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(by arrangement with HINDUSTAN SHIPYARD LTD., VISAKHAPATNAM) Art Work

M. V. "HINDSHIP"

When using the Trim and Stability Data for M. V. "Hindship", the following should be taken into account *unless otherwise stated* :—

1. Relative densities of liquids shall be taken as follows :—

Salt Water	1.025	Fresh Water	1.00
Heavy Fuel Oil.	0.95	Diesel Oil.	0.88
Lub. Oil.	0.90	Cylinder Oil.	0.92

2. GZ curves, hydrostatic curves and displacement scale are for inspection only. For actual calculations, tables on page 21-22 and 7 & 8 respectively should be used. Interpolated values shall be considered correct for in between displacements/drafts.
3. Draft marks are to be assumed as at the fore and aft perpendicular.
4. KG means the KG without allowing for free surface correction.
5. GM (Solid) means GM without allowing for free surface correction.
6. GM (Fluid) means GM (Solid)—FSC
7. F.S.C. is to be applied to the GM and *NOT* to the KG except when determining GZ values from KN.
8. Corrected KG means KG—FSC. (when determining GZ from KN.).
9. Kg of liquid in any tank is always to be presumed as for full tank.
10. Moment of inertia for calculations of FSC is to be obtained from page 19 and the FSC is to be worked out as indicated on page 18—20.
11. Hydrostatic draft means the draft at the Centre of Flotation.
12. All information taken from pages 8 & 9 relates to hydrostatic draft. However, when trim of the ship given. the mean draft may be considered to be the same as the hydrostatic draft.
13. A tank shall be considered to be full when filled to its 100% capacity.
14. When a large change of displacement is involved, the hydrostatic data is to be obtained corresponding to the final draft/displacement.
15. Trim is to be calculated as indicated.
16. Righting arm (KN) values from Column 'B' only to be used where both 'A' & 'B' are given on pages 21 and 22.
17. Weights added or removed from any compartment are to be assumed at or from the respective Centre of Gravity of the compartment (Both vertical and longitudinal).
18. For calculations involving capacities of cargo compartments, the grain capacities are to be used.

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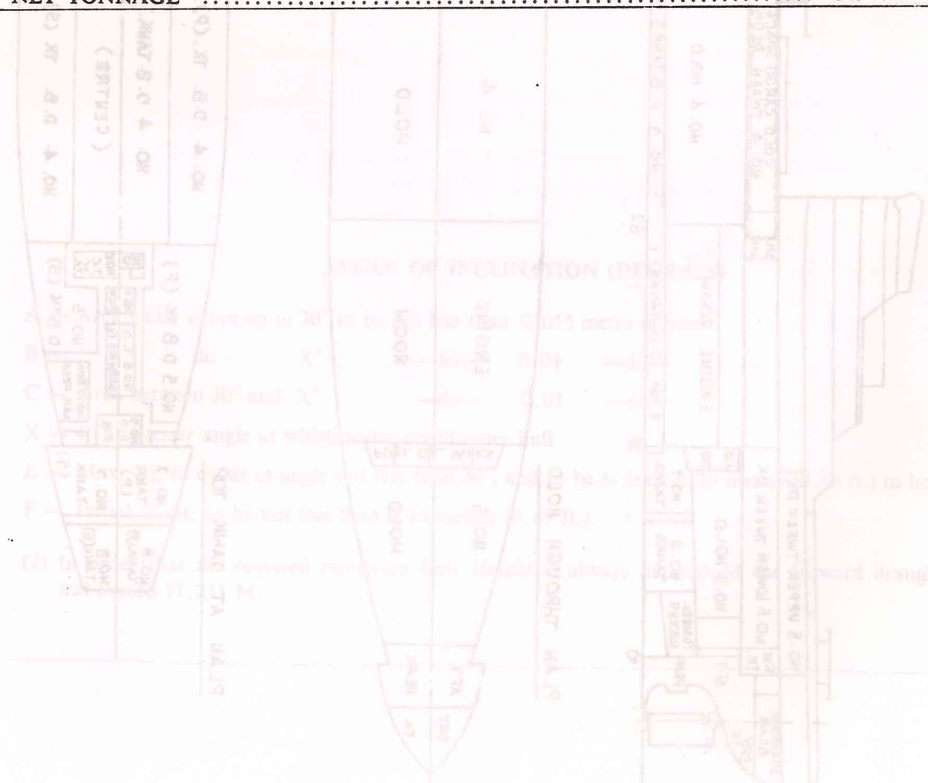
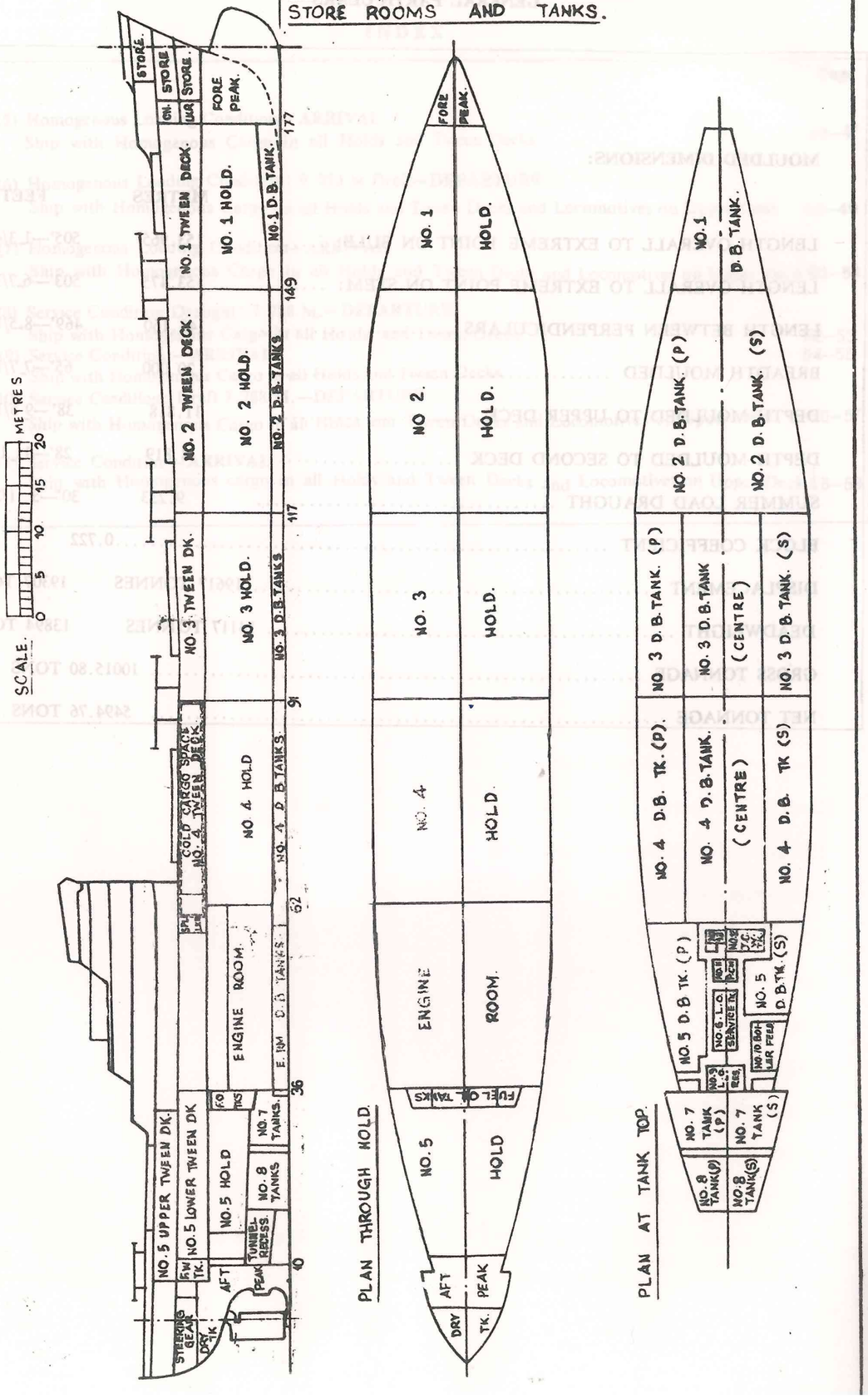
GENERAL PARTICULARS

MOULDED DIMENSIONS:

	METRES	FEET
LENGTH OVERALL TO EXTREME POINT ON BULB:	153.965	505'—1 3/4"
LENGTH OVERALL TO EXTREME POINT ON STEM:	153.475	503'—6 7/16"
LENGTH BETWEEN PERPENDICULARS	143.160	469'—8 5/16"
BREADTH MOULDED	20.000	65'—7 7/16"
DEPTH MOULDED TO UPPER DECK	11.818	38'—9 5/16"
DEPTH MOULDED TO SECOND DECK	8.819	28'—11 13/16"
SUMMER LOAD DRAUGHT	9.233	30'—3 1/2"
BLOCK COEFFICIENT	0.722	
DISPLACEMENT	19617 TONNES	19307 TONS
DEADWEIGHT	14117 TONNES	13894 TONS
GROSS TONNAGE	10015.80 TONS	
NET TONNAGE	5494.76 TONS	



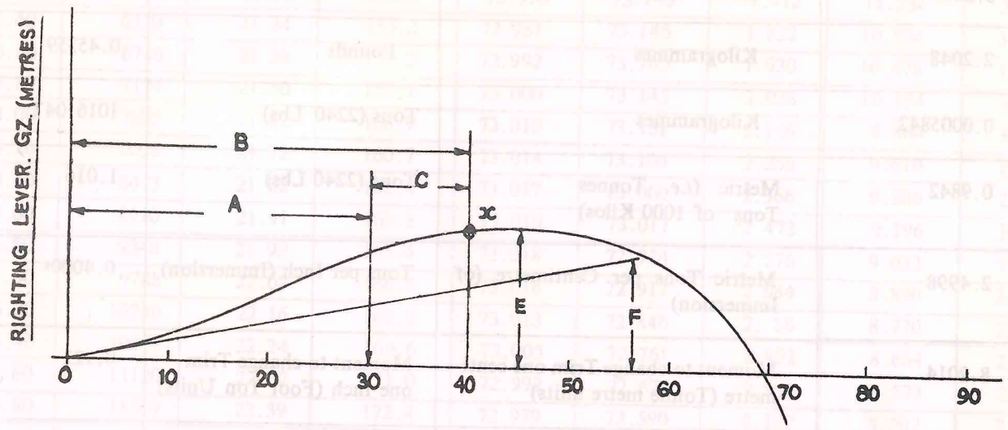
PLAN SHOWING CARGO SPACES, STORE ROOMS AND TANKS.



SPECIAL NOTES REGARDING THE STABILITY AND LOADING OF THE SHIP

(1) As this ship is required to comply with Regulation 10 (1) and (2) of the Load Line Convention 1966 the G. O. INDIA considers it important to ensure that in any sailing condition the stability complies at least with the following minimum criteria:

STATICAL STABILITY CURVE



ANGLE OF INCLINATION (DEGREES)

A — Area under curve up to 30° to be not less than 0.055 metre radians

B — do X° —do— 0.09 —do—

C — Area between 30° and X° —do— 0.03 —do—

X — 40° or *lesser* angle at which water could enter hull

E — Max. GZ to occur at angle not less than 30°, and to be at least 0.20 metres (0.66 ft.) in height.

F — Initial G. M. to be not less than 0.15 metres (0.49 ft.).

(2) In order that the required minimum Bow Height is always maintained the forward draught should not exceed 11.211 M.

METRIC CONVERSIONS

Metric Equivalents

Multiply by	To Convert from	To obtain	
0.03937	Millimetres	Inches	25.400
0.3937	Centimetres	Inches	2.5400
3.2808	Metres	Feet	0.3048
2.2048	Kilogrammes	Pounds	0.45359
0.0005842	Kilogrammes	Tons (2240 Lbs)	1016.047
0.9842	Metric (*i.e.* Tonnes Tons of 1000 Kilos)	Tons (2240 Lbs)	1.016
2.4998	Metric Tons per Centimetre (of Immersion)	Tons per Inch (Immersion)	0.4000
8.2014	Moment to change Trim one centimetre (Tonne metre units)	Moment to change Trim one inch (Foot Ton Units)	0.122
187.9767	Metre Radians	Feet Degrees	0.0053
	To obtain	To Convert from	Multiply by above

Relation between weight and Volume.

10 mm. cubed = 1 Cubic Centimetre
1 Cubic Centimetre of fresh water (S. G. 1.0) = 1 gramme
1000 ,, ,, ,, ,, ,, (,,) = 1 Kilogram (1000 gms)
1 ,, metre ,, ,, ,, (,,) = 1 Tonne (1000 Kilos)

1 ,, ,, ,, Salt water (S.G. 1.025) = 1.025 Tonnes

1 Tonne ,, ,, ,, (,,) = 0.975 Cubic Metres.

1 Cubic Metre = 35.316 Cubic Feet
1 Cubic Feet = 0.0283 Cubic Metres.

HYDROSTATIC PARTICULARS

(In Salt water)
(S. G. 1.025)

Draught B.K. (Metres)	Displacement (Metric Tonnes) *i.e.* 1000 Kilograms	T.P.C.I. (Tonnes per Cm. Immersion)	M.C.T.C. (Moment to change Trim one Cm)	L.C.B. F.W.D. of AP (Metres)	L.C.F. F.W.D. of AP (Metres)	V.C.B. Above Base (Metres)	K.M.(T) Transverse Meta-centre A.B. (Metres)	K.M.(L) Longl. Meta-centre A.B. (Metres)
2.80	5063	20.72	145.2	72.946	73.117	1.496	12.152	415.4
3.00	5478	20.90	148.0	72.958	73.131	1.604	11.674	391.3
3.20	5897	21.09	150.7	72.970	73.145	1.712	11.234	369.2
3.40	6320	21.24	153.2	72.981	73.145	1.822	10.834	349.5
3.60	6746	21.38	155.2	72.992	73.145	1.930	10.478	332.5
3.80	7174	21.50	157.1	73.000	73.145	2.038	10.154	317.0
4.00	7605	21.62	158.9	73.010	73.131	2.146	9.864	303.3
4.20	8038	21.72	160.7	73.014	73.103	2.256	9.610	290.1
4.40	8473	21.82	162.4	73.017	73.060	2.366	9.386	278.4
4.60	8910	21.91	163.8	73.019	73.017	2.472	9.196	267.5
4.80	9348	21.99	165.4	73.018	72.974	2.576	9.032	257.3
5.00	9788	22.08	166.8	73.016	72.917	2 684	8.890	247.7
5.20	10230	22.16	168.2	73.013	72.846	2. 88	8.770	238.8
5.40	10674	22.24	169.6	73.005	72.761	2.892	8.664	230.9
5.60	11120	22.32	171.0	72.992	72.675	2.998	8.578	223.3
5.80	11569	22.39	172.4	72.979	72.590	3.102	8.502	216.4
6.00	12019	22.47	174.0	72.962	72.476	3.204	8.438	210.6
6.20	12472	22.56	175.7	72.941	72.333	3.308	8.384	205.0
6.40	12927	22.66	177.5	72.916	72.176	3.412	8.340	200.0
6.60	13383	22.75	179.3	72.889	72.005	3.516	8.304	195.8
6.80	13840	22.85	181.4	72.858	71.806	3.620	8.280	191.6

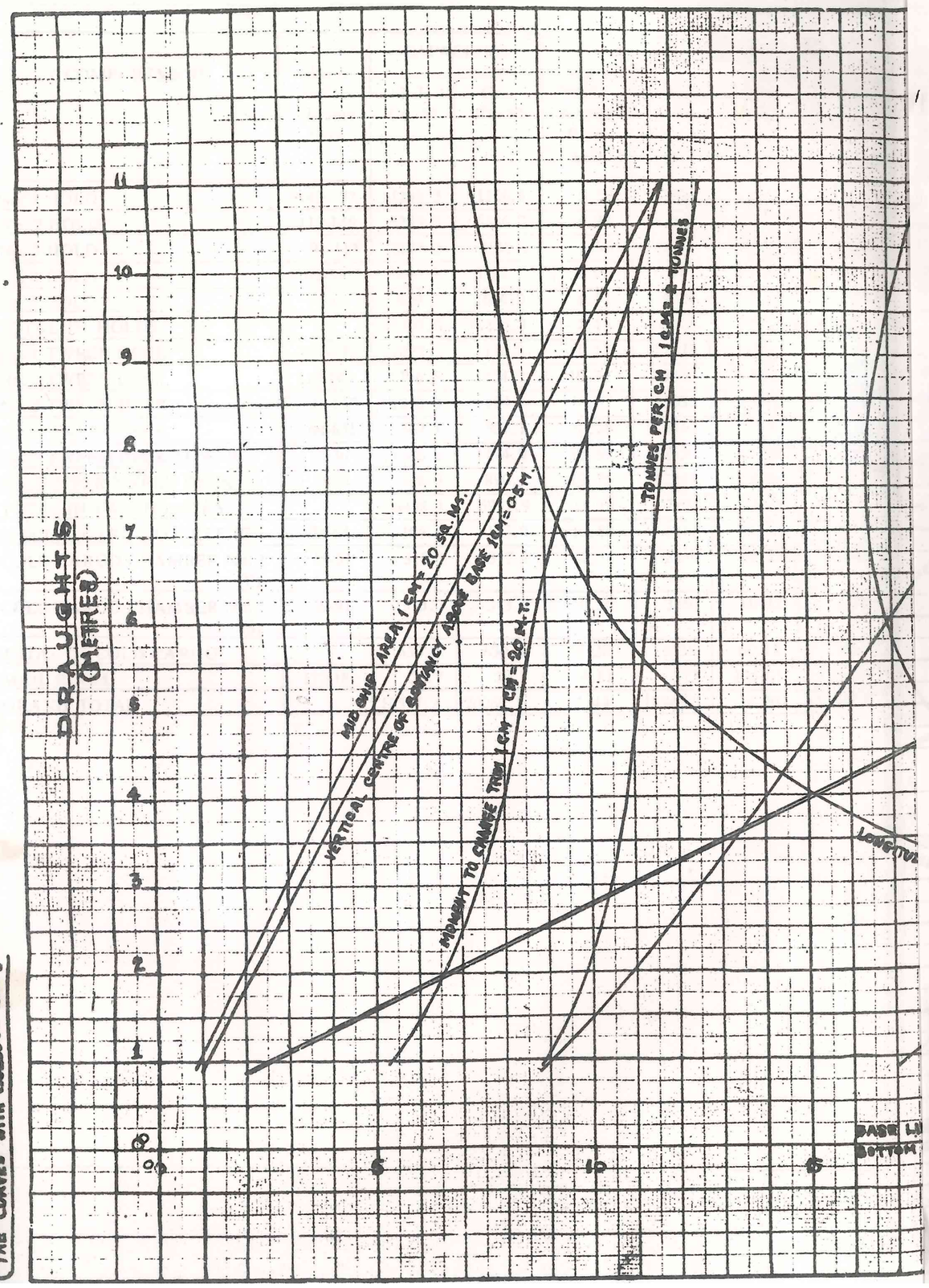
Note:—The hydrostatic particulars given above have been developed with the vessel floating on water lines which are level to the keel.

HYDROSTATIC PARTICULARS

(In Salt water)
(S. G. 1.025)

Draught, B.K. (Metres)	Displacement (Metric (Tonnes) *i.e.* 1000 Kilograms	T.P.C.I. (Tonnes per Cm. Immersion)	M.C.T.C. (Moment to change Trim one Cm)	L.C.B. F.W.D. of AP (Metres)	L.C.F. F.W.D. of AP (Metres)	V.C.B. Above Base (Metres)	K.M.(T) Transverse Meta-centre A.B. (Metres)	K.M.(L) Longl. Meta-centre A.B. (Metres)
7.00	14299	22.95	183.8	72.821	71.606	3.724	8.258	188.0
7.20	14761	23.07	186.4	72.781	71.393	3.828	8.244	184.7
7.40	15226	23.19	189.0	72.737	71.193	3.934	8.238	181.7
7.60	15693	23.29	191.8	72.690	70.979	4.040	8.238	178.9
7.80	16161	23.41	194.6	72.641	70.780	4.144	8.240	176.6
8.00	16635	23.54	197.4	72.588	70.595	4.252	8.250	174.1
8.20	17116	23.66	200.2	72.532	70.409	4.356	8.270	172.0
8.40	17598	23.78	203.1	72.473	70.238	4.460	8.292	170.2
8.60	18081	23.90	206.0	72.413	70.067	4.566	8.318	168.2
8.80	18565	24.02	209.0	72.351	69.911	4.674	8.352	166.3
9.00	19051	24.14	211.8	72.288	69.768	4.782	8.388	164.6
9.20	19537	24.26	214.5	72.223	69.611	4.892	8.428	162.9
9.40	20024	24.36	217.4	72.159	69.483	5.000	8.468	161.1
9.60	20514	24.46	220.0	72.093	69.355	5.108	8.514	159.2
9.80	21006	24.57	222.6	72.027	69.241	5.216	8.562	157.4
10.00	21498	24.69	225.0	71.962	69.127	5.324	8.618	155.8

Note:—The hydrostatic particulars given above have been developed with the vessel floating on water lines which are level to the keel.



SCALE FOR
LONGITUDINAL CENTRE OF FLOATATION
LONGITUDINAL CENTRE OF BUOYANCY
CHANGE OF DISPLACEMENT PER M.TRIM

5 AFT 0 FORWARD 5

LONGITUDINAL CENTRE OF FLOATATION
1 C.M. = 0·4 METER

TONNES

WETTED SURFACE 1CM = 200 SQ.MS.

WATER PLANE AREA 1CM = 100 SQ.MS.

MOULDED DISPLACEMENT 1CM = 500 TONNES

FULL DISPLACEMENT 1CM = 300 TONNES

SLOW COEFFICIENT 1CM = 0.01

PRISMATIC COEFFICIENT 1CM = 0.02

WATER PLANE AREA COEFFICIENT 1 CM = 0.02

LONGITUDINAL CENTRE OF BUOYANCY 1CM = 0.02

CHANGE OF DISPLACEMENT PER M.TRIM 1CM = 0.02

LONGITUDINAL METACENTRE ABOVE BASE 1CM = 20M

TRANSVERSE METACENTRE ABOVE BASE 1CM = 0.5M

MIDSHIP AREA COEFFICIENT 1CM = 0.02

BASE LINE
BOTTOM OF KEEL

15 20 25 30 35 40 45 50

HYDROSTATIC CURVES

CAPACITIES AND CENTRES OF GRAVITY OF DRY CARGO SPACES

COMPARTMENT	Location (Frame (Nos.)	CAPACITIES		CENTRES OF GRAVITY			
		Bale Cu. M.	Grain Cu. M.	Vertl. Above Base (M)	V. Moments M-Tonnes.	Longl. from A.P. (M)	L. Moments Abt. A.P. M-Tonnes
No. 1 HOLD	149-177	1248.3	1356.8	5.59	7585	123.52	167592
No. 2 HOLD	117-149	3299.8	3586.7	4.98	17862	103.14	369932
No. 3 HOLD	91-117	2885.3	3136.2	5.00	15681	80.63	252872
No. 4 HOLD	62-91	3240.3	3522.1	4.99	17575	58.66	206506
No. 5 HOLD	11-33	629.3	684.0	6.91	4726	17.31	11840
TOTAL IN HOLDS		11303.0	12285.8	5.16	63429	82.11	1008842
No. 1 TWEEN DECK	149-177	1027.5	1116.8	11.17	12475	124.67	139231
No. 2 TWEEN DECK	117-149	1706.5	1854.9	10.72	19885	103.91	192743
No. 3 TWEEN DECK	91-117	1338.0	1454.4	10.37	15082	80.79	117501
No. 4 TWEEN DECK	64-85¼	467.1	507.7	10.76	5463	57.44	29162
No. 5 TWEEN DECK LOWER	11-36	1080.1	1174.0	10.69	12550	17.24	20240
No. 5 UPPER TWEEN DECK	7-33	818.9	890.1	13.76	12248	14.78	13156
TOTAL IN TWEEN DECKS		6438.1	6997.9	11.10	77703	73.17	512033
SPECIAL CARGO LOCKER (C)	58-64	106.6	115.9	10.50	1217	46.36	5373
COLD CARGO CHAMBER No. 1 (P)	59-91	317.1	317.1	10.36	3285	60.22	19096
COLD CARGO CHAMBER No. 2 (S)	59-91	313.7	313.7	10.36	3250	60.12	18860
TOTAL OF COLD CARGO		630.8	630.8	10.36	6535	60.17	37956
MAIL ROOM	173-182	38.7	38.7	14.81	573	135.01	5225
GRAND TOTAL		18517.2	20069.1	7.44	149457	78.20	1569429

STORE ROOMS
CAPACITIES AND CENTRES OF GRAVITY

COMPARTMENT	Location (Between Frames)	Bale Capacity Cubic Metres	Centres of Gravity (Metres)	
			Vertical (Above Base)	Longitudinal from A.P.
BOAT DECK:				
Linen Locker (P)	54-57	14.9	20.87	41.90
BRIDGE DECK:				
Linen Locker (S)	39-42	10.9	18.40	29.75
Locker (P)	39-44	15.9	18.56	30.57
Med. Locker (S)	48-50	6.3	18.64	27.14
Custom Locker (P)	51-54	8.9	18.42	39.55
LONG POOP:				
Daily Provision Stores (S)	38-41	6.4	16.06	29.32
Oil Skin Locker (P)	57-58	2.2	15.98	43.47
UPPER DECK:				
Bosun's Store	185-FE	37.5	15.35	140.82
Paint Room (S)	180-185	16.5	15.08	138.19
Mail Room (P)	173-182	38.7	14.81	135.01
Lamp Room (S)	175-180	10.4	14.92	135.14
Carpenter Workshop (S)	173-180	22.7	14.31	133.92
Electrical Store (S)	2-7	87.1	14.19	2.97
Baggage Room	d-Aft	51.7	14.37	—3.60
PLATFORM DECK:				
Engine Store (P)	44-52	94.4	7.46	35.89
UNDER UPPER DECK:				
Bosun's Store	181-FE	45.4	12.71	138.00
SECOND DECK:				
Bosun Store	181-FE	24.3	10.00	137.70
Beer Locker (P)	43½-46	37.7	10.53	33.24
Bond Locker (P)	46-48½	38.0	10.53	35.24
Dry Provision Store (P)	48½-59	157.6	10.48	40.44
Oxigen Locker (S)	55-59	47.1	10.45	43.04

CAPACITIES AND CENTRES OF GRAVITY OF STORE ROOMS AND CREW AND EFFECTS AND DECK CARGO.

CREW, STORES AND EFFECTS

ITEM	DEPARTURE			ARRIVAL		
	Tonnes	Centres of Gravity		Tonnes	Centres of Gravity	
		Vertl. A.B.	Longl. From AP.		K.G. (M) A.B.	LCG (M) Ford of AP.
Stores, Spares and Provisions	84.5	11.97	65.25	75.4	11.70	64.78
Crew and Effects	10.9	14.47	38.28	10.9	14.47	38.28

DISTRIBUTION OF CREW AND EFFECTS:

	Weight in Tonnes	KG. in (M) above Base	LCG in (M) Ford of A.P.
ON UPPER DECK	6.825	13.01	37.25
ON LONG POOP DECK	1.050	15.44	37.44
ON BRIDGE DECK	2.275	17.89	40.06
ON BOAT DECK	0.700	20.34	43.84
TOTAL:	10.850	14.47	38.28

WEIGHT, KG., AND L.C.G. OF DECK CARGO:

Position	Weight in Tonnes	KG. in (M) above base	LCG in (M) Ford of AP.
Bet. Frames 131-150	190.0	14.20	109.44
—do— 109-127	190.0	13.82	91.84
—do— 89-107	190.0	13.63	75.84
—do— 68-86	190.0	13.65	50.04
TOTAL:	760.0	13.83	84.04

CAPACITIES AND CENTRES OF GRAVITY OF REFRIGERATED CARGO DOMESTIC CHAMBERS

COMPARTMENT	Location (Frame Number)	Bale Capacity Cubic Metres	Centres of Gravity (Metres)	
			Vertical above base	Longl. from A.P.
NO. 1 COLD CARGO SPACE P	59-91	317 1	10.36	60.215
NO. 2 COLD CARGO SPACE S	59-91	313.7	10.36	60.115
DOMESTIC CHAMBERS				
MEAT	36-38½	18.4	10.54	27.240
FISH	38½-41	10.5	10.54	29.240
VEGETABLES	41-43½	18.7	10.50	31.240

CAPACITIES, CENTRES OF GRAVITY AND FREE SURFACE MOMENTS OF OIL AND OTHER TANKS

COMPARTMENT		Location Frame No.	CAPACITIES			Centres of Gravity (M)		Free Surface Moment AT. S.G. 1.0 (Tonne/M)
			100% Full	98% full				
			Cubic Metres	Cubic Metres	Tonnes AT. SG. 1.0	Vertl. A.B.	Longl. from A.P.	
OIL FUEL TANKS: 0.95 Tonnes/M³ or 37.8 Cu. ft./Ton (approx.)								
NO. 1 D. B. TANK		149-177	157.6	154.4	154.4	1.14	124.63	657
NO. 2 D. B. TANK	P.	117-149	202.4	198.4	198.4	0.65	102.20	718
—Do—	S.	117-149	202.4	198.4	198.4	0.65	102.20	718
NO. 3 D. B. TANK	P.	91-117	110.5	108.3	108.3	0.67	80.62	227
—Do—	S.	91-117	110.5	108.3	108.3	0.67	80 62	227
—Do—	C.	91-117	210.7	206.5	206.5	0.61	80.64	1181
NO. 4 D. B. TANK	P.	60-91	127.4	124.9	124.9	0.68	58.14	271
—Do—	S.	60-91	127.4	124.9	124.9	0.68	58.14	271
—Do—	C.	60-91	257.4	252.3	252.3	0.63	57.58	1408
NO. 5 D. B. TANK	S.	47-60	48.8	47.8	47.8	0.87	39.73	95
SETTING. TANK T1	P.	33-36	34.4	33.7	33.7	6.00	25.06	9
—Do—	S.	33-36	34.6	33.9	33.9	6.15	25.04	9
SERVICE TANK T2	P.	33-36	34.4	33.7	33.7	6.11	25.09	6
—Do—	S.	33-36	34.4	33.7	33.7	6.11	25.09	6
TOTAL			1692.9	1659.2	1659.2			
DIESEL OIL TANKS: 0.88 Tonnes/M³ or 40.8 Cu. Ft/Ton (approx.)								
NO. 5 D. B. TANK	P.	39-60	83.5	81.8	81.8	0.85	38.24	172
NO. 7 TANK	P.	28-36	114.6	112.3	112.3	2.62	22.97	50
NO. 7 TANK	S.	28-36	101.9	99.9	99.9	2.59	22.97	33
SERVICE TANK FOR M.E. T3.	P.	36-40	14.6	14.3	14.3	7.31	27.92	3
SERVICE TANK FOR A.E. T4.	P.	36-40	10.3	10.1	10.1	7.06	27.84	1
TOTAL			324.9	318.4	318.4			

NOTE:—TO OBTAIN WEIGHT OF THE LIQUID CONTENTS OF ANY COMPARTMENT MULTIPLY "TONNES AT S.G. 1.0" BY THE ACTUAL SPECIFIC GRAVITY OF THE LIQUID.

CAPACITIES, CENTRES OF GRAVITY AND FREE SURFACE MOMENTS OF OIL AND FUEL TANKS (CONTD.)

COMPARTMENT	Location Frame Nos.	CAPACITIES 100% FULL Cubic	CAPACITIES 98% FULL Cubic	CAPACITIES 98% FULL Tonnes At S.G. 1.0	CENTRES OF GRAVITIES Vertl. A.B. Metres	CENTRES OF GRAVITIES Longl. from A.P.	Free Surface Moments AT. S.G. 1.0 (T/M)
ENGINE ROOM: LUB. OIL CYLINDER OIL AND OTHER TANKS:							
LUB. OIL: 0.90 M³/Tonne or 39.9 Cu. ft./Ton (approx.)							
CYLINDER OIL: 0.92 M³/Tonne or 39.0 Cu. ft./Ton (approx.)							
No. 6 D. B. SER. TK. L.O. C.	41-50	19.4	19.0	19.0	1.21	33.84	12
No. 9 D. B. SER. TK. L.O. C.	36-40	21.3	20.9	20.9	0.82	27.91	20
STORAGE TK. FOR M.E.T7 L.O. S.	42-47	17.1	16.8	16.8	7.06	33.24	5
SETTING. TANK FOR M.E. T8 L.O. S.	42-47	17.4	16.9	16.9	7.19	33.24	5
STORAGE TK. FOR A.E. T10 L.O. P.	41-44	6.4	6.3	6.3	7.06	31.44	Negligible.
L.O. SLUDGE TK. T22 S.	42-46	1.4	1.4	1.4	3.02	32.64	—do—
CYL. OIL TK. FOR M.E. T9 P.	41-44	5.4	5.3	5.3	7.06	31.44	—do—
—DO— T9. P.	41-44	5.4	5.3	5.3	7.06	31.44	—do—
CYL. OIL MEASR. TK. T27 S.	39-40	0.2	0.2	0.2	10.50	29.08	—do—
H.F.O. SLUDGE TK. T6. P.	37-42	3.8	3.7	3.7	3.05	29.04	—do—
CONDENSATE FEED TANK T11. S.	36-38	0.8	0.8	0.8	3.17	27.04	—do—
COMPENSATION TK. FOR M.E. JACKETS T13. S.	55-57	1.8	1.8	1.8	13.40	42.33	—do—
COMPENSATION TK. FOR M.E. NOZZLES T15. S.	42-43	0.6	0.6	0.6	12.65	31.44	—do—
COMPENSATION TANK FOR A.E. T16. P.	56-57	0.7	0.7	0.7	13.40	42.63	—do—
COMPRESSOR OIL TANK T18 P.	49-50	0.2	0.2	0.2	6.80	35.84	—do—
PARAFFIN TANK T19. P.	51-52	0.2	0.2	0.2	6.80	38.64	—do—
ANTI-CORROSIVE OIL TANK T20. P.	50-51	0.2	0.2	0.2	6.80	37.84	—do—
TOTALS		102.3	100.3	100.3			

CAPACITIES, CENTRES OF GRAVITY AND FREE SURFACE MOMENTS OF OIL AND WATER TANKS (contd.)

COMPARTMENT	Location Frame No.	CAPACITIES 100% full Cubic Metres	CAPACITIES 98% full Cubic Metres	CAPACITIES 98% full Tonnes AT. S G. 1.0	CENTRES OF GRAVITY Vertl. Metres A.B.	CENTRES OF GRAVITY Longl. Metres From AP	Free Surface Moment AT SG. 1.0 (Ton/M)
FRESH AND FEED WATER TANKS: 1.0 M³/Tonne or 36 Cu. Ft./Ton.							
No. 8 TANK P.	19-27	74.1	72.6	72.6	2.76	16.24	15
No. 8 TANK S.	19-27	63.4	62.1	62.1	2.77	16.21	8
TWEEN DK. DRINKING WATER TANK P.	7-11	49.7	48.7	48.7	11.19	5.86	37
—DO— S.	7-11	43.7	42.8	42.8	11.23	5.80	42
AFT PEAK TANK	0-10	117.8	115.4	115.4	8.81	3.58	18
NO. 10 BOILER FEED TANK —S.	39-46	14.1	13.8	13.8	0.90	31.74	16
No. 11 PISTON COOLING WATER TANK — C.	52-55	6.3	6.2	6.2	1.20	40.21	4
No. 12 JACKET COOLING WATER TANK —S.	56-59	14.4	14.1	14.1	0.72	43.44	17
No. 13 LEAKAGE WATER TANK — P.	57-59	4.7	4.6	4.6	0.71	43.84	1
TOTAL:		388.2	380.3	380.3			
BALLAST WATER TANKS: 1.025 M³/Tonne or 35 Cu. ft./Ton (approx.)							
FORE PEAK TANK	177-F.E.	103.5	101.4	101.4	6.31	137.18	9
No. 1 D. B. TANK	149-177	157.6	154.4	154.4	1.14	124.63	419
No. 2 D. B. TANK P.	117-149	202.4	198.4	198.4	0.65	102.20	718
—DO— S.	117-149	202.4	198.4	198.4	0.65	102.20	718
No. 3 D. B. TANK P.	91-117	110.5	108.3	108.3	0.67	80.62	227
—DO— S.	91-117	110.5	108.3	108.3	0.67	80.62	227
—DO— C.	91-117	210.7	206.5	206.5	0.61	80.64	1181
No. 4 D. B. TANK P.	60-91	127.4	124.9	124.9	0.68	58.14	271
—DO— S.	60-91	127.4	124.9	124.9	0.68	58.14	271
—DO— C.	60-91	257.4	252.3	252.3	0.63	57.58	1408
AFT PEAK	0-10	117.8	115.4	115.4	8.81	3.58	18
TOTAL		1727.6	1693.2	1693.2			

NOTE:—TO OBTAIN WEIGHT OF THE LIQUID CONTENTS OF ANY COMPARTMENT MULTIPLY

TANKS IN ENGINE ROOM
CONTENTS, CENTRES OF GRAVITY AND MOMENTS

TANKS	Bet. Frames.	Weight in Tonnes	K.G. (M)	Vertl. Moments M-Tonnes	LCG. (M) Ford of A.P.	Longl. Moments M-Tonnes
L. O. Sludge Tank S.	42-46	1.26	3.02	3.8	32.64	41.1
Cyl. Oil Measuring Tank S.	39-40	0.22	10.50	2.3	29.08	6.4
H. F. O. Sludge Tank P.	37-42	3.62	3.05	11.0	29.04	105.1
Condensate Feed Tank S.	36-38	0.80	3.97	3.2	27.04	21.6
Compensation Tank for M. E. Jackets. S.	55-57	1.79	13.40	24.0	42.33	75.8
Compensation Tank for M.E. Nozzles. S.	42-43	0.61	12.65	7.7	31.44	19.2
Compensation Tank for A.E.	56-57	0.72	13.40	9.6	42.63	30.7
Compressor Oil Tank P.	49-50	0.20	6.80	1.4	35.84	7.2
Paraffin Tank	51-52	0.19	6.80	1.3	38.64	7.3
Anti-corrosive Oil Tank P.	50-51	0.20	6.80	1.4	37.84	7.6
DEPARTURE CONDITIONS		9.61	6.84	65.7	33.51	322.0

TANKS	Bet. Frames	Weight in Tonnes	K.G. (M)	Vertl. Moments M-Tonnes	L.C.G. (M) Ford of A.P.	Longl.. Moments M-Tonnes
L. O. Sludge Tank S.	42-46	1.26	3.02	3.8	32.64	41.1
Cyl. Oil Measuring Tk. S.	39-40	0.22	10.50	2.3	29.08	6.4
H. F. O. Sludge Tank P.	37-42	3.62	3.05	11.0	29.04	105.1
Condensate Feed Tank. S.	36-38	0.80	3.97	3.2	27.04	21.6
Compensation Tank for M. E. Jackets. S.	55-57	1.79	13.40	24.0	42.33	75.8
Compensation Tank for M. E. Nozzles. S.	42-43	0.61	12.65	7.7	31.44	19.2
Compensation Tank for A.E. P.	56-57	0.72	13.40	9.6	42.63	30.7
Compressor Oil Tank	49-50	0.10	6.58	0.7	35.84	3.6
Paraffin Tank P.	51-52	0.09	6.58	0.6	38.64	3.5
Anti-corrosive Oil Tank P.	50-51	0.10	6.58	0.7	37.84	3.8
ARRIVAL CONDITION		9.31	6.83	63.6	33.38	310.8

NOTES ON USE OF FREE SURFACE MOMENTS

PROVIDED A TANK IS COMPLETELY FILLED WITH LIQUID, NO MOVEMENT OF THE LIQUID IS POSSIBLE AND THE EFFECT ON THE SHIP'S STABILITY IS PRECISELY THE SAME AS IF THE TANK CONTAINED SOLID MATERIAL.

IMMEDIATELY A QUANTITY OF LIQUID IS WITHDRAWN FROM THE TANK, THE SITUATION CHANGES COMPLETELY AND THE STABILITY OF THE SHIP IS ADVERSELY AFFECTED BY WHAT IS KNOWN AS THE "FREE SURFACE EFFECTS".

THIS ADVERSE EFFECT ON THE STABILITY IS REFERRED TO AS A "LOSS IN G. M." OR AS A "VIRTUAL RISE IN V. C. G." AND IS CALCULATED AS FOLLOWS:

$$\text{LOSS OF G. M. DUE TO FREE SURFACE EFFECTS (METRES)} = \frac{\text{FREE SURFACE MOMENT (TONNES METRES)} \times \text{SP. GRAVITY OF LIQUID IN TANK}}{\text{DISPLACEMENT OF VESSEL IN TONNES.}}$$

N.B.—THE "FREE SURFACE EFFECTS" OF ALL OIL-FUEL, FRESH WATER, FEED WATER AND SERVICE TANKS SHOULD BE TAKEN INTO ACCOUNT IN BOTH THE ARRIVAL AND DEPARTURE CONDITIONS.

FREE SURFACE CORRECTIONS

N.B.—1. To find the loss of GM due to free surface for any tank divide the moment of inertia of the particular tank by A/1.025 in that particular condition.

2. Moment of inertia (*i*) is not indicated for tanks, where loss of GM due to free surface is considered negligible.

COMPARTMENT	Between Frames	Moment of inertia (im^4)
Fore Peak Tank	177—FE	9
No. 1. D. B. Tank	149—177	419
No. 2 D. B. Tank P or S	117—149	718
No. 3 D. B. Tank P or S	91—117	227
No. 3 D. B. Tank Centre	91—117	1181
No. 4 D. B. Tank P or S	60—91	271
No. 4 D. B. Tank Centre	60—91	1408
No. 5 D. B. Tank P	39—60	172
No. 5 D. B. Tank S	47—60	95
No. 6 D. B. Tank C	41—50	12
No. 7 D. B. Tank P	28—36	50
No. 7 D. B. Tank S	28—36	33
No. 8 D. B. Tank P	19—27	15
No. 8 D. B. Tank S	19—27	8
No. 9 D. B. Tank C	36—40	20
No. 10 D. B. Tank S	39—46	16
No. 11 D. B. Tank C	52—55	4
No. 12 D. B. Tank S	56—59	17
Tween deck F. W. Tanks P	7—11	37
Tween deck F. W. Tank S.	7—11	42
T1 H. F. O. Settling Tanks P or S	33—36	9
T2 H. F. O. Service Tanks P or S	33—36	6
T3 D. O. Service Tank for M.E. P	36—40	3
T4 D. O. Settling Tank for A.E. P. and service (each)	36—40	1
T7 L. O. Storage Tank for M.E.S.	42—47	5
T8 L. O. Settling Tank for M. E. S.	42—47	5

TYPICAL EXAMPLE ON FREE SURFACE MOMENTS

EFFECT ON G.M. OF SHIP DUE TO FREE SURFACE OF LIQUID IN TANK

IN LOADED ARRIVAL CONDITION No. 5 THE FOLLOWING TANKS WERE CONSIDERED SLACK AND THEIR FREE SURFACE MOMENTS ARE SHOWN AGAINST EACH TANK.

TABLE OF '1' IS SHOWN ON PAGE 19

TANKS		1	Sp. Gr.	Free Surface Moments.
NO. 3 D. B. TANKS C.	(W.B.)	1181 × 1.025	=	1210
NO. 5 D. B. TANK P.	(D.O.) 46–47	172 × 0.88	=	152
NO. 5 D. B. TANK S.	(H.F.O.) 48–49	25 × 0.95	=	90
F. W. FOR ENGINES S & C	(F.W.) 50–51	21 × 1.00	=	21
H. F. O. SETTLG. & SERVICE TKS. P & S.	52–53	30 × 0.95	=	28
D. O. SETTLG. & SERVICE TKS.	54–55	4 × 0.88	=	4
L. O. STORAGE & SETTLING TKS.	56–57	5 × 0.90	=	5
DRINKING WATER TANKS. S. (F.W.)	58–59	42 × 1.00	=	42
		TOTAL I	=	1552

THE TOTAL FREE SURFACE MOMENTS ARE THEN DIVIDED BY THE DISPLACEMENT OF 18529.3 TONNES, WHICH GIVES THE LOSS OF G. M. DUE TO FREE SURFACE OF LIQUIDS.

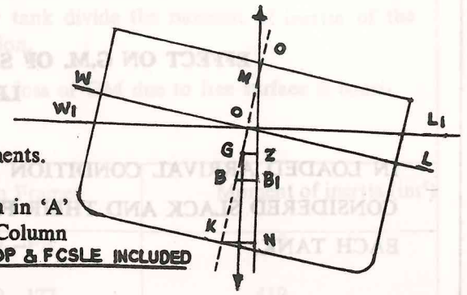
CROSS CURVES OF STABILITY PARTICULARS

NOTE:—

(1) Centre of Gravity is assumed on Base Line.

(2) Interpolated values will hold good for in between displacements.

(3) For 30°, 40°, 45°, 60° & 75° Inclinations, values given in 'A' Column are without superstructure and values given in 'B' Column are inclusive of superstructure.



Displacement in Tonnes	RIGHTING ARM IN METRES							Deck Edge Immersed.
	5°	10°	15°	20°	25°	30° A	30° B	
5000	1.085	2.135	3.142	4.000	4.695	5.320	5.320	42.1°
5500	1.025	2.030	3.005	3.870	4.580	5.230	5.230	41.4°
6000	0.980	1.940	2.880	3.748	4.465	5.144	5.144	40.6°
6500	0.940	1.868	2.770	3.640	4.375	5.068	5.068	39.7°
7000	0.908	1.800	2.675	3.540	4.280	4.997	4.997	38.9°
7500	0.883	1.750	2.597	3.452	4.210	4.932	4.932	38.1°
8000	0.865	1.708	2.527	3.375	4.140	4.875	4.875	37.3°
8500	0.848	1.672	2.475	3.310	4.075	4.823	4.823	36.4°
9000	0.833	1.642	2.432	3.252	4.015	4.773	4.773	35.6°
9500	0.819	1.620	2.397	3.202	3.960	4.727	4.727	34.7°
10000	0.807	1.598	2.365	3.157	3.910	4.682	4.682	33.8°
10500	0.797	1.580	2.335	3.121	3.867	4.645	4.645	32.9°
11000	0.788	1.564	2.310	3.087	3.835	4.612	4.612	31.9°
11500	0.780	1.550	2.288	3.057	3.805	4.580	4.580	30.9°
12000	0.772	1.538	2.272	3.033	3.780	4.554	4.554	30.0°
12500	0.765	1.528	2.258	3.017	3.760	4.530	4.530	29.1°
13000	0.760	1.519	2.247	3.003	3.740	4.508	4.508	28.1°
13500	0.757	1.512	2.238	2.991	3.730	4.488	4.488	27.2°
14000	0.755	1.506	2.231	2.981	3.722	4.470	4.470	26.2°
14500	0.755	1.502	2.225	2.970	3.713	4.452	4.452	25.2°
15000	0.756	1.500	2.222	2.962	3.705	4.435	4.435	24.1°
15500	0.757	1.500	2.220	2.965	3.700	4.415	4.415	23.1°
16000	0.760	1.500	2.222	2.968	3.690	4.385	4.398	22.1°
16500	0.757	1.500	2.225	2.972	3.680	4.355	4.380	21.0°
17000	0.755	1.502	2.229	2.978	3.670	4.325	4.362	19.9°
17500	0.755	1.505	2.236	2.984	3.660	4.295	4.345	18.9°
18000	0.757	1.509	2.244	2.990	3.645	4.265	4.330	17.8°
18500	0.760	1.516	2.252	2.990	3.630	4.230	4.313	16.7°
19000	0.764	1.525	2.260	2.985	3.615	4.190	4.295	15.6°
19500	0.769	1.537	2.267	2.978	3.598	4.154	4.277	14.6°
20000	0.773	1.550	2.271	2.970	3.580	4.120	4.260	13.5°
20500	0.776	1.555	2.269	2.960	3.650	4.085	4.242	12.4°
21000	0.780	1.560	2.265	2.947	3.540	4.050	4.225	11.3°

CROSS CURVES OF STABILITY PARTICULARS.

Displacement in Tonnes	RIGHTING ARM IN METRES							
	40° A	40° B	45° A	45° B	60° A	60° B	75° A	75° B
5000	6.328	6.328	6.752	6.752	7.648	7.668	7.673	7.977
5500	6.288	6.288	6.740	6.740	7.665	7.710	7.660	7.965
6000	6.253	6.253	6.729	6.729	7.663	7.745	7.640	7.953
6500	6.223	6.223	6.720	6.720	7.645	7.775	7.610	7.940
7000	6.195	6.195	6.706	6.706	7.617	7.795	7.580	7.926
7500	6.168	6.168	6.690	6.690	7.577	7.805	7.550	7.912
8000	6.145	6.145	6.673	6.673	7.535	7.785	7.520	7.897
8500	6.120	6.120	6.652	6.652	7.490	7.755	7.485	7.880
9000	6.092	6.092	6.620	6.630	7.443	7.720	7.446	7.861
9500	6.060	6.060	6.585	6.618	7.395	7.685	7.405	7.842
10000	6.026	6.032	6.545	6.585	7.350	7.650	7.368	7.822
10500	5.990	6.005	6.500	6.561	7.305	7.615	7.332	7.800
11000	5.956	5.982	6.452	6.536	7.260	7.578	7.298	7.777
11500	5.922	5.955	6.405	6.508	7.215	7.539	7.262	7.753
12000	5.885	5.925	6.358	6.479	7.168	7.498	7.224	7.727
12500	5.845	5.898	6.313	6.450	7.120	7.457	7.188	7.700
13000	5.802	5.871	6.265	6.420	7.073	7.417	7.153	7.673
13500	5.760	5.845	6.215	6.385	7.026	7.382	7.120	7.645
14000	5.716	5.817	6.163	6.347	6.980	7.350	7.090	7.617
14500	5.670	5.787	6.111	6.307	6.934	7.316	7.064	7.589
15000	5.622	5.755	6.058	6.267	6.889	7.281	7.040	7.563
15500	5.570	5.725	6.004	6.227	6.844	7.245	7.018	7.540
16000	5.518	5.692	5.950	6.186	6.798	7.210	6.998	7.520
16500	5.462	5.657	5.894	6.145	6.750	7.175	6.980	7.500
17000	5.402	5.620	5.837	6.103	6.700	7.138	6.960	7.480
17500	5.347	5.580	5.779	6.061	6.652	7.102	6.935	7.459
18000	5.293	5.540	5.720	6.020	6.605	7.066	6.910	7.438
18500	5.240	5.500	5.660	5.980	6.558	7.029	6.885	7.417
19000	5.190	5.460	5.600	5.940	6.511	6.991	6.859	7.396
19500	5.137	5.420	5.542	5.900	6.464	6.954	6.833	7.375
20000	5.083	5.380	5.485	5.860	6.417	6.918	6.805	7.357
20500	5.027	5.340	5.429	5.820	6.370	6.875	8.778	7.339
21000	4.975	5.300	5.375	5.780	6.325	6.820	6.755	7.322

EXAMPLE SHOWING USE OF CROSS CURVES (KN).

The purpose of the cross curves is to enable statical stability curves to be drawn for the ship in any sailing condition, *e.g.*,

Assume the displacement of the ship to be 19617.0 Tonnes, and the vertical centre of gravity of the ship above bottom of keel = 7.272 + 0.070 = 7.342 Metres.

(Corrected for free surface effects) in condition No. 4.

Then the Righting lever GZ = KN—KG SIN θ .

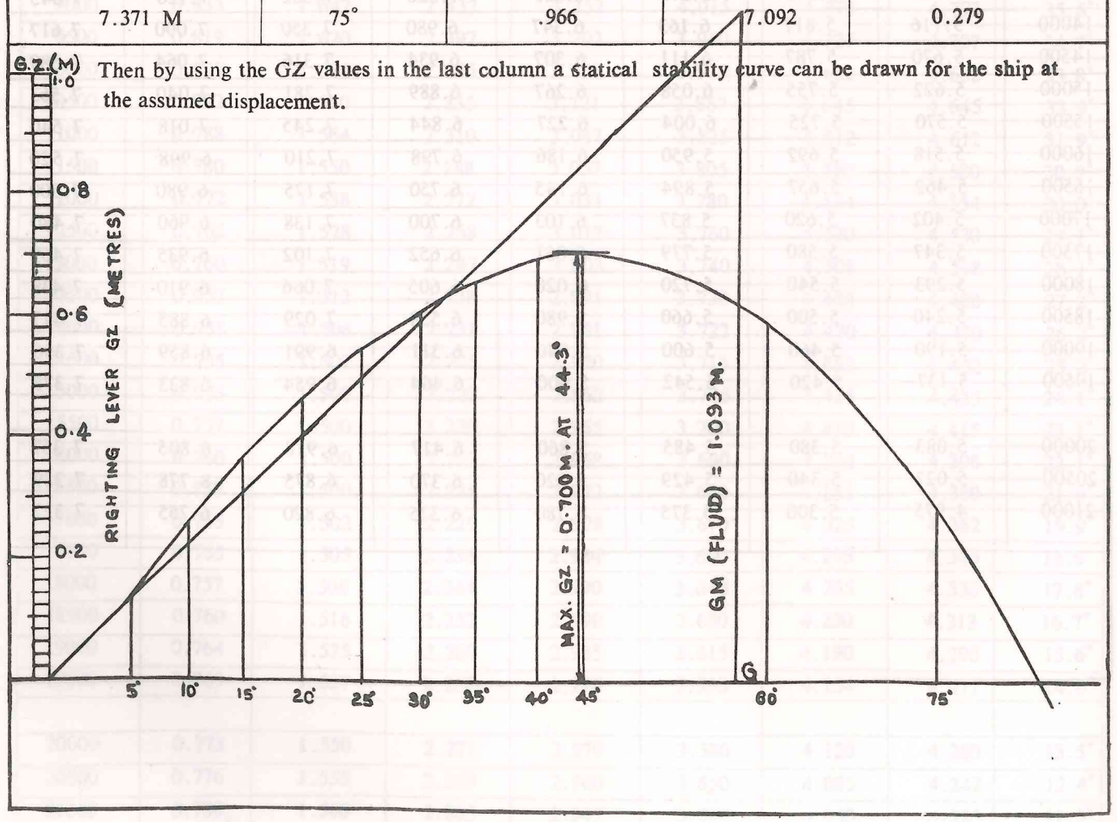
where KN = Cross curve ordinate

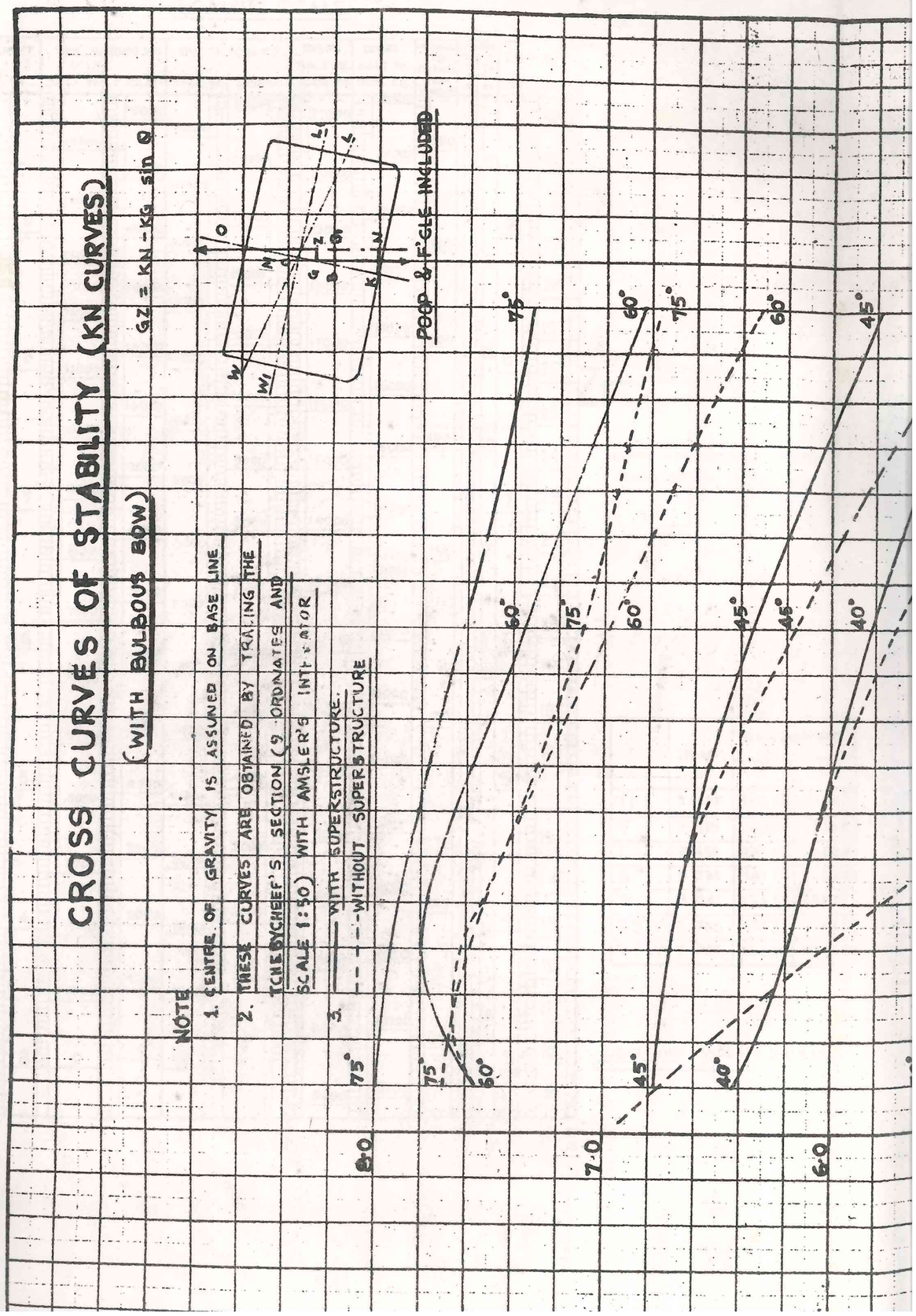
and KG = Centre of gravity above keel (corrected for free surface effects).

and θ = Angle of inclination.

KN at 19617 Tonnes	θ	Sin θ	KG Sin θ M	GZ = (KN-KG SIN θ) M
0.770	5°	.087	0.639	0.131
1.540 M	10°	.174	1.278	0.262
2.976 M	20°	.342	2.511	0.465
4.273 M	30°	.500	3.671	0.602
5.891 M	45°	.707	5.191	0.700
6.946 M	60°	.866	6.358	0.588
7.371 M	75°	.966	7.092	0.279

Then by using the GZ values in the last column a statical stability curve can be drawn for the ship at the assumed displacement.





RIGHTING LEVER (KN) IN METRES.

0 1·0 2·0 3·0 4·0 5·0 6·0

5000

5° 10° 15° 20° 25° 30° 40° 45°

10,000

5° 10° 15° 20° 25° 30° 40° 45° 60° 75°

15,000

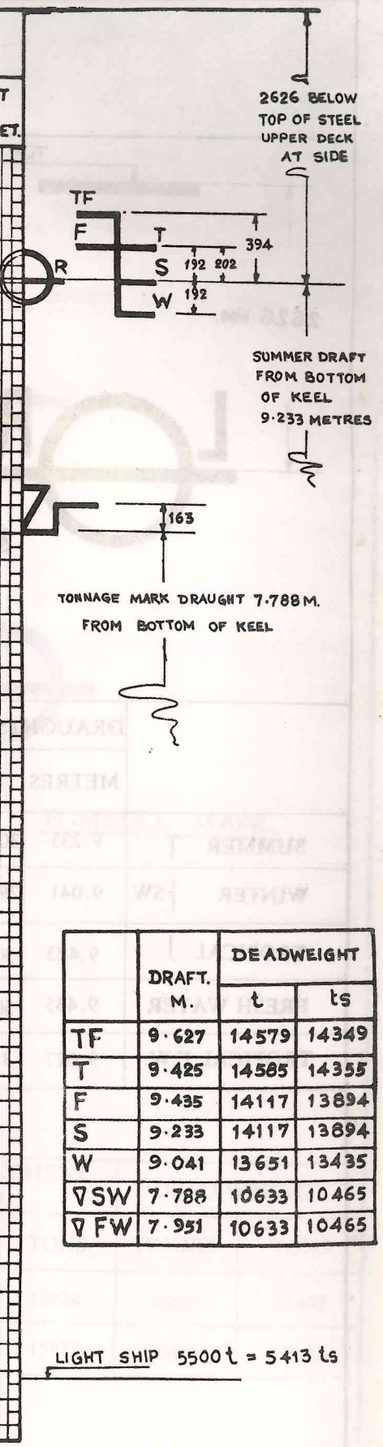
5° 10° 15° 20° 25° 30° 40° 45° 60°

20,000

ANGLE AT WHICH DECK EDGE CONCIDES WITH WATER LINE

LOADING SCALE.

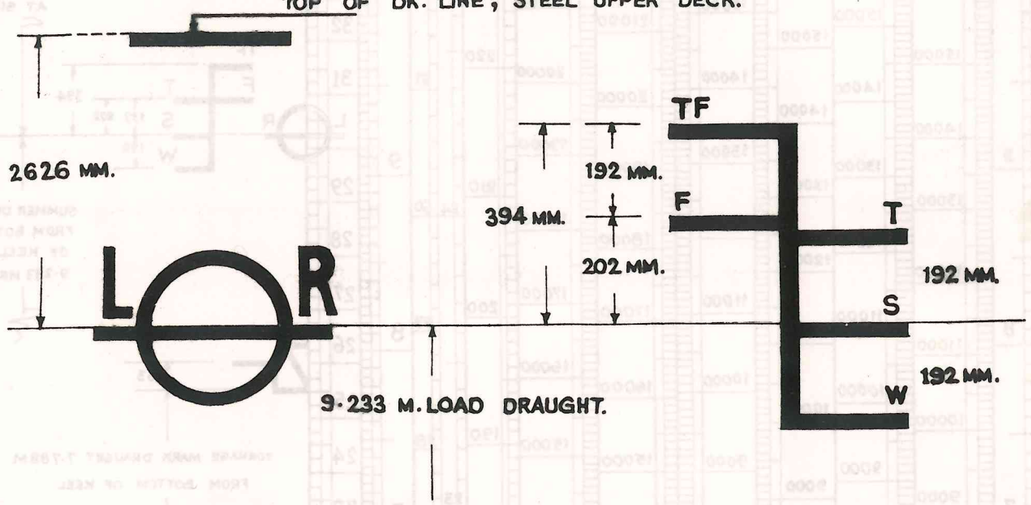
DRAUGHT FEET	DRAUGHT M	DW IN 1000 KG SALT W.	DW IN 1000 KG FRESH	DW IN 1016 KG. SALT W.	DW IN 1016 KG. FRESH	DISPL. SALT W. 1000 KG	DISPL. SALT W. 1016 KG.	MOMENT TO CHANGE TRIM 1 CM/MT	IMMERSION IN T / TS PER CM/IN	DRAUGHT M.	DRAUGHT FEET.
32			15000		15000						32
31		15000	14000	15000	14000	21000	20000	220	61		31
30	9	14000	13000	14000	13000	20000	19000			9	30
29		13000	12000	13000	12000	19000	18000	210	60		29
28		12000	11000	12000	11000	18000	17000				28
27	8	11000	10000	11000	10000	17000	16000	200	59	8	27
26		10000	9000	10000	9000	16000	15000				26
25		9000	8000	9000	8000	15000	14000	190	58		25
24	7	8000	7000	8000	7000	14000	13000			7	24
23		7000	6000	7000	6000	13000	12000	180	57		23
22	6	6000	5000	6000	5000	12000	11000			6	22
21		5000	4000	5000	4000	11000	10000	170	56		21
20	5	4000	3000	4000	3000	10000	9000			5	20
19		3000	2000	3000	2000	9000	8000	160	54		19
18	4	2000	1000	2000	1000	8000	7000			4	18
17		1000	0	1000	0	7000	6000	150	53		17
16	3	0		0		6000	5000			3	16
15											15
14											14
13											13
12											12
11											11
10											10
9											9



	DRAFT. M.	DEADWEIGHT t	DEADWEIGHT ts
TF	9·627	14579	14349
T	9·425	14585	14355
F	9·435	14117	13894
S	9·233	14117	13894
W	9·041	13651	13435
∇SW	7·788	10633	10465
∇FW	7·951	10633	10465

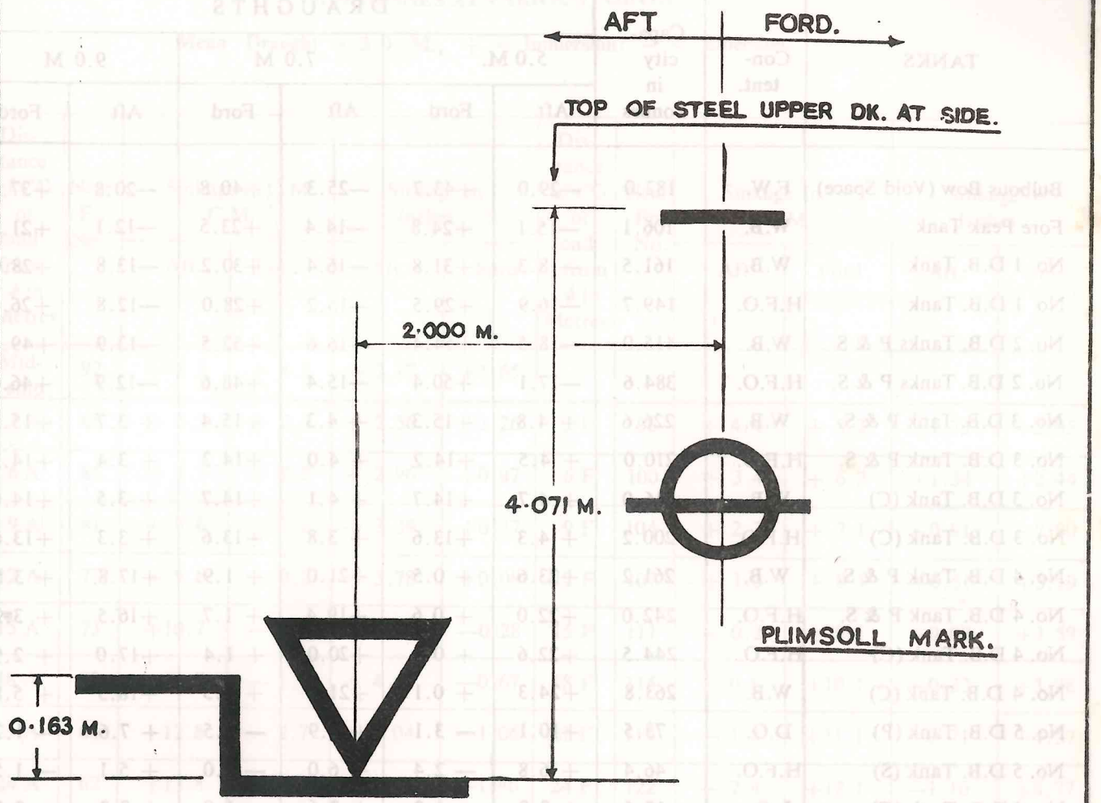
LIGHT SHIP 5500 t = 5413 ts

PLIMSOLL MARK DETAILS



	DRAUGHTS FULL		FREEBOARD		DISPLACEMENT FULL		DEAD-WEIGHT	
	METRES	FEET	METRES	FEET	TONNES	TONS.	TONNES	TONS.
SUMMER	9.233	30'-3-1/2"	2.626	8'-7-3/8"	19617	19307	14117	13894
WINTER (SW)	9.041	29'-7 15/16"	2.818	9'-2-15/16"	19151	18848	13651	13435
TROPICAL	9.425	30'-11-1/16"	2.434	7'-11-13/6"	20085	19768	14585	14355
FRESH WATER	9.435	30'11-1/2"	2.424	7'-11 7/16"	19617	19307	14117	13894
TROPICAL F.W.	9.627	31'-7-1/16"	2.232	7'-3-7/8"	20079	19762	14579	14349

TONNAGE MARK DETAILS



	DRAUGHTS FULL		FREEBOARD		DISPLACEMENT FULL		DEAD-WEIGHT	
	METRES	FEET	METRES	FEET	TONNES	TONS.	TONNES	TONS.
SUMMER	7.788	25'-6-5/8"	4.071	14'-4-1/4"	16133	15878	10633	10465
FRESH	7.951	26'-1-1/16"	3.908	12'-9-7/8"	16133	15878	10633	10465

TANKS
TRIM TABLES

CHANGE IN DRAUGHTS IN CM. WHEN EACH TANK IS FILLED + IMMERSION — = EMERSION

TANKS	Content.	Capacity in Tonnes	DRAUGHTS					
			5.0 M.		7.0 M		9.0 M	
			Aft	Ford	Aft	Ford	Aft	Ford
Bulbous Bow (Void Space)	F.W.	182.0	—29.0	+43.7	—25.3	+40.8	—20.8	+37.0
Fore Peak Tank	W.B.	106.1	—15.1	+24.8	—14.4	+23.5	—12.1	+21.7
No. 1 D.B. Tank	W.B.	161.5	—18.3	+31.8	—16.4	+30.2	—13.8	+28.0
No 1 D.B. Tank	H.F.O.	149.7	—16.9	+29.5	—15.2	+28.0	—12.8	+26.0
No. 2 D.B. Tanks P & S	W.B.	415.0	—18.5	+54.4	—16.6	+52.5	—13.9	+49.6
No. 2 D.B. Tanks P & S.	H.F.O.	384.6	—17.1	+50.4	—15.4	+48.6	—12.9	+46.0
No. 3 D.B. Tank P & S.	W.B.	226.6	+ 4.8	+15.3	+ 4.3	+15.4	+ 3.7	+15.3
No. 3 D.B. Tank P & S.	H.F.O.	210.0	+ 4.5	+14.2	+ 4.0	+14.3	+ 3.4	+14.2
No. 3 D.B. Tank (C)	W.B.	216.0	+ 4.7	+14.7	+ 4.1	+14.7	+ 3.5	+14.6
No. 3 D.B. Tank (C)	H.F.O.	200.2	+ 4.3	+13.6	+ 3.8	+13.6	+ 3.3	+13.6
No. 4 D.B. Tank P & S.	W.B.	261.2	+23.6	+ 0.5	+21.0	+ 1.9	+17.8	+ 3.5
No. 4 D.B. Tank P & S.	H.F.O.	242.0	+22.0	+ 0.6	+19.4	+ 1.7	+16.5	+ 3.2
No. 4 D.B. Tank (C)	H.F.O.	244.5	+22.6	+ 0.1	+20.0	+ 1.4	+17.0	+ 2.9
No. 4 D.B. Tank (C)	W.B.	263.8	+24.3	+ 0.1	+21.6	+ 1.5	+18.3	+ 5.8
No. 5 D.B. Tank (P)	D.O.	73.5	+10.1	— 3.1	+ 8.9	— 2.5	+ 7.6	— 1.7
No. 5 D.B. Tank (S)	H.F.O.	46.4	+ 6.8	— 2.4	+ 6.0	— 2.0	+ 5.1	— 1.5
No. 6 D.B. Tank (C)	L.O.	17.5	+ 2.9	— 1.2	+ 2.6	— 1.0	+ 2.2	— 0.8
No. 7 D.B. Tank (P)	D.O.	100.8	+20.1	—10.1	+17.8	— 8.9	+15.1	— 7.2
No. 7 D.B. Tank (S)	D.O.	89.7	+17.8	— 9.0	+15.8	— 7.9	+13.4	— 6.4
No. 8 D.B. Tank (P)	F.W.	74.1	+16.3	— 8.9	+14.4	— 7.9	+12.3	— 6.4
No. 8 D.B. Tank (S)	F.W.	63.4	+14.0	— 7.6	+12.4	— 6.7	+10.4	— 5.6
No. 9 L.O. Reserve Tk. (C)	L.O.	19.2	+ 3.6	— 1.6	+ 3.1	— 1.5	+ 2.7	— 1.1
No. 10 Boiler Feed Tk. (S)	F.W.	14.1	+ 2.5	— 1.0	+ 2.2	— 1.0	+ 1.9	— 0.7
No. 11 Piston Cooling (C)	F.W.	6.3	+ 0.9	— 0.3	+ 0.2	— 0.2	+ 0.7	— 0.2
No. 12 Cooling Water Tk. (S)	F.W.	14.4	+ 2.0	— 0.5	— 1.7	— 0.5	+ 1.5	— 0.3
No. 13 Leakage Water Tk. (P)	F.W.	4.7	+ 0.6	— 0.2	+ 0.6	— 0.1	+ 0.5	— 0.1
Aft Peak	W.B.	120.7	+31.2	—19.0	+27.8	—16.9	+23.5	—14.2
Aft Peak	F.W.	117·8	+30.4	—18.6	+27.0	—16.6	+22.9	—13.9
Tween Deck Tank (P)	F.W.	49.7	+12.5	— 7.5	+11.3	— 6.8	+ 9.7	— 5.9
Tween Deck Tank (S)	F.W.	43.7	+11.0	— 6.6	+9.9	— 6.0	+ 8.5	— 5.2

TRIM TABLES AT VARIOUS FRAMES.

CHANGE OF DRAUGHT AT A.P. & F.P. DUE TO AN ADDITIONAL LOAD OF 100 TONNES AT VARIOUS POINTS

Mean Draught = 3.0 M., + = Immersion: — = Emersion.

Distance of CG of load from ϕ in Metres	Near Fr. No.	Sinkage in C.M. C.M.		Sinkage in Inches		Distance of CG of load from ϕ in Metres	Near Fr. No.	Sinkage in C.M.		Sinkage in Inches	
		Aft.	Ford	Aft.	Ford			Aft.	Ford	Aft.	Ford
Mid-ship	92	+ 5.5	+ 4.2	+2.17	+1.65						
3 A	88	+ 6.5	+ 3.2	+ 2.56	+1.26	3 F	96	+ 4.4	+ 5.2	+1.73	+2.05
6 A	85	+ 7.5	+ 2.2	+ 2.96	+0.87	6 F	100	+ 3.4	+ 6.2	+1.34	+2.44
9 A	81	+ 8.6	+ 1.2	+ 3.39	+0.47	9 F	104	+ 2.3	+ 7.1	+0.91	+2.80
12 A	77	+ 9.6	+ 0.2	+ 3.78	+0.08	12 F	107	+ 1.3	+ 8.1	+0.51	+3.19
15 A	73	+10.7	— 0.7	+ 4.22	—0.28	15 F	111	+ 0.2	+ 9.1	+0.08	+3.59
18 A	70	+11.7	— 1.7	+ 4.61	—0.67	18 F	115	— 0.8	+10.1	—0.32	+3.98
21 A	66	+12.8	— 2.7	+ 5.04	—1.06	21 F	119	— 1.8	+11.1	—0.71	+4.37
24 A	62	+13.8	— 3.7	+ 5.44	—1.46	24 F	122	— 2.8	+12.1	—1.10	+4.77
27 A	58	+14.8	— 4.7	+ 5.83	—1.85	27 F	126	— 3.9	+13.1	—1.54	+5.16
30 A	55	+15.8	— 5.7	+ 6.23	—2.25	30 F	130	— 5.0	+14.0	—1.97	+5.52
33 A	51	+16.9	— 6.7	+ 6.66	—2.64	33 F	134	— 6.0	+15.0	—2.36	+5.91
36 A	47	+17.9	— 7.7	+ 7.05	—3.03	36 F	137	— 7.1	+16.0	—2.80	+6.30
39 A	43	+19.0	— 8.6	+ 7.49	—3.39	39 F	141	— 8.1	+17.0	—3.19	+6.70
42 A	40	+20.0	— 9.6	+ 7.88	—3.78	42 F	145	— 9.1	+18.0	—3.59	+7.09
45 A	36	+21.1	—10.6	+ 8.31	—4.18	45 F	149	—10.1	+19.0	—3.98	+7.49
48 A	32	+22.1	—11.6	+ 8.71	—4.57	48 F	153	—11.2	+20.0	—4.41	+7.88
51 A	28	+23.1	—12.6	+ 9.10	—4.96	51 F	158	—12.2	+21.0	—4.81	+8.27
54 A	25	+24.2	—13.6	+ 9.53	—5.36	54 F	162	—13.3	+21.9	—5.24	+8.63
57 A	21	+25.2	—14.6	+ 9.93	—5.75	57 F	167	—14.3	+22.9	—5.63	+9.02
60 A	17	+26.3	—15.5	+10.36	—6.11	60 F	171	—15.4	+23.9	—6.08	+9.42
63 A	13	+27.3	—16.5	+10.76	—6.50	63 F	176	—16.4	+24.9	—6.46	+9.81
66 A	8	+28.4	—17.5	+11.19							

TRIM TABLES AT VARIOUS FRAMES

CHANGE OF DRAUGHT AT A.P. & F.P. DUE TO AN ADDITIONAL LOAD OF 100 TONNES AT VARIOUS POINTS

Mean Draught = 5.0 M.: + = Immersion: − = Emersion.

Distance of CG of Load from ϕ in Mtrs.	Near Fr. No.	Sinkage in C.M.		Sinkage in Inches		Distance of CG of load from ϕ in Mtrs.	Near Fr. No.	Sinkage in Cm.		Sinkage in Inches	
		Aft.	Ford.	Aft.	Ford.			Aft.	Ford.	Aft.	Ford
Mid-ship	92	+ 5.0	+ 4.0	+1.97	+1.58						
3 A	88	+ 5.9	+ 3.1	+2.32	+1.22	3 F	96	+ 4.1	+ 4.9	+1.62	+1.93
6 A	85	+ 6.9	+ 2.3	+2.72	+0.91	6 F	100	+ 3.2	+ 5.8	+1.26	+2.29
9 A	81	+ 7.8	+ 1.4	+3.07	+0.55	9 F	104	+ 2.2	+ 6.6	+0.87	+2.60
12 A	77	+ 8.7	+ 0.5	+3.43	+0.20	12 F	107	+ 1.3	+ 7.5	+0.51	+2.96
15 A	73	+ 9.6	− 0.4	+3.78	−0.16	15 F	111	+ 0.4	+ 8.4	+0.16	+3.31
18 A	70	+10.5	− 1.3	+4.14	−0.51	18 F	115	− 0.5	+ 9.3	−0.20	+3.66
21 A	66	+11.5	− 2.1	+4.53	−0.83	21 F	119	− 1.4	+10.2	−0.55	+4.02
24 A	62	+12.4	− 3.0	+4.89	−1.18	24 F	122	− 2.4	+11.0	−0.95	+4.33
27 A	58	+13.3	− 3.9	+5.24	−1.54	27 F	126	− 3.3	+11.9	−1.30	+4.69
30 A	55	+14.2	− 4.8	+5.59	−1.89	30 F	130	− 4.2	+12.8	−1.65	+5.04
33 A	51	+15.1	− 5.7	+5.95	−2.25	33 F	134	− 5.1	+13.7	−2.01	+5.40
36 A	47	+16.1	− 6.5	+6.34	−2.56	36 F	137	− 6.0	+14.6	−2.36	+5.75
39 A	43	+17.0	− 7.4	+6.70	−2.92	39 F	141	− 7.0	+15.4	−2.76	+6.07
42 A	40	+17.9	− 8.3	+7.05	−3.27	42 F	145	− 7.9	+16.3	−3.11	+6.42
45 A	36	+18.8	− 9.2	+7.41	−3.62	45 F	149	− 8.8	+17.2	−3.47	+6.78
48 A	32	+19.7	−10.1	+7.76	−3.98	48 F	153	− 9.7	+18.1	−3.82	+7.13
51 A	28	+20.7	−10.9	+8.16	−4.29	51 F	158	−10.6	+19.0	−4.18	+7.49
54 A	25	+21.6	−11.8	+8.51	−4.65	54 F	162	−11.6	+19.8	−4.57	+7.80
57 A	21	+22.5	−12.7	+8.87	−5.00	57 F	167	−12.5	+20.7	−4.93	+8.16
60 A	17	+23.4	−13.6	+9.22	−5.36	60 F	171	−13.4	+21.6	−5.28	+8.51
63 A	13	+24.4	−14.4	+9.61	−5.67	63 F	176	−14.3	+22.5	−5.63	+8.87
66 A	8	+25.3	−15.3	+9.97	−6.03	66 F	181	−15.3	+23.3	−6.03	+9.18

TRIM TABLES AT VARIOUS FRAMES.

CHANGE OF DRAUGHT AT A.P. AND F.P. DUE TO AN ADDITIONAL LOAD OF 100 TONNES AT VARIOUS POINTS.

Mean Draught = 7.0M: + = Immersion: − = Emersion.

Distance of CG load from ϕ in Mtrs.	Near Fr. No.	Sinkage in Cm.		Sinkage in Inches		Distance of CG of Load from ϕ in Mtrs.	Near Fr. No.	Sinkage in Cm.		Sinkage in Inches	
		Aft.	Ford.	Aft.	Ford.			Aft.	Ford	Aft.	Ford
Mid-ship	92	+ 4.5	+ 4.3	+1.77	+1.69						
3 A	88	+ 5.3	+ 3.5	+2.09	+1.38	3 F	96	+ 3.7	+ 5.1	+1.46	+2.01
6 A	85	+ 6.2	+ 2.7	+2.44	+1.06	6 F	100	+ 2.8	+ 5.9	+1.10	+2.32
9 A	81	+ 7.0	+ 1.9	+2.76	+0.75	9 F	104	+ 2.0	+ 6.7	+0.79	+2.64
12 A	77	+ 7.8	+ 1.1	+3.07	+0.43	12 F	107	+ 1.2	+ 7.5	+0.47	+2.96
15 A	73	+ 8.6	+ 0.2	+3.39	+0.08	15 F	111	+ 0.4	+ 8.4	+0.16	+3.31
18 A	70	+ 9.4	− 0.6	+3.70	−0.24	18 F	115	− 0.4	+ 9.2	−0.16	+3.62
21 A	66	+10.2	− 1.4	+4.02	−0.55	21 F	119	− 1.2	+10.0	−0.47	+3.94
24 A	62	+11.1	− 2.2	+4.37	−0.87	24 F	122	− 2.1	+10.8	−0.83	+4.26
27 A	58	+11.9	− 3.0	+4.69	−1.18	27 F	126	− 2.9	+11.6	−1.14	+4.57
30 A	55	+12.7	− 3.8	+5.00	−1.50	30 F	130	− 3.7	+12.4	−1.46	+4.89
33 A	51	+13.5	− 4.6	+5.32	−1.81	33 F	134	− 4.5	+13.3	−1.77	+5.24
36 A	47	+14.3	− 5.5	+5.63	−2.17	36 F	137	− 5.3	+14.1	−2.09	+5.56
39 A	43	+15.2	− 6.2	+5.99	−2.44	39 F	141	− 6.2	+14.8	−2.44	+5.83
42 A	40	+16.0	− 7.0	+6.30	−2.76	42 F	145	− 7.0	+15.7	−2.76	+6.91
45 A	36	+16.8	− 7.9	+6.62	−3.11	45 F	149	− 7.8	+16.5	−3.07	+6.50
48 A	32	+17.8	− 8.7	+6.93	−3.43	48 F	153	− 8.6	+17.7	−3.38	+6.82
51 A	28	+18.4	− 9.5	+7.25	−3.74	51 F	158	− 9.5	+18.1	−3.74	+7.13
54 A	25	+19.3	−10.3	+7.60	−4.06	54 F	162	−10.3	+18.9	−4.06	+7.45
57 A	21	+20.1	−11.1	+7.92	−4.37	57 F	167	−11.1	+19.7	−4.37	+7.76
60 A	17	+20.9	−11.9	+8.23	−4.69	60 F	171	−11.9	+20.6	−4.69	+8.12
63 A	13	+21.7	−12.8	+8.55	−5.04	63 F	176	−12.7	+21.4	−5.00	+8.43
66 A	8	+22.5	−13.6	+8.87	−5.36	66 F	181	−13.5	+22.2	−5.32	+8.75
69 A	3	+23.3	−14.4	+9.18	−5.67	69 F	188	−14.3	+23.0	−5.63	+9.06

TRIM TABLES AT VARIOUS FRAMES.

CHANGE OF DRAUGHT AT A.P. AND F.P. DUE TO AN ADDITIONAL LOAD OF 100 TONNES AT VARIOUS POINTS.

Mean Draught: = 9.0 M: + = Immersion: — = Emersion.

Distance of CG of load from ϕ in Mtrs.	Near Fr. No.	Sinkage in Cm.		Sinkage in Inches		Distance of CG of load from ϕ in Mtrs.	Near Fr. No.	Sinkage in Cm.		Sinkage in Inches	
		Aft.	Ford	Aft.	Ford			Aft.	Ford	Aft.	Ford
						Mid-ship	92	+ 3.8	+ 4.5	+1.50	+1.77
3 A	88	+ 4.4	+ 3.7	+1.73	+1.46	3 F	96	+ 3.1	+ 5.2	+1.22	+2.05
6 A	85	+ 5.1	+ 3.0	+2.01	+1.18	6 F	100	+ 2.4	+ 5.9	+0.95	+2.32
9 A	81	+ 5.8	+ 2.3	+2.29	+0.91	9 F	104	+ 1.7	+ 6.6	+0.67	+2.60
12 A	77	+ 6.5	+ 1.5	+2.56	+0.59	12 F	107	+ 1.0	+ 7.4	+0.39	+2.92
15 A	73	+ 7.2	+ 0.8	+2.84	+0.32	15 F	111	+ 0.3	+ 8.1	+0.12	+3.19
18 A	70	+ 7.9	+ 0.1	+3.11	+0.04	18 F	115	— 0.4	+ 8.8	—0.16	+3.47
21 A	66	+ 8.6	— 0.6	+3.39	—0.24	21 F	119	— 1.1	+ 9.5	—0.43	+3.74
24 A	62	+ 9.3	— 1.2	+3.66	—0.51	24 F	122	— 1.8	+10.2	—0.71	+4.02
27 A	58	+10.0	— 2.0	+3.94	—0.79	27 F	126	— 2.5	+10.9	—0.99	+4.29
30 A	55	+10.7	— 2.8	+4.22	—1.10	30 F	130	— 3.2	+11.7	—1.26	+4.61
35 A	51	+11.4	— 3.5	+4.49	—1.38	33 F	134	— 3.9	+12.4	—1.54	+4.89
36 A	47	+12.1	— 4.2	+4.77	—1.65	36 F	137	— 4.6	+13.1	—1.81	+5.16
39 A	43	+12.8	— 4.9	+5.04	—1.93	39 F	141	— 5.3	+13.8	—2.09	+5.44
42 A	40	+13.5	— 5.6	+5.32	—2.21	42 F	145	— 5.9	+14.6	—2.32	+5.75
45 A	36	+14.2	— 6.3	+5.59	—2.48	45 F	149	— 6.6	+15.3	—2.60	+6.03
48 A	32	+14.9	— 7.1	+5.87	—2.80	48 F	153	— 7.4	+16.0	—2.92	+6.30
51 A	28	+15.6	— 7.8	+6.15	—3.07	51 F	158	— 8.0	+16.8	—3.15	+6.62
54 A	25	+16.2	— 8.6	+6.38	—3.39	54 F	162	— 8.7	+17.5	—3.43	+6.90
57 A	21	+16.9	— 9.3	+6.66	—3.66	57 F	167	— 9.4	+18.2	—3.70	+7.17
60 A	17	+17.6	—10.0	+6.93	—3.94	60 F	171	—10.1	+18.9	—3.98	+7.45
63 A	13	+18.3	—10.7	+7.21	—4.22	63 F	176	—10.8	+19.6	—4.26	+7.72
66 A	8	+19.0	—11.5	+7.49	—4.53	66 F	181	—11.5	+20.4	—4.53	+8.04
69 A	3	+19.7	—12.2	+7.76	—4.81	69 F	186	—12.2	+21.1	—4.81	+8.31

REPORT ON INCLINING EXPERIMENT.

The inclining experiment of the ship M.V. "HINDSHIP" was conducted by Messrs. Hindustan Shipyard Ltd., Visakhapatnam, off their Fitting Out Jetty on 7-3-1975 between 7-30 hours and 16-00 hours.

The proceedings of the experiment were witnessed by:—

1. Surveyor-in-Charge, Mercantile Marine Department, Visakhapatnam.
2. Owner's representative.
3. Representatives of the Shipyard.

OBSERVATIONS:

Ship's direction: Facing East Weather: Fair

Sp. Gr. of water: 1.021

Observed drafts, Stern 5.693 M

,, ,, Stem 2.071 M

Corrected drafts: A.P. 5.838 M

,, ,, F.P. 2.052 M

Net displacement after correction 7381.6 Tonnes.

For C. F. and Sp. Gravity. (Appendix—I)

INCLINING WEIGHTS:

16 Blocks of cast-iron weighing 42.894 Tonnes were placed on Upper Deck (See Appendix IV).

NO. 3 HATCH:

Weight	Position	Distance shifted.
10.627 tonnes	Port	17.589 M
10.747 ,,	Stbd.	17.589 M

No. 4 HATCH :

Weight	Position.	Distance shifted.
10.759 Tonnes	Port	17.601 M
10.761 ,,	Stbd.	17.601 M

PENDULUMS:

ARRANGED IN HOLDS NO. 2 AND 4 AT FRAMES 144 AND 84 RESPECTIVELY. THE LENGTH OF THE PENDULUM AT HOLD No. 2 IS 8.498 METRES, AND THE LENGTH OF THE PENDULUM AT HOLD NO. 4 IS 8.498 METRES.

REPORT ON INCLINING EXPERIMENT.

Men on board 76 Men

Condition of Ship:

1. Vessel almost complete in all respects except:

	Tonnes.
A. Awnings on boat deck	1.0
B.	
C.	
D.	
E.	
F.	
Total weight of items to go on board	1.0

2. Items on board that were not part of Light Ship:
Solids:

A. Inclining weights (Appendix IV)	42.894	Tonnes
B. Spares etc.	36.684	,,
C. Shipyard equipment	6.807	,,
D. Men on board	4.572	,,
Total solids	90.957	,,
Say	91.0	,,
Fluids: (Appendix III)	1791.8	,,
Total to come off the board	1882.8	Tonnes.

Calculation for K. G. (As heeled condition)

K. M. (from hydrostatics)	9.942	Metres.
G. M. (as calculated in Appendix II)	2.539	,,
K. G. (Before F. S. Correction)	7.403	,,
F. S. correction (Appendix III)	0.019	Metres.
K. G. as heeled	7.384	

REPORT ON INCLINING EXPERIMENT
CALCULATION FOR LIGHT SHIP, K.G. & L.C.G.

Item	Weight in Tonnes	K.G. M	V Moments	L.C.G. A.P.	L Moments
1. Condition as heeled	7381.6	7.384	54506	65.111	480623
2. Wts. to come off:					
A. Solids	91.0	12.303	1120	48.100	4377
B. Liquids	1791.8	2.684	4809	81.385	145826
Total to come off	1882.8	3.149	5929	79.776	150203
3. Resultant of 1—2	5498.8	8.831	48577	60.089	330420
4. Wts. to go on board	1.0	19.0	19	28.7	29
5. Resultant of 3—4 Light ship	5499.8	8.836	48596	60.084	330449

Light ship	5499.8	Tonnes
Mean draught	3.010	Metres.
K.M. (from hydrostatics)	11.652	,,
K.G.	8.836	,,
G.M.	2.816	,,
Draft aft.	5.464	,,
Draft ford.	0.683	,,

REPORT ON INCLINING EXPERIMENT
CALCULATION FOR LIGHT SHIP, K.G. & L.C.G.

Item	Weight in Tonnes	K.G. M	V Moments	L.C.G A.P.	L Moments
1. Condition as heeled	7381.6	7.384	54506	65.111	480623
2. Wts. to come off:					
A. Solids	91.0	12.303	1120	48.100	4377
B. Liquids	1791.8	2.684	4809	81.385	145826
Total to come off	1882.8	3.149	5929	79.776	150203
3. Resultant of 1—2	5498.8	8.831	48577	60.089	330420
4. Wts. to go on board	1.0	19.0	19	28.7	29
5. Resultant of 3—4 Light ship	5499.8	8.836	48596	60.084	330449

Light ship	5499.8	Tonnes
Mean draught	3.010	Metres.
K.M. (from hydrostatics)	11.652	,,
K.G.	8.836	,,
G.M.	2.816	,,
Draft aft.	5.464	,,
Draft ford.	0.683	,,

REPORT ON INCLINING EXPERIMENT

APPENDIX II

DISPLACEMENT AS HEELED. 7381.6 TONNES.

$$GM = \frac{W \times d}{\Delta \times \text{TAN } \theta.}$$

DIRECTION OF SHIFT	WEIGHT IN TONNES W.	DISTANCE MOVED d (M)	WEIGHT × DISTANCE W × D	PENDULUM NO. 1		PENDULUM No. 2	STABILOGRAPH.		GM. IN METRES.			
				DEFLECTION IN MM	TAN θ.	TAN θ.	ANGLE.	TAN θ	PENDULUM NO. 1.	PENDULUM NO. 2.	STABILOGRAPH.	
S—P	5.267	17.601	92.7	89	0.01047	0.01024			2.423	2.478		
	5.381	17.589	94.6									
S—P	5.494	17.601	96.7	93	0.01094	0.00953			2.366	2.717		
	5.366	17.589	94.4									
	10.761	17.601	189.4	182	0.02142	0.01977			2.393	2.593		
	10.747	17.589	189.0									
P—S	5.494	17.601	96.7	87	0.01024	0.01153			2.528	2.245		
	5.366	17.589	94.4									
P—S	5.267	17.601	92.7	79	0.00930	0.00930			2.728	2.728		
	5.381	17.589	94.6									
	10.761	17.601	189.4	166	0.01953	0.02083			2.625	2.461		
	10.747	17.589	189.0									
P—S	5.327	17.601	93.8	88	0.01036	0.01200			2.441	2.108		
	5.284	17.589	92.9									
P—S	5.432	17.601	95.6	83	0.00977	0.00812			2.629	3.163		
	5.343	17.589	94.0									
	10.759	17.601	189.4	171	0.02012	0.02012			2.534	2.534		
	10.627	17.589	186.9									
S—P	5.432	17.601	95.6	81	0.00953	0.00965			2.695	2.662		
	5.343	17.589	94.0									
S—P	5.327	17.601	93.8	86	0.01012	0.01094			2.499	2.312		
	5.284	17.589	92.9									
—	10.759	17.601	189.4	167	0.01965	0.02059			2.594	2.476		
	10.827	17.589	186.9									
									MEAN. GM.			2.538
									MEAN OF PENDULUM			2.539

PENDULUM NO	AT. FR	FEET	METRES.
1	144	27'—10-9/16"	8.498
2	84	27'—10-9/16"	8.498

REPORT ON INCLINING EXPERIMENT

APPENDIX III

LIQUIDS ON BOARD AT THE TIME OF INCLINING EXPERIMENT

Compartment		Bet. frames	Con-tent	Sounding in mm		Capa-city in Tonnes	Condition	F.S. correction (M) 4
				Mea-sured.	Correc-ted.			
1		2	3	4	5	6	7	8
Bulbous bow			SW		Max.	186.6	Full	..
Fore peak tank		177-FE	SW		Max.	106.1	Full	..
No. 1 D. B. tank		149-177	SW		Max.	161.5	Full	..
No. 2 D. B. tank	P	117-149	SW		Max.	207.5	Full	..
No. 2 D. B. tank	P	117-149	SW		Max.	207.5	Full	..
No. 3 D. B. tank	P	91-117	SW		Max.	113.3	Full	..
No. 3 D. B. tank	S	91-117	SW		Max.	113.3	Full	..
No. 3 D. B. tank	C	91-117	SW		Max.	216.0	Full	..
No. 7 D. B. tank	P	28-36	DO	450	366	0.4	Slack	44
No. 7 D. B. tank	S	28-36	DO	5860	5776	51.4	Slack	29
No. 8 D. B. tank	P	19-27	FW		Max.	74.1	Full	..
No. 8 D. B. tank	S	19-27	FW		Max.	63.4	Full	..
Aft peak tank		0-10	FW		Max.	117.8	Full	..
Tween dk. water tk.	P	7-11	FW		Max.	49.7	Full	..
Tween dk. ,, ,,	S	7-11	FW		Max.	43.7	Full	..
No. 12 Jacket cool Tank	S	56-59	FW		Max.	14.4	Full	..
No. 11 piston cool Tank	C	52-55	FW	850	820	5.3	Slack	4
No. 10 Boiler feed Tank	S	39-46	FW	1140	1092	12.7	Slack	16
No. 6 DB L. O. serv. tk.	C	41-50	LO	640	543	9.7	Slack	11
T1 HFO settl. tk.	P	33-36	HFO	720	720	2.6	Slack	9
T1 —do—	S	33-36	HFO	60	60	0.2	Slack	9
T2 ,, Serv. tk.	P	33-36	,,	1780	1780	8.9	Slack	6
T2 HFO. Serv. TK.	S	33-36	,,	500	500	2.3	Slack	6
T3 D. O. Serv. Tk. for ME	P	36-40	DO	1660	1660	11.2	Slack	3
T4 —do— AE	P	36-40	DO	1640	1640	7.9	Slack	1
T6 HFO sludge TK.		37-42	HFO	160	160	0.8	Slack	Negligible
T11 Condensate fd. tk.	S	36-38	FW	620	620	0.5	Slack	,,
T13 Comp. tk. for ME. jkts.	S	55-57	FW	1230	1230	1.5	Slack	,,
T15 —do— Nozzles	S	42-43	FW	1070	1070	0.6	Slack	,,
T16 Comp. Tk. for A.E.P		56-57	FW	1400	1400	0.7	Slack	,,
No. 27 cylinder oil Tk.		39-40	Cyl. oil	750	750	0.2	Slack	,,
Total						1791.8		138

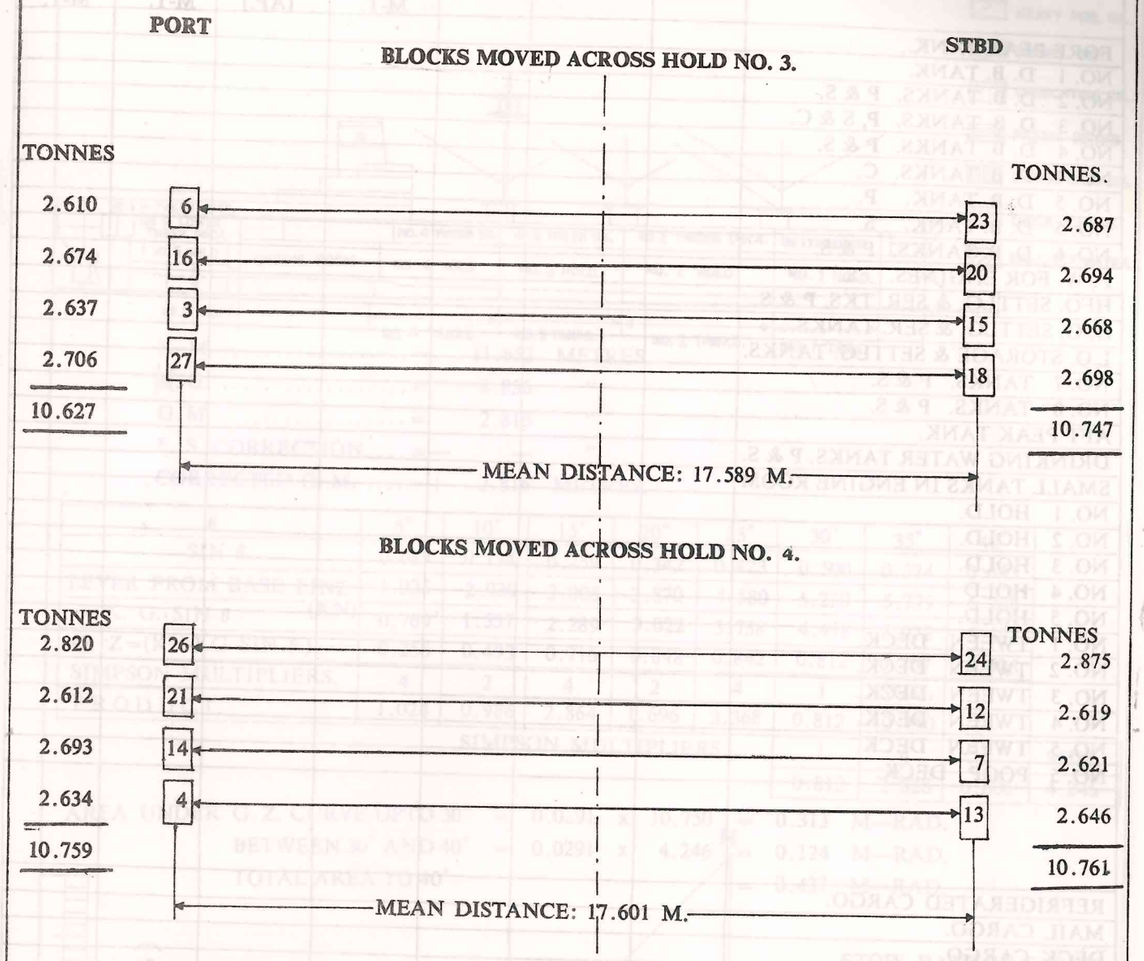
NOTE: The soundings of all the tanks of the ship were taken on the day of the experiment. The dry tanks are not indicated above.

Total correction for F. S. $= \frac{I}{V} = \frac{138}{7201.0} = 0.019.$

REPORT ON INCLINING EXPERIMENT.

APPENDIX IV.

POSITION OF CAST IRON BLOCKS



N.B. NUMBER IN THE RECTANGLE INDICATES SHIPYARD.
C.I. BLOCK NUMBER.

CONDITION NO. 1—LIGHT SHIP-FULLY EQUIPPED.

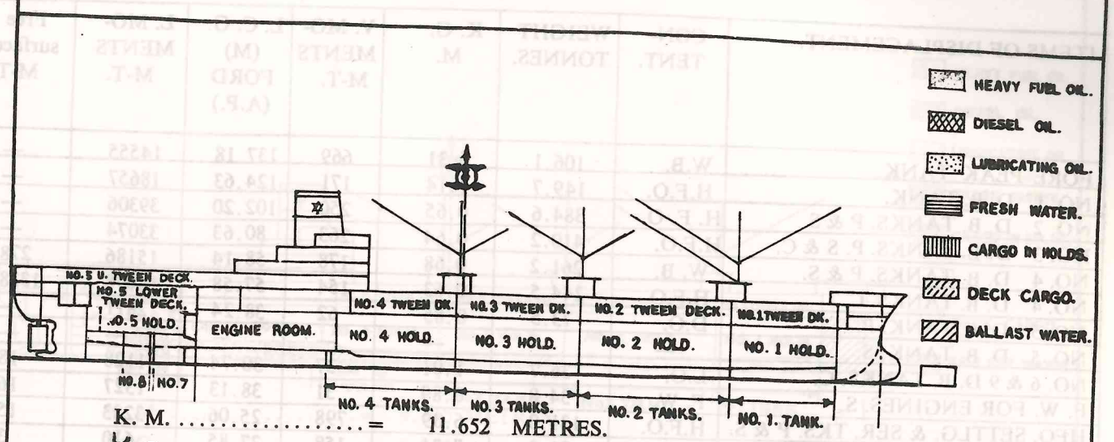
CALCULATION OF DISPLACEMENT, K. G. / L. C. G. CONDITION.

ITEMS OF DISPLACEMENT.	CONTENT.	WEIGHT TONNES.	K. G. M.	V. MOMENTS M-T.	L.C.G. (M) FORD (AP.)	L. MOMENTS M-T.	Free surface M-T.
FORE PEAK TANK.							
NO. 1 D. B. TANK.							
NO. 2 D. B. TANKS. P & S.							
NO. 3 D. B. TANKS. P, S & C.							
NO. 4 D. B. TANKS. P & S.							
NO. 4 D. B. TANKS. C.							
NO. 5 D. B. TANK. P.							
NO. 5 D. B. TANK. S.							
NO. 6 D. B. TANKS. P & S.							
F. W. FOR ENGINES. S.							
HFO. SETTLG. & SER. TKS. P & S.							
D. O. SETTLG. & SER. TANKS.							
L.O. STORAGE & SETTLG. TANKS.							
NO. 7 TANKS. P & S.							
NO. 8 TANKS. P & S.							
AFT PEAK TANK.							
DRINKING WATER TANKS. P & S.							
SMALL TANKS IN ENGINE ROOM							
NO. 1 HOLD.							
NO. 2 HOLD.							
NO. 3 HOLD.							
NO. 4 HOLD							
NO. 5 HOLD.							
NO. 1 TWEEN DECK.							
NO. 2 TWEEN DECK.							
NO. 3 TWEEN DECK.							
NO. 4 TWEEN DECK.							
NO. 5 TWEEN DECK.							
NO. 5 POOP DECK.							
REFRIGERATED CARGO.							
MAIL CARGO.							
DECK CARGO.							
CREW AND EFFECTS.							
STORES, SPARES & PROVISIONS.							
DEADWEIGHT.							
LIGHT SHIP.		5499.8	8.836	48596	60.084	330449	
DISPLACEMENT.		5499.8	8.836	48596	60.084	330449	

TRIM AND DRAUGHTS.

DISPLACEMENT.	=	5499.8	TONNES	TRIM. BY Stern	=	4.781	M.
L.C.G. FROM A.P.	=	60.084	M.	IMMERSION AT A.P.	=	2.454	M.
L.C.B. FROM A.P.	=	72.958	M.	EMERSION AT F.P.	=	2.327	M.
L.C.F. FROM A.P.	=	51.32	%	MEAN DRAUGHT.	=	3.010	M.
M.C.T. 1 CM.	=	148.1	M-T	DRAUGHT AT A.P.	=	5.464	M.
TRIMMING MOMENT.	=	70804	M-T	DRAUGHT AT F.P.	=	0.683	M.

CONDITION NO. 1 **LIGHT SHIP-FULLY EQUIPPED.**



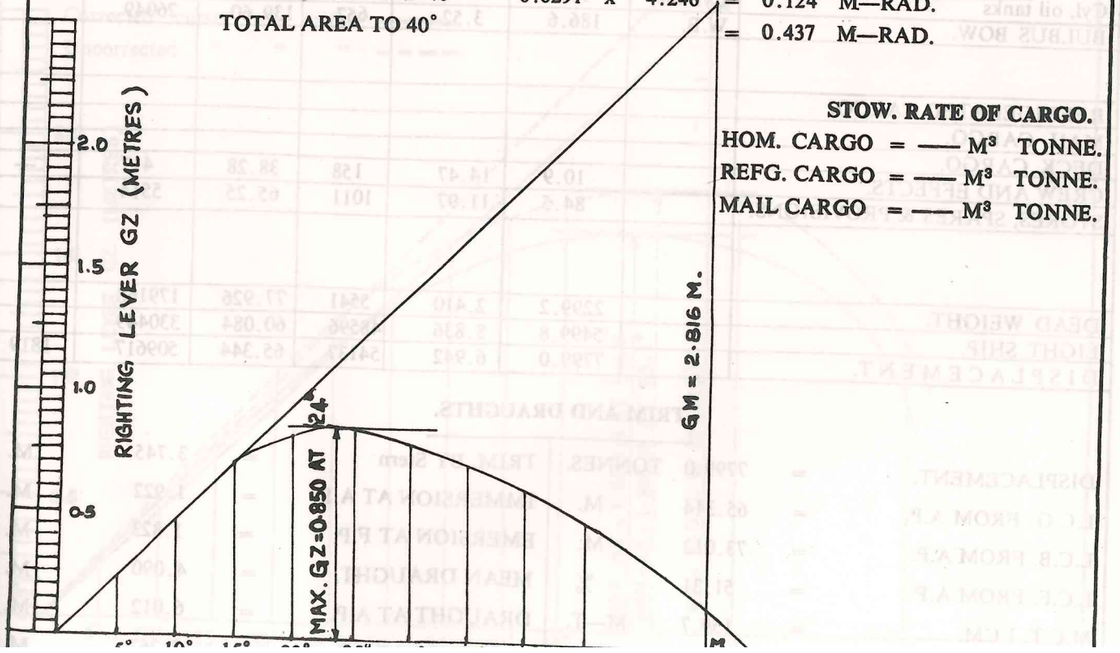
K. M. ..... = 11.652 METRES.
K. G. ..... = 8.836 "
G. M. ..... = 2.816 "
F. S. CORRECTION. ... = — — "
CORRECTED G. M. .... = + 2.816 METRES.

θ	5°	10°	15°	20°	25°	30°	35°	40°
SIN θ.	0.087	0.174	0.259	0.342	0.423	0.500	0.574	0.643
LEVER FROM BASE LINE (KN)	1.025	2.030	3.005	3.870	4.580	5.230	5.779	6.288
— K. G. SIN θ	0.769	1.537	2.289	3.022	3.738	4.418	5.072	5.682
G. Z=(KN-KG SIN θ)	0.256	0.493	0.716	0.848	0.842	0.812	0.707	0.606
SIMPSON MULTIPLIERS.	4	2	4	2	4	1	SUM.	
PRODUCT.	1.024	0.986	2.864	1.696	3.368	0.812	10.750	

SIMPSON MULTIPLIERS.

1	4	1	SUM.
0.812	2.828	0.606	4.246

AREA UNDER G. Z. CURVE UPTO 30° = 0.0291 x 10.750 = 0.313 M—RAD.
BETWEEN 30° AND 40° = 0.0291 x 4.246 = 0.124 M—RAD.
TOTAL AREA TO 40° = 0.437 M—RAD.



STOW. RATE OF CARGO.

HOM. CARGO = —— M^3 TONNE.
REFG. CARGO = —— M^3 TONNE.
MAIL CARGO = —— M^3 TONNE.

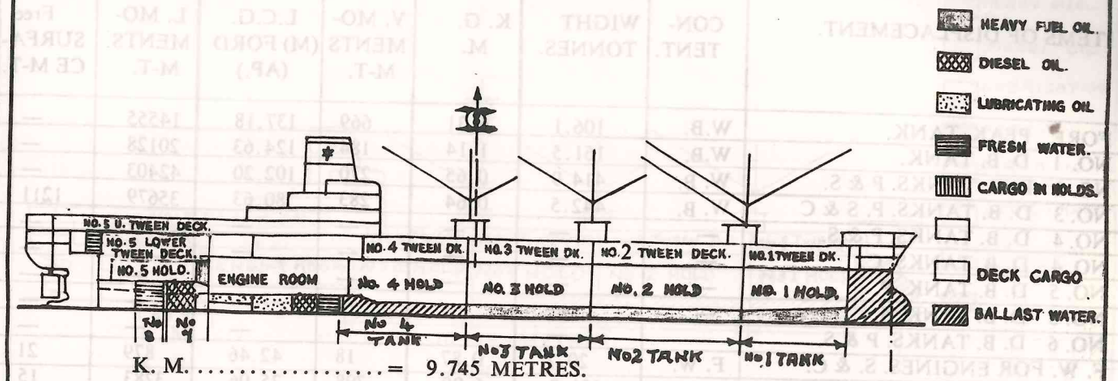
CONDITION NO. 2—SHIP IN BALLAST-DEPARTURE
CALCULATION OF DISPLACEMENT, K. G. / L. C. G. CONDITION.

ITEMS OF DISPLACEMENT.	CON-TENT.	WEIGHT TONNES.	K. G. M.	V. MO-MENTS M-T.	L. C. G. (M) FORD (A.P.)	L. MO-MENTS M-T.	Free surface M-T.
FORE PEAK TANK.	W.B.	106.1	6.31	669	137.18	14555	—
NO. 1 D. B. TANK.	H.F.O.	149.7	1.14	171	124.63	18657	—
NO. 2 D. B. TANKS. P & S.	H. F. O.	384.6	0.65	250	102.20	39306	—
NO. 3 D. B. TANKS. P. S & C.	H.F.O.	410.2	0.64	263	80.63	33074	—
NO. 4 D. B. TANKS. P & S.	W. B.	261.2	0.68	178	58.14	15186	278
NO. 4 D. B. TANKS. C.	H.F.O.	244.5	0.63	154	57.58	14078	1338
NO. 5 D. B. TANK. P.	D.O.	73.5	0.85	62	38.24	2811	—
NO. 5 D. B. TANK. S.	—	—	—	—	—	—	—
NO. 6 & 9 D. B. TANKS. C.	L.O.	36.7	1.01	37	30.74	1128	18
F. W. FOR ENGINES. S.	F. W.	34.8	0.89	31	38.13	1327	16
HFO. SETTLG. & SER. TKS. P & S.	H.F.O.	131.0	6.09	798	25.06	3283	15
D. O. SETTLG & SER. TANKS.	D.O.	21.9	7.21	158	27.85	610	3
L.O. STORAGE & SETTLG. TANKS.	L.O.	36.9	7.13	263	32.95	1216	5
NO. 7 TANKS. P & S.	D. O.	10.5	0.97	10	23.25	244	44
NO. 8 TANKS. P & S.	F.W.	50.0	1.30	65	16.18	809	23
AFT PEAK TANK.	—	—	—	—	—	—	—
DRINKING WATER TANKS P & S.	F. W.	46.0	10.20	469	5.82	268	79
SMALL TANKS IN ENGINE ROOM.		9.6	6.84	66	33.51	322	—
NO. 1 HOLD.	—	—	—	—	—	—	—
NO. 2 HOLD.	—	—	—	—	—	—	—
NO. 3 HOLD.	—	—	—	—	—	—	—
NO. 4 HOLD.	—	—	—	—	—	—	—
NO. 5 HOLD.	—	—	—	—	—	—	—
NO. 1 TWEEN DECK.	—	—	—	—	—	—	—
NO. 2 TWEEN DECK.	—	—	—	—	—	—	—
NO. 3 TWEEN DECK.	—	—	—	—	—	—	—
NO. 4 TWEEN DECK.	—	—	—	—	—	—	—
NO. 5 TWEEN DECK.	—	—	—	—	—	—	—
NO. 5 POOP DECK.	—	—	—	—	—	—	—
Cyl. oil tanks	Cyl. oil	10.0	7.06	71	31.44	314	—
BULBUS BOW.	W.B.	186.6	3.52	657	139.60	26049	
REFRIGERATED CARGO.							
MAIL CARGO.							
DECK CARGO.							
CREW AND EFFECTS.		10.9	14.47	158	38.28	417	—
STORES, SPARES & PROVISIONS.		84.5	11.97	1011	65.25	5514	
DEAD WEIGHT.		2299.2	2.410	5541	77.926	179168	
LIGHT SHIP.		5499.8	8.836	48596	60.084	330449	
DISPLACEMENT.		7799.0	6.942	54137	65.344	509617	1819

TRIM AND DRAUGHTS.

DISPLACEMENT.	=	7799.0 TONNES.	TRIM. BY Stern	=	3.745	M.
L.C.G. FROM A.P.	=	65.344 M.	IMMERSION AT A.P.	=	1.922	M.
L.C.B. FROM A.P.	=	73.012 M.	EMERSION AT F.P.	=	1.823	M.
L.C.F. FROM A.P.	=	51.31 %	MEAN DRAUGHT.	=	4.090	M.
M.C.T. 1 CM.	=	159.7 M—T.	DRAUGHT AT A.P.	=	6.012	M.
TRIMMING MOMENT	=	59803 M—T.	DRAUGHT AT F.P.	=	2.267	M.

CONDITION NO. 2. **SHIP IN BALLAST - DEPARTURE.**

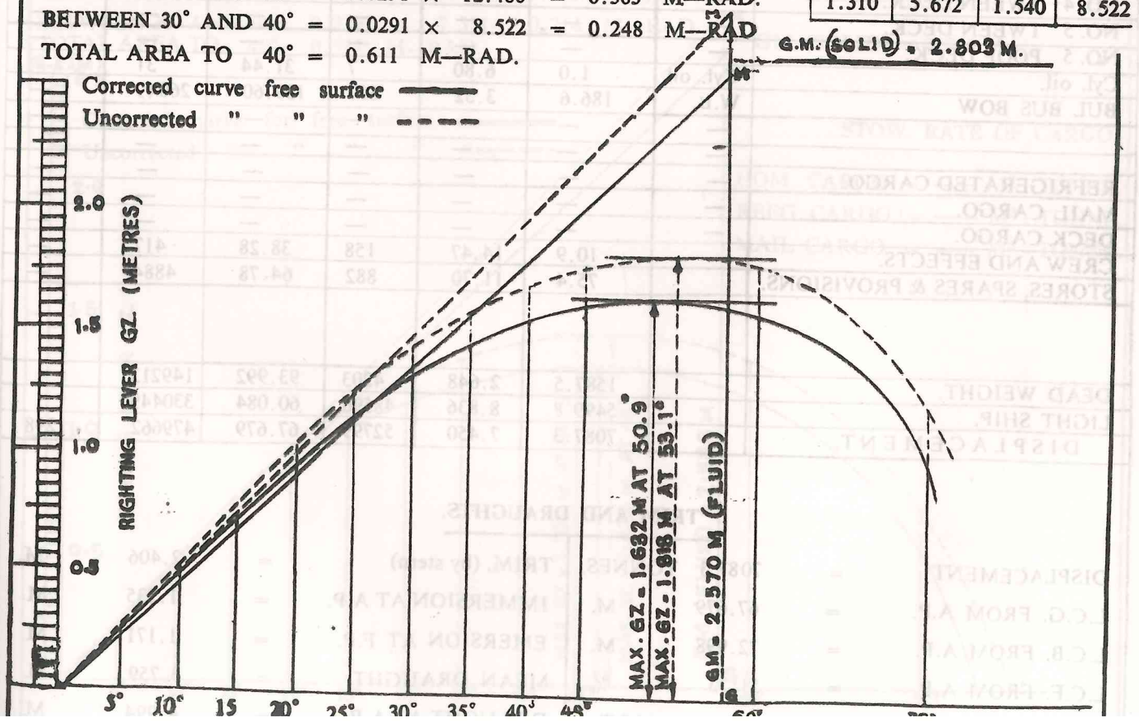


K. M. ..... = 9.745 METRES.
K. G. ..... = 6.942 "
G. M. (Solid) ..... = 2.803 "
F. S. CORRECTION. .... = —0.233 "
CORRECTED. G. M. = +2.570 METRES.

SIN θ.	5°	10°	15	20°	25°	30°	35°	40°
SIN θ.	0.087	0.174	0.259	0.342	0.423	0.500	0.574	0.643
LEVER FROM BASE LINE (KN)	0.872	1.725	2.555	3.406	4.168	4.898	5.536	6.154
— K. G. SIN θ.	0.624	1.248	1.858	2.454	3.035	3.588	4.118	4.614
G. Z. = (KN—KG SIN θ)	0.248	0.477	0.697	0.952	1.133	1.310	1.418	1.540
SIMPSON MULTIPLIERS.	4	2	4	2	4	1	SUM.	
PRODUCT.	0.992	0.954	2.788	1.904	4.532	1.310	12.840	

AREA UNDER G. Z. CURVE UPTO 30° = 0.0291 × 12.480 = 0.363 M—RAD.
BETWEEN 30° AND 40° = 0.0291 × 8.522 = 0.248 M—RAD
TOTAL AREA TO 40° = 0.611 M—RAD.

SIMPSON MULTIPLIERS.	1	4	1	SUM.
	1.310	5.672	1.540	8.522



CONDITION NO. 3. : SHIP IN BALLAST-ARRIVAL
CALCULATION OF DISPLACEMENT, K.G. / L.C.G. CONDITION

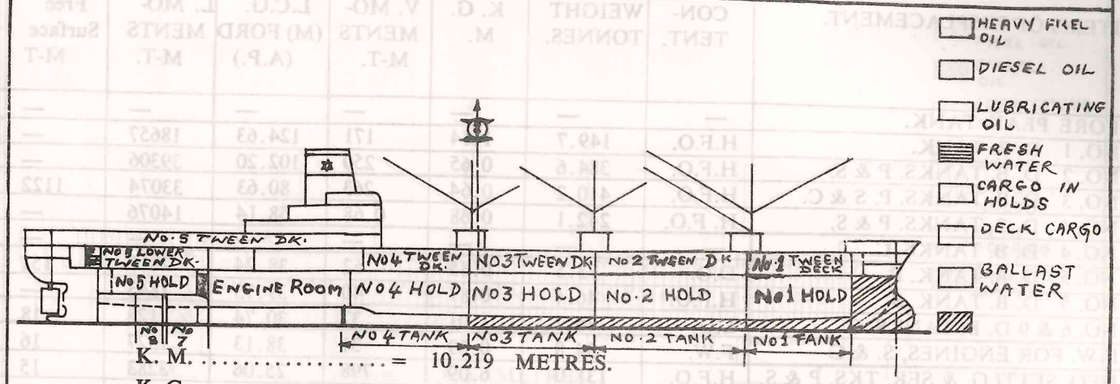
ITEMS OF DISPLACEMENT.	CON-TENT.	WIGHT TONNES.	K. G. M.	V. MO-MENTS M-T.	L.C.G. (M) FORD (AP.)	L. MO-MENTS M-T.	Free SURFA-CE M-T.
FORE PEAK TANK.	W.B.	106.1	6.31	669	137.18	14555	—
NO. 1 D. B. TANK.	W.B.	161.5	1.14	184	124.63	20128	—
NO. 2 D. B. TANKS. P & S.	W. B.	414.9	0.65	270	102.20	42403	—
NO. 3 D. B. TANKS. P. S & C	W. B.	442.5	0.64	283	80.63	35679	1211
NO. 4 D. B. TANKS. P & S.	—	—	—	—	—	—	—
NO. 4 D. B. TANKS. C.	—	—	—	—	—	—	—
NO. 5 D. B. TANK. P.	—	—	—	—	—	—	—
NO. 5 D. B. TANK. S.	—	—	—	—	—	—	—
NO. 6 D. B. TANKS. P & S.	—	—	—	—	—	—	—
F. W. FOR ENGINES. S. & C.	F. W.	20.7	0.87	18	42.46	879	21
HFO. SETTLG. & SER. TKS. P & S.	H. F. O.	131.0	6.09	798	25.06	3283	15
D.O. SETTLG. & SER. TANKS.	D. O.	10.6	6.70	71	27.92	296	4
L.O. STORAGE & SETTLG. TANKS	L. O.	7.4	6.35	47	32.84	243	5
NO. 7 TANKS. P & S.	—	—	—	—	—	—	—
NO. 8 TANKS. P & S.	—	—	—	—	—	—	—
AFT PEAK TANK.	—	—	—	—	—	—	—
DRINKING WATER TANKS.	F. W.	9.6	9.91	95	5.86	56	42
SMALL TANKS IN ENGINE ROOM		9.3	6.83	64	33.38	310	—
NO. 1 HOLD.	—	—	—	—	—	—	—
NO. 2 HOLD.	—	—	—	—	—	—	—
NO. 3 HOLD.	—	—	—	—	—	—	—
NO. 4 HOLD.	—	—	—	—	—	—	—
NO. 5 HOLD.	—	—	—	—	—	—	—
NO. 1 TWEEN DECK.	—	—	—	—	—	—	—
NO. 2 TWEEN DECK.	—	—	—	—	—	—	—
NO. 3 TWEEN DECK.	—	—	—	—	—	—	—
NO. 4 TWEEN DECK.	—	—	—	—	—	—	—
NO. 5 TWEEN DECK.	—	—	—	—	—	—	—
NO. 5 POOP DECK.	—	—	—	—	—	—	—
Cyl. oil.	Cyl. oil	1.0	6.80	7	31.44	31	
BUL BUS BOW	W.B.	186.6	3.52	657	139.60	26049	—
	—	—	—	—	—	—	—
	—	—	—	—	—	—	—
REFRIGERATED CARGO.	—	—	—	—	—	—	—
MAIL CARGO.	—	—	—	—	—	—	—
DECK CARGO.	—	—	—	—	—	—	—
CREW AND EFFECTS.		10.9	14.47	158	38.28	417	—
STORES, SPARES & PROVISIONS.		75.4	11.70	882	64.78	4884	—
DEAD WEIGHT.		1587.5	2.648	4203	93.992	149213	
LIGHT SHIP.		5499.8	8.836	48596	60.084	330449	
DISPLACEMENT.		7087.3	7.450	52799	67.679	479662	1298

TRIM AND DRAUGHTS.

DISPLACEMENT	=	7087.3 TONNES.	TRIM. (by stern)	=	2.406	M.
L.C.G. FROM A.P.	=	67.679 M.	IMMERSION AT A.P.	=	1.235	M.
L.C.B. FROM A.P.	=	72.998 M.	EMERSION AT F.P.	=	1.171	M.
L.C.F. FROM A.P.	=	51.33 %	MEAN DRAUGHT.	=	3.759	M.
		156.7 M.T.	DRAUGHT AT A.P.	=	4.994	M.

CONDITION NO. 3.

SHIP IN BALLAST-ARRIVAL

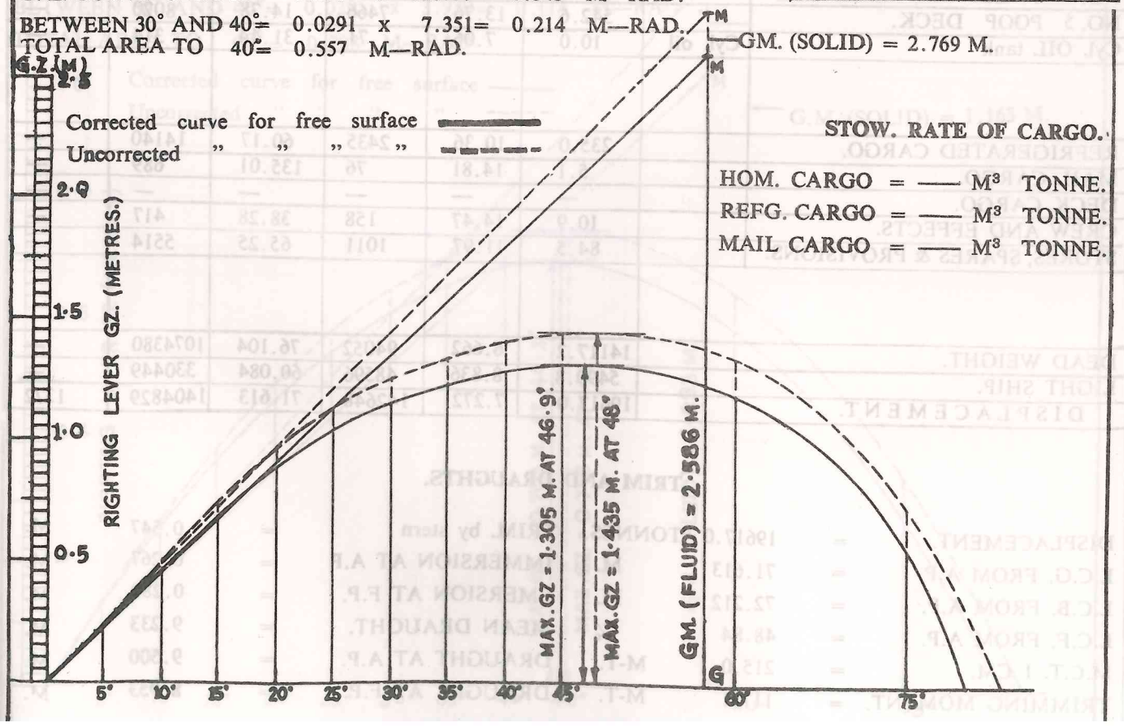


K. M. ..... = 10.219 METRES.
K. G. ..... = 7.450 "
G. M. (Solid) ..... = 2.769 "
F. S. CORRECTION .... = — 0.183 "
CORRECTED G. M. .... = + 2.586 METRES.
(Fluid)

θ.	5°	10°	15°	20°	25°	30°	35°	40°
SIN θ.	0.087	0.174	0.259	0.342	0.423	0.500	0.574	0.643
LIVER FROM BASE LINE (KN)	0.904	1.791	2.661	3.525	4.268	4.986	5.606	6.190
— K. G. SIN θ.	0.664	1.328	1.977	2.610	3.229	3.017	4.381	4.908
G. Z. = (KN-KG SIN θ)	0.240	0.463	0.684	0.915	1.039	1.169	1.225	1.282
SIMPSON MULTIPLIERS.	4	2	4	2	4	1	SUM.	
PRODUCT.	0.960	0.926	2.736	1.830	4.156	1.169	11.777	

SIMPSON MULTIPLIERS.	1	4	1	SUM.
	1.169	4.900	1.282	7.351

AREA UNDER
G. Z. CURVE UPTO 30° = 0.291 x 11.777 = 0.343 M—RAD.
BETWEEN 30° AND 40° = 0.0291 x 7.351 = 0.214 M—RAD.
TOTAL AREA TO 40° = 0.557 M—RAD.



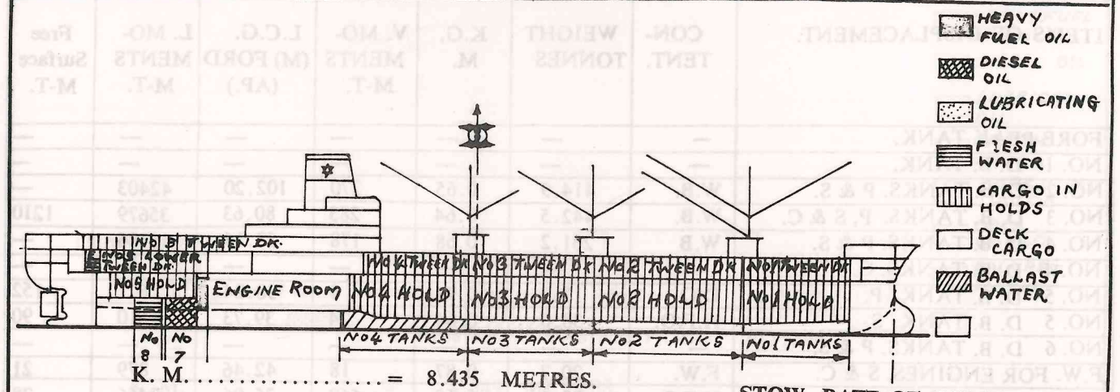
CONDITION NO. 4 - DEPARTURE.
CALCULATION OF DISPLACEMENT, K.G. / L.C.G. CONDITION.

ITEMS OF DISPLACEMENT.	CON-TENT.	WEIGHT TONNES.	K. G. M.	V. MO-MENTS M-T.	L.C.G. (M) FORD (A.P.)	L. MO-MENTS M-T.	Free Surface M-T
FORE PEAK TANK.	—	—	—	—	—	—	—
NO. 1 D. B. TANK.	H.F.O.	149.7	1.14	171	124.63	18657	—
NO. 2 D. B. TANKS. P & S.	H.F.O.	384.6	0.65	250	102.20	39306	—
NO. 3 D. B. TANKS. P. S & C.	H.F.O.	410.2	0.64	263	80.63	33074	1122
NO. 4 D. B. TANKS. P & S.	H. F.O.	242.1	0.68	0.68	58.14	14076	—
NO. 4 D. B. TANKS. C.	—	—	—	—	—	—	—
NO. 5 D. B. TANK. P.	D.O.	73.5	0.85	62	38.24	2811	151
NO. 5 D. B. TANK. S.	H.F.O.	46.4	0.87	40	39.73	1843	—
NO. 6 & 9 D. B. TANKS. C	L.O.	36.7	1.01	37	30.74	1128	18
F.W. FOR ENGINES, S. & C	F.W.	34.8	0.89	31	38.13	1327	16
HFO. SETTLG. & SER. TKS. P & S.	H.F.O.	131.0	6.09	798	25.06	3283	15
D.O. SETTLG. & SER. TANKS.	D.O.	21.9	7.21	158	27.85	610	3
L.O. STORAGE & SETTLG. TANKS.	L.O.	36.9	7.13	263	32.95	1216	5
NO. 7 TANKS. P. & S.	D.O.	190.5	2.60	495	22.97	4376	—
NO. 8 TANKS. P & S.	F.W.	137.5	2.77	381	16.23	2232	—
AFT PEAK TANK.		—	—	—	—	—	—
DRINKING WATER TANKS. P&S.	F.W.	93.4	11.21	1047	5.82	544	42
SMALL TANKS IN ENGINE ROOM.		9.6	6.84	66	33.51	322	—
NO. 1 HOLD.	Hom. cargo	827.6	5.59	4626	123.52	102225	—
NO. 2 HOLD.	"	2189.8	4.98	10905	103.14	225856	—
NO. 3 HOLD.	"	1913.1	5.00	9566	80.63	154253	—
NO. 4 HOLD.	"	2148.6	4.99	10722	58.66	126037	—
NO. 5 HOLD.	"	417.9	6.91	2888	17.31	7234	—
NO. 1 TWEEN DECK.	"	681.7	11.17	7615	124.67	84988	—
NO. 2 TWEEN DECK.	"	1131.4	10.72	12129	103.91	117564	—
NO. 3 TWEEN DECK.	"	887.7	10.37	9205	80.79	71717	—
NO. 4 TWEEN DECK.	"	316.7	10.42	3300	57.68	18267	—
NO. 5 TWEEN DECK.	"	715.8	10.69	7652	17.24	12340	—
NO. 5 POOP DECK.	"	542.6	13.76	7466	14.78	8020	—
Cyl. OIL tank	Cyl. oil	10.0	7.06	71	31.44	314	—
REFRIGERATED CARGO.		235.0	10.36	2435	60.17	14140	—
MAIL CARGO.		5.1	14.81	76	135.01	689	—
DECK CARGO.		—	—	—	—	—	—
CREW AND EFFECTS.		10.9	14.47	158	38.28	417	—
STORES, SPARES & PROVISIONS.		84.5	11.97	1011	65.25	5514	—
DEAD WEIGHT.		14117.2	6.662	94052	76.104	1074380	—
LIGHT SHIP.		5499.8	8.836	48596	60.084	330449	—
DISPLACEMENT.		19617.0	7.272	142648	71.613	1404829	1372

TRIM AND DRAUGHTS.

DISPLACEMENT.	=	19617.0	TONNES.	TRIM. by stern	=	0.547	M.
L.C.G. FROM A.P.	=	71.613	M.	IMMERSION AT A.P	=	0.267	M.
L.C.B. FROM A.P.	=	72.212	M.	EMERSION AT F.P.	=	0.280	M.
L.C.F. FROM A.P.	=	48.84	%	MEAN DRAUGHT.	=	9.233	M.
M.C.T. 1 CM.	=	215.0	M-T.	DRAUGHT AT A.P.	=	9.500	M.
TRIMMING MOMENT.	=	11751	M-T.	DRAUGHT AT F.P.	=	8.953	M.

CONDITION NO. 4.
UPPER DECK AS FREEBOARD DECK - DEPARTURE
SHIP WITH HOMOGENEOUS CARGO IN ALL HOLDS AND TWEEN DECKS.



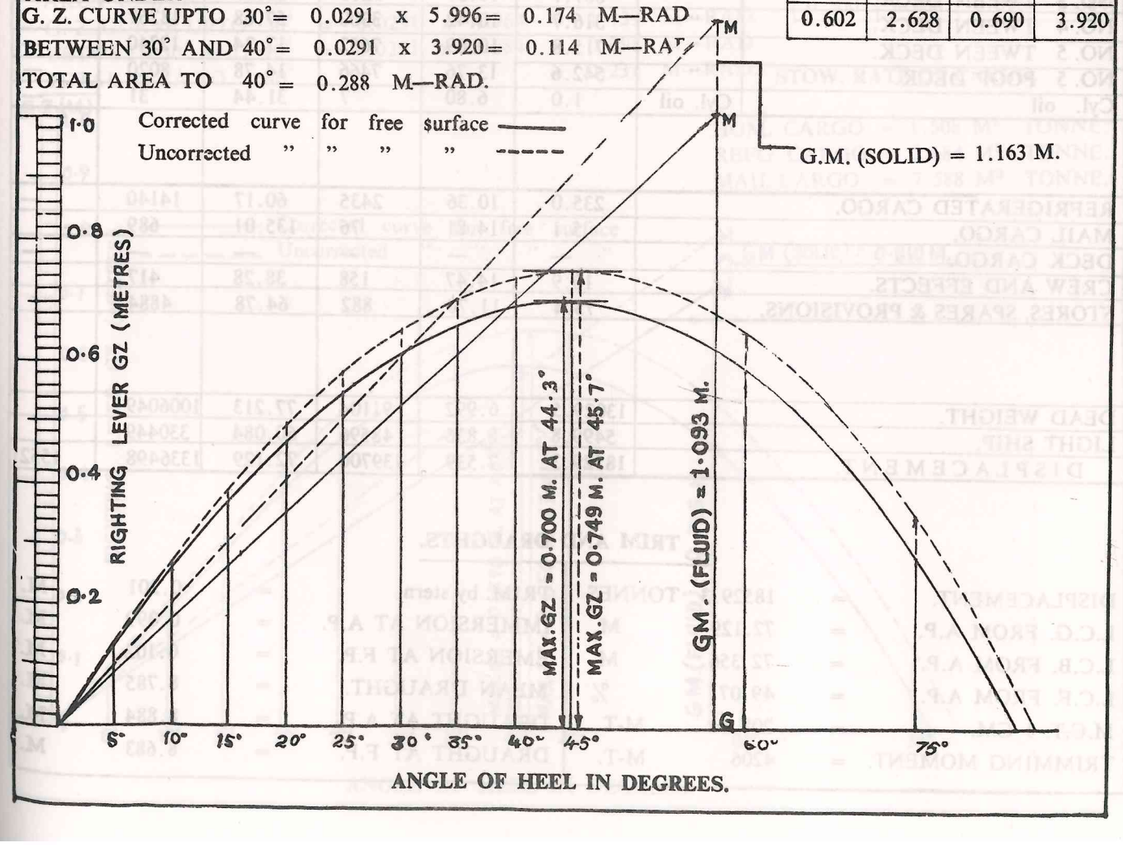
K. M. ..... = 8.435 METRES.
K. G. ..... = 7.272 "
G. M. (Solid) ..... = 1.163 "
F. S. CORRECTION..... = —0.070 "
CORRECTED G. M. .... = +1.093 METRES.

STOW. RATE OF CARGO

HOM. CARGO = 1.508 M³ TONNE.
REFG. CARGO = 2.684 M³ TONNE.
MAIL CARGO = 7.588 M³ TONNE.

θ.	5°	10°	15°	20°	25°	30°	35°	40°
SIN θ.	0.087	0.174	0.259	0.342	0.423	0.500	0.574	0.643
LEVER FROM BASE LINE (KN)	0.770	1.540	2.268	2.976	3.594	4.273	4.871	5.411
— K. G. SIN θ.	0.639	1.278	1.902	2.511	3.106	3.671	4.214	4.721
G. Z. = (KN-KG SIN θ.)	0.131	0.262	0.366	0.465	0.488	0.602	0.657	0.690
SIMPSON MULTIPLIERS.	4	2	4	2	4	1	SUM.	
PRODUCT.	0.524	0.524	1.464	0.930	1.952	0.602	5.996	

	SIMPSON MULTIPLIERS.			
AREA UNDER	1	4	1	SUM.
G. Z. CURVE UPTO 30° = 0.0291 x 5.996 = 0.174 M—RAD	0.602	2.628	0.690	3.920
BETWEEN 30° AND 40° = 0.0291 x 3.920 = 0.114 M—RAD				
TOTAL AREA TO 40° = 0.288 M—RAD.				



CONDITION NO. 5 : ARRIVAL
CALCULATION OF DISPLACEMENT, K.G. & L.C.G. CONDITION.

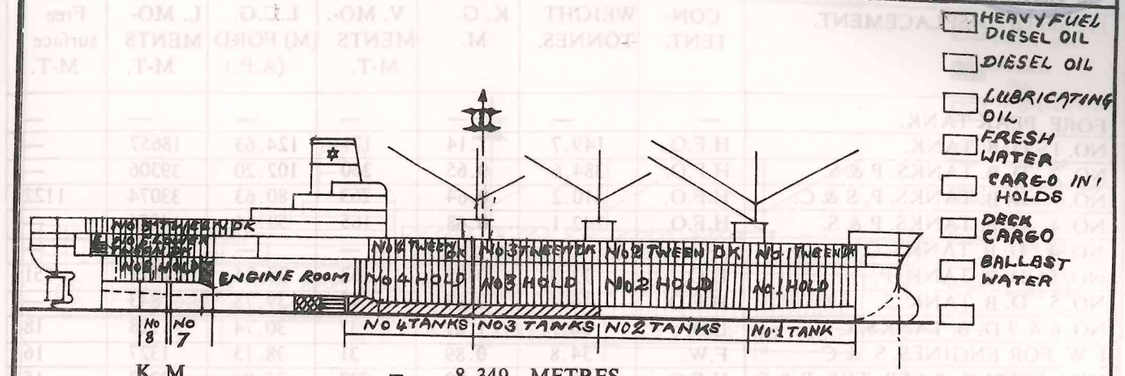
ITEMS OF DISPLACEMENT.	CON-TENT.	WEIGHT TONNES	K.G. M.	V. MO-MENTS M-T.	L.C.G. (M) FORD (AP.)	L. MO-MENTS M-T.	Free Surface M-T.
FORE PEAK TANK.	—	—	—	—	—	—	—
NO. 1 D. B. TANK.	—	—	—	—	—	—	—
NO. 2 D. B. TANKS. P & S.	W.B.	414.9	0.65	270	102.20	42403	—
NO. 3 D. B. TANKS. P, S & C.	W.B.	442.5	0.64	283	80.63	35679	1210
NO. 4 D. B. TANKS. P & S.	W.B	261.2	0.68	178	58.14	15186	—
NO. 4 D. B. TANKS. C.	—	—	—	—	—	—	—
NO. 5 D. B. TANK. P.	D.O.	17.7	0.21	4	38.24	677	152
NO. 5 D. B. TANK. S.	H.F.O.	38.0	0.64	24	39.73	1510	90
NO. 6 D. B. TANKS. P & S.	—	—	—	—	—	—	—
F.W. FOR ENGINES. S & C.	F.W.	20.7	0.87	18	42.46	879	21
HFO. SETTLG. & SER. TKS. P&S.	H.F.O.	98.4	5.69	560	25.06	2466	28
D.O. SETTLG. & SER. TANKS.	D.O.	10.9	6.61	72	27.89	304	4
L.O. STORAGE & SETTLG. TANKS.	L.O.	7.4	6.46	48	32.75	242	5
NO. 7 TANKS. P & S.	—	—	—	—	—	—	—
NO. 8 TANKS. P & S.	—	—	—	—	—	—	—
AFT PEAK TANK.	—	—	—	—	—	—	—
DRINKING WATER TANKS. S	F.W.	23.1	9.57	221	5.80	134	42
SMALL TANKS IN ENGINE ROOM.		9.3	5.83	64	33.38	310	—
NO. 1 HOLD.	Hom. Cargo	827.6	5.59	4626	123.52	102225	—
NO. 2 HOLD.	"	2189.8	4.98	10905	103.14	225856	—
NO. 3 HOLD.	"	1913.1	5.00	9566	80.63	154253	—
NO. 4 HOLD.	"	2148.6	4.99	10722	58.66	126037	—
NO. 5 HOLD.	"	417.9	6.91	2888	17.31	7234	—
NO. 1 TWEEN DECK.	"	681.7	11.17	7615	124.67	84988	—
NO. 2 TWEEN DECK.	"	1131.4	10.72	12129	103.91	117564	—
NO. 3 TWEEN DECK.	"	887.7	10.37	9205	80.79	71717	—
NO. 4 TWEEN DECK.	"	316.7	10.42	3300	57.68	18267	—
NO. 5 TWEEN DECK.	"	715.8	10.69	7652	17.24	12340	—
NO. 5 POOP DECK.	"	542.6	13.76	7466	14.78	8020	—
Cyl. oil	Cyl. oil	1.0	6.80	7	31.44	31	—
REFRIGERATED CARGO.		235.0	10.36	2435	60.17	14140	—
MAIL CARGO.		5.1	14.81	76	135.01	689	
DECK CARGO.		—	—	—	—	—	—
CREW AND EFFECTS.		10.9	14.47	158	38.28	417	
STORES, SPARES & PROVISIONS.		75.4	11.70	882	64.78	4884	
DEAD WEIGHT.		13029.5	6.992	91104	77.213	1006049	
LIGHT SHIP.		5499.8	8.836	48596	60.084	330449	
DISPLACEMENT.		18529.3	7.539	139700	72.129	1336498	1552

TRIM AND DRAUGHTS.

DISPLACEMENT.	=	18529.3	TONNES	TRIM. by stern	=	0.201	M.
L.C.G. FROM A.P.	=	72.129	M.	IMMERSION AT A.P.	=	0.099	M.
L.C.B. FROM A.P.	=	72.356	M.	EMERSION AT F.P.	=	0.102	M.
L.C.F. FROM A.P.	=	49.07	%	MEAN DRAUGHT.	=	8.785	M.
M.C.T. 1 CM.	=	208.8	M-T.	DRAUGHT AT A.P.	=	8.884	M.
TRIMMING MOMENT.	=	4206	M-T.	DRAUGHT AT F.P.	=	8.683	M.

CONDITION NO. 5.

UPPER DECK AS FREE BOARD DECK - ARRIVAL. SHIP WITH HOMOGENEOUS CARGO IN ALL HOLDS AND TWEEN DECKS.



K. M. ..... = 8.349 METRES.
K. G. ..... = 7.539 "
G. M. (Solid) ..... = 0.810 "
F. S. CORRECTION..... = — 0.084 "
CORRECTED G. M. .... = + 0.726 METRES.

θ.	5°	10°	15°	20°	25°	30°	35°	40°
SIN θ.	0.087	0.174	0.259	0.342	0.423	0.500	0.574	0.643
LEVER FROM BASE LINE (KN)	0.760	1.517	2.252	2.990	3.629	4.312	4.948	5.498
— K. G. SIN θ.	0.663	1.326	1.974	2.607	3.225	3.312	4.376	4.902
G. Z. =(KN-KG SIN θ)	0:097	0.191	0.278	0.383	0.404	0.500	0.572	0.596
SIMPSON MULTIPLIERS.	4	2	4	2	4	1	SUM.	
PRODUCT.	0.388	0.382	1.112	0.766	1.616	0.500	4.764	

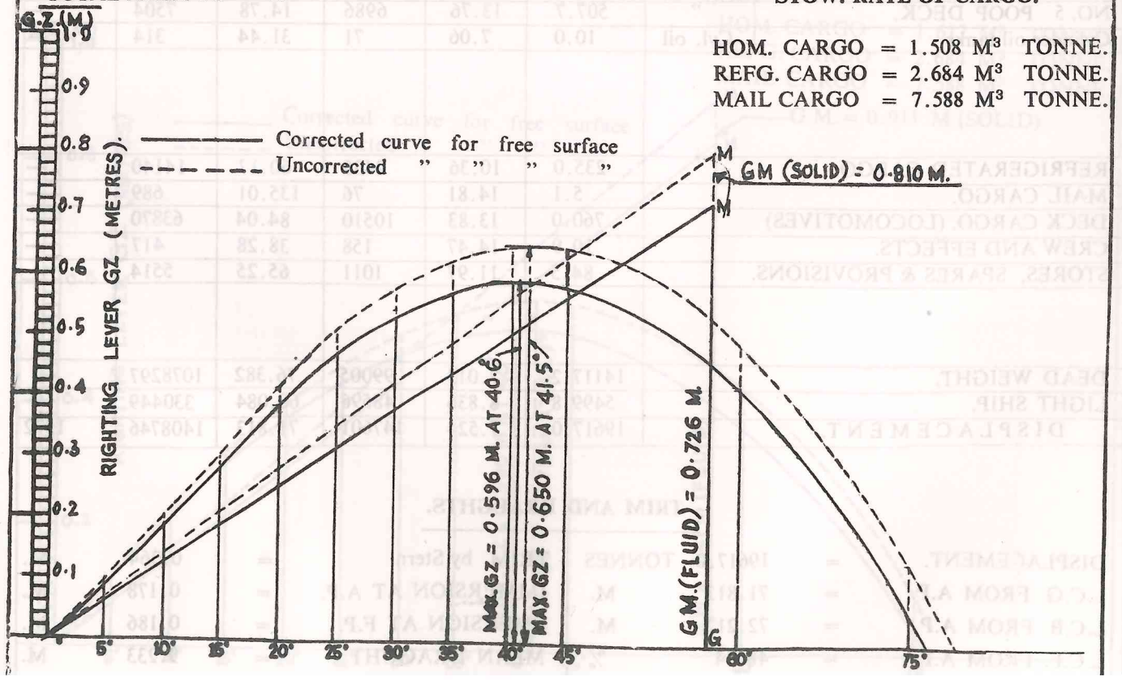
SIMPSON MULTIPLIERS.

1	4	1	SUM.
0.500	2.288	0.596	3.384

AREA UNDER
G. Z. CURVE UPTO 30° = 0.0291 x 4.764 = 1.139 M—RAD.
BETWEEN 30° AND 40° = 0.0291 x 3.384 = 0.098 M—RAD.
TOTAL AREA TO 40° = 0.237 M—RAD.

STOW. RATE OF CARGO.

HOM. CARGO = 1.508 M^3 TONNE.
REFG. CARGO = 2.684 M^3 TONNE.
MAIL CARGO = 7.588 M^3 TONNE.



CONDITION NO. 6 : DEPARTURE
CALCULATION OF DISPLACEMENT, K.G. & L.C.G. CONDITION.

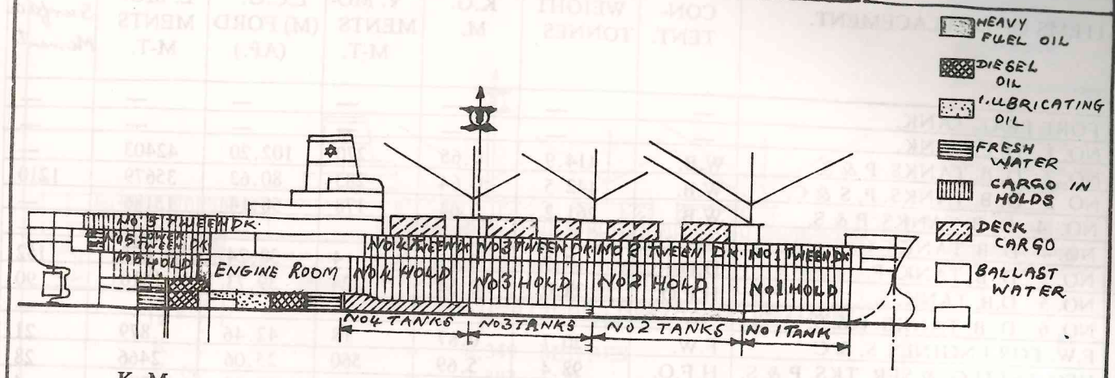
ITEMS OF DISPLACEMENT.	CON-TENT.	WEIGHT TONNES.	K. G. M.	V. MO-MENTS M-T.	L.C.G. (M) FORD (A.P.)	L. MO-MENTS M-T.	Free surface M-T.
FORE PEAK TANK.	—	—	—	—	—	—	—
NO. 1 D. B. TANK.	H.F.O.	149.7	1.14	171	124.63	18657	—
NO. 2 D. B. TANKS. P & S.	H.F.O.	384.6	0.65	250	102.20	39306	—
NO. 3 D. B. TANKS. P, S & C.	H.F.O.	410.2	0.64	263	80.63	33074	1122
NO. 4 D. B. TANKS. P & S.	H.F.O.	242.1	0.68	165	58.14	14076	—
NO. 4 D. B. TANKS. C.	—	—	—	—	—	—	—
NO. 5 D. B. TANK. P.	D.O.	73.5	0.85	62	38.24	2811	151
NO. 5 D. B. TANK. S.	H.F.O.	46.4	0.87	40	39.73	1843	—
NO. 6 & 9 D. B. TANKS. C	L.O.	36.7	1.01	37	30.74	1128	18
F.W. FOR ENGINES. S. & C	F.W.	34.8	0.89	31	38.13	1327	16
HFO. SETTLG. & SER. TKS. P & S.	H.F.O.	131.0	6.09	798	25.06	3283	15
D.O. SETTLG. & SER. TANKS.	D.O.	21.9	7.21	158	27.85	610	3
L.O. STORAGE & SETTLG. TANKS.	L.O.	36.9	7.13	263	32.95	1216	5
NO. 7 TANKS. P & S.	D.O.	190.5	2.60	495	22.97	4376	—
NO. 8 TANKS. P & S.	F.W.	137.5	2.77	381	16.23	2232	—
AFT PEAK TANK.	—	—	—	—	—	—	—
AFT PEAK TANK.	—	—	—	—	—	—	—
DRINKING WATER TANKS. P&S.	F.W.	93.4	11.21	1047	5.82	544	42
SMALL TANKS IN ENGINE ROOM		9.6	6.84	66	33.51	322	—
NO. 1 HOLD.	Hom. cargo	774.2	5.59	4328	123.52	95629	—
NO. 2 HOLD.	"	2048.4	4.98	10201	103.14	211272	—
NO. 3 HOLD.	"	1789.6	5.00	8948	80.63	144295	—
NO. 4 HOLD.	"	2009.8	4.99	10029	58.66	117895	—
NO. 5 HOLD.	"	391.0	6.91	2702	17.31	6768	—
NO. 1 TWEEN DECK.	"	637.6	11.17	7122	124.67	79490	—
NO. 2 TWEEN DECK.	"	1058.4	10.72	11346	103.91	109978	—
NO. 3 TWEEN DECK.	"	830.4	10.37	8611	80.79	67088	—
NO. 4 TWEEN DECK.	"	296.2	10.42	3086	57.68	17085	—
NO. 5 TWEEN DECK.	"	669.6	10.69	7158	17.24	11544	—
NO. 5 POOP DECK.	"	507.7	13.76	6986	14.78	7504	—
Cylinder oil tanks	Cyl. oil	10.0	7.06	71	31.44	314	—
REFRIGERATED CARGO.		235.0	10.36	2435	60.17	14140	—
MAIL CARGO.		5.1	14.81	76	135.01	689	—
DECK CARGO. (LOCOMOTIVES)		760.0	13.83	10510	84.04	63870	—
CREW AND EFFECTS.		10.9	14.47	158	38.28	417	—
STORES, SPARES & PROVISIONS.		84.5	11.97	1011	65.25	5514	—
DEAD WEIGHT.		14117.2	7.013	99005	76.382	1078297	
LIGHT SHIP.		5499.8	8.836	48596	60.084	330449	
DISPLACEMENT.		19617.0	7.524	147601	71.813	1408746	1372

TRIM AND DRAUGHTS.

DISPLACEMENT.	=	19617.0 TONNES	TRIM. by Stern	=	0.364	M.
L.C.G. FROM A.P.	=	71.813 M.	IMMERSION AT A.P.	=	0.178	M.
L.C.B. FROM A.P.	=	72.212 M.	EMERSION AT F.P.	=	0.186	M.
L.C.F. FROM A.P.	=	48.84 %	MEAN DRAGUHT	=	9.233	M.
M.C.T. 1 CM.	=	215.0 M-T	DRAUGHT AT A.P.	=	9.142	M.
			DRAUGHT AT F.P.	=	9.324	M.

CONDITION NO. 6.

UPPER DECK AS FREE BOARD DECK - DEPARTURE
SHIP WITH HOMOGENEOUS CARGO IN ALL HOLDS AND TWEEN DECKS AND LOCOMOTIVES ON UPPER DECK.



K. M. ..... = 8.435 METRES.
K. G. ..... = 7.524 "
G. M. (Solid) ..... = 0.911 "
F. S. CORRECTION .... = — 0.070 "
CORRECTED G. M. .... = + 0.841 METRES.
(Flu d)

θ.	5°	10°	15°	20°	25°	30°	35°	40°
SIN θ.	0.087	0.174	0.259	0.342	0.423	0.500	0.574	0.643
LEVER FAOM BASE LINE (KN)	0.770	1.540	2.268	2.976	3.594	4 273	4.870	5.411
— K. G. SIN θ.	0.661	1.321	1.967	2.597	3.212	3.797	4.359	4.883
G. Z. = (KN-KG SIN θ.)	0.109	0.219	0.301	0.379	0.382	0.476	0.511	0.528
SIMPSON MULTIPLIERS.	4	2	4	2	4	1	SUM.	
PRODUCT.	0.436	0.438	1.204	0.758	1.528	0.476	4.840	

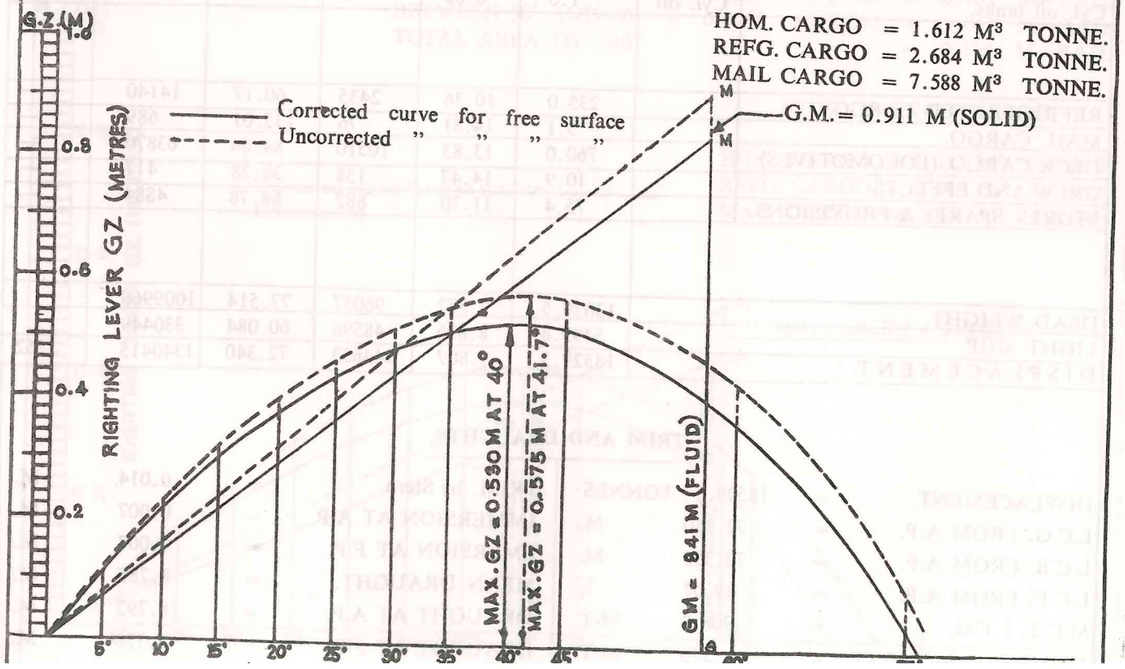
AREA UNDER G. Z. CURVE UPTO 30° = 0.0291 x 4.840 = 0.141 M—RAD.
BETWEEN 30° AND 40° = 0.0291 x 3.048 = 0.092 M—RAD.
TOTAL AREA TO 40° = 0.233 M—RAD.

SIMPSON MULTIPLIERS.

1	4	1	SUM.
0.476	2.044	0.528	3.048

STOW. RATE OF CARGO

HOM. CARGO = 1.612 M^3 TONNE.
REFG. CARGO = 2.684 M^3 TONNE.
MAIL CARGO = 7.588 M^3 TONNE.



CONDITION NO. 7 - ARRIVAL.
CALCULATION OF DISPLACEMENT, K.G. & L.C.G. CONDITION.

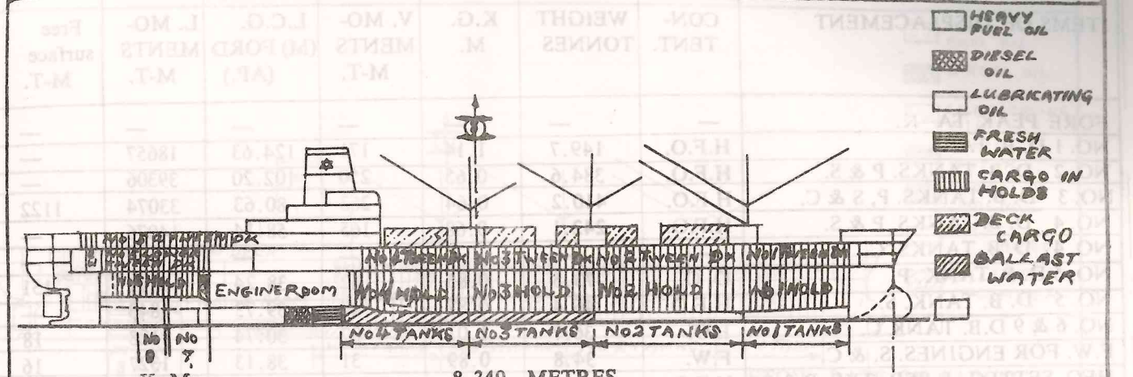
ITEMS OF DISPLACEMENT.	CON-TENT.	WEIGHT TONNES	K.G. M.	V. MO-MENTS M-T.	L.C.G. (M) FORD (AP.)	L. MO-MENTS M-T.	Free Surface Moment
FORE PEAK TANK.	—	—	—	—	—	—	—
NO. 1 D. B. TANK.	—	—	—	—	—	—	—
NO. 2 D. B. TANKS. P & S.	W.B.	414.9	0.65	270	102.20	42403	—
NO. 3 D. B. TANKS. P, S & C.	W.B.	442.5	0.64	283	80.63	35679	1210
NO. 4 D. B. TANKS. P & S.	W.B.	261.2	0.68	178	58.14	15186	—
NO. 4 D. B. TANKS. C.	—	—	—	—	—	—	—
NO. 5 D. B. TANK. P.	D.O.	17.7	0.21	4	38.24	677	152
NO. 5 D.B. TANK. S.	H.F.O.	38.0	0.64	24	39.73	1510	90
NO. 6 D. B. TANKS. P & S.	—	—	—	—	—	—	—
F.W. FOR ENGINES. S. & C	F.W.	20.7	0.87	18	42.46	879	21
HFO. SETTLG. & SER. TKS. P & S.	H.F.O.	98.4	5.69	560	25.06	2466	28
D.O. SETTLG. & SER. TANKS.	D.O.	10.9	6.61	72	27.89	304	4
L.O. STORAGE & SETTLG. TANKS.	L.O.	7.4	6.46	48	32.75	242	5
NO. 7 TANKS. P & S.	—	—	—	—	—	—	—
NO. 8 TANKS. P. & S.	—	—	—	—	—	—	—
AFT PEAK TANK.	—	—	—	—	—	—	—
DRINKING WATER TANKS. S.	F.W.	23.1	9.57	221	5.80	134	42
SMALL TANKS IN ENGINE ROOM	—	9.3	6.83	64	33.38	310	—
NO. 1 HOLD.	Hom. cargo	774.2	5.59	4328	123.52	95629	—
NO. 2 HOLD.	"	2048.4	4.98	10201	103.14	211272	—
NO. 3 HOLD	"	1789.6	5.00	8948	80.63	144205	—
NO. 4 HOLD.	"	2009.8	4.99	10029	58.66	117895	—
NO. 5 HOLD.	"	391.0	6.91	2702	17.31	6768	—
NO. 1 TWEEN DECK.	"	637.6	11.17	7122	124.67	79490	—
NO. 2 TWEEN DECK.	"	1058.4	10.72	11346	103.91	109978	—
NO. 3 TWEEN DECK.	"	830.4	10.37	8611	80.79	67088	—
NO. 4 TWEEN DECK.	"	296.2	10.42	3086	57.68	17085	—
NO. 5 TWEEN DECK.	"	669.6	10.69	7158	17.24	11544	—
NO. 5 POOP DECK.	"	507.7	13.76	6986	14.78	7504	—
Cyl. oil tanks.	Cyl. oil	1.0	6.80	7	31.44	31	—
REFRIGERATED CARGO.		235.0	10.36	2435	60.17	14140	—
MAIL CARGO.		5.1	14.81	76	135.01	689	—
DECK CARGO. (LOCOMOTIVES)		760.0	13.83	10510	84.04	63870	—
CREW AND EFFECTS.		10.9	14.47	158	38.28	417	—
STORES, SPARES & PROVISIONS.		75.4	11.70	882	64.78	4884	—
DEAD WEIGHT.		13029.5	7.372	96057	77.514	1009966	
LIGHT SHIP.		5499.8	8.836	48596	60.084	330449	
DISPLACEMENT.		18529.3	7.807	144653	72.340	1340415	1552

TRIM AND DRAUGHTS.

DISPLACEMENT.	=	18529.3 TONNES	TRIM. by Stern	=	0.014	M.
L.C.G. FROM A.P.	=	72.340 M.	IMMERSION AT A.P.	=	0.007	M.
L.C.B. FROM A.P.	=	72.356 M.	EMERSION AT F.P.	=	0.007	M.
L.C.F. FROM A.P.	=	49.07 %	MEAN DRAUGHT.	=	8.785	M.
M.C.T. 1 CM.	=	208.8 M-T.	DRAUGHT AT A.P.	=	8.792	M.
TRIMMING MOMENT	=	296 M-T.	DRAUGHT AT F.P.	=	8.778	M.

CONDITION NO. 7

UPPER DECK AS FREE BOARD DECK-ARRIVAL
SHIP WITH HOMOGENEOUS CARGO IN ALL HOLDS
AND TWEEN DECKS AND LOCOMOTIVES ON UPPER DECK

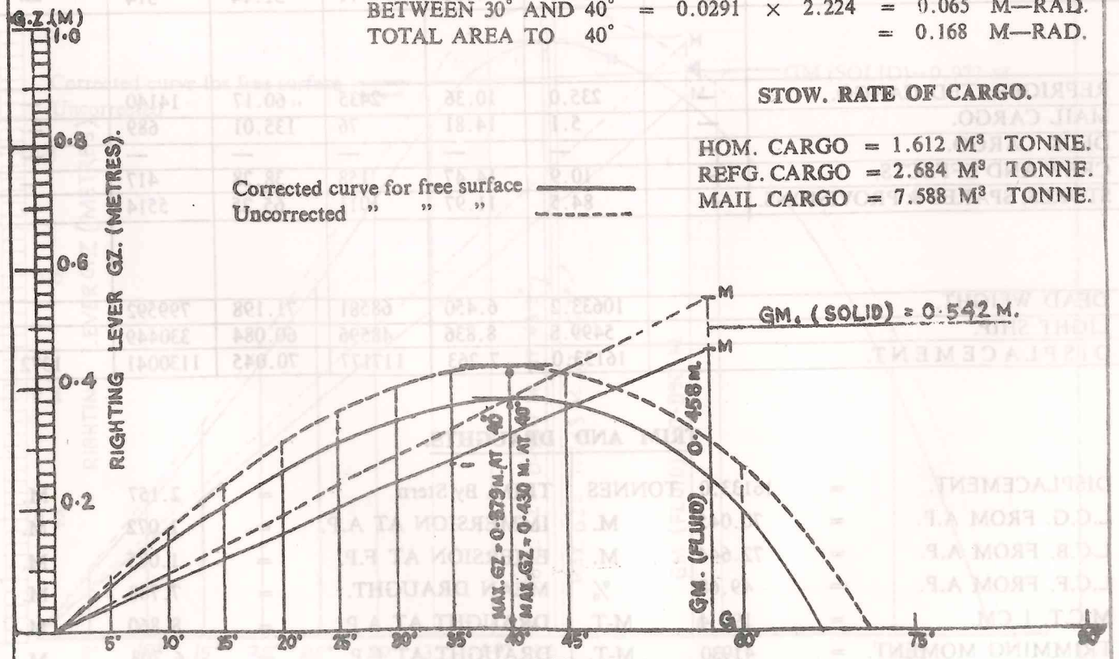


K. M. ..... = 8.349 METRES
K. G. ..... = 7.807 "
G. M. (Solid) ..... = 0.542 "
F. S. CORRECTION .... = — 0.084 "
CORRECTED G. M. .... = + 0.458 METRES.
(Fluid)

θ.	5°	10°	15°	20°	25°	30°	35°	40°
SIN θ.	0.087	0.174	0.259	0.342	0.423	0.500	0.574	0.643
LEVER FROM BASE LINE (KN)	0.760	1.517	2.252	2.990	3.629	4.312	4.900	5.448
— K. G. SIN θ.	0.687	1.373	2.044	2.699	3.338	3.946	4.529	5.074
G. Z. = (KN-KG SIN θ)	0.073	0.144	0.208	0.291	0.291	0.366	0.371	0.374
SIMPSON MULTIPLIERS.	4	2	4	2	4	1	SUM.	
PRODUCT.	0.292	0.288	0.832	0.582	1:164	0.366	3.526	

SIMPSON MULTIPLIERS.	1	4	1	SUM.
	0.366	1.484	0.374	2.224

AREA UNDER G. Z. CURVE UPTO 30° = 0.0291 × 3.526 = 0.103 M—RAD.
BETWEEN 30° AND 40° = 0.0291 × 2.224 = 0.065 M—RAD.
TOTAL AREA TO 40° = 0.168 M—RAD.



STOW. RATE OF CARGO.

HOM. CARGO = 1.612 M³ TONNE.
REFG. CARGO = 2.684 M³ TONNE.
MAIL CARGO = 7.588 M³ TONNE.

CONDITION NO. 8 - DEPARTURE
CALCULATION OF DISPLACEMENT, K.G. & L.C.G. CONDITION

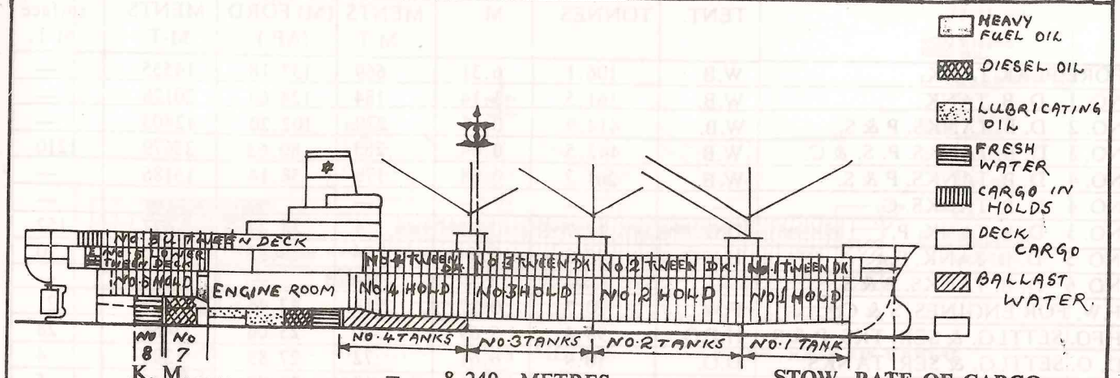
ITEMS OF DISPLACEMENT	CONTENT.	WEIGHT TONNES	K.G. M.	V. MOMENTS M-T.	L.C.G. (M) FORD (AP.)	L. MOMENTS M-T.	Free surface M-T.
FORE PEAK TANK.	—	—	—	—	—	—	—
NO. 1 D. B. TANK.	H.F.O.	149.7	1.14	171	124.63	18657	—
NO. 2 D. B. TANKS. P & S.	H.F.O.	384.6	0.65	250	102.20	39306	—
NO. 3 D. B. TANKS. P, S & C.	H.F.O.	410.2	0.64	263	80.63	33074	1122
NO. 4 D. B. TANKS. P & S.	H.F.O.	242.1	0.68	165	58.14	14076	—
NO. 4 D. B. TANKS. C.	—	—	—	—	—	—	—
NO. 5 D. B. TANK. P.	D. O.	73.5	0.85	62	38.24	2811	151
NO. 5 D. B. TANK. S.	H.F.O.	46.4	0.87	40	39.73	1843	—
NO. 6 & 9 D.B. TANK C.	L.O.	36.7	1.01	37	30.74	1128	18
F.W. FOR ENGINES. S. & C.	F.W.	34.8	0.89	31	38.13	1327	16
HFO. SETTLG. & SER. TKS. P & S.	H.F.O.	131.0	6.09	798	25.06	3283	15
D.O. SETTLG. & SER. TANKS.	D.O.	21.9	7.21	158	27.85	610	3
L.O. STORAGE & SETTLG. TANKS.	L.O.	36.9	7.13	263	32.95	1216	5
NO. 7 TANKS. P & S.	D.O.	190.5	2.60	495	22.97	4376	—
NO. 8 TANKS. P & S.	F.W.	137.5	2.77	381	16.23	2232	—
AFT PEAK TANK.	—	—	—	—	—	—	—
DRINKING WATER TANKS. P&S.	F.W.	93.4	11.21	1047	5.82	544	42
SMALL TANKS IN ENGINE ROOM.	—	9.6	6.84	66	33.51	322	—
NO. 1 HOLD.	Hom. cargo	582.7	5.59	3257	123.52	71975	—
NO. 2 HOLD.	"	1541.7	4.98	7678	103.14	159011	—
NO. 3 HOLD.	"	1346.9	5.00	6735	80.63	108601	—
NO. 4 HOLD.	"	1512.7	4.99	7548	58.66	88735	—
NO. 5 HOLD.	"	294.3	6.91	2034	17.31	5094	—
NO. 1 TWEEN DECK.	"	479.9	11.17	5360	124.67	59829	—
NO. 2 TWEEN DECK.	"	796.6	10.72	8540	103.91	82775	—
NO. 3 TWEEN DECK.	"	625.0	10.37	6481	30.79	50494	—
NO. 4 TWEEN DECK.	"	223.0	10.42	2324	57.68	12863	—
NO. 5 TWEEN DECK.	"	504.0	10.69	5388	17.24	8689	—
NO. 5 POOP DECK.	"	382.1	13.76	5258	14.78	5647	—
Cylinder oil tanks	Cyl . oil	10.0	7.06	71	31.44	314	—
REFRIGERATED CARGO.	—	235.0	10.36	2435	60.17	14140	—
MAIL CARGO.	—	5.1	14.81	76	135.01	689	—
DECK CARGO.	—	—	—	—	—	—	—
CREW AND EFFECTS.	—	10.9	14.47	158	38.28	417	—
STORES, SPARES & PROVISIONS.	—	84.5	11.97	1011	65.25	5514	—
DEAD WEIGHT.		10633.2	6.450	68581	71.198	799592	
LIGHT SHIP.		5499.8	8.836	48596	60.084	330449	
DISPLACEMENT.		16133.0	7.263	117177	70.045	1130041	1372

TRIM AND DRAUGHTS.

DISPLACEMENT.	=	16133.0 TONNES	TRIM. By Stern	=	2.157	M.
L.C.G. FROM A.P.	=	70.045 M.	IMMERSION AT A.P.	=	1.072	M.
L.C.B. FROM A.P.	=	72.644 M.	EMERSION AT F.P.	=	1.085	M.
L.C.F. FROM A.P.	=	49.68 %	MEAN DRAUGHT.	=	7.788	M.
M.C.T. 1 CM.	=	194.4 M-T.	DRAUGHT AT A.P.	=	8.860	M.
TRIMMING MOMENT.	=	41930 M-T.	DRAUGHT AT F.P.	=	6 703	M.

CONDITION NO. 8.

SERVICE CONDITION-DEPARTURE
SHIP WITH HOMOGENEOUS CARGO IN ALL HOLDS AND TWEEN DECKS.



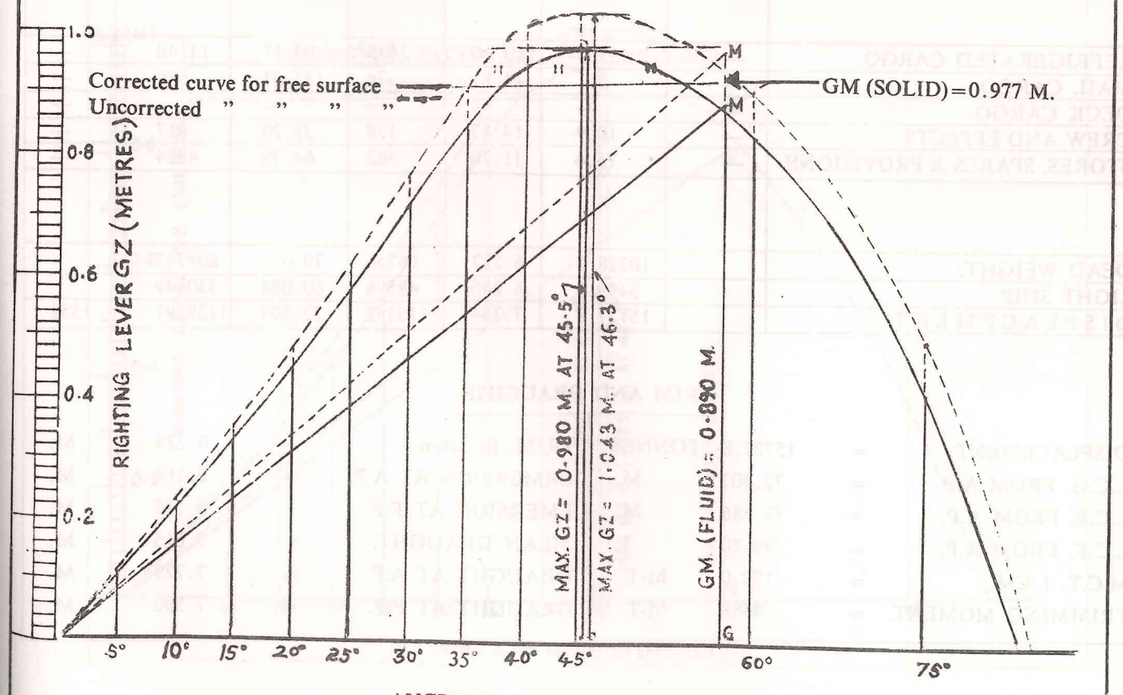
K. M. ..... = 8.240 METRES.
K. G. ..... = 7.263 "
G. M. (Solid) ..... = 0.977 "
F. S. CORRECTION = — 0.087 "
CORRECTED G. M.(Fluid) = + 0.890 METRES.

STOW. RATE OF CARGO.
HOM. CARGO = 2.142 M³ TONNE.
REFG. CARGO = 2.684 M³ TONNE.
MAIL CARGO = 7.588 M³ TC

θ.	5°	10°	15°	20°	25°	30°	35°	40°
SIN θ.	0.087	0.174	0.259	0.342	0.423	0.500	0.574	0.643
LEVER FROM BASE LINE (KN)	0.759	1.500	2.223	2.969	3.687	4.393	5.074	5.683
— K. G. SIN θ.	0.639	1.279	1.904	2.514	3.109	3.675	4.219	4.726
G.Z. = (KN—KG SIN θ)	0.120	0.221	0.319	0.455	0.578	0.718	0.855	0.957
SIMPSON MULTIPLIERS.	4	2	4	2	4	1	SUM.	
PRODUCT.	0.480	0.442	1.276	0.910	2.312	0.718	6.138	

SIMPSON MULTIPLIERS.	1	4	1	SUM.
	0.718	3.420	0.957	5.095

AREA UNDER G. Z. CURVE UPTO 30° = 0.0291 x 6.138 = 0.179 M—RAD.
BETWEEN 30° AND 40° = 0.0291 x 5.095 = 0.148 M—RAD.
TOTAL AREA TO 40° = 0.327 M—RAD.



CONDITION NO. 9 — ARRIVAL
CALCULATION OF DISPLACEMENT, K.G. & L.C.G. CONDITION.

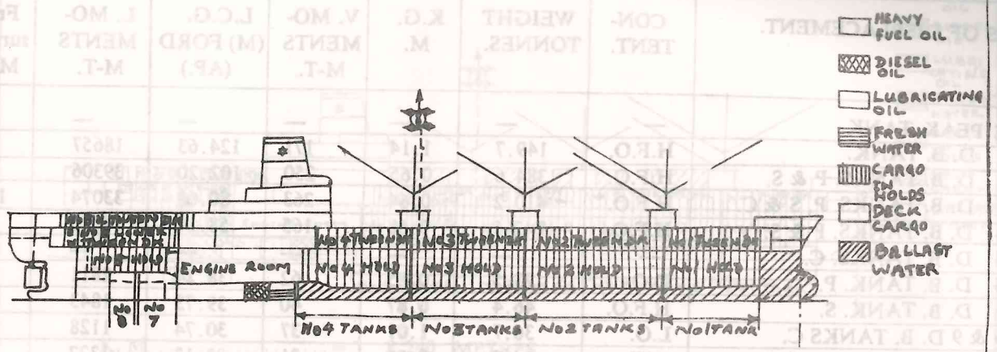
ITEMS OF DISPLACEMENT.	CON-TENT.	WEIGHT TONNES	K.G. M.	V. MO-MENTS M-T.	L.C.G. (M) FORD (AP.)	L. MO-MENTS M-T.	Free surface M-T.
FORE PEAK TANK.	W.B.	106.1	6.31	669	137.18	14555	—
NO. 1 D. B. TANK.	W.B.	161.5	1.14	184	124.63	20128	—
NO. 2 D. B. TANKS. P & S.	W.B.	414.9	0.65	270	102.20	42403	—
NO. 3 D. B. TANKS. P. S. & C.	W.B.	442.5	0.64	283	80.63	35679	1210
NO. 4 D. B. TANKS. P & S.	W.B.	261.2	0.68	178	58.14	15186	—
NO. 4 D. B. TANKS. C.	—	—	—	—	—	—	—
NO. 5 D. B. TANK. P.	D.O.	17.7	0.21	4	38.24	677	152
NO. 5 D. B. TANK. S.	H.F.O.	38.0	0.64	24	39.73	1510	90
NO. 6 D. B. TANKS. P & S.	—	—	—	—	—	—	—
F.W. FOR ENGINES. S & C.	F.W.	20.7	0.87	18	42.46	879	21
HFO. SETTLG. & SER. TKS. P & S.	H.F.O.	98.4	5.69	560	25.06	2466	28
D. O. SETTLG. & SER. TANKS.	D.O.	10.9	6.61	72	27.89	304	4
L.O. STORAGE & SETTLG. TANKS	L.O.	7.4	6.46	48	32.75	242	5
NO. 7 TANKS. P & S.	—	—	—	—	—	—	—
NO. 8 TANKS. P & S.	—	—	—	—	—	—	—
AFT PEAK TANK.	—	—	—	—	—	—	—
DRINKING WATER TANKS. S.	F.W.	23.1	9.57	221	5.80	134	42
SMALL TANKS IN ENGINE ROOM	—	9.3	6.83	64	33.38	310	—
NO. 1 HOLD.	Hom. cargo	582.7	5.59	3257	123.52	71975	—
NO. 2 HOLD.	-do-	1541.7	4.98	7678	103.14	159011	—
NO. 3 HOLD.	-do-	1346.9	5.00	6735	80.63	108601	—
NO. 4 HOLD.	-do-	1512.7	4.99	7548	58.66	88735	—
NO. 5 HOLD.	-do-	294.3	6.91	2034	17.31	5094	—
NO. 1 TWEEN DECK.	-do-	479.8	11.17	5360	124.61	59829	—
NO. 2 TWEEN DECK.	-do-	796.6	10.72	8540	103.91	82775	—
NO. 3 TWEEN DECK.	-do-	625.0	10.37	6481	80.79	50494	—
NO. 4 TWEEN DECK.	-do-	223.0	10.42	2324	57.68	12863	—
NO. 5 TWEEN DECK.	-do-	504.0	10.69	5388	17.24	8689	—
NO. 5 POOP DECK.		382.1	13.76	5258	14.78	5647	—
Cyl. oil tanks	Cyl. oil	1.0	6.80	7	31.44	31	
REFRIGERATED CARGO.	—	235.0	10.36	2435	60.17	14140	—
MAIL CARGO.	—	5.1	14.81	76	135.01	689	—
DECK CARGO.	—	—	—	—	—	—	—
CREW AND EFFECTS.	—	10.9	14.47	158	38.28	417	—
STORES, SPARES & PROVISIONS.	—	75.4	11.70	882	64.78	4884	—
DEAD WEIGHT.		10228.0	6.527	66756	79.033	808347	
LIGHT SHIP.		5499.8	8.836	48596	60.084	330449	
DISPLACEMENT.		15727.8	7.334	115352	72.407	1138797	1552

TRIM AND DRAUGHTS.

DISPLACEMENT.	=	15727.8	TONNES	TRIM. By Stern.	=	0.229 M.
L.C.G. FROM A.P.	=	72.407	M.	IMMERSION AT A.P.	=	0.114 M.
L.C.B. FROM A.P.	=	72.686	M.	EMERSION AT F.P.	=	0.115 M.
L.C.F. FROM A.P.	=	49.80	%	MEAN DRAUGHT.	=	7.615 M.
M.C.T. 1 CM.	=	192.0	M-T.	DRAUGHT AT A.P.	=	7.729 M.
TRIMMING MOMENT.	=	4388	M-T.	DRAUGHT AT F.P.	=	7.500 M.

CONDITION NO. 9.

SERVICE CONDITION -ARRIVAL SHIP WITH HOMOGENEOUS CARGO IN ALL HOLDS AND TWEEN DECKS



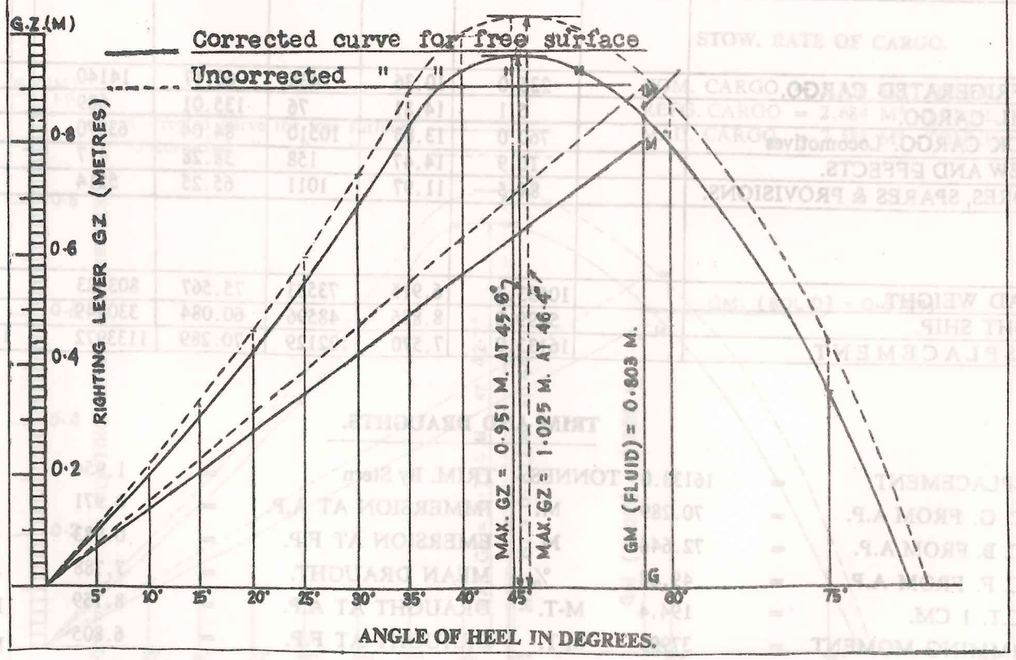
K.M. ..... = 8.238 METRES.
K.G. ..... = 7.334 "
G.M. (Solid) ..... = 0.904 "
F. S. CORRECTION..... = — 0.101 "
CORRECTED G. M. .... = + 0.803 METRES.
(Fluid)

STOW. RATE OF CARGO.
HOM. CARGO = 2.142 M³ TONNE.
REFG. CARGO = 2.684 M³ TONNE.
MAIL CARGO = 7.588 M³ TONNE.

θ.	5°	10°	15°	20°	25°	30°	35°	40°
SIN θ.	0.087	0.174	0.259	0.342	423	0.500	0.574	0.643
LEVER FROM BASE LINE(KN)	0.758	1.500	2.221	2.966	2.695	4.407	5.098	5.710
— K.G. SIN θ.	0.647	1.294	1.926	2.543	3.145	3.718	4.268	4.781
G.Z. = (KN-KG SIN θ.)	0.111	0.206	0.295	0.423	0.550	0.689	0.830	0.929
SIMPSON MULTIPLIERS	4	2	4	2	4	1	SUM.	
PRODUCT.	0.444	0.412	1.180	0.846	2.200	0.689	5.771	

SUMPSON MULTIPLIERS.	1	4	1	SUM.
	0.689	3.320	0.929	4.938

AREA UNDER G. Z. CURVE UPTO 30° = 0.0291 x 5.771 = 0.168 M—RAD.
BETWEEN 30° AND 40° = 0.0291 x 4.938 = 0.144 M—RAD.
TOTAL AREA TO 40° = 0.312 M—RAD.
G.M (SOLID) = 0.904 M.



CONDITION NO. 10 - DEPARTURE
CALCULATION OF DISPLACEMENT, K.G. & L.C.G. CONDITION.

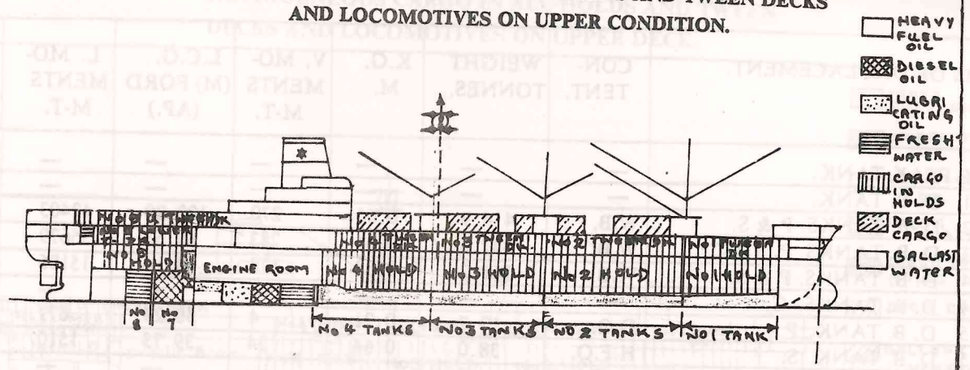
ITEMS OF DISPLACEMENT.	CON-TENT.	WEIGHT TONNES.	K.G. M.	V. MO-MENTS M-T.	L.C.G. (M) FORD (AP.)	L. MO-MENTS M-T.	Free surface M-T.
FORE PEAK TANK.	—	—	—	—	—	—	—
NO. 1 D. B. TANK.	H.F.O.	149.7	1.14	171	124.63	18657	—
NO. 2 D. B. TANKS. P & S.	H.F.O.	384.6	0.65	250	102.20	39306	—
NO. 3 D. B. TANKS. P, S & C.	H.F.O.	410.2	0.64	263	80.63	33074	1122
NO. 4 D. B. TANKS. P & S.	H.F.O.	242.1	0.68	165	58.14	14076	—
NO. 4 D. B. TANKS. C.	—	—	—	—	—	—	—
NO. 5 D. B. TANK. P.	D.O.	73.5	0.85	62	38.24	2811	151
NO. 5 D. B. TANK. S.	H.F.O.	46.4	0.87	40	39.73	1843	—
NO. 6 & 9 D. B. TANKS C.	L.O.	36.7	1.01	37	30.74	1128	18
F.W. FOR ENGINES, S. & C.	F.W.	34.8	0.89	31	38.13	1327	16
H.F.O. SETTLG. & SER. TKS. P & S.	H.F.O.	131.0	6.09	798	25.06	3283	15
D.O. SETTLG & SER. TANKS.	D.O.	21.9	7.21	158	27.85	610	3
L.O. STORAGE & SETTLG. TANKS.	L.O.	36.9	7.13	263	32.95	1216	5
NO. 7 TANKS. P & S.	D.O.	190.5	2.60	495	22.97	4376	—
NO. 8 TANKS. P & S.	F.W.	137.5	2.77	381	16.23	2232	—
AFT PEAK TANK.	—	—	—	—	—	—	—
DRINKING WATER TANKS. P&S.	F. W.	93.4	11.21	1047	5.82	544	42
SMALL TANKS IN ENGINE ROOM.		9.6	6.84	66	33.51	322	—
NO. 1 HOLD.	Hom. cargo	529.3	5.59	2959	123.52	65379	—
NO. 2 HOLD.	-do-	1400.4	4.98	6974	103.14	144437	—
NO. 3 HOLD.	-do-	1223.4	5.00	6117	80.63	98643	—
NO. 4 HOLD.	-do-	1374.0	4.99	6856	58.66	80599	—
NO. 5 HOLD.	-do-	267.3	6.91	1847	17.31	4627	—
NO. 1 TWEEN DECK.	-do-	435.9	11.17	4869	124.67	54344	—
NO. 2 TWEEN DECK.	-do-	723.5	10.72	7756	103.91	75179	—
NO. 3 TWEEN DECK.	-do-	567.7	10.37	5887	80.79	45864	—
NO. 4 TWEEN DECK.	-do-	202.5	10.42	2110	57.68	11680	—
NO. 5 TWEEN DECK.	-do-	457.8	10.69	4894	17.24	7892	—
NO. 5 POOP DECK.	-do-	347.1	13.76	4776	14.78	5130	—
Cylinder oil tank.	Cyl. oil	10.0	7.96	71	31.44	314	—
REFRIGERATED CARGO.		235.0	10.36	2435	60.17	14140	—
MAIL CARGO.		5.1	14.81	76	135.01	689	—
DECK CARGO. Locomotives		760.0	13.83	10510	84.04	63870	—
CREW AND EFFECTS.		10.9	14.47	158	38.28	417	—
STORES, SPARES & PROVISIONS.		84.5	11.97	1011	65.25	5514	—
DEAD WEIGHT.		10633.2	6.915	73533	75.567	803523	
LIGHT SHIP.		5499.8	8.836	48596	60.084	330449	
DISPLACEMENT.		16133.0	7.570	122129	70.289	1133972	1372

TRIM AND DRAUGHTS.

DISPLACEMENT.	=	16133.0 TONNES.	TRIM. By Stern	=	1.954	M.
L. C. G. FROM A.P.	=	70.289 M.	IMMERSION AT A.P.	=	0.971	M.
L. C. B. FROM A.P.	=	72.644 M	EMERSION AT F.P.	=	0.983	M.
L. C. F. FROM A.P.	=	49.68 %	MEAN DRAUGHT.	=	7.788	M.
M.C.T. 1 CM.	=	194.4 M-T.	DRAUGHT AT A.P.	=	8.759	M.
TRIMMING MOMENT.	=	37993 M-T.	DRAUGHT AT F.P.	=	6.805	M.

CONDITION NO. : 10.

SERVICE CONDITION-DEPARTURE SHIP WITH HOMOGENEOUS CARGO IN ALL HOLDS AND TWEEN DECKS AND LOCOMOTIVES ON UPPER CONDITION.



K. M. ..... = 8.240 METRES.
K. G. ..... = 7.570 "
G. M. (Solid) ..... = 0.670 "
F. S CORRECTION..... = — 0.085 "
CORRECTED G. M. .... = + 0.585 METRES.
(Fluid)

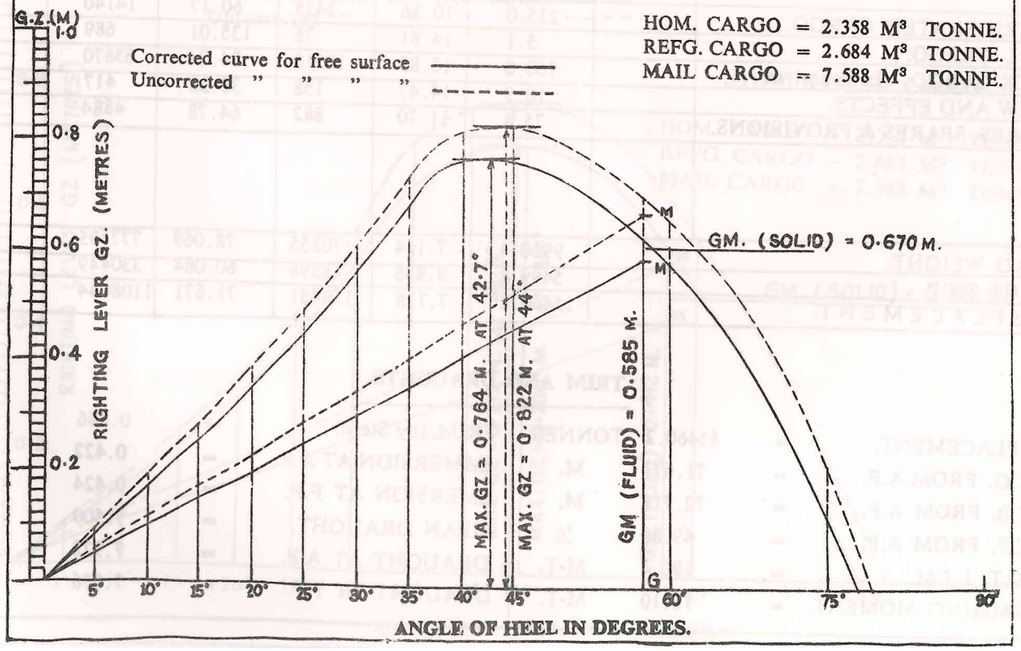
θ.	5°	10°	15°	20°	25°	30°	35°	40°
SIN θ	0.087	0.174	0.259	0.342	0.423	0.500	0.574	0.643
LEVER FROM BASE LINE (KN)	0.759	1.500	2.223	2.969	3.687	4.393	5.072	5.683
— K. G. SIN θ.	0.666	1.332	1.983	2.618	3.238	3.828	4.394	4.922
G. Z. = (KN-KG SIN θ.)	0.093	0.168	0.240	0.351	0.449	0.565	0.678	0.761
SIMPSON MULTIPLIERS.	4	2	4	2	4	1	SUM.	
PRODUCT.	0.372	0.336	0.960	0.702	1.796	0.565	4.731	

SIMPSON MULTIPLIERS.	1	4	1	SUM.
	0.565	2.712	0.761	4.038

AREA UNDER G. Z. CURVE UPTO 30° = 0.0291 x 4.731 = 0.138 M—RAD.
BETWEEN 30° AND 40° = 0.0291 x 4.038 = 0.118 M—RAD.
TOTAL AREA TO 40° = 0.256 M—RAD.

STOW. RATE OF CARGO.

HOM. CARGO = 2.358 M³ TONNE.
REFG. CARGO = 2.684 M³ TONNE.
MAIL CARGO = 7.588 M³ TONNE.



CONDITION NO. 11 - ARRIVAL
CALCULATION OF DISPLACEMENT, K.G. & L.C.G. CONDITION.

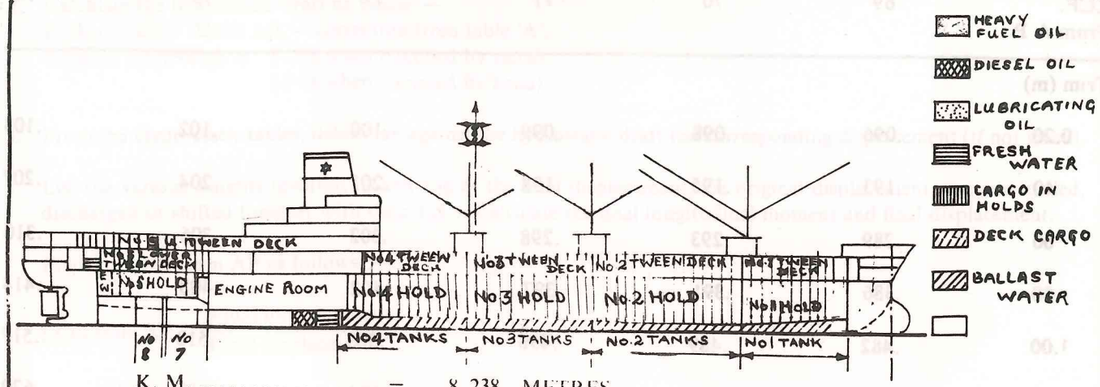
ITEMS OF DISPLACEMENT.	CON-TENT.	WEIGHT TONNES.	K.G. M.	V. MO-MENTS M-T.	L.C.G. (M) FORD (AP.)	L. MO-MENTS M-T.	Free surface M-T.
FORE PEAK TANK.	—	—	—	—	—	—	—
NO. 1 D. B. TANK.	—	—	—	—	—	—	—
NO. 2 D. B. TANKS. P & S.	W.B.	414.9	0.65	270	102.20	42403	—
NO. 3 D. B. TANKS. P, S & C.	W.B.	442.5	0.64	283	80.63	35679	1210
NO. 4 D. B. TANKS. P & S.	W.B.	261.2	0.68	178	58.14	15186	—
NO. 4 D. B. TANKS. C.	—	—	—	—	—	—	—
NO. 5 D. B. TANK. P.	D.O.	17.7	0.21	4	38.24	677	152
NO. 5 D. B. TANK. S.	H.F.O.	38.0	0.64	24	39.73	1510	90
NO. 6 D. B. TANKS. P & S.	—	—	—	—	—	—	—
F.W. FOR ENGINES. S & C	F.W.	20.7	0.87	18	42.46	879	21
HFO. SETTLG. & SER. TKS. P & S.	H.F.O.	98.4	5.69	560	25.06	2466	28
D.O. SETTLG. & SER. TANKS.	D.O.	10.9	6.61	72	27.89	304	4
L.O. STORAGE & SETTLG. TANKS.	L.O.	7.4	6.46	48	32.75	242	5
NO. 7 TANKS. P & S.	—	—	—	—	—	—	—
NO. 8 TANKS. P & S.	—	—	—	—	—	—	—
AFT PEAK TANK.	—	—	—	—	—	—	—
DRINKING WATER TANKS. S.	F.W.	23.1	9.57	221	5.80	134	42
SMALL TANKS IN ENGINE ROOM.		9.3	6.83	64	33.38	310	—
NO. 1 HOLD.	Hom. cargo	529.3	5.59	2959	123.52	65379	—
NO. 2 HOLD.	-do-.	1400.4	4.98	6974	103.14	144437	—
NO. 3 HOLD.	-do-	1223.4	5.00	6117	80.63	98643	—
NO. 4 HOLD.	-do-	1374.0	4.99	6856	58.66	80599	—
NO. 5 HOLD.	-do-	267.3	6.91	1847	17.31	4627	—
NO. 1 TWEEN DECK.	-do-	435.9	11.17	4869	124.67	54344	—
NO. 2 TWEEN DECK.	-do-	723.5	10.72	7756	103.91	75179	—
NO. 3 TWEEN DECK.	-do-	567.7	10.37	5887	80.79	45864	—
NO. 4 TWEEN DECK.	-do-	202.5	10.42	2110	57.68	11680	—
NO. 5 TWEEN DECK.	-do-	457.8	10.69	4894	17.24	7892	—
NO. 5 POOP DECK.	-do-	347.1	13.76	4776	14.78	5130	—
Cyl. oil tank	Cyl. oil	1.0	6.80	7	31.44	31	—
REFRIGERATED CARGO.		235.0	10.36	2435	60.17	14140	—
MAIL CARGO.		5.1	14.81	76	135.01	689	—
DECK CARGO. Locomotives		760.0	13.83	10510	84.04	63870	—
CREW AND EFFECTS.		10.9	14.47	158	38.28	417	—
STORES, SPARES & PROVISIONS.		75.4	11.70	882	64.78	4884	—
DEAD WEIGHT.		9960.4	7.114	70855	78.069	777595	
LIGHT SHIP.		5499.8	8.836	48596	60.084	330449	
DISPLACEMENT.		15460.2	7.726	119451	71.671	1108044	1552

TRIM AND DRAUGHTS.

DISPLACEMENT.	=	15460.2 TONNES	TRIM. (by Stern)	=	0.846	M.
L.C.G. FROM A.P.	=	71.671 M.	IMMERSION AT A.P.	=	0.422	M.
L.C.B. FROM A.P.	=	72.713 M.	EMERSION AT F.P.	=	0.424	M.
L.C.F. FROM A.P.	=	49.88 %	MEAN DRAUGHT.	=	7.500	M.
M.C.T. 1 CM.	=	190.4 M-T.	DRAUGHT AT A.P.	=	7.922	M.
TRIMMING MOMENT.	=	16110 M-T.	DRAUGHT AT F.P.	=	7.076	M.

CONDITION NO. 11.

SERVICE CONDITION-ARRIVAL SHIP WITH HOMOGENEOUS CARGO IN ALL HOLDS AND TWEEN DECKS AND LOCOMOTIVES ON UPPER DECK.

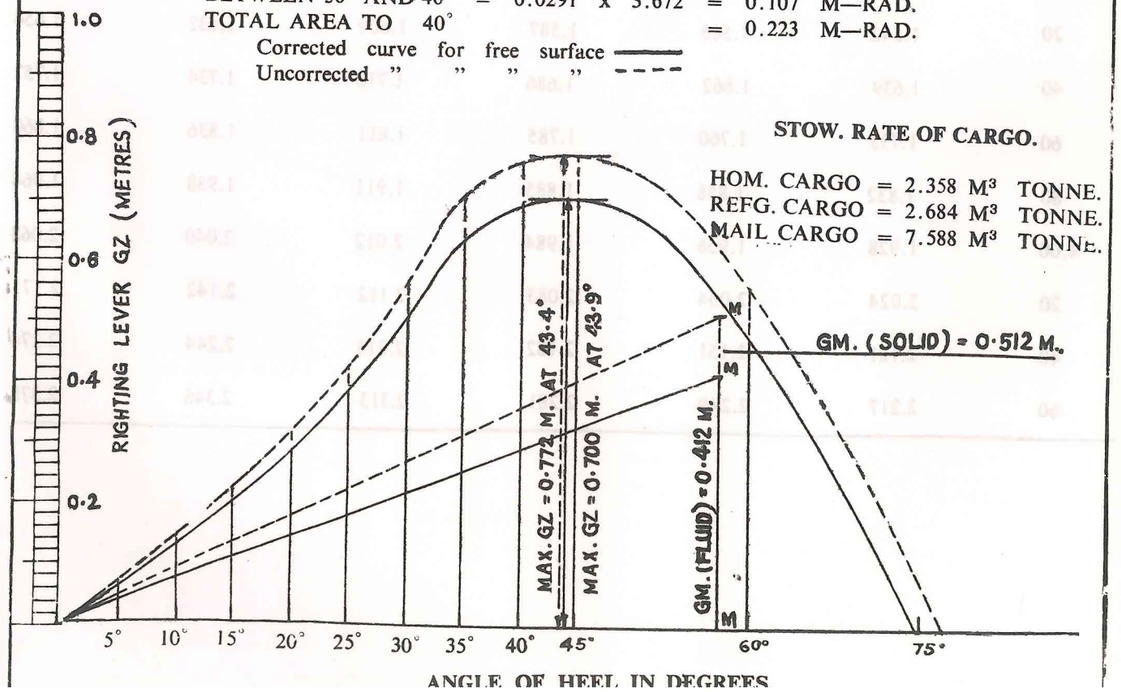


K. M. ..... = 8.238 METRES.
K. G. ..... = 7.726 "
G. M. (Solid) ..... = 0.512 "
F. S. CORRECTION ..... = — 0.100 "
CORRECTED G. M. .... = + 0.412 METRES.
(Fluid)

θ.	5°	10°	15°	20°	25°	30°	35°	40°
SIN θ.	0.087	0.174	0.259	0.342	0.423	0.500	0.574	0.643
LEVER FROM BASE LINE (KN)	0.757	1.500	2.220	2.965	3.700	4.417	5.110	5.728
— K. G. SIN θ.	0.681	1.362	2.027	2.676	3.310	3.913	4.492	5.032
G. Z. = (KN-KG SIN θ)	0.076	0.138	0.193	0.289	0.390	0.504	0.618	0.695
SIMPSON MULTIPLIERS.	4	2	4	2	4	1	SUM.	
PRODUCT.	0.304	0.276	0.772	0.578	1.560	0.504	3.994	

SIMPSON MULTIPLIERS.	1	4	1	SUM.
	0.504	2.472	0.696	3.672

AREA UNDER G. Z. CURVE UPTO 30° = 0.0291 x 3.994 = 0.116 M—RAD.
BETWEEN 30° AND 40° = 0.0291 x 3.672 = 0.107 M—RAD.
TOTAL AREA TO 40° = 0.223 M—RAD.
Corrected curve for free surface ——
Uncorrected " " " " - - - -



STOW. RATE OF CARGO.

HOM. CARGO = 2.358 M³ TONNE.
REFG. CARGO = 2.684 M³ TONNE.
MAIL CARGO = 7.588 M³ TONNE.

TABLE 'A'
CORRECTION TO AFTER DRAFT TO OBTAIN HYDROSTATIC DRAFT

Pos.of LCF. From A P	69	70	71	72	73	74
Trim (m)						
0.20	.096	.098	.099	.100	.102	.103
40	.193	.195	.198	.201	.204	.207
60	.289	.293	.298	.302	.306	.310
80	.386	.391	.397	.402	.408	.414
1.00	.482	.489	.496	.503	.510	.517
20	.578	.587	.595	.604	.612	.620
40	.675	.685	.694	.704	.714	.724
60	.771	.782	.794	.805	.816	.827
80	.868	.880	.893	.905	.918	.930
2.00	.964	.978	.992	1.006	1.020	1.034
20	1.060	1.076	1.091	1.106	1.122	1.137
40	1.157	1.174	1.190	1.207	1.224	1.241
60	1.253	1.271	1.289	1.308	1.326	1.344
80	1.350	1.369	1.389	1.408	1.428	1.447
3.00	1.446	1.467	1.488	1.509	1.530	1.551
20	1.542	1.565	1.587	1.609	1.632	1.654
40	1.639	1.662	1.686	1.710	1.734	1.757
60	1.735	1.760	1.785	1.811	1.836	1.860
80	1.832	1.858	1.885	1.911	1.938	1.964
4.00	1.928	1.956	1.984	2.012	2.040	2.068
20	2.024	2.054	2.083	2.112	2.142	2.171
40	2.121	2.151	2.182	2.213	2.244	2.274
60	2.217	2.249	2.281	2.313	2.346	2.378

NOTES TO CALCULATE TRIM OF VESSEL AFTER LOADING/DISCHARGING/SHIFTING

1. For a vessel with no trim, arithmetical mean draft is the same as the Hydrostatic draft. For a vessel which is trimmed, obtain the arithmetical mean draft. Determine the position of LCF from AP, for this mean draft.

2. Calculate the hydrostatic draft as below:—
   Hydro. draft = Draft Aft. – correction from table 'A'.
   Note:— Correction is (–ve when trimmed by stern)
   (+ve when trimmed by head)

3. From the Hydrostatic tables, determine against the hydrostatic draft the corresponding displacement (if not given).

4. List the various weights involved in arriving at the final displacement, viz original displacement, weights loaded, discharged or shifted together with their Lcf's. Calculate the final longitudinal moment and final displacement.

   Find the LCG from AP as follows :—

   $$\text{LCG from AP} = \frac{\text{Final long moments}}{\text{Final displacement}}$$

6. Determine against final displacement, the values of hydrostatic draft, MCTC, LCB and LCF.

7. $$\text{Total trim "t" (metre)} = \frac{\text{LCB} - \text{LCG}}{\text{MCTC} \times 100} \times \text{Displacement}$$

8. $$\text{Trim aft 'ta' (metre)} = \frac{\text{'t'} \times \text{LCF}}{\text{LBP}}$$

9. Trim forward 'tf' (metre) = "t" – 'ta'
   Draft aft = Hydrostatic draft – 'ta'
   Draft fwd = Hydratatic draft – 'tf'