0
FW_411PS.P	1.000	15.50%	20.31	116.547f	2.975p	2.834	135.5
FW_412SB.S	1.000	15.50%	20.85	116.547f	2.975s	2.834	139.2
Subtotals:		10.15%	41.16	116.547f	0.040s	2.834	274.7

HW

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
HEEL_812PS.P	1.000	50.00%	160.35	77.910f	10.820p	2.755	194.4
HEEL_812SB.S	1.000	56.00%	181.25	77.920f	10.831s	2.898	196.2
Subtotals:		53.01%	341.60	77.915f	0.668s	2.831	390.6

DIESEL OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
DO_1001.C	0.860	<empty>					0.0
DO_DAY_914.S	0.860	69.50%	9.04	60.800f	4.750s	2.890	3.0
Subtotals:		9.97%	9.04	60.800f	4.750s	2.890	3.0

TO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
TO_STOR1202.P	0.861	98.00%	19.23	37.214f	2.309p	1.198	17.5
TO_DRAIN1202.S	0.861	98.00%	19.23	37.214f	2.309s	1.198	17.5
Subtotals:		98.00%	38.47	37.214f	0.000	1.198	35.0

HFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
HFO_801.C	0.980	<empty>					0.0
HFO_811.C	0.980	<empty>					0.0
HFO_OVFL_902.C	0.980	10.00%	4.43	63.583f	0.000	0.075	402.8
HFO_DAY_911.P	0.980	33.00%	17.04	70.798f	2.000p	2.160	33.7
HFO_SETT.P	0.980	90.00%	46.47	85.199f	3.600p	4.600	33.7
SLUDGE_913.P	0.980	98.00%	14.46	70.800f	5.600p	3.460	0.8
Subtotals:		9.97%	82.39	78.533f	3.427p	3.652	471.1

LUBE OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LO_1102PS.P	0.910	60.00%	8.20	46.779f	4.500p	0.504	1.3
LO_1102SB.S	0.910	60.00%	8.20	46.779f	4.500s	0.504	1.3
LO_1103PS.P	0.910	60.00%	7.33	46.887f	7.384p	0.582	1.1
LO_1103SB.S	0.910	60.00%	7.33	46.887f	7.384s	0.582	1.1
DIRTYLO_1101.P	0.910	70.00%	15.42	45.565f	0.800p	0.567	2.9
STOR_LO_1101.S	0.910	10.00%	2.20	45.353f	0.800s	0.082	2.9
Subtotals:		50.80%	48.68	46.362f	0.217p	0.529	10.7

MISCELLANEOUS

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
BILGEWT_915P.P	1.000	20.00%	3.02	70.797f	8.800p	1.890	0.8
HFODRAIN_917.P	1.000	20.00%	0.33	64.794f	5.100p	1.600	0.0
HFOSLUDGE916.S	1.000	50.00%	8.76	64.798f	0.900s	1.750	189.6
LOGEAR_1104P.C	1.000	100.00%	6.45	40.400f	0.000	1.050	0.0
FWDRAIN1104S.S	1.000	20.00%	1.04	42.765f	2.800s	0.193	0.1
Subtotals:		42.70%	19.58	56.520f	0.890p	1.456	190.7

LSHFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LSHFO_901.C	0.980	<empty>					0.0
LSHFO_DAY912.S	0.980	20.00%	10.33	70.797f	3.600s	1.900	33.7
LSHFO_SETT.S	0.980	27.00%	13.94	85.198f	2.000s	3.340	33.7
Subtotals:		10.28%	24.27	79.070f	2.681s	2.727	67.5

All Tanks

	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
Totals:		27.35%	1 464.02	54.007f	0.000	2.555	1 443.2

Displacer Status

Item	Status	Spgr	Displ (MT)	LCB (m)	TCB (m)	VCB (m)	Eff /Perm
HULL	Intact	1.025	15 672.99	67.607f	0.000	3.357	1.000
SubTotals:			15 672.99	67.607f	0.000	3.357	

Critical points

Name	L,T,V (m)	Height (m)
(1) MES Height Limiting Point PS	47.200f, 13.850p, 5.900	-0.144
(2) MES Height Limiting Point SB	47.200f, 13.850s, 5.900	-0.144

Immersion of propeller tip 1.574 m

Current Rolling Period is : 12.06 second

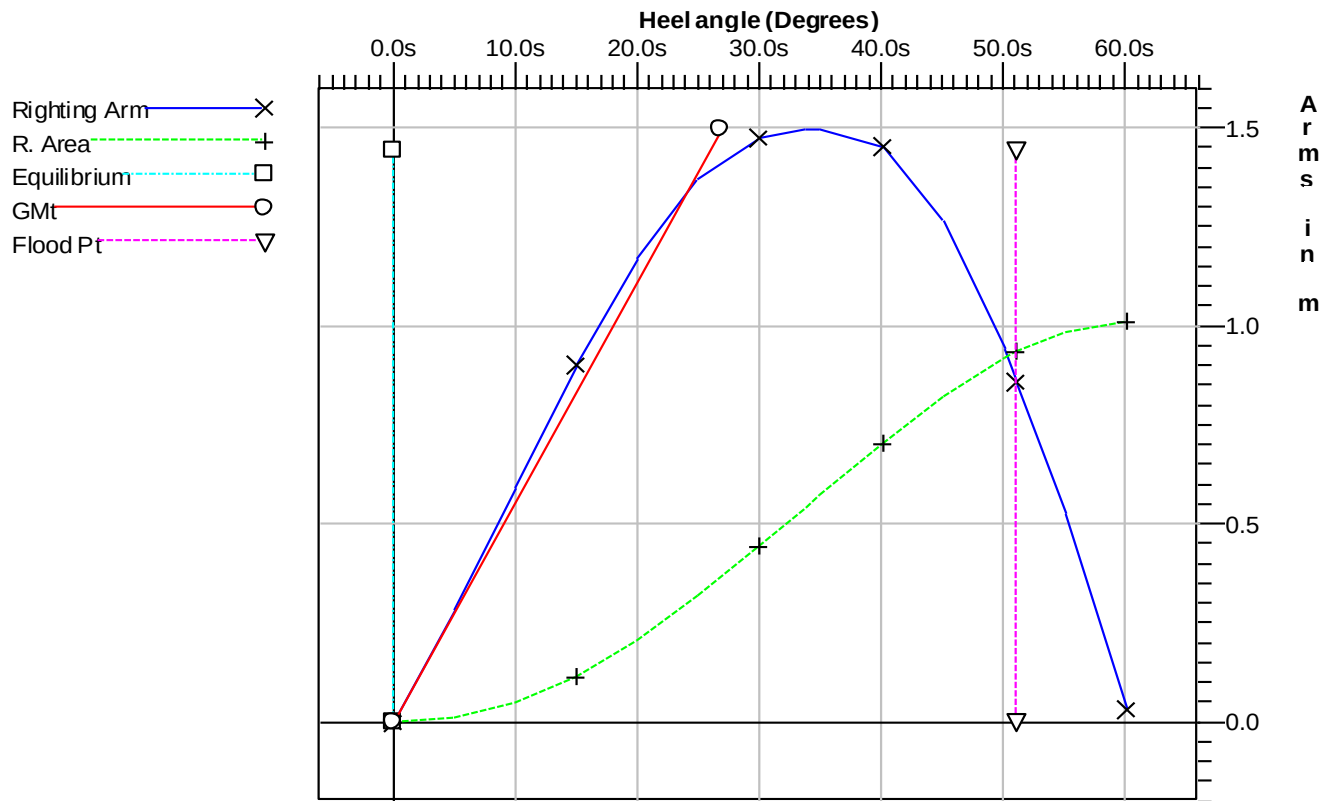
Righting Arms vs. Heel - IMO RES. A.749 (18)

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Righting Arm (m)	Area (m-Rad)	Flood Pt Height (m)	Notes
0.00	0.30a	6.289	0.000	0.000	11.799 (1)	Equil
5.00s	0.28a	6.224	0.285	0.012	10.638 (2)	
10.00s	0.22a	6.015	0.595	0.051	9.492 (2)	
15.00s	0.16a	5.709	0.901	0.116	8.326 (2)	
20.00s	0.09a	5.314	1.173	0.207	7.142 (2)	
25.00s	0.03a	4.818	1.375	0.318	5.965 (2)	
30.00s	0.03f	4.209	1.478	0.444	4.817 (2)	
33.80s	0.07f	3.675	1.496	0.543	3.970 (2)	MaxRa
35.00s	0.08f	3.494	1.495	0.574	3.707 (2)	
40.00s	0.13f	2.685	1.454	0.703	2.624 (4)	
45.00s	0.19f	1.841	1.265	0.823	1.447 (4)	
50.00s	0.24f	0.994	0.941	0.920	0.252 (4)	
51.05s	0.25f	0.817	0.860	0.936	0.000 (4)	FldPt
55.00s	0.29f	0.147	0.523	0.984	-0.953 (4)	
60.00s	0.34f	-0.708	0.030	1.009	-2.155 (4)	

Unprotected Flood Points

Name	L,T,V (m)	Height (m)
(1) Aft Ventilation Opening PS	2.150a, 13.300p, 18.100	11.799
(2) Aft Ventilation Opening SB	2.150a, 13.300s, 18.100	10.638
(4) Fwd Ventilation Opening SB	139.200f, 12.800s, 18.100	2.624

Righting Arms vs. Heel - IMO RES. A.749 (18)



IMO RES. A.749 (18)

Limit	Min/Max	Actual	Margin	Pass
(1) GM at Equilibrium	>0.150 m	3.195	3.045	Yes
(2) Area from 0.00 deg to 30.00	>0.0550 m-R	0.444	0.389	Yes
(3) Area from 0.00 deg to 40.00 or Flood	>0.0900 m-R	0.703	0.613	Yes
(4) Area from 30.00 deg to 40.00 or Flood	>0.0300 m-R	0.259	0.229	Yes
(5) Righting Arm at 30.00 deg	>0.200 m	1.478	1.278	Yes
(6) Angle from 0.00 deg to MaxRA	>25.00 deg	33.80	8.80	Yes

Current VCG Fluid 12.485 m < Max Allowable VCG 13.753 m - PASS

MAXIMUM TURNING ANGLE VERIFICATION

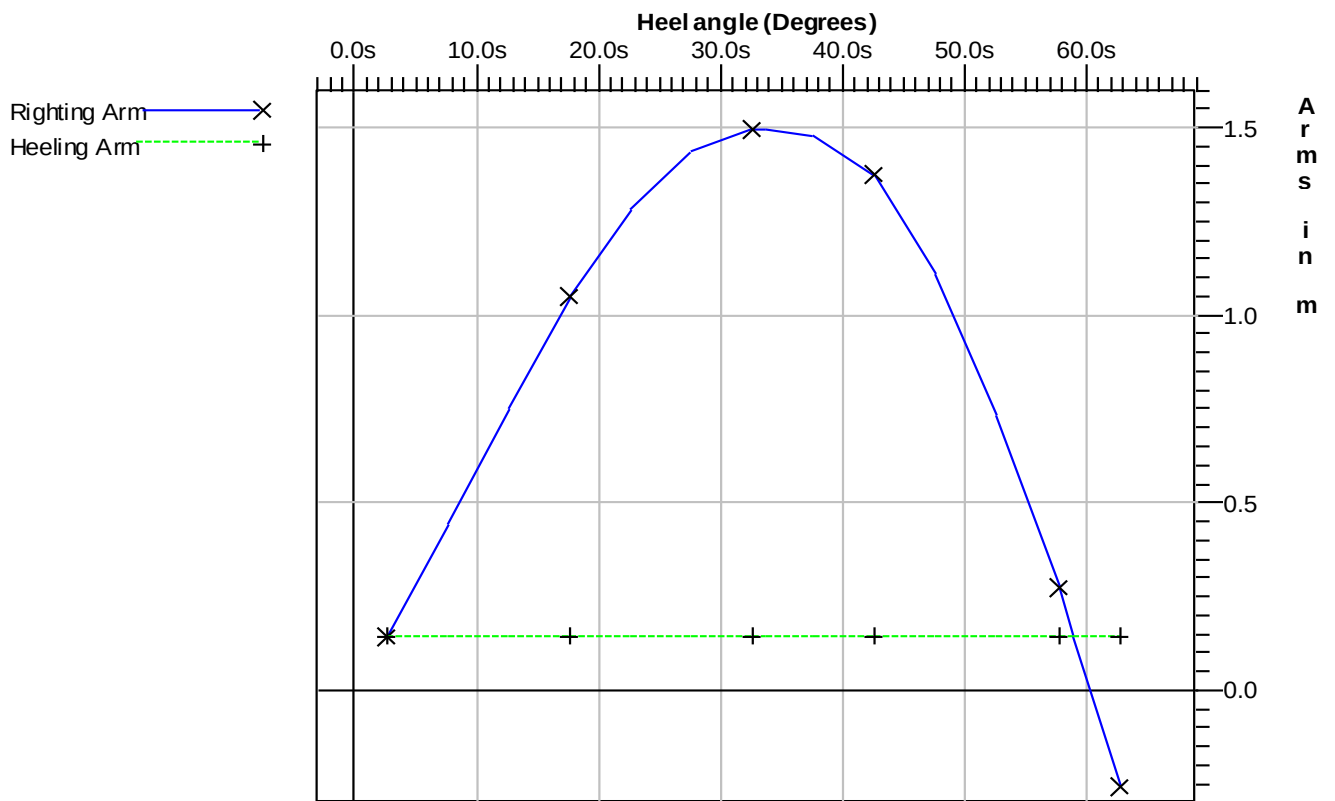
Cruising speed 21.15 knots

MOMENT DUE TO MAXIMUM TURNING ANGLE 2294.496 tm

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)
2.61s	0.29a	6.272	0.000
7.61s	0.25a	6.131	0.299
12.61s	0.19a	5.865	0.611
17.61s	0.12a	5.514	0.904
22.61s	0.06a	5.067	1.143
27.61s	0.00	4.514	1.296
32.61s	0.06f	3.848	1.349
33.61s	0.07f	3.702	1.350
37.61s	0.11f	3.082	1.337
42.61s	0.16f	2.245	1.229
47.61s	0.22f	1.398	0.963
52.61s	0.27f	0.551	0.586
57.61s	0.32f	-0.299	0.127
58.88s	0.33f	-0.516	0.000
62.61s	0.36f	-1.158	-0.403

Righting Arms vs. Heel - IMO RES. A.749 (18)



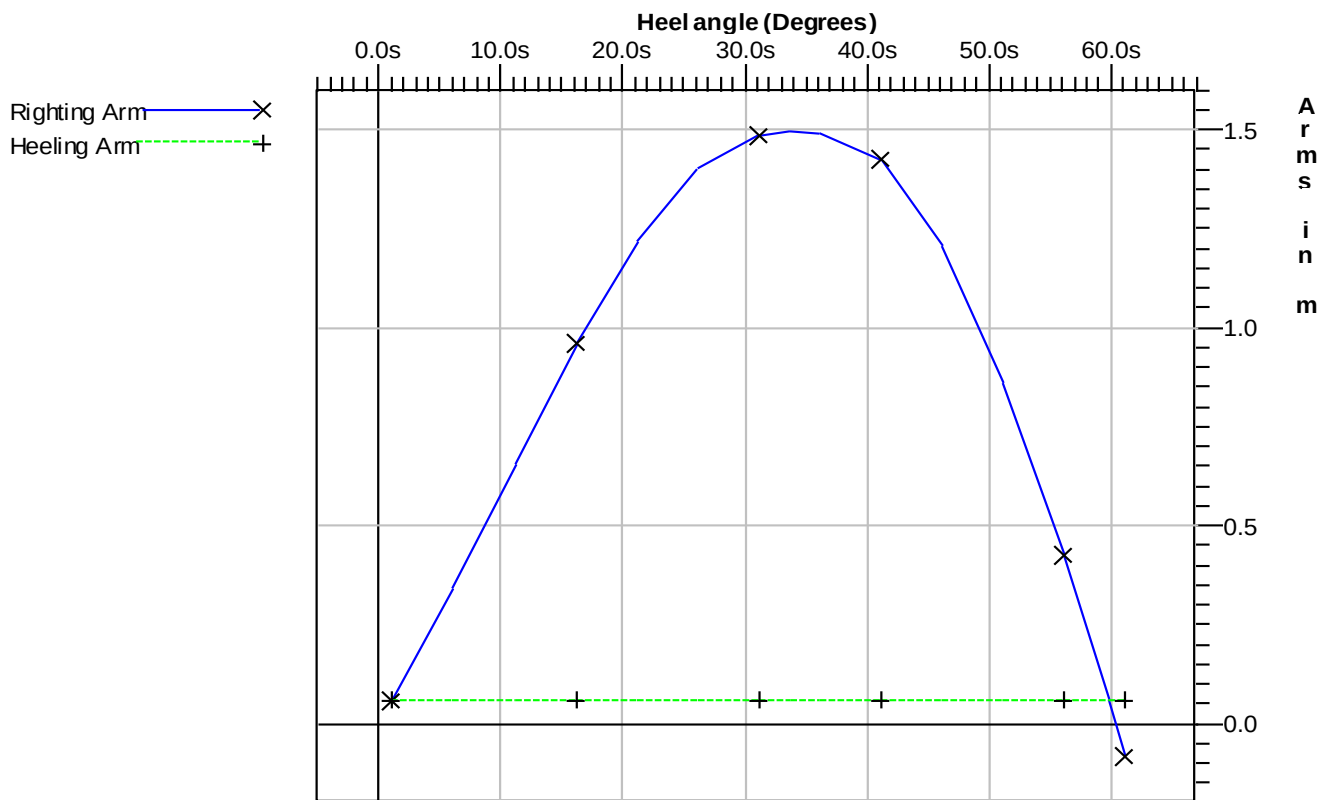
HEELING ANGLE DUE TO TURNING 2.61s deg

1000 PASSENGERS CROWDING VERIFICATION

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)
1.05s	0.30a	6.287	0.000
6.05s	0.27a	6.192	0.290
11.05s	0.21a	5.958	0.602
16.05s	0.14a	5.634	0.904
21.05s	0.08a	5.219	1.164
26.05s	0.02a	4.700	1.347
31.05s	0.04f	4.068	1.429
33.65s	0.07f	3.698	1.438
36.05s	0.09f	3.332	1.433
41.05s	0.15f	2.509	1.370
46.05s	0.20f	1.664	1.148
51.05s	0.25f	0.816	0.801
56.05s	0.30f	-0.031	0.367
59.73s	0.34f	-0.662	0.000
61.05s	0.35f	-0.889	-0.141

Righting Arms vs. Heel - IMO RES. A.749 (18)



HEELING ANGLE DUE TO PASSENGERS CROWDING 1.05s deg

IMO Res. A.749 (18), SEVERE WIND AND ROLLING CRITERION (WEATHER CRITERION)

Wind speed 53.4 kn

Wind pressure 504 N /m²Under Water Lateral Plane 907.423 m²Above Water Lateral Plane 3580.370 m²

Under Water Lateral Plane Centroid 2.909 m below water line

Above Water Lateral Plane Centroid 11.767 m above water line

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)	Area (m-Rad)	Flood Pt Height (m)	Notes
21.13p	0.08a	5.212	-1.484	0.000	6.874 (1)	Roll
16.13p	0.14a	5.628	-1.226	-0.118	8.059 (1)	
11.13p	0.21a	5.953	-0.925	-0.212	9.232 (1)	
6.13p	0.27a	6.189	-0.612	-0.280	10.378 (1)	
1.13p	0.30a	6.286	-0.322	-0.320	11.537 (1)	
3.87s	0.29a	6.251	-0.040	-0.336	10.899 (2)	
4.56s	0.28a	6.235	0.000	-0.336	10.740 (2)	Equil
8.87s	0.24a	6.073	0.265	-0.326	9.751 (2)	
13.87s	0.17a	5.785	0.575	-0.290	8.592 (2)	
18.87s	0.11a	5.412	0.858	-0.227	7.409 (2)	
23.87s	0.04a	4.938	1.078	-0.142	6.229 (2)	
28.87s	0.02f	4.356	1.205	-0.042	5.072 (2)	
33.67s	0.07f	3.694	1.237	0.061	3.998 (2)	MaxRa
33.87s	0.07f	3.664	1.237	0.066	3.954 (2)	
38.87s	0.12f	2.875	1.214	0.173	2.875 (2)	
43.87s	0.18f	2.032	1.062	0.273	1.715 (4)	
48.87s	0.23f	1.185	0.764	0.354	0.523 (4)	
50.00s	0.24f	0.994	0.682	0.368	0.252 (4)	
51.05s	0.25f	0.817	0.601	0.380	0.000 (4)	FldPt
55.00s	0.29f	0.147	0.264	0.410	-0.953 (4)	

Note:

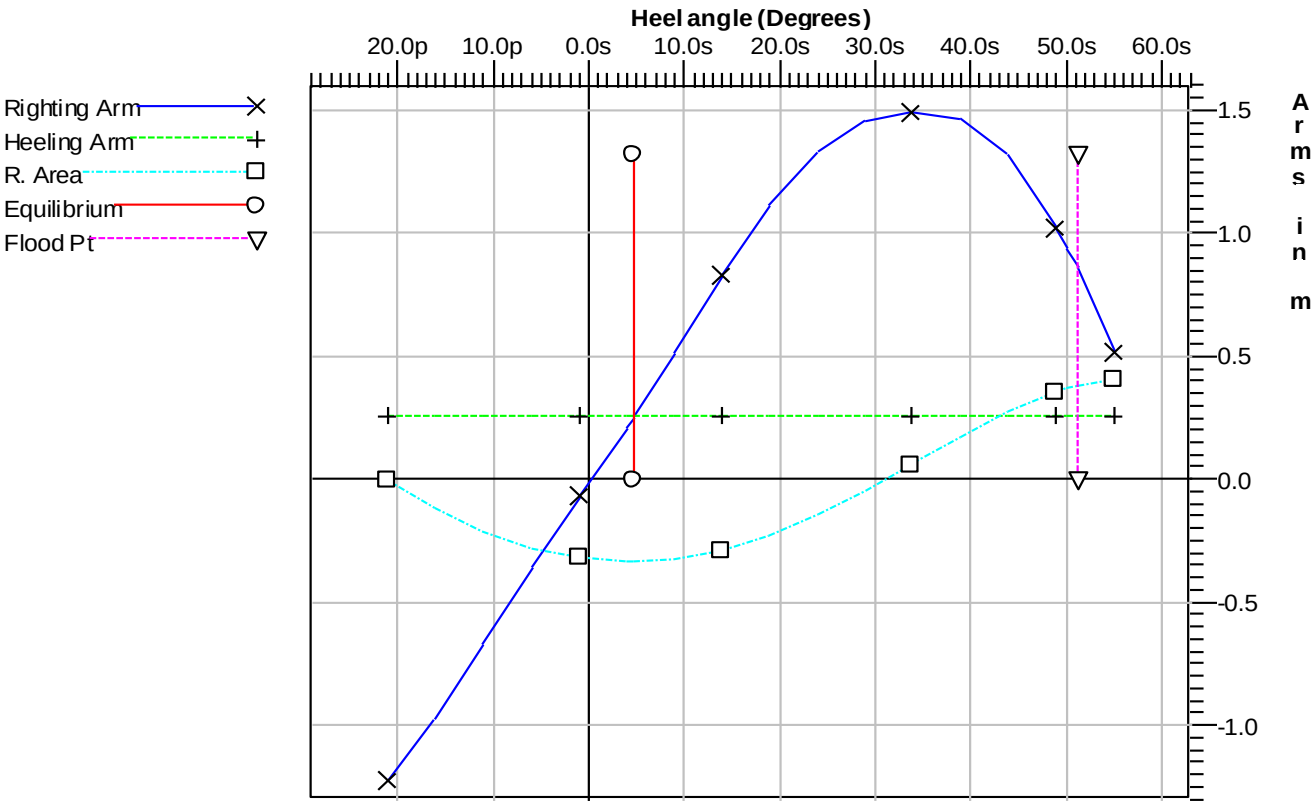
Roll angle is 24.21

Equilibrium for load condition without gust is 3.08s

Unprotected Flood Points

Name	L,T,V (m)	Height (m)
(1) Aft Ventilation Opening PS	2.150a, 13.300p, 18.100	6.874
(2) Aft Ventilation Opening SB	2.150a, 13.300s, 18.100	10.899
(4) Fwd Ventilation Opening SB	139.200f, 12.800s, 18.100	1.715

Righting Arms vs. Heel - IMO SEVERE WIND & ROLLING



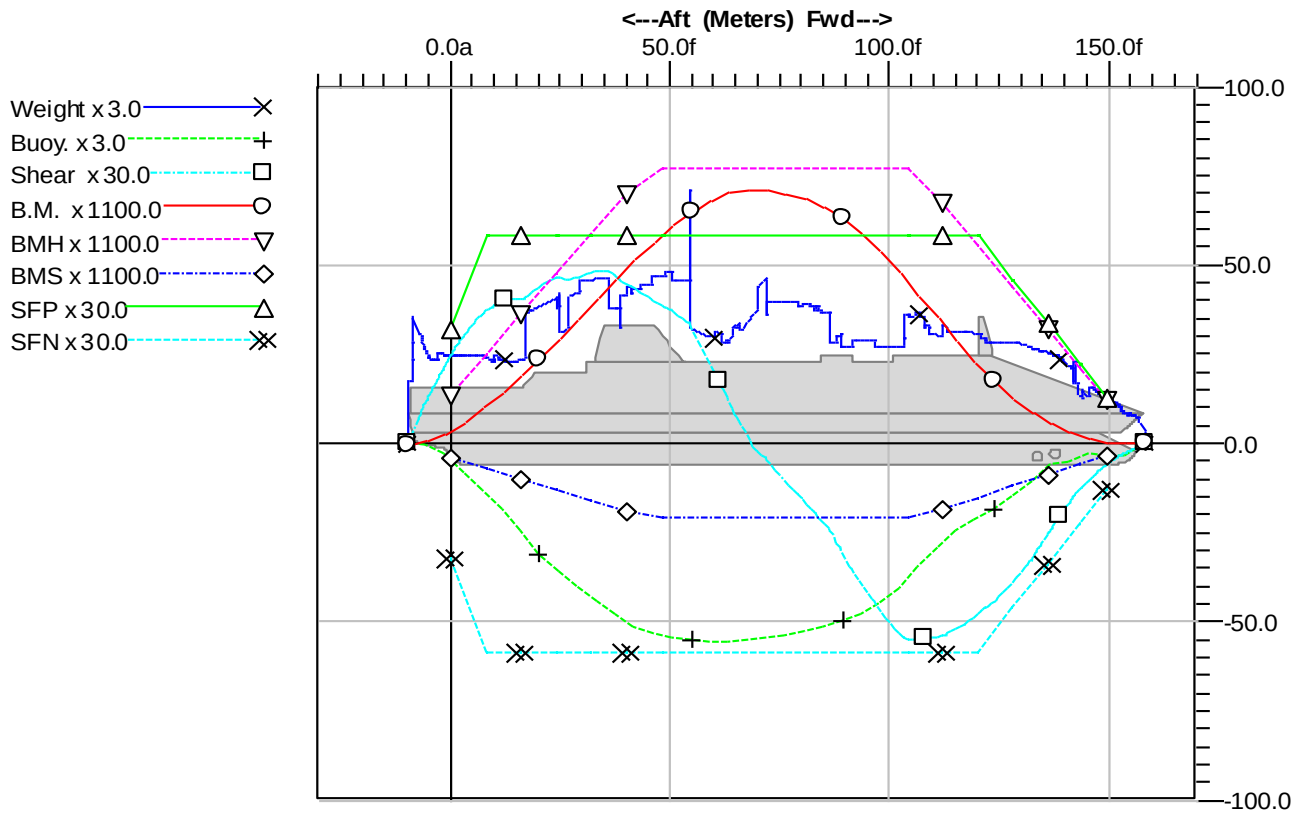
IMO SEVERE WIND & ROLLING

Limit	Min/Max	Actual	Margin	Pass
(1) Res. Ratio from Roll to Abs 50.00 deg or Flood	>1.000	2.095	1.095	Yes

LONGITUDINAL STRENGTH

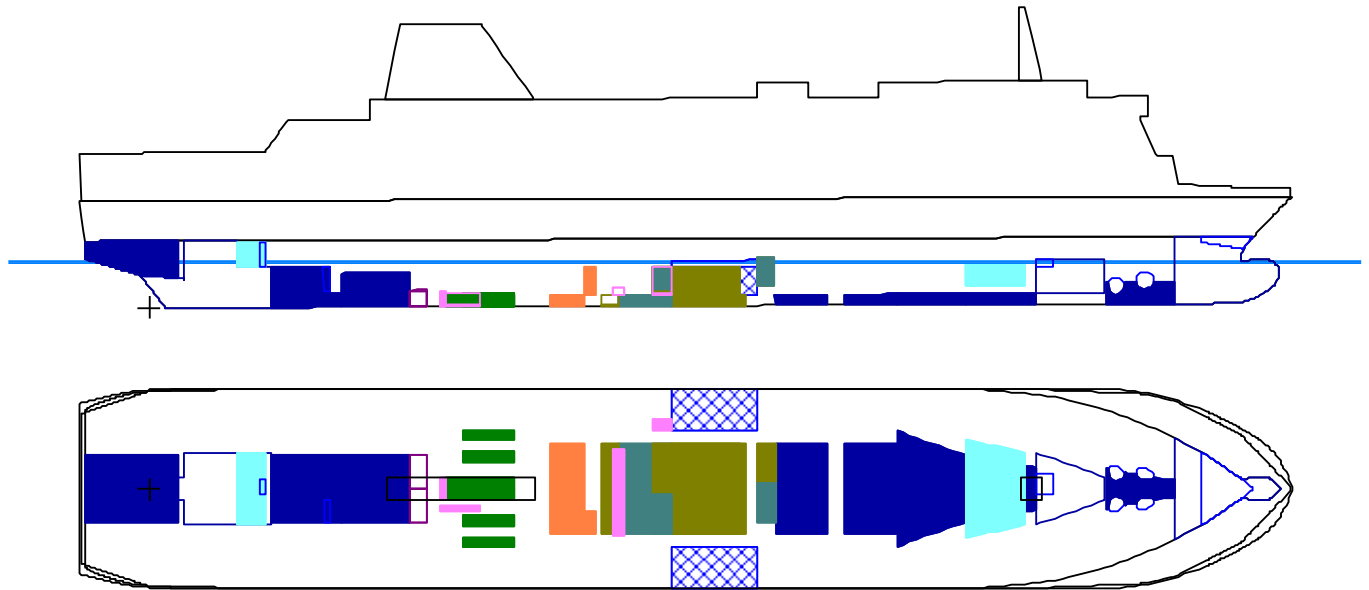
Frame No.	Location (m)	Weight (MT/m)	Buoyancy (MT/m)	Shear (MT)	Bending (MT-m)	Shear (%/Max)	Bending (%/Max)
FR -10	8.000a	100.0	<und>	141.9	152	undef	undef
FR 0	0.000	74.0	11.4	739.0	3860	76.03	26.08
BKHD FR 6	4.800f	74.0	30.2	992.6	8075	68.98	36.24
FR 10	8.000f	72.5	41.8	1113.4	11468	63.62	42.06
FR 20	16.000f	71.3	74.4	1223.6	21038	69.92	52.95
BKHD FR 21	16.800f	110.3	78.0	1220.1	22019	69.72	53.74
FR 30	24.000f	123.6	106.4	1393.0	31524	79.60	60.40
BKHD FR 33	26.400f	123.5	113.5	1376.1	34872	78.64	62.35
BKHD FR 36	28.800f	127.5	120.4	1396.6	38211	79.81	64.04
FR 40	32.000f	138.5	129.0	1434.6	42755	81.98	66.13
BKHD FR 50	40.000f	132.8	150.4	1343.8	54172	76.79	70.24
BKHD FR 51	40.800f	132.8	152.1	1329.0	55245	75.94	70.94
FR 60	48.000f	141.6	162.1	1164.5	64222	66.55	75.91
BKHD FR 63	50.400f	144.3	163.7	1117.8	66970	63.88	79.16
BKHD FR 64	51.200f	138.2	164.1	1097.3	67857	62.70	80.21
FR 70	56.000f	94.9	165.8	900.0	72786	51.43	86.04
BKHD FR 75	60.000f	94.4	166.6	601.9	75816	34.40	89.62
FR 80	64.000f	96.4	166.1	294.5	77635	16.83	91.77
BKHD FR 90	72.000f	119.9	163.7	-133.5	78059	7.63	92.27
FR 100	80.000f	118.8	158.5	-471.3	75658	26.93	89.43
BKHD FR 105	84.000f	112.9	155.1	-631.7	73473	36.10	86.85
FR 110	88.000f	91.2	150.7	-838.4	70591	47.91	83.44
BKHD FR 117	93.600f	87.0	142.3	-1183.4	64924	67.62	76.74
FR 120	96.000f	87.0	137.5	-1310.7	61945	74.90	73.22
BKHD FR 129	103.200f	109.0	116.6	-1636.3	51276	93.50	60.61
FR 130	103.200f	109.0	116.6	-1636.3	51276	93.50	60.61
FR 140	112.000f	99.4	82.8	-1618.6	36927	92.49	49.74
BKHD FR 141	112.800f	98.7	80.1	-1604.5	35641	91.68	48.85
FR 150	120.000f	93.3	62.4	-1433.8	24664	81.93	40.23
BKHD FR 153	112.400f	99.1	81.4	-1611.5	36284	92.09	49.30
FR 160	128.000f	85.4	44.1	-1172.2	14210	84.88	29.38
BKHD FR 165	132.000f	81.4	32.9	-990.0	9893	82.77	23.61
FR 170	136.000f	76.5	23.7	-767.1	6401	75.88	18.07
BKHD FR 177	141.600f	64.4	13.4	-455.2	3037	60.45	11.49
FR 180	143.400f	39.4	10.7	-381.9	2301	57.00	9.77
FR 190	149.400f	36.7	9.2	-176.7	661	44.96	4.81
FR 200	155.400f	24.2	3.8	-49.8	48	undef	undef

Longitudinal Strength At Sea Condition



Max. Shear	-1645.2 MT	at	105.000f
Max. Bending Moment	78299 MT-m	at	69.000f (Hogging)
Max% Shear	94.01%	at	105.000f
Max% Bending Moment	92.55%	at	69.000f

CASE 7.1 - SHIP WITH 1000 PASSENGERS
FULL CARS ON DECKS 3, 5, 6 AND 7
SHIP AT DEPARTURE (100% CONSUMABLES)



Fluid Legend

Fluid Name	Legend	Weight (MT)	Load%
BALLAST		1 683.24	58.55%
FRESH WATER		402.63	99.31%
HW		531.57	82.50%
DIESEL OIL		88.86	98.00%
TO		38.47	98.00%
HFO		761.48	92.18%
LUBE OIL		74.51	77.77%
MISCELLANEOUS		10.39	22.66%
LSHFO		231.31	98.00%

Floating Status

Draft FP	5.827 m	Heel	0.00 deg	GM(Solid)	4.242 m
Draft MS	6.143 m	Equil	Yes	F/S Corr.	0.306 m
Draft AP	6.458 m	Wind	Off	GM(Fluid)	3.936 m
Trim	0.63a m	Wave	No	KMT	15.475 m
LCG	67.871f m	VCG-Solid	11.233 m	TPcm	36.35
Displacement	16516.9 MT	WaterSpgr	1.025		

Draft At Draft Marks

FORE.p	5.832(m)	FORE.s	5.832(m)
MID.p	6.143(m)	MID.s	6.143(m)
AFT.p	6.421(m)	AFT.s	6.421(m)

TRIM (Referred to Draft Marks) aft 0.59/140.00a m

Fixed Weight Status

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	11 244.06	70.053f	0.000	13.381u
1) CREW	5.40	120.960f	0.000	25.540u
2) PROVISIONS	45.00	124.100f	0.000	10.110u
3) STORES INCL. SHOP STORES	45.00	98.630f	0.000	11.280u
4) 1000 PASSENGERS	100.00	74.770f	0.000	26.270u
5) CARS ON DECK 3	445.00	66.680f	0.000	9.900u
6) CARS ON DECK 5	460.00	68.930f	0.000	15.500u
7) CARS ON CAR DECK 6	75.00	123.250f	0.000	18.470u
8) CARS ON DECK 7	275.00	39.680f	0.000	21.100u
Total Fixed:	12 694.47	69.902f	0.000	13.621u

Tank Status

BALLAST

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
PFT_WB_101.C	1.025	<empty>					0.0
WB_201.C	1.025	100.00%	41.70	137.000f	0.000	1.702	0.0
WB_401.C	1.025	100.00%	77.29	117.171f	0.000	0.887	0.0
WB_501.C	1.025	100.00%	138.17	107.479f	0.000	0.852	0.0
WB_601.C	1.025	100.00%	130.02	99.547f	0.000	0.779	0.0
WB_701.C	1.025	100.00%	138.76	89.998f	0.000	0.750	0.0
WB_1201.C	1.025	100.00%	381.44	31.268f	0.000	2.545	0.0
WB_1301.C	1.025	100.00%	339.22	21.058f	0.085p	3.167	0.0
WB_1401.C	1.025	<empty>					0.0
WB_1511.C	1.025	100.00%	436.64	1.706a	0.000	7.457	0.0
WB_311.C	1.025	<empty>					0.0
Subtotals:		58.55%	1 683.24	43.592f	0.017p	3.424	0.0

FRESH WATER

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
FW_1411.C	1.000	98.00%	137.09	13.934f	0.010s	7.366	355.9
FW_411PS.P	1.000	100.00%	131.01	116.609f	2.991p	4.087	0.0
FW_412SB.S	1.000	100.00%	134.54	116.609f	2.991s	4.087	0.0
Subtotals:		99.31%	402.63	81.649f	0.030s	5.203	355.9

HW

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
HEEL_812PS.P	1.000	83.50%	267.78	77.949f	10.862p	3.550	194.4
HEEL_812SB.S	1.000	81.50%	263.79	77.948f	10.860s	3.502	196.2
Subtotals:		82.50%	531.57	77.949f	0.082p	3.526	390.6

DIESEL OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
DO_1001.C	0.860	98.00%	76.11	57.594f	0.000	0.735	707.0
DO_DAY_914.S	0.860	98.00%	12.75	60.800f	4.750s	3.460	3.0
Subtotals:		98.00%	88.86	58.054f	0.681s	1.126	709.9

TO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
TO_STOR1202.P	0.861	98.00%	19.23	37.214f	2.309p	1.198	17.5
TO_DRAIN1202.S	0.861	98.00%	19.23	37.214f	2.309s	1.198	17.5
Subtotals:		98.00%	38.47	37.214f	0.000	1.198	35.0

HFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
HFO_801.C	0.980	100.00%	191.75	77.200f	0.000	0.750	0.0
HFO_811.C	0.980	98.00%	462.63	76.792f	0.000	3.460	1 611.2
HFO_OVFL_902.C	0.980	10.00%	4.43	63.586f	0.000	0.075	402.8
HFO_DAY_911.P	0.980	98.00%	50.60	70.800f	2.000p	3.460	33.7
HFO_SETT.P	0.980	98.00%	50.60	85.200f	3.600p	4.760	33.7
SLUDGE_913.P	0.980	10.00%	1.48	70.795f	5.600p	1.700	0.8
Subtotals:		92.18%	761.48	76.967f	0.383p	2.841	2 082.3

LUBE OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LO_1102PS.P	0.910	98.00%	13.39	46.790f	4.500p	0.823	1.3
LO_1102SB.S	0.910	98.00%	13.39	46.790f	4.500s	0.823	1.3
LO_1103PS.P	0.910	98.00%	11.97	46.856f	7.388p	0.921	1.1
LO_1103SB.S	0.910	98.00%	11.97	46.856f	7.388s	0.921	1.1
DIRTYLO_1101.P	0.910	10.00%	2.20	45.401f	0.800p	0.081	2.9
STOR_LO_1101.S	0.910	98.00%	21.59	45.580f	0.800s	0.794	2.9
Subtotals:		77.77%	74.51	46.419f	0.208s	0.824	10.7

MISCELLANEOUS

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
BILGEWT_915P.P	1.000	10.00%	1.51	70.795f	8.800p	1.695	0.8
HFODRAIN_917.P	1.000	10.00%	0.16	64.791f	5.100p	1.550	0.0
HFOSLUDGE916.S	1.000	10.00%	1.75	64.791f	0.900s	1.550	189.6
LOGEAR_1104P.C	1.000	100.00%	6.45	40.400f	0.000	1.050	0.0
FWDRAIN1104S.S	1.000	10.00%	0.52	42.743f	2.800s	0.097	0.1
Subtotals:		22.66%	10.39	49.422f	1.066p	1.188	190.7

LSHFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LSHFO_901.C	0.980	98.00%	130.11	68.388f	0.000	0.735	1 208.5
LSHFO_DAY912.S	0.980	98.00%	50.60	70.800f	3.600s	3.460	33.7
LSHFO_SETT.S	0.980	98.00%	50.60	85.200f	2.000s	4.760	33.7
Subtotals:		98.00%	231.31	72.593f	1.225s	2.212	1 275.9

All Tanks

	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
Totals:		71.42%	3 822.46	61.125f	0.001p	3.304	5 051.0

Displacer Status

Item	Status	Spgr	Displ (MT)	LCB (m)	TCB (m)	VCB (m)	Eff /Perm
HULL	Intact	1.025	16 516.95	67.839f	0.000	3.494	1.000
SubTotals:			16 516.95	67.839f	0.000	3.494	

Critical points

Name	L,T,V (m)	Height (m)
(1) MES Height Limiting Point PS	47.200f, 13.850p, 5.900	-0.359
(2) MES Height Limiting Point SB	47.200f, 13.850s, 5.900	-0.359

Immersion of propeller tip 1.745 m

Current Rolling Period is : 10.43 second

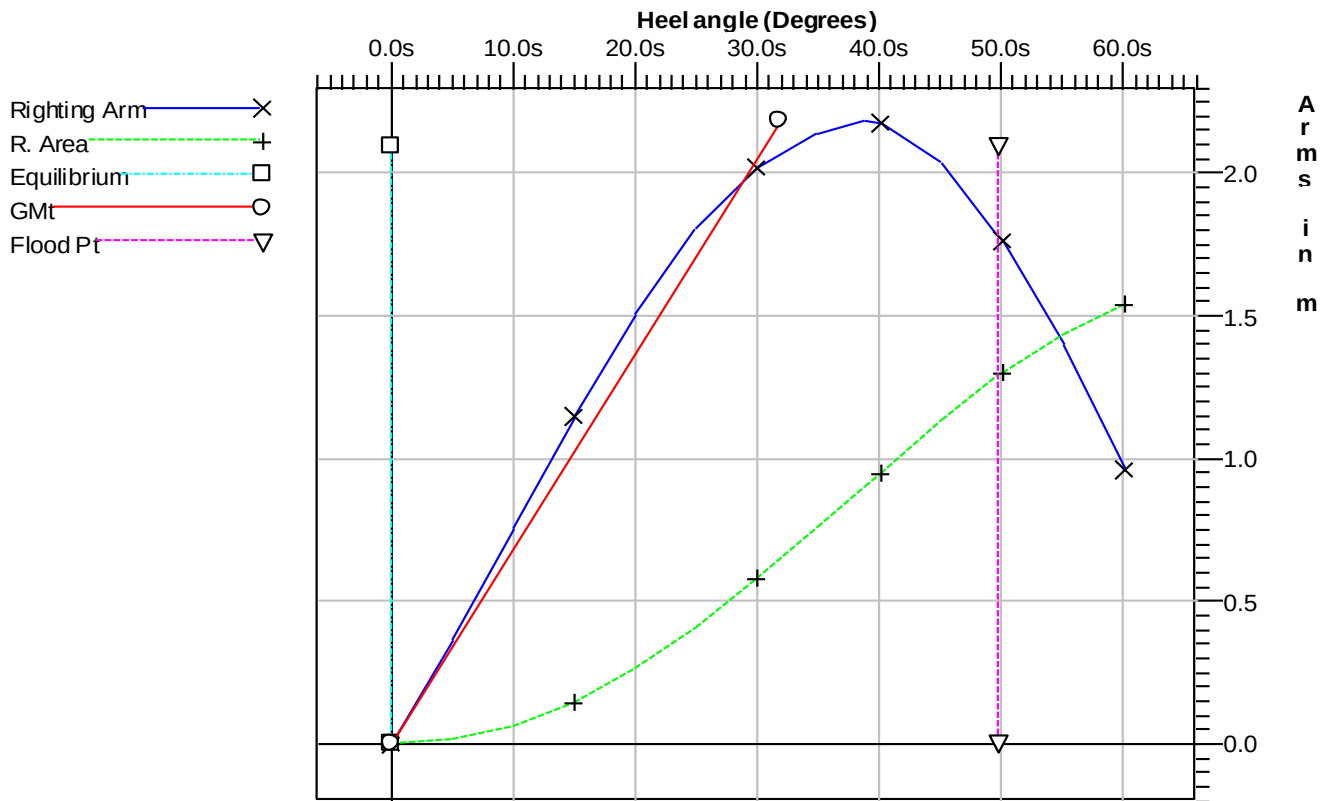
Righting Arms vs. Heel - IMO RES. A.749 (18)

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Righting Arm (m)	Area (m-Rad)	Flood Pt Height (m)	Notes
0.00	0.24a	6.458	0.000	0.000	11.633 (1)	Equil
5.00s	0.22a	6.390	0.368	0.016	10.474 (2)	
10.00s	0.17a	6.182	0.762	0.065	9.328 (2)	
15.00s	0.11a	5.884	1.149	0.149	8.153 (2)	
20.00s	0.05a	5.500	1.509	0.265	6.957 (2)	
25.00s	0.00f	5.015	1.809	0.410	5.769 (2)	
30.00s	0.06f	4.418	2.019	0.578	4.609 (2)	
35.00s	0.11f	3.711	2.140	0.760	3.491 (2)	
38.80s	0.14f	3.107	2.184	0.903	2.628 (4)	MaxRa
40.00s	0.16f	2.911	2.177	0.949	2.345 (4)	
45.00s	0.21f	2.089	2.041	1.134	1.153 (4)	
49.77s	0.25f	1.302	1.783	1.294	0.000 (4)	FldPt
50.00s	0.26f	1.264	1.769	1.301	-0.055 (4)	
55.00s	0.30f	0.440	1.403	1.440	-1.271 (4)	
60.00s	0.35f	-0.391	0.965	1.544	-2.487 (4)	

Unprotected Flood Points

Name	L,T,V (m)	Height (m)
(1) Aft Ventilation Opening PS	2.150a, 13.300p, 18.100	11.633
(2) Aft Ventilation Opening SB	2.150a, 13.300s, 18.100	10.474
(4) Fwd Ventilation Opening SB	139.200f, 12.800s, 18.100	2.628

Righting Arms vs. Heel - IMO RES. A.749 (18)



IMO RES. A.749 (18)

Limit	Min/Max	Actual	Margin	Pass
(1) GM at Equilibrium	>0.150 m	3.936	3.786	Yes
(2) Area from 0.00 deg to 30.00	>0.0550 m-R	0.578	0.523	Yes
(3) Area from 0.00 deg to 40.00 or Flood	>0.0900 m-R	0.949	0.859	Yes
(4) Area from 30.00 deg to 40.00 or Flood	>0.0300 m-R	0.371	0.341	Yes
(5) Righting Arm at 30.00 deg	>0.200 m	2.019	1.819	Yes
(6) Angle from 0.00 deg to MaxRA	>25.00 deg	38.80	13.80	Yes

Current VCG Fluid 11.539 m < Max Allowable VCG 13.527 m - PASS

MAXIMUM TURNING ANGLE VERIFICATION

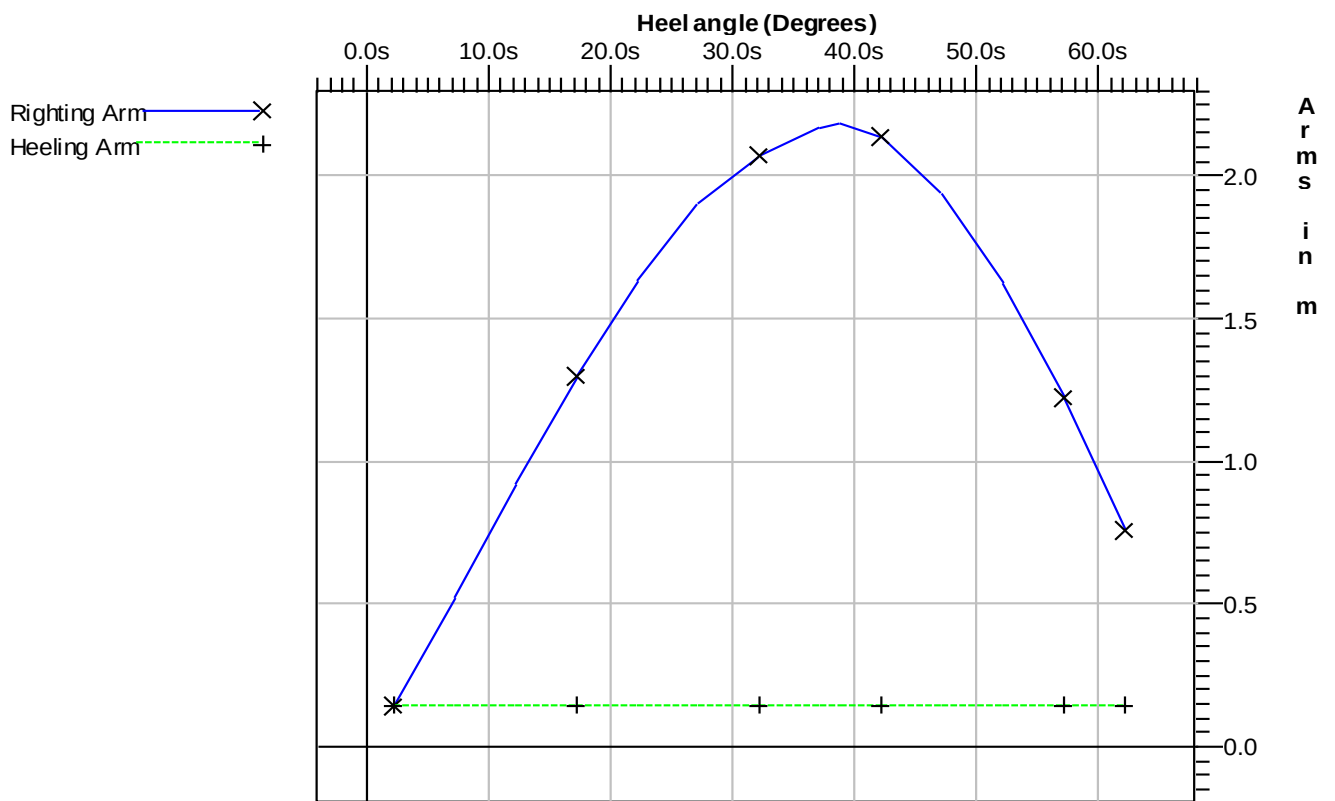
Cruising speed 21.15 knots

MOMENT DUE TO MAXIMUM TURNING ANGLE 2439.315 tm

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)
2.07s	0.24a	6.447	0.000
7.07s	0.20a	6.317	0.383
12.07s	0.14a	6.068	0.776
17.07s	0.08a	5.736	1.156
22.07s	0.03a	5.312	1.495
27.07s	0.03f	4.781	1.760
32.07s	0.08f	4.137	1.930
37.07s	0.13f	3.387	2.025
38.67s	0.14f	3.128	2.037
42.07s	0.18f	2.571	1.993
47.07s	0.23f	1.747	1.794
52.07s	0.27f	0.922	1.479
57.07s	0.32f	0.097	1.081
62.07s	0.37f	-0.739	0.617

Righting Arms vs. Heel - IMO RES. A.749 (18)



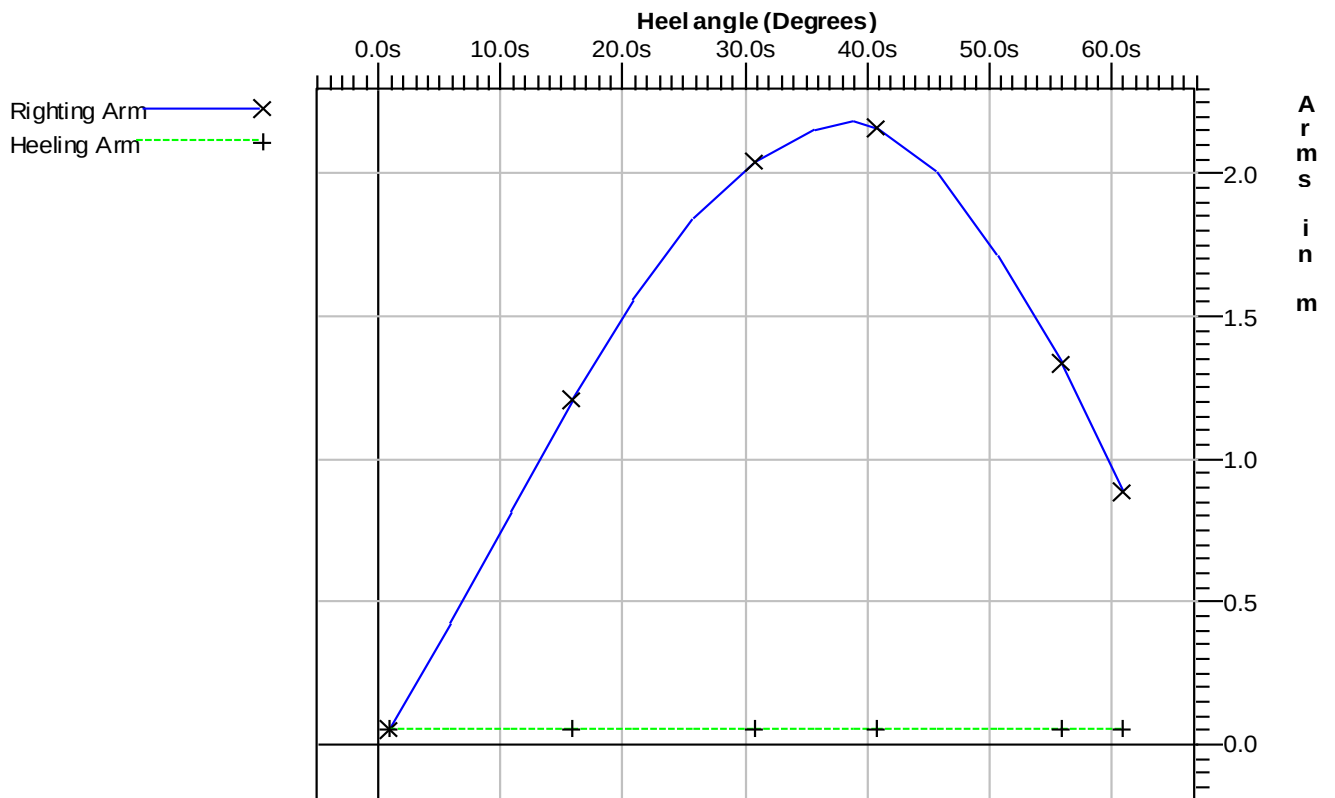
HEELING ANGLE DUE TO TURNING 2.07s deg

1000 PASSENGERS CROWDING VERIFICATION

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)
0.80s	0.24a	6.457	0.000
5.80s	0.22a	6.365	0.374
10.80s	0.16a	6.140	0.769
15.80s	0.10a	5.829	1.154
20.80s	0.04a	5.430	1.506
25.80s	0.01f	4.927	1.793
30.80s	0.06f	4.313	1.987
35.80s	0.11f	3.589	2.098
38.80s	0.14f	3.108	2.129
40.80s	0.17f	2.781	2.111
45.80s	0.22f	1.958	1.950
50.80s	0.26f	1.133	1.660
55.80s	0.31f	0.309	1.282
60.80s	0.35f	-0.524	0.834

Righting Arms vs. Heel - IMO RES. A.749 (18)



HEELING ANGLE DUE TO PASSENGERS CROWDING 0.80s deg

IMO Res. A.749 (18), SEVERE WIND AND ROLLING CRITERION (WEATHER CRITERION)

Wind speed 53.4 kn

Wind pressure 504 N /m²Under Water Lateral Plane 946.883 m²Above Water Lateral Plane 3540.909 m²

Under Water Lateral Plane Centroid 3.026 m below water line

Above Water Lateral Plane Centroid 11.655 m above water line

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)	Area (m-Rad)	Flood Pt Height (m)	Notes
22.28p	0.03a	5.293	-1.897	0.000	6.413 (1)	Roll
17.28p	0.08a	5.721	-1.561	-0.151	7.608 (1)	
12.28p	0.14a	6.056	-1.182	-0.271	8.796 (1)	
7.28p	0.20a	6.309	-0.789	-0.357	9.952 (1)	
2.28p	0.24a	6.444	-0.405	-0.409	11.103 (1)	
2.72s	0.24a	6.438	-0.047	-0.428	11.001 (2)	
3.35s	0.23a	6.428	0.000	-0.429	10.855 (2)	Equil
7.72s	0.20a	6.290	0.339	-0.416	9.852 (2)	
12.72s	0.13a	6.030	0.732	-0.369	8.692 (2)	
17.72s	0.08a	5.687	1.108	-0.289	7.503 (2)	
22.72s	0.02a	5.249	1.439	-0.177	6.308 (2)	
27.72s	0.03f	4.704	1.693	-0.040	5.133 (2)	
32.72s	0.08f	4.046	1.851	0.115	3.996 (2)	
37.72s	0.13f	3.283	1.938	0.281	2.881 (4)	
42.72s	0.19f	2.465	1.880	0.449	1.699 (4)	
47.72s	0.23f	1.640	1.664	0.604	0.497 (4)	
49.77s	0.25f	1.302	1.541	0.662	0.000 (4)	FldPt
50.00s	0.26f	1.264	1.526	0.668	-0.055 (4)	
55.00s	0.30f	0.440	1.160	0.786	-1.271 (4)	

Note:

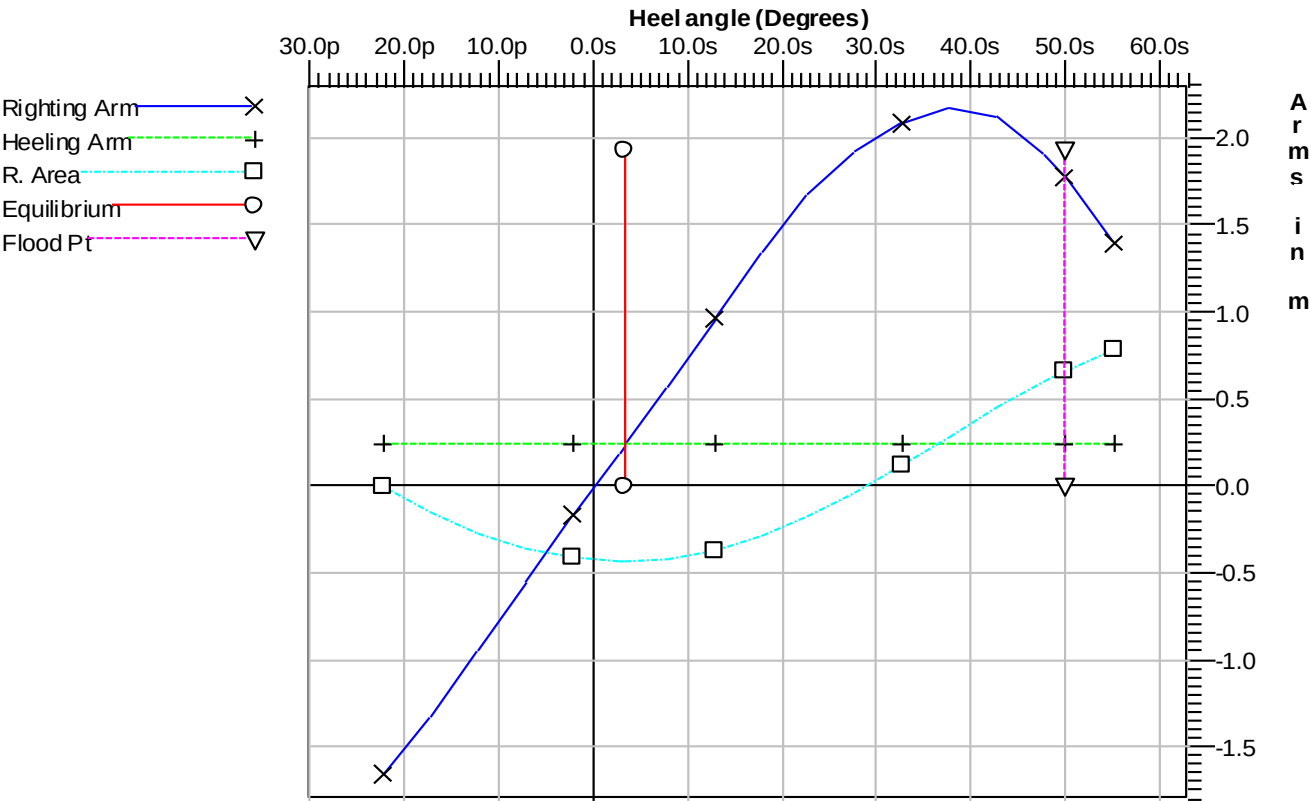
Roll angle is 24.55

Equilibrium for load condition without gust is 2.27s

Unprotected Flood Points

Name	L,T,V (m)	Height (m)
(1) Aft Ventilation Opening PS	2.150a, 13.300p, 18.100	6.413
(2) Aft Ventilation Opening SB	2.150a, 13.300s, 18.100	11.001
(4) Fwd Ventilation Opening SB	139.200f, 12.800s, 18.100	2.881

Righting Arms vs. Heel - IMO SEVERE WIND & ROLLING



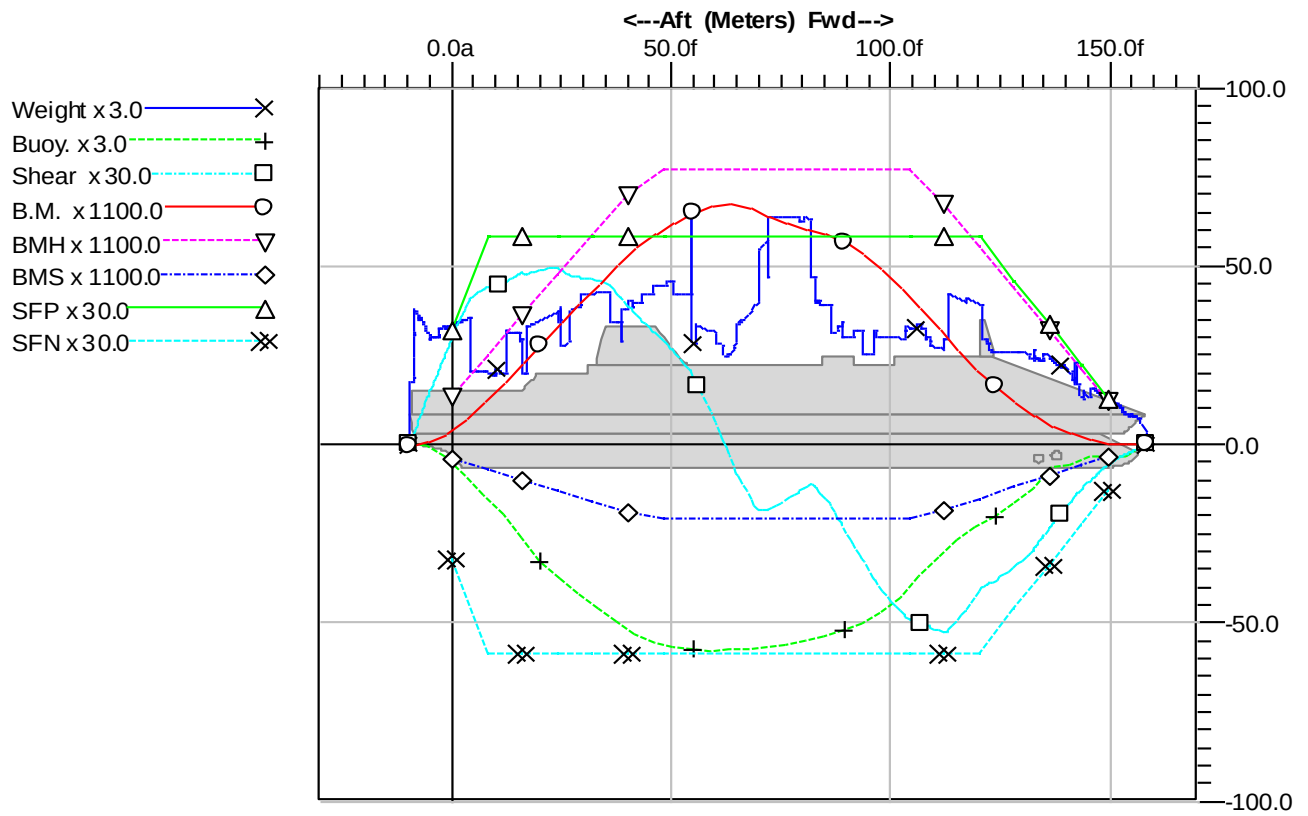
IMO SEVERE WIND & ROLLING

Limit	Min/Max	Actual	Margin	Pass
(1) Res. Ratio from Roll to Abs 50.00 deg or Flood	>1.000	2.544	1.544	Yes

LONGITUDINAL STRENGTH

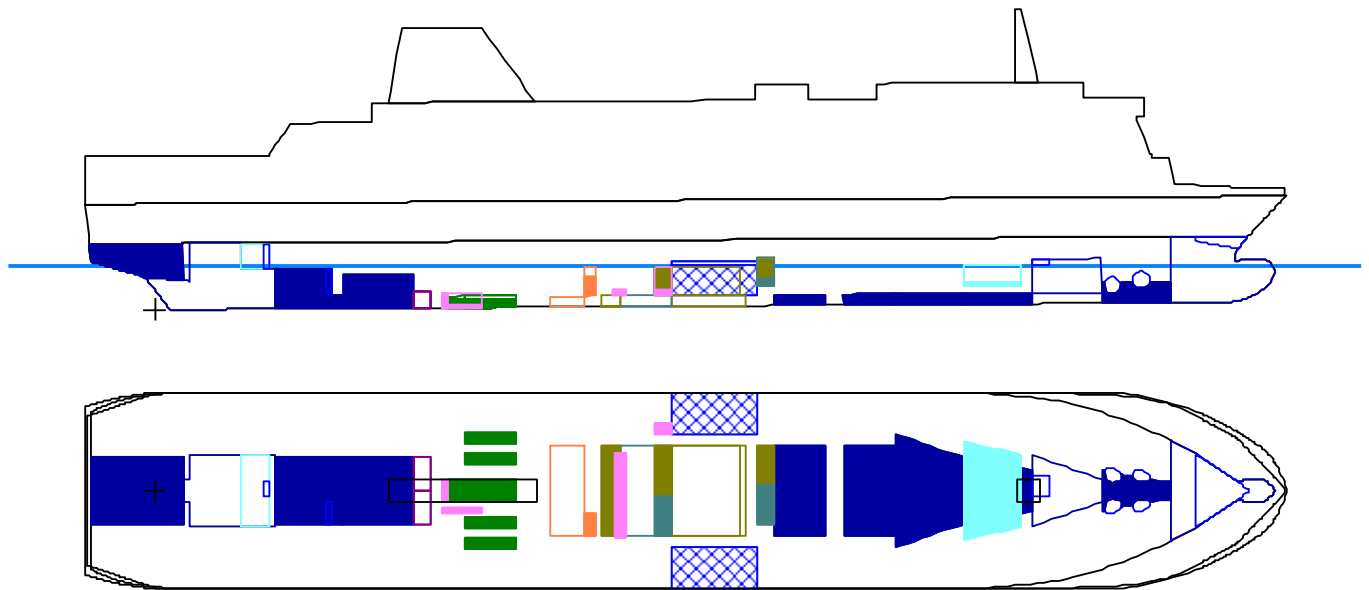
Frame No.	Location (m)	Weight (MT/m)	Buoyancy (MT/m)	Shear (MT)	Bending (MT-m)	Shear (%/Max)	Bending (%/Max)
FR -10	8.000a	108.9	<und>	153.2	131	undef	undef
FR 0	0.000	101.2	13.8	894.5	4440	92.03	30.00
BKHD FR 6	4.800f	62.8	33.6	1247.0	9692	86.67	43.50
FR 10	8.000f	61.3	45.6	1320.4	13822	75.45	50.69
FR 20	16.000f	88.9	79.3	1443.7	24831	82.50	62.50
BKHD FR 21	16.800f	99.2	83.0	1427.4	25983	81.56	63.41
FR 30	24.000f	112.7	111.9	1483.2	36551	84.75	70.03
BKHD FR 33	26.400f	112.6	119.1	1426.9	40066	81.54	71.63
BKHD FR 36	28.800f	116.6	126.0	1408.0	43476	80.45	72.86
FR 40	32.000f	127.7	134.7	1393.2	47969	79.61	74.19
BKHD FR 50	40.000f	122.0	156.3	1169.9	58517	66.85	75.88
BKHD FR 51	40.800f	122.0	158.1	1141.7	59444	65.24	76.34
FR 60	48.000f	134.5	168.2	874.5	66680	49.97	78.82
BKHD FR 63	50.400f	137.2	169.9	795.8	68690	45.47	81.19
BKHD FR 64	51.200f	127.7	170.3	761.8	69313	43.53	81.93
FR 70	56.000f	100.4	172.2	496.7	72439	28.38	85.62
BKHD FR 75	60.000f	94.1	173.1	194.5	73843	11.12	87.29
FR 80	64.000f	81.6	172.7	-176.8	73905	10.11	87.36
BKHD FR 90	72.000f	192.3	170.5	-558.4	70496	31.91	83.33
FR 100	80.000f	191.0	165.6	-373.1	66787	21.32	78.94
BKHD FR 105	84.000f	118.8	162.3	-417.7	65345	23.87	77.24
FR 110	88.000f	100.5	158.0	-621.6	63316	35.52	74.84
BKHD FR 117	93.600f	96.3	149.7	-955.8	58894	54.62	69.61
FR 120	96.000f	95.9	145.0	-1124.5	56403	64.26	66.67
BKHD FR 129	103.200f	99.2	124.1	-1445.1	47092	82.57	55.66
FR 130	103.200f	99.2	124.1	-1445.1	47092	82.57	55.66
FR 140	112.000f	89.8	89.3	-1574.6	33761	89.98	45.47
BKHD FR 141	112.800f	127.8	86.6	-1573.4	32504	89.91	44.55
FR 150	120.000f	118.6	68.2	-1241.0	22350	70.91	36.46
BKHD FR 153	112.400f	89.4	88.0	-1574.0	33132	89.94	45.02
FR 160	128.000f	78.8	48.8	-1040.0	13296	75.31	27.49
BKHD FR 165	132.000f	72.1	36.8	-903.2	9415	75.52	22.47
FR 170	136.000f	73.9	26.7	-714.3	6190	70.66	17.47
BKHD FR 177	141.600f	56.5	15.1	-444.7	2997	59.06	11.34
FR 180	143.400f	39.4	12.0	-374.1	2276	55.84	9.67
FR 190	149.400f	36.7	9.6	-173.5	660	44.14	4.80
FR 200	155.400f	24.2	3.9	-49.7	50	undef	undef

Longitudinal Strength At Sea Condition



Max. Shear	-1574.7 MT	at	111.909f
Max. Bending Moment	74063 MT-m	at	62.000f (Hogging)
Max% Shear	92.03%	at	0.000
Max% Bending Moment	87.54%	at	62.000f

**CASE 7.2 - SHIP WITH 1000 PASSENGERS -
FULL CARS ON DECKS 3, 5, 6 AND 7
SHIP AT ARRIVAL (10% CONSUMABLES)**



Fluid Legend

Fluid Name	Legend	Weight (MT)	Load%
BALLAST		1 683.24	58.55%
FRESH WATER		41.16	10.15%
HW		531.68	82.51%
DIESEL OIL		9.04	9.97%
TO		38.47	98.00%
HFO		82.39	9.97%
LUBE OIL		48.68	50.80%
MISCELLANEOUS		19.58	42.70%
LSHFO		24.27	10.28%

Floating Status

Draft FP	5.206 m	Heel	0.00 deg	GM(Solid)	3.915 m
Draft MS	5.731 m	Equil	Yes	F/S Corr.	0.095 m
Draft AP	6.256 m	Wind	Off	GM(Fluid)	3.820 m
Trim	1.05a m	Wave	No	KMT	15.860 m
LCG	67.120f m	VCG-Solid	11.944 m	TPcm	35.42
Displacement	15132.5 MT	WaterSpgr	1.025		

Draft At Draft Marks

FORE.p	5.215(m)	FORE.s	5.215(m)
MID.p	5.731(m)	MID.s	5.731(m)
AFT.p	6.194(m)	AFT.s	6.194(m)

TRIM (Referred to Draft Marks) aft 0.98/140.00a m

Fixed Weight Status

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	11 244.06	70.053f	0.000	13.381u
1) CREW	5.40	120.960f	0.000	25.540u
2) PROVISIONS	4.50	124.100f	0.000	10.110u
3) STORES INCL. SHOP STORES	45.00	98.630f	0.000	11.280u
4) 1000 PASSENGERS	100.00	74.770f	0.000	26.270u
5) CARS ON DECK 3	445.00	66.680f	0.000	9.900u
6) CARS ON DECK 5	460.00	68.930f	0.000	15.500u
7) CARS ON CAR DECK 6	75.00	123.250f	0.000	18.470u
8) CARS ON DECK 7	275.00	39.680f	0.000	21.100u
Total Fixed:	12 653.97	69.729f	0.000	13.632u

Tank Status

BALLAST

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
PFT_WB_101.C	1.025	<empty>					0.0
WB_201.C	1.025	100.00%	41.70	137.000f	0.000	1.702	0.0
WB_401.C	1.025	100.00%	77.29	117.171f	0.000	0.887	0.0
WB_501.C	1.025	100.00%	138.17	107.479f	0.000	0.852	0.0
WB_601.C	1.025	100.00%	130.02	99.547f	0.000	0.779	0.0
WB_701.C	1.025	100.00%	138.76	89.998f	0.000	0.750	0.0
WB_1201.C	1.025	100.00%	381.44	31.268f	0.000	2.545	0.0
WB_1301.C	1.025	100.00%	339.22	21.058f	0.085p	3.167	0.0
WB_1401.C	1.025	<empty>					0.0
WB_1511.C	1.025	100.00%	436.64	1.706a	0.000	7.457	0.0
WB_311.C	1.025	<empty>					0.0
Subtotals:		58.55%	1 683.24	43.592f	0.017p	3.424	0.0

FRESH WATER

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
FW_1411.C	1.000	<empty>					0.0
FW_411PS.P	1.000	15.50%	20.31	116.526f	2.977p	2.834	135.5
FW_412SB.S	1.000	15.50%	20.85	116.526f	2.977s	2.834	139.2
Subtotals:		10.15%	41.16	116.526f	0.040s	2.834	274.7

HW

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
HEEL_812PS.P	1.000	79.50%	254.95	77.938f	10.859p	3.455	194.4
HEEL_812SB.S	1.000	85.50%	276.73	77.942f	10.863s	3.597	196.2
Subtotals:		82.51%	531.69	77.940f	0.447s	3.529	390.6

DIESEL OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
DO_1001.C	0.860	<empty>					0.0
DO_DAY_914.S	0.860	69.50%	9.04	60.799f	4.750s	2.890	3.0
Subtotals:		9.97%	9.04	60.799f	4.750s	2.890	3.0

TO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
TO_STOR1202.P	0.861	98.00%	19.23	37.214f	2.309p	1.198	17.5
TO_DRAIN1202.S	0.861	98.00%	19.23	37.214f	2.309s	1.198	17.5
Subtotals:		98.00%	38.47	37.214f	0.000	1.198	35.0

HFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
HFO_801.C	0.980	<empty>					0.0
HFO_811.C	0.980	<empty>					0.0
HFO_OVFL_902.C	0.980	10.00%	4.43	63.577f	0.000	0.075	402.8
HFO_DAY_911.P	0.980	33.00%	17.04	70.798f	2.000p	2.160	33.7
HFO_SETT.P	0.980	90.00%	46.47	85.199f	3.600p	4.600	33.7
SLUDGE_913.P	0.980	98.00%	14.46	70.799f	5.600p	3.460	0.8
Subtotals:		9.97%	82.39	78.533f	3.427p	3.652	471.1

LUBE OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LO_1102PS.P	0.910	60.00%	8.20	46.771f	4.500p	0.504	1.3
LO_1102SB.S	0.910	60.00%	8.20	46.771f	4.500s	0.504	1.3
LO_1103PS.P	0.910	60.00%	7.33	46.880f	7.384p	0.582	1.1
LO_1103SB.S	0.910	60.00%	7.33	46.880f	7.384s	0.582	1.1
DIRTYLO_1101.P	0.910	70.00%	15.42	45.553f	0.800p	0.567	2.9
STOR_LO_1101.S	0.910	10.00%	2.20	45.268f	0.800s	0.082	2.9
Subtotals:		50.80%	48.68	46.350f	0.217p	0.529	10.7

MISCELLANEOUS

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
BILGEWT_915P.P	1.000	20.00%	3.02	70.796f	8.800p	1.890	0.8
HFODRAIN_917.P	1.000	20.00%	0.33	64.793f	5.100p	1.600	0.0
HFOSLUDGE916.S	1.000	50.00%	8.76	64.797f	0.900s	1.750	189.6
LOGEAR_1104P.C	1.000	100.00%	6.45	40.400f	0.000	1.050	0.0
FWDRAIN1104S.S	1.000	20.00%	1.04	42.752f	2.800s	0.193	0.1
Subtotals:		42.70%	19.58	56.519f	0.890p	1.456	190.7

LSHFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LSHFO_901.C	0.980	<empty>					0.0
LSHFO_DAY912.S	0.980	20.00%	10.33	70.796f	3.600s	1.900	33.7
LSHFO_SETT.S	0.980	27.00%	13.94	85.197f	2.000s	3.340	33.7
Subtotals:		10.28%	24.27	79.069f	2.681s	2.727	67.5

All Tanks

	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
Totals:		46.31%	2 478.51	53.801f	0.003s	3.329	1 443.2

Displacer Status

Item	Status	Spgr	Displ (MT)	LCB (m)	TCB (m)	VCB (m)	Eff /Perm
HULL	Intact	1.025	15 132.48	67.060f	0.000	3.271	1.000
SubTotals:			15 132.48	67.060f	0.000	3.271	

Critical points

Name	L,T,V (m)	Height (m)
(1) MES Height Limiting Point PS	47.200f, 13.850p, 5.900	-0.025
(2) MES Height Limiting Point SB	47.200f, 13.850s, 5.900	-0.025

Immersion of propeller tip 1.535 m

Current Rolling Period is : 10.85 second

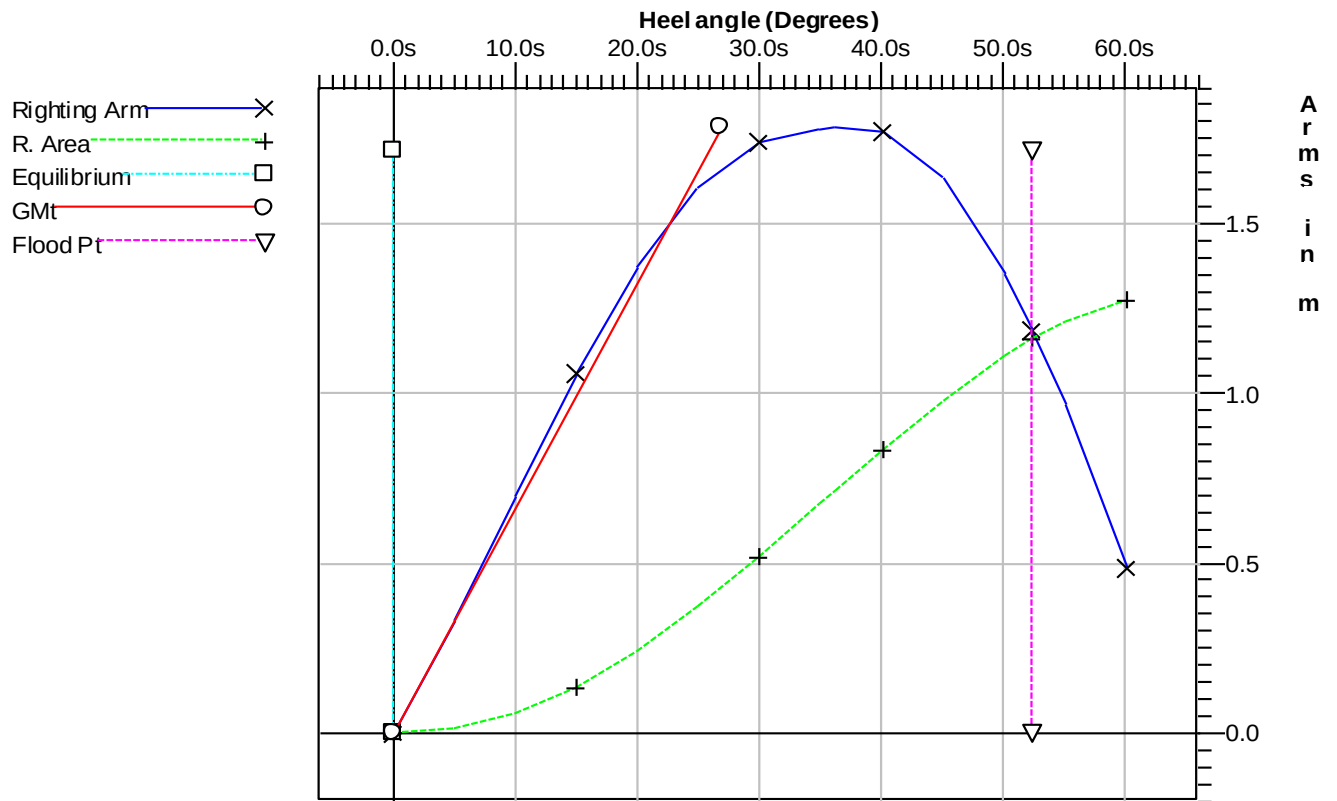
Righting Arms vs. Heel - IMO RES. A.749 (18)

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Righting Arm (m)	Area (m-Rad)	Flood Pt Height (m)	Notes
0.00	0.40a	6.256	0.000	0.000	11.829 (1)	Equil
5.00s	0.38a	6.190	0.339	0.015	10.667 (2)	
10.00s	0.32a	5.979	0.703	0.060	9.524 (2)	
15.00s	0.25a	5.667	1.059	0.137	8.364 (2)	
20.00s	0.18a	5.267	1.375	0.243	7.185 (2)	
25.00s	0.12a	4.763	1.613	0.374	6.016 (2)	
30.00s	0.05a	4.147	1.742	0.522	4.876 (2)	
35.00s	0.01f	3.426	1.782	0.676	3.773 (2)	
36.20s	0.02f	3.238	1.784	0.713	3.513 (2)	MaxRa
40.00s	0.06f	2.611	1.773	0.831	2.707 (2)	
45.00s	0.11f	1.757	1.633	0.981	1.641 (2)	
50.00s	0.16f	0.901	1.350	1.112	0.528 (4)	
52.21s	0.19f	0.521	1.190	1.161	0.000 (4)	FldPt
55.00s	0.21f	0.045	0.964	1.214	-0.664 (4)	
60.00s	0.26f	-0.816	0.490	1.278	-1.841 (4)	

Unprotected Flood Points

Name	L,T,V (m)	Height (m)
(1) Aft Ventilation Opening PS	2.150a, 13.300p, 18.100	11.829
(2) Aft Ventilation Opening SB	2.150a, 13.300s, 18.100	10.667
(4) Fwd Ventilation Opening SB	139.200f, 12.800s, 18.100	0.528

Righting Arms vs. Heel - IMO RES. A.749 (18)



IMO RES. A.749 (18)

Limit	Min/Max	Actual	Margin	Pass
(1) GM at Equilibrium	>0.150 m	3.820	3.670	Yes
(2) Area from 0.00 deg to 30.00	>0.0550 m-R	0.522	0.467	Yes
(3) Area from 0.00 deg to 40.00 or Flood	>0.0900 m-R	0.831	0.741	Yes
(4) Area from 30.00 deg to 40.00 or Flood	>0.0300 m-R	0.310	0.280	Yes
(5) Righting Arm at 30.00 deg	>0.200 m	1.742	1.542	Yes
(6) Angle from 0.00 deg to MaxRA	>25.00 deg	36.20	11.20	Yes

Current VCG Fluid 12.040 m < Max Allowable VCG 13.869 m - PASS

MAXIMUM TURNING ANGLE VERIFICATION

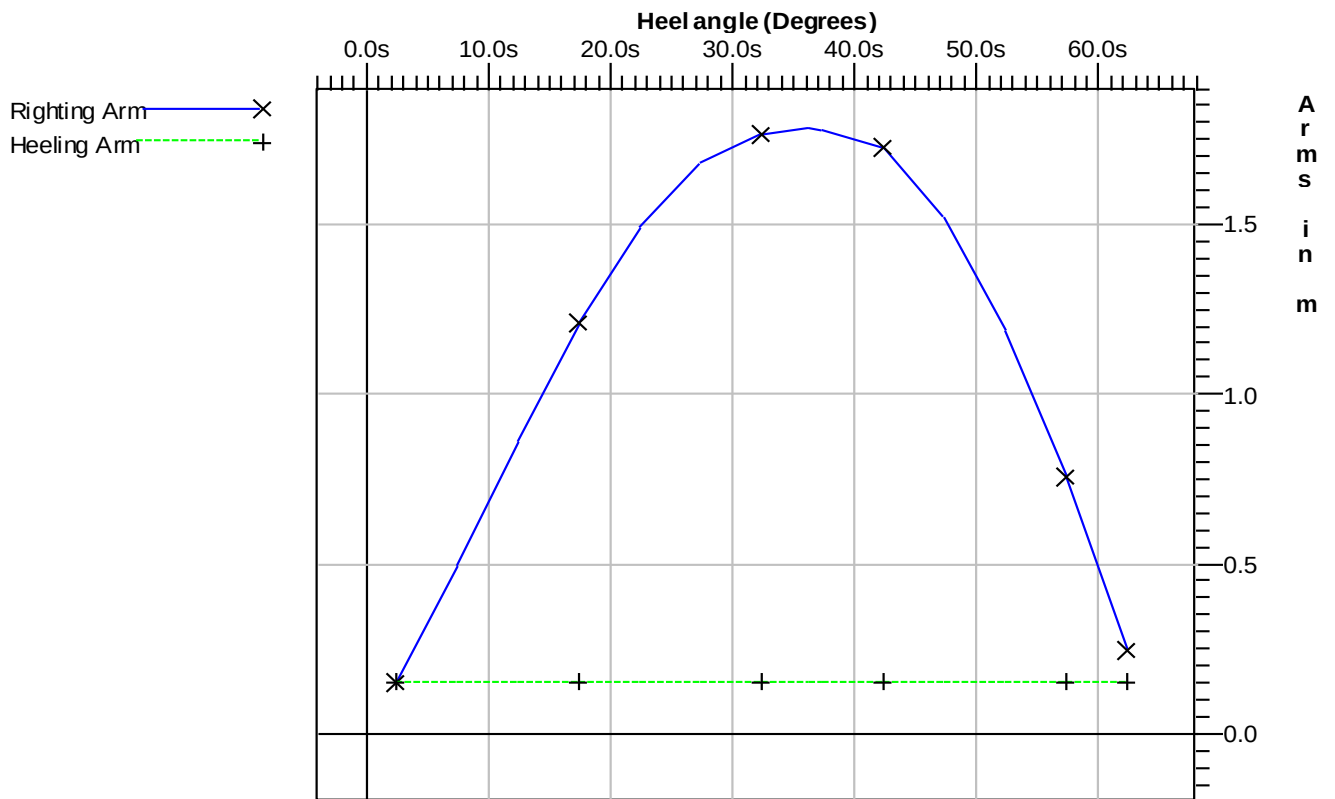
Cruising speed 21.15 knots

MOMENT DUE TO MAXIMUM TURNING ANGLE 2280.831 tm

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)
2.26s	0.40a	6.243	0.000
7.26s	0.36a	6.112	0.350
12.26s	0.29a	5.848	0.716
17.26s	0.22a	5.498	1.059
22.26s	0.15a	5.053	1.343
27.26s	0.09a	4.498	1.534
32.26s	0.02a	3.833	1.618
36.26s	0.02f	3.229	1.633
37.26s	0.03f	3.068	1.632
42.26s	0.09f	2.226	1.580
47.26s	0.14f	1.370	1.369
52.26s	0.19f	0.514	1.036
57.26s	0.23f	-0.344	0.610
62.26s	0.27f	-1.205	0.096

Righting Arms vs. Heel - IMO RES. A.749 (18)



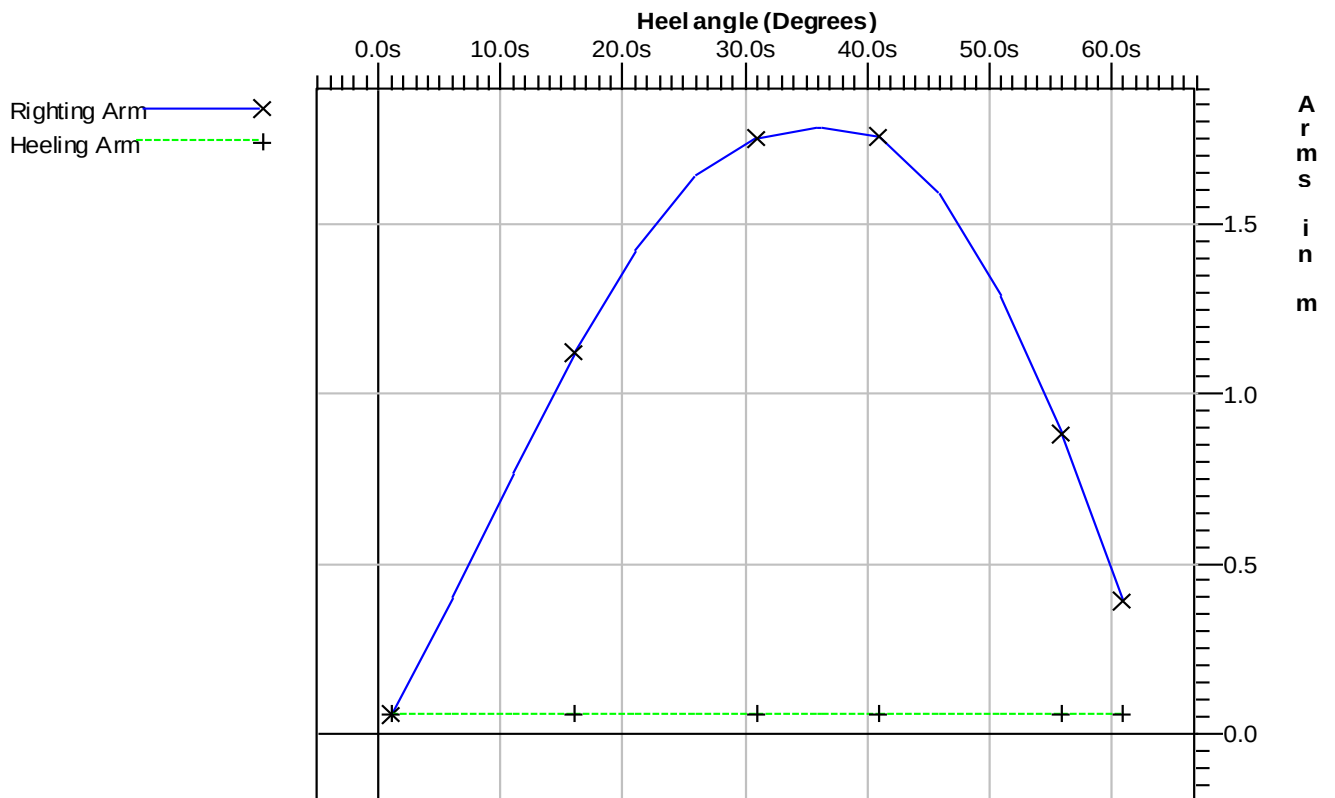
HEELING ANGLE DUE TO TURNING 2.26s deg

1000 PASSENGERS CROWDING VERIFICATION

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)
0.91s	0.40a	6.254	0.000
5.91s	0.38a	6.162	0.343
10.91s	0.31a	5.928	0.709
15.91s	0.24a	5.601	1.061
20.91s	0.17a	5.183	1.365
25.91s	0.10a	4.659	1.584
30.91s	0.04a	4.022	1.694
35.91s	0.02f	3.283	1.723
36.31s	0.02f	3.220	1.723
40.91s	0.07f	2.456	1.700
45.91s	0.12f	1.600	1.530
50.91s	0.17f	0.744	1.226
55.91s	0.22f	-0.112	0.824
60.91s	0.26f	-0.973	0.333

Righting Arms vs. Heel - IMO RES. A.749 (18)



HEELING ANGLE DUE TO PASSENGERS CROWDING 0.91s deg

IMO Res. A.749 (18), SEVERE WIND AND ROLLING CRITERION (WEATHER CRITERION)

Wind speed 53.4 kn

Wind pressure 504 N /m²Under Water Lateral Plane 880.191 m²Above Water Lateral Plane 3607.601 m²

Under Water Lateral Plane Centroid 2.830 m below water line

Above Water Lateral Plane Centroid 11.843 m above water line

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)	Area (m-Rad)	Flood Pt Height (m)	Notes
22.60p	0.15a	5.018	-1.782	0.000	6.574 (1)	Roll
17.60p	0.22a	5.472	-1.503	-0.143	7.751 (1)	
12.60p	0.29a	5.828	-1.163	-0.260	8.924 (1)	
7.60p	0.36a	6.097	-0.797	-0.346	10.071 (1)	
2.60p	0.40a	6.239	-0.445	-0.400	11.224 (1)	
2.40s	0.40a	6.240	-0.111	-0.424	11.272 (2)	
4.02s	0.39a	6.213	0.000	-0.426	10.895 (2)	Equil
7.40s	0.36a	6.106	0.240	-0.419	10.117 (2)	
12.40s	0.29a	5.840	0.606	-0.382	8.971 (2)	
17.40s	0.22a	5.487	0.948	-0.314	7.799 (2)	
22.40s	0.15a	5.039	1.230	-0.218	6.622 (2)	
27.40s	0.08a	4.481	1.418	-0.102	5.465 (2)	
32.40s	0.02a	3.813	1.499	0.026	4.342 (2)	
37.40s	0.03f	3.046	1.512	0.158	3.257 (2)	MaxRa
42.40s	0.09f	2.203	1.456	0.288	2.199 (2)	
47.40s	0.14f	1.346	1.241	0.407	1.121 (2)	
50.00s	0.17f	0.900	1.079	0.460	0.528 (4)	
52.21s	0.19f	0.521	0.920	0.498	0.000 (4)	FldPt
55.00s	0.21f	0.045	0.694	0.537	-0.664 (4)	

Note:

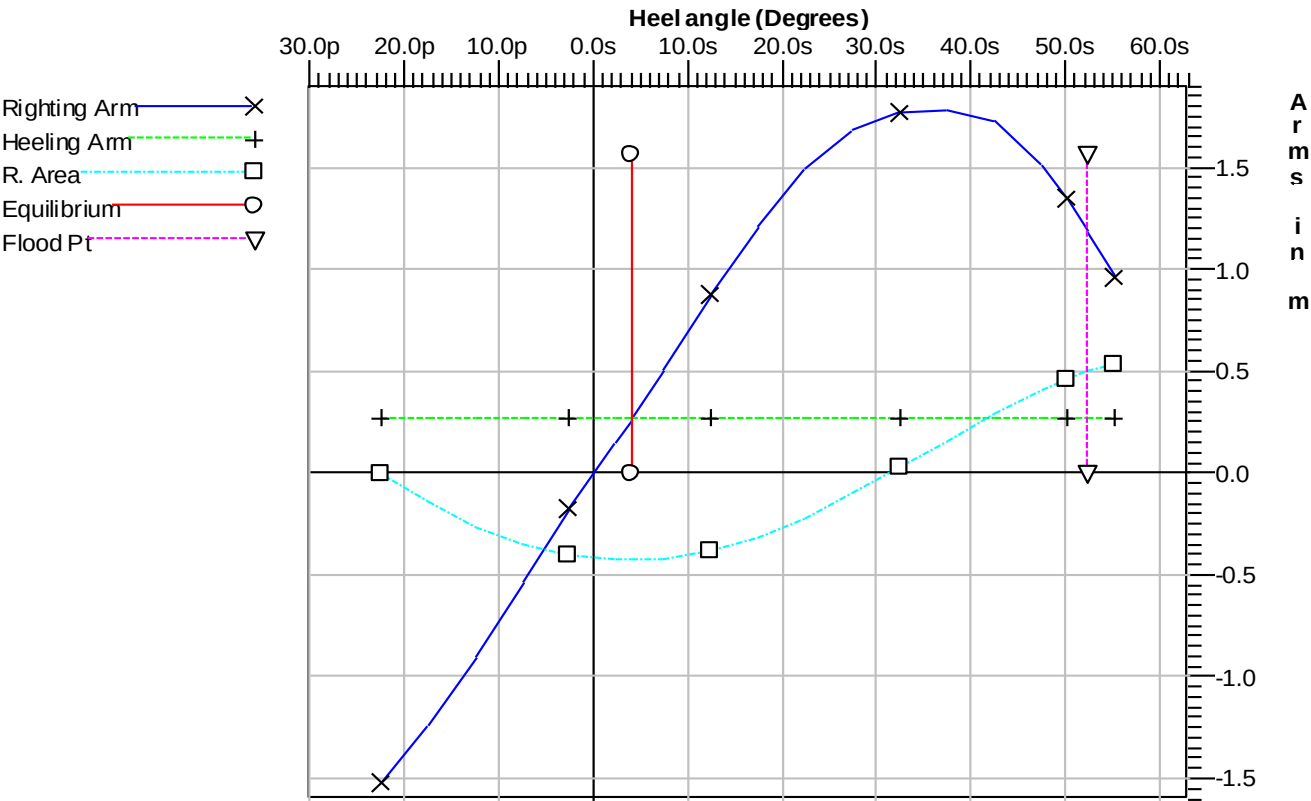
Roll angle is 25.31

Equilibrium for load condition without gust is 2.71s

Unprotected Flood Points

Name	L,T,V (m)	Height (m)
(1) Aft Ventilation Opening PS	2.150a, 13.300p, 18.100	6.574
(2) Aft Ventilation Opening SB	2.150a, 13.300s, 18.100	11.272
(4) Fwd Ventilation Opening SB	139.200f, 12.800s, 18.100	0.528

Righting Arms vs. Heel - IMO SEVERE WIND & ROLLING



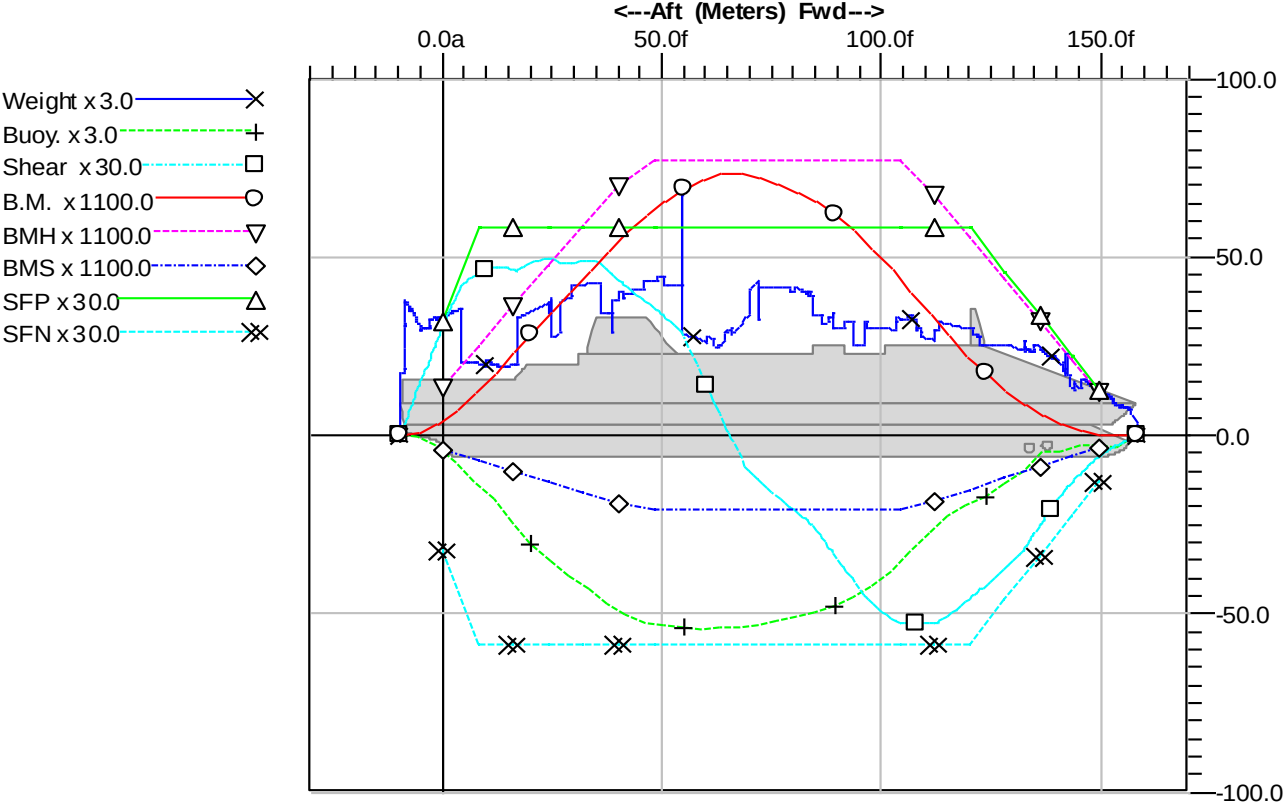
IMO SEVERE WIND & ROLLING

Limit	Min/Max	Actual	Margin	Pass
(1) Res. Ratio from Roll to Abs 50.00 deg or Flood	>1.000	2.080	1.080	Yes

LONGITUDINAL STRENGTH

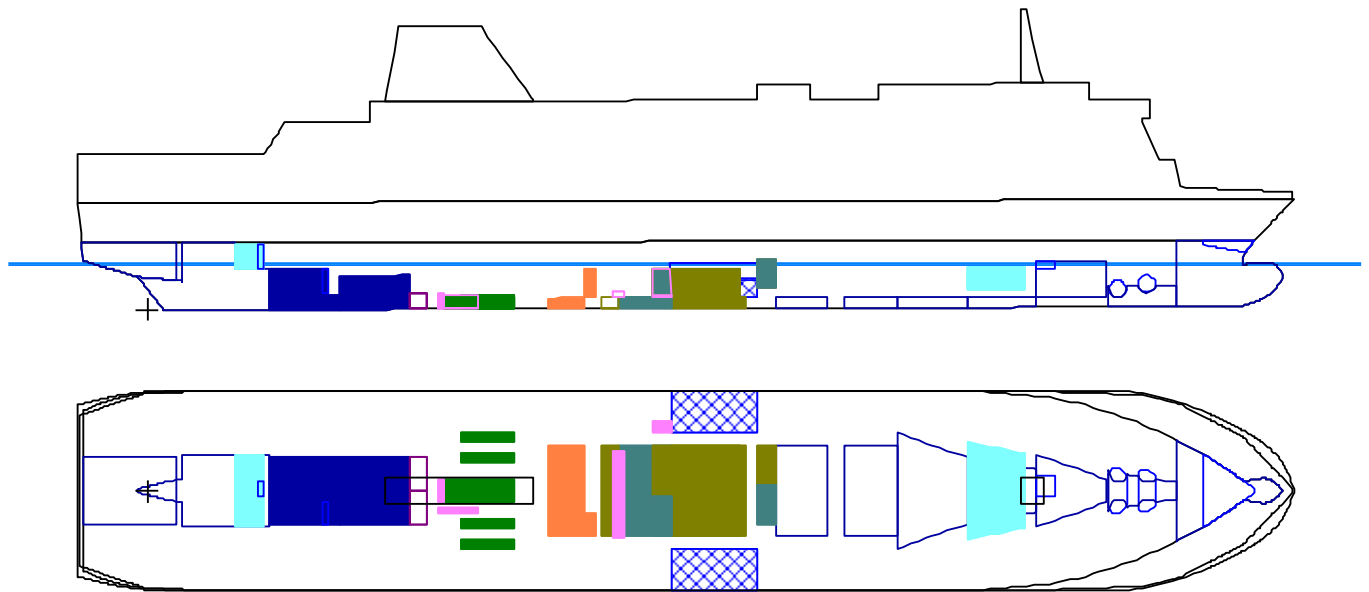
Frame No.	Location (m)	Weight (MT/m)	Buoyancy (MT/m)	Shear (MT)	Bending (MT-m)	Shear (%/Max)	Bending (%/Max)
FR -10	8.000a	108.9	<und>	153.2	136	undef	undef
FR 0	0.000	101.2	10.9	906.4	4493	93.25	30.36
BKHD FR 6	4.800f	62.8	29.4	1276.2	9853	88.70	44.22
FR 10	8.000f	61.3	40.8	1364.1	14105	77.95	51.73
FR 20	16.000f	60.3	72.7	1395.9	25372	79.77	63.86
BKHD FR 21	16.800f	99.2	76.3	1384.9	26489	79.14	64.65
FR 30	24.000f	112.7	104.2	1492.8	36952	85.30	70.80
BKHD FR 33	26.400f	112.6	111.2	1455.1	40517	83.15	72.44
BKHD FR 36	28.800f	116.6	117.9	1455.2	44024	83.15	73.78
FR 40	32.000f	127.7	126.4	1466.5	48716	83.80	75.35
BKHD FR 50	40.000f	122.1	147.4	1311.9	60140	74.97	77.98
BKHD FR 51	40.800f	122.1	149.1	1291.0	61185	73.77	78.57
FR 60	48.000f	131.1	158.7	1073.3	69704	61.33	82.39
BKHD FR 63	50.400f	133.7	160.2	1009.5	72215	57.69	85.36
BKHD FR 64	51.200f	127.7	160.5	983.3	73014	56.19	86.31
FR 70	56.000f	84.5	162.0	753.4	77323	43.05	91.40
BKHD FR 75	60.000f	84.0	162.6	429.3	79719	24.53	94.23
FR 80	64.000f	86.1	161.9	96.9	80801	5.53	95.51
BKHD FR 90	72.000f	125.6	159.1	-378.0	79463	21.60	93.93
FR 100	80.000f	124.5	153.5	-631.3	75453	36.07	89.19
BKHD FR 105	84.000f	118.6	149.9	-748.4	72718	42.76	85.96
FR 110	88.000f	100.5	145.3	-942.9	69361	53.88	81.99
BKHD FR 117	93.600f	96.3	136.5	-1204.6	63355	68.83	74.89
FR 120	96.000f	95.9	131.7	-1341.4	60310	76.65	71.29
BKHD FR 129	103.200f	99.2	110.6	-1564.6	49802	89.40	58.87
FR 130	103.200f	99.2	110.6	-1564.6	49802	89.40	58.87
FR 140	112.000f	89.8	77.4	-1582.0	35943	90.40	48.41
BKHD FR 141	112.800f	96.1	74.8	-1571.4	34686	89.79	47.55
FR 150	120.000f	90.7	57.5	-1371.4	24080	78.37	39.28
BKHD FR 153	112.400f	89.4	76.1	-1576.7	35314	90.10	47.98
FR 160	128.000f	76.0	40.0	-1133.4	14087	82.07	29.13
BKHD FR 165	132.000f	72.1	29.6	-974.0	9885	81.43	23.60
FR 170	136.000f	73.9	21.1	-759.5	6439	75.12	18.18
BKHD FR 177	141.600f	56.5	12.0	-465.3	3082	61.80	11.66
FR 180	143.400f	39.4	9.7	-389.9	2332	58.19	9.90
FR 190	149.400f	36.7	8.8	-180.7	665	45.99	4.83
FR 200	155.400f	24.2	3.4	-49.8	45	undef	undef

Longitudinal Strength At Sea Condition (stbd 0.01 deg.)



Max. Shear	-1584.7 MT	at	111.000f
Max. Bending Moment	80870 MT-m	at	65.600f (Hogging)
Max% Shear	93.25%	at	0.000
Max% Bending Moment	95.59%	at	65.600f

**CASE 8.1 - SHIP WITH 1000 PASSENGERS
TRAILERS ON DECK 3, CARS ON DECK 5
SHIP AT DEPARTURE (100% CONSUMABLES)**



Fluid Legend

Fluid Name	Legend	Weight (MT)	Load%
BALLAST		720.67	25.07%
FRESH WATER		402.63	99.31%
HW		341.48	53.00%
DIESEL OIL		88.86	98.00%
TO		38.47	98.00%
HFO		761.48	92.18%
LUBE OIL		74.51	77.77%
MISCELLANEOUS		10.39	22.66%
LSHFO		231.31	98.00%

Floating Status

Draft FP	5.940 m	Heel	0.00 deg	GM(Solid)	3.869 m
Draft MS	6.168 m	Equil	Yes	F/S Corr.	0.305 m
Draft AP	6.395 m	Wind	Off	GM(Fluid)	3.565 m
Trim	0.46a m	Wave	No	KMT	15.440 m
LCG	68.239f m	VCG-Solid	11.571 m	TPcm	36.30
Displacement	16569.3 MT	WaterSpgr	1.025		

Draft At Draft Marks

FORE.p	5.944(m)	FORE.s	5.944(m)
MID.p	6.168(m)	MID.s	6.168(m)
AFT.p	6.369(m)	AFT.s	6.369(m)

TRIM (Referred to Draft Marks) aft 0.42/140.00a m

Fixed Weight Status

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	11 244.06	70.053f	0.000	13.381u
1) CREW	5.40	120.960f	0.000	25.540u
2) PROVISIONS	45.00	124.100f	0.000	10.110u
3) STORES INCL. SHOP STORES	45.00	98.630f	0.000	11.280u
4) 1000 PASSENGERS	100.00	74.770f	0.000	26.270u
5) TRAILERS ON DECK 3	2 000.00	64.300f	0.000	11.200u
6) CARS ON DECK 5	460.00	68.930f	0.000	15.500u
Total Fixed:	13 899.47	69.509f	0.000	13.217u

Tank Status**BALLAST**

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
PFT_WB_101.C	1.025	<empty>					0.0
WB_201.C	1.025	<empty>					0.0
WB_401.C	1.025	<empty>					0.0
WB_501.C	1.025	<empty>					0.0
WB_601.C	1.025	<empty>					0.0
WB_701.C	1.025	<empty>					0.0
WB_1201.C	1.025	100.00%	381.44	31.268f	0.000	2.545	0.0
WB_1301.C	1.025	100.00%	339.22	21.058f	0.085p	3.167	0.0
WB_1401.C	1.025	<empty>					0.0
WB_1511.C	1.025	<empty>					0.0
WB_311.C	1.025	<empty>					0.0
Subtotals:		25.07%	720.67	26.462f	0.040p	2.838	0.0

FRESH WATER

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
FW_1411.C	1.000	98.00%	137.09	13.934f	0.010s	7.366	355.9
FW_411PS.P	1.000	100.00%	131.01	116.609f	2.991p	4.087	0.0
FW_412SB.S	1.000	100.00%	134.54	116.609f	2.991s	4.087	0.0
Subtotals:		99.31%	402.63	81.649f	0.030s	5.203	355.9

HW

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
HEEL_812PS.P	1.000	54.00%	173.17	77.927f	10.827p	2.850	194.4
HEEL_812SB.S	1.000	52.00%	168.31	77.924f	10.824s	2.803	196.2
Subtotals:		53.00%	341.48	77.926f	0.156p	2.827	390.6

DIESEL OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
DO_1001.C	0.860	98.00%	76.11	57.596f	0.000	0.735	707.0
DO_DAY_914.S	0.860	98.00%	12.75	60.800f	4.750s	3.460	3.0
Subtotals:		98.00%	88.86	58.055f	0.681s	1.126	709.9

TO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
TO_STOR1202.P	0.861	98.00%	19.23	37.215f	2.309p	1.198	17.5
TO_DRAIN1202.S	0.861	98.00%	19.23	37.215f	2.309s	1.198	17.5
Subtotals:		98.00%	38.47	37.215f	0.000	1.198	35.0

HFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
HFO_801.C	0.980	100.00%	191.75	77.200f	0.000	0.750	0.0
HFO_811.C	0.980	98.00%	462.63	76.794f	0.000	3.460	1 611.2
HFO_OVFL_902.C	0.980	10.00%	4.43	63.590f	0.000	0.075	402.8
HFO_DAY_911.P	0.980	98.00%	50.60	70.800f	2.000p	3.460	33.7
HFO_SETT.P	0.980	98.00%	50.60	85.200f	3.600p	4.760	33.7
SLUDGE_913.P	0.980	10.00%	1.48	70.797f	5.600p	1.700	0.8
Subtotals:		92.18%	761.48	76.968f	0.383p	2.841	2 082.2

LUBE OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LO_1102PS.P	0.910	98.00%	13.39	46.793f	4.500p	0.823	1.3
LO_1102SB.S	0.910	98.00%	13.39	46.793f	4.500s	0.823	1.3
LO_1103PS.P	0.910	98.00%	11.97	46.859f	7.388p	0.921	1.1
LO_1103SB.S	0.910	98.00%	11.97	46.859f	7.388s	0.921	1.1
DIRTYLO_1101.P	0.910	10.00%	2.20	45.456f	0.800p	0.081	2.9
STOR_LO_1101.S	0.910	98.00%	21.59	45.585f	0.800s	0.794	2.9
Subtotals:		77.77%	74.51	46.425f	0.208s	0.824	10.7

MISCELLANEOUS

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
BILGEWT_915P.P	1.000	10.00%	1.51	70.796f	8.800p	1.695	0.8
HFODRAIN_917.P	1.000	10.00%	0.16	64.794f	5.100p	1.550	0.0
HFOSLUDGE916.S	1.000	10.00%	1.75	64.794f	0.900s	1.550	189.6
LOGEAR_1104P.C	1.000	100.00%	6.45	40.400f	0.000	1.050	0.0
FWDRAIN1104S.S	1.000	10.00%	0.52	42.759f	2.800s	0.097	0.1
Subtotals:		22.66%	10.39	49.424f	1.066p	1.188	190.6

LSHFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LSHFO_901.C	0.980	98.00%	130.11	68.391f	0.000	0.735	1 208.5
LSHFO_DAY912.S	0.980	98.00%	50.60	70.800f	3.600s	3.460	33.7
LSHFO_SETT.S	0.980	98.00%	50.60	85.200f	2.000s	4.760	33.7
Subtotals:		98.00%	231.31	72.595f	1.225s	2.212	1 275.9

All Tanks

	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
Totals:		49.88%	2 669.80	61.623f	0.005p	2.997	5 051.0

Displacer Status

Item	Status	Spgr	Displ (MT)	LCB (m)	TCB (m)	VCB (m)	Eff /Perm
HULL	Intact	1.025	16 569.31	68.214f	0.000	3.501	1.000
SubTotals:			16 569.31	68.214f	0.000	3.501	

Critical points

Name	L,T,V (m)	Height (m)
(1) MES Height Limiting Point PS	47.200f, 13.850p, 5.900	-0.352
(2) MES Height Limiting Point SB	47.200f, 13.850s, 5.900	-0.352

Immersion of propeller tip 1.686 m

Current Rolling Period is : 11.09 second

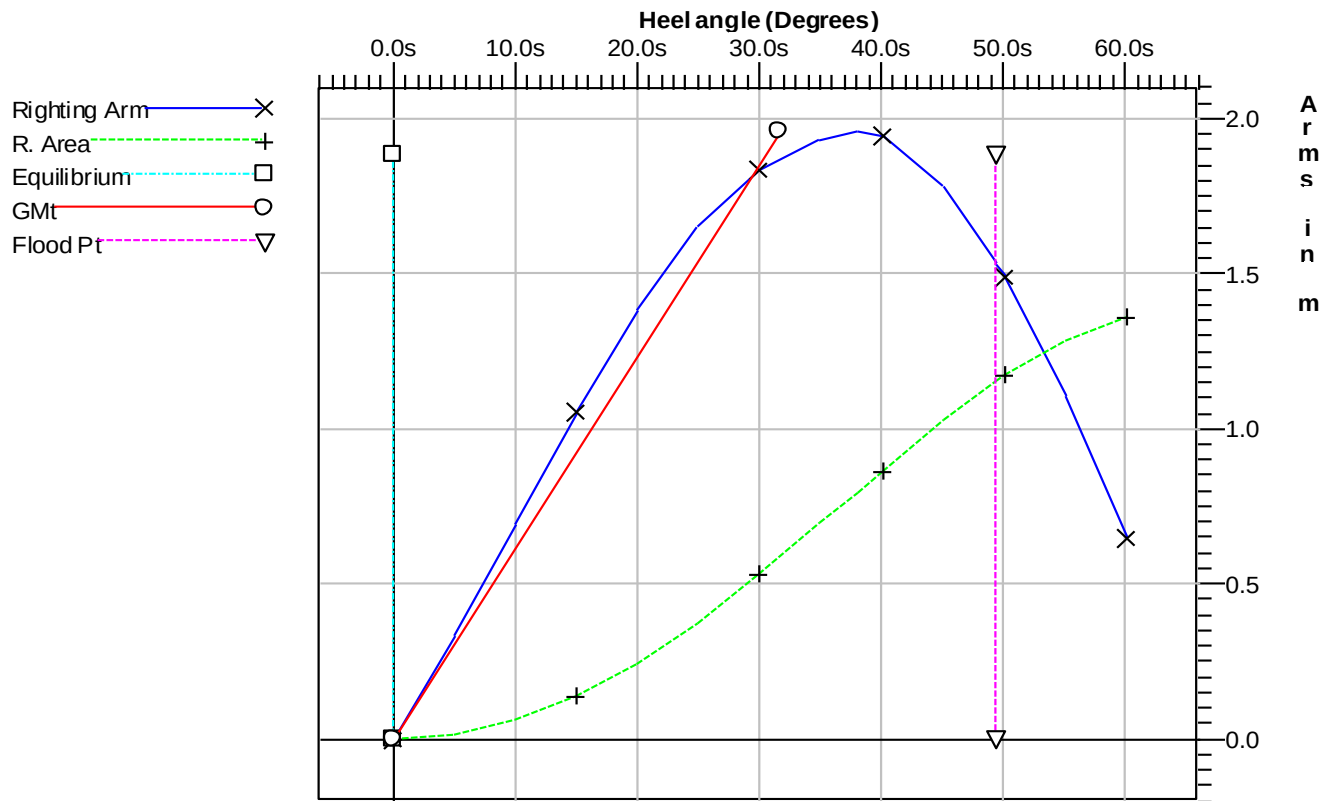
Righting Arms vs. Heel - IMO RES. A.749 (18)

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Righting Arm (m)	Area (m-Rad)	Flood Pt Height (m)	Notes
0.00	0.17a	6.395	0.000	0.000	11.698 (1)	Equil
5.00s	0.16a	6.329	0.335	0.015	10.537 (2)	
10.00s	0.10a	6.122	0.697	0.059	9.389 (2)	
15.00s	0.04a	5.824	1.055	0.136	8.215 (2)	
20.00s	0.01f	5.441	1.387	0.243	7.019 (2)	
25.00s	0.06f	4.956	1.658	0.376	5.830 (2)	
30.00s	0.12f	4.360	1.841	0.529	4.631 (4)	
35.00s	0.16f	3.655	1.936	0.695	3.429 (4)	
38.00s	0.19f	3.182	1.962	0.797	2.729 (4)	MaxRa
40.00s	0.22f	2.855	1.947	0.865	2.257 (4)	
45.00s	0.27f	2.031	1.785	1.029	1.062 (4)	
49.38s	0.31f	1.305	1.533	1.156	0.000 (4)	FldPt
50.00s	0.32f	1.203	1.490	1.173	-0.151 (4)	
55.00s	0.37f	0.376	1.105	1.287	-1.370 (4)	
60.00s	0.42f	-0.459	0.650	1.364	-2.590 (4)	

Unprotected Flood Points

Name	L,T,V (m)	Height (m)
(1) Aft Ventilation Opening PS	2.150a, 13.300p, 18.100	11.698
(2) Aft Ventilation Opening SB	2.150a, 13.300s, 18.100	10.537
(4) Fwd Ventilation Opening SB	139.200f, 12.800s, 18.100	4.631

Righting Arms vs. Heel - IMO RES. A.749 (18)



IMO RES. A.749 (18)

Limit	Min/Max	Actual	Margin	Pass
(1) GM at Equilibrium	>0.150 m	3.565	3.415	Yes
(2) Area from 0.00 deg to 30.00	>0.0550 m-R	0.529	0.474	Yes
(3) Area from 0.00 deg to 40.00 or Flood	>0.0900 m-R	0.865	0.775	Yes
(4) Area from 30.00 deg to 40.00 or Flood	>0.0300 m-R	0.336	0.306	Yes
(5) Righting Arm at 30.00 deg	>0.200 m	1.841	1.641	Yes
(6) Angle from 0.00 deg to MaxRA	>25.00 deg	38.00	13.00	Yes

Current VCG Fluid 11.875 m < Max Allowable VCG 13.550 m - PASS

MAXIMUM TURNING ANGLE VERIFICATION

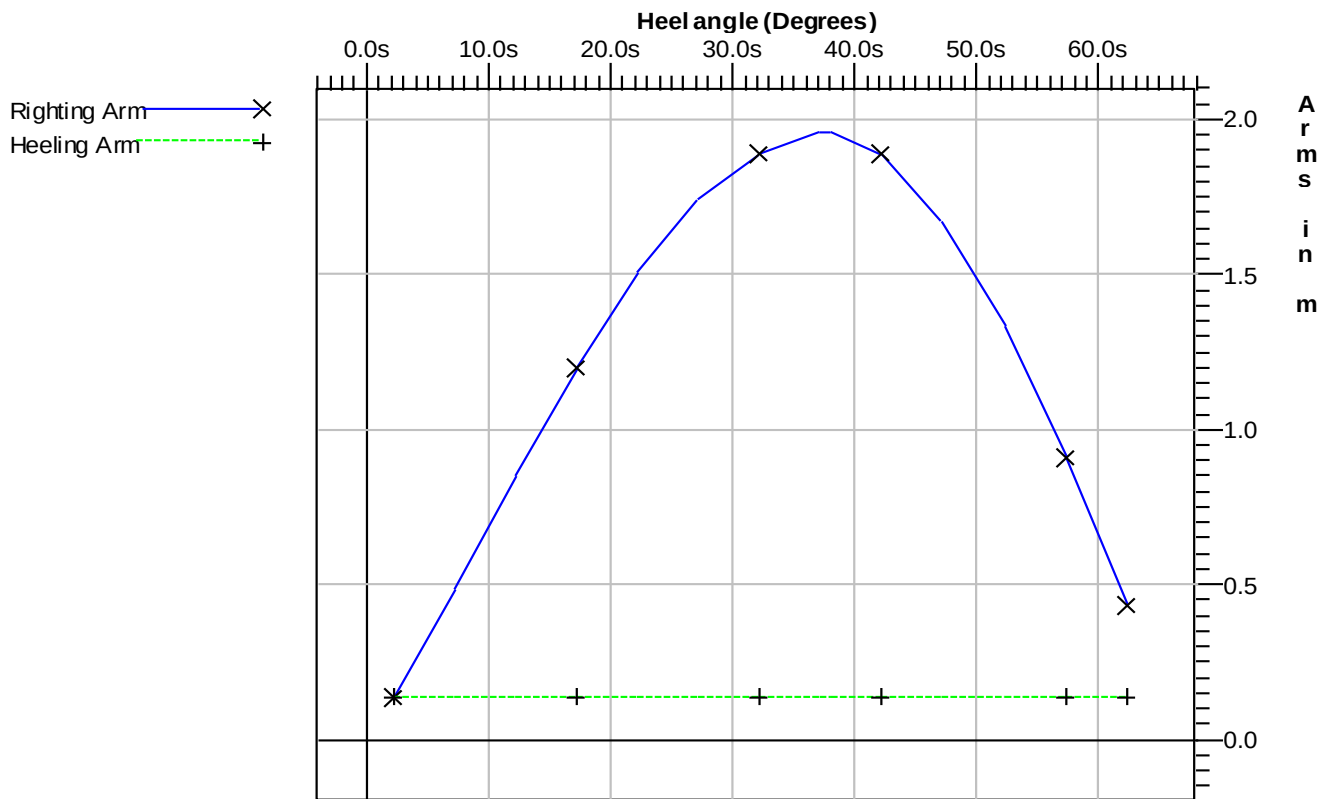
Cruising speed 21.15 knots

MOMENT DUE TO MAXIMUM TURNING ANGLE 2350.554 tm

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)
2.17s	0.17a	6.383	0.000
7.17s	0.14a	6.254	0.349
12.17s	0.08a	6.003	0.713
17.17s	0.02a	5.669	1.063
22.17s	0.03f	5.243	1.372
27.17s	0.09f	4.711	1.608
32.17s	0.14f	4.066	1.749
37.17s	0.19f	3.316	1.818
37.97s	0.19f	3.187	1.820
42.17s	0.24f	2.497	1.754
47.17s	0.29f	1.671	1.528
52.17s	0.34f	0.843	1.190
57.17s	0.39f	0.015	0.773
62.17s	0.44f	-0.828	0.291

Righting Arms vs. Heel - IMO RES. A.749 (18)



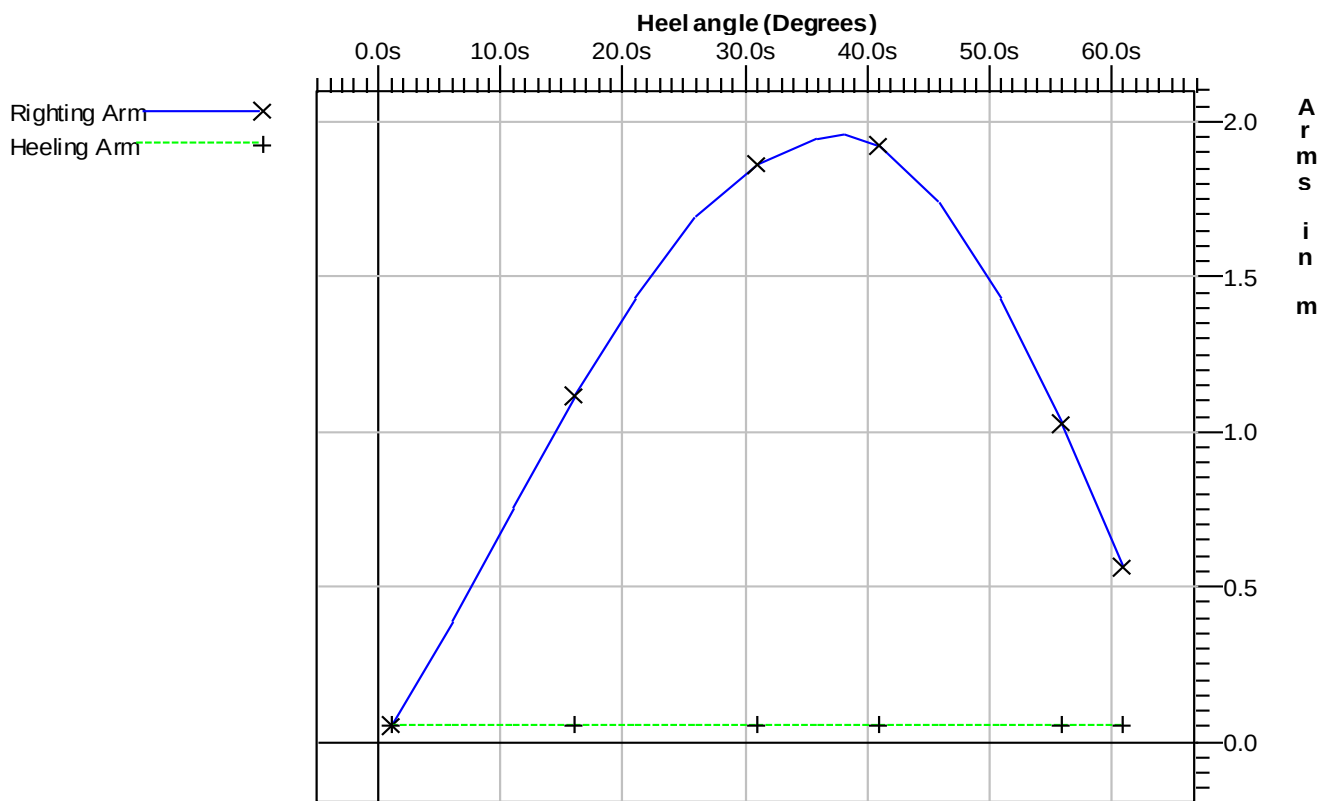
HEELING ANGLE DUE TO TURNING 2.17s deg

1000 PASSENGERS CROWDING VERIFICATION

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)
0.87s	0.17a	6.394	0.001
5.87s	0.15a	6.302	0.342
10.87s	0.09a	6.076	0.705
15.87s	0.03a	5.764	1.061
20.87s	0.02f	5.364	1.384
25.87s	0.07f	4.860	1.642
30.87s	0.13f	4.245	1.807
35.87s	0.17f	3.521	1.892
38.07s	0.19f	3.170	1.907
40.87s	0.23f	2.712	1.875
45.87s	0.28f	1.886	1.686
50.87s	0.33f	1.058	1.373
55.87s	0.37f	0.231	0.975
60.87s	0.43f	-0.607	0.509

Righting Arms vs. Heel - IMO RES. A.749 (18)



HEELING ANGLE DUE TO PASSENGERS CROWDING 0.87s deg

IMO Res. A.749 (18), SEVERE WIND AND ROLLING CRITERION (WEATHER CRITERION)

Wind speed 53.4 kn

Wind pressure 504 N /m²Under Water Lateral Plane 950.700 m²Above Water Lateral Plane 3537.092 m²

Under Water Lateral Plane Centroid 3.039 m below water line

Above Water Lateral Plane Centroid 11.645 m above water line

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)	Area (m-Rad)	Flood Pt Height (m)	Notes
21.67p	0.03f	5.291	-1.725	0.000	6.620 (1)	Roll
16.67p	0.03a	5.706	-1.410	-0.137	7.817 (1)	
11.67p	0.08a	6.032	-1.058	-0.245	9.001 (1)	
6.67p	0.14a	6.274	-0.694	-0.321	10.154 (1)	
1.67p	0.17a	6.388	-0.348	-0.367	11.310 (1)	
3.33s	0.17a	6.366	-0.022	-0.383	10.924 (2)	
3.65s	0.17a	6.361	0.000	-0.383	10.850 (2)	Equil
8.33s	0.12a	6.204	0.334	-0.369	9.774 (2)	
13.33s	0.06a	5.933	0.696	-0.324	8.610 (2)	
18.33s	0.01a	5.579	1.040	-0.248	7.419 (2)	
23.33s	0.05f	5.129	1.334	-0.145	6.225 (2)	
28.33s	0.10f	4.572	1.549	-0.018	5.044 (4)	
33.33s	0.15f	3.902	1.670	0.123	3.824 (4)	
38.33s	0.20f	3.129	1.721	0.271	2.651 (4)	MaxRa
43.33s	0.25f	2.307	1.614	0.418	1.463 (4)	
48.33s	0.30f	1.479	1.359	0.549	0.255 (4)	
49.38s	0.31f	1.305	1.291	0.573	0.000 (4)	FldPt
50.00s	0.32f	1.203	1.249	0.587	-0.151 (4)	
55.00s	0.37f	0.376	0.863	0.680	-1.370 (4)	

Note:

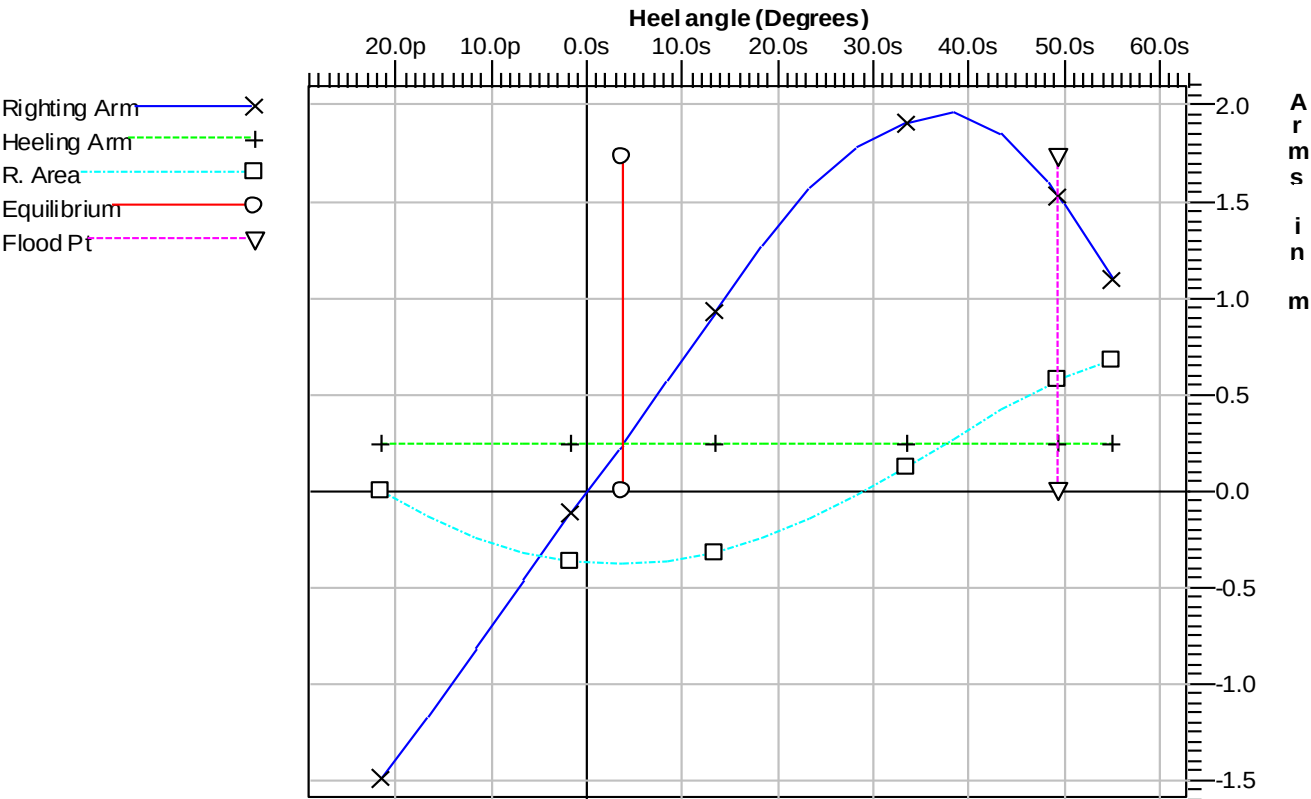
Roll angle is 24.14

Equilibrium for load condition without gust is 2.47s

Unprotected Flood Points

Name	L,T,V (m)	Height (m)
(1) Aft Ventilation Opening PS	2.150a, 13.300p, 18.100	6.620
(2) Aft Ventilation Opening SB	2.150a, 13.300s, 18.100	10.924
(4) Fwd Ventilation Opening SB	139.200f, 12.800s, 18.100	5.044

Righting Arms vs. Heel - IMO SEVERE WIND & ROLLING



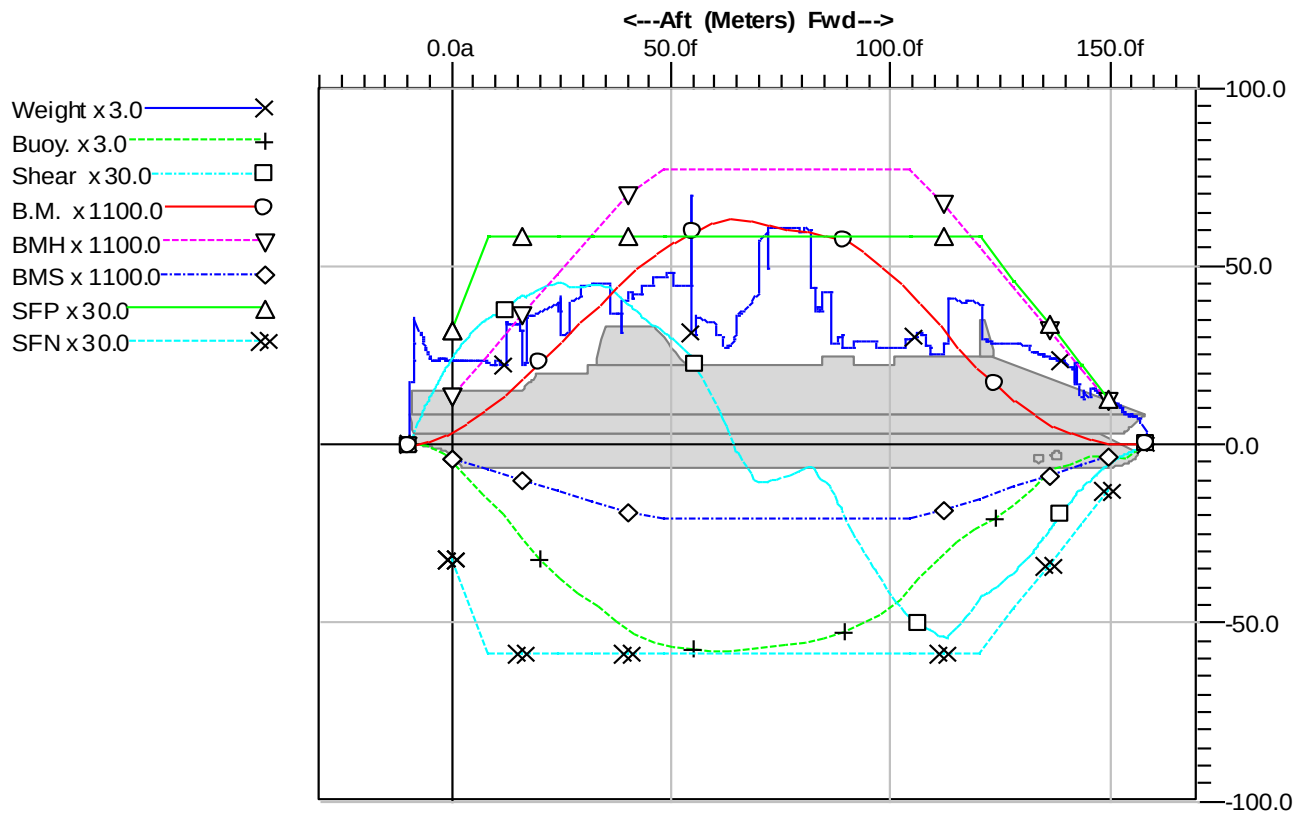
IMO SEVERE WIND & ROLLING

Limit	Min/Max	Actual	Margin	Pass
(1) Res. Ratio from Roll to Abs 50.00 deg or Flood	>1.000	2.498	1.498	Yes

LONGITUDINAL STRENGTH

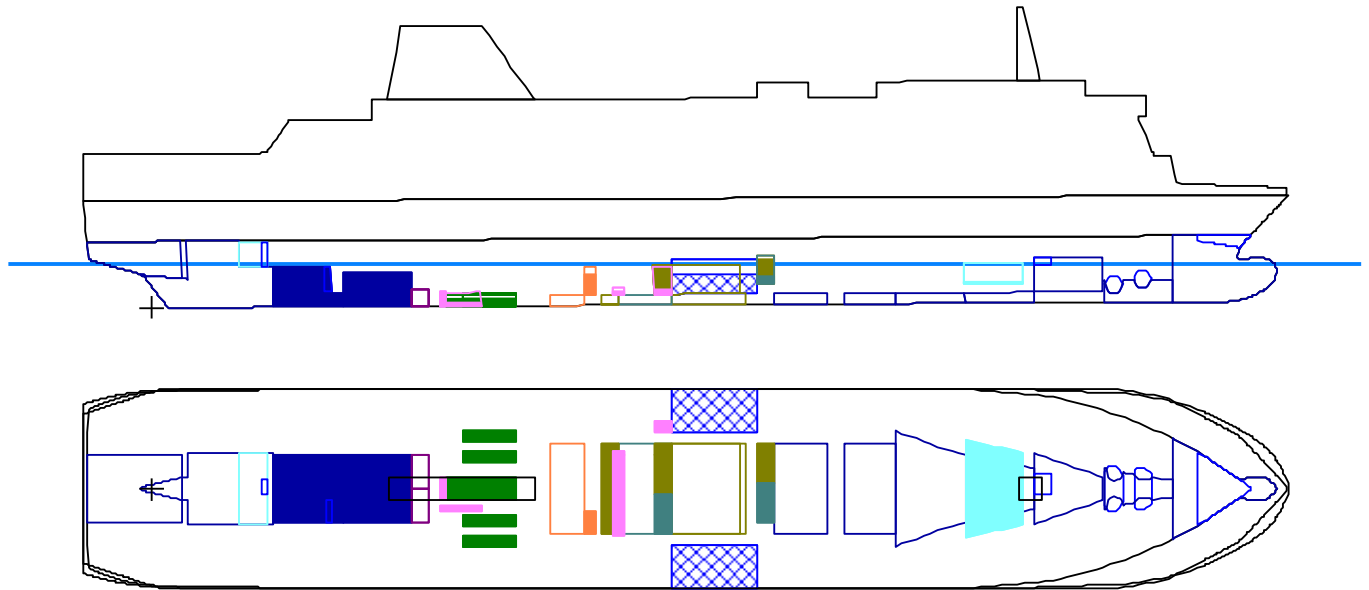
Frame No.	Location (m)	Weight (MT/m)	Buoyancy (MT/m)	Shear (MT)	Bending (MT-m)	Shear (%/Max)	Bending (%/Max)
FR -10	8.000a	100.0	<und>	142.9	138	undef	undef
FR 0	0.000	70.8	12.9	723.2	3811	74.41	25.75
BKHD FR 6	4.800f	70.8	32.5	952.1	7883	66.18	35.38
FR 10	8.000f	69.2	44.5	1054.8	11113	60.28	40.76
FR 20	16.000f	96.8	78.1	1250.8	20283	71.47	51.05
BKHD FR 21	16.800f	107.1	81.8	1241.6	21282	70.95	51.94
FR 30	24.000f	120.4	110.9	1361.2	30738	77.78	58.89
BKHD FR 33	26.400f	120.3	118.2	1325.7	33984	75.75	60.76
BKHD FR 36	28.800f	124.3	125.1	1327.2	37174	75.84	62.30
FR 40	32.000f	135.3	134.0	1339.3	41449	76.53	64.11
BKHD FR 50	40.000f	129.4	155.9	1180.9	51821	67.48	67.19
BKHD FR 51	40.800f	129.5	157.6	1159.1	52759	66.23	67.75
FR 60	48.000f	141.8	168.0	947.4	60315	54.14	71.29
BKHD FR 63	50.400f	144.6	169.8	886.7	62521	50.67	73.90
BKHD FR 64	51.200f	135.0	170.3	858.7	63218	49.07	74.73
FR 70	56.000f	107.6	172.3	628.5	66889	35.91	79.06
BKHD FR 75	60.000f	101.3	173.3	354.6	68874	20.26	81.41
FR 80	64.000f	88.7	173.1	10.7	69628	0.61	82.30
BKHD FR 90	72.000f	183.3	171.1	-318.2	67926	18.18	80.29
FR 100	80.000f	182.1	166.5	-210.3	65823	12.02	77.80
BKHD FR 105	84.000f	128.1	163.3	-289.2	64955	16.53	76.78
FR 110	88.000f	91.2	159.1	-488.3	63484	27.90	75.04
BKHD FR 117	93.600f	87.0	151.0	-881.4	59632	50.36	70.49
FR 120	96.000f	87.0	146.4	-1029.8	57349	58.85	67.79
BKHD FR 129	103.200f	89.8	125.7	-1420.5	48452	81.17	57.27
FR 130	103.200f	89.8	125.7	-1420.5	48452	81.17	57.27
FR 140	112.000f	86.3	91.0	-1619.2	34995	92.52	47.13
BKHD FR 141	112.800f	124.3	88.2	-1621.8	33701	92.67	46.19
FR 150	120.000f	118.7	69.8	-1311.3	23098	74.93	37.68
BKHD FR 153	112.400f	86.3	89.6	-1620.5	34348	92.60	46.67
FR 160	128.000f	85.7	50.3	-1082.8	13540	78.40	28.00
BKHD FR 165	132.000f	79.0	38.0	-923.8	9529	77.24	22.74
FR 170	136.000f	74.1	27.7	-729.2	6236	72.12	17.60
BKHD FR 177	141.600f	64.4	15.7	-441.2	2993	58.59	11.32
FR 180	143.400f	39.4	12.5	-371.5	2275	55.45	9.66
FR 190	149.400f	36.7	9.7	-172.6	664	43.93	4.83
FR 200	155.400f	24.2	3.9	-49.7	53	undef	undef

Longitudinal Strength At Sea Condition



Max. Shear	-1621.8 MT	at	112.800f
Max. Bending Moment	69628 MT-m	at	64.000f (Hogging)
Max% Shear	92.67%	at	112.800f
Max% Bending Moment	82.30%	at	64.000f

**CASE 8.2 - SHIP WITH 1000 PASSENGERS -
TRAILERS ON DECK 3, CARS ON DECK 5
SHIP AT ARRIVAL (10% CONSUMABLES)**



Fluid Legend

Fluid Name	Legend	Weight (MT)	Load%
BALLAST		720.67	25.07%
FRESH WATER		41.16	10.15%
HW		341.60	53.01%
DIESEL OIL		9.04	9.97%
TO		38.47	98.00%
HFO		82.39	9.97%
LUBE OIL		48.68	50.80%
MISCELLANEOUS		19.58	42.70%
LSHFO		24.27	10.28%

Floating Status

Draft FP	5.326 m	Heel	0.00 deg	GM(Solid)	3.507 m
Draft MS	5.757 m	Equil	Yes	F/S Corr.	0.095 m
Draft AP	6.189 m	Wind	Off	GM(Fluid)	3.412 m
Trim	0.86a m	Wave	No	KMT	15.817 m
LCG	67.524f m	VCG-Solid	12.310 m	TPcm	35.38
Displacement	15184.8 MT	WaterSpgr	1.025		

Draft At Draft Marks

FORE.p	5.333(m)	FORE.s	5.333(m)
MID.p	5.757(m)	MID.s	5.757(m)
AFT.p	6.138(m)	AFT.s	6.138(m)

TRIM (Referred to Draft Marks) aft 0.81/140.00a m

Fixed Weight Status

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	11 244.06	70.053f	0.000	13.381u
1) CREW	5.40	120.960f	0.000	25.540u
2) PROVISIONS	4.50	124.100f	0.000	10.110u
3) STORES INCL. SHOP STORES	45.00	98.630f	0.000	11.280u
4) 1000 PASSENGERS	100.00	74.770f	0.000	26.270u
5) TRAILERS ON DECK 3	2 000.00	64.300f	0.000	11.200u
6) CARS ON DECK 5	460.00	68.930f	0.000	15.500u
Total Fixed:	13 858.97	69.350f	0.000	13.226u

Tank Status

BALLAST

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
PFT_WB_101.C	1.025	<empty>					0.0
WB_201.C	1.025	<empty>					0.0
WB_401.C	1.025	<empty>					0.0
WB_501.C	1.025	<empty>					0.0
WB_601.C	1.025	<empty>					0.0
WB_701.C	1.025	<empty>					0.0
WB_1201.C	1.025	100.00%	381.44	31.268f	0.000	2.545	0.0
WB_1301.C	1.025	100.00%	339.22	21.058f	0.085p	3.167	0.0
WB_1401.C	1.025	<empty>					0.0
WB_1511.C	1.025	<empty>					0.0
WB_311.C	1.025	<empty>					0.0
Subtotals:		25.07%	720.67	26.462f	0.040p	2.838	0.0

FRESH WATER

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
FW_1411.C	1.000	<empty>					0.0
FW_411PS.P	1.000	15.50%	20.31	116.540f	2.976p	2.834	135.5
FW_412SB.S	1.000	15.50%	20.85	116.540f	2.976s	2.834	139.2
Subtotals:		10.15%	41.16	116.540f	0.040s	2.834	274.7

HW

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
HEEL_812PS.P	1.000	50.00%	160.35	77.907f	10.820p	2.755	194.4
HEEL_812SB.S	1.000	56.00%	181.25	77.917f	10.831s	2.898	196.2
Subtotals:		53.01%	341.60	77.913f	0.668s	2.831	390.6

DIESEL OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
DO_1001.C	0.860	<empty>					0.0
DO_DAY_914.S	0.860	69.50%	9.04	60.800f	4.750s	2.890	3.0
Subtotals:		9.97%	9.04	60.800f	4.750s	2.890	3.0

TO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
TO_STOR1202.P	0.861	98.00%	19.23	37.214f	2.309p	1.198	17.5
TO_DRAIN1202.S	0.861	98.00%	19.23	37.214f	2.309s	1.198	17.5
Subtotals:		98.00%	38.47	37.214f	0.000	1.198	35.0

HFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
HFO_801.C	0.980	<empty>					0.0
HFO_811.C	0.980	<empty>					0.0
HFO_OVFL_902.C	0.980	10.00%	4.43	63.581f	0.000	0.075	402.8
HFO_DAY_911.P	0.980	33.00%	17.04	70.798f	2.000p	2.160	33.7
HFO_SETT.P	0.980	90.00%	46.47	85.199f	3.600p	4.600	33.7
SLUDGE_913.P	0.980	98.00%	14.46	70.799f	5.600p	3.460	0.8
Subtotals:		9.97%	82.39	78.533f	3.427p	3.652	471.1

LUBE OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LO_1102PS.P	0.910	60.00%	8.20	46.777f	4.500p	0.504	1.3
LO_1102SB.S	0.910	60.00%	8.20	46.777f	4.500s	0.504	1.3
LO_1103PS.P	0.910	60.00%	7.33	46.885f	7.384p	0.582	1.1
LO_1103SB.S	0.910	60.00%	7.33	46.885f	7.384s	0.582	1.1
DIRTYLO_1101.P	0.910	70.00%	15.42	45.561f	0.800p	0.567	2.9
STOR_LO_1101.S	0.910	10.00%	2.20	45.327f	0.800s	0.082	2.9
Subtotals:		50.80%	48.68	46.358f	0.217p	0.529	10.7

MISCELLANEOUS

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
BILGEWT_915P.P	1.000	20.00%	3.02	70.797f	8.800p	1.890	0.8
HFODRAIN_917.P	1.000	20.00%	0.33	64.794f	5.100p	1.600	0.0
HFOSLUDGE916.S	1.000	50.00%	8.76	64.798f	0.900s	1.750	189.6
LOGEAR_1104P.C	1.000	100.00%	6.45	40.400f	0.000	1.050	0.0
FWDRAIN1104S.S	1.000	20.00%	1.04	42.761f	2.800s	0.193	0.1
Subtotals:		42.70%	19.58	56.520f	0.890p	1.456	190.7

LSHFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LSHFO_901.C	0.980	<empty>					0.0
LSHFO_DAY912.S	0.980	20.00%	10.33	70.797f	3.600s	1.900	33.7
LSHFO_SETT.S	0.980	27.00%	13.94	85.198f	2.000s	3.340	33.7
Subtotals:		10.28%	24.27	79.070f	2.681s	2.727	67.5

All Tanks

	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
Totals:		24.77%	1 325.85	48.434f	0.001p	2.732	1 443.2

Displacer Status

Item	Status	Spgr	Displ (MT)	LCB (m)	TCB (m)	VCB (m)	Eff /Perm
HULL	Intact	1.025	15 184.81	67.472f	0.000	3.277	1.000
SubTotals:			15 184.81	67.472f	0.000	3.277	

Critical points

Name	L,T,V (m)	Height (m)
(1) MES Height Limiting Point PS	47.200f, 13.850p, 5.900	-0.017
(2) MES Height Limiting Point SB	47.200f, 13.850s, 5.900	-0.017

Immersion of propeller tip 1.471 m

Current Rolling Period is : 11.64 second

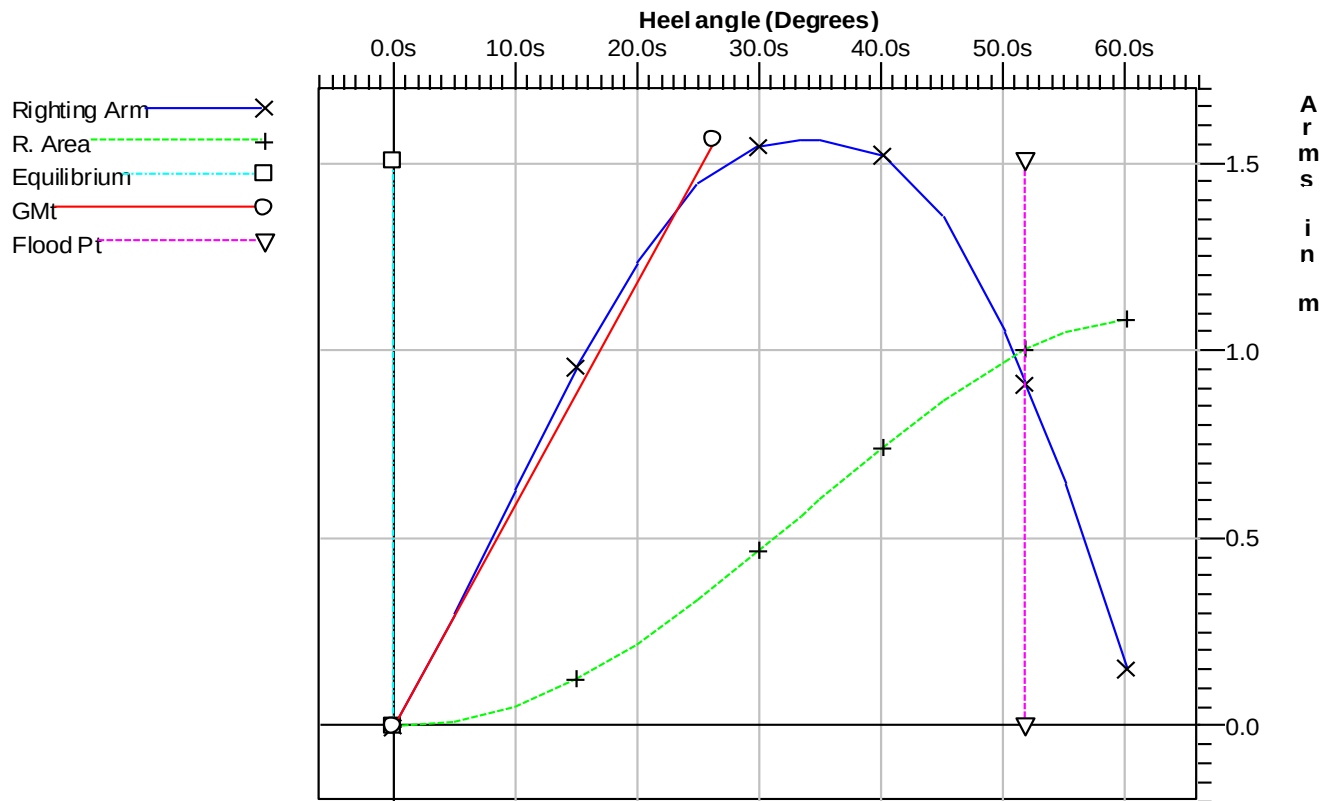
Righting Arms vs. Heel - IMO RES. A.749 (18)

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Righting Arm (m)	Area (m-Rad)	Flood Pt Height (m)	Notes
0.00	0.33a	6.188	0.000	0.000	11.899 (1)	Equil
5.00s	0.31a	6.124	0.303	0.013	10.736 (2)	
10.00s	0.26a	5.917	0.632	0.054	9.589 (2)	
15.00s	0.18a	5.605	0.956	0.123	8.429 (2)	
20.00s	0.12a	5.204	1.240	0.219	7.251 (2)	
25.00s	0.05a	4.701	1.448	0.337	6.080 (2)	
30.00s	0.01f	4.086	1.548	0.469	4.939 (2)	
33.40s	0.05f	3.608	1.564	0.561	4.184 (2)	MaxRa
35.00s	0.07f	3.367	1.561	0.605	3.834 (2)	
40.00s	0.12f	2.554	1.524	0.740	2.766 (2)	
45.00s	0.18f	1.698	1.356	0.866	1.618 (4)	
50.00s	0.23f	0.838	1.049	0.972	0.430 (4)	
51.80s	0.25f	0.529	0.912	1.003	0.000 (4)	FldPt
55.00s	0.28f	-0.022	0.642	1.047	-0.768 (4)	
60.00s	0.34f	-0.892	0.151	1.082	-1.958 (4)	

Unprotected Flood Points

Name	L,T,V (m)	Height (m)
(1) Aft Ventilation Opening PS	2.150a, 13.300p, 18.100	11.899
(2) Aft Ventilation Opening SB	2.150a, 13.300s, 18.100	10.736
(4) Fwd Ventilation Opening SB	139.200f, 12.800s, 18.100	1.618

Righting Arms vs. Heel - IMO RES. A.749 (18)



IMO RES. A.749 (18)

Limit	Min/Max	Actual	Margin	Pass
(1) GM at Equilibrium	>0.150 m	3.412	3.262	Yes
(2) Area from 0.00 deg to 30.00	>0.0550 m-R	0.469	0.414	Yes
(3) Area from 0.00 deg to 40.00 or Flood	>0.0900 m-R	0.740	0.650	Yes
(4) Area from 30.00 deg to 40.00 or Flood	>0.0300 m-R	0.271	0.241	Yes
(5) Righting Arm at 30.00 deg	>0.200 m	1.548	1.348	Yes
(6) Angle from 0.00 deg to MaxRA	>25.00 deg	33.40	8.40	Yes

Current VCG Fluid 12.405 m < Max Allowable VCG 13.880 m - PASS

MAXIMUM TURNING ANGLE VERIFICATION

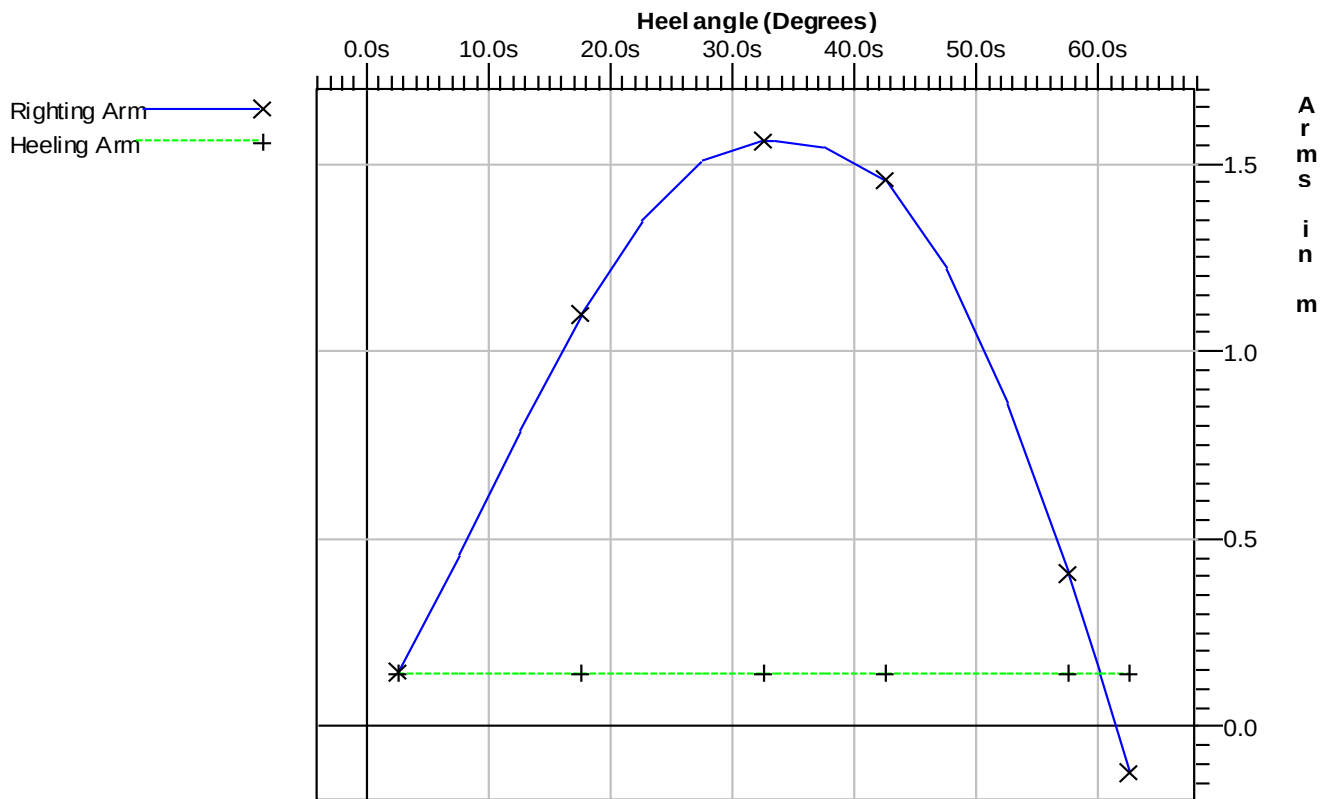
Cruising speed 21.15 knots

MOMENT DUE TO MAXIMUM TURNING ANGLE 2199.640 tm

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)
2.43s	0.33a	6.174	0.001
7.43s	0.29a	6.041	0.315
12.43s	0.22a	5.775	0.648
17.43s	0.15a	5.422	0.957
22.43s	0.08a	4.973	1.208
27.43s	0.02a	4.416	1.366
32.43s	0.04f	3.748	1.418
33.43s	0.05f	3.603	1.419
37.43s	0.10f	2.982	1.403
42.43s	0.15f	2.138	1.318
47.43s	0.20f	1.279	1.076
52.43s	0.26f	0.420	0.717
57.43s	0.31f	-0.445	0.268
60.06s	0.34f	-0.903	0.000
62.43s	0.35f	-1.315	-0.263

Righting Arms vs. Heel - IMO RES. A.749 (18)



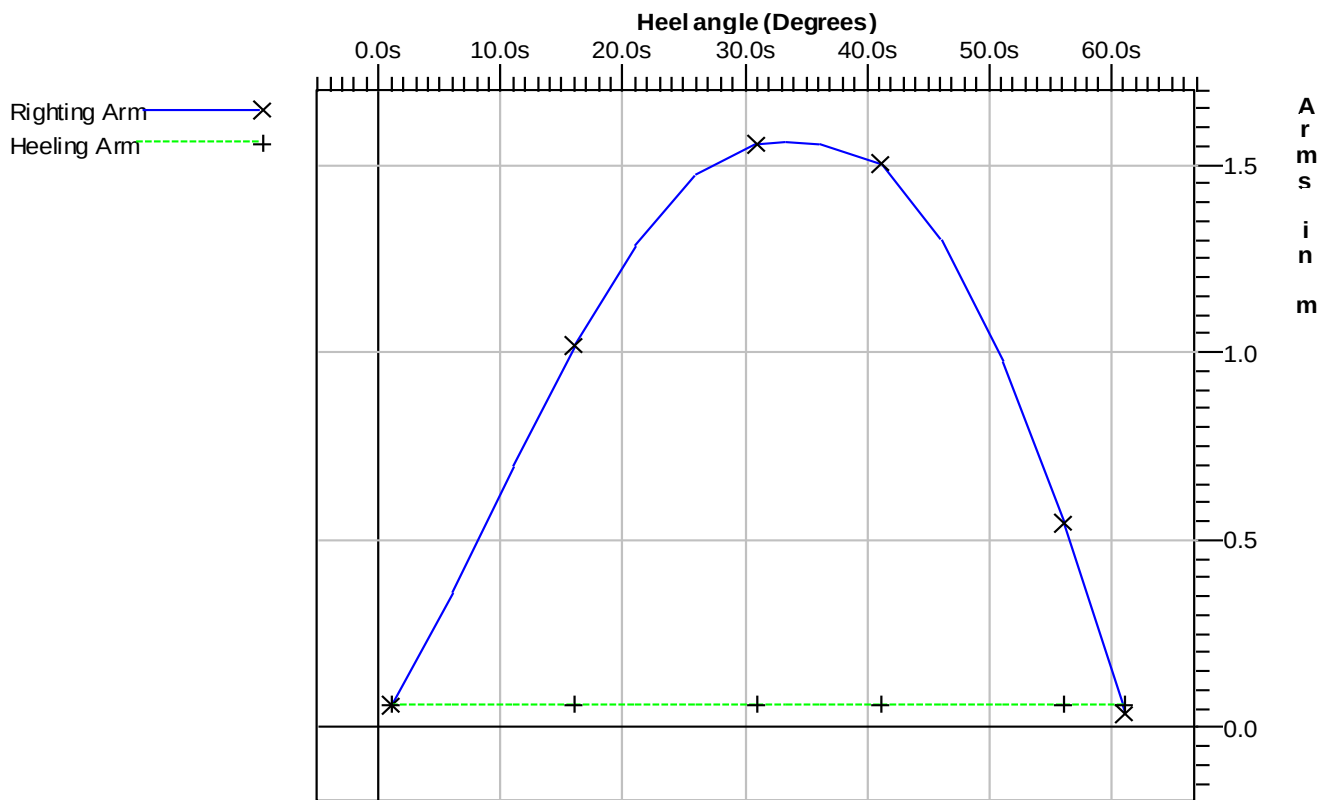
HEELING ANGLE DUE TO TURNING 2.43s deg

1000 PASSENGERS CROWDING VERIFICATION

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)
1.01s	0.33a	6.187	0.000
6.01s	0.31a	6.094	0.307
11.01s	0.24a	5.860	0.639
16.01s	0.17a	5.532	0.958
21.01s	0.10a	5.111	1.229
26.01s	0.04a	4.586	1.417
31.01s	0.03f	3.949	1.496
33.41s	0.05f	3.606	1.503
36.01s	0.08f	3.210	1.496
41.01s	0.13f	2.382	1.444
46.01s	0.19f	1.523	1.243
51.01s	0.24f	0.664	0.913
56.01s	0.29f	-0.198	0.489
60.84s	0.34f	-1.038	0.000
61.01s	0.34f	-1.068	-0.019

Righting Arms vs. Heel - IMO RES. A.749 (18)



HEELING ANGLE DUE TO PASSENGERS CROWDING 1.01s deg

IMO Res. A.749 (18), SEVERE WIND AND ROLLING CRITERION (WEATHER CRITERION)

Wind speed 53.4 kn

Wind pressure 504 N /m²Under Water Lateral Plane 884.325 m²Above Water Lateral Plane 3603.467 m²

Under Water Lateral Plane Centroid 2.841 m below water line

Above Water Lateral Plane Centroid 11.832 m above water line

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)	Area (m-Rad)	Flood Pt Height (m)	Notes
21.74p	0.09a	5.042	-1.592	0.000	6.841 (1)	Roll
16.74p	0.16a	5.477	-1.331	-0.128	8.019 (1)	
11.74p	0.23a	5.818	-1.016	-0.230	9.189 (1)	
6.74p	0.30a	6.068	-0.684	-0.305	10.334 (1)	
1.74p	0.33a	6.181	-0.373	-0.351	11.494 (1)	
3.26s	0.32a	6.162	-0.074	-0.370	11.140 (2)	
4.46s	0.32a	6.138	0.000	-0.371	10.860 (2)	Equil
8.26s	0.28a	6.004	0.246	-0.363	9.987 (2)	
13.26s	0.21a	5.723	0.577	-0.327	8.836 (2)	
18.26s	0.14a	5.355	0.879	-0.263	7.661 (2)	
23.26s	0.07a	4.888	1.117	-0.176	6.485 (2)	
28.26s	0.01a	4.313	1.256	-0.071	5.332 (2)	
33.26s	0.05f	3.628	1.294	0.041	4.214 (2)	
33.46s	0.05f	3.599	1.294	0.045	4.170 (2)	MaxRa
38.26s	0.10f	2.847	1.273	0.153	3.133 (2)	
43.26s	0.16f	1.996	1.163	0.260	2.027 (4)	
48.26s	0.21f	1.137	0.899	0.351	0.845 (4)	
50.00s	0.23f	0.837	0.779	0.377	0.430 (4)	
51.80s	0.25f	0.529	0.643	0.399	0.000 (4)	FldPt
55.00s	0.28f	-0.022	0.372	0.428	-0.768 (4)	

Note:

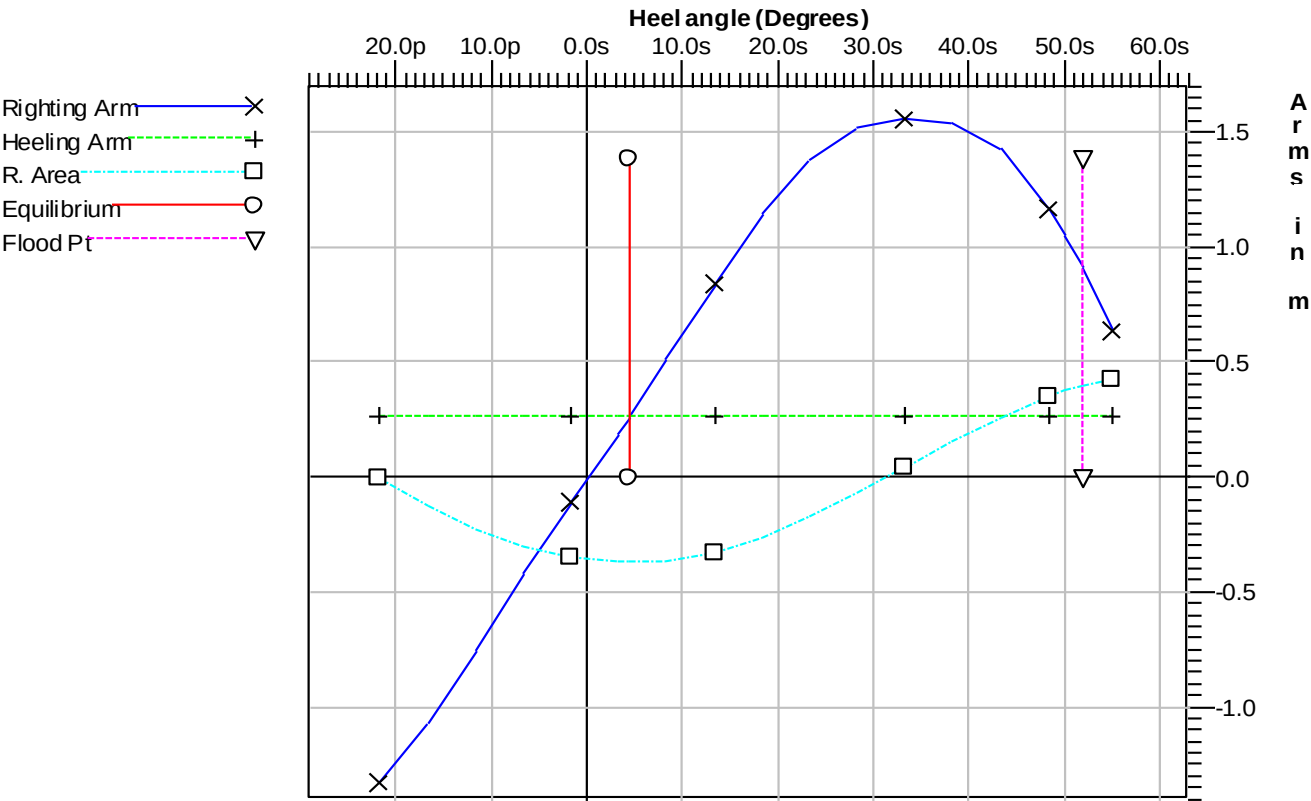
Roll angle is 24.74

Equilibrium for load condition without gust is 3.00s

Unprotected Flood Points

Name	L,T,V (m)	Height (m)
(1) Aft Ventilation Opening PS	2.150a, 13.300p, 18.100	6.841
(2) Aft Ventilation Opening SB	2.150a, 13.300s, 18.100	11.140
(4) Fwd Ventilation Opening SB	139.200f, 12.800s, 18.100	2.027

Righting Arms vs. Heel - IMO SEVERE WIND & ROLLING



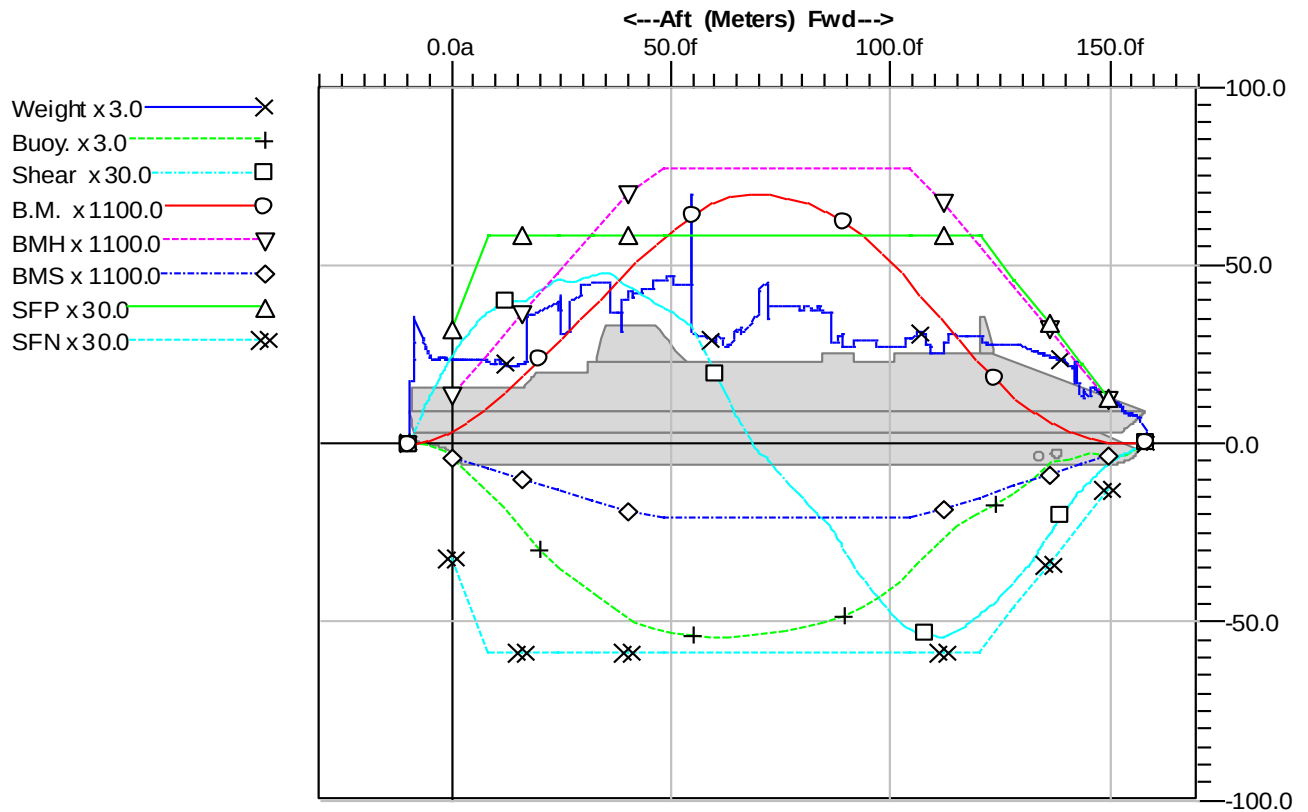
IMO SEVERE WIND & ROLLING

Limit	Min/Max	Actual	Margin	Pass
(1) Res. Ratio from Roll to Abs 50.00 deg or Flood	>1.000	2.016	1.016	Yes

LONGITUDINAL STRENGTH

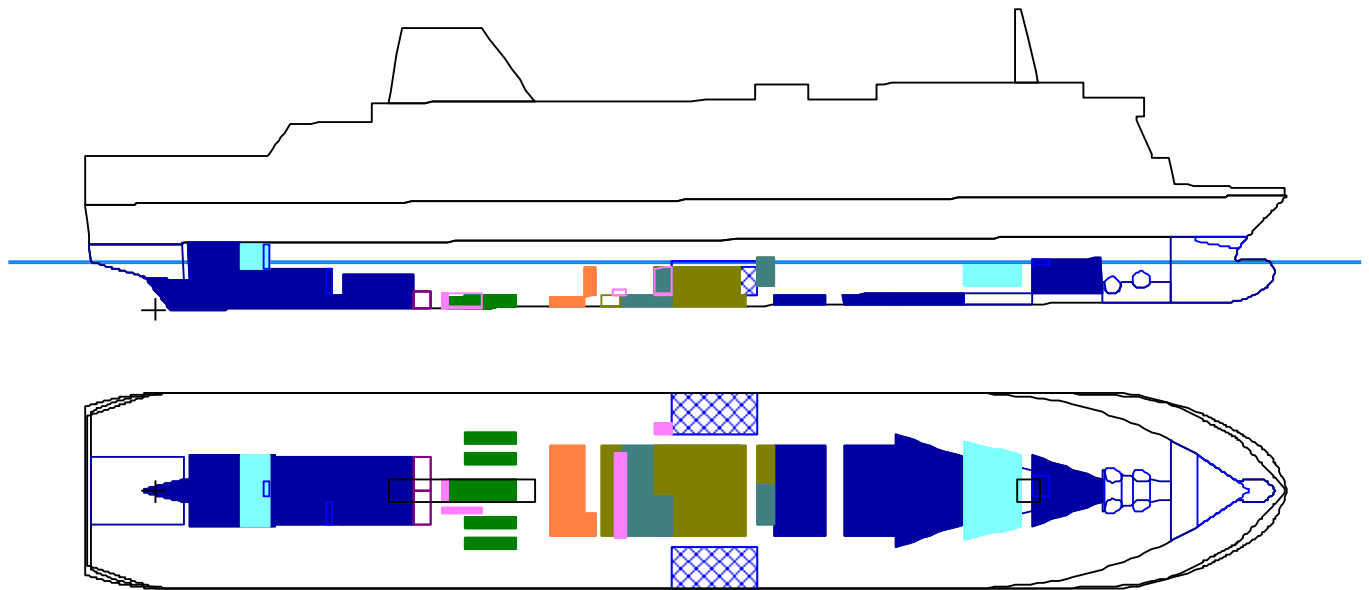
Frame No.	Location (m)	Weight (MT/m)	Buoyancy (MT/m)	Shear (MT)	Bending (MT-m)	Shear (%/Max)	Bending (%/Max)
FR -10	8.000a	100.0	<und>	140.8	163	undef	undef
FR 0	0.000	70.8	10.0	734.2	3860	75.54	26.08
BKHD FR 6	4.800f	70.8	28.3	980.2	8034	68.13	36.06
FR 10	8.000f	69.2	39.6	1097.4	11384	62.71	41.75
FR 20	16.000f	68.1	71.5	1202.2	20803	68.70	52.36
BKHD FR 21	16.800f	107.1	75.1	1198.5	21768	68.48	53.12
FR 30	24.000f	120.4	103.2	1370.6	31114	78.32	59.61
BKHD FR 33	26.400f	120.3	110.3	1353.8	34410	77.36	61.52
BKHD FR 36	28.800f	124.3	117.0	1374.5	37697	78.54	63.17
FR 40	32.000f	135.3	125.7	1412.9	42171	80.74	65.22
BKHD FR 50	40.000f	129.5	146.9	1323.7	53424	75.64	69.27
BKHD FR 51	40.800f	129.6	148.6	1309.1	54480	74.81	69.96
FR 60	48.000f	138.4	158.4	1147.2	63326	65.55	74.85
BKHD FR 63	50.400f	141.1	160.0	1101.5	66034	62.94	78.05
BKHD FR 64	51.200f	135.0	160.4	1081.3	66909	61.79	79.09
FR 70	56.000f	91.7	162.1	886.3	71768	50.65	84.83
BKHD FR 75	60.000f	91.2	162.8	590.5	74749	33.74	88.36
FR 80	64.000f	93.2	162.3	285.5	76529	16.31	90.46
BKHD FR 90	72.000f	116.7	159.7	-136.8	76906	7.82	90.90
FR 100	80.000f	115.5	154.4	-467.7	74508	26.73	88.07
BKHD FR 105	84.000f	112.9	150.9	-619.5	72350	35.40	85.52
FR 110	88.000f	91.2	146.5	-809.3	69552	46.25	82.21
BKHD FR 117	93.600f	87.0	137.9	-1130.3	64117	64.59	75.79
FR 120	96.000f	87.0	133.2	-1247.1	61279	71.27	72.43
BKHD FR 129	103.200f	89.8	112.3	-1540.9	51182	88.05	60.50
FR 130	103.200f	89.8	112.3	-1540.9	51182	88.05	60.50
FR 140	112.000f	86.3	79.1	-1627.7	37187	93.01	50.09
BKHD FR 141	112.800f	92.5	76.4	-1620.9	35891	92.62	49.20
FR 150	120.000f	90.8	59.1	-1442.9	24827	82.45	40.50
BKHD FR 153	112.400f	86.3	77.7	-1624.3	36539	92.82	49.65
FR 160	128.000f	82.9	41.4	-1176.9	14324	85.22	29.62
BKHD FR 165	132.000f	79.0	30.8	-994.9	9990	83.19	23.85
FR 170	136.000f	74.1	22.1	-774.3	6475	76.59	18.28
BKHD FR 177	141.600f	64.4	12.5	-461.3	3068	61.27	11.61
FR 180	143.400f	39.4	10.1	-386.7	2323	57.71	9.87
FR 190	149.400f	36.7	9.0	-179.0	666	45.56	4.84
FR 200	155.400f	24.2	3.6	-49.8	47	undef	undef

Longitudinal Strength At Sea Condition



Max. Shear	-1628.4 MT	at	111.909f
Max. Bending Moment	77158 MT-m	at	69.000f (Hogging)
Max% Shear	93.05%	at	111.909f
Max% Bending Moment	91.20%	at	69.000f

**CASE 9.1 - SHIP WITH 1000 PASSENGERS
TRAILERS AND CARS ON DECK 3
SHIP AT DEPARTURE (100% CONSUMABLES)**



Fluid Legend

Fluid Name	Legend	Weight (MT)	Load%
BALLAST		2 053.11	71.41%
FRESH WATER		402.63	99.31%
HW		534.79	83.00%
DIESEL OIL		88.86	98.00%
TO		38.47	98.00%
HFO		761.48	92.18%
LUBE OIL		74.51	77.77%
MISCELLANEOUS		10.39	22.66%
LSHFO		231.31	98.00%

Floating Status

Draft FP	5.667 m	Heel	0.00 deg	GM(Solid)	4.752 m
Draft MS	6.189 m	Equil	Yes	F/S Corr.	0.301 m
Draft AP	6.711 m	Wind	Off	GM(Fluid)	4.451 m
Trim	1.04a m	Wave	No	KMT	15.502 m
LCG	66.944f m	VCG-Solid	10.750 m	TPcm	36.78
Displacement	16785.0 MT	WaterSpgr	1.025		

Draft At Draft Marks

FORE.p	5.676(m)	FORE.s	5.676(m)
MID.p	6.189(m)	MID.s	6.189(m)
AFT.p	6.650(m)	AFT.s	6.650(m)

TRIM (Referred to Draft Marks) aft 0.97/140.00a m

Fixed Weight Status

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	11 244.06	70.053f	0.000	13.381u
1) CREW	5.40	120.960f	0.000	25.540u
2) PROVISIONS	45.00	124.100f	0.000	10.110u
3) STORES INCL. SHOP STORES	45.00	98.630f	0.000	11.280u
4) 1000 PASSENGERS	100.00	74.770f	0.000	26.270u
5) TRAILERS ON DECK 3	950.00	36.047f	0.000	11.200u
6) 132 CARS ON DECK 3	200.00	107.297f	0.000	9.900u
Total Fixed:	12 589.46	68.433f	0.000	13.250u

Tank Status**BALLAST**

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
PFT_WB_101.C	1.025	<empty>					0.0
WB_201.C	1.025	<empty>					0.0
WB_401.C	1.025	<empty>					0.0
WB_501.C	1.025	100.00%	138.17	107.479f	0.000	0.852	0.0
WB_601.C	1.025	100.00%	130.02	99.547f	0.000	0.779	0.0
WB_701.C	1.025	100.00%	138.76	89.998f	0.000	0.750	0.0
WB_1201.C	1.025	100.00%	381.44	31.268f	0.000	2.545	0.0
WB_1301.C	1.025	100.00%	339.22	21.058f	0.085p	3.167	0.0
WB_1401.C	1.025	100.00%	642.35	10.017f	0.000	5.095	0.0
WB_1511.C	1.025	<empty>					0.0
WB_311.C	1.025	100.00%	283.14	126.489f	0.017s	3.951	0.0
Subtotals:		71.41%	2 053.11	49.486f	0.012p	3.292	0.0

FRESH WATER

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
FW_1411.C	1.000	98.00%	137.09	13.933f	0.010s	7.366	355.9
FW_411PS.P	1.000	100.00%	131.01	116.609f	2.991p	4.087	0.0
FW_412SB.S	1.000	100.00%	134.54	116.609f	2.991s	4.087	0.0
Subtotals:		99.31%	402.63	81.649f	0.030s	5.203	355.9

HW

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
HEEL_812PS.P	1.000	84.00%	269.38	77.941f	10.862p	3.561	194.4
HEEL_812SB.S	1.000	82.00%	265.41	77.940f	10.861s	3.514	196.2
Subtotals:		83.00%	534.79	77.941f	0.082p	3.538	390.6

DIESEL OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
DO_1001.C	0.860	98.00%	76.11	57.591f	0.000	0.735	707.0
DO_DAY_914.S	0.860	98.00%	12.75	60.800f	4.750s	3.460	3.0
Subtotals:		98.00%	88.86	58.051f	0.681s	1.126	709.9

TO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
TO_STOR1202.P	0.861	98.00%	19.23	37.214f	2.309p	1.198	17.5
TO_DRAIN1202.S	0.861	98.00%	19.23	37.214f	2.309s	1.198	17.5
Subtotals:		98.00%	38.47	37.214f	0.000	1.198	35.0

HFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
HFO_801.C	0.980	100.00%	191.75	77.200f	0.000	0.750	0.0
HFO_811.C	0.980	98.00%	462.63	76.787f	0.000	3.460	1 611.2
HFO_OVFL_902.C	0.980	10.00%	4.43	63.578f	0.000	0.075	402.8
HFO_DAY_911.P	0.980	98.00%	50.60	70.799f	2.000p	3.460	33.7
HFO_SETT.P	0.980	98.00%	50.60	85.199f	3.600p	4.760	33.7
SLUDGE_913.P	0.980	10.00%	1.48	70.792f	5.600p	1.700	0.8
Subtotals:		92.18%	761.48	76.963f	0.383p	2.841	2 082.3

LUBE OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LO_1102PS.P	0.910	98.00%	13.39	46.783f	4.500p	0.824	1.3
LO_1102SB.S	0.910	98.00%	13.39	46.783f	4.500s	0.824	1.3
LO_1103PS.P	0.910	98.00%	11.97	46.849f	7.388p	0.921	1.1
LO_1103SB.S	0.910	98.00%	11.97	46.849f	7.388s	0.921	1.1
DIRTYLO_1101.P	0.910	10.00%	2.20	45.270f	0.800p	0.082	2.9
STOR_LO_1101.S	0.910	98.00%	21.59	45.566f	0.800s	0.794	2.9
Subtotals:		77.77%	74.51	46.407f	0.208s	0.824	10.7

MISCELLANEOUS

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
BILGEWT_915P.P	1.000	10.00%	1.51	70.792f	8.800p	1.695	0.8
HFODRAIN_917.P	1.000	10.00%	0.16	64.785f	5.100p	1.550	0.0
HFOSLUDGE916.S	1.000	10.00%	1.75	64.785f	0.900s	1.550	189.6
LOGEAR_1104P.C	1.000	100.00%	6.45	40.400f	0.000	1.050	0.0
FWDRAIN1104S.S	1.000	10.00%	0.52	42.705f	2.800s	0.097	0.1
Subtotals:		22.66%	10.39	49.419f	1.066p	1.188	190.7

LSHFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LSHFO_901.C	0.980	98.00%	130.11	68.380f	0.000	0.735	1 208.5
LSHFO_DAY912.S	0.980	98.00%	50.60	70.799f	3.600s	3.460	33.7
LSHFO_SETT.S	0.980	98.00%	50.60	85.199f	2.000s	4.760	33.7
Subtotals:		98.00%	231.31	72.588f	1.225s	2.212	1 275.9

All Tanks

	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
Totals:		78.39%	4 195.55	62.474f	0.000	3.251	5 051.1

Displacer Status

Item	Status	Spgr	Displ (MT)	LCB (m)	TCB (m)	VCB (m)	Eff /Perm
HULL	Intact	1.025	16 784.99	66.895f	0.000	3.542	1.000
SubTotals:			16 784.99	66.895f	0.000	3.542	

Critical points

Name	L,T,V (m)	Height (m)
(1) MES Height Limiting Point PS	47.200f, 13.850p, 5.900	-0.483
(2) MES Height Limiting Point SB	47.200f, 13.850s, 5.900	-0.483

Immersion of propeller tip 1.990 m

Current Rolling Period is : 9.64 second

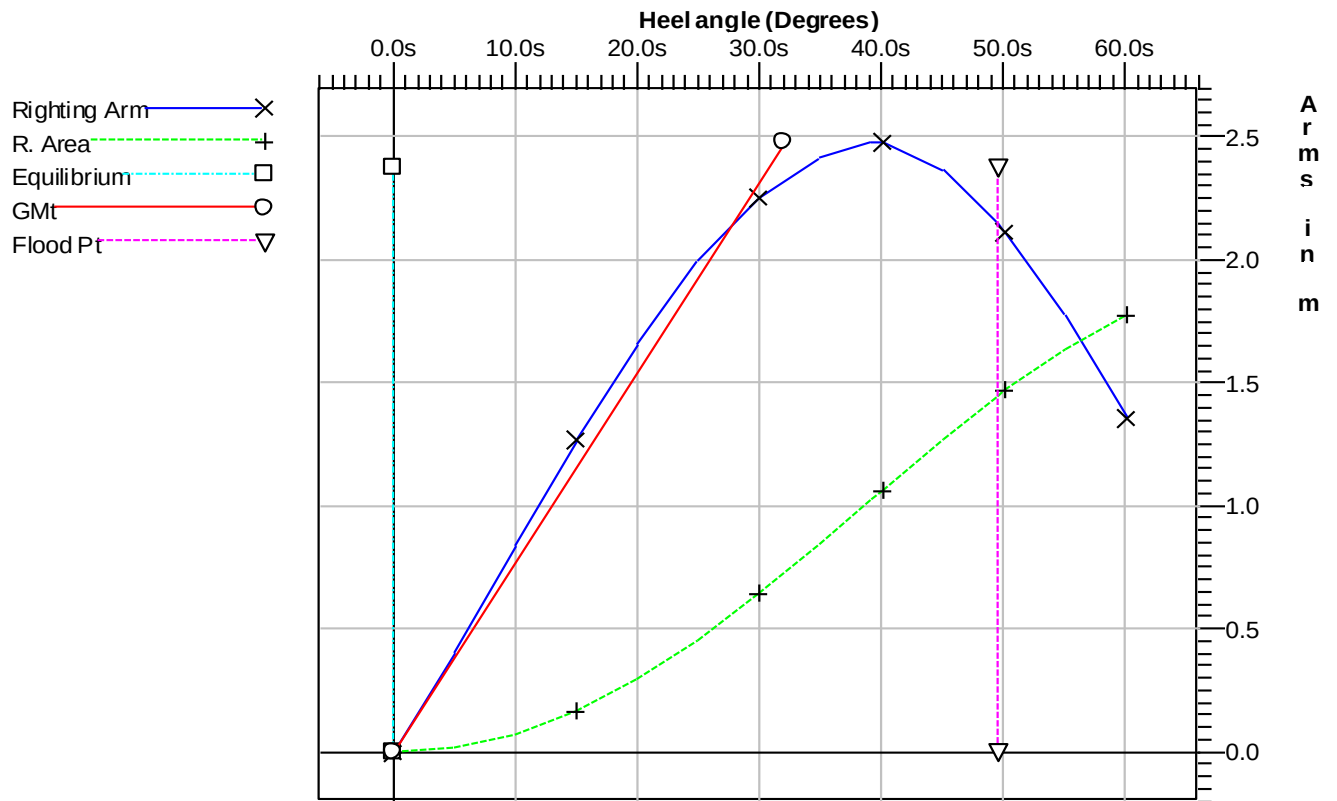
Righting Arms vs. Heel - IMO RES. A.749 (18)

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Righting Arm (m)	Area (m-Rad)	Flood Pt Height (m)	Notes
0.00	0.40a	6.711	0.000	0.000	11.374 (1)	Equil
5.00s	0.38a	6.635	0.414	0.018	10.222 (2)	
10.00s	0.32a	6.428	0.846	0.073	9.075 (2)	
15.00s	0.26a	6.137	1.268	0.165	7.894 (2)	
20.00s	0.21a	5.758	1.666	0.293	6.693 (2)	
25.00s	0.16a	5.276	2.005	0.454	5.501 (2)	
30.00s	0.10a	4.682	2.256	0.641	4.340 (2)	
35.00s	0.05a	3.972	2.417	0.845	3.224 (2)	
39.20s	0.01a	3.309	2.486	1.025	2.311 (2)	MaxRa
40.00s	0.00	3.181	2.484	1.060	2.135 (2)	
45.00s	0.04f	2.378	2.370	1.273	1.018 (2)	
49.47s	0.08f	1.655	2.152	1.450	0.000 (2)	FldPt
50.00s	0.08f	1.571	2.121	1.470	-0.121 (2)	
55.00s	0.12f	0.764	1.777	1.641	-1.272 (2)	
60.00s	0.15f	-0.043	1.362	1.778	-2.420 (2)	

Unprotected Flood Points

Name	L,T,V (m)	Height (m)
(1) Aft Ventilation Opening PS	2.150a, 13.300p, 18.100	11.374
(2) Aft Ventilation Opening SB	2.150a, 13.300s, 18.100	10.222

Righting Arms vs. Heel - IMO RES. A.749 (18)



IMO RES. A.749 (18)

Limit	Min/Max	Actual	Margin	Pass
(1) GM at Equilibrium	>0.150 m	4.451	4.301	Yes
(2) Area from 0.00 deg to 30.00	>0.0550 m-R	0.641	0.586	Yes
(3) Area from 0.00 deg to 40.00 or Flood	>0.0900 m-R	1.060	0.970	Yes
(4) Area from 30.00 deg to 40.00 or Flood	>0.0300 m-R	0.419	0.389	Yes
(5) Righting Arm at 30.00 deg	>0.200 m	2.256	2.056	Yes
(6) Angle from 0.00 deg to MaxRA	>25.00 deg	39.20	14.20	Yes

Current VCG Fluid 11.051 m < Max Allowable VCG 13.275 m - PASS

MAXIMUM TURNING ANGLE VERIFICATION

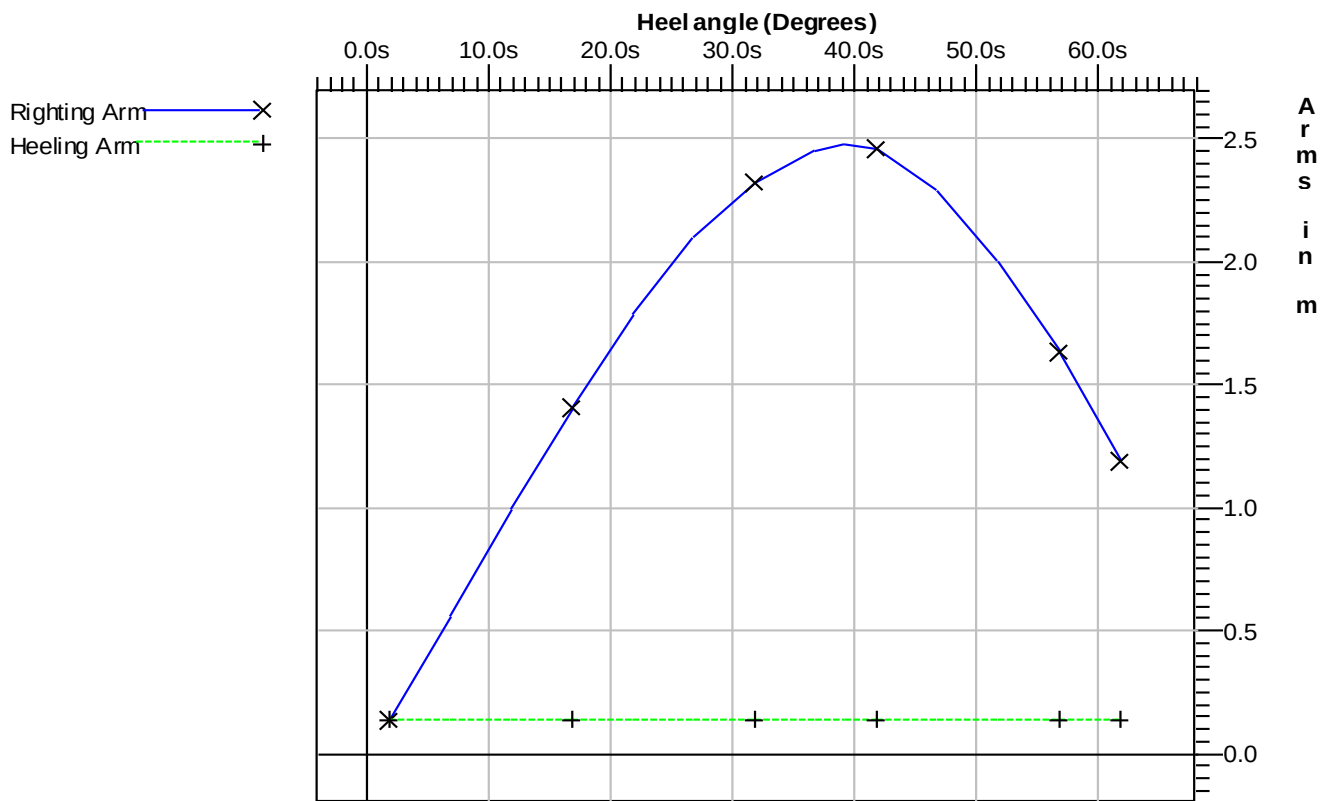
Cruising speed 21.15 knots

MOMENT DUE TO MAXIMUM TURNING ANGLE 2386.323 tm

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)
1.79s	0.40a	6.702	0.001
6.79s	0.36a	6.572	0.427
11.79s	0.30a	6.333	0.856
16.79s	0.24a	6.013	1.273
21.79s	0.19a	5.599	1.653
26.79s	0.14a	5.078	1.964
31.79s	0.08a	4.441	2.180
36.79s	0.03a	3.694	2.318
39.19s	0.01a	3.312	2.344
41.79s	0.02f	2.895	2.320
46.79s	0.06f	2.090	2.152
51.79s	0.09f	1.282	1.865
56.79s	0.13f	0.476	1.494
61.79s	0.16f	-0.332	1.055

Righting Arms vs. Heel - IMO RES. A.749 (18)



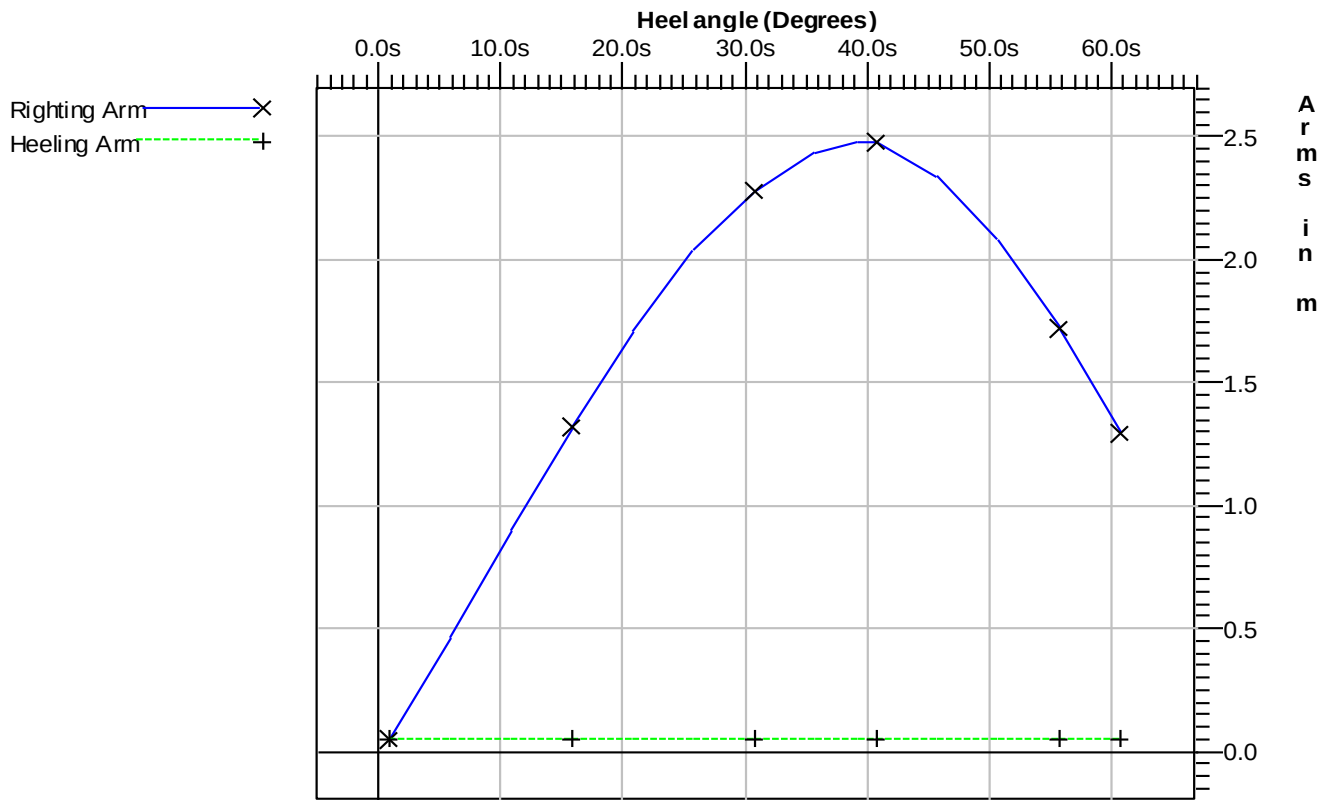
HEELING ANGLE DUE TO TURNING 1.79s deg

1000 PASSENGERS CROWDING VERIFICATION

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)
0.69s	0.40a	6.710	0.000
5.69s	0.37a	6.613	0.419
10.69s	0.31a	6.393	0.851
15.69s	0.26a	6.090	1.271
20.69s	0.20a	5.698	1.662
25.69s	0.15a	5.201	1.991
30.69s	0.09a	4.590	2.228
35.69s	0.04a	3.866	2.380
39.29s	0.01a	3.295	2.432
40.69s	0.01f	3.071	2.424
45.69s	0.05f	2.266	2.288
50.69s	0.09f	1.459	2.024
55.69s	0.12f	0.652	1.669
60.69s	0.15f	-0.155	1.245

Righting Arms vs. Heel - IMO RES. A.749 (18)



HEELING ANGLE DUE TO PASSENGERS CROWDING 0.69s deg

IMO Res. A.749 (18), SEVERE WIND AND ROLLING CRITERION (WEATHER CRITERION)

Wind speed 53.4 kn

Wind pressure 504 N /m²Under Water Lateral Plane 955.183 m²Above Water Lateral Plane 3532.608 m²

Under Water Lateral Plane Centroid 3.048 m below water line

Above Water Lateral Plane Centroid 11.631 m above water line

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)	Area (m-Rad)	Flood Pt Height (m)	Notes
22.87p	0.18a	5.495	-2.107	0.000	6.005 (1)	Roll
17.87p	0.23a	5.932	-1.740	-0.168	7.203 (1)	
12.87p	0.29a	6.271	-1.328	-0.302	8.400 (1)	
7.87p	0.34a	6.527	-0.901	-0.399	9.567 (1)	
2.87p	0.39a	6.687	-0.471	-0.459	10.709 (1)	
2.13s	0.39a	6.698	-0.067	-0.483	10.881 (2)	
2.93s	0.39a	6.686	0.000	-0.483	10.696 (2)	Equil
7.13s	0.35a	6.558	0.361	-0.470	9.739 (2)	
12.13s	0.30a	6.314	0.790	-0.420	8.577 (2)	
17.13s	0.24a	5.988	1.205	-0.333	7.384 (2)	
22.13s	0.19a	5.567	1.581	-0.211	6.184 (2)	
27.13s	0.13a	5.038	1.886	-0.059	5.002 (2)	
32.13s	0.08a	4.393	2.096	0.115	3.860 (2)	
37.13s	0.03a	3.640	2.229	0.305	2.763 (2)	
42.13s	0.02f	2.840	2.218	0.500	1.664 (2)	
47.13s	0.06f	2.035	2.040	0.687	0.536 (2)	
49.47s	0.08f	1.656	1.915	0.768	0.000 (2)	FldPt
50.00s	0.08f	1.571	1.883	0.785	-0.121 (2)	
55.00s	0.12f	0.764	1.539	0.936	-1.272 (2)	

Note:

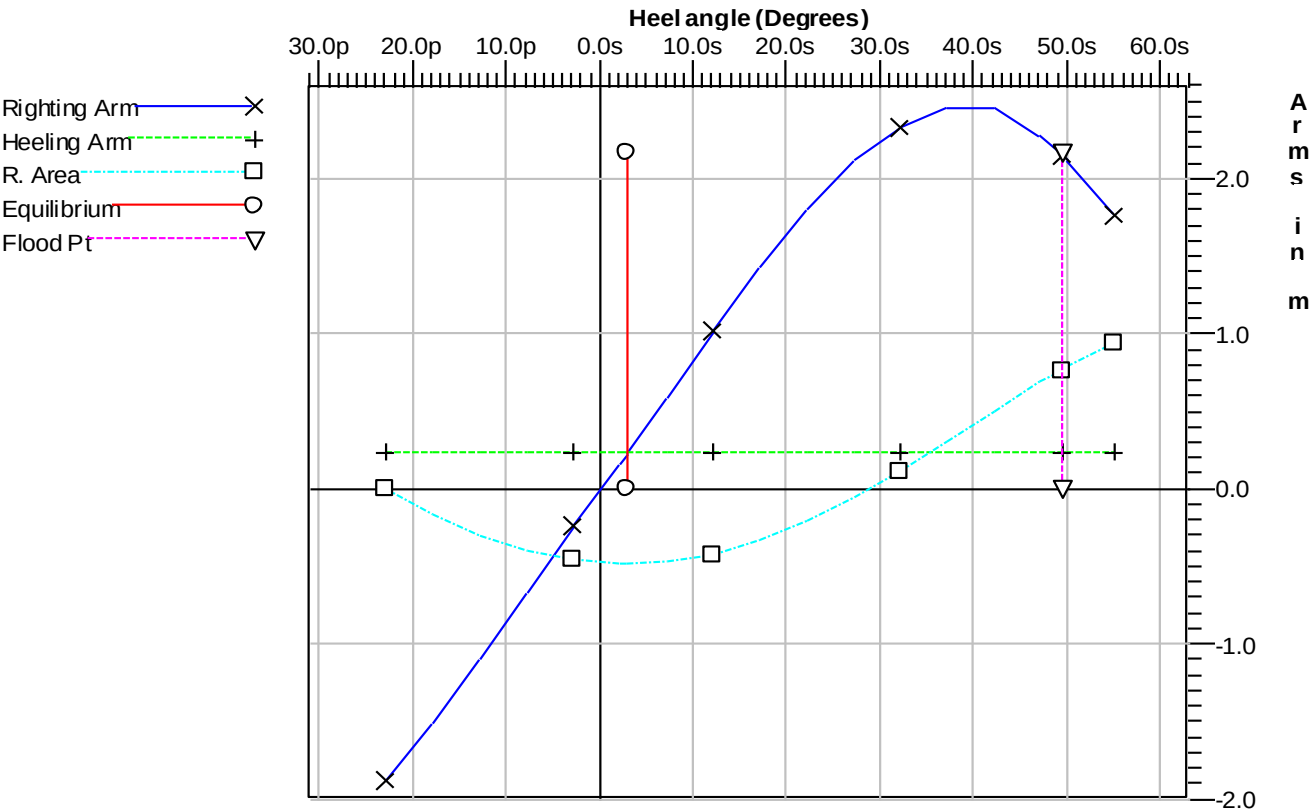
Roll angle is 24.86

Equilibrium for load condition without gust is 1.98s

Unprotected Flood Points

Name	L,T,V (m)	Height (m)
(1) Aft Ventilation Opening PS	2.150a, 13.300p, 18.100	6.005
(2) Aft Ventilation Opening SB	2.150a, 13.300s, 18.100	10.881

Righting Arms vs. Heel - IMO SEVERE WIND & ROLLING



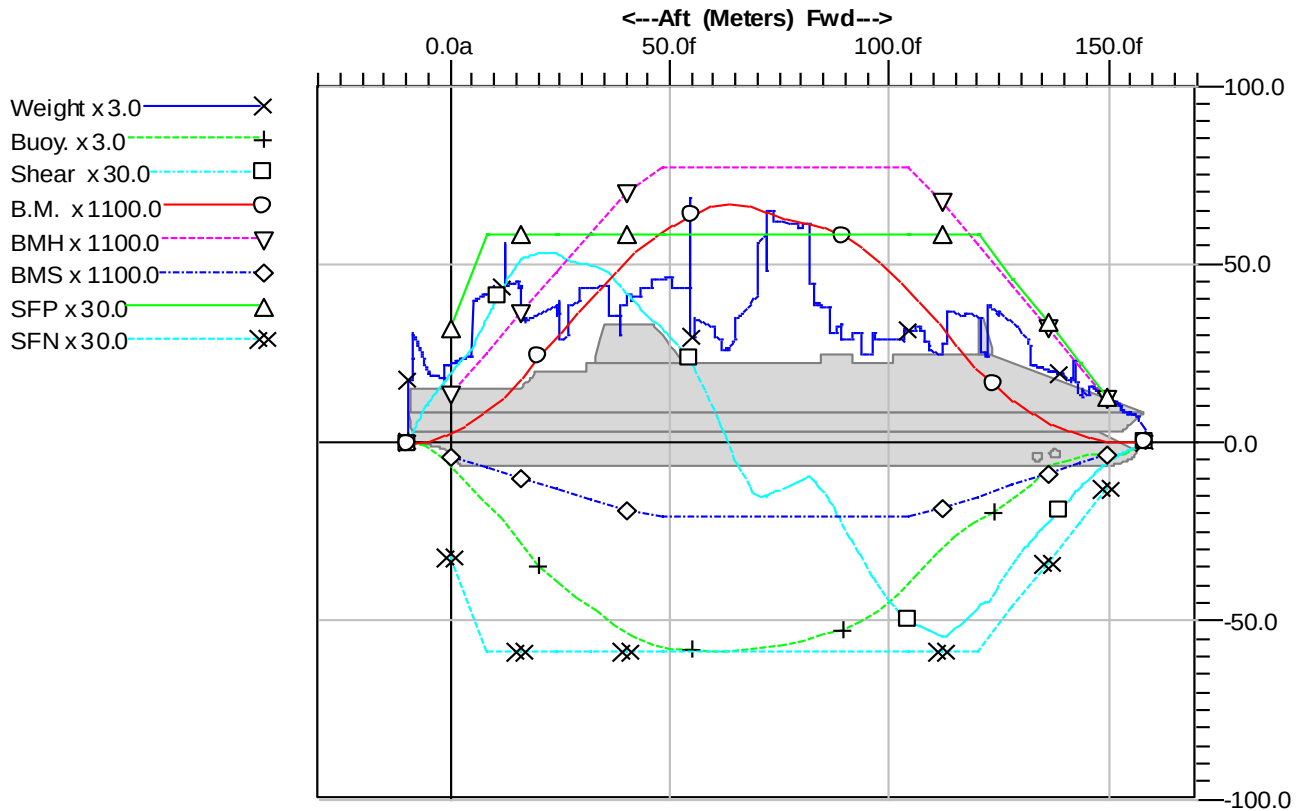
IMO SEVERE WIND & ROLLING

Limit	Min/Max	Actual	Margin	Pass
(1) Res. Ratio from Roll to Abs 50.00 deg or Flood	>1.000	2.590	1.590	Yes

LONGITUDINAL STRENGTH

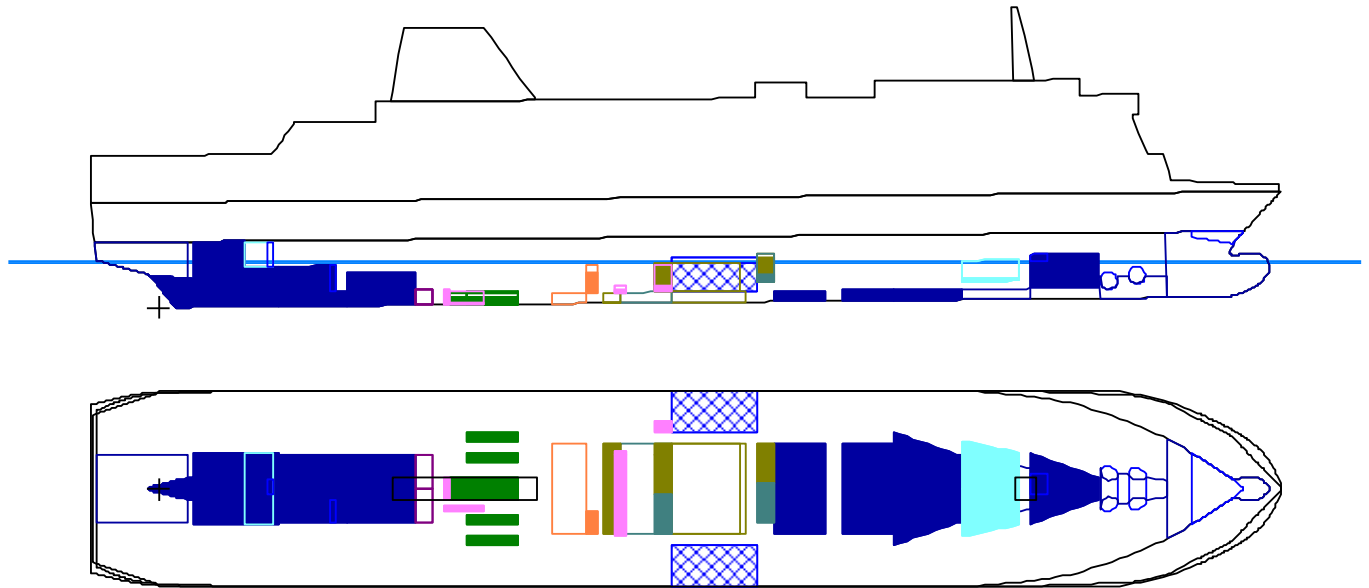
Frame No.	Location (m)	Weight (MT/m)	Buoyancy (MT/m)	Shear (MT)	Bending (MT-m)	Shear (%/Max)	Bending (%/Max)
FR -10	8.000a	85.6	0.3	132.6	125	undef	undef
FR 0	0.000	66.9	18.1	580.1	3201	59.68	21.63
BKHD FR 6	4.800f	73.7	38.7	780.1	6516	54.22	29.25
FR 10	8.000f	125.1	51.0	1028.9	9433	58.79	34.60
FR 20	16.000f	131.9	84.9	1540.2	19879	88.01	50.04
BKHD FR 21	16.800f	105.1	88.6	1554.1	21121	88.81	51.55
FR 30	24.000f	115.9	117.2	1593.6	32555	91.06	62.37
BKHD FR 33	26.400f	115.9	124.2	1532.6	36333	87.58	64.96
BKHD FR 36	28.800f	119.9	130.9	1509.4	39996	86.25	67.03
FR 40	32.000f	131.0	139.4	1489.6	44812	85.12	69.31
BKHD FR 50	40.000f	125.2	160.4	1257.4	56107	71.85	72.75
BKHD FR 51	40.800f	125.3	162.1	1228.6	57105	70.21	73.33
FR 60	48.000f	137.7	171.6	958.2	64965	54.76	76.79
BKHD FR 63	50.400f	140.4	173.1	879.2	67181	50.24	79.41
BKHD FR 64	51.200f	131.0	173.5	845.2	67871	48.30	80.23
FR 70	56.000f	103.7	175.0	581.4	71409	33.23	84.41
BKHD FR 75	60.000f	97.3	175.6	281.7	73164	16.10	86.48
FR 80	64.000f	84.9	174.9	-86.0	73589	4.91	86.98
BKHD FR 90	72.000f	196.2	172.1	-456.5	70963	26.09	83.88
FR 100	80.000f	184.6	166.5	-314.8	67956	17.99	80.33
BKHD FR 105	84.000f	115.7	162.9	-382.9	66702	21.88	78.84
FR 110	88.000f	97.3	158.3	-601.6	64789	34.38	76.58
BKHD FR 117	93.600f	93.1	149.6	-954.3	60437	54.53	71.44
FR 120	96.000f	92.6	144.7	-1130.2	57945	64.58	68.49
BKHD FR 129	103.200f	96.0	123.2	-1469.7	48535	83.98	57.37
FR 130	103.200f	96.0	123.2	-1469.7	48535	83.98	57.37
FR 140	112.000f	84.1	88.0	-1627.8	34899	93.02	47.00
BKHD FR 141	112.800f	111.4	85.2	-1630.1	33599	93.15	46.06
FR 150	120.000f	105.9	66.6	-1389.4	22703	79.40	37.03
BKHD FR 153	112.400f	83.8	86.6	-1628.9	34249	93.08	46.53
FR 160	128.000f	101.0	47.2	-1039.8	12822	75.29	26.51
BKHD FR 165	132.000f	81.6	35.3	-833.2	9106	69.67	21.73
FR 170	136.000f	61.6	25.5	-678.7	6105	67.13	17.23
BKHD FR 177	141.600f	52.2	14.3	-449.6	2997	59.71	11.34
FR 180	143.400f	39.4	11.4	-377.9	2269	56.41	9.64
FR 190	149.400f	36.7	9.4	-175.0	649	44.53	4.72
FR 200	155.400f	24.2	3.9	-49.7	46	undef	undef

Longitudinal Strength At Sea Condition (0.01 deg.)



Max. Shear	-1630.1 MT	at	112.800f
Max. Bending Moment	73624 MT-m	at	63.000f (Hogging)
Max% Shear	93.15%	at	112.800f
Max% Bending Moment	87.03%	at	63.000f

**CASE 9.2 - SHIP WITH 1000 PASSENGERS -
TRAILERS AND CARS ON DECK 3
SHIP AT ARRIVAL (10% CONSUMABLES)**



Fluid Legend

Fluid Name	Legend	Weight (MT)	Load%
BALLAST		2 053.11	71.41%
FRESH WATER		41.16	10.15%
HW		534.91	83.01%
DIESEL OIL		9.04	9.97%
TO		38.47	98.00%
HFO		82.39	9.97%
LUBE OIL		48.68	50.80%
MISCELLANEOUS		19.58	42.70%
LSHFO		24.27	10.28%

Floating Status

Draft FP	5.033 m	Heel	0.00 deg	GM(Solid)	4.463 m
Draft MS	5.777 m	Equil	Yes	F/S Corr.	0.094 m
Draft AP	6.522 m	Wind	Off	GM(Fluid)	4.370 m
Trim	1.49a m	Wave	No	KMT	15.869 m
LCG	66.123f m	VCG-Solid	11.406 m	TPcm	35.85
Displacement	15400.6 MT	WaterSpgr	1.025		

Draft At Draft Marks

FORE.p	5.045(m)	FORE.s	5.045(m)
MID.p	5.777(m)	MID.s	5.777(m)
AFT.p	6.434(m)	AFT.s	6.434(m)

TRIM (Referred to Draft Marks) aft 1.39/140.00a m

Fixed Weight Status

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	11 244.06	70.053f	0.000	13.381u
1) CREW	5.40	120.960f	0.000	25.540u
2) PROVISIONS	4.50	124.100f	0.000	10.110u
3) STORES INCL. SHOP STORES	45.00	98.630f	0.000	11.280u
4) 1000 PASSENGERS	100.00	74.770f	0.000	26.270u
5) TRAILERS ON DECK 3	950.00	36.047f	0.000	11.200u
6) 132 CARS ON DECK 3	200.00	107.297f	0.000	9.900u
Total Fixed:	12 548.97	68.254f	0.000	13.260u

Tank Status

BALLAST

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
PFT_WB_101.C	1.025	<empty>					0.0
WB_201.C	1.025	<empty>					0.0
WB_401.C	1.025	<empty>					0.0
WB_501.C	1.025	100.00%	138.17	107.479f	0.000	0.852	0.0
WB_601.C	1.025	100.00%	130.02	99.547f	0.000	0.779	0.0
WB_701.C	1.025	100.00%	138.76	89.998f	0.000	0.750	0.0
WB_1201.C	1.025	100.00%	381.44	31.268f	0.000	2.545	0.0
WB_1301.C	1.025	100.00%	339.22	21.058f	0.085p	3.167	0.0
WB_1401.C	1.025	100.00%	642.35	10.017f	0.000	5.095	0.0
WB_1511.C	1.025	<empty>					0.0
WB_311.C	1.025	100.00%	283.14	126.489f	0.017s	3.951	0.0
Subtotals:		71.41%	2 053.11	49.486f	0.012p	3.292	0.0

FRESH WATER

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
FW_1411.C	1.000	<empty>					0.0
FW_411PS.P	1.000	15.50%	20.31	116.492f	2.981p	2.834	135.5
FW_412SB.S	1.000	15.50%	20.85	116.492f	2.981s	2.834	139.2
Subtotals:		10.15%	41.16	116.492f	0.040s	2.834	274.7

HW

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
HEEL_812PS.P	1.000	80.00%	256.55	77.929f	10.859p	3.467	194.4
HEEL_812SB.S	1.000	86.00%	278.35	77.934f	10.864s	3.609	196.2
Subtotals:		83.01%	534.91	77.931f	0.445s	3.541	390.6

DIESEL OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
DO_1001.C	0.860	<empty>					0.0
DO_DAY_914.S	0.860	69.50%	9.04	60.799f	4.750s	2.890	3.0
Subtotals:		9.97%	9.04	60.799f	4.750s	2.890	3.0

TO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
TO_STOR1202.P	0.861	98.00%	19.23	37.213f	2.309p	1.198	17.5
TO_DRAIN1202.S	0.861	98.00%	19.23	37.213f	2.309s	1.198	17.5
Subtotals:		98.00%	38.47	37.213f	0.000	1.198	35.1

HFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
HFO_801.C	0.980	<empty>					0.0
HFO_811.C	0.980	<empty>					0.0
HFO_OVFL_902.C	0.980	10.00%	4.43	63.568f	0.000	0.075	402.8
HFO_DAY_911.P	0.980	33.00%	17.04	70.797f	2.000p	2.160	33.7
HFO_SETT.P	0.980	90.00%	46.47	85.199f	3.600p	4.600	33.7
SLUDGE_913.P	0.980	98.00%	14.46	70.799f	5.600p	3.460	0.8
Subtotals:		9.97%	82.39	78.532f	3.427p	3.652	471.1

LUBE OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LO_1102PS.P	0.910	60.00%	8.20	46.759f	4.500p	0.505	1.3
LO_1102SB.S	0.910	60.00%	8.20	46.759f	4.500s	0.505	1.3
LO_1103PS.P	0.910	60.00%	7.33	46.868f	7.384p	0.582	1.1
LO_1103SB.S	0.910	60.00%	7.33	46.868f	7.384s	0.582	1.1
DIRTYLO_1101.P	0.910	70.00%	15.42	45.533f	0.800p	0.567	2.9
STOR_LO_1101.S	0.910	10.00%	2.20	45.130f	0.800s	0.083	2.9
Subtotals:		50.80%	48.68	46.329f	0.217p	0.529	10.7

MISCELLANEOUS

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
BILGEWT_915P.P	1.000	20.00%	3.02	70.794f	8.800p	1.890	0.8
HFODRAIN_917.P	1.000	20.00%	0.33	64.789f	5.100p	1.600	0.0
HFOSLUDGE916.S	1.000	50.00%	8.76	64.796f	0.900s	1.750	189.6
LOGEAR_1104P.C	1.000	100.00%	6.45	40.400f	0.000	1.050	0.0
FWDRAIN1104S.S	1.000	20.00%	1.04	42.733f	2.800s	0.193	0.1
Subtotals:		42.70%	19.58	56.517f	0.890p	1.456	190.7

LSHFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LSHFO_901.C	0.980	<empty>					0.0
LSHFO_DAY912.S	0.980	20.00%	10.33	70.794f	3.600s	1.900	33.7
LSHFO_SETT.S	0.980	27.00%	13.94	85.196f	2.000s	3.340	33.7
Subtotals:		10.28%	24.27	79.068f	2.681s	2.727	67.5

All Tanks

	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
Totals:		53.28%	2 851.60	56.745f	0.005s	3.249	1 443.2

Displacer Status

Item	Status	Spgr	Displ (MT)	LCB (m)	TCB (m)	VCB (m)	Eff /Perm
HULL	Intact	1.025	15 400.53	66.044f	0.000	3.324	1.000
SubTotals:			15 400.53	66.044f	0.000	3.324	

Critical points

Name	L,T,V (m)	Height (m)
(1) MES Height Limiting Point PS	47.200f, 13.850p, 5.900	-0.153
(2) MES Height Limiting Point SB	47.200f, 13.850s, 5.900	-0.153

Immersion of propeller tip 1.792 m

Current Rolling Period is : 9.96 second

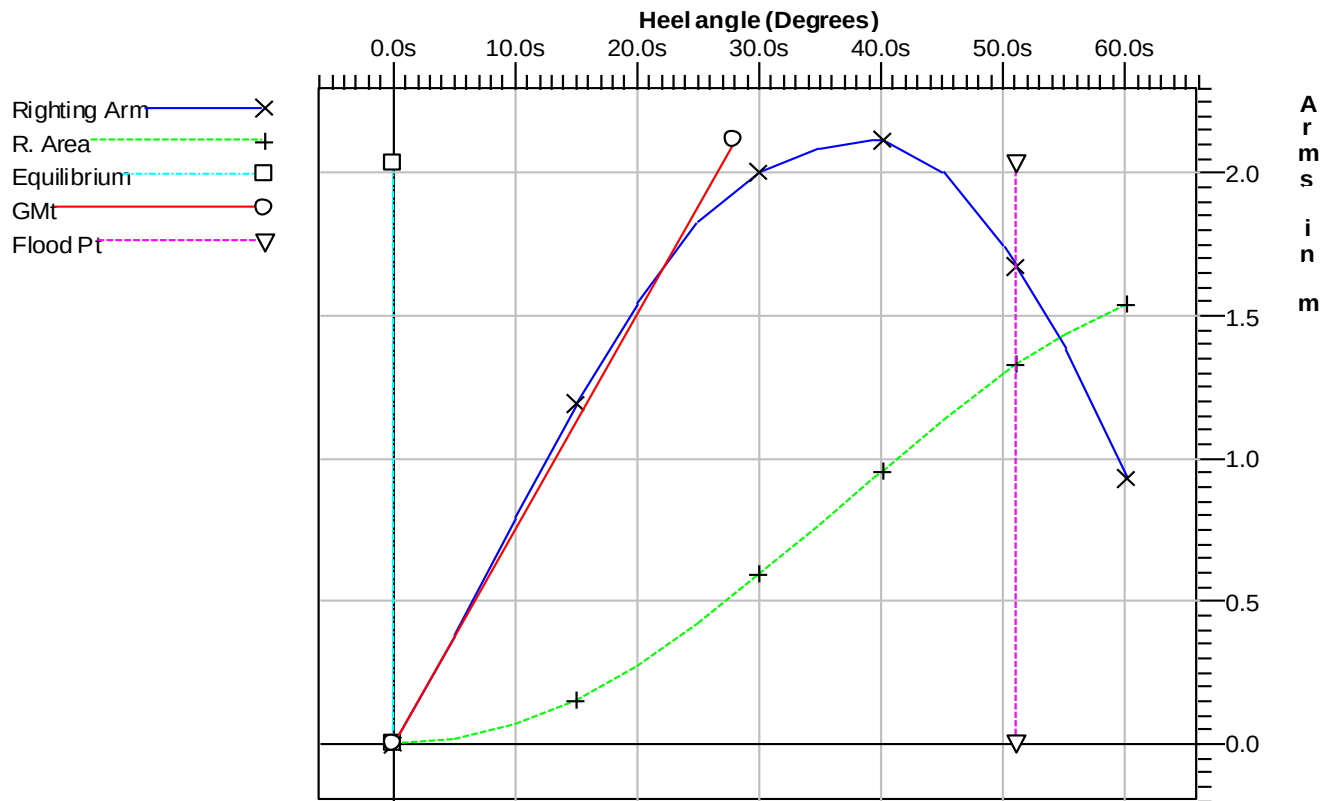
Righting Arms vs. Heel - IMO RES. A.749 (18)

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Righting Arm (m)	Area (m-Rad)	Flood Pt Height (m)	Notes
0.00	0.57a	6.521	0.000	0.000	11.556 (1)	Equil
5.00s	0.55a	6.449	0.388	0.017	10.402 (2)	
10.00s	0.48a	6.232	0.798	0.069	9.265 (2)	
15.00s	0.41a	5.929	1.194	0.156	8.096 (2)	
20.00s	0.35a	5.534	1.551	0.276	6.913 (2)	
25.00s	0.28a	5.033	1.833	0.424	5.739 (2)	
30.00s	0.21a	4.419	2.009	0.592	4.598 (2)	
35.00s	0.15a	3.696	2.093	0.772	3.496 (2)	
39.40s	0.10a	2.983	2.123	0.934	2.558 (2)	MaxRa
40.00s	0.10a	2.883	2.121	0.956	2.430 (2)	
45.00s	0.05a	2.046	2.005	1.137	1.346 (2)	
50.00s	0.01a	1.209	1.747	1.302	0.237 (2)	
51.06s	0.00a	1.031	1.678	1.333	0.000 (2)	FldPt
55.00s	0.02f	0.376	1.385	1.439	-0.888 (2)	
60.00s	0.04f	-0.451	0.935	1.541	-2.016 (2)	

Unprotected Flood Points

Name	L,T,V (m)	Height (m)
(1) Aft Ventilation Opening PS	2.150a, 13.300p, 18.100	11.556
(2) Aft Ventilation Opening SB	2.150a, 13.300s, 18.100	10.402

Righting Arms vs. Heel - IMO RES. A.749 (18)



IMO RES. A.749 (18)

Limit	Min/Max	Actual	Margin	Pass
(1) GM at Equilibrium	>0.150 m	4.370	4.220	Yes
(2) Area from 0.00 deg to 30.00	>0.0550 m-R	0.592	0.537	Yes
(3) Area from 0.00 deg to 40.00 or Flood	>0.0900 m-R	0.956	0.866	Yes
(4) Area from 30.00 deg to 40.00 or Flood	>0.0300 m-R	0.364	0.334	Yes
(5) Righting Arm at 30.00 deg	>0.200 m	2.009	1.809	Yes
(6) Angle from 0.00 deg to MaxRA	>25.00 deg	39.40	14.40	Yes

Current VCG Fluid 11.500 m < Max Allowable VCG 13.894 m - PASS

MAXIMUM TURNING ANGLE VERIFICATION

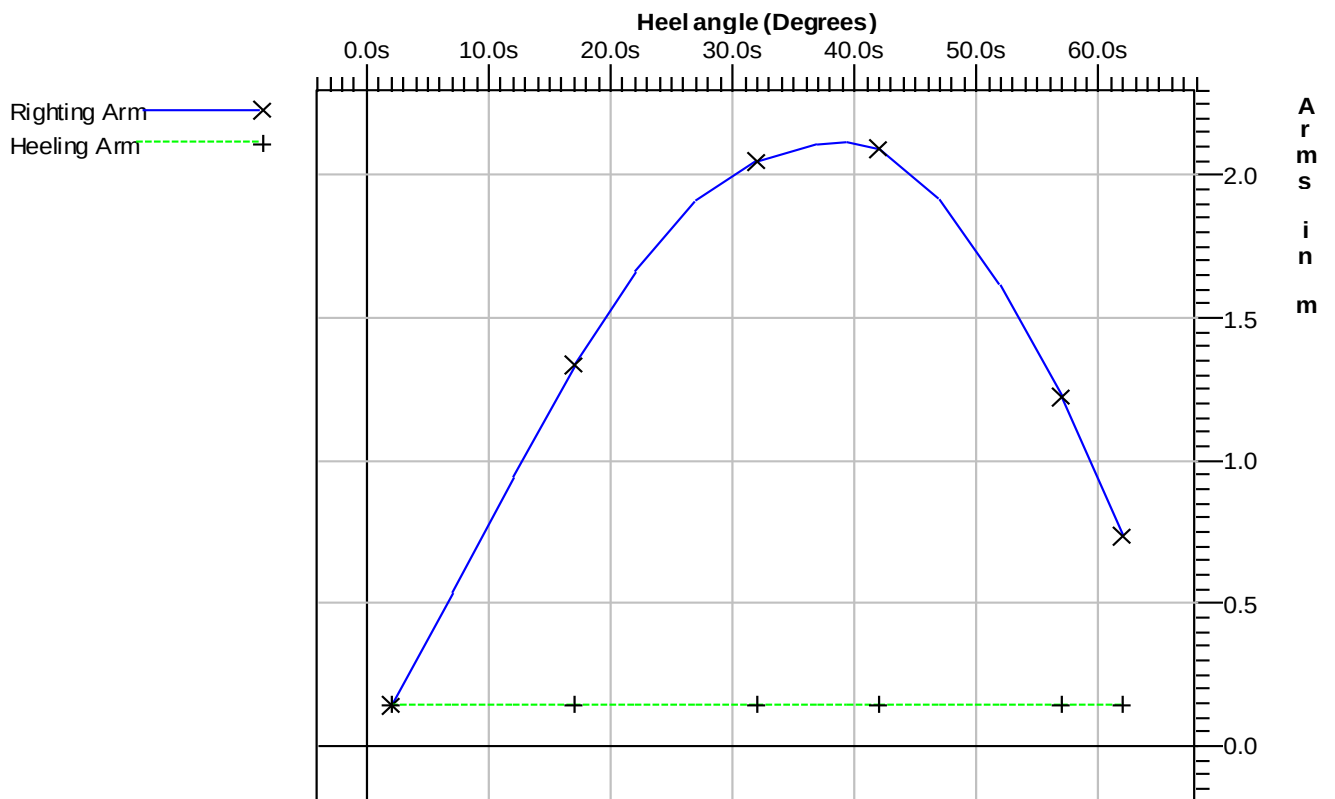
Cruising speed 21.15 knots

MOMENT DUE TO MAXIMUM TURNING ANGLE 2236.075 tm

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)
1.91s	0.57a	6.512	0.000
6.91s	0.52a	6.380	0.400
11.91s	0.46a	6.127	0.807
16.91s	0.39a	5.789	1.192
21.91s	0.32a	5.356	1.524
26.91s	0.25a	4.812	1.768
31.91s	0.19a	4.155	1.904
36.91s	0.13a	3.394	1.965
39.31s	0.10a	2.998	1.977
41.91s	0.08a	2.564	1.952
46.91s	0.04a	1.726	1.776
51.91s	0.00f	0.890	1.474
56.91s	0.03f	0.059	1.079
61.91s	0.05f	-0.765	0.595

Righting Arms vs. Heel - IMO RES. A.749 (18)



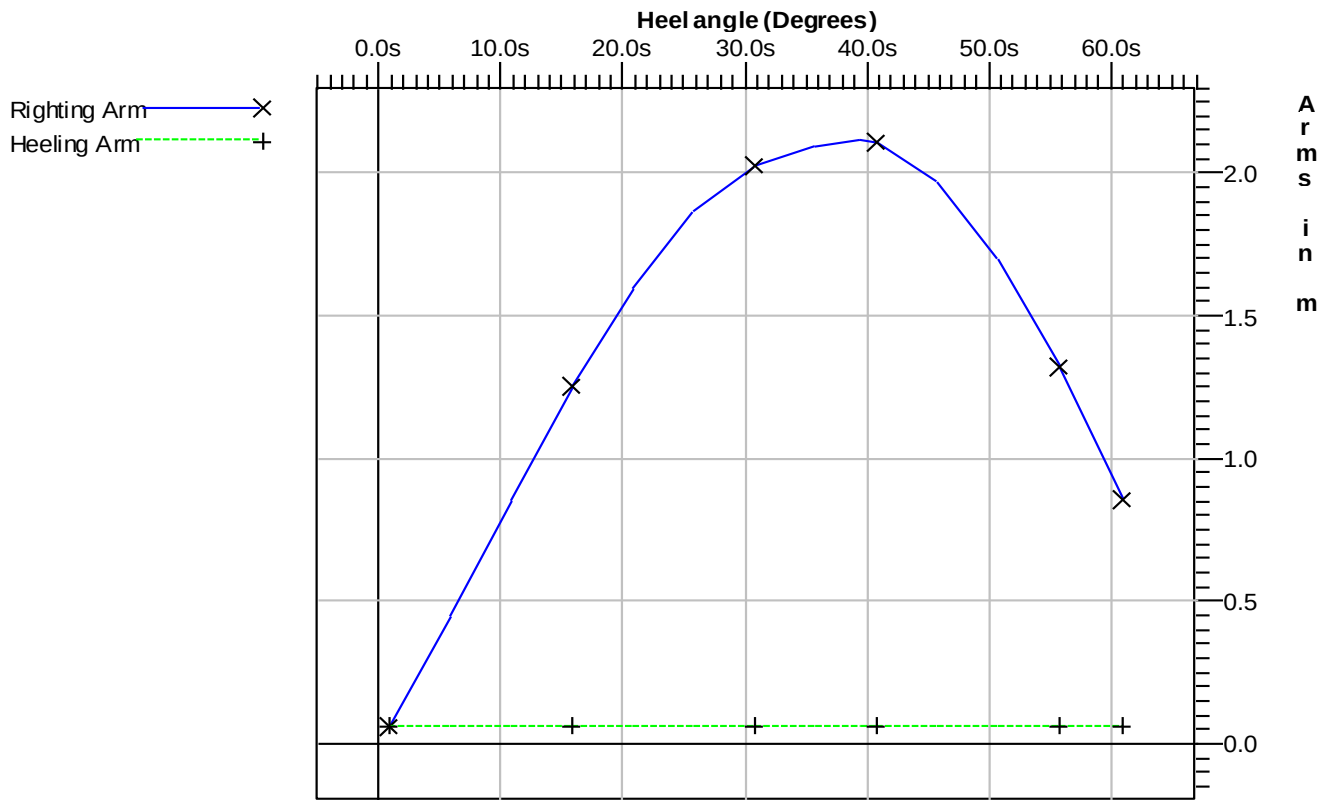
HEELING ANGLE DUE TO TURNING 1.91s deg

1000 PASSENGERS CROWDING VERIFICATION

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)
0.79s	0.57a	6.521	0.000
5.79s	0.54a	6.423	0.393
10.79s	0.47a	6.190	0.803
15.79s	0.40a	5.873	1.194
20.79s	0.34a	5.462	1.542
25.79s	0.27a	4.944	1.809
30.79s	0.20a	4.312	1.967
35.79s	0.14a	3.573	2.041
39.39s	0.10a	2.984	2.063
40.79s	0.09a	2.751	2.055
45.79s	0.05a	1.914	1.913
50.79s	0.01a	1.077	1.636
55.79s	0.03f	0.245	1.261
60.79s	0.04f	-0.580	0.796

Righting Arms vs. Heel - IMO RES. A.749 (18)



HEELING ANGLE DUE TO PASSENGERS CROWDING 0.79s deg

IMO Res. A.749 (18), SEVERE WIND AND ROLLING CRITERION (WEATHER CRITERION)

Wind speed 53.4 kn

Wind pressure 504 N /m²Under Water Lateral Plane 888.350 m²Above Water Lateral Plane 3601.716 m²

Under Water Lateral Plane Centroid 2.856 m below water line

Above Water Lateral Plane Centroid 11.816 m above water line

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)	Area (m-Rad)	Flood Pt Height (m)	Notes
23.42p	0.30a	5.203	-2.020	0.000	6.107 (1)	Roll
18.42p	0.37a	5.669	-1.711	-0.163	7.286 (1)	
13.42p	0.43a	6.034	-1.338	-0.296	8.467 (1)	
8.42p	0.50a	6.312	-0.936	-0.396	9.625 (1)	
3.42p	0.56a	6.488	-0.529	-0.460	10.763 (1)	
1.58s	0.57a	6.515	-0.145	-0.489	11.190 (2)	
3.44s	0.56a	6.488	0.000	-0.491	10.759 (2)	Equil
6.58s	0.53a	6.393	0.253	-0.484	10.044 (2)	
11.58s	0.46a	6.146	0.660	-0.445	8.899 (2)	
16.58s	0.39a	5.815	1.048	-0.370	7.724 (2)	
21.58s	0.33a	5.388	1.385	-0.264	6.541 (2)	
26.58s	0.26a	4.852	1.636	-0.131	5.375 (2)	
31.58s	0.19a	4.202	1.778	0.019	4.246 (2)	
36.58s	0.13a	3.448	1.843	0.177	3.157 (2)	
41.58s	0.08a	2.619	1.838	0.338	2.091 (2)	
46.58s	0.04a	1.782	1.672	0.493	0.999 (2)	
50.00s	0.01a	1.209	1.482	0.587	0.237 (2)	
51.06s	0.00a	1.031	1.413	0.614	0.000 (2)	FldPt
55.00s	0.02f	0.376	1.121	0.702	-0.888 (2)	

Note:

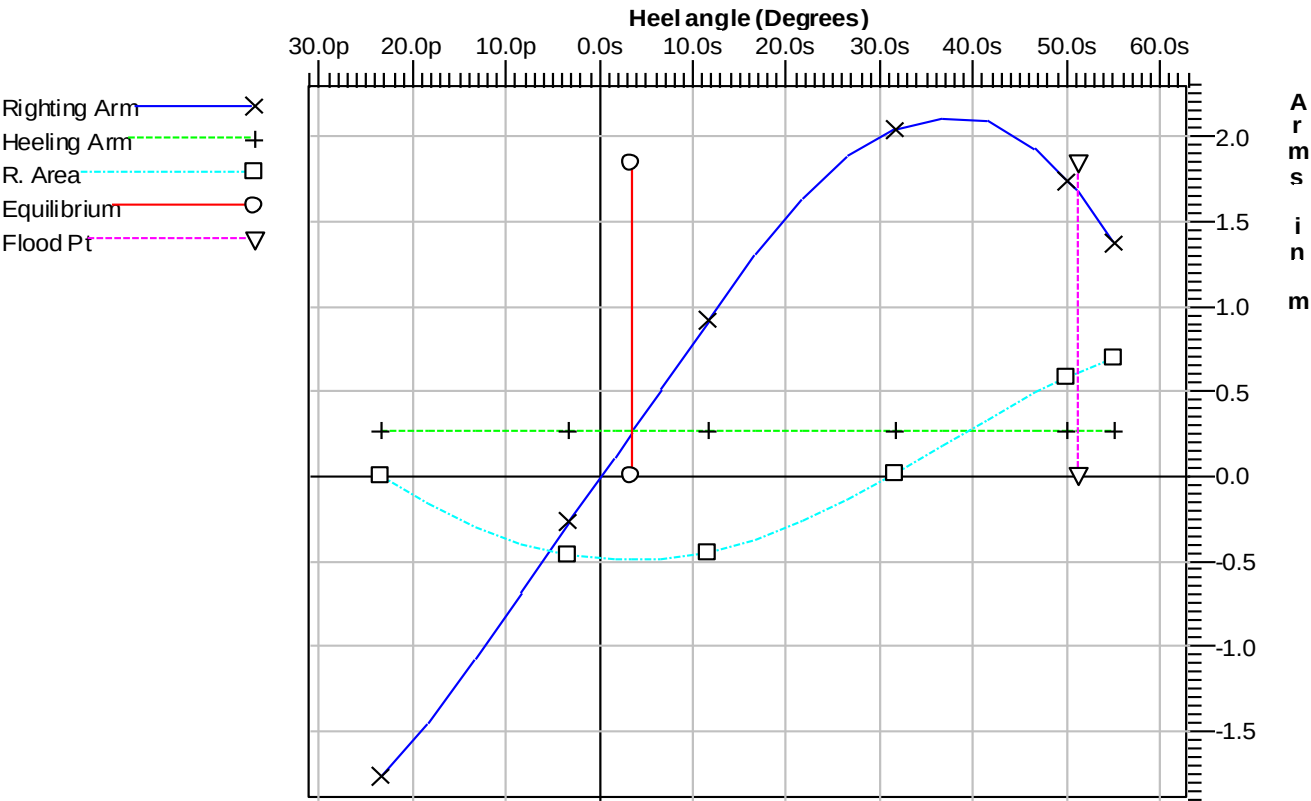
Roll angle is 25.74

Equilibrium for load condition without gust is 2.32s

Unprotected Flood Points

Name	L,T,V (m)	Height (m)
(1) Aft Ventilation Opening PS	2.150a, 13.300p, 18.100	6.107
(2) Aft Ventilation Opening SB	2.150a, 13.300s, 18.100	11.190

Righting Arms vs. Heel - IMO SEVERE WIND & ROLLING



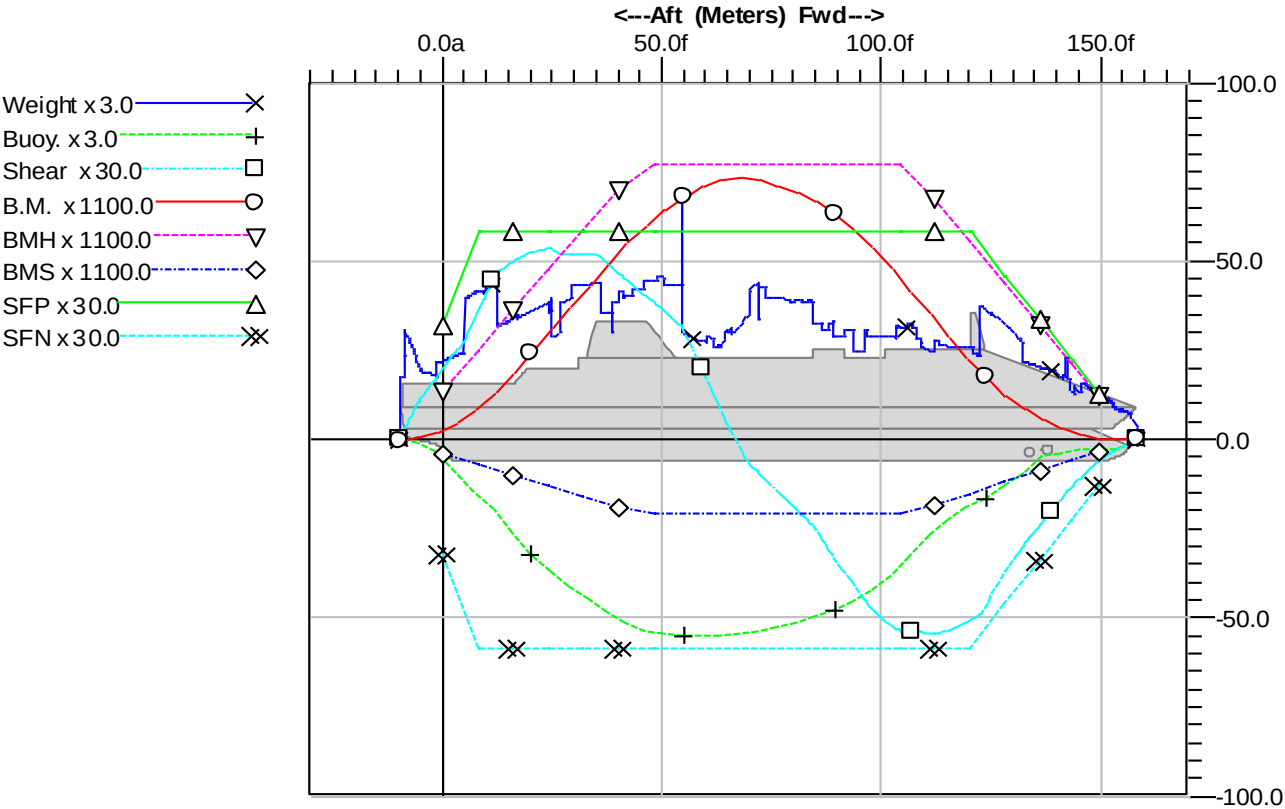
IMO SEVERE WIND & ROLLING

Limit	Min/Max	Actual	Margin	Pass
(1) Res. Ratio from Roll to Abs 50.00 deg or Flood	>1.000	2.195	1.195	Yes

LONGITUDINAL STRENGTH

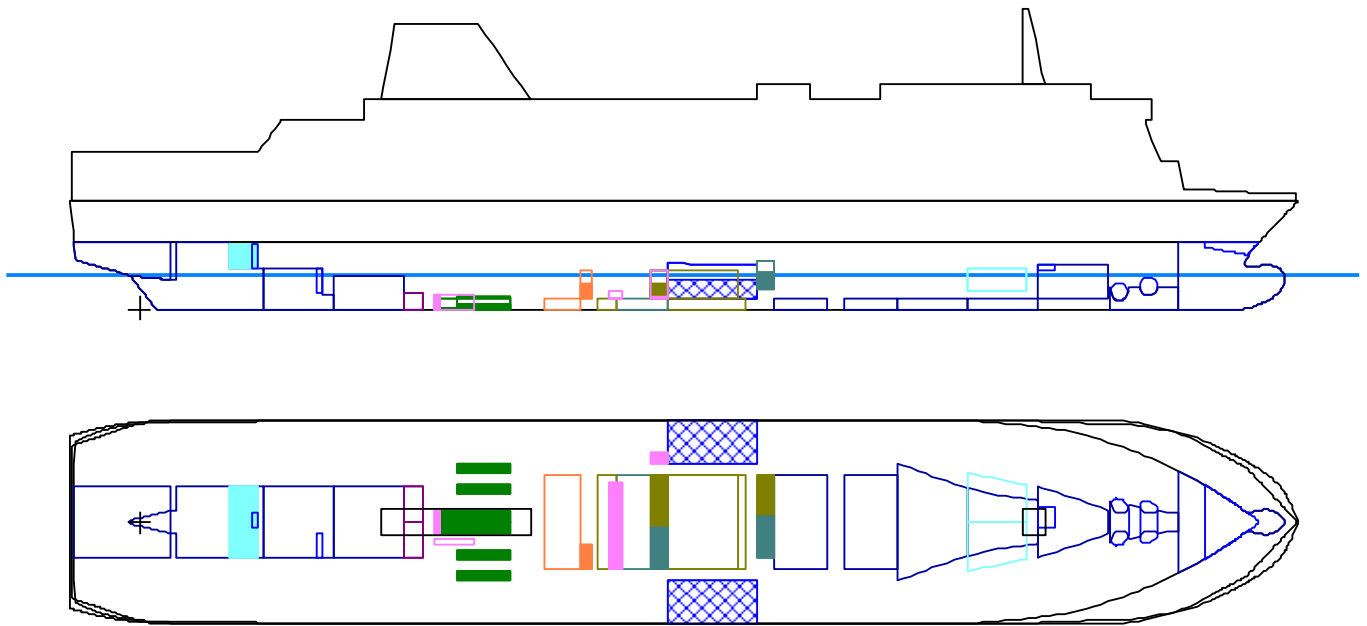
Frame No.	Location (m)	Weight (MT/m)	Buoyancy (MT/m)	Shear (MT)	Bending (MT-m)	Shear (%/Max)	Bending (%/Max)
FR -10	8.000a	85.6	0.0	132.6	130	undef	undef
FR 0	0.000	66.9	14.8	595.9	3272	61.30	22.11
BKHD FR 6	4.800f	73.7	34.4	814.2	6716	56.59	30.14
FR 10	8.000f	125.1	46.0	1077.8	9772	61.59	35.84
FR 20	16.000f	103.3	78.5	1497.2	20519	85.55	51.65
BKHD FR 21	16.800f	105.1	82.1	1516.3	21730	86.65	53.03
FR 30	24.000f	115.9	109.8	1606.3	33086	91.79	63.39
BKHD FR 33	26.400f	115.9	116.6	1563.3	36922	89.33	66.01
BKHD FR 36	28.800f	119.9	123.1	1558.6	40687	89.06	68.19
FR 40	32.000f	131.0	131.3	1564.2	45707	89.38	70.69
BKHD FR 50	40.000f	125.3	151.7	1399.2	57883	79.96	75.05
BKHD FR 51	40.800f	125.3	153.3	1377.6	58999	78.72	75.77
FR 60	48.000f	134.3	162.2	1155.7	68137	66.04	80.54
BKHD FR 63	50.400f	136.9	163.5	1091.2	70850	62.36	83.75
BKHD FR 64	51.200f	131.0	163.8	1065.0	71716	60.86	84.77
FR 70	56.000f	87.7	164.9	835.9	76426	47.76	90.34
BKHD FR 75	60.000f	87.3	165.2	513.8	79163	29.36	93.57
FR 80	64.000f	89.4	164.1	184.9	80598	10.56	95.27
BKHD FR 90	72.000f	129.3	160.6	-279.1	80019	15.95	94.59
FR 100	80.000f	118.2	154.4	-576.2	76685	32.92	90.64
BKHD FR 105	84.000f	115.5	150.4	-716.4	74127	40.94	87.62
FR 110	88.000f	97.3	145.5	-925.5	70876	52.88	83.78
BKHD FR 117	93.600f	93.1	136.3	-1205.2	64926	68.87	76.74
FR 120	96.000f	92.6	131.3	-1349.1	61875	77.09	73.14
BKHD FR 129	103.200f	96.0	109.7	-1590.3	51259	90.88	60.59
FR 130	103.200f	96.0	109.7	-1590.3	51259	90.88	60.59
FR 140	112.000f	84.1	76.0	-1635.4	37089	93.45	49.95
BKHD FR 141	112.800f	83.4	73.4	-1628.2	35789	93.04	49.06
FR 150	120.000f	77.9	55.9	-1519.6	24443	86.83	39.87
BKHD FR 153	112.400f	83.8	74.7	-1631.8	36439	93.25	49.51
FR 160	128.000f	98.2	38.4	-1133.0	13626	82.04	28.17
BKHD FR 165	132.000f	81.6	28.2	-903.9	9590	75.58	22.89
FR 170	136.000f	61.6	20.0	-724.2	6369	71.63	17.98
BKHD FR 177	141.600f	52.2	11.3	-471.0	3092	62.56	11.70
FR 180	143.400f	39.4	9.1	-394.6	2334	58.90	9.92
FR 190	149.400f	36.7	8.6	-183.5	657	46.68	4.78
FR 200	155.400f	24.2	3.2	-49.9	39	undef	undef

Longitudinal Strength At Sea Condition (stbd 0.01 deg.)



Max. Shear	-1636.2 MT	at	111.909f
Max. Bending Moment	80848 MT-m	at	67.000f (Hogging)
Max% Shear	93.49%	at	111.909f
Max% Bending Moment	95.57%	at	67.000f

CASE 10 - DOCKING



Fluid Legend

Fluid Name	Legend	Weight (MT)	Load%
FRESH WATER		137.09	33.81%
HW		324.77	50.40%
DIESEL OIL		6.50	7.17%
TO		38.47	98.00%
HFO		53.84	6.52%
LUBE OIL		25.11	26.20%
MISCELLANEOUS		9.87	21.53%
LSHFO		46.47	19.69%

Floating Status

Draft FP	4.888 m	Heel	0.00 deg	GM(Solid)	4.087 m
Draft MS	4.849 m	Equil	Yes	F/S Corr.	0.094 m
Draft AP	4.811 m	Wind	Off	GM(Fluid)	3.994 m
Trim	0.08f m	Wave	No	KMT	16.936 m
LCG	69.761f m	VCG-Solid	12.848 m	TPcm	32.35
Displacement	11959.1 MT	WaterSpgr	1.025		

Draft At Draft Marks

FORE.p	4.887(m)	FORE.s	4.887(m)
MID.p	4.849(m)	MID.s	4.849(m)
AFT.p	4.815(m)	AFT.s	4.815(m)

TRIM (Referred to Draft Marks) fwd 0.07/140.00f m

Fixed Weight Status

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	11 244.06	70.053f	0.000	13.381u
1) CREW	5.40	120.960f	0.000	25.540u
2) PROVISIONS	22.50	124.100f	0.000	10.110u
3) STORES INCL. SHOP STORES	45.00	98.630f	0.000	11.280u
Total Fixed:	11 316.97	70.298f	0.000	13.372u

Tank Status**BALLAST**

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
PFT_WB_101.C	1.025	<empty>					0.0
WB_201.C	1.025	<empty>					0.0
WB_401.C	1.025	<empty>					0.0
WB_501.C	1.025	<empty>					0.0
WB_601.C	1.025	<empty>					0.0
WB_701.C	1.025	<empty>					0.0
WB_1201.C	1.025	<empty>					0.0
WB_1301.C	1.025	<empty>					0.0
WB_1401.C	1.025	<empty>					0.0
WB_1511.C	1.025	<empty>					0.0
WB_311.C	1.025	<empty>					0.0

FRESH WATER

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
FW_1411.C	1.000	98.00%	137.09	13.936f	0.010s	7.366	355.9
FW_411PS.P	1.000	<empty>					0.0
FW_412SB.S	1.000	<empty>					0.0
Subtotals:		33.81%	137.09	13.936f	0.010s	7.366	355.9

HW

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
HEEL_812PS.P	1.000	50.00%	160.35	77.939f	10.820p	2.755	194.4
HEEL_812SB.S	1.000	50.80%	164.42	77.940f	10.821s	2.774	196.2
Subtotals:		50.40%	324.77	77.940f	0.137s	2.765	390.6

DIESEL OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
DO_1001.C	0.860	<empty>					0.0
DO_DAY_914.S	0.860	50.00%	6.50	60.800f	4.750s	2.500	3.0
Subtotals:		7.17%	6.50	60.800f	4.750s	2.500	3.0

TO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
TO_STOR1202.P	0.861	98.00%	19.23	37.215f	2.309p	1.198	17.5
TO_DRAIN1202.S	0.861	98.00%	19.23	37.215f	2.309s	1.198	17.5
Subtotals:		98.00%	38.47	37.215f	0.000	1.198	35.0

HFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
HFO_801.C	0.980	<empty>					0.0
HFO_811.C	0.980	<empty>					0.0
HFO_OVFL_902.C	0.980	<empty>					0.0
HFO_DAY_911.P	0.980	30.00%	15.49	70.800f	2.000p	2.100	33.7
HFO_SETT.P	0.980	60.00%	30.98	85.200f	3.600p	4.000	33.7
SLUDGE_913.P	0.980	50.00%	7.38	70.800f	5.600p	2.500	0.8
Subtotals:		6.52%	53.84	79.085f	3.414p	3.248	68.2

LUBE OIL

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LO_1102PS.P	0.910	40.00%	5.47	46.805f	4.500p	0.336	1.3
LO_1102SB.S	0.910	40.00%	5.47	46.805f	4.500s	0.336	1.3
LO_1103PS.P	0.910	40.00%	4.88	46.965f	7.378p	0.403	1.1
LO_1103SB.S	0.910	40.00%	4.88	46.965f	7.378s	0.403	1.1
DIRTYLO_1101.P	0.910	10.00%	2.20	45.624f	0.800p	0.081	2.9
STOR_LO_1101.S	0.910	10.00%	2.20	45.624f	0.800s	0.081	2.9
Subtotals:		26.20%	25.11	46.660f	0.000	0.317	10.7

MISCELLANEOUS

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
BILGEWT_915P.P	1.000	10.00%	1.51	70.801f	8.800p	1.695	0.8
HFODRAIN_917.P	1.000	10.00%	0.16	64.801f	5.100p	1.550	0.0
HFOSLUDGE916.S	1.000	10.00%	1.75	64.801f	0.900s	1.550	189.6
LOGEAR_1104P.C	1.000	100.00%	6.45	40.400f	0.000	1.050	0.0
FWDRAIN1104S.S	1.000	<empty>					0.0
Subtotals:		21.53%	9.87	49.776f	1.269p	1.245	190.5

LSHFO

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
LSHFO_901.C	0.980	<empty>					0.0
LSHFO_DAY912.S	0.980	30.00%	15.49	70.800f	3.600s	2.100	33.7
LSHFO_SETT.S	0.980	60.00%	30.98	85.200f	2.000s	4.000	33.7
Subtotals:		19.69%	46.47	80.400f	2.533s	3.367	67.5

All Tanks

	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
Totals:		12.00%	642.13	60.280f	0.003p	3.616	1 121.5

Displacer Status

Item	Status	Spgr	Displ (MT)	LCB (m)	TCB (m)	VCB (m)	Eff /Perm
HULL	Intact	1.025	11 959.10	69.766f	0.000	2.716	1.000
SubTotals:			11 959.10	69.766f	0.000	2.716	

Immersion of propeller tip 0.112 m

Current Rolling Period is : 10.97 second

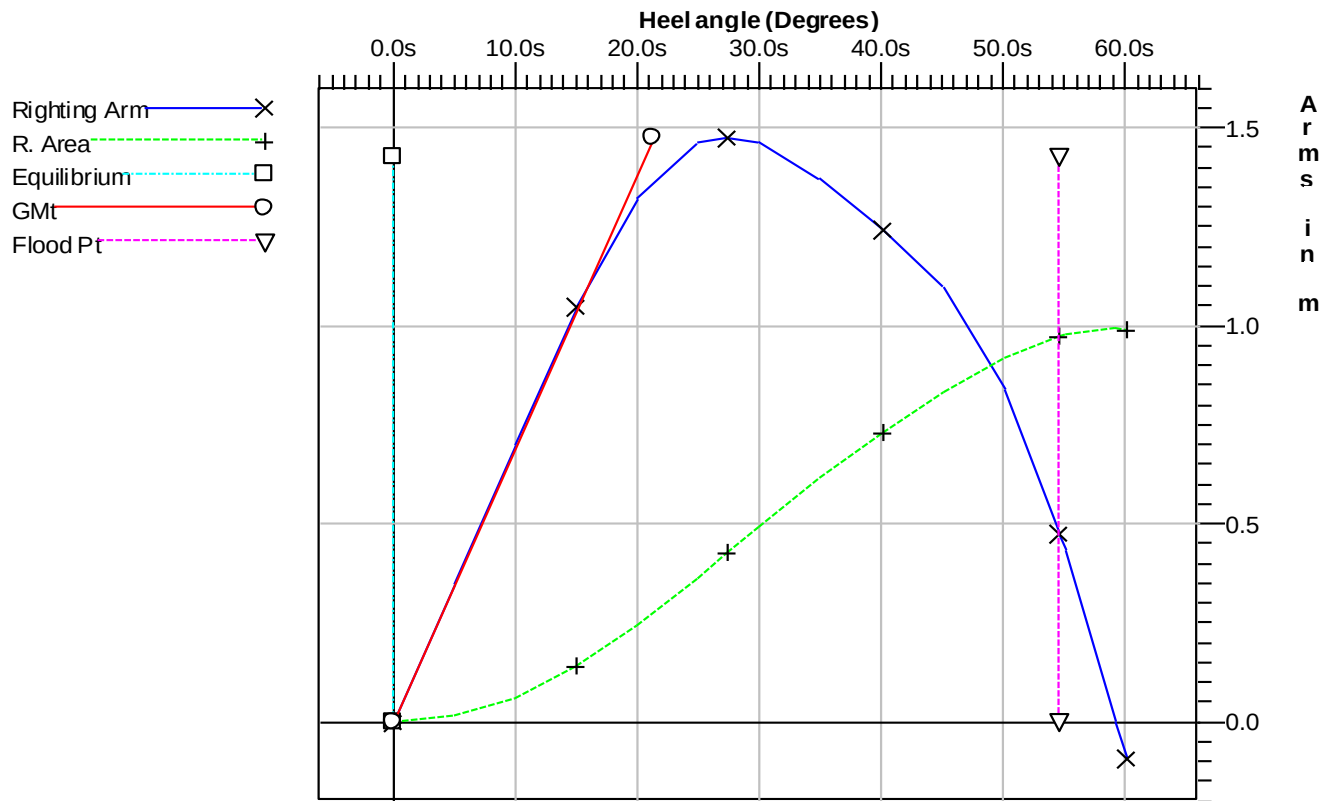
Righting Arms vs. Heel - IMO RES. A.749 (18)

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Righting Arm (m)	Area (m-Rad)	Flood Pt Height (m)	Notes
0.00	0.03f	4.811	0.000	0.000	13.218 (3)	Equil
5.00s	0.04f	4.758	0.352	0.015	12.062 (4)	
10.00s	0.07f	4.598	0.705	0.061	10.841 (4)	
15.00s	0.12f	4.304	1.048	0.138	9.564 (4)	
20.00s	0.21f	3.872	1.323	0.242	8.258 (4)	
25.00s	0.29f	3.328	1.464	0.365	6.969 (4)	
27.40s	0.32f	3.027	1.478	0.426	6.363 (4)	MaxRa
30.00s	0.36f	2.677	1.463	0.493	5.718 (4)	
35.00s	0.43f	1.936	1.374	0.618	4.511 (4)	
40.00s	0.48f	1.116	1.243	0.732	3.350 (4)	
45.00s	0.54f	0.216	1.095	0.834	2.226 (4)	
50.00s	0.63f	-0.769	0.840	0.920	1.069 (4)	
54.53s	0.73f	-1.699	0.477	0.972	0.000 (4)	FldPt
55.00s	0.74f	-1.796	0.433	0.976	-0.110 (4)	
59.18s	0.82f	-2.642	0.000	0.992	-1.061 (4)	RaZero
60.00s	0.83f	-2.807	-0.093	0.992	-1.245 (4)	

Unprotected Flood Points

Name	L,T,V (m)	Height (m)
(3) Fwd Ventilation Opening PS	139.200f, 12.800p, 18.100	13.218
(4) Fwd Ventilation Opening SB	139.200f, 12.800s, 18.100	12.062

Righting Arms vs. Heel - IMO RES. A.749 (18)



IMO RES. A.749 (18)

Limit	Min/Max	Actual	Margin	Pass
(1) GM at Equilibrium	>0.150 m	3.994	3.844	Yes
(2) Area from 0.00 deg to 30.00	>0.0550 m-R	0.493	0.438	Yes
(3) Area from 0.00 deg to 40.00 or Flood	>0.0900 m-R	0.732	0.642	Yes
(4) Area from 30.00 deg to 40.00 or Flood	>0.0300 m-R	0.239	0.209	Yes
(5) Righting Arm at 30.00 deg	>0.200 m	1.463	1.263	Yes
(6) Angle from 0.00 deg to MaxRA	>25.00 deg	27.40	2.40	Yes

IMO Res. A.749 (18), SEVERE WIND AND ROLLING CRITERION (WEATHER CRITERION)

Wind speed 53.4 kn

Wind pressure 504 N /m²Under Water Lateral Plane 739.536 m²Above Water Lateral Plane 3748.256 m²

Under Water Lateral Plane Centroid 2.406 m below water line

Above Water Lateral Plane Centroid 12.278 m above water line

Residual Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Residual Arm (m)	Area (m-Rad)	Flood Pt Height (m)	Notes
23.39p	0.26f	3.515	-1.796	0.000	7.380 (3)	Roll
18.39p	0.18f	4.023	-1.606	-0.148	8.678 (3)	
13.39p	0.10f	4.415	-1.301	-0.276	9.981 (3)	
8.39p	0.06f	4.662	-0.952	-0.375	11.241 (3)	
3.39p	0.03f	4.787	-0.598	-0.442	12.443 (3)	
1.61s	0.03f	4.805	-0.248	-0.479	12.854 (4)	
5.13s	0.04f	4.756	0.000	-0.487	12.033 (4)	Equil
6.61s	0.05f	4.719	0.105	-0.486	11.675 (4)	
11.61s	0.08f	4.520	0.457	-0.461	10.436 (4)	
16.61s	0.15f	4.178	0.787	-0.407	9.144 (4)	
21.61s	0.23f	3.709	1.026	-0.327	7.839 (4)	
26.61s	0.31f	3.129	1.116	-0.232	6.561 (4)	
27.41s	0.32f	3.026	1.117	-0.217	6.360 (4)	MaxRa
31.61s	0.38f	2.448	1.081	-0.136	5.325 (4)	
36.61s	0.45f	1.680	0.974	-0.045	4.132 (4)	
41.61s	0.50f	0.835	0.838	0.034	2.987 (4)	
46.61s	0.56f	-0.094	0.669	0.100	1.858 (4)	
50.00s	0.63f	-0.769	0.479	0.134	1.068 (4)	
54.53s	0.73f	-1.699	0.116	0.158	0.000 (4)	FldPt
55.00s	0.74f	-1.796	0.073	0.159	-0.110 (4)	

Note:

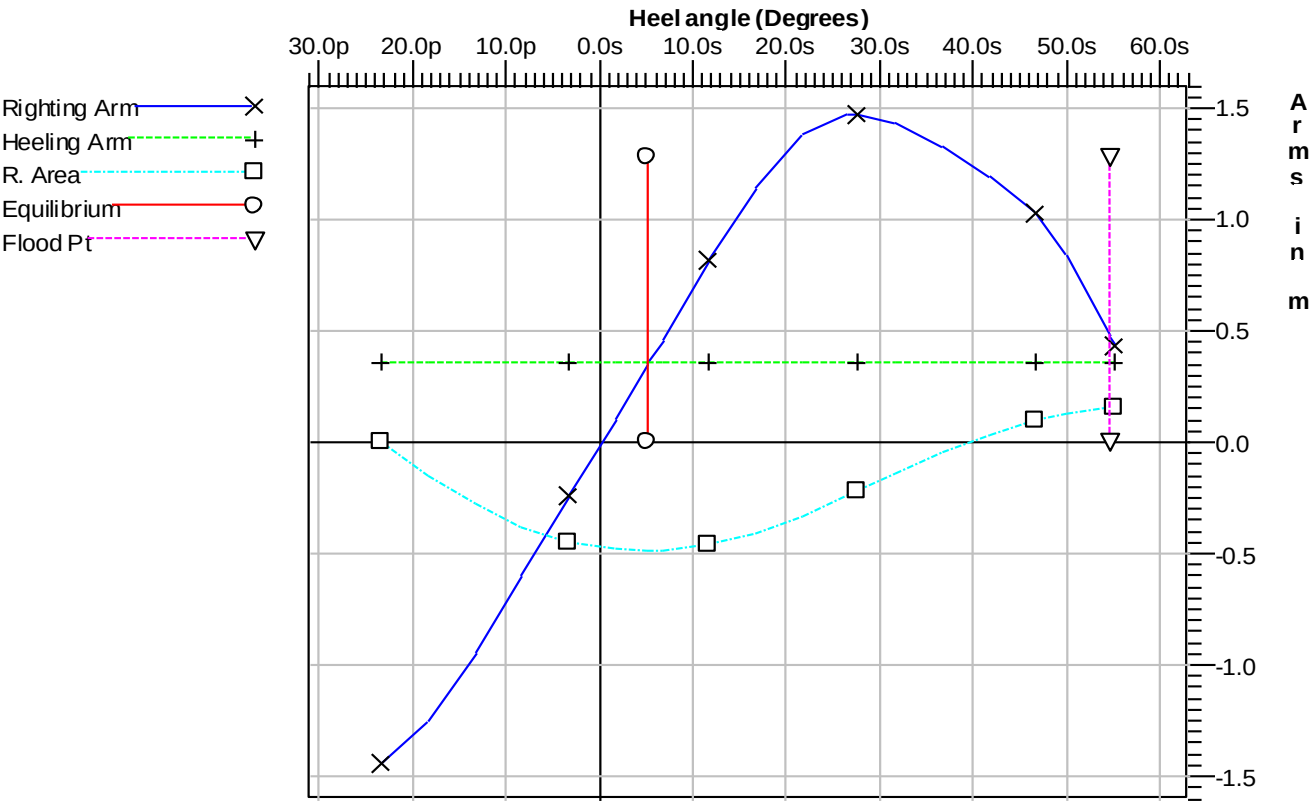
Roll angle is 26.82

Equilibrium for load condition without gust is 3.43s

Unprotected Flood Points

Name	L,T,V (m)	Height (m)
(3) Fwd Ventilation Opening PS	139.200f, 12.800p, 18.100	7.380
(4) Fwd Ventilation Opening SB	139.200f, 12.800s, 18.100	12.854

Righting Arms vs. Heel - IMO SEVERE WIND & ROLLING



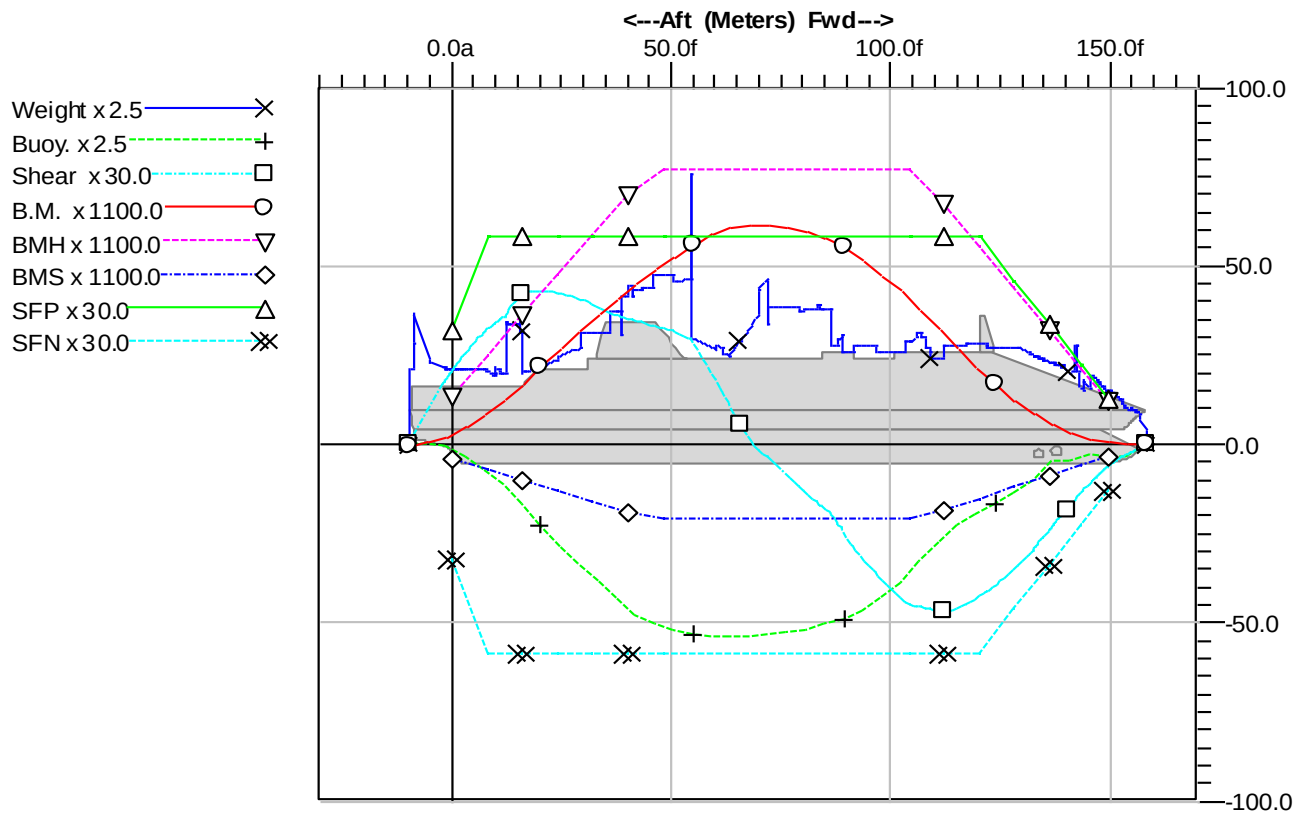
IMO SEVERE WIND & ROLLING

Limit	Min/Max	Actual	Margin	Pass
(1) Res. Ratio from Roll to Abs 50.00 deg or Flood	>1.000	1.276	0.276	Yes

LONGITUDINAL STRENGTH

Frame No.	Location (m)	Weight (MT/m)	Buoyancy (MT/m)	Shear (MT)	Bending (MT-m)	Shear (%/Max)	Bending (%/Max)
FR -10	8.000a	85.6	<und>	124.3	184	undef	undef
FR 0	0.000	53.4	1.4	621.2	3282	63.91	22.18
BKHD FR 6	4.800f	53.4	11.7	845.3	6822	58.75	30.62
FR 10	8.000f	51.9	18.9	966.8	9727	55.25	35.67
FR 20	16.000f	79.6	41.3	1274.4	18553	72.82	46.70
BKHD FR 21	16.800f	51.8	44.2	1281.2	19576	73.21	47.77
FR 30	24.000f	62.7	69.3	1271.8	28838	72.68	55.25
BKHD FR 33	26.400f	65.5	76.3	1250.7	31865	71.47	56.97
BKHD FR 36	28.800f	68.3	83.2	1219.9	34831	69.71	58.37
FR 40	32.000f	78.3	92.2	1184.8	38680	67.71	59.82
BKHD FR 50	40.000f	112.5	114.9	1059.1	47605	60.52	61.73
BKHD FR 51	40.800f	112.5	116.8	1056.4	48451	60.37	62.22
FR 60	48.000f	118.9	127.9	980.1	55761	56.01	65.91
BKHD FR 63	50.400f	119.0	129.9	956.2	58084	54.64	68.66
BKHD FR 64	51.200f	115.6	130.4	944.5	58843	53.97	69.55
FR 70	56.000f	72.5	132.9	798.8	63140	45.65	74.63
BKHD FR 75	60.000f	70.6	134.4	541.5	65829	30.95	77.81
FR 80	64.000f	68.0	134.5	267.5	67456	15.29	79.74
BKHD FR 90	72.000f	96.3	133.4	-101.9	67852	5.82	80.20
FR 100	80.000f	96.1	129.5	-387.4	65878	22.14	77.87
BKHD FR 105	84.000f	95.7	126.7	-513.6	64070	29.35	75.73
FR 110	88.000f	75.1	123.0	-671.4	61741	38.37	72.98
BKHD FR 117	93.600f	70.2	115.5	-957.6	57152	54.72	67.56
FR 120	96.000f	70.3	111.1	-1061.3	54731	60.65	64.69
BKHD FR 129	103.200f	73.2	92.8	-1324.2	46058	75.67	54.44
FR 130	103.200f	73.2	92.8	-1324.2	46058	75.67	54.44
FR 140	112.000f	70.0	64.2	-1404.8	33982	80.27	45.77
BKHD FR 141	112.800f	70.0	62.0	-1399.1	32860	79.95	45.04
FR 150	120.000f	71.6	47.5	-1278.7	23144	73.07	37.75
BKHD FR 153	112.400f	70.0	63.1	-1401.9	33421	80.11	45.41
FR 160	128.000f	68.3	33.2	-1054.2	13753	76.33	28.43
BKHD FR 165	132.000f	63.2	24.5	-902.6	9833	75.47	23.47
FR 170	136.000f	58.4	17.6	-723.7	6586	71.59	18.59
BKHD FR 177	141.600f	52.2	10.3	-476.7	3251	63.32	12.30
FR 180	143.400f	39.4	8.5	-398.8	2470	59.52	10.49
FR 190	149.400f	36.7	8.3	-185.3	730	47.16	5.31
FR 200	155.400f	24.2	3.0	-50.0	60	undef	undef

Longitudinal Strength At Sea Condition



Max. Shear	-1405.3 MT	at	111.909f
Max. Bending Moment	68041 MT-m	at	69.000f (Hogging)
Max% Shear	80.30%	at	111.909f
Max% Bending Moment	80.43%	at	69.000f

APPENDIX

A.1 - FRAME DISTANCE TABLE

Frame Distance Table (from Aft Perpendicular)

FR	X	FR	X	FR	X	FR	X
-15	-12000	26	20800	67	53600	108	86400
-14	-11200	27	21600	68	54400	109	87200
-13	-10400	28	22400	69	55200	110	88000
-12	-9600	29	23200	70	56000	111	88800
-11	-8800	30	24000	71	56800	112	89600
-10	-8000	31	24800	72	57600	113	90400
-9	-7200	32	25600	73	58400	114	91200
-8	-6400	33	26400	74	59200	115	92000
-7	-5600	34	27200	75	60000	116	92800
-6	-4800	35	28000	76	60800	117	93600
-5	-4000	36	28800	77	61600	118	94400
-4	-3200	37	29600	78	62400	119	95200
-3	-2400	38	30400	79	63200	120	96000
-2	-1600	39	31200	80	64000	121	96800
-1	-800	40	32000	81	64800	122	97600
0	0	41	32800	82	65600	123	98400
1	800	42	33600	83	66400	124	99200
2	1600	43	34400	84	67200	125	100000
3	2400	44	35200	85	68000	126	100800
4	3200	45	36000	86	68800	127	101600
5	4000	46	36800	87	69600	128	102400
6	4800	47	37600	88	70400	129	103200
7	5600	48	38400	89	71200	130	104000
8	6400	49	39200	90	72000	131	104800
9	7200	50	40000	91	72800	132	105600
10	8000	51	40800	92	73600	133	106400
11	8800	52	41600	93	74400	134	107200
12	9600	53	42400	94	75200	135	108000
13	10400	54	43200	95	76000	136	108800
14	11200	55	44000	96	76800	137	109600
15	12000	56	44800	97	77600	138	110400
16	12800	57	45600	98	78400	139	111200
17	13600	58	46400	99	79200	140	112000
18	14400	59	47200	100	80000	141	112800
19	15200	60	48000	101	80800	142	113600
20	16000	61	48800	102	81600	143	114400
21	16800	62	49600	103	82400	144	115200
22	17600	63	50400	104	83200	145	116000
23	18400	64	51200	105	84000	146	116800
24	19200	65	52000	106	84800	147	117600
25	20000	66	52800	107	85600	148	118400
FR	X	FR	X	FR	X	FR	X
149	119200	165	132000	181	144000	197	153600

150	120000
151	120800
152	121600
153	122400
154	123200
155	124000
156	124800
157	125600
158	126400
159	127200
160	128000
161	128800
162	129600
163	130400
164	131200

166	132800
167	133600
168	134400
169	135200
170	136000
171	136800
172	137600
173	138400
174	139200
175	140000
176	140800
177	141600
178	142200
179	142800
180	143400

182	144600
183	145200
184	145800
185	146400
186	147000
187	147600
188	148200
189	148800
190	149400
191	150000
192	150600
193	151200
194	151800
195	152400
196	153000

198	154200
199	154800
200	155400
201	156000
202	156600
203	157200
204	157800
205	158400
206	159000
207	159600
208	160200
209	160800
210	161400

A.2 - LIGHTWEIGHT DISTRIBUTION

x1	q1	x2	q2
[m]	[t/m]	[m]	[t/m]
-9.983	53.445	-8.826	53.445
-8.826	71.878	-8.674	71.878
-8.674	92.038	-5.420	60.940
-5.420	58.206	-1.824	54.850
-1.824	53.350	7.154	53.350
7.154	53.350	9.438	49.381
9.438	50.127	9.872	50.127
9.872	54.601	10.957	52.240
10.957	50.873	12.313	50.873
12.313	48.931	14.300	48.931
14.300	48.931	24.000	59.922
24.000	62.680	29.284	68.818
29.284	78.254	37.542	78.254
37.542	77.739	38.541	77.773
38.541	104.353	41.158	104.442
41.158	107.668	45.600	107.668
45.600	115.424	54.331	115.665
54.311	75.001	62.907	62.147
62.907	62.147	71.760	99.674
71.760	68.534	78.909	69.285
78.909	66.183	79.853	66.283
79.853	69.215	82.888	69.533
82.888	72.515	83.900	72.613
83.900	69.640	87.879	70.057
87.879	75.042	88.800	75.138
88.800	62.389	91.449	62.480
91.449	67.889	96.439	68.069
96.439	63.227	102.925	63.448
102.925	70.953	104.432	71.004
104.432	71.004	105.916	72.832
105.916	76.005	106.559	76.027
106.559	73.824	107.954	73.872
107.954	65.165	108.797	65.197
108.797	60.583	111.909	60.595
111.909	69.841	121.657	69.876
121.657	67.742	121.679	67.746
121.679	67.203	122.478	67.206

x1	q1	x2	q2
[m]	[t/m]	[m]	[t/m]
129.041	66.546	138.738	54.918
138.738	56.422	139.017	56.422
139.017	55.427	139.200	54.810
139.200	54.810	140.551	50.316
140.551	50.316	141.754	52.471
141.754	69.157	142.093	69.917
142.093	69.917	142.358	69.917
142.358	52.127	142.573	52.127
142.573	41.621	143.561	38.971
143.561	45.602	145.242	39.764
145.242	48.592	145.825	48.592
145.825	48.592	149.507	36.321
149.507	38.051	149.743	38.051
149.743	38.051	152.497	31.297
152.497	28.841	154.304	24.116
154.304	24.116	156.831	18.517
153.831	7.271	158.062	4.432

A.3 - METRIC CONVERSIONS TABLE

(1) Length

	Meter (m)	Foot (ft)	Inch (in)
1 Meter (m)	1	3.2808	39.370
1 Foot (ft)	0.3048	1	12.000
1 (Inch) (in)	0.0254	0.0833	1

(2) Area

	Sq. Meter (m ²)	Sq. Foot (ft ²)	Sq. Inch (in ²)
1 Sq Meter (m ²)	1	10.764	1550.0
1 Sq. Foot (ft ²)	0.0929	1	144.0
1 Sq. Inch (in ²)	0.000645	0.006944	1

(3) Volume

	Cub. Meter (m ³)	Cub. Foot (ft ³)	Imperial Gallen	US Gallen	Barrel (bbl)
1 Cub. Meter (m ³)	1	35.315	219.98	264.18	6.2898
1 Cub Foot (ft ³)	0.028317	1	6.229	7.4806	0.17811
1 Imperial Gallen	0.004546	0.16054	1	1.2009	0.028593
1 US Gallen	0.0037853	0.13368	0.83269	1	0.023810
1 Barrel (bbl)	0.15898	5.6146	34.973	42.00	1

(4) Weight

	Metric ton (MT)	Kilogram (kg)	Long ton (LT)	Short ton (ST)	Pound (lb)
1 Metric ton (MT)	1	1000.0	0.9842	1.1023	2204.6
1 Kilogram (Kg)	0.001	1	0.0009842	0.0011023	2.2046
1 Long ton (LT)	1.016047	1016.047	1	1.1200	2240.0
1 Short ton (ST)	0.90719	907.19	0.89286	1	2000.0
1 Pound (lb)	0.0004536	0.45359	0.00044643	0.00050	1

(5) Relation between Weight and Volume

10 mm cubed (mm ³)	=	1 cubic centimeter (cm ³)
1 cubic centimeter (cm ³) of freshwater (S.G.= 1.000)	=	1 gram (g)
1000 cubic centimeter (cm ³) of freshwater (S.G.= 1.000)	=	1 Kilogram (kg) (=1000 g)
1 cubic meter (m ³) of freshwater (S.G.= 1.000)	=	1 ton (= 1000 kg)
1 cubic meter (m ³) of saltwater (S.G.= 1.025)	=	1.025 tons (MT)
1 ton (MT) of saltwater (S.G.= 1.025)	=	0.975 cubic meters (m ³)

(6) Force

	Kilogram (kg)	Metric ton (t)	Newton (N)	Kilonewton (kN)
1 Kilogram (Kg)	1	0.001	9.80665	0.00980665
1 Metric ton (t)	1000.0	1	9806.65	9.80665
1 Newton (N)	0.1019716	0.00109716	1	0.001
1 Kilonewton (kN)	101.9716	0.1019716	1000.0	1

(7) Power

	Kilowatt (kW)	kg*m/second (kg*m/s)	Pferdestärke (PS)	Horsepower (hp)
1 Kilowatt (kW)	1	101.9716	1.3596	1.3410
1 kg*m/second (kg*m/s)	0.0098	1	0.0133	0.0132
1 Pferdestärke (PS)	0.7355	75.0	1	0.9863
1 Horsepower (hp)	0.7457	76.0402	1.0139	1

(8) Speed

	meter/second (m/s)	kilometer/hour (km/h)	nmile/hour (knot)	feet/second (ft/s)
1 Meter/second (m/s)	1	3.6	1.943	3.281
1 Kilometer/hour (km/h)	0.2778	1	0.5396	0.9113
1 nmile/hour (knot)	0.5144	1.852	1	1.689
1 feet/second (ft/s)	0.3048	1.097	0.5921	1

(9) Metric Equivalents

Multiply by	to convert from	to obtain	--
2.4998	Metric ton per centimeters (of Immersion)	Tons per inch (of Immersion)	0.400
8.2014	Moment to change trim one centimetres (Tonnes meter unit)	Moment to change trim one inch (Foot ton units)	0.122
187.9767	Meter Radians (m-rad)	Feet degrees (ft-deg)	0.0053
--	to obtain	to convert from	Multiply by above

(10) Stowage factor conversion table.

ft³/Lt	m³/t	t/m³	ft³/Lt	m³/t	t/m³	ft³/Lt	m³/t	t/m³
11	0.3066	3.2619	31	0.8639	1.1575	51	1.4213	0.7036
12	0.3344	2.9901	32	0.8918	1.1213	52	1.4492	0.6900
13	0.3623	2.7601	33	0.9197	1.0873	53	1.4471	0.6770
14	0.3902	2.5630	34	0.9476	1.0553	54	1.5049	0.6645
15	0.4180	2.3921	35	0.9754	1.0252	55	1.5328	0.6524
16	0.4459	2.2426	36	1.0033	0.9967	56	1.5607	0.6407
17	0.4738	2.1107	37	1.0312	0.9698	57	1.5886	0.6295
18	0.5016	1.9934	38	1.0590	0.9443	58	1.6164	0.6187
19	0.5295	1.8885	39	1.0869	0.9200	59	1.6443	0.6082
20	0.5574	1.7941	40	1.1148	0.8970	60	1.6722	0.5980
21	0.5853	1.7087	41	1.1426	0.8752	61	1.7000	0.5882
22	0.6131	1.6310	42	1.1705	0.8543	62	1.7279	0.5787
23	0.6410	1.5601	43	1.1984	0.8345	63	1.7558	0.5696
24	0.6689	1.4951	44	1.2262	0.8155	64	1.7836	0.5607
25	0.6967	1.4353	45	1.2541	0.7974	65	1.8115	0.5520
26	0.7246	1.3801	46	1.2820	0.7800	66	1.8394	0.5437
27	0.7525	1.3290	47	1.3099	0.7634	67	1.8672	0.5355
28	0.7803	1.2815	48	1.3377	0.7475			
29	0.8082	1.2373	49	1.3656	0.7323			
30	0.8361	1.1961	50	1.3935	0.7176			