Pentland Firth Voluntary Reporting Scheme: extract from Admiralty List of Radio Signals, Volume 6 (NP 286(1))

AREA:
The Pentland Firth Reporting Area can be defined as being the area between meridians 3º00'.00W and 3º30'.00W.

DESCRIPTION:
This is a **voluntary** reporting system for tankers and all laden vessels.

PROCEDURE:
(1) Reporting. Tankers and all laden commercial vessel may report to Shetland Coastguard on VHF Ch 16 or 70 at least 1h before ETA and on final departure of the Pentland Firth (see NOTES).
(2) The report will be passed on a working VHF Channel as advised by Shetland Coastguard, and should be in the following format:

ID	Information required
A	Vessel's name, call sign, MMSI, Port of Registry and Flag State
B	Day of month (2 figures) and time in hours and minutes (UT(GMT) in 4 figures)
C	Latitude (4 figures N or S and longitude (5 figures E or W)
D	True bearing (first 3 figures) and distance in nautical miles from identified landmark
E	True course in degrees (3 figures)
F	Speed in knots and decimal of knots (3 figures)
G	Last port of call
I	Destination
M	VHF channels monitored
O	Deepest draught in metres and centimetres
P	Type and quantity (tonnes) of cargo
Q	Brief details of damage/deficiency/other limitations
S	Weather
	POB

NOTES:
(1) Details under sections A, B, C, E, F, I and O in the above table may be taken from AIS and hence not requested from the vessel.
(2) Exceptionally, vessels requiring to pass messages of a sensitive or confidential nature may pass their reports by telephone.

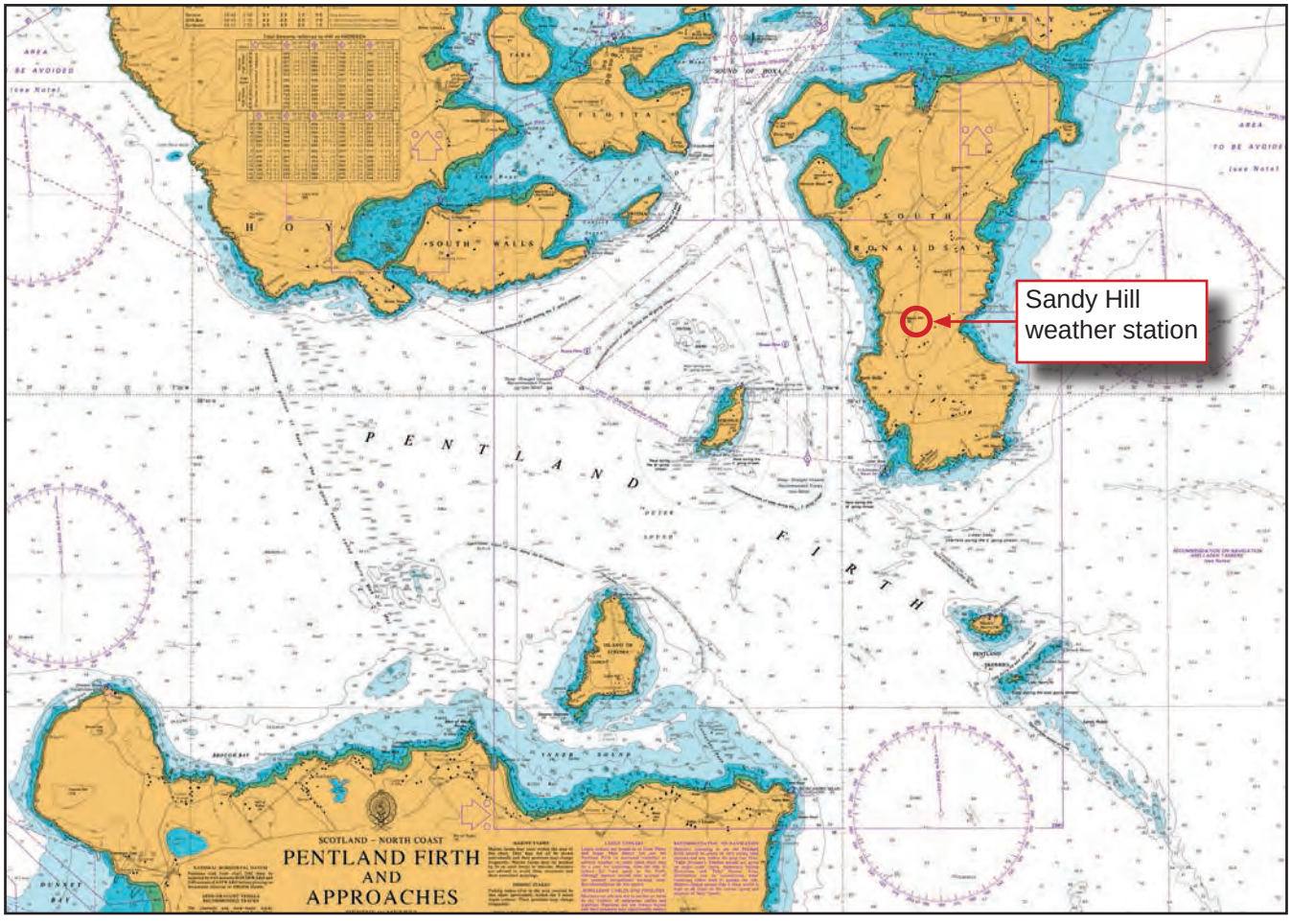
Transcript of VHF conversation between the master of *Cemfjord* and Shetland Coastguard

Station	Transmission (on Ch. 67 after initial call on Ch. 16)
Shetland coastguard	*"Cemfjord, this is Shetland coastguard, over."*
Cemfjord	*"Sir, good morning, Cemfjord replying."*
Shetland coastguard	*"This is Shetland coastguard, your last port of call, Sir, over?"*
Cemfjord	*"My last port of call Aalborg, Denmark, destination Runcorn, UK."*
Shetland coastguard	*"This is Shetland coastguard, roger, and your cargo type and quantity, over?"*
Cemfjord	*"My cargo cement in bulk, quantity 2084 metric tonnes."*
Shetland coastguard	*"This is Shetland coastguard, roger, and persons on board over?"*
Cemfjord	*"Eight person on board."*
Shetland coastguard	*"This is Shetland coastguard, roger, and does your vessel have any defects or deficiencies, over?"*
Cemfjord	*"Any defects, everything working properly."*
Shetland coastguard	*"This is Shetland coastguard, roger, and as we can monitor your progress on AIS[1], there is no requirement to report in when you leave the Pentland Firth area. We hope you have a good onward journey and a safe watch. This is Shetland coastguard, out."*
Cemfjord	*"Copied, thank you, have a nice watch."*

[1] Automatic Identification System

Sandy Hill Weather Station observed winds on 2 January 2015 and inset chart of location

Sandy Hill Date/Time	Record number	Ave wind speed (kts)	Wind direction	Max wind speed (kts)
02/01/2015 06:00	79648	36.17	268	64.19
02/01/2015 06:15	79649	31.2	253.1	39.34
02/01/2015 06:30	79650	37.01	264.5	43.95
02/01/2015 06:45	79651	30.94	258.1	40.2
02/01/2015 07:00	79652	34.34	263.7	45.94
02/01/2015 07:15	79653	33.69	255.2	64.62
02/01/2015 07:30	79654	36.86	254.8	47.42
02/01/2015 07:45	79655	43.79	259.4	63.04
02/01/2015 08:00	79656	40.99	267.1	51.67
02/01/2015 08:15	79657	50.19	266.5	67.28
02/01/2015 08:30	79658	42.06	268.6	53.78
02/01/2015 08:45	79659	42.84	268.7	56.45
02/01/2015 09:00	79660	41.42	267.4	55.12
02/01/2015 09:15	79661	45.58	261.9	69.35
02/01/2015 09:30	79662	53.57	267.2	74.82
02/01/2015 09:45	79663	41.92	263.4	48.55
02/01/2015 10:00	79664	50.22	258.9	67.26
02/01/2015 10:15	79665	46.17	260.6	63.99
02/01/2015 10:30	79666	45.33	262	58.05
02/01/2015 10:45	79667	51.45	260.9	68.4
02/01/2015 11:00	79668	49.28	258.4	64.79
02/01/2015 11:15	79669	46.41	262.3	60.39
02/01/2015 11:30	79670	42.5	266.3	62.38
02/01/2015 11:45	79671	42.81	255.6	57.94
02/01/2015 12:00	79672	46.52	259.2	74.62
02/01/2015 12:15	79673	44.34	265.9	63.3
02/01/2015 12:30	79674	40.01	260.2	54.21
02/01/2015 12:45	79675	39.54	256.5	60.29
02/01/2015 13:00	79676	50.97	251.9	63.37
02/01/2015 13:15	79677	50.39	251.3	64.66
02/01/2015 13:30	79678	47.52	248.2	62.14
02/01/2015 13:45	79679	47.27	252.1	61.53
02/01/2015 14:00	79680	47.52	247.5	59.92
02/01/2015 14:15	79681	43.95	251.2	56.73
02/01/2015 14:30	79682	46.49	255.2	61.04
02/01/2015 14:45	79683	51.38	259.4	70.79
02/01/2015 15:00	79684	39.03	261.9	53.29

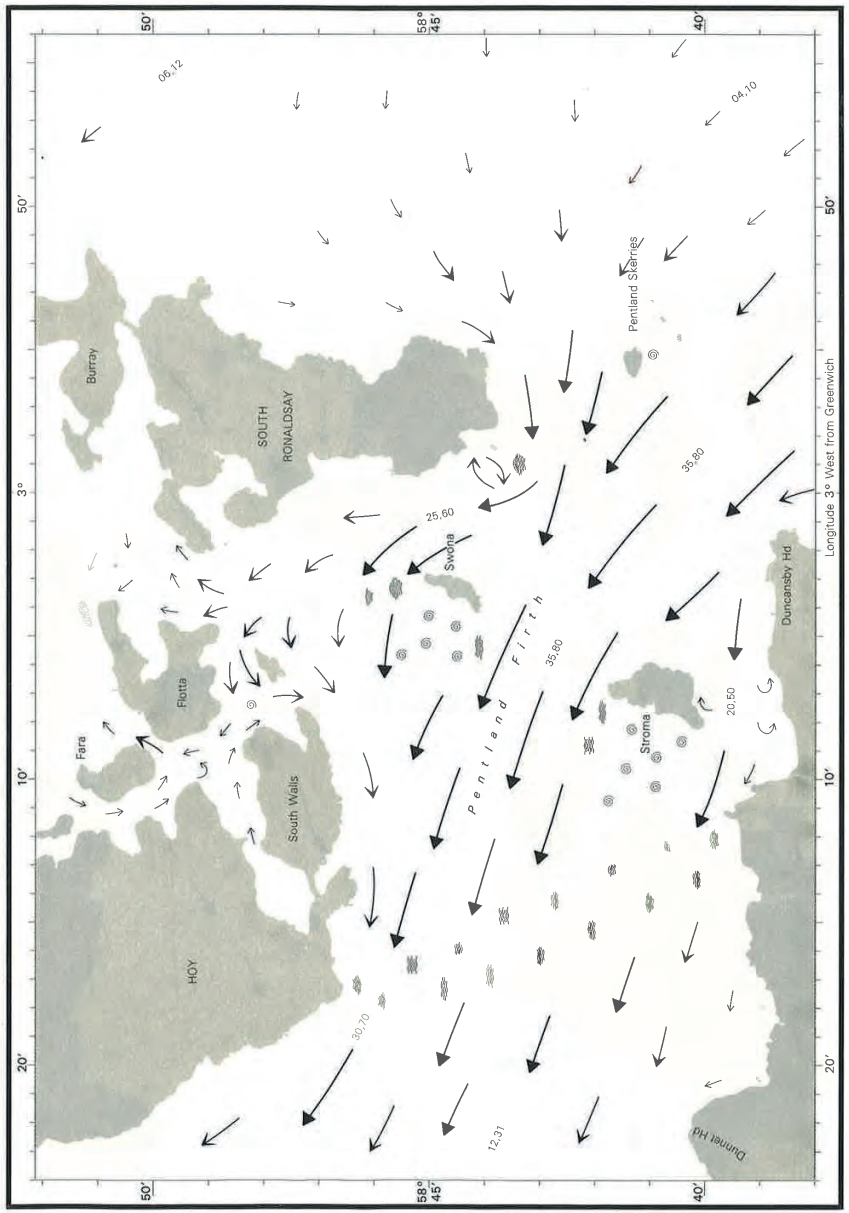


Extract of the Admiralty Tidal Stream Atlas including Pentland Firth (NP209) 4 and 5 hours after High Water (Dover)

CAUTION:— Due to the very strong rates of the tidal streams in some of the areas covered by this Atlas, many eddies may occur. Where possible some indication of these eddies has been included. In many areas there is either insufficient information or the eddies are unstable.

4 **AFTER HW DOVER**

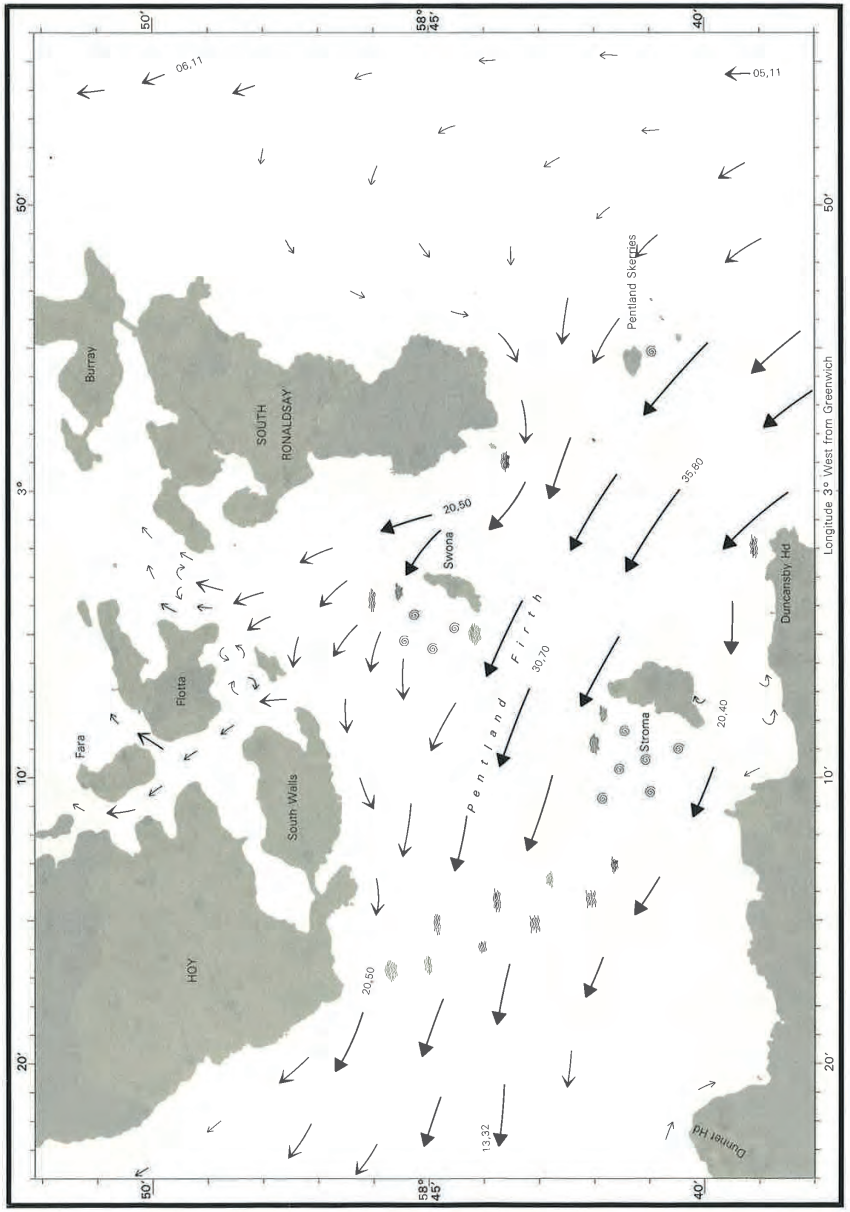
1h 40m after HW ABERDEEN



5 **AFTER HW DOVER**

2h 40m after HW ABERDEEN

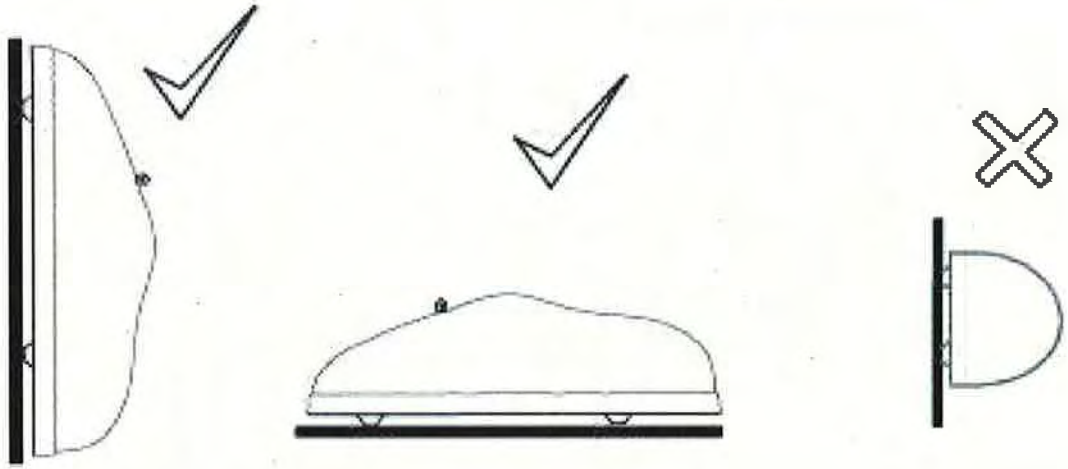
CAUTION:— Due to the very strong rates of the tidal streams in some of the areas covered by this Atlas, many eddies may occur. Where possible some indication of these eddies has been included. In many areas there is either insufficient information or the eddies are unstable.



Extract of manufacturer’s installation instructions for *Cemfjord*’s emergency position indicating radio beacon

Category 1 automatic release installation

The enclosure should be mounted upright against a vertical bulkhead. Alternately, it may be mounted horizontally on a flat surface, such as a cabin roof. No other orientations are recommended.



It is critical to locate the enclosure in a position where the released EPIRB will not get trapped by overhangs, rigging, antennas etc, should the vessel ever sink. An expanse of flat surface is required to allow the enclosure lid to eject.

- Mount it were it can easily be accessed without use of a ladder
- Mount it close to the vessel's navigation position
- Consider ease of access in an emergency

AVOID:

- Positions with insufficient space for lid ejection and maintenance.
- Positions within 1m (3') of any compass equipment.
- Mounting within 2m (6') of any Radar antenna.
- Direct impact from waves
- Locations where damage is possible when operating other equipment
- Exhaust fumes, chemical and oil sources and areas of high vibration

Mounting procedure

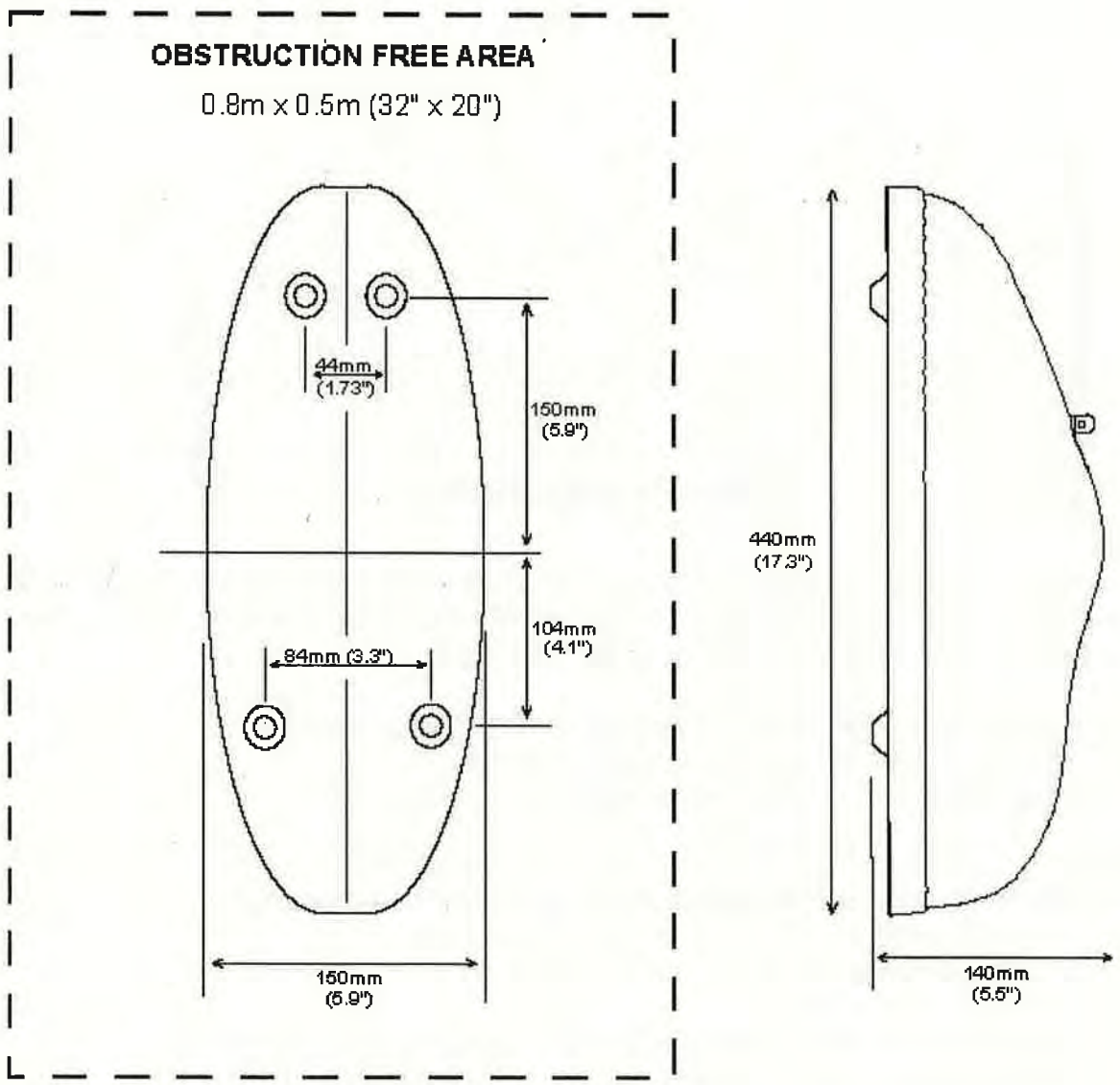
Locate enclosure base against a flat surface using the 4 fixing points. The base plate of the enclosure can be used as a drilling guide.

1. Pull out the R-shaped clip and remove the enclosure lid. Note how the EPIRB fits then remove it to somewhere dry (its sea switch is now armed).

2. Offer the base plate into the chosen position and mark through the mounting holes.

3. The enclosure is supplied with x4 25mm (1") stainless steel wood screw fixings. 6mm (1/4") nuts and bolts can also be used (not supplied).

Category 1 enclosure installation outline



Marking Hydrostatic Release Unit (HRU) expiry (Category 1 enclosure)

The HRU has a two year in-service life starting from the date of installation of the EPIRB. The installer must mark off the month date of two years into the future on the body of the HRU and put the same month date onto the label on the outside of the enclosure.

Mark the HRU by cutting out the corresponding month and year label date.

The outside of the enclosure should be marked using the alpha-numeric stickers provided and then covered with the clear adhesive label provided. Use date format, month and year, for example: JUN 2006.

Cemfjord's safety management system: generic abandon ship procedure

ABANDON SHIP

Responsibilities and Authority:

Master	-	Leads the action on the bridge
	-	Arranges external communication
	-	Orders Abandon Ship
Chief Mate	-	Commands the action on Muster Station, follows Master's orders
Officers	-	Commands relevant LSA according to Muster List
Crew	-	Perform duties according to Muster List and orders

Emergency Response Team Ashore
– arrange inform and report to: Underwriters/salvage companies/P&I Club, Class, Flag and Coast Administration
- mobilize Company Crisis Response Team

In case of absence or indisposition of key personnel (i.e. Master, Chief Mate or Chief Engineer) they are substituted according to Muster List.

Procedure:

⇒ Master arranges activation of Abandon Ship signal (•_•_•_•_)
⇒ Master arranges transmission of distress signals and communication with RCC and Company Emergency Line
⇒ Crewmembers goes to the muster station
⇒ Chief Mate carry out roll call and report to the bridge
⇒ Chief Mate orders search for missing persons and/or arranges assistance for injured
⇒ Chief Mate orders all necessary equipment to be brought at muster station and checks all is present
⇒ Chief Mate orders preparing relevant liferaft or lifeboat for launching
⇒ Designated crewmembers prepare liferaft or lifeboat for launching and report to Chief Mate
⇒ Upon Chief Mates order crewmembers donning immersion suits and/or life jackets
⇒ Master gives verbal order to abandon ship

⇒ Crewmembers join designated Life Saving Appliance or abandon ship in a way ordered by the Master

⇒ All efforts are to be undertaken to stay in one group and not to lose contact with any crewmember

International Maritime Solid Bulk Cargoes Code - schedule for cement

CEMENT

DESCRIPTION
Cement is a finely ground powder which becomes almost fluid in nature when aerated or significantly disturbed thereby creating a very minimal angle of repose. After loading is completed de-aeration occurs almost immediately and the product settles into a stable mass. Cement dust can be a major concern during loading and discharge if the vessel is not specially designed as a cement carrier or shore equipment is not fitted with special dust control equipment.

CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m^3)	STOWAGE FACTOR (m^3/t)
Not applicable	1000 to 1493	0.67 to 1.00
SIZE	**CLASS**	**GROUP**
Up to 0.1 mm	Not applicable	C

HAZARD
It may shift when aerated.
This cargo is non-combustible or has a low fire-risk.

STOWAGE & SEGREGATION
No special requirements.

HOLD CLEANLINESS
Clean and dry as relevant to the hazards of the cargo.

WEATHER PRECAUTIONS
This cargo shall be kept as dry as practicable. This cargo shall not be handled during precipitation. During handling of this cargo all non-working hatches of the cargo spaces into which this cargo is loaded or to be loaded shall be closed.

LOADING
The ship shall be kept upright during loading of this cargo. This cargo shall be so trimmed to the boundaries of the cargo space that the angle of the surface of the cargo with the horizontal plane does not exceed 25 degrees. Both the specific gravity and the flow characteristics of this cargo are dependent on the volume of air in the cargo. The volume of air in this cargo may be up to 12%. This cargo shows fluid state prior to settlement. The ship carrying this cargo shall not depart until the cargo has settled. After the settlement, shifting of the cargo is not liable to occur unless the angle of the surface with the horizontal plane exceeds 30 degrees.

PRECAUTIONS
Appropriate precautions shall be taken to protect machinery and accommodation spaces from the dust of the cargo. Bilge wells of the cargo spaces shall be protected from ingress of the cargo. Due consideration shall be paid to protect equipment from the dust of the cargo. Persons who may be exposed to the dust of the cargo shall wear protective clothing, goggles or other equivalent dust eye-protection and dust filter masks, as necessary. Bilge wells shall be clean, dry and covered as appropriate, to prevent ingress of the cargo.

CARRIAGE
No special requirements.

DISCHARGE
No special requirements.

CLEAN-UP
After discharge of this cargo, the cargo spaces shall be thoroughly cleaned and washed out to remove all traces of the cargo.

EMERGENCY PROCEDURES

SPECIAL EMERGENCY EQUIPMENT TO BE CARRIED

Protective clothing (gloves, boots, coveralls, headgear). Self-contained breathing apparatus. Spray nozzles.

EMERGENCY PROCEDURES

Wear protective clothing and self-contained breathing apparatus.

EMERGENCY ACTION IN THE EVENT OF FIRE

Batten down. Use ship's fixed fire-fighting installation if available. Exclusion of air may be sufficient to control fire.

MEDICAL FIRST AID

Refer to the Medical First Aid Guide (MFAG), as amended.

Cemfjord's loading manual and GL approval letter

Germanischer Lloyd SE • P.O. Box 11 16 06 • 20416 Hamburg • Germany

Brise Bereederungs GmbH & Co. KG
Schaarsteinwegsbrücke 2
20459 Hamburg
Federal Republic of Germany

Head Office
Brooktorkai 18
20457 Hamburg
Germany

Phone +49 40 36149-0
Fax +49 40 36149-200
headoffice@gl-group.com
www.gl-group.com

Your reference	Your letter of	Our reference	Extension	Date
	2012-03-07	12-027517/Hof	+49 40 36149-4504	2012-05-07

Approval Type: Drawing/Document Approval
GL Reg. No.: 31107 Cement Carrier "CEMFJORD"
Hull No.: 126 IMO No. 8403569

Dear Sirs,

Attached please find copies each of the drawings

Drawing No.	Drawing Title	Status	Remarks	Red entries
	Loading Manual	Approved	☒	☐
	Inclining Test	Approved	☒	☐

submitted to us with your above mentioned letter duly marked with our respective notation.

Kindly observe our remarks:

		Reply by client necessary	Follow-up by surveyor	For info, no reply necessary
1.	**General**			
1.1.	The submitted document has been reviewed for compliance with chapter 3 of the Intact Stability Code (IMO Res. A749 as amended by MSC.75(69)), and has been assigned an appraisal status as indicated subject to our following comments:	☐	☐	☒
1.2.	The following lightship particulars are found acceptable as amended after conversion to cement carrier: Lightweight: 1102 t LCG 36.22 m VCG 4.41 m			
1.3.	Our approval should not be considered as relieving the master in any way of the responsibility for the safe and proper loading and ballasting of the vessel. Therefore the master should exercise prudence and good seamanship. - The provision of adequate			

	stability, at all times, remains the master's responsibility.			
2.	**Final Stability Book/Loading Manual**			
2.1.	The stability documentation bases on the above mentioned lightship data.	☐	☐	☒
2.2.	We have approved the submitted drawings and found to comply with the requirements of GL Class Notation corresponding to the stability requirements of IMO Res. A.749 (18) and ILLC; up to the maximum draught (Tc=4.347) with assigned B freeboard.			
2.3.	Stability criteria might be fulfilled only if the cement is settled sufficiently.			

Please forward the complete approved stability documentation onboard.

Our invoice will be forwarded separately.

Yours faithfully,

Germanischer Lloyd

[redacted]

[redacted]

LOADING MANUAL

OF

M/V „MARGARETA"

Remarks in the letter to be observed

INDEX :

PRINCIPAL PARTICULARS

TYPE	:	CEMENT TANKER
BUILDERS	:	DETLEF HAGEMANN, ROLANDWERFT GmbH, Bremen 1984
REBUILDER	:	MORSKA STOCZNIA REMONTOWA S.A. Świnoujście, Poland 1998
OWNERS	:	BRISE Schiffahrts - GmbH Hamburg, Germany
CALL SIGN	:	**P J T M**
DIMENSIONS	:	LENGTH OVER ALL L_{OA} = 84.18 m
		LENGTH B.P. L_{BP} = 78.45 m
		BREADTH (MOULDED) B = 11.34 m
		DEPTH TO MAINDECK D = 4.95 m
		DEPTH TO QUARTERDECK D = 5.70 m
		DRAUGHT (SUMMER) T = 4.36 m

DISPLACEMENT (seawater) : 3420 tonnes

LIGHTSHIP data are based on inclining test from 24.05.1998 made on completion of conversion in Morska Stocznia Remontowa S.A. Świnoujście - Poland

FLOODING POINT:

- Acces door to Engine Room inside of superstructure (X , Y , Z = 7.2m, 1.9 m, 6.3 m)

PERMISSIBLE STILL WATER BENDING MOMENTS & SHEAR FORCES

Frame nr	Position Forw.AP(m)	Shear Force (kN) Sea	Harbour	Bending Moments (kNm) Hogging	Sagging	Harbour
39	23.4	±9790	±12494	205434	-203252	±261625
52	31.2	±9020	±11158	186704	-183795	±261625
„C"	46.8	±9020	±11158	186704	-183795	±261625
80	51.0	±8909	±11540	186704	-183795	±261625
86	54.6	±8813	±11867	197418	-194925	±261625

PERMISSIBLE LOCAL LOADS:

- Trunkdeck - 0.93 t/m^2 (uniformly distributed)
- Quarterdeck/maindeck - 1.79 t/m^2 (uniformly distributed)
- Cargo tank bottom- cement with sp.gr. 1.30 t/m^3 loaded upto level 7.6 m above ship`s base line (0.67 m below trunk deck line)

REMARKS

Present calculations are based on tanks characteristics specified in „ STABILITAT UND TRIM" of ship MARGARETA - document prepared by INGENIEURBURO FRANZ STERNKOPF * LEER - LOGA

Following tanks have been rebuilt and their data recalculated :DB-TK.8 PS, DB-TK.9 StB, SIDE-TK.6PS, SIDE-TK.7 StB , DB-TK.14C

Data of STERN TK 16.C containing Fresh Water is enclosed in order to show free surface moments

Hydrostatics properties and cross curves of stability were recalculated using **Autoship Systems Corp.,- Autohydro**

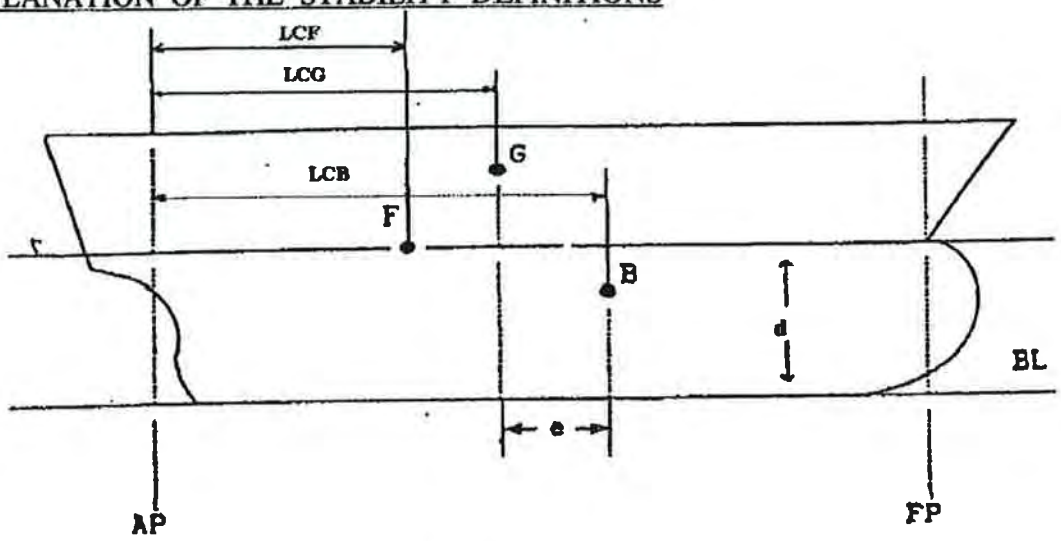
Model of hull geometry was prepared on base of geodetic measurements report dated 09.04.1998 made on the vessel in floating dock of Morska Stocznia Remontowa - Świnoujście, POLAND.
The loading cases were calculated with the same program on personal computer equipment.
Any loading case is documented by :

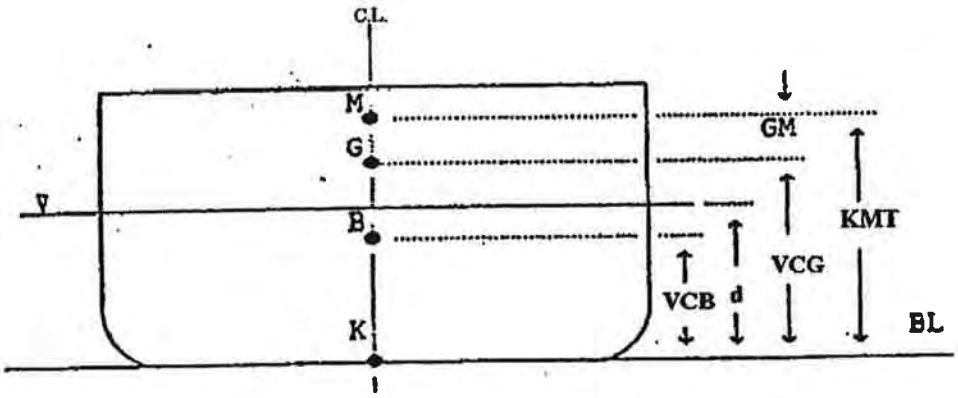
- compilation of masses and their centre coordinates for ballast water, stores and cargo,
- compilation of hydrostatic values, draughts, lever-arms, including a comparison of existing and required stability criteria,
- diagram of leverarm (righting arms) curves,
- compilation of longitudinal strength results

LIGHTSHIP WEIGHT DISTRIBUTION

MAIN GROUPS OF WEIGHT	WEIGHT (t)	AFT END m from AP	FORW.END m from AP	WEIGHT t / m	LCG (m) m from AP	WEIGHT*LCG Moment in tm
Structural Steel Forebody	77.0	69.6	82.0	6.21	75.80	5836.60
Structural Steel Hold Area	436.9	14.4	69.6	7.91	42.00	18349.80
Structural Steel Aftbody	145.3	-3.0	14.4	8.35	5.70	828.21
Hull & Cargo Outfit Forebody	15.0	70.2	80.5	1.46	75.35	1130.25
Hull & Cargo Outfit Hold Area	96.2	15.0	70.2	1.74	42.60	4098.12
Hull & Cargo Outfit Aftbody	13.0	-2.0	12.0	0.93	5.00	65.00
Accommodation Aftbody	16.0	-3.0	14.4	0.92	5.70	91.20
Engine Plant Aftbody	71.9	2.0	14.4	5.80	8.20	589.58
Electric Plant Aftbody	24.0	4.0	13.0	2.67	8.50	204.00
Deck Machinery Forebody	4.0	73.0	75.0	2.00	74.00	296.00
Deckm&Steering Gear Aftbody	6.0	-1.0	1.0	3.00	0.00	0.00
Double Bottom(Removal) Steel Hold Area	-9.0	40.5	43.5	-3.00	42.00	-378.00
Cargo Hatch Covers (Removal) Hold Area	-94.2	15.0	70.2	-1.71	42.60	-4012.92
Piping For Cement System Hold Area	10.0	15.0	70.2	0.18	42.60	426.00
IBAU Panels / Tank 1 Hold Area	16.0	45.0	70.2	0.63	57.60	921.60
IBAU Panels / Tank 2 Hold Area	16.0	15.0	40.2	0.63	27.60	441.60
Remaining IBAU Supply Hold Area	30.0	40.8	48.4	3.95	44.60	1338.00
New Deck&Coam.Height Increase Hold Area	82.0	15.0	70.2	1.49	42.60	3493.20
New Steel in Tank 1 Hold Area	47.4	15.0	40.8	1.84	27.90	1322.46
New Steel in Tank 1 Hold Area	47.4	44.4	70.2	1.84	57.30	2716.02
New Deckhouse Hold Area	10.0	39.5	46.4	1.45	42.95	429.50
New Steel in PumpRoom&Transv.Bulkheads Hold Area	41.1	39.5	44.5	8.22	42.00	1726.20
TOTAL LIGHTSHIP AFTER CONVERSIO	1102.0				36.218	39912.42

EXPLANATION OF THE STABILITY DEFINITIONS

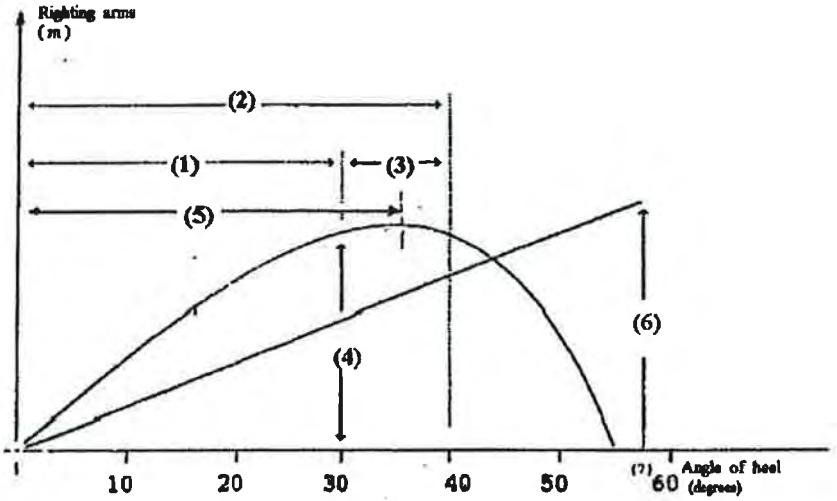




AP	-	aft perpendicular
FP	-	forward perpendicular
BL	-	base line
K	-	keel point
M	-	metacentre
d	-	theoretical draught
VCB	-	height of centre of buoyancy above BL
VCG	-	centre of gravity above BL
fsm	-	correction of free surfaces
VCG(fsm)	-	corrected centre of gravity: VCG' = VCG + fsm/DISP
GM	-	metacentric height
GM(liq)	-	corrected metacentric height
LCG	-	length of centre of gravity from AP
LCB	-	length of centre of buoyancy from AP
LCF	-	centre of flotation from AP
RA	-	righhting arm: RA(heel) - VCG x sin (PHI)
RA(heel)	-	righting arm from cross curves of stability
e	-	trim lever
DISP	-	displacement
LBP	-	length between perpendiculars
TRIM	-	trim

STABILITY CRITERIA :

ACC. TO IMO RES. A167 ES. IV



(1). - Area under the righting lever curve (GZ curve) up to 30 degrees to be not less than 0.055 metre-radian.
(2). - Area under GZ curve up to 40 degrees or flood to be not less than 0.090 metre-radian.
(3). - Area between 30 and 40 degrees or flood to be not less than 0.030 metre-radian.

(4). - Righting lever GZ to be at least 0,20 m at an angle of heel equal to or greater than 30 degrees
(5). - Angle from 0 deg to max of righting arm to be not less than 25 deg.
(6). - Initial GM' (corrected for free surfaces) not to be less than 0,15 m.

TANK CAPACITIES

TANKS - FULL (VESSEL WITH TRIM 0)

ITEM	VOLUME	WEIGHT	LONGL. MOMENT LM	FORW.OF A.P. LCG	VERTICAL MOMENT VM	FROM BL VCG	Free surface moment (mt)
	(m3)	(t)	(mt)	(m)	(mt)	(m)	
Sp.Gr 1.025							max. value
BALLAST WATER							
FOREPEAK 1(fr.118-fore)	44.24	45.35	3417.7	75.370	142.8	3.150	75
DB-Tk. 4 PS (fr.80-114)	108.82	111.54	6801.7	60.980	69.2	0.620	158
DB-Tk. 5 StB (fr.80-114)	108.82	111.54	3857.8	60.980	69.2	0.620	158
DB-Tk. 8 PS (fr.55-80)	88.50	90.71	3857.8	42.528	56.4	0.622	166
DB-Tk. 9 StB (fr.55-80)	88.50	90.71	3857.8	42.528	56.4	0.622	166
DB-Tk. 12 PS (fr.24-55)	66.71	68.38	1620.6	23.700	41.0	0.600	45
DB-Tk. 13 StB (fr.24-55)	66.71	68.38	1620.6	23.700	41.0	0.600	45
SIDE-Tk. 2 PS (fr.80-112)	89.44	91.68	5412.6	59.040	287.9	3.14	2
SIDE-Tk. 3 StB (fr.80-112)	89.44	91.68	5412.6	59.04	287.9	3.14	2
SIDE-Tk. 6 PS (fr.55-80)	94.50	96.86	4063.4	41.95	298.3	3.08	2
SIDE-Tk. 7 StB (fr.55-80)	94.50	96.86	4063.4	41.95	298.3	3.08	2
SIDE-Tk. 10 PS (fr.23-55)	103.48	106.07	2528.6	23.84	309.7	2.92	2
SIDE-Tk. 11 PS (fr.23-55)	103.48	106.07	2528.6	23.84	309.7	2.92	2
TOTAL BALLAST	1147.14	1175.82	49043.2	41.710	2267.9	1.929	825
Sp.Gr 1.000							
FRESH WATER							
STERN Tk. 16 (fr.2-8)	19.41	19.41	64.6	3.33	62.7	3.23	132
SIDE Tk. 17 PS (fr.10-18)	6.15	6.15	53.4	8.68	18.6	3.02	1
SIDE Tk. 18 StB(fr.10-18)	6.15	6.15	53.4	8.68	18.6	3.02	1
TOTAL FRESH WATER	31.71	31.71	171.40	5.41	99.84	3.15	134
Sp.Gr. 0.860							
FUEL OIL TANKS							
DB-Tk.14 Centr.(fr.39-61)	49.90	42.91	1287.4	30.00	25.7	0.600	31
DB-Tk.15 Centr.(fr.24-39)	34.21	29.42	535.2	18.19	17.7	0.600	21
SIDE Tk. 19 PS (fr.19-23)	5.29	4.55	57.2	12.57	11.2	2.470	
SIDE Tk. 20 StB (fr.19-23)	5.29	4.55	57.2	12.57	11.2	2.470	
DAY Tk. 21PS (fr.20-23)	5.22	4.49	57.9	12.90	21.1	4.700	
TOTAL	99.91	85.92	1994.9	23.22	86.97	1.01	
Sp.Gr. 0.920							
LUBOIL TANK							
LUB OIL STORE TK 22 P	3.92	3.61	46.6	12.900	17.0	4.700	
OTHER TANKS							
Fecal Tk. 23 PS(fr.20-24)	6.70	6.70	88.4	13.20	4.2	0.62	3
Old Oil Tk.24StB(fr20-23)	3.92	3.61	46.6	12.90	17.0	4.70	
DrainOil Tk.25StB(fr.18-19	2.99	2.57	28.5	11.1	2.8	1.09	2
Dirty Oil Tk.26PS(fr17-19)	5.75	5.29	57.2	10.81	5.71	1.08	3

CEMENT TANK 1 (FORE) : VOLUMES TABLE FOR CARGO DENSITY 1.35 t/m^3

Cement level above BL (m)	Volume (m3)	Weight (tonnes)	LCG from AP(m)	VCG from BL(m)	Ullage below trunkdeck(m)
1.00	0.3	0.4	44.797f	1.080	7.27
1.10	0.6	0.8	44.909f	1.114	7.17
1.20	1.1	1.5	45.110f	1.173	7.07
1.30	2.5	3.4	45.393f	1.259	6.97
1.40	4.2	5.7	45.639f	1.333	6.87
1.50	7.2	9.7	45.923f	1.420	6.77
1.60	10.6	14.3	46.169f	1.496	6.67
1.70	15.0	20.3	46.429f	1.578	6.57
1.80	20.1	27.1	46.679f	1.659	6.47
1.90	26.1	35.2	46.923f	1.738	6.37
2.00	33.0	44.6	47.173f	1.819	6.27
2.10	40.5	54.7	47.414f	1.895	6.17
2.20	48.8	65.9	47.660f	1.972	6.07
2.30	57.9	78.2	47.910f	2.048	5.97
2.40	67.8	91.5	48.164f	2.123	5.87
2.50	78.4	105.8	48.420f	2.199	5.77
2.60	90.0	121.5	48.683f	2.275	5.67
2.70	102.1	137.8	48.940f	2.350	5.57
2.80	115.0	155.3	49.200f	2.425	5.47
2.90	128.6	173.6	49.461f	2.500	5.37
3.00	143.0	193.1	49.724f	2.575	5.27
3.10	158.2	213.6	49.988f	2.650	5.17
3.20	174.2	235.2	50.253f	2.725	5.07
3.30	190.9	257.7	50.518f	2.800	4.97
3.40	208.4	281.3	50.784f	2.876	4.87
3.50	226.7	306.0	51.051f	2.951	4.77
3.60	245.7	331.7	51.318f	3.026	4.67
3.70	265.4	358.3	51.584f	3.101	4.57
3.80	285.8	385.8	51.850f	3.176	4.47
3.90	307.1	414.6	52.117f	3.250	4.37
4.00	329.1	444.3	52.385f	3.325	4.27
4.10	346.1	467.2	52.500f	3.389	4.17
4.20	360.1	486.1	52.540f	3.446	4.07
4.30	376.1	507.7	52.619f	3.504	3.97
4.40	393.2	530.8	52.745f	3.561	3.87
4.50	411.9	556.1	52.895f	3.618	3.77
4.60	432.3	583.6	53.067f	3.675	3.67
4.70	454.9	614.1	53.260f	3.734	3.57
4.80	478.7	646.2	53.458f	3.791	3.47
4.90	502.7	678.6	53.642f	3.845	3.37
5.00	526.8	711.2	53.809f	3.898	3.27
5.10	550.8	743.6	53.961f	3.950	3.17
5.20	574.8	776.0	54.101f	4.002	3.07
5.30	598.9	808.5	54.229f	4.053	2.97
5.40	622.9	840.9	54.348f	4.103	2.87

CEMENT TANK 1 (FORE) : VOLUMES TABLE FOR CARGO DENSITY 1.35 t/m³

Continued

Cement level above BL (m)	Volume (m3)	Weight (tonnes)	LCG from AP(m)	VCG from BL (m)	Ullage below trunkdeck(m)
5.50	646.9	873.3	54.457f	4.154	2.77
5.60	670.9	905.7	54.559f	4.204	2.67
5.70	695.0	938.2	54.654f	4.255	2.57
5.80	719.0	970.6	54.742f	4.305	2.47
5.90	743.0	1003.0	54.825f	4.355	2.37
6.00	767.1	1035.6	54.903f	4.405	2.27
6.10	791.4	1068.4	54.976f	4.456	2.17
6.20	815.4	1100.8	55.045f	4.506	2.07
6.30	839.4	1133.2	55.109f	4.556	1.97
6.40	863.4	1165.6	55.170f	4.606	1.87
6.50	887.5	1198.1	55.228f	4.656	1.77
6.60	911.5	1230.5	55.282f	4.706	1.67
6.70	935.5	1262.9	55.334f	4.756	1.57
6.80	959.5	1295.3	55.383f	4.806	1.47
6.90	983.5	1327.7	55.430f	4.856	1.37
7.00	1007.6	1360.3	55.475f	4.906	1.27
7.10	1031.6	1392.7	55.517f	4.956	1.17
7.20	1055.6	1425.1	55.558f	5.006	1.07
7.30	1079.6	1457.5	55.597f	5.056	0.97
7.40	1103.7	1490.0	55.634f	5.106	0.87
7.50	1127.7	1522.4	55.669f	5.156	0.77
7.60	1151.7	1554.8	55.703f	5.206	0.67
7.70	1175.8	1587.3	55.733f	5.256	0.57
7.80	1199.7	1619.6	55.767f	5.306	0.47
7.90	1223.7	1652.0	55.797f	5.356	0.37
7.99	1245.3	1681.2	55.823f	5.401	0.28

CEMENT TANK 2 (AFT) : VOLUMES TABLE FOR CARGO DENSITY 1.35 t/m^3

Cement level above BL (m)	Volume (m3)	Weight (tonnes)	LCG from AP(m)	VCG from BL (m)	Ullage below trunkdeck(m)
1.00	0.3	0.4	40.404f	1.080	7.27
1.10	0.6	0.8	40.292f	1.113	7.17
1.20	1.1	1.5	40.090f	1.173	7.07
1.30	2.5	3.4	39.808f	1.259	6.97
1.40	4.2	5.7	39.562f	1.333	6.87
1.50	7.2	9.7	39.277f	1.420	6.77
1.60	10.6	14.3	39.031f	1.496	6.67
1.70	15.0	20.3	38.771f	1.578	6.57
1.80	20.1	27.1	38.521f	1.659	6.47
1.90	26.1	35.2	38.277f	1.738	6.37
2.00	33.1	44.7	38.027f	1.818	6.27
2.10	40.6	54.8	37.786f	1.895	6.17
2.20	48.9	66.0	37.540f	1.972	6.07
2.30	58.0	78.3	37.290f	2.047	5.97
2.40	67.8	91.5	37.036f	2.123	5.87
2.50	78.5	106.0	36.780f	2.199	5.77
2.60	90.1	121.6	36.517f	2.275	5.67
2.70	102.1	137.8	36.260f	2.350	5.57
2.80	115.0	155.3	36.000f	2.425	5.47
2.90	128.6	173.6	35.739f	2.500	5.37
3.00	143.1	193.2	35.476f	2.575	5.27
3.10	158.2	213.6	35.212f	2.650	5.17
3.20	174.2	235.2	34.947f	2.725	5.07
3.30	190.9	257.7	34.682f	2.800	4.97
3.40	208.4	281.3	34.416f	2.875	4.87
3.50	226.7	306.0	34.150f	2.951	4.77
3.60	245.8	331.8	33.882f	3.026	4.67
3.70	265.5	358.4	33.616f	3.101	4.57
3.80	285.9	386.0	33.350f	3.175	4.47
3.90	307.1	414.6	33.083f	3.250	4.37
4.00	329.2	444.4	32.815f	3.325	4.27
4.10	346.2	467.4	32.700f	3.389	4.17
4.20	360.1	486.1	32.660f	3.446	4.07
4.30	376.1	507.7	32.581f	3.504	3.97
4.40	393.3	531.0	32.455f	3.561	3.87
4.50	411.9	556.1	32.305f	3.618	3.77
4.60	432.4	583.7	32.133f	3.675	3.67
4.70	454.9	614.1	31.941f	3.734	3.57
4.80	478.8	646.4	31.742f	3.791	3.47
4.90	502.8	678.8	31.558f	3.845	3.37
5.00	526.8	711.2	31.391f	3.898	3.27
5.10	550.8	743.6	31.239f	3.950	3.17
5.20	574.9	776.1	31.100f	4.002	3.07
5.30	598.9	808.5	30.971f	4.053	2.97
5.40	622.9	840.9	30.853f	4.103	2.87

CEMENT TANK 2 (AFT) : VOLUMES TABLE FOR CARGO DENSITY 1.35 t/m³

Continued

Cement level above BL (m)	Volume (m3)	Weight (tonnes)	LCG from AP(m)	VCG from BL (m)	Ullage below trunkdeck(m)
5.50	647.0	873.5	30.743f	4.154	2.77
5.60	671.0	905.9	30.641f	4.204	2.67
5.70	695.0	938.3	30.546f	4.255	2.57
5.80	719.1	970.8	30.458f	4.305	2.47
5.90	743.1	1003.2	30.375f	4.355	2.37
6.00	767.1	1035.6	30.298f	4.405	2.27
6.10	791.4	1068.4	30.224f	4.456	2.17
6.20	815.5	1100.9	30.156f	4.506	2.07
6.30	839.5	1133.3	30.091f	4.556	1.97
6.40	863.5	1165.7	30.030f	4.606	1.87
6.50	887.5	1198.1	29.972f	4.656	1.77
6.60	911.5	1230.5	29.918f	4.706	1.67
6.70	935.5	1262.9	29.866f	4.756	1.57
6.80	959.6	1295.5	29.817f	4.806	1.47
6.90	983.6	1327.9	29.770f	4.856	1.37
7.00	1007.6	1360.3	29.725f	4.906	1.27
7.10	1031.6	1392.7	29.683f	4.956	1.17
7.20	1055.7	1425.2	29.642f	5.006	1.07
7.30	1079.7	1457.6	29.604f	5.056	0.97
7.40	1103.7	1490.0	29.567f	5.106	0.87
7.50	1127.7	1522.4	29.531f	5.156	0.77
7.60	1151.7	1554.8	29.497f	5.206	0.67
7.70	1175.8	1587.3	29.467f	5.256	0.57
7.80	1199.7	1619.6	29.433f	5.306	0.47
7.90	1223.8	1652.1	29.403f	5.356	0.37
7.99	1245.3	1681.2	29.377f	5.401	0.28

COMBINATION OF STORES

100% STORES (SHORT VOYAGE)

ITEM	VOLUME (m3)	WEIGHT (t)	LM (mt)	LCG (m)	VM (mt)	VCG (m)	Free surface moment(mt)
Sp.Gr 1.000							
FRESH WATER							
STERN Tk. 16 (fr.2-8)	15.00	15.00	50.4	3.36	45.5	3.03	121
			0.0		0.0		
Sp.Gr. 0.860							
FUEL OIL TANKS							
DB-Tk.15 Centr.(fr.24-39)	34.21	29.42	535.2	18.19	17.7	0.600	21
SIDE Tk. 19 PS (fr.18-23)	5.29	4.55	57.2	12.57	11.2	2.470	
SIDE Tk. 20 StB (fr.18-23)	5.29	4.55	57.2	12.57	11.2	2.470	
DAY Tk. 21PS (fr.20-23)	5.22	4.49	57.9	12.90	21.1	4.700	
TOTAL FUEL	50.01	43.01	707.44	16.449	61.23	1.424	
Sp.Gr. 0.920							
LUBOIL TANK							
LUB OIL STORE TK 22 PS	3.92	3.61	46.6	12.900	17.0	4.700	

10% STORES SHORT VOYAGE

ITEM	VOLUME (m3)	WEIGHT (t)	LM (mt)	LCG (m)	VM (mt)	VCG (m)	Free surface moment(mt)
Sp.Gr 1.000							
FRESH WATER							
STERN Tk. 16 (fr.2-8)	1.5	1.5	5.0	3.33	3.9	2.59	20
Sp.Gr. 0.860							
FUEL OIL TANKS							
DAY Tk. 21PS (fr.20-23)	5	4.30	55.5	12.90	20.2	4.700	
Sp.Gr. 0.920							
LUBOIL TANK							
LUB OIL STORE TK 22 PS	3.92	3.61	46.6	12.900	17.0	4.700	
OTHER TANKS							
Fecal Tk. 23 PS(fr.20-24)	6.70	6.70	88.4	13.20	4.2	0.62	3

COMBINATION OF STORES II

100% STORES (LONG VOYAGE)

ITEM	VOLUME (m3)	WEIGHT (t)	LM (mt)	LCG (m)	VM (mt)	VCG (m)	Free surface moment (mt)
Sp.Gr 1.000							
FRESH WATER							
STERN Tk. 16 (fr.2-8)	19.41	19.41	64.6	3.33	62.7	3.23	132
SIDE Tk. 17 PS (fr.10-18)	6.15	6.15	53.4	8.68	18.6	3.02	
SIDE Tk. 18 StB(fr.10-18)	6.15	6.15	53.4	8.68	18.6	3.02	
TOTAL FRESH WATER	31.71	31.71	171.40	5.41	99.84	3.15	132
Sp.Gr. 0.860							
FUEL OIL TANKS							
DB-Tk.14 Centr.(fr.39-61)	49.90	42.91	1287.4	30.00	25.7	0.600	31
DB-Tk.15 Centr.(fr.24-39)	34.21	29.42	535.2	18.19	17.7	0.600	
SIDE Tk. 19 PS (fr.19-23)	5.29	4.55	57.2	12.57	11.2	2.470	
SIDE Tk. 20 StB (fr.19-23)	5.29	4.55	57.2	12.57	11.2	2.470	
DAY Tk. 21PS (fr.20-23)	5.22	4.49	57.9	12.90	21.1	4.700	
TOTAL	99.91	85.92	1994.9	23.22	86.97	1.01	
Sp.Gr. 0.920							
LUBOIL TANK							
LUB OIL STORE TK 22 PS	3.92	3.61	46.6	12.900	17.0	4.700	

10% STORES (LONG VOYAGE)

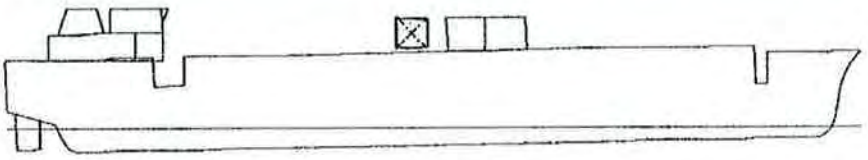
ITEM	VOLUME (m3)	WEIGHT (t)	LM (mt)	LCG (m)	VM (mt)	VCG (m)	Free surface moment (mt)
Sp.Gr 1.000							
FRESH WATER							
STERN Tk. 16 (fr.2-8)	3.1	3.1	11.3	3.65	8.3	2.67	26
Sp.Gr. 0.860							
FUEL OIL TANKS							
DB-Tk.15 Centr.(fr.24-39)	4.78	4.11	74.8	18.19	0.3	0.083	21
DAY Tk. 21PS (fr.20-23)	5.22	4.49	57.9	12.90	21.1	4.700	
TOTAL	10.00	8.60	132.69	15.43	21.44	2.49	
Sp.Gr. 0.920							
LUBOIL TANK							
LUB OIL STORE TK 22 PS	3.92	3.61	46.6	12.900	17.0	4.700	
OTHER TANKS							
Fecal Tk. 23 PS(fr.20-24)	6.70	6.70	88.4	13.20	4.2	0.62	3

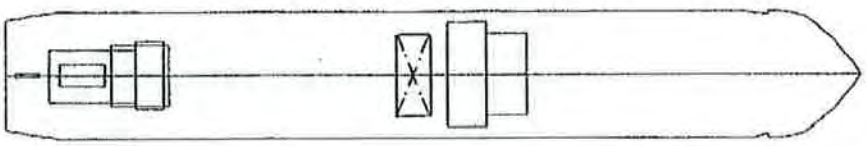
LOAD CONDITION : LIGHTSHIP

WEIGHT AND DISPLACEMENT STATUS

ITEM	WEIGHT	LONGL. MOMENT LM	FORW. FROM AP LCG	VERTICAL MOMENT VM	FROM BL VCG	Free surface
	(t)	(mt)	(m)	(mt)	(m)	moment (mt)
LIGHTSHIP	1101.96	39910.8	36.218	4854.1	4.405	
Container with dieselgenerator	17.00	656.2	38.600	163.2	9.600	
DISPLACEMENT	1118.96	40567.0	36.254	5017.3	4.484	

Floating Status	GM = 2.853m	
Draft FP: 0.976m	Draft MS: 1.547m	Draft AP: 2.118m
LCF = 38.977 m	LCB = 36.202 m	weight/cm = 7.49 t
Trim: Aft 1.142/78.450	VCB = 0.803 m	Moment trim/cm = 33.5





Righting Arms vs Heel Angle

Angles in Degrees Water Specific Gravity: 1.025 Area in m-Rad.

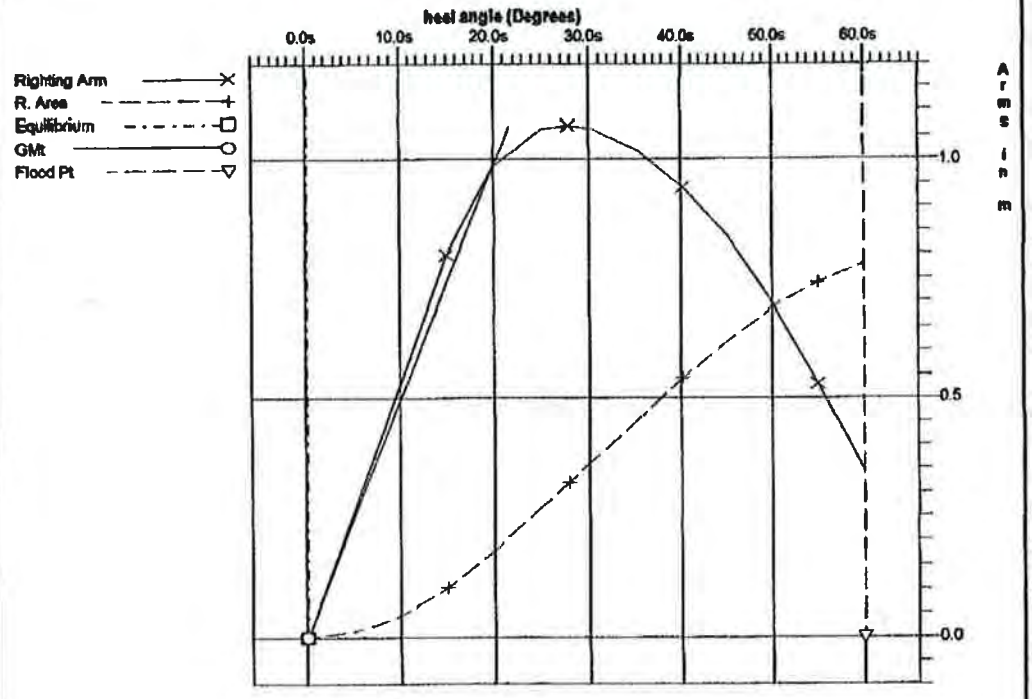
Angle of Heel	Angle of Trim	Origin Depth	Disp. (MT)	Righting In Heel	Area	Flood Pt Height
0.00	0.83a	2.118	1119.48	0.000	0.000	4.286 (1)
5.00s	0.83a	2.106	1118.72	0.259	0.011	4.108 (1)
10.00s	0.82a	2.072	1118.92	0.529	0.048	3.905 (1)
15.00s	0.80a	2.014	1119.31	0.798	0.104	3.679 (1)
20.00s	0.80a	1.920	1119.04	0.987	0.182	3.451 (1)
25.00s	0.80a	1.762	1118.97	1.066	0.272	3.245 (1)
27.59s	0.79a	1.654	1118.82	1.074	0.321	3.148 (1)
30.00s	0.78a	1.541	1118.98	1.067	0.366	3.064 (1)
35.00s	0.76a	1.265	1119.17	1.019	0.457	2.900 (1)
40.00s	0.72a	0.943	1118.51	0.943	0.543	2.752 (1)
45.00s	0.68a	0.587	1118.59	0.838	0.621	2.609 (1)
50.00s	0.64a	0.211	1119.41	0.700	0.688	2.464 (1)
55.00s	0.57a	-0.195	1119.45	0.530	0.742	2.323 (1)
60.00s	0.47a	-0.632	1119.38	0.348	0.781	2.196 (1)

Flood points

Name	Long.	Trans.	Vert.	Height	Related Tank
(1) Acces d	7.200f	1.900s	6.300	4.286	none

LIM IMO RESOLUTOIN A.167 /ES	Min/Max	Margin%
(1) Area from 0 deg to 30	> 0.0550 m-R	565%
(2) Area from 0 deg to 40 or Flood	> 0.0900 m-R	503%
(3) Area from 30 deg to 40 or Flood	> 0.0300 m-R	491%
(4) Righting Arm at 30 deg	> 0.200 m	433%
(5) Angle from 0 deg to MaxRA	> 25.00 deg	3 deg
(6) GM at Equilibrium	> 0.150 m	1801%

Righting Arms vs. Heel

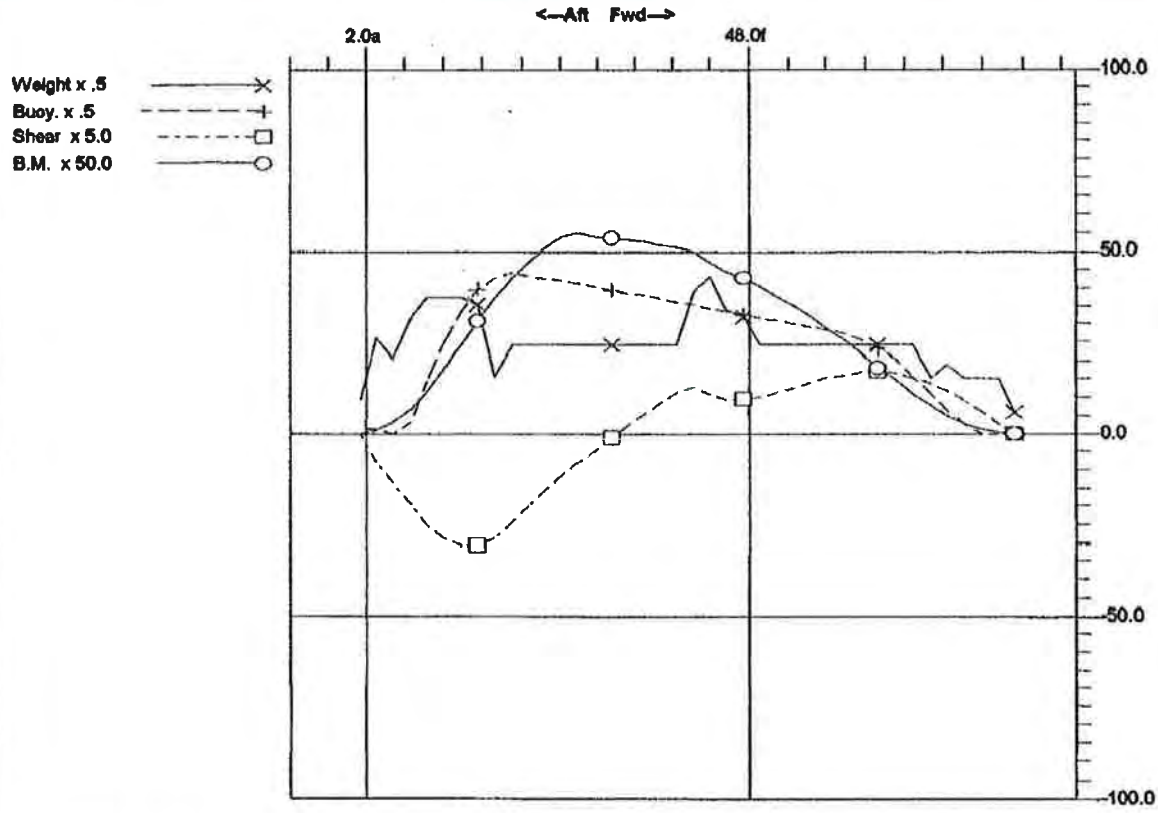


LOAD CONDITION :LIGHTSHIP - LONGITUDINAL STRENGTH

Frame nr	Position Forw.AP(m)	Shear Force (kN)	Bending Moments(kNm)
39	23.4	523.0	26742
52	31.2	-57.0	26183
„C"	46.8	-469.8	21160
80	51.0	-558.4	18815
86	54.6	-673.1	16589

Longitudinal Strength Summary		
Max. Shear:	152.97 tonnes (1500.63 kN)	at 12.0 m from AP
Max. Bending Moment:	2763 tm (Hogging) (27105 kNm)	at 24.0 m from AP

Longitudinal Strength



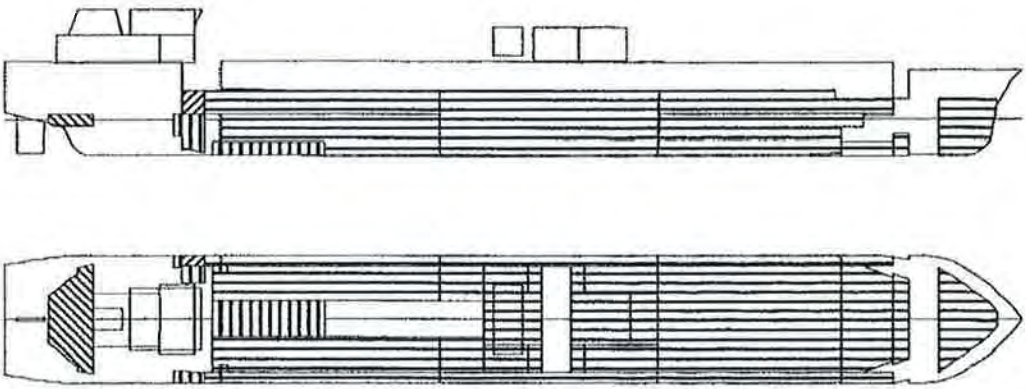
LOAD CONDITION: BALLAST + 100% STORES (SHORT VOYAGE) - DEPARTURE
WEIGHT AND DISPLACEMENT STATUS

ITEM	WEIGHT	LONGL. MOMENT LM	FORW. FROM AP LCG	VERTICAL MOMENT VM	FROM BL VCG	Free surface
	(t)	(m t)	(m)	(m t)	(m)	moment (mt
LIGHTSHIP	1102.0	39910.8	36.218	4854.1	4.405	
BALLAST WATER	1175.8	49043.5	41.710	2268.2	1.929	
CREW&EFFECT&INVENTAR	3.0	25.5	8.500	22.5	7.500	
PROVISION	2.0	14.0	7.000	13.6	6.800	
FRESH WATER	15.0	50.4	3.360	45.5	3.030	121
LUB OIL	3.61	46.6	12.900	17.0	4.700	
FUEL	43.01	707.5	16.449	61.2	1.424	21
CONTAINER WITH DIESEL	17.00	656.2	38.600	163.2	9.600	
DISPLACEMENT	2361.40	90454.4	38.305	7445.3	3.153	142

Correction for free surface

VCG(fsm) = 3.153 + 142 / 2361.40 = 3.213 m

Floating Status						
			GM(Fluid): 1.885m			
Draft FP: 2.806m		Draft MS: 3.128m		Draft AP: 3.449m		
LCF = 37.851 m		LCB = 38.292 m		Weight/cm = 8.29 t		
Trim: Aft 0.643/78.450		VCB = 1.611 m		Moment trim/cm = 44.1 tm		
Loading Summary						
Item	Weight	LCG	TCG	VCG		
Displacemen	2,361.40	38.305f	0.000	3.213		



SEA WATER@BW 1175.82 T
FO@FO 43.01 T
FW@FW 15.00 T
LO@LO 3.61 T

Righting Arms vs Heel Angle

Angles in Degrees Water Specific Gravity: 1.025 Area in m-Rad.

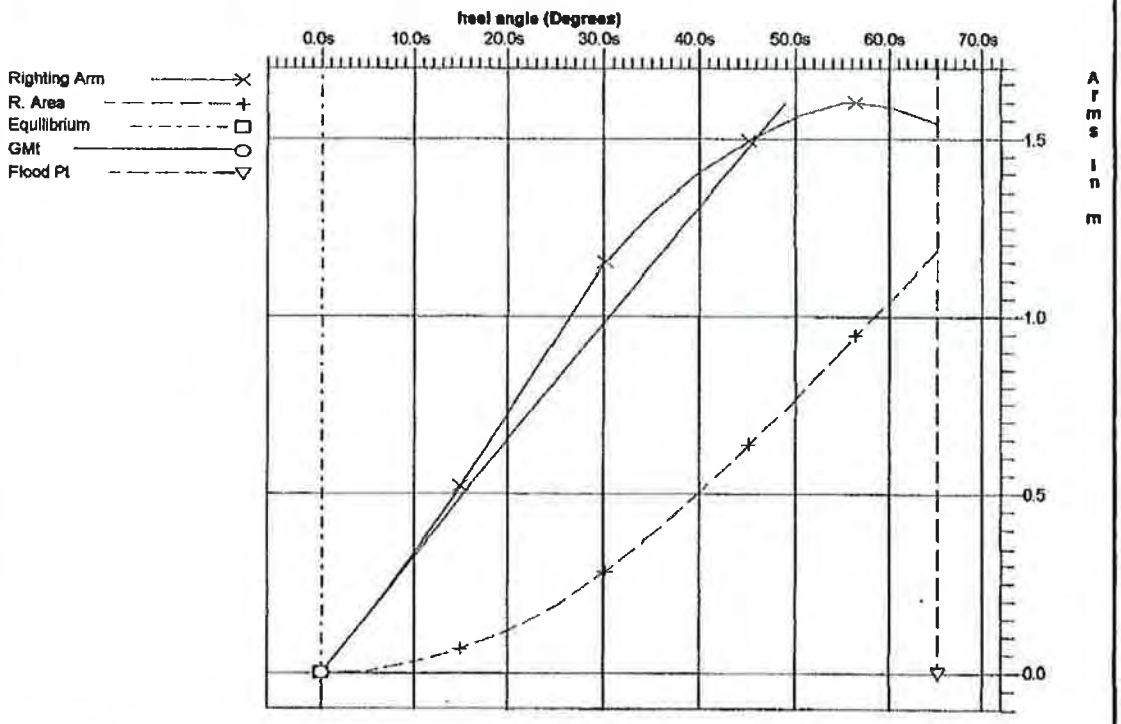
Angle of Heel	Angle of Trim	Origin Depth	Disp. (MT)	Righting In Heel	Area	Flood Pt Height
0.00	0.47a	3.449	2361.38	0.000	0.000	2.910 (1)
5.00s	0.46a	3.428	2361.07	0.166	0.007	2.740 (1)
10.00s	0.43a	3.364	2361.94	0.338	0.029	2.565 (1)
15.00s	0.39a	3.260	2361.96	0.521	0.067	2.382 (1)
20.00s	0.34a	3.120	2361.89	0.724	0.121	2.192 (1)
25.00s	0.27a	2.946	2361.68	0.948	0.194	1.995 (1)
30.00s	0.20a	2.758	2361.86	1.152	0.285	1.772 (1)
35.00s	0.12a	2.536	2361.83	1.298	0.393	1.550 (1)
40.00s	0.06a	2.263	2361.79	1.411	0.511	1.350 (1)
45.00s	0.00f	1.939	2361.92	1.499	0.638	1.173 (1)
50.00s	0.05f	1.580	2361.97	1.563	0.772	1.008 (1)
55.00s	0.08f	1.196	2360.95	1.602	0.910	0.851 (1)
56.34s	0.09f	1.091	2360.93	1.604	0.948	0.807 (1)
60.00s	0.12f	0.806	2361.47	1.592	1.050	0.684 (1)
65.00s	0.15f	0.411	2361.44	1.543	1.187	0.511 (1)

Flood points

Name	Long.	Trans.	Vert.	Height	Related Tank
(1) Acces d	7.200f	1.900s	6.300	2.910	none

LIM IMO RESOLUTOIN A.167 /ES	Min/Max	Margin%
(1) Area from 0 deg to 30	> 0.0550 m-R	419%
(2) Area from 0 deg to 40 or Flood	> 0.0900 m-R	468%
(3) Area from 30 deg to 40 or Flood	> 0.0300 m-R	652%
(4) Righting Arm at 30 deg	> 0.200 m	476%
(5) Angle from 0 deg to MaxRA	> 25.00 deg	31 deg
(6) GM at Equilibrium	> 0.150 m	1156%

Righting Arms vs. Heel

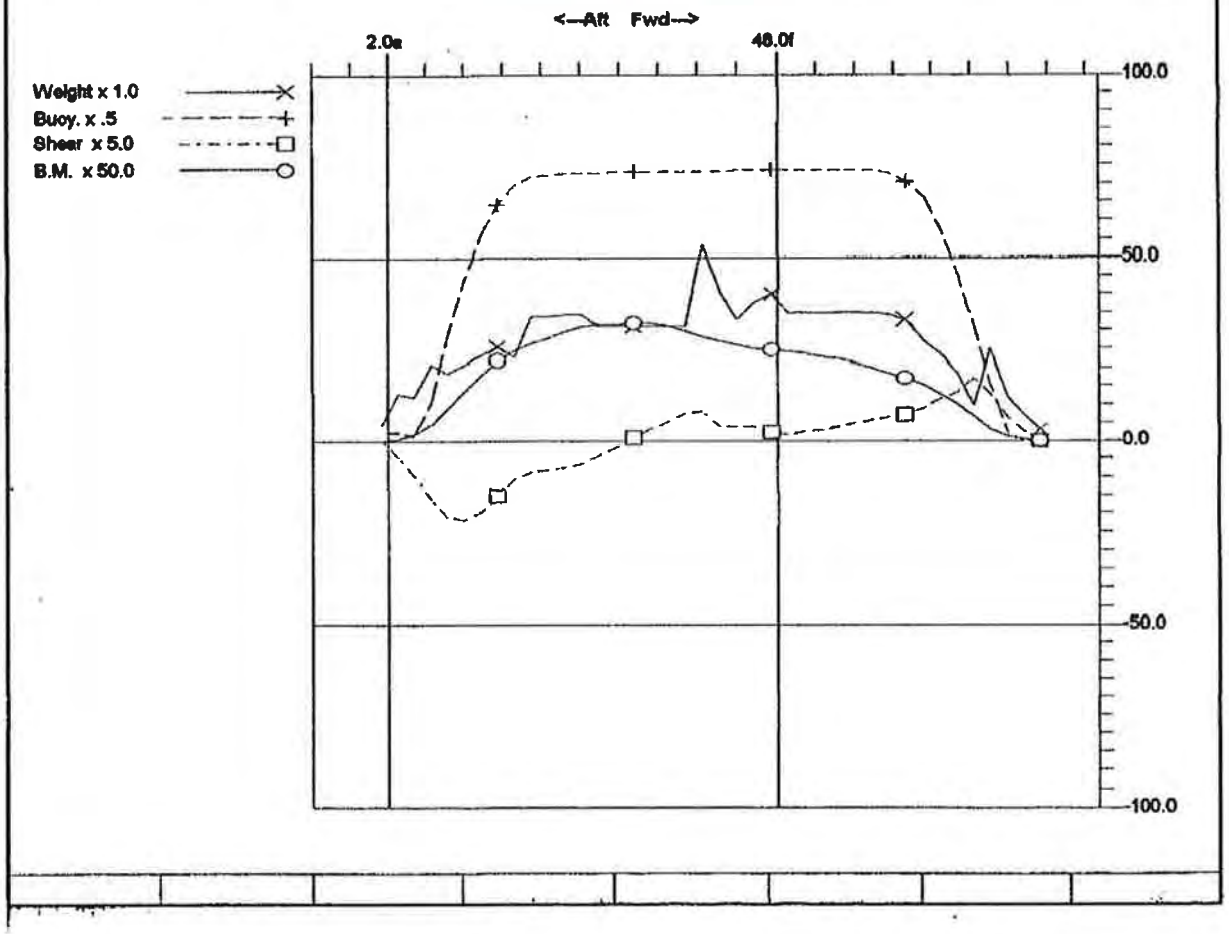


LOAD CONDITION :BALLAST DEPARTURE - LONGITUDINAL STRENGTH

Frame nr	Position Forw.AP(m)	Shear Force (kN)	Bending Moments(kNm)
39	23.4	288.7	15450
52	31.2	-71.1	15725
„C"	46.8	-138.2	12155
80	51.0	-117.2	11733
86	54.6	-184.0	11105

Longitudinal Strength Summary		
Max. Shear:	109.72 tonnes (1076 kN)	at 7.0 m from AP
Max. Bending Moment:	1609 tm (Hogging) (15784 kNm)	at 33.0 m from AP

Longitudinal Strength

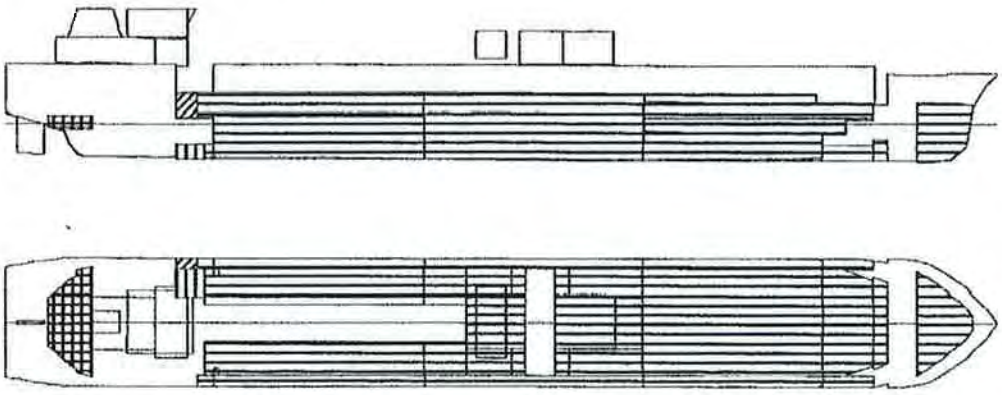


LOAD CONDITION: BALLAST + 10% STORES (SHORT VOAGE) - ARRIVAL
WEIGHT AND DISPLACEMENT STATUS

ITEM	WEIGHT	LONGL. MOMENT LM	FORW. FROM AP LCG	VERTICAL MOMENT VM	FROM BL VCG	Free surface
	(t)	(mt)	(m)	(mt)	(m)	moment (mt
LIGHTSHIP	1102.0	39910.8	36.218	4854.1	4.405	
BALLAST WATER	1175.8	49043.5	41.710	2268.2	1.929	
CREW&EFFECT&INVENTA	3.0	25.5	8.500	22.5	7.500	
PROVISION	0.2	1.4	7.000	1.4	6.800	
FRESH WATER	1.50	5.0	3.330	3.9	2.591	20
LUB OIL	3.61	46.6	12.900	17.0	4.700	
FUEL DAY TK 21	4.30	55.5	12.900	20.2	4.700	
CONTAINER WITH DIESEL	17.00	656.2	38.600	163.2	9.600	
Fecal TK 23	6.70	86.4	13.200	4.2	0.620	3
DISPLACEMENT	2314.09	89832.8	38.820	7354.6	3.178	23

Correction for free surface VCG(fsm) = 3.178 + 23/ 2314 = 3.188 m

Floating Status						
			GM(Fluid): 1.912m			
Draft FP: 2.886m		Draft MS: 3.075m		Draft AP: 3.264m		
LCF = 38.236 m		LCB = 38.812 m		Weight/cm = 8.21 t		
Trim: Aft 0.378/78.450		VCB = 1.578 m		Moment trim/cm = 43.9 tm		
Loading Summary						
Item	**Weight**	**LCG**	**TCG**	**VCG**		
Displacemen	2,314.09	38.820f	0.000	3.188		



SALT WATER 1175.82 T
SEW@Misc. 6.70 T
FO@FO 4.30 T
LO@LO 3.61 T
FW@FW 1.50 T

Righting Arms vs Heel Angle

Angles in Degrees Water Specific Gravity: 1.025 Area in m-Rad.

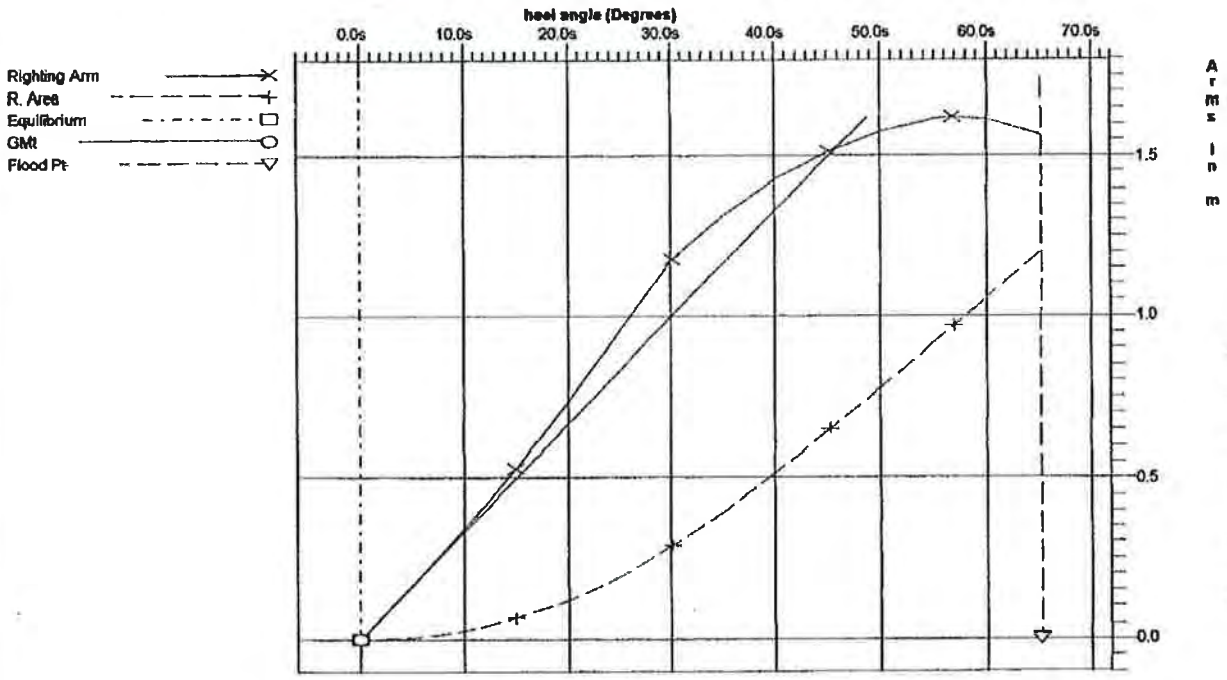
Angle of Heel	Angle of Trim	Origin Depth	Disp. (MT)	Righting In Heel	Area	Flood Pt Height
0.00	0.28a	3.264	2314.42	0.000	0.000	3.071 (1)
5.00s	0.27a	3.243	2313.55	0.168	0.007	2.901 (1)
10.00s	0.24a	3.182	2314.58	0.342	0.030	2.723 (1)
15.00s	0.21a	3.084	2314.68	0.529	0.067	2.536 (1)
20.00s	0.16a	2.949	2314.55	0.736	0.123	2.341 (1)
25.00s	0.09a	2.779	2314.46	0.966	0.197	2.140 (1)
30.00s	0.02a	2.587	2314.54	1.178	0.290	1.921 (1)
35.00s	0.05f	2.364	2314.52	1.322	0.400	1.700 (1)
40.00s	0.11f	2.091	2314.64	1.431	0.520	1.500 (1)
45.00s	0.17f	1.766	2314.59	1.516	0.649	1.323 (1)
50.00s	0.23f	1.403	2314.65	1.579	0.784	1.163 (1)
55.00s	0.27f	1.012	2313.77	1.620	0.924	1.011 (1)
56.65s	0.28f	0.881	2313.77	1.622	0.971	0.960 (1)
60.00s	0.31f	0.613	2314.07	1.612	1.065	0.853 (1)
65.00s	0.35f	0.211	2314.12	1.564	1.204	0.686 (1)

Flood points

Name	Long.	Trans.	Vert.	Height	Related Tank
(1) Acces d	7.200f	1.900s	6.300	3.071	none

LIM IMO RESOLUTOIN A.167 /ES	Min/Max	Margin%
(1) Area from 0 deg to 30	> 0.0550 m-R	428%
(2) Area from 0 deg to 40 or Flood	> 0.0900 m-R	478%
(3) Area from 30 deg to 40 or Flood	> 0.0300 m-R	666%
(4) Righting Arm at 30 deg	> 0.200 m	489%
(5) Angle from 0 deg to MaxRA	> 25.00 deg	32 deg
(6) GM at Equilibrium	> 0.150 m	1174%

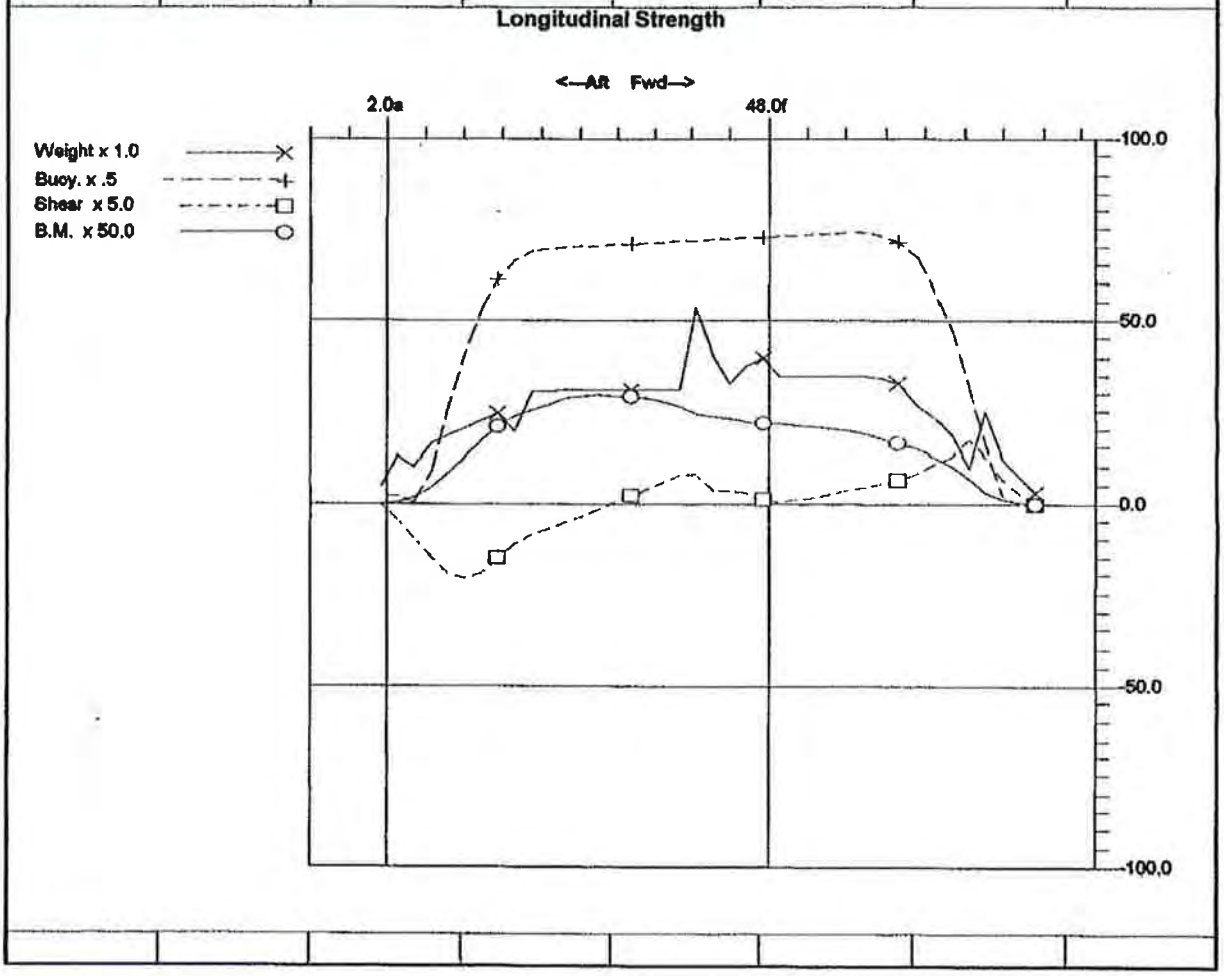
Righting Arms vs. Heel



LOAD CONDITION :BALLAST ARRIVAL - LONGITUDINAL STRENGTH

Frame nr	Position Forw.AP(m)	Shear Force (kN)	Bending Moments(kNm)
39	23.4	+159.2	14568
52	31.2	-129.0	14352
„C"	46.8	-75.5	10791
80	51.0	-53.8	10614
86	54.6	118.5	10222

Longitudinal Strength Summary		
Max. Shear:	104.42 tonnes (1024 kN)	at 8.50 m from AP
Max. Bending Moment:	1497 tm (Hogging) (14686 kNm)	at 24.0 m from AP



LOAD CONDITION: CEMENT CARGO SETTLED + 100% STORE(SHORT VOYAGE) - DEPARTURE

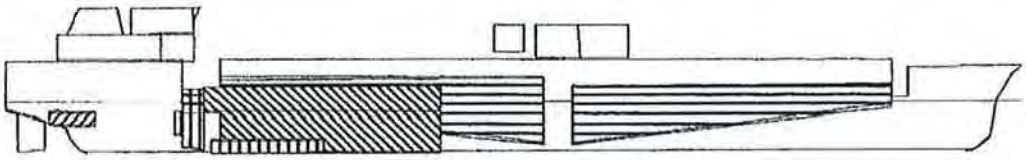
Cement specific gravity 1.35 t/m3 - level in aft cargo tanks equal 6.6 m above BL
level in fore cargo tank equal 5.8 m above BL

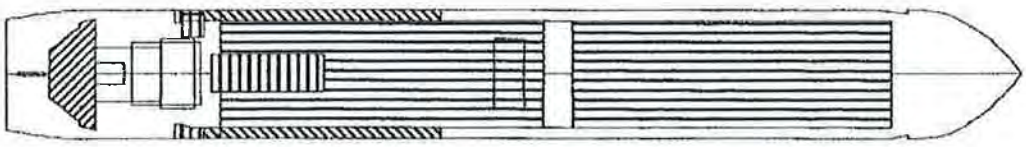
WEIGHT AND DISPLACEMENT STATUS

ITEM	WEIGHT	LONGL. MOMENT LM	FORW. FROM AP LCG	VERTICAL MOMENT VM	FROM BL VCG	Free surface
	(t)	(mt)	(m)	(mt)	(m)	moment (mt)
LIGHTSHIP	1102.0	39910.8	36.218	4854.1	4.405	
CREW&EFFECT&INVENT.	3.0	25.5	8.500	22.5	7.500	
PROVISION	2.0	14.0	7.000	13.6	6.800	
FRESH WATER	15.00	50.4	3.360	45.5	3.030	121
LUB OIL & DIRTY OIL	3.61	46.6	12.900	17.0	4.700	
FUEL OIL	43.01	707.5	16.449	61.2	1.424	21
CONTAINER WITH DIESELC	17.00	656.2	38.600	163.2	9.600	
Ballast water SIDE-Tk.10&11	33.24	792.4	23.840	16.6	0.500	4
CEMENT IN AFT TK	1230.53	36815.0	29.918	5790.9	4.706	
CEMENT IN FORE TK	970.65	53135.3	54.742	4178.6	4.305	
DISPLACEMENT	3420.00	132153.7	38.641	15163.2	4.434	146

Correction for free surface VCG(fsm) = 4.434 + 146/3420 = 4.477 m

Floating Status			GM(Fluid): 0.452m		
Draft FP: 4.266m		Draft MS: 4.367m		Draft AP: 4.467m	
LCF = 36.977 m		LCB = 38.635 m		Weight/cm = 8.90 t	
Trim: Aft 0.201/78.450		VCB = 2.275 m		Moment trim/cm = 54.8 tm	
Loading Summary					
Item	**Weight**	**LCG**	**TCG**	**VCG**	
Displacemen	3,420.00	38.641f	0.000	4.477	





CEMENT 2201.18 T
FO@FO 43.01 MT
SEA WATER@BW 33.24 T
FW@FW 15.00 T
LO@LO 3.61 T

Righting Arms vs Heel Angle

Angles in Degrees Water Specific Gravity: 1.025 Area in m-Rad.

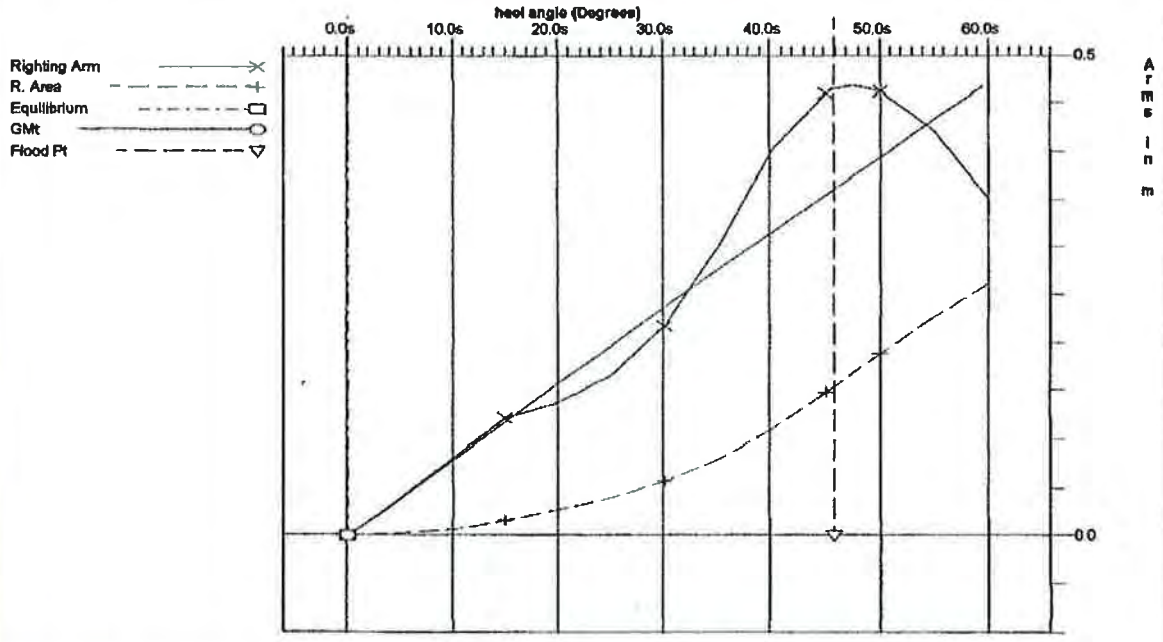
Angle of Heel	Angle of Trim	Origin Depth	Disp. (MT)	Righting In Heel	Area	Flood Pt Height
0.00	0.15a	4.467	3420.51	0.000	0.000	1.851 (1)
5.00s	0.14a	4.446	3419.52	0.040	0.002	1.683 (1)
10.00s	0.12a	4.378	3420.48	0.081	0.007	1.512 (1)
15.00s	0.09a	4.269	3420.02	0.122	0.016	1.336 (1)
20.00s	0.05a	4.143	3420.24	0.137	0.027	1.133 (1)
25.00s	0.00a	3.985	3420.27	0.165	0.040	0.922 (1)
30.00s	0.04f	3.794	3420.21	0.217	0.057	0.706 (1)
35.00s	0.09f	3.569	3419.83	0.299	0.079	0.490 (1)
40.00s	0.14f	3.322	3419.83	0.401	0.110	0.265 (1)
45.00s	0.18f	3.053	3419.62	0.461	0.148	0.036 (1)
45.77s	0.18f	3.011	3419.96	0.464	0.154	0.000 (1)
47.60s	0.20f	2.906	3419.78	0.468	0.169	-0.198 (1)
50.00s	0.21f	2.766	3420.06	0.462	0.188	-0.199 (1)
55.00s	0.25f	2.460	3420.31	0.422	0.227	-0.433 (1)
60.00s	0.28f	2.136	3419.64	0.352	0.261	-0.667 (1)

Flood points

Name	Long.	Trans.	Vert.	Height	Related Tank
(1) Acces d	7.200f	1.900s	6.300	1.851	none

LIM IMO RESOLUTOIN A.167 /ES	Min/Max	Margin%
(1) Area from 0 deg to 30	> 0.0550 m-R	4%
(2) Area from 0 deg to 40 or Flood	> 0.0900 m-R	22%
(3) Area from 30 deg to 40 or Flood	> 0.0300 m-R	76%
(4) Righting Arm at 30 deg	> 0.200 m	9%
(5) Angle from 0 deg to MaxRA	> 25.00 deg	23 deg
(6) GM at Equilibrium	> 0.150 m	201%

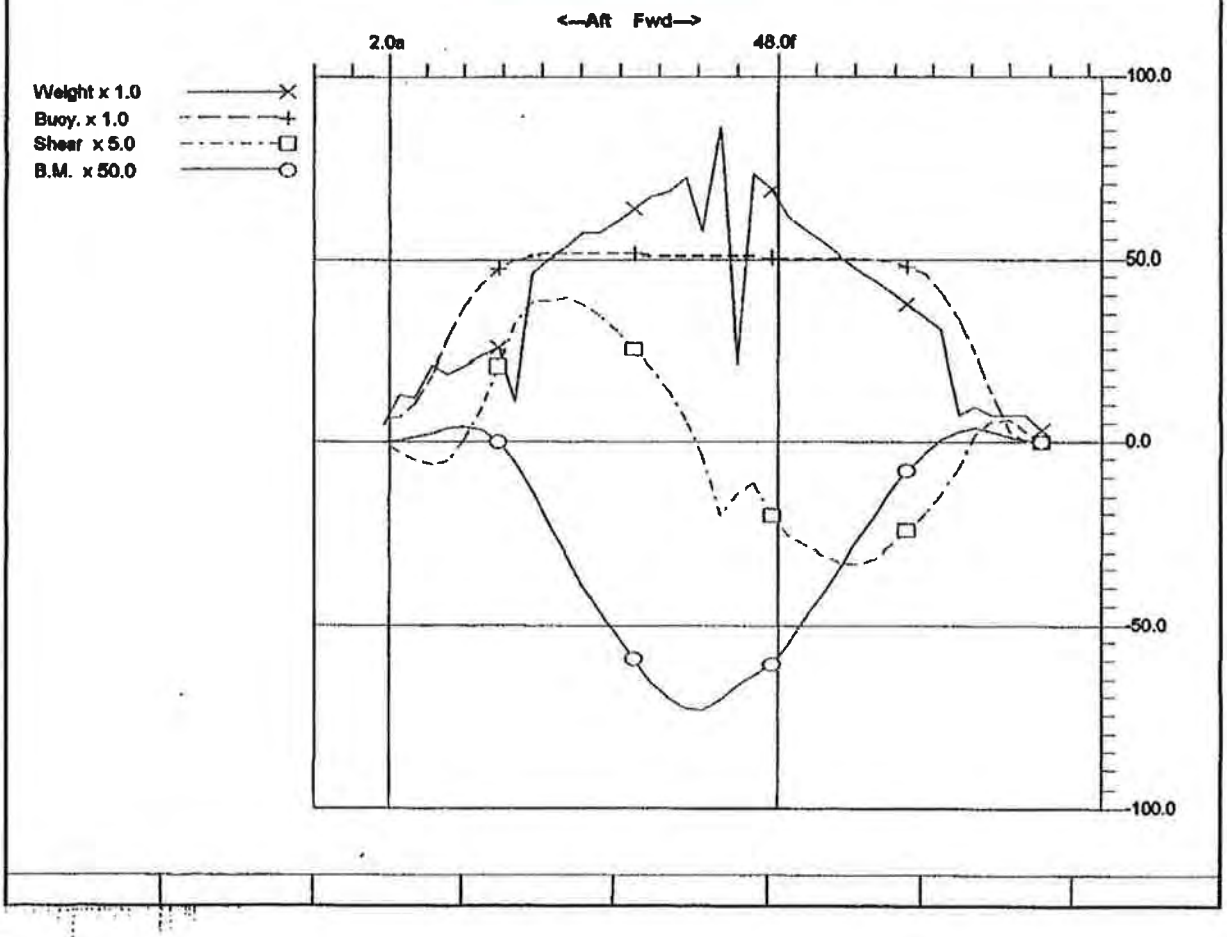
Righting Arms vs. Heel



LOAD CONDITION :
CEMENT CARGO+ SHORT STORES DEPARTURE - LONGITUDINAL STRENGTH

Frame nr	Position Forw.AP(m)	Shear Force (kN)	Bending Moments(kNm)
39	23.4	-1844.3	-19649
52	31.2	-1179.8	-29793
„C"	46.8	931.4	-30038
80	51.0	1353.6	-24437
86	54.6	1541.4	-18904

Longitudinal Strength Summary		
Max. Shear:	-197.71 t (-1939 kN)	at 21.0 m from AP
Max. Bending Moment:	-3666 tm (Sagging) (-35963 kNm)	at 38.6 m from AP



LOAD CONDITION: CEMENT CARGO SETTLED + 10% STORE(SHORT VOYAGE) - ARRIVAL

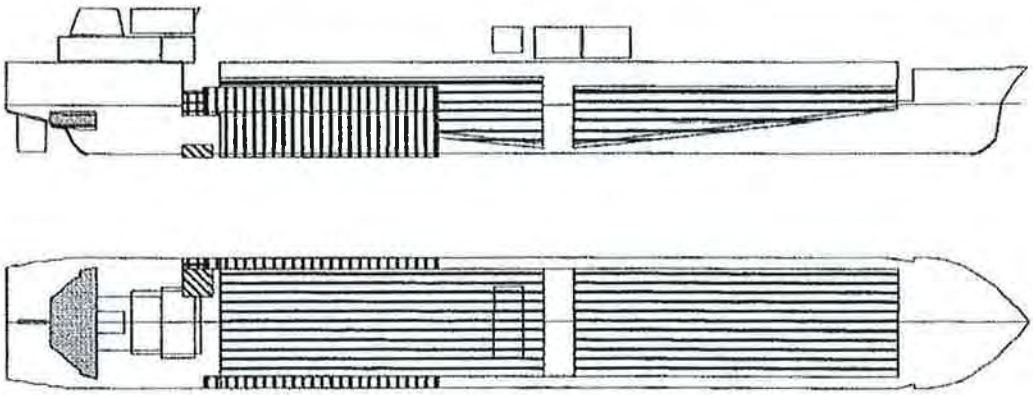
Cement specific gravity 1.35 t/m3 - level in aft cargo tanks equal 6.6 m above BL
level in fore cargo tank equal 5.8 m above BL

WEIGHT AND DISPLACEMENT STATUS

ITEM	WEIGHT	LONGL. MOMENT LM	FORW. FROM AP LCG	VERTICAL MOMENT VM	FROM BL VCG	Free surface
	(t)	(mt)	(m)	(mt)	(m)	moment (mt)
LIGHTSHIP	1102.0	39910.8	36.218	4854.1	4.405	
CREW&EFFECT&INVENT.	3.0	25.5	8.500	22.5	7.500	
PROVISION	0.2	1.4	7.000	1.4	6.800	
FRESH WATER	1.50	5.0	3.330	3.9	2.590	20
LUB OIL & DIRTY OIL	3.61	46.6	12.900	17.0	4.700	
FUEL DAY TK 21	4.30	55.5	12.900	20.2	4.700	
Fecal Tk 21	6.70	88.4	13.200	4.2	0.620	
CONTAINER WITH DIESEL	17.00	656.2	38.600	163.2	9.600	
Ballast water SIDE-TK10&11	33.24	792.4	23.840	16.6	0.500	4
CEMENT IN AFT TK	1230.53	36814.8	29.918	5790.9	4.706	
CEMENT IN FORE TK	970.65	53135.3	54.742	4178.6	4.305	
DISPLACEMENT	3372.69	131532.0	38.999	15072.5	4.469	24

Correction for free surface moment in balast tank VCG(fsm) = 4.469 + 24/3372.69 = 4.476 m

Floating Status		GM(Fluid): 0.444m				
Draft FP: 4.319m		Draft MS: 4.319m		Draft AP: 4.319m		
LCF = 37.131 m		LCB = 38.999 m		Weight/cm = 8.87 t		
Trim: 0.00		VCB = 2.246 m		Moment trim / cm = 54.4 tm		
Loading Summary						
Item	**Weight**	**LCG**	**TCG**	**VCG**		
Displacemen	3,372.69	38.999f	0.000	4.476		



CEMENT 2201.18 T
SEA WATER@BW 33.24 T
SEW@Misc. 6.70 T
FO@FO 4.30 T
LO@LO 3.61 T

Righting Arms vs Heel Angle

Angles in Degrees Water Specific Gravity: 1.025 Area in m-Rad.

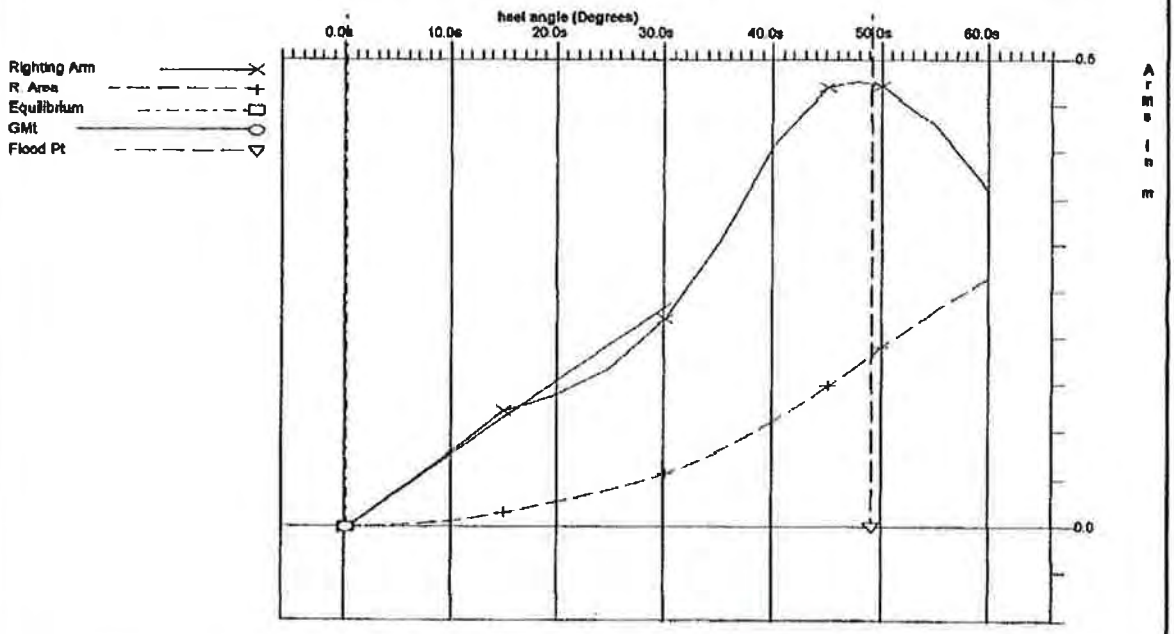
Angle of Heel	Angle of Trim	Origin Depth	Disp. (MT)	Righting In Heel	Area	Flood Pt Height
0.00	0.00f	4.316	3372.97	0.000	0.000	1.983 (1)
5.00s	0.01f	4.294	3372.20	0.040	0.002	1.815 (1)
10.00s	0.03f	4.225	3373.20	0.080	0.007	1.646 (1)
15.00s	0.07f	4.111	3372.71	0.122	0.016	1.474 (1)
20.00s	0.12f	3.983	3373.20	0.140	0.027	1.273 (1)
25.00s	0.16f	3.826	3373.21	0.168	0.041	1.061 (1)
30.00s	0.20f	3.637	3372.57	0.221	0.058	0.843 (1)
35.00s	0.25f	3.414	3372.52	0.304	0.080	0.625 (1)
40.00s	0.30f	3.164	3372.54	0.407	0.111	0.404 (1)
45.00s	0.35f	2.883	3372.34	0.468	0.150	0.184 (1)
47.69s	0.37f	2.724	3372.14	0.476	0.172	0.065 (1)
49.11s	0.39f	2.638	3372.08	0.474	0.184	0.001 (1)
50.00s	0.40f	2.585	3373.18	0.470	0.191	-0.041 (1)
55.00s	0.44f	2.268	3373.00	0.430	0.230	-0.266 (1)
60.00s	0.48f	1.936	3372.26	0.359	0.265	-0.492 (1)

Flood points

Name	Long.	Trans.	Vert.	Height	Related Tank
(1) Acces d	7.200f	1.900s	6.300	1.983	none

LIM IMO RESOLUTOIN A.167 /ES	Min/Max	Margin%
(1) Area from 0 deg to 30	> 0.0550 m-R	5%
(2) Area from 0 deg to 40 or Flood	> 0.0900 m-R	23%
(3) Area from 30 deg to 40 or Flood	> 0.0300 m-R	78%
(4) Righting Arm at 30 deg	> 0.200 m	11%
(5) Angle from 0 deg to MaxRA	> 25.00 deg	23 deg
(6) GM at Equilibrium	> 0.150 m	196%

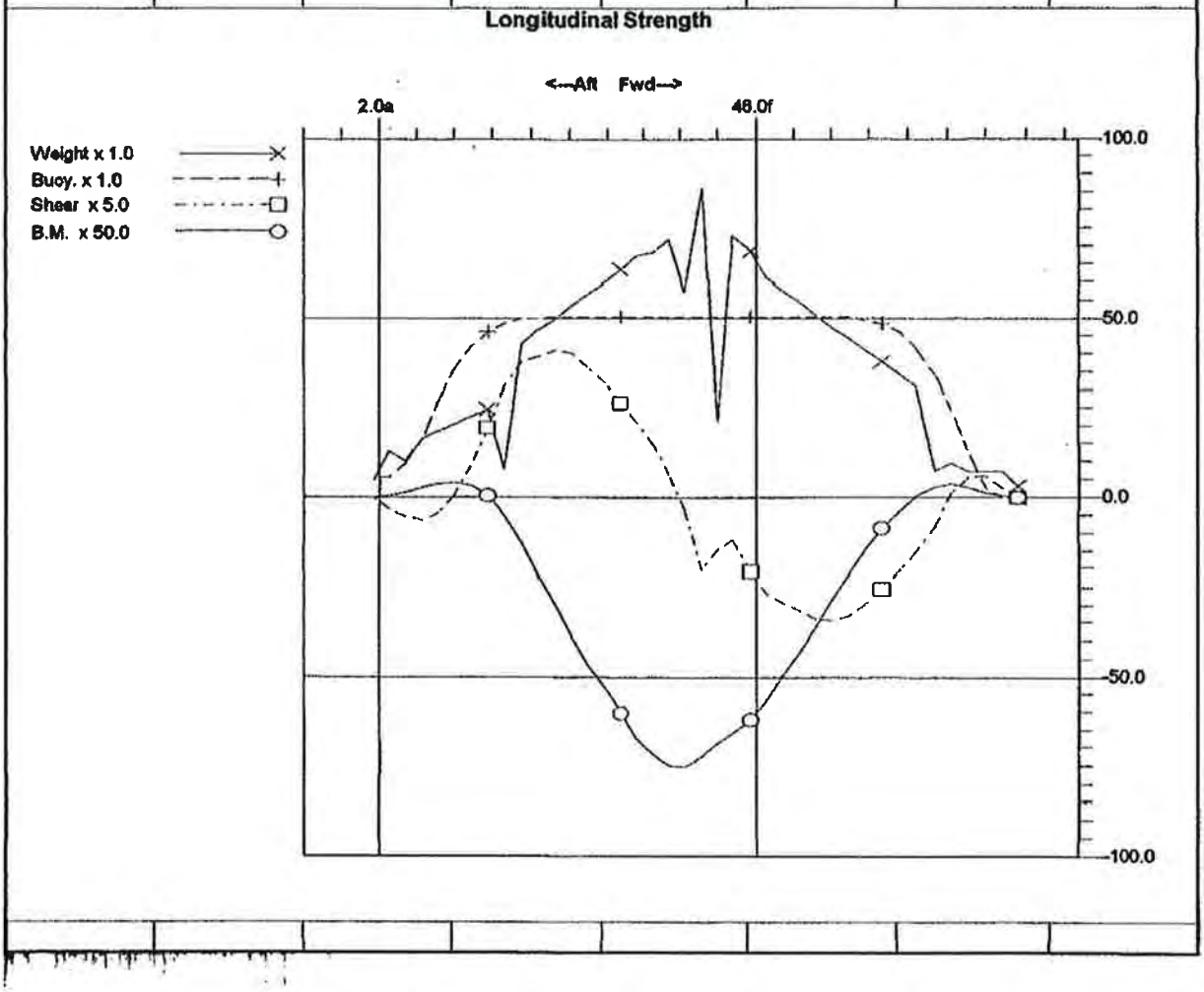
Righting Arms vs. Heel



LOAD CONDITION :
CEMENT CARGO+ SHORT STORES ARRIVAL - LONGITUDINAL STRENGTH

Frame nr	Position Forw.AP(m)	Shear Force (kN)	Bending Moments(kNm)
39	23.4	-1958.1	-19620
52	31.2	-1246.4	-30362
„C"	46.8	958.0	-30911
80	51.0	1388.9	-25182
86	54.6	1581.9	-19503

Longitudinal Strength Summary		
Max. Shear:	-204.96 tonnes (-2011kN)	at 21.0 m from AP
Max. Bending Moment:	-3783 tm (Sagging) (36916 kNm)	at 38.6 m from AP



LOAD CONDITION: CEMENT CARGO SETTLED + 100% STORE(LONG VOYAGE) - DEPARTURE

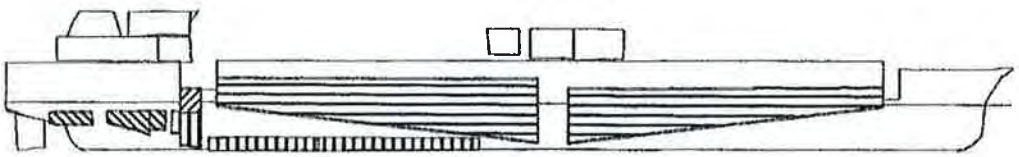
Cement specific gravity 1.35 t/m3 - level in aft cargo tanks equal 6.6 m above BL
level in fore cargo tank equal 5.72 m above BL

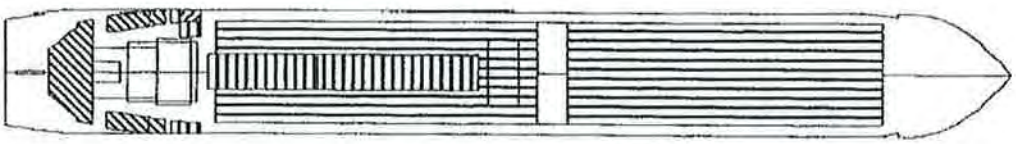
WEIGHT AND DISPLACEMENT STATUS

ITEM	WEIGHT (t)	LONGL. MOMENT LM (mt)	FORW. FROM AP LCG (m)	VERTICAL MOMENT VM (mt)	FROM BL VCG (m)	Free surface moment (mt)
LIGHTSHIP	1102.0	39910.8	36.218	4854.1	4.405	
CREW&EFFECT&INVENT.	3.0	25.5	8.500	22.5	7.500	
PROVISION	2.0	14.0	7.000	13.6	6.800	
FRESH WATER	31.71	171.6	5.410	99.9	3.150	132
LUB OIL & DIRTY OIL	3.61	46.6	12.900	17.0	4.700	
FUEL OIL	85.92	1995.1	23.220	86.8	1.010	31
CONTAINER WITH DIESELC	17.00	656.2	38.600	163.2	9.600	
CEMENT IN AFT TK	1230.53	36815.0	29.918	5790.9	4.706	
CEMENT IN FORE TK	944.27	51623.2	54.670	4026.4	4.264	
DISPLACEMENT	3420.00	131257.9	38.380	15074.3	4.408	163

Correction for free surface moment in tanks VCG(fsm) = 4.408 + 163/3420 = 4.456 m

Floating Status						
			GM(Fluid): 0.477m			
Draft FP: 4.180m		Draft MS: 4.362m		Draft AP: 4.544m		
LCF = 36.881 m		LCB = 38.37 m		Weight/cm = 8.90 t		
Trim: Aft 0.364/78.450		VCB = 2.276 m		Moment trim/cm = 54.8 tm		
Loading Summary						
Item	Weight	LCG	TCG	VCG		
Displacemen	3,420.00	38.380f	0.000	4.456		





CEMENT 2174.8 T
FO@FO 85.92 T
FW@FW 31.71 T
LO@LO 3.61 T

Righting Arms vs Heel Angle

Angles in Degrees Water Specific Gravity: 1.025 Area in m-Rad.

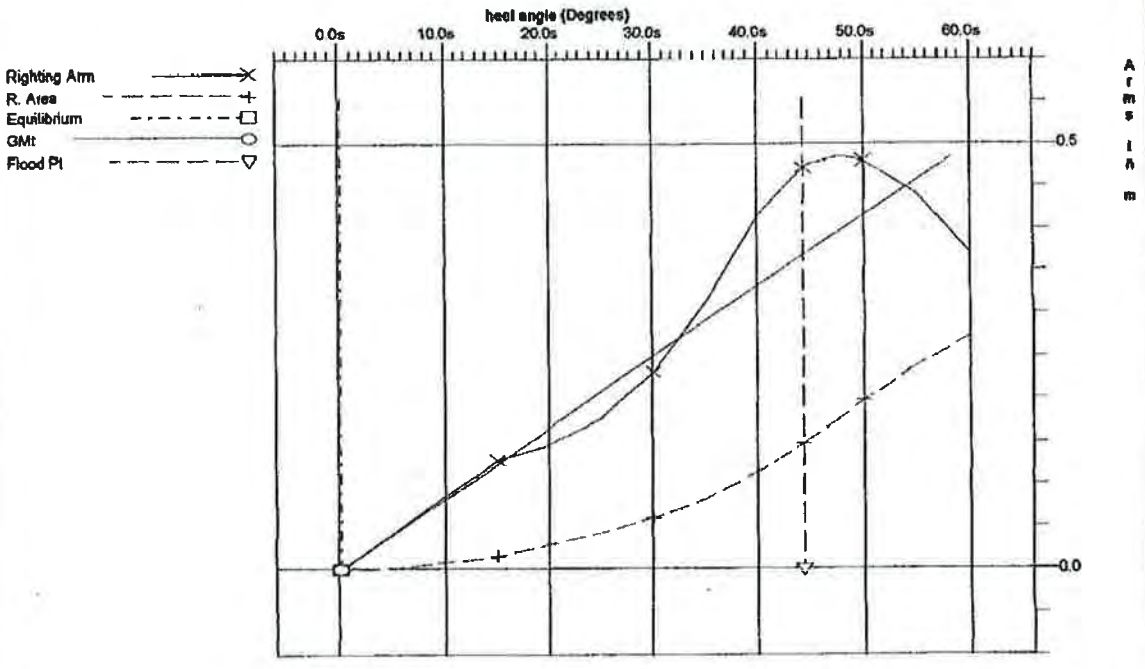
Angle of Heel	Angle of Trim	Origin Depth	Disp. (MT)	Righting In Heel	Area	Flood Pt Height
0.00	0.27a	4.544	3420.55	0.000	0.000	1.789 (1)
5.00s	0.26a	4.523	3419.58	0.042	0.002	1.621 (1)
10.00s	0.25a	4.456	3420.15	0.086	0.007	1.449 (1)
15.00s	0.21a	4.349	3420.06	0.129	0.017	1.271 (1)
20.00s	0.17a	4.224	3420.21	0.146	0.029	1.067 (1)
25.00s	0.12a	4.066	3420.28	0.176	0.043	0.857 (1)
30.00s	0.08a	3.874	3420.22	0.230	0.061	0.642 (1)
35.00s	0.03a	3.648	3419.88	0.313	0.084	0.426 (1)
40.00s	0.01f	3.404	3419.97	0.416	0.116	0.199 (1)
44.26s	0.04f	3.180	3419.41	0.473	0.149	0.001 (1)
45.00s	0.05f	3.142	3420.62	0.478	0.155	-0.036 (1)
47.76s	0.06f	2.987	3419.98	0.485	0.178	-0.273 (1)
50.00s	0.08f	2.858	3420.02	0.480	0.197	-0.273 (1)
55.00s	0.10f	2.556	3419.55	0.441	0.238	-0.512 (1)
60.00s	0.13f	2.237	3419.60	0.371	0.273	-0.749 (1)

Flood points

Name	Long.	Trans.	Vert.	Height	Related Tank
(1) Acces d	7.200f	1.900s	6.300	1.789	none

LIM IMO RESOLUTOIN A.167 /ES	Min/Max	Margin%
(1) Area from 0 deg to 30	> 0.0550 m-R	10%
(2) Area from 0 deg to 40 or Flood	> 0.0900 m-R	29%
(3) Area from 30 deg to 40 or Flood	> 0.0300 m-R	84%
(4) Righting Arm at 30 deg	> 0.200 m	15%
(5) Angle from 0 deg to MaxRA	> 25.00 deg	23 deg
(6) GM at Equilibrium	> 0.150 m	218%

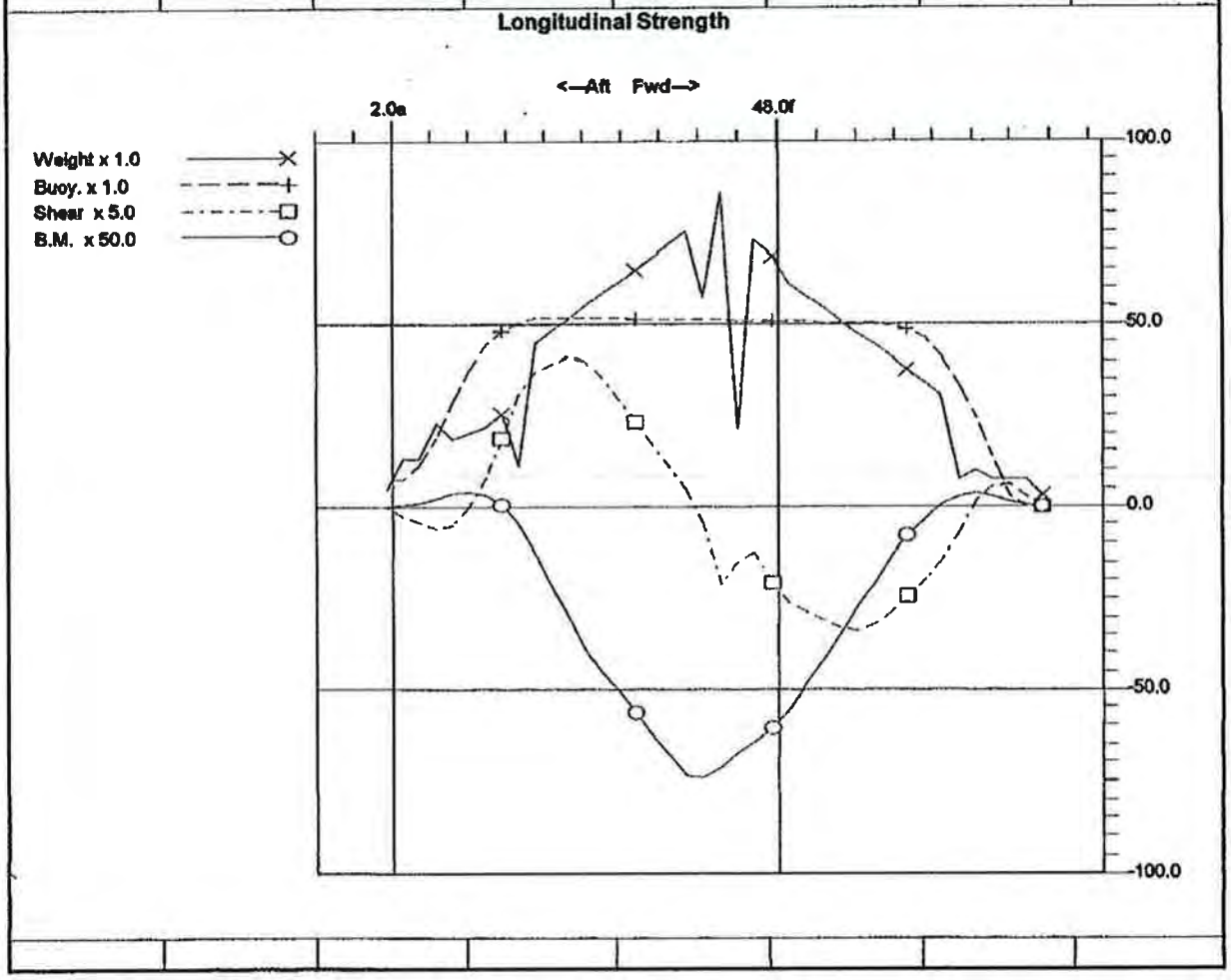
Righting Arms vs. Heel



LOAD CONDITION :
CEMENT CARGO+ LONG STORES DEPARTURE - LONGITUDINAL STRENGTH

Frame nr	Position Forw.AP(m)	Shear Force (kN)	Bending Moments(kNm)
39	23.4	-1972	-19483
52	31.2	-934	-29744
„C"	46.8	958	-30234
80	51.0	1372	-24554
86	54.6	1553	-18973

Longitudinal Strength Summary		
Max. Shear:	-204.82 tonnes (-2009 kN)	at 21.0 m from AP
Max. Bending Moment:	-3728 tm (Sagging) (-36572 kNm)	at 36.6 m from AP



LOAD CONDITION: CEMENT CARGO SETTLED + 10% STORE(LONG VOYAGE) - ARRIVAL

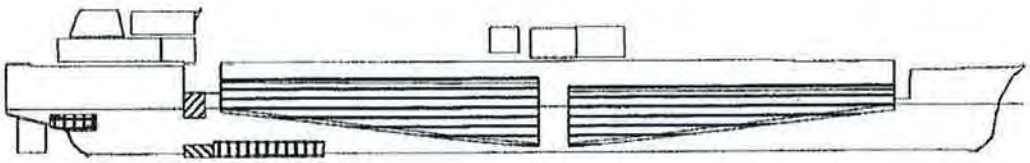
Cement specific gravity 1.35 t/m3 - level in aft cargo tanks equal 6.6 m above BL
level in fore cargo tank equal 5.72 m above BL

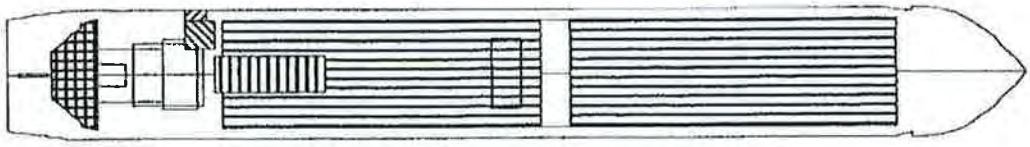
WEIGHT AND DISPLACEMENT STATUS

ITEM	WEIGHT	LONGL. MOMENT LM	FORW. FROM AP LCG	VERTICAL MOMENT VM	FROM BL VCG	Free surface
	(t)	(mt)	(m)	(mt)	(m)	moment (mt)
LIGHTSHIP	1102.0	39910.8	36.218	4854.1	4.405	
CREW&EFFECT&INVENT.	3.0	25.5	8.500	22.5	7.500	
PROVISION	2.0	14.0	7.000	13.6	6.800	
FRESH WATER	3.10	11.3	3.650	8.3	2.670	26
LUB OIL & DIRTY OIL	3.61	46.6	12.900	17.0	4.700	
FUEL OIL	8.60	132.7	15.430	21.4	2.490	21
CONTAINER WITH DIESELC	17.00	656.2	38.600	163.2	9.600	
Fecal Tk.23	6.70	88.4	13.200	4.2	0.620	3
CEMENT IN AFT TK	1230.53	36815.0	29.918	5790.9	4.706	
CEMENT IN FORE TK	944.27	51623.2	54.670	4026.4	4.264	
DISPLACEMENT	3320.77	129323.7	38.944	14921.5	4.493	50

Correction for free surface moment in tanks VCG(fsm) = 4.493 + 50/3320.77 = 4.508 m

Floating Status					
		GM(Fluid): 0.412m			
Draft FP: 4.237m	Draft MS: 4.259m		Draft AP: 4.282m		
LCF = 37.120 m	LCB = 38.943 m		Weight/cm = 8.85		
Trim: Aft 0.045/78.450	VCB = 2.214 m		Moment trim / cm = 54.0 tm		
Loading Summary					
Item	Weight	LCG	TCG	VCG	
Displacemen	3,320.77	38.944f	0.000	4.508	





CEMENT 2174.8 T
FO@FO 8.60 T
SEW@Misc. 6.70 T
LO@LO 3.61 T
FW@FW 3.10 T

Righting Arms vs Heel Angle

Angles in Degrees Water Specific Gravity: 1.025 Area in m-Rad.

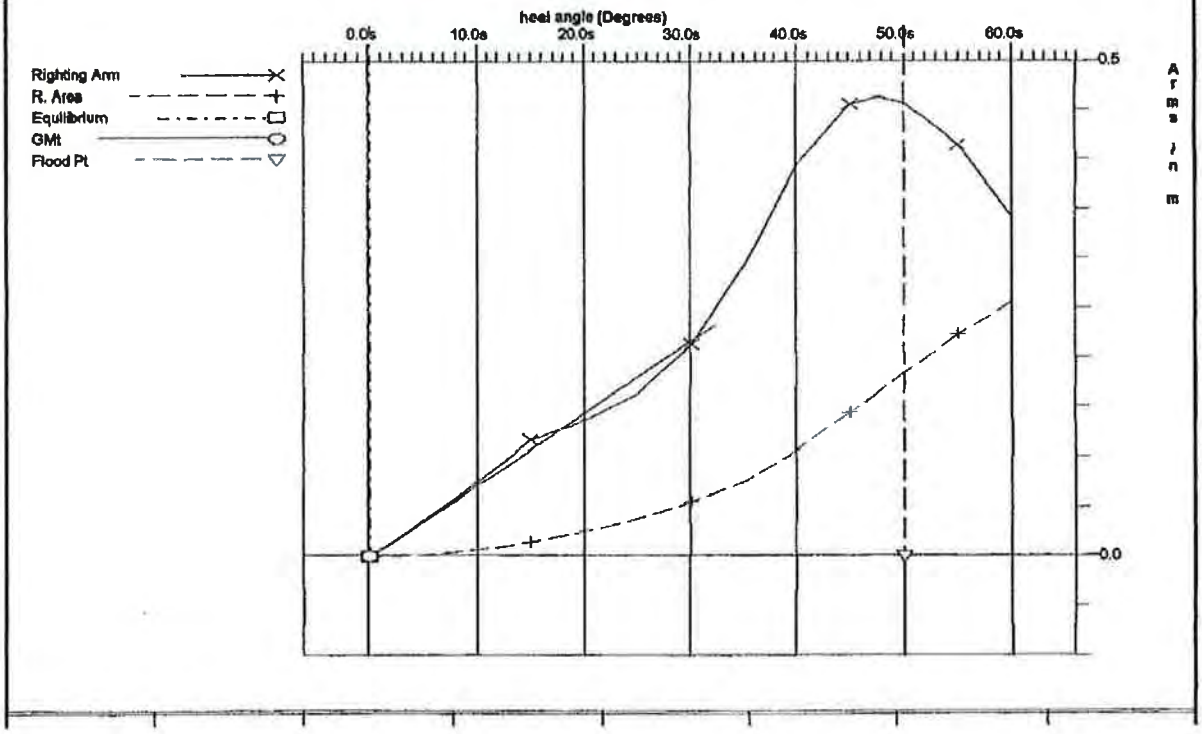
Angle of Heel	Angle of Trim	Origin Depth	Disp. (MT)	Righting In Heel	Area	Flood Pt Height
0.00	0.03a	4.282	3321.16	0.000	0.000	2.022 (1)
5.00s	0.03a	4.260	3320.36	0.037	0.002	1.854 (1)
10.00s	0.01a	4.191	3320.89	0.075	0.006	1.685 (1)
15.00s	0.03f	4.077	3320.77	0.117	0.015	1.513 (1)
20.00s	0.08f	3.946	3321.39	0.135	0.026	1.314 (1)
25.00s	0.13f	3.789	3321.31	0.162	0.039	1.102 (1)
30.00s	0.17f	3.601	3320.88	0.213	0.055	0.883 (1)
35.00s	0.22f	3.380	3320.90	0.294	0.077	0.663 (1)
40.00s	0.27f	3.128	3320.85	0.396	0.107	0.443 (1)
45.00s	0.32f	2.844	3320.40	0.457	0.144	0.227 (1)
47.55s	0.34f	2.692	3320.39	0.463	0.165	0.115 (1)
50.00s	0.36f	2.542	3320.85	0.457	0.185	0.006 (1)
55.00s	0.41f	2.223	3321.06	0.415	0.223	-0.217 (1)
60.00s	0.45f	1.888	3320.44	0.342	0.256	-0.440 (1)

Flood points

Name	Long.	Trans.	Vert.	Height	Related Tank
(1) Acces d	7.200f	1.900s	6.300	2.022	none

LIM IMO RESOLUTOIN A.167 /ES	Min/Max	Margin%
(1) Area from 0 deg to 30	> 0.0550 m-R	0%
(2) Area from 0 deg to 40 or Flood	> 0.0900 m-R	19%
(3) Area from 30 deg to 40 or Flood	> 0.0300 m-R	73%
(4) Righting Arm at 30 deg	> 0.200 m	6%
(5) Angle from 0 deg to MaxRA	> 25.00 deg	23 deg
(6) GM at Equilibrium	> 0.150 m	175%

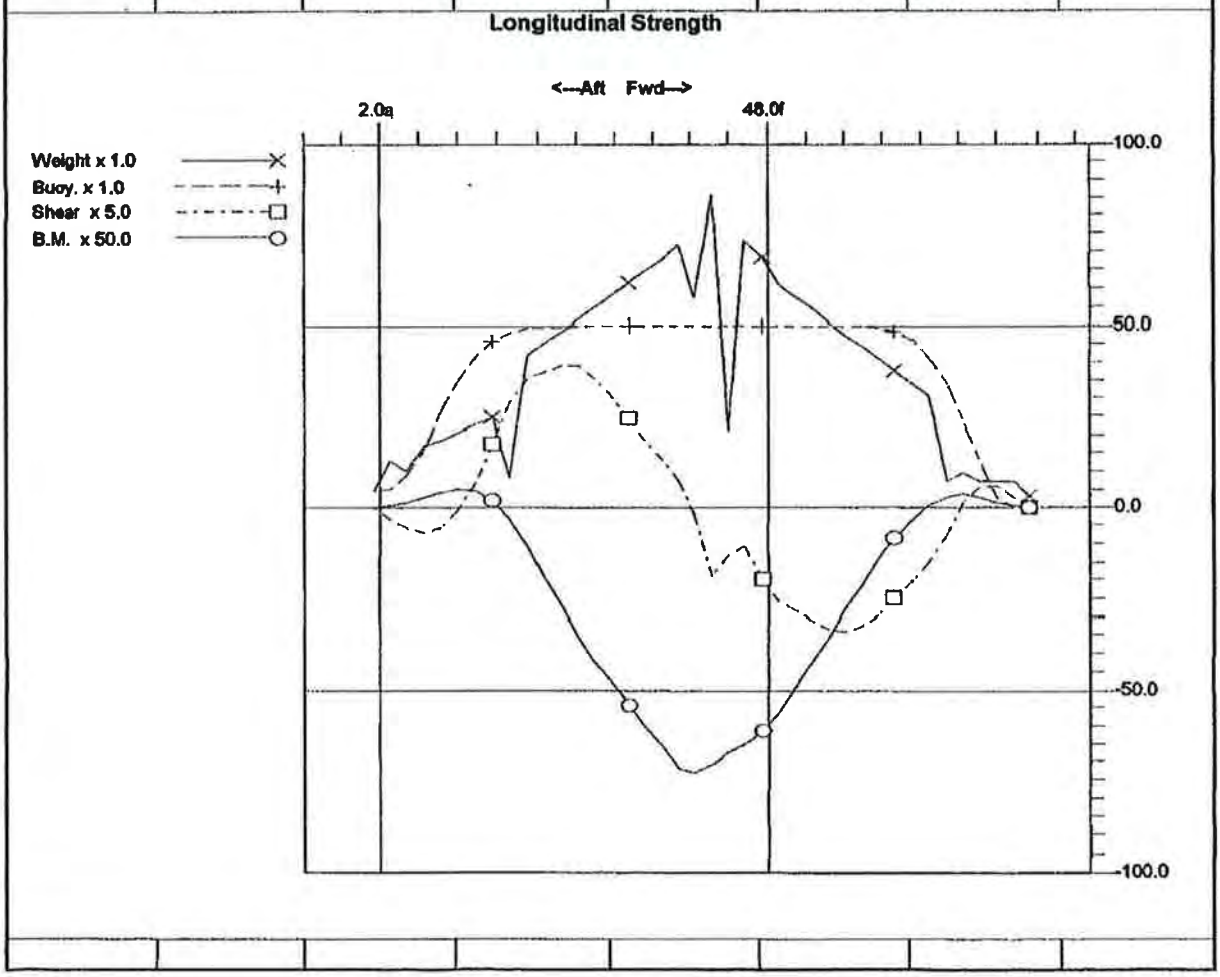
Righting Arms vs. Heel



LOAD CONDITION :
CEMENT CARGO+ LONG STORES ARRIVAL - LONGITUDINAL STRENGTH

Frame nr	Position Forw.AP(m)	Shear Force (kN)	Bending Moments(kNm)
39	23.4	-1917	-17952
52	31.2	-1005	-28567
„C"	46.8	911	-30382
80	51.0	1352	-24809
86	54.6	1554	-19247

Longitudinal Strength Summary			
	Max. Shear:	-197.38 tonnes (1936 kN)	at 21.0 m from AP
	Max. Bending Moment:	-3658 tm (Sagging) (35885 kNm)	at 38.6 m from AP



LOAD CONDITION: FLY ASH CARGO SETTLED + 100% STORE(LONG VOYAGE) - DEPARTURE

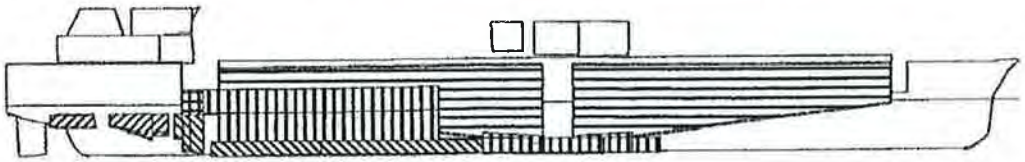
fly ash specific gravity 0.794 t/m3 - cargo tanks full filling height 7.524 m above BL

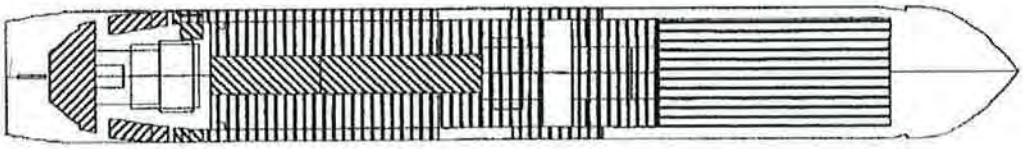
WEIGHT AND DISPLACEMENT STATUS

ITEM	WEIGHT	LONGL. MOMENT LM	FORW. FROM AP LCG	VERTICAL MOMENT VM	FROM BL VCG	Free surface
	(t)	(mt)	(m)	(mt)	(m)	moment (mt)
LIGHTSHIP	1102.0	39910.8	36.218	4854.1	4.405	
CREW&EFFECT&INVENT.	3.0	25.5	8.500	22.5	7.500	
PROVISION	2.0	14.0	7.000	13.6	6.800	
FRESH WATER	31.71	171.6	5.410	99.9	3.150	132
LUB OIL & DIRTY OIL	3.61	46.6	12.900	17.0	4.700	
FUEL OIL	85.92	1995.1	23.220	86.8	1.010	31
CONTAINER WITH DIESELG	17.00	656.2	38.600	163.2	9.600	
Ballast Water Side-Tk .10&11	56.62	1349.8	23.840	91.2	1.610	4
Ballat Water DB-Tk. 8 & 9	181.42	7715.4	42.528	112.8	0.622	
Ballast Water DB-Tk .12&13	136.76	3241.2	23.700	82.1	0.600	
FLY ASH IN AFT TK	900.00	26439.3	29.377	4651.2	5.168	
FLY ASH IN FORE TK	900.00	50240.7	55.823	4651.2	5.168	
DISPLACEMENT	3420.00	131806.1	38.540	14845.5	4.341	167

Correction for free surface moment in tanks VCG(fsm) = 4.341 + 167/3420 = 4.390 m

Floating Status		GM(Fluid): 0.541m			
Draft FP: 4.233m		Draft MS: 4.365m		Draft AP: 4.497m	
LCF = 36.940 m		LCB = 38.533 m		Weight/cm = 8.90 t	
Trim: Aft 0.264/78.450		VCB = 2.276 m		Moment trim /cm 54.8	
Loading Summary					
Item	**Weight**	**LCG**	**TCG**	**VCG**	
Displacemen	3,420.00	38.540f	0.000	4.390	





FLY_ASH 1800 T
SEA WATER@BW 374.8 T
FO@FO 85.92 T
FW@FW 31.71 T
LO@LO 3.61 T

Righting Arms vs Heel Angle

Angles in Degrees Water Specific Gravity: 1.025 Area in m-Rad.

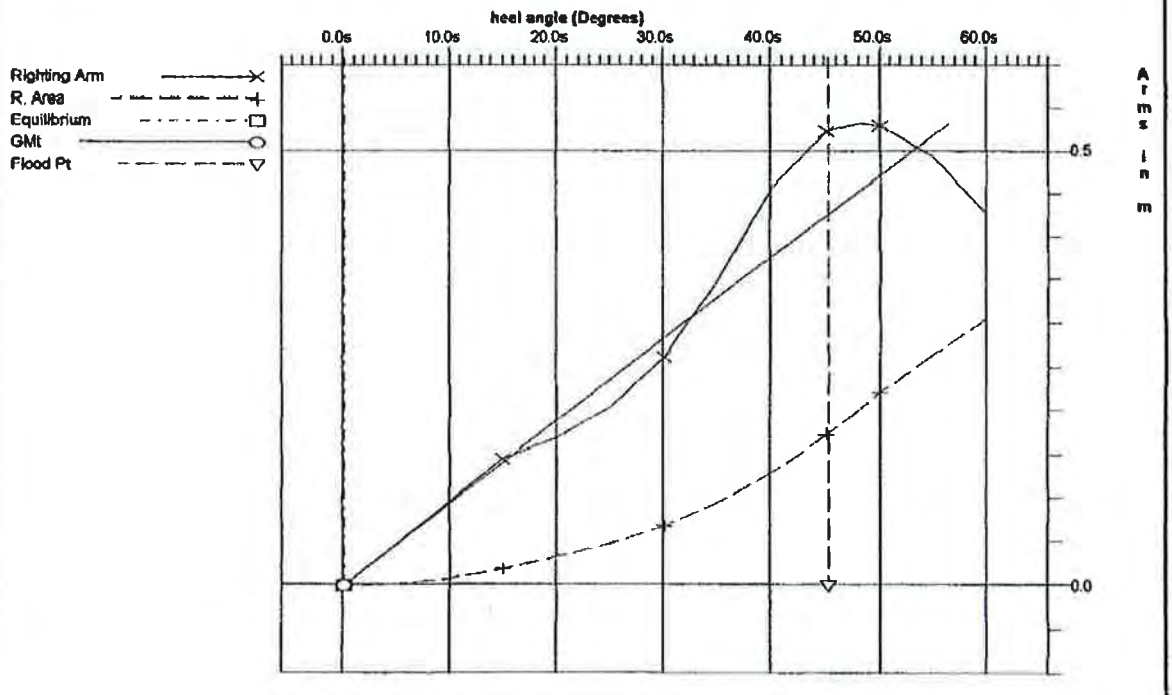
Angle of Heel	Angle of Trim	Origin Depth	Disp. (MT)	Righting In Heel	Area	Flood Pt Height
0.00	0.19a	4.497	3420.32	0.000	0.000	1.827 (1)
5.00s	0.19a	4.475	3419.58	0.048	0.002	1.659 (1)
10.00s	0.17a	4.408	3420.15	0.097	0.008	1.488 (1)
15.00s	0.14a	4.300	3420.02	0.145	0.019	1.311 (1)
20.00s	0.09a	4.174	3420.23	0.168	0.033	1.108 (1)
25.00s	0.05a	4.016	3420.26	0.203	0.049	0.897 (1)
30.00s	0.00a	3.825	3420.21	0.262	0.069	0.681 (1)
35.00s	0.05f	3.599	3419.88	0.350	0.095	0.465 (1)
40.00s	0.09f	3.354	3419.83	0.458	0.131	0.240 (1)
45.00s	0.12f	3.087	3419.61	0.523	0.174	0.008 (1)
45.18s	0.13f	3.077	3419.95	0.524	0.175	0.000 (1)
48.15s	0.15f	2.909	3419.83	0.533	0.203	-0.227 (1)
50.00s	0.16f	2.802	3420.05	0.529	0.220	-0.228 (1)
55.00s	0.19f	2.498	3420.31	0.494	0.265	-0.464 (1)
60.00s	0.22f	2.175	3419.66	0.428	0.305	-0.699 (1)

Flood points

Name	Long.	Trans.	Vert.	Height	Related Tank
(1) Acces d	7.200f	1.900s	6.300	1.827	none

LIM IMO RESOLUTOIN A.167 /ES	Min/Max	Margin%
(1) Area from 0 deg to 30	> 0.0550 m-R	25%
(2) Area from 0 deg to 40 or Flood	> 0.0900 m-R	45%
(3) Area from 30 deg to 40 or Flood	> 0.0300 m-R	105%
(4) Righting Arm at 30 deg	> 0.200 m	31%
(5) Angle from 0 deg to MaxRA	> 25.00 deg	23 deg
(6) GM at Equilibrium	> 0.150 m	260%

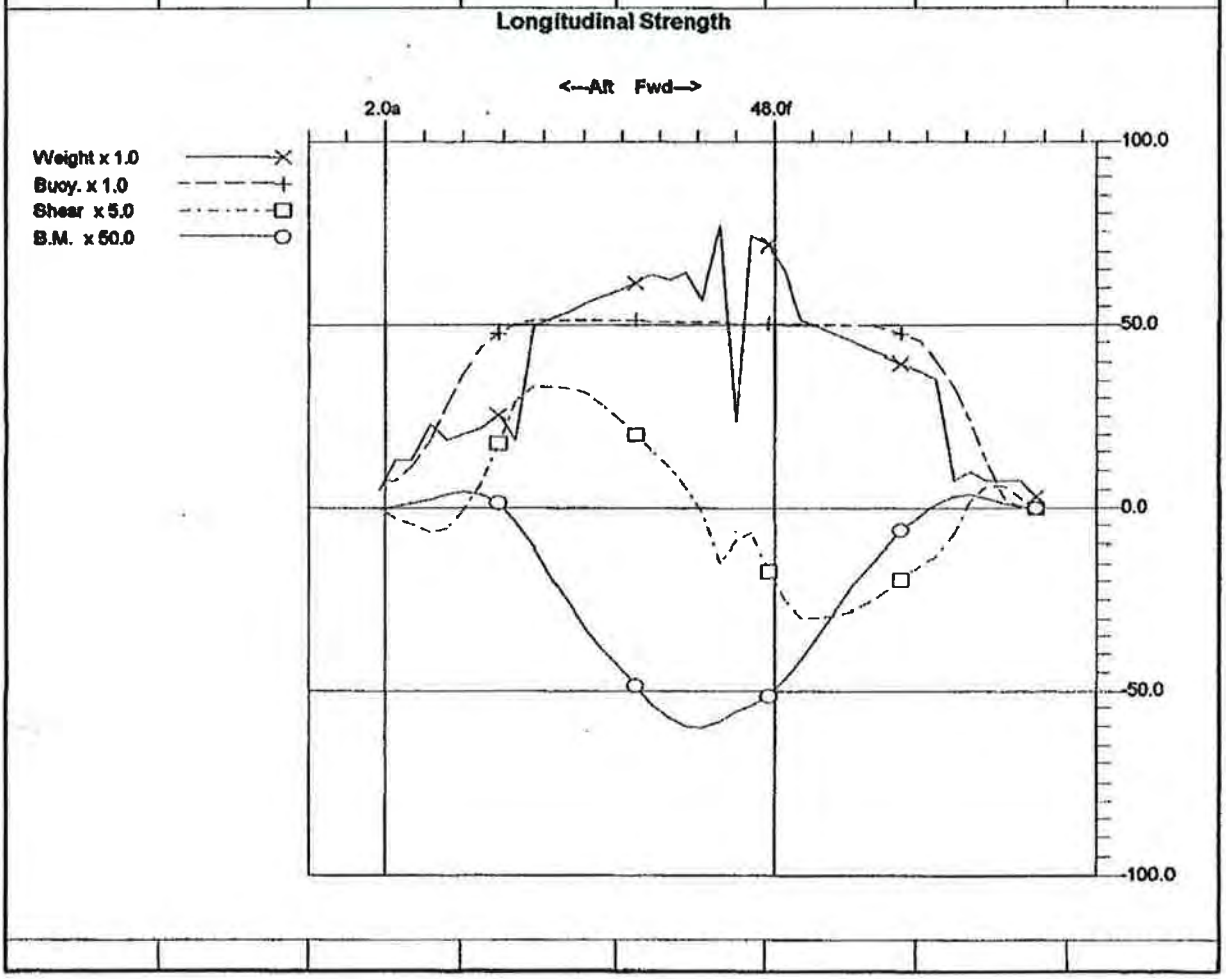
Righting Arms vs. Heel



LOAD CONDITION :
FLY ASH CARGO+ LONG STORES DEPARTURE - LONGITUDINAL STRENGTH

Frame nr	Position Forw.AP(m)	Shear Force (kN)	Bending Moments(kNm)
39	23.4	-1550	-16412
52	31.2	-845	-25673
„C"	46.8	762	-25555
80	51.0	1458	-20787
86	54.6	1426	-15529

Longitudinal Strength Summary		
Max. Shear:	-167.99 tonnes (-1648 kN)	at 16.2 m from AP
Max. Bending Moment:	-3016 tm (Sagging) (-29587 kNm)	at 38.6 m from AP



LOAD CONDITION: FLY ASH CARGO SETTLED + 10% STORE(LONG VOYAGE) - ARRIVAL

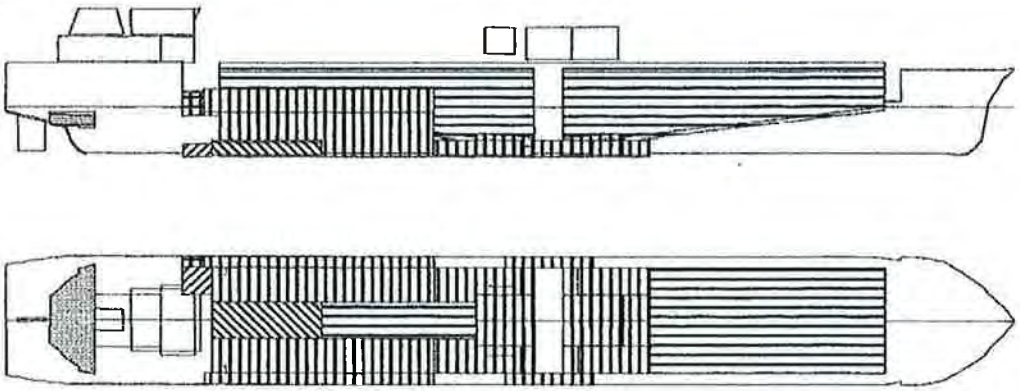
fly ash specific gravity 0.794 t/m3 - cargo tanks full filling height 7.524 m above BL

WEIGHT AND DISPLACEMENT STATUS

ITEM	WEIGHT	LONGL. MOMENT LM	FORW. FROM AP LCG	VERTICAL MOMENT VM	FROM BL VCG	Free surface
	(t)	(mt)	(m)	(mt)	(m)	moment (mt)
LIGHTSHIP	1102.0	39910.8	36.218	4854.1	4.405	
CREW&EFFECT&INVENT.	3.0	25.5	8.500	22.5	7.500	
PROVISION	2.0	14.0	7.000	13.6	6.800	
FRESH WATER	3.10	11.3	3.650	8.3	2.670	26
LUB OIL & DIRTY OIL	3.61	46.6	12.900	17.0	4.700	
FUEL OIL	8.60	132.7	15.430	21.4	2.490	21
Fecal Tk.23	6.70	88.4	13.200	4.2	0.620	3
CONTAINER WITH DIESELC	17.00	656.2	38.600	163.2	9.600	
Ballast Water Side-Tk .10&11	56.62	1349.8	23.840	91.2	1.610	4
Ballat Water DB-Tk. 8 & 9	181.42	7715.4	42.528	112.8	0.622	
Ballast Water DB-Tk .12&13	136.76	3241.2	23.700	82.1	0.600	
FLY ASH IN AFT TK	900.00	26439.3	29.377	4651.2	5.168	
FLY ASH IN FORE TK	900.00	50240.7	55.823	4651.2	5.168	
DISPLACEMENT	3320.77	129872.0	39.020	14692.7	4.424	54

Correction for free surface moment in tanks VCG(fsm) = 4.424 + 54/3320.77 = 4.440 m

Floating Status			GM(Fluid): 0.478m		
Draft FP: 4.261m		Draft MS: 4.261m		Draft AP: 4.260m	
LCF = 37.159 m		LCB = 39.019 m		Weight/cm = 8.85 t	
Trim: 0.000		VCB = 2.214 m		Moment trim/cm = 54.0 tm	
Loading Summary					
Item	Weight	LCG	TCG	VCG	
Displacemen	3,320.77	39.020f	0.000	4.440	



FLY_ASH 1800 T
SEA WATER@BW 374.87 MT
FO@FO 8.60 T
SEW@Misc. 6.70 T
LO@LO 3.61 T

Righting Arms vs Heel Angle

Angles in Degrees Water Specific Gravity: 1.025 Area in m-Rad.

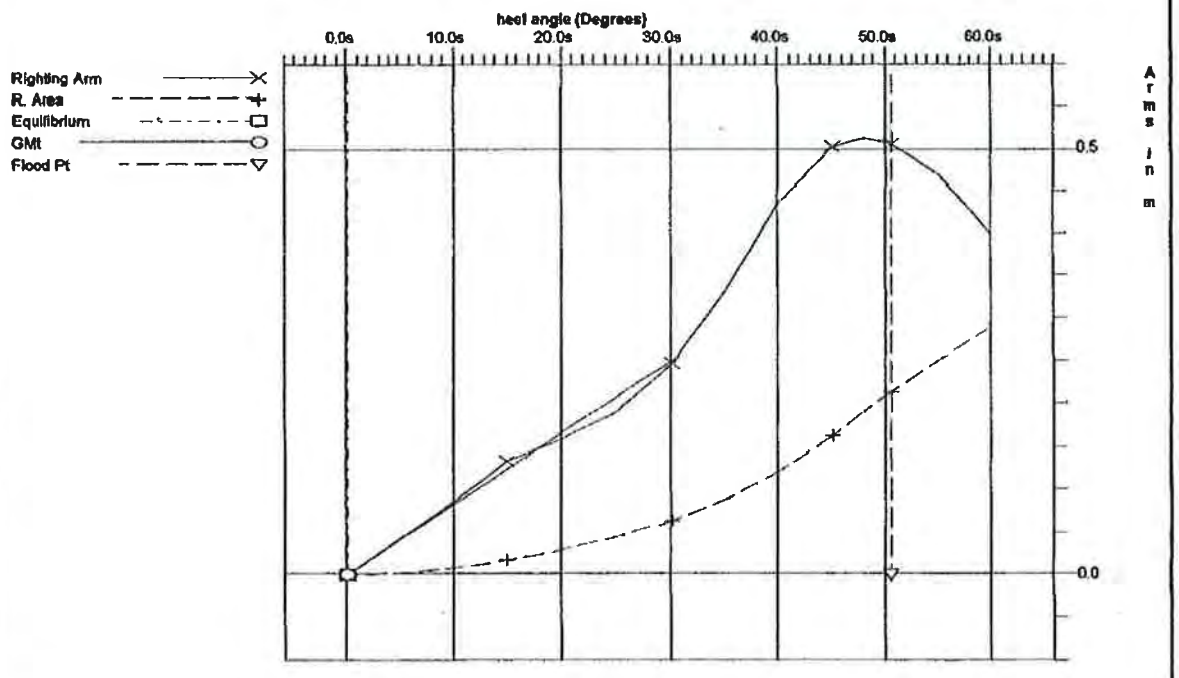
Angle of Heel	Angle of Trim	Origin Depth	Disp. (MT)	Righting In Heel	Area	Flood Pt Height
0.00	0.00f	4.260	3321.11	0.000	0.000	2.040 (1)
5.00s	0.01f	4.237	3320.38	0.043	0.002	1.872 (1)
10.00s	0.03f	4.168	3320.80	0.086	0.007	1.703 (1)
15.00s	0.06f	4.055	3321.00	0.134	0.017	1.531 (1)
20.00s	0.11f	3.923	3321.34	0.158	0.030	1.333 (1)
25.00s	0.16f	3.766	3321.31	0.190	0.045	1.121 (1)
30.00s	0.20f	3.579	3320.89	0.246	0.064	0.902 (1)
35.00s	0.25f	3.358	3320.64	0.333	0.089	0.681 (1)
40.00s	0.30f	3.106	3320.85	0.439	0.123	0.461 (1)
45.00s	0.35f	2.820	3320.40	0.504	0.164	0.247 (1)
47.96s	0.38f	2.642	3320.25	0.513	0.190	0.118 (1)
50.00s	0.40f	2.517	3320.85	0.509	0.209	0.027 (1)
50.60s	0.41f	2.478	3320.48	0.506	0.214	0.001 (1)
55.00s	0.45f	2.197	3321.21	0.470	0.252	-0.195 (1)
60.00s	0.49f	1.860	3320.35	0.400	0.290	-0.417 (1)

Flood points

Name	Long.	Trans.	Vert.	Height	Related Tank
(1) Acces d	7.200f	1.900s	6.300	2.040	none

LIM IMO RESOLUTOIN A.167 /ES	Min/Max	Margin%
(1) Area from 0 deg to 30	> 0.0550 m-R	16%
(2) Area from 0 deg to 40 or Flood	> 0.0900 m-R	36%
(3) Area from 30 deg to 40 or Flood	> 0.0300 m-R	95%
(4) Righting Arm at 30 deg	> 0.200 m	23%
(5) Angle from 0 deg to MaxRA	> 25.00 deg	23 deg
(6) GM at Equilibrium	> 0.150 m	219%

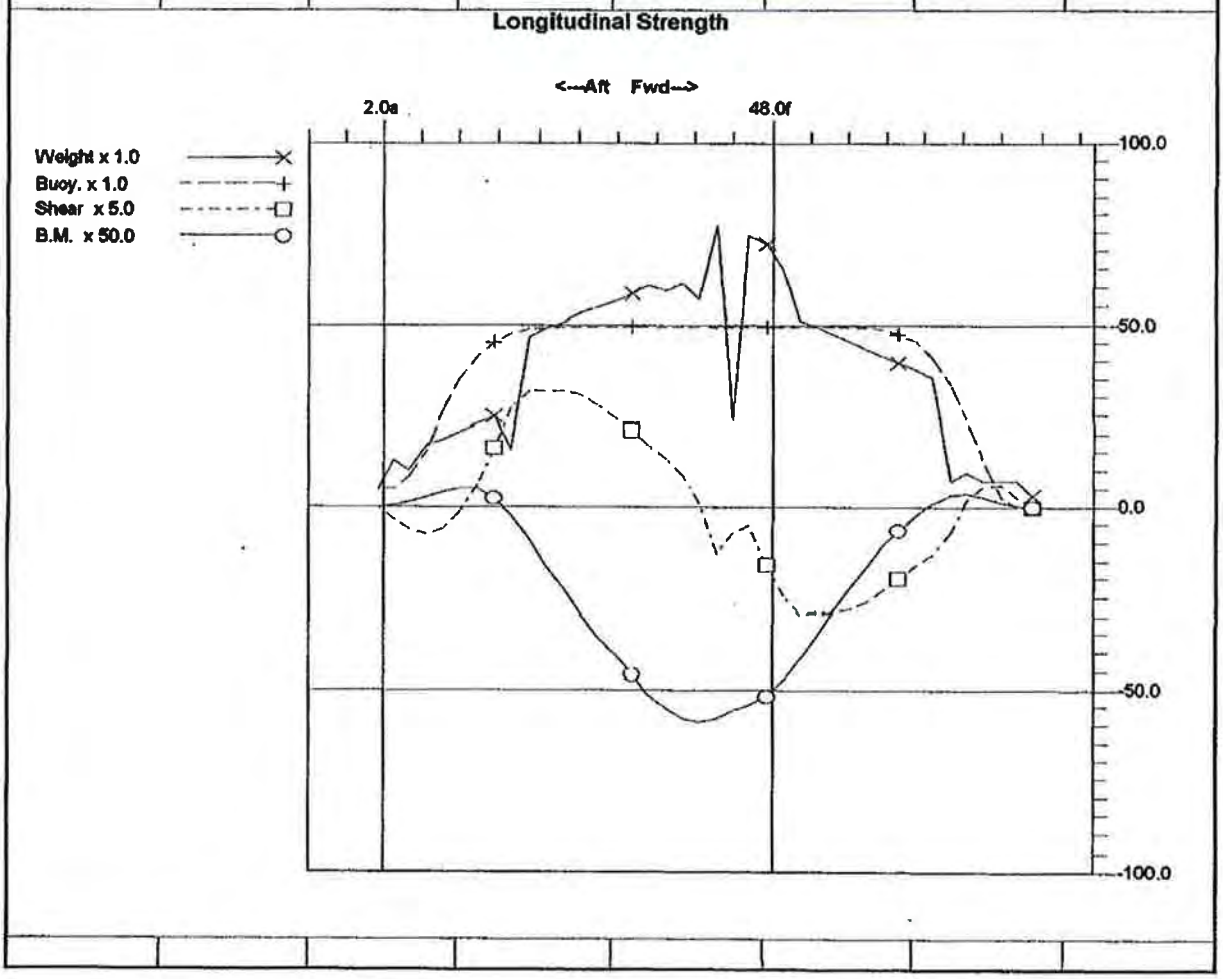
Righting Arms vs. Heel



LOAD CONDITION :
FLY ASH CARGO+ LONG STORES ARRIVAL - LONGITUDINAL STRENGTH

Frame nr	Position Forw.AP(m)	Shear Force (kN)	Bending Moments(kNm)
39	23.4	-1498	-14911
52	31.2	-956	-23603
„C"	46.8	715	-25711
80	51.0	1442	-21091
86	54.6	1429	-15843

Longitudinal Strength Summary		
Max. Shear:	-159.54 tonnes (-1565 kN)	at 21.0 m from AP
Max. Bending Moment:	-2958 tm (Sagging) (-29018 kNm)	at 38.6 m from AP



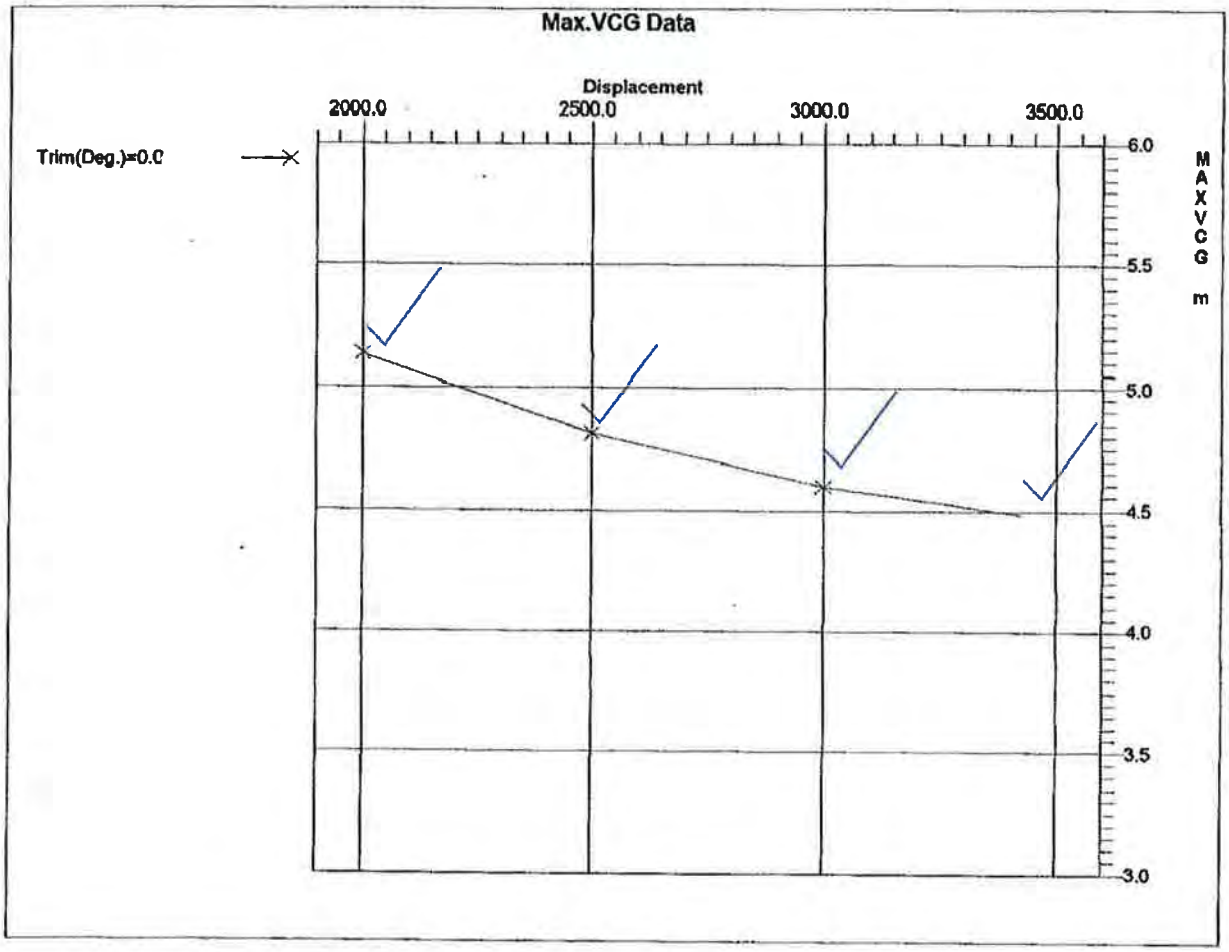
LIM STABILITY	Min/Max
(1) Area from 0 deg to 30	> 0.0550 m-R
(2) Area from 0 deg to 40	> 0.0900 m-R
(3) Area from 30 deg to 40	> 0.0300 m-R
(4) Righting Arm at 30 deg	> 0.200 m
(5) Angle from 0 deg to MaxRA	> 25.00 deg
(6) GM at Equilibrium	> 0.150 m

Maximum VCG vs. Displacement

Trim = 0

Displ(MT)	Max.VCG(m)	Limit 1	Limit 2	Limit 3	Limit 4	Limit 5	Limit 6
2000.00	5.139	10%	27%	78%	64%	6°	0%
2500.00	4.818	0%	22%	83%	37%	17°	26%
3000.00	4.600	0%	20%	77%	12%	22°	113%
3420.00	4.486	0%	18%	71%	5%	22°	191%

Note: All limits >0 indicates near capsize VCG



Cemfjord's safety management system: cement loading procedure

Loading is to be carried out according to Cargo Plan elaborated by Chief Mate, approved by the Master and agreed with silo or barge.

Chief Mate:

1) provide loading instructions for silo and deck crew
2) agree communication with the silo (barge)
3) agree sequence of de-ballasting with Chief Engineer
4) carry out initial, intermediate and final draughts
5) check the ballast tanks are drained properly

Chief Engineer:

1) carry out de-ballasting and stripping according to sequence agree with Chief Mate
2) monitor whether the ballasts are correctly drained.

Preparation for loading

Deck crew:

1) open hold filters flaps on deckhouse
2) check oil level in a steering air compressor
3) start steering air compressor
   wait until compressor tank is fully charged and green control is lit
4) switch on and run both filters simultaneously
5) check the cleanliness of the filters on their pressure gauges
6) check whether the filter cleaning system is working correctly
7) check the compressor tank automatic drain valve is working correctly
8) connect loading pipe to relevant loading point and check tightness

After above preparations are completed Chief Mate can give permission to start loading

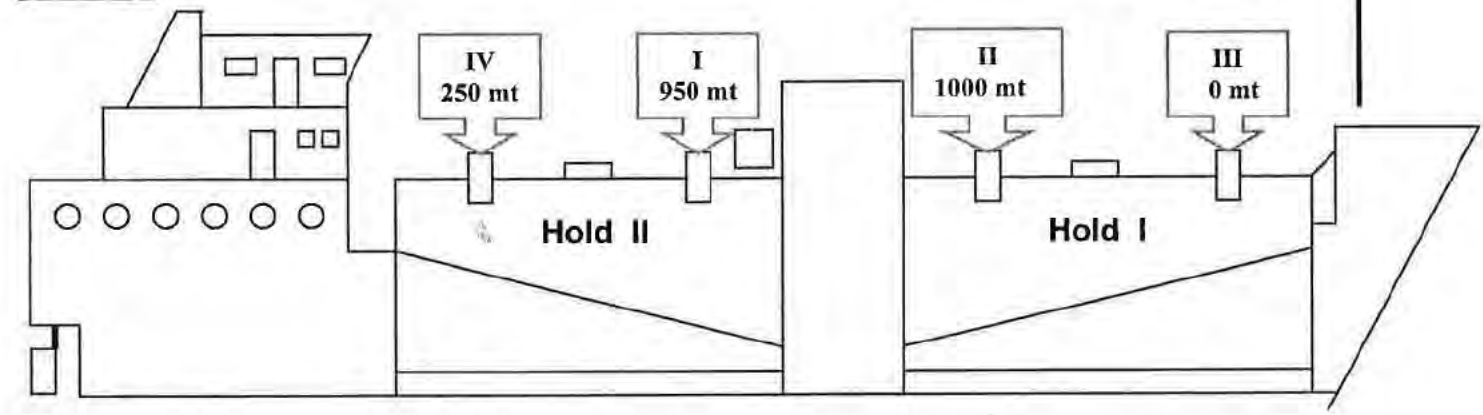
During loading crew:

1) inform Chief Mate of any abnormalities
2) maintain communication with silo
3) keep the vessel always without list by operating dividers
4) monitor the cargo level indicators
5) stop loading when level indicator shows 80-90% to prevent shifting of cargo over the longitudinal bulkhead.
   (Note: In case the cargo starts to shift over the bulkhead the list cannon be controlled and loading position is to be changed.)
6) record times and approximate loading quantity in cargo log book.
7) Monitor pressure in cargo hold (when loading with pneumatic system producing big air volume. Immediately stop when pressure gage in control room exceed -1,0)
8) monitor the mooring lines and gangway

Example of cement loading plan (not for loading prior to the accident)

M/V „CEMFJORD" AALBORG 20.08.2010
VOY : 30

Cargo : CEMENT
Quantity : 2200 MT



γ =

Sequences of LOADING :

1. Hold No **2 - 950 mt** – FP
2. Hold No **1 - 1000 mt** – AP
3. Hold No **1 - 0 mt** – FP
4. Hold No **2 - 250 mt** – AP
5. Rest according to Ch.Off**. indication.**

Note: Do not list the vessel more than **2°** during loading

Chief Officer

[redacted]

Cemfjord - summary of Flag State exemptions from safety regulations

Date of issue	Required safety equipment subject to exemption	Validity of the exemption	Remarks
16 December 2013	Starboard lifeboat davit	16 January 2014, extended to 1 March 14	Exemption necessary for release from UK Port State Control (PSC) detention. Reported as rectified on 8 March 2014.
17 January 2014	Emergency Fire Pump	1 February 2014, extended to 10 March 2014, then again to 28 April 2014	
23 September 2014	Port lifeboat winch brake	30 October 2014	Starboard lifeboat required to be operational
29 October 2014	Starboard lifeboat motor	15 November 2015	Port lifeboat required to be operational
28 November 2014	Starboard lifeboat and davit	12 January 2015	Port lifeboat required to be operational
12 December 2014	Starboard lifeboat and davit	12 January 2015	Update to exemption issued on 28 November 2015 after rejection of temporary rescue boat
13 December 2014	Bilge suction system	28 December 2014	Temporary bilge pumps required

Department of Merchant Shipping Cyprus 1986: equivalence arrangement for cargo ships of less than 85m in length

MINISTRY OF COMMUNICATIONS AND WORKS
DEPARTMENT OF MERCHANT SHIPPING
LIMASSOL

TEN 32/4/7

7th April, 1986.

VS	S	G	E	M	E	I
VM	16.04.86 * 19519					
VA						
VK	K	KA	SP			

To Owners and Representatives of Cyprus Ships

To All Classification Societies

Subject: Equivalent arrangements

I wish to inform you that the following Statement has been submitted to the I.M.O. by the Goverment of the Republic of Cyprus:

Regulation 35 of Chapter III of the International Convention for the Safety of Life at Sea, 1974 provides that every cargo ship, with certain exceptions, shall carry lifeboats on each side of the ship of such aggregate capacity as will accommodate all persons on board and, in addition shall carry liferafts sufficient to accommodate half the number.

The Government of the Republic of Cyprus herewith gives notification of acceptance of the following equivalent arrangements under the provisions of Regulation 5 of Chapter I of the Convention:

Cargo ships of less than 1600 tons gross tonnage, or less than 85 m. in length, other than oil tankers, chemical tankers and gas carriers, may carry the following equipment:

1. on each side of the ship one or more liferafts of sufficient aggregate capacity to accommodate the total number of persons on board;

2. unless such liferafts can be readily transferred for launching on either side of the ship, additional liferafts so that the total capacity of the liferafts available on each side will be sufficient to accommodate 150% of the total number of persons on board;

.../2...

3. at least one approved launching device on each side of the ship if the distance from the embarkation deck to the waterline in the lightest sea-going condition exceeds 4.5 m. (15 feet). In this case the liferafts required at 1 and 3 above are to be of the davit launched type;

4. A rescue boat, or a lifeboat which complies with the requirements for a rescue boat of the 1983 Amendments to the Convention on one side of the ship of such capacity as to accommodate all persons on board. This rescue boat or lifeboat shall be provided with an approved launching device capable of launching and recovering the boat.

In accepting this equivalent arrangement, the Government of the Republic of Cyprus has taken into account the experience gained upto now and the 1983 relevant Amendments to the Convention.

[redacted]
for Director
Department of Merchant Shipping.

IK/EK

GL's instructions to surveyors '*Additional Statutory Requirements for Cyprus*'

SAFEQU_CYP	CYPRUS ADDITIONAL STATUTORY REQUIREMENTS	GL

This checklist is an appendix to the applicable forms for surveys and shall be used during all initial surveys as well as during all regular survey intervals such as renewal, intermediate, periodical and annual surveys and during change of flag to the flag state in question.

GL - Reg. No.	Name of Ship	This checklist is an enclosure to the	Date of Survey
	———	Survey Statement No. ———	———

Note : Any deficiencies / remarks are to be reported on the Survey Statement.

Safety Equipment Survey				
No.	**Item**	**Yes**	**No**	**N.A.**
1	**Periodical inspection and maintenance of fixed fire detection and extinguishing systems, portable and mobile (wheeled) fire extinguishers, SCBAs, oxygen cylinders for medical use, self-contained air support systems for lifeboats and compressed air cylinders used in inflatable liferafts** [1]			
1.2	Acceptable service providers: Have the third party inspection and maintenance listed below been conducted by a service provider which was either - authorized or accredited in this respect by the manufacturer of the system or appliances; or - accredited in this respect by GL, or another RO authorized by the flag State Administration (if acceptable to GL); or - or authorized on a single case basis by the Department of Merchant Shipping.	☐	☐	☐
1.3	Information on recommended time intervals: Although a +/- 3 months time window does not apply for annual inspections / maintenance, the third party service provider inspections should be conducted preferably within the time window for the safety equipment survey or the passenger ship safety survey. Extensions may only be granted by the Department of Merchant Shipping.			
	General rule: A system or an individual part or unit of a system and appliance should be recharged when the loss of contents of the system as a whole or of an individual part or unit of the system or of an appliance exceeds 10 per cent; and In all circumstances the attending surveyor may require, if he/she deems it fit, the thorough inspection, hydrostatic testing or the recharging of a system or of an individual part or unit of the system or of an appliance.			
1.4	**National requirements for maintenance and inspection:**			
1.4.1	Have **fixed fire detection systems** been subject to third party inspection by a service provider at intervals not exceeding **two** years?	☐	☐	☐
1.4.2	**Fixed gas fire extinguishing systems:**			
1.4.2.1	Has the quantity of the gas fire extinguishing medium been checked at intervals not exceeding **two** years?	☐	☐	☐
1.4.2.5	Have the control valves of fixed gas fire extinguishing systems been internally inspected by a third party at intervals not exceeding **five** years?	☐	☐	☐
1.4.3	**Portable and mobile (wheeled) fire extinguishers**			
1.4.3.1	Have all portable and mobile (wheeled) fire extinguishers been subject to third party inspection by a service provider at intervals not exceeding **two** years?	☐	☐	☐

Safety Equipment Survey				
No.	**Item**	**Yes**	**No**	**N.A.**
1.4.3.2	Has the quantity of the fire extinguishing medium and the quantity of the propellant medium been checked at **yearly** intervals?	☐	☐	☐
1.4.3.3	In case of loss of contents exceeding 10%, have the extinguishers been recharged?	☐	☐	☐
1.4.3.5	Have the flexible hoses, applicators and control valves, including those of the propellant medium, been visually inspected at **yearly** intervals?	☐	☐	☐
1.4.3.9	Spare charges for portable and mobile (wheeled) fire extinguishers (irrespective of the keellaying date): are spare charges provided on board for 100% for the first ten portable and the first five non-portable extinguishers and 50% for the remaining extinguishers (but not more than 60) available. For fire extinguishers which cannot be recharged on board, additional portable fire extinguishers of the same quantity, type, capacity and number as determined above shall be provided in lieu of spare charges.	☐	☐	☐
1.4.4	**Self-contained breathing apparatuses (SCBAs)**			
1.4.4.1	Have all SCBAs been subject to third party inspection by a service provider at intervals not exceeding **two** years?	☐	☐	☐
1.4.4.2	Has the shipborne air charging system been subject to **annual** third party inspection by a service provider?	☐	☐	☐
1.4.4.3	Have the masks, flexible hoses, breathing regulator, flow meters and control valves been visually inspected and the quantity and quality of air of self-contained breathing apparatus checked at **annual** intervals and by a third party at intervals not exceeding **two** years?	☐	☐	☐
1.4.4.4	In case of loss exceeding 10%, has the breathing apparatus been recharged?	☐	☐	☐
1.4.4.6	Has the quality of air of the shipborne air recharging system been checked at **annual** intervals and by a third party at intervals not exceeding **two** years?	☐	☐	☐
1.4.4.7	Have pressure vessels of the shipborne air recharging system been internally inspected and hydrostatically tested by a third party at intervals not exceeding **five** years?	☐	☐	☐
1.4.4.10	Are 200% charged spare bottles provided on board in case there are no means on board to recharge bottles (irrespective of the keellaying date)?	☐	☐	☐
1.4.5	**Oxygen cylinders for medical use**			
	Are ships equipped with the following quantities of medical oxygen in the ship's hospital? Ships with Notation "DG" or "SOLAS II-2,Reg.19": a quantity of medical oxygen not less than 40 litres @ 200 bar, in non portable medical oxygen cylinder assembled for direct use with 1 flow meter unit with two ports for supplying oxygen for 2 persons at the same time. If more than 1 non-portable cylinder is used there must be 2 flow meter units for supplying oxygen to 2 persons at the same time; and one complete portable set with a quantity of medical oxygen not less than 2 litres @ 200 bar ready for use and a spare cylinder with a quantity of medical oxygen not less than 2 litres @ 200 bar. Ships not intended for the carriage of dangerous goods: a quantity of medical oxygen not less than 2 litres @ 200 bar in a portable cylinder and a spare quantity medical oxygen not less than 2 litres @ 200 bar in a portable cylinder.			
	Have the masks, flexible hoses, breathing regulator, flow meters and control valves been inspected and the quantity of medical oxygen checked at **annual** intervals and by a third party at intervals not exceeding **two** years?	☐	☐	☐
	In case of loss exceeding 10%, has the medical oxygen been recharged?	☐	☐	☐
	Has the medical oxygen been replaced before the expiry date (medical oxygen has a limited shelf life of 3 years)?	☐	☐	☐

Safety Equipment Survey				
No.	**Item**	**Yes**	**No**	**N.A.**
	Have cylinders containing medical oxygen been internally inspected and hydrostatically tested by a third party at intervals not exceeding **five** years?	☐	☐	☐
1.4.6	**Self-contained air support system for lifeboats**			
	Has the inspection regime for SCBAs as prescribed in section 1.4.4 been applied as well to the self-contained air support system for lifeboats, where provided?	☐	☐	☐
1.4.7	**Compressed air cylinders used in inflatable liferafts**			
	Have the compressed air cylinders used in inflatable liferafts been internally inspected and hydrostatically tested at intervals not exceeding **ten** years?	☐	☐	☐
2	**-- Life-Saving Appliances Accepted as Equivalent to the Requirements of SOLAS 74 unamended; Chapter III; Reg. 35 – [2)]** ***CARGO SHIPS of LESS THAN 1600 TONS GROSS TONNAGE OR LESS THAN 85 m in LENGTH*** constructed before 1st July, 1986 and other than oil tankers, chemical tankers and gas carriers, may carry the following equipment :			
2.1	One or more liferafts of sufficient aggregate capacity to accommodate the total number of persons on board on each side of the ship.	☐	☐	☐
2.1.1	Are these liferaft(s) stowed in a position providing for easy side-to-side transfer at a single open deck level ?	☐	☐	☐
2.1.2.	If such liferaft(s) cannot be readily transferred for launching on either side of the ship, additional liferafts shall be provided so that the total capacity available on each side of the ship will accommodate 150% of the total number of persons on board.	☐	☐	☐
2.2	Does the distance from the embarkation deck to the waterline in the lightest sea-going condition exceed 4,5 m (15 feet)?	☐	☐	☐
2.2.1	If the distance defined under 2.2 exceeds 4,5 m (15 feet):			
	Does at least one approved launching device exist on each side of the ship ?	☐	☐	☐
	Are the liferafts capable for use with the approved launching device, i.e. of the davit launched type?	☐	☐	☐
2.3	A rescue boat or a lifeboat has to be equipped on one side of the ship, which complies with the requirements for a rescue boat of the 1983 Amendments to the Convention, on such capacity as to accommodate all persons on board.	☐	☐	☐
2.3.1	This rescue boat or lifeboat shall be provided with an approved launching device capable of launching and recovering the boat.	☐	☐	☐
3	**Immersion Suits (SOLAS 74 as amended, Reg III/32.3, Res MSC 152(78) adopted 2004-05-20 (MSC 78/26/Add.1 Annex 2, p.4), MSC/Circ 1046 of 2002-05-28**			
3.1	Is at least one (1) immersion suit provided for every person on board the ship (refer to item 2.1 of the Record Form E of the CSS Equipment Certificate)?	☐	☐	
3.2	Are additional liferafts required as specified by SOLAS 74 as amended, Reg III/31.1.4?	☐	☐	
3.2.1	If yes, are at least two (2) additional immersion suits provided in the vicinity of the liferaft?	☐	☐	☐
3.3	Are a minimum of two (2) additional immersion suits provided at each remotely located workstation? Remark: A **workstation** is any place of the ship where the crew is occupied performing its normal duties, and considered remotely located if more than 100 m (horizontally) from the place where the immersion suits are stowed.	☐	☐	☐
3.4	Are a minimum of two (2) additional immersion suits provided at each remotely located watch station? Remark: A **watch station** is any place of the ship where the crew performs normal watch keeping duties, and considered remotely located if more than 50 m (horizontally) from the place	☐	☐	☐

Safety Equipment Survey				
No.	**Item**	**Yes**	**No**	**N.A.**
	where the immersion suits are stowed.			
3.5	Is the ship constantly engaged on voyages in warm climates? The Flag State Administation defines warm climates as: - between latitudes 30°N and 30°S - the Mediterranean Sea south of 35°N - the Mediterranean Sea during summer period (between 01/04 and 31/10) - the coasts of Africa (within 20 nm from the shore) not included above	☐	☐	
3.5.1	If item 3.5 applies, the immersion suits are not necessary.	☐	☐	☐
3.5.2	Is the ship under survey a bulk carrier?	☐	☐	
3.5.2.1	If yes, items 3.5 to 3.5.1 have to be answered "no" and immersion suits have to be provided as stated under items 3.1 until 3.4 above.	☐	☐	☐
3.6	**Storage of Immersion suits and related quantity requirements:**			
3.6.1	Are the immersion suits stored on deck in a box or in a centralized accessible store room within or outside of the accommodation on the way to or in the vicinity of the assembly station?	☐	☐	
3.6.1.1	If yes, is the quantity of the immersion suits equal to the number of persons for which life-saving appliances are provided (Record E), plus, as applicable the immersion suits required by items 3.2.1, 3.3 and 3.4 above?	☐	☐	☐
3.6.2	Are the immersion suits stored in the crew cabins?	☐	☐	
3.6.2.1	If yes, are immersion suits provided as per item 3.6.1.1 plus **additionally** at least two (2) in the Navigation Bridge and at least two (2) in the Engine Control Room?	☐	☐	
3.7	**Inspection and Testing of Immersion Suits**			
3.7.1	Are records of the monthly inspection of immersion suits available? Information: The monthly inspection must be carried out in accordance with the Guidelines for the Monthly Shipboard Inspection of Immersion Suits and Anti-Exposure Suits by Ship's Crews (**MSC/Circ. 1047**).	☐	☐	☐
3.7.2	Applicable intervals for mandatory periodic testing (air pressure test): Information: The testing must be carried out in accordance with the Guidelines for Periodic Testing of Immersion Suit and Anti – Exposure Suit Seams and Closures (**MSC/Circ.1114**)			
3.7.2.1	In case the periodic testing is carried out by a suitable shore based facility: This option is recommended by the Flag State Administration.			
	.1 Has the periodic testing been conducted at intervals of not more than three years for immersion suits which are less than twelve years of age?	☐	☐	☐
	.2 Has the periodic testing been conducted at intervals of not more than two years for immersion suits which are over twelve years of age?	☐	☐	☐
	.3 Is the shore based service station which carried out the periodic testing of the immersion suits an approved liferaft servicing station (refer to Circular 12/2001)?	☐	☐	☐
3.7.2.2	In case the periodic testing is carried out by the ship's crews (**MSC/Circ.1114**):			
	.1 Has the periodic testing of the immersion suits been carried out at intervals of not more than 30 months for immersion suits which are less than ten years of age?	☐	☐	☐
	.2 Has the periodic testing of the immersion suits been carried out at intervals of not more than one year for immersion suits which are over ten years of age?	☐	☐	☐
	.3 Has the periodic testing of the immersion suits been carried out every fifth year at a suitable shore based facility, irrespective of the immersion suit's age?	☐	☐	☐

Safety Equipment Survey				
No.	**Item**	**Yes**	**No**	**N.A.**
	.4 Is the ship in possession of the immersion suit manufacturer's Service Manual and an appropriate Test Kit accepted/ recommended by the immersion suit manufacturer? A written acceptance /recommendation should be available on board.	☐	☐	☐
	.5 Are the ship's crewmembers, designated to perform the testing, trained in the use of the test equipment and the procedures /instructions contained in the manufacturer's Service Manual regarding the periodic testing and the related inspections of the immersion suits? All designated crewmembers shall hold a valid training certificate issued by the test equipment manufacturer.	☐	☐	☐
	.6 Are the procedures for the periodic testing and inspection of the immersion suits incorporated into the instructions manual for onboard maintenance?	☐	☐	☐
	.7 Are the results of the inspection and testing of the immersion suits recorded in the log for inspections and maintenance of life-saving appliances (as required by SOLAS Reg. III/36.7)?	☐	☐	☐
	.8 Were repairs, if found necessary as a result of the onboard inspection / testing, carried out by a shore-based facility?	☐	☐	☐
3.8	**Conditions for acceptance of Vacuum Packed Immersion Suits:**			
3.8.1	Are instructions for the monthly inspection of the vacuum pack provided on board?	☐	☐	☐
3.8.2	In case an inspection indicated that the vacuum pack is damaged, has the immersion suit either been inspected as per MSC/Circ. 1047 or sent for inspection and re-packing to an approved service station?	☐	☐	☐
3.8.3	Are a sufficient number of immersion suits onboard which can be used by the crew during drills?	☐	☐	☐
3.9	Is a copy each of the Circular 12/2006 dated 2006-07-01 and Circular 05/2010 dated 2010-01-29, issued by the MINISTRY OF COMMUNICATIONS AND WORKS DEPARMTENT OF MERCHANT SHIPPING LEMESOS available on board?	☐	☐	
3.10	The original documents issued by the Flag State Administration can be found on GL's home page Flag State, Requirements - Guidelines, Immersion Suits.			
4	**Embarkation arrangement for remotely located survival craft (MSC.1/Circ.1243)**			
	Information: The area where the remotely located survival craft is stowed should be provided with an embarkation ladder or other means of embarkation.			
4.1	Is an embarkation ladder (complying with Section 6.1.6 of the LSA Code) available? (The application of this option is the **preferred** action for ships flying the Cyprus Flag.)	☐	☐	☐
4.2	If no, are other means of embarkation available? (The use of either a Jacob's ladder or an aluminium ladder complying with Section 6.1.6 of the LSA Code is acceptable. **The use of a knotted rope is not acceptable.**)	☐	☐	☐
5	**Emergency escape breathing devices (EEBD's) (SOLAS 74 as amended, Reg. II-2/13.3.4 and II-2/Reg. 13.4.3; Resolution MSC.99(73) adopted on 5 December 2000); MSC/Circ.849 of 8 June 1998 and MSC/Circ.1081 of 13 June 2003; FSS Code, Chapter 3.2.2**			
	The minimum number of EEBD's should be kept:			
5.1	- in machinery spaces the number of EEBD's must be equal to the number of crew stipulated in the Document of Safe Manning for the Engine Department, however the maximum number required does not exceed eight (8) devices.	☐	☐	☐
5.2	- at least two (2) spare EEBD's shall be kept on board.	☐	☐	☐
5.3	Have EEBD's been subject to periodic inspections as required for self-contained breathing apparatus (refer to section 1.4.4 above)?[1)]	☐	☐	☐

Safety Equipment Survey				
No.	**Item**	**Yes**	**No**	**N.A.**
6	**Lifeboat release and retrieval systems (SOLAS III/1.5 as amended by Res. MSC.317(89); LSA Code paragraphs 4.4.7.6.4 to 4.4.7.6.6; MSC.1/Circ.1327; MSC.1/Circ. 1392 and MSC.1/Circ.1392) [6])**			
6.1	For ships ***constructed on or after 20 May 2011 but before 1 July 2014***, either: - is evidence of compliance with the requirements of the amended LSA Code at the date of completion of the initial survey available? or - are fall preventer devices employed in accordance with MSC.1/Circ.1327 for each existing lifeboat release and retrieval system?	☐ ☐	☐ ☐	☐ ☐
6.2	For ships ***constructed before 20 May 2011***, either: - is evidence of compliance with the requirements of SOLAS III/1.5 available (i.e. a factual statement issued by the manufacturer)? or - are fall preventer devices employed in accordance with MSC.1/Circ. 1327 for each existing lifeboat release and retrieval system?	☐ ☐	☐ ☐	☐ ☐

References

[1)] DMS Circular No. 14/2013 dated 30 May 2013

[2)] DMS Circular No. 7/2008 dated 2008-05-14.

3) DMS Circular No. 12/2006 dated 2006-07-01 and Circular 05/2010 dated 2010-01-29

4) DMS Circular No. 23/2008 dated 2008-12-22

5) DMS Circular No. 7/2002 dated 2002-03-05

[6)] DMS Circular No. 35/2011 dated 2011-09-26

Cemfjord's safety management system: man overboard recovery procedure

MAN OVER BOARD

This emergency plan is designed to be able to react more quickly and more efficiently in a situation where a person has fallen overboard.

Procedure:

⇒ person has fallen overboard
⇒ person who has first recognised that a person has fallen overboard throws life-buoy over board and calls for attention
⇒ inform bridge and activate general alarm
⇒ activate MOB-button on GPS
⇒ try to keep the person fallen overboard always insight
⇒ the Master will turn the vessel (Williamson Turn) and reduce speed
⇒ to dead slow ahead after turning
⇒ Chief Officer prepares the rescue-boat
⇒ stop vessel close to position of life-buoy and lower rescue-boat into water
⇒ Master orders the rescue-boat to the position of person fallen overboard by walkie-talkie
⇒ pick the person out of the water
⇒ hoist rescue-boat on board
⇒ treat the person who has fallen into the water
⇒ secure rescue boat
⇒ resume voyage
⇒ Master makes a log-book entry

Actions, responsibilities and authorities:

The Master has the overall responsibility in the emergency.
The Crew to look out all around the vessel, to communicate to the Master the position of the man fallen overboard and to assist the Master in all actions.

Republic of Cyprus letter of exemption for *Cemfjord*'s starboard lifeboat and davit, dated 12 December 2014

CONSULATE GENERAL OF THE REPUBLIC OF CYPRUS
HAMBURG

Our Ref: 09.10.06.VI
RCS : P- 466

December 12, 2014

To : DNVGL
HAMBURG

C.C.: BRISE BEREEDERUNG HAMBURG
HAMBURG

[redacted]
LIMASSOL

Dear Sirs,

Subject: M/V "CEMFJORD" – Call Sign: P3ZG9 – IMO NO: 8403569

Further to a request received from the owners/managers of the subject vessel, this is to advise you that under the circumstances we have no objection if the subject vessel sails until January 12, 2015, pending the installation of a new davit and lifeboat, as requested SOLAS 1974, as amended, Ch. III/R.8, provided that the ship is equipped with an additional liferaft of capacity which conforms to the provisions of SOLAS 1974 as amended, Ch. III/R. 35.

The above waiver is not valid if the vessel is currently under PSC detention.

Sincerely,

[redacted]

Consul

CONSULATE GENERAL OF THE REPUBLIC OF CYPRUS HAMBURG

Rothenbaumchaussee 3 • D-20148 Hamburg
Tel.: 040 - 410 74 97 • Fax: 040 - 410 72 46 • e-mail: cyconsulate-hamburg@t-online.de

Republic of Cyprus letter of exemption for *Cemfjord*'s defective bilge pumping system, dated 13 December 2014

CONSULATE GENERAL OF THE REPUBLIC OF CYPRUS
HAMBURG

Our Ref: 09.10.06.VI

December 13, 2014

DNVGL,
Hamburg

C.C Brise Bereederungs GmbH & Co. KG
Hamburg

[redacted]
Limassol

Dear Sirs,

Subject: M/V "CEMFJORD - IMO 8403569 CALL SIGN P3ZG9

Further to a request received from the owners / managers of the subject vessel, this is to advise you that we have no objection if the subject vessel performs voyages until 28/12/2014, pending the repair of her bilge suction system, provided that:

1. The vessel is fitted with two portable submergible pumps which can reach the bilge wells of the ship, forward and aft,
2. The ship will perform voyages only in the North Sea, including the western coast of UK and the Baltic sea,
3. The ship's route will not be more than 150 miles from a port or place in which the crew could be placed in safety.
4. The vessel is not under PSC detention.

Sincerely,

[redacted]
Consul

Rothenbaumchaussee 3 • D-20148 Hamburg
Tel.: 040 - 410 74 97 • Fax: 040 - 410 72 46 • e-mail: cyconsulate-hamburg@t-online.de

Cemfjord - Interim Cargo Ship Safety Equipment Certificate

DNV·GL

INTERIM
CARGO SHIP SAFETY EQUIPMENT CERTIFICATE

This certificate shall be supplemented by a Record of Equipment for Cargo Ship Safety (Form E)

CONDITIONALLY ISSUED (SEE OVERLEAF)**

Issued under the authority of the Government of the

REPUBLIC OF CYPRUS

by DNV GL

Name of Ship	Distinctive Number or Letters	Port of Registry	Gross Tonnage	IMO Number
CEMFJORD	**P3ZG9**	**Limassol**	**1850**	**8403569**

Deadweight of ship:* — metric tons
Length of ship (regulation III/3.12): **78.45** m

Type of ship:** ~~**Bulk Carrier / Oil tanker / Chemical tanker / Gas carrier /**~~ **Cargo ship other than any of the above**

Date on which keel was laid or ship was at a similar stage of construction or, where applicable, date on which work for a conversion or an alteration or modification of a major character was commenced: **15th February, 1984**

THIS IS TO CERTIFY:

1 That the ship has been surveyed in accordance with the requirements of regulation I/8 of SOLAS.

2 That the survey showed that:

2.1 The ship complied with the requirements of SOLAS as regards fire safety systems and appliances and fire control plans;

2.2 the life-saving appliances and the equipment of the lifeboats, liferafts and rescue boats were provided in accordance with the requirements of SOLAS;

2.3 the ship was provided with a line-throwing appliance and radio installations used in life-saving appliances in accordance with the requirements of SOLAS;

2.4 the ship complied with the requirements of SOLAS as regards shipborne navigational equipment, means of embarkation for pilots and nautical publications;

2.5 the ship was provided with lights, shapes, means of making sound signals and distress signals in accordance with the requirements of SOLAS and the International Regulations for Preventing Collisions at Sea in force;

2.6 in all other respects the ship complied with the relevant requirements of SOLAS;

2.7*** the ship ~~**was/was not**~~** subjected to an alternative design and arrangements in pursuance of regulation(s) **II-2/17 / III-38**** of SOLAS;

2.8*** a Document of approval of alternative design and arrangements for ~~**fire protection / life-saving appliances and arrangements**~~** ~~**is/is not**~~** appended to this certificate.

3 That the ship operates in accordance with regulation III/26.1.1.1 within the limits of the trade area****

4 That an Exemption Certificate ~~**has/has not**~~** been issued.

This certificate is valid until receipt of the final Certificate to be issued by **DNV GL / ~~competent Authority~~****, but not longer than **12th January, 2015**

Completion date of the survey on which this certificate is based: **13th December, 2014**

Issued at **Gdynia**, **13th December, 2014**

Seal

DNV GL Representative

[redacted]

* For oil tankers, chemical tankers and gas carriers only.
** Delete as appropriate.
*** Only applicable for ships for which HSSC applies.
**** Refer to the 1983 amendments to SOLAS (MSC.6(48)), applicable to ships constructed on or after 1 July 1986, but before 1 July 1998 in the case of self-righting partially enclosed lifeboats(s) on board.

Rescue boat to be placed on board. Initial test to be carried out in prsence of DNVGL

Cemfjord - Record of life-saving equipment

RECORD OF EQUIPMENT FOR CARGO SHIP SAFETY (FORM E)

This Record shall be permanently attached to the Interim Cargo Ship Safety Equipment Certificate

RECORD OF EQUIPMENT FOR COMPLIANCE WITH THE INTERNATIONAL CONVENTION FOR THE SAFETY OF LIFE AT SEA, 1974, AS AMENDED

1 Particulars of ship

Name of ship: **CEMFJORD**

Distinctive number or letters: **P3ZG9**

2 Details of life-saving appliances

1	Total number of persons for which life-saving appliances are provided	7	
		PORT SIDE	STARBOARD SIDE
2	Total number of lifeboats	—	—
2.1	Total number of persons accommodated by them	—	—
2.2	Number of self-righting partially enclosed lifeboats (regulation III/43)*	—	—
2.3	Number of totally enclosed lifeboats (regulation III/31 and LSA Code, section 4.6)	—	—
2.4	Number of lifeboats with a self-contained air support system (regulation III/31 and LSA Code, section 4.8)	—	—
2.5	Number of fire-protected lifeboats (regulation III/31 and LSA Code, section 4.9)	—	—
2.6	Other lifeboats		
2.6.1	Number	—	—
2.6.2	Type	—	—
2.7	Number of freefall lifeboats		
2.7.1	Totally enclosed (regulation III/31 and LSA Code, section 4.7)	—	
2.7.2	Self-contained (regulation III/31 and LSA Code, section 4.8)	—	
2.7.3	Fire-protected (regulation III/31 and LSA Code, section 4.9)	—	
3	Number of motor lifeboats (included in the total lifeboats shown above)	—	
3.1	Number of lifeboats fitted with searchlights	—	
4	Number of rescue boats	1	
4.1	Number of boats which are included in the total lifeboats shown above	—	
5	Liferafts		
5.1	Those for which approved launching appliances are required		
5.1.1	Number of liferafts	—	
5.1.2	Number of persons accommodated by them	—	
5.2	Those for which approved launching appliances are not required		
5.2.1	Number of liferafts	2 + 1 Additional as per class request	
5.2.2	Number of persons accommodated by them	24	
5.3	Number of liferafts required by regulation III/31.1.4	—	

Flagstate

* Refer to the 1983 amendments to SOLAS (MSC.6(48)), applicable to ships constructed on or after 1 July 1986, but before 1 July 1998.

2 Details of life-saving appliances

6	Number of lifebuoys	8
7	Number of lifejackets (adults and children)	10 + —
8	Immersion suits	
8.1	Total number	7
8.2	Number of suits complying with the requirements for lifejackets	—
9	Number of anti-exposure suits	—
10	Radio installations used in life-saving appliances	
10.1	Number of search and rescue locating devices	
10.1.1	Radar search and rescue transponders (SART)	2
10.1.2	AIS search and rescue transmitters (AIS-SART)	—
10.2	Number of two-way VHF radiotelephone apparatus	3

3 Details of navigational systems and equipment

	ITEM	ACTUAL PROVISION
1.1	Standard magnetic compass **	fitted
1.2	Spare magnetic compass **	—
1.3	Gyro-compass **	fitted
1.4	Gyro-compass heading repeater **	—
1.5	Gyro-compass bearing repeater **	—
1.6	Heading or track control system **	—
1.7	Pelorus or compass bearing device **	fitted
1.8	Means of correcting heading and bearings	provided
1.9	Transmitting heading device (THD) **	—
2.1	Nautical charts / ~~Electronic chart display and information system (ECDIS)~~ +	provided
2.2	Back-up arrangements for ECDIS	—
2.3	Nautical publications	provided
2.4	Back-up arrangements for electronic nautical publications	—
3.1	Receiver for a global navigation satellite system / ~~terrestrial radionavigation system~~ **,+	fitted
3.2	9 GHz radar **	fitted
3.3	Second radar (~~3 GHz~~ / 9 GHz) **,+	—
3.4	Automatic radar plotting aid (ARPA) **	—
3.5	Automatic tracking aid **	—
3.6	Second automatic tracking aid **	—
3.7	Electronic plotting aid **	—
4.1	Automatic identification system (AIS)	fitted
4.2	Long-range identification and tracking system	fitted

** Alternative means of meeting this requirement are permitted under regulation V/19. In case of other means they shall be specified.
+ Delete as appropriate

3 Details of navigational systems and equipment

	ITEM	ACTUAL PROVISION
5.1	Voyage data recorder (VDR)+	—
5.2	Simplified voyage data recorder (S-VDR)+	—
6.1	Speed and distance measuring device (through the water) **	—
6.2	Speed and distance measuring device (over the ground in the forward and the athwartship direction) **	—
7	Echo sounding device **	**fitted**
8.1	Rudder, propeller, thrust, pitch and operational mode indicator **	**fitted**
8.2	Rate-of-turn indicator **	—
9	Sound reception system **	—
10	Telephone to emergency steering position **	**fitted**
11	Daylight signalling lamp **	**fitted**
12	Radar reflector **	—
13	International Code of Signals	**provided**
14	IAMSAR Manual, Volume III	**provided**
15	Bridge navigational watch alarm system (BNWAS)	**fitted**

THIS IS TO CERTIFY that this Record is correct in all respects.

Issued at **Gdynia, 13th December, 2014**

Seal

.....

DNV GL Representative

[redacted]

** Alternative means of meeting this requirement are permitted under regulation V/19. In case of other means they shall be specified.
+ Delete as appropriate

Cemfjord - Interim Cargo Ship Safety Construction Certificate

DNV·GL

INTERIM
CARGO SHIP SAFETY CONSTRUCTION CERTIFICATE

CONDITIONALLY ISSUED (SEE OVERLEAF)**

Issued under the authority of the Government of the

REPUBLIC OF CYPRUS

by DNV GL

Name of Ship	Distinctive Number or Letters	Port of Registry	Gross Tonnage	IMO Number
CEMFJORD	**P3ZG9**	**Limassol**	**1850**	**8403569**

Deadweight of ship:* — metric tons

Type of ship:** ~~**Bulk carrier / Oil tanker / Chemical tanker / Gas carrier /**~~
Cargo ship other than any of the above

Date of build:
- Date of building contract: **not applicable**
- Date on which keel was laid or ship was at similar stage of construction: **15th February, 1984**
- Date of delivery: **1st November, 1984**
- Date on which work for a conversion or an alteration or modification of a major character was commenced (where applicable): **not applicable**

All applicable dates shall be completed.

THIS IS TO CERTIFY THAT:

1 The ship has been surveyed in accordance with the requirements of regulation I/10 of SOLAS.

2 The survey showed that the condition of the structure, machinery and equipment as defined in the above regulation was satisfactory and the ship complied with the relevant requirements of chapters II-1 and II-2 of SOLAS (other than those relating to fire safety systems and appliances and fire control plans).

3 The last two inspections of the outside of the ship's bottom took place on **21st November, 2012** and **13th December, 2014**.

4 An Exemption Certificate **has / has not**** been issued.

5*** The ship **was/was not**** subjected to an alternative design and arrangements in pursuance of regulation(s) **II-1/55 / II-2/17**** of the Convention.

6*** A Document of approval of alternative design and arrangements for **machinery and electrical installations / fire protection** ** **is/is not**** appended to this certificate.

This certificate is valid until receipt of the final certificate to be issued by **DNV GL / ~~competent Authority~~**** but not longer than **12th January, 2015**

Issued at **Hamburg, 25th December, 2014**

Seal

[redacted]

DNV GL Representative

[redacted]

* For oil tankers, chemical tankers and gas carriers only.
** Delete as appropriate
*** Only applicable for ships for which HSSC applies

www.dnvgl.com

Deficiency:

The bilge pumping system in watertight compartments below Cargo Hold no:1 and 2 is to be repaired.

Confirmed: **Hamburg, 2014-12-25**

Comparison of time of high water Dover and the passage of *Cemfjord* past the accident location on eight occasions in 2014

Date (all 2014)	Time vessel passed accident position (UTC)	Time and height of HW Dover (UTC)	Difference between HW Dover and accident longitude	Remarks
7 February	1842	1640	2 hours 20 minutes after HW Dover	
6 March	1544	1424	1 hour 20 minutes after HW Dover	Entry to Pentland Firth delayed by 2 hours (course reversal)
31 March	1130	1227	57 minutes before HW Dover	Passage through Pentland Firth delayed by 2 hours 30 minutes (vessel maintained position heading)
17 May	1334	1325	9 minutes after HW Dover	Entry to Pentland Firth delayed by 5 hours (vessel altered course and maintained position east of Firth)
13 July	1801	1220	5 hours 41 minutes after HW Dover	
18 August	0726	0519	2 hours 7 minutes after HW Dover	
7 October	1208	1050	1 hour 18 minutes after HW Dover	Vessel attempted to delay entry by reversing course (Cargo shift incident)
14 November	0951	0338	6 hours 13 minutes after HW Dover	