Annex N

Swanland - Load Line Certificate issued by INSB, 19 October 2009 (including annotations to show the MAIB's calculation of draughts)

Cert. No. VG05/1815

INTERNATIONAL NAVAL SURVEYS BUREAU - I.N.S.B.
INTERNATIONAL LOAD LINE CERTIFICATE (1966)

Issued under the provisions of the International Convention on Load Lines, 1966,
as modified by the Protocol of 1988 relating thereto
under the authority of the Government of
COOK ISLANDS
by International Naval Surveys Bureau - I.N.S.B.

Name of Ship	Distinctive Number or Letters	Port of Registry	Length(L) as defined in Article 2(8)	IMO Number ±
"SWANLAND"	E5U2283	AVATIU	74.81 m	7607431

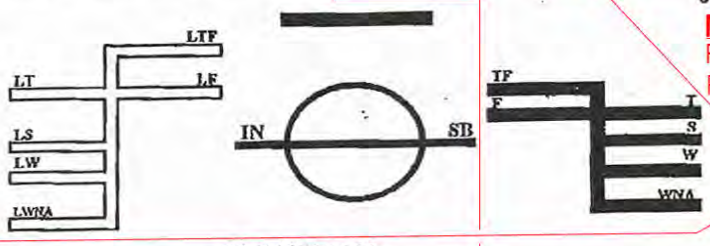
Freeboard assigned as: * A new ship / ~~An existing ship~~

Type of ship: * ~~Type "A"~~ / Type "B" / ~~Type "B" with reduced freeboard~~ / ~~Type "B" with increased freeboard~~

	Freeboard from deck line**		Load Line**	
Tropical	880	mm. (T)	110	mm. above (S)
Summer	990	mm. (S)	Upper edge of line through centre of ring	
Winter	1100	mm. (W)	110	mm. below (S)
Winter North Atlantic	1150	mm. (WNA)	160	mm. below (S)
Timber tropical	-	mm. (LT)	-	mm. above (LS)
Timber summer	-	mm. (LS)	-	mm. above (S)
Timber winter	-	mm. (LW)	-	mm. below (LS)
Timber winter North Atlantic	-	mm. (LWNA)	-	mm. below (LS)

Difference = 110mm

NOTE : Freeboards and load lines which are not applicable need not be entered on the certificate.
Allowance for fresh water for all freeboards other than timber 110 mm. For timber freeboards - mm.
The upper edge of the deck line from which these freeboards are measured is 200 mm below the top of steel upper deck at side.



MAIB Calculation of Draughts

From Figure 1, Moulded depth to main deck	= 6.540m
From Figure 35, Thickness of deck stringer	= 0.014m
∴ Freeboard depth	= 6.554m
Deduction for distance to deck line	= -0.200m
∴ Depth to freeboard deck line	= 6.554m
Deduction for distance to summer draught	= -0.990m
∴ Mean summer draught	= 5.364m
Deduction for distance to winter draught	= -0.110m
∴ Mean winter draught	= 5.254m

Date of initial or periodical survey 30 MAY 2009

THIS IS TO CERTIFY:

1. That the ship has been surveyed in accordance with the requirements of article 14 of the Convention.
2. That the survey showed that the freeboards have been assigned and load lines shown above have been marked in accordance with the Convention.

This Certificate is valid until THE 25TH DAY OF MARCH 2012 *** subject to annual surveys in accordance with Article 14 (1) (c) of the Convention.

Completion date of the survey on which this certificate is based 30 MAY 2009

Issued at PIRAEUS - GREECE the 19TH day of OCTOBER 2009

For the International Naval Surveys Bureau - I.N.S.B.

[redacted] / Attending Surveyor

[redacted] / Technical Director

* Delete as appropriate
** Freeboards and load lines which are not applicable need not be entered on the certificate. Subdivision load lines may be entered on the certificate on a voluntary basis.
*** Insert the date of expiry as specified by the Administration in accordance with article 19(1) of the Convention. The day and the month of this date correspond to the anniversary date as defined in article 2(9) of the Convention, unless amended in accordance with article 19(8) of the Convention.
± In accordance with resolution A.600(15) - IMO Ship Identification Number Scheme, this information may be included voluntarily.

FORM No. 7154 -SH / 06

THIS CERTIFICATE IS AUTOMATICALLY EXPIRED UPON THE EXPIRY DATE OF THE REGISTRATION CERTIFICATE

Endorsement for annual surveys

THIS IS TO CERTIFY that, at an annual survey required by article 14(1)(c) of the Convention, the ship was found to comply with the relevant requirements of the Convention.

Annual survey:

Signed: [redacted]

Surveyor to International Naval Surveys Bureau - I.N.S.B.

Place: GREAT YARMOUTH

Dated: 9 JUNE 2010

Annual survey:

Signed: [redacted]

Surveyor to International Naval Surveys Bureau - I.N.S.B.

Place: LONDONDERRY N.I.

Dated: 8 JUNE 2011

Annual survey:

Signed: _____

Surveyor to International Naval Surveys Bureau - I.N.S.B.

Place: _____

Dated: _____

Annual survey:

Signed: _____

Surveyor to International Naval Surveys Bureau - I.N.S.B.

Place: _____

Dated: _____

Annual survey in accordance with article 19(8)(c)

THIS IS TO CERTIFY that, at a survey in accordance with article 19(8)(c) of the Convention, the ship was found to comply with the relevant requirements of the Convention:

Signed: _____

Surveyor to International Naval Surveys Bureau - I.N.S.B.

Place: _____

Dated: _____

NOTES: 1. When ship departs from a port situated on a river or inland water, deeper loading shall be permitted corresponding to the weight of fuel and all other materials required for consumption between the point of departure and the sea.
2. When a ship in fresh water or unit density the appropriate load may be submerged by the amount of the fresh water allowance shown above. Where the density is other than unity, an allowance shall be made proportional to the difference between 1.025 and the actual density.

*Delete as appropriate

Annex O

TMC’s derivation of various cargo distributions

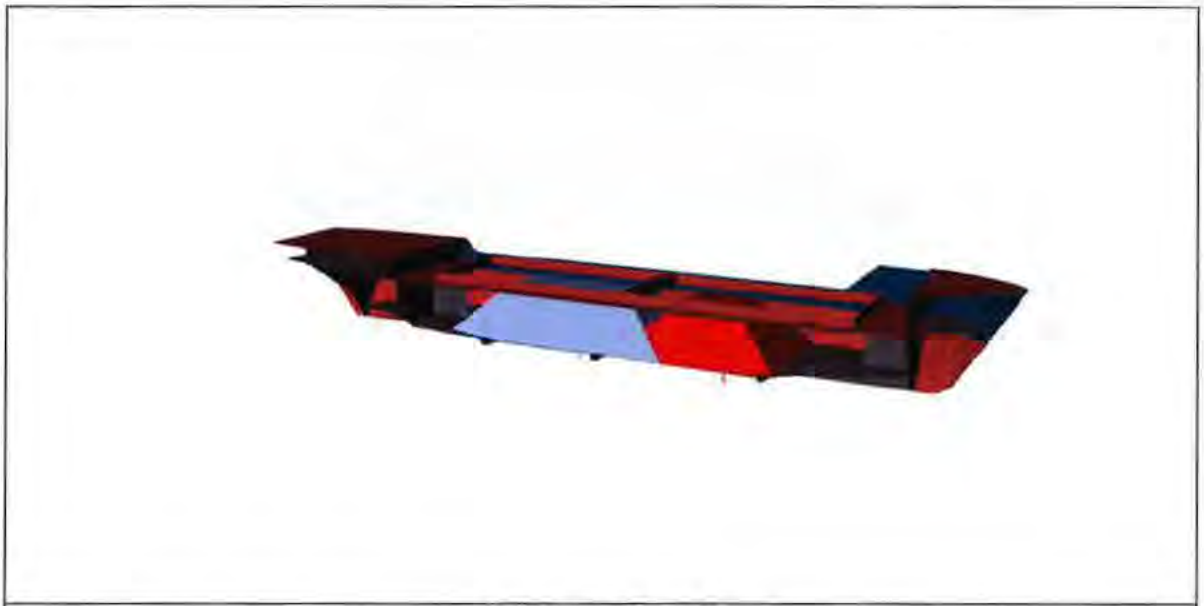
SWANLAND CARGO DISTRIBUTION

Assumptions

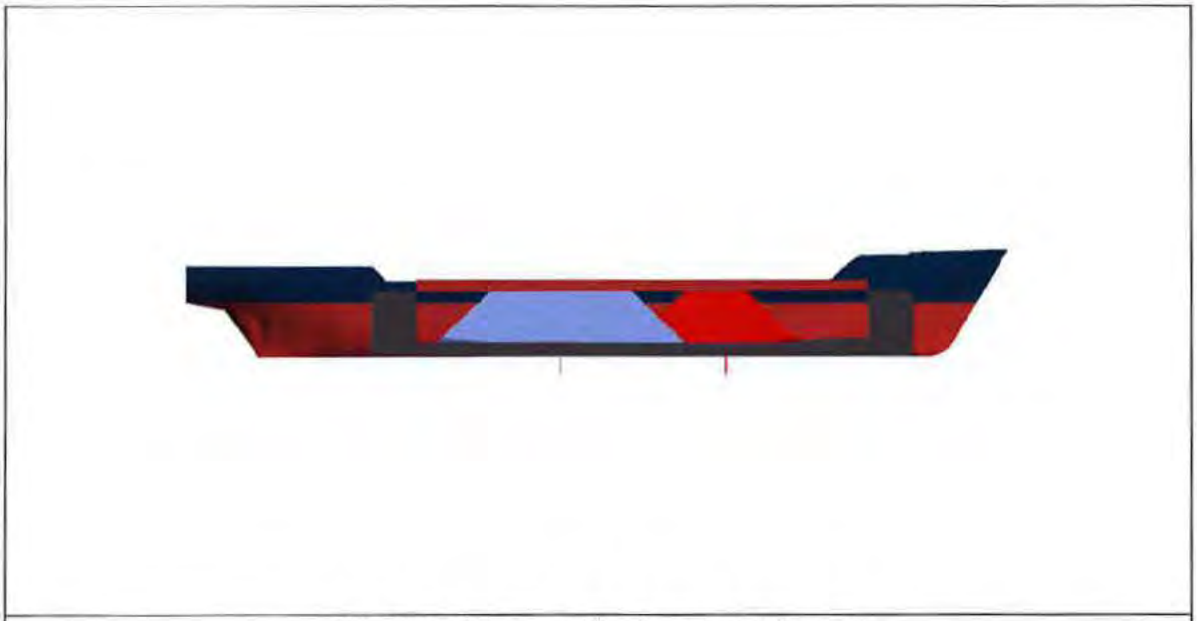
- Two piles of cargo; the aft pile poured first, forward pile poured second, so the aft end of forward pile is on top of forward end of aft pile.
- The 3D CAD program Rhinoceros 3D was used to calculate the volume, weight and centroid of each pile of cargo and generate the images below.
- Density of cargo used is 1.85 t/m^3.
- Aft pile weighs about 1800 tonnes, forward pile weighs about 930 tonnes as per bill of lading.
- All sides of the cargo piles are flat without curvature except where the cargo meets the side shell
- No allowance has been made for the reduction in hold volume due to ship structure.

Cargo Distribution 1

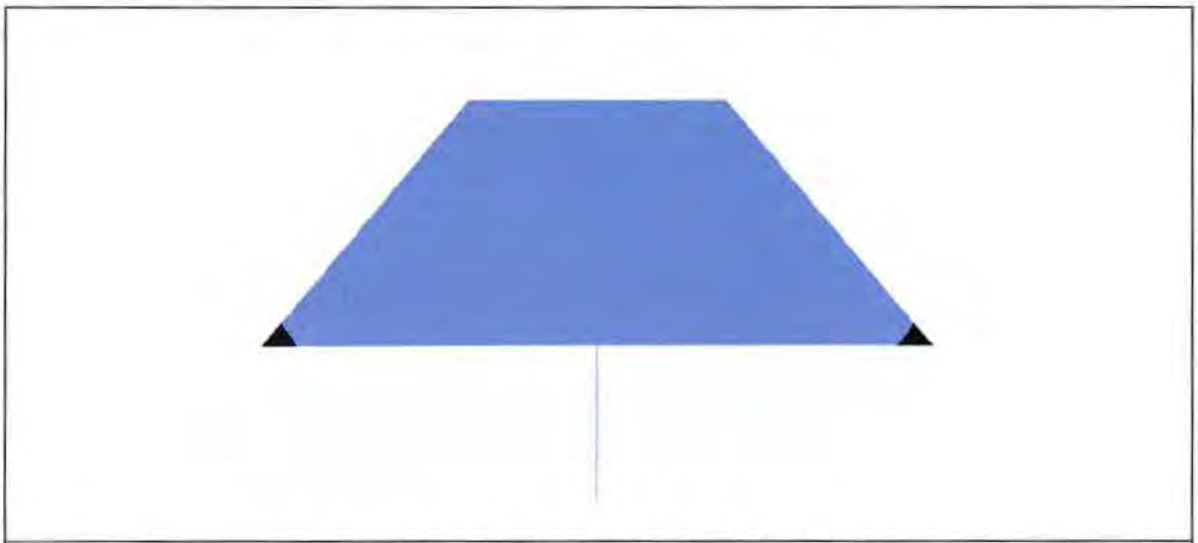
- Aft end of aft pile at frame 34, forward end of aft pile at frame 71.5.
- Forward end of forward pile at frame 90.
- Angle of repose 50 degrees on P&S sides, 44 degrees on fwd and aft ends of each pile. Cargo loaded up to deck level, i.e. the height of the bottom of the hatch coaming.



Cargo Distribution 1



Side view of cargo, angle of repose 50 degrees



Section view of cargo, angle of repose 50 degrees

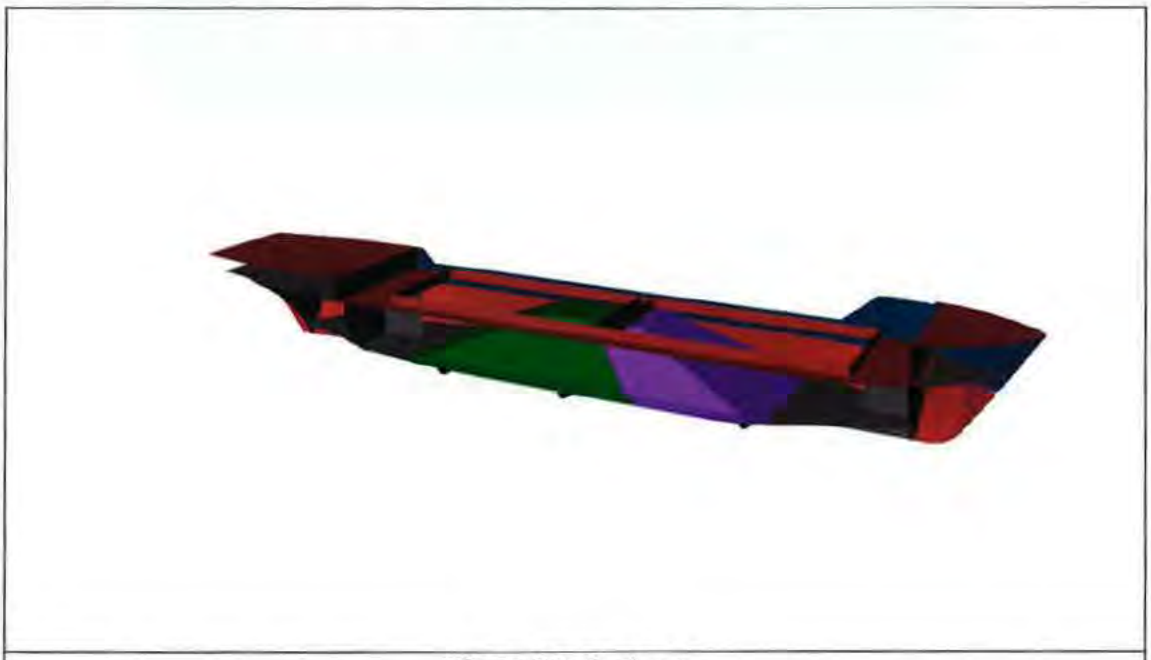
Plan view of cargo distribution 1

Weight of aft pile = 1800.06 tonnes, LCG = 33.88m fwd of AP, VCG = 3.43m above baseline.
Weight of fwd pile = 927.04 tonnes, LCG = 49.97m fwd of AP, VCG = 3.46m above baseline.

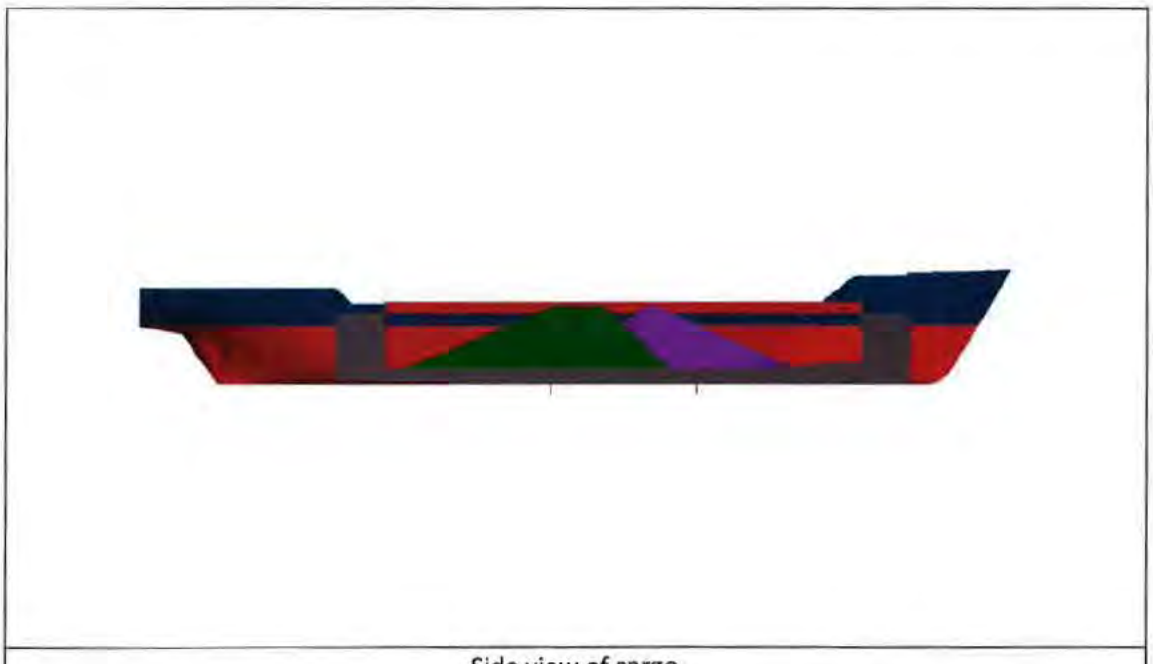
Total cargo weight = 2727.10 tonnes, LCG = 39.35m fwd of AP, VCG = 3.44m above baseline.

Cargo Distribution 2

- Aft end of aft pile at frame 34, forward end of aft pile at frame 71.5.
- Forward end of forward pile at frame 90.
- Lowest 1.0m portion of cargo filled over full width of hold, angle of repose 50 degrees above this.
- 50 degree angle of repose on P&S sides of each pile, 44 degrees on forward slope of aft pile and aft slope of forward pile – the aft slope of the aft pile and forward slope of the forward pile selected to obtain the desired cargo weight.
- Cargo loaded up to 0.3m below the top of the hatch coaming.

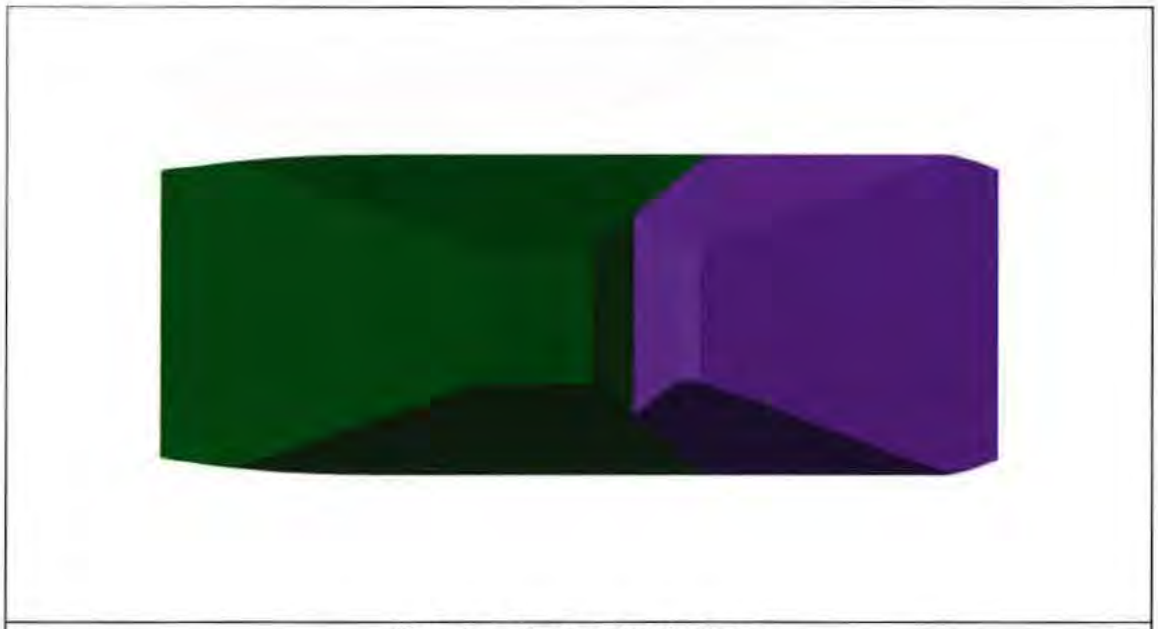


Cargo Distribution 2



Side view of cargo

Section view of cargo, full width in lower part of hold, 50 degrees angle of repose above



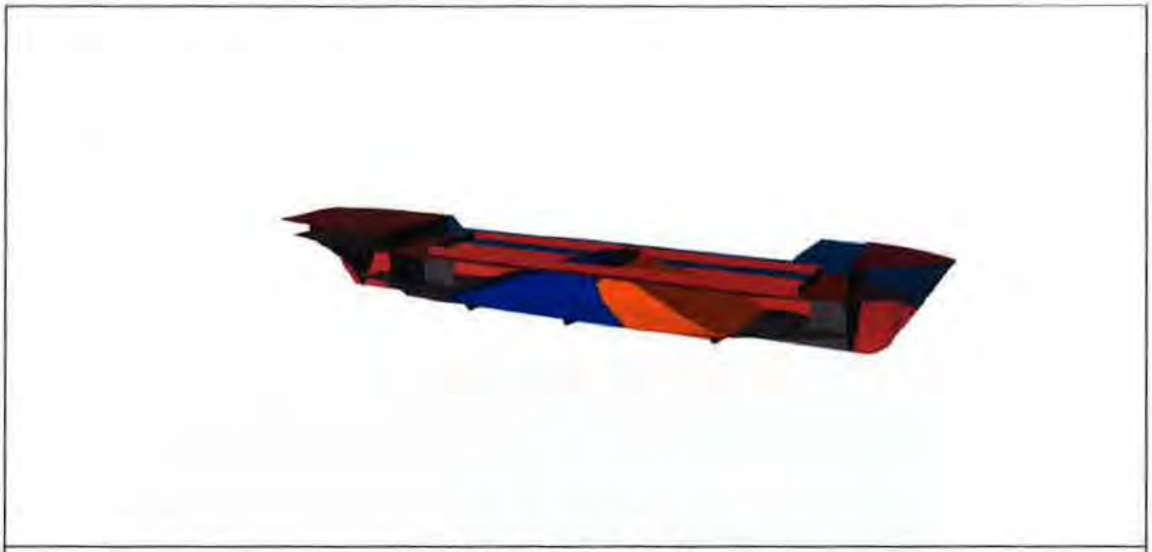
Plan view of cargo distribution 2

Weight of aft pile = 1800.27 tonnes, LCG = 35.15m fwd of AP, VCG = 3.40m above baseline.
Weight of fwd pile = 929.40 tonnes, LCG = 48.63m fwd of AP, VCG = 3.49m above baseline.

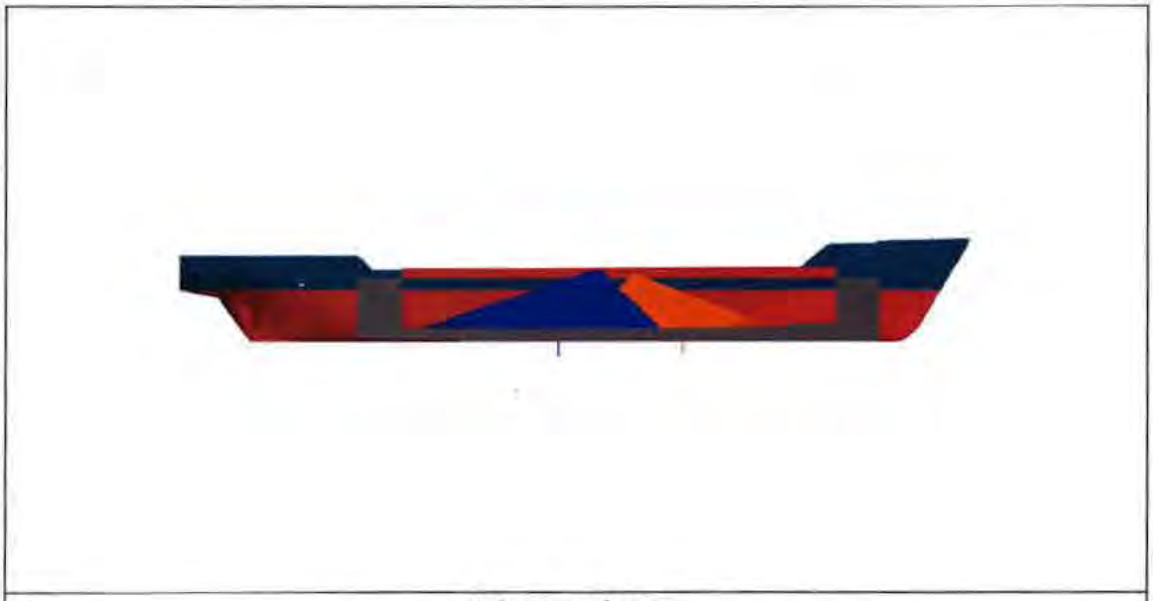
Total cargo weight = 2729.67 tonnes, LCG = 39.74m fwd of AP, VCG = 3.44m above baseline.

Cargo Distribution 3

- Aft end of aft pile at frame 34, forward end of aft pile at frame 71.5.
- Forward end of forward pile at frame 90.
- Lowest 2.38m portion of cargo filled over full width of hold, angle of repose 50 degrees above this.
- 50 degree angle of repose on P&S sides of each pile, 44 degrees on forward slope of aft pile and aft slope of forward pile – the aft slope of the aft pile and forward slope of the forward pile selected to obtain the desired cargo weight.
- Cargo loaded up to 0.3m below the top of the hatch coaming.

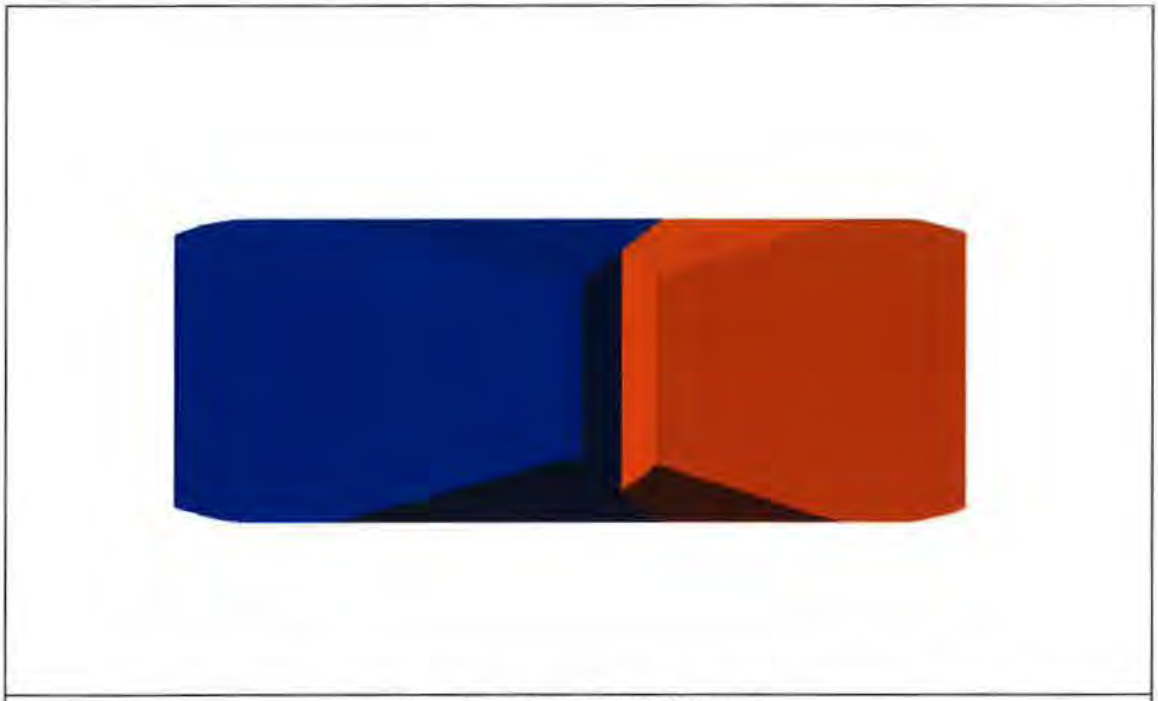


Cargo Distribution 3



Side view of cargo

Section view of cargo, full width in lower part of hold, 50 degrees angle of repose above



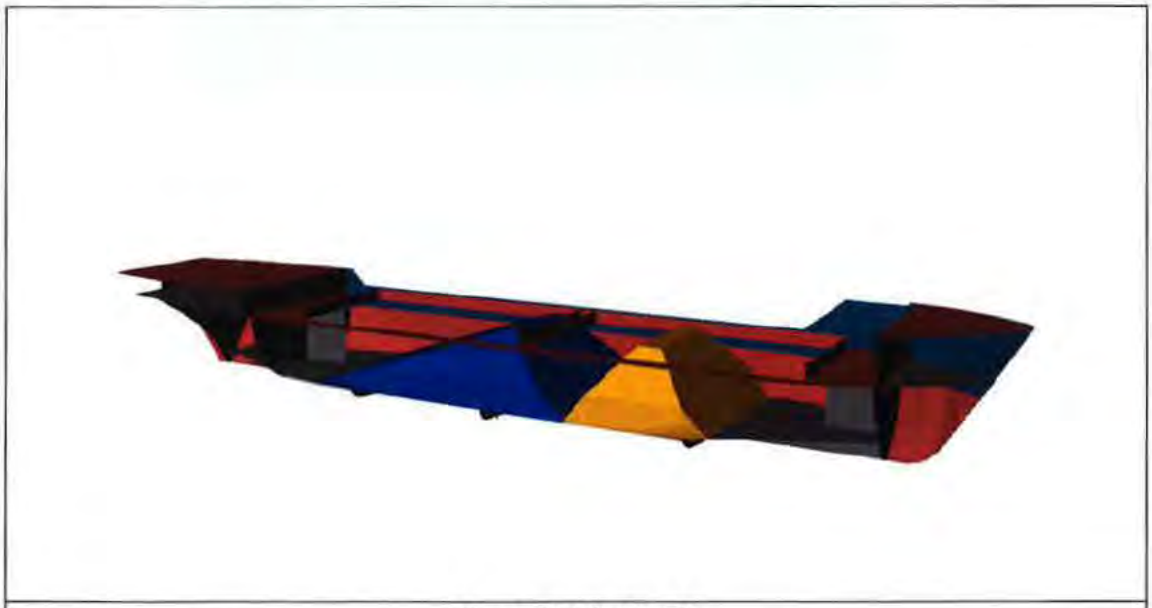
Plan view of cargo distribution 3

Weight of aft pile = 1798.36 tonnes, LCG = 35.69m fwd of AP, VCG = 3.37m above baseline.
Weight of fwd pile = 931.14 tonnes, LCG = 48.36m fwd of AP, VCG = 3.44m above baseline.

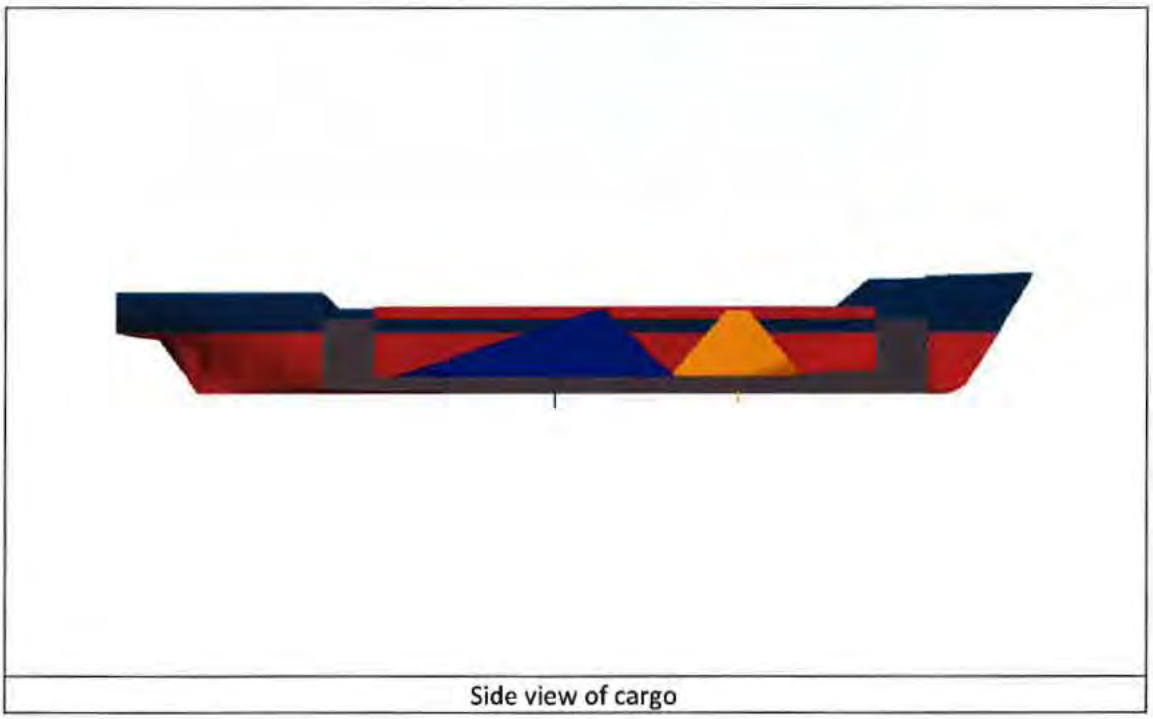
Total cargo weight = 2729.50 tonnes, LCG = 40.02m fwd of AP, VCG = 3.39m above baseline.

Cargo Distribution 4

- Aft end of aft pile at frame 34, forward end of aft pile at frame 71.5.
- Forward end of forward pile at frame 90.
- Lowest 2.38m portion of cargo filled over full width of hold, angle of repose 50 degrees above this.
- Aft pile same as in Cargo Distribution 3.
- 50 degree angle of repose on all sides of forward pile.
- Cargo loaded up to 0.3m below the top of the hatch coaming.

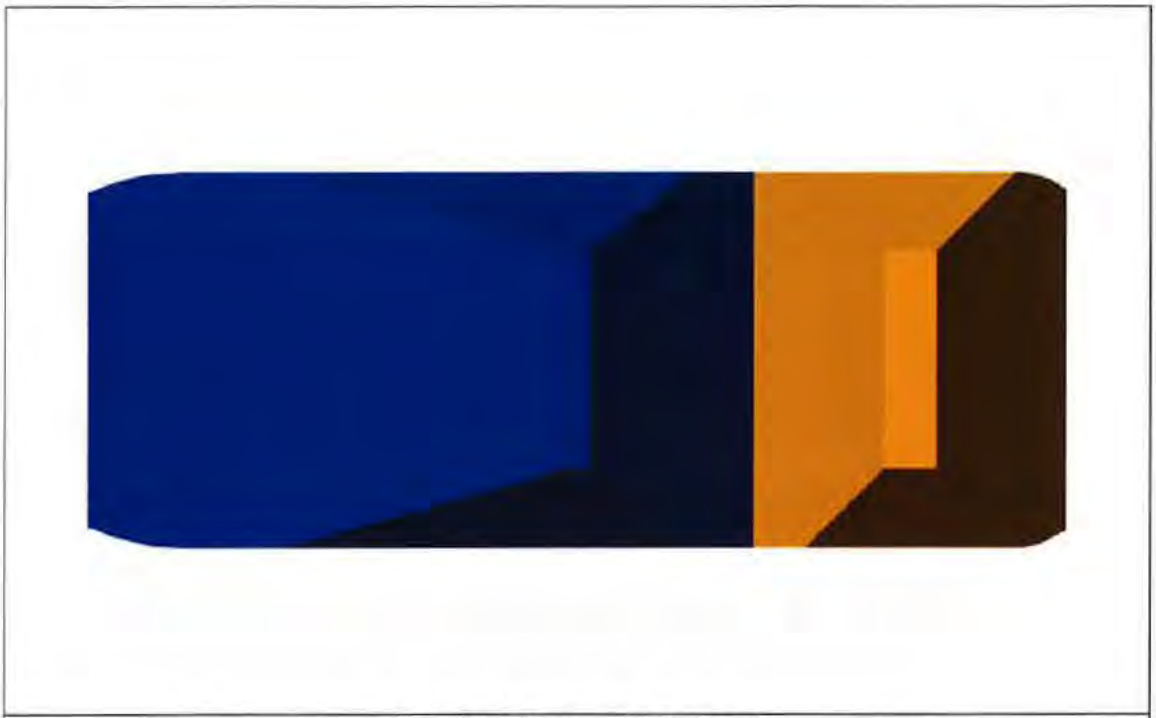


Cargo Distribution 4



Side view of cargo

Section view of cargo, full width in lower part of hold, 50 degrees angle of repose above



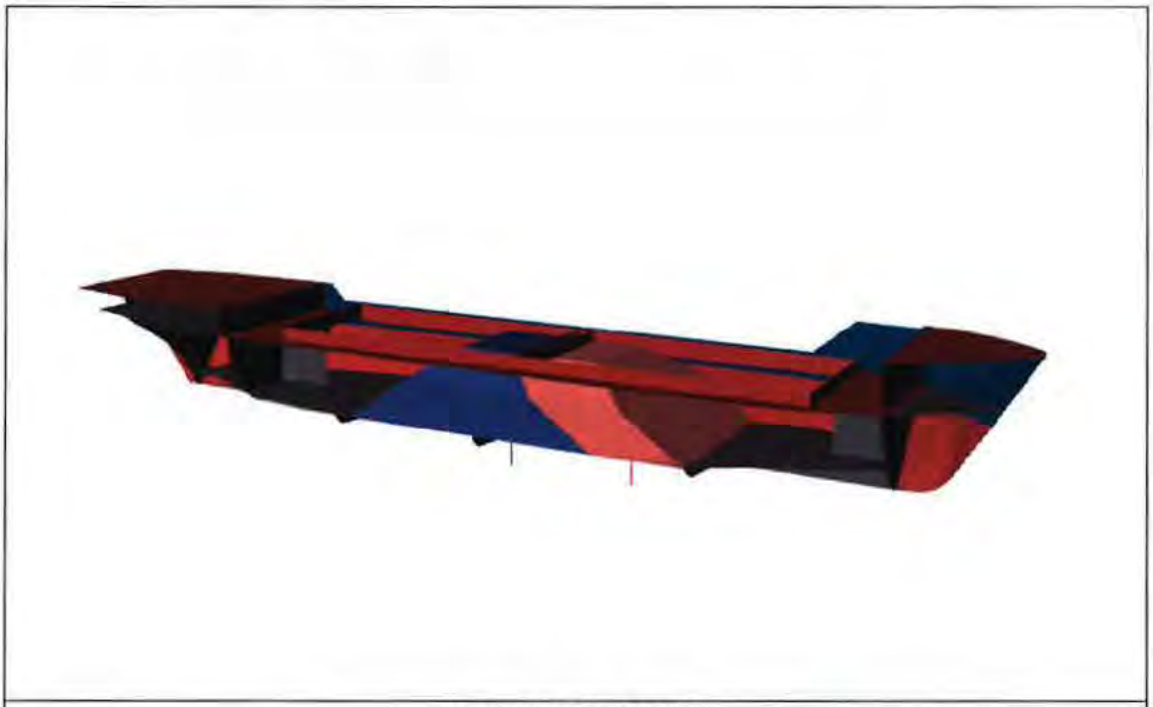
Plan view of cargo distribution 4

Weight of aft pile = 1798.36 tonnes, LCG = 35.69m fwd of AP, VCG = 3.37m above baseline.
Weight of fwd pile = 932.66 tonnes, LCG = 51.63m fwd of AP, VCG = 3.57m above baseline.

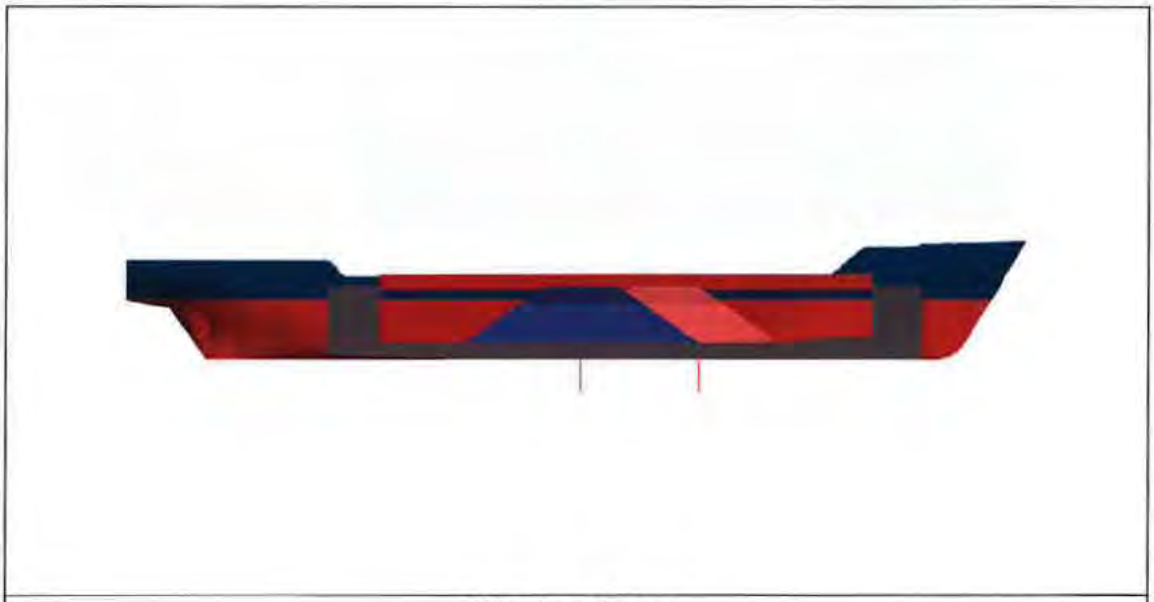
Total cargo weight = 2731.01 tonnes, LCG = 41.13m fwd of AP, VCG = 3.44m above baseline.

Cargo Distribution 5b

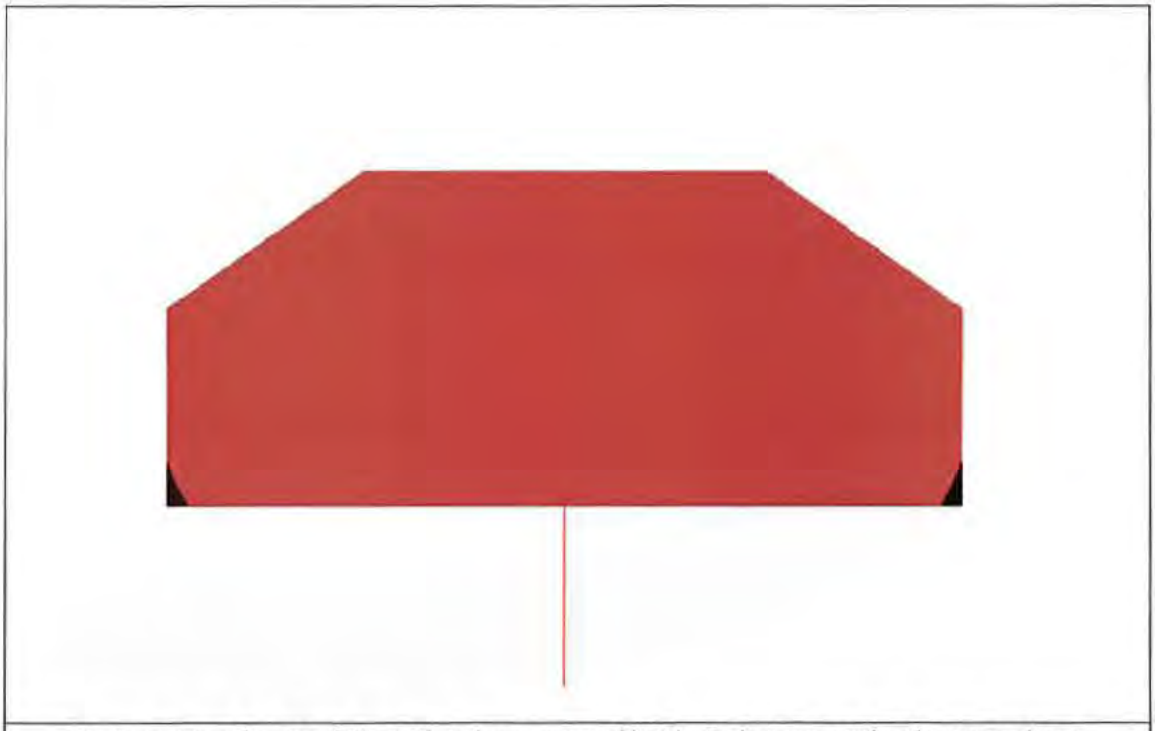
- Aft end of aft pile at frame 43, forward end of aft pile at frame 75.
- Forward end of forward pile at frame 86.
- Lowest 3.45m portion of cargo filled over full width of hold, angle of repose 35 degrees above this.
- 35 degree angle of repose on all sides of both piles.
- Cargo loaded up to 0.305m below the top of the hatch coaming.
- Cargo LCG moved aft by 0.30m



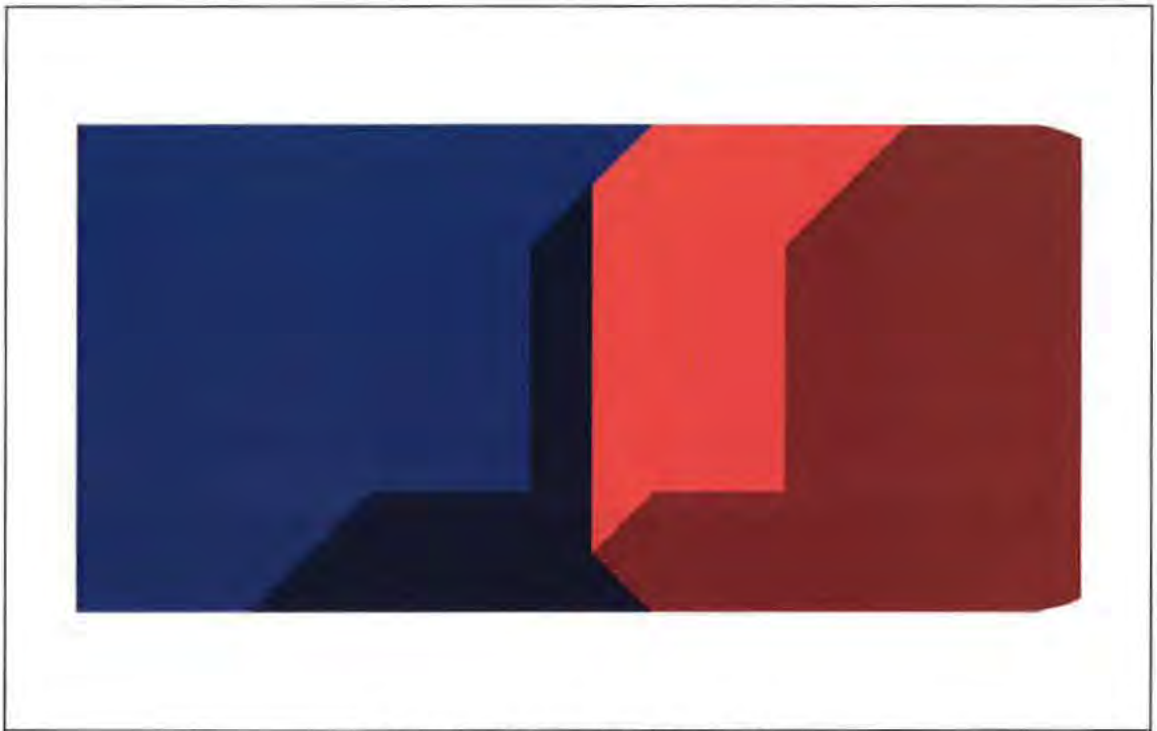
Cargo Distribution 5b



Side view of cargo



Section view of cargo, full width in lower part of hold, 50 degrees angle of repose above



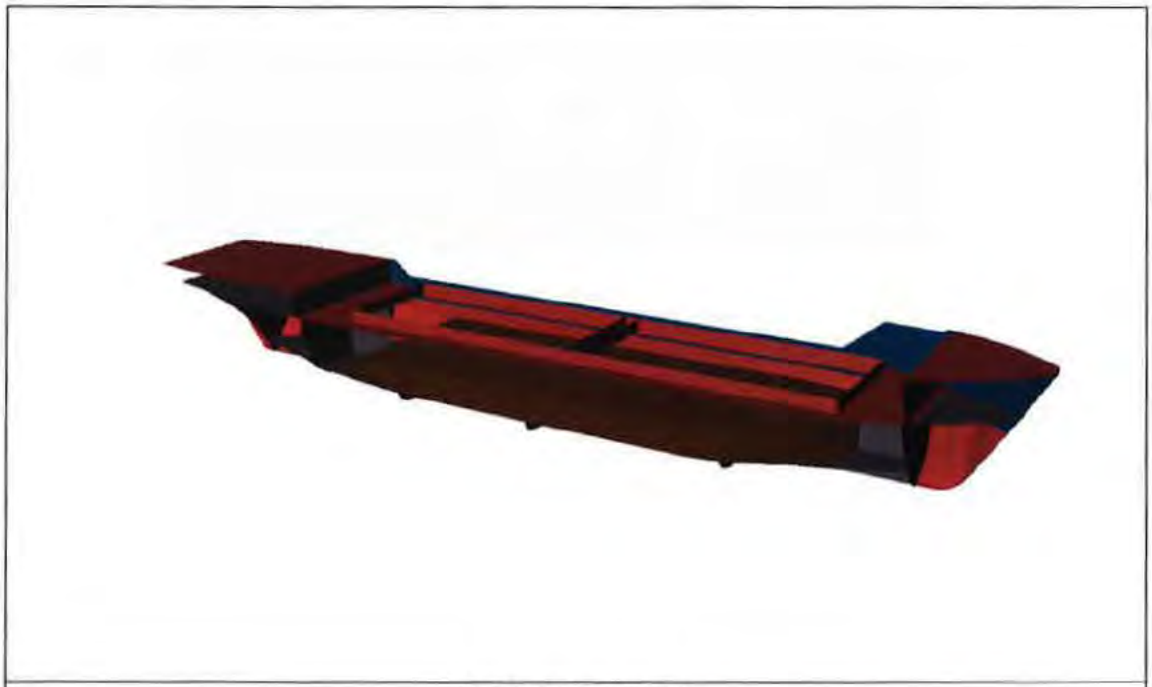
Plan view of cargo distribution 5b

Weight of aft pile = 1800.15 tonnes, LCG = 37.57 fwd of AP, VCG = 3.61m above baseline.
Weight of fwd pile = 929.63 tonnes, LCG = 48.08m fwd of AP, VCG = 4.06m above baseline.

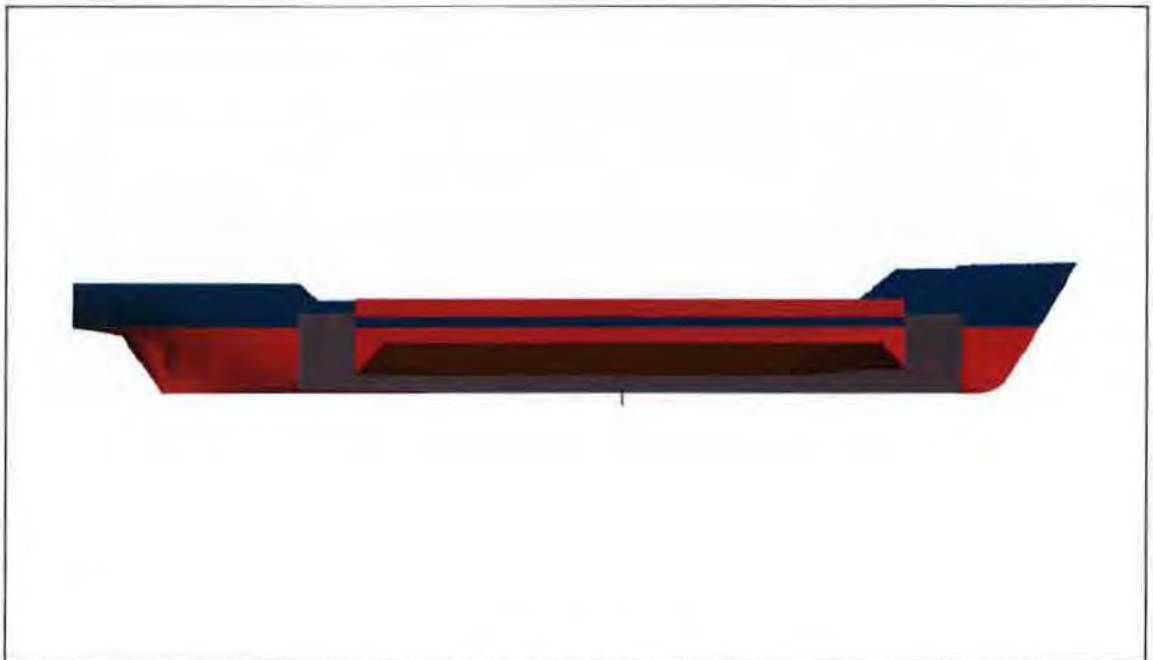
Total cargo weight = 2729.77 tonnes, LCG = 41.15 fwd of AP, VCG = 3.76m above baseline.

Cargo Distribution 7

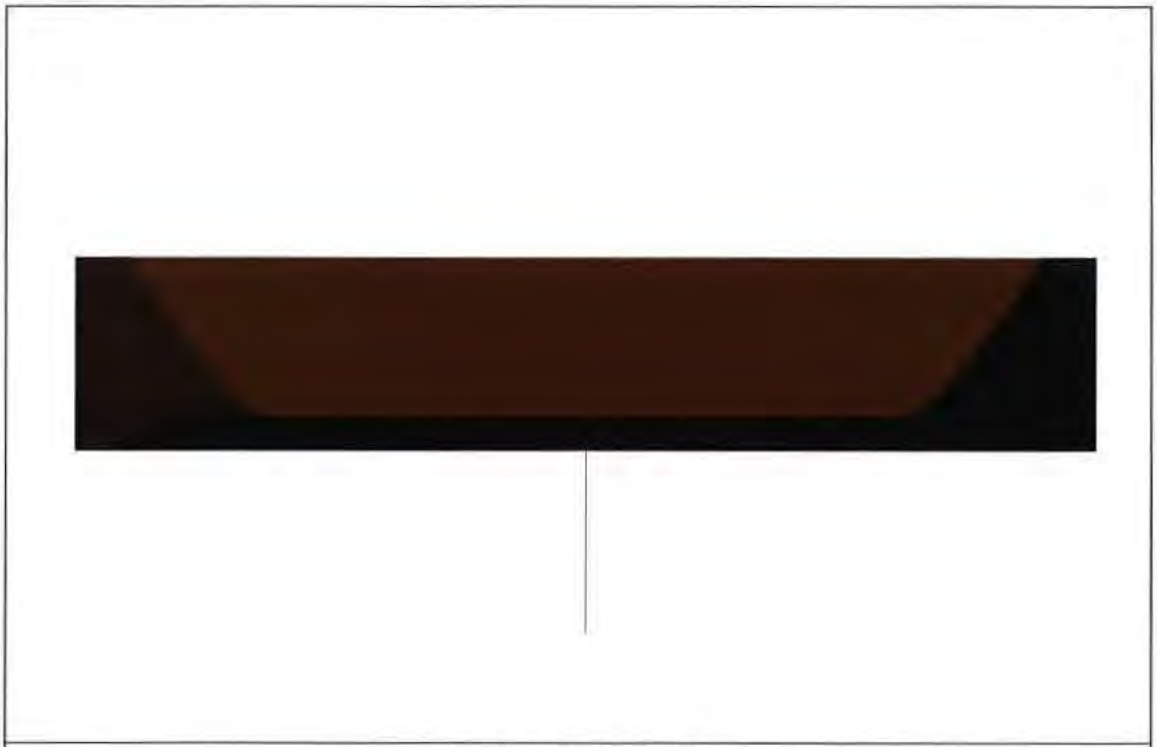
- Homogenous fully trimmed cargo
- Aft end of cargo at frame 31, forward end of cargo at frame 99.
- Fwd and aft ends of cargo have angle of repose of 50 degrees



Cargo Distribution 7



Side view of cargo



Section view of cargo

Plan view of cargo distribution

Total cargo weight = 2730 tonnes, LCG = 41.27 fwd of AP, VCG = 2.83 above baseline.

Summary

	Distribution 1			Distribution 2			Distribution 3		
	Aft Pile	Fwd Pile	Total	Aft Pile	Fwd Pile	Total	Aft Pile	Fwd Pile	Total
Weight	1800.06	927.04	2727.10	1800.27	929.40	2729.67	1798.36	931.14	2729.50
LCG	33.88	49.97	39.35	35.15	48.63	39.74	35.69	48.36	40.02
VCG	3.43	3.46	3.44	3.41	3.49	3.44	3.37	3.44	3.39

	Distribution 4			Distribution 5b			Distribution 7
	Aft Pile	Fwd Pile	Total	Aft Pile	Fwd Pile	Total	Total
Weight	1798.36	932.65	2731.01	1800.15	929.63	2729.77	2730
LCG	35.69	51.63	41.13	37.87	48.38	41.45	41.27
VCG	3.37	3.57	3.44	3.61	4.06	3.76	2.83

Annex P

Internal LR Memo requesting a copy of the loading manual

LLOYD'S REGISTER OF SHIPPING

MEMORANDUM

ONTVANGEN 2 4 OKT. 1977

To The Surveyors, GRONINGEN

From CERTS

Reference Z68/54

Headquarters, 71 Fenchurch Street, London, EC3M 4BS

Name CAREBEKA IX

Date 18th October 1977.

Please forward as soon as possible, a copy of the trim and Stability/loading Manual for the above ship as no such manual can be located in this office.

[redacted]

Signed

Reply

Date 7th November 1977

Please find enclosed approved trim and stability manual for the above ship.

RECEIVED

-9 NOV 1977

[redacted]

Signed

RECIPIENT: RETAIN TOP COPY. RETAIN YELLOW COPY

Annex Q

Extracts from *Swan Diana*'s loading manual

SINUS DESIGN OFFICE
Ltd.

LOADING MANUAL
0520-100

SWAN
DIANA

~~**MS TRIOBULK**~~

SP 504
GENERAL CARGO SHIP

DET NORSKE VERITAS * 1864 *

APPROVED
SIGN.: [redacted]
1999 -02- 08

DET NORSKE VERITAS AS
Division Technology and Products

Approved
Ref. No. 025639-04
Hamburg 04. 05. 05
Germanischer Lloyd
Bemerkungen im Brief sind zu bea
Remarks in the letter to be obse

Made by:
Checked:

PRUSZCZ GDANSKI
1998.09.10

1.0 General characteristics of the ship :

L_{oa}	≈	89.97 m	
L_{pp}	=	83.78 m	
B	=	12 m	
D	=	6.8 m	
T	=	5.3 m	- scantling draught
V	=	4020.7 m^3	

calculation length of the ship defined :

L_{wl}	=	87.007 m.		
L_1	=	0.97·87.007	=	84.397 m
L_2	=	0.96·87.007	=	83.527 m

for calculation – length of the ship : L = 84.397 m

block coefficient defined :

$$C_B = \frac{V \cdot 1.005}{L \cdot B \cdot T} = 0.753$$

block coefficient $C_B = 0.753$

wave coefficient block :

$C_w = 0.0792 \cdot L = 6.684$
$C_{wmax} = D/1.4 = 4.857$

wave coefficient block $C_w = 4.857$

Class: DnV + 1A1, GENERAL CARGO CARRIER

3.1 List of loading conditions.

No	Condition description	Stores	Stores	Ballast	Load.	Add.	Total
0	Light ship	-	-	-	-	-	1467.1
1	Ballast cond. Departure	100%	133.7	621	-	3	2224.8
2	Ballast cond. Arrival	10%	59.1	621	-	3	2150.2
3	Homogeneous Cargo Departure	100%	133.7	24.9	2255.8	3	3884.5
4	Homogeneous Cargo Arrival	10%	59.1	24.9	2255.8	3	3809.9
5	Heavy Cargo Departure	100%	133.7	-	2552.0	3	4155.8
6	Heavy Cargo Arrival	10%	59.1	-	2552.0	3	4081.2

Acc. Document: STABILITY MANUAL/TRIOBULK/0420-30

3.2 Summary of loading conditions.

No	Condition description	da	df	dm	BM max [kNm]	Fr.	SF max [kN]	Fr.	SF max [kN]	Fr.
0	Light ship	3,78	0,74	2,26	64757	62	2987	35	-2240	99
1	Ballast cond. Departure	3,44	2,94	2,19	75000	64	3407	35	-3124	106
2	Ballast cond. Arrival	3,22	2,97	3,10	74357	64	3395	35	-3118	106
3	Homogeneous Cargo Departure	4,89	5,20	5,04	16057	35	367	107	-1216	40
4	Homogeneous Cargo Arrival	4,75	5,20	4,97	16161	35	355	107	-1198	40
5	Heavy Cargo Departure	5,56	5,03	5,30	-40932	66	3198	96	-3130	40
6	Heavy Cargo Arrival	5,42	5,03	5,22	-40348	66	3157	96	-3110	40

Load condition No 5

HEAVY CARGO DEPARTURE - scantling draught (100% OF STORES)

Heavy products (steel products)distributed between aft bulkhead of the hold and Fr. 96

CREW AND PROVIS.	from	to	P	LCG	TCG	VCG
CREW	5	35	1.0	12.60	0.00	7.90
PROVISION	5	35	2.0	10.00	0.00	7.90
Group total			3.0	10.87	0.00	7.90
STORES	**from**	**to**	**P**	**LCG**	**TCG**	**VCG**
Stores on depart	-4	95	133.7	23.96	-0.26	1.86
Group total			133.7	23.96	-0.26	1.86
CARGO	**from**	**to**	**P**	**LCG**	**TCG**	**VCG**
HOLD	40	96	2552.0	43.65	0.00	4.10
Group total			2552.0	43.65	0.00	4.10
			P	LCG	TCG	VCG
Light ship			1467.1	35.40	0.00	5.26
Grand total			4155.8	40.08	-0.01	4.44

Load condition No 5
HEAVY CARGO DEPARTURE

Results: SFmax= 3198 sp= 96 BMmax= -40931.6 sp= 66 da= 5.56 df= 5.03

Sp	x[m]	q[t/m]	P[t]	SF[kN]	BM[kNm]	f[mm]	SFbd[kN]	BMbd[kNm]
-4	-1.80	0.00	0.00	00	00	0.0	0	0
-3	-1.20	1.36	0.82	-58	-57	0.0	0	0
-2	-0.60	0.27	0.16	-57	-92	0.0	0	0
-1	0.00	-0.64	-0.38	-61	-127	0.0	0	0
0	0.60	-1.53	-0.92	-70	-166	0.0	0	0
1	1.20	-2.46	-1.47	-84	-212	0.0	0	0
2	1.80	-3.52	-2.11	-105	-269	0.0	0	0
3	2.40	-4.86	-2.92	-133	-340	0.0	0	0
4	3.00	-6.75	-4.05	-173	-432	0.0	0	0
5	3.60	12.01	7.21	-102	-514	0.0	0	0
6	4.20	10.37	6.22	-41	-558	0.0	0	0
7	4.80	8.72	5.23	10	-567	0.0	0	0
8	5.40	7.10	4.26	52	-548	0.0	0	0
9	6.00	5.48	3.29	84	-508	0.0	0	0
10	6.60	3.83	2.30	107	-450	0.0	0	0
11	7.20	2.19	1.31	119	-383	0.0	0	0
12	7.80	0.57	0.34	123	-310	0.0	0	0
13	8.40	0.38	0.23	125	-236	0.0	0	0
14	9.00	-1.19	-0.72	118	-163	0.0	0	0
15	9.60	-2.74	-1.65	102	-97	0.0	0	0
16	10.20	-4.28	-2.57	77	-43	0.0	0	0
17	10.80	-5.79	-3.47	43	-7	0.0	0	0
18	11.40	-5.27	-3.16	12	9	0.0	0	0
19	12.00	-6.74	-4.04	-28	4	0.0	0	0
20	12.60	-8.16	-4.90	-76	-27	0.0	0	0
21	13.20	-9.54	-5.73	-132	-89	0.0	0	0
22	13.80	-10.88	-6.53	-196	-188	0.0	0	0
23	14.40	-12.16	-7.30	-268	-327	0.0	0	0
24	15.00	-14.40	-8.64	-352	-513	0.0	0	0
25	15.60	-15.60	-9.36	-444	-752	0.0	0	0
26	16.20	-16.75	-10.05	-543	-1048	0.0	0	0
27	16.80	-17.87	-10.72	-648	-1406	0.0	0	0
28	17.40	-18.94	-11.37	-759	-1828	0.0	0	0
29	18.00	-19.96	-11.98	-877	-2319	0.0	0	0
30	18.60	-20.92	-12.55	-1000	-2882	0.0	0	0
31	19.20	-21.82	-13.09	-1128	-3520	0.0	0	0
32	19.80	-22.62	-13.57	-1261	-4237	0.0	0	0
33	20.40	-23.32	-13.99	-1399	-5035	0.0	0	0
34	21.00	-23.95	-14.37	-1540	-5917	0.0	0	0
35	21.60	-24.51	-14.71	-1684	-6884	0.0	0	0
36	22.20	-48.38	-29.03	-1968	-7979	0.0	0	0
37	22.80	-48.81	-29.29	-2256	-9247	0.0	0	0

Load condition No 5

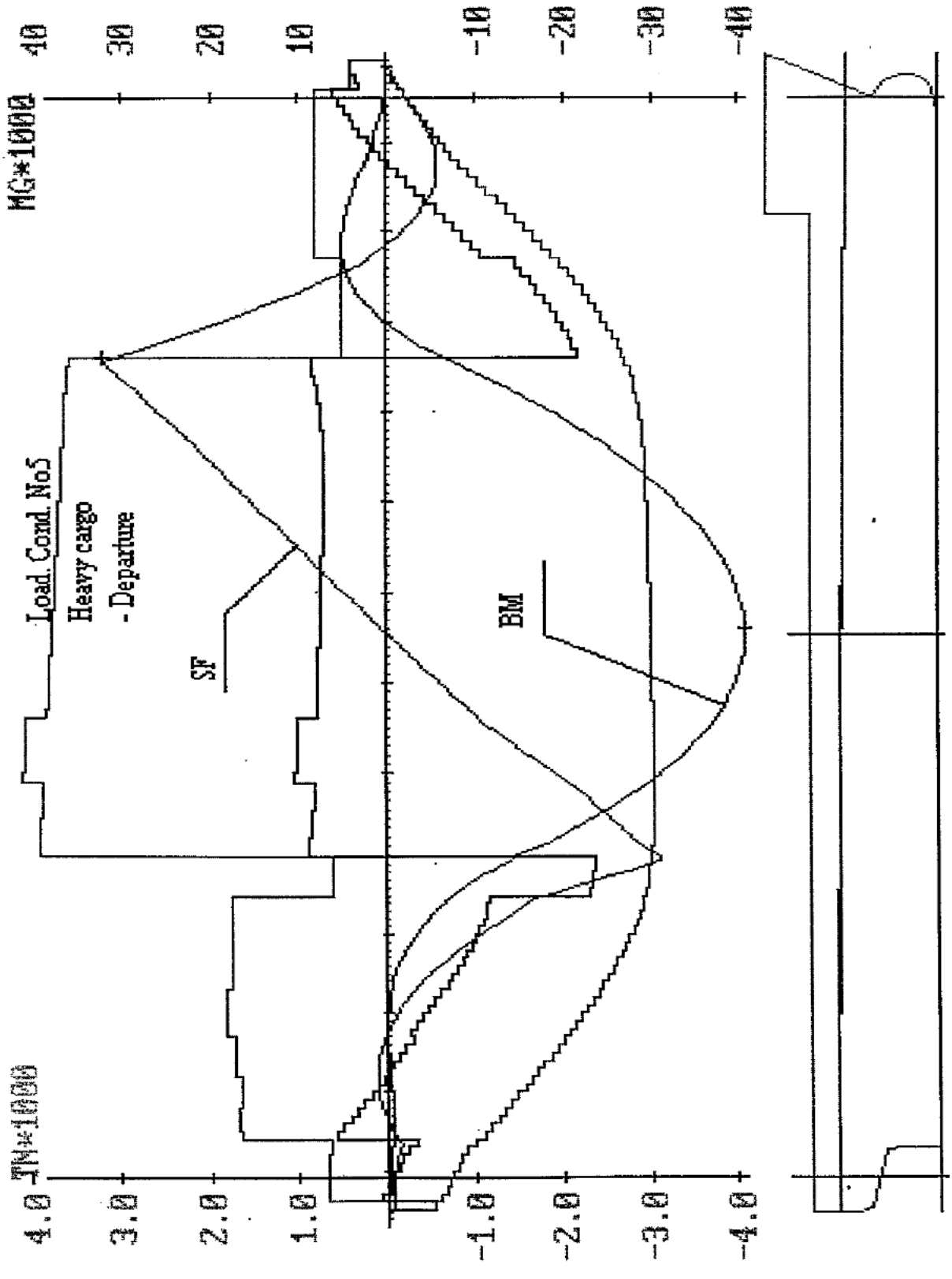
HEAVY CARGO DEPARTURE

Sp	x[m]	q[t/m]	P[t]	SF[kN]	BM[kNm]	f[mm]	SFbd[kN]	BMbd[kNm]
38	23.40	-49.19	-29.52	-2545	-10687	0.0	0	0
39	24.00	-49.53	-29.72	-2837	-12301	0.0	0	0
40	24.60	-49.82	-29.89	-3130	-14091	0.0	0	0
41	24.70	18.71	1.87	-3111	-14403	0.0	0	0
42	25.40	18.50	12.95	-2984	-16537	0.0	0	0
43	26.10	18.17	12.72	-2860	-18582	0.0	0	0
44	26.80	17.88	12.52	-2737	-20541	0.0	0	0
45	27.50	17.63	12.34	-2616	-22414	0.0	0	0
46	28.20	17.42	12.19	-2496	-24203	0.0	0	0
47	28.90	17.24	12.07	-2378	-25909	0.0	0	0
48	29.60	17.08	11.96	-2261	-27532	0.0	0	0
49	30.30	16.96	11.87	-2144	-29074	0.0	0	0
50	31.00	21.65	15.16	-1995	-30523	0.0	0	0
51	31.70	21.57	15.10	-1847	-31868	0.0	0	0
52	32.40	21.50	15.05	-1700	-33110	0.0	0	0
53	33.10	21.45	15.01	-1553	-34248	0.0	0	0
54	33.80	21.39	14.98	-1406	-35283	0.0	0	0
55	34.50	21.34	14.94	-1259	-36216	0.0	0	0
56	35.20	21.29	14.90	-1113	-37047	0.0	0	0
57	35.90	16.44	11.51	-1000	-37786	0.0	0	0
58	36.60	16.38	11.47	-888	-38447	0.0	0	0
59	37.30	16.32	11.42	-776	-39029	0.0	0	0
60	38.00	16.26	11.38	-664	-39533	0.0	0	0
61	38.70	16.19	11.34	-553	-39960	0.0	0	0
62	39.40	16.13	11.29	-442	-40308	0.0	0	0
63	40.10	16.06	11.24	-332	-40579	0.0	0	0
64	40.80	15.99	11.19	-222	-40773	0.0	0	0
65	41.50	15.92	11.14	-113	-40891	0.0	0	0
66	42.20	15.85	11.09	-4	-40932	0.0	0	0
67	42.90	15.78	11.04	104	-40897	0.0	0	0
68	43.60	15.71	10.99	212	-40786	0.0	0	0
69	44.30	15.63	10.94	319	-40600	0.0	0	0
70	45.00	15.56	10.89	426	-40339	0.0	0	0
71	45.70	15.49	10.84	532	-40004	0.0	0	0
72	46.40	15.42	10.79	638	-39594	0.0	0	0
73	47.10	15.36	10.75	744	-39111	0.0	0	0
74	47.80	15.30	10.71	849	-38553	0.0	0	0
75	48.50	15.25	10.67	953	-37923	0.0	0	0
76	49.20	15.21	10.64	1058	-37219	0.0	0	0
77	49.90	15.17	10.62	1162	-36442	0.0	0	0
78	50.60	15.14	10.60	1266	-35592	0.0	0	0
79	51.30	15.12	10.58	1370	-34670	0.0	0	0
80	52.00	15.09	10.57	1473	-33675	0.0	0	0
81	52.70	15.07	10.55	1577	-32608	0.0	0	0
82	53.40	15.05	10.54	1680	-31468	0.0	0	0
83	54.10	15.04	10.53	1783	-30256	0.0	0	0
84	54.80	15.02	10.52	1886	-28972	0.0	0	0
85	55.50	15.02	10.52	1989	-27615	0.0	0	0
86	56.20	15.05	10.53	2093	-26186	0.0	0	0
87	56.90	15.10	10.57	2196	-24685	0.0	0	0

Load condition No 5

HEAVY CARGO DEPARTURE

Sp	x[m]	q[t/m]	P[t]	SF[kN]	BM[kNm]	f[mm]	SFbd[kN]	BMbd[kNm]
88	57.60	15.18	10.63	2301	-23111	0.0	0	0
89	58.30	15.30	10.71	2406	-21464	0.0	0	0
90	59.00	15.48	10.83	2512	-19743	0.0	0	0
91	59.70	15.71	11.00	2620	-17947	0.0	0	0
92	60.40	16.03	11.22	2730	-16074	0.0	0	0
93	61.10	16.42	11.50	2843	-14124	0.0	0	0
94	61.80	16.92	11.85	2959	-12094	0.0	0	0
95	62.50	17.52	12.27	3079	-9981	0.0	0	0
96	63.20	17.40	12.18	3198	-7784	0.0	0	0
97	63.90	-45.27	-31.69	2888	-5653	0.0	0	0
98	64.60	-44.24	-30.97	2584	-3738	0.0	0	0
99	65.30	-43.08	-30.16	2288	-2033	0.0	0	0
100	66.00	-41.82	-29.27	2001	-532	0.0	0	0
101	66.70	-40.46	-28.32	1723	772	0.0	0	0
102	67.40	-39.02	-27.31	1456	1884	0.0	0	0
103	68.10	-37.49	-26.25	1198	2813	0.0	0	0
104	68.80	-35.89	-25.12	952	3566	0.0	0	0
105	69.50	-34.19	-23.93	717	4150	0.0	0	0
106	70.20	-32.40	-22.68	495	4574	0.0	0	0
107	70.90	-30.51	-21.35	285	4847	0.0	0	0
108	71.60	-22.22	-15.55	133	4993	0.0	0	0
109	72.30	-20.13	-14.09	-5	5038	0.0	0	0
110	73.00	-18.01	-12.61	-129	4991	0.0	0	0
111	73.70	-15.88	-11.11	-238	4863	0.0	0	0
112	74.40	-13.74	-9.62	-332	4663	0.0	0	0
113	75.10	-11.51	-8.06	-411	4403	0.0	0	0
114	75.80	-9.18	-6.43	-474	4093	0.0	0	0
115	76.50	-6.89	-4.82	-522	3745	0.0	0	0
116	77.20	-4.65	-3.26	-553	3368	0.0	0	0
117	77.90	-2.49	-1.74	-571	2975	0.0	0	0
118	78.60	-0.42	-0.29	-573	2574	0.0	0	0
119	79.20	1.42	0.85	-565	2233	0.0	0	0
120	79.80	3.06	1.83	-547	1899	0.0	0	0
121	80.40	4.66	2.80	-520	1579	0.0	0	0
122	81.00	6.21	3.72	-483	1278	0.0	0	0
123	81.60	7.65	4.59	-438	1002	0.0	0	0
124	82.20	8.93	5.36	-386	755	0.0	0	0
125	82.80	10.13	6.08	-326	541	0.0	0	0
126	83.40	11.41	6.84	-259	366	0.0	0	0
127	84.00	13.13	7.88	-182	234	0.0	0	0
128	84.60	6.23	3.74	-145	136	0.0	0	0
129	85.20	7.43	4.46	-101	62	0.0	0	0
130	85.80	8.60	5.16	-51	16	0.0	0	0
131	86.40	8.60	5.16	0	1	0.0	0	0



Calculation for still water

4.0 Permissible limits of stillwater bending moments.

Max permissible stillwater bending moments on midship part

For hogging conditions: **75000 kNm**

For sagging conditions: **54700 kNm**

Min. Draught on F.P.

$$T_F = 2.88\text{m.}$$

5.0 The allowable local loadings for the structure.

1) The allowable loadings in hold:

1.1 For standard cargo density

$$\rho = 0.7 \ t/m^3$$

the means loads on inner bottom

$$p = 5.3 \ t/m^3$$

1.2 For heavy cargo (steel product)

the allowable loads on inner bottom

$$p_{max} = 6.0 \ t/m^3$$

2) The reaming area – deck and hatch covers only sea presure.

Annex R

Extract from IMSBC Code, including extracts from SOLAS CH VI, Parts A and B

IMSBC CODE

International Maritime Solid Bulk Cargoes Code

2012 EDITION

INCORPORATING AMENDMENT 01-11

and supplement

IMO INTERNATIONAL MARITIME ORGANIZATION

Section 1

General provisions

1.1 Introductory note

1.1.1 It should be noted that other international and national regulations exist and that those regulations may recognize all or part of the provisions of this Code. In addition, port authorities and other bodies and organizations should recognize the Code and may use it as a basis for their storage and handling by-laws within loading and discharge areas.

1.2 Cargoes listed in this Code

1.2.1 Typical cargoes currently shipped in bulk, together with advice on their properties and methods of handling, are given in the schedules for individual cargoes. However, these schedules are not exhaustive and the properties attributed to the cargoes are given only for guidance. Consequently, before loading, it is essential to obtain current valid information from the shipper on the physical and chemical properties of the cargoes presented for shipment. The shipper shall provide appropriate information about the cargo to be shipped (see section 4.2).

1.2.2 Where a solid bulk cargo is specifically listed in appendix 1 to this Code (individual schedules for solid bulk cargoes), it shall be transported in accordance with the provisions in its schedule in addition to the provisions in sections 1 to 10 and 11.1.1 of this Code. The master shall consider to consult the authorities at the ports of loading and discharge, as necessary, concerning the requirements which may be in force and applicable for the carriage.

1.3 Cargoes not listed in this Code

1.3.1 If a solid cargo which is not listed in appendix 1 to this Code is proposed for carriage in bulk, the shipper shall, prior to loading, provide the competent authority of the port of loading with the characteristics and properties of the cargo in accordance with section 4 of this Code. Based on the information received, the competent authority will assess the acceptability of the cargo for safe shipment.

1.3.1.1 When it is assessed that the solid bulk cargo proposed for carriage may present hazards as those defined by Group A or B of this Code as defined in 1.7, advice is to be sought from the competent authorities of the port of unloading and of the flag State. The three competent authorities will set the preliminary suitable conditions for the carriage of this cargo.

1.3.1.2 When it is assessed that the solid bulk cargo proposed for carriage presents no specific hazards for transportation, the carriage of this cargo shall be authorized. The competent authorities of the port of unloading and of the flag State shall be advised of that authorization.

1.3.2 The competent authority of the port of loading shall provide to the master a certificate stating the characteristics of the cargo and the required conditions for carriage and handling of this shipment. The competent authority of the port of loading shall also submit an application to the Organization, within one year from the issue of the certificate, to incorporate this solid bulk cargo into appendix 1 of this Code. The format of this application shall be as outlined in subsection 1.3.3.

1.3.3 Format for the properties of cargoes not listed in this Code and conditions of the carriage

TENTATIVE BULK CARGO SHIPPING NAME (In capital letters)

Description (Describe the cargo)

Characteristics (Fill the following table)

Angle of repose	Bulk density (kg/m^3)	Stowage factor (m^3/t)
Size	**Class**	**Group**

Hazard (Clarify the hazard of carriage of the cargo)

(Determine the following types of requirements. If no requirement is necessary, write "No special requirements")

Stowage & segregation

Hold cleanliness

Weather precautions

Loading

Precautions

Ventilation

Carriage

Discharge

Clean-up

(Specify the emergency procedures for the cargo, if necessary)

Emergency procedures

Special emergency equipment to be carried
Emergency procedures **Emergency action in the event of fire** **Medical First Aid**

1.4 Application and implementation of this Code

1.4.1 The provisions contained in this Code apply to all ships to which the SOLAS Convention, as amended, applies and that are carrying solid bulk cargoes as defined in regulation 1-1 of part A of chapter VI of the Convention.

1.4.2 Although this Code is legally treated as a mandatory instrument under the SOLAS Convention, the following provisions of this Code remain recommendatory or informative:

Section 11 Security provisions (except subsection 11.1.1);

Section 12 Stowage factor conversion tables;

Section 13 References to related information and recommendations;

Appendices other than appendix 1, Individual schedules of solid bulk cargoes; and

The texts in the sections for "Description", "Characteristics", "Hazard" and "Emergency procedures" of individual schedules of solid bulk cargoes in appendix 1.

1.4.3 In certain parts of this Code, a particular action is prescribed, but the responsibility for carrying out the action has not been specifically assigned to any particular person. Such responsibility may vary according to the laws and customs of different countries and the international conventions into which these countries have entered. For the purpose of this Code, it is not necessary to make this assignment, but only to identify the action itself. It remains the prerogative of each Government to assign this responsibility.

1.5 Exemptions and equivalent measures

1.5.1 Where this Code requires that a particular provision for the transport of solid bulk cargoes shall be complied with, a competent authority or competent authorities (port State of departure, port State of arrival or flag State) may authorize any other provision by exemption if satisfied that such provision is at least as effective and safe as that required by this Code. Acceptance of an exemption authorized under this section by a competent authority not party to it is subject to the discretion of that competent authority. Accordingly, prior to any shipment covered by the exemption, the recipient of the exemption shall notify other competent authorities concerned.

1.5.2 A competent authority or competent authorities which have taken the initiative with respect to the exemption:

.1 shall send a copy of such exemption to the Organization, which shall bring it to the attention of the Contracting Parties to SOLAS; and

.2 shall take action to amend this Code to include the provisions covered by the exemption, as appropriate.

1.5.3 The period of validity of the exemption shall be not more than five years from the date of authorization. An exemption that is not covered under 1.5.2.2 may be renewed in accordance with the provisions of this section.

1.5.4 A copy of the exemption or an electronic copy thereof shall be maintained on board each ship transporting solid bulk cargoes in accordance with the exemption, as appropriate.

1.5.5 Contact information for the main designated national competent authorities concerned is given in the separate document issued by the Organization.

Section 2

General loading, carriage and unloading precautions

2.1 Cargo distribution

2.1.1 General

A number of accidents have occurred as a result of improper loading and unloading of solid bulk cargoes. It shall be noted that solid bulk cargoes have to be properly distributed throughout the ship to provide adequate stability and to ensure that the ship's structure is never overstressed. Furthermore, the shipper shall provide the master with adequate information about the cargo, as specified in section 4, to ensure that the ship is properly loaded.*

2.1.2 To prevent the structure being overstressed

A general cargo ship is normally constructed to carry cargoes in the range of 1.39 to 1.67 cubic metres per tonne when loaded to full bale and deadweight capacities. When loading a high-density solid bulk cargo, particular attention shall be paid to the distribution of weights to avoid excessive stresses, taking into account that the loading conditions may be different from those found normally and that improper distribution of such cargo may be capable of stressing either the structure under the load or the entire hull. To set out exact rules for the distribution of loading is not practicable for all ships because the structural arrangements of each vessel may vary greatly. The information on proper distribution of cargo may be provided in the ship's stability information booklet or may be obtained by the use of loading calculators, if available.

2.1.3 To aid stability

2.1.3.1 Having regard to regulation II-1/22.1 of the SOLAS Convention, a stability information booklet shall be provided aboard all ships subject to the Convention. The master shall be able to calculate the stability for the anticipated worst conditions during the voyage, as well as that on departure, and demonstrate that the stability is adequate.

2.1.3.2 Shifting divisions and bins, of adequate strength, shall be erected whenever solid bulk cargoes which are suspected of readily shifting are carried in 'tween-deck cargo spaces or in only partially filled cargo spaces.

2.1.3.3 As far as practicable, high-density cargoes shall be loaded in the lower hold cargo spaces in preference to 'tween-deck cargo spaces.

2.1.3.4 When it is necessary to carry high-density cargoes in 'tween-decks or higher cargo spaces, due consideration shall be paid to ensure that the deck area is not overstressed and that the ship's stability is not reduced below the minimum acceptable level specified in the ship's stability data.

* Also refer to the Code of Practice for the Safe Loading and Unloading of Bulk Carriers, adopted by the Organization by resolution A.862(20), as amended (see the supplement of this publication).

2.2 Loading and unloading

2.2.1 Cargo spaces shall be inspected and prepared for the particular cargo which is to be loaded.*

2.2.2 Due consideration shall be paid to bilge wells and strainer plates, for which special preparation is necessary, to facilitate drainage and to prevent entry of the cargoes into the bilge system.

2.2.3 Bilge lines, sounding pipes and other service lines within the cargo space shall be in good order.

2.2.4 Because of the velocity at which some high-density solid bulk cargoes are loaded, special care may be necessary to protect cargo space fittings from damage. To sound bilges after the completion of loading may be effective to detect damage on cargo space fittings.

2.2.5 As far as practicable, ventilation systems shall be shut down or screened and air conditioning systems placed on recirculation during loading or discharge, to minimize dust ingress into the living quarters or other interior spaces.

2.2.6 Due consideration shall be paid to minimize the extent to which dust may come into contact with moving parts of deck machinery and external navigational aids.

* Refer to the Guidance to ships' crews and terminal personnel for bulk carrier inspections, adopted by the Organization by resolution A.866(20).

Section 4

Assessment of acceptability of consignments for safe shipment

4.1 Identification and classification

4.1.1 Each solid bulk cargo in this Code has been assigned a Bulk Cargo Shipping Name (BCSN). When a solid bulk cargo is carried by sea it shall be identified in the transport documentation by the BCSN. The BCSN shall be supplemented with the United Nations (UN) number when the cargo is dangerous goods.

4.1.2 If waste cargoes are being transported for disposal, or for processing for disposal, the name of the cargoes shall be preceded by the word "WASTE".

4.1.3 Correct identification of a solid bulk cargo facilitates identification of the conditions necessary to safely carry the cargo and the emergency procedures, if applicable.

4.1.4 Solid bulk cargoes shall be classified, where appropriate, in accordance with the UN Manual of Tests and Criteria, part III. The various properties of a solid bulk cargo required by this Code shall be determined, as appropriate to that cargo, in accordance with the test procedures approved by a competent authority in the country of origin, when such test procedures exist. In the absence of such test procedures, those properties of a solid bulk cargo shall be determined, as appropriate to that cargo, in accordance with the test procedures prescribed in appendix 2 to this Code.

4.2 Provision of information

4.2.1 The shipper shall provide the master or his representative with appropriate information on the cargo sufficiently in advance of loading to enable the precautions which may be necessary for proper stowage and safe carriage of the cargo to be put into effect.

4.2.2 Cargo information shall be confirmed in writing and by appropriate shipping documents prior to loading. The cargo information shall include:

.1 the BCSN when the cargo is listed in this Code. Secondary names may be used in addition to the BCSN;

.2 the cargo group (A and B, A, B or C);

.3 the IMO Class of the cargo, if applicable;

.4 the UN number, preceded by letters "UN" for the cargo, if applicable;

.5 the total quantity of the cargo offered;

.6 the stowage factor;

.7 the need for trimming and the trimming procedures, as necessary;

.8 the likelihood of shifting, including angle of repose, if applicable;

.9 additional information in the form of a certificate on the moisture content of the cargo and its transportable moisture limit in the case of a concentrate or other cargo which may liquefy;

.10 likelihood of formation of a wet base (see subsection 7.2.3 of this Code);

.11 toxic or flammable gases which may be generated by cargo, if applicable;

.12 flammability, toxicity, corrosiveness and propensity to oxygen depletion of the cargo, if applicable;

.13 self-heating properties of the cargo, and the need for trimming, if applicable;

.14 properties on emission of flammable gases in contact with water, if applicable;

.15 radioactive properties, if applicable; and

.16 any other information required by national authorities.

4.2.3 Information provided by the shipper shall be accompanied by a declaration. An example of a cargo declaration form is set out below. Another form may be used for cargo declaration. As an aid to paper documentation, Electronic Data Processing (EDP) or Electronic Data Interchange (EDI) techniques may be used.

FORM FOR CARGO INFORMATION
for solid bulk cargoes

<table>
<tr><td colspan="2">BCSN</td></tr>
<tr><td>Shipper</td><td>Transport document number</td></tr>
<tr><td>Consignee</td><td>Carrier</td></tr>
<tr><td>Name/means of transport
Port/place of departure</td><td rowspan="2">Instructions or other matters</td></tr>
<tr><td>Port/place of destination</td></tr>
<tr><td>General description of the cargo
(Type of material/particle size)</td><td>Gross mass (kg/tonnes)</td></tr>
<tr><td>Specifications of bulk cargo, if applicable:
Stowage factor:
Angle of repose, if applicable:
Trimming procedures:
Chemical properties if potential hazard*:
* e.g., Class & UN No. or "MHB"</td><td></td></tr>
<tr><td>☐ Group A and B*
☐ Group A*
☐ Group B
☐ Group C
* For cargoes which may liquefy (Group A and Group A and B cargoes)</td><td>Transportable moisture limit

Moisture content at shipment</td></tr>
<tr><td>Relevant special properties of the cargo (e.g., highly soluble in water)</td><td>Additional certificate(s)*
☐ Certificate of moisture content and transportable moisture limit
☐ Weathering certificate
☐ Exemption certificate
☐ Other (specify)
* If required</td></tr>
<tr><td>DECLARATION
I hereby declare that the consignment is fully and accurately described and that the given test results and other specifications are correct to the best of my knowledge and belief and can be considered as representative for the cargo to be loaded.</td><td>Name/status, company/organization of signatory

Place and date

Signature on behalf of shipper</td></tr>
</table>

Section 5

Trimming procedures

5.1 General provisions for trimming

5.1.1 Trimming a cargo reduces the likelihood of the cargo shifting and minimizes the air entering the cargo. Air entering the cargo could lead to spontaneous heating. To minimize these risks, cargoes shall be trimmed reasonably level, as necessary.

5.1.2 Cargo spaces shall be as full as practicable without resulting in excessive loading on the bottom structure or 'tween-deck to prevent sliding of a solid bulk cargo. Due consideration shall be given to the amount of a solid bulk cargo in each cargo space, taking into account the possibility of shifting and longitudinal moments and forces of the ship. Cargo shall be spread as widely as practicable to the boundary of the cargo space. Alternate hold loading restrictions, as required by SOLAS chapter XII, may also need to be taken into account.

5.1.3 The master has the right to require that the cargo be trimmed level, where there is any concern regarding stability based upon the information available, taking into account the characteristics of the ship and the intended voyage.

5.2 Special provisions for multi-deck ships

5.2.1 When a solid bulk cargo is loaded only in lower cargo spaces, it shall be trimmed sufficiently to equalize the mass distribution on the bottom structure.

5.2.2 When solid bulk cargoes are carried in 'tween-decks, the hatchways of such 'tween-decks shall be closed in those cases where the loading information indicates an unacceptable level of stress of the bottom structure if the hatchways are left open. The cargo shall be trimmed reasonably level and shall either extend from side to side or be secured by additional longitudinal divisions of sufficient strength. The safe load-carrying capacity of the 'tween-decks shall be observed to ensure that the deck structure is not overloaded.

5.2.3 If coal cargoes are carried in 'tween decks, the hatchways of such 'tween-decks shall be tightly sealed to prevent air moving up through the body of the cargo in the 'tween decks.

5.3 Special provisions for cohesive bulk cargoes

5.3.1 All damp cargoes and some dry ones possess cohesion. For cohesive cargoes, the general provisions in subsection 5.1 shall apply.

5.3.2 The angle of repose is not an indicator of the stability of a cohesive bulk cargo and it is not included in the individual schedules for cohesive cargoes.

5.4 Special provisions for non-cohesive bulk cargoes

5.4.1 Non-cohesive bulk cargoes are those listed in paragraph 1 in appendix 3 and any other cargo not listed in the appendix, exhibiting the properties of a non-cohesive material.

1.5.2 Competent authority or competent authorities which have taken the initiative with respect to the exemption:

.1 shall send a copy of such exemption to the Organization, which shall bring it to the attention of the Contracting Parties to SOLAS; and

.2 shall take action to amend this Code to include the provisions covered by the exemption, as appropriate.

1.5.3 The period of validity of the exemption shall be not more than five years from the date of authorization. An exemption that is not covered under 1.5.2.2 may be renewed in accordance with the provisions of this section.

1.5.4 A copy of the exemption or an electronic copy thereof shall be maintained on board each ship transporting solid bulk cargoes in accordance with the exemption, as appropriate.

1.5.5 Contact information for the main designated national competent authorities concerned is given in the separate document issued by the Organization.

1.6 Conventions

Parts A and B of chapter VI and part A-1 of chapter VII of the SOLAS Convention, as amended, deal with the carriage of solid bulk cargoes and the carriage of dangerous goods in solid form in bulk, respectively, and are reproduced in full:

CHAPTER VI

CARRIAGE OF CARGOES

Part A

General provisions

Regulation 1
Application

1 This chapter applies to the carriage of cargoes (except liquids in bulk, gases in bulk and those aspects of carriage covered by other chapters) which, owing to their particular hazards to ships or persons on board, may require special precautions in all ships to which the present regulations apply and in cargo ships of less than 500 gross tonnage. However, for cargo ships of less than 500 gross tonnage, the Administration, if it considers that the sheltered nature and conditions of voyage are such as to render the application of any specific requirements of part A or B of this chapter unreasonable or unnecessary, may take other effective measures to ensure the required safety for these ships.

Regulation 1-1
Definitions

For the purpose of this chapter, unless expressly provided otherwise:

1 *IMSBC Code* means the International Maritime Solid Bulk Cargoes (IMSBC) Code adopted by the Maritime Safety Committee of the Organization by resolution MSC.268(85), as may be amended by the Organization, provided that such amendments are adopted, brought into force and take effect in accordance with the provisions of article VIII of the present Convention concerning the amendment procedures applicable to the annex other than chapter I.

2 *Solid bulk cargo* means any cargo, other than liquid or gas, consisting of a combination of particles, granules or any larger pieces of material generally uniform in composition, which is loaded directly into the cargo spaces of a ship without any intermediate form of containment.

Regulation 1-2
Requirements for the carriage of solid bulk cargoes other than grain

1 The carriage of solid bulk cargoes other than grain shall be in compliance with the relevant provisions of the IMSBC Code.

2 To supplement the provisions of parts A and B of this chapter, each Contracting Government shall ensure that appropriate information on cargo and its stowage and securing is provided, specifying, in particular, precautions necessary for the safe carriage of such cargoes.*

Regulation 2
Cargo information

1 The shipper shall provide the master or his representative with appropriate information on the cargo sufficiently in advance of loading to enable the precautions which may be necessary for proper stowage and safe carriage of the cargo to be put into effect. Such information** shall be confirmed in writing*** and by appropriate shipping documents prior to loading the cargo on the ship.

---

* Refer to:

.1 the Code of Safe Practice for Cargo Stowage and Securing adopted by the Organization by resolution A.714(17), as amended; and

.2 the Code of Safe Practice for Ships Carrying Timber Deck Cargoes adopted by the Organization by resolution A.715(17), as amended; MSC/Circ.525, Guidance note on precautions to be taken by the masters of ships of below 100 metres in length engaged in the carriage of logs; and MSC/Circ.548, Guidance note on precautions to be taken by masters of ships engaged in the carriage of timber cargoes.

** Refer to the Form for cargo information (MSC/Circ.663).

*** Reference to documents in this regulation does not preclude the use of electronic data processing (EDP) and electronic data interchange (EDI) transmission techniques as an aid to paper documentation.

2 The cargo information shall include:

.1 in the case of general cargo, and of cargo carried in cargo units, a general description of the cargo, the gross mass of the cargo or of the cargo units, and any relevant special properties of the cargo. For the purpose of this regulation the cargo information required in sub-chapter 1.9 of the Code of Safe Practice for Cargo Stowage and Securing, adopted by the Organization by resolution A.714(17), as may be amended, shall be provided. Any such amendment to sub-chapter 1.9 shall be adopted, brought into force and take effect in accordance with the provisions of article VIII of the present Convention concerning the amendment procedures applicable to the annex other than chapter I;

.2 in the case of solid bulk cargo, information as required by section 4 of the IMSBC Code.

3 Prior to loading cargo units on board ships, the shipper shall ensure that the gross mass of such units is in accordance with the gross mass declared on the shipping documents.

Regulation 3
Oxygen analysis and gas detection equipment

1 When transporting a solid bulk cargo which is liable to emit a toxic or flammable gas, or cause oxygen depletion in the cargo space, an appropriate instrument for measuring the concentration of gas or oxygen in the air shall be provided together with detailed instructions for its use. Such an instrument shall be to the satisfaction of the Administration.

2 The Administration shall take steps to ensure that crews of ships are trained in the use of such instruments.

Regulation 4
The use of pesticides in ships[*]

Appropriate precautions shall be taken in the use of pesticides in ships, in particular for the purposes of fumigation.

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[*] Refer to:

.1 The Recommendations on the safe use of pesticides in ships (MSC/Circ.612, as amended);

.2 The Recommendations on the safe use of pesticides in ships applicable to the fumigation of cargo holds (MSC.1/Circ.1264); and

.3 The Recommendations on the safe use of pesticides in ships applicable to the fumigation of cargo transport units (MSC.1/Circ.1265), as appropriate.

Regulation 5
Stowage and securing

1 Cargo, cargo units* and cargo transport units** carried on or under deck shall be so loaded, stowed and secured as to prevent as far as is practicable, throughout the voyage, damage or hazard to the ship and the persons on board, and loss of cargo overboard.

2 Cargo, cargo units and cargo transport units shall be so packed and secured within the unit as to prevent, throughout the voyage, damage or hazard to the ship and the persons on board.

3 Appropriate precautions shall be taken during loading and transport of heavy cargoes or cargoes with abnormal physical dimensions to ensure that no structural damage to the ship occurs and to maintain adequate stability throughout the voyage.

4 Appropriate precautions shall be taken during loading and transport of cargo units and cargo transport units on board ro-ro ships, especially with regard to the securing arrangements on board such ships and on the cargo units and cargo transport units and with regard to the strength of the securing points and lashings.

5 Freight containers shall not be loaded to more than the maximum gross weight indicated on the Safety Approval Plate under the International Convention for Safe Containers (CSC), as amended.

6 All cargoes, other than solid and liquid bulk cargoes, cargo units and cargo transport units, shall be loaded, stowed and secured throughout the voyage in accordance with the Cargo Securing Manual approved by the Administration. In ships with ro-ro spaces, as defined in regulation II-2/3.41, all securing of such cargoes, cargo units, and cargo transport units, in accordance with the Cargo Securing Manual, shall be completed before the ship leaves the berth. The Cargo Securing Manual shall be drawn up to a standard at least equivalent to relevant guidelines developed by the Organization.***

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* Refer to the Code of Safe Practice for Cargo Stowage and Securing, adopted by the Organization by resolution A.714(17), as amended.

** Refer to the International Maritime Dangerous Goods (IMDG) Code, adopted by the Organization by resolution MSC.122(75).

*** Refer to the Guidelines on the preparation of the Cargo Securing Manual (MSC/Circ.745).

Part B

Special provisions for solid bulk cargoes

Regulation 6
Acceptability for shipment

1 Prior to loading a solid bulk cargo, the master shall be in possession of comprehensive information on the ship's stability and on the distribution of cargo for the standard loading conditions. The method of providing such information shall be to the satisfaction of the Administration.*

Regulation 7
*Loading, unloading and stowage of solid bulk cargoes***

1 For the purpose of this regulation, terminal representative means a person appointed by the terminal or other facility, where the ship is loading or unloading, who has responsibility for operations conducted by that terminal or facility with regard to the particular ship.

2 To enable the master to prevent excessive stresses in the ship's structure, the ship shall be provided with a booklet, which shall be written in a language with which the ship's officers responsible for cargo operations are familiar. If this language is not English, the ship shall be provided with a booklet written also in the English language. The booklet shall, as a minimum, include:

.1 stability data, as required by regulation II-1/22;

.2 ballasting and deballasting rates and capacities;

.3 maximum allowable load per unit surface area of the tanktop plating;

.4 maximum allowable load per hold;

.5 general loading and unloading instructions with regard to the strength of the ship's structure including any limitations on the most adverse operating conditions during loading, unloading, ballasting operations and the voyage;

---

* Refer to:

.1 SOLAS regulation II-1/5-1 on Stability information to be supplied to the master; and

.2 the Recommendation on a severe wind and rolling criterion (weather criterion) for the intact stability of passenger and cargo ships of 24 metres in length and over adopted by the Organization by resolution A.562(14).

** Refer to the Code of Practice for the Safe Loading and Unloading of Bulk Carriers (BLU Code) adopted by the Organization by resolution A.862(20).

.6 any special restrictions such as limitations on the most adverse operating conditions imposed by the Administration or organization recognized by it, if applicable; and

.7 where strength calculations are required, maximum permissible forces and moments on the ship's hull during loading, unloading and the voyage.

3 Before a solid bulk cargo is loaded or unloaded, the master and the terminal representative shall agree on a plan* which shall ensure that the permissible forces and moments on the ship are not exceeded during loading or unloading, and shall include the sequence, quantity and rate of loading or unloading, taking into consideration the speed of loading or unloading, the number of pours and the deballasting or ballasting capability of the ship. The plan and any subsequent amendments thereto shall be lodged with the appropriate authority of the port State.

4 The master and terminal representative shall ensure that loading and unloading operations are conducted in accordance with the agreed plan.

5 If during loading or unloading any of the limits of the ship referred to in paragraph 2 are exceeded or are likely to become so if the loading or unloading continues, the master has the right to suspend operation and the obligation to notify accordingly the appropriate authority of the port State with which the plan has been lodged. The master and the terminal representative shall ensure that corrective action is taken. When unloading cargo, the master and terminal representative shall ensure that the unloading method does not damage the ship's structure.

6 The master shall ensure that ship's personnel continuously monitor cargo operations. Where possible, the ship's draught shall be checked regularly during loading or unloading to confirm the tonnage figures supplied. Each draught and tonnage observation shall be recorded in a cargo log-book. If significant deviations from the agreed plan are detected, cargo or ballast operations or both shall be adjusted to ensure that the deviations are corrected.

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* Refer to the Code of Practice for the Safe Loading and Unloading of Bulk Carriers (BLU Code) adopted by the Organization by resolution A.862(20).

Annex S

Extract of INSB 2008 Rules Part II, Chapter 1, Sections 4.9 & 4.10

4.9 Loading control facilities

4.9.1 By loading control facilities are meant **Loading Manual** and **loading instrument** by means of which it can be ascertained that the still water bending moments, shear forces, and the still water torsional and lateral loads, where applicable, in any load or ballast condition will not exceed the specified permissible values.

4.9.2 In order to be provided with loading control facilities ships are categorized as follows:

(a) **Category I:**
  (i) Ships with large deck opening, for which combined stresses due to vertical and horizontal hull girder bending, as well as torsional and lateral loads, have to be considered.
  (ii) Ships for which uneven loading, i.e. uneven distribution of cargo and/or ballast, is possible.
  (iii) Ships of less than 120 m in length, whose design takes uneven distribution of cargo or ballast into account, belong to category II.
  (iv) Chemical tankers and gas carriers.

(b) **Category II:**
  (i) Ships with arrangements giving small possibilities for variation in cargo and ballast distribution.
  (ii) Ships on regular and fixed trading pattern where the Loading Manual gives sufficient guidance
  (iii) Ships not included in Category I.

4.9.3 The ***Loading Manual*** will be a document approved by the Bureau describing the following:

(a) The loading conditions on which the design of the ship has been based.
(b) Permissible limits of still water bending moment and shear force and, where applicable, limitations due to torsional and lateral loads.
(c) The results of the calculations of still water bending moments, shear forces for loading conditions stated in *para 4.3.1*.
(d) The allowable local loadings for the structure (hatch covers, decks, double bottom, etc.).

4.9.4 A ***loading instrument*** is an instrument approved by the Bureau, which is either analog or digital by means of which the still water bending moments, shear forces and torsional and lateral loads, where required, in any load or ballast condition can be easily and quickly checked at specified readout points.

4.9.5 The number and position of sections and permissible still water bending moments and shear forces as well as the limitations due to torsional and lateral loads are to be approved by the Bureau.

4.9.6 Single point loading instruments are not acceptable.

4.9.7 An approved Operational Manual is to be provided for the loading instrument.

4.9.8 All ships other than category II ships of less 90 m in length, which deadweight is not greater than 30 % of summer loadline displacement, are to be provided with the *Loading Manual* approved by the Bureau. In addition to the *Loading Manual*, all ships of category I are to carry a loading instrument approved by the Bureau.

4.9.9 For bulk carriers, ore carriers, ore-oil carriers and oil-bulk carriers having a length of 150 m and more, additional requirements for strength control during loading are given in *Pt VII.*

4.10 Information (booklet) on stability and strength during loading, unloading and stowage of bulk cargoes other than grain.

4.10.1 To prevent excessive hull stresses, provision is to be made for Information (booklet) on stability and strength during loading, unloading and stowage of bulk cargoes other than grain to be carried on board, including the following as a minimum:

(a) Stability data required in SOLAS, Ch.II-1, Part B "Subdivision & Stability"
(b) Data on the capacity of ballast tanks and of equipment for their filling and emptying;
(c) Maximum permissible load upon a unit of double-bottom plating surface;
(d) Maximum permissible cargo hold load;
(e) General instructions concerning loading and unloading and pertinent to hull strength, including any limitations due to the worst operating conditions during loading, unloading, handling of water ballast, and during the voyage;
(f) Any special limitations, for instance, those due to the worst operating conditions, where applicable;
(g) Where necessary—strength calculations: maximum permissible forces and moments affecting the hull during loading, unloading and the voyage.

4.10.2 The Information (booklet) is to be drawn up in a language familiar to the ship officers and, additionally, in English.

Annex T

Bureau Veritas ‘Attestation’ for *Artemis* to carry bulk cargoes

BUREAU VERITAS

International Register for Classification of Ships - Established 1828 -
Registre International de Classification de Navires - Fondé en 1828 -

MARINE BRANCH
BRANCHE MARINE

ATTESTATION

Issued within the scope of the Bureau Veritas Marine Branch General Conditions
Délivrée dans le cadre des Conditions Générales de la Branche Marine du Bureau Veritas

Name of Vessel	:	" ARTEMIS "
Register No	:	86 R 380
Flag	:	Cyprus
Port of Registry	:	Limassol

I, the undersigned Surveyor have attended at the request of the owner's representative the ship in caption at Piraeus on 27 February 1992 and found she is suitable to carry in bulk a cargo of (See Annex 1,2,3) in compliance with the code of Safe Practice for Solid Bulk Cargoes provided that the subject vessel is loaded according to the said regulations and to the loading manual on board to the satisfaction of the master.

This certificate is to remain valid as long as the condition permitting the issuance of this attestation remains unchanged.

The undersigned declare to be duly authorised by the Cyprus Government to issue this attestation.

Piraeus, 6 March 1992

A.G.N°8/8.1.92

BUREAU VERITAS SURVEYORS IN PIRAEUS PARIS 1828 INTERNATIONAL REGISTER

[redacted]

PRINCIPAL SURVEYOR
BUREAU VERITAS - PIRAEUS

The latest published Rules of the Bureau Veritas Marine Branch and the General Conditions therein are applicable.
La dernière édition des Réglements de la Branche Marine du Bureau Veritas ainsi que les Conditions Générales qui y figurent sont applicables.

SUITE A .....

ANNEX 1

(APPENDIX A)

BLENDE (ZINC SULPHIDE)
CHALCOPYRITE
COAL SLURRY
COKE BREEZE
COPPER NICKEL
COPPER PRECIPITATES
FISH IN BULK
GALENA (lead)
ILMENITE
("dry" and "moist")
IRON ORE CONCENTRATE
IRON ORE (MAGNETITE)
IRON ORE (PELLET FEED)
IRON ORE (SINTER FEED)
IRON PYRITE
LEAD ORE CONCENTRATE
LEAD ORE RESIDUE
LEAD SILVER ORE
LEAD SULPHIDE
LEAD SULPHIDE (galena)
LEAD AND ZINC CALCINES, mixed
LEAD AND ZINC MIDDLINGS
MAGNETITE
MAGNETITE-TACONITE
MANGANIC CONCENTRATE
(manganese)
NEFELIN SYENITE (mineral)
NICKEL ORE CONCENTRATE
PYRITES
PYRITES (cupreous)
PYRITES (fine)
PYRITES (flotation)
PYRITES (sulphur)
PYRITIC ASHES (iron)
PYRITIC CINDERS
SILVER LEAD ORE CONCENTRATE
"SLIG" (IRON ORE CONCENTRATE)
ZINC AND LEAD CALCINES
ZINC ORE CONCENTRATE
ZINC ORE (burnt ore)
ZINC ORE (calamine)
ZINC ORE (crude)
ZINC-LEAD MIDDLINGS
ZINC SINTER
ZINC SLUDGE
ZINC SULPHIDE (blende)

****

A N N E X 2

(APPENDIX B)

ALUMINIUM DROSS
ALUMINIUM NITRATE
ALUMINIUM RESIDUES
ALIMINIUM SKIMMINGS
AMMONIUM NITRATE
AMMONIUM NITRATE FERTILIZERS
BARIUM NITRATE
CALCINED PYRITES

CALCIUM NITRATE
(fertilizer)

CHARCOAL
CHARCOAL BRIQUETTES
DIRECT REDUCED IRON (DRI)
FERROPHOSPHORUS
FERROPHOSPHORUS, BRIQUETTES
FERROUS METAL
FISHMEAL, FISHSCRAP
FLUORSPAR
IRON OXIDE, spent
IRON SPONGE, spent
LEAD NITRATE
MAGNESIUM NITRATE
METAL SUPHIDE CONCENTRATES
PENCIL PITCH
PETROLEUM COKE, calcined
or uncalcined
PITCH PRILL
POTASSIUM NITRATE
PRILLED COAL TAR

RADIOACTIVE MATERIAL,
LOW SPECIFIC ACTIVITY
MATERIAL (LSA-I)

RADIOACTIVE MATERIAL,
SURFACE CONTAMINATED
OBJECT(S) (SCO-I)

SAWDUST
SEED CAKE
SILICOMANGANESE
SODIUM NITRATE

SODIUM NITRATE POTASSIUM
NITRATE (mixture)

TANKAGE
VANADIUM ORE
WOODCHIPS
WOOD PULP PELLETS
ZINC ASHES

****

"ARTEMIS" -86R380

SUITE A .....

A N N E X 3

(APPENDIX C)

ALFALFA PELLETS
ALUMINA
ALUMINA, calcined
ALUMINA SILICA
ALUMINA SILICA, pellets
AMMONIUM SULPHATE
ANTIMONY ORE (STIBNITE)
BARYTES
BAUXITE
BORAX
BORAX ANHYDROUS
CALCINED CLAY
CARBORUNDUM
CEMENT
CEMENT CLINKERS
CHAMOTTE
CHROME ORE
CHROME PELLETS
CHROMIUM ORE
CLAY
COKE
COLEMANITE
COPPER GRANULES
COPPER MATTE
CRYOLITE
DIAMMONIUM PHOSPHATE
DOLOMITE
FELSPAR LUMP
FERROCHROME
FERROCHROME, exothermic
FERROMANGANESE
FERROMANGANESE, exothermic
FERTILIZERS WITHOUT NITRATES
FLY ASH
FERRONICKEL
FOUNDRY SAND
GRANULATED SLAG
GYPSUM
ILMENITE SAND
IRON ORE
IRON ORE PELLETS
IRON PYRITES
IRONSTONE
LABRADORITE
LEAD ORE
LIMESTONE
MAGNESIAL CLINKERS
MAGNESITE, natural
MAGNESIUM CARBONATE
MANGANESE ORE
MILORGANITE
MONOAMMONIUM PHOSPHATE
MURATE OF POTASH
PEANUTS (in shell)
PEBBLES (sea)
PELLETS (concentrates)
PERLITE ROCK
PHOSPHATE, defluorinated
PHOSPHATE ROCK, calcined
PHOSPHATE ROCK, uncalcined
PIG IRON
POTASH
POTASH MURIATE
POTASSIUM CHLORIDE
POTASSIUM FELSPAR SAND
POTASSIUM SULPHATE
PUMICE
PYRITE
(containing copper and iron)

...2

Annex U

Paris MOU Flag State and RO Performance Tables, 2009-2011

Valid 1st July 2012

White – Grey – Black Lists

Flag	Inspections 2009-2011	Detentions 2009-2011	Black to Grey Limit	Grey to White Limit	Excess Factor
White List 2009 - 2011					
Germany	1,335	10	109	78	-1.91
Sweden	810	5	69	44	-1.90
Denmark	1,376	15	112	80	-1.78
Netherlands	3,691	49	284	232	-1.78
United Kingdom	1,905	25	152	115	-1.73
France	337	2	32	15	-1.70
Hong Kong, China	1,489	20	121	88	-1.69
Singapore	1,370	19	112	80	-1.66
Italy	1,471	21	120	86	-1.66
Greece	1,334	19	109	78	-1.65
Finland	562	6	50	29	-1.64
Croatia	153	0	16	5	-1.62
Man, Isle of, UK	828	12	71	45	-1.56
Bahamas	3,265	67	253	204	-1.50
Norway	2,023	40	161	122	-1.48
Poland	189	1	20	7	-1.47
Belgium	233	2	23	9	-1.42
Liberia	4,270	105	327	271	-1.38
Bermuda, UK	270	3	26	12	-1.36
Cyprus	2,422	59	191	148	-1.33
Ireland	165	1	17	6	-1.33
Gibraltar, UK	1,208	27	100	69	-1.31
Spain	257	3	25	11	-1.31
Marshall Islands	2,361	59	186	144	-1.31
China	241	3	24	10	-1.24
Korea, Republic of	141	1	15	4	-1.13
Estonia	89	0	11	2	-1.02
Malta	5,301	186	402	340	-1.01
Barbados	463	11	42	23	-1.01
Luxembourg	195	3	20	7	-0.96
Cayman Islands, UK	282	6	27	12	-0.91
Russian Federation	1,644	60	133	98	-0.83
Antigua and Barbuda	4,767	196	363	304	-0.79
Portugal	496	15	45	25	-0.78
Philippines	250	6	25	10	-0.73
Panama	7,611	345	570	496	-0.69
Lithuania	216	5	22	8	-0.68
Turkey	2,107	96	167	128	-0.54
Faroe Islands (DK)	193	5	20	7	-0.49
Japan	91	1	11	2	-0.48
Vanuatu	203	6	21	8	-0.37
Latvia	109	2	13	3	-0.33
Iran, Islamic Republic of	134	4	15	4	-0.01

Paris MoU
on Port State Control

Valid 1st July 2012

Flag	Inspections 2009-2011	Detentions 2009-2011	Black to Grey Limit	Grey to White Limit	Excess Factor
Grey List 2009 - 2011					
Kazakhstan	42	0	6	0	0.04
United States of America	174	7	18	6	0.07
Saudi Arabia	59	1	8	0	0.08
Malaysia	57	1	8	0	0.09
Thailand	77	2	10	1	0.09
Switzerland	96	3	11	2	0.10
India	129	5	14	4	0.12
Bulgaria	141	7	15	4	0.24
Belize	644	40	56	34	0.27
Morocco	131	7	14	4	0.30
Curacao	490	32	44	25	0.38
Tuvalu	39	2	6	0	0.38
Tunisia	53	3	7	0	0.40
Slovakia	140	9	15	4	0.43
Algeria	85	6	10	2	0.51
Egypt	105	9	12	3	0.67
Viet Nam	38	4	6	0	0.72
Cook Islands	160	14	17	5	0.74
Jamaica	36	5	6	0	0.91
St Vincent and the Grenadines	1,586	126	128	94	0.94

Paris MoU
on Port State Control

Valid 1st July 2012

Flag	Inspections 2009-2011	Detentions 2009-2011	Black to Grey Limit	Grey to White Limit	Excess Factor
Black List 2009 - 2011					
Honduras	59	8	8	Medium risk	1.06
Dominica	144	16	16		1.07
Syrian Arab Republic	166	19	18		1.25
Lebanon	74	10	9		1.25
Azerbaijan	34	6	5		1.46
Ukraine	372	42	35		1.59
Georgia	647	72	56		1.73
Cambodia	768	91	66	Medium to high risk	2.00
Comoros	593	76	52		2.22
St Kitts and Nevis	416	60	38		2.57
Moldova, Republic of	590	88	52		2.86
Albania	175	32	18	High risk	3.24
Tanzania United Rep.	130	25	14		3.29
Sierra Leone	476	85	43		3.69
Togo	205	42	21	Very high risk	4.01
Bolivia	46	12	7		4.03
Libyan Arab Jamahiriya	46	14	7		5.24

Valid 1st July 2012

Recognized Organization performance table (2009 – 2011)

Recognized Organization		Inspections	Detentions	Low//medium limit	Medium/high limit	Excess Factor	Performance level
American Bureau of Shipping (USA)	ABS	6035	1	139	102	-1.97	
Det Norske Veritas	DNV	12725	11	281	228	-1.89	
China Classification Society	CCS	878	0	25	10	-1.87	
Lloyd's Register (UK)	LR	14112	18	310	254	-1.85	
Germanischer Lloyd	GL	15868	27	347	288	-1.80	
Registro Italiano Navale	RINA	3160	4	77	50	-1.80	
Bureau Veritas (France)	BV	13515	28	298	243	-1.75	high
Nippon Kaiji Kyokai	NKK	6878	15	157	118	-1.72	
Turkish Lloyd	TL	1437	2	38	20	-1.69	
Korean Register of Shipping (Korea, Rep. of)	KRS	833	1	24	10	-1.58	
Russian Maritime Register of Shipping	RMRS	6055	26	140	103	-1.45	
Polski Rejestr Statkow	PRS	787	5	23	9	-0.63	
Hellenic Register of Shipping (Greece)	HRS	418	3	14	3	-0.05	
Alfa Register of Shipping	ARS	116	0	5	0	0.11	
International Naval Surveys Bureau (Greece)	INSB	915	13	26	11	0.15	
Croatian Register of Shipping	CRS	225	2	8	1	0.18	
Indian Register of Shipping	IRS	137	1	6	0	0.23	
Isthmus Bureau of Shipping (Greece)	IBS	293	4	10	1	0.29	
INCLAMAR (Cyprus)	INC	117	2	5	0	0.44	medium
Shipping Register of Ukraine	SRU	771	15	22	9	0.47	
Panama Register Corporation	PRC	150	3	6	0	0.50	
Panama Maritime Documentation Services	PMDS	125	3	6	0	0.58	
Dromon Bureau of Shipping	DBS	60	2	3	0	0.68	
Universal Shipping Bureau Inc.	USB	197	6	8	0	0.78	
Bulgarski Koraben Registar	BKR	406	17	13	3	1.74	low
International Register of Shipping (USA)	IRS	1051	42	29	13	2.07	
Register of Shipping (Albania)	RSA	175	13	7	0	3.55	very low
Phoenix Register of Shipping	PHRS	116	10	5	0	3.90	

In this table only Recognized Organizations that had 60 or more inspections in a 3-year period are taken into account. The formula used is identical to the one used for the White Grey and Black list. However, the values for P and Q are adjusted to P=0.02 and Q=0.01

*Where a country is shown after a Recognized Organization this indicates its location and not necessarily any connection with the maritime administration of that country.

Annex V

Tokyo MOU Flag State and RO Performance Tables, 2009-2011

SUMMARY OF PORT STATE INSPECTION DATA 2009 – 2011

Table 7: BLACK – GREY – WHITE LISTS *

Flag	Inspections 2009-2011	Detentions 2009-2011	Black to Grey Limit	Grey to White Limit	Excess Factor
BLACK LIST					
Sierra Leone	555	111	49		4.42
Papua New Guinea	39	11	6		4.34
Georgia	203	42	21		4.06
Korea, Democratic People's Republic	418	79	38		3.95
Cambodia	5,181	861	393		3.93
Mongolia	446	70	41		2.99
Saint Kitts and Nevis	183	28	19		2.40
Kiribati	529	65	47		2.01
Indonesia	576	70	51		2.00
Thailand	1,042	109	87		1.65
Bangladesh	57	9	8		1.59
Viet Nam	1,873	183	150		1.56
Tonga	41	7	6		1.55
GREY LIST					
Turkey	179	18	19	6	0.95
Curacao	63	7	8	1	0.84
Dominica	64	7	8	1	0.83
Belize	1,054	83	88	60	0.83
Tuvalu	453	37	41	22	0.78
Barbados	72	7	9	1	0.74
Egypt	42	3	6	0	0.51
Gibraltar (UK)	151	10	16	5	0.45
Luxemburg	38	2	6	0	0.39
India	310	20	30	14	0.39
Myanmar	42	2	6	0	0.35
Belgium	83	4	10	1	0.29
Kuwait	37	1	6	0	0.24
Saudi Arabia	44	1	6	0	0.18
Switzerland	71	2	9	1	0.13
Croatia	84	2	10	2	0.05
WHITE LIST					
Cook Islands	30	0		0	0
Maldives	35	0		0	0
Malta	1,781	106		106	-0.01
Italy	389	18		18	-0.05

Flag	Inspections 2009-2011	Detentions 2009-2011	Black to Grey Limit	Grey to White Limit	Excess Factor
Cyprus	1,474	82		87	-0.11
Taiwan, China	219	8		9	-0.12
Malaysia	733	35		39	-0.23
Antigua and Barbuda	1,465	76		86	-0.25
Saint Vincent and the Grenadines	780	37		42	-0.26
Philippines	640	27		34	-0.40
Russian Federation	887	37		49	-0.51
Panama	23,977	1,235		1,613	-0.54
Netherlands	391	13		19	-0.57
Sweden	71	0		1	-0.71
Cayman Islands (UK)	256	6		11	-0.77
Isle of Man (UK)	354	9		16	-0.84
United States	116	1		3	-0.86
Greece	872	28		48	-0.87
Marshall Islands	2,753	103		170	-0.87
Liberia	5,067	194		324	-0.90
Vanuatu	312	7		14	-0.91
Norway	640	18		34	-0.94
United Kingdom (UK)	681	19		36	-0.96
Bahamas	1,863	61		112	-0.98
Bermuda (UK)	209	3		8	-1.05
France	135	1		4	-1.07
Denmark	371	7		17	-1.14
Singapore	4,244	117		269	-1.27
Germany	769	16		42	-1.29
Japan	383	5		18	-1.42
Hong Kong, China	5,540	90		356	-1.69
Korea, Republic of	3,614	51		227	-1.75
China	2,076	17		126	-1.92

Note: 1) Flags listed above are those of ships which were involved in 30 or more port State inspections over the 3-year period.

2) According to the decision by the Port State Control Committee, flags involving 30-49 port State inspections with nil detentions are listed on top of the White List.

* *See explanatory note on page 50.*

p=7%

$z_{95\%}=1.645$

q=3%

Table 12: PERFORMANCE OF RECOGNIZED ORGANIZATION

Recognized organization (RO)	No. of overall inspections 2009-2011	No. of RO responsible detentions 2009-2011	Low/medium Limit	Medium/high Limit	Excess factor	Performance level
Union Bureau of Shipping	3,168	96	77	50	1.56	Low
Korea Classification Society (former Joson Classification Society)	406	12	13	3	0.88	Medium
Universal Maritime Bureau	1,083	25	30	14	0.71	
International Register of Shipping	1,279	29	34	17	0.70	
Maritime Technical Systems and Services	179	4	7	0	0.56	
International Ship Classification	1,038	21	29	13	0.52	
Croatian Register of Shipping	109	2	5	0	0.47	
Biro Klasifikasi Indonesia	271	5	10	1	0.45	
Panama Bureau of Shipping	208	3	8	0	0.35	
Global Marine Bureau	1,905	34	49	28	0.31	
International Naval Surveys Bureau	175	2	7	0	0.29	
Overseas Marine Certification Services	725	11	21	8	0.24	
INCLAMAR (Inspection y Classification Maritime, S. de. R.L.)	428	5	14	3	0.16	
Isthmus Bureau of Shipping	1,509	23	40	21	0.12	
Panama Maritime Documentation Services	852	10	24	10	0.01	
Panama Register Corporation	200	0	8	0	-0.23	High
Vietnam Register	2,052	26	52	30	-0.23	
Panama Maritime Surveyors Bureau Inc	399	2	13	3	-0.33	
Universal Shipping Bureau	310	1	11	2	-0.33	
Indian Register of Shipping	321	1	11	2	-0.39	
Panama Shipping Registrar Inc.	561	3	17	5	-0.56	
Intermaritime Certification Services, S.A.	973	5	27	12	-0.89	
China Corporation Register of Shipping	1,007	3	28	12	-1.28	
Russian Maritime Register of Shipping	1,613	6	42	23	-1.32	
Nippon Kaiji Kyokai	24,001	70	516	444	-1.67	
Lloyd's Register	9,485	20	213	167	-1.74	
Bureau Veritas	7,456	15	170	129	-1.74	
American Bureau of Shipping	7,129	13	163	123	-1.77	
Germanischer Lloyd	7,849	12	178	136	-1.80	

Recognized organization (RO)	No. of overall inspections 2009-2011	No. of RO responsible detentions 2009-2011	Low/medium Limit	Medium/high Limit	Excess factor	Perfomance level
Det Norske Veritas	8,521	12	192	149	-1.82	
Registro Italiano Navale	1,597	1	42	22	-1.84	
Korean Register of Shipping	6,851	5	157	117	-1.90	
China Classification Society	6,679	3	153	114	-1.93	

Note: 1) In this table, only recognized organizations (RO) that had more than 60 inspections are taken into account. The formula used is identical to the one used for the Black-Grey-White List. However, the values for P and Q are adjusted to P=2% and Q=1%.

2) ROs involving 60-179 inspections with zero detention are not included in this table.

Annex W

MCA MIN 380 (M) - New Port State Control Directive including details of Paris MOU risk calculator

Maritime and Coastguard Agency

MARINE INFORMATION NOTE

MIN 380 (M)

New Port State Control Directive

Notice to all Shipowners, Operators, Masters, Seafarers, Port Authorities and Pilots

This MIN expires expires 31 March 2011

Summary

The purpose of this MIN is to notify stakeholders of the forthcoming implementation of the new Port State Control directive into UK law from the 1st January 2011 and explain the changes to the Port State Control regime.

1. Introduction and Background

1.1 Severe sea and coastal pollution associated with the structural failure and loss of the single hull oil tankers the Erika off the coast of France in 1999 and the Prestige off the coast of Spain in 2002, led to a programme of European legislation. Among measures introduced were changes to port State control, which included the concept of Mandatory Expanded Inspections and Mandatory Inspections on ships with a Target Factor over 50, phasing out single hull oil tankers, a surveillance system for monitoring traffic in waters of EU members and, more recently, a package of 8 legal instruments (the Third Maritime Safety Package) including **Directive 2009/16 on port State control, to replace existing Directive 95/21, to be implemented into UK legislation on 1st January 2011**.

1.2 The Paris MOU were also looking at a new approach to Port State Control (PSC) to target substandard ships and move away from the 25% inspection regime where good ships were being targeted as well as poor ships. The New Inspection Regime (NIR) was developed by the Paris MOU to provide: a more risk based system of targeting ships; dispense with the 25% inspection commitment and provide full inspection coverage of ships visiting the Paris MOU region as a whole, to which each member contributes a fair share. Another aim of the NIR is to eliminate substandard shipping by increasing the frequency of inspection of “high risk” ships, while reducing the frequency of inspection of “low risk” ships, with the intention of rewarding the good operator. The concept of the NIR is incorporated into the new PSC directive.

2. UK Implementation

2. The UK already has existing powers of inspection and detention through the 1995 Merchant Shipping Act as amended. However a new Statutory Instrument will implement specific provisions of the new PSC Directive where new law is needed.

2.1 A new Merchant Shipping Notice (MSN) will be issued to provide guidance to shipowners, masters, agents, port authorities etc on the implementation of the new PSC regulations.

2.2 A new Merchant Shipping Notice (MSN) will be issued to provide guidance to ports on their reporting requirements under the PSC directive and the Vessel Traffic Monitoring Directive as amended.

2.3 Technically the EU Directive on PSC (2009/16/EC) came into force on 17th June 2009, however member States have a "transposition period" to implement the Directive into their national legislation by the 1st January 2011.

2.4 For the purposes of counting number of detentions towards the banning provision, inspections and detentions for calculating company performance etc this will be from 17th June 2009

2.5 Note also that inspections under the previous regime will count. Thus, for example, if a ship was inspected on 21st October 2010 and under the new regime is designated a Standard Risk ship, the window for inspection will open 21st August 2011 (ie 10 months after last inspection) and the ship will be Priority II. The ship will become Priority I from the 21st October 2011 (ie 12 months since the last inspection) and must be inspected.

3. Key Changes

3.1 The new Directive, incorporating the New Inspection Regime introduces some key changes with respect to the existing PSC Directive and Paris MOU PSC procedures. The key changes are:

3.2 Ships will be targeted for inspection based on their "risk profile". Each ship in the database will be allocated a risk profile, the criteria is based on: type of ship; age of ship; flag; Recognised Organisation (RO); company performance; number of deficiencies and number of detentions. Ships will be designated "high risk", "low risk" or "standard risk". A ship risk profile calculator is available on the Paris MoU and EMSA website which allows companies to calculate the ship risk profile of their ships. (see Annex I);

3.3 Company performance is a new criteria and is based on the companies performance in the Paris MOU region appertaining to number of deficiencies per inspection and number of detentions in the preceding 3 year period. A company performance calculator is available on the Paris MoU and EMSA website which allows companies to calculate their company performance. (see Annex II);

3.4 Frequency of inspection depends on the ship risk profile, high risk ships will be due "periodic" inspections every 5 - 6 months, low risk every 24 - 36 months and standard risk every 10 - 12 months. When the "window" for inspection opens, eg after 5 months for a high risk ship (HRS), the ship is designated Priority II (PII) and **may** be inspected. When the window closes, eg after 6 months for a HRS the ship becomes Priority I (PI) and the **must** be inspected, ie it is mandatory. However, PI inspections can, in certain circumstances, be postponed to another port in the same member State or a port in another member State provided they agree in advance to undertake the inspection.

Inspections will not take place if the ship call takes place only at night time or if in the judgement of the port State the inspection would create a risk to the safety of the inspectors, the ship, it's crew or to the port;

3.5 "Additional" inspections may be carried out between periodic inspections due to "overriding" or "unexpected" factors such as, a report from a pilot, ship involved in a collision, grounding or stranding on its way into port. This is similar to the present "overriding priority" concept but has 2 levels. An overriding factor will automatically trigger the ship to be designated PI and **must** be inspected. An unexpected factor will cause the ship to become PII and **may** be inspected at the discretion of the PSC administration;

3.6 Type of inspection, "expanded", "initial" or "more detailed", will depend on risk profile. High risk ships, regardless of type, will undergo, as a minimum, an "expanded" inspection. Low risk and Standard risk ships will undergo an initial or more detailed inspection. Ships currently requiring expanded inspections (bulk carriers, oil, gas and chemical tankers, passenger ships) will still be subject to expanded inspections;

3.7 Ships requiring an expanded inspection must give notice of arrival in a UK port or anchorage to the port authority at least 72 hours before arrival. The port authority must forward the information to the MCA via the MCA Consolidated European Reporting System (CERS);

3.8 Ships may be inspected in an anchorage within the port jurisdiction where a "ship/port interface" takes place;

3.9 Port authorities are subject to a requirement to record information on **actual** times of arrival and departure of ships calling at their ports and anchorages in the MCA Consolidated European Reporting System (CERS);

3.10 "Refusal of Access" (banning) is amended to include all ship types registered with a black of grey listed flag, according to the "ParisMOU BGW list". Banning will be based, as at present, on the number of detentions within a specified period. For a black listed flag ship, if it has been detained more than twice in the preceding **36 months** it will be banned. For a grey listed ship, if it has been detained more than twice in the previous **24 months** it will also be banned. A minimum time of banning will apply, 3 months for first ban, 12 months for second ban. A detention after a second ban could lead to possible permanent exclusion from EU ports and anchorages;

3.11 Current reporting requirements by port pilots and port authorities of ship related anomalies will be extended to deep sea pilots.

4. Implications for UK Shipowners

4.1 The new system is more prescriptive in that depending on the risk profile of a ship it will be known when the next periodic inspection is due. Thus, for a Standard Risk ship, once an inspection has taken place then the ship could expect an inspection free period of at least 10 months. The ship **could** be inspected within the next 2 months but will know that after 12 months it **will** be inspected at the next ParisMOU port. (see Paragraph 3.4)

4.2 In order to be a Low Risk ship the flag State must be on the Paris MOU white list and the flag State has undergone the **Voluntary IMO Member State Audit (VIMSA) Scheme**. The UK has undergone the audit. Note also that in order to maintain Low Risk status no more than 5 deficiencies should be recorded at any one inspection and no detention recorded in the preceding 3 years. See Annex I for details of calculating the risk profile. A

calculator is also available on the EMSA website (http://www.emsa.europa.eu/appl/SRP_Calculator.html) (See Annex I and II)

4.3 The company performance is calculated daily and is part of the criteria for the risk profile. In order to be a low risk ship the company performance must be "high". See Annex II for details of how the company performance is calculated. A calculator is also available on the EMSA website (http://www.emsa.europa.eu/appl/Company_Performance_Calculator.html)

4.4 Operators and masters of ships due for an expanded inspection are required to set aside sufficient time in the operating schedule to allow an expanded inspection to be carried out; the ship is required to remain until the inspection is completed.

5. Definitions and Abbreviations

Additional Inspection – An inspection carried out following notification of either an "unexpected factor" or an "overriding factor".

Black Grey and White (BGW) List – a list of flag States published every year on the 1st of July by the ParisMOU. It is prepared on the basis of ParisMOU inspection results over 3 calendar years and uses binomial calculus to take into account sample size. (More details available at www.parismou.org)

Expanded Inspection – a prescriptive inspection that covers specific items on different ship types.

Initial Inspection – an inspection to check compliance with the conventions and comprises a check of certification and a walk around the ship.

More Detailed Inspection – a more in-depth inspection where the "Initial Inspection" has revealed "clear grounds" that the ship does not substantially meet the requirements of the conventions

Overriding Factor – a factor that is considered serious enough to trigger an additional inspection at Priority I. eg ships reported by another member State, ships accused of an alleged violation of the provisions on the discharge of harmful substances and effluents.

Periodic Inspection – an inspection carried out according to the "risk profile" of the ship.

Ship Risk Profile – The profile awarded to a ship in the database based on certain criteria. Ships are designated "High Risk", "Low Risk" or "Standard Risk"

Ship to Port Interface – interactions that occur when a ship is affected by actions involving movement of persons or goods or the provision of port services to or from the ship eg bunkering.

Unexpected Factor – A factor that could indicate a serious threat to the safety of the ship and the crew or to the environment eg a ship reported by a pilot, a ship which did not comply with the reporting requirements, ship operated in a manner to pose a danger. The need to undertake an additional inspection is for the professional judgement of the port State administration

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Annex I

Ship Risk Profile

				Profile			
				High Risk Ship (HRS)		Standard Risk Ship (SRS)	Low Risk Ship (LRS)
Generic Parameters				Criteria	Weighting points	Criteria	Criteria
1	Type of ship			Chemical tankship Gas Carrier Oil tankship Bulk carrier Passenger ship	2	neither a high risk nor a low risk ship	All types
2	Age of ship			all types > 12 y	1		All ages
3a	Flag	BGW-list		Black - VHR, HR, M to HR	2		White
				Black – MR	1		
3b		IMO-Audit		-	-		Yes
4a	Recognized Organisation	Performance	H	-	-		High
			M	-	-		-
			L	Low	1		-
			VL	Very Low			-
4b	Recognized Organisation	EU recognised		-	-		Yes
5	Company	Performance	H	-	-		High
			M	-	-		-
			L	Low	2		-
			VL	Very Low			-
Historic Parameters							
6	Number of def. recorded in each insp. within previous 36 months	Deficiencies		Not eligible	-		≤ 5 (and at least one inspection carried out in previous 36 months)
7	Number of Detention within previous 36 months	Detentions		≥ 2 detentions	1		No Detention

The table above shows the criteria within each parameter for the three ship risk profiles – high, standard and low. For High Risk Ships (HRS) each criterion has a weighting which reflects the relative influence of each parameter on the overall risk of the ship.

HRS are ships which meet criteria to a total value of 5 or more weighting points.
LRS are ships which meet all the criteria of the Low Risk Parameters and have had at least one inspection in the previous 36 months.
SRS are ships which are neither HRS nor LRS.

The use of weighting points is a means of determining which combinations of criteria indicate a HRS. For example the following combinations have 5 points:

a) Oil tanker (2 pts.), black listed flag, HR (2 pts.), and low RO performance (1 pt.)
b) Container ship (0 pts.), more than 12 years old (1 pt.), black listed flag, MR to HR (2 pts.), very low RO performance (1 pt.), and ≥ 2 detentions in last 36 months (1 pt.)
c) Bulk carrier (2 pt.), black listed flag, VHR (2 pts.), and ≥ 2 detentions in last 36 months (1 pt.)
d) General cargo ship (0 pts.), more than 12 years old (1 pt.), low RO performance (1 pt.), low company performance (2 pts.), and ≥ 2 detentions in last 36 months (1 pt.)

The reward granted to a LRS will be withdrawn after 36 months if no further inspection is carried out between the 24th (end of time span according to inspection scheme) and the 36th month. In such cases it will not meet criterion number 6 in table 3 above and therefore becomes a SRS.

A ship's risk profile is recalculated daily taking into account changes in the more dynamic parameters such as age, the 36 month history and company performance. Recalculation also occurs after every inspection and when the applicable performance tables for flag and R.O.s are changed.

Annex II

Company performance formula

1. Detention index

The detention index is the ratio of the number of detentions of all ships in a company's fleet to the number of inspections of all the ships in the company's fleet within the last 36 months, compared with the average detention ratio for all ships inspected in the region covered by the Paris MOU over the last 3 calendar years.

The detention index will be average, above average or below average depending on whether the ratio is within the average percentage of detentions in the region covered by the Paris MoU with a margin of +/- 2 percent points, above or below.

The detention index of a company shall become automatically above average irrespective of all other inspection results if a refusal of access order in accordance with Directive 2009/16/EC is issued within the last 36 months to any ship in the fleet.

2. Deficiency index

The deficiency index is the ratio of the total points of all deficiencies of all ships in a company's fleet to the number of inspections of all ships in the company's fleet within the last 36 months, compared with the average deficiency ratio for all ships inspected in the region covered by the Paris MOU over the last 3 calendar years.

ISM (International Safety Management) related deficiencies shall be weighted at 5 points while any other deficiencies shall be weighted at 1 point. The average deficiency ratio within the region covered by the Paris MOU shall be weighted taking into account the average occurrence of ISM and non ISM deficiencies per inspection.

The deficiency index will be average, above average or below average depending on whether the ratio is within the weighted average of deficiencies in the region covered by the Paris MOU with a margin of +/- 2 percent points, above or below.

3. Company performance matrix

Detention Index	Deficiency Index	Company Performance
above average	above average	very low
above average	average	low
above average	below average	
average	above average	
below average	above average	
average	average	medium
average	below average	
below average	average	
below average	below average	high

The company performance formula takes account of the detention and deficiency history of all ships of a company.

Example

Deficiencies	Number	Value	Points	
Non-ISM	90	1 pt.	90	
ISM	10	5 pts.	50	
		Total points	140	/ 15 (no. of insp.)
			9.3	points per inspection

Detention Index

Determination of thresholds:

Average of detentions in Paris MoU within last 36 months = 6.1 %
Thresholds determined by margins of +/- 2 percentpoints of average percentage of detentions

above average	> 8.1 %
average	4.1 % - 8.1 %
below average	< 4.1 %

The detention index will be calculated by the ratio of number of detentions to number of inspections within 36 months.

Each banning will trigger a detention index above average.

Example: Ships of company XY have been inspected 15 times within 36 months resulting in 2 detentions
Company XY has a detention rate of 2 / 15 x 100 = 13,33 %, which is above average.

Deficiency Index

Basis figures: 70,000 deficiencies recorded in Paris MoU database and 22,000 inspections give an average occurrence of 3.2 deficiencies per inspection.

Of 70,000 deficiencies 4,000 are ISM related, which means an average occurrence of 4,000 / 70,000 x 3.2 = 0.2 ISM related deficiencies per inspection.
Calculation of deficiency index

Parameter	Value	Average Occurrence	Points
each deficiency counts	1 pt.	x 3.2	3.2
each ISM related deficiency counts	5 pts.	x 0.2	1.0
		Total points per inspection	4.2

Thresholds determined by margins of +/- 2 points of the average of deficiencies

above average	> 6.2
average	2.2 – 6.2
below average	< 2.2

Example: Company XY has had in 36 months 15 inspections with the following results:

Therefore deficiency index of company XY is above average. In total company XY has a very low performance.

Annex X

Distribution and holdings of immersion suits within Torbulk's fleet

Immersion Suits serviced @ Tarbulk.

Vessel Name	Make	Type	Qty	D of M	
MV Independent	Imperial	Insulated		5	1991
MV Independent	Imperial	Insulated		3	1992
MV Independent	Intrepid	MK1 Insulated		4	2005
MV Independent	Mustang	Insulated		1	1984
MV Independent	Seepilz	Insulated		4	2006
MV Independent	Sola	Insulated		4	1991
MV Independent	Stearn	Insulated		1	1991
MV MITHRIL	Aqua	Insulated		7	1991
MV MITHRIL	Bayley	Insulated		1	1992
MV MITHRIL	Intrepid	Insulated		2	2005
MV MITHRIL	Mustang	Insulated		2	1984
MV Sea Hawk	Autoflug	Insulated		6	1989
MV Sea Hawk	Fitzwight	Insulated		2	1990
MV Sea Hawk	Helly Hansen	Insulated		1	1996
MV Sea Hawk	Imperial	Insulated		2	1991
MV Sea Hawk	Mustang	Insulated		1	1984
MV Sea MITHRIL	Autoflug	Insulated		8	1990
MV Sea MITHRIL	MSP	Insulated		1	1992
MV Sea MITHRIL	Mustang	Insulated		2	1984
MV Sea MITHRIL	Sola	Insulated		1	1998
MV Sea Ruby	Imperial	Insulated		1	1992
MV Sea Ruby	Intrepid	Insulated		1	1998
MV Sea Ruby	Intrepid	Insulated		5	2005
MV Sea Ruby	Lalizas	Neptune Insulated		2	2007
MV Sea Ruby	Mustang	Insulated		2	1984
MV Sea Ruby	Stearn	Insulated		1	1991
MV Shoreham	Aqua	Insulated		8	1995
MV Shoreham	Helly Hansen	Insulated		1	1978
MV Shoreham	HYF-1	Insulated		1	2005
MV Shoreham	Stearn	Insulated		1	1983
MV Shoreham	Stearn	Insulated		1	1991
Sea Hunter	Crewsaver	Insulated		1	1998
Sea Hunter	Imperial	Insulated		1	1990
Sea Hunter	Imperial	Insulated		3	1992
Sea Hunter	Imperial	Insulated		1	1992
Sea Hunter	Intrepid	Insulated		2	1997
Sea Hunter	Intrepid	Insulated		5	2005
Sea Hunter	Mustang	Insulated		2	1984
Sea Hunter	Neptune	Insulated		2	2005
Sea Hunter	Sola	Insulated		1	1997
Sea Hunter	Stearn	Insulated ISS5901		4	1991
Sea Hunter	Stearn	Insulated		1	1991
Sea Hunter	Stearn	Insulated ISS5901		1	1997
TOR-BULK Grimsby	Aqua	Insulated		2	1983
TOR-BULK Grimsby	Helly Hansen	Insulated		2	1992
TOR-BULK Grimsby	Imperial	Insulated		2	1991
TOR-BULK Grimsby	Imperial	Insulated		6	1992
TOR-BULK Grimsby	Intrepid	Insulated		1	2005
TOR-BULK Grimsby	Stearn	Insulated		4	1991
TOR-BULK Grimsby	Stearn	Insulated		2	1991
TOR-BULK Grimsby	Stearn	Insulated		1	1997
TORBULK Ltd	Helly Hansen	Insulated E305-7		1	1990
TORBULK Ltd	Helly Hansen	Insulated E305-7		11	1991

Annex Y

LSA Code - Section 2.3 - Immersion Suits

2.3 Immersion suits

2.3.1 *General requirements for immersion suits*

2.3.1.1 An immersion suit shall be constructed with waterproof materials such that:

.1 it can be unpacked and donned without assistance within 2 min, taking into account donning of any associated clothing*, donning of a lifejacket if the immersion suit must be worn in conjunction with a lifejacket to meet the requirements of paragraph 2.3.1.2, and inflation of orally inflatable chambers if fitted;

.2 it will not sustain burning or continue melting after being totally enveloped in a fire for a period of 2 s;

.3 it will cover the whole body with the exception of the face, except that covering for the hands may be provided by separate gloves which shall be permanently attached to the suit;

.4 it is provided with arrangements to minimize or reduce free air in the legs of the suit; and

.5 following a jump from a height of not less than 4.5 m into the water there is no undue ingress of water into the suit.

2.3.1.2 An immersion suit on its own, or worn in conjunction with a lifejacket if necessary, shall have sufficient buoyancy and stability in calm fresh water to:

.1 lift the mouth of an exhausted or unconscious person clear of the water by not less than 120 mm; and

.2 allow the wearer to turn from a face-down to a face-up position in not more than 5 s.

2.3.1.3 An immersion suit shall permit the person wearing it, and also wearing a lifejacket if the immersion suit is to be worn in conjunction with a lifejacket, to:

.1 climb up and down a vertical ladder at least 5 m in length;

.2 perform normal duties associated with abandonment;

.3 jump from a height of not less than 4.5 m into the water without damaging or dislodging the immersion suit or its attachments, or being injured; and

.4 swim a short distance through the water and board a survival craft.

2.3.1.4 An immersion suit which has buoyancy and is designed to be worn without a lifejacket shall be fitted with a light complying with the requirements of paragraph 2.2.3 and the whistle prescribed by paragraph 2.2.1.14.

2.3.1.5 An immersion suit which has buoyancy and is designed to be worn without a lifejacket shall be provided with a releasable buoyant line or other means to secure it to a suit worn by another person in the water.

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* Refer to paragraph 3.1.3 of the Recommendation on testing of life-saving appliances, adopted by the Maritime Safety Committee of the Organization by resolution MSC.81(70), as amended.

2.3.1.6 An immersion suit which has buoyancy and is designed to be worn without a lifejacket shall be provided with a suitable means to allow a rescuer to lift the wearer from the water into a survival craft or rescue boat.

2.3.1.7 If an immersion suit is to be worn in conjunction with a lifejacket, the lifejacket shall be worn over the immersion suit. Persons wearing such an immersion suit shall be able to don a lifejacket without assistance. The immersion suit shall be marked to indicate that it must be worn in conjunction with a compatible lifejacket.

2.3.1.8 An immersion suit shall have buoyancy which is not reduced by more than 5% after 24 h submersion in fresh water and does not depend on the use of loose granulated materials.

2.3.2 *Thermal performance requirements for immersion suits*

2.3.2.1 An immersion suit made of material which has no inherent insulation shall be:

.1 marked with instructions that it must be worn in conjunction with warm clothing; and

.2 so constructed that, when worn in conjunction with warm clothing, and with a lifejacket if the immersion suit is to be worn with a lifejacket, the immersion suit continues to provide sufficient thermal protection, following one jump by the wearer into the water from a height of 4.5 m, to ensure that when it is worn for a period of 1 h in calm circulating water at a temperature of 5°C, the wearer's body core temperature does not fall more than 2°C.

2.3.2.2 An immersion suit made of material with inherent insulation, when worn either on its own or with a lifejacket, if the immersion suit is to be worn in conjunction with a lifejacket, shall provide the wearer with sufficient thermal insulation, following one jump into the water from a height of 4.5 m, to ensure that the wearer's body core temperature does not fall more than 2°C after a period of 6 h immersion in calm circulating water at a temperature of between 0°C and 2°C.

Annex Z

MAIB flyer to the shipping industry (cargo loading)

MAIB
MARINE ACCIDENT INVESTIGATION BRANCH

FLYER TO THE SHIPPING INDUSTRY

Catastrophic structural failure of a general cargo ship

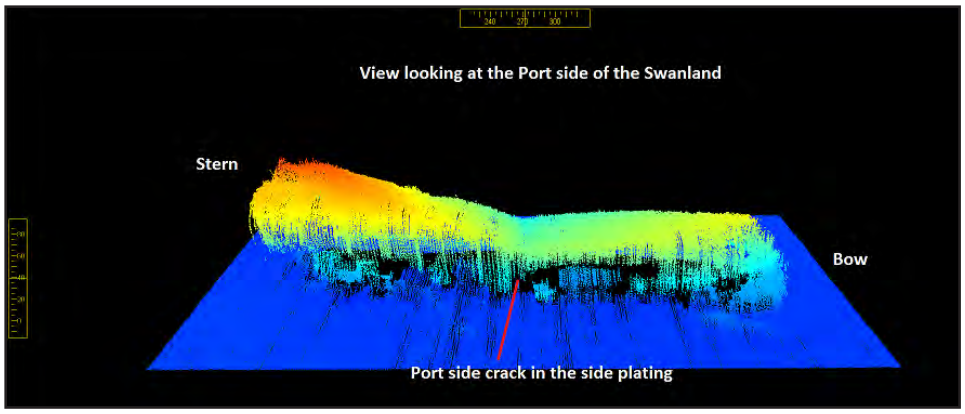

Figure 1: Sonar image of Swanland inverted on the seabed

NARRATIVE

On 27 November 2011, the master and five of the crew from the 34-year old general cargo ship *Swanland* were lost when the vessel foundered about 17 minutes after suffering a structural failure amidships. The failure occurred as the vessel was heading directly into a south westerly gale in rough to very rough seas. Only the second officer and an AB survived. Underwater surveys confirmed that the vessel had suffered a structural failure amidships **(Figure 2)**.

Figure 2: ROV image of the structural failure amidships

At the time of the accident, *Swanland* was carrying a cargo of 2730 tonnes of MOT Type 1 Granular Sub Base (GSB) limestone, which is a high density cargo. The limestone had been loaded in two piles biased towards the centre of the vessel's single hold in accordance with the loading plan prepared on board **(Figure 3)**.

The vessel had been converted in 2003 to allow self-discharging of the cargo and had carried limestone in this manner on numerous occasions. The loading information available on board *Swanland* was probably limited to that included in the vessel's stability book, which lacked detail and provided no information on longitudinal strength or tank top loading limits. *Swanland* had not been strengthened to carry heavy cargoes.

A longitudinal strength assessment of the vessel following the accident confirmed that the large sagging bending moments induced by the cargo and the wave conditions experienced on the day of the accident would have been sufficient to cause compressive failure of the upper midships structure.

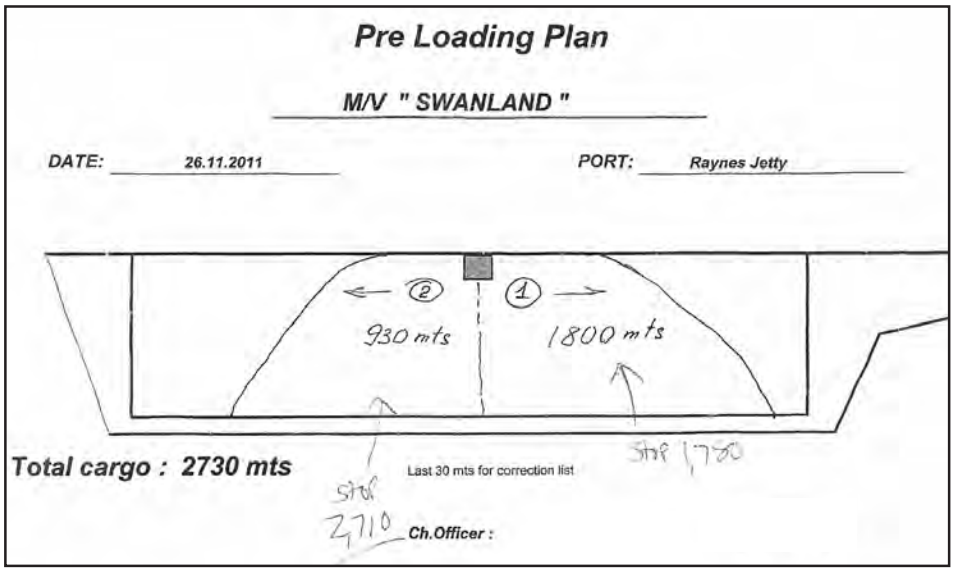

Figure 3: Pre-loading plan

SAFETY LESSONS

Swanland's foundering is one of many cargo ship losses in recent years in which poor loading or overloading of cargo has been a significant contributing factor. In this case, the stresses on the vessel's hull would have been significantly reduced had the limestone cargo been loaded and trimmed in an even or more 'homogenous' distribution within the vessel's single hold.

On 1 January 2011, the International Maritime Solid Bulk Cargoes (IMSBC Code) entered into force, replacing the Code of Safe Practice for Solid Bulk Cargoes (BC Code). The aim of the IMSBC Code is to *'facilitate the safe stowage and shipment of solid bulk cargoes'*. Unlike the BC Code the IMSBC Code is mandatory for **all vessels carrying solid bulk cargoes, not just bulk carriers**. Nevertheless, it is evident that compliance with its requirements and recommendations is not as widespread as intended.

To try and prevent further similar accidents occurring in the future, owners, operators and crews of general cargo ships carrying solid bulk cargoes are strongly advised to:

- Adhere to the requirements and best practice contained in SOLAS and the IMSBC Code, particularly regarding:
  - The provision of sufficient information on a vessel's longitudinal and tank top strengths and the proper distribution of the cargo in order to prevent the structure from being overstressed.
  - The importance of cargo trimming; a single pile of cargo will inevitably lead to increased bending moments and might also overload the tank tops in the cargo hold.
- Ensure that appropriate authorisation to carry solid bulk and high density cargoes has been obtained from the vessel's flag state administration and/or classification society.
- Where possible, reduce the wave-induced bending moments and stresses on a vessel's structure in heavy weather by weather routing, sheltering, or adjusting course and/or speed.

Furthermore, the shippers of solid bulk cargoes, the competent authorities of the ports of loading and terminal representatives are also strongly advised to ensure they fulfil their obligations under SOLAS and the IMSBC Code, in particular:

- By providing cargo information, including density and angle of repose, to a vessel's master or his representatives.
- By agreeing with a master how a solid bulk cargo is to be loaded or unloaded to ensure that the permissible forces and moments on the ship are not exceeded.

This flyer and the MAIB's investigation report are posted on our website: www.maib.gov.uk

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Annex AA

MAIB flyer to the shipping industry (LSA)

MAIB
MARINE ACCIDENT INVESTIGATION BRANCH

FLYER TO THE SHIPPING INDUSTRY

Six crew lost as a general cargo ship founders

Swanland's two survivors in a liferaft

NARRATIVE

The master and five crew from the general cargo ship *Swanland* were lost when the vessel foundered about 17 minutes after suffering a catastrophic structural failure in darkness and heavy seas.

The officer of the watch, who was the second officer, sounded the general alarm to alert the crew, who were asleep in their cabins, and the master wasted no time in broadcasting a “Mayday” message on Very High Frequency (VHF) radio channel 16; he did not use Digital Selective Calling (DSC). The “Mayday” message was very brief and so over the next 4 minutes the master was prompted by the coastguard operator to provide more details about the vessel’s cargo, damage and liferafts.

The crew started to assemble on the bridge and donned immersion suits collected from two decks below. These were a mix of different types - some of the suits were required to be donned with lifejackets, others did not. However, the cook was never seen, and some of the other crew went back to their cabins to collect valuables and did not return.

As the vessel’s freeboard reduced, the master realised that the vessel was sinking and ordered the crew to prepare to launch the liferafts. At about the same time, the second officer collected the two search and rescue transponders (SART). However, he had difficulty activating them because of the design of the gloves integral to his immersion suit **(Figure 1)**, and eventually had to use his teeth to operate them.

Four of the crew were preparing to launch a liferaft from the port bridge wing, when they were covered by a wave and *Swanland* started to sink beneath them. The second officer and able seaman (AB) soon surfaced and climbed into a liferaft, which fortunately had inflated nearby.

Figure 1: Immersion suit glove

The liferaft's internal light soon extinguished, and the survivors continued to be hampered by the lack of dexterity afforded by the immersion suit gloves **(Figure 1)**.

About 1 hour after Swanland foundered, a rescue helicopter arrived on scene and spotted the survivors in the liferaft. No other survivors were seen, so the helicopter crew winched the second officer and the AB on board; they were cold but uninjured. The body of the chief officer was recovered several hours later. He was wearing an immersion suit but no lifejacket; he had drowned. The master and the remaining four crewmen have not been found.

SAFETY LESSONS

Abandoning ship in the middle of the night in rough seas is a situation no seafarer wants to experience. Unfortunately, many do, and although SOLAS requirements place a great deal of emphasis on the importance of life saving appliances (LSA) and abandon ship drills, tragically lives continue to be lost.

To improve the likelihood of all crew surviving should the need to abandon ship arise, vessel owners, managers and crews are strongly advised to take into account the lessons to be learned from this accident. In particular:

- The importance of ensuring that all crew are fully briefed on mustering procedures and that they are able to properly don the immersion suits and lifejackets available through regular and realistic abandon ship drills.

- The benefits of transmitting distress messages in the recommended and internationally recognised format. This can quickly and accurately be achieved via DSC, but in situations in which the use of voice procedures is preferred, a simple aide-mémoire, showing the format and information required, is a simple and cost-free option.

- The provision on board of several different types of immersion suit and lifejackets is potentially confusing and increases the risk of the equipment either being donned incorrectly or not quickly enough. It is commonsense that either all of the immersion suits provided on board a vessel should be of the same type; i.e. they all have in built buoyancy, or, they all need to be worn with a compatible lifejacket, but not a mix of the two designs. Even in large fleets that carry many types of suits and lifejackets, this can usually be arranged through good planning.

- The provision of LSA should be goal-based and holistic in order to ensure that the components are compatible and that the 'system' is fit for purpose. The compatibility of individual items of equipment cannot be taken for granted, even where the LSA provided meets the required performance standards.

This flyer and the MAIB's investigation report are posted on our website: www.maib.gov.uk

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