

CCGS Samuel Risley

69.73m Navigational Aids Vessel

Trim and Stability Book

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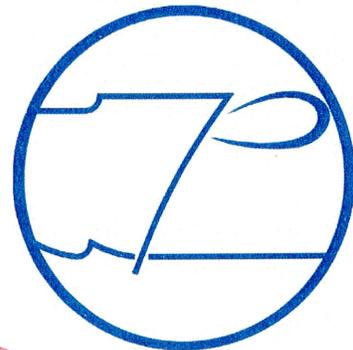


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SUBJECT TO THE ACCURACY OF THE BASIC DATA BEING THE RESPONSIBILITY OF THE OWNER, HIS NAVAL ARCHITECT OR THE SHIP-BUILDER.

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NOMENCLATURE

Units used in this book:

<u>Abbreviation</u>	<u>Description</u>	<u>Units</u>
	Weight and displacement	metric tons
KG or VCG	Vertical centre of gravity	meters
LCG	Longitudinal centre of gravity	meters
TCG	Transversal centre of gravity	meters
LCB	Longitudinal centre of buoyancy	meters
VCB	Vertical center of buoyancy	meters
LCF	Longitudinal centre of flotation	meters
	Draft measured above underside of keel plate	meters
KM(t)	Transverse metacentric height above baseline	meters
KM(l)	Longitudinal metacentric height above baseline	meters
GMs	Metacentric height above KG without FSC	meters
GMf	Metacentric height above KG with FSC	meters
GZ	Righting Arm	meters
TPcm	Tonnes per centimeter immersion	MT/cm
MCT	Moment to change trim 1cm	MT-m/cm
FSC	Free surface correction	meters
	Area under GZ curve	m-radian
	Heel Angle	degrees
SG	Specific gravity	MT/m ³
USK	Underside of keel	
	Longitudinal reference	amidships (375mm Fwd of Fr.44); Aft is "-" or "a" Forward is "+" or "f"
	Transverse reference	centerline; Starboard is "+" or "s" Port is "-" or "p"
	Vertical reference	baseline amidships; negative below baseline; Above baseline is "+" Below baseline is "-"

DEFINITIONS

Draft Fwd Marks = the draft measured in meters from the underside of keel at 2.00m aft of the forward perpendicular (27.46m fwd of amidships) and projected to the stem profile.

Draft Aft Marks = the draft measured in meters from the underside of keel at the aft perpendicular (29.46m aft of amidships).

Draft FP, AP, MS, LCF = The draft measured in meters at the forward perpendicular, aft perpendicular, at amidships, and at the longitudinal center of floatation from the baseline to the vessel's waterplane at the given heel and trim.

Trim = The difference between vertical measurements of forward and aft drafts, taking into account the rake of keel, measured in meters over length between perpendiculars.

Righting Arm in Heel = Vessels righting arm measured in meters at each heel angle for a given displacement.

Area = The area under the righting arm curve to a given angle measured in meter-radians.

Deck Immersion = The point at which the deck edge at side meets the vessels waterplane at the given heel angle and trim. Negative values indicate the deck edge is below the waterplane.

Loadline height = the distance from the waterline to the summer loadline mark (maximum draft) of the vessel measured in meters.

Stability Criterion Min./Max. = The minimum or maximum required criterion as stipulated by Transport Canada, Marine Safety; for Non-Passenger Ships and Passenger Ships Carrying Not More Than 12 Passengers (STAB 6).

Stability Criterion Margin = The amount by which the stipulated criterion are exceeded.

NOTES REGARDING STABILITY AND SAFE OPERATION OF THE VESSEL

[SECTION 1.0]

SECTION 1.1 STATEMENT OF THE MASTER'S RESPONSIBILITY REGARDING STABILITY

The vessel meets all stability requirements set out in Transport Canada TP7301E, Stability, Loadline, and Subdivision Standards, Part 1, Stab 6. Further, the vessel meets all additional requirements for topside icing set out in Stab 7 of the same standard.

Notwithstanding the above, compliance with the stability criteria does not ensure immunity against capsizing regardless of the circumstances, or absolve the vessel Master from his responsibility. The Master should therefore exercise prudence and good seamanship having regard to the season of the year, weather forecasts and the navigational zone and should take the appropriate action as to speed and course warranted by the prevailing circumstances.

The operating conditions shown in the trim and stability book are intended to demonstrate an envelope of conditions which reflect how the vessel is operated. Should the Master wish to deviate from the envelope of conditions presented, manual calculation of the contemplated condition should be carried out in accordance with **Section 10** to ensure compliance with the minimum stability criteria set forth by Transport Canada.

In all conditions of loading, whether presented in this stability book or not, the Master is to ensure that adequate stability, at least in compliance with the minimum criteria, is maintained throughout any contemplated voyage.

Altering the vessel, which may in turn change the stability characteristics of the vessel, is prohibited by Transport Canada, Marine Safety Branch. Should alteration of the vessel be contemplated, the Owner is reminded to please notify the local TCMS office prior to effecting any changes. This book is accurate for the vessel as inclined on 21 October 2016.

SECTION 1.2 SUMMARY OF VESSEL LOADING

In the Port Departure condition the ship is fully stored and fuelled. In the Arrival condition, consumables and fuel tanks are at 10%. All transit conditions show decreasing percentages of stores and consumables as appropriate. Ballast tanks are used to maintain a desirable heel and trim as determined by the Master.

Table 1.1: Loading Conditions Summary

Loading Condition	Lightship		Continuous Icebreaking Port Departure, Max Consumables		Continuous Icebreaking Mid-Voyage, 50% Consumables		Continuous Icebreaking Port Arrival, 10% Consumables	
	Loading (%)	Weight (tonne)	Loading (%)	Weight (tonne)	Loading (%)	Weight (tonne)	Loading (%)	Weight (tonne)
Lightship	100	2172.25	100	2172.25	100	2172.25	100	2172.25
Stores and Provisions	0	0	100	10.00	50	5.00	10	1.00
Crew and Effects	0	0	100	5.00	100	5.00	100	5.00
Deck Equipment	0	0	100	5.00	100	5.00	100	5.00
Engine Room Stores	0	0	100	2.00	100	2.00	100	2.00
Buoy Tender Barge	0	0	100	8.75	100	8.75	100	8.75
Zodiac Work Boat	0	0	100	0.92	100	0.92	100	0.92
Trimming Weight	0	0	100	8.17	100	8.17	100	8.17
Fuel Oil	0	0	68	471.09	50	345.35	10	69.07
Fresh Water	0	0	100	67.22	50	33.61	0	6.72
Ballast Water	0	0	0	0	9.27	51.80	50.62	282.79
Misc. Lube/Dirty Oil	0	0	80	8.00	60	6.00	40	4.00
Displacement	N/A	2172.25	N/A	2758.40	N/A	2643.84	N/A	2565.67

Loading Condition	Open Water No Deck Cargo Port Departure, Max Consumables		Open Water, No Deck Cargo Mid-Voyage, 50% Consumables		Open Water No Deck Cargo Port Arrival, 10% Consumables		Open Water With Deck Cargo Port Departure, Max Consumables	
	Loading (%)	Weight (tonne)	Loading (%)	Weight (tonne)	Loading (%)	Weight (tonne)	Loading (%)	Weight (tonne)
Lightship	100	2172.25	100	2172.25	100	2172.25	100	2172.25
Stores and Provisions	100	10.00	50	5.00	10	1.00	100	10.00
Crew and Effects	100	5.00	100	5.00	100	5.00	100	5.00
Deck Equipment	100	5.00	100	5.00	100	5.00	100	5.00
Engine Room Stores	100	2.00	100	2.00	100	2.00	100	2.00
Buoy Tender Barge	100	8.75	100	8.75	100	8.75	100	8.75
Zodiac Work Boat	100	0.92	100	0.92	100	0.92	100	0.92
Trimming Weight	100	8.17	100	8.17	100	8.17	100	8.17
Fuel Oil	98.68	681.55	50	345.35	10	69.07	98.68	681.55
Fresh Water	100	67.22	50	33.61	10	6.72	100	67.22
Ballast Water	28.34	158.35	9.27	51.80	50.62	282.79	4.50	25.12
Misc. Lube/Dirty Oil	80	8.00	60	6.00	40	4.00	80	8.00
Deck Load	-	-	-	-	-	-	100	350.00
Displacement	N/A	3127.21	N/A	2643.85	N/A	2565.67	N/A	3343.98

Loading Condition	Open Water With Deck Cargo Mid-Voyage, 50% Consumables		Open Water, With Deck Cargo Port Arrival, 10% Consumables		Buoy Handling Mid-Voyage, 50% Consumables		Buoy Handling Port Arrival, 10% Consumables	
	Loading (%)	Weight (tonne)	Loading (%)	Weight (tonne)	Loading (%)	Weight (tonne)	Loading (%)	Weight (tonne)
Lightship	100	2172.25	100	2172.25	100	2172.25	100	2172.25
Stores and Provisions	50	5.00	10	1.00	50	5.00	10	1.00
Crew and Effects	100	5.00	100	5.00	100	5.00	100	5.00
Deck Equipment	100	5.00	100	5.00	100	5.00	100	5.00
Engine Room Stores	100	2.00	100	2.00	100	2.00	100	2.00
Buoy Tender Barge	100	8.75	100	8.75	100	8.75	100	8.75
Zodiac Work Boat	100	0.92	100	0.92	100	0.92	100	0.92
Trimming Weight	100	8.17	100	8.17	100	8.17	100	8.17
Fuel Oil	50.01	345.37	10	69.07	50	345.35	10	69.07
Fresh Water	50.00	33.61	10	6.72	50	33.61	10	6.72
Ballast Water	6.44	36.00	12.89	72.01	11.59	64.74	37.74	210.80
Misc. Lube/Dirty Oil	60	6.00	40	4.00	60	6.00	40	4.00
Deck Load	100	350.00	100	350	-	-	-	-
Buoy on Deck	-	-	-	-	100	15.00	100	15.00
Buoy on Crane	-	-	-	-	100	15.00	100	15.00
Container	-	-	-	-	100	2.00	100	2.00
Displacement	N/A	2978.07	N/A	2704.89	N/A	2688.79	N/A	2525.66

Loading Condition	Salt Water Transit Port Departure, Max Consumables		Salt Water Transit Mid voyage, 50% Consumables		Salt Water Transit Port Arrival, 10% Consumables		Continuous Icebreaking with Topside Ice Port Arrival, 10% Consumables	
	Loading (%)	Weight (tonne)	Loading (%)	Weight (tonne)	Loading (%)	Weight (tonne)	Loading (%)	Weight (tonne)
Lightship	100	2172.25	100	2172.25	100	2172.25	100	2172.25
Stores and Provisions	100	10.00	50	5.00	10	1.00	10	1.00
Crew and Effects	100	5.00	100	5.00	100	5.00	100	5.00
Deck Equipment	100	5.00	100	5.00	100	5.00	100	5.00
Engine Room Stores	100	2.00	100	2.00	100	2.00	100	2.00
Buoy Tender Barge	100	8.75	100	8.75	100	8.75	100	8.75
Zodiac Work Boat	100	0.92	100	0.92	100	0.92	100	0.92
Trimming Weight	100	8.17	100	8.17	100	8.17	100	8.17
Fuel Oil	98.68	681.55	50.00	345.35	10	69.07	10.00	69.07
Fresh Water	100	67.22	50.00	33.61	10	6.72	50.62	0.00
Ballast Water	26.16	146.16	8.11	45.32	50.62	282.79	40	282.79
Misc. Lube/Dirty Oil	80	8.00	60	6.00	40	4.00	40	4.00
Topside Ice	-	-	-	-	-	-	100	80.39
Displacement	N/A	3115.02	N/A	2637.37	N/A	2565.67	N/A	2639.64

Loading Condition	Open Water With Deck Cargo and Topside Ice Port Departure, Max Consumables		Ramming Mode with Topside Ice Port Arrival, 10% Consumables	
	Loading (%)	Weight (tonne)	Loading (%)	Weight (tonne)
Lightship	100	2172.25	100	2172.25
Stores and Provisions	100	10.00	10	1.00
Crew and Effects	100	5.00	100	5.00
Deck Equipment	100	5.00	100	5.00
Engine Room Stores	100	2.00	100	2.00
Buoy Tender Barge	100	8.75	100	8.75
Zodiac Work Boat	100	0.92	100	0.92
Trimming Weight	100	8.17	100	8.17
Fuel Oil	98.68	681.55	10.00	69.07
Fresh Water	100	67.22	0.00	0.00
Ballast Water	4.16	23.24	50.62	282.79
Misc. Lube/Dirty Oil	80	8.00	40	4.00
Topside Ice	100	80.39	100	80.39
Upward Ice Force	-	-	100	-308.00
Displacement	N/A	3322.49	N/A	2055.27

Stability conditions show the vessel operating with a trim ranging from 0.48m aft to 0.335m fwd (with the exception of the ice ramming condition); typical operation having a trim of 0.10m aft. Trim outside of that range is permissible at the discretion of the Master. Draft, heel, and trim can be optimized through use of the water ballast tanks and / or by internal transfer of fuel.

This vessel is fitted with ten fuel tanks, two fresh water tanks, and eleven water ballast tanks. Other system tanks included as point loads in the stability conditions include lube oil, gear oil, sludge.

The tank usage plan specifies tank levels for fuel and fresh water loads. These levels have been presented for three loading conditions: departure (max fuel), mid-voyage transit (50% fuel) and the arrival (10% fuel) condition. The tank usage plan is outline in Table 1.2.

Table 1.2: Consumables Tank Usage Plan

Tank Name	Condition		
	Departure**	Mid-Voyage**	Arrival
Fuel Oil No. 1 Center	100.00%	0.00%	0.00%
Fuel Oil No. 2 Port	98.00%	0.00%	0.00%
Fuel Oil No. 2 Starboard	98.00%	0.00%	0.00%
Fuel Oil No. 3 Center	100.00%	100.00%	0.00%
Fuel Oil No. 3 Port	100.00%	66.31%	0.00%
Fuel Oil No. 3 Starboard	100.00%	71.44%	0.00%
Fuel Oil No. 4 Port	100.00%	100.00%	8.65%
Fuel Oil No. 4 Starboard	100.00%	100.00%	8.65%
Fuel Oil Day Tank	90.00%	90.00%	90.00%
Fuel Oil Settling Tank	90.00%	90.00%	90.00%
Fresh Water Tank Port	100.00%	50.00%	10.00%
Sanitary Tank Starboard	100.00%	50.00%	10.00%

**Fuel tank loading in the departure and mid-voyage conditions will vary depending on vessel use and required / desired vessel draft and trim.

SECTION 1.3 EFFECT OF FREE SURFACE

When a tank is completely filled, no movement of the liquid is possible, thus there is no adverse effect on the vessel's stability. Partially filled or "slack" tanks cause a free surface effect as the liquid moves freely toward the ship's direction of heel, resulting in a reduction in both static and dynamic stability. This effect on stability is referred to as a "loss in GM" or as a virtual rise in KG".

The free surface moment is stated in the right hand column of the tank capacity / sounding table for each tank.

In all conditions of loading maximum free surface is applied to ballast and fresh water tanks in use, regardless of actual fill percentage. Free surface on fuel tanks is based on actual loading.

SECTION 1.4 STOWAGE OF EQUIPMENT

This vessel is outfitted with one Zodiac H753 OB RHIB, one Zodiac 590 OB work boat, and one work barge fitted on starboard side. The vessel is equipped with a 340.0m² open working deck fitted with multiple lashing points for the carriage and securing of cargo.

Before a voyage commences, care should be taken to ensure that the cargo and sizeable pieces of equipment have been properly stowed and secured, so as to minimize the possibility of both longitudinal and lateral shifting while at sea due to rolling and pitching accelerations. The arrangement of any cargo or equipment stowed on deck should be such to avoid any obstruction of the freeing ports.

SECTION 1.5 WATERTIGHT DOORS AND HATCHES

Hatches, doors, etc. which give access to the main deck should be kept closed during navigation, except when necessarily opened for the working of the vessel, and should always be ready for immediate closure and be clearly marked to indicate that these fittings are to be kept closed except for access. It should be ensured that gear on the weather deck does not impede the operation of these fittings.

Sliding watertight doors are fitted below the shelter deck in bulkheads at frames 5 and 15. These can be closed using manual hydraulic controls in the winch room or at their location as necessary.

All hatches in the main deck including the cargo hatch are to be kept closed and properly secured while at sea.

Watertight bulkheads exist at frames, 1, 5, 10, 16, 32, 39, 44, and 46, and provide watertight subdivision of vessel up to main deck.

SECTION 1.6 SAFETY EQUIPMENT

This vessel is fitted with search and rescue and safety equipment as deemed necessary to fulfill its mandate. This includes one fast rescue craft and equipment, water retrieval equipment, and first aid / ongoing care equipment.

SECTION 1.7 TOPSIDE ICINGCalculation of Ice Accretion:

Ice accretion for the vessel has been calculated in accordance with TP 7301E, Stability, Subdivision, and Load Line Standards, Part 1, STAB 7 paragraph 5 (iii)(b). Table 1.3 below provides details of icing coverage and thickness.

Table 1.3: Icing Coverage and Thickness Calculation

Item	Area (m ²)	Accumulation Factor (kg/m ²)	Total Weight (kg)	Ice Thickness* (cm)	VCG (m)	VMMT (kg-m)	LCG (m)	LMMT (kg-m)
Deck Areas								
Wheelhouse Top	102.06	54	5511.24	5.9	17.80	98100.07	11.49	63324.15
Bridge Deck	55.49	54	2996.46	5.9	14.98	44886.97	18.40	55134.86
Forecastle Deck	201.14	54	10861.56	5.9	12.23	132836.88	23.93	259917.13
Boat Deck	124.47	54	6721.38	5.9	9.48	63718.68	2.32	15593.60
Main Deck	345.75	54	18670.50	5.9	6.73	125652.47	-18.51	-345590.96
Superstructure Sides / Front								
Superstructure Sides incl. Casing	283.02	37	10471.74	4.0	15.57	163044.99	7.74	81051.27
Superstructure Front	53.52	37	1980.24	4.0	12.20	24158.93	19.98	39565.20
Guard Rails / Stanchions / Deck Equipment								
WHT Rails / Skirt	19.95	78	1556.10	8.5	19.56	30437.32	12.12	18852.15
Bridge Deck Rails	14.94	78	1165.32	8.5	15.63	18208.13	15.24	17759.48
Forecastle Deck Rails/Bulwarks	42.06	78	3280.68	8.5	15.22	49931.95	16.82	55181.04
Casing rails	8.36	78	652.08	8.5	22.76	14841.34	6.49	4232.00
Main Deck Bulwarks	68.94	78	5377.32	8.5	6.99	37565.96	-21.01	-112977.49
Anchor winches	8.40	78	655.20	8.5	12.20	7993.44	26.30	17231.76
Crane	43.60	78	3400.80	8.5	11.71	39823.37	-21.01	-71450.81
Wave break	15.72	78	1226.16	8.5	6.99	8570.86	-33.10	-40585.90
Mooring Bits & Equipment Fwd	4.80	78	374.40	8.5	12.27	4593.89	29.46	11029.82
Rescue boats / Davits	16.35	78	1275.30	8.5	10.77	13734.98	1.49	1900.20
Life Boats / Davits	9.78	78	762.84	8.5	11.69	8917.60	-4.14	-3154.34
Work Barge	28.02	78	2185.56	8.5	10.77	23538.48	0.24	524.53
Mooring Bits & Equipment Aft	16.20	78	1263.60	8.5	6.90	8718.84	-30.46	-38489.26
	Running Length (m)	Accumulation Factor (kg/m)						
Rigging / masts / derricks								
Masts (max 6.1m above main deck)		48	0.00	NA		0.00		0.00
			80388.48		11.44	919275.13	0.36	29048.44
TOTAL WEIGHT (kg)	80388.48							
TOTAL WEIGHT (MT)	80.39							
VCG (m)	11.44							
LCG (m)	0.36							
LCG measured from amidships (positive is forward)								
VCG measured from baseline (positive is above)								
*Ice specific gravity	0.917							

The resulting ice load is approximately 80.39 Metric tons. Loading conditions including ice accretion are theoretical and only intended to show compliance with the stability criteria. Actual ice accumulation will vary.

*Table 1.4: Icing Conditions and Rates*Prediction of Ship Icing:

Icing Condition	None	Light	Moderate	Heavy	Extreme
Icing Rates (cm/hour)	0	<0.7	0.7-2.0	2.0-4.0	>4.0
Icing Rates (inches/hour)	0	<0.3	0.3-0.8	0.8-1.6	>1.6

Actual icing rates depend on various parameters. Values provided in Table 1.4 should be used as a guide for crew to monitor ice accumulation and mitigate dangerous situation associated. Table 1.5 below provides time to reach ice thickness for areas considered on the ship. Icing rates considered in calculation are 0.7, 2 and 4 cm/h.

Table 1.5: Time to Reach Ice Thicknesses on Various Areas

	Total Weight (kg)	Ice Thickness* (cm)	Ice Accretion time (h) for the following icing rates (cm/h)		
			0.7	2.0	4.0
Deck Areas					
Wheelhouse Top	5511.24	5.9	8.4	2.9	1.5
Bridge Deck	2996.46	5.9	8.4	2.9	1.5
Forecastle Deck	10861.56	5.9	8.4	2.9	1.5
Boat Deck	6721.38	5.9	8.4	2.9	1.5
Main Deck	18670.50	5.9	8.4	2.9	1.5
Superstructure Sides / Front					
Superstructure Sides incl. Casing	10471.74	4.0	5.8	2.0	1.0
Superstructure Front	1980.24	4.0	5.8	2.0	1.0
Guard Rails / Stanchions / Deck Equipment					
WHT Rails / Skirt	1556.10	8.5	12.2	4.3	2.1
Bridge Deck Rails	1165.32	8.5	12.2	4.3	2.1
Forecastle Deck Rails/Bulwarks	3280.68	8.5	12.2	4.3	2.1
Casing rails	652.08	8.5	12.2	4.3	2.1
Main Deck Bulwarks	5377.32	8.5	12.2	4.3	2.1
Anchor winches	655.20	8.7	12.4	4.4	2.2
Crane	3400.80	8.5	12.2	4.3	2.1
Wave break	1226.16	8.5	12.2	4.3	2.1
Mooring Bits & Equipment Fwd	374.40	8.5	12.2	4.3	2.1
Rescue boats / Davits	1275.30	8.5	12.2	4.3	2.1
Life Boats / Davits	762.84	8.5	12.2	4.3	2.1
Work Barge	2185.56	8.5	12.2	4.3	2.1
Mooring Bits & Equipment Aft	1263.60	8.7	12.4	4.4	2.2
*Ice specific gravity 0.917					

Avoidance and mitigation of ship icing:

Vessel icing is associated with the following weather conditions: cold air advection and cold sea temperatures. Monitor weather and these two factors. Crew should especially be aware of polar low pressure cyclones as they can create severe icing due to their high winds and formation of cold air.

The icing season is from November 30 to April 01 however freezing spray can occur outside of this time period. When the danger of ship damage and instability arises due to ice formation immediate steps should be taken to remove the ice from large surfaces of the vessel, beginning with the upper structures. Crew should be organized and all the means for combating ice formation should be ready for use.

Freeing ports should be kept clear of debris and ice accretion at all times.

Recommended tools for physical removal are: baseball bats, wooden mallets, steel-bladed ice scrapers, straight bottom shovels, spades, picks, brooms, snow shovels. Wooden tools are good as they are efficient and make no damage to the ship.

The following chemicals may also be used for ice removal: rock salt, calcium chloride, urea, ethylene glycol, methanol and other de-icing agents including alcohols. Check local regulations prior to using any chemical which may be discharged overboard. The following devices can also be used for ice removal: hot air guns and steam lances.

SECTION 1.8 LIFTING OF HEAVY WEIGHTS

As this vessel is engaged in buoy handling operations, an assessment of weights suspended over the side has been completed for this vessel and can be found in conditions 11 and 12.

SECTION 1.9 ICEBREAKING REQUIREMENTS

The operating draft during Icebreaking operations should be no more than 5.2m.

In order to simulate the vessel riding up on an ice ridge, a negative weight of 308MT has been applied to the bow of the vessel. See condition 18.

SECTION 1.10 VOLUMES INCLUDED IN CROSS CURVES

Volumes used in the calculation of cross curves include all portions of the hull below the Forecastle Deck. Thruster tunnels as well as sea bays / sea chests fitted in the bow thruster compartment, engine room forward, and engine room aft have been deducted from the volume of the hull.

All external openings fitted in the hull structure are to be fitted with gasketed, weathertight closures and securing devices. Closures not required for normal operation of the vessel are to be shut while at sea. Other closures are to be secured shut as deemed necessary by the Master. Freeing ports should be maintained open and unobstructed.

SECTION 1.11 TANK SOUNDING TABLES

Accurate volumes for each tank can be measured through manual soundings and calculations using the onboard tank sounding tables. Tables with trim closest to actual trim of the vessel should be used. Sounding tubes should be maintained in good working order, free of rust and debris. The crew should be familiar with the location of each sounding tube and use of the sounding gauge.

Should any tank, its contents, or the sounding tube be modified, the sounding tables will need to be updated accordingly.

Tank capacity tables included in section 9 of this manual can be used to estimate weight, centers, and free surface of tank contents based on fill percentage.

VESSEL INFORMATION
[SECTION 2.0]

SECTION 2.1 VESSEL PARTICULARS

Ship's Name	CCGS Samuel Risley
Type	Type 1050 Navigational Aid Vessel
Classification	Lloyds 100A1 Ice Class 1A Super*
Length Overall	69.73m
Length Between Perpendiculars	63.00m
Breadth Overall	13.70m
Depth (USK to upper deck)	9.45m
Depth (USK to main deck)	6.70m
Camber of Decks	0.00m
Rise of Floor at Amidships	0.00m
Location of Amidships	Fr. 26.8
Forward Draft Marks Location	32.13m fwd Amidships
Aft Draft Marks Location	24.75m aft Amidships
Summer Loadline Draft (USK)	5.817m
Port Departure – Ice Breaking Condition Draft	5.200m
Port Departure Condition Trim	0.028f
Lightship Weight	2172.25t
Keel Plate Thickness	19.00 mm Fwd 28.00mm Aft
Lowest Point below Reference Baseline	0.00 m
Loaded Displacement	3343.98t
Gross Tonnage	1967.13t
Net Tonnage	649.48t
Official Number	805575
Port of Registry	Ottawa, ON
Year Built	1984

NOTE: Hydrostatic Baseline is at the underside of keel amidships. Draft marks are measure 2.00m aft of the FP and at the AP. Draft marks are also located at the transom on center however are not tracked in the included conditions. Drafts are measured vertically from the underside of keel.

SECTION 2.2 FRAME SPACING*Table 2.1: Frame Locations*

Frame	Location								
A	-33.26	10	-21.01	21	-7.26	32	6.49	43	21.56
0	-32.26	11	-19.76	22	-6.01	33	7.74	44	23.14
1	-31.46	12	-18.51	23	-4.76	34	8.99	45	24.72
2	-30.46	13	-17.26	24	-3.51	35	10.24	46	26.30
3	-29.46	14	-16.01	25	-2.26	36	11.49	47	27.88
4	-28.66	15	-14.76	26	-1.01	37	12.74	48	29.46
5	-27.26	16	-13.51	27	0.24	38	13.99	49	31.04
6	-26.01	17	-12.26	28	1.49	39	15.24	50	32.62
7	-24.76	18	-11.01	29	2.74	40	16.82	51	34.20
8	-23.51	19	-9.76	30	3.99	41	18.40	52	35.78
9	-22.26	20	-8.51	31	5.24	42	19.98		

SECTION 2.3 DRAWINGS

The following drawings are included:

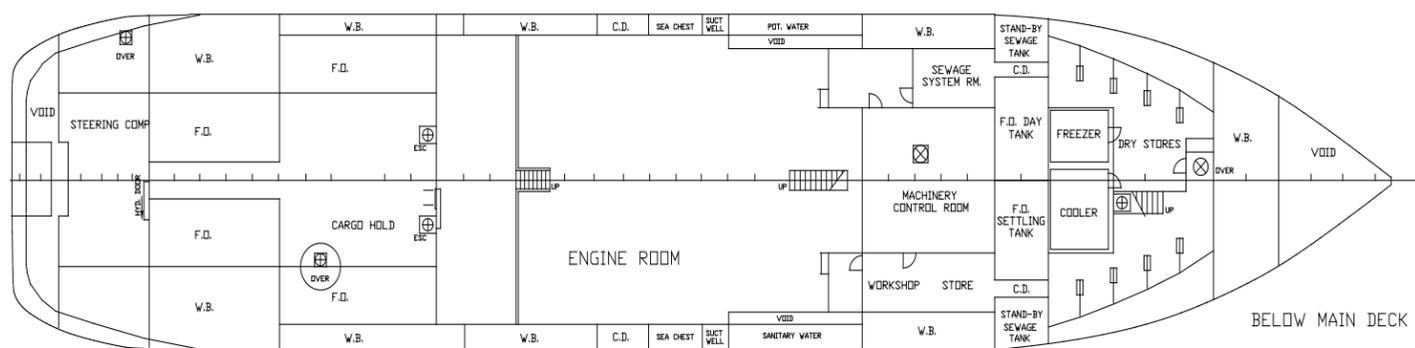
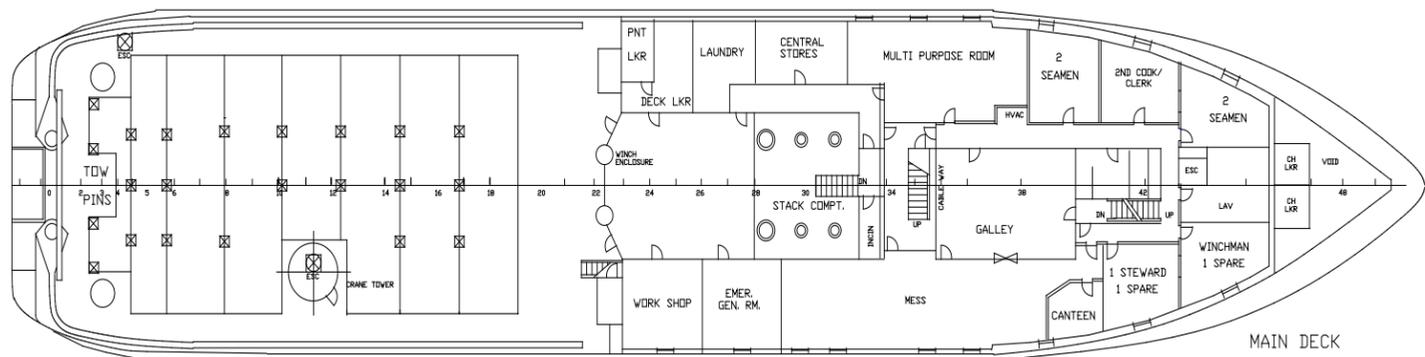
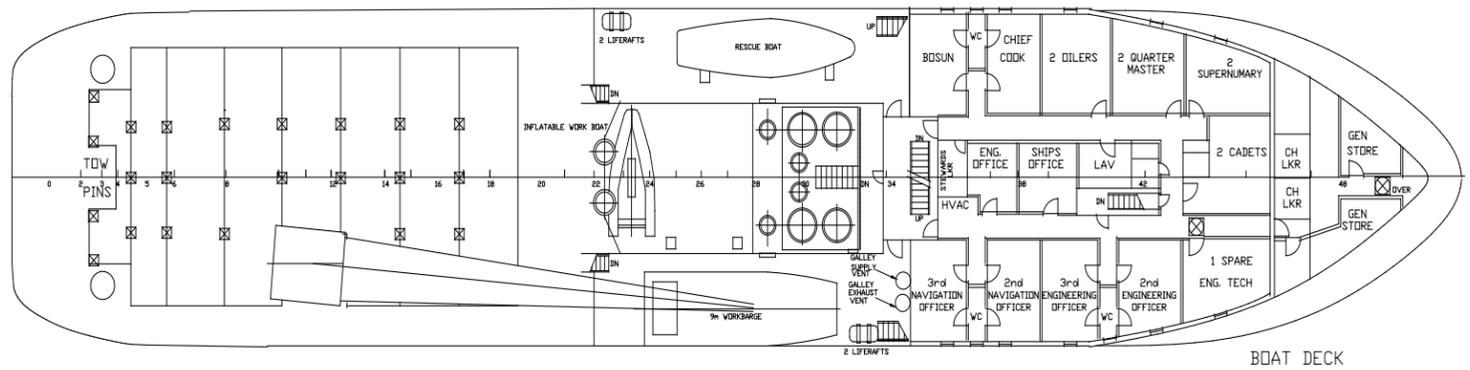
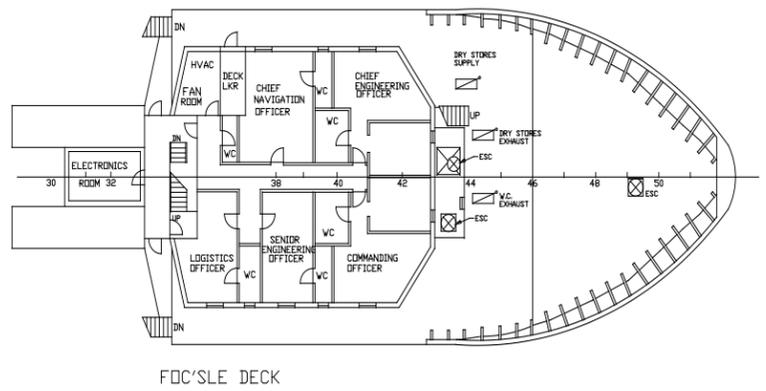
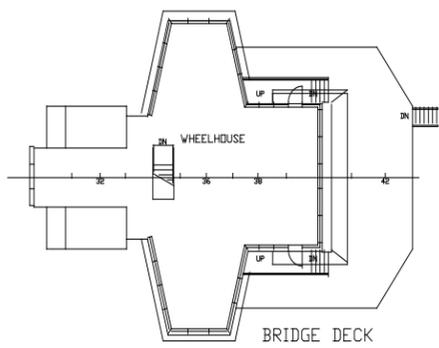
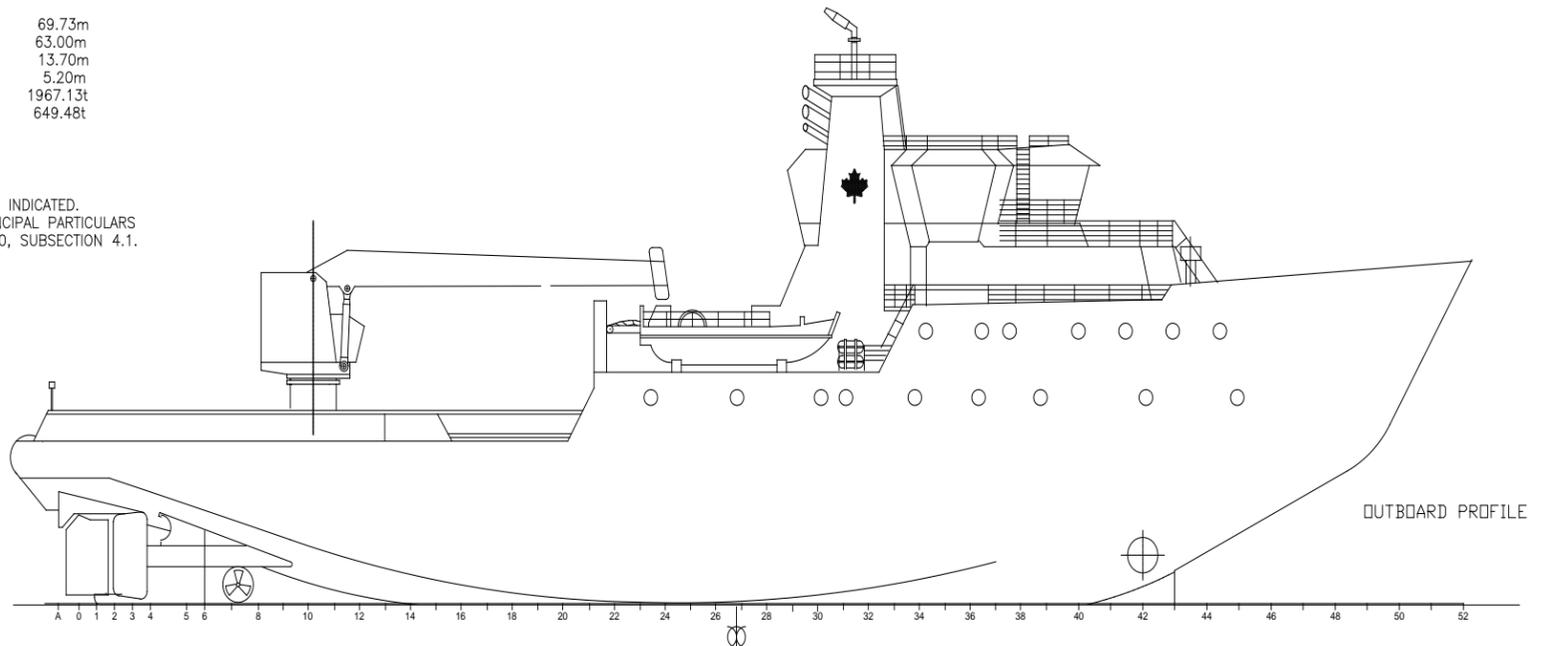
1. General Arrangement
2. Location of Draft Marks
3. Location of Key Bulkheads
4. Tank Capacity Plan

PRINCIPAL PARTICULARS

LENGTH OVERALL: 69.73m
 LENGTH BP: 63.00m
 BREADTH OVERALL: 13.70m
 DRAFT: 5.20m
 GROSS TONNAGE: 1967.13t
 NET TONNAGE: 649.48t

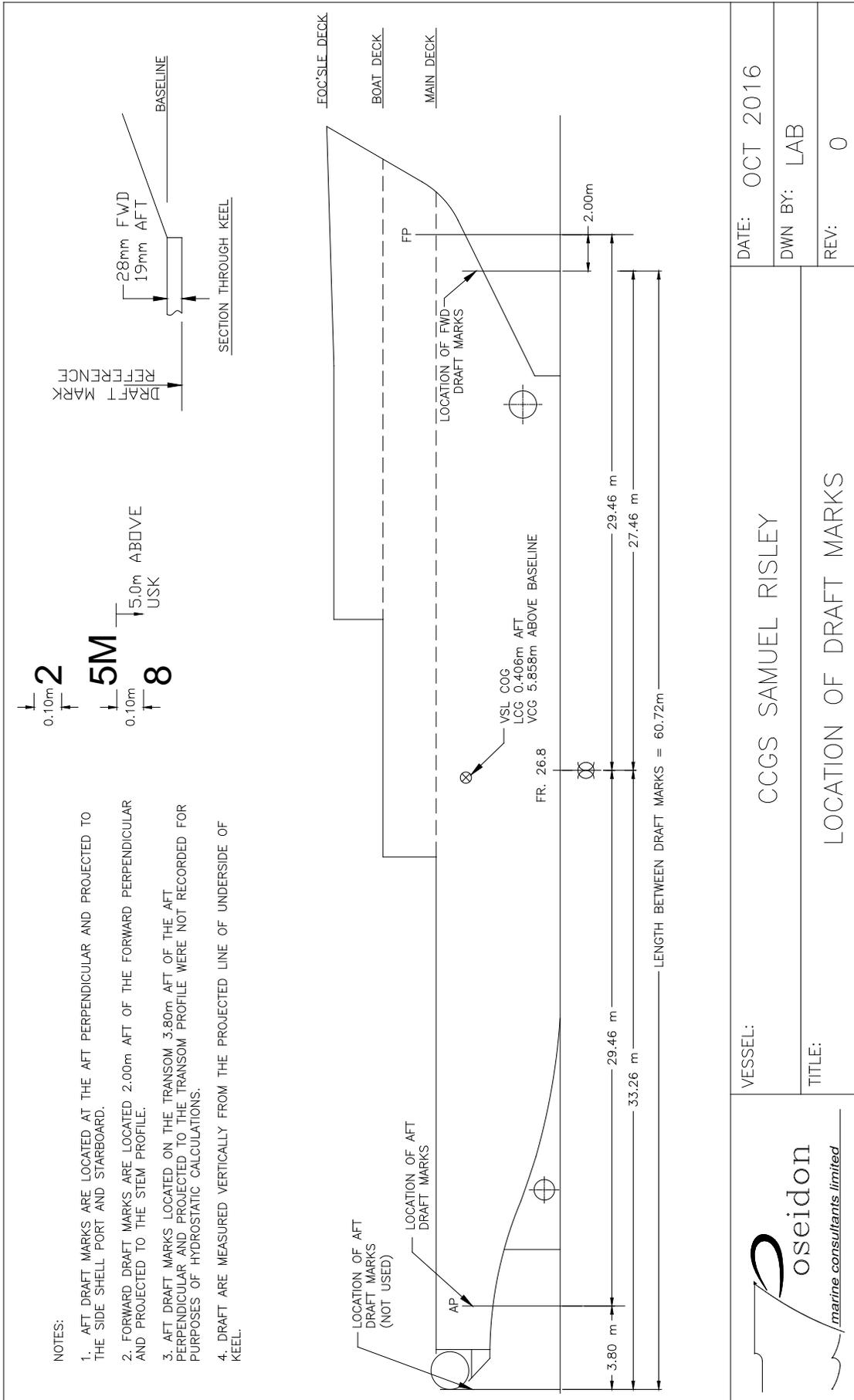
NOTES:

1. FRAME SPACING AS INDICATED.
2. FOR DETAILED PRINCIPAL PARTICULARS REFER TO SECTION 1.0, SUBSECTION 4.1.

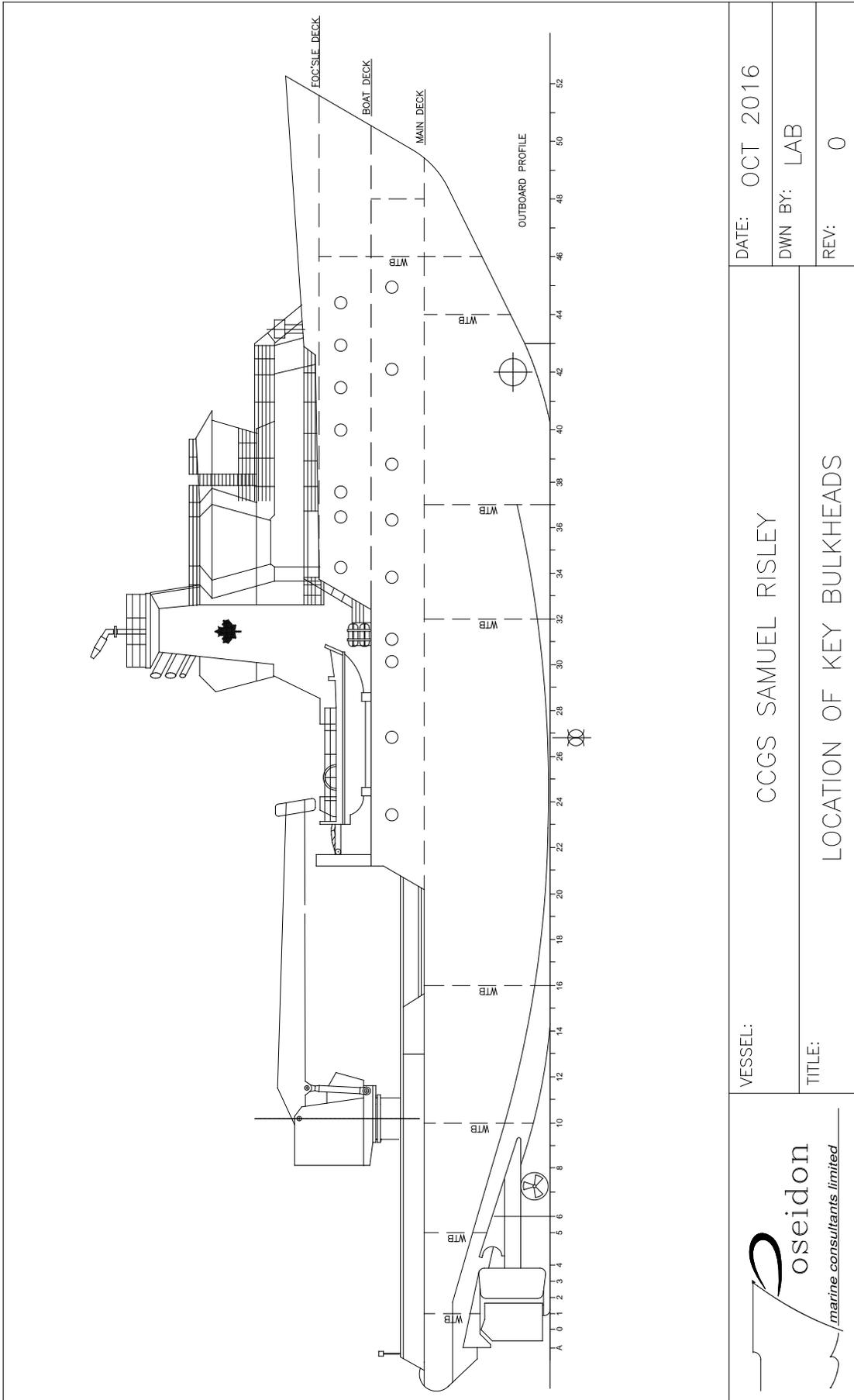


VESSEL:	CCGS SAMUEL RISLEY
TITLE:	GENERAL ARRANGEMENT

DATE:	OCT 2016
DWN BY:	LAB
REV:	0

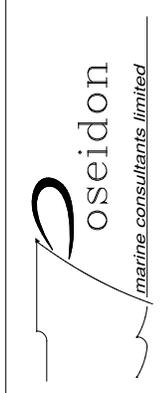


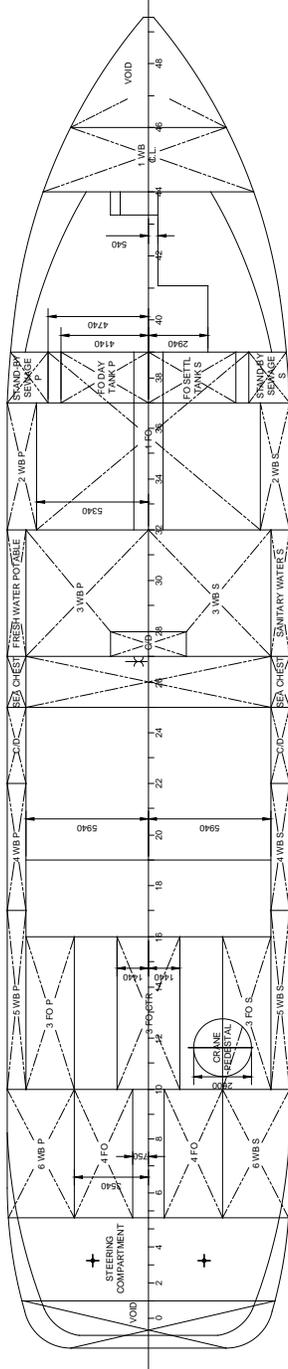
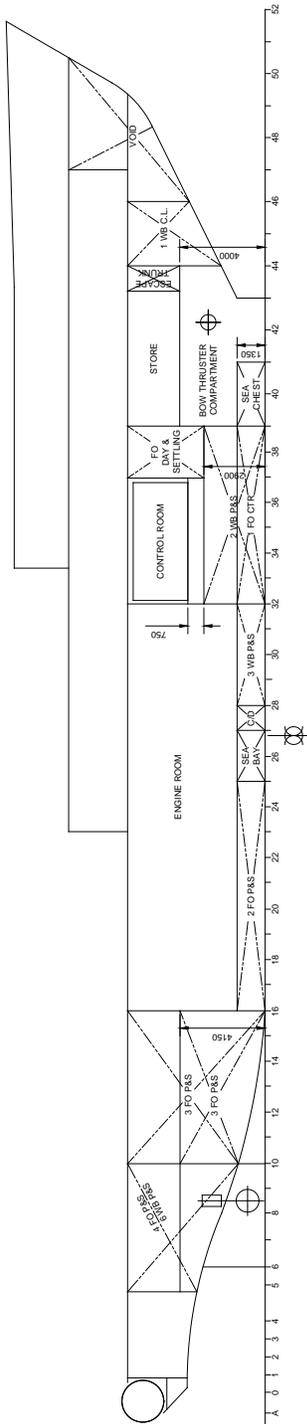
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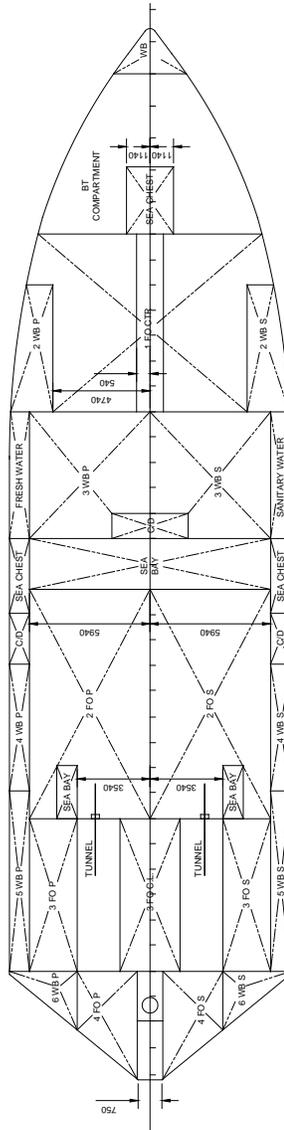
DATE:	OCT 2016
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REV:	0

VESEL:	CCGS SAMUEL RISLEY
TITLE:	LOCATION OF KEY BULKHEADS





BELOW MAIN DECK



PLAN VIEW AT DOUBLE BOTTOM

TANK NAME	CONTENTS	SIDE	FRAMES	CAPACITY (TONS)	SG
FO1.C	FUEL OIL	C	32-39	165.0	0.85
FO2.P	FUEL OIL	P	16-25	62.2	0.85
FO3.S	FUEL OIL	S	16-25	62.2	0.85
FO4.P	FUEL OIL	P	10-18	78.9	0.85
FO4.S	FUEL OIL	S	10-18	73.2	0.85
FO4.S	FUEL OIL	P	5-10	56.6	0.85
FO DAY TANK	FUEL OIL	S	37-39	32.9	0.85
FO SETT. TANK	FUEL OIL	S	37-39	32.9	0.85
WB1.C	WATER BALLAST	C	44-46	64.4	1.025
WB2.P	WATER BALLAST	P	32-37	50.4	1.025
WB2.S	WATER BALLAST	S	32-37	50.4	1.025
WB3.P	WATER BALLAST	P	27-32	42.9	1.025
WB3.S	WATER BALLAST	S	27-32	36.9	1.025
WB4.P	WATER BALLAST	P	17-22	36.9	1.025
WB4.S	WATER BALLAST	S	17-22	36.9	1.025
WB5.P	WATER BALLAST	P	10-17	41.7	1.025
WB5.S	WATER BALLAST	S	10-17	41.7	1.025
WB6.P	WATER BALLAST	P	5-10	66.4	1.025
WB6.S	WATER BALLAST	S	5-10	66.4	1.025
FWP	FRESH WATER	P	27-32	50.1	1.000
SWS	FRESH WATER	S	27-32	12.9	1.000

VESEL:

CCGS SAMUEL RISLEY

DATE: OCT 2016

TITLE:

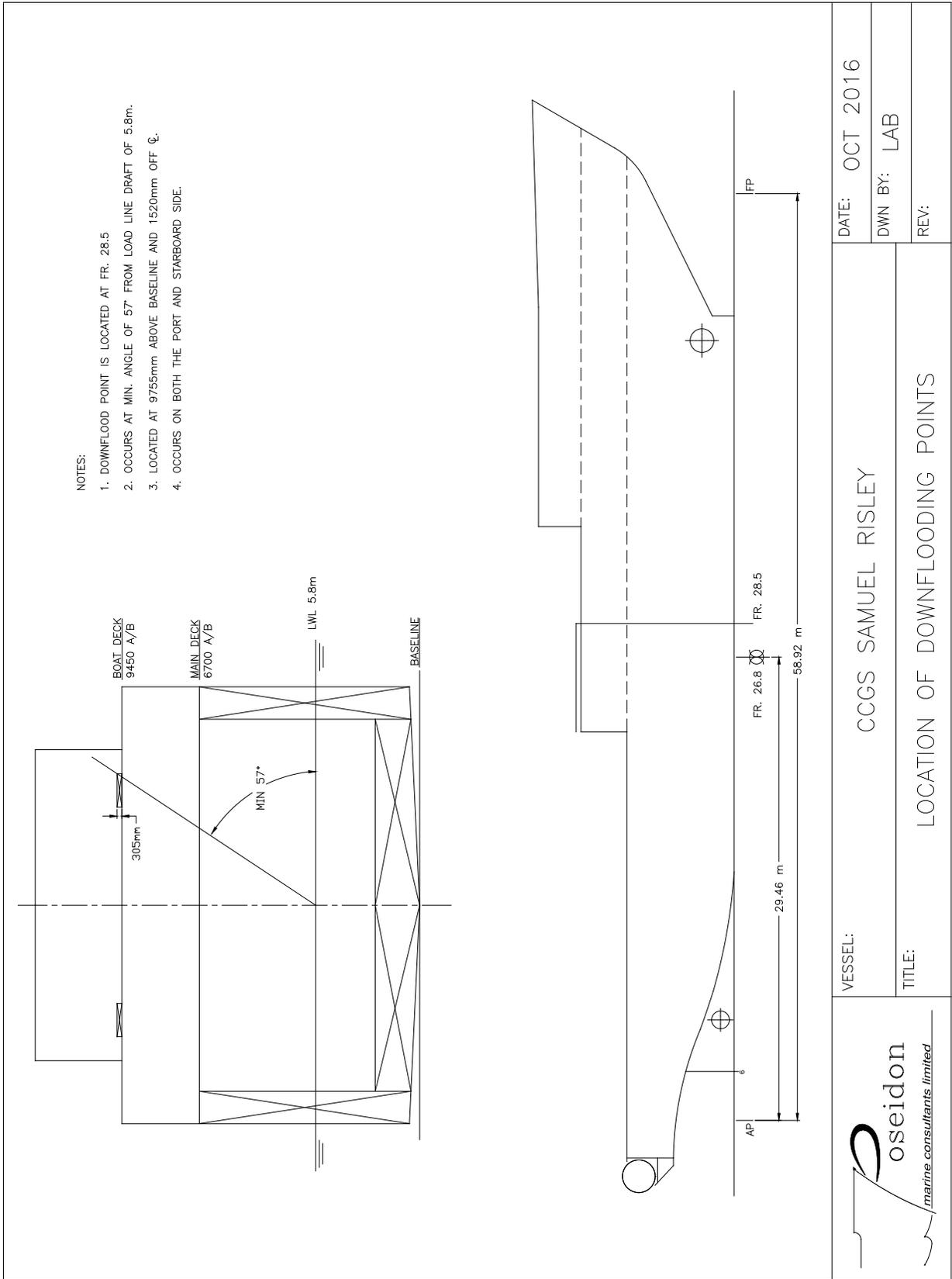
TANK CAPACITY PLAN

DWN BY: LAB

REV: 0



SECTION 2.4 DOWNFLOOD POINTS



STABILITY CRITERIA
[SECTION 3.0]

SECTION 3.1 STABILITY CRITERIA

Per Transport Canada TP 7301E, "Standards for the Intact Stability of Non-Passenger Ships and Passenger Ships Carrying Not More Than 12 Passengers" (STAB 6) and "Stability Criteria for Offshore Supply Vessels" (STAB 7), the minimum stability criteria to be maintained in the icing and non-icing season is as follows:

Limit	Min/Max
(1) Angle from Abs 0.00 deg to MaxRA	>25.00 deg
(2) Area from Abs 0.00 deg to Abs 30.00	>0.055 m-rad.
(3) Area from Abs 0.00 deg to Abs 40.00 or Flood	>0.090 m-rad.
(4) Area from Abs 30.00 deg to Abs 40.00 or Flood	>0.030 m-rad.
(5) Righting Arm at Abs 30.00 deg or MaxRA	>0.20 meters
(6) GM at Equilibrium	>0.15 meters

This manual demonstrates compliance with the above criteria over a range of conditions with and without the use of water ballast, with and without deck cargo, while buoy handling, and during Icebreaking operations.

The conditions presented are representative of the typical operation of the vessel. Should vessel loading differ from what is presented, the Master is reminded to verify stability manually, using the included calculation sheets or other appropriate means.

INTACT CONDITIONS
[SECTION 4.0]

4.1 Intact Stability Assessment

Table 4.1: Table of Conditions

No.	Condition
1	Lightship (Non-Operating)
2	Continuous Icebreaking – Port Departure, Max Consumables
3	Continuous Icebreaking – Mid-Voyage, 50% Consumables
4	Continuous Icebreaking – Port Arrival, 10% Consumables
5	Open Water No Deck Cargo – Port Departure, Max Consumables
6	Open Water No Deck Cargo – Mid-Voyage, 50% Consumables
7	Open Water No Deck Cargo – Port Arrival, 10% Consumables
8	Open Water With Deck Cargo – Port Departure, Max Consumables
9	Open Water With Deck Cargo – Mid-Voyage, 50% Consumables
10	Open Water With Deck Cargo – Port Arrival, 10% Consumables
11	Buoy Handling – Mid-Voyage, 50% Consumables
12	Buoy Handling – Port Arrival, 10% Consumables
13	Salt Water Transit – Port Departure, Max Consumables
14	Salt Water Transit – Mid-Voyage, 50% Consumables
15	Salt Water Transit – Port Arrival, 10% Consumables
16	Continuous Ice Breaking with Topside Ice – Port Arrival, 10% Consumables **
17	Open Water With Deck Cargo and Topside Ice – Port Departure, Max Consumables **
18	Ramming Mode With Topside Ice – Port Arrival, 10% Consumables

** Worst Operating Condition

Table 4.2: Summary of Intact Stability Assessment

Condition	Displacement (MT)	VCG (m)	Trim (m)	Heel (deg)	Area 0-30 (m-rad)	Area 0-40 (m-rad)	Area 30-40 (m-rad)	Righting Arm at 30° (m)	Angle at Max RA (deg)	GM (m)
Min. Value	--	--	--	--	≥0.055	≥0.090	≥0.030	≥0.20	≥25.00	≥0.150
1	2172.25	5.585	1.545f	0	-	-	-	-	-	-
2	2758.40	5.421	0.028f	0	0.160	0.261	0.101	0.526	41.40	1.268
3	2643.84	5.529	0.118a	0	0.166	0.273	0.107	0.559	40.60	1.274
4	2565.67	5.675	0.231f	0	0.155	0.259	0.105	0.544	40.00	1.104
5	3127.21	5.108	0.147a	0	0.163	0.258	0.095	0.505	47.00	1.559
6	2643.84	5.529	0.112a	0	0.166	0.273	0.107	0.559	40.60	1.124
7	2565.67	5.675	0.219f	0	0.155	0.259	0.105	0.544	40.00	1.104
8	3343.98	5.398	0.479a	0	0.082	0.118	0.036	0.210	30.00	1.259
9	2978.07	5.689	0.032f	0	0.120	0.185	0.066	0.356	40.00	1.099
10	2704.89	6.004	0.131a	0	0.092	0.142	0.050	0.273	36.20	0.758
11	2688.79	5.638	0.320a	5.43s	0.088	0.160	0.072	0.425	34.60	1.203
12	2525.66	5.842	0.272f	7.31s	0.069	0.139	0.071	0.429	32.00	1.008
13	3115.02	5.116	0.157a	0	0.172	0.274	0.102	0.542	47.00	1.555
14	2637.37	5.532	0.116a	0	0.172	0.285	0.114	0.590	40.60	1.275
15	2565.67	5.675	0.167f	0	0.159	0.268	0.109	0.569	39.80	1.110
16	2646.06	5.850	0.335f	0	0.126	0.209	0.082	0.430	38.80	0.916
17	3322.49	5.475	0.041a	0	0.087	0.125	0.038	0.224	30.00	1.162
18	2055.27	6.542	1.356a	0	0.085	0.129	0.044	0.294	29.20	0.529

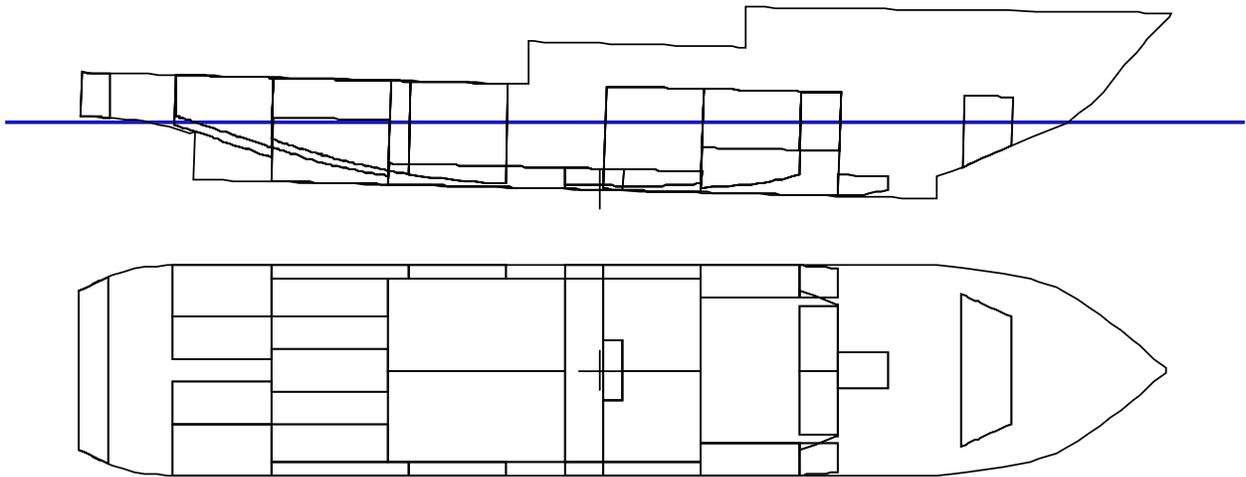
**CONDITION 1
LIGHTSHIP**

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
Light Ship	2,172.25	0.406a	0.000	5.858
Displacement	2,172.25	0.406a	0.000	5.858

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	2,172.25	0.406a	0.000	5.858
Total Weight:	2,172.25	0.406a	0.000	5.858

LCF (m)	1.382a	KMt (m)	NA	Draft LCF Baseline (m)	4.421
LCB (m)	0.321a	KML (m)	NA	Draft aft marks USK (m)	3.703
VCB (m)	2.567	FSC (m)	NA	Draft fwd marks USK (m)	5.195
MCT (MT/cm)	23.99	GMs (m)	0.974	Draft AP Baseline (m)	3.684
TPC (MT/cm)	6.76	GMf (m)	0.974	Draft FP Baseline (m)	5.228
Loadline Height (m)	0.742	Trim (m)	1.545f	Draft MS Baseline (m)	4.458

**CONDITION 1
LIGHTSHIP**



**CONDITION 2
CONTINUOUS ICEBREAKING
PORT DEPARTURE, MAX CONSUMABLES**

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	2,172.25	0.406a	0.000	5.858
BUOYTENDER BARGE	8.75	1.490f	0.000	10.200
CREW & EFFECTS	5.00	14.000f	0.000	11.000
DECK EQUIPMENT	5.00	18.600a	0.000	7.570
ER STORES	2.00	7.650f	0.000	4.000
MISC. LUBE OIL / DIRTY OIL	8.00	8.490a	0.000	4.230
STORES & PROVISIONS	10.00	19.000f	0.000	8.000
TRIMMING WEIGHT	8.17	29.060a	0.000	7.200
ZODIAC WORK BOAT	0.92	3.510a	0.000	10.200
Total Fixed:	2,220.09	0.448a	0.000	5.899

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
FO3.C	0.850	100.00%	68.22	17.139a	0.000	2.232	0.0
FO3.P	0.850	100.00%	78.86	17.050a	4.722p	4.057	0.0
FO3.S	0.850	100.00%	73.19	16.932a	4.771s	3.951	0.0
FO4.P	0.850	100.00%	56.64	23.879a	2.107p	4.717	0.0
FO4.S	0.850	100.00%	56.64	23.879a	2.107s	4.717	0.0
FO2.P	0.850	56.00%	35.35	7.353a	2.615p	0.487	161.4
FO2.S	0.850	68.00%	42.93	7.417a	2.670s	0.561	161.8
FODAY.P	0.850	90.00%	29.63	13.990f	2.070p	4.610	12.4
FOSET.S	0.850	90.00%	29.63	13.990f	2.070s	4.610	12.4
FW.P	1.000	100.00%	33.61	3.297f	6.378p	3.669	0.4*
SAN.S	1.000	100.00%	33.61	3.297f	6.378s	3.669	0.4*
Totals:			538.31	11.119a	0.002p	3.450	348.8

FSM Notes

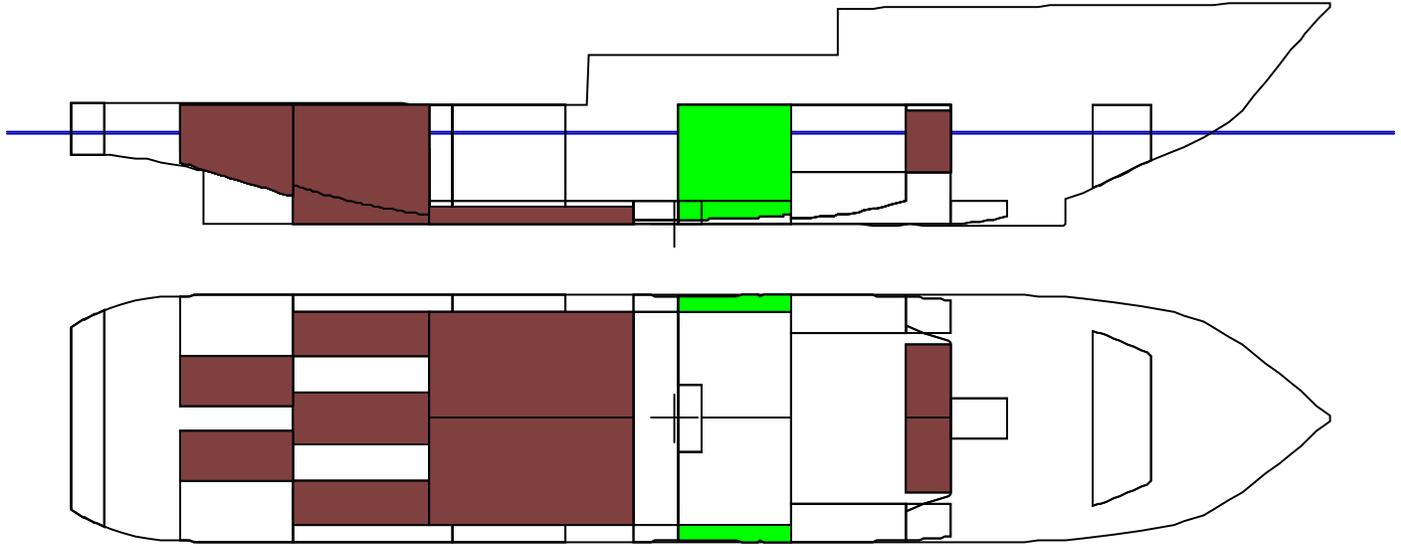
* Max. FSM is the Maximum Free Surface Moment of any load at the present heel and trim. It may not be the current FSM.

** FSM is predefined. It may not be the current FSM.

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
Light Ship	2,172.25	0.406a	0.000	5.858
Deadweight	586.15	10.405a	0.002p	3.803
Displacement	2,758.40	2.531a	0.000	5.421

LCF (m)	4.070a	KMt (m)	6.816	Draft LCF Baseline (m)	5.197
LCB (m)	2.530a	KML (m)	76.495	Draft aft marks USK (m)	5.204
VCB (m)	3.023	FSC (m)	0.126	Draft fwd marks USK (m)	5.231
MCT (MT/cm)	33.21	GMs (m)	1.394	Draft AP Baseline (m)	5.185
TPC (MT/cm)	7.55	GMf (m)	1.268	Draft FP Baseline (m)	5.213
Loadline Height (m)	0.001	Trim (m)	0.028f	Draft MS Baseline (m)	5.199

**CONDITION 2
CONTINUOUS ICEBREAKING
PORT DEPARTURE, MAX CONSUMABLES**



Fluid Legend

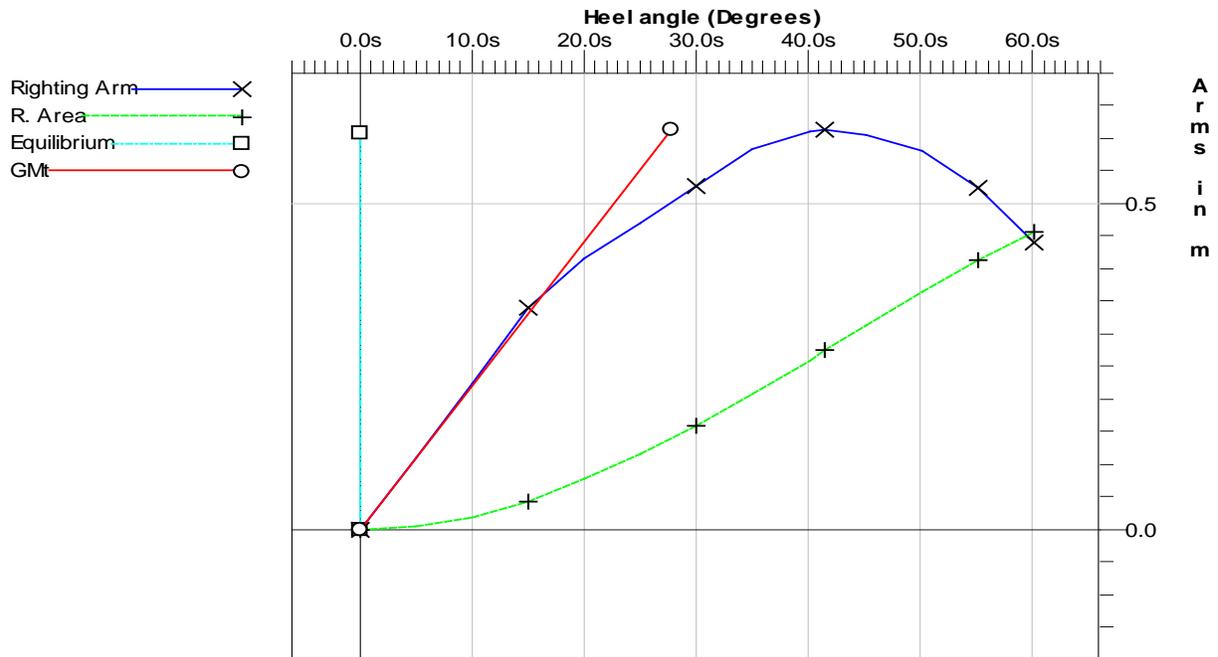
Fluid Name	Legend	Weight (MT)	Load%
FUEL OIL		471.09	68.21%
FRESH WATER		67.22	100.00%

**CONDITION 2
CONTINUOUS ICEBREAKING
PORT DEPARTURE, MAX CONSUMABLES**

STAB 6 CRITERIA

Limit	Min/Max	Actual	Margin	Pass
(1) Angle from 0.00 deg to MaxRA	>25.00 deg	41.40	16.40	Yes
(2) Area from Abs 0.00 deg to Abs 30.00	>0.0550 m-R	0.160	0.105	Yes
(3) Area from Abs 0.00 deg to Abs 40.00 or Flood	>0.0900 m-R	0.261	0.171	Yes
(4) Area from Abs 30.00 deg to Abs 40.00 or Flood	>0.0300 m-R	0.101	0.071	Yes
(5) Righting Arm at 30.00 deg	>0.200 m	0.526	0.326	Yes
(6) GM at Equilibrium	>0.150 m	1.268	1.118	Yes

Righting Arms vs. Heel - STAB 6 CRITERIA



**CONDITION 3
CONTINUOUS ICEBREAKING
MID-TRIP, 50% CONSUMABLES**

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	2,172.25	0.406a	0.000	5.858
BUOYTENDER BARGE	8.75	1.490f	0.000	10.200
CREW & EFFECTS	5.00	14.000f	0.000	11.000
DECK EQUIPMENT	5.00	18.600a	0.000	7.570
ER STORES	2.00	7.650f	0.000	4.000
MISC. LUBE OIL / DIRTY OIL	6.00	8.490a	0.000	4.230
STORES & PROVISIONS	5.00	19.000f	0.000	8.000
TRIMMING WEIGHT	8.17	29.060a	0.000	7.200
ZODIAC WORK BOAT	0.92	3.510a	0.000	10.200
Total Fixed:	2,213.09	0.485a	0.000	5.896

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
FO3.C	0.850	100.00%	68.22	17.139a	0.000	2.232	0.0
FO3.P	0.850	66.31%	52.29	16.946a	4.713p	3.162	7.2
FO3.S	0.850	71.44%	52.29	16.894a	4.739s	3.177	5.9
FO4.P	0.850	100.00%	56.64	23.879a	2.107p	4.717	0.0
FO4.S	0.850	100.00%	56.64	23.879a	2.107s	4.717	0.0
FODAY.P	0.850	90.00%	29.63	13.990f	2.070p	4.610	12.4
FOSET.S	0.850	90.00%	29.63	13.990f	2.070s	4.610	12.4
FW.P	1.000	50.00%	16.80	3.202f	6.358p	2.126	0.4*
SAN.S	1.000	50.00%	16.80	3.202f	6.358s	2.126	0.4*
WB6.S	1.000	40.00%	25.90	23.345a	5.019s	4.008	19.0*
WB6.P	1.000	40.00%	25.90	23.345a	5.019p	4.008	19.0*
Totals:		30.71%	430.76	13.734a	0.003s	3.646	76.7

FSM Notes

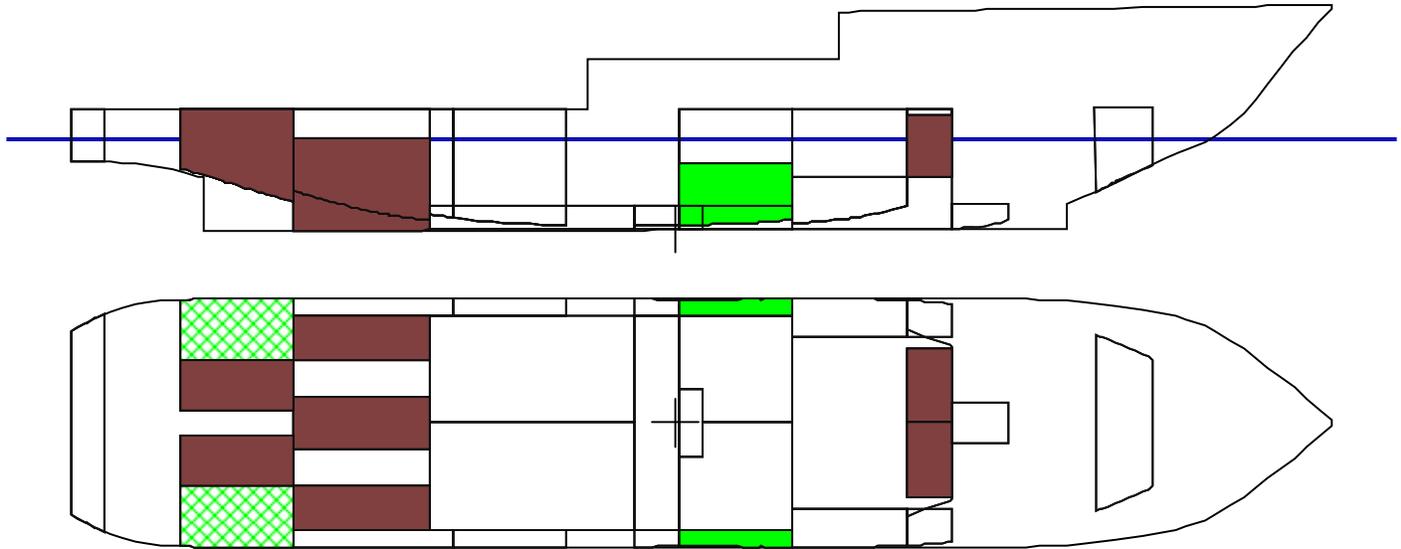
* Max. FSM is the Maximum Free Surface Moment of any load at the present heel and trim. It may not be the current FSM.

** FSM is predefined. It may not be the current FSM.

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
Light Ship	2,172.25	0.406a	0.000	5.858
Deadweight	471.59	12.951a	0.003s	4.016
Displacement	2,643.84	2.644a	0.000	5.529

LCF (m)	4.170a	KMt (m)	6.832	Draft LCF Baseline (m)	5.045
LCB (m)	2.648a	KML (m)	77.485	Draft aft marks USK (m)	5.114
VCB (m)	2.932	FSC (m)	0.029	Draft fwd marks USK (m)	5.000
MCT (MT/cm)	32.28	GMs (m)	1.303	Draft AP Baseline (m)	5.095
TPC (MT/cm)	7.47	GMf (m)	1.274	Draft FP Baseline (m)	4.997
Loadline Height (m)	0.164	Trim (m)	0.118a	Draft MS Baseline (m)	5.036

**CONDITION 3
CONTINUOUS ICEBREAKING
MID-TRIP, 50% CONSUMABLES**



Fluid Legend

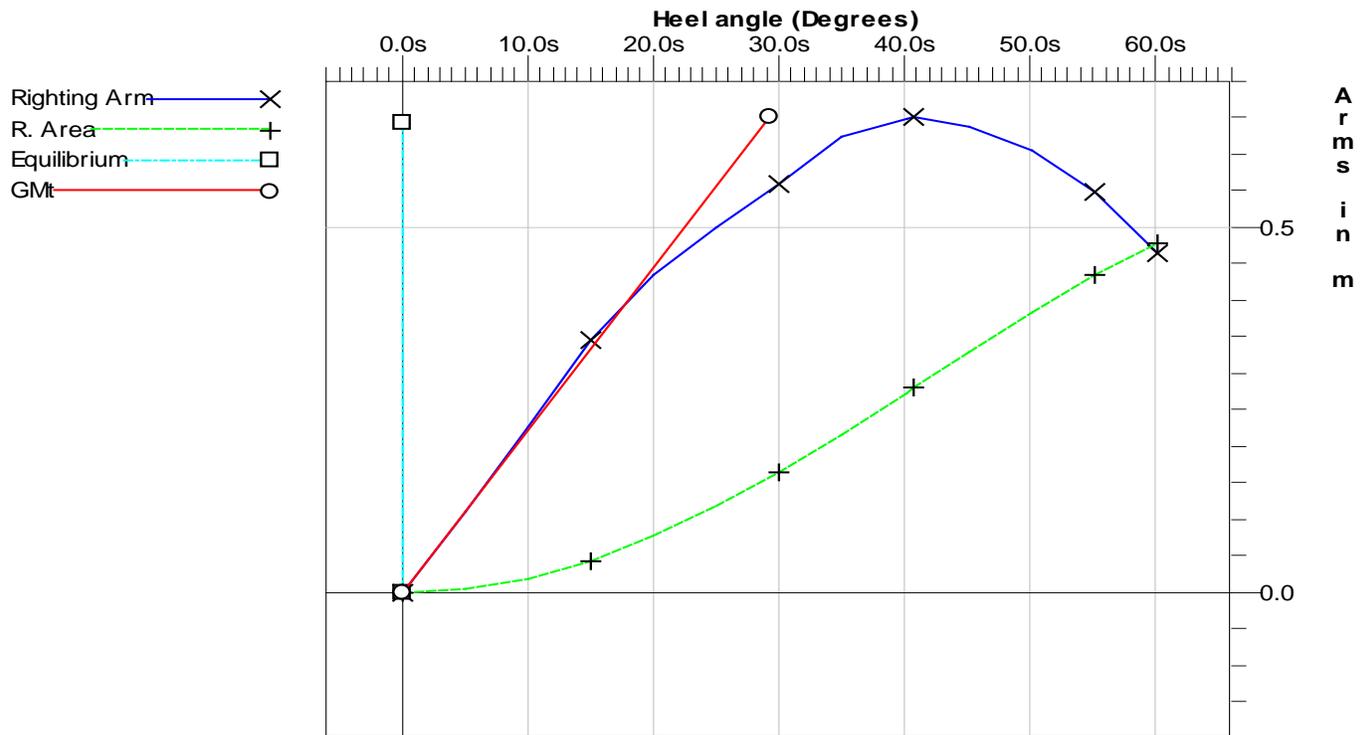
Fluid Name	Legend	Weight (MT)	Load%
FUEL OIL		345.35	50.00%
FRESH WATER		33.61	50.00%
WATER BALLAST		51.80	9.27%

**CONDITION 3
CONTINUOUS ICEBREAKING
MID-TRIP, 50% CONSUMABLES**

STAB 6 CRITERIA

Limit	Min/Max	Actual	Margin	Pass
(1) Angle from 0.00 deg to MaxRA	>25.00 deg	40.60	15.60	Yes
(2) Area from Abs 0.00 deg to Abs 30.00	>0.0550 m-R	0.166	0.111	Yes
(3) Area from Abs 0.00 deg to Abs 40.00 or Flood	>0.0900 m-R	0.273	0.183	Yes
(4) Area from Abs 30.00 deg to Abs 40.00 or Flood	>0.0300 m-R	0.107	0.077	Yes
(5) Righting Arm at 30.00 deg	>0.200 m	0.559	0.359	Yes
(6) GM at Equilibrium	>0.150 m	1.274	1.124	Yes

Righting Arms vs. Heel - STAB 6 CRITERIA



**CONDITION 4
CONTINUOUS ICEBREAKING
PORT ARRIVAL, 10% CONSUMABLES**

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	2,172.25	0.406a	0.000	5.858
BUOYTENDER BARGE	8.75	1.490f	0.000	10.200
CREW & EFFECTS	5.00	14.000f	0.000	11.000
DECK EQUIPMENT	5.00	18.600a	0.000	7.570
ER STORES	2.00	7.650f	0.000	4.000
MISC. LUBE OIL / DIRTY OIL	4.00	8.490a	0.000	4.230
STORES & PROVISIONS	1.00	19.000f	0.000	8.000
TRIMMING WEIGHT	8.17	29.060a	0.000	7.200
ZODIAC WORK BOAT	0.92	3.510a	0.000	10.200
Total Fixed:	2,207.09	0.513a	0.000	5.894

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
FO4.P	0.850	8.65%	4.90	22.303a	1.886p	2.594	5.4
FO4.S	0.850	8.65%	4.90	22.303a	1.886s	2.594	5.4
FODAY.P	0.850	90.00%	29.63	13.991f	2.070p	4.610	12.4
FOSET.S	0.850	90.00%	29.63	13.991f	2.070s	4.610	12.4
FW.P	1.000	10.00%	3.36	2.858f	6.319p	0.767	0.4*
SAN.S	1.000	10.00%	3.36	2.858f	6.319s	0.767	0.4*
WB4.P	1.000	100.00%	36.00	9.095a	6.407p	3.570	0.4*
WB4.S	1.000	100.00%	36.00	9.095a	6.407s	3.570	0.4*
WB5.P	1.000	100.00%	40.65	16.333a	6.405p	4.141	0.6*
WB5.S	1.000	100.00%	40.65	16.333a	6.405s	4.141	0.6*
WB6.S	1.000	100.00%	64.75	23.805a	5.123s	5.053	19.0*
WB6.P	1.000	100.00%	64.75	23.805a	5.123p	5.053	19.0*
Totals:			358.58	12.369a	0.000	4.328	76.5

FSM Notes

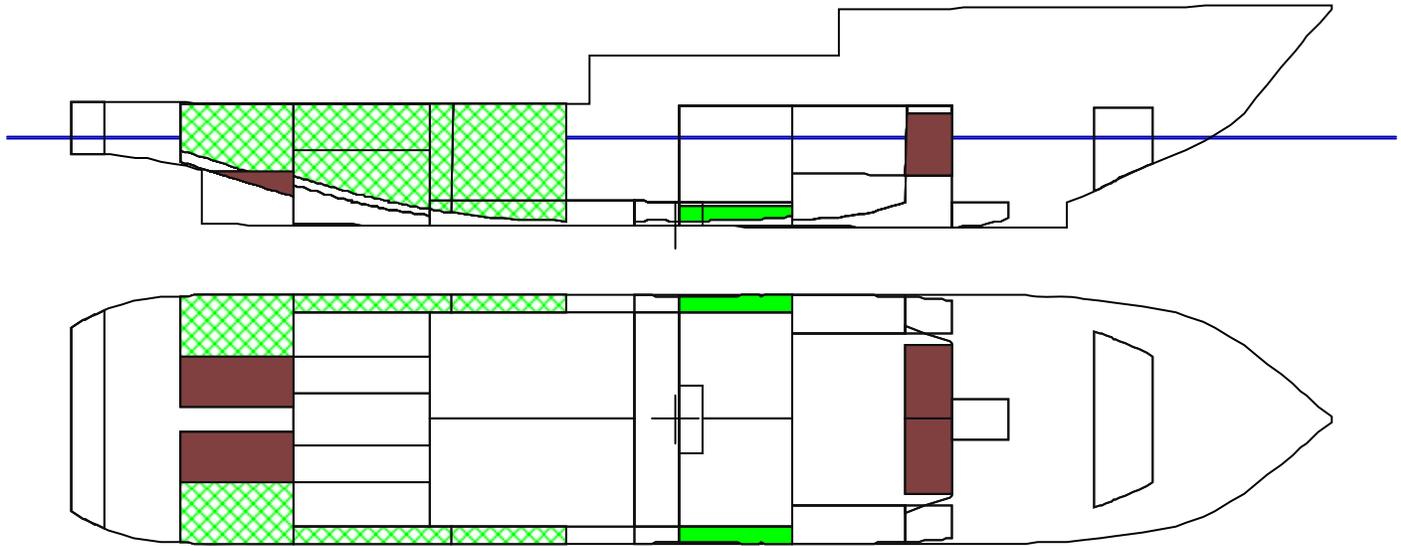
* Max. FSM is the Maximum Free Surface Moment of any load at the present heel and trim. It may not be the current FSM.

** FSM is predefined. It may not be the current FSM.

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
Light Ship	2,172.25	0.406a	0.000	5.858
Deadweight	393.42	11.910a	0.000	4.664
Displacement	2,565.67	2.170a	0.000	5.675

LCF (m)	3.759a	KMt (m)	6.809	Draft LCF Baseline (m)	4.940
LCB (m)	2.159a	KML (m)	77.527	Draft aft marks USK (m)	4.858
VCB (m)	2.870	FSC (m)	0.030	Draft fwd marks USK (m)	5.081
MCT (MT/cm)	31.27	GMs (m)	1.134	Draft AP Baseline (m)	4.839
TPC (MT/cm)	7.38	GMf (m)	1.104	Draft FP Baseline (m)	5.070
Loadline Height (m)	0.245	Trim (m)	0.231f	Draft MS Baseline (m)	4.955

**CONDITION 4
CONTINUOUS ICEBREAKING
PORT ARRIVAL, 10% CONSUMABLES**



Fluid Legend

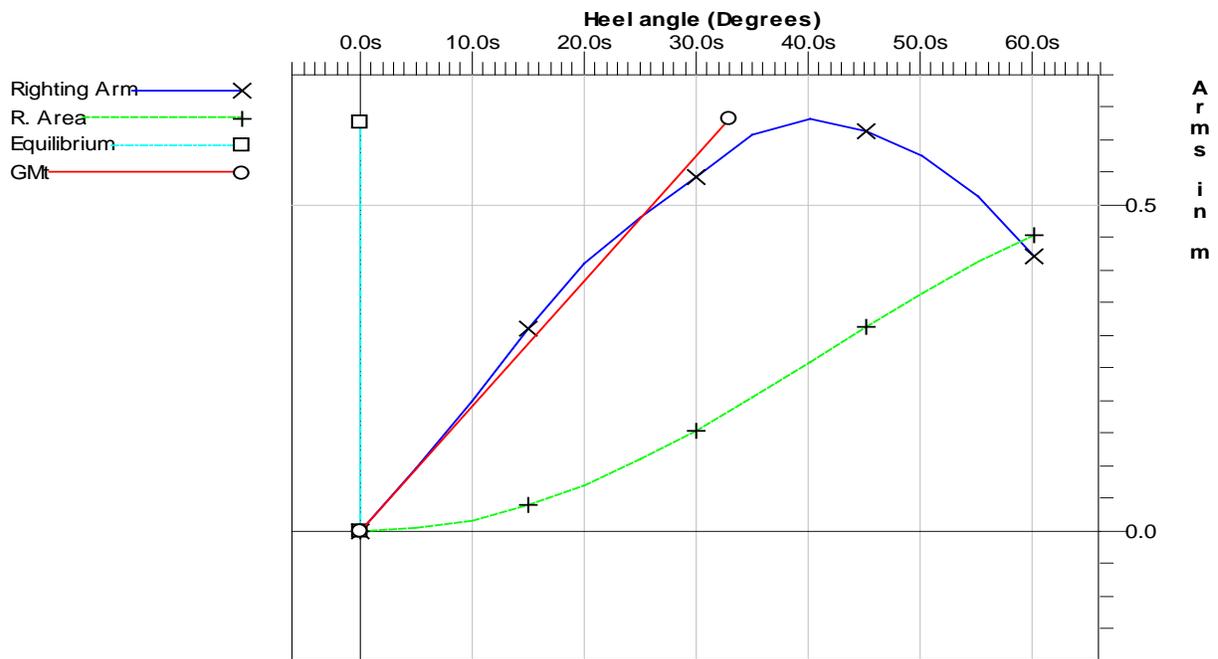
Fluid Name	Legend	Weight (MT)	Load%
FUEL OIL		69.07	10.00%
FRESH WATER		6.72	10.00%
WATER BALLAST		282.79	50.62%

**CONDITION 4
CONTINUOUS ICEBREAKING
PORT ARRIVAL, 10% CONSUMABLES**

STAB 6 CRITERIA

Limit	Min/Max	Actual	Margin	Pass
(1) Angle from 0.00 deg to MaxRA	>25.00 deg	40.00	15.00	Yes
(2) Area from Abs 0.00 deg to Abs 30.00	>0.0550 m-R	0.155	0.100	Yes
(3) Area from Abs 0.00 deg to Abs 40.00 or Flood	>0.0900 m-R	0.259	0.169	Yes
(4) Area from Abs 30.00 deg to Abs 40.00 or Flood	>0.0300 m-R	0.105	0.075	Yes
(5) Righting Arm at 30.00 deg	>0.200 m	0.544	0.344	Yes
(6) GM at Equilibrium	>0.150 m	1.104	0.954	Yes

Righting Arms vs. Heel - STAB 6 CRITERIA



CONDITION 5
OPEN WATER NO DECK CARGO
PORT DEPARTURE, MAX CONSUMABLES

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	2,172.25	0.406a	0.000	5.858
BUOYTENDER BARGE	8.75	1.490f	0.000	10.200
CREW & EFFECTS	5.00	14.000f	0.000	11.000
DECK EQUIPMENT	5.00	18.600a	0.000	7.570
ER STORES	2.00	7.650f	0.000	4.000
MISC. LUBE OIL / DIRTY OIL	8.00	8.490a	0.000	4.230
STORES & PROVISIONS	10.00	19.000f	0.000	8.000
TRIMMING WEIGHT	8.17	29.060a	0.000	7.200
ZODIAC WORK BOAT	0.92	3.510a	0.000	10.200
Total Fixed:	2,220.09	0.448a	0.000	5.899

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
FO1.C	0.850	100.00%	165.01	10.580f	0.000	1.487	0.0
FO3.C	0.850	100.00%	68.22	17.139a	0.000	2.232	0.0
FO3.P	0.850	100.00%	78.86	17.050a	4.722p	4.057	0.0
FO3.S	0.850	100.00%	73.19	16.932a	4.771s	3.951	0.0
FO4.P	0.850	100.00%	56.64	23.879a	2.107p	4.717	0.0
FO4.S	0.850	100.00%	56.64	23.879a	2.107s	4.717	0.0
FO2.P	0.850	98.00%	61.86	7.535a	2.749p	0.741	161.8
FO2.S	0.850	98.00%	61.86	7.535a	2.749s	0.741	161.8
FODAY.P	0.850	90.00%	29.63	13.990f	2.070p	4.610	12.4
FOSET.S	0.850	90.00%	29.63	13.990f	2.070s	4.610	12.4
WB5.P	1.000	31.00%	12.60	15.671a	6.399p	2.319	0.6*
WB5.S	1.000	40.00%	16.26	15.888a	6.401s	2.572	0.6*
WB6.S	1.000	100.00%	64.75	23.805a	5.123s	5.053	19.0*
WB6.P	1.000	100.00%	64.75	23.805a	5.123p	5.053	19.0*
Totals:			907.12	8.965a	0.000	3.173	388.5

FSM Notes

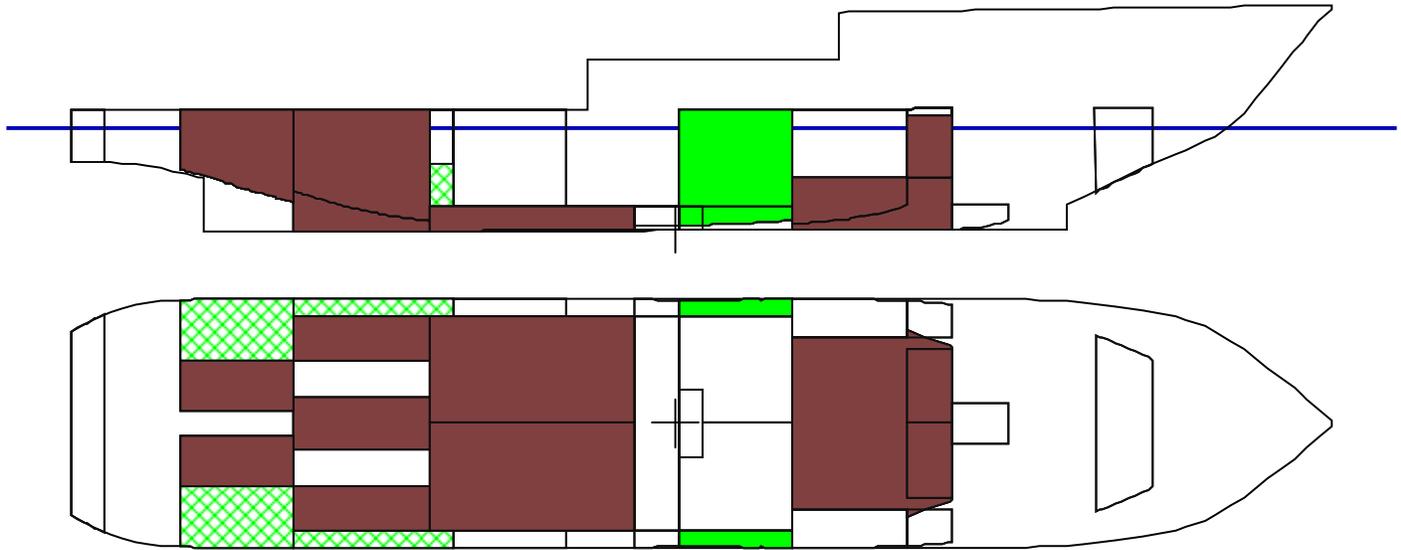
* Max. FSM is the Maximum Free Surface Moment of any load at the present heel and trim. It may not be the current FSM.

** FSM is predefined. It may not be the current FSM.

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
Light Ship	2,172.25	0.406a	0.000	5.858
Deadweight	954.96	8.634a	0.000	3.404
Displacement	3,127.21	2.919a	0.000	5.108

LCF (m)	4.070a	KMt (m)	6.792	Draft LCF Baseline (m)	5.679
LCB (m)	2.923a	KML (m)	72.439	Draft aft marks USK (m)	5.765
VCB (m)	3.308	FSC (m)	0.124	Draft fwd marks USK (m)	5.615
MCT (MT/cm)	37.69	GMs (m)	1.683	Draft AP Baseline (m)	5.746
TPC (MT/cm)	7.73	GMf (m)	1.559	Draft FP Baseline (m)	5.591
Loadline Height (m)	0.259	Trim (m)	0.147a	Draft MS Baseline (m)	5.668

**CONDITION 5
OPEN WATER NO DECK CARGO
PORT DEPARTURE, MAX CONSUMABLES**



Fluid Legend

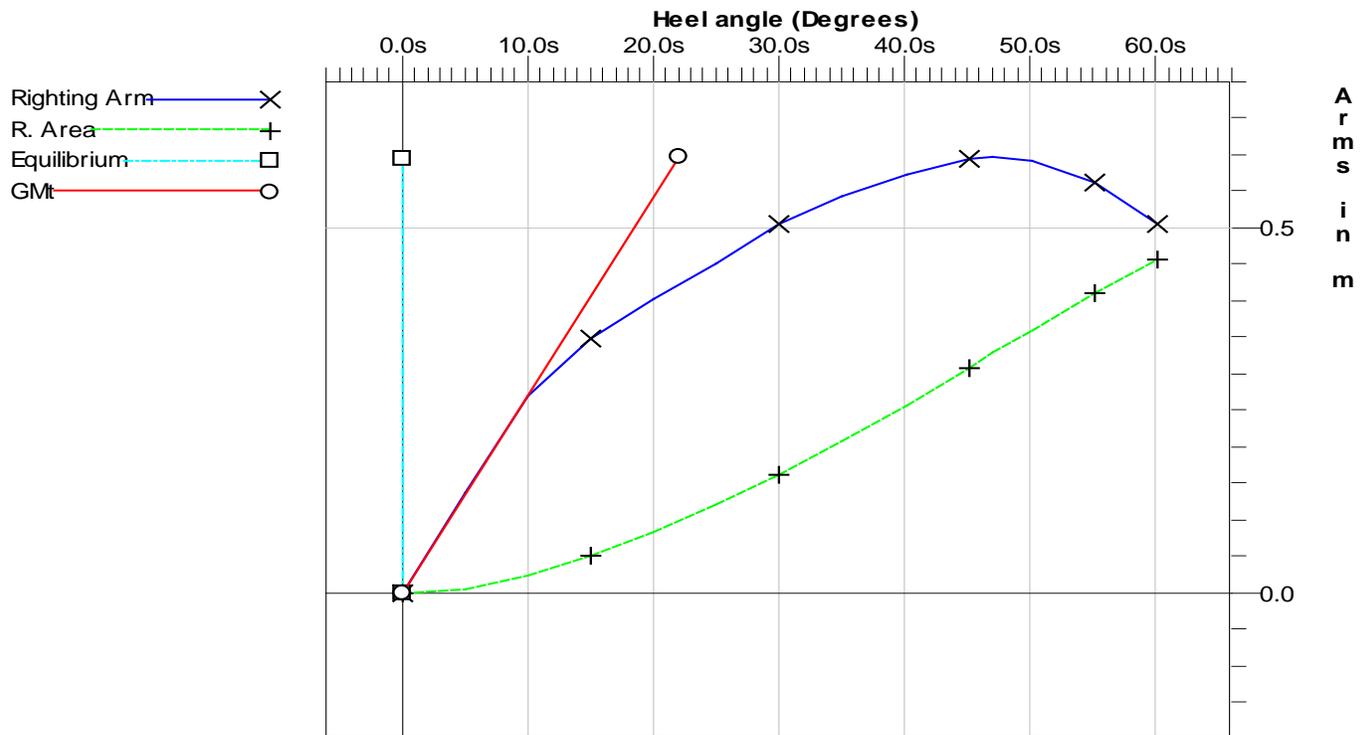
Fluid Name	Legend	Weight (MT)	Load%
FUEL OIL		681.56	98.68%
FRESH WATER		67.22	100.00%
WATER BALLAST		158.35	28.34%

**CONDITION 5
OPEN WATER NO DECK CARGO
PORT DEPARTURE, MAX CONSUMABLES**

STAB 6 CRITERIA

Limit	Min/Max	Actual	Margin	Pass
(1) Angle from 0.00 deg to MaxRA	>25.00 deg	47.00	22.00	Yes
(2) Area from Abs 0.00 deg to Abs 30.00	>0.0550 m-R	0.163	0.108	Yes
(3) Area from Abs 0.00 deg to Abs 40.00 or Flood	>0.0900 m-R	0.258	0.168	Yes
(4) Area from Abs 30.00 deg to Abs 40.00 or Flood	>0.0300 m-R	0.095	0.065	Yes
(5) Righting Arm at 30.00 deg	>0.200 m	0.505	0.305	Yes
(6) GM at Equilibrium	>0.150 m	1.559	1.409	Yes

Righting Arms vs. Heel - STAB 6 CRITERIA



**CONDITION 6
OPEN WATER NO DECK CARGO
MID-TRIP, 50% CONSUMABLES**

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	2,172.25	0.406a	0.000	5.858
BUOYTENDER BARGE	8.75	1.490f	0.000	10.200
CREW & EFFECTS	5.00	14.000f	0.000	11.000
DECK EQUIPMENT	5.00	18.600a	0.000	7.570
ER STORES	2.00	7.650f	0.000	4.000
MISC. LUBE OIL / DIRTY OIL	6.00	8.490a	0.000	4.230
STORES & PROVISIONS	5.00	19.000f	0.000	8.000
TRIMMING WEIGHT	8.17	29.060a	0.000	7.200
ZODIAC WORK BOAT	0.92	3.510a	0.000	10.200
Total Fixed:	2,213.09	0.485a	0.000	5.896

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
FO3.C	0.850	100.00%	68.22	17.139a	0.000	2.232	0.0
FO3.P	0.850	66.31%	52.29	16.946a	4.713p	3.162	7.2
FO3.S	0.850	71.44%	52.29	16.894a	4.739s	3.177	5.9
FO4.P	0.850	100.00%	56.64	23.879a	2.107p	4.717	0.0
FO4.S	0.850	100.00%	56.64	23.879a	2.107s	4.717	0.0
FODAY.P	0.850	90.00%	29.63	13.990f	2.070p	4.610	12.4
FOSET.S	0.850	90.00%	29.63	13.990f	2.070s	4.610	12.4
FW.P	1.000	50.00%	16.80	3.202f	6.358p	2.126	0.4*
SAN.S	1.000	50.00%	16.80	3.202f	6.358s	2.126	0.4*
WB6.S	1.000	40.00%	25.90	23.345a	5.019s	4.008	19.0*
WB6.P	1.000	40.00%	25.90	23.345a	5.019p	4.008	19.0*
Totals:			430.76	13.734a	0.003s	3.646	76.7

FSM Notes

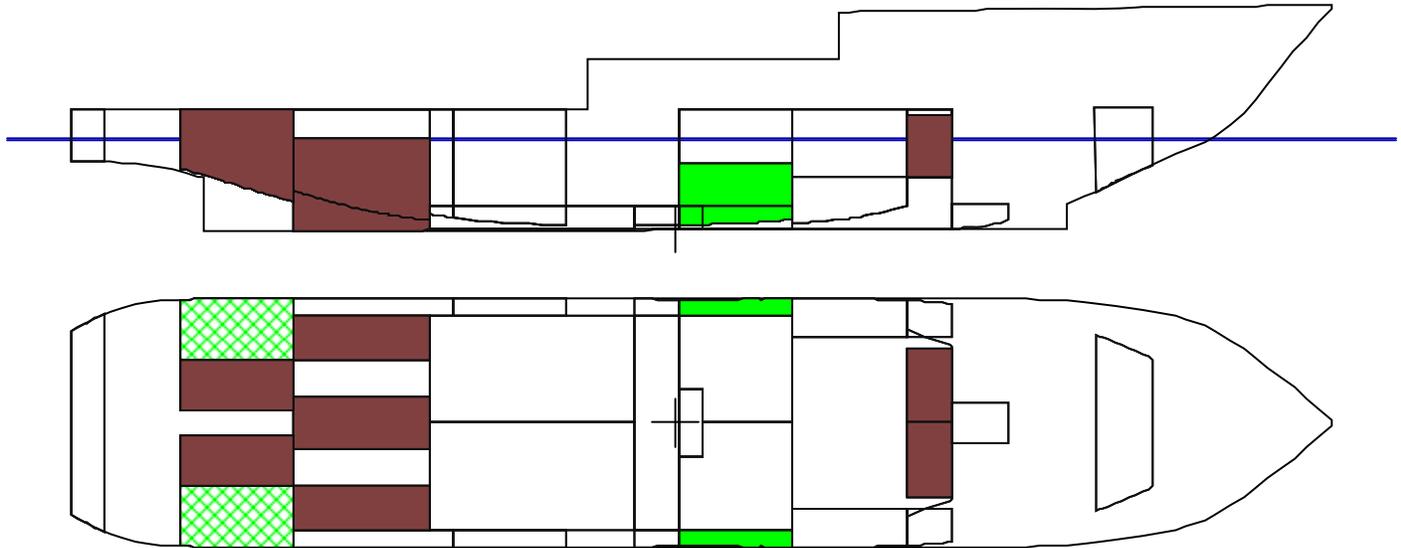
* Max. FSM is the Maximum Free Surface Moment of any load at the present heel and trim. It may not be the current FSM.

** FSM is predefined. It may not be the current FSM.

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
Light Ship	2,172.25	0.406a	0.000	5.858
Deadweight	471.59	12.951a	0.003s	4.016
Displacement	2,643.84	2.644a	0.000	5.529

LCF (m)	4.170a	KMt (m)	6.832	Draft LCF Baseline (m)	5.045
LCB (m)	2.649a	KML (m)	77.486	Draft aft marks USK (m)	5.114
VCB (m)	2.932	FSC (m)	0.029	Draft fwd marks USK (m)	5.000
MCT (MT/cm)	34.10	GMs (m)	1.303	Draft AP Baseline (m)	5.096
TPC (MT/cm)	7.47	GMf (m)	1.274	Draft FP Baseline (m)	4.977
Loadline Height (m)	0.891	Trim (m)	0.112a	Draft MS Baseline (m)	5.036

**CONDITION 6
OPEN WATER NO DECK CARGO
MID-TRIP, 50% CONSUMABLES**



Fluid Legend

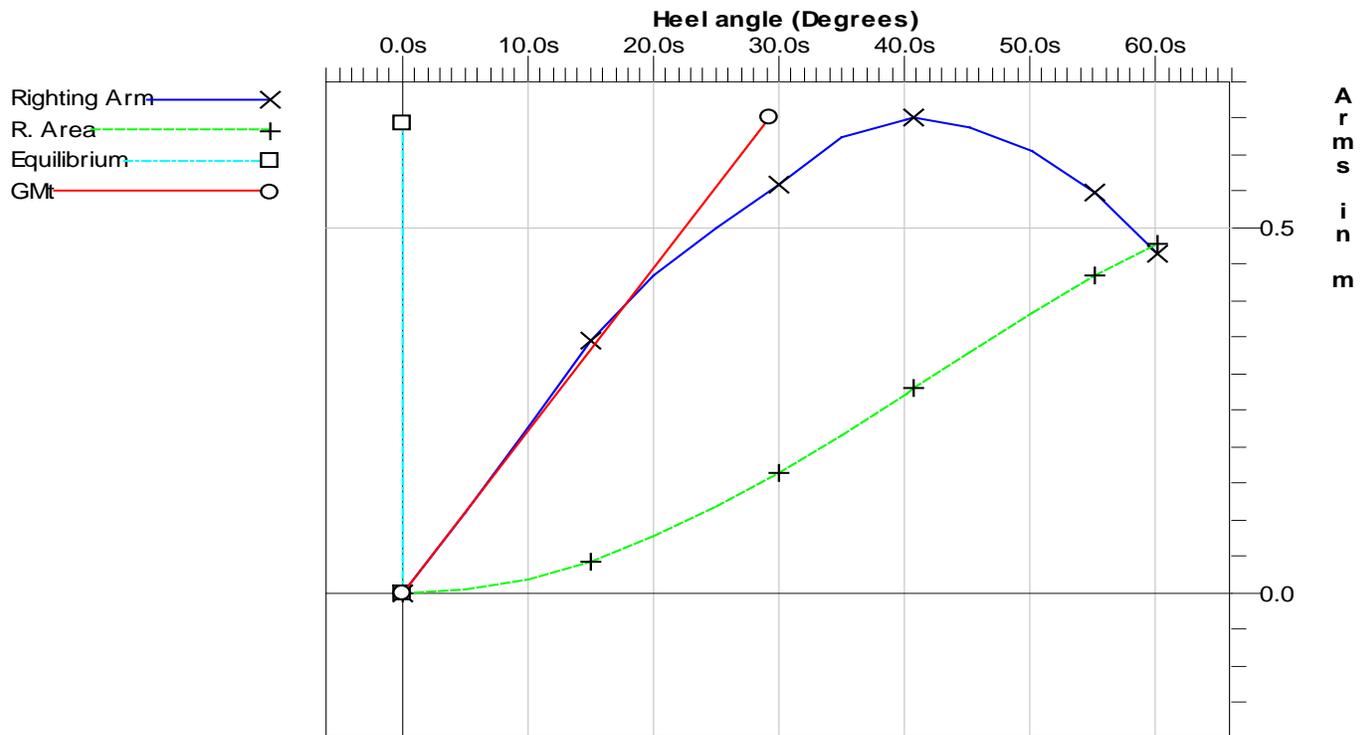
Fluid Name	Legend	Weight (MT)	Load%
FUEL OIL		345.35	50.00%
FRESH WATER		33.61	50.00%
WATER BALLAST		51.80	9.27%

**CONDITION 6
OPEN WATER NO DECK CARGO
MID-TRIP, 50% CONSUMABLES**

STAB 6 CRITERIA

Limit	Min/Max	Actual	Margin	Pass
(1) Angle from 0.00 deg to MaxRA	>25.00 deg	40.60	15.60	Yes
(2) Area from Abs 0.00 deg to Abs 30.00	>0.0550 m-R	0.166	0.111	Yes
(3) Area from Abs 0.00 deg to Abs 40.00 or Flood	>0.0900 m-R	0.273	0.183	Yes
(4) Area from Abs 30.00 deg to Abs 40.00 or Flood	>0.0300 m-R	0.107	0.077	Yes
(5) Righting Arm at 30.00 deg	>0.200 m	0.559	0.359	Yes
(6) GM at Equilibrium	>0.150 m	1.274	1.124	Yes

Righting Arms vs. Heel - STAB 6 CRITERIA



CONDITION 7
OPEN WATER NO DECK CARGO
PORT ARRIVAL, 10% CONSUMABLES

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	2,172.25	0.406a	0.000	5.858
BUOYTENDER BARGE	8.75	1.490f	0.000	10.200
CREW & EFFECTS	5.00	14.000f	0.000	11.000
DECK EQUIPMENT	5.00	18.600a	0.000	7.570
ER STORES	2.00	7.650f	0.000	4.000
MISC. LUBE OIL / DIRTY OIL	4.00	8.490a	0.000	4.230
STORES & PROVISIONS	1.00	19.000f	0.000	8.000
TRIMMING WEIGHT	8.17	29.060a	0.000	7.200
ZODIAC WORK BOAT	0.92	3.510a	0.000	10.200
Total Fixed:	2,207.09	0.513a	0.000	5.894

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
FO4.P	0.850	8.65%	4.90	22.303a	1.886p	2.594	5.4
FO4.S	0.850	8.65%	4.90	22.303a	1.886s	2.594	5.4
FODAY.P	0.850	90.00%	29.63	13.991f	2.070p	4.610	12.4
FOSET.S	0.850	90.00%	29.63	13.991f	2.070s	4.610	12.4
FW.P	1.000	10.00%	3.36	2.858f	6.319p	0.767	0.4*
SAN.S	1.000	10.00%	3.36	2.858f	6.319s	0.767	0.4*
WB4.P	1.000	100.00%	36.00	9.095a	6.407p	3.570	0.4*
WB4.S	1.000	100.00%	36.00	9.095a	6.407s	3.570	0.4*
WB5.P	1.000	100.00%	40.65	16.333a	6.405p	4.141	0.6*
WB5.S	1.000	100.00%	40.65	16.333a	6.405s	4.141	0.6*
WB6.S	1.000	100.00%	64.75	23.805a	5.123s	5.053	19.0*
WB6.P	1.000	100.00%	64.75	23.805a	5.123p	5.053	19.0*
Totals:			358.58	12.369a	0.000	4.328	76.5

FSM Notes

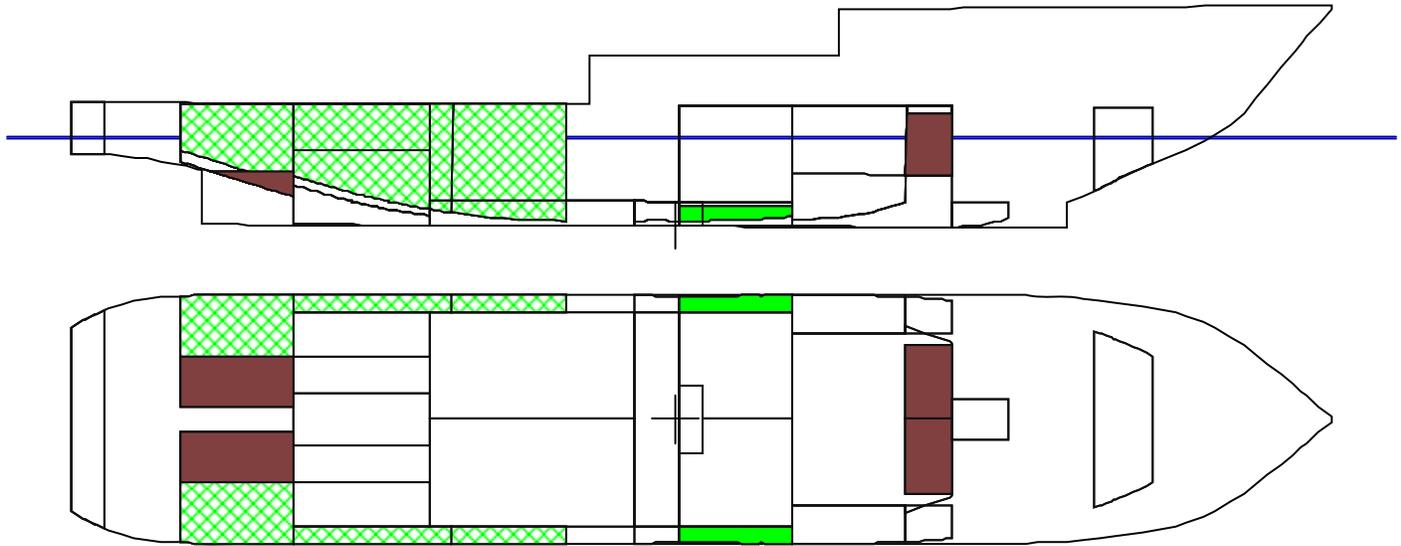
* Max. FSM is the Maximum Free Surface Moment of any load at the present heel and trim. It may not be the current FSM.

** FSM is predefined. It may not be the current FSM.

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
Light Ship	2,172.25	0.406a	0.000	5.858
Deadweight	393.42	11.910a	0.000	4.664
Displacement	2,565.67	2.170a	0.000	5.675

LCF (m)	3.759a	KMt (m)	6.809	Draft LCF Baseline (m)	4.940
LCB (m)	2.159a	KML (m)	77.527	Draft aft marks USK (m)	4.858
VCB (m)	2.870	FSC (m)	0.030	Draft fwd marks USK (m)	5.081
MCT (MT/cm)	33.05	GMs (m)	1.134	Draft AP Baseline (m)	4.839
TPC (MT/cm)	7.38	GMf (m)	1.104	Draft FP Baseline (m)	5.070
Loadline Height (m)	0.973	Trim (m)	0.219f	Draft MS Baseline (m)	4.955

**CONDITION 7
OPEN WATER NO DECK CARGO
PORT ARRIVAL, 10% CONSUMABLES**



Fluid Legend

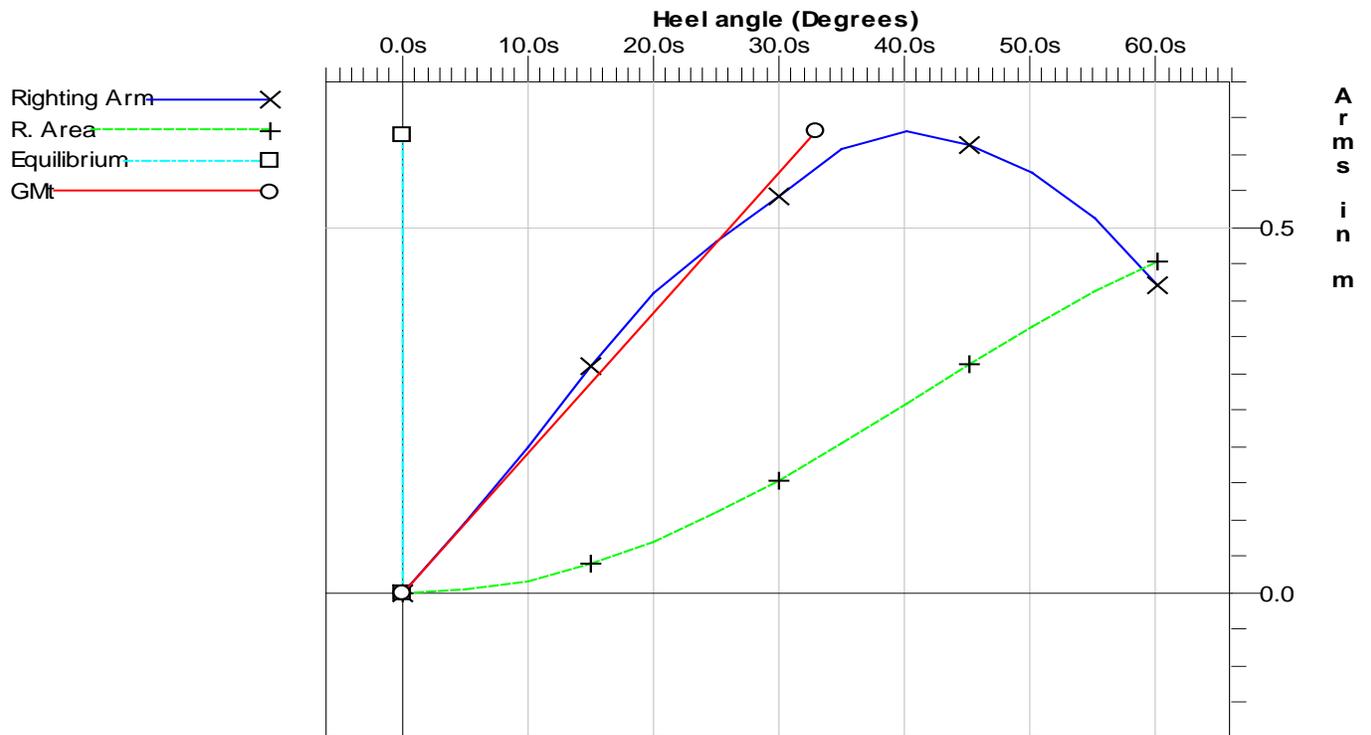
Fluid Name	Legend	Weight (MT)	Load%
FUEL OIL		69.07	10.00%
FRESH WATER		6.72	10.00%
WATER BALLAST		282.79	50.62%

**CONDITION 7
OPEN WATER NO DECK CARGO
PORT ARRIVAL, 10% CONSUMABLES**

STAB 6 CRITERIA

Limit	Min/Max	Actual	Margin	Pass
(1) Angle from 0.00 deg to MaxRA	>25.00 deg	40.00	15.00	Yes
(2) Area from Abs 0.00 deg to Abs 30.00	>0.0550 m-R	0.155	0.100	Yes
(3) Area from Abs 0.00 deg to Abs 40.00 or Flood	>0.0900 m-R	0.259	0.169	Yes
(4) Area from Abs 30.00 deg to Abs 40.00 or Flood	>0.0300 m-R	0.105	0.075	Yes
(5) Righting Arm at 30.00 deg	>0.200 m	0.544	0.344	Yes
(6) GM at Equilibrium	>0.150 m	1.104	0.954	Yes

Righting Arms vs. Heel - STAB 6 CRITERIA



**CONDITION 8
OPEN WATER WITH DECK CARGO
PORT DEPARTURE, MAX CONSUMABLES**

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	2,172.25	0.406a	0.000	5.858
BUOYTENDER BARGE	8.75	1.490f	0.000	10.200
CREW & EFFECTS	5.00	14.000f	0.000	11.000
DECK EQUIPMENT	5.00	18.600a	0.000	7.570
DECK LOAD	350.00	18.000a	0.000	7.700
ER STORES	2.00	7.650f	0.000	4.000
MISC. LUBE OIL / DIRTY OIL	8.00	8.490a	0.000	4.230
STORES & PROVISIONS	10.00	19.000f	0.000	8.000
TRIMMING WEIGHT	8.17	29.060a	0.000	7.200
ZODIAC WORK BOAT	0.92	3.510a	0.000	10.200
Total Fixed:	2,570.09	2.838a	0.000	6.145

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
FO1.C	0.850	100.00%	165.01	10.580f	0.000	1.487	0.0
FO3.C	0.850	100.00%	68.22	17.139a	0.000	2.232	0.0
FO3.P	0.850	100.00%	78.86	17.050a	4.722p	4.057	0.0
FO3.S	0.850	100.00%	73.19	16.932a	4.771s	3.951	0.0
FO4.P	0.850	100.00%	56.64	23.879a	2.107p	4.717	0.0
FO4.S	0.850	100.00%	56.64	23.879a	2.107s	4.717	0.0
FO2.P	0.850	98.00%	61.86	7.569a	2.758p	0.742	109.0
FO2.S	0.850	98.00%	61.86	7.569a	2.738s	0.742	109.0
FODAY.P	0.850	90.00%	29.63	13.989f	2.072p	4.610	12.4
FOSET.S	0.850	90.00%	29.63	13.989f	2.068s	4.610	12.4
FW.P	1.000	100.00%	33.61	3.297f	6.378p	3.669	0.4*
SAN.S	1.000	100.00%	33.61	3.297f	6.378s	3.669	0.4*
WB1.C	1.000	40.00%	25.12	24.390f	0.015p	4.227	159.4*
Totals:		55.17%	773.90	5.150a	0.032p	2.919	402.9

FSM Notes

* Max. FSM is the Maximum Free Surface Moment of any load at the present heel and trim. It may not be the current FSM.

** FSM is predefined. It may not be the current FSM.

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
Light Ship	2,172.25	0.406a	0.000	5.858
Deadweight	1,171.73	8.874a	0.021p	4.545
Displacement	3,343.98	3.373a	0.007p	5.398

LCF (m)	4.087a	KMt (m)	6.778	Draft LCF Baseline (m)	5.958
LCB (m)	3.390a	KML (m)	69.486	Draft aft marks USK (m)	6.195
VCB (m)	3.473	FSC (m)	0.120	Draft fwd marks USK (m)	5.706
MCT (MT/cm)	38.36	GMs (m)	1.379	Draft AP Baseline (m)	6.176
TPC (MT/cm)	7.79	GMf (m)	1.259	Draft FP Baseline (m)	5.670
Loadline Height (m)	0.004	Trim (m)	0.479a	Draft MS Baseline (m)	5.923

**CONDITION 8
OPEN WATER WITH DECK CARGO
PORT DEPARTURE, MAX CONSUMABLES**



Fluid Legend

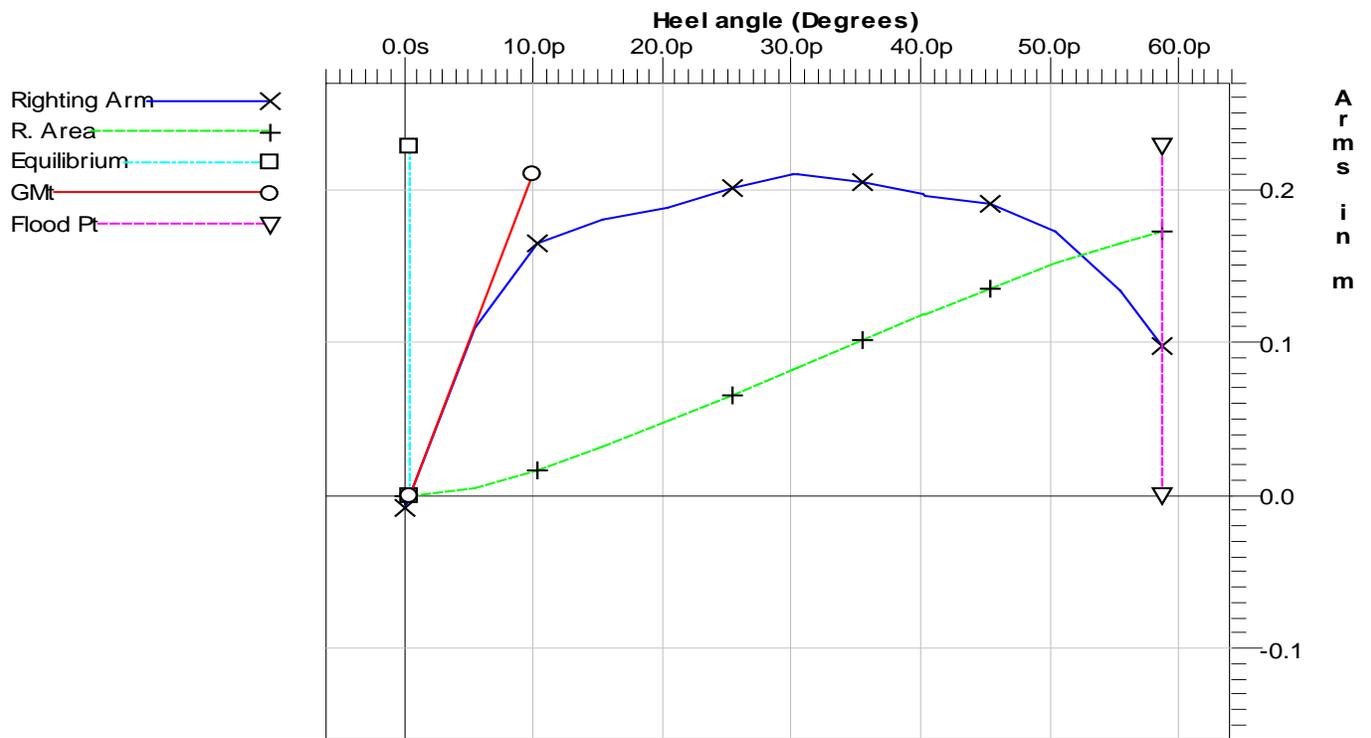
Fluid Name	Legend	Weight (MT)	Load%
FUEL OIL		681.55	98.68%
FRESH WATER		67.22	100.00%
WATER BALLAST		25.12	4.50%

**CONDITION 8
OPEN WATER WITH DECK CARGO
PORT DEPARTURE, MAX CONSUMABLES**

STAB 6 CRITERIA

Limit	Min/Max	Actual	Margin	Pass
(1) Angle from 0.00 deg to MaxRA	>25.00 deg	30.00	5.00	Yes
(2) Area from Abs 0.00 deg to Abs 30.00	>0.0550 m-R	0.082	0.027	Yes
(3) Area from Abs 0.00 deg to Abs 40.00 or Flood	>0.0900 m-R	0.118	0.028	Yes
(4) Area from Abs 30.00 deg to Abs 40.00 or Flood	>0.0300 m-R	0.036	0.006	Yes
(5) Righting Arm at 30.00 deg	>0.200 m	0.210	0.010	Yes
(6) GM at Equilibrium	>0.150 m	1.259	1.109	Yes

Righting Arms vs. Heel - STAB 6 CRITERIA



**CONDITION 9
OPEN WATER WITH DECK CARGO
MID-TRIP, 50% CONSUMABLES**

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	2,172.25	0.406a	0.000	5.858
BUOYTENDER BARGE	8.75	1.490f	0.000	10.200
CREW & EFFECTS	5.00	14.000f	0.000	11.000
DECK EQUIPMENT	5.00	18.600a	0.000	7.570
DECK LOAD	350.00	18.000a	0.000	7.700
ER STORES	2.00	7.650f	0.000	4.000
MISC. LUBE OIL / DIRTY OIL	6.00	8.490a	0.000	4.230
STORES & PROVISIONS	5.00	19.000f	0.000	8.000
TRIMMING WEIGHT	8.17	29.060a	0.000	7.200
ZODIAC WORK BOAT	0.92	3.510a	0.000	10.200
Total Fixed:	2,563.09	2.877a	0.000	6.142

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
FO1.C	0.850	100.00%	165.01	10.580f	0.000	1.487	0.0
FO3.C	0.850	11.45%	7.81	16.836a	0.000	0.381	7.2
FO4.P	0.850	100.00%	56.64	23.879a	2.107p	4.717	0.0
FO4.S	0.850	100.00%	56.64	23.879a	2.107s	4.717	0.0
FODAY.P	0.850	90.00%	29.63	13.990f	2.070p	4.610	12.4
FOSET.S	0.850	90.00%	29.63	13.990f	2.070s	4.610	12.4
FW.P	1.000	50.00%	16.80	3.205f	6.358p	2.126	0.4*
SAN.S	1.000	50.00%	16.80	3.205f	6.358s	2.126	0.4*
WB4.P	1.000	50.00%	18.00	9.055a	6.406p	2.005	0.4*
WB4.S	1.000	50.00%	18.00	9.055a	6.406s	2.005	0.4*
Totals:		29.58%	414.98	1.156a	0.000	2.891	33.6

FSM Notes

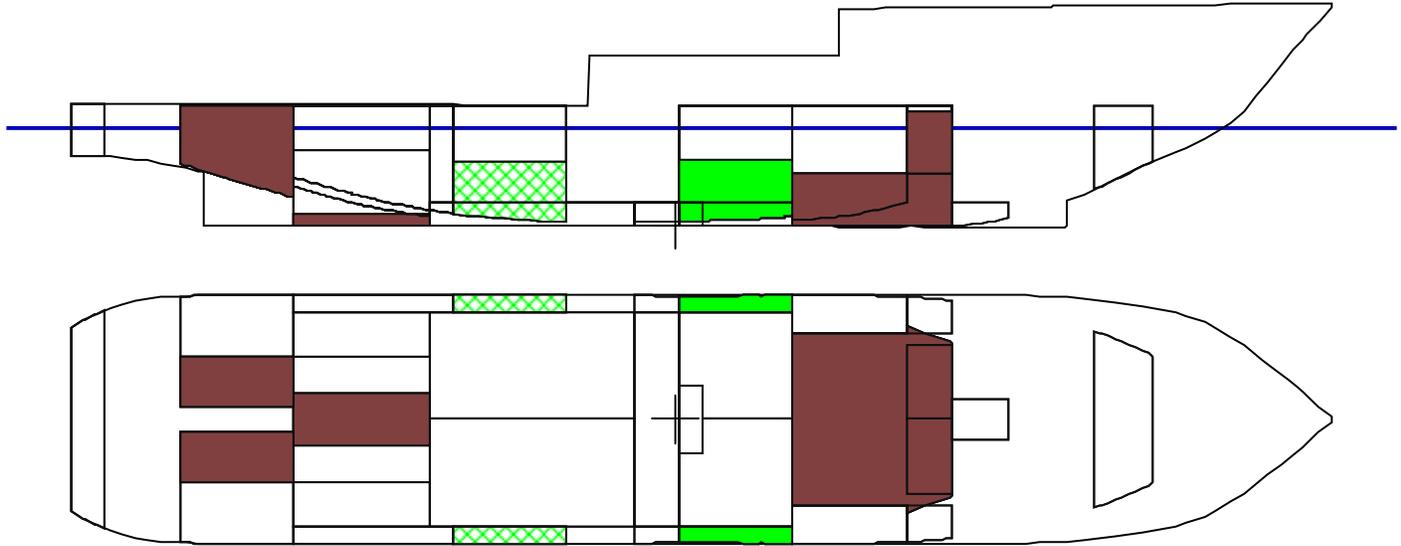
* Max. FSM is the Maximum Free Surface Moment of any load at the present heel and trim. It may not be the current FSM.

** FSM is predefined. It may not be the current FSM.

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
Light Ship	2,172.25	0.406a	0.000	5.858
Deadweight	805.82	8.651a	0.000	5.235
Displacement	2,978.07	2.637a	0.000	5.689

LCF (m)	4.037a	KMt (m)	6.800	Draft LCF Baseline (m)	5.485
LCB (m)	2.635a	KML (m)	74.664	Draft aft marks USK (m)	5.490
VCB (m)	3.194	FSC (m)	0.011	Draft fwd marks USK (m)	5.523
MCT (MT/cm)	36.83	GMs (m)	1.110	Draft AP Baseline (m)	5.471
TPC (MT/cm)	7.68	GMf (m)	1.099	Draft FP Baseline (m)	5.505
Loadline Height (m)	0.439	Trim (m)	0.032f	Draft MS Baseline (m)	5.488

**CONDITION 9
OPEN WATER WITH DECK CARGO
MID-TRIP, 50% CONSUMABLES**



Fluid Legend

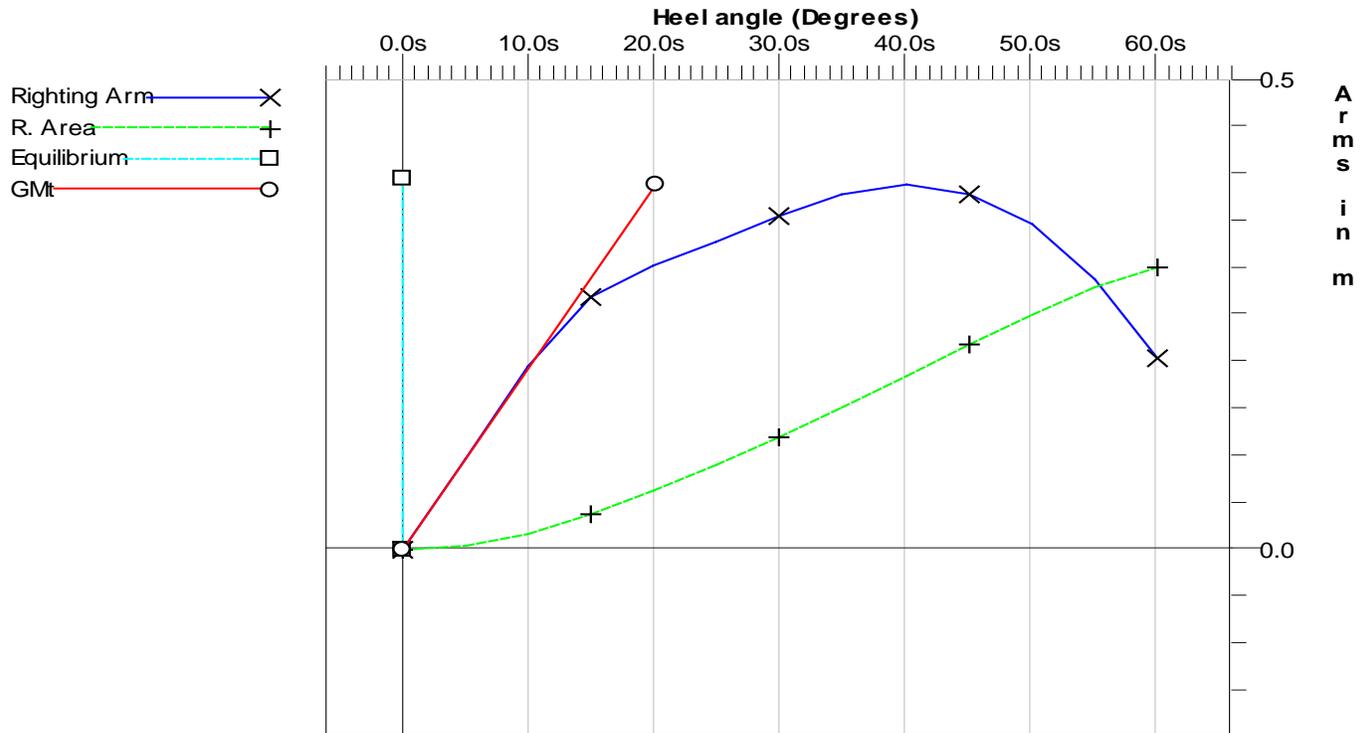
Fluid Name	Legend	Weight (MT)	Load%
FUEL OIL		345.37	50.01%
FRESH WATER		33.61	50.00%
WATER BALLAST		36.00	6.44%

**CONDITION 9
OPEN WATER WITH DECK CARGO
MID-TRIP, 50% CONSUMABLES**

STAB 6 CRITERIA

Limit	Min/Max	Actual	Margin	Pass
(1) Angle from 0.00 deg to MaxRA	>25.00 deg	40.00	15.00	Yes
(2) Area from Abs 0.00 deg to Abs 30.00	>0.0550 m-R	0.120	0.065	Yes
(3) Area from Abs 0.00 deg to Abs 40.00 or Flood	>0.0900 m-R	0.185	0.095	Yes
(4) Area from Abs 30.00 deg to Abs 40.00 or Flood	>0.0300 m-R	0.066	0.036	Yes
(5) Righting Arm at 30.00 deg	>0.200 m	0.356	0.156	Yes
(6) GM at Equilibrium	>0.150 m	1.099	0.949	Yes

Righting Arms vs. Heel - STAB 6 CRITERIA



CONDITION 10
OPEN WATER WITH DECK CARGO
PORT ARRIVAL, 10% CONSUMABLES

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	2,172.25	0.406a	0.000	5.858
BUOYTENDER BARGE	8.75	1.490f	0.000	10.200
CREW & EFFECTS	5.00	14.000f	0.000	11.000
DECK EQUIPMENT	5.00	18.600a	0.000	7.570
DECK LOAD	350.00	18.000a	0.000	7.700
ER STORES	2.00	7.650f	0.000	4.000
MISC. LUBE OIL / DIRTY OIL	4.00	8.490a	0.000	4.230
STORES & PROVISIONS	1.00	19.000f	0.000	8.000
TRIMMING WEIGHT	8.17	29.060a	0.000	7.200
ZODIAC WORK BOAT	0.92	3.510a	0.000	10.200
Total Fixed:	2,557.09	2.906a	0.000	6.141

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
FO2.P	0.850	7.76%	4.90	7.002a	1.489p	0.144	78.0
FO2.S	0.850	7.76%	4.90	7.002a	1.489s	0.144	78.0
FODAY.P	0.850	90.00%	29.63	13.990f	2.070p	4.610	12.4
FOSET.S	0.850	90.00%	29.63	13.990f	2.070s	4.610	12.4
FW.P	1.000	10.00%	3.36	2.832f	6.320p	0.767	0.4*
SAN.S	1.000	10.00%	3.36	2.832f	6.320s	0.767	0.4*
WB4.P	1.000	100.00%	36.00	9.095a	6.407p	3.570	0.4*
WB4.S	1.000	100.00%	36.00	9.095a	6.407s	3.570	0.4*
Totals:		10.54%	147.80	0.843f	0.000	3.633	182.3

FSM Notes

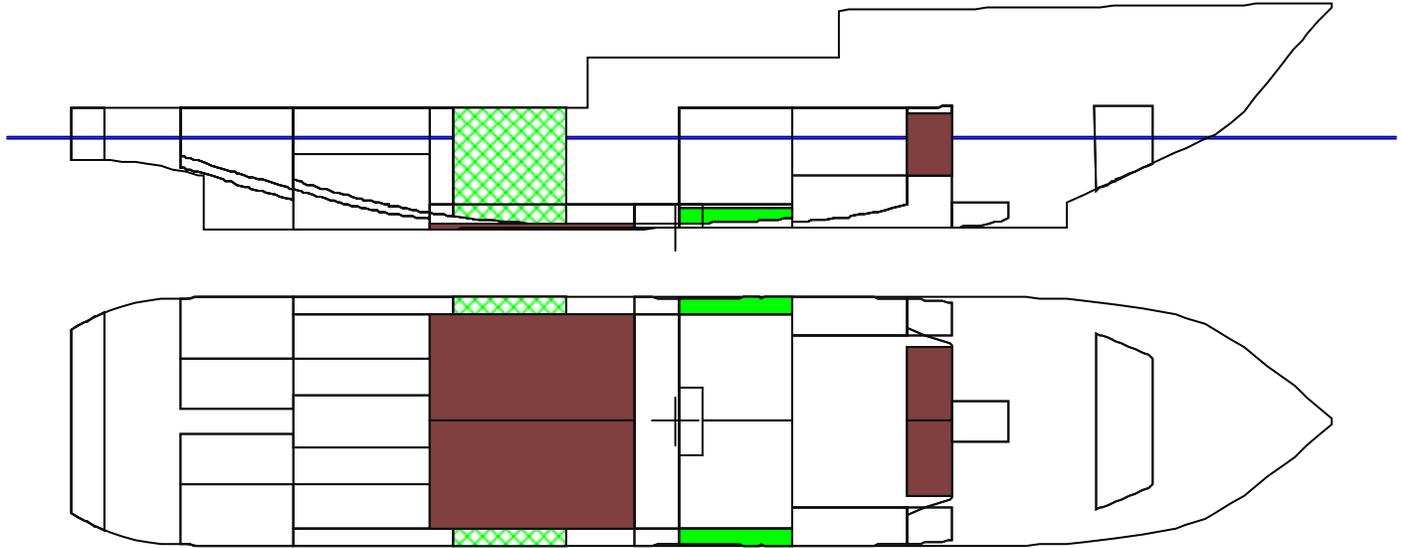
* Max. FSM is the Maximum Free Surface Moment of any load at the present heel and trim. It may not be the current FSM.

** FSM is predefined. It may not be the current FSM.

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
Light Ship	2,172.25	0.406a	0.000	5.858
Deadweight	532.63	12.064a	0.000	6.599
Displacement	2,704.89	2.702a	0.000	6.004

LCF (m)	4.205a	KMt (m)	6.829	Draft LCF Baseline (m)	5.126
LCB (m)	2.708a	KML (m)	76.992	Draft aft marks USK (m)	5.204
VCB (m)	2.981	FSC (m)	0.067	Draft fwd marks USK (m)	5.071
MCT (MT/cm)	34.40	GMs (m)	0.825	Draft AP Baseline (m)	5.186
TPC (MT/cm)	7.52	GMf (m)	0.758	Draft FP Baseline (m)	5.047
Loadline Height (m)	0.811	Trim (m)	0.131a	Draft MS Baseline (m)	5.116

**CONDITION 10
OPEN WATER WITH DECK CARGO
PORT ARRIVAL, 10% CONSUMABLES**



Fluid Legend

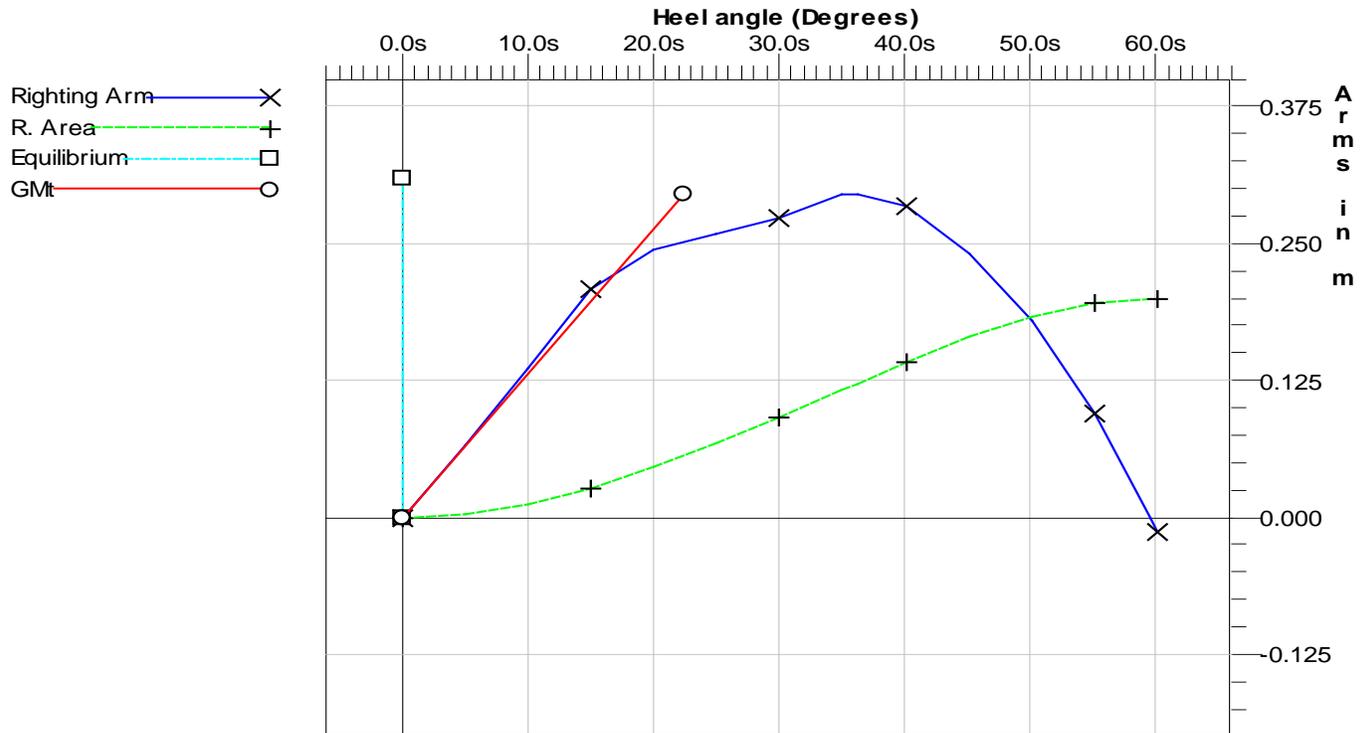
Fluid Name	Legend	Weight (MT)	Load%
FUEL OIL		69.07	10.00%
FRESH WATER		6.72	10.00%
WATER BALLAST		72.01	12.89%

**CONDITION 10
OPEN WATER WITH DECK CARGO
PORT ARRIVAL, 10% CONSUMABLES**

STAB 6 CRITERIA

Limit	Min/Max	Actual	Margin	Pass
(1) Angle from 0.00 deg to MaxRA	>25.00 deg	36.20	11.20	Yes
(2) Area from Abs 0.00 deg to Abs 30.00	>0.0550 m-R	0.092	0.037	Yes
(3) Area from Abs 0.00 deg to Abs 40.00 or Flood	>0.0900 m-R	0.142	0.052	Yes
(4) Area from Abs 30.00 deg to Abs 40.00 or Flood	>0.0300 m-R	0.050	0.020	Yes
(5) Righting Arm at 30.00 deg	>0.200 m	0.273	0.073	Yes
(6) GM at Equilibrium	>0.150 m	0.758	0.608	Yes

Righting Arms vs. Heel - STAB 6 CRITERIA



**CONDITION 11
BUOY HANDLING
MID VOYAGE, 50% CONSUMABLES**

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	2,172.25	0.406a	0.000	5.858
BUOY ON CRANE	15.00	19.760a	20.000s	22.880
BUOY ON DECK	15.00	21.000a	0.000	7.700
BUOYTENDER BARGE	8.75	1.490f	0.000	10.200
CONTAINER	2.00	8.000a	0.000	7.920
CREW & EFFECTS	5.00	14.000f	0.000	11.000
DECK EQUIPMENT	5.00	18.600a	0.000	7.570
ER STORES	2.00	7.650f	0.000	4.000
MISC. LUBE OIL / DIRTY OIL	6.00	8.490a	0.000	4.230
STORES & PROVISIONS	5.00	19.000f	0.000	8.000
TRIMMING WEIGHT	8.17	29.060a	0.000	7.200
ZODIAC WORK BOAT	0.92	3.510a	0.000	10.200
Total Fixed:	2,245.09	0.757a	0.134s	6.023

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
FO3.C	0.850	100.00%	68.22	17.139a	0.000	2.232	0.0
FO3.P	0.850	66.31%	52.29	16.951a	4.700p	3.163	7.3
FO3.S	0.850	71.44%	52.29	16.903a	4.750s	3.178	6.0
FO4.P	0.850	100.00%	56.64	23.879a	2.107p	4.717	0.0
FO4.S	0.850	100.00%	56.64	23.879a	2.107s	4.717	0.0
FODAY.P	0.850	90.00%	29.63	13.989f	2.030p	4.612	12.5
FOSET.S	0.850	90.00%	29.63	13.989f	2.110s	4.612	12.5
FW.P	1.000	50.00%	16.80	3.198f	6.355p	2.127	0.4*
SAN.S	1.000	50.00%	16.80	3.198f	6.360s	2.127	0.4*
WB6.S	1.000	50.00%	32.37	23.495a	5.101s	4.200	19.3*
WB6.P	1.000	50.00%	32.37	23.504a	4.995p	4.200	19.3*
Totals:		31.63%	443.70	14.039a	0.019s	3.685	77.7

FSM Notes

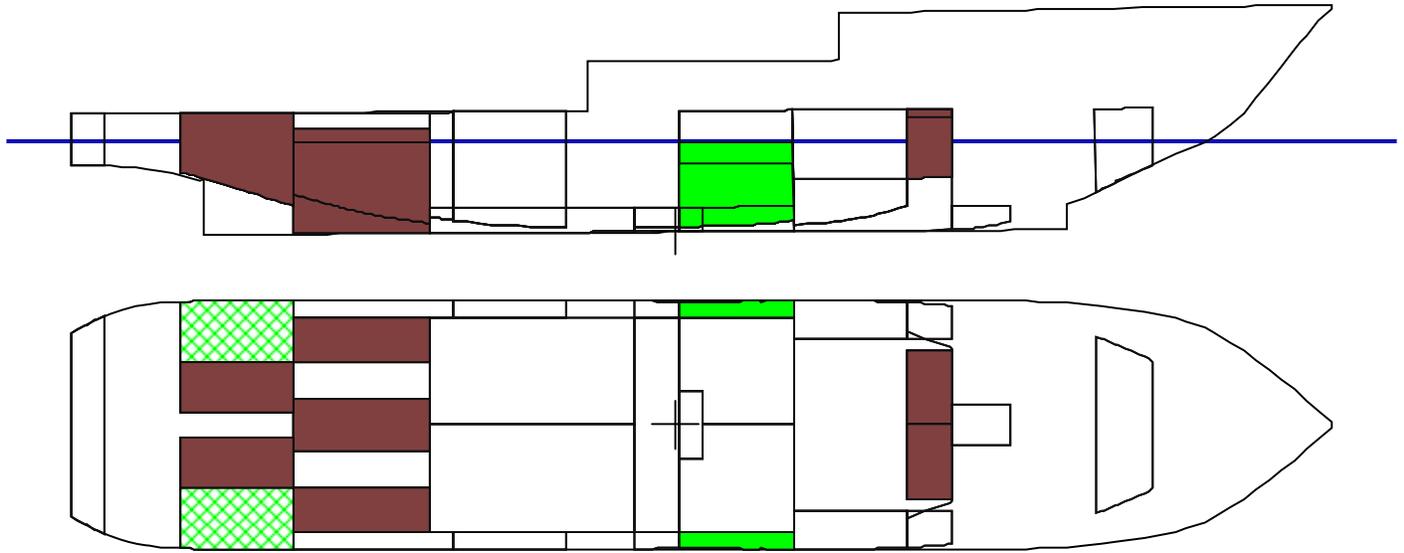
* Max. FSM is the Maximum Free Surface Moment of any load at the present heel and trim. It may not be the current FSM.

** FSM is predefined. It may not be the current FSM.

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
Light Ship	2,172.25	0.406a	0.000	5.858
Deadweight	516.54	13.645a	0.597s	4.710
Displacement	2,688.79	2.949a	0.115s	5.638

LCF (m)	4.269a	KMt (m)	6.869	Draft LCF Baseline (m)	5.098
LCB (m)	2.996a	KML (m)	76.604	Draft aft marks USK (m)	5.239
VCB (m)	2.986	FSC (m)	0.029	Draft fwd marks USK (m)	4.912
MCT (MT/cm)	34.21	GMs (m)	1.232	Draft AP Baseline (m)	5.220
TPC (MT/cm)	7.50	GMf (m)	1.203	Draft FP Baseline (m)	4.882
Loadline Height (m)	0.849	Trim (m)	0.320a	Draft MS Baseline (m)	5.074

**CONDITION 11
BUOY HANDLING
MID VOYAGE, 50% CONSUMABLES**



Fluid Legend

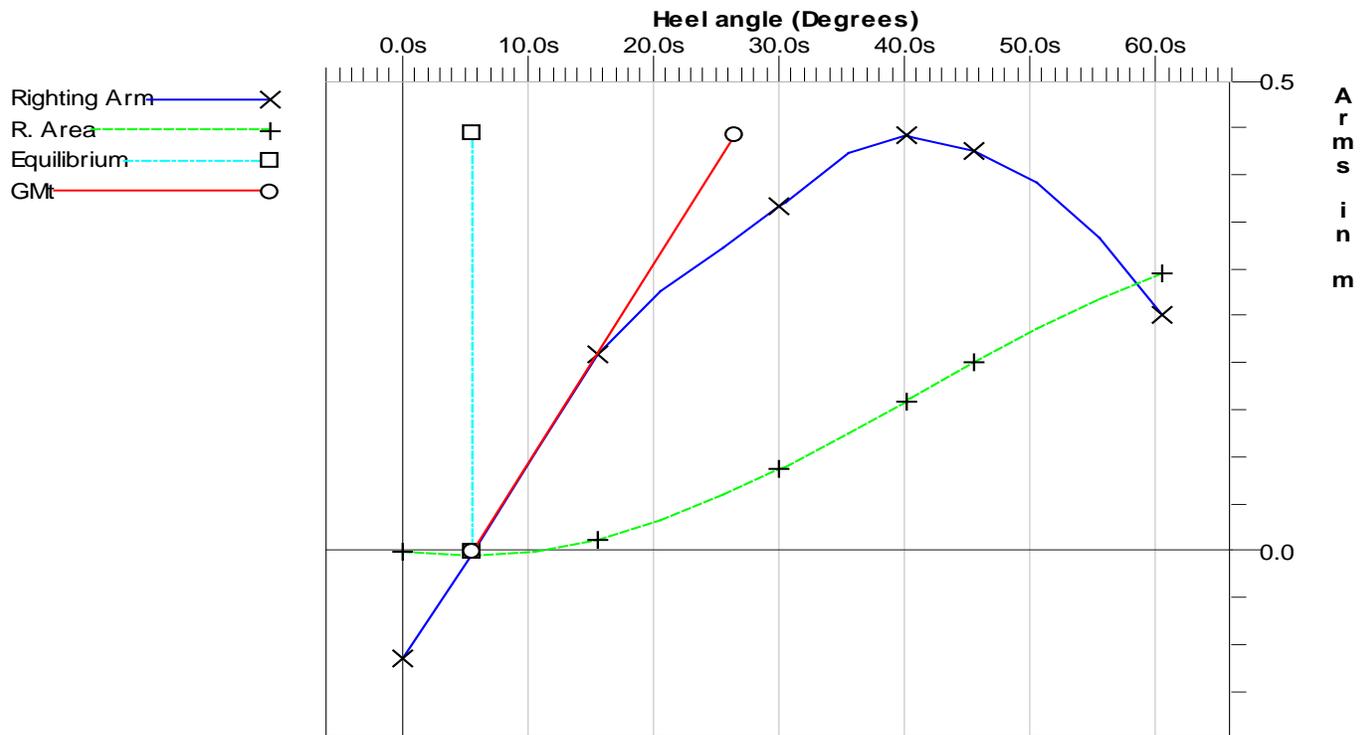
Fluid Name	Legend	Weight (MT)	Load%
FUEL OIL		345.35	50.00%
FRESH WATER		33.61	50.00%
WATER BALLAST		64.74	11.59%

**CONDITION 11
BUOY HANDLING
MID VOYAGE, 50% CONSUMABLES**

STAB 6 CRITERIA

Limit	Min/Max	Actual	Margin	Pass
(1) Angle from 0.00 deg to MaxRA	>25.00 deg	34.60	9.60	Yes
(2) Area from Abs 0.00 deg to Abs 30.00	>0.0550 m-R	0.088	0.033	Yes
(3) Area from Abs 0.00 deg to Abs 40.00 or Flood	>0.0900 m-R	0.160	0.070	Yes
(4) Area from Abs 30.00 deg to Abs 40.00 or Flood	>0.0300 m-R	0.072	0.042	Yes
(5) Righting Arm at 30.00 deg	>0.200 m	0.425	0.225	Yes
(6) GM at Equilibrium	>0.150 m	1.203	1.053	Yes

Righting Arms vs. Heel - STAB 6 CRITERIA



**CONDITION 12
BUOY HANDLING
PORT ARRIVAL - 10% CONSUMABLES**

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	2,172.25	0.406a	0.000	5.858
BUOY ON CRANE	15.00	19.760a	20.000s	22.880
BUOY ON DECK	15.00	21.000a	0.000	7.700
BUOYTENDER BARGE	8.75	1.490f	0.000	10.200
CONTAINER	2.00	8.000a	0.000	7.920
CREW & EFFECTS	5.00	14.000f	0.000	11.000
DECK EQUIPMENT	5.00	18.600a	0.000	7.570
ER STORES	2.00	7.650f	0.000	4.000
MISC. LUBE OIL / DIRTY OIL	4.00	8.490a	0.000	4.230
STORES & PROVISIONS	1.00	19.000f	0.000	8.000
TRIMMING WEIGHT	8.17	29.060a	0.000	7.200
ZODIAC WORK BOAT	0.92	3.510a	0.000	10.200
Total Fixed:	2,239.09	0.786a	0.134s	6.022

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
FO2.P	0.850	7.76%	4.90	7.256a	0.799p	0.174	11.4
FO2.S	0.850	7.76%	4.90	5.749a	4.455s	0.320	53.7
FODAY.P	0.850	90.00%	29.63	13.991f	2.016p	4.613	12.7
FOSET.S	0.850	90.00%	29.63	13.991f	2.123s	4.613	12.7
FW.P	1.000	10.00%	3.36	2.877f	6.309p	0.768	0.4*
SAN.S	1.000	10.00%	3.36	2.846f	6.329s	0.768	0.4*
WB5.P	1.000	100.00%	40.65	16.333a	6.405p	4.141	0.6*
WB5.S	1.000	100.00%	40.65	16.333a	6.405s	4.141	0.7*
WB6.S	1.000	100.00%	64.75	23.805a	5.123s	5.053	19.5*
WB6.P	1.000	100.00%	64.75	23.805a	5.123p	5.053	19.5*
Totals:		20.43%	286.58	12.651a	0.074s	4.439	132.4

FSM Notes

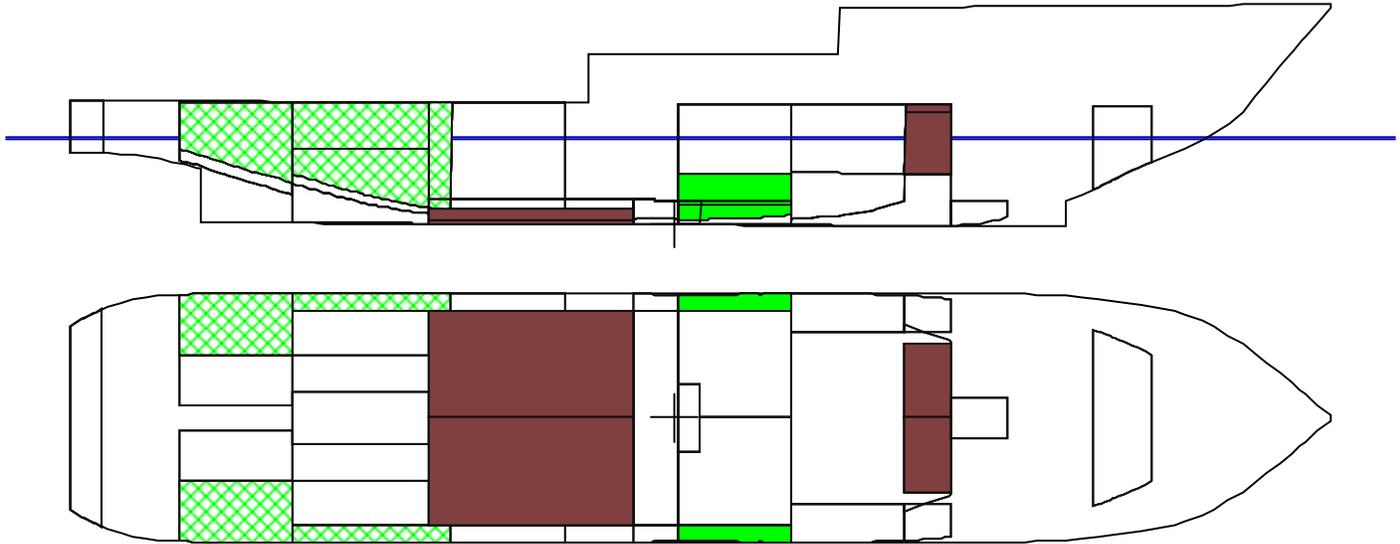
* Max. FSM is the Maximum Free Surface Moment of any load at the present heel and trim. It may not be the current FSM.

** FSM is predefined. It may not be the current FSM.

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
Light Ship	2,172.25	0.406a	0.000	5.858
Deadweight	353.41	12.742a	0.909s	5.743
Displacement	2,525.66	2.132a	0.127s	5.842

LCF (m)	3.687a	KMt (m)	6.895	Draft LCF Baseline (m)	4.872
LCB (m)	2.119a	KML (m)	78.016	Draft aft marks USK (m)	4.732
VCB (m)	2.870	FSC (m)	0.052	Draft fwd marks USK (m)	4.995
MCT (MT/cm)	30.92	GMs (m)	1.053	Draft AP Baseline (m)	4.714
TPC (MT/cm)	7.38	GMf (m)	1.001	Draft FP Baseline (m)	4.985
Loadline Height (m)	1.030	Trim (m)	0.272f	Draft MS Baseline (m)	4.889

**CONDITION 12
BUOY HANDLING
PORT ARRIVAL - 10% CONSUMABLES**



Fluid Legend

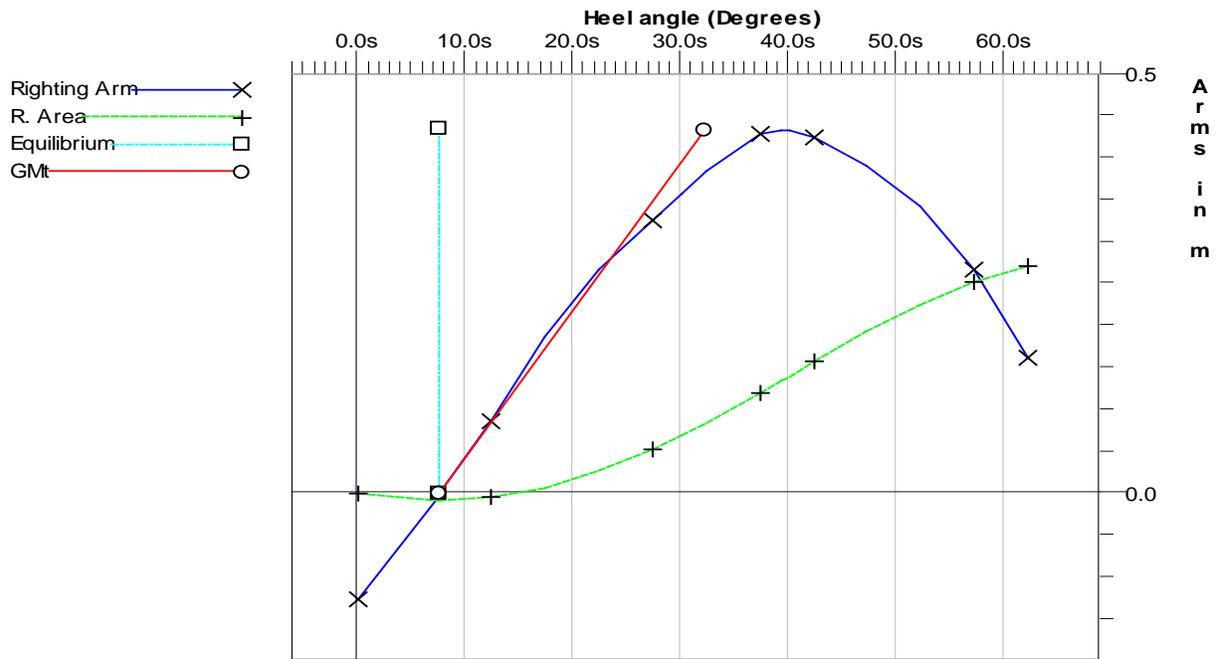
Fluid Name	Legend	Weight (MT)	Load%
FUEL OIL		69.07	10.00%
FRESH WATER		6.72	10.00%
WATER BALLAST		210.78	37.73%

**CONDITION 12
BUOY HANDLING
PORT ARRIVAL - 10% CONSUMABLES**

STAB 6 CRITERIA

Limit	Min/Max	Actual	Margin	Pass
(1) Angle from 0.00 deg to MaxRA	>25.00 deg	32.00	7.00	Yes
(2) Area from Abs 0.00 deg to Abs 30.00	>0.0550 m-R	0.069	0.014	Yes
(3) Area from Abs 0.00 deg to Abs 40.00 or Flood	>0.0900 m-R	0.139	0.049	Yes
(4) Area from Abs 30.00 deg to Abs 40.00 or Flood	>0.0300 m-R	0.071	0.041	Yes
(5) Righting Arm at 30.00 deg	>0.200 m	0.429	0.229	Yes
(6) GMt at Equilibrium	>0.150 m	1.008	0.858	Yes

Righting Arms vs. Heel - STAB 6 CRITERIA



**CONDITION 13
SALT WATER TRANSIT
PORT DEPARTURE, MAX CONSUMABLES**

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	2,172.25	0.406a	0.000	5.858
BUOYTENDER BARGE	8.75	1.490f	0.000	10.200
CREW & EFFECTS	5.00	14.000f	0.000	11.000
DECK EQUIPMENT	5.00	18.600a	0.000	7.570
ER STORES	2.00	7.650f	0.000	4.000
MISC. LUBE OIL / DIRTY OIL	8.00	8.490a	0.000	4.230
STORES & PROVISIONS	10.00	19.000f	0.000	8.000
TRIMMING WEIGHT	8.17	29.060a	0.000	7.200
ZODIAC WORK BOAT	0.92	3.510a	0.000	10.200
Total Fixed:	2,220.09	0.448a	0.000	5.899

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
FO1.C	0.850	100.00%	165.01	10.580f	0.000	1.487	0.0
FO3.C	0.850	100.00%	68.22	17.139a	0.000	2.232	0.0
FO3.P	0.850	100.00%	78.86	17.050a	4.722p	4.057	0.0
FO3.S	0.850	100.00%	73.19	16.932a	4.771s	3.951	0.0
FO4.P	0.850	100.00%	56.64	23.879a	2.107p	4.717	0.0
FO4.S	0.850	100.00%	56.64	23.879a	2.107s	4.717	0.0
FO2.P	0.850	98.00%	61.86	7.532a	2.749p	0.741	161.8
FO2.S	0.850	98.00%	61.86	7.532a	2.749s	0.741	161.8
FODAY.P	0.850	90.00%	29.63	13.990f	2.070p	4.610	12.4
FOSET.S	0.850	90.00%	29.63	13.990f	2.070s	4.610	12.4
FW.P	1.000	100.00%	33.61	3.297f	6.378p	3.669	0.4*
SAN.S	1.000	100.00%	33.61	3.297f	6.378s	3.669	0.4*
WB5.P	1.025	16.00%	6.67	14.898a	6.393p	1.833	0.6*
WB5.S	1.025	25.00%	10.42	15.440a	6.397s	2.139	0.6*
WB6.S	1.025	100.00%	66.36	23.805a	5.123s	5.053	19.5*
WB6.P	1.025	100.00%	66.36	23.805a	5.123p	5.053	19.5*
Totals:			898.58	8.918a	0.001s	3.181	389.5

FSM Notes

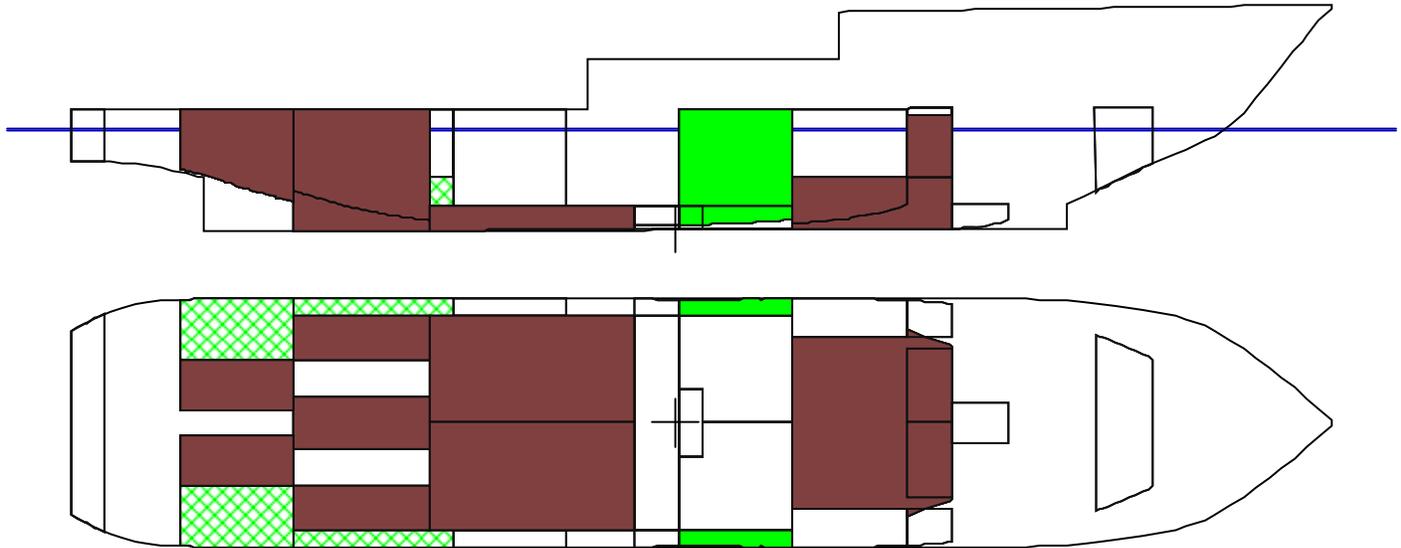
* Max. FSM is the Maximum Free Surface Moment of any load at the present heel and trim. It may not be the current FSM.

** FSM is predefined. It may not be the current FSM.

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
Light Ship	2,172.25	0.406a	0.000	5.858
Deadweight	946.42	8.587a	0.000	3.413
Displacement	3,118.67	2.889a	0.000	5.116

LCF (m)	4.114a	KMt (m)	6.796	Draft LCF Baseline (m)	5.570
LCB (m)	2.894a	KML (m)	73.374	Draft aft marks USK (m)	5.656
VCB (m)	3.244	FSC (m)	0.125	Draft fwd marks USK (m)	5.504
MCT (MT/cm)	36.06	GMs (m)	1.680	Draft AP Baseline (m)	5.637
TPC (MT/cm)	7.89	GMf (m)	1.555	Draft FP Baseline (m)	5.480
Loadline Height (m)	0.245	Trim (m)	0.157a	Draft MS Baseline (m)	5.559

**CONDITION 13
SALT WATER TRANSIT
PORT DEPARTURE, MAX CONSUMABLES**



Fluid Legend

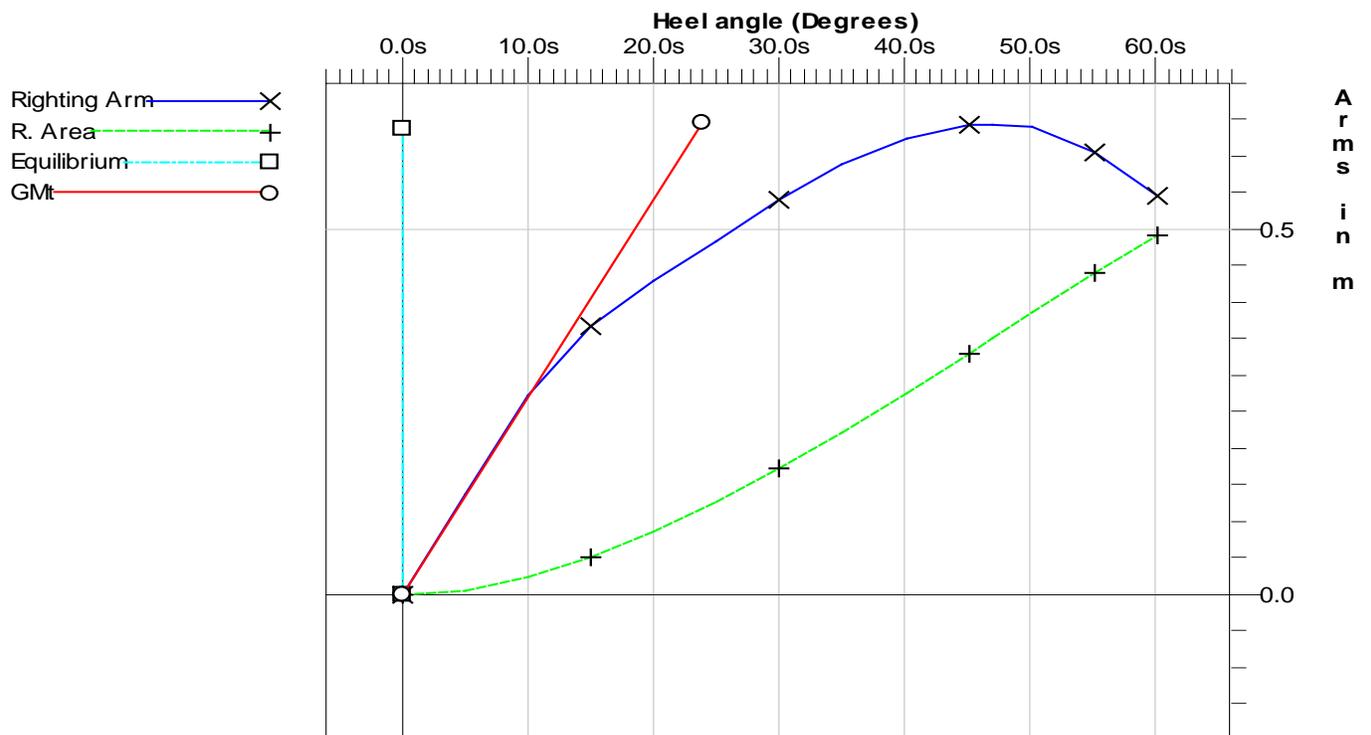
Fluid Name	Legend	Weight (MT)	Load%
FUEL OIL		681.56	98.68%
FRESH WATER		67.22	100.00%
WATER BALLAST		149.81	26.20%

**CONDITION 13
SALT WATER TRANSIT
PORT DEPARTURE, MAX CONSUMABLES**

STAB 6 CRITERIA

Limit	Min/Max	Actual	Margin	Pass
(1) Angle from 0.00 deg to MaxRA	>25.00 deg	47.00	22.00	Yes
(2) Area from Abs 0.00 deg to Abs 30.00	>0.0550 m-R	0.171	0.116	Yes
(3) Area from Abs 0.00 deg to Abs 40.00 or Flood	>0.0900 m-R	0.273	0.183	Yes
(4) Area from Abs 30.00 deg to Abs 40.00 or Flood	>0.0300 m-R	0.102	0.072	Yes
(5) Righting Arm at 30.00 deg	>0.200 m	0.538	0.338	Yes
(6) GM at Equilibrium	>0.150 m	1.555	1.405	Yes

Righting Arms vs. Heel - STAB 6 CRITERIA



CONDITION 14
SALT WATER TRANSIT
MID-TRIP, 50% CONSUMABLES

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	2,172.25	0.406a	0.000	5.858u
BUOYTENDER BARGE	8.75	1.490f	0.000	10.200u
CREW & EFFECTS	5.00	14.000f	0.000	11.000u
DECK EQUIPMENT	5.00	18.600a	0.000	7.570u
ER STORES	2.00	7.650f	0.000	4.000u
MISC. LUBE OIL / DIRTY OIL	6.00	8.490a	0.000	4.230u
STORES & PROVISIONS	5.00	19.000f	0.000	8.000u
TRIMMING WEIGHT	8.17	29.060a	0.000	7.200u
ZODIAC WORK BOAT	0.92	3.510a	0.000	10.200u
Total Fixed:	2,213.09	0.485a	0.000	5.896u

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
FO3.C	0.850	100.00%	68.22	17.139a	0.000	2.232	0.0
FO3.P	0.850	66.31%	52.29	16.945a	4.713p	3.162	7.2
FO3.S	0.850	71.44%	52.29	16.894a	4.739s	3.177	5.9
FO4.P	0.850	100.00%	56.64	23.879a	2.107p	4.717	0.0
FO4.S	0.850	100.00%	56.64	23.879a	2.107s	4.717	0.0
FODAY.P	0.850	90.00%	29.63	13.990f	2.070p	4.610	12.4
FOSET.S	0.850	90.00%	29.63	13.990f	2.070s	4.610	12.4
FW.P	1.000	50.00%	16.80	3.202f	6.358p	2.126	0.4*
SAN.S	1.000	50.00%	16.80	3.202f	6.358s	2.126	0.4*
WB6.S	1.025	35.00%	23.23	23.242a	4.999s	3.909	19.5*
WB6.P	1.025	35.00%	23.23	23.242a	4.999p	3.909	19.5*
Totals:			425.41	13.602a	0.003s	3.630	77.6

FSM Notes

* Max. FSM is the Maximum Free Surface Moment of any load at the present heel and trim. It may not be the current FSM.

** FSM is predefined. It may not be the current FSM.

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
Light Ship	2,172.25	0.406a	0.000	5.858
Deadweight	466.25	12.821a	0.003s	4.006
Displacement	2,638.50	2.600a	0.000	5.531

LCF (m)	4.136a	KMt (m)	6.836	Draft LCF Baseline (m)	4.951
LCB (m)	2.605a	KML (m)	77.858	Draft aft marks USK (m)	5.020
VCB (m)	2.876	FSC (m)	0.029	Draft fwd marks USK (m)	4.908
MCT (MT/cm)	32.38	GMs (m)	1.305	Draft AP Baseline (m)	5.001
TPC (MT/cm)	7.60	GMf (m)	1.276	Draft FP Baseline (m)	4.885
Loadline Height (m)	0.861	Trim (m)	0.116a	Draft MS Baseline (m)	4.943

**CONDITION 14
SALT WATER TRANSIT
MID-TRIP, 50% CONSUMABLES**



Fluid Legend

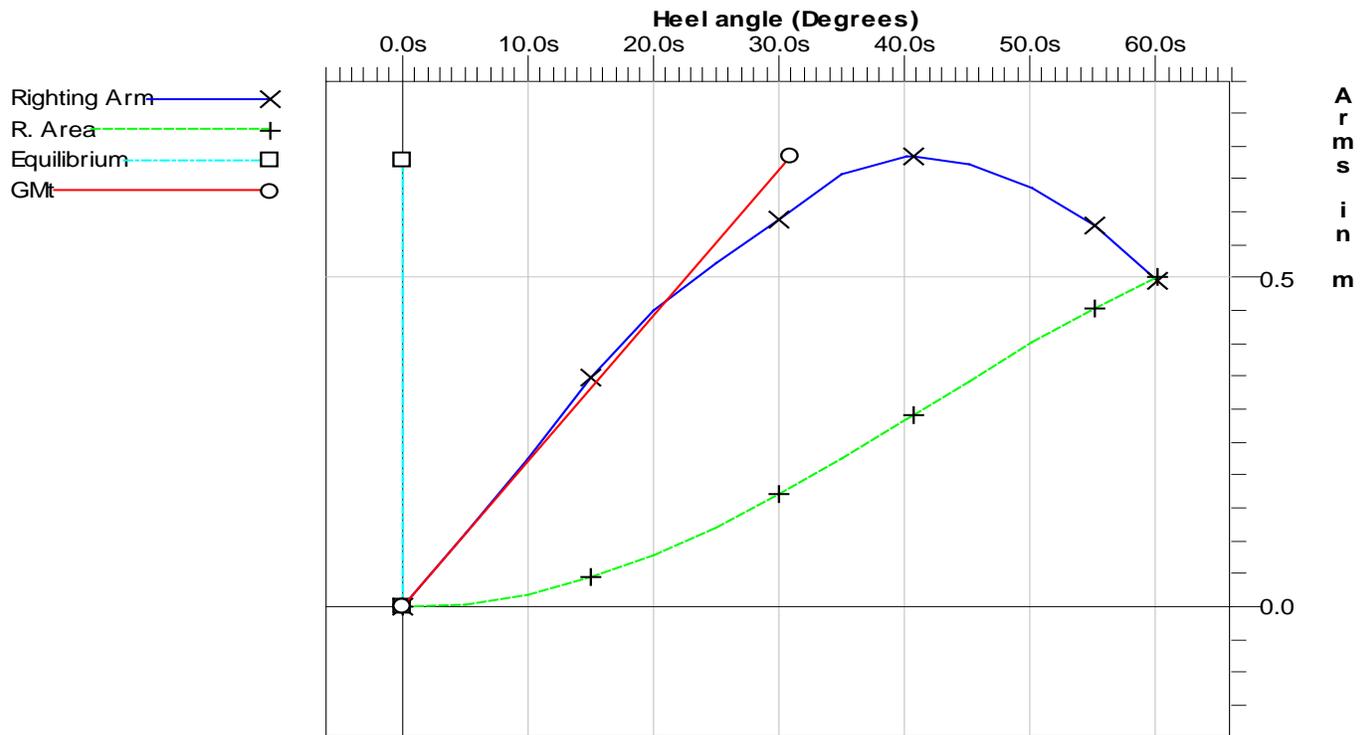
Fluid Name	Legend	Weight (MT)	Load%
FUEL OIL		345.35	50.00%
FRESH WATER		33.61	50.00%
WATER BALLAST		46.45	8.12%

**CONDITION 14
SALT WATER TRANSIT
MID-TRIP, 50% CONSUMABLES**

STAB 6 CRITERIA

Limit	Min/Max	Actual	Margin	Pass
(1) Angle from 0.00 deg to MaxRA	>25.00 deg	40.60	15.60	Yes
(2) Area from Abs 0.00 deg to Abs 30.00	>0.0550 m-R	0.171	0.116	Yes
(3) Area from Abs 0.00 deg to Abs 40.00 or Flood	>0.0900 m-R	0.285	0.195	Yes
(4) Area from Abs 30.00 deg to Abs 40.00 or Flood	>0.0300 m-R	0.113	0.083	Yes
(5) Righting Arm at 30.00 deg	>0.200 m	0.590	Yes	
(6) GM at Equilibrium	>0.150 m	1.276	1.126	Yes

Righting Arms vs. Heel - STAB 6 CRITERIA



CONDITION 15
SALT WATER TRANSIT
PORT ARRIVAL, 10% CONSUMABLES

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	2,172.25	0.406a	0.000	5.858
BUOYTENDER BARGE	8.75	1.490f	0.000	10.200
CREW & EFFECTS	5.00	14.000f	0.000	11.000
DECK EQUIPMENT	5.00	18.600a	0.000	7.570
ER STORES	2.00	7.650f	0.000	4.000
MISC. LUBE OIL / DIRTY OIL	4.00	8.490a	0.000	4.230
STORES & PROVISIONS	1.00	19.000f	0.000	8.000
TRIMMING WEIGHT	8.17	29.060a	0.000	7.200
ZODIAC WORK BOAT	0.92	3.510a	0.000	10.200
Total Fixed:	2,207.09	0.513a	0.000	5.894

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
FO4.P	0.850	8.65%	4.90	22.304a	1.886p	2.594	5.4
FO4.S	0.850	8.65%	4.90	22.304a	1.886s	2.594	5.4
FODAY.P	0.850	90.00%	29.63	13.991f	2.070p	4.610	12.4
FOSET.S	0.850	90.00%	29.63	13.991f	2.070s	4.610	12.4
FW.P	1.000	10.00%	3.36	2.856f	6.319p	0.767	0.4*
SAN.S	1.000	10.00%	3.36	2.856f	6.319s	0.767	0.4*
WB4.P	1.025	100.00%	36.90	9.095a	6.407p	3.570	0.4*
WB4.S	1.025	100.00%	36.90	9.095a	6.407s	3.570	0.4*
WB5.P	1.025	100.00%	41.66	16.333a	6.405p	4.141	0.6*
WB5.S	1.025	100.00%	41.66	16.333a	6.405s	4.141	0.6*
WB6.S	1.025	100.00%	66.36	23.805a	5.123s	5.053	19.5*
WB6.P	1.025	100.00%	66.36	23.805a	5.123p	5.053	19.5*
Totals:			365.65	12.476a	0.000	4.329	77.5

FSM Notes

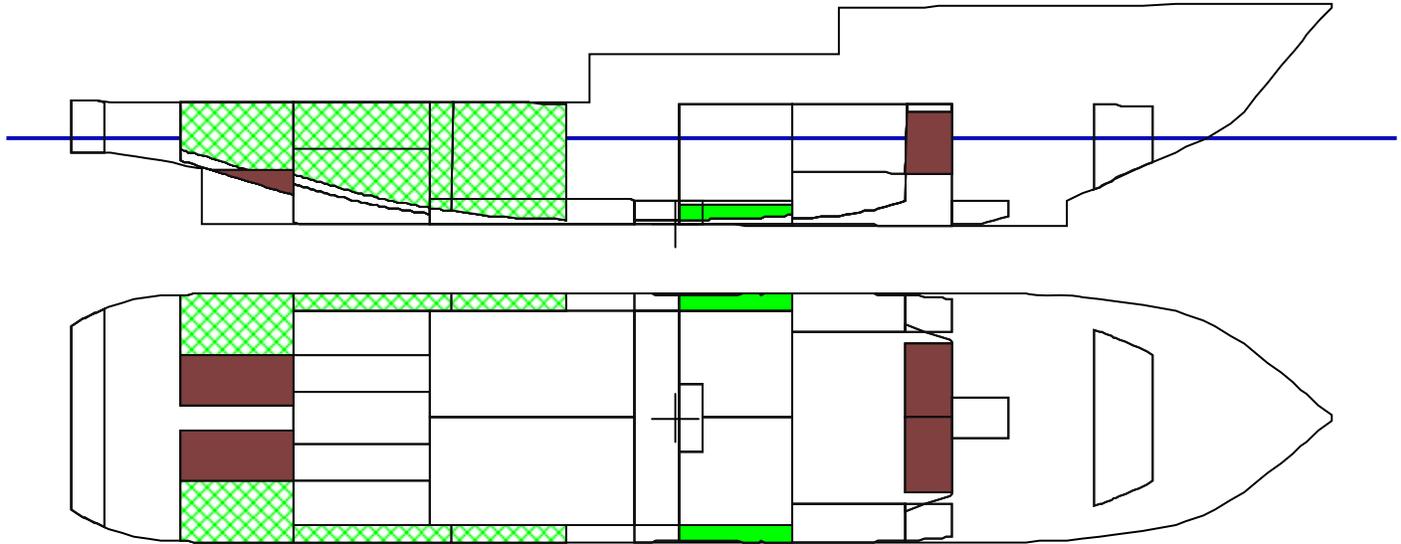
* Max. FSM is the Maximum Free Surface Moment of any load at the present heel and trim. It may not be the current FSM.

** FSM is predefined. It may not be the current FSM.

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
Light Ship	2,172.25	0.406a	0.000	5.858
Deadweight	400.49	12.016a	0.000	4.660
Displacement	2,572.74	2.213a	0.000	5.672

LCF (m)	3.783a	KMt (m)	6.818	Draft LCF Baseline (m)	4.864
LCB (m)	2.205a	KML (m)	77.779	Draft aft marks USK (m)	4.810
VCB (m)	2.824	FSC (m)	0.030	Draft fwd marks USK (m)	4.972
MCT (MT/cm)	31.47	GMs (m)	1.146	Draft AP Baseline (m)	4.791
TPC (MT/cm)	7.52	GMf (m)	1.116	Draft FP Baseline (m)	4.958
Loadline Height (m)	0.929	Trim (m)	0.167f	Draft MS Baseline (m)	4.875

**CONDITION 15
SALT WATER TRANSIT
PORT ARRIVAL, 10% CONSUMABLES**



Fluid Legend

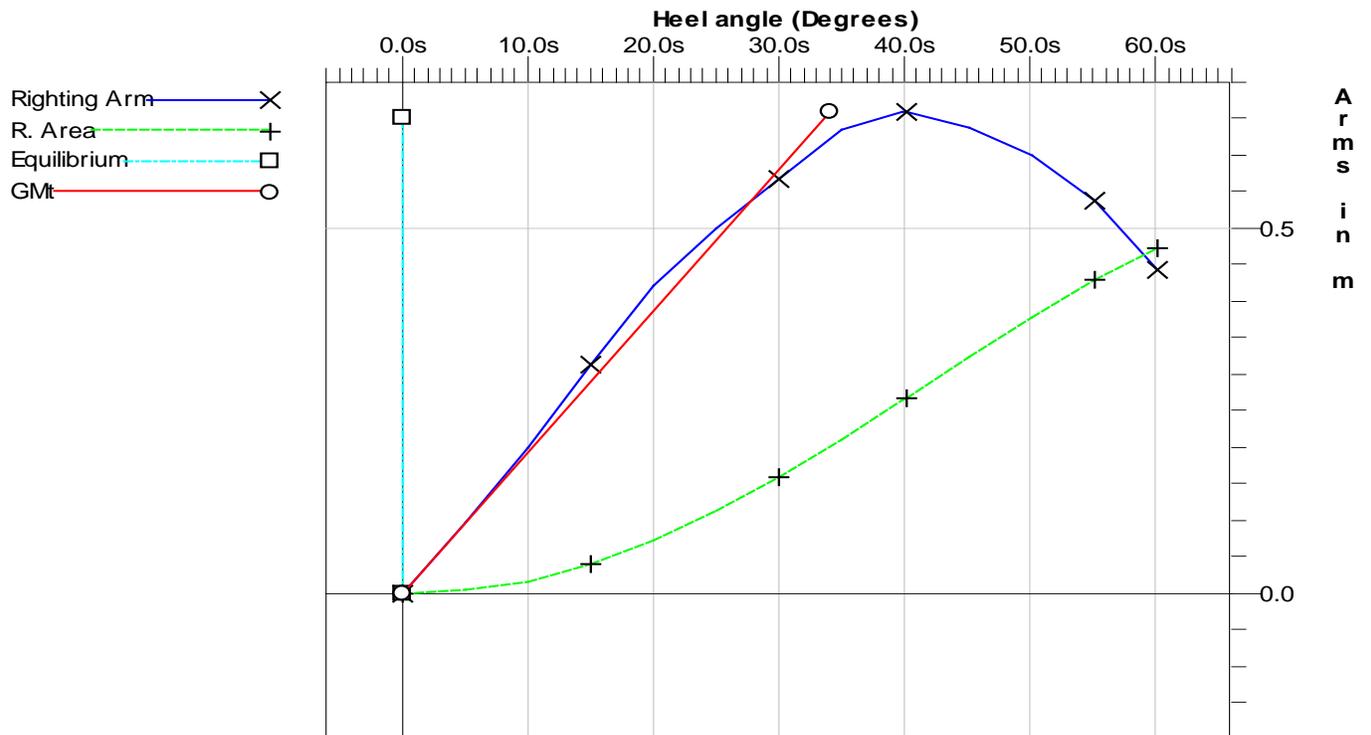
Fluid Name	Legend	Weight (MT)	Load%
FUEL OIL		69.07	10.00%
FRESH WATER		6.72	10.00%
WATER BALLAST		289.86	50.69%

**CONDITION 15
SALT WATER TRANSIT
PORT ARRIVAL, 10% CONSUMABLES**

STAB 6 CRITERIA

Limit	Min/Max	Actual	Margin	Pass
(1) Angle from 0.00 deg to MaxRA	>25.00 deg	39.80	14.80	Yes
(2) Area from Abs 0.00 deg to Abs 30.00	>0.0550 m-R	0.159	0.104	Yes
(3) Area from Abs 0.00 deg to Abs 40.00 or Flood	>0.0900 m-R	0.267	0.177	Yes
(4) Area from Abs 30.00 deg to Abs 40.00 or Flood	>0.0300 m-R	0.109	0.079	Yes
(5) Righting Arm at 30.00 deg	>0.200 m	0.566	0.366	Yes
(6) GM at Equilibrium	>0.150 m	1.116	0.966	Yes

Righting Arms vs. Heel - STAB 6 CRITERIA



CONDITION 16
CONTINUOUS ICEBREAKING WITH TOPSIDE ICE
PORT ARRIVAL, 10% CONSUMABLES

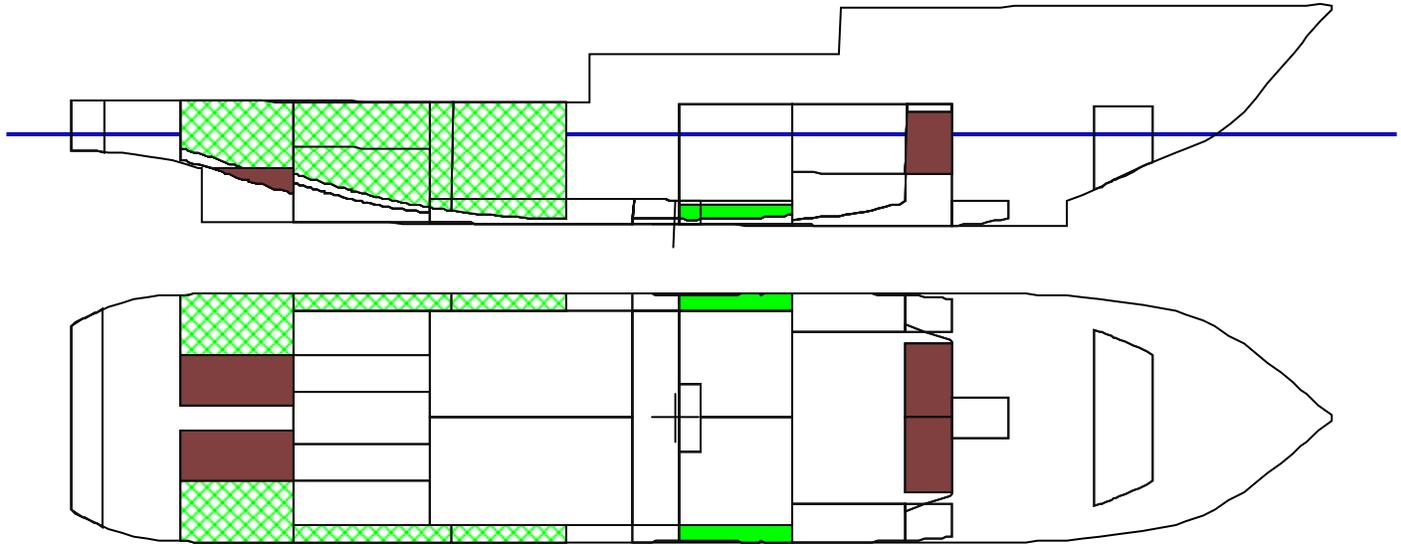
Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	2,172.25	0.406a	0.000	5.858
BUOYTENDER BARGE	8.75	1.490f	0.000	10.200
CREW & EFFECTS	5.00	14.000f	0.000	11.000
DECK EQUIPMENT	5.00	18.600a	0.000	7.570
ER STORES	2.00	7.650f	0.000	4.000
MISC. LUBE OIL / DIRTY OIL	4.00	8.490a	0.000	4.230
STORES & PROVISIONS	1.00	19.000f	0.000	8.000
TOPSIDE ICE	80.39	0.360f	0.000	11.440
TRIMMING WEIGHT	8.17	29.060a	0.000	7.200
ZODIAC WORK BOAT	0.92	3.510a	0.000	10.200
Total Fixed:	2,287.47	0.482a	0.000	6.089

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
FO4.P	0.850	8.65%	4.90	22.300a	1.887p	2.594	5.4
FO4.S	0.850	8.65%	4.90	22.300a	1.887s	2.594	5.4
FODAY.P	0.850	90.00%	29.63	13.991f	2.070p	4.610	12.4
FOSET.S	0.850	90.00%	29.63	13.991f	2.070s	4.610	12.4
FW.P	1.000	10.00%	3.36	2.866f	6.319p	0.767	0.4*
SAN.S	1.000	10.00%	3.36	2.866f	6.319s	0.767	0.4*
WB4.P	1.000	100.00%	36.00	9.095a	6.407p	3.570	0.4*
WB4.S	1.000	100.00%	36.00	9.095a	6.407s	3.570	0.4*
WB5.P	1.000	100.00%	40.65	16.333a	6.405p	4.141	0.6*
WB5.S	1.000	100.00%	40.65	16.333a	6.405s	4.141	0.6*
WB6.S	1.000	100.00%	64.75	23.805a	5.123s	5.053	19.0*
WB6.P	1.000	100.00%	64.75	23.805a	5.123p	5.053	19.0*
Totals:		25.56%	358.58	12.369a	0.000	4.328	76.4

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
Light Ship	2,172.25	0.406a	0.000	5.858
Deadweight	473.81	9.828a	0.000	5.814
Displacement	2,646.06	2.093a	0.000	5.850

LCF (m)	3.710a	KMt (m)	6.795	Draft LCF Baseline (m)	5.049
LCB (m)	2.077a	KML (m)	77.070	Draft aft marks USK (m)	4.921
VCB (m)	2.935	FSC (m)	0.029	Draft fwd marks USK (m)	5.245
MCT (MT/cm)	31.97	GMs (m)	0.945	Draft AP Baseline (m)	4.902
TPC (MT/cm)	7.45	GMf (m)	0.916	Draft FP Baseline (m)	5.237
Loadline Height (m)	0.130	Trim (m)	0.335f	Draft MS Baseline (m)	5.070

**CONDITION 16
CONTINUOUS ICEBREAKING WITH TOPSIDE ICE
PORT ARRIVAL, 10% CONSUMABLES**



Fluid Legend

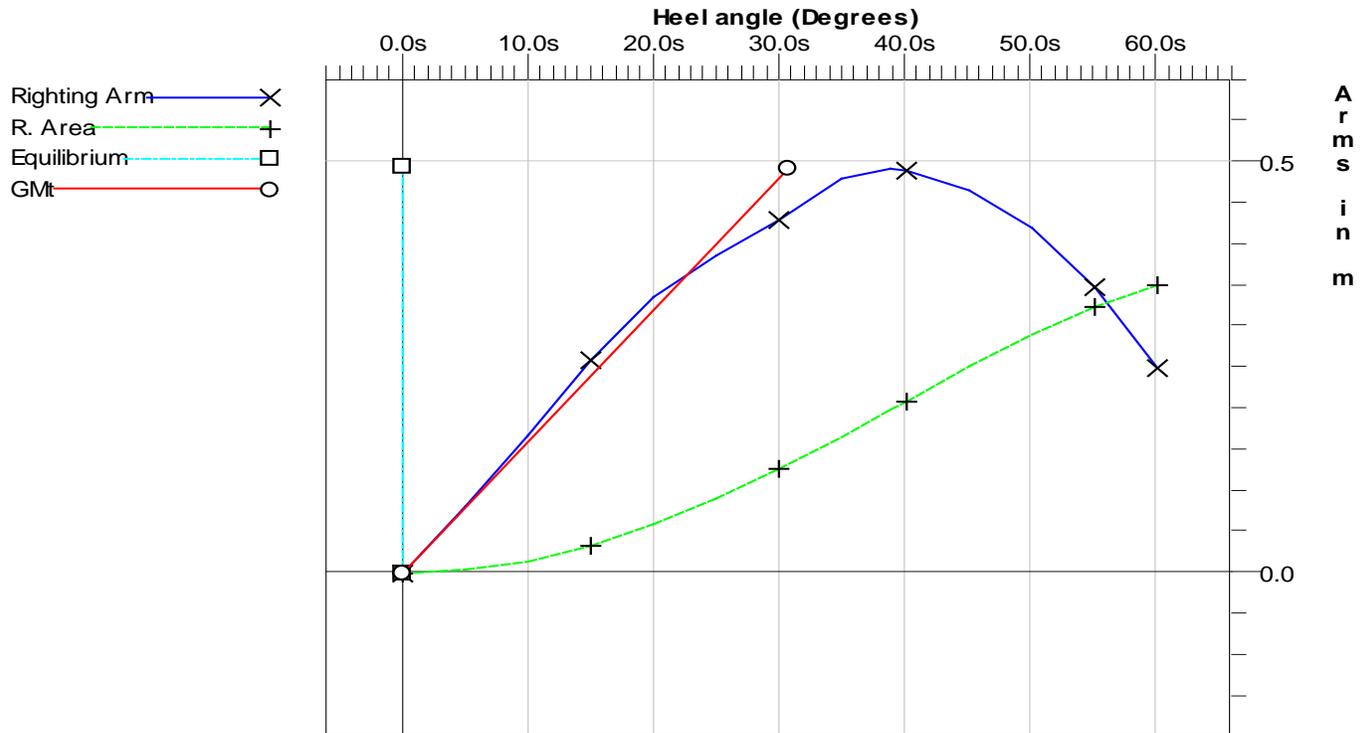
Fluid Name	Legend	Weight (MT)	Load%
FUEL OIL		69.07	10.00%
FRESH WATER		6.72	10.00%
WATER BALLAST		282.79	50.62%

**CONDITION 16
CONTINUOUS ICEBREAKING WITH TOPSIDE ICE
PORT ARRIVAL, 10% CONSUMABLES**

STAB 6 CRITERIA

Limit	Min/Max	Actual	Margin	Pass
(1) Angle from 0.00 deg to MaxRA	>25.00 deg	38.80	13.80	Yes
(2) Area from Abs 0.00 deg to Abs 30.00	>0.0550 m-R	0.126	0.071	Yes
(3) Area from Abs 0.00 deg to Abs 40.00 or Flood	>0.0900 m-R	0.209	0.119	Yes
(4) Area from Abs 30.00 deg to Abs 40.00 or Flood	>0.0300 m-R	0.082	0.052	Yes
(5) Righting Arm at 30.00 deg	>0.200 m	0.430	0.230	Yes
(6) GM at Equilibrium	>0.150 m	0.916	0.766	Yes

Righting Arms vs. Heel - STAB 6 CRITERIA



CONDITION 17
OPEN WATER WITH DECK CARGO AND TOPSIDE ICE
PORT DEPARTURE, MAX CONSUMABLES

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	2,172.25	0.406a	0.000	5.858
BUOYTENDER BARGE	8.75	1.490f	0.000	10.200
CREW & EFFECTS	5.00	14.000f	0.000	11.000
DECK EQUIPMENT	5.00	18.600a	0.000	7.570
DECK LOAD	250.00	18.000a	0.000	7.700
ER STORES	2.00	7.650f	0.000	4.000
MISC. LUBE OIL / DIRTY OIL	8.00	8.490a	0.000	4.230
STORES & PROVISIONS	10.00	19.000f	0.000	8.000
TOPSIDE ICE	80.39	0.360f	0.000	11.440
TRIMMING WEIGHT	8.17	29.060a	0.000	7.200
ZODIAC WORK BOAT	0.92	3.510a	0.000	10.200
Total Fixed:	2,550.47	2.143a	0.000	6.251

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
FO1.C	0.850	100.00%	165.01	10.580f	0.000	1.487	0.0
FO3.C	0.850	100.00%	68.22	17.139a	0.000	2.232	0.0
FO3.P	0.850	100.00%	78.86	17.050a	4.722p	4.057	0.0
FO3.S	0.850	100.00%	73.19	16.932a	4.771s	3.951	0.0
FO4.P	0.850	100.00%	56.64	23.879a	2.107p	4.717	0.0
FO4.S	0.850	100.00%	56.64	23.879a	2.107s	4.717	0.0
FO2.P	0.850	98.00%	61.86	7.515a	2.764p	0.741	161.8
FO2.S	0.850	98.00%	61.86	7.517a	2.734s	0.741	161.8
FODAY.P	0.850	90.00%	29.63	13.990f	2.072p	4.610	12.4
FOSET.S	0.850	90.00%	29.63	13.990f	2.068s	4.610	12.4
FW.P	1.000	100.00%	33.61	3.297f	6.378p	3.669	0.4*
SAN.S	1.000	100.00%	33.61	3.297f	6.378s	3.669	0.4*
WB1.C	1.000	37.00%	23.24	24.380f	0.015p	4.163	160.0*
Totals:			772.01	5.214a	0.033p	2.914	509.2

FSM Notes

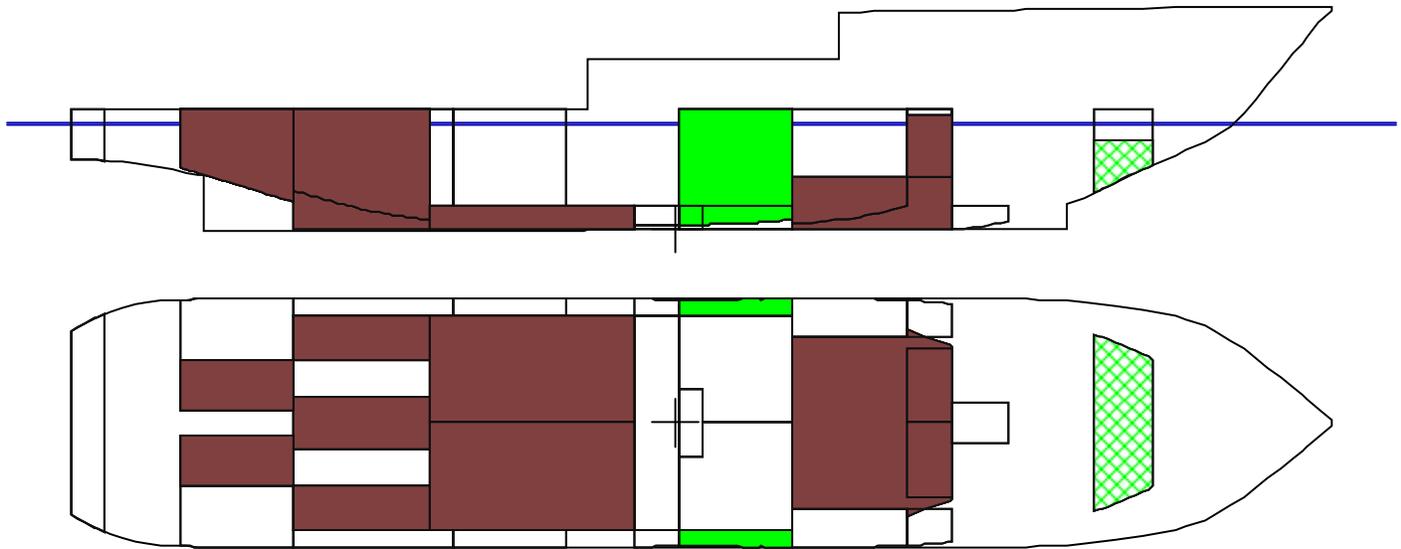
* Max. FSM is the Maximum Free Surface Moment of any load at the present heel and trim. It may not be the current FSM.

** FSM is predefined. It may not be the current FSM.

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
Light Ship	2,172.25	0.406a	0.000	5.858
Deadweight	1,150.23	7.485a	0.022p	4.752
Displacement	3,322.49	2.857a	0.008p	5.475

LCF (m)	3.926a	KMt (m)	6.790	Draft LCF Baseline (m)	5.930
LCB (m)	2.858a	KML (m)	70.619	Draft aft marks USK (m)	5.966
VCB (m)	3.455	FSC (m)	0.153	Draft fwd marks USK (m)	5.927
MCT (MT/cm)	36.65	GMs (m)	1.315	Draft AP Baseline (m)	5.948
TPC (MT/cm)	7.82	GMf (m)	1.162	Draft FP Baseline (m)	5.907
Loadline Height (m)	0.000	Trim (m)	0.041a	Draft MS Baseline (m)	5.927

**CONDITION 17
OPEN WATER WITH DECK CARGO AND TOPSIDE ICE
PORT DEPARTURE, MAX CONSUMABLES**



Fluid Legend

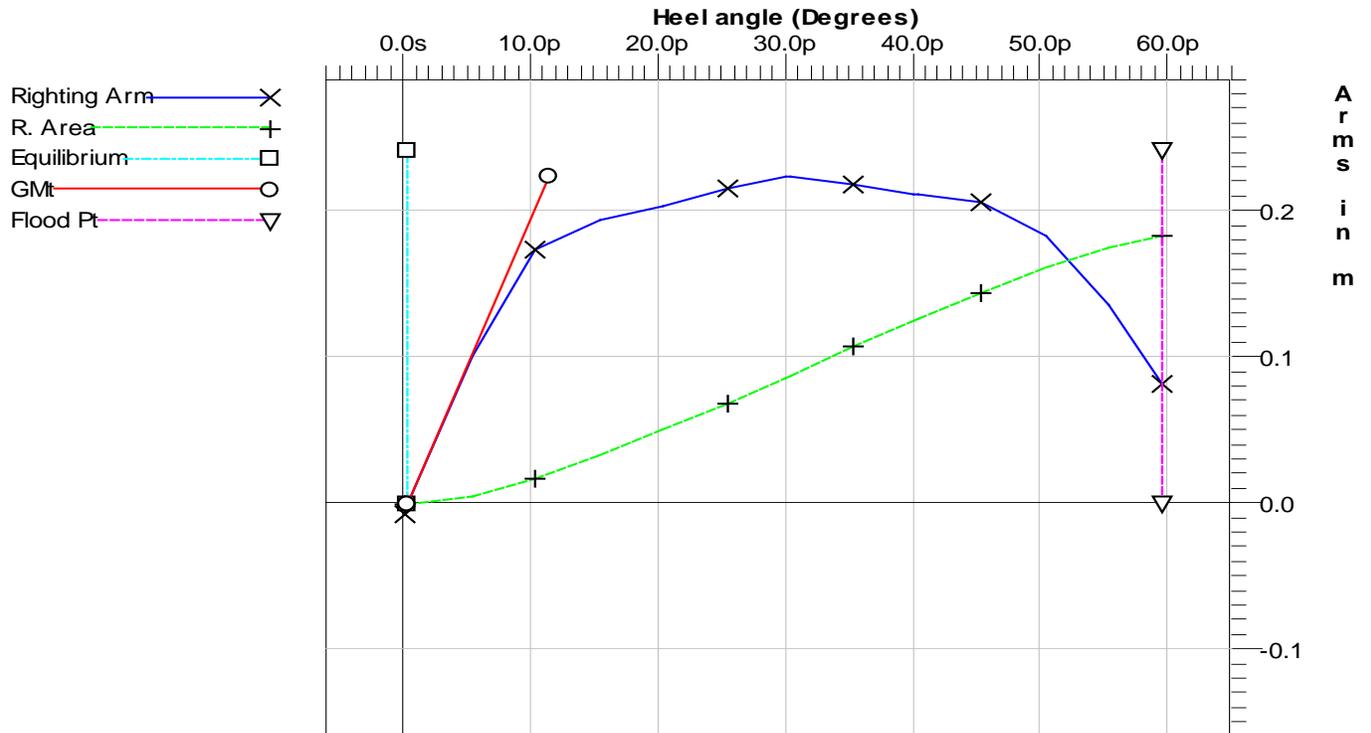
Fluid Name	Legend	Weight (MT)	Load%
FUEL OIL		681.56	98.68%
FRESH WATER		67.22	100.00%
WATER BALLAST		23.24	4.16%

**CONDITION 17
OPEN WATER WITH DECK CARGO AND TOPSIDE ICE
PORT DEPARTURE, MAX CONSUMABLES**

STAB 6 CRITERIA

Limit	Min/Max	Actual	Margin	Pass
(1) Angle from 0.00 deg to MaxRA	>25.00 deg	30.00	5.00	Yes
(2) Area from Abs 0.00 deg to Abs 30.00	>0.0550 m-R	0.087	0.032	Yes
(3) Area from Abs 0.00 deg to Abs 40.00 or Flood	>0.0900 m-R	0.125	0.035	Yes
(4) Area from Abs 30.00 deg to Abs 40.00 or Flood	>0.0300 m-R	0.038	0.008	Yes
(5) Righting Arm at 30.00 deg	>0.200 m	0.224	0.024	Yes
(6) GM at Equilibrium	>0.150 m	1.162	1.012	Yes

Righting Arms vs. Heel - STAB 6 CRITERIA



CONDITION 18
RAMMING MODE WITH TOPSIDE ICE
PORT ARRIVAL, 10% CONSUMABLES

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	2,172.25	0.406a	0.000	5.858
BUOYTENDER BARGE	8.75	1.490f	0.000	10.200
CREW & EFFECTS	5.00	14.000f	0.000	11.000
DECK EQUIPMENT	5.00	18.600a	0.000	7.570
ER STORES	2.00	7.650f	0.000	4.000
ICE FORCE	-308.00	23.980f	0.000	2.550
MISC. LUBE OIL / DIRTY OIL	4.00	8.490a	0.000	4.230
STORES & PROVISIONS	1.00	19.000f	0.000	8.000
TOPSIDE ICE	80.39	0.360f	0.000	11.440
TRIMMING WEIGHT	8.17	29.060a	0.000	7.200
ZODIAC WORK BOAT	0.92	3.510a	0.000	10.200
Total Fixed:	1,979.47	4.289a	0.000	6.639

Tank Name	Spgr	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	FSMT (MT-m)
FO4.P	0.850	8.65%	4.90	22.366a	1.876p	2.595	5.6
FO4.S	0.850	8.65%	4.90	22.366a	1.876s	2.595	5.6
FODAY.P	0.850	90.00%	29.63	13.987f	2.070p	4.610	12.4
FOSET.S	0.850	90.00%	29.63	13.987f	2.070s	4.610	12.4
FW.P	1.000	10.00%	3.36	2.745f	6.322p	0.768	0.4*
SAN.S	1.000	10.00%	3.36	2.745f	6.322s	0.768	0.4*
Totals:			75.79	8.289f	0.000	4.009	36.8

FSM Notes

* Max. FSM is the Maximum Free Surface Moment of any load at the present heel and trim. It may not be the current FSM.

** FSM is predefined. It may not be the current FSM.

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
Light Ship	2,172.25	0.406a	0.000	5.858
Displacement	2,055.27	3.825a	0.000	6.542

LCF (m)	5.156a	KMt (m)	7.089	Draft LCF Baseline (m)	4.244
LCB (m)	3.918a	KML (m)	81.835	Draft aft marks USK (m)	4.821
VCB (m)	2.463	FSC (m)	0.018	Draft fwd marks USK (m)	3.511
MCT (MT/cm)	26.26	GMs (m)	0.547	Draft AP Baseline (m)	4.802
TPC (MT/cm)	6.99	GMf (m)	0.529	Draft FP Baseline (m)	3.447
Loadline Height (m)	1.074	Trim (m)	1.356a	Draft MS Baseline (m)	4.125

**CONDITION 18
RAMMING MODE WITH TOPSIDE ICE
PORT ARRIVAL, 10% CONSUMABLES**



Fluid Legend

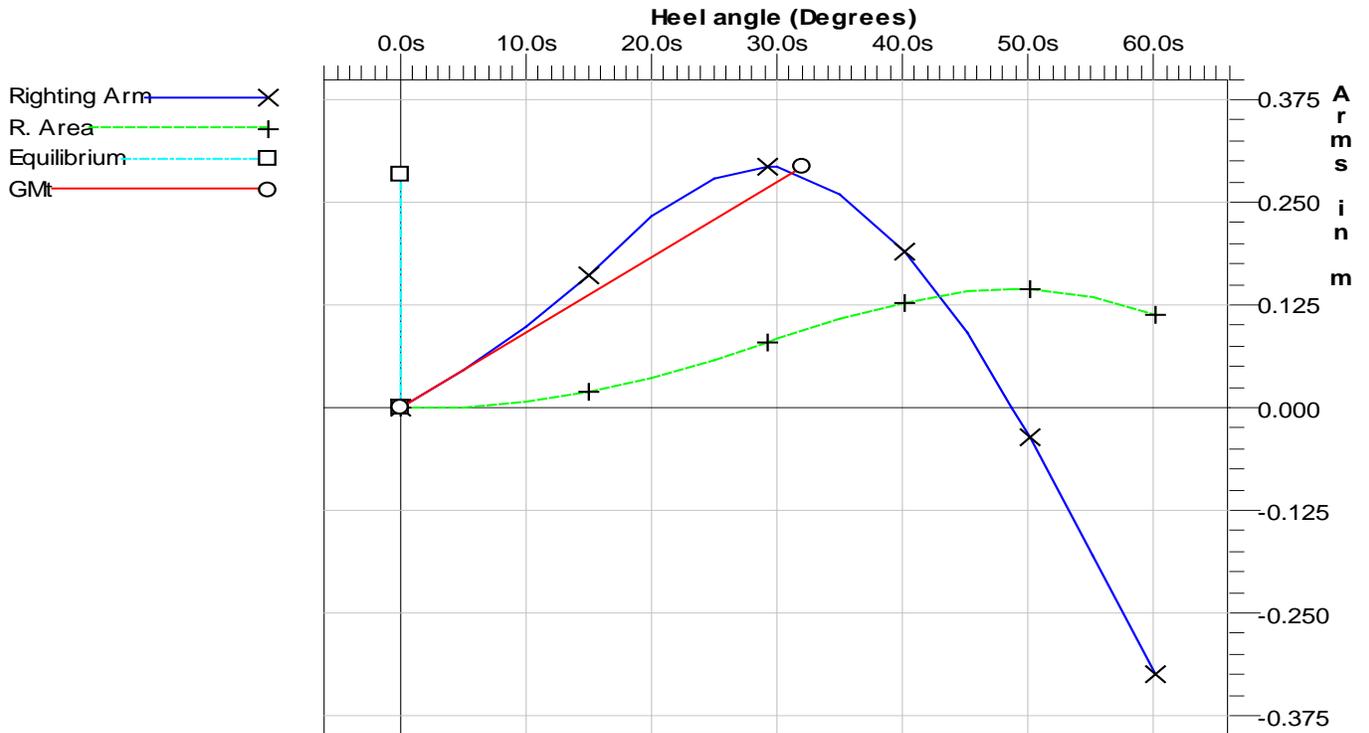
Fluid Name	Legend	Weight (MT)	Load%
FUEL OIL		69.07	10.00%
FRESH WATER		6.72	10.00%

**CONDITION 18
RAMMING MODE WITH TOPSIDE ICE
PORT ARRIVAL, 10% CONSUMABLES**

STAB 6 CRITERIA

Limit	Min/Max	Actual	Margin	Pass
(1) Angle from 0.00 deg to MaxRA	>25.00 deg	29.20	4.20	Yes
(2) Area from Abs 0.00 deg to Abs 30.00	>0.0550 m-R	0.085	0.030	Yes
(3) Area from Abs 0.00 deg to Abs 40.00 or Flood	>0.0900 m-R	0.129	0.039	Yes
(4) Area from Abs 30.00 deg to Abs 40.00 or Flood	>0.0300 m-R	0.044	0.014	Yes
(5) Righting Arm at 30.00 deg	>0.200 m	0.294	0.094	Yes
(6) GM at Equilibrium	>0.150 m	0.529	0.379	Yes

Righting Arms vs. Heel - STAB 6 CRITERIA



DAMAGE STABILITY ASSESSMENT
[SECTION 5.0]

SECTION 5.1 DAMAGE STABILITY

Regulations do not require an assessment of damage stability for this vessel.

SPECIAL STABILITY REQUIREMENTS
[SECTION 6.0]

SECTION 6.1 SPECIAL STABILITY REQUIREMENTS

There are no special stability requirements for this vessel.

HYDROSTATIC DATA TABLES
[SECTION 7.0]

Note: An average VCG of 5.537m has been used in the calculation of the following hydrostatic tables. This results in more accurate *TPcm* values.

7.1 Guidance on Using Hydrostatic Data

7.1.1 Determine Vessel's Draft and Trim:

Read the vessel draft marks on port and starboard, forward and aft and calculate the vessel's mean draft using the following formulas:

$$d_F = (d_{FP} + d_{FS})/2,$$

$$d_A = (d_{AP} + d_{AS})/2,$$

$$t = d_A - d_F$$

$$[tm/LBM \times 2.0] + d_F$$

$$t = d_A - d_F$$

$$d_{MS} = (d_F + d_A)/2.$$

Where: d_F , d_{FP} , d_{FS} – Forward drafts at CL, port and starboard side respectively

d_A , d_{AP} , d_{AS} – Aft drafts at CL, port and starboard side respectively

d_{MS} – Amidships draft

t , t_m - trim

Hydrostatic tables use trim between perpendiculars. If trim between draft marks is calculated as above, multiply the value by 0.98 to obtain trim between perpendiculars.

7.1.2 Determine Vessel's Displacement and Other Hydrostatic Data:

The amidships draft (d_{MS}) and trim (t) are obtained from the calculations above. Determine vessel's displacement or any other hydrostatic data (C) from the hydrostatic tables by interpolating between appropriate drafts at the trim nearest to actual. Hydrostatic tables are provided at several trim values and draft increment of 10 cm. The following formula can be used to interpolate between given values:

$$C = C_1 + (C_2 - C_1) * (d_{Actual} - d_1) / (d_2 - d_1)$$

Where:

C – required value

C_1 – value at lower draft under specific column

C_2 – value at higher draft under specific column

d_{Actual} – actual draft of vessel

d_1 – draft value at line lower than actual draft of vessel taken from table

d_2 – draft value at line higher than actual draft of vessel taken from table

Example calculating LCB at even trim for draft of 5.05m

$$C = C_1 + (C_2 - C_1) * (d_{Actual} - d_1) / (d_2 - d_1)$$

$$C = -2.479 + (-2.523 - (-2.479)) * (5.05 - 5.00) / (5.10 - 5.00)$$

$$C = -2.479 + (-0.044) * (0.05) / (0.10)$$

$$C = -2.501 \text{ m}$$

$$C = 2.501 \text{ a m}$$

7.2 Hydrostatic Properties – Trim 0.500m fwd.**Hydrostatic Properties**

Draft is from Baseline.

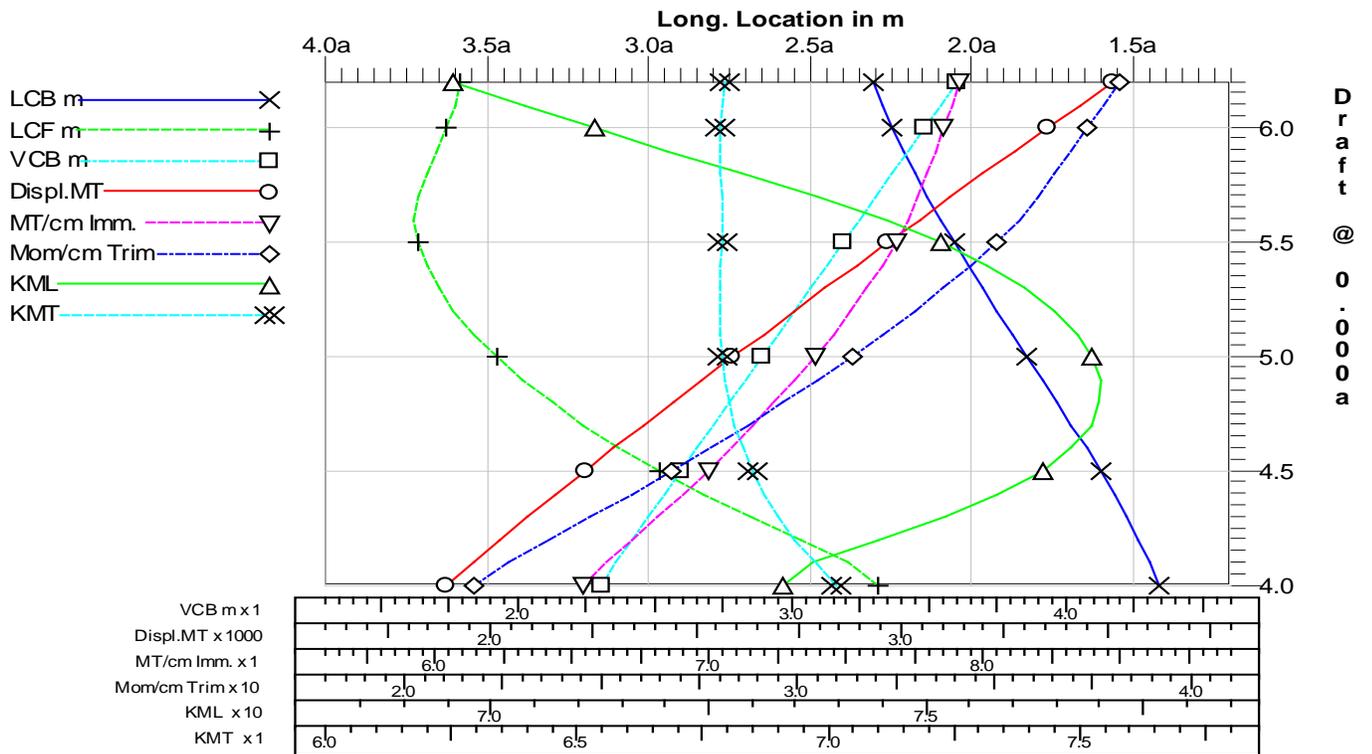
Trim: fwd 0.500/58.920, No heel, VCG = 5.537

Draft at Origin (m)	Displ (MT)	LCB (m)	VCB (m)	LCF (m)	TPcm (MT/cm)	MTcm (MT-m/cm)	KML (m)	KMT (m)
4.000	1889.370	1.424a	2.299	2.291a	6.53	21.74	73.342	7.016
4.100	1955.135	1.455a	2.357	2.388a	6.62	22.62	73.694	6.971
4.200	2021.774	1.488a	2.416	2.533a	6.71	23.64	74.426	6.933
4.300	2089.378	1.524a	2.474	2.692a	6.81	24.71	75.204	6.899
4.400	2157.916	1.564a	2.533	2.836a	6.90	25.74	75.813	6.870
4.500	2227.376	1.605a	2.592	2.972a	6.99	26.76	76.322	6.848
4.600	2297.719	1.648a	2.652	3.097a	7.07	27.73	76.654	6.828
4.700	2368.868	1.694a	2.711	3.207a	7.16	28.69	76.883	6.812
4.800	2440.813	1.740a	2.770	3.304a	7.23	29.60	76.979	6.799
4.900	2513.534	1.786a	2.830	3.397a	7.31	30.49	77.010	6.792
5.000	2586.974	1.833a	2.889	3.475a	7.38	31.34	76.906	6.786
5.100	2661.112	1.880a	2.948	3.546a	7.45	32.16	76.735	6.783
5.200	2735.903	1.926a	3.008	3.607a	7.51	32.94	76.472	6.783
5.300	2811.318	1.972a	3.067	3.653a	7.57	33.68	76.124	6.783
5.400	2887.313	2.016a	3.126	3.691a	7.63	34.38	75.690	6.784
5.500	2963.835	2.060a	3.186	3.719a	7.68	35.02	75.152	6.786
5.600	3040.818	2.102a	3.245	3.731a	7.72	35.61	74.535	6.787
5.700	3118.217	2.142a	3.304	3.716a	7.76	36.10	73.739	6.785
5.800	3195.950	2.180a	3.362	3.686a	7.79	36.52	72.854	6.782
5.900	3274.002	2.216a	3.421	3.657a	7.82	36.93	72.001	6.781
6.000	3352.365	2.249a	3.479	3.631a	7.85	37.34	71.170	6.782
6.100	3431.036	2.280a	3.538	3.605a	7.88	37.76	70.373	6.786
6.200	3509.990	2.310a	3.596	3.588a	7.91	38.13	69.548	6.792

Water Specific Gravity = 1.000.

Trim is per 58.92m

Hydrostatic Properties at fwd 0.500/58.920, Heel = 0.00



7.3 Hydrostatic Properties – Even Keel

Hydrostatic Properties

Draft is from Baseline.

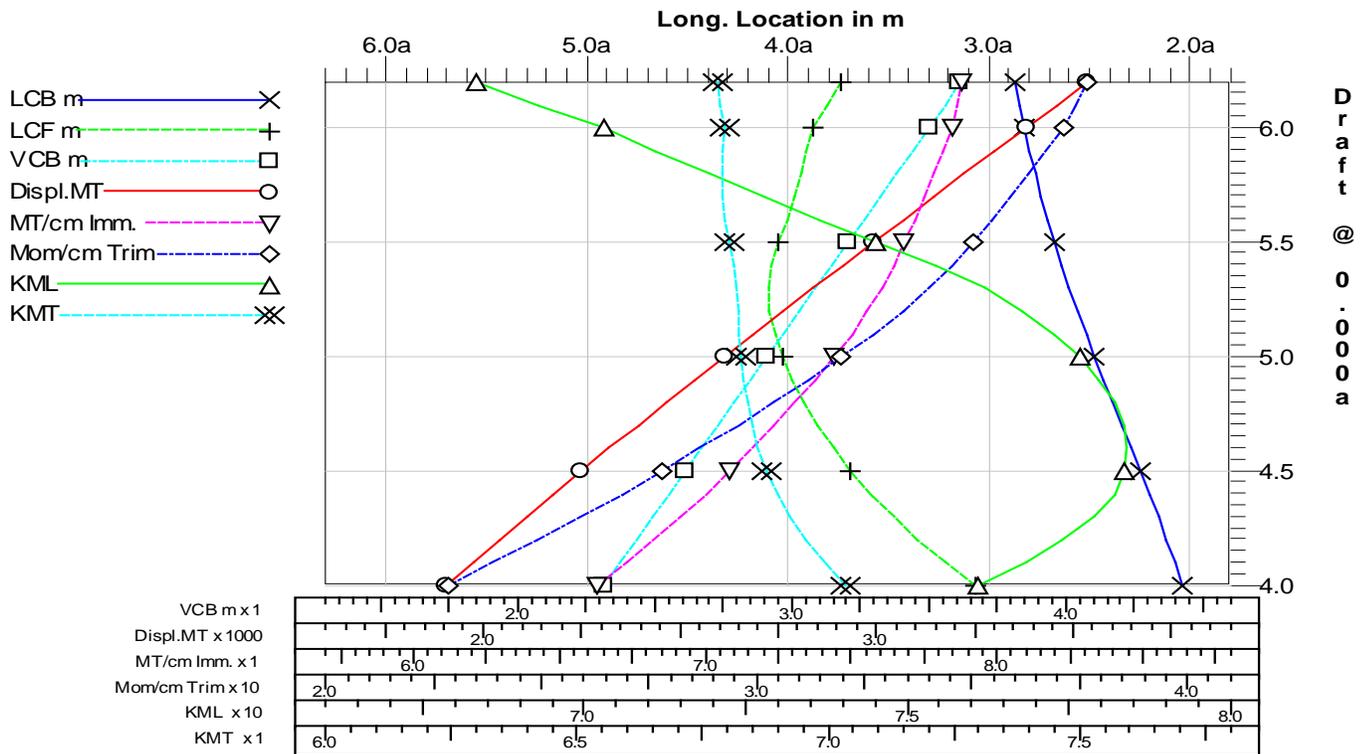
No Trim, No heel, VCG = 5.537

Draft at Origin (m)	Displ (MT)	LCB (m)	VCB (m)	LCF (m)	TPcm (MT/cm)	MTcm (MT-m/cm)	KML (m)	KMT (m)
4.000	1904.142	2.045a	2.309	3.075a	6.63	22.80	76.090	7.031
4.100	1971.007	2.082a	2.369	3.221a	6.73	23.85	76.825	6.989
4.200	2038.738	2.121a	2.428	3.358a	6.82	24.86	77.370	6.952
4.300	2107.380	2.164a	2.487	3.480a	6.91	25.87	77.859	6.923
4.400	2176.914	2.208a	2.547	3.592a	7.00	26.84	78.184	6.898
4.500	2247.294	2.252a	2.606	3.691a	7.08	27.76	78.326	6.876
4.600	2318.479	2.298a	2.666	3.781a	7.16	28.66	78.378	6.859
4.700	2390.454	2.344a	2.726	3.861a	7.23	29.54	78.341	6.846
4.800	2463.173	2.389a	2.786	3.931a	7.31	30.38	78.210	6.836
4.900	2536.585	2.434a	2.846	3.989a	7.37	31.18	77.959	6.829
5.000	2610.641	2.479a	2.905	4.036a	7.44	31.96	77.657	6.824
5.100	2685.320	2.523a	2.965	4.072a	7.50	32.69	77.271	6.821
5.200	2760.575	2.565a	3.025	4.095a	7.55	33.37	76.763	6.817
5.300	2836.354	2.606a	3.084	4.104a	7.60	34.01	76.179	6.814
5.400	2912.604	2.646a	3.143	4.091a	7.64	34.55	75.425	6.808
5.500	2989.233	2.682a	3.203	4.051a	7.68	34.99	74.510	6.799
5.600	3066.211	2.716a	3.262	4.012a	7.71	35.43	73.621	6.792
5.700	3143.529	2.747a	3.320	3.976a	7.75	35.87	72.762	6.789
5.800	3221.165	2.776a	3.379	3.945a	7.78	36.28	71.905	6.787
5.900	3299.115	2.803a	3.437	3.913a	7.81	36.71	71.093	6.789
6.000	3377.380	2.829a	3.496	3.879a	7.84	37.11	70.284	6.791
6.100	3455.888	2.852a	3.554	3.810a	7.86	37.39	69.281	6.783
6.200	3534.587	2.872a	3.611	3.743a	7.88	37.66	68.312	6.777

Water Specific Gravity = 1.000.

Trim is per 58.92m

Hydrostatic Properties at zero, Heel = 0.00



7.4 Hydrostatic Properties – Trim 0.500m aft**Hydrostatic Properties**

Draft is from Baseline.

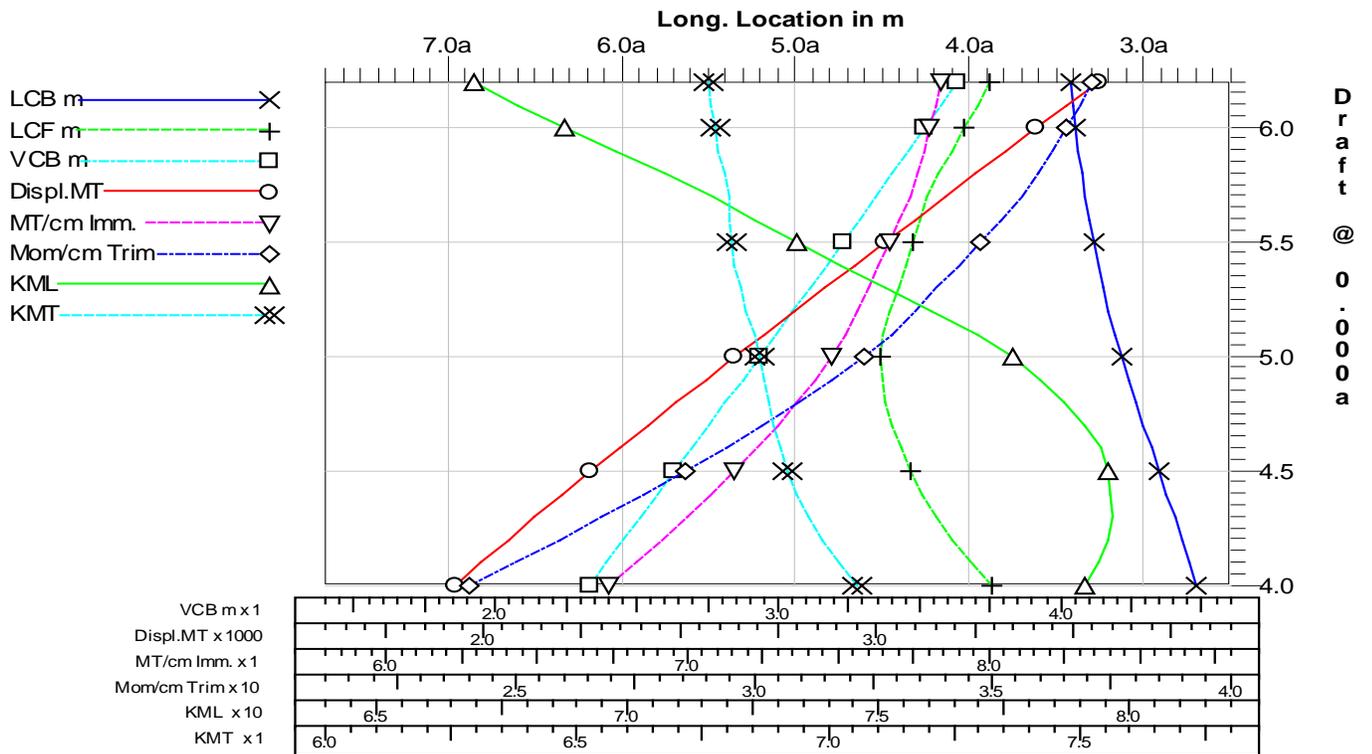
Trim: aft 0.500/58.920, No heel, VCG = 5.537

Draft at Origin (m)	Displ (MT)	LCB (m)	VCB (m)	LCF (m)	TPcm (MT/cm)	MTcm (MT-m/cm)	KML (m)	KMT (m)
4.000	1923.789	2.698a	2.330	3.876a	6.74	24.01	79.075	7.056
4.100	1991.660	2.739a	2.389	3.998a	6.83	24.96	79.372	7.019
4.200	2060.427	2.782a	2.449	4.109a	6.91	25.88	79.544	6.987
4.300	2130.056	2.826a	2.509	4.198a	7.00	26.79	79.627	6.957
4.400	2200.466	2.871a	2.570	4.284a	7.08	27.66	79.599	6.935
4.500	2271.609	2.916a	2.630	4.347a	7.15	28.53	79.532	6.916
4.600	2343.508	2.961a	2.690	4.402a	7.23	29.38	79.404	6.902
4.700	2416.109	3.005a	2.750	4.450a	7.29	30.16	79.073	6.889
4.800	2489.375	3.048a	2.810	4.485a	7.36	30.91	78.687	6.879
4.900	2563.266	3.089a	2.870	4.508a	7.42	31.62	78.220	6.870
5.000	2637.739	3.129a	2.930	4.517a	7.47	32.29	77.658	6.861
5.100	2712.742	3.167a	2.989	4.508a	7.52	32.89	76.961	6.852
5.200	2788.137	3.203a	3.049	4.462a	7.56	33.35	76.017	6.835
5.300	2863.904	3.236a	3.108	4.414a	7.59	33.81	75.097	6.822
5.400	2940.034	3.265a	3.167	4.368a	7.63	34.27	74.210	6.812
5.500	3016.511	3.293a	3.226	4.325a	7.67	34.71	73.338	6.805
5.600	3093.341	3.318a	3.285	4.285a	7.70	35.16	72.498	6.801
5.700	3170.514	3.341a	3.343	4.245a	7.73	35.60	71.692	6.799
5.800	3248.000	3.362a	3.401	4.179a	7.76	35.94	70.736	6.791
5.900	3325.714	3.380a	3.459	4.102a	7.78	36.24	69.736	6.780
6.000	3403.642	3.395a	3.517	4.031a	7.80	36.52	68.750	6.771
6.100	3481.746	3.409a	3.575	3.959a	7.82	36.80	67.811	6.765
6.200	3560.044	3.420a	3.632	3.889a	7.84	37.08	66.903	6.761

Water Specific Gravity = 1.000.

Trim is per 58.92m

Hydrostatic Properties at aft 0.500/58.920, Heel = 0.00



7.5 Hydrostatic Properties – Trim 1.000m aft**Hydrostatic Properties**

Draft is from Baseline.

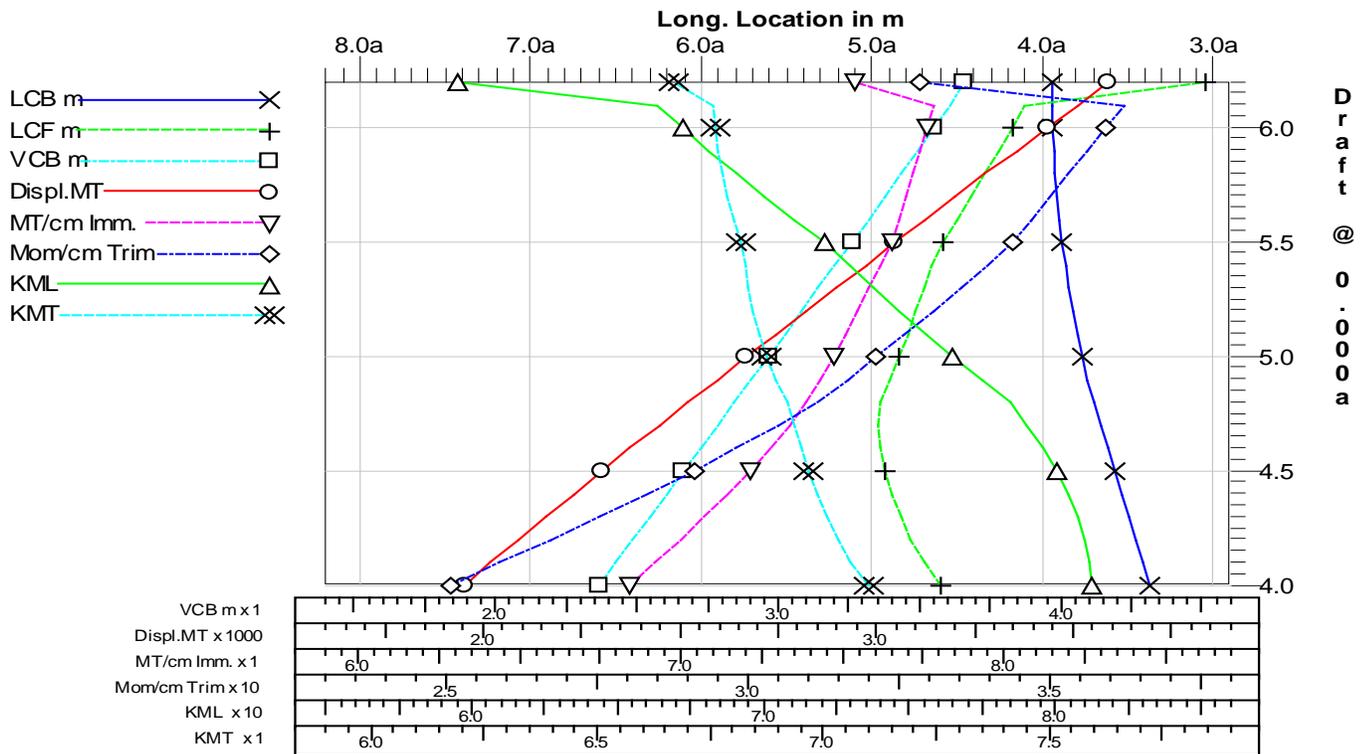
Trim: aft 1.000/58.920, No heel, VCG = 5.537

Draft at Origin (m)	Displ (MT)	LCB (m)	VCB (m)	LCF (m)	TPcm (MT/cm)	MTcm (MT-m/cm)	KML (m)	KMT (m)
4.000	1948.227	3.374a	2.360	4.602a	6.84	25.03	81.234	7.096
4.100	2016.999	3.417a	2.420	4.692a	6.92	25.88	81.123	7.059
4.200	2086.579	3.461a	2.480	4.776a	7.00	26.72	80.982	7.032
4.300	2156.940	3.504a	2.541	4.839a	7.07	27.52	80.713	7.005
4.400	2228.050	3.547a	2.601	4.894a	7.14	28.31	80.381	6.983
4.500	2299.874	3.589a	2.662	4.933a	7.21	29.08	80.024	6.966
4.600	2372.364	3.629a	2.722	4.960a	7.27	29.79	79.515	6.949
4.700	2445.382	3.669a	2.782	4.965a	7.33	30.50	79.010	6.934
4.800	2518.976	3.707a	2.842	4.951a	7.39	31.15	78.396	6.918
4.900	2593.055	3.742a	2.902	4.908a	7.43	31.65	77.450	6.895
5.000	2667.522	3.773a	2.961	4.853a	7.47	32.12	76.470	6.874
5.100	2742.377	3.802a	3.021	4.800a	7.50	32.58	75.531	6.856
5.200	2817.616	3.828a	3.080	4.748a	7.54	33.05	74.631	6.842
5.300	2893.240	3.851a	3.138	4.697a	7.58	33.51	73.770	6.831
5.400	2969.213	3.872a	3.197	4.651a	7.61	33.96	72.915	6.823
5.500	3045.523	3.890a	3.256	4.590a	7.65	34.37	72.025	6.814
5.600	3122.114	3.907a	3.314	4.506a	7.67	34.70	71.011	6.799
5.700	3198.937	3.920a	3.372	4.424a	7.69	35.01	70.010	6.784
5.800	3275.982	3.931a	3.429	4.343a	7.72	35.32	69.045	6.772
5.900	3353.249	3.939a	3.487	4.264a	7.74	35.62	68.116	6.763
6.000	3430.736	3.946a	3.544	4.186a	7.76	35.92	67.222	6.757
6.100	3508.439	3.950a	3.601	4.111a	7.78	36.22	66.353	6.752
6.200	3585.849	3.949a	3.658	3.050a	7.54	32.84	59.497	6.668

Water Specific Gravity = 1.000.

Trim is per 58.92m

Hydrostatic Properties at aft 1.000/58.920, Heel = 0.00



7.6 Hydrostatic Properties – Trim 1.500m aft**Hydrostatic Properties**

Draft is from Baseline.

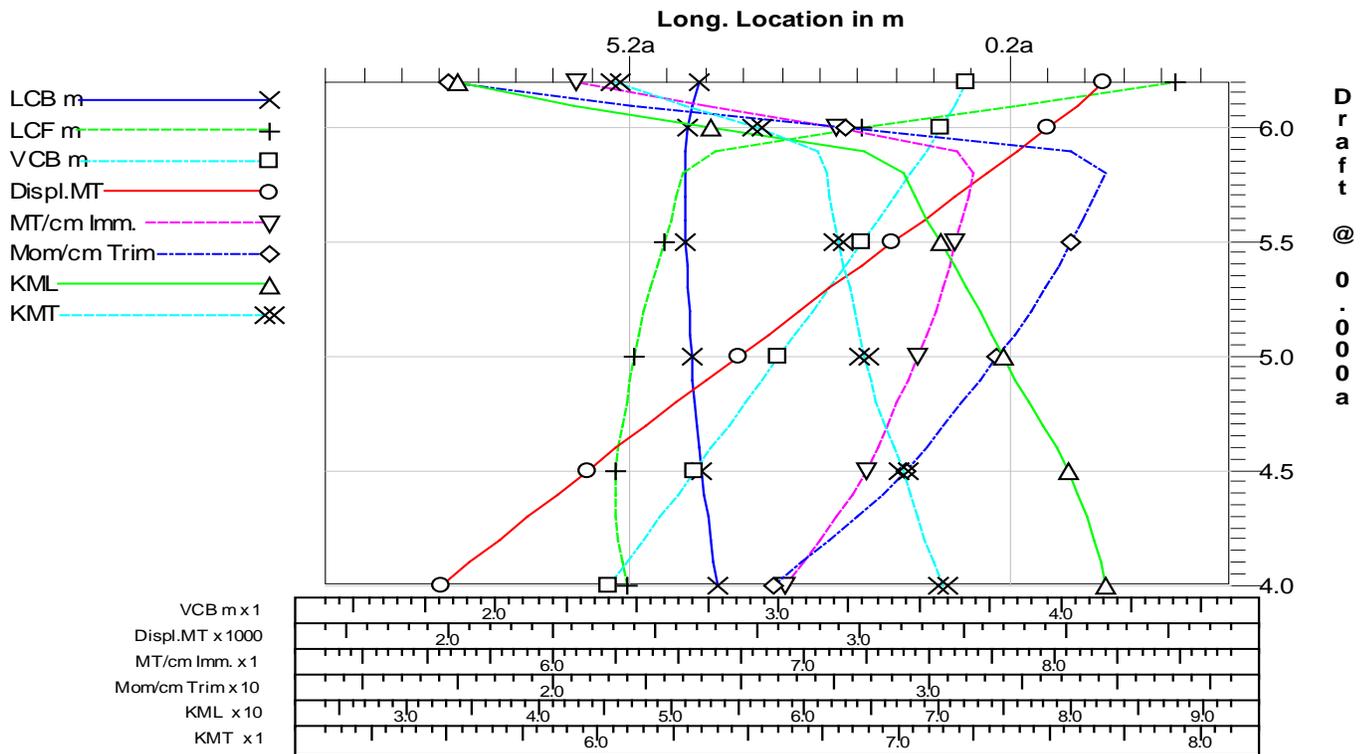
Trim: aft 1.500/58.920, No heel, VCG = 5.537

Draft at Origin (m)	Displ (MT)	LCB (m)	VCB (m)	LCF (m)	TPcm (MT/cm)	MTcm (MT-m/cm)	KML (m)	KMT (m)
4.000	1977.015	4.066a	2.399	5.240a	6.92	25.88	82.627	7.146
4.100	2046.563	4.108a	2.460	5.312a	6.99	26.61	82.134	7.114
4.200	2116.826	4.148a	2.521	5.359a	7.06	27.36	81.659	7.084
4.300	2187.773	4.188a	2.581	5.395a	7.13	28.07	81.109	7.059
4.400	2259.361	4.227a	2.642	5.415a	7.19	28.75	80.478	7.035
4.500	2331.548	4.263a	2.702	5.417a	7.25	29.38	79.762	7.011
4.600	2404.271	4.297a	2.762	5.385a	7.29	29.91	78.812	6.982
4.700	2477.428	4.327a	2.822	5.326a	7.33	30.38	77.754	6.951
4.800	2551.002	4.354a	2.881	5.262a	7.37	30.86	76.788	6.924
4.900	2624.900	4.379a	2.940	5.209a	7.41	31.31	75.788	6.901
5.000	2699.171	4.401a	2.999	5.146a	7.45	31.80	74.927	6.883
5.100	2773.839	4.420a	3.058	5.091a	7.49	32.26	74.050	6.868
5.200	2848.877	4.437a	3.117	5.031a	7.52	32.71	73.167	6.854
5.300	2924.247	4.451a	3.175	4.948a	7.55	33.07	72.153	6.835
5.400	2999.889	4.462a	3.233	4.858a	7.58	33.40	71.126	6.814
5.500	3075.790	4.471a	3.291	4.768a	7.60	33.74	70.141	6.796
5.600	3151.943	4.476a	3.348	4.682a	7.63	34.05	69.169	6.781
5.700	3228.299	4.480a	3.405	4.596a	7.65	34.38	68.255	6.769
5.800	3304.894	4.482a	3.463	4.511a	7.67	34.69	67.369	6.759
5.900	3381.628	4.481a	3.519	4.088a	7.61	33.75	64.325	6.726
6.000	3455.363	4.453a	3.573	2.175a	7.13	27.77	52.870	6.529
6.100	3524.074	4.389a	3.622	0.109a	6.61	22.12	42.507	6.291
6.200	3587.603	4.295a	3.666	1.966f	6.09	17.25	33.850	6.060

Water Specific Gravity = 1.000.

Trim is per 58.92m

Hydrostatic Properties at aft 1.500/58.920, Heel = 0.00



CROSS CURVES OF STABILITY
[SECTION 8.0]

8.1 Guidance on Using Cross Curves (KN) and Righting Arm (GZ) Calculation

8.1.1 Determine Vessel's Draft, Trim and Displacement

Read the vessel draft marks on port and starboard, forward and aft and calculate the vessel's mean draft using the following formulas:

$$d_F = (d_{FP} + d_{FS})/2,$$

$$d_A = (d_{AP} + d_{AS})/2,$$

$$t = d_A - d_F$$

$$[tm/LBM \times 2.0] + d_F$$

$$t = d_A - d_F$$

$$d_{MS} = (d_F + d_A)/2.$$

Where:

d_F , d_{FP} , d_{FS} – Forward drafts at CL, port and starboard side respectively

d_A , d_{AP} , d_{AS} – Aft drafts at CL, port and starboard side respectively

d_{MS} – Amidships draft

t , tm - trim

The amidships draft (d_{MS}) and trim (t) from this calculation can then be used to obtain the vessel displacement from the Hydrostatic tables or curves.

8.1.2 Determine Vessel's Vertical Centre of Gravity

Determine the vertical centre of gravity using condition tables similar to those presented in Section 4.0 of this manual and as reproduced in Table 8.1 below. Weight and location of deadweight items (solid and liquid loads) that are onboard the vessel should be estimated, as example below, and should be added to the lightship displacement. The resulting loaded displacement should be checked against the displacement obtained from the draft marks as a check against the accuracy of the estimate. The vertical centre of gravity corresponding to this displacement is obtained by summing the vertical moments of the individual lightship and load items and dividing this number by the total displacement of the vessel.

Table 8.1: Calculation of Vertical Center of Gravity

Condition 3: Continuous Ice Breaking – Mid-Trip, 50% Consumables					
Weight Item	S.G.	% Full	Weight (t)	VCG (m)	V. Mom. (mt)
Lightship	N/A	100	2172.25	5.858	12725.04
Solid Weights					
Crew and Effects	N/A	100	5.00	11.000	55.00
Deck Equipment	N/A	100	5.00	7.570	37.85
Engine Room Stores	N/A	100	2.00	4.000	8.00
Stores and Provisions	N/A	50	5.00	8.000	40.00
Buoy Tender Barge	N/A	100	8.75	10.200	89.25
Zodiac Work Boat	N/A	100	0.92	10.200	9.38
Trimming Weight	N/A	100	8.17	7.200	58.82
Misc. Lube Oil / Dirty Oil	N/A	60	6.00	4.230	25.38
Total Solid Weight			40.84	7.926	323.68
Icing Weight	N/A	N/A	0	0	0
Liquid Loads					
Fuel Oil 3 Center (FO3.C)	0.850	100	68.22	2.232	152.27
Fuel Oil 3 Port (FO3.P)	0.850	66.31	52.29	3.162	165.34
Fuel Oil 3 Starboard (FO3.S)	0.850	71.44	52.29	3.177	166.13
Fuel Oil 4 Port (FO4.P)	0.850	100	56.64	4.717	267.17
Fuel Oil 4 Starboard (FO4.S)	0.850	100	56.64	4.717	267.17
Fuel Oil Day Tank (FODAY.P)	0.850	90	29.63	4.610	136.59
Fuel Oil Settling Tank (FOSET.S)	0.850	90	29.63	4.610	136.59
Fresh Water (FW.P)	1.000	50	16.80	2.126	35.72
Sanitary Water (SAN.S)	1.000	50	16.80	2.126	35.72
Water Ballast 6 Port (WB6.P)	1.000	40	25.90	4.008	103.80
Water Ballast 6 Starboard (WB6.S)	1.000	40	25.90	4.008	103.80
Total Tanks			430.75	3.645	1570.23
Deadweight	N/A	N/A	471.59	4.016	1893.91
Condition Totals	N/A	N/A	2643.84	5.529	14618.95

8.1.3 Obtain Cross Curves Ordinates (KN)

Obtain cross curves ordinates (KN) from the cross curves of stability presented in Section 8.0 for the vessel's displacement and trim estimated in sub-sections 8.6 and 8.7. Interpolate between appropriate displacements and trims to the actual displacement and trim and determine the KN values at each angle of heel including the limiting flooding angle. Insert the KN values in the table. See example below.

8.1.4 Calculating Resulting GZ Curve

Calculating righting arm (GZ) curve values is required for each angle of heel. Having obtained the KN values at each heel angle for the required displacement the righting arm (GZ) values can be obtained by subtracting from KN the value of $KG\sin\theta$ using the following formula:

$$GZ = KN - KG \times \sin\theta$$

Where: GZ – Righting arm (m),
 KN – cross curves ordinate (m),
 KG – Vertical Centre of gravity,
 θ - Heel Angle (°)

For the loaded displacement 2643.84 tonnes and centre of gravity 5.529m in Table 8.1, corresponding GZ values have been calculated in Table 8.2 below.

Table 8.2: Calculation of Vertical Center of Gravity

KN	θ (°)	$\sin\theta$	$KG\sin\theta$	$GZ = KN - KG\sin\theta$
0.596	5	0.0872	0.482	0.114
1.191	10	0.1736	0.960	0.231
1.784	15	0.2588	1.431	0.353
2.340	20	0.3420	1.891	0.449
2.856	25	0.4226	2.337	0.519
3.349	30	0.5000	2.765	0.584
3.826	35	0.5736	3.171	0.655
4.242	40	0.6428	3.554	0.688
4.592	45	0.7071	3.910	0.682
4.892	50	0.7660	4.235	0.657
5.131	55	0.8192	4.529	0.602
5.305	60	0.8660	4.788	0.517

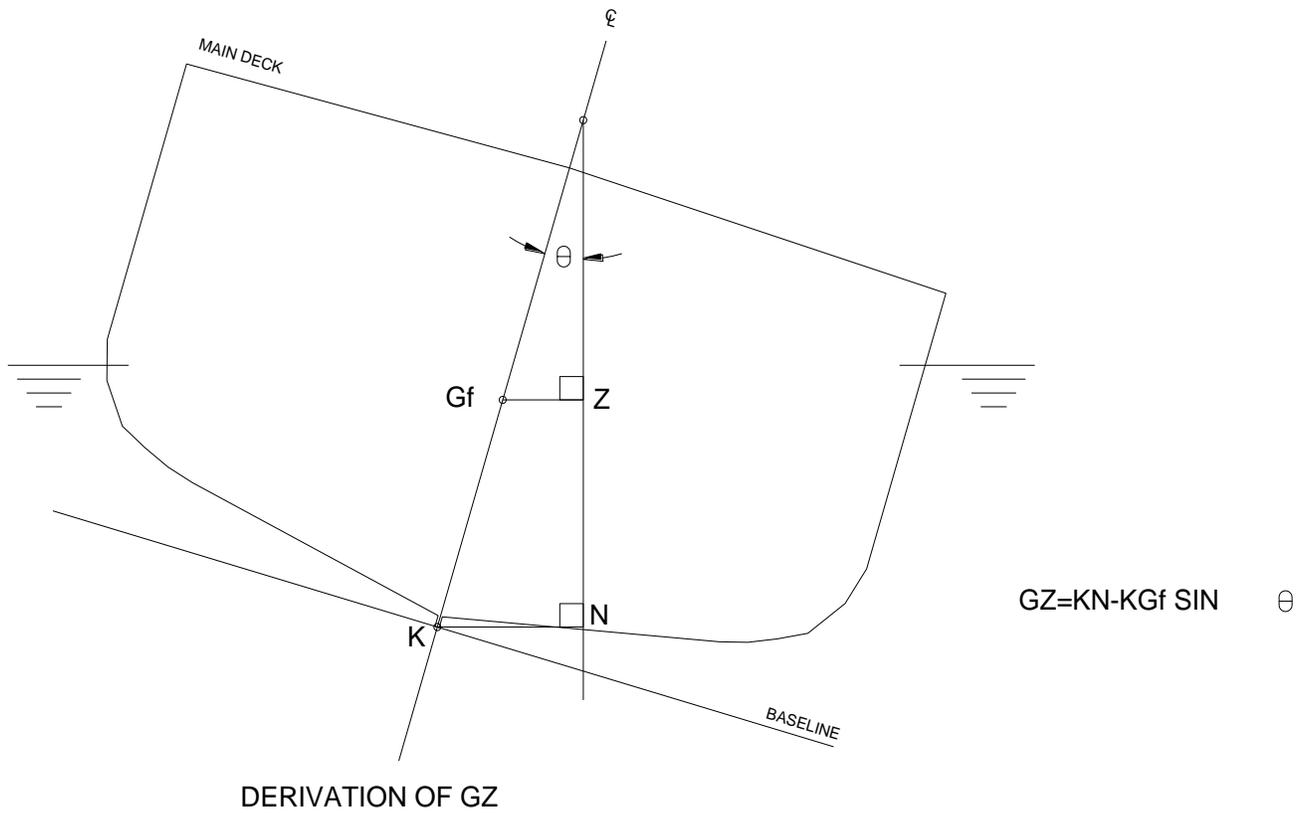
8.1.5 Use of Righting Arm (GZ) Curve

Righting Arm (GZ) curve, once obtained for any loading condition, can be used to assess stability for that particular loading condition. Righting arm curve graph can be obtained by plotting GZ values (ordinates) against heel angles (coordinates).

GZ curve calculated using the above explained is approximate, however sufficiently accurate for quick stability assessment when no other more sophisticated tools are available. For more accurate stability assessment, use stability software or on-board stability programs.

For further examples of manual calculations, see section 10 of this manual.

8.2 DERIVATION OF GZ



Sketch shows how the righting lever, GZ is derived.

8.3 Cross Curves of Stability – Trim at 0.500m fwd

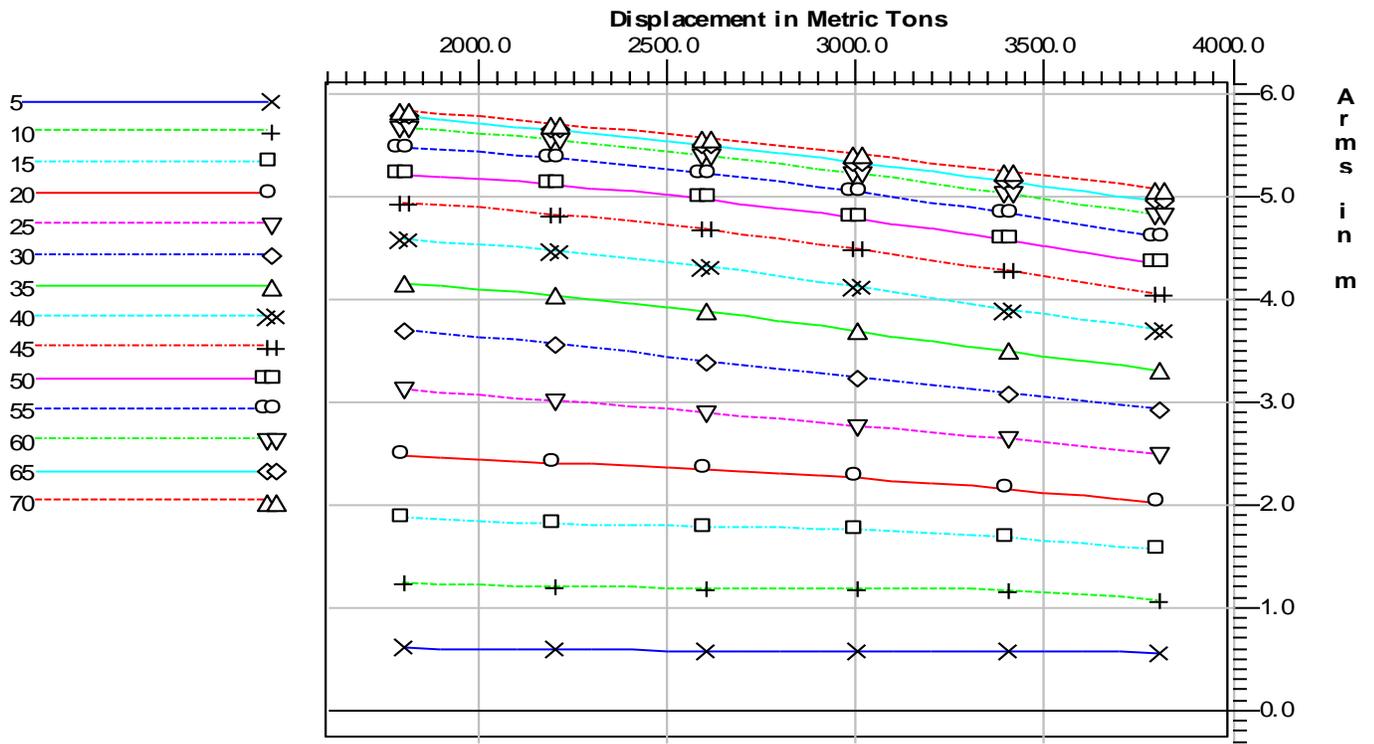
Cross Curves of Stability

Righting Arms(heel) for VCG = 0.00
 Trim fwd 0.500/58.920 at heel = 0 (RA Trim = 0)

Displ (MT)	5.000s	10.000s	15.000s	20.000s	25.000s	30.000s	35.000s
1800.000	0.619s	1.239s	1.863s	2.490s	3.119s	3.692s	4.167s
1900.000	0.612s	1.226s	1.844s	2.465s	3.090s	3.662s	4.138s
2000.000	0.607s	1.215s	1.828s	2.445s	3.062s	3.629s	4.109s
2100.000	0.602s	1.207s	1.815s	2.428s	3.034s	3.594s	4.077s
2200.000	0.599s	1.200s	1.805s	2.415s	3.006s	3.556s	4.044s
2300.000	0.596s	1.195s	1.797s	2.402s	2.978s	3.517s	4.008s
2400.000	0.595s	1.191s	1.791s	2.389s	2.950s	3.477s	3.970s
2500.000	0.593s	1.189s	1.786s	2.374s	2.921s	3.438s	3.930s
2600.000	0.593s	1.187s	1.782s	2.357s	2.891s	3.398s	3.887s
2700.000	0.592s	1.185s	1.778s	2.338s	2.860s	3.360s	3.842s
2800.000	0.592s	1.184s	1.772s	2.318s	2.829s	3.321s	3.794s
2900.000	0.592s	1.183s	1.763s	2.295s	2.797s	3.283s	3.746s
3000.000	0.592s	1.183s	1.751s	2.271s	2.765s	3.246s	3.697s
3100.000	0.592s	1.182s	1.736s	2.245s	2.733s	3.207s	3.648s
3200.000	0.592s	1.180s	1.718s	2.218s	2.700s	3.168s	3.600s
3300.000	0.592s	1.173s	1.696s	2.189s	2.667s	3.128s	3.552s
3400.000	0.592s	1.161s	1.673s	2.160s	2.635s	3.087s	3.504s
3500.000	0.592s	1.145s	1.647s	2.129s	2.602s	3.045s	3.457s
3600.000	0.591s	1.124s	1.618s	2.098s	2.568s	3.004s	3.410s
3700.000	0.585s	1.100s	1.588s	2.067s	2.532s	2.962s	3.365s
3800.000	0.570s	1.071s	1.556s	2.035s	2.495s	2.920s	3.320s
Displ (MT)	40.000s	45.000s	50.000s	55.000s	60.000s	65.000s	70.000s
1800.000	4.575s	4.931s	5.224s	5.466s	5.657s	5.785s	5.831s
1900.000	4.551s	4.908s	5.201s	5.447s	5.632s	5.751s	5.799s
2000.000	4.525s	4.882s	5.177s	5.424s	5.605s	5.719s	5.765s
2100.000	4.497s	4.853s	5.149s	5.398s	5.576s	5.686s	5.731s
2200.000	4.467s	4.821s	5.119s	5.368s	5.545s	5.653s	5.698s
2300.000	4.432s	4.786s	5.087s	5.335s	5.511s	5.618s	5.664s
2400.000	4.395s	4.749s	5.053s	5.299s	5.475s	5.582s	5.629s
2500.000	4.355s	4.710s	5.016s	5.260s	5.436s	5.544s	5.593s
2600.000	4.311s	4.669s	4.976s	5.219s	5.395s	5.505s	5.556s
2700.000	4.265s	4.625s	4.934s	5.175s	5.352s	5.465s	5.518s
2800.000	4.216s	4.579s	4.889s	5.130s	5.308s	5.423s	5.479s
2900.000	4.165s	4.531s	4.842s	5.084s	5.262s	5.380s	5.440s
3000.000	4.113s	4.481s	4.793s	5.036s	5.216s	5.336s	5.400s
3100.000	4.058s	4.430s	4.741s	4.985s	5.169s	5.292s	5.360s
3200.000	4.004s	4.376s	4.688s	4.934s	5.120s	5.247s	5.321s
3300.000	3.950s	4.321s	4.633s	4.881s	5.071s	5.202s	5.281s
3400.000	3.897s	4.265s	4.577s	4.827s	5.020s	5.156s	5.240s
3500.000	3.846s	4.209s	4.520s	4.773s	4.969s	5.108s	5.198s
3600.000	3.796s	4.153s	4.463s	4.717s	4.916s	5.060s	5.154s
3700.000	3.747s	4.098s	4.405s	4.661s	4.863s	5.012s	5.111s
3800.000	3.699s	4.045s	4.349s	4.604s	4.809s	4.962s	5.066s

Water Specific Gravity = 1.000.

Cross Curves



8.4 Cross Curves of Stability – Even Keel

Cross Curves of Stability

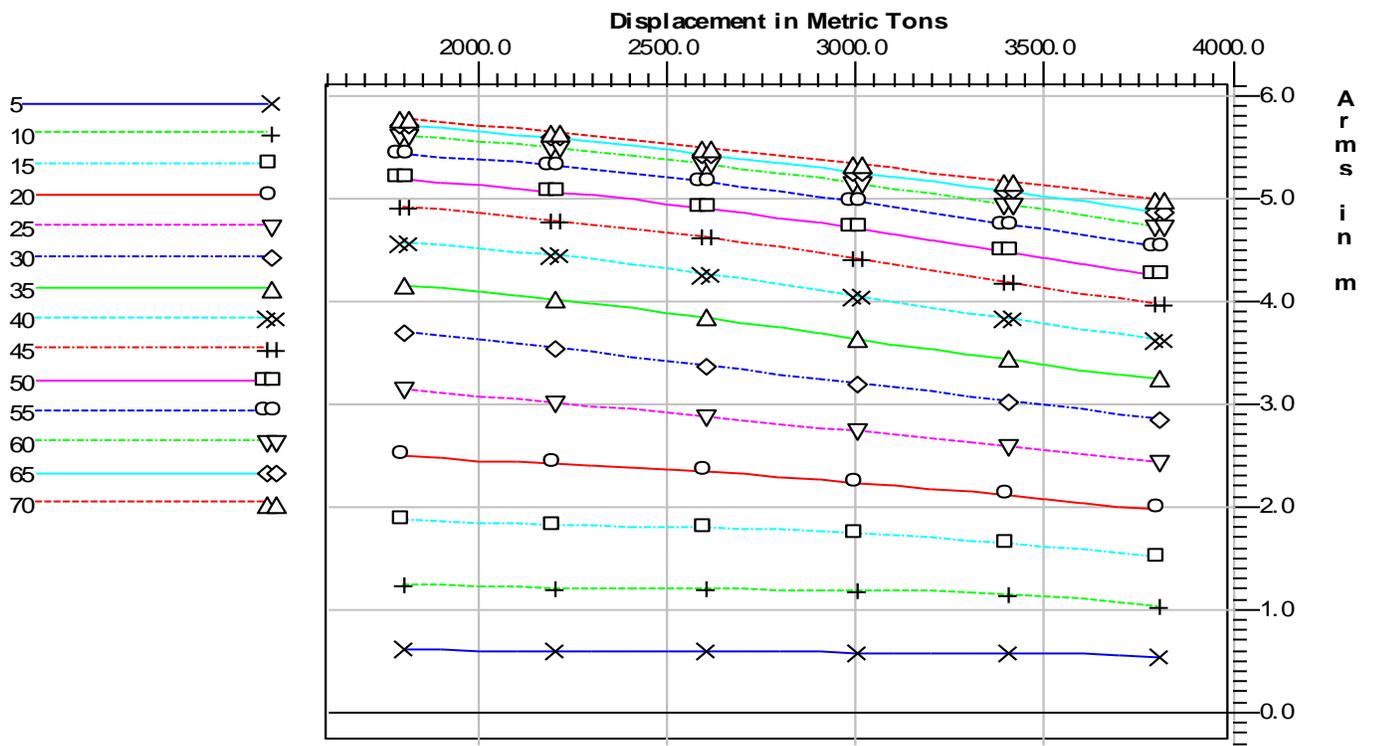
Righting Arms(heel) for VCG = 0.00

Trim zero at heel = 0 (RA Trim = 0)

Displ (MT)	5.000s	10.000s	15.000s	20.000s	25.000s	30.000s	35.000s
1800.000	0.621s	1.244s	1.871s	2.502s	3.134s	3.700s	4.165s
1900.000	0.614s	1.231s	1.852s	2.478s	3.102s	3.665s	4.132s
2000.000	0.609s	1.221s	1.836s	2.457s	3.071s	3.628s	4.098s
2100.000	0.605s	1.212s	1.824s	2.440s	3.039s	3.587s	4.062s
2200.000	0.602s	1.206s	1.814s	2.425s	3.006s	3.545s	4.023s
2300.000	0.600s	1.201s	1.806s	2.409s	2.973s	3.500s	3.982s
2400.000	0.598s	1.197s	1.799s	2.391s	2.939s	3.456s	3.939s
2500.000	0.597s	1.194s	1.793s	2.372s	2.906s	3.412s	3.895s
2600.000	0.596s	1.192s	1.787s	2.350s	2.871s	3.368s	3.848s
2700.000	0.595s	1.190s	1.780s	2.327s	2.836s	3.325s	3.798s
2800.000	0.594s	1.188s	1.770s	2.301s	2.800s	3.282s	3.747s
2900.000	0.594s	1.186s	1.756s	2.274s	2.764s	3.241s	3.694s
3000.000	0.593s	1.185s	1.739s	2.245s	2.728s	3.200s	3.642s
3100.000	0.593s	1.182s	1.718s	2.215s	2.692s	3.158s	3.591s
3200.000	0.592s	1.174s	1.695s	2.183s	2.656s	3.116s	3.540s
3300.000	0.592s	1.161s	1.669s	2.151s	2.621s	3.073s	3.489s
3400.000	0.591s	1.143s	1.640s	2.118s	2.585s	3.030s	3.439s
3500.000	0.591s	1.121s	1.610s	2.084s	2.549s	2.986s	3.390s
3600.000	0.585s	1.094s	1.577s	2.050s	2.513s	2.942s	3.341s
3700.000	0.569s	1.064s	1.543s	2.016s	2.475s	2.898s	3.294s
3800.000	0.543s	1.029s	1.508s	1.982s	2.436s	2.855s	3.248s
Displ (MT)	40.000s	45.000s	50.000s	55.000s	60.000s	65.000s	70.000s
1800.000	4.563s	4.909s	5.192s	5.421s	5.603s	5.725s	5.768s
1900.000	4.535s	4.883s	5.166s	5.398s	5.577s	5.694s	5.735s
2000.000	4.505s	4.853s	5.137s	5.373s	5.549s	5.662s	5.702s
2100.000	4.473s	4.820s	5.105s	5.344s	5.518s	5.628s	5.669s
2200.000	4.438s	4.783s	5.071s	5.312s	5.485s	5.593s	5.636s
2300.000	4.399s	4.744s	5.034s	5.276s	5.448s	5.556s	5.600s
2400.000	4.358s	4.703s	4.995s	5.237s	5.409s	5.517s	5.564s
2500.000	4.312s	4.659s	4.954s	5.195s	5.368s	5.477s	5.526s
2600.000	4.264s	4.613s	4.912s	5.151s	5.325s	5.435s	5.487s
2700.000	4.213s	4.565s	4.867s	5.106s	5.280s	5.393s	5.448s
2800.000	4.160s	4.515s	4.819s	5.059s	5.234s	5.350s	5.408s
2900.000	4.105s	4.463s	4.769s	5.010s	5.187s	5.305s	5.367s
3000.000	4.049s	4.409s	4.717s	4.959s	5.140s	5.261s	5.326s
3100.000	3.991s	4.354s	4.663s	4.907s	5.091s	5.216s	5.285s
3200.000	3.934s	4.298s	4.608s	4.854s	5.040s	5.170s	5.245s
3300.000	3.878s	4.241s	4.551s	4.799s	4.989s	5.123s	5.203s
3400.000	3.823s	4.183s	4.494s	4.744s	4.937s	5.075s	5.160s
3500.000	3.770s	4.126s	4.435s	4.688s	4.884s	5.026s	5.117s
3600.000	3.719s	4.070s	4.377s	4.630s	4.830s	4.977s	5.072s
3700.000	3.669s	4.016s	4.320s	4.573s	4.776s	4.926s	5.026s
3800.000	3.620s	3.963s	4.263s	4.516s	4.720s	4.873s	4.977s

Water Specific Gravity = 1.000.

Cross Curves



8.5 Cross Curves of Stability – Trim at 0.500m aft

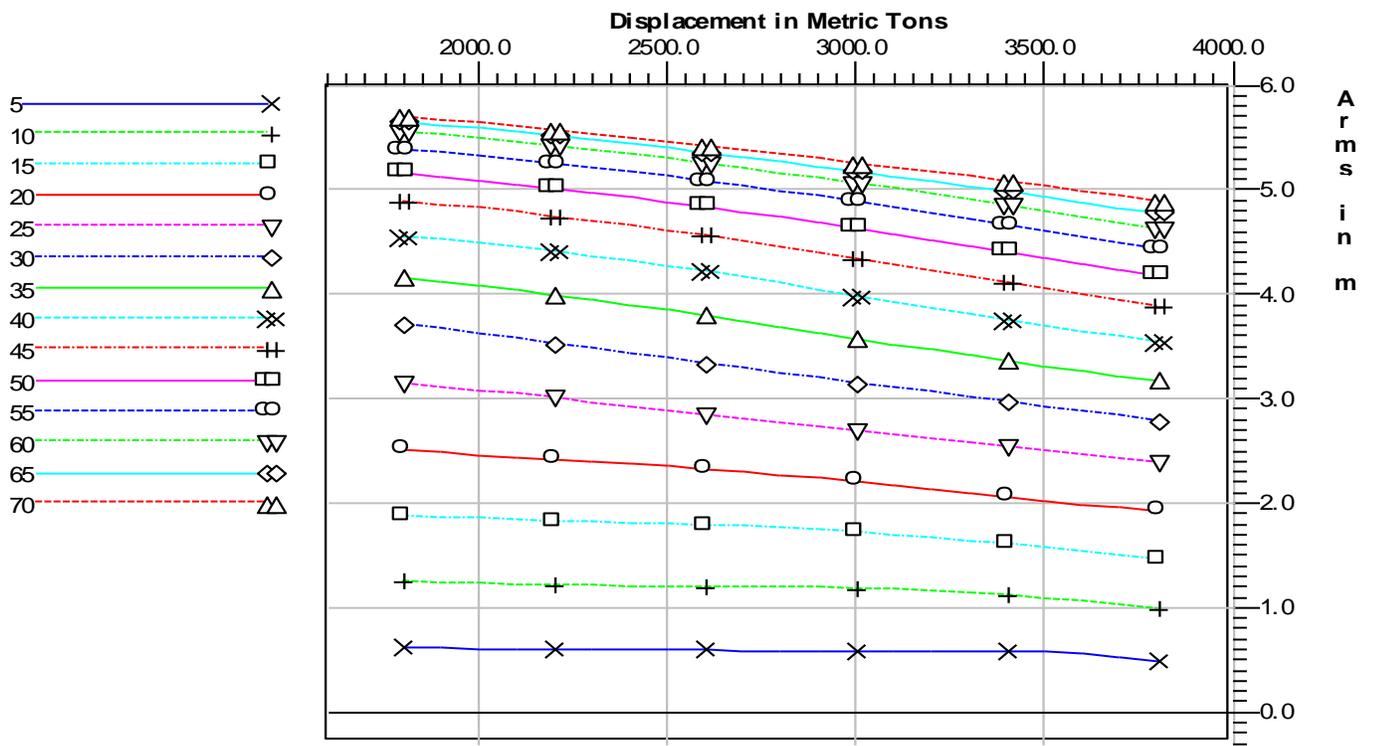
Cross Curves of Stability

Righting Arms(heel) for VCG = 0.00
 Trim aft 0.500/58.920 at heel = 0 (RA Trim = 0)

Displ (MT)	5.000s	10.000s	15.000s	20.000s	25.000s	30.000s	35.000s
1800.000	0.624s	1.250s	1.882s	2.517s	3.149s	3.706s	4.160s
1900.000	0.618s	1.238s	1.863s	2.492s	3.113s	3.666s	4.123s
2000.000	0.613s	1.228s	1.848s	2.470s	3.077s	3.623s	4.084s
2100.000	0.609s	1.220s	1.835s	2.451s	3.039s	3.577s	4.043s
2200.000	0.606s	1.214s	1.824s	2.433s	3.002s	3.529s	3.999s
2300.000	0.603s	1.208s	1.814s	2.412s	2.963s	3.480s	3.952s
2400.000	0.602s	1.204s	1.806s	2.390s	2.925s	3.430s	3.905s
2500.000	0.600s	1.200s	1.799s	2.365s	2.886s	3.381s	3.855s
2600.000	0.599s	1.197s	1.790s	2.338s	2.846s	3.333s	3.804s
2700.000	0.597s	1.193s	1.778s	2.309s	2.807s	3.285s	3.750s
2800.000	0.596s	1.191s	1.762s	2.279s	2.767s	3.239s	3.695s
2900.000	0.595s	1.188s	1.743s	2.247s	2.727s	3.194s	3.639s
3000.000	0.594s	1.184s	1.720s	2.213s	2.687s	3.150s	3.584s
3100.000	0.593s	1.175s	1.694s	2.179s	2.648s	3.105s	3.530s
3200.000	0.592s	1.161s	1.666s	2.144s	2.608s	3.060s	3.477s
3300.000	0.591s	1.142s	1.635s	2.108s	2.570s	3.015s	3.424s
3400.000	0.590s	1.118s	1.602s	2.071s	2.532s	2.969s	3.372s
3500.000	0.583s	1.089s	1.567s	2.034s	2.494s	2.924s	3.321s
3600.000	0.566s	1.057s	1.531s	1.998s	2.455s	2.878s	3.271s
3700.000	0.539s	1.020s	1.493s	1.961s	2.415s	2.833s	3.222s
3800.000	0.504s	0.983s	1.458s	1.928s	2.377s	2.790s	3.178s
Displ (MT)	40.000s	45.000s	50.000s	55.000s	60.000s	65.000s	70.000s
1800.000	4.548s	4.885s	5.158s	5.374s	5.549s	5.661s	5.701s
1900.000	4.515s	4.855s	5.128s	5.347s	5.520s	5.630s	5.667s
2000.000	4.481s	4.820s	5.095s	5.318s	5.489s	5.598s	5.634s
2100.000	4.445s	4.783s	5.059s	5.286s	5.456s	5.564s	5.601s
2200.000	4.406s	4.742s	5.020s	5.251s	5.419s	5.527s	5.567s
2300.000	4.363s	4.698s	4.979s	5.212s	5.380s	5.488s	5.531s
2400.000	4.316s	4.653s	4.935s	5.170s	5.339s	5.448s	5.493s
2500.000	4.266s	4.605s	4.891s	5.126s	5.296s	5.406s	5.454s
2600.000	4.213s	4.555s	4.844s	5.080s	5.251s	5.363s	5.414s
2700.000	4.157s	4.502s	4.796s	5.032s	5.205s	5.318s	5.374s
2800.000	4.100s	4.447s	4.745s	4.983s	5.158s	5.273s	5.332s
2900.000	4.041s	4.391s	4.692s	4.932s	5.109s	5.228s	5.291s
3000.000	3.982s	4.335s	4.638s	4.879s	5.060s	5.183s	5.249s
3100.000	3.922s	4.277s	4.582s	4.825s	5.009s	5.136s	5.208s
3200.000	3.862s	4.218s	4.524s	4.770s	4.957s	5.089s	5.165s
3300.000	3.804s	4.158s	4.466s	4.714s	4.904s	5.040s	5.122s
3400.000	3.748s	4.100s	4.407s	4.657s	4.850s	4.991s	5.077s
3500.000	3.693s	4.042s	4.347s	4.599s	4.795s	4.940s	5.032s
3600.000	3.641s	3.986s	4.289s	4.540s	4.739s	4.888s	4.984s
3700.000	3.590s	3.931s	4.231s	4.482s	4.682s	4.834s	4.933s
3800.000	3.544s	3.881s	4.178s	4.428s	4.628s	4.781s	4.881s

Water Specific Gravity = 1.000.

Cross Curves



8.6 Cross Curves of Stability – Trim at 1.000m aft

Cross Curves of Stability

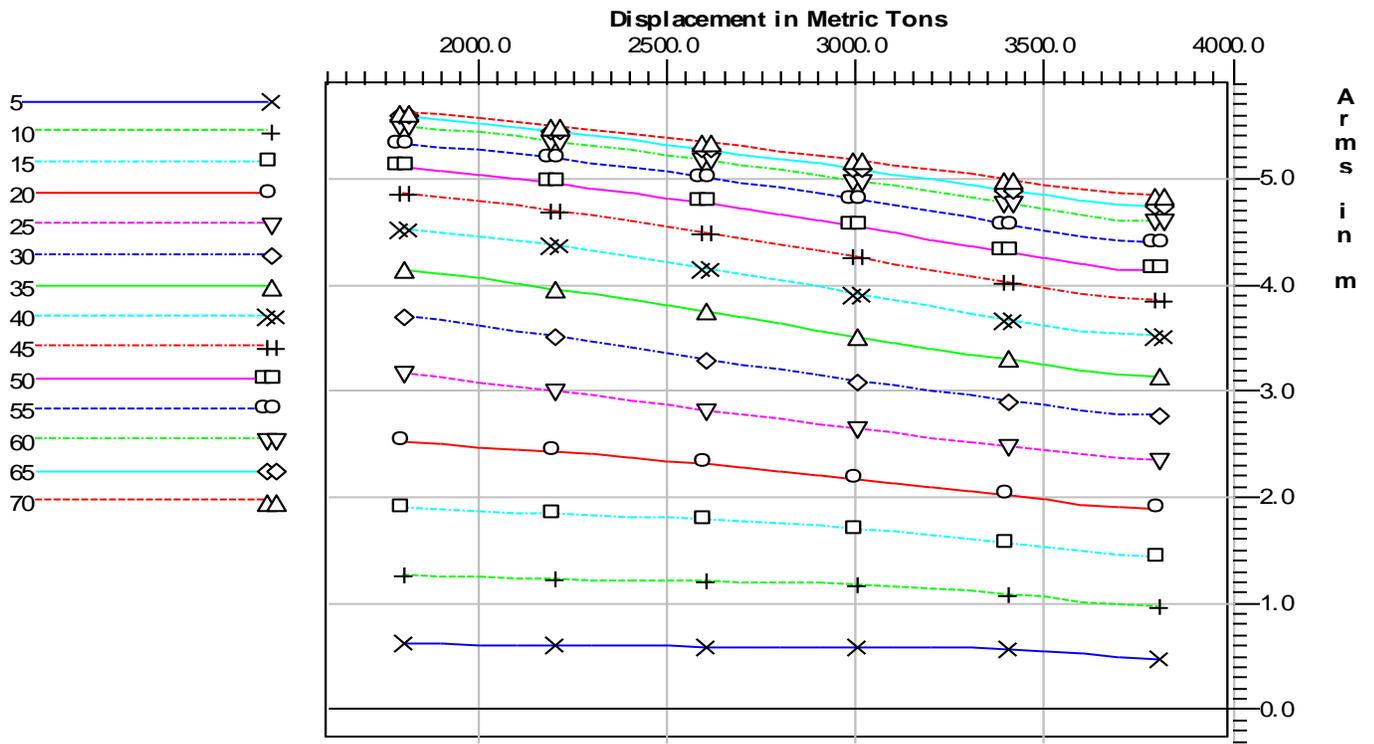
Righting Arms(heel) for VCG = 0.00

Trim aft 1.000/58.920 at heel = 0 (RA Trim = 0)

Displ (MT)	5.000s	10.000s	15.000s	20.000s	25.000s	30.000s	35.000s
1800.000	0.628s	1.259s	1.895s	2.533s	3.162s	3.708s	4.153s
1900.000	0.622s	1.247s	1.876s	2.506s	3.121s	3.662s	4.111s
2000.000	0.617s	1.237s	1.860s	2.483s	3.079s	3.614s	4.066s
2100.000	0.613s	1.229s	1.846s	2.461s	3.036s	3.562s	4.019s
2200.000	0.610s	1.221s	1.834s	2.437s	2.993s	3.509s	3.970s
2300.000	0.608s	1.215s	1.823s	2.411s	2.949s	3.455s	3.918s
2400.000	0.605s	1.210s	1.813s	2.383s	2.905s	3.400s	3.866s
2500.000	0.603s	1.205s	1.802s	2.353s	2.861s	3.346s	3.811s
2600.000	0.601s	1.201s	1.788s	2.321s	2.817s	3.294s	3.755s
2700.000	0.599s	1.196s	1.770s	2.287s	2.773s	3.242s	3.698s
2800.000	0.598s	1.193s	1.748s	2.251s	2.729s	3.192s	3.639s
2900.000	0.596s	1.187s	1.723s	2.215s	2.685s	3.144s	3.581s
3000.000	0.594s	1.177s	1.695s	2.177s	2.642s	3.096s	3.523s
3100.000	0.593s	1.161s	1.664s	2.139s	2.599s	3.049s	3.467s
3200.000	0.592s	1.140s	1.631s	2.100s	2.557s	3.002s	3.411s
3300.000	0.588s	1.115s	1.596s	2.060s	2.516s	2.954s	3.356s
3400.000	0.580s	1.085s	1.558s	2.021s	2.475s	2.907s	3.303s
3500.000	0.562s	1.050s	1.520s	1.981s	2.435s	2.860s	3.250s
3600.000	0.534s	1.012s	1.481s	1.943s	2.396s	2.814s	3.201s
3700.000	0.505s	0.981s	1.451s	1.917s	2.366s	2.780s	3.164s
3800.000	0.484s	0.962s	1.436s	1.906s	2.352s	2.763s	3.148s
Displ (MT)	40.000s	45.000s	50.000s	55.000s	60.000s	65.000s	70.000s
1800.000	4.530s	4.859s	5.121s	5.325s	5.491s	5.594s	5.629s
1900.000	4.493s	4.824s	5.087s	5.294s	5.461s	5.563s	5.596s
2000.000	4.454s	4.785s	5.050s	5.261s	5.427s	5.530s	5.563s
2100.000	4.413s	4.742s	5.009s	5.225s	5.390s	5.494s	5.528s
2200.000	4.369s	4.697s	4.966s	5.186s	5.351s	5.455s	5.492s
2300.000	4.322s	4.650s	4.920s	5.144s	5.309s	5.414s	5.455s
2400.000	4.270s	4.600s	4.873s	5.100s	5.265s	5.372s	5.417s
2500.000	4.215s	4.547s	4.824s	5.053s	5.220s	5.328s	5.377s
2600.000	4.158s	4.493s	4.774s	5.005s	5.173s	5.284s	5.336s
2700.000	4.098s	4.436s	4.722s	4.955s	5.125s	5.238s	5.295s
2800.000	4.037s	4.377s	4.668s	4.904s	5.077s	5.192s	5.253s
2900.000	3.975s	4.318s	4.613s	4.851s	5.027s	5.146s	5.212s
3000.000	3.912s	4.258s	4.556s	4.796s	4.976s	5.100s	5.170s
3100.000	3.850s	4.196s	4.497s	4.740s	4.924s	5.052s	5.127s
3200.000	3.788s	4.135s	4.438s	4.683s	4.870s	5.003s	5.082s
3300.000	3.729s	4.074s	4.378s	4.625s	4.816s	4.953s	5.037s
3400.000	3.671s	4.015s	4.317s	4.567s	4.760s	4.902s	4.990s
3500.000	3.616s	3.957s	4.257s	4.507s	4.703s	4.849s	4.941s
3600.000	3.563s	3.902s	4.200s	4.449s	4.647s	4.794s	4.890s
3700.000	3.526s	3.863s	4.159s	4.407s	4.605s	4.755s	4.851s
3800.000	3.511s	3.846s	4.142s	4.389s	4.588s	4.739s	4.838s

Water Specific Gravity = 1.000.

Cross Curves



8.7 Cross Curves of Stability – Trim at 1.500m aft

Cross Curves of Stability

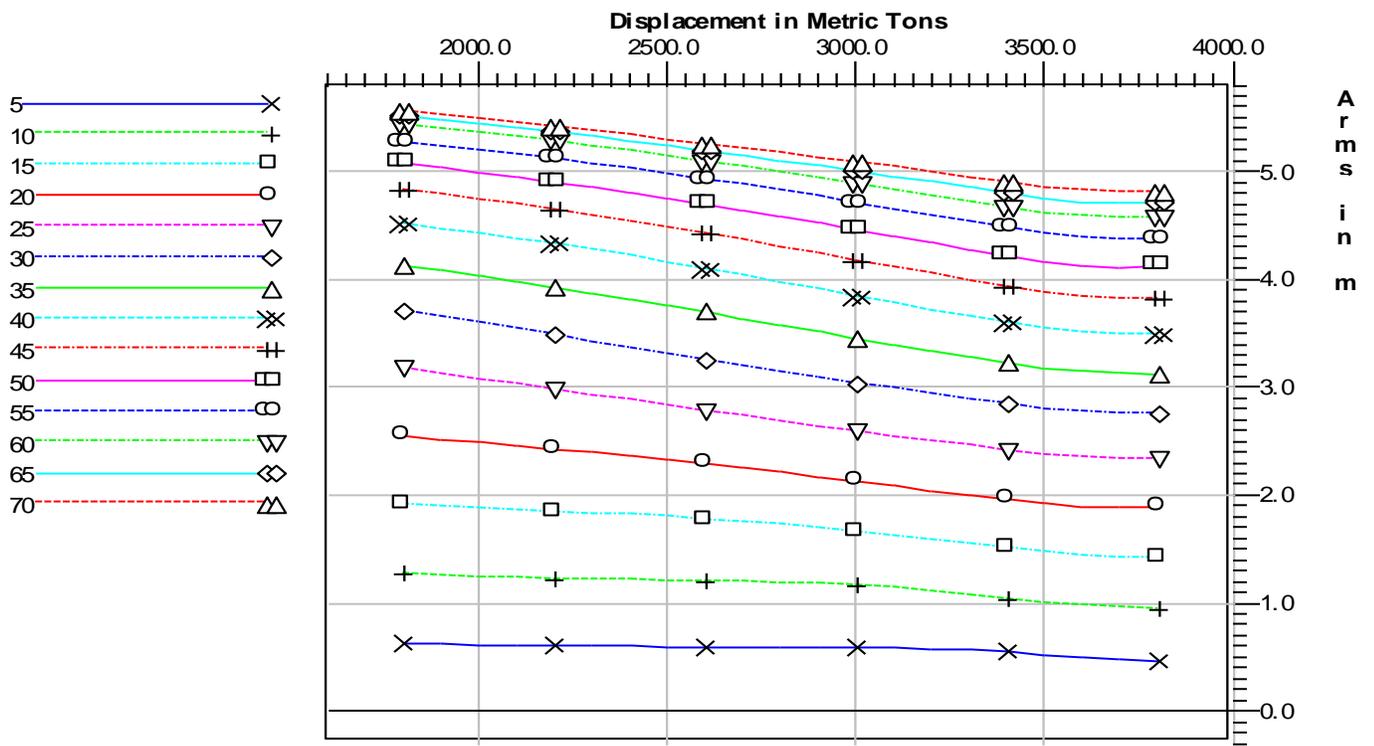
Righting Arms(heel) for VCG = 0.00

Trim aft 1.500/58.920 at heel = 0 (RA Trim = 0)

Displ (MT)	5.000s	10.000s	15.000s	20.000s	25.000s	30.000s	35.000s
1800.000	0.633s	1.270s	1.910s	2.550s	3.172s	3.706s	4.141s
1900.000	0.627s	1.257s	1.890s	2.522s	3.125s	3.655s	4.094s
2000.000	0.623s	1.247s	1.872s	2.494s	3.077s	3.600s	4.044s
2100.000	0.619s	1.237s	1.857s	2.467s	3.028s	3.543s	3.991s
2200.000	0.615s	1.229s	1.843s	2.437s	2.979s	3.484s	3.936s
2300.000	0.612s	1.222s	1.830s	2.405s	2.930s	3.425s	3.880s
2400.000	0.608s	1.215s	1.816s	2.371s	2.881s	3.366s	3.822s
2500.000	0.606s	1.209s	1.799s	2.335s	2.832s	3.307s	3.763s
2600.000	0.603s	1.204s	1.779s	2.298s	2.784s	3.251s	3.703s
2700.000	0.600s	1.198s	1.755s	2.259s	2.735s	3.196s	3.642s
2800.000	0.598s	1.190s	1.728s	2.219s	2.687s	3.142s	3.581s
2900.000	0.596s	1.178s	1.698s	2.178s	2.639s	3.091s	3.520s
3000.000	0.594s	1.161s	1.664s	2.136s	2.593s	3.040s	3.460s
3100.000	0.592s	1.139s	1.629s	2.094s	2.547s	2.990s	3.401s
3200.000	0.586s	1.112s	1.591s	2.051s	2.502s	2.941s	3.344s
3300.000	0.576s	1.081s	1.551s	2.009s	2.459s	2.891s	3.288s
3400.000	0.557s	1.045s	1.510s	1.967s	2.417s	2.843s	3.233s
3500.000	0.533s	1.009s	1.474s	1.932s	2.382s	2.802s	3.187s
3600.000	0.508s	0.980s	1.446s	1.907s	2.357s	2.771s	3.154s
3700.000	0.487s	0.961s	1.430s	1.895s	2.342s	2.754s	3.136s
3800.000	0.476s	0.953s	1.427s	1.896s	2.341s	2.751s	3.135s
Displ (MT)	40.000s	45.000s	50.000s	55.000s	60.000s	65.000s	70.000s
1800.000	4.509s	4.828s	5.081s	5.275s	5.429s	5.524s	5.556s
1900.000	4.467s	4.789s	5.043s	5.240s	5.397s	5.492s	5.523s
2000.000	4.423s	4.745s	5.001s	5.202s	5.361s	5.457s	5.488s
2100.000	4.377s	4.699s	4.956s	5.161s	5.321s	5.419s	5.451s
2200.000	4.328s	4.649s	4.909s	5.118s	5.279s	5.379s	5.413s
2300.000	4.276s	4.598s	4.859s	5.073s	5.235s	5.337s	5.374s
2400.000	4.219s	4.543s	4.808s	5.026s	5.189s	5.293s	5.334s
2500.000	4.160s	4.486s	4.756s	4.977s	5.141s	5.248s	5.294s
2600.000	4.099s	4.427s	4.702s	4.927s	5.093s	5.202s	5.253s
2700.000	4.036s	4.367s	4.646s	4.875s	5.044s	5.156s	5.212s
2800.000	3.971s	4.305s	4.589s	4.822s	4.994s	5.109s	5.170s
2900.000	3.906s	4.242s	4.531s	4.766s	4.942s	5.062s	5.128s
3000.000	3.840s	4.178s	4.471s	4.709s	4.889s	5.013s	5.085s
3100.000	3.776s	4.114s	4.411s	4.652s	4.835s	4.963s	5.040s
3200.000	3.713s	4.051s	4.349s	4.593s	4.780s	4.912s	4.994s
3300.000	3.653s	3.989s	4.287s	4.533s	4.724s	4.860s	4.946s
3400.000	3.594s	3.930s	4.227s	4.473s	4.666s	4.806s	4.896s
3500.000	3.546s	3.881s	4.176s	4.423s	4.617s	4.761s	4.853s
3600.000	3.513s	3.847s	4.142s	4.388s	4.583s	4.728s	4.822s
3700.000	3.495s	3.829s	4.124s	4.370s	4.566s	4.713s	4.809s
3800.000	3.497s	3.831s	4.125s	4.372s	4.569s	4.720s	4.818s

Water Specific Gravity = 1.000.

Cross Curves



TANK CAPACITY TABLES
[SECTION 9.0]

9.1 Tank Summary Table

Tank Name	Contents	Specific Gravity	100% Load Weight (MT)
FO1.C	Fuel Oil	0.850	165.01
FO2.P	Fuel Oil	0.850	63.13
FO2.S	Fuel Oil	0.850	63.13
FO3.C	Fuel Oil	0.850	68.22
FO3.P	Fuel Oil	0.850	78.86
FO3.S	Fuel Oil	0.850	73.19
FO4.P	Fuel Oil	0.850	56.64
FO4.S	Fuel Oil	0.850	56.64
FODAY.P	Fuel Oil	0.850	32.93
FOSET.S	Fuel Oil	0.850	32.93
WB1.C	Water Ballast	1.000	62.81
WB2.P	Water Ballast	1.000	49.16
WB2.S	Water Ballast	1.000	49.16
WB3.P	Water Ballast	1.000	41.87
WB3.S	Water Ballast	1.000	41.87
WB4.P	Water Ballast	1.000	36.00
WB4.S	Water Ballast	1.000	36.00
WB5.P	Water Ballast	1.000	40.65
WB5.S	Water Ballast	1.000	40.65
WB6.P	Water Ballast	1.000	64.75
WB6.S	Water Ballast	1.000	64.75
FW.P	Fresh Water	1.000	33.61
SAN.S	Fresh Water	1.000	33.61

Note - Water Ballast tanks typically contain fresh water however during salt water transit conditions are shown filled with salt water, SG 1.025.

9.2 Tank Capacities at Trim 0.500m Fwd

Tank Capacities for FO1.C containing FUEL OIL (0.850)

Trim: fwd 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	9.71	8.25	10.337f	0.000	0.143	166.10	261.03
10.00%	19.41	16.50	10.306f	0.000	0.239	281.29	320.58
20.00%	38.83	33.00	10.366f	0.000	0.399	386.54	367.82
30.00%	58.24	49.50	10.443f	0.000	0.543	439.66	393.94
40.00%	77.65	66.00	10.507f	0.000	0.679	471.75	411.62
50.00%	97.06	82.50	10.553f	0.000	0.810	494.46	374.75
60.00%	116.48	99.01	10.597f	0.000	0.943	517.02	386.35
70.00%	135.89	115.51	10.625f	0.000	1.076	472.99	363.78
80.00%	155.30	132.01	10.630f	0.000	1.211	437.34	338.14
90.00%	174.72	148.51	10.619f	0.000	1.348	410.23	309.18
95.00%	184.42	156.76	10.608f	0.000	1.417	399.70	293.22
98.00%	190.25	161.71	10.600f	0.000	1.459	394.30	283.10
100.00%	194.13	165.01	10.580f	0.000	1.487		

Tank Capacities for FO2.P containing FUEL OIL (0.850)

Trim: fwd 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	3.71	3.16	6.182a	1.340p	0.112	50.80	237.22
10.00%	7.43	6.31	6.373a	1.812p	0.168	111.18	337.89
20.00%	14.85	12.62	6.694a	2.220p	0.251	134.83	434.30
30.00%	22.28	18.94	6.917a	2.400p	0.321	145.21	481.16
40.00%	29.71	25.25	7.067a	2.508p	0.387	152.42	506.22
50.00%	37.13	31.56	7.176a	2.583p	0.450	158.17	531.35
60.00%	44.56	37.87	7.262a	2.638p	0.512	161.48	545.64
70.00%	51.99	44.19	7.326a	2.680p	0.574	161.84	546.99
80.00%	59.41	50.50	7.374a	2.711p	0.634	161.84	546.99
90.00%	66.84	56.81	7.412a	2.735p	0.694	161.84	546.99
95.00%	70.55	59.97	7.428a	2.745p	0.724	161.84	546.99
98.00%	72.78	61.86	7.451a	2.750p	0.742	115.78	201.90
100.00%	74.26	63.13	7.516a	2.753p	0.753		

Tank Capacities for FO2.S containing FUEL OIL (0.850)

Trim: fwd 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	3.71	3.16	6.182a	1.340s	0.112	50.80	237.22
10.00%	7.43	6.31	6.373a	1.812s	0.168	111.18	337.89
20.00%	14.85	12.62	6.694a	2.220s	0.251	134.83	434.30
30.00%	22.28	18.94	6.917a	2.400s	0.321	145.21	481.16
40.00%	29.71	25.25	7.067a	2.508s	0.387	152.42	506.22
50.00%	37.13	31.56	7.176a	2.583s	0.450	158.17	531.35
60.00%	44.56	37.87	7.262a	2.638s	0.512	161.48	545.64
70.00%	51.99	44.19	7.326a	2.680s	0.574	161.84	546.99
80.00%	59.41	50.50	7.374a	2.711s	0.634	161.84	546.99
90.00%	66.84	56.81	7.412a	2.735s	0.694	161.84	546.99
95.00%	70.55	59.97	7.428a	2.745s	0.724	161.84	546.99
98.00%	72.78	61.86	7.451a	2.750s	0.742	115.78	201.90
100.00%	74.26	63.13	7.516a	2.753s	0.753		

Tank Capacities for FO3.C containing FUEL OIL (0.850)

Trim: fwd 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	4.01	3.41	16.948a	0.000	0.184	4.07	57.28
10.00%	8.03	6.82	16.796a	0.000	0.340	6.59	58.49
20.00%	16.05	13.64	16.761a	0.000	0.605	9.47	63.18
30.00%	24.08	20.47	16.833a	0.000	0.838	11.52	76.05
40.00%	32.10	27.29	16.931a	0.000	1.053	12.50	84.77
50.00%	40.13	34.11	16.997a	0.000	1.258	12.50	84.77
60.00%	48.15	40.93	17.041a	0.000	1.457	12.50	84.77
70.00%	56.18	47.75	17.072a	0.000	1.653	12.50	84.77
80.00%	64.21	54.58	17.096a	0.000	1.847	12.50	84.77
90.00%	72.23	61.40	17.114a	0.000	2.040	12.50	84.77
95.00%	76.24	64.81	17.122a	0.000	2.136	12.50	84.77
98.00%	78.65	66.85	17.126a	0.000	2.194	12.50	84.77
100.00%	80.26	68.22	17.139a	0.000	2.232		

Tank Capacities for FO3.P containing FUEL OIL (0.850)

Trim: fwd 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	4.64	3.94	15.024a	4.558p	1.232	3.97	13.52
10.00%	9.28	7.89	15.519a	4.612p	1.484	5.37	31.16
20.00%	18.56	15.77	16.176a	4.652p	1.858	6.97	66.51
30.00%	27.83	23.66	16.534a	4.681p	2.164	7.24	70.66
40.00%	37.11	31.54	16.715a	4.696p	2.447	7.24	70.66
50.00%	46.39	39.43	16.824a	4.704p	2.722	7.24	70.66
60.00%	55.67	47.32	16.897a	4.710p	2.993	7.24	70.66
70.00%	64.94	55.20	16.949a	4.715p	3.261	7.24	70.66
80.00%	74.22	63.09	16.988a	4.718p	3.527	7.24	70.66
90.00%	83.50	70.97	17.018a	4.720p	3.792	7.24	70.66
95.00%	88.14	74.92	17.031a	4.721p	3.925	7.24	70.66
98.00%	90.92	77.28	17.038a	4.722p	4.004	7.24	70.66
100.00%	92.78	78.86	17.050a	4.722p	4.057		

Tank Capacities for FO3.S containing FUEL OIL (0.850)

Trim: fwd 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	4.31	3.66	14.979a	4.551s	1.210	3.83	12.37
10.00%	8.61	7.32	15.459a	4.607s	1.452	5.20	28.43
20.00%	17.22	14.64	16.101a	4.648s	1.810	6.84	63.43
30.00%	25.83	21.96	16.477a	4.676s	2.100	7.24	70.66
40.00%	34.44	29.28	16.673a	4.692s	2.367	7.24	70.66
50.00%	43.05	36.60	16.790a	4.702s	2.624	7.24	70.66
60.00%	51.66	43.91	16.852a	4.717s	2.878	5.87	65.24
70.00%	60.27	51.23	16.878a	4.736s	3.139	5.87	65.24
80.00%	68.89	58.55	16.897a	4.751s	3.406	5.87	65.24
90.00%	77.50	65.87	16.912a	4.762s	3.677	5.87	65.24
95.00%	81.80	69.53	16.919a	4.767s	3.814	5.87	65.24
98.00%	84.38	71.73	16.922a	4.769s	3.896	5.87	65.24
100.00%	86.11	73.19	16.932a	4.771s	3.951		

Tank Capacities for FO4.P containing FUEL OIL (0.850)

Trim: fwd 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	3.33	2.83	22.014a	1.805p	2.406	3.96	5.10
10.00%	6.66	5.66	22.379a	1.907p	2.652	5.75	12.72
20.00%	13.33	11.33	22.896a	1.976p	2.995	8.17	34.33
30.00%	19.99	16.99	23.258a	2.019p	3.258	9.32	46.64
40.00%	26.65	22.66	23.477a	2.051p	3.488	9.47	47.53
50.00%	33.32	28.32	23.609a	2.070p	3.704	9.47	47.53
60.00%	39.98	33.98	23.696a	2.082p	3.912	9.47	47.53
70.00%	46.65	39.65	23.759a	2.091p	4.117	9.47	47.53
80.00%	53.31	45.31	23.806a	2.098p	4.318	9.47	47.53
90.00%	59.97	50.98	23.843a	2.103p	4.518	9.47	47.53
95.00%	63.30	53.81	23.858a	2.105p	4.618	9.47	47.53
98.00%	65.30	55.51	23.866a	2.107p	4.677	9.47	47.53
100.00%	66.64	56.64	23.879a	2.107p	4.717		

Tank Capacities for FO4.S containing FUEL OIL (0.850)

Trim: fwd 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	3.33	2.83	22.014a	1.805s	2.406	3.96	5.10
10.00%	6.66	5.66	22.379a	1.907s	2.652	5.75	12.72
20.00%	13.33	11.33	22.896a	1.976s	2.995	8.17	34.33
30.00%	19.99	16.99	23.258a	2.019s	3.258	9.32	46.64
40.00%	26.65	22.66	23.477a	2.051s	3.488	9.47	47.53
50.00%	33.32	28.32	23.609a	2.070s	3.704	9.47	47.53
60.00%	39.98	33.98	23.696a	2.082s	3.912	9.47	47.53
70.00%	46.65	39.65	23.759a	2.091s	4.117	9.47	47.53
80.00%	53.31	45.31	23.806a	2.098s	4.318	9.47	47.53
90.00%	59.97	50.98	23.843a	2.103s	4.518	9.47	47.53
95.00%	63.30	53.81	23.858a	2.105s	4.618	9.47	47.53
98.00%	65.30	55.51	23.866a	2.107s	4.677	9.47	47.53
100.00%	66.64	56.64	23.879a	2.107s	4.717		

Tank Capacities for FODAY.P containing FUEL OIL (0.850)

Trim: fwd 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	1.94	1.65	14.013f	2.070p	2.995	12.38	4.51
10.00%	3.87	3.29	14.002f	2.070p	3.090	12.38	4.51
20.00%	7.75	6.59	13.996f	2.070p	3.280	12.38	4.51
30.00%	11.62	9.88	13.994f	2.070p	3.470	12.38	4.51
40.00%	15.50	13.17	13.993f	2.070p	3.660	12.38	4.51
50.00%	19.37	16.46	13.992f	2.070p	3.850	12.38	4.51
60.00%	23.24	19.76	13.992f	2.070p	4.040	12.38	4.51
70.00%	27.12	23.05	13.992f	2.070p	4.230	12.38	4.51
80.00%	30.99	26.34	13.991f	2.070p	4.420	12.38	4.51
90.00%	34.86	29.63	13.991f	2.070p	4.610	12.38	4.51
95.00%	36.80	31.28	13.991f	2.070p	4.705	12.38	4.51
98.00%	37.96	32.27	13.991f	2.070p	4.762	12.38	4.51
100.00%	38.74	32.93	13.990f	2.070p	4.800		

Tank Capacities for FOSET.S containing FUEL OIL (0.850)

Trim: fwd 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	1.94	1.65	14.013f	2.070s	2.995	12.38	4.51
10.00%	3.87	3.29	14.002f	2.070s	3.090	12.38	4.51
20.00%	7.75	6.59	13.996f	2.070s	3.280	12.38	4.51
30.00%	11.62	9.88	13.994f	2.070s	3.470	12.38	4.51
40.00%	15.50	13.17	13.993f	2.070s	3.660	12.38	4.51
50.00%	19.37	16.46	13.992f	2.070s	3.850	12.38	4.51
60.00%	23.24	19.76	13.992f	2.070s	4.040	12.38	4.51
70.00%	27.12	23.05	13.992f	2.070s	4.230	12.38	4.51
80.00%	30.99	26.34	13.991f	2.070s	4.420	12.38	4.51
90.00%	34.86	29.63	13.991f	2.070s	4.610	12.38	4.51
95.00%	36.80	31.28	13.991f	2.070s	4.705	12.38	4.51
98.00%	37.96	32.27	13.991f	2.070s	4.762	12.38	4.51
100.00%	38.74	32.93	13.990f	2.070s	4.800		

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

Trim: fwd 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	1.68	1.68	2.704f	6.312p	0.574	0.24	12.83
10.00%	3.36	3.36	2.878f	6.318p	0.767	0.26	14.33
20.00%	6.72	6.72	3.031f	6.330p	1.130	0.29	16.08
30.00%	10.08	10.08	3.113f	6.340p	1.473	0.33	17.08
40.00%	13.44	13.44	3.171f	6.349p	1.805	0.36	17.83
50.00%	16.80	16.80	3.213f	6.358p	2.126	0.38	18.24
60.00%	20.17	20.17	3.244f	6.364p	2.442	0.39	18.34
70.00%	23.53	23.53	3.265f	6.368p	2.752	0.39	18.40
80.00%	26.89	26.89	3.281f	6.372p	3.060	0.40	18.45
90.00%	30.25	30.25	3.292f	6.375p	3.366	0.40	18.49
95.00%	31.93	31.93	3.297f	6.376p	3.518	0.40	18.51
98.00%	32.94	32.94	3.300f	6.377p	3.609	0.40	18.53
100.00%	33.61	33.61	3.297f	6.378p	3.669		

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

Trim: fwd 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	1.68	1.68	2.704f	6.312s	0.574	0.24	12.83
10.00%	3.36	3.36	2.878f	6.318s	0.767	0.26	14.33
20.00%	6.72	6.72	3.031f	6.330s	1.130	0.29	16.08
30.00%	10.08	10.08	3.113f	6.340s	1.473	0.33	17.08
40.00%	13.44	13.44	3.171f	6.349s	1.805	0.36	17.83
50.00%	16.80	16.80	3.213f	6.358s	2.126	0.38	18.24
60.00%	20.17	20.17	3.244f	6.364s	2.442	0.39	18.34
70.00%	23.53	23.53	3.265f	6.368s	2.752	0.39	18.40
80.00%	26.89	26.89	3.281f	6.372s	3.060	0.40	18.45
90.00%	30.25	30.25	3.292f	6.375s	3.366	0.40	18.49
95.00%	31.93	31.93	3.297f	6.376s	3.518	0.40	18.51
98.00%	32.94	32.94	3.300f	6.377s	3.609	0.40	18.53
100.00%	33.61	33.61	3.297f	6.378s	3.669		

Tank Capacities for WB1.C containing WATER BALLAST (1.000)

Trim: fwd 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	3.14	3.14	23.851f	0.000	3.084	5.50	2.92
10.00%	6.28	6.28	24.052f	0.000	3.367	12.98	6.91
20.00%	12.56	12.56	24.249f	0.000	3.732	30.33	11.30
30.00%	18.84	18.84	24.344f	0.000	4.001	48.36	13.84
40.00%	25.12	25.12	24.401f	0.000	4.227	66.47	15.68
50.00%	31.41	31.41	24.439f	0.000	4.428	84.10	17.16
60.00%	37.69	37.69	24.467f	0.000	4.612	100.93	18.36
70.00%	43.97	43.97	24.488f	0.000	4.783	116.94	19.37
80.00%	50.25	50.25	24.505f	0.000	4.945	132.17	20.24
90.00%	56.53	56.53	24.519f	0.000	5.100	147.10	21.02
95.00%	59.67	59.67	24.525f	0.000	5.174	154.50	21.38
98.00%	61.55	61.55	24.528f	0.000	5.218	158.95	21.60
100.00%	62.81	62.81	24.528f	0.000	5.248		

Tank Capacities for WB2.P containing WATER BALLAST (1.000)

Trim: fwd 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	2.46	2.46	8.174f	5.265p	0.911	0.94	11.13
10.00%	4.92	4.92	8.503f	5.322p	1.147	1.40	19.51
20.00%	9.83	9.83	8.804f	5.386p	1.513	1.93	26.37
30.00%	14.75	14.75	8.958f	5.434p	1.824	2.44	30.77
40.00%	19.66	19.66	9.035f	5.522p	2.115	0.98	22.47
50.00%	24.58	24.58	9.101f	5.613p	2.422	1.25	25.57
60.00%	29.49	29.49	9.159f	5.682p	2.729	1.47	27.57
70.00%	34.41	34.41	9.209f	5.736p	3.029	1.63	28.84
80.00%	39.32	39.32	9.252f	5.780p	3.323	1.74	29.67
90.00%	44.24	44.24	9.288f	5.815p	3.611	1.80	30.15
95.00%	46.70	46.70	9.304f	5.830p	3.753	1.81	30.29
98.00%	48.17	48.17	9.313f	5.838p	3.837	1.82	30.35
100.00%	49.16	49.16	9.314f	5.843p	3.893		

Tank Capacities for WB2.S containing WATER BALLAST (1.000)

Trim: fwd 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	2.46	2.46	8.174f	5.265s	0.911	0.94	11.13
10.00%	4.92	4.92	8.503f	5.322s	1.147	1.40	19.51
20.00%	9.83	9.83	8.804f	5.386s	1.513	1.93	26.37
30.00%	14.75	14.75	8.958f	5.434s	1.824	2.44	30.77
40.00%	19.66	19.66	9.035f	5.522s	2.115	0.98	22.47
50.00%	24.58	24.58	9.101f	5.613s	2.422	1.25	25.57
60.00%	29.49	29.49	9.159f	5.682s	2.729	1.47	27.57
70.00%	34.41	34.41	9.209f	5.736s	3.029	1.63	28.84
80.00%	39.32	39.32	9.252f	5.780s	3.323	1.74	29.67
90.00%	44.24	44.24	9.288f	5.815s	3.611	1.80	30.15
95.00%	46.70	46.70	9.304f	5.830s	3.753	1.81	30.29
98.00%	48.17	48.17	9.313f	5.838s	3.837	1.82	30.35
100.00%	49.16	49.16	9.314f	5.843s	3.893		

Tank Capacities for WB3.P containing WATER BALLAST (1.000)

Trim: fwd 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	2.09	2.09	4.064f	1.524p	0.096	28.30	59.65
10.00%	4.19	4.19	3.824f	1.948p	0.147	56.33	81.97
20.00%	8.37	8.37	3.644f	2.422p	0.225	91.01	98.67
30.00%	12.56	12.56	3.601f	2.643p	0.294	96.11	102.45
40.00%	16.75	16.75	3.585f	2.759p	0.359	96.58	102.94
50.00%	20.93	20.93	3.575f	2.829p	0.423	96.58	102.94
60.00%	25.12	25.12	3.569f	2.876p	0.485	96.58	102.94
70.00%	29.31	29.31	3.565f	2.909p	0.548	96.58	102.94
80.00%	33.50	33.50	3.561f	2.934p	0.610	96.58	102.94
90.00%	37.68	37.68	3.559f	2.953p	0.672	96.58	102.94
95.00%	39.78	39.78	3.558f	2.962p	0.702	96.58	102.94
98.00%	41.03	41.03	3.557f	2.966p	0.721	95.42	99.56
100.00%	41.87	41.87	3.536f	2.972p	0.733		

Tank Capacities for WB3.S containing WATER BALLAST (1.000)

Trim: fwd 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	2.09	2.09	4.064f	1.524s	0.096	28.30	59.65
10.00%	4.19	4.19	3.824f	1.948s	0.147	56.33	81.97
20.00%	8.37	8.37	3.644f	2.422s	0.225	91.01	98.67
30.00%	12.56	12.56	3.601f	2.643s	0.294	96.11	102.45
40.00%	16.75	16.75	3.585f	2.759s	0.359	96.58	102.94
50.00%	20.93	20.93	3.575f	2.829s	0.423	96.58	102.94
60.00%	25.12	25.12	3.569f	2.876s	0.485	96.58	102.94
70.00%	29.31	29.31	3.565f	2.909s	0.548	96.58	102.94
80.00%	33.50	33.50	3.561f	2.934s	0.610	96.58	102.94
90.00%	37.68	37.68	3.559f	2.953s	0.672	96.58	102.94
95.00%	39.78	39.78	3.558f	2.962s	0.702	96.58	102.94
98.00%	41.03	41.03	3.557f	2.966s	0.721	95.42	99.56
100.00%	41.87	41.87	3.536f	2.972s	0.733		

Tank Capacities for WB4.P containing WATER BALLAST (1.000)

Trim: fwd 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	1.80	1.80	8.281a	6.389p	0.569	0.40	16.82
10.00%	3.60	3.60	8.701a	6.399p	0.741	0.42	18.75
20.00%	7.20	7.20	8.917a	6.403p	1.062	0.42	18.74
30.00%	10.80	10.80	8.989a	6.405p	1.377	0.42	18.74
40.00%	14.40	14.40	9.025a	6.405p	1.691	0.42	18.74
50.00%	18.00	18.00	9.047a	6.406p	2.005	0.42	18.74
60.00%	21.60	21.60	9.062a	6.406p	2.318	0.42	18.74
70.00%	25.20	25.20	9.072a	6.406p	2.631	0.42	18.74
80.00%	28.80	28.80	9.080a	6.406p	2.944	0.42	18.74
90.00%	32.40	32.40	9.086a	6.406p	3.257	0.42	18.74
95.00%	34.20	34.20	9.088a	6.407p	3.414	0.42	18.74
98.00%	35.28	35.28	9.090a	6.407p	3.508	0.42	18.74
100.00%	36.00	36.00	9.095a	6.407p	3.570		

Tank Capacities for WB4.S containing WATER BALLAST (1.000)

Trim: fwd 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	1.80	1.80	8.281a	6.389s	0.569	0.40	16.82
10.00%	3.60	3.60	8.701a	6.399s	0.741	0.42	18.75
20.00%	7.20	7.20	8.917a	6.403s	1.062	0.42	18.74
30.00%	10.80	10.80	8.989a	6.405s	1.377	0.42	18.74
40.00%	14.40	14.40	9.025a	6.405s	1.691	0.42	18.74
50.00%	18.00	18.00	9.047a	6.406s	2.005	0.42	18.74
60.00%	21.60	21.60	9.062a	6.406s	2.318	0.42	18.74
70.00%	25.20	25.20	9.072a	6.406s	2.631	0.42	18.74
80.00%	28.80	28.80	9.080a	6.406s	2.944	0.42	18.74
90.00%	32.40	32.40	9.086a	6.406s	3.257	0.42	18.74
95.00%	34.20	34.20	9.088a	6.407s	3.414	0.42	18.74
98.00%	35.28	35.28	9.090a	6.407s	3.508	0.42	18.74
100.00%	36.00	36.00	9.095a	6.407s	3.570		

Tank Capacities for WB5.P containing WATER BALLAST (1.000)

Trim: fwd 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	2.03	2.03	13.825a	6.384p	1.323	0.30	7.05
10.00%	4.06	4.06	14.374a	6.390p	1.586	0.40	16.94
20.00%	8.13	8.13	15.103a	6.395p	1.976	0.54	41.12
30.00%	12.19	12.19	15.592a	6.398p	2.290	0.59	51.40
40.00%	16.26	16.26	15.853a	6.401p	2.572	0.59	51.40
50.00%	20.32	20.32	16.009a	6.402p	2.843	0.59	51.40
60.00%	24.39	24.39	16.114a	6.403p	3.107	0.59	51.41
70.00%	28.45	28.45	16.188a	6.404p	3.368	0.59	51.41
80.00%	32.52	32.52	16.244a	6.404p	3.627	0.59	51.41
90.00%	36.58	36.58	16.287a	6.404p	3.885	0.59	51.41
95.00%	38.61	38.61	16.306a	6.405p	4.013	0.59	51.42
98.00%	39.83	39.83	16.316a	6.405p	4.090	0.59	51.42
100.00%	40.65	40.65	16.333a	6.405p	4.141		

Tank Capacities for WB5.S containing WATER BALLAST (1.000)

Trim: fwd 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	2.03	2.03	13.825a	6.384s	1.323	0.30	7.05
10.00%	4.06	4.06	14.374a	6.390s	1.586	0.40	16.94
20.00%	8.13	8.13	15.103a	6.395s	1.976	0.54	41.12
30.00%	12.19	12.19	15.592a	6.398s	2.290	0.59	51.40
40.00%	16.26	16.26	15.853a	6.401s	2.572	0.59	51.40
50.00%	20.32	20.32	16.009a	6.402s	2.843	0.59	51.40
60.00%	24.39	24.39	16.114a	6.403s	3.107	0.59	51.41
70.00%	28.45	28.45	16.188a	6.404s	3.368	0.59	51.41
80.00%	32.52	32.52	16.244a	6.404s	3.627	0.59	51.41
90.00%	36.58	36.58	16.287a	6.404s	3.885	0.59	51.41
95.00%	38.61	38.61	16.306a	6.405s	4.013	0.59	51.42
98.00%	39.83	39.83	16.316a	6.405s	4.090	0.59	51.42
100.00%	40.65	40.65	16.333a	6.405s	4.141		

Tank Capacities for WB6.S containing WATER BALLAST (1.000)

Trim: fwd 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	3.24	3.24	21.957a	4.662s	3.021	6.21	5.99
10.00%	6.47	6.47	22.287a	4.821s	3.250	10.13	14.26
20.00%	12.95	12.95	22.742a	4.931s	3.563	14.03	36.77
30.00%	19.42	19.42	23.083a	4.979s	3.803	16.23	56.66
40.00%	25.90	25.90	23.319a	5.019s	4.009	17.37	63.50
50.00%	32.37	32.37	23.471a	5.048s	4.197	17.86	64.42
60.00%	38.85	38.85	23.575a	5.070s	4.377	18.28	65.29
70.00%	45.32	45.32	23.652a	5.087s	4.550	18.66	66.10
80.00%	51.80	51.80	23.711a	5.102s	4.721	19.00	66.76
90.00%	58.27	58.27	23.758a	5.113s	4.888	19.00	66.77
95.00%	61.51	61.51	23.778a	5.118s	4.971	19.00	66.77
98.00%	63.45	63.45	23.789a	5.121s	5.020	19.01	66.77
100.00%	64.75	64.75	23.805a	5.123s	5.053		

Tank Capacities for WB6.P containing WATER BALLAST (1.000)

Trim: fwd 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	3.24	3.24	21.957a	4.662p	3.021	6.21	5.99
10.00%	6.47	6.47	22.287a	4.821p	3.250	10.13	14.26
20.00%	12.95	12.95	22.742a	4.931p	3.563	14.03	36.77
30.00%	19.42	19.42	23.083a	4.979p	3.803	16.23	56.65
40.00%	25.90	25.90	23.319a	5.019p	4.009	17.37	63.50
50.00%	32.37	32.37	23.471a	5.048p	4.197	17.86	64.42
60.00%	38.85	38.85	23.575a	5.070p	4.377	18.28	65.29
70.00%	45.32	45.32	23.652a	5.087p	4.550	18.66	66.10
80.00%	51.80	51.80	23.711a	5.102p	4.721	19.00	66.76
90.00%	58.27	58.27	23.758a	5.113p	4.888	19.00	66.77
95.00%	61.51	61.51	23.778a	5.118p	4.971	19.00	66.77
98.00%	63.45	63.45	23.789a	5.121p	5.020	19.01	66.77
100.00%	64.75	64.75	23.805a	5.123p	5.053		

9.3 Tank Capacities at Even Keel

Tank Capacities for FO1.C containing FUEL OIL (0.850)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	9.71	8.25	10.072f	0.000	0.141	171.03	255.95
10.00%	19.41	16.50	10.144f	0.000	0.238	280.57	314.58
20.00%	38.83	33.00	10.273f	0.000	0.399	382.57	363.99
30.00%	58.24	49.50	10.376f	0.000	0.543	436.27	391.44
40.00%	77.65	66.00	10.454f	0.000	0.678	469.17	409.71
50.00%	97.06	82.50	10.514f	0.000	0.810	492.08	373.23
60.00%	116.48	99.01	10.564f	0.000	0.942	515.68	385.56
70.00%	135.89	115.51	10.598f	0.000	1.076	476.79	366.28
80.00%	155.30	132.01	10.608f	0.000	1.210	440.32	340.93
90.00%	174.72	148.51	10.601f	0.000	1.347	412.44	312.33
95.00%	184.42	156.76	10.592f	0.000	1.417	401.55	296.59
98.00%	190.25	161.71	10.585f	0.000	1.459	395.94	286.61
100.00%	194.13	165.01	10.580f	0.000	1.487		

Tank Capacities for FO2.P containing FUEL OIL (0.850)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	3.71	3.16	6.849a	1.225p	0.110	42.35	258.55
10.00%	7.43	6.31	6.849a	1.715p	0.166	113.17	369.10
20.00%	14.85	12.63	6.993a	2.183p	0.250	137.24	452.57
30.00%	22.28	18.94	7.135a	2.382p	0.320	147.37	490.22
40.00%	29.71	25.25	7.238a	2.499p	0.386	154.52	514.87
50.00%	37.13	31.56	7.320a	2.578p	0.450	159.87	538.93
60.00%	44.56	37.88	7.384a	2.636p	0.512	161.83	546.93
70.00%	51.99	44.19	7.431a	2.678p	0.573	161.83	546.93
80.00%	59.41	50.50	7.466a	2.709p	0.634	161.83	546.93
90.00%	66.84	56.81	7.494a	2.733p	0.694	161.83	546.93
95.00%	70.55	59.97	7.505a	2.744p	0.724	161.83	546.93
98.00%	72.78	61.86	7.512a	2.749p	0.741	161.83	546.93
100.00%	74.26	63.13	7.516a	2.753p	0.753		

Tank Capacities for FO2.S containing FUEL OIL (0.850)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	3.71	3.16	6.849a	1.225s	0.110	42.35	258.55
10.00%	7.43	6.31	6.849a	1.715s	0.166	113.17	369.10
20.00%	14.85	12.63	6.993a	2.183s	0.250	137.24	452.57
30.00%	22.28	18.94	7.135a	2.382s	0.320	147.37	490.22
40.00%	29.71	25.25	7.238a	2.499s	0.386	154.52	514.87
50.00%	37.13	31.56	7.320a	2.578s	0.450	159.87	538.93
60.00%	44.56	37.88	7.384a	2.636s	0.512	161.83	546.93
70.00%	51.99	44.19	7.431a	2.678s	0.573	161.83	546.93
80.00%	59.41	50.50	7.466a	2.709s	0.634	161.83	546.93
90.00%	66.84	56.81	7.494a	2.733s	0.694	161.83	546.93
95.00%	70.55	59.97	7.505a	2.744s	0.724	161.83	546.93
98.00%	72.78	61.86	7.512a	2.749s	0.741	161.83	546.93
100.00%	74.26	63.13	7.516a	2.753s	0.753		

Tank Capacities for FO3.C containing FUEL OIL (0.850)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	4.01	3.41	17.090a	0.000	0.183	3.88	56.92
10.00%	8.03	6.82	16.869a	0.000	0.340	6.62	58.50
20.00%	16.05	13.64	16.800a	0.000	0.605	9.55	63.60
30.00%	24.08	20.47	16.865a	0.000	0.838	11.63	77.41
40.00%	32.10	27.29	16.958a	0.000	1.053	12.50	84.76
50.00%	40.13	34.11	17.018a	0.000	1.258	12.50	84.76
60.00%	48.15	40.93	17.058a	0.000	1.457	12.50	84.76
70.00%	56.18	47.75	17.087a	0.000	1.653	12.50	84.76
80.00%	64.21	54.58	17.109a	0.000	1.847	12.50	84.76
90.00%	72.23	61.40	17.126a	0.000	2.040	12.50	84.76
95.00%	76.24	64.81	17.133a	0.000	2.136	12.50	84.76
98.00%	78.65	66.85	17.137a	0.000	2.194	12.50	84.76
100.00%	80.26	68.22	17.139a	0.000	2.232		

Tank Capacities for FO3.P containing FUEL OIL (0.850)

No Trim, No Heel

Load (%)	Volume (m ³)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	4.64	3.94	15.054a	4.554p	1.232	4.03	14.22
10.00%	9.28	7.89	15.554a	4.610p	1.484	5.45	32.57
20.00%	18.56	15.77	16.212a	4.652p	1.857	7.01	67.40
30.00%	27.83	23.66	16.559a	4.681p	2.163	7.23	70.65
40.00%	37.11	31.54	16.734a	4.696p	2.447	7.23	70.65
50.00%	46.39	39.43	16.839a	4.704p	2.722	7.23	70.65
60.00%	55.67	47.32	16.910a	4.710p	2.993	7.23	70.65
70.00%	64.94	55.20	16.960a	4.715p	3.261	7.23	70.65
80.00%	74.22	63.09	16.997a	4.718p	3.527	7.23	70.65
90.00%	83.50	70.97	17.026a	4.720p	3.792	7.23	70.65
95.00%	88.14	74.92	17.039a	4.721p	3.925	7.23	70.65
98.00%	90.92	77.28	17.045a	4.722p	4.004	7.23	70.65
100.00%	92.78	78.86	17.050a	4.722p	4.057		

Tank Capacities for FO3.S containing FUEL OIL (0.850)

No Trim, No Heel

Load (%)	Volume (m ³)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	4.31	3.66	15.009a	4.547s	1.210	3.89	13.02
10.00%	8.61	7.32	15.493a	4.605s	1.452	5.27	29.72
20.00%	17.22	14.64	16.138a	4.647s	1.810	6.87	64.62
30.00%	25.83	21.96	16.505a	4.676s	2.100	7.23	70.65
40.00%	34.44	29.28	16.694a	4.692s	2.367	7.23	70.65
50.00%	43.05	36.60	16.807a	4.702s	2.624	7.23	70.65
60.00%	51.66	43.91	16.864a	4.717s	2.878	5.87	65.23
70.00%	60.28	51.23	16.889a	4.736s	3.139	5.87	65.23
80.00%	68.89	58.55	16.907a	4.751s	3.406	5.87	65.23
90.00%	77.50	65.87	16.921a	4.762s	3.677	5.87	65.23
95.00%	81.80	69.53	16.927a	4.767s	3.814	5.87	65.23
98.00%	84.38	71.73	16.930a	4.770s	3.896	5.87	65.23
100.00%	86.11	73.19	16.932a	4.771s	3.951		

Tank Capacities for FO4.P containing FUEL OIL (0.850)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	3.33	2.83	22.030a	1.801p	2.406	4.01	5.32
10.00%	6.66	5.66	22.399a	1.904p	2.652	5.82	13.27
20.00%	13.33	11.33	22.922a	1.974p	2.995	8.24	35.37
30.00%	19.99	16.99	23.282a	2.019p	3.258	9.37	46.95
40.00%	26.65	22.66	23.495a	2.051p	3.488	9.47	47.52
50.00%	33.32	28.32	23.623a	2.070p	3.704	9.47	47.52
60.00%	39.98	33.98	23.708a	2.082p	3.912	9.47	47.52
70.00%	46.65	39.65	23.769a	2.091p	4.116	9.47	47.52
80.00%	53.31	45.31	23.815a	2.098p	4.318	9.47	47.52
90.00%	59.97	50.98	23.850a	2.103p	4.518	9.47	47.52
95.00%	63.30	53.81	23.865a	2.105p	4.618	9.47	47.52
98.00%	65.30	55.51	23.874a	2.107p	4.677	9.47	47.52
100.00%	66.64	56.64	23.879a	2.107p	4.717		

Tank Capacities for FO4.S containing FUEL OIL (0.850)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	3.33	2.83	22.030a	1.801s	2.406	4.01	5.32
10.00%	6.66	5.66	22.399a	1.904s	2.652	5.82	13.27
20.00%	13.33	11.33	22.922a	1.974s	2.995	8.24	35.37
30.00%	19.99	16.99	23.282a	2.019s	3.258	9.37	46.95
40.00%	26.65	22.66	23.495a	2.051s	3.488	9.47	47.52
50.00%	33.32	28.32	23.623a	2.070s	3.704	9.47	47.52
60.00%	39.98	33.98	23.708a	2.082s	3.912	9.47	47.52
70.00%	46.65	39.65	23.769a	2.091s	4.116	9.47	47.52
80.00%	53.31	45.31	23.815a	2.098s	4.318	9.47	47.52
90.00%	59.97	50.98	23.850a	2.103s	4.518	9.47	47.52
95.00%	63.30	53.81	23.865a	2.105s	4.618	9.47	47.52
98.00%	65.30	55.51	23.874a	2.107s	4.677	9.47	47.52
100.00%	66.64	56.64	23.879a	2.107s	4.717		

Tank Capacities for FODAY.P containing FUEL OIL (0.850)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	1.94	1.65	13.990f	2.070p	2.995	12.38	4.51
10.00%	3.87	3.29	13.990f	2.070p	3.090	12.38	4.51
20.00%	7.75	6.59	13.990f	2.070p	3.280	12.38	4.51
30.00%	11.62	9.88	13.990f	2.070p	3.470	12.38	4.51
40.00%	15.50	13.17	13.990f	2.070p	3.660	12.38	4.51
50.00%	19.37	16.46	13.990f	2.070p	3.850	12.38	4.51
60.00%	23.24	19.76	13.990f	2.070p	4.040	12.38	4.51
70.00%	27.12	23.05	13.990f	2.070p	4.230	12.38	4.51
80.00%	30.99	26.34	13.990f	2.070p	4.420	12.38	4.51
90.00%	34.86	29.63	13.990f	2.070p	4.610	12.38	4.51
95.00%	36.80	31.28	13.990f	2.070p	4.705	12.38	4.51
98.00%	37.96	32.27	13.990f	2.070p	4.762	12.38	4.51
100.00%	38.74	32.93	13.990f	2.070p	4.800		

Tank Capacities for FOSET.S containing FUEL OIL (0.850)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	1.94	1.65	13.990f	2.070s	2.995	12.38	4.51
10.00%	3.87	3.29	13.990f	2.070s	3.090	12.38	4.51
20.00%	7.75	6.59	13.990f	2.070s	3.280	12.38	4.51
30.00%	11.62	9.88	13.990f	2.070s	3.470	12.38	4.51
40.00%	15.50	13.17	13.990f	2.070s	3.660	12.38	4.51
50.00%	19.37	16.46	13.990f	2.070s	3.850	12.38	4.51
60.00%	23.24	19.76	13.990f	2.070s	4.040	12.38	4.51
70.00%	27.12	23.05	13.990f	2.070s	4.230	12.38	4.51
80.00%	30.99	26.34	13.990f	2.070s	4.420	12.38	4.51
90.00%	34.86	29.63	13.990f	2.070s	4.610	12.38	4.51
95.00%	36.80	31.28	13.990f	2.070s	4.705	12.38	4.51
98.00%	37.96	32.27	13.990f	2.070s	4.762	12.38	4.51
100.00%	38.74	32.93	13.990f	2.070s	4.800		

Tank Capacities for FW.P 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)
0.00%	0.00	0.00					
5.00%	1.68	1.68	2.640f	6.314p	0.573	0.24	12.72
10.00%	3.36	3.36	2.841f	6.319p	0.767	0.26	14.24
20.00%	6.72	6.72	3.011f	6.330p	1.129	0.29	16.04
30.00%	10.08	10.08	3.099f	6.340p	1.473	0.33	17.05
40.00%	13.44	13.44	3.159f	6.349p	1.805	0.36	17.81
50.00%	16.80	16.80	3.204f	6.358p	2.126	0.38	18.23
60.00%	20.17	20.17	3.236f	6.364p	2.442	0.39	18.34
70.00%	23.53	23.53	3.258f	6.368p	2.752	0.39	18.40
80.00%	26.89	26.89	3.275f	6.372p	3.060	0.40	18.45
90.00%	30.25	30.25	3.287f	6.375p	3.366	0.40	18.49
95.00%	31.93	31.93	3.292f	6.376p	3.518	0.40	18.51
98.00%	32.94	32.94	3.295f	6.377p	3.609	0.40	18.53
100.00%	33.61	33.61	3.297f	6.378p	3.669		

Tank Capacities for SAN.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)
0.00%	0.00	0.00					
5.00%	1.68	1.68	2.640f	6.314s	0.573	0.24	12.72
10.00%	3.36	3.36	2.841f	6.319s	0.767	0.26	14.24
20.00%	6.72	6.72	3.011f	6.330s	1.129	0.29	16.04
30.00%	10.08	10.08	3.099f	6.340s	1.473	0.33	17.05
40.00%	13.44	13.44	3.159f	6.349s	1.805	0.36	17.81
50.00%	16.80	16.80	3.204f	6.358s	2.126	0.38	18.23
60.00%	20.17	20.17	3.236f	6.364s	2.442	0.39	18.34
70.00%	23.53	23.53	3.258f	6.368s	2.752	0.39	18.40
80.00%	26.89	26.89	3.275f	6.372s	3.060	0.40	18.45
90.00%	30.25	30.25	3.287f	6.375s	3.366	0.40	18.49
95.00%	31.93	31.93	3.292f	6.376s	3.518	0.40	18.51
98.00%	32.94	32.94	3.295f	6.377s	3.609	0.40	18.53
100.00%	33.61	33.61	3.297f	6.378s	3.669		

Tank Capacities for WB1.C containing WATER BALLAST (1.000)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	3.14	3.14	23.844f	0.000	3.084	5.52	2.83
10.00%	6.28	6.28	24.042f	0.000	3.367	13.02	6.82
20.00%	12.56	12.56	24.241f	0.000	3.732	30.35	11.25
30.00%	18.84	18.84	24.338f	0.000	4.001	48.39	13.81
40.00%	25.12	25.12	24.395f	0.000	4.227	66.49	15.65
50.00%	31.41	31.41	24.434f	0.000	4.428	84.12	17.14
60.00%	37.69	37.69	24.463f	0.000	4.612	100.94	18.35
70.00%	43.97	43.97	24.485f	0.000	4.783	116.95	19.36
80.00%	50.25	50.25	24.502f	0.000	4.945	132.19	20.24
90.00%	56.53	56.53	24.516f	0.000	5.100	147.12	21.01
95.00%	59.67	59.67	24.522f	0.000	5.174	154.52	21.37
98.00%	61.55	61.55	24.525f	0.000	5.218	158.97	21.59
100.00%	62.81	62.81	24.528f	0.000	5.248		

Tank Capacities for WB2.P containing WATER BALLAST (1.000)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	2.46	2.46	8.137f	5.269p	0.911	0.91	10.65
10.00%	4.91	4.91	8.470f	5.326p	1.147	1.41	19.15
20.00%	9.83	9.83	8.781f	5.388p	1.513	1.93	26.20
30.00%	14.75	14.75	8.940f	5.435p	1.823	2.45	30.65
40.00%	19.66	19.66	9.025f	5.522p	2.115	0.98	22.37
50.00%	24.58	24.58	9.092f	5.613p	2.422	1.25	25.50
60.00%	29.49	29.49	9.151f	5.682p	2.729	1.47	27.52
70.00%	34.41	34.41	9.202f	5.736p	3.029	1.62	28.80
80.00%	39.32	39.32	9.245f	5.780p	3.323	1.73	29.64
90.00%	44.24	44.24	9.282f	5.815p	3.611	1.80	30.13
95.00%	46.70	46.70	9.299f	5.830p	3.753	1.81	30.27
98.00%	48.17	48.17	9.308f	5.838p	3.837	1.82	30.34
100.00%	49.16	49.16	9.314f	5.843p	3.893		

Tank Capacities for WB2.S containing WATER BALLAST (1.000)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	2.46	2.46	8.137f	5.269s	0.911	0.91	10.65
10.00%	4.91	4.91	8.470f	5.326s	1.147	1.41	19.15
20.00%	9.83	9.83	8.781f	5.388s	1.513	1.93	26.20
30.00%	14.75	14.75	8.940f	5.435s	1.823	2.45	30.65
40.00%	19.66	19.66	9.025f	5.522s	2.115	0.98	22.37
50.00%	24.58	24.58	9.092f	5.613s	2.422	1.25	25.50
60.00%	29.49	29.49	9.151f	5.682s	2.729	1.47	27.52
70.00%	34.41	34.41	9.202f	5.736s	3.029	1.62	28.80
80.00%	39.32	39.32	9.245f	5.780s	3.323	1.73	29.64
90.00%	44.24	44.24	9.282f	5.815s	3.611	1.80	30.13
95.00%	46.70	46.70	9.299f	5.830s	3.753	1.81	30.27
98.00%	48.17	48.17	9.308f	5.838s	3.837	1.82	30.34
100.00%	49.16	49.16	9.314f	5.843s	3.893		

Tank Capacities for WB3.P containing WATER BALLAST (1.000)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	2.09	2.09	3.813f	1.551p	0.095	30.21	63.67
10.00%	4.19	4.19	3.656f	1.981p	0.146	58.94	83.76
20.00%	8.37	8.37	3.545f	2.440p	0.225	89.79	97.77
30.00%	12.56	12.56	3.532f	2.652p	0.294	95.72	102.06
40.00%	16.75	16.75	3.533f	2.765p	0.359	96.58	102.93
50.00%	20.93	20.93	3.534f	2.834p	0.422	96.58	102.93
60.00%	25.12	25.12	3.534f	2.880p	0.485	96.58	102.93
70.00%	29.31	29.31	3.535f	2.913p	0.548	96.58	102.93
80.00%	33.50	33.50	3.535f	2.937p	0.610	96.58	102.93
90.00%	37.68	37.68	3.536f	2.956p	0.671	96.58	102.93
95.00%	39.78	39.78	3.536f	2.964p	0.702	96.58	102.93
98.00%	41.03	41.03	3.536f	2.969p	0.721	96.58	102.93
100.00%	41.87	41.87	3.536f	2.972p	0.733		

Tank Capacities for WB3.S containing WATER BALLAST (1.000)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	2.09	2.09	3.813f	1.551s	0.095	30.21	63.67
10.00%	4.19	4.19	3.656f	1.981s	0.146	58.94	83.76
20.00%	8.37	8.37	3.545f	2.440s	0.225	89.79	97.77
30.00%	12.56	12.56	3.532f	2.652s	0.294	95.72	102.06
40.00%	16.75	16.75	3.533f	2.765s	0.359	96.58	102.93
50.00%	20.93	20.93	3.534f	2.834s	0.422	96.58	102.93
60.00%	25.12	25.12	3.534f	2.880s	0.485	96.58	102.93
70.00%	29.31	29.31	3.535f	2.913s	0.548	96.58	102.93
80.00%	33.50	33.50	3.535f	2.937s	0.610	96.58	102.93
90.00%	37.68	37.68	3.536f	2.956s	0.671	96.58	102.93
95.00%	39.78	39.78	3.536f	2.964s	0.702	96.58	102.93
98.00%	41.03	41.03	3.536f	2.969s	0.721	96.58	102.93
100.00%	41.87	41.87	3.536f	2.972s	0.733		

Tank Capacities for WB4.P containing WATER BALLAST (1.000)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	1.80	1.80	8.361a	6.389p	0.569	0.40	17.62
10.00%	3.60	3.60	8.745a	6.399p	0.741	0.42	18.74
20.00%	7.20	7.20	8.939a	6.403p	1.062	0.42	18.74
30.00%	10.80	10.80	9.004a	6.405p	1.377	0.42	18.74
40.00%	14.40	14.40	9.036a	6.405p	1.691	0.42	18.74
50.00%	18.00	18.00	9.056a	6.406p	2.005	0.42	18.74
60.00%	21.60	21.60	9.069a	6.406p	2.318	0.42	18.74
70.00%	25.20	25.20	9.078a	6.406p	2.631	0.42	18.74
80.00%	28.80	28.80	9.085a	6.406p	2.944	0.42	18.74
90.00%	32.40	32.40	9.091a	6.406p	3.257	0.42	18.74
95.00%	34.20	34.20	9.093a	6.407p	3.414	0.42	18.74
98.00%	35.28	35.28	9.094a	6.407p	3.508	0.42	18.74
100.00%	36.00	36.00	9.095a	6.407p	3.570		

Tank Capacities for WB4.S containing WATER BALLAST (1.000)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	1.80	1.80	8.361a	6.389s	0.569	0.40	17.62
10.00%	3.60	3.60	8.745a	6.399s	0.741	0.42	18.74
20.00%	7.20	7.20	8.939a	6.403s	1.062	0.42	18.74
30.00%	10.80	10.80	9.004a	6.405s	1.377	0.42	18.74
40.00%	14.40	14.40	9.036a	6.405s	1.691	0.42	18.74
50.00%	18.00	18.00	9.056a	6.406s	2.005	0.42	18.74
60.00%	21.60	21.60	9.069a	6.406s	2.318	0.42	18.74
70.00%	25.20	25.20	9.078a	6.406s	2.631	0.42	18.74
80.00%	28.80	28.80	9.085a	6.406s	2.944	0.42	18.74
90.00%	32.40	32.40	9.091a	6.406s	3.257	0.42	18.74
95.00%	34.20	34.20	9.093a	6.407s	3.414	0.42	18.74
98.00%	35.28	35.28	9.094a	6.407s	3.508	0.42	18.74
100.00%	36.00	36.00	9.095a	6.407s	3.570		

Tank Capacities for WB5.P containing WATER BALLAST (1.000)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	2.03	2.03	13.855a	6.383p	1.323	0.31	7.43
10.00%	4.06	4.06	14.411a	6.390p	1.586	0.41	17.72
20.00%	8.13	8.13	15.146a	6.395p	1.976	0.55	42.84
30.00%	12.19	12.19	15.628a	6.398p	2.289	0.59	51.39
40.00%	16.26	16.26	15.880a	6.401p	2.572	0.59	51.40
50.00%	20.32	20.32	16.031a	6.402p	2.843	0.59	51.40
60.00%	24.39	24.39	16.131a	6.403p	3.107	0.59	51.40
70.00%	28.45	28.45	16.203a	6.404p	3.368	0.59	51.40
80.00%	32.52	32.52	16.257a	6.404p	3.627	0.59	51.41
90.00%	36.58	36.58	16.299a	6.404p	3.884	0.59	51.41
95.00%	38.61	38.61	16.317a	6.405p	4.013	0.59	51.41
98.00%	39.83	39.83	16.327a	6.405p	4.090	0.59	51.41
100.00%	40.65	40.65	16.333a	6.405p	4.141		

Tank Capacities for WB5.S containing WATER BALLAST (1.000)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	2.03	2.03	13.855a	6.383s	1.323	0.31	7.43
10.00%	4.06	4.06	14.411a	6.390s	1.586	0.41	17.72
20.00%	8.13	8.13	15.146a	6.395s	1.976	0.55	42.84
30.00%	12.19	12.19	15.628a	6.398s	2.289	0.59	51.39
40.00%	16.26	16.26	15.880a	6.401s	2.572	0.59	51.40
50.00%	20.32	20.32	16.031a	6.402s	2.843	0.59	51.40
60.00%	24.39	24.39	16.131a	6.403s	3.107	0.59	51.40
70.00%	28.45	28.45	16.203a	6.404s	3.368	0.59	51.40
80.00%	32.52	32.52	16.257a	6.404s	3.627	0.59	51.41
90.00%	36.58	36.58	16.299a	6.404s	3.884	0.59	51.41
95.00%	38.61	38.61	16.317a	6.405s	4.013	0.59	51.41
98.00%	39.83	39.83	16.327a	6.405s	4.090	0.59	51.41
100.00%	40.65	40.65	16.333a	6.405s	4.141		

Tank Capacities for WB6.S containing WATER BALLAST (1.000)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	3.24	3.24	21.973a	4.657s	3.021	6.28	6.27
10.00%	6.47	6.47	22.306a	4.816s	3.250	10.23	14.86
20.00%	12.95	12.95	22.766a	4.927s	3.563	14.19	38.46
30.00%	19.42	19.42	23.108a	4.978s	3.803	16.33	57.59
40.00%	25.90	25.90	23.340a	5.019s	4.008	17.39	63.54
50.00%	32.37	32.37	23.488a	5.048s	4.197	17.88	64.48
60.00%	38.85	38.85	23.589a	5.070s	4.377	18.30	65.34
70.00%	45.32	45.32	23.664a	5.087s	4.550	18.68	66.14
80.00%	51.80	51.80	23.722a	5.102s	4.721	19.00	66.76
90.00%	58.27	58.27	23.768a	5.113s	4.888	19.00	66.76
95.00%	61.51	61.51	23.787a	5.118s	4.971	19.00	66.76
98.00%	63.45	63.45	23.798a	5.121s	5.020	19.01	66.76
100.00%	64.75	64.75	23.805a	5.123s	5.053		

Tank Capacities for WB6.P containing WATER BALLAST (1.000)

No Trim, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	3.24	3.24	21.973a	4.657p	3.021	6.28	6.27
10.00%	6.47	6.47	22.306a	4.816p	3.250	10.23	14.86
20.00%	12.95	12.95	22.766a	4.927p	3.563	14.19	38.46
30.00%	19.42	19.42	23.108a	4.978p	3.803	16.33	57.59
40.00%	25.90	25.90	23.340a	5.019p	4.008	17.39	63.54
50.00%	32.37	32.37	23.488a	5.048p	4.197	17.88	64.48
60.00%	38.85	38.85	23.589a	5.070p	4.377	18.30	65.34
70.00%	45.32	45.32	23.664a	5.087p	4.550	18.68	66.14
80.00%	51.80	51.80	23.722a	5.102p	4.721	19.00	66.76
90.00%	58.27	58.27	23.768a	5.113p	4.888	19.00	66.76
95.00%	61.51	61.51	23.787a	5.118p	4.971	19.00	66.76
98.00%	63.45	63.45	23.798a	5.121p	5.020	19.01	66.76
100.00%	64.75	64.75	23.805a	5.123p	5.053		

9.4 Tank Capacities at Trim 0.500m Aft

Tank Capacities for FO1.C containing FUEL OIL (0.850)

Trim: aft 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	9.71	8.25	9.814f	0.000	0.142	175.63	249.29
10.00%	19.41	16.50	9.985f	0.000	0.238	279.24	308.02
20.00%	38.83	33.00	10.180f	0.000	0.399	378.59	359.98
30.00%	58.24	49.50	10.309f	0.000	0.543	432.75	388.77
40.00%	77.65	66.00	10.402f	0.000	0.679	466.43	407.84
50.00%	97.06	82.50	10.476f	0.000	0.810	489.76	371.78
60.00%	116.48	99.01	10.531f	0.000	0.942	513.44	384.36
70.00%	135.89	115.51	10.571f	0.000	1.076	480.69	368.83
80.00%	155.30	132.01	10.586f	0.000	1.211	443.42	343.76
90.00%	174.72	148.51	10.583f	0.000	1.347	414.76	315.51
95.00%	184.42	156.76	10.576f	0.000	1.417	403.50	299.98
98.00%	190.25	161.71	10.570f	0.000	1.459	397.67	290.13
100.00%	194.13	165.01	10.580f	0.000	1.487		

Tank Capacities for FO2.P containing FUEL OIL (0.850)

Trim: aft 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	3.71	3.16	7.561a	1.139p	0.113	35.40	269.03
10.00%	7.43	6.31	7.355a	1.628p	0.169	103.92	381.66
20.00%	14.85	12.63	7.302a	2.149p	0.251	139.61	467.07
30.00%	22.28	18.94	7.356a	2.366p	0.321	149.64	497.48
40.00%	29.71	25.25	7.413a	2.491p	0.387	156.79	525.39
50.00%	37.13	31.56	7.466a	2.575p	0.451	161.09	544.08
60.00%	44.56	37.88	7.507a	2.634p	0.512	161.84	546.99
70.00%	51.99	44.19	7.536a	2.676p	0.574	161.84	546.99
80.00%	59.41	50.50	7.558a	2.707p	0.634	161.84	546.99
90.00%	66.84	56.81	7.575a	2.732p	0.694	161.84	546.99
95.00%	70.55	59.97	7.583a	2.742p	0.724	161.84	546.99
98.00%	72.78	61.86	7.570a	2.748p	0.742	113.12	191.86
100.00%	74.26	63.13	7.516a	2.753p	0.753		

Tank Capacities for FO2.S containing FUEL OIL (0.850)

Trim: aft 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	3.71	3.16	7.561a	1.139s	0.113	35.40	269.03
10.00%	7.43	6.31	7.355a	1.628s	0.169	103.92	381.67
20.00%	14.85	12.63	7.302a	2.149s	0.251	139.61	467.07
30.00%	22.28	18.94	7.356a	2.366s	0.321	149.64	497.48
40.00%	29.71	25.25	7.413a	2.491s	0.387	156.79	525.39
50.00%	37.13	31.56	7.466a	2.575s	0.451	161.09	544.08
60.00%	44.56	37.88	7.507a	2.634s	0.512	161.84	546.99
70.00%	51.99	44.19	7.536a	2.676s	0.574	161.84	546.99
80.00%	59.41	50.50	7.558a	2.707s	0.634	161.84	546.99
90.00%	66.84	56.81	7.575a	2.732s	0.694	161.84	546.99
95.00%	70.55	59.97	7.583a	2.742s	0.724	161.84	546.99
98.00%	72.78	61.86	7.570a	2.748s	0.742	113.12	191.86
100.00%	74.26	63.13	7.516a	2.753s	0.753		

Tank Capacities for FO3.C containing FUEL OIL (0.850)

Trim: aft 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	4.01	3.41	17.231a	0.000	0.184	3.72	56.58
10.00%	8.03	6.82	16.942a	0.000	0.340	6.65	58.51
20.00%	16.05	13.64	16.840a	0.000	0.605	9.63	64.02
30.00%	24.08	20.47	16.898a	0.000	0.838	11.77	78.75
40.00%	32.10	27.29	16.984a	0.000	1.053	12.50	84.77
50.00%	40.13	34.11	17.039a	0.000	1.258	12.50	84.77
60.00%	48.15	40.93	17.076a	0.000	1.457	12.50	84.77
70.00%	56.18	47.75	17.102a	0.000	1.653	12.50	84.77
80.00%	64.21	54.58	17.122a	0.000	1.847	12.50	84.77
90.00%	72.23	61.40	17.137a	0.000	2.040	12.50	84.77
95.00%	76.24	64.81	17.144a	0.000	2.136	12.50	84.77
98.00%	78.65	66.85	17.147a	0.000	2.194	12.50	84.77
100.00%	80.26	68.22	17.139a	0.000	2.232		

Tank Capacities for FO3.P containing FUEL OIL (0.850)

Trim: aft 0.500/58.920, No Heel

Load (%)	Volume (m ³)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	4.64	3.94	15.086a	4.551p	1.232	4.09	14.97
10.00%	9.28	7.89	15.590a	4.607p	1.484	5.52	34.09
20.00%	18.55	15.77	16.249a	4.652p	1.858	7.06	68.28
30.00%	27.83	23.66	16.584a	4.681p	2.164	7.24	70.66
40.00%	37.11	31.54	16.753a	4.696p	2.447	7.24	70.66
50.00%	46.39	39.43	16.855a	4.704p	2.722	7.24	70.66
60.00%	55.67	47.32	16.922a	4.710p	2.993	7.24	70.66
70.00%	64.94	55.20	16.970a	4.715p	3.261	7.24	70.66
80.00%	74.22	63.09	17.007a	4.718p	3.527	7.24	70.66
90.00%	83.50	70.97	17.035a	4.720p	3.792	7.24	70.66
95.00%	88.14	74.92	17.047a	4.721p	3.925	7.24	70.66
98.00%	90.92	77.28	17.053a	4.722p	4.004	7.24	70.66
100.00%	92.78	78.86	17.050a	4.722p	4.057		

Tank Capacities for FO3.S containing FUEL OIL (0.850)

Trim: aft 0.500/58.920, No Heel

Load (%)	Volume (m ³)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	4.31	3.66	15.040a	4.544s	1.210	3.95	13.72
10.00%	8.61	7.32	15.528a	4.602s	1.452	5.35	31.15
20.00%	17.22	14.64	16.176a	4.646s	1.810	6.92	65.79
30.00%	25.83	21.96	16.532a	4.676s	2.100	7.24	70.66
40.00%	34.44	29.28	16.714a	4.692s	2.367	7.24	70.66
50.00%	43.05	36.60	16.823a	4.702s	2.624	7.24	70.66
60.00%	51.66	43.91	16.877a	4.717s	2.878	5.87	65.24
70.00%	60.27	51.23	16.899a	4.737s	3.139	5.87	65.24
80.00%	68.89	58.55	16.916a	4.751s	3.406	5.87	65.24
90.00%	77.50	65.87	16.929a	4.762s	3.677	5.87	65.24
95.00%	81.80	69.53	16.935a	4.767s	3.814	5.87	65.24
98.00%	84.38	71.73	16.938a	4.770s	3.896	5.87	65.24
100.00%	86.11	73.19	16.932a	4.771s	3.951		

Tank Capacities for FO4.P containing FUEL OIL (0.850)

Trim: aft 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	3.33	2.83	22.046a	1.797p	2.407	4.06	5.56
10.00%	6.66	5.66	22.419a	1.901p	2.652	5.90	13.85
20.00%	13.33	11.33	22.949a	1.972p	2.995	8.27	36.32
30.00%	19.99	16.99	23.305a	2.019p	3.258	9.42	47.23
40.00%	26.65	22.66	23.513a	2.051p	3.488	9.47	47.53
50.00%	33.32	28.32	23.637a	2.070p	3.704	9.47	47.53
60.00%	39.98	33.98	23.720a	2.082p	3.912	9.47	47.53
70.00%	46.65	39.65	23.779a	2.091p	4.117	9.47	47.53
80.00%	53.31	45.31	23.824a	2.098p	4.318	9.47	47.53
90.00%	59.97	50.98	23.858a	2.103p	4.518	9.47	47.53
95.00%	63.30	53.81	23.873a	2.105p	4.618	9.47	47.53
98.00%	65.30	55.51	23.881a	2.107p	4.677	9.47	47.53
100.00%	66.64	56.64	23.879a	2.107p	4.717		

Tank Capacities for FO4.S containing FUEL OIL (0.850)

Trim: aft 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	3.33	2.83	22.046a	1.797s	2.407	4.06	5.56
10.00%	6.66	5.66	22.419a	1.901s	2.652	5.90	13.85
20.00%	13.33	11.33	22.949a	1.972s	2.995	8.27	36.32
30.00%	19.99	16.99	23.305a	2.019s	3.258	9.42	47.23
40.00%	26.65	22.66	23.513a	2.051s	3.488	9.47	47.53
50.00%	33.32	28.32	23.637a	2.070s	3.704	9.47	47.53
60.00%	39.98	33.98	23.720a	2.082s	3.912	9.47	47.53
70.00%	46.65	39.65	23.779a	2.091s	4.117	9.47	47.53
80.00%	53.31	45.31	23.824a	2.098s	4.318	9.47	47.53
90.00%	59.97	50.98	23.858a	2.103s	4.518	9.47	47.53
95.00%	63.30	53.81	23.873a	2.105s	4.618	9.47	47.53
98.00%	65.30	55.51	23.881a	2.107s	4.677	9.47	47.53
100.00%	66.64	56.64	23.879a	2.107s	4.717		

Tank Capacities for FODAY.P containing FUEL OIL (0.850)

Trim: aft 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	1.94	1.65	13.967f	2.070p	2.995	12.38	4.51
10.00%	3.87	3.29	13.978f	2.070p	3.090	12.38	4.51
20.00%	7.75	6.59	13.984f	2.070p	3.280	12.38	4.51
30.00%	11.62	9.88	13.986f	2.070p	3.470	12.38	4.51
40.00%	15.50	13.17	13.987f	2.070p	3.660	12.38	4.51
50.00%	19.37	16.46	13.988f	2.070p	3.850	12.38	4.51
60.00%	23.24	19.76	13.988f	2.070p	4.040	12.38	4.51
70.00%	27.12	23.05	13.988f	2.070p	4.230	12.38	4.51
80.00%	30.99	26.34	13.989f	2.070p	4.420	12.38	4.51
90.00%	34.86	29.63	13.989f	2.070p	4.610	12.38	4.51
95.00%	36.80	31.28	13.989f	2.070p	4.705	12.38	4.51
98.00%	37.96	32.27	13.989f	2.070p	4.762	12.38	4.51
100.00%	38.74	32.93	13.990f	2.070p	4.800		

Tank Capacities for FOSET.S containing FUEL OIL (0.850)

Trim: aft 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	1.94	1.65	13.967f	2.070s	2.995	12.38	4.51
10.00%	3.87	3.29	13.978f	2.070s	3.090	12.38	4.51
20.00%	7.75	6.59	13.984f	2.070s	3.280	12.38	4.51
30.00%	11.62	9.88	13.986f	2.070s	3.470	12.38	4.51
40.00%	15.50	13.17	13.987f	2.070s	3.660	12.38	4.51
50.00%	19.37	16.46	13.988f	2.070s	3.850	12.38	4.51
60.00%	23.24	19.76	13.988f	2.070s	4.040	12.38	4.51
70.00%	27.12	23.05	13.988f	2.070s	4.230	12.38	4.51
80.00%	30.99	26.34	13.989f	2.070s	4.420	12.38	4.51
90.00%	34.86	29.63	13.989f	2.070s	4.610	12.38	4.51
95.00%	36.80	31.28	13.989f	2.070s	4.705	12.38	4.51
98.00%	37.96	32.27	13.989f	2.070s	4.762	12.38	4.51
100.00%	38.74	32.93	13.990f	2.070s	4.800		

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

Trim: aft 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	1.68	1.68	2.576f	6.316p	0.574	0.24	12.61
10.00%	3.36	3.36	2.806f	6.321p	0.767	0.26	14.15
20.00%	6.72	6.72	2.991f	6.331p	1.130	0.29	16.01
30.00%	10.08	10.08	3.085f	6.340p	1.473	0.32	17.03
40.00%	13.44	13.44	3.148f	6.349p	1.805	0.36	17.79
50.00%	16.80	16.80	3.195f	6.357p	2.126	0.38	18.23
60.00%	20.17	20.17	3.228f	6.364p	2.442	0.39	18.34
70.00%	23.53	23.53	3.252f	6.368p	2.752	0.39	18.40
80.00%	26.89	26.89	3.269f	6.372p	3.060	0.40	18.45
90.00%	30.25	30.25	3.282f	6.375p	3.366	0.40	18.50
95.00%	31.93	31.93	3.287f	6.376p	3.518	0.40	18.52
98.00%	32.94	32.94	3.290f	6.377p	3.609	0.40	18.53
100.00%	33.61	33.61	3.297f	6.378p	3.669		

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

Trim: aft 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	1.68	1.68	2.576f	6.316s	0.574	0.24	12.61
10.00%	3.36	3.36	2.806f	6.321s	0.767	0.26	14.15
20.00%	6.72	6.72	2.991f	6.331s	1.130	0.29	16.01
30.00%	10.08	10.08	3.085f	6.340s	1.473	0.32	17.03
40.00%	13.44	13.44	3.148f	6.349s	1.805	0.36	17.79
50.00%	16.80	16.80	3.195f	6.357s	2.126	0.38	18.23
60.00%	20.17	20.17	3.228f	6.364s	2.442	0.39	18.34
70.00%	23.53	23.53	3.252f	6.368s	2.752	0.39	18.40
80.00%	26.89	26.89	3.269f	6.372s	3.060	0.40	18.45
90.00%	30.25	30.25	3.282f	6.375s	3.366	0.40	18.50
95.00%	31.93	31.93	3.287f	6.376s	3.518	0.40	18.52
98.00%	32.94	32.94	3.290f	6.377s	3.609	0.40	18.53
100.00%	33.61	33.61	3.297f	6.378s	3.669		

Tank Capacities for WB1.C containing WATER BALLAST (1.000)

Trim: aft 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	3.14	3.14	23.836f	0.000	3.084	5.54	2.74
10.00%	6.28	6.28	24.033f	0.000	3.367	13.06	6.72
20.00%	12.56	12.56	24.234f	0.000	3.732	30.39	11.20
30.00%	18.84	18.84	24.332f	0.000	4.001	48.42	13.77
40.00%	25.12	25.12	24.390f	0.000	4.227	66.51	15.64
50.00%	31.41	31.41	24.430f	0.000	4.428	84.14	17.12
60.00%	37.69	37.69	24.459f	0.000	4.612	100.97	18.33
70.00%	43.97	43.97	24.481f	0.000	4.783	116.97	19.35
80.00%	50.25	50.25	24.498f	0.000	4.945	132.22	20.22
90.00%	56.53	56.53	24.513f	0.000	5.100	147.15	21.01
95.00%	59.67	59.67	24.519f	0.000	5.174	154.55	21.37
98.00%	61.55	61.55	24.522f	0.000	5.218	159.00	21.58
100.00%	62.81	62.81	24.528f	0.000	5.248		

Tank Capacities for WB2.P containing WATER BALLAST (1.000)

Trim: aft 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	2.46	2.46	8.101f	5.273p	0.911	0.91	10.18
10.00%	4.91	4.91	8.437f	5.329p	1.147	1.41	18.78
20.00%	9.83	9.83	8.759f	5.390p	1.513	1.93	26.02
30.00%	14.75	14.75	8.923f	5.436p	1.823	2.45	30.54
40.00%	19.66	19.66	9.016f	5.523p	2.115	0.98	22.28
50.00%	24.58	24.58	9.083f	5.614p	2.422	1.25	25.44
60.00%	29.49	29.49	9.143f	5.683p	2.729	1.47	27.48
70.00%	34.41	34.41	9.195f	5.737p	3.029	1.62	28.77
80.00%	39.32	39.32	9.239f	5.780p	3.323	1.73	29.62
90.00%	44.24	44.24	9.277f	5.815p	3.611	1.80	30.12
95.00%	46.70	46.70	9.293f	5.830p	3.753	1.81	30.27
98.00%	48.17	48.17	9.302f	5.838p	3.837	1.82	30.33
100.00%	49.16	49.16	9.314f	5.843p	3.893		

Tank Capacities for WB2.S containing WATER BALLAST (1.000)

Trim: aft 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	2.46	2.46	8.101f	5.273s	0.911	0.91	10.18
10.00%	4.91	4.91	8.437f	5.329s	1.147	1.41	18.78
20.00%	9.83	9.83	8.759f	5.390s	1.513	1.93	26.02
30.00%	14.75	14.75	8.923f	5.436s	1.823	2.45	30.54
40.00%	19.66	19.66	9.016f	5.523s	2.115	0.98	22.28
50.00%	24.58	24.58	9.083f	5.614s	2.422	1.25	25.44
60.00%	29.49	29.49	9.143f	5.683s	2.729	1.47	27.48
70.00%	34.41	34.41	9.195f	5.737s	3.029	1.62	28.77
80.00%	39.32	39.32	9.239f	5.780s	3.323	1.73	29.62
90.00%	44.24	44.24	9.277f	5.815s	3.611	1.80	30.12
95.00%	46.70	46.70	9.293f	5.830s	3.753	1.81	30.27
98.00%	48.17	48.17	9.302f	5.838s	3.837	1.82	30.33
100.00%	49.16	49.16	9.314f	5.843s	3.893		

Tank Capacities for WB3.P containing WATER BALLAST (1.000)

Trim: aft 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	2.09	2.09	3.550f	1.598p	0.096	32.57	66.10
10.00%	4.19	4.19	3.485f	2.022p	0.147	62.02	85.13
20.00%	8.37	8.37	3.446f	2.460p	0.225	88.60	96.84
30.00%	12.56	12.56	3.463f	2.661p	0.294	95.22	101.59
40.00%	16.75	16.75	3.481f	2.772p	0.359	96.58	102.94
50.00%	20.93	20.93	3.492f	2.839p	0.423	96.58	102.94
60.00%	25.12	25.12	3.500f	2.884p	0.485	96.58	102.94
70.00%	29.31	29.31	3.505f	2.916p	0.548	96.58	102.94
80.00%	33.50	33.50	3.509f	2.940p	0.610	96.58	102.94
90.00%	37.68	37.68	3.512f	2.959p	0.672	96.58	102.94
95.00%	39.78	39.78	3.514f	2.967p	0.702	96.58	102.94
98.00%	41.03	41.03	3.515f	2.971p	0.721	93.14	86.15
100.00%	41.87	41.87	3.536f	2.972p	0.733		

Tank Capacities for WB3.S containing WATER BALLAST (1.000)

Trim: aft 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	2.09	2.09	3.550f	1.598s	0.096	32.57	66.10
10.00%	4.19	4.19	3.485f	2.022s	0.147	62.02	85.13
20.00%	8.37	8.37	3.446f	2.460s	0.225	88.60	96.84
30.00%	12.56	12.56	3.463f	2.661s	0.294	95.22	101.59
40.00%	16.75	16.75	3.481f	2.772s	0.359	96.58	102.94
50.00%	20.93	20.93	3.492f	2.839s	0.423	96.58	102.94
60.00%	25.12	25.12	3.500f	2.884s	0.485	96.58	102.94
70.00%	29.31	29.31	3.505f	2.916s	0.548	96.58	102.94
80.00%	33.50	33.50	3.509f	2.940s	0.610	96.58	102.94
90.00%	37.68	37.68	3.512f	2.959s	0.672	96.58	102.94
95.00%	39.78	39.78	3.514f	2.967s	0.702	96.58	102.94
98.00%	41.03	41.03	3.515f	2.971s	0.721	93.14	86.15
100.00%	41.87	41.87	3.536f	2.972s	0.733		

Tank Capacities for WB4.P containing WATER BALLAST (1.000)

Trim: aft 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	1.80	1.80	8.446a	6.389p	0.570	0.41	18.38
10.00%	3.60	3.60	8.789a	6.399p	0.741	0.42	18.75
20.00%	7.20	7.20	8.961a	6.403p	1.062	0.42	18.74
30.00%	10.80	10.80	9.019a	6.405p	1.377	0.42	18.74
40.00%	14.40	14.40	9.047a	6.405p	1.691	0.42	18.74
50.00%	18.00	18.00	9.065a	6.406p	2.005	0.42	18.74
60.00%	21.60	21.60	9.076a	6.406p	2.318	0.42	18.74
70.00%	25.20	25.20	9.085a	6.406p	2.631	0.42	18.74
80.00%	28.80	28.80	9.091a	6.406p	2.944	0.42	18.74
90.00%	32.40	32.40	9.096a	6.406p	3.257	0.42	18.74
95.00%	34.20	34.20	9.098a	6.407p	3.414	0.42	18.74
98.00%	35.28	35.28	9.099a	6.407p	3.508	0.42	18.74
100.00%	36.00	36.00	9.095a	6.407p	3.570		

Tank Capacities for WB4.S containing WATER BALLAST (1.000)

Trim: aft 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	1.80	1.80	8.446a	6.389s	0.570	0.41	18.38
10.00%	3.60	3.60	8.789a	6.399s	0.741	0.42	18.75
20.00%	7.20	7.20	8.961a	6.403s	1.062	0.42	18.74
30.00%	10.80	10.80	9.019a	6.405s	1.377	0.42	18.74
40.00%	14.40	14.40	9.047a	6.405s	1.691	0.42	18.74
50.00%	18.00	18.00	9.065a	6.406s	2.005	0.42	18.74
60.00%	21.60	21.60	9.076a	6.406s	2.318	0.42	18.74
70.00%	25.20	25.20	9.085a	6.406s	2.631	0.42	18.74
80.00%	28.80	28.80	9.091a	6.406s	2.944	0.42	18.74
90.00%	32.40	32.40	9.096a	6.406s	3.257	0.42	18.74
95.00%	34.20	34.20	9.098a	6.407s	3.414	0.42	18.74
98.00%	35.28	35.28	9.099a	6.407s	3.508	0.42	18.74
100.00%	36.00	36.00	9.095a	6.407s	3.570		

Tank Capacities for WB5.P containing WATER BALLAST (1.000)

Trim: aft 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	2.03	2.03	13.887a	6.383p	1.323	0.31	7.82
10.00%	4.06	4.06	14.448a	6.390p	1.586	0.41	18.51
20.00%	8.13	8.13	15.192a	6.395p	1.977	0.56	44.92
30.00%	12.19	12.19	15.664a	6.398p	2.290	0.59	51.40
40.00%	16.26	16.26	15.907a	6.401p	2.572	0.59	51.40
50.00%	20.32	20.32	16.052a	6.402p	2.843	0.59	51.40
60.00%	24.39	24.39	16.149a	6.403p	3.107	0.59	51.41
70.00%	28.45	28.45	16.219a	6.404p	3.368	0.59	51.41
80.00%	32.52	32.52	16.271a	6.404p	3.627	0.59	51.41
90.00%	36.58	36.58	16.311a	6.404p	3.885	0.59	51.42
95.00%	38.61	38.61	16.328a	6.405p	4.013	0.59	51.42
98.00%	39.83	39.83	16.338a	6.405p	4.090	0.59	51.42
100.00%	40.65	40.65	16.333a	6.405p	4.141		

Tank Capacities for WB5.S containing WATER BALLAST (1.000)

Trim: aft 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	2.03	2.03	13.887a	6.383s	1.323	0.31	7.82
10.00%	4.06	4.06	14.448a	6.390s	1.586	0.41	18.51
20.00%	8.13	8.13	15.192a	6.395s	1.977	0.56	44.92
30.00%	12.19	12.19	15.664a	6.398s	2.290	0.59	51.40
40.00%	16.26	16.26	15.907a	6.401s	2.572	0.59	51.40
50.00%	20.32	20.32	16.052a	6.402s	2.843	0.59	51.40
60.00%	24.39	24.39	16.149a	6.403s	3.107	0.59	51.41
70.00%	28.45	28.45	16.219a	6.404s	3.368	0.59	51.41
80.00%	32.52	32.52	16.271a	6.404s	3.627	0.59	51.41
90.00%	36.58	36.58	16.311a	6.404s	3.885	0.59	51.42
95.00%	38.61	38.61	16.328a	6.405s	4.013	0.59	51.42
98.00%	39.83	39.83	16.338a	6.405s	4.090	0.59	51.42
100.00%	40.65	40.65	16.333a	6.405s	4.141		

Tank Capacities for WB6.S containing WATER BALLAST (1.000)

Trim: aft 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	3.24	3.24	21.990a	4.651s	3.021	6.38	6.55
10.00%	6.47	6.47	22.326a	4.812s	3.250	10.35	15.48
20.00%	12.95	12.95	22.792a	4.924s	3.563	14.33	40.12
30.00%	19.42	19.42	23.134a	4.976s	3.803	16.41	58.44
40.00%	25.90	25.90	23.361a	5.018s	4.009	17.41	63.61
50.00%	32.37	32.37	23.505a	5.048s	4.197	17.90	64.54
60.00%	38.85	38.85	23.604a	5.070s	4.377	18.32	65.41
70.00%	45.32	45.32	23.677a	5.087s	4.550	18.71	66.21
80.00%	51.80	51.80	23.733a	5.102s	4.721	19.00	66.76
90.00%	58.27	58.27	23.778a	5.113s	4.888	19.00	66.77
95.00%	61.51	61.51	23.797a	5.118s	4.971	19.00	66.77
98.00%	63.45	63.45	23.807a	5.121s	5.020	19.01	66.77
100.00%	64.75	64.75	23.805a	5.123s	5.053		

Tank Capacities for WB6.P containing WATER BALLAST (1.000)

Trim: aft 0.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	3.24	3.24	21.990a	4.651p	3.021	6.38	6.55
10.00%	6.47	6.47	22.326a	4.812p	3.250	10.35	15.48
20.00%	12.95	12.95	22.792a	4.924p	3.563	14.33	40.12
30.00%	19.42	19.42	23.134a	4.976p	3.803	16.41	58.44
40.00%	25.90	25.90	23.361a	5.018p	4.009	17.41	63.61
50.00%	32.37	32.37	23.505a	5.048p	4.197	17.90	64.54
60.00%	38.85	38.85	23.604a	5.070p	4.377	18.32	65.41
70.00%	45.32	45.32	23.677a	5.087p	4.550	18.71	66.21
80.00%	51.80	51.80	23.733a	5.102p	4.721	19.00	66.76
90.00%	58.27	58.27	23.778a	5.113p	4.888	19.00	66.77
95.00%	61.51	61.51	23.797a	5.118p	4.971	19.00	66.77
98.00%	63.45	63.45	23.807a	5.121p	5.020	19.01	66.77
100.00%	64.75	64.75	23.805a	5.123p	5.053		

9.5 Tank Capacities at Trim 1.000m Aft

Tank Capacities for FO1.C containing FUEL OIL (0.850)

Trim: aft 1.000/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	9.71	8.25	9.564f	0.000	0.145	179.95	241.25
10.00%	19.41	16.50	9.830f	0.000	0.240	277.24	300.84
20.00%	38.83	33.00	10.089f	0.000	0.400	374.60	355.88
30.00%	58.24	49.50	10.243f	0.000	0.544	429.24	386.08
40.00%	77.65	66.00	10.350f	0.000	0.679	463.65	406.00
50.00%	97.06	82.50	10.438f	0.000	0.810	487.44	370.35
60.00%	116.48	99.01	10.498f	0.000	0.943	511.24	383.23
70.00%	135.89	115.51	10.544f	0.000	1.076	484.72	371.43
80.00%	155.30	132.01	10.564f	0.000	1.211	446.62	346.64
90.00%	174.72	148.51	10.565f	0.000	1.348	417.17	318.73
95.00%	184.42	156.76	10.560f	0.000	1.417	405.54	303.39
98.00%	190.25	161.71	10.555f	0.000	1.459	387.98	277.27
100.00%	194.13	165.01	10.580f	0.000	1.487		

Tank Capacities for FO2.P containing FUEL OIL (0.850)

Trim: aft 1.000/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	3.71	3.16	8.284a	1.090p	0.122	30.65	267.17
10.00%	7.43	6.31	7.870a	1.565p	0.175	92.56	383.64
20.00%	14.85	12.62	7.620a	2.117p	0.255	142.31	478.59
30.00%	22.28	18.94	7.581a	2.352p	0.324	152.12	506.27
40.00%	29.71	25.25	7.591a	2.485p	0.389	158.87	534.95
50.00%	37.13	31.56	7.612a	2.572p	0.452	161.75	546.79
60.00%	44.56	37.88	7.629a	2.631p	0.514	161.85	547.17
70.00%	51.99	44.19	7.641a	2.674p	0.575	161.85	547.17
80.00%	59.41	50.50	7.650a	2.706p	0.635	161.85	547.17
90.00%	66.84	56.81	7.657a	2.730p	0.695	161.85	547.17
95.00%	70.55	59.97	7.641a	2.741p	0.725	126.48	268.16
98.00%	72.78	61.86	7.586a	2.748p	0.742	80.00	67.87
100.00%	74.26	63.13	7.516a	2.753p	0.753		

Tank Capacities for FO2.S containing FUEL OIL (0.850)

Trim: aft 1.000/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	3.71	3.16	8.284a	1.090s	0.122	30.65	267.17
10.00%	7.43	6.31	7.870a	1.565s	0.175	92.56	383.64
20.00%	14.85	12.62	7.620a	2.117s	0.255	142.31	478.59
30.00%	22.28	18.94	7.581a	2.352s	0.324	152.12	506.27
40.00%	29.71	25.25	7.591a	2.485s	0.389	158.87	534.95
50.00%	37.13	31.56	7.612a	2.572s	0.452	161.75	546.79
60.00%	44.56	37.88	7.629a	2.631s	0.514	161.85	547.17
70.00%	51.99	44.19	7.641a	2.674s	0.575	161.85	547.17
80.00%	59.41	50.50	7.650a	2.706s	0.635	161.85	547.17
90.00%	66.84	56.81	7.657a	2.730s	0.695	161.85	547.17
95.00%	70.55	59.97	7.641a	2.741s	0.725	126.48	268.16
98.00%	72.78	61.86	7.586a	2.748s	0.742	80.00	67.87
100.00%	74.26	63.13	7.516a	2.753s	0.753		

Tank Capacities for FO3.C containing FUEL OIL (0.850)

Trim: aft 1.000/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	4.01	3.41	17.371a	0.000	0.186	3.50	56.01
10.00%	8.03	6.82	17.015a	0.000	0.341	6.67	58.54
20.00%	16.05	13.64	16.880a	0.000	0.605	9.73	64.46
30.00%	24.08	20.47	16.930a	0.000	0.839	11.94	80.18
40.00%	32.10	27.29	17.010a	0.000	1.054	12.50	84.80
50.00%	40.13	34.11	17.060a	0.000	1.258	12.50	84.80
60.00%	48.15	40.93	17.094a	0.000	1.457	12.50	84.80
70.00%	56.18	47.75	17.117a	0.000	1.653	12.50	84.80
80.00%	64.21	54.58	17.135a	0.000	1.847	12.50	84.80
90.00%	72.23	61.40	17.149a	0.000	2.040	12.50	84.80
95.00%	76.24	64.81	17.155a	0.000	2.136	12.50	84.80
98.00%	78.65	66.85	17.158a	0.000	2.194	12.50	84.80
100.00%	80.26	68.22	17.139a	0.000	2.232		

Tank Capacities for FO3.P containing FUEL OIL (0.850)

Trim: aft 1.000/58.920, No Heel

Load (%)	Volume (m ³)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	4.64	3.94	15.119a	4.547p	1.232	4.15	15.79
10.00%	9.28	7.89	15.627a	4.605p	1.485	5.61	35.76
20.00%	18.55	15.77	16.286a	4.651p	1.858	7.11	69.11
30.00%	27.83	23.66	16.610a	4.681p	2.164	7.24	70.68
40.00%	37.11	31.54	16.772a	4.696p	2.448	7.24	70.68
50.00%	46.39	39.43	16.870a	4.704p	2.723	7.24	70.68
60.00%	55.67	47.32	16.935a	4.710p	2.993	7.24	70.68
70.00%	64.94	55.20	16.981a	4.715p	3.261	7.24	70.68
80.00%	74.22	63.09	17.016a	4.718p	3.527	7.24	70.68
90.00%	83.50	70.97	17.043a	4.720p	3.793	7.24	70.68
95.00%	88.14	74.92	17.055a	4.721p	3.925	7.24	70.68
98.00%	90.92	77.28	17.061a	4.722p	4.004	7.24	70.68
100.00%	92.78	78.86	17.050a	4.722p	4.057		

Tank Capacities for FO3.S containing FUEL OIL (0.850)

Trim: aft 1.000/58.920, No Heel

Load (%)	Volume (m ³)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	4.31	3.66	15.072a	4.540s	1.210	4.02	14.49
10.00%	8.61	7.32	15.565a	4.600s	1.452	5.44	32.69
20.00%	17.22	14.64	16.214a	4.645s	1.810	6.98	66.94
30.00%	25.83	21.96	16.559a	4.676s	2.101	7.24	70.68
40.00%	34.44	29.28	16.735a	4.692s	2.367	7.24	70.68
50.00%	43.05	36.60	16.840a	4.702s	2.624	7.24	70.68
60.00%	51.66	43.91	16.890a	4.718s	2.878	5.87	65.26
70.00%	60.27	51.23	16.910a	4.737s	3.139	5.87	65.26
80.00%	68.89	58.55	16.926a	4.751s	3.406	5.87	65.26
90.00%	77.50	65.87	16.938a	4.763s	3.677	5.87	65.26
95.00%	81.80	69.53	16.943a	4.767s	3.814	5.87	65.26
98.00%	84.38	71.73	16.945a	4.770s	3.896	5.87	65.26
100.00%	86.11	73.19	16.932a	4.771s	3.951		

Tank Capacities for FO4.P containing FUEL OIL (0.850)

Trim: aft 1.000/58.920, No Heel

Load (%)	Volume (m ³)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	3.33	2.83	22.063a	1.792p	2.407	4.11	5.82
10.00%	6.66	5.66	22.441a	1.897p	2.653	5.98	14.49
20.00%	13.33	11.33	22.976a	1.970p	2.995	8.31	37.26
30.00%	19.99	16.99	23.329a	2.019p	3.259	9.44	47.38
40.00%	26.65	22.66	23.530a	2.051p	3.489	9.47	47.54
50.00%	33.32	28.32	23.651a	2.070p	3.704	9.47	47.54
60.00%	39.98	33.98	23.732a	2.082p	3.912	9.47	47.54
70.00%	46.65	39.65	23.790a	2.091p	4.117	9.47	47.54
80.00%	53.31	45.31	23.833a	2.098p	4.318	9.47	47.54
90.00%	59.97	50.98	23.866a	2.103p	4.518	9.47	47.54
95.00%	63.30	53.81	23.880a	2.105p	4.618	9.47	47.54
98.00%	65.30	55.51	23.888a	2.107p	4.677	9.47	47.54
100.00%	66.64	56.64	23.879a	2.107p	4.717		

Tank Capacities for FO4.S containing FUEL OIL (0.850)

Trim: aft 1.000/58.920, No Heel

Load (%)	Volume (m ³)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	3.33	2.83	22.063a	1.792s	2.407	4.11	5.82
10.00%	6.66	5.66	22.441a	1.897s	2.653	5.98	14.49
20.00%	13.33	11.33	22.976a	1.970s	2.995	8.31	37.26
30.00%	19.99	16.99	23.329a	2.019s	3.259	9.44	47.38
40.00%	26.65	22.66	23.530a	2.051s	3.489	9.47	47.54
50.00%	33.32	28.32	23.651a	2.070s	3.704	9.47	47.54
60.00%	39.98	33.98	23.732a	2.082s	3.912	9.47	47.54
70.00%	46.65	39.65	23.790a	2.091s	4.117	9.47	47.54
80.00%	53.31	45.31	23.833a	2.098s	4.318	9.47	47.54
90.00%	59.97	50.98	23.866a	2.103s	4.518	9.47	47.54
95.00%	63.30	53.81	23.880a	2.105s	4.618	9.47	47.54
98.00%	65.30	55.51	23.888a	2.107s	4.677	9.47	47.54
100.00%	66.64	56.64	23.879a	2.107s	4.717		

Tank Capacities for FODAY.P containing FUEL OIL (0.850)

Trim: aft 1.000/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	1.94	1.65	13.943f	2.070p	2.995	12.38	4.51
10.00%	3.87	3.29	13.967f	2.070p	3.090	12.38	4.51
20.00%	7.75	6.59	13.978f	2.070p	3.280	12.38	4.51
30.00%	11.62	9.88	13.982f	2.070p	3.470	12.38	4.51
40.00%	15.50	13.17	13.984f	2.070p	3.660	12.38	4.51
50.00%	19.37	16.46	13.985f	2.070p	3.850	12.38	4.51
60.00%	23.24	19.76	13.986f	2.070p	4.040	12.38	4.51
70.00%	27.12	23.05	13.987f	2.070p	4.230	12.38	4.51
80.00%	30.99	26.34	13.987f	2.070p	4.420	12.38	4.51
90.00%	34.86	29.63	13.987f	2.070p	4.610	12.38	4.51
95.00%	36.80	31.28	13.988f	2.070p	4.705	12.38	4.51
98.00%	37.96	32.27	13.988f	2.070p	4.762	12.38	4.51
100.00%	38.74	32.93	13.990f	2.070p	4.800		

Tank Capacities for FOSET.S containing FUEL OIL (0.850)

Trim: aft 1.000/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	1.94	1.65	13.943f	2.070s	2.995	12.38	4.51
10.00%	3.87	3.29	13.967f	2.070s	3.090	12.38	4.51
20.00%	7.75	6.59	13.978f	2.070s	3.280	12.38	4.51
30.00%	11.62	9.88	13.982f	2.070s	3.470	12.38	4.51
40.00%	15.50	13.17	13.984f	2.070s	3.660	12.38	4.51
50.00%	19.37	16.46	13.985f	2.070s	3.850	12.38	4.51
60.00%	23.24	19.76	13.986f	2.070s	4.040	12.38	4.51
70.00%	27.12	23.05	13.987f	2.070s	4.230	12.38	4.51
80.00%	30.99	26.34	13.987f	2.070s	4.420	12.38	4.51
90.00%	34.86	29.63	13.987f	2.070s	4.610	12.38	4.51
95.00%	36.80	31.28	13.988f	2.070s	4.705	12.38	4.51
98.00%	37.96	32.27	13.988f	2.070s	4.762	12.38	4.51
100.00%	38.74	32.93	13.990f	2.070s	4.800		

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

Trim: aft 1.000/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	1.68	1.68	2.513f	6.319p	0.574	0.24	12.51
10.00%	3.36	3.36	2.770f	6.322p	0.768	0.25	14.07
20.00%	6.72	6.72	2.970f	6.331p	1.130	0.29	15.98
30.00%	10.08	10.08	3.070f	6.341p	1.473	0.32	17.00
40.00%	13.44	13.44	3.137f	6.349p	1.805	0.36	17.78
50.00%	16.80	16.80	3.186f	6.357p	2.127	0.38	18.23
60.00%	20.17	20.17	3.220f	6.364p	2.442	0.39	18.35
70.00%	23.53	23.53	3.245f	6.368p	2.752	0.39	18.41
80.00%	26.89	26.89	3.263f	6.372p	3.060	0.40	18.46
90.00%	30.25	30.25	3.277f	6.375p	3.366	0.40	18.50
95.00%	31.93	31.93	3.282f	6.376p	3.518	0.40	18.52
98.00%	32.94	32.94	3.285f	6.377p	3.609	0.40	18.54
100.00%	33.61	33.61	3.297f	6.378p	3.669		

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

Trim: aft 1.000/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	1.68	1.68	2.513f	6.319s	0.574	0.24	12.51
10.00%	3.36	3.36	2.770f	6.322s	0.768	0.25	14.07
20.00%	6.72	6.72	2.970f	6.331s	1.130	0.29	15.98
30.00%	10.08	10.08	3.070f	6.341s	1.473	0.32	17.00
40.00%	13.44	13.44	3.137f	6.349s	1.805	0.36	17.78
50.00%	16.80	16.80	3.186f	6.357s	2.127	0.38	18.23
60.00%	20.17	20.17	3.220f	6.364s	2.442	0.39	18.35
70.00%	23.53	23.53	3.245f	6.368s	2.752	0.39	18.41
80.00%	26.89	26.89	3.263f	6.372s	3.060	0.40	18.46
90.00%	30.25	30.25	3.277f	6.375s	3.366	0.40	18.50
95.00%	31.93	31.93	3.282f	6.376s	3.518	0.40	18.52
98.00%	32.94	32.94	3.285f	6.377s	3.609	0.40	18.54
100.00%	33.61	33.61	3.297f	6.378s	3.669		

Tank Capacities for WB1.C containing WATER BALLAST (1.000)

Trim: aft 1.000/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	3.14	3.14	23.829f	0.000	3.084	5.56	2.65
10.00%	6.28	6.28	24.024f	0.000	3.367	13.09	6.62
20.00%	12.56	12.56	24.226f	0.000	3.732	30.42	11.15
30.00%	18.84	18.84	24.326f	0.000	4.001	48.46	13.75
40.00%	25.12	25.12	24.385f	0.000	4.227	66.54	15.61
50.00%	31.41	31.41	24.425f	0.000	4.428	84.16	17.11
60.00%	37.69	37.69	24.454f	0.000	4.612	100.99	18.32
70.00%	43.97	43.97	24.477f	0.000	4.783	117.00	19.35
80.00%	50.25	50.25	24.495f	0.000	4.945	132.26	20.22
90.00%	56.53	56.53	24.510f	0.000	5.100	147.19	21.01
95.00%	59.67	59.67	24.516f	0.000	5.174	154.58	21.36
98.00%	61.55	61.55	24.519f	0.000	5.218	159.04	21.58
100.00%	62.81	62.81	24.528f	0.000	5.248		

Tank Capacities for WB2.P containing WATER BALLAST (1.000)

Trim: aft 1.000/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	2.46	2.46	8.066f	5.277p	0.911	0.91	9.74
10.00%	4.91	4.91	8.405f	5.333p	1.147	1.41	18.38
20.00%	9.83	9.83	8.736f	5.392p	1.513	1.94	25.85
30.00%	14.75	14.75	8.905f	5.438p	1.824	2.45	30.43
40.00%	19.66	19.66	9.006f	5.523p	2.115	0.99	22.19
50.00%	24.58	24.58	9.074f	5.614p	2.422	1.25	25.38
60.00%	29.49	29.49	9.135f	5.683p	2.729	1.47	27.44
70.00%	34.41	34.41	9.188f	5.737p	3.029	1.62	28.75
80.00%	39.32	39.32	9.233f	5.780p	3.323	1.73	29.61
90.00%	44.24	44.24	9.271f	5.815p	3.611	1.80	30.12
95.00%	46.70	46.70	9.288f	5.830p	3.753	1.81	30.26
98.00%	48.17	48.17	9.297f	5.838p	3.837	1.82	30.34
100.00%	49.16	49.16	9.314f	5.843p	3.893		

Tank Capacities for WB2.S containing WATER BALLAST (1.000)

Trim: aft 1.000/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	2.46	2.46	8.066f	5.277s	0.911	0.91	9.74
10.00%	4.91	4.91	8.405f	5.333s	1.147	1.41	18.38
20.00%	9.83	9.83	8.736f	5.392s	1.513	1.94	25.85
30.00%	14.75	14.75	8.905f	5.438s	1.824	2.45	30.43
40.00%	19.66	19.66	9.006f	5.523s	2.115	0.99	22.19
50.00%	24.58	24.58	9.074f	5.614s	2.422	1.25	25.38
60.00%	29.49	29.49	9.135f	5.683s	2.729	1.47	27.44
70.00%	34.41	34.41	9.188f	5.737s	3.029	1.62	28.75
80.00%	39.32	39.32	9.233f	5.780s	3.323	1.73	29.61
90.00%	44.24	44.24	9.271f	5.815s	3.611	1.80	30.12
95.00%	46.70	46.70	9.288f	5.830s	3.753	1.81	30.26
98.00%	48.17	48.17	9.297f	5.838s	3.837	1.82	30.34
100.00%	49.16	49.16	9.314f	5.843s	3.893		

Tank Capacities for WB3.P containing WATER BALLAST (1.000)

Trim: aft 1.000/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	2.09	2.09	3.279f	1.665p	0.100	35.60	67.44
10.00%	4.19	4.19	3.311f	2.072p	0.149	65.06	85.79
20.00%	8.37	8.37	3.349f	2.480p	0.227	87.44	95.88
30.00%	12.56	12.56	3.395f	2.671p	0.295	94.66	101.07
40.00%	16.75	16.75	3.428f	2.778p	0.360	96.51	102.89
50.00%	20.93	20.93	3.450f	2.844p	0.423	96.59	102.98
60.00%	25.12	25.12	3.465f	2.889p	0.486	96.59	102.98
70.00%	29.31	29.31	3.475f	2.920p	0.548	96.59	102.98
80.00%	33.50	33.50	3.483f	2.944p	0.610	96.59	102.98
90.00%	37.68	37.68	3.489f	2.962p	0.672	96.59	102.98
95.00%	39.78	39.78	3.492f	2.970p	0.703	96.59	102.98
98.00%	41.03	41.03	3.503f	2.972p	0.721	70.67	33.79
100.00%	41.87	41.87	3.536f	2.972p	0.733		

Tank Capacities for WB3.S containing WATER BALLAST (1.000)

Trim: aft 1.000/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	2.09	2.09	3.279f	1.665s	0.100	35.60	67.44
10.00%	4.19	4.19	3.311f	2.072s	0.149	65.06	85.79
20.00%	8.37	8.37	3.349f	2.480s	0.227	87.44	95.88
30.00%	12.56	12.56	3.395f	2.671s	0.295	94.66	101.07
40.00%	16.75	16.75	3.428f	2.778s	0.360	96.51	102.89
50.00%	20.93	20.93	3.450f	2.844s	0.423	96.59	102.98
60.00%	25.12	25.12	3.465f	2.889s	0.486	96.59	102.98
70.00%	29.31	29.31	3.475f	2.920s	0.548	96.59	102.98
80.00%	33.50	33.50	3.483f	2.944s	0.610	96.59	102.98
90.00%	37.68	37.68	3.489f	2.962s	0.672	96.59	102.98
95.00%	39.78	39.78	3.492f	2.970s	0.703	96.59	102.98
98.00%	41.03	41.03	3.503f	2.972s	0.721	70.67	33.79
100.00%	41.87	41.87	3.536f	2.972s	0.733		

Tank Capacities for WB4.P containing WATER BALLAST (1.000)

Trim: aft 1.000/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	1.80	1.80	8.534a	6.390p	0.571	0.42	18.75
10.00%	3.60	3.60	8.833a	6.399p	0.742	0.42	18.75
20.00%	7.20	7.20	8.983a	6.403p	1.062	0.42	18.75
30.00%	10.80	10.80	9.033a	6.405p	1.377	0.42	18.75
40.00%	14.40	14.40	9.058a	6.405p	1.691	0.42	18.75
50.00%	18.00	18.00	9.074a	6.406p	2.005	0.42	18.75
60.00%	21.60	21.60	9.084a	6.406p	2.318	0.42	18.75
70.00%	25.20	25.20	9.091a	6.406p	2.631	0.42	18.75
80.00%	28.80	28.80	9.096a	6.406p	2.944	0.42	18.75
90.00%	32.40	32.40	9.101a	6.406p	3.258	0.42	18.75
95.00%	34.20	34.20	9.102a	6.407p	3.414	0.42	18.74
98.00%	35.28	35.28	9.103a	6.407p	3.508	0.42	18.74
100.00%	36.00	36.00	9.095a	6.407p	3.570		

Tank Capacities for WB4.S containing WATER BALLAST (1.000)

Trim: aft 1.000/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	1.80	1.80	8.534a	6.390s	0.571	0.42	18.75
10.00%	3.60	3.60	8.833a	6.399s	0.742	0.42	18.75
20.00%	7.20	7.20	8.983a	6.403s	1.062	0.42	18.75
30.00%	10.80	10.80	9.033a	6.405s	1.377	0.42	18.75
40.00%	14.40	14.40	9.058a	6.405s	1.691	0.42	18.75
50.00%	18.00	18.00	9.074a	6.406s	2.005	0.42	18.75
60.00%	21.60	21.60	9.084a	6.406s	2.318	0.42	18.75
70.00%	25.20	25.20	9.091a	6.406s	2.631	0.42	18.75
80.00%	28.80	28.80	9.096a	6.406s	2.944	0.42	18.75
90.00%	32.40	32.40	9.101a	6.406s	3.258	0.42	18.75
95.00%	34.20	34.20	9.102a	6.407s	3.414	0.42	18.74
98.00%	35.28	35.28	9.103a	6.407s	3.508	0.42	18.74
100.00%	36.00	36.00	9.095a	6.407s	3.570		

Tank Capacities for WB5.P containing WATER BALLAST (1.000)

Trim: aft 1.000/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	2.03	2.03	13.920a	6.382p	1.324	0.32	8.24
10.00%	4.06	4.06	14.488a	6.389p	1.587	0.42	19.43
20.00%	8.13	8.13	15.240a	6.394p	1.977	0.57	46.75
30.00%	12.19	12.19	15.700a	6.398p	2.290	0.59	51.41
40.00%	16.26	16.26	15.933a	6.401p	2.573	0.59	51.42
50.00%	20.32	20.32	16.074a	6.402p	2.843	0.59	51.42
60.00%	24.39	24.39	16.167a	6.403p	3.108	0.59	51.42
70.00%	28.45	28.45	16.234a	6.404p	3.369	0.59	51.43
80.00%	32.52	32.52	16.284a	6.404p	3.627	0.59	51.43
90.00%	36.58	36.58	16.323a	6.404p	3.885	0.59	51.43
95.00%	38.61	38.61	16.340a	6.405p	4.013	0.59	51.43
98.00%	39.83	39.83	16.349a	6.405p	4.090	0.59	51.43
100.00%	40.65	40.65	16.333a	6.405p	4.141		

Tank Capacities for WB5.S containing WATER BALLAST (1.000)

Trim: aft 1.000/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	2.03	2.03	13.920a	6.382s	1.324	0.32	8.24
10.00%	4.06	4.06	14.488a	6.389s	1.587	0.42	19.43
20.00%	8.13	8.13	15.240a	6.394s	1.977	0.57	46.75
30.00%	12.19	12.19	15.700a	6.398s	2.290	0.59	51.41
40.00%	16.26	16.26	15.933a	6.401s	2.573	0.59	51.42
50.00%	20.32	20.32	16.074a	6.402s	2.843	0.59	51.42
60.00%	24.39	24.39	16.167a	6.403s	3.108	0.59	51.42
70.00%	28.45	28.45	16.234a	6.404s	3.369	0.59	51.43
80.00%	32.52	32.52	16.284a	6.404s	3.627	0.59	51.43
90.00%	36.58	36.58	16.323a	6.404s	3.885	0.59	51.43
95.00%	38.61	38.61	16.340a	6.405s	4.013	0.59	51.43
98.00%	39.83	39.83	16.349a	6.405s	4.090	0.59	51.43
100.00%	40.65	40.65	16.333a	6.405s	4.141		

Tank Capacities for WB6.S containing WATER BALLAST (1.000)

Trim: aft 1.000/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	3.24	3.24	22.007a	4.645s	3.021	6.44	6.88
10.00%	6.47	6.47	22.346a	4.808s	3.251	10.46	16.19
20.00%	12.95	12.95	22.818a	4.920s	3.564	14.46	41.73
30.00%	19.42	19.42	23.159a	4.975s	3.803	16.49	59.23
40.00%	25.90	25.90	23.382a	5.017s	4.009	17.43	63.69
50.00%	32.37	32.37	23.522a	5.047s	4.197	17.92	64.62
60.00%	38.85	38.85	23.618a	5.069s	4.377	18.35	65.48
70.00%	45.32	45.32	23.689a	5.087s	4.551	18.73	66.28
80.00%	51.80	51.80	23.744a	5.102s	4.721	19.00	66.78
90.00%	58.27	58.27	23.788a	5.113s	4.888	19.00	66.79
95.00%	61.51	61.51	23.806a	5.118s	4.971	19.01	66.79
98.00%	63.45	63.45	23.816a	5.121s	5.020	19.01	66.79
100.00%	64.75	64.75	23.805a	5.123s	5.053		

Tank Capacities for WB6.P containing WATER BALLAST (1.000)

Trim: aft 1.000/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	3.24	3.24	22.007a	4.645p	3.021	6.44	6.88
10.00%	6.47	6.47	22.346a	4.808p	3.251	10.46	16.19
20.00%	12.95	12.95	22.818a	4.920p	3.564	14.46	41.73
30.00%	19.42	19.42	23.159a	4.975p	3.803	16.49	59.23
40.00%	25.90	25.90	23.382a	5.017p	4.009	17.43	63.69
50.00%	32.37	32.37	23.522a	5.047p	4.197	17.92	64.62
60.00%	38.85	38.85	23.618a	5.069p	4.377	18.35	65.48
70.00%	45.32	45.32	23.689a	5.087p	4.551	18.73	66.28
80.00%	51.80	51.80	23.744a	5.102p	4.721	19.00	66.78
90.00%	58.27	58.27	23.788a	5.113p	4.888	19.00	66.79
95.00%	61.51	61.51	23.806a	5.118p	4.971	19.01	66.79
98.00%	63.45	63.45	23.816a	5.121p	5.020	19.01	66.79
100.00%	64.75	64.75	23.805a	5.123p	5.053		

9.6 Tank Capacities at Trim 1.500m Aft

Tank Capacities for FO1.C containing FUEL OIL (0.850)

Trim: aft 1.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	9.71	8.25	9.323f	0.000	0.150	182.92	230.71
10.00%	19.41	16.50	9.678f	0.000	0.243	274.73	292.96
20.00%	38.83	33.00	9.998f	0.000	0.402	370.57	351.52
30.00%	58.24	49.50	10.177f	0.000	0.545	425.80	383.44
40.00%	77.65	66.00	10.298f	0.000	0.680	460.90	404.19
50.00%	97.06	82.50	10.400f	0.000	0.811	485.11	368.91
60.00%	116.48	99.01	10.466f	0.000	0.943	509.01	382.10
70.00%	135.89	115.51	10.517f	0.000	1.077	488.86	374.10
80.00%	155.30	132.01	10.542f	0.000	1.211	449.93	349.56
90.00%	174.72	148.51	10.547f	0.000	1.348	419.70	321.97
95.00%	184.42	156.76	10.543f	0.000	1.417	407.69	306.82
98.00%	190.25	161.71	10.544f	0.000	1.459	308.44	160.14
100.00%	194.13	165.01	10.580f	0.000	1.487		

Tank Capacities for FO2.P containing FUEL OIL (0.850)

Trim: aft 1.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	3.71	3.16	8.984a	1.078p	0.137	28.21	251.80
10.00%	7.43	6.31	8.380a	1.529p	0.186	84.38	374.72
20.00%	14.85	12.62	7.944a	2.088p	0.262	145.13	486.51
30.00%	22.28	18.94	7.810a	2.340p	0.329	154.79	517.66
40.00%	29.71	25.25	7.772a	2.480p	0.393	160.55	542.24
50.00%	37.13	31.56	7.759a	2.569p	0.456	161.88	547.46
60.00%	44.56	37.88	7.752a	2.629p	0.517	161.88	547.46
70.00%	51.99	44.19	7.746a	2.672p	0.577	161.88	547.46
80.00%	59.41	50.50	7.742a	2.704p	0.637	161.88	547.46
90.00%	66.84	56.81	7.731a	2.729p	0.697	144.95	394.00
95.00%	70.55	59.97	7.668a	2.741p	0.725	103.29	146.05
98.00%	72.78	61.86	7.593a	2.748p	0.742	65.33	36.96
100.00%	74.26	63.13	7.516a	2.753p	0.753		

Tank Capacities for FO2.S containing FUEL OIL (0.850)

Trim: aft 1.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	3.71	3.16	8.984a	1.078s	0.137	28.21	251.80
10.00%	7.43	6.31	8.380a	1.529s	0.186	84.38	374.72
20.00%	14.85	12.62	7.944a	2.088s	0.262	145.13	486.51
30.00%	22.28	18.94	7.810a	2.340s	0.329	154.79	517.66
40.00%	29.71	25.25	7.772a	2.480s	0.393	160.55	542.24
50.00%	37.13	31.56	7.759a	2.569s	0.456	161.88	547.46
60.00%	44.56	37.88	7.752a	2.629s	0.517	161.88	547.46
70.00%	51.99	44.19	7.746a	2.672s	0.577	161.88	547.46
80.00%	59.41	50.50	7.742a	2.704s	0.637	161.88	547.46
90.00%	66.84	56.81	7.731a	2.729s	0.697	144.95	394.00
95.00%	70.55	59.97	7.668a	2.741s	0.725	103.29	146.05
98.00%	72.78	61.86	7.593a	2.748s	0.742	65.33	36.96
100.00%	74.26	63.13	7.516a	2.753s	0.753		

Tank Capacities for FO3.C containing FUEL OIL (0.850)

Trim: aft 1.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	4.01	3.41	17.510a	0.000	0.189	3.18	54.98
10.00%	8.03	6.82	17.087a	0.000	0.343	6.70	58.58
20.00%	16.05	13.64	16.920a	0.000	0.606	9.84	64.90
30.00%	24.08	20.47	16.964a	0.000	0.840	12.17	82.08
40.00%	32.10	27.29	17.037a	0.000	1.054	12.50	84.85
50.00%	40.13	34.11	17.081a	0.000	1.258	12.50	84.85
60.00%	48.15	40.93	17.111a	0.000	1.457	12.50	84.85
70.00%	56.18	47.75	17.132a	0.000	1.653	12.50	84.85
80.00%	64.21	54.58	17.148a	0.000	1.848	12.50	84.85
90.00%	72.23	61.40	17.161a	0.000	2.041	12.50	84.85
95.00%	76.24	64.81	17.166a	0.000	2.137	12.50	84.85
98.00%	78.65	66.85	17.168a	0.000	2.194	11.11	59.62
100.00%	80.26	68.22	17.139a	0.000	2.232		

Tank Capacities for FO3.P containing FUEL OIL (0.850)

Trim: aft 1.500/58.920, No Heel

Load (%)	Volume (m ³)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	4.64	3.94	15.154a	4.543p	1.233	4.24	16.65
10.00%	9.28	7.89	15.667a	4.603p	1.485	5.71	37.58
20.00%	18.55	15.77	16.323a	4.651p	1.859	7.16	69.78
30.00%	27.83	23.66	16.635a	4.681p	2.164	7.24	70.72
40.00%	37.11	31.54	16.791a	4.696p	2.448	7.24	70.72
50.00%	46.39	39.43	16.885a	4.704p	2.723	7.24	70.72
60.00%	55.67	47.32	16.948a	4.710p	2.993	7.24	70.72
70.00%	64.94	55.20	16.992a	4.715p	3.261	7.24	70.72
80.00%	74.22	63.09	17.026a	4.718p	3.527	7.24	70.72
90.00%	83.50	70.97	17.052a	4.720p	3.793	7.24	70.72
95.00%	88.14	74.92	17.063a	4.721p	3.925	7.24	70.72
98.00%	90.92	77.28	17.069a	4.722p	4.004	7.24	70.72
100.00%	92.78	78.86	17.050a	4.722p	4.057		

Tank Capacities for FO3.S containing FUEL OIL (0.850)

Trim: aft 1.500/58.920, No Heel

Load (%)	Volume (m ³)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	4.31	3.66	15.107a	4.536s	1.211	4.09	15.32
10.00%	8.61	7.32	15.604a	4.597s	1.453	5.54	34.30
20.00%	17.22	14.64	16.253a	4.645s	1.811	7.03	67.86
30.00%	25.83	21.96	16.587a	4.676s	2.101	7.24	70.72
40.00%	34.44	29.28	16.755a	4.692s	2.368	7.24	70.72
50.00%	43.05	36.60	16.856a	4.702s	2.625	7.24	70.72
60.00%	51.66	43.91	16.902a	4.718s	2.879	5.87	65.30
70.00%	60.27	51.23	16.921a	4.737s	3.140	5.87	65.30
80.00%	68.89	58.55	16.935a	4.752s	3.407	5.87	65.30
90.00%	77.50	65.87	16.946a	4.763s	3.678	5.87	65.30
95.00%	81.80	69.53	16.951a	4.768s	3.814	5.87	65.30
98.00%	84.38	71.73	16.953a	4.770s	3.896	5.87	65.30
100.00%	86.11	73.19	16.932a	4.771s	3.951		

Tank Capacities for FO4.P containing FUEL OIL (0.850)

Trim: aft 1.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	3.33	2.83	22.081a	1.788p	2.407	4.16	6.10
10.00%	6.66	5.66	22.464a	1.893p	2.653	6.08	15.17
20.00%	13.33	11.33	23.004a	1.969p	2.996	8.35	38.18
30.00%	19.99	16.99	23.353a	2.019p	3.259	9.46	47.52
40.00%	26.66	22.66	23.548a	2.051p	3.489	9.47	47.57
50.00%	33.32	28.32	23.666a	2.070p	3.704	9.47	47.57
60.00%	39.98	33.99	23.744a	2.082p	3.913	9.47	47.57
70.00%	46.65	39.65	23.800a	2.091p	4.117	9.47	47.57
80.00%	53.31	45.31	23.842a	2.098p	4.319	9.47	47.57
90.00%	59.97	50.98	23.874a	2.103p	4.518	9.47	47.57
95.00%	63.30	53.81	23.888a	2.105p	4.618	9.47	47.57
98.00%	65.30	55.51	23.895a	2.107p	4.678	9.35	45.82
100.00%	66.64	56.64	23.879a	2.107p	4.717		

Tank Capacities for FO4.S containing FUEL OIL (0.850)

Trim: aft 1.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	3.33	2.83	22.081a	1.788s	2.407	4.16	6.10
10.00%	6.66	5.66	22.464a	1.893s	2.653	6.08	15.17
20.00%	13.33	11.33	23.004a	1.969s	2.996	8.35	38.18
30.00%	19.99	16.99	23.353a	2.019s	3.259	9.46	47.52
40.00%	26.66	22.66	23.548a	2.051s	3.489	9.47	47.57
50.00%	33.32	28.32	23.666a	2.070s	3.704	9.47	47.57
60.00%	39.98	33.99	23.744a	2.082s	3.913	9.47	47.57
70.00%	46.65	39.65	23.800a	2.091s	4.117	9.47	47.57
80.00%	53.31	45.31	23.842a	2.098s	4.319	9.47	47.57
90.00%	59.97	50.98	23.874a	2.103s	4.518	9.47	47.57
95.00%	63.30	53.81	23.888a	2.105s	4.618	9.47	47.57
98.00%	65.30	55.51	23.895a	2.107s	4.678	9.35	45.82
100.00%	66.64	56.64	23.879a	2.107s	4.717		

Tank Capacities for FODAY.P containing FUEL OIL (0.850)

Trim: aft 1.500/58.920, No Heel

Load (%)	Volume (m ³)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	1.94	1.65	13.920f	2.070p	2.996	12.38	4.52
10.00%	3.87	3.29	13.955f	2.070p	3.090	12.38	4.52
20.00%	7.75	6.59	13.973f	2.070p	3.280	12.38	4.52
30.00%	11.62	9.88	13.978f	2.070p	3.470	12.38	4.52
40.00%	15.50	13.17	13.981f	2.070p	3.660	12.38	4.52
50.00%	19.37	16.46	13.983f	2.070p	3.850	12.38	4.52
60.00%	23.24	19.76	13.984f	2.070p	4.040	12.38	4.52
70.00%	27.12	23.05	13.985f	2.070p	4.230	12.38	4.52
80.00%	30.99	26.34	13.986f	2.070p	4.420	12.38	4.52
90.00%	34.86	29.63	13.986f	2.070p	4.610	12.38	4.52
95.00%	36.80	31.28	13.986f	2.070p	4.705	12.38	4.52
98.00%	37.96	32.27	13.986f	2.070p	4.762	12.38	4.52
100.00%	38.74	32.93	13.990f	2.070p	4.800		

Tank Capacities for FOSET.S containing FUEL OIL (0.850)

Trim: aft 1.500/58.920, No Heel

Load (%)	Volume (m ³)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	1.94	1.65	13.920f	2.070s	2.996	12.38	4.52
10.00%	3.87	3.29	13.955f	2.070s	3.090	12.38	4.52
20.00%	7.75	6.59	13.973f	2.070s	3.280	12.38	4.52
30.00%	11.62	9.88	13.978f	2.070s	3.470	12.38	4.52
40.00%	15.50	13.17	13.981f	2.070s	3.660	12.38	4.52
50.00%	19.37	16.46	13.983f	2.070s	3.850	12.38	4.52
60.00%	23.24	19.76	13.984f	2.070s	4.040	12.38	4.52
70.00%	27.12	23.05	13.985f	2.070s	4.230	12.38	4.52
80.00%	30.99	26.34	13.986f	2.070s	4.420	12.38	4.52
90.00%	34.86	29.63	13.986f	2.070s	4.610	12.38	4.52
95.00%	36.80	31.28	13.986f	2.070s	4.705	12.38	4.52
98.00%	37.96	32.27	13.986f	2.070s	4.762	12.38	4.52
100.00%	38.74	32.93	13.990f	2.070s	4.800		

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

Trim: aft 1.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	1.68	1.68	2.450f	6.321p	0.576	0.24	12.40
10.00%	3.36	3.36	2.735f	6.323p	0.768	0.25	13.98
20.00%	6.72	6.72	2.950f	6.331p	1.130	0.29	15.95
30.00%	10.08	10.08	3.056f	6.341p	1.474	0.32	16.99
40.00%	13.44	13.44	3.126f	6.349p	1.805	0.36	17.77
50.00%	16.80	16.80	3.177f	6.357p	2.127	0.38	18.23
60.00%	20.17	20.17	3.213f	6.364p	2.442	0.39	18.36
70.00%	23.53	23.53	3.238f	6.368p	2.753	0.39	18.42
80.00%	26.89	26.89	3.257f	6.372p	3.060	0.40	18.47
90.00%	30.25	30.25	3.272f	6.375p	3.366	0.40	18.51
95.00%	31.93	31.93	3.278f	6.376p	3.518	0.40	18.54
98.00%	32.94	32.94	3.281f	6.377p	3.609	0.40	18.55
100.00%	33.61	33.61	3.297f	6.378p	3.669		

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

Trim: aft 1.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	1.68	1.68	2.450f	6.321s	0.576	0.24	12.40
10.00%	3.36	3.36	2.735f	6.323s	0.768	0.25	13.98
20.00%	6.72	6.72	2.950f	6.331s	1.130	0.29	15.95
30.00%	10.08	10.08	3.056f	6.341s	1.474	0.32	16.99
40.00%	13.44	13.44	3.126f	6.349s	1.805	0.36	17.77
50.00%	16.80	16.80	3.177f	6.357s	2.127	0.38	18.23
60.00%	20.17	20.17	3.213f	6.364s	2.442	0.39	18.36
70.00%	23.53	23.53	3.238f	6.368s	2.753	0.39	18.42
80.00%	26.89	26.89	3.257f	6.372s	3.060	0.40	18.47
90.00%	30.25	30.25	3.272f	6.375s	3.366	0.40	18.51
95.00%	31.93	31.93	3.278f	6.376s	3.518	0.40	18.54
98.00%	32.94	32.94	3.281f	6.377s	3.609	0.40	18.55
100.00%	33.61	33.61	3.297f	6.378s	3.669		

Tank Capacities for WB1.C containing WATER BALLAST (1.000)

Trim: aft 1.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	3.14	3.14	23.822f	0.000	3.084	5.58	2.58
10.00%	6.28	6.28	24.015f	0.000	3.367	13.13	6.53
20.00%	12.56	12.56	24.219f	0.000	3.732	30.46	11.09
30.00%	18.84	18.84	24.319f	0.000	4.001	48.50	13.73
40.00%	25.12	25.12	24.380f	0.000	4.227	66.57	15.59
50.00%	31.41	31.41	24.420f	0.000	4.428	84.19	17.09
60.00%	37.69	37.69	24.450f	0.000	4.612	101.03	18.32
70.00%	43.97	43.97	24.473f	0.000	4.783	117.03	19.34
80.00%	50.25	50.25	24.492f	0.000	4.945	132.31	20.22
90.00%	56.53	56.53	24.506f	0.000	5.100	147.24	21.01
95.00%	59.67	59.67	24.513f	0.000	5.174	154.64	21.36
98.00%	61.55	61.55	24.517f	0.000	5.218	159.09	21.58
100.00%	62.81	62.81	24.528f	0.000	5.248		

Tank Capacities for WB2.P containing WATER BALLAST (1.000)

Trim: aft 1.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	2.46	2.46	8.033f	5.281p	0.911	0.91	9.33
10.00%	4.91	4.91	8.374f	5.336p	1.148	1.41	17.94
20.00%	9.83	9.83	8.714f	5.394p	1.514	1.94	25.68
30.00%	14.75	14.75	8.888f	5.439p	1.824	2.46	30.32
40.00%	19.66	19.66	8.997f	5.524p	2.115	0.99	22.10
50.00%	24.58	24.58	9.065f	5.614p	2.422	1.25	25.33
60.00%	29.49	29.49	9.127f	5.683p	2.729	1.46	27.40
70.00%	34.41	34.41	9.181f	5.737p	3.029	1.62	28.73
80.00%	39.32	39.32	9.226f	5.780p	3.323	1.73	29.60
90.00%	44.24	44.24	9.265f	5.815p	3.611	1.79	30.12
95.00%	46.70	46.70	9.282f	5.830p	3.753	1.81	30.27
98.00%	48.17	48.17	9.292f	5.838p	3.837	1.82	30.34
100.00%	49.16	49.16	9.314f	5.843p	3.893		

Tank Capacities for WB2.S containing WATER BALLAST (1.000)

Trim: aft 1.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	2.46	2.46	8.033f	5.281s	0.911	0.91	9.33
10.00%	4.91	4.91	8.374f	5.336s	1.148	1.41	17.94
20.00%	9.83	9.83	8.714f	5.394s	1.514	1.94	25.68
30.00%	14.75	14.75	8.888f	5.439s	1.824	2.46	30.32
40.00%	19.66	19.66	8.997f	5.524s	2.115	0.99	22.10
50.00%	24.58	24.58	9.065f	5.614s	2.422	1.25	25.33
60.00%	29.49	29.49	9.127f	5.683s	2.729	1.46	27.40
70.00%	34.41	34.41	9.181f	5.737s	3.029	1.62	28.73
80.00%	39.32	39.32	9.226f	5.780s	3.323	1.73	29.60
90.00%	44.24	44.24	9.265f	5.815s	3.611	1.79	30.12
95.00%	46.70	46.70	9.282f	5.830s	3.753	1.81	30.27
98.00%	48.17	48.17	9.292f	5.838s	3.837	1.82	30.34
100.00%	49.16	49.16	9.314f	5.843s	3.893		

Tank Capacities for WB3.P containing WATER BALLAST (1.000)

Trim: aft 1.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	2.09	2.09	3.006f	1.751p	0.105	38.51	66.79
10.00%	4.19	4.19	3.139f	2.128p	0.152	66.11	84.61
20.00%	8.37	8.37	3.252f	2.501p	0.229	86.30	94.90
30.00%	12.56	12.56	3.327f	2.681p	0.296	94.00	100.49
40.00%	16.75	16.75	3.376f	2.785p	0.361	96.43	102.84
50.00%	20.93	20.93	3.409f	2.850p	0.424	96.61	103.03
60.00%	25.12	25.12	3.430f	2.893p	0.487	96.61	103.03
70.00%	29.31	29.31	3.446f	2.924p	0.549	96.61	103.03
80.00%	33.50	33.50	3.457f	2.947p	0.611	96.61	103.03
90.00%	37.68	37.68	3.466f	2.965p	0.672	96.61	103.03
95.00%	39.78	39.78	3.473f	2.972p	0.703	88.73	69.17
98.00%	41.03	41.03	3.498f	2.972p	0.721	57.71	18.41
100.00%	41.87	41.87	3.536f	2.972p	0.733		

Tank Capacities for WB3.S containing WATER BALLAST (1.000)

Trim: aft 1.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	2.09	2.09	3.006f	1.751s	0.105	38.51	66.79
10.00%	4.19	4.19	3.139f	2.128s	0.152	66.11	84.61
20.00%	8.37	8.37	3.252f	2.501s	0.229	86.30	94.90
30.00%	12.56	12.56	3.327f	2.681s	0.296	94.00	100.49
40.00%	16.75	16.75	3.376f	2.785s	0.361	96.43	102.84
50.00%	20.93	20.93	3.409f	2.850s	0.424	96.61	103.03
60.00%	25.12	25.12	3.430f	2.893s	0.487	96.61	103.03
70.00%	29.31	29.31	3.446f	2.924s	0.549	96.61	103.03
80.00%	33.50	33.50	3.457f	2.947s	0.611	96.61	103.03
90.00%	37.68	37.68	3.466f	2.965s	0.672	96.61	103.03
95.00%	39.78	39.78	3.473f	2.972s	0.703	88.73	69.17
98.00%	41.03	41.03	3.498f	2.972s	0.721	57.71	18.41
100.00%	41.87	41.87	3.536f	2.972s	0.733		

Tank Capacities for WB4.P containing WATER BALLAST (1.000)

Trim: aft 1.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	1.80	1.80	8.622a	6.390p	0.573	0.42	18.76
10.00%	3.60	3.60	8.878a	6.399p	0.743	0.42	18.76
20.00%	7.20	7.20	9.005a	6.403p	1.062	0.42	18.76
30.00%	10.80	10.80	9.048a	6.405p	1.378	0.42	18.76
40.00%	14.40	14.40	9.069a	6.405p	1.692	0.42	18.76
50.00%	18.00	18.00	9.082a	6.406p	2.005	0.42	18.76
60.00%	21.60	21.60	9.091a	6.406p	2.318	0.42	18.76
70.00%	25.20	25.20	9.097a	6.406p	2.632	0.42	18.76
80.00%	28.80	28.80	9.102a	6.406p	2.945	0.42	18.76
90.00%	32.40	32.40	9.105a	6.406p	3.258	0.42	18.76
95.00%	34.20	34.20	9.107a	6.407p	3.414	0.42	18.76
98.00%	35.28	35.28	9.108a	6.407p	3.508	0.42	18.75
100.00%	36.00	36.00	9.095a	6.407p	3.570		

Tank Capacities for WB4.S containing WATER BALLAST (1.000)

Trim: aft 1.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	1.80	1.80	8.622a	6.390s	0.573	0.42	18.76
10.00%	3.60	3.60	8.878a	6.399s	0.743	0.42	18.76
20.00%	7.20	7.20	9.005a	6.403s	1.062	0.42	18.76
30.00%	10.80	10.80	9.048a	6.405s	1.378	0.42	18.76
40.00%	14.40	14.40	9.069a	6.405s	1.692	0.42	18.76
50.00%	18.00	18.00	9.082a	6.406s	2.005	0.42	18.76
60.00%	21.60	21.60	9.091a	6.406s	2.318	0.42	18.76
70.00%	25.20	25.20	9.097a	6.406s	2.632	0.42	18.76
80.00%	28.80	28.80	9.102a	6.406s	2.945	0.42	18.76
90.00%	32.40	32.40	9.105a	6.406s	3.258	0.42	18.76
95.00%	34.20	34.20	9.107a	6.407s	3.414	0.42	18.76
98.00%	35.28	35.28	9.108a	6.407s	3.508	0.42	18.75
100.00%	36.00	36.00	9.095a	6.407s	3.570		

Tank Capacities for WB5.P containing WATER BALLAST (1.000)

Trim: aft 1.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	2.03	2.03	13.956a	6.381p	1.325	0.32	8.72
10.00%	4.06	4.06	14.530a	6.389p	1.588	0.43	20.42
20.00%	8.13	8.13	15.290a	6.394p	1.978	0.57	48.53
30.00%	12.19	12.19	15.735a	6.398p	2.291	0.59	51.44
40.00%	16.26	16.26	15.960a	6.401p	2.573	0.59	51.45
50.00%	20.32	20.32	16.095a	6.402p	2.844	0.59	51.45
60.00%	24.39	24.39	16.185a	6.403p	3.108	0.59	51.45
70.00%	28.45	28.45	16.249a	6.404p	3.369	0.59	51.45
80.00%	32.52	32.52	16.298a	6.404p	3.628	0.59	51.46
90.00%	36.58	36.58	16.335a	6.404p	3.885	0.59	51.46
95.00%	38.61	38.61	16.351a	6.405p	4.013	0.59	51.46
98.00%	39.83	39.83	16.359a	6.405p	4.090	0.56	44.37
100.00%	40.65	40.65	16.333a	6.405p	4.141		

Tank Capacities for WB5.S containing WATER BALLAST (1.000)

Trim: aft 1.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	2.03	2.03	13.956a	6.381s	1.325	0.32	8.72
10.00%	4.06	4.06	14.530a	6.389s	1.588	0.43	20.42
20.00%	8.13	8.13	15.290a	6.394s	1.978	0.57	48.53
30.00%	12.19	12.19	15.735a	6.398s	2.291	0.59	51.44
40.00%	16.26	16.26	15.960a	6.401s	2.573	0.59	51.45
50.00%	20.32	20.32	16.095a	6.402s	2.844	0.59	51.45
60.00%	24.39	24.39	16.185a	6.403s	3.108	0.59	51.45
70.00%	28.45	28.45	16.249a	6.404s	3.369	0.59	51.45
80.00%	32.52	32.52	16.298a	6.404s	3.628	0.59	51.46
90.00%	36.58	36.58	16.335a	6.404s	3.885	0.59	51.46
95.00%	38.61	38.61	16.351a	6.405s	4.013	0.59	51.46
98.00%	39.83	39.83	16.359a	6.405s	4.090	0.56	44.37
100.00%	40.65	40.65	16.333a	6.405s	4.141		

Tank Capacities for WB6.S containing WATER BALLAST (1.000)

Trim: aft 1.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	3.24	3.24	22.026a	4.638s	3.022	6.52	7.23
10.00%	6.47	6.47	22.368a	4.803s	3.251	10.57	16.95
20.00%	12.95	12.95	22.846a	4.916s	3.564	14.58	43.28
30.00%	19.42	19.42	23.185a	4.973s	3.804	16.57	60.01
40.00%	25.90	25.90	23.403a	5.017s	4.009	17.45	63.79
50.00%	32.37	32.37	23.539a	5.047s	4.198	17.95	64.72
60.00%	38.85	38.85	23.632a	5.069s	4.377	18.37	65.57
70.00%	45.32	45.32	23.701a	5.087s	4.551	18.76	66.37
80.00%	51.80	51.80	23.755a	5.102s	4.721	19.00	66.81
90.00%	58.27	58.27	23.797a	5.113s	4.888	19.01	66.82
95.00%	61.51	61.51	23.815a	5.118s	4.971	19.01	66.82
98.00%	63.45	63.45	23.824a	5.121s	5.021	16.95	47.22
100.00%	64.75	64.75	23.805a	5.123s	5.053		

Tank Capacities for WB6.P containing WATER BALLAST (1.000)

Trim: aft 1.500/58.920, No Heel

Load (%)	Volume (m3)	Weight (MT)	Lcg (m)	Tcg (m)	Vcg (m)	FSMt (MT-m)	FSMI (MT-m)
0.00%	0.00	0.00					
5.00%	3.24	3.24	22.026a	4.638p	3.022	6.52	7.23
10.00%	6.47	6.47	22.368a	4.803p	3.251	10.57	16.95
20.00%	12.95	12.95	22.846a	4.916p	3.564	14.58	43.28
30.00%	19.42	19.42	23.185a	4.973p	3.804	16.57	60.01
40.00%	25.90	25.90	23.403a	5.017p	4.009	17.45	63.79
50.00%	32.37	32.37	23.539a	5.047p	4.198	17.95	64.72
60.00%	38.85	38.85	23.632a	5.069p	4.377	18.37	65.57
70.00%	45.32	45.32	23.701a	5.087p	4.551	18.76	66.37
80.00%	51.80	51.80	23.755a	5.102p	4.721	19.00	66.81
90.00%	58.27	58.27	23.797a	5.113p	4.888	19.01	66.82
95.00%	61.51	61.51	23.815a	5.118p	4.971	19.01	66.82
98.00%	63.45	63.45	23.824a	5.121p	5.021	16.95	47.22
100.00%	64.75	64.75	23.805a	5.123p	5.053		

**SAMPLE HAND CALCULATION &
BLANK HAND CALCULATION SHEETS**
[SECTION 10.0]

METHOD OF STABILITY HAND CALCULATION

This book contains data and information for use by the vessel's master to determine the method of loading and compliance with the Transport Canada Marine Safety minimum criteria. Several standard conditions are presented in this book, however for other conditions the master may wish to calculate the trim and stability characteristics of the vessel in a specific condition of loading using the included data and information.

To manually calculate conditions of loading, please use the sample calculation on the following pages as a guide in conjunction with the blank calculation sheets supplied in this book.

It should be noted by the user of this book that the loading conditions presented have been calculated using a computerized stability simulation program, therefore calculations completed manually, in the traditional fashion may differ slightly from the computer generated condition presented in this book; primarily with respect to trim, position of LCB and LCF.

SAMPLE CALCULATIONS

To determine the Stability Characteristics of this vessel for conditions other than those included in this book:

1. Determine the weights and centers of all loads. Vertical centers are above baseline, and longitudinal centers are from amidships.
2. Sum the weights and the products of the weights by their centers. The results of dividing the sum of the moments by total weight will give the VCG or LCG of the loading condition.
3. Determine the total free surface moment from the Capacity Tables in the Stability Book. Divide this total by the displacement. This figure is known as the Virtual rise in KG or "Free Surface Effect" and must be added to the VCG calculated in Step 2, to give the correct KG of KGF for stability purposes.
4. To determine righting areas under curves, etc., it will be necessary to use the "Cross Curves of Stability" for the correct trim.

SAMPLE LOADING SHEET 1

VESSEL	CCGS "SAMUEL RISLEY"					
CONDITION	CONDITION 9 OPEN WATER WITH DECK CARGO MID TRIP, 50% CONSUMABLES					
COLUMN	A	B	C=A x B	D	E=A x D	F
ITEM	WEIGHT (MT)	LCG (m)	LMMT (MT-m)	VCG (m)	VMMT (MT-m)	FS (MT-m)
LIGHTSHIP	2172.25	-0.406	-881.934	5.858	12725.041	~
BUOYTERDER BARGE	8.75	1.490	13.038	10.200	89.250	~
CREW & EFFECTS	5.00	14.000	70.000	11.000	55.000	~
DECK EQUIPMENT	5.00	-18.600	-93.000	7.570	37.850	~
DECK LOAD	350.00	-18.000	-6300.000	7.700	2695.000	~
ER STORES	2.00	7.650	15.300	4.000	8.000	~
MISC. LUBE OIL / DIRTY OIL	6.00	-8.490	-50.940	4.230	25.380	~
STORES & PROVISIONS	5.00	19.000	95.000	8.000	40.000	~
TRIMMING WEIGHT	8.17	-29.060	-237.420	7.200	58.824	~
ZODIAC WORK BOAT	0.92	-3.510	-3.229	10.200	9.384	~
FO1.C	165.01	10.580	1745.806	1.487	245.370	0.0
FO3.C	7.81	-16.836	-131.489	0.381	2.976	7.2
FO4.P	56.64	-23.879	-1352.507	4.717	267.171	0.0
FO4.S	56.64	-23.879	-1352.507	4.717	267.171	0.0
FODAY.P	29.63	13.990	414.524	4.610	136.594	12.4
FOSET.S	29.63	13.990	414.5237	4.610	136.5943	12.4
FW.P	16.80	3.205	53.844	2.126	35.717	0.4
SAN.S	16.80	3.205	53.844	2.126	35.717	0.4
WB4.P	18.00	-9.055	-162.990	2.005	36.090	0.4
WB4.S	18.00	-9.055	-162.990	2.005	36.090	0.4
TOTAL	2978.050	-2.637	-7853.126	5.689	16943.218	33.600

Positive - Forward of Amidships
 Negative - Aft of Amidships

INSTRUCTIONS FOR SAMPLE HAND CALCULATION

The following steps correspond to the numbered rows as shown on the following Sample Hand Calculation Sheet, and the lettered columns shown on the previous Sample Loading Sheet.

1) Obtained from Principal Particulars in Stability Book.

2) Values taken from draft mark sketch.

3) Displacement = Total of Column A = **2978.05 MT**

$$4) \text{ Ship VCG} = \frac{\text{Total of Column E}}{\text{Total of Column A}} = \frac{16943.218}{2978.05} = \mathbf{5.689 \text{ m}}$$

$$5) \text{ Ship LCG} = \frac{\text{Total of Column C}}{\text{Total of Column A}} = \frac{-7853.126}{2978.05} = \mathbf{-2.637 \text{ m (aft)}}$$

$$6) \text{ Free Surface Correction (FSC)} = \frac{\text{Total of Column F}}{\text{Total of Column A}} = \frac{33.60}{2978.05} = \mathbf{0.011 \text{ m}}$$

7) For numbered rows 8-11:

Enter the Hydrostatic Tables, which are included in this book in **Section 7.0**. Values are to be obtained from the table corresponding to **zero** trim. Values are to be calculated by means of linear interpolation, at a displacement of **2978.05 MT**.

8) Mean draft (at origin) = **5.485 m**

9) Longitudinal Center of Floatation (LCF) = **-4.057 m (aft)**

10) Longitudinal Center of Buoyancy (LCB) = **-2.677m (aft)**

11) Moment to Change Trim by 1cm (MTcm) = **34.926 MT-m/cm**

These values are now used to calculate the following:

$$12) \text{ TRIM} = \frac{(\text{LCG} - \text{LCB}) \times \text{DISP.}}{\text{MTcm} \times 100} = \frac{(-2.637 - (-2.677)) \times 2978.05}{34.926 \times 100} = \mathbf{0.034m \text{ (fwd)}}$$

$$13) \text{ Draft FP} = \text{Mean Draft} + (\text{LFP} - \text{LCF}) \times (\text{Trim} / \text{LBP}) \\ = 5.485 + [29.46 - (-4.057)] \times (0.034 / 58.92) \\ = \mathbf{5.504 \text{ m}} \text{ (to hydrostatic baseline)}$$

*LFP – dist from amidships to fwd perpendicular (see draft marks sketch)

$$14) \text{ Draft AFT Marks} = \text{Draft FWD} - \text{Trim} \\ = 5.504 - 0.034 \\ = \mathbf{5.470m}$$

15) The remaining steps of this sample calculation assume trim calculated from Item 12. In this example the trim is **0.034m fwd**, therefore the following values are obtained from the **zero trim Hydrostatic Data Table**, as they are the closest in value to our calculated trim:

16) Enter the Hydrostatic Data Table corresponding to **zero trim** and interpolate the **KMT** value based on the calculated displacement of **2978.05 MT = 6.800 m**

17) VCG (KG) (Item 4) + Free Surface Correction (Item 6) = 5.689 + 0.011 = **5.700 m**

18) GM fluid = KMT (Item 16) – KG fluid (Item 17) = 6.800 – 5.700 = **1.100 m**

19) KG SIN Angle = KG fluid (Item 17) x SINE of the applicable Angle.

(SIN 0° = 0.000 SIN 10° = 0.174 SIN 20° = 0.342 SIN 30° = 0.500 SIN 40° = 0.643)

20) To obtain righting levers, enter the Cross Curves of Stability Tables. In this example our trim is **0.034m fwd**, therefore closest values are obtained from the **zero trim Cross Curves of Stability Tables**. Interpolate the value at each of the desired angles based on the calculated displacement of **2978.05 MT**.

21) (Item 20 – Item 19) = GZ m

22-26) Take value from Item 21 at the appropriate angle and use Simpson's rule to calculate the area under the curve.

27) Sum of angles 0-30 = (0.00 x 1) + (0.193 x 3) + (0.301 x 3) + (0.359 x 1) = 1.841

Sum of angles 0-30 x (0.0654) = 1.842 x 0.0654 = **0.120 m-Rad**

28) Sum of angles 0-40 = (0.0 x 1) + (0.193 x 4) + (0.301 x 2) + (0.359 x 4) + (0.395 x 1) = 3.206

Sum of angles 0-40 x (0.0582) 3.206 x 0.0582 = **0.187 m-Rad**

29) (Item 28 – Item 27) = Area 30-40 = 0.187 - 0.120 = **0.067 m-Rad**

30) See Item 18

31) On the Righting Arm vs. Heel Graph, read the value of GZ at 30° = **approx. 0.360 m**

32) Angle on the graph at which Maximum GZ occurs (high point on the graph). = **> 40°**

SAMPLE LOADING SHEET 2

VESSEL **CCGS "SAMUEL RISLEY"**

CONDITION 9

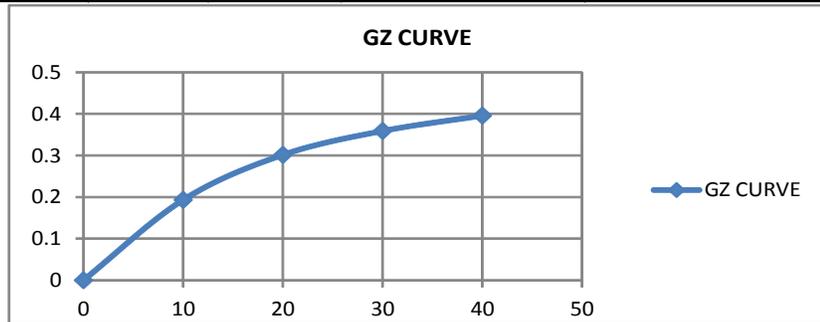
**CONDITION OPEN WATER WITH DECK CARGO
MID TRIP, 50% CONSUMABLES**

1	LBP	58.92 m
2	LENGTH TO MARKS FWD	27.46 m
2a	LENGTH TO MARKS AFT	29.46 m
3	DISPLACEMENT	2978.05 MT
4	VCG	5.689 m (ABOVE BASE)
5	LCG	-2.637 m
6	FS CORRECTION	0.011 m
7 FROM HYDROSTATICS AT NO TRIM		
8	MEAN DRAFT (BASE)	5.485 m
9	LCF	-4.057 m (AFT IS -VE)
10	LCB	-2.677 m (AFT IS -VE)
11	MTcm	34.926 MT-m/cm
12	TOTAL TRIM	0.034 m (AFT IS -VE)
13	DRAFT FP (BASE)	5.504 m
14	DRAFT AP (BASE)	5.470 m
15 FROM HYDROSTATICS AT GIVEN TRIM		
16	KMT	6.800 m (ABOVE BASE)
17	KG (FLUID)	5.700 m (ABOVE BASE)
18	GM (FLUID)	1.100 m

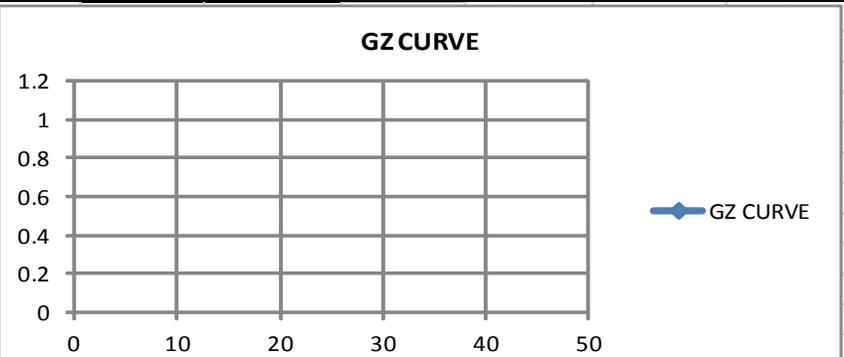
	HEEL ANGLE (θ)		0	10	20	30	40
	SINE OF ANGLE (SIN θ)		0	0.174	0.342	0.5	0.643
19	KG SINE ANGLE (=KG X SIN θ)		0	0.992	1.949	2.850	3.665
20	KN (FROM CROSS CURVES)		0	1.185	2.251	3.209	4.061
21	GZ (=KN - KG X SIN θ)		0	0.193	0.302	0.359	0.396

ANGLES	GZ	X	MULT	= PROD	GZ	X	MULT	= PROD
22	0 DEGREES	0	1	0	0	1	0	0
23	10 DEGREES	0.193	3	0.580	0.193	4	0.773	
24	20 DEGREES	0.302	3	0.905	0.302	2	0.603	
25	30 DEGREES	0.359	1	0.359	0.359	4	1.436	
26	40 DEGREES	0.396			0.396	1	0.396	
				SUM (0-30)			SUM(0-40)	
				1.843			3.208	

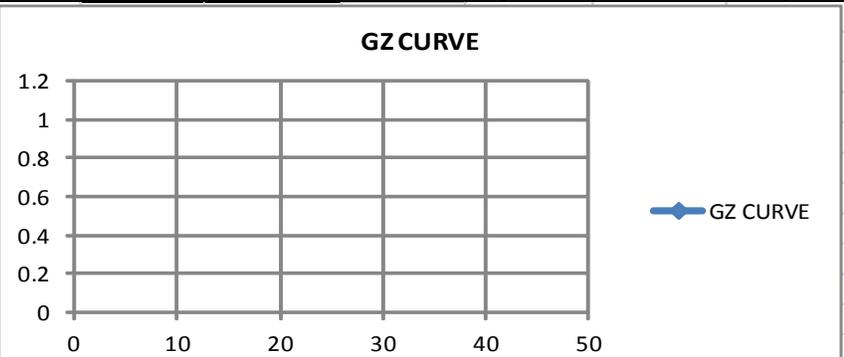
	SUM	X	MULTIPLIER	= PROD	
27	AREA 0-30	1.843	0.065	0.120 m-rad	Min. value 0.055 m-rad
28	AREA 0-40	3.208	0.058	0.187 m-rad	Min. value 0.090 m-rad
29	AREA 30-40			0.067 m-rad	Min. value 0.030 m-rad
30	GM FLUID			1.10 m	Min. value 0.15m
31	GZ AT 30			0.36 m	Min. value 0.20m
32	ANGLE OF MAX GZ			>40 deg.	Min. value 25 deg.



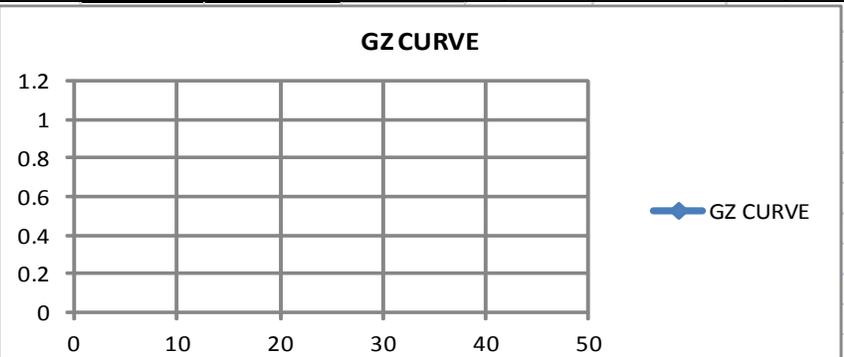
VESSEL															
CONDITION															
1	LBM		m												
2	LENGTH TO MARKS FWD		m												
2a	LENGTH TO MARKS AFT		m												
3	DISPLACEMENT		MT												
4	VCG		m (ABOVE BASE)												
5	LCG		m												
6	FS CORRECTION		m												
7	FROM HYDROSTATICS AT NO TRIM														
8	MEAN DRAFT (BASE)		m												
9	LCF		m (AFT IS +VE)												
10	LCB		m (AFT IS +VE)												
11	MTcm		MT-m/cm												
12	TOTAL TRIM		m												
13	DRAFT FWD (USK)		m												
14	DRAFT AFT (USK)		m												
15	FROM HYDROSTATICS AT GIVEN TRIM														
16	KMT		m (ABOVE BASE)												
17	KG (FLUID)		m (ABOVE BASE)												
18	GM (FLUID)		m												
	HEEL ANGLE (θ)		0	10	20	30	40								
	SINE OF ANGLE (SIN θ)		0	0.174	0.342	0.5	0.643								
19	KG SINE ANGLE (= KG X SIN θ)														
20	KN (FROM CROSS CURVES)														
21	GZ (= KN - KG X SINθ)														
	ANGLES		GZ	X	MULT	=	PROD				GZ	X	MULT	=	PROD
22	0 DEGREES				1								1		
23	10 DEGREES				3								4		
24	20 DEGREES				3								2		
25	30 DEGREES				1								4		
26	40 DEGREES												1		
					SUM (0-30)								SUM(0-40)		
			SUM	X	MULTIPLIER		=	PROD							
27	AREA 0-30				0.065			m-rad							Min. value 0.055 m-rad
28	AREA 0-40				0.058			m-rad							Min. value 0.090 m-rad
29	AREA 30-40							m-rad							Min. value 0.030 m-rad
30	GM FLUID							m							Min. value 0.15m
31	GZ AT 30							m							Min. value 0.20m
32	ANGLE OF MAX GZ							deg.							Min. value 25 deg.



VESSEL															
CONDITION															
1	LBM		m												
2	LENGTH TO MARKS FWD		m												
2a	LENGTH TO MARKS AFT		m												
3	DISPLACEMENT		MT												
4	VCG		m (ABOVE BASE)												
5	LCG		m												
6	FS CORRECTION		m												
7	FROM HYDROSTATICS AT NO TRIM														
8	MEAN DRAFT (BASE)		m												
9	LCF		m (AFT IS +VE)												
10	LCB		m (AFT IS +VE)												
11	MTcm		MT-m/cm												
12	TOTAL TRIM		m												
13	DRAFT FWD (USK)		m												
14	DRAFT AFT (USK)		m												
15	FROM HYDROSTATICS AT GIVEN TRIM														
16	KMT		m (ABOVE BASE)												
17	KG (FLUID)		m (ABOVE BASE)												
18	GM (FLUID)		m												
	HEEL ANGLE (θ)		0	10	20	30	40								
	SINE OF ANGLE (SIN θ)		0	0.174	0.342	0.5	0.643								
19	KG SINE ANGLE (= KG X SIN θ)														
20	KN (FROM CROSS CURVES)														
21	GZ (= KN - KG X SINθ)														
	ANGLES		GZ	X	MULT	=	PROD				GZ	X	MULT	=	PROD
22	0 DEGREES				1								1		
23	10 DEGREES				3								4		
24	20 DEGREES				3								2		
25	30 DEGREES				1								4		
26	40 DEGREES												1		
					SUM (0-30)								SUM(0-40)		
			SUM	X	MULTIPLIER	=	PROD								
27	AREA 0-30				0.065			m-rad							Min. value 0.055 m-rad
28	AREA 0-40				0.058			m-rad							Min. value 0.090 m-rad
29	AREA 30-40							m-rad							Min. value 0.030 m-rad
30	GM FLUID							m							Min. value 0.15m
31	GZ AT 30							m							Min. value 0.20m
32	ANGLE OF MAX GZ							deg.							Min. value 25 deg.



VESSEL															
CONDITION															
1	LBM		m												
2	LENGTH TO MARKS FWD		m												
2a	LENGTH TO MARKS AFT		m												
3	DISPLACEMENT		MT												
4	VCG		m (ABOVE BASE)												
5	LCG		m												
6	FS CORRECTION		m												
7	FROM HYDROSTATICS AT NO TRIM														
8	MEAN DRAFT (BASE)		m												
9	LCF		m (AFT IS +VE)												
10	LCB		m (AFT IS +VE)												
11	MTcm		MT-m/cm												
12	TOTAL TRIM		m												
13	DRAFT FWD (USK)		m												
14	DRAFT AFT (USK)		m												
15	FROM HYDROSTATICS AT GIVEN TRIM														
16	KMT		m (ABOVE BASE)												
17	KG (FLUID)		m (ABOVE BASE)												
18	GM (FLUID)		m												
	HEEL ANGLE (θ)		0	10	20	30	40								
	SINE OF ANGLE (SIN θ)		0	0.174	0.342	0.5	0.643								
19	KG SINE ANGLE (= KG X SIN θ)														
20	KN (FROM CROSS CURVES)														
21	GZ (= KN - KG X SINθ)														
	ANGLES		GZ	X	MULT	=	PROD				GZ	X	MULT	=	PROD
22	0 DEGREES				1								1		
23	10 DEGREES				3								4		
24	20 DEGREES				3								2		
25	30 DEGREES				1								4		
26	40 DEGREES												1		
					SUM (0-30)								SUM(0-40)		
			SUM	X	MULTIPLIER	=	PROD								
27	AREA 0-30				0.065			m-rad							Min. value 0.055 m-rad
28	AREA 0-40				0.058			m-rad							Min. value 0.090 m-rad
29	AREA 30-40							m-rad							Min. value 0.030 m-rad
30	GM FLUID							m							Min. value 0.15m
31	GZ AT 30							m							Min. value 0.20m
32	ANGLE OF MAX GZ							deg.							Min. value 25 deg.



VESSEL															
CONDITION															
1	LBM		m												
2	LENGTH TO MARKS FWD		m												
2a	LENGTH TO MARKS AFT		m												
3	DISPLACEMENT		MT												
4	VCG		m (ABOVE BASE)												
5	LCG		m												
6	FS CORRECTION		m												
7	FROM HYDROSTATICS AT NO TRIM														
8	MEAN DRAFT (BASE)		m												
9	LCF		m (AFT IS +VE)												
10	LCB		m (AFT IS +VE)												
11	MTcm		MT-m/cm												
12	TOTAL TRIM		m												
13	DRAFT FWD (USK)		m												
14	DRAFT AFT (USK)		m												
15	FROM HYDROSTATICS AT GIVEN TRIM														
16	KMT		m (ABOVE BASE)												
17	KG (FLUID)		m (ABOVE BASE)												
18	GM (FLUID)		m												
	HEEL ANGLE (θ)		0	10	20	30	40								
	SINE OF ANGLE (SIN θ)		0	0.174	0.342	0.5	0.643								
19	KG SINE ANGLE (= KG X SIN θ)														
20	KN (FROM CROSS CURVES)														
21	GZ (= KN - KG X SINθ)														
	ANGLES		GZ	X	MULT	=	PROD				GZ	X	MULT	=	PROD
22	0 DEGREES				1								1		
23	10 DEGREES				3								4		
24	20 DEGREES				3								2		
25	30 DEGREES				1								4		
26	40 DEGREES												1		
					SUM (0-30)								SUM(0-40)		
			SUM	X	MULTIPLIER		=	PROD							
27	AREA 0-30				0.065			m-rad						Min. value 0.055 m-rad	
28	AREA 0-40				0.058			m-rad						Min. value 0.090 m-rad	
29	AREA 30-40							m-rad						Min. value 0.030 m-rad	
30	GM FLUID							m						Min. value 0.15m	
31	GZ AT 30							m						Min. value 0.20m	
32	ANGLE OF MAX GZ							deg.						Min. value 25 deg.	

