

Triton

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TNA – ONBOARD STABILITY PROGRAM DESCRIPTION

The TNA Onboard Stability Program was first developed in 1997, as a combination of an inhouse tool, and for installations onboard the Debeers Marine Mining Ships (ABS Class).

It has been further enhanced over the years, as listed in the Online Help / Program Versions section, with new Criteria added, new features added, and bugs fixed as they were discovered.

It is currently, and has been used to produce ALL the Triton Stability Books submitted to Class and Flag States for the last 9 years. As it was used by three different people within the office the exact number of stability books produced have never been tallied, but estimations would be in the region of 400 Intact Stability Books, all of which were either Class or Flag State approved. It is obviously only used to calculate and display the conditions of loading, with relation to compliance of the required Intact Stability Criteria. The rest of the book being produced by word processors, spreadsheets and other office tools.

It is also currently installed on some 32 shipboard installations, ranging from Drill Ships, Tugs, Offshore Supply Vessels, Research Ships. Many of the vessels being class ranging from ABS, BV, DNV and Lloyds, however to date no Type or Ship Specific Approval has been requested or undertaken. This being the first time it is officially being reviewed for Class Approval.

In June 2007 commencement of the development of the Longitudinal Strength Module's development took place, with 3 current Onboard Installations now including this module. This module by nature of its calculation requirements, now includes a Hull and Tank Definition (generated externally by GHS), whereas before the program only relied on pre-calculated tables of Hydrostatic and Cross Curve Data, along with the another associated Tank Tables, Fixed Weight data, Lightship Data etc etc.

The program still uses the pre-calculated hydrostatic and cross curve data for its buoyancy and stability calculations but uses the hull and tank definition for calculating the buoyancy distribution and tank distributions.

The program usage is largely self instructional, in that currently basically no training of its users has been required.

When running the program, you need to load the Ship Data, or select from a list in the case of an office copy. Then one typically opens an existing loading condition, or starts to load the vessel via the Tank or Fixed Weight interface, as shown on the following page. For every entry the hydrostatic data is automatically updated.

Load Editor - Tanks

WATER BALLAST

FRESH WATER

FUEL OIL

SUNDRY

DRILL WATER

HYDRAULIC OIL

LUBE OIL

BASE OIL

MUD

Tank Name	Max Vol	Max Snd'g	Sounding	% Fill	Mass	VCG	TCG	LCG	FSM
	Cub.m.	m	m		Tonne	m	m	m	t.m.
WB 1 FPEAK FR 176-FWD	214.210	13.200	0.000	0.0%	0.000	0.000	0.000	0.000	0.000
HEEL 6 PORT FR 136-145	115.983	3.751	0.641	10.0%	11.888	0.375	5.690	104.564	34.515
HEEL 7 STBD FR 136-145	115.983	3.751	3.454	90.0%	106.995	1.948	-6.574	104.760	130.124
WB 9 CNTR FR 95-127	247.114	1.321	0.000	0.0%	0.000	0.000	0.000	0.000	0.000
WB 12 PORT FR 127-136	269.007	6.151	0.000	0.0%	0.000	0.000	0.000	0.000	0.000
WB 13 STBD FR 127-136	269.007	6.151	0.000	0.0%	0.000	0.000	0.000	0.000	0.000
WB 14 PORT FR 105-127	121.014	1.400	1.400	100.0%	124.039	0.676	6.943	87.805	0.000
WB 15 STBD FR 105-127	121.014	1.400	1.400	100.0%	124.039	0.676	-6.943	87.805	0.000
WB 39 CNTR FR AFT-5	223.679	5.200	0.000	0.0%	0.000	0.000	0.000	0.000	0.000
WB 60 PORT FR 52-76	341.587	11.300	0.000	0.0%	0.000	0.000	0.000	0.000	0.000
WB 61 STBD FR 52-76	357.347	11.300	0.000	0.0%	0.000	0.000	0.000	0.000	0.000
	2994.519			19.0%	581.700	2.765	-5.949	82.146	178.600

Close

Load Editor - Fixed

GENERAL

RISER STORAGE(P)-AREA 2

RISER STORAGE(S)-AREA 1

RISER STORAGE C

Description	Default	% Loaded	Mass	VCG	TCG	LCG
	Mass		Tonne	m	m	m
FIRST TIER	122.500	50.0%	61.250	14.260	5.516	34.520
SECOND TIER	105.000	50.0%	52.500	15.317	5.516	34.520
THIRD TIER	122.500	50.0%	61.250	16.374	5.516	34.520
FOURTH TIER	105.000	50.0%	52.500	17.431	5.516	34.520
FIFTH TIER	122.500	50.0%	61.250	18.488	5.516	34.520
SIXTH TIER	105.000	50.0%	52.500	19.545	5.516	34.520
SEVENTH TIER	122.500	0.0%	0.000	20.602	5.516	34.520
			341.250	16.862	5.516	34.520

Add Group

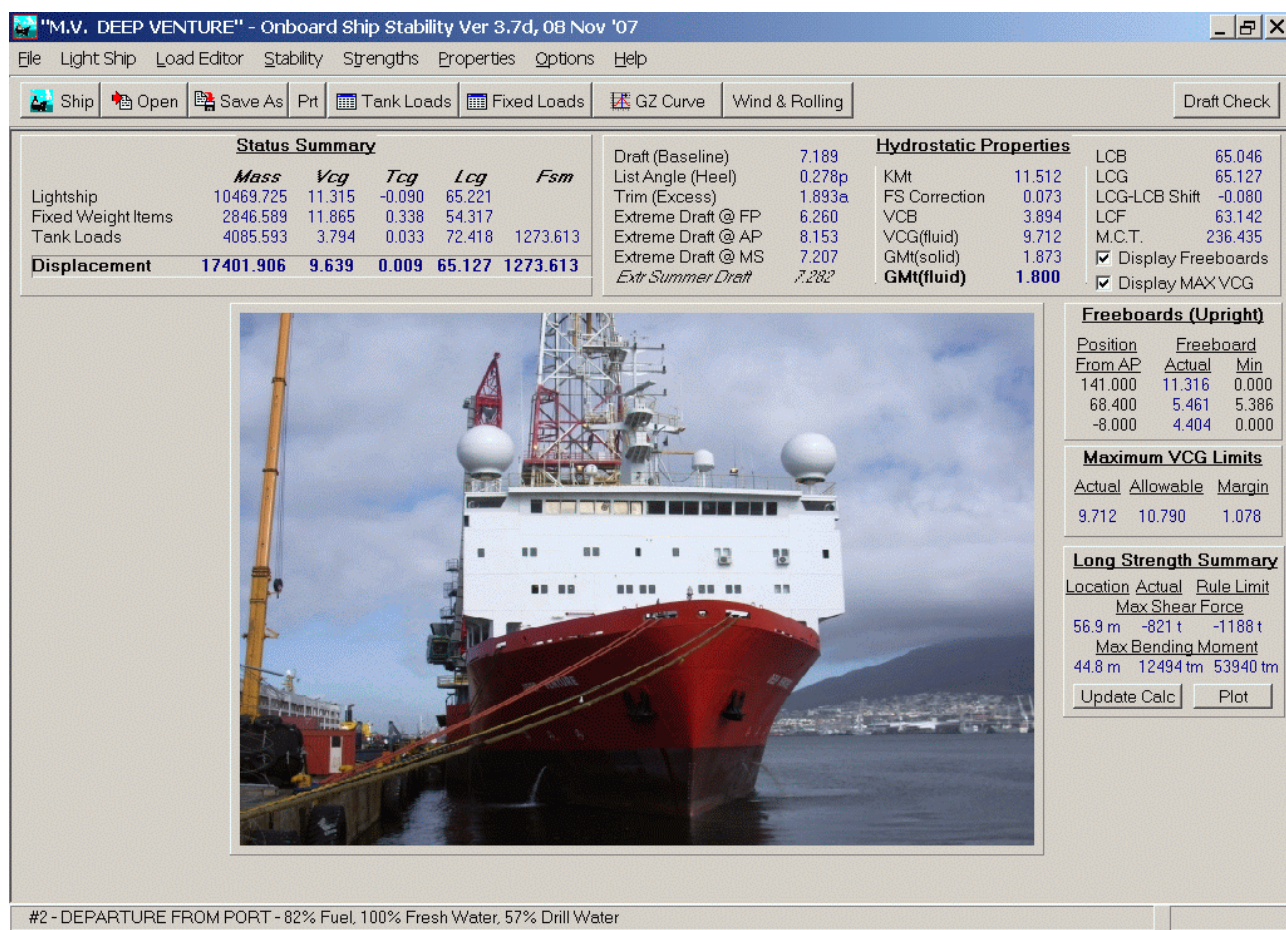
Remove Group

Close

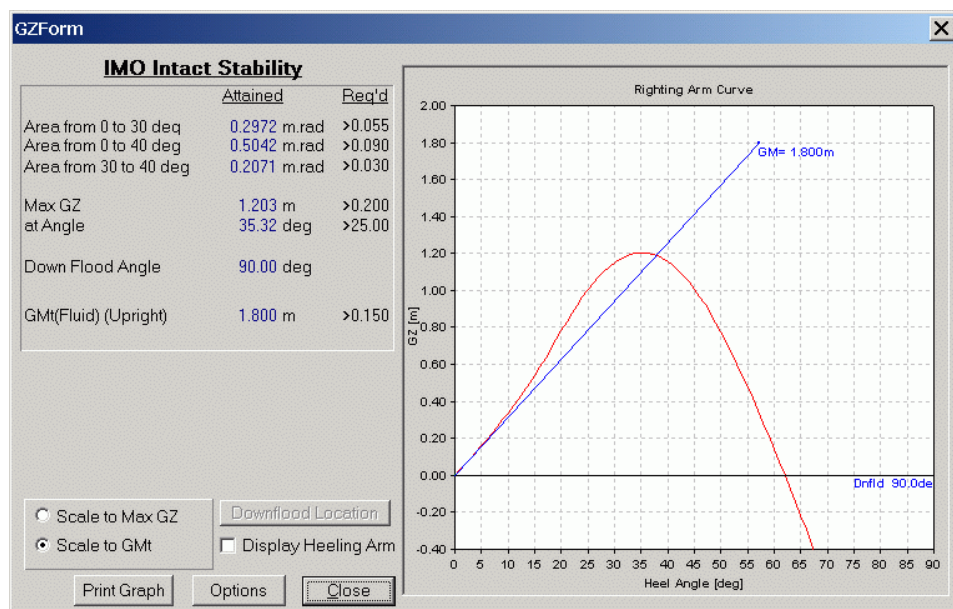
Add Item

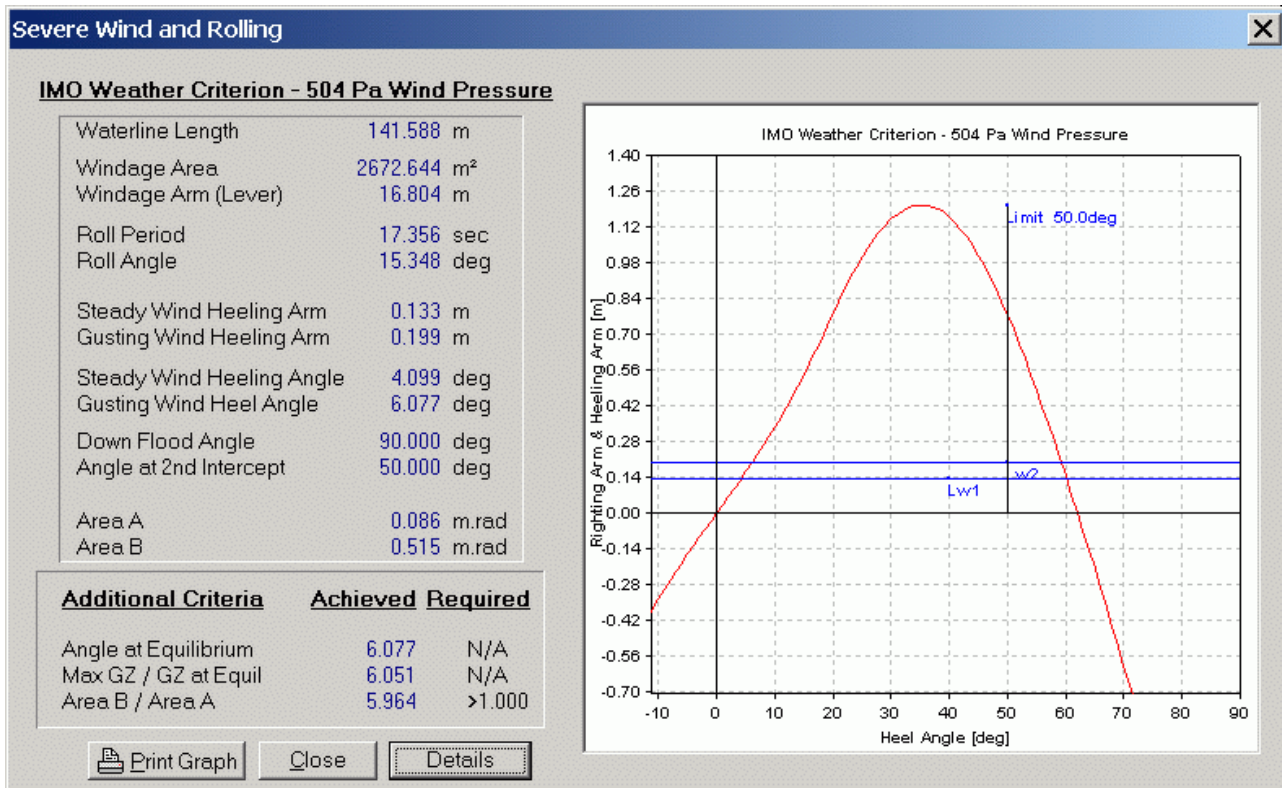
Remove Item

The onscreen **Hydrostatic Data** and basic interface as shown on the following screen, is updated with every entry, or change to loading. The Longitudinal Strength summaries are only updated when prompted by the user due to the delay time, the calculation takes. (It essentially recalculates the buoyancy distribution and all the tank distributions for every entry, thus is user invoked, however if the data is out of date, it is grey'd out so as to prompt the user to update it.



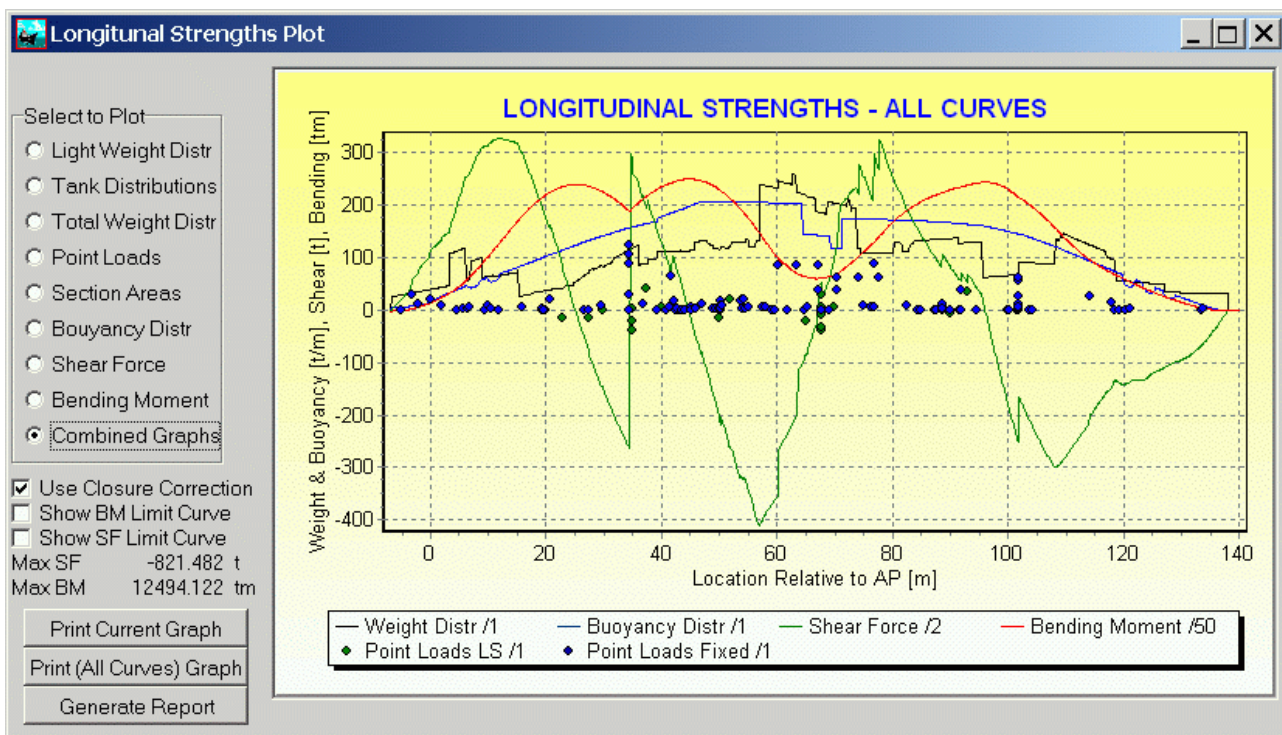
Other typical graphical , outputs include **GZ Graph**, **Wind** and **Rolling Curves** as follows:





Longitudinal Strength (fully described in the online help)

Longitudinal Strength Graphic displays, of which there are many options as listed on the left side.



MAXVCG

The program uses MAXVCG data (also pre-calculated externally) for evaluation of compliance, if MaxVcg data is supplied, else the user is required to use the GZ Curve, and other Wind Criteria Curves for evaluation of compliance.

Stability Criteria

Various Intact and Wind related criteria are available to the user, as listed under the Options Menu, as shown below.

The screenshot displays two side-by-side dialog boxes from a software application. The left dialog, titled 'Intact Stability Options', contains a section 'Intact Stability Criteria' with a 'Select Criteria' group box. It lists seven radio button options: 'IMO Intact Stability - IMO Res A.749(18) Ch 3.1' (selected), 'IMO Intact Stability - Res A.749(18) Ch 4.5.6.2', 'Always Include Both Intact and Supply Vessel Criteria', 'Only Include Supply Vessel when Angle < 25', 'Multihull Craft Stability Criteria - IMO Res MSC.36(63)', and 'ABS Barge Stability (Pontoons with Deck Cargo)'. At the bottom are 'OK' and 'Save as Default' buttons. The right dialog, titled 'Wind Options', contains a section 'SPECIFY WIND AND ROLLING CRITERIA' with a 'Select Applicable Criteria' group box. It lists six radio button options: 'IMO A.749(18) Severe Wind and Rolling (Weather Criteria)', 'IMO A.749(18) MODU - User Defined Wind Speed' (selected), 'US Navy Wind and Waves - User Defined Wind Speed', 'IMO Multi Hull Criteria - User Defined Wind Speed', 'AUS Livestock Stability Criteria', and 'ABS Barge Criteria (Pontoons with Deck Cargo)'. Below this is a 'Specify Wind Speed' field set to '70' knots. At the bottom are 'OK' and 'Save As Default' buttons.

Other “operational” stability evaluation options include (where applicable, as described in the Online Help)

Passenger Crowding
High Speed Turning
Crane Heeling
Icing

Damage Stability

The program has a very limited “what-if” a compartment is flooded capability via the added-weight method, but it is not intended to be a fully fledged Damage Stability tool, and has no output options for Damage Stability.

Reporting

The hardcopy output options include a report which first summarizes the loading, with the associated Hydrostatic Properties, and Cross Curve Data, as shown on the following page, with subsequent pages in the report listing the tank contents, and fixed weight items. The GZ and Wind Criteria graphs are then optionally appended, as is output from the Longitudinal Strength module, which has its own Report Generating Options. Typically reports and associated graphs are printed to a PDF writer so as to append all the pages into one PDF document, as shown in the Test Loading Conditions, else they can be sent directly to a printer, in the correct sequence for reporting purposes.

Example of the Summary Page of a Loading Condition Output Report:

TNA - Ship Stability
Ver 3.7d, 08 Nov '07

13/11/2007 15:22

"M.V. DEEP VENTURE"

#2 - DEPARTURE FROM PORT - 82% Fuel, 100% Fresh Water, 57% Drill Water

SUMMARY OF LOADING

ITEM	MASS [t]	VCG [m]	TCG [m]	LCG [m]	FSM [tm]
WATER BALLAST	620.253	0.804	0.516	89.421	178.580
FRESH WATER	669.262	3.200	0.140	112.844	0.000
FUEL OIL	1643.008	6.456	-0.175	58.572	455.818
SUNDRY	106.910	0.818	0.068	44.505	535.874
DRILL WATER	967.354	1.396	-0.000	65.346	34.612
HYDRAULIC OIL	2.491	1.863	0.000	27.900	0.648
LUBE OIL	76.315	10.655	0.000	7.989	68.081
BASE OIL	0.000	0.000	0.000	0.000	0.000
MUD	0.000	0.000	0.000	0.000	0.000
GENERAL	40.000	12.750	0.000	115.500	
RISER STORAGE(P)-AREA 2	607.500	16.531	5.516	34.520	
RISER STORAGE(S)-AREA 1	520.000	16.557	-4.906	34.520	
RISER STORAGE CENTRE	17.500	20.810	0.000	42.120	
MAIN DECK STORAGE FWD	0.000	0.000	0.000	0.000	
MAIN DECK STORAGE AFT	40.000	14.025	-4.950	37.510	
PIPE HOLD No.1	177.000	7.850	0.991	101.820	
PIPE HOLD No.2	27.000	7.900	1.211	88.520	
PIPE HOLD No.3	24.000	2.500	-1.537	88.520	
DECK LOADS	56.000	17.448	5.223	44.204	
SACK STORE	73.400	10.466	-6.358	41.947	
CONSTANTS-INCLINE REPORT	145.239	11.790	0.681	31.529	
ROV GEAR	52.320	17.604	-7.639	48.975	
THIRD PARTY EQUIPMENT	10.050	16.940	9.706	65.757	
DRILLING LOADS	241.580	13.744	0.230	72.779	
MUD(1.6T/m ³ -13.349Lbs/US	0.000	0.000	0.000	0.000	
BARYTE(2.4T/m ³ -20.023Lbs	432.000	5.100	1.450	62.880	
BENTONITE(1.04T/m ³ -8.677	77.000	5.100	-7.250	68.820	
CEMENT(1.7T/m ³ -14.183Lbs	306.000	5.100	1.450	74.840	
LIGHTSHIP	10469.725	11.315	-0.090	65.221	
DISPLACEMENT	17401.906	9.639	0.009	65.127	1273.613

HYDROSTATIC PROPERTIES

Draft (Baseline)	7.189 m			VCGmax	10.790 m
List Angle [port]	0.278 deg			VCGMarg	1.078 m
Trim (Excess) [aft]	1.893 m	KMt	11.512 m	LCB	65.046 m
Extreme Draft @ FP	6.260 m	FsCorr	0.073 m	LCG	65.127 m
Extreme Draft @ AP	8.153 m	VCGf	9.712 m	LCG-LCB	-0.080 m
Extreme Draft @ MS	7.207 m	GMT	1.873 m	LCF	63.142 m
Extr Summer Draft	7.282 m	GMTf	1.800 m	M.C.T.	236.435 tm

	Actual	Required	Pass/Fail
Freeboard: (-8.000m from AP)	4.404 m	0.000	Pass
Freeboard: (68.400m from AP)	5.461 m	5.386	Pass
Freeboard: (141.000m from AP)	11.316 m	0.000	Pass

NOTE: The Freeboard calculation considers the vessel Upright

STATIC STABILITY DATA

Angle	KN	GZ
0.0	0.000	0.000
5.0	1.009	0.163
10.0	2.024	0.338
15.0	3.055	0.541

20.0	4.103	0.781
25.0	5.108	1.003
30.0	6.005	1.149
40.0	7.400	1.157
50.0	8.213	0.773
60.0	8.554	0.143
70.0	8.528	-0.599
80.0	8.196	-1.369
90.0	7.595	-2.118

IMO INTACT STABILITY CRITERIA

	Attained	Required	Pass/Fail
Area from 0 to 30 deg	0.297 m.rad	0.055	Pass
Area from 0 to 40 deg	0.504 m.rad	0.090	Pass
Area from 30 to 40 deg	0.207 m.rad	0.030	Pass
Max GZ	1.203 m	0.200	Pass
Angle at Maximum	35.32 deg	25.00	Pass
GMt (Fluid)	1.800 m	0.150	Pass
Downflood Angle	90.000 deg		

TANK LOADS

WATER BALLAST @ 1.025 t/Cub.m.

	Max Vol [Cub.m]	Fill [%]	Mass [t]	Vcg [m]	Tcg [m]	Lcg [m]	FSM [tm]	MAXFSM [tm]	Sndg [m]
WB 1 FPEAK FR 176-FWD	214.210	0.0%	0.000	0.000	0.000	0.000	0.00	215.61	0.00
HEEL 6 PORT FR 136-145	115.983	70.0%	83.218	1.605	6.447	104.744	111.71	136.80	2.84
HEEL 7 STBD FR 136-145	115.983	30.0%	35.665	0.841	-6.064	104.684	66.87	136.80	1.48
WB 9 CNTR FR 95-127	247.114	100.0%	253.292	0.660	0.000	83.820	0.00	1023.28	1.32
WB 12 PORT FR 127-136	269.007	0.0%	0.000	0.000	0.000	0.000	0.00	260.22	0.00
WB 13 STBD FR 127-136	269.007	0.0%	0.000	0.000	0.000	0.000	0.00	260.22	0.00
WB 14 PORT FR 105-127	121.014	100.0%	124.039	0.676	6.943	87.805	0.00	267.19	1.40
WB 15 STBD FR 105-127	121.014	100.0%	124.039	0.676	-6.943	87.805	0.00	267.19	1.40
WB 39 CNTR FR AFT-5	223.679	0.0%	0.000	0.000	0.000	0.000	0.00	1174.86	0.00
WB 60 PORT FR 52-76	341.587	0.0%	0.000	0.000	0.000	0.000	0.00	18.27	0.00
WB 61 STBD FR 52-76	357.347	0.0%	0.000	0.000	0.000	0.000	0.00	18.27	0.00
WB 62 PORT FR 76-91	299.287	0.0%	0.000	0.000	0.000	0.000	0.00	13.96	0.00
WB 63 STBD FR 76-91	299.287	0.0%	0.000	0.000	0.000	0.000	0.00	13.96	0.00
TOTAL WATER BALLAST	2994.519	20.2%	620.253	0.804	0.516	89.421	178.58		

FRESH WATER @ 1.000 t/Cub.m.

	Max Vol [Cub.m]	Fill [%]	Mass [t]	Vcg [m]	Tcg [m]	Lcg [m]	FSM [tm]	MAXFSM [tm]	Sndg [m]
FW 2 PORT FR 145-160	252.698	100.0%	252.698	3.026	4.985	112.628	0.00	229.68	6.20
FW 3 STBD FR 145-160	238.147	100.0%	238.147	2.949	-4.977	112.290	0.00	230.65	6.15
PW 4 PORT FR 146-160	92.428	100.0%	92.428	3.780	3.000	113.720	0.00	6.50	4.80
PW 5 STBD FR 147-160	85.989	100.0%	85.989	3.780	-3.000	114.070	0.00	6.05	4.74
TOTAL FRESH WATER	669.262	100.0%	669.262	3.200	0.140	112.844	0.00		

FUEL OIL @ 0.850 t/Cub.m.

	Max Vol [Cub.m]	Fill [%]	Mass [t]	Vcg [m]	Tcg [m]	Lcg [m]	FSM [tm]	MAXFSM [tm]	Sndg [m]
FO 10 PORT FR 127-145	66.696	0.0%	0.000	0.000	0.000	0.000	0.00	56.63	0.00
FO 11 STBD FR 127-145	66.696	0.0%	0.000	0.000	0.000	0.000	0.00	56.63	0.00
FO 16 PORT FR 105-127	372.997	98.0%	310.706	6.496	10.921	87.925	9.91	9.91	12.45
FO 17 STBD FR 105-127	375.047	98.0%	312.414	6.345	-10.902	87.901	9.24	10.10	12.41
DRAIN 22 PORT FR 54-62	44.877	98.0%	37.382	0.707	6.732	42.620	37.10	125.52	1.36
FO 24 PORT FR 62-76	84.782	98.0%	70.623	0.665	6.924	51.328	65.16	162.93	1.34
FO 25 STBD FR 50-76	150.616	98.0%	125.463	0.693	-6.792	46.932	98.84	314.05	1.37
FO 26 PORT FR 52-76	356.176	98.0%	296.694	7.311	10.886	48.960	12.14	11.67	12.51
FO 27 STBD FR 52-76	373.520	98.0%	311.142	7.564	-10.905	48.069	17.56	16.18	12.52
FO 30 PORT FR 24-50	115.701	0.0%	0.000	0.000	0.000	0.000	0.00	354.71	0.00
FO 31 STBD FR 24-50	116.406	0.0%	0.000	0.000	0.000	0.000	0.00	356.87	0.00
FO SETT 36 PORT FR 6-10	72.983	98.0%	60.795	10.403	5.769	4.851	50.82	52.24	5.02
FO SETT 37 STBD FR 6-10	72.983	98.0%	60.795	10.403	-5.769	4.851	50.82	52.24	5.02

FO DAY 38 CNTR FR 6-10	68.419	98.0%	56.993	11.545	0.000	4.820	104.24	104.24	2.99
TOTAL FUEL OIL	2337.899	82.7%	1643.008	6.456	-0.175	58.572	455.82		

SUNDRY @ 1.000 t/Cub.m.

	Max Vol [Cub.m]	Fill [%]	Mass [t]	Vcg [m]	Tcg [m]	Lcg [m]	FSM [tm]	MAXFSM [tm]	Sndg [m]
DIRTY W 8 P FR 143-160	13.171	5.0%	0.659	3.810	0.000	107.420	7.32	7.32	0.12
SLUDGE 28 PORT FR 50-54	11.930	5.0%	0.597	0.058	4.918	37.917	3.48	30.64	0.12
COOLING 29 CNTR FR 50-62	101.731	95.0%	96.644	0.639	0.000	40.922	400.55	400.55	1.30
SEWAGE 42 P FR 136-140	40.170	5.0%	2.008	3.810	5.350	103.220	51.90	51.90	0.12
SEWAGE 43 S FR 136-140	41.092	5.0%	2.055	3.810	-3.120	103.220	55.55	55.55	0.12
COLLECT 72 CNTR FR 76-80	98.948	5.0%	4.947	1.543	0.000	58.700	17.07	17.07	0.39
TOTAL SUNDRY	307.042	34.8%	106.910	0.818	0.068	44.505	535.87		

DRILL WATER @ 1.000 t/Cub.m.

	Max Vol [Cub.m]	Fill [%]	Mass [t]	Vcg [m]	Tcg [m]	Lcg [m]	FSM [tm]	MAXFSM [tm]	Sndg [m]
DW 18 PORT FR 76-105	172.012	100.0%	172.012	0.677	7.087	68.588	0.00	342.79	1.40
DW 19 STBD FR 76-105	172.012	100.0%	172.012	0.677	-7.087	68.588	0.00	342.79	1.40
DW 20 PORT FR 76-105	544.988	33.2%	181.000	2.097	10.908	68.622	17.31	17.41	4.02
DW 21 STBD FR 76-105	544.988	33.2%	181.000	2.097	-10.908	68.622	17.31	17.41	4.02
DW 23 CNTR FR 62-84	261.330	100.0%	261.330	1.369	0.000	56.539	0.00	724.99	3.86
TOTAL DRILL WATER	1695.330	57.1%	967.354	1.396	-0.000	65.346	34.61		

HYDRAULIC OIL @ 0.900 t/Cub.m.

	Max Vol [Cub.m]	Fill [%]	Mass [t]	Vcg [m]	Tcg [m]	Lcg [m]	FSM [tm]	MAXFSM [tm]	Sndg [m]
HYD 32 PORT FR 39-40	1.457	95.0%	1.246	1.863	3.415	27.900	0.32	0.48	1.03
HYD 33 STBD FR 39-40	1.457	95.0%	1.246	1.863	-3.415	27.900	0.32	0.48	1.03
TOTAL HYDRAULIC OIL	2.914	95.0%	2.491	1.863	0.000	27.900	0.65		

LUBE OIL @ 0.900 t/Cub.m.

	Max Vol [Cub.m]	Fill [%]	Mass [t]	Vcg [m]	Tcg [m]	Lcg [m]	FSM [tm]	MAXFSM [tm]	Sndg [m]
LO 34 PORT FR 11-14	44.628	95.0%	38.157	10.655	7.042	7.989	34.04	35.30	4.97
LO 35 STBD FR 11-14	44.628	95.0%	38.157	10.655	-7.042	7.989	34.04	35.30	4.97
TOTAL LUBE OIL	89.256	95.0%	76.315	10.655	0.000	7.989	68.08		

BASE OIL @ 0.900 t/Cub.m.

	Max Vol [Cub.m]	Fill [%]	Mass [t]	Vcg [m]	Tcg [m]	Lcg [m]	FSM [tm]	MAXFSM [tm]	Sndg [m]
BASE OIL 68 P FR 136-145	59.026	0.0%	0.000	0.000	0.000	0.000	0.00	29.51	0.00
BASE OIL 69 S FR 136-145	59.026	0.0%	0.000	0.000	0.000	0.000	0.00	29.51	0.00
TOTAL BASE OIL	118.052	0.0%	0.000	0.000	0.000	0.000	0.00		

MUD @ 1.000 t/Cub.m.

	Max Vol [Cub.m]	Fill [%]	Mass [t]	Vcg [m]	Tcg [m]	Lcg [m]	FSM [tm]	MAXFSM [tm]	Sndg [m]
MUD 70 PORT FR 127-136	119.509	0.0%	0.000	0.000	0.000	0.000	0.00	33.20	0.00
MUD 71 STBD FR 127-136	119.509	0.0%	0.000	0.000	0.000	0.000	0.00	33.20	0.00
TOTAL MUD	239.018	0.0%	0.000	0.000	0.000	0.000	0.00		

FIXED WEIGHT ITEMS

GROUP [1] - GENERAL

	Mass [t]	Vcg [m]	Tcg [m]	Lcg [m]
CREW & EFFECTS	15.000	19.000	0.000	118.000
PROVISIONS	25.000	9.000	0.000	114.000

SUBTOTAL - GROUP [1]	40.000	12.750	0.000	115.500
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GROUP [2] - RISER STORAGE(P)-AREA 2

	Mass [t]	Vcg [m]	Tcg [m]	Lcg [m]
FIRST TIER	122.500	14.260	5.516	34.520
SECOND TIER	105.000	15.317	5.516	34.520
THIRD TIER	122.500	16.374	5.516	34.520
FOURTH TIER	105.000	17.431	5.516	34.520
FIFTH TIER	122.500	18.488	5.516	34.520
SIXTH TIER	30.000	19.545	5.516	34.520
SEVENTH TIER	0.000	20.602	5.516	34.520
SUBTOTAL - GROUP [2]	607.500	16.531	5.516	34.520

GROUP [3] - RISER STORAGE(S)-AREA 1

	Mass [t]	Vcg [m]	Tcg [m]	Lcg [m]
FIRST TIER	105.000	14.260	-4.906	34.520
SECOND TIER	87.500	15.317	-4.906	34.520
THIRD TIER	105.000	16.374	-4.906	34.520
FOURTH TIER	87.500	17.431	-4.906	34.520
FIFTH TIER	105.000	18.488	-4.906	34.520
SIXTH TIER	30.000	19.545	-4.906	34.520
SEVENTH TIER	0.000	20.602	-4.906	34.520
SUBTOTAL - GROUP [3]	520.000	16.557	-4.906	34.520

GROUP [4] - RISER STORAGE CENTRE

	Mass [t]	Vcg [m]	Tcg [m]	Lcg [m]
RISER CATWALK	17.500	20.810	0.000	42.120
SUBTOTAL - GROUP [4]	17.500	20.810	0.000	42.120

GROUP [5] - MAIN DECK STORAGE FWD

	Mass [t]	Vcg [m]	Tcg [m]	Lcg [m]
Area 1 Port	0.000	14.600	4.100	104.088
Area 2 Port	0.000	14.600	4.100	100.000
Area 3 Port	0.000	14.600	4.100	94.500
Area 4 Port	0.000	14.600	4.100	90.000
Area 5 Port	0.000	14.600	4.100	87.300
Area 6 Port	0.000	14.600	4.100	84.400
Area 7 Stbd	0.000	14.600	-3.000	104.088
Area 8 Stbd	0.000	14.600	-3.000	100.000
Area 9 Stbd	0.000	14.600	-3.000	94.500
Area 10 Stbd	0.000	14.600	-3.000	90.000
Area 11 Stbd	0.000	14.600	-3.000	87.300
Area 12 Stbd	0.000	14.600	-3.000	84.400
Outboard Port Area 1	0.000	14.600	10.000	101.450
Outboard Port Area 2	0.000	14.600	10.000	91.840
Outboard Stbd Area 1	0.000	14.600	-9.800	101.600
Outboard Stbd Area 2	0.000	14.600	-9.500	91.700
Catwalk Fwd Area 1	0.000	15.500	0.000	100.100
Catwalk Aft Area 2	0.000	15.500	0.000	87.460
SUBTOTAL - GROUP [5]	0.000	0.000	0.000	0.000

GROUP [6] - MAIN DECK STORAGE AFT

	Mass [t]	Vcg [m]	Tcg [m]	Lcg [m]
STBD FR.68-80-AREA 11	20.000	13.900	-9.900	54.300
CENTRE FR.26-34-AREA 12	20.000	14.150	0.000	20.720
SUBTOTAL - GROUP [6]	40.000	14.025	-4.950	37.510

GROUP [7] - PIPE HOLD No.1

	Mass [t]	Vcg [m]	Tcg [m]	Lcg [m]
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Port Wing	5.000	7.850	10.700	101.820
Bay 1 Port	11.000	7.850	8.400	101.820
Bay 2 Port	56.000	7.850	5.800	101.820
Bay 3 Port	11.000	7.850	3.100	101.820
Bay 4 Cntr	25.000	7.850	-0.420	101.820
Bay 5 Stbd	62.000	7.850	-4.000	101.820
Bay 6 (Hatchway) Stbd	0.000	7.850	-6.500	101.820
Bay 7 Stbd	2.000	7.850	-8.700	101.820
Stbd Wing	5.000	7.850	-10.700	101.820

SUBTOTAL - GROUP [7] **177.000** **7.850** **0.991** **101.820**

GROUP [8] - PIPE HOLD No.2

	Mass [t]	Vcg [m]	Tcg [m]	Lcg [m]
Bay 1 Port	6.000	7.900	7.800	88.520
Bay 2 Port	6.000	7.900	3.800	88.520
Bay 3 Cntr	2.000	7.900	0.000	88.520
Bay 4 Stbd	12.000	7.900	-3.800	88.520
Bay 5 (Hatchway) Stbd	0.000	7.900	-6.600	88.520
Bay 6 Stbd	1.000	7.900	8.700	88.520

SUBTOTAL - GROUP [8] **27.000** **7.900** **1.211** **88.520**

GROUP [9] - PIPE HOLD No.3

	Mass [t]	Vcg [m]	Tcg [m]	Lcg [m]
Bay 1 Port	3.000	2.500	7.800	88.520
Bay 2 Port	3.000	2.500	3.800	88.520
Bay 3 Cntr	3.000	2.500	0.000	88.520
Bay 4 Stbd	12.000	2.500	-3.800	88.520
Bay 5 (Hatchway) Stbd	0.000	2.500	-6.600	88.520
Bay 6 Stbd	3.000	2.500	-8.700	88.520

SUBTOTAL - GROUP [9] **24.000** **2.500** **-1.537** **88.520**

GROUP [10] - DECK LOADS

	Mass [t]	Vcg [m]	Tcg [m]	Lcg [m]
STORAGE DECK	10.000	19.610	10.150	29.720
WELL TEST DECK	3.000	13.000	8.500	49.000
DRILL LINE DECK	5.000	18.950	6.000	57.500
DRILL FLOOR	5.000	20.850	7.500	58.150
SHACKER SCREEN STORE	10.000	17.500	0.000	50.600
POOP DECK	10.000	16.300	0.000	2.000
MUD LOGGING UNIT	10.000	16.300	10.000	75.000
SACK STORE HATCH	2.000	13.000	-6.000	46.000
SUBSEA WORKSHOP	1.000	16.000	10.000	85.000

SUBTOTAL - GROUP [10] **56.000** **17.448** **5.223** **44.204**

GROUP [11] - SACK STORE

	Mass [t]	Vcg [m]	Tcg [m]	Lcg [m]
PORT AFT	1.000	8.550	6.620	39.300
PORT FORWARD	5.000	8.550	6.620	45.300
STARBOARD AFT	1.000	8.550	-1.080	39.300
STARBOARD FORWARD	1.000	8.550	-1.080	45.300
SALT (1.09T/m^3,max60m^3)	65.400	10.700	-7.710	41.720

SUBTOTAL - GROUP [11] **73.400** **10.466** **-6.358** **41.947**

GROUP [12] - CONSTANTS-INCLINE REPORT

	Mass [t]	Vcg [m]	Tcg [m]	Lcg [m]
BOATSWAIN STORE	1.307	13.998	-0.016	133.711
DECK STORE	0.705	15.941	-2.103	133.373
STEERING FLAT	1.102	9.999	-0.296	4.828
LOWER STORES	29.287	11.264	-1.419	-3.165
ENGINEER WORKSHOP	9.270	13.548	0.653	10.181
ELECTRICIAN WORKSHOP	1.227	13.964	8.927	6.507
BOILER ROOM	2.725	14.170	9.600	10.700

PORT FUNNEL CASING	0.142	13.170	7.900	19.800
EMERG.GEN ROOM	0.076	13.370	-9.500	9.600
STBD FUNNEL CASING	1.259	13.370	-7.700	19.500
FAN ROOM	6.623	14.131	0.609	15.876
SHAFT TUNNEL	0.052	1.550	-2.300	26.700
HOLD No.1	0.508	1.754	-8.672	103.771
HOLD No.2	8.432	7.169	2.106	82.565
MAIN DECK	16.225	13.746	-2.558	53.694
MOONPOOL-B/DECK	4.393	9.842	8.469	65.290
SUBSEA ENG.WORKSHOP	2.445	7.609	-2.203	54.550
BULK TRANSFER ROOM	6.279	7.150	6.626	55.197
DRILL FLOOR	11.722	20.419	0.561	36.775
POOP DECK	2.144	16.588	2.538	5.640
PAINT&DECK LOCKER	0.956	17.493	-4.524	11.898
SACK STORE	12.637	7.320	2.507	46.965
MUD PUMP ROOM	3.973	3.167	-2.526	54.135
ENGINE CONTROL ROOM	0.095	8.397	3.476	19.389
ENGINE ROOM	0.652	8.258	2.681	27.589
AUX.ENGINE ROOM	4.553	7.951	-1.524	6.889
AFT STORES-M/DECK	12.413	14.113	0.984	-1.987
ELECTRICIANS OFFICE	0.082	11.210	6.900	118.400
LINEN LOCKER	3.209	11.197	6.122	121.074
BOW THRUSTER SPACE	0.084	7.510	-1.100	119.300
BRIDGE DECK	0.104	24.800	-2.800	120.200
AFT THRUSTER ROOM	0.558	3.100	4.810	61.760
SUBTOTAL - GROUP [12]	145.239	11.790	0.681	31.529

GROUP [13] - ROV GEAR

	Mass [t]	Vcg [m]	Tcg [m]	Lcg [m]
UMBILICLE	18.000	17.900	-4.100	50.300
REEL	8.000	18.400	-9.500	50.300
CONTAINER	5.000	17.500	-10.100	41.400
CONTAINER	3.000	17.500	-7.700	42.900
CONTAINER	4.000	14.450	-11.700	49.600
UNIT FR.67	1.820	13.870	-5.900	50.400
A-FRAME	6.500	18.400	-9.500	50.300
BOAT	6.000	18.170	-9.500	50.300
SUBTOTAL - GROUP [13]	52.320	17.604	-7.639	48.975

GROUP [14] - THIRD PARTY EQUIPMENT

	Mass [t]	Vcg [m]	Tcg [m]	Lcg [m]
SWACO VACUUM UNIT&TNK	6.000	18.370	12.200	76.300
SWACO MUD CLEANER	3.300	14.970	5.400	50.100
SWACO VERTI-G	0.750	14.170	8.700	50.300
SUBTOTAL - GROUP [14]	10.050	16.940	9.706	65.757

GROUP [15] - DRILLING LOADS

	Mass [t]	Vcg [m]	Tcg [m]	Lcg [m]
HOOK LOAD	0.000	20.000	0.000	67.720
ROTARY LOAD	0.000	20.000	0.000	67.720
SET BACK	0.000	33.900	3.250	67.720
RISER TENSION	0.000	19.300	0.000	67.720
BOP UNIT	87.000	13.170	-1.700	76.730
BOP SKID	4.600	10.150	-1.700	76.730
MLRP UNIT	87.000	13.170	1.700	76.730
MLRP SKID	4.600	10.150	1.700	76.730
FLARE BOOM STOWED	19.980	18.750	0.000	0.000
FLARE BOOM EXTENDED	0.000	18.750	0.000	-5.000
SLIP JOINT & DIVERTER	38.400	14.600	1.450	91.800
SUBTOTAL - GROUP [15]	241.580	13.744	0.230	72.779

GROUP [16] - MUD(1.6T/m^3-13.349Lbs/USg)

	Mass [t]	Vcg [m]	Tcg [m]	Lcg [m]
STORAGE BR1 (max-89m^3)	0.000	3.200	4.200	43.720
STORAGE BR2 (max-93m^3)	0.000	3.200	4.200	43.720

STORAGE BR3 (max-62m^3)	0.000	4.730	-7.710	44.120
STORAGE BR4 (max-62m^3)	0.000	4.730	-7.710	40.920
MIXING BP1 (max-20m^3)	0.000	3.200	-2.400	42.520
CHEMICAL BP2 (max-10m^3)	0.000	3.200	-2.400	45.320
ACTIVE BC1 (max-23.05m^3)	0.000	14.050	6.910	68.950
ACTIVE BC2 (max-63.60m^3)	0.000	14.050	8.850	64.650
ACTIVE BC3 (max-64.20m^3)	0.000	14.050	9.150	59.650
ACTIVE BC4 (max-40.70m^3)	0.000	14.050	9.150	59.100
SAND TRAPS (max-37.36m^3)	0.000	11.000	10.120	68.950
SUBTOTAL - GROUP [16]	0.000	0.000	0.000	0.000

GROUP [17] - BARYTE(2.4T/m^3-20.023Lbs/USg)

	Mass [t]	Vcg [m]	Tcg [m]	Lcg [m]
SILO No.1 (max-45m^3)	86.400	5.100	7.250	60.120
SILO No.2 (max-45m^3)	86.400	5.100	7.250	63.520
SILO No.3 (max-45m^3)	86.400	5.100	7.250	67.120
SILO No.7 (max-45m^3)	86.400	5.100	-7.250	60.120
SILO No.8 (max-45m^3)	86.400	5.100	-7.250	63.520
SUBTOTAL - GROUP [17]	432.000	5.100	1.450	62.880

GROUP [18] - BENTONITE(1.04T/m^3-8.677Lbs/USg)

	Mass [t]	Vcg [m]	Tcg [m]	Lcg [m]
SILO No.9 (max-45m^3)	38.500	5.100	-7.250	67.120
SILO No.10 (max-45m^3)	38.500	5.100	-7.250	70.520
SUBTOTAL - GROUP [18]	77.000	5.100	-7.250	68.820

GROUP [19] - CEMENT(1.7T/m^3-14.183Lbs/USg)

	Mass [t]	Vcg [m]	Tcg [m]	Lcg [m]
SILO No.4 (max-45m^3)	61.200	5.100	7.250	70.520
SILO No.5 (max-45m^3)	61.200	5.100	7.250	74.120
SILO No.6 (max-45m^3)	61.200	5.100	7.250	77.720
SILO No.11 (max-45m^3)	61.200	5.100	-7.250	74.120
SILO No.12 (max-45m^3)	61.200	5.100	-7.250	77.720
SUBTOTAL - GROUP [19]	306.000	5.100	1.450	74.840

If there are any other specific items or features that require description, please contact us, or consult the online help.

Regards

BARRY KINGWILL