

M/B "SAVA"

KNJIGA TRIMA I STABILNOSTI

(IZVOD)

Builders 1973 3.Maj - SHIPYARD AND DIESEL ENGINE FACTORY

YARD NUMBER 560

Port of Registry RIJEKA

Signal Letters 3-FJJ

Length overall 196.600 metres (645 Ft 0 5/16 ins)

Length between perpendiculars 182.880 metres (600 " 0 ")

Breadth moulded 22.900 metres (75 " 1 9/16 ")

Depth moulded to main deck 14.480 metres (47 " 6 1/8 ")

Draught (max), summer 10.841 metres (35 " 6 13/16 ")

Deadweight, summer 30830.52 metric tons (30345 Long Tons)

Lightship weight 8001.00 metric tons (7875 Long Tons)

Lightship centre of gravity 9.557 metres vertical

78.500 metres forward of A.P.

Classed by

LLOYD'S REGISTER OF SHIPPING

+ 100A.1, + LMC

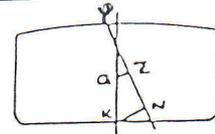
"STRENGTHENED FOR HEAVY CARGOES"

HOLDS No 3 OR 4 OR 5 MAY BE EMPTY

HOLDS Nos 2, 4 AND 6 MAY BE EMPTY

HOLD	LENGTH OF HOLD (METRES)	TOTAL HATCH AND HOLD CAPACITY (METRES ³)	HATCH PLUS HOLD CENTRE OF GRAVITY (METRES)		TRANSVERSE HEELING MOMENTS (METRES ⁴)	
			ABOVE BASE (GRAIN)	FROM AFT PERP		TOTAL
1	A 4.795	5057.64	8.666	154.31		1586
	B 12.330					
	C 3.806					
2	A 3.248	4236.87	7.955	135.93		1197
	B 8.932					
	C 4.060					
3	A 4.060	5151.07	7.974	118.04		1311
	B 12.180					
	C 3.248					
4	A 3.248	4238.47	7.945	100.20		1197
	B 8.932					
	C 4.060					
5	A 4.060	5151.07	7.974	82.31		1311
	B 12.180					
	C 3.248					
6	A 3.248	4238.47	7.945	64.47		1197
	B 8.932					
	C 4.060					
7	A 4.060	5194.27	7.997	46.78		1311
	B 12.180					
	C 3.248					
		33267.86	TOTAL MOMENTS OF HOLDS			9110
DRY HOLD	A 3.660	1115.01	11.765	168.96		1499
	B 3.050					
	C 1.830					
WING TANK	LENGTH P & S (METRES)	CAPACITY (METRES ³)	CENTRE OF GRAVITY (METRES)		TRANSVERSE HEELING MOMENTS (METRES ⁴)	
			ABOVE BASE (GRAIN)	FROM AFT PERP		TOTAL
1 P&S	20.931	741.6	13.490	154.35		275
2 P&S	16.240	513.2	13.044	136.01		165
3 P&S	19.488	605.6	13.013	118.05		198
4 P&S	16.240	504.8	13.013	100.19		165
5 P&S	19.488	605.6	13.013	82.32		198
6 P&S	16.240	504.8	13.013	64.46		165
7 P&S	19.488	598.2	13.006	46.75		198
		4073.8	TOTAL MOMENT OF WING TANKS			1364

HOLD	LENGTH OF HOLD (METRES)	TOTAL HATCH AND HOLD CAPACITY (METRES ³)	HATCH PLUS HOLD CENTRE OF GRAVITY (METRES)		TRANSVERSE HEELING MOMENTS (METRES ⁴)	
			ABOVE BASE (GRAIN)	FROM AFT PERP		TOTAL
1	A 4.795	5312.3	8.666	154.31		641
	B 12.330					
	C 3.806					
2	A 3.248	4446.1	7.955	135.93		504
	B 8.932					
	C 4.060					
3	A 4.060	5358.3	7.974	118.04		601
	B 12.180					
	C 3.248					
4	A 3.248	4445.7	7.945	100.20		505
	B 8.932					
	C 4.060					
5	A 4.060	5358.3	7.974	82.31		601
	B 12.180					
	C 3.248					
6	A 3.248	4445.7	7.945	64.47		505
	B 8.932					
	C 4.060					
7	A 4.060	5401.5	7.997	46.78		601
	B 12.180					
	C 3.248					
		34767.9	TOTAL MOMENTS OF HOLDS			3958
DRY HOLD	A 3.660	1439.20	11.765	168.96		407
	B 3.050					
	C 1.830					
WING TANK	LENGTH P & S (METRES)	CAPACITY (METRES ³)	CENTRE OF GRAVITY (METRES)		TRANSVERSE HEELING MOMENTS (METRES ⁴)	
			ABOVE BASE (GRAIN)	FROM AFT PERP		TOTAL
1 P&S	20.931	741.6	13.490	154.35		275
2 P&S	16.240	513.2	13.044	136.01		165
3 P&S	19.488	605.6	13.013	118.05		198
4 P&S	16.240	504.8	13.013	100.19		165
5 P&S	19.488	605.6	13.013	82.32		198
6 P&S	16.240	504.8	13.013	64.46		165
7 P&S	19.488	598.2	13.006	46.75		198
		4073.8	TOTAL MOMENT OF WING TANKS			1364



GZ = KN - k + sin alpha

RIGHTING LEVER (KN) IN METRES
(Assumed VCG is 0.0 metres above Base
and Vessel inclined about this point)
AT HEELING ANGLES:-

EVEN KEEL DRAFT	RIGHTING LEVER (KN) IN METRES (Assumed VCG is 0.0 metres above Base and Vessel inclined about this point) AT HEELING ANGLES:-									
	5°	10°	15°	20°	25°	30°	35°	40°	45°	60°
METRES										
2.25	1.67	3.30	4.64	5.63	6.34	6.90	7.33	7.64	7.91	8.38
2.50	1.54	3.05	4.36	5.40	6.15	6.75	7.22	7.57	7.89	8.48
2.75	1.43	2.85	4.11	5.18	5.98	6.62	7.12	7.51	7.87	8.58
3.00	1.34	2.66	3.89	4.98	5.81	6.48	7.03	7.45	7.85	8.66
3.25	1.25	2.50	3.69	4.78	5.65	6.35	6.94	7.40	7.84	8.73
3.50	1.17	2.37	3.51	4.60	5.50	6.24	6.86	7.36	7.83	8.79
3.75	1.11	2.25	3.35	4.44	5.37	6.13	6.78	7.32	7.87	8.84
4.00	1.06	2.14	3.21	4.29	5.24	6.03	6.71	7.29	7.81	8.87
4.25	1.01	2.05	3.09	4.16	5.13	5.93	6.65	7.26	7.81	8.88
4.50	.98	1.98	2.99	4.04	5.04	5.85	6.59	7.24	7.80	8.88
4.75	.95	1.92	2.91	3.93	4.95	5.77	6.53	7.22	7.79	8.87
5.00	.93	1.87	2.83	3.83	4.87	5.69	6.48	7.20	7.78	8.85
5.25	.91	1.83	2.77	3.75	4.79	5.62	6.43	7.17	7.77	8.82
5.50	.89	1.79	2.71	3.54	4.72	5.55	6.38	7.14	7.75	8.78
5.75	.88	1.76	2.67	3.60	4.65	5.49	6.34	7.12	7.73	8.74
6.00	.87	1.74	2.63	3.54	4.58	5.43	6.30	7.09	7.70	8.70
6.25	.86	1.72	2.59	3.49	4.52	5.38	6.27	7.06	7.67	8.67
6.50	.85	1.70	2.56	3.45	4.46	5.33	6.23	7.03	7.63	8.62
6.75	.84	1.68	2.54	3.42	4.40	5.29	6.20	6.99	7.60	8.58
7.00	.83	1.67	2.52	3.39	4.35	5.25	6.16	6.95	7.55	8.54
7.25	.83	1.66	2.50	3.37	4.30	5.21	6.13	6.91	7.50	8.50
7.50	.82	1.66	2.49	3.35	4.26	5.18	6.09	6.86	7.45	8.45
7.75	.81	1.65	2.48	3.33	4.23	5.14	6.04	6.81	7.40	8.41
8.00	.81	1.65	2.47	3.32	4.20	5.11	6.00	6.75	7.34	8.37
8.25	.81	1.64	2.46	3.32	4.18	5.09	5.95	6.69	7.28	8.32
8.50	.81	1.64	2.46	3.31	4.17	5.06	5.90	6.63	7.21	8.28
8.75	.81	1.64	2.46	3.31	4.17	5.04	5.85	6.56	7.15	8.23
9.00	.81	1.64	2.46	3.31	4.17	5.02	5.81	6.50	7.09	8.17
9.25	.82	1.64	2.47	3.32	4.17	5.00	5.76	6.43	7.02	8.12
9.50	.82	1.65	2.48	3.33	4.18	4.98	5.71	6.37	6.95	8.06
9.75	.83	1.65	2.49	3.34	4.18	4.95	5.66	6.31	6.89	8.01
10.00	.83	1.66	2.51	3.35	4.18	4.93	5.62	6.26	6.82	7.95
10.25	.83	1.68	2.52	3.36	4.18	4.91	5.58	6.20	6.76	7.89
10.50	.84	1.69	2.54	3.37	4.17	4.89	5.54	6.15	6.70	7.84
10.75	.84	1.70	2.55	3.38	4.16	4.87	5.50	6.10	6.64	7.78
11.00	.85	1.71	2.57	3.39	4.14	4.84	5.46	6.05	6.58	7.72
11.25	.85	1.72	2.58	3.39	4.13	4.81	5.43	5.99	6.51	7.66
11.50	.86	1.73	2.59	3.39	4.10	4.78	5.38	5.94	6.45	7.60
11.75	.87	1.73	2.59	3.38	4.08	4.74	5.33	5.88	6.38	7.55
12.00	.84	1.73	2.58	3.36	4.05	4.70	5.29	5.82	6.32	7.49

C O M P A R T M E N T	I D E N T I T Y K E Y	W E I G H T M T O N S	F R O M A . P .		F R O M B . O F K E E L		F R E E S U R F A C E C O R R N M . M T O N S
			L . C . G .	M O M E N T	V . C . G .	M O M E N T	
			M	M . M T O N S	M	M . M T O N S	
F O R A L L D E P A R T U R E C O N D I T I O N S							
FUEL OIL							
SIDE BUNKER	P&S	609.60	33.02	20128.99	6.190	3773.42	179
DAILY TANK	P&S	95.50	9.24	882.42	11.117	1061.67	8
SETTLING TANK	PORT	52.83	9.24	488.15	11.117	587.31	6
TOTAL HEAVY OIL		757.93	28.37	21499.56	7.154	5422.40	193
DIESEL OIL							
STORAGE TANK	PORT	65.02	9.32	605.99	11.682	759.56	29
STORAGE TANK	STBD	73.15	9.31	681.03	11.832	865.51	55
DAILY TANK		8.13	9.24	75.12	13.127	106.72	-
TOTAL DIESEL OIL		146.30	9.31	1362.14	11.837	1731.79	84
LUBRICATING OIL							
SUMP TANK		12.19	19.50	237.71	1.119	13.64	2
DIRTY TANK		11.18	23.15	258.82	.587	6.56	1
VARIOUS TANKS IN E.R.		17.27	23.05	398.07	9.861	170.30	18
TOTAL LUBRICATING OIL		40.64	22.01	894.60	4.687	190.50	21
FRESH WATER							
FEED WATER TANK		39.62	10.99	435.42	1.150	45.56	45
PISTON COOLING TANK		10.16	27.92	283.67	1.190	12.09	5
DRINKING WATER TK P&S		79.25	35.23	2791.98	13.077	1036.35	91
DOUBLE BOTTOM TANK		101.60	22.64	2300.22	.894	90.83	181
TOTAL FRESH WATER		230.63	25.20	5811.29	5.137	1184.83	322
CREW & STORES							
CREW WITH EFFECTS		10.16	28.00	284.48	19.500	198.12	-
STORES & SPARE PARTS		140.21	90.00	12618.90	12.000	1682.52	-
TOTAL CREW & STORES		150.37	85.81	12903.38	12.507	1880.64	-
TOTAL CONSUMABLES							
		1325.87	32.03	42470.97	7.852	10410.16	620

COMPARTMENT	FRAMES	V.C.G. ABOVE BOTTOM OF KEEL METRES	L.C.G. FROM A.P. METRES	CAPACITIES					FREE SURFACE EFFECTS (1) MTONS X METRES
				CUBIC FEET	CUBIC METRES	METRIC TONS	LONG TONS		
FORE PEAK	224 - STEM	5.795	178.01	25816	731.0	749.28	737.6	511	
DEEP TANK	210 - 224	3.507	168.85	20939	592.9	607.72	598.3	1934	
No 1 DOUBLE BOTTOM TANK	P&S 180 - 210	1.444	153.96	27434	776.8	796.22	783.2	3723	
No 2 DOUBLE BOTTOM TANK	P&S 136 - 180	1.075	126.03	47840	1354.6	1388.46	1366.8	8882	
No 3 DOUBLE BOTTOM TANK	P&S 116 - 136	1.082	100.19	22122	626.4	642.06	632.1	4166	
No 4 DOUBLE BOTTOM TANK	P&S 72 - 116	1.082	74.20	48617	1376.6	1411.01	1389.1	9163	
No 5 DOUBLE BOTTOM TANK	P&S 46 - 72	1.122	46.48	25583	724.4	742.51	731.0	5414	
No 1 TOP-SIDE TANK	P&S 180 - 210	13.490	154.35	26191	741.6	760.14	748.3	454	
No 2 TOP-SIDE TANK	P&S 160 - 180	13.044	136.01	18124	513.2	526.03	517.9	383	
No 3 TOP-SIDE TANK	P&S 136 - 160	13.013	118.05	21388	605.6	620.74	611.1	460	
No 4 TOP-SIDE TANK	P&S 116 - 136	13.013	100.19	17828	504.8	517.42	509.4	383	
No 5 TOP-SIDE TANK	P&S 92 - 116	13.013	82.32	21388	605.6	620.74	611.1	460	
No 6 TOP-SIDE TANK	P&S 72 - 92	13.013	64.46	17828	504.8	517.42	509.4	383	
No 7 TOP-SIDE TANK	P&S 48 - 72	13.006	46.75	21126	598.2	613.15	603.6	460	
AFT PEAK	0 - 12	9.564	4.56	10839	306.9	314.57	309.7	1975	
TOTALS				373063	10563.4	10827.47	10658.6	38751	

CAPACITIES & CENTRES OF GRAVITY (WATER BALLAST TANKS)

M.V. "SAVA"

COMPARTMENT	FRAMES	V.C.G. ABOVE BOTTOM OF KEEL METRES	L.C.G. FROM A.P. METRES	CAPACITY					FREE SURFACE EFFECTS (1) MTONS X METRES
				CUBIC FEET	CUBIC METRES	METRIC TONS	LONG TONS		
NO 5 DOUBLE BOTTOM TANK	P&S	46 - 72	1,122	46,48	25583	724,4	684,0	673,2	4987,5
SIDE BUNKER	P	38 - 48	7,938	33,01	15737	445,6	420,7	414,1	89,4
SIDE BUNKER	S	38 - 48	7,893	32,95	16044	454,3	428,9	422,2	89,4
SLUDGE TANK IN BUNKER		38 - 41	6,359	29,54	286	8,7	8,2	8,1	9,1
D.O. OR H.F. OIL DB TANK	P	40 - 46	1,070	32,96	1847	52,3	49,4	48,6	77,2
HEAVY FUEL OIL DB TANK	S	38 - 46	1,070	32,11	2592	73,4	69,3	68,2	102,6
HEAVY FUEL OIL DAILY TANK	P	12 - 16	11,117	9,24	1624	46,0	43,5	42,8	3,0
HEAVY FUEL OIL DAILY TANK	S	12 - 16	11,117	9,24	1939	54,9	51,8	51,0	5,1
SETTLING TANK	P	12 - 16	11,117	9,24	1995	56,5	53,3	52,5	6,1
FUEL OIL OVERFLOW		39 - 41	1,070	30,36	484	13,7	12,9	12,7	9,1
TOTAL HEAVY FUEL OIL					68131	1929,8	1822,0	1793,4	5378,5
DIESEL OIL STORAGE	P	12 - 16	11,682	9,32	2705	76,6	65,4	64,4	28,4
DIESEL OIL STORAGE	S	12 - 16	11,832	9,31	3041	86,1	73,5	72,4	54,9
DIESEL OIL DAILY		12 - 16	13,127	9,24	335	9,5	8,1	8,0	-
D.O. OR H.F. OIL DB TANK	P	40 - 46	1,070	32,96	1847	52,3	44,7	44,0	70,1
TOTAL DIESEL OIL					7928	224,5	191,7	188,8	153,4
DIRTY LUBRICATING OIL		29 - 34	1,087	23,15	660	18,7	16,8	16,5	1,0
LUBRICATING OIL SWMP		20 - 29	1,387	19,50	699	19,8	17,8	17,5	2,0
CYLINDER LUB OIL.		29 - 31	10,525	22,28	819	23,2	20,8	20,5	9,1
SEPAR. LUB OIL TANK FOR ME		31 - 33	10,232	23,90	565	16,0	14,3	14,1	9,1
CLEAN LUB OIL TANK FOR AE		31 - 33	11,350	23,90	176	5,0	4,5	4,4	-
SLUDGE TANK FOR TURBULO		38 - 39	1,070	29,14	88	2,5	2,2	2,2	2,0
LUB OIL OVERFLOW		38 - 39	1,070	29,14	88	2,5	2,2	2,2	2,0
AUX E COLL LUB OIL		38 - 39	1,070	29,14	60	1,7	1,5	1,5	-
TOTAL LUBRICATING OIL					3155	89,4	80,1	78,9	25,2
TOTALS (INCLUDING X)					77367	2191,4	2049,1	2017,1	5487,0
TOTALS (INCLUDING Ø)					77367	2191,4	2044,4	2012,5	5479,9

COMPARTMENT	FRAMES	V.C.G. ABOVE BOTTOM OF KEEL METRES	L.C.G. FROM A.P. METRES	CAPACITY			FREE SURFACE EFFECTS (1) MTONS X METRES
				CUBIC FEET	CUBIC METRES	METRIC TONS	
FRESH WATER							
BOILER FEED DB TANK	12 - 19	1.150	10.99	1395	39.5	39.5	44.7
FRESH WATER DB TANK	19 - 37	1.234	22.64	5523	156.4	156.4	180.8
PISTON COOLING FW TANK	35 - 39	1.190	27.92	364	10.3	10.3	5.1
DRINKING WATER TANK	44 - 48	13.077	35.23	2825	80.0	80.0	91.4
TOTALS				10107	286.2	286.2	322.0

NOTES:

1. Free Surfaces in H.F.O., Diesel Oil, Lub Oil and Fresh Water Tanks:

For the sailing conditions shown in the accompanying pages the Free Surface Effect has been calculated on the basis of free surfaces existing in tanks as listed in the Tables on Pages 14 and 15 for Departure and Arrival cases respectively.

If in an actual case the consumables are carried in an other manner than as shown in the Tables on Pages 14 and 15 the appropriate Free Surface Effects of respective tanks can be read from the Tables on Pages 34 and 35.

2. Free Surfaces in Ballast Tanks:

The Free Surface Effect of only those Ballast Tanks that will be filled during the voyage is to be taken in account. The respective Free Surface Effects can be read from the Table on Page 33.

3. Cargo in Top-Side Tanks:

When carrying cargo in Top-Side Tanks Nos. 1 to 7, Overboard Discharge Valves have to be closed, their remote control disconnected and watertight covers fitted.

4. The specific weights for the various liquids (Pages 33, 34 and 35) are:-

Sea Water	Cubic feet per long ton	Cubic metres per metric ton
Fresh Water	35.000	0.9754
Heavy Fuel Oil	35.840	0.9988
Diesel Oil	38.000	1.0590
Lub Oil	42.000	1.1705
	40.000	1.1148

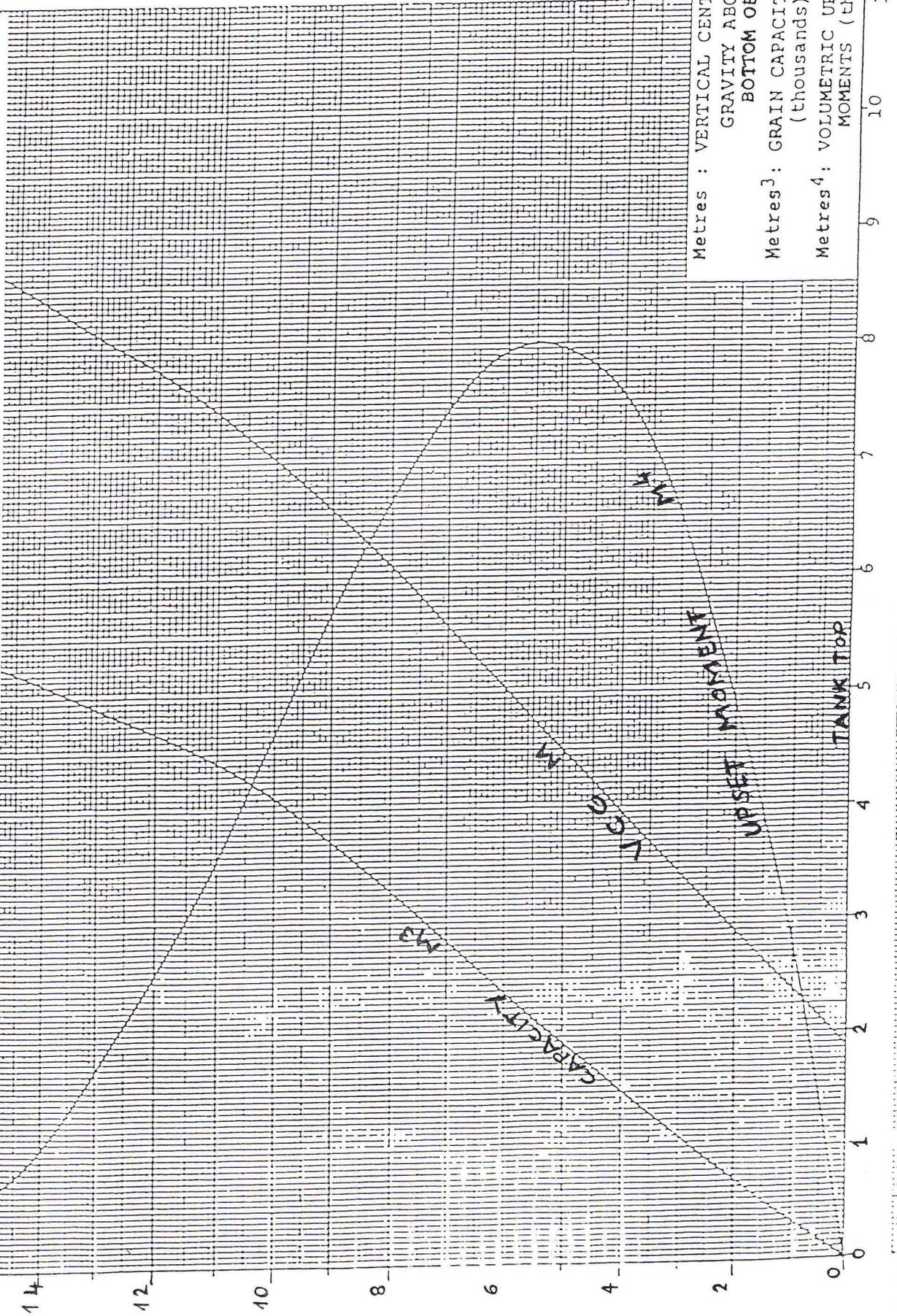
CURVES OF UPSET MOMENTS, CAPACITY AND VERTICAL CENTRE OF GRAVITY IN HOLD No 1

M.V. "SAVA"

NOTE: - The Grain Shift Moments incorporate an allowance of 12 per cent to account for the adverse effect of vertical shift of grain except at zero ullage (compartment filled).

FOR FULL HOLD		TRIMMED	NOT TRIMMED
CAPACITY (M ³)		5312.30	5057.64
V.C.G.		8.666	8.666
UPSET MOMENTS (M ³)		641	1437

TOP OF HATCH COAMING (AFT)



Metres : VERTICAL CENTRE OF GRAVITY ABOVE BOTTOM OF KEEL
 Metres³ : GRAIN CAPACITY (thousands)
 Metres⁴ : VOLUMETRIC UPSET MOMENTS (thousands)

CAPACITY

ULLAGE

UPSET MOMENT

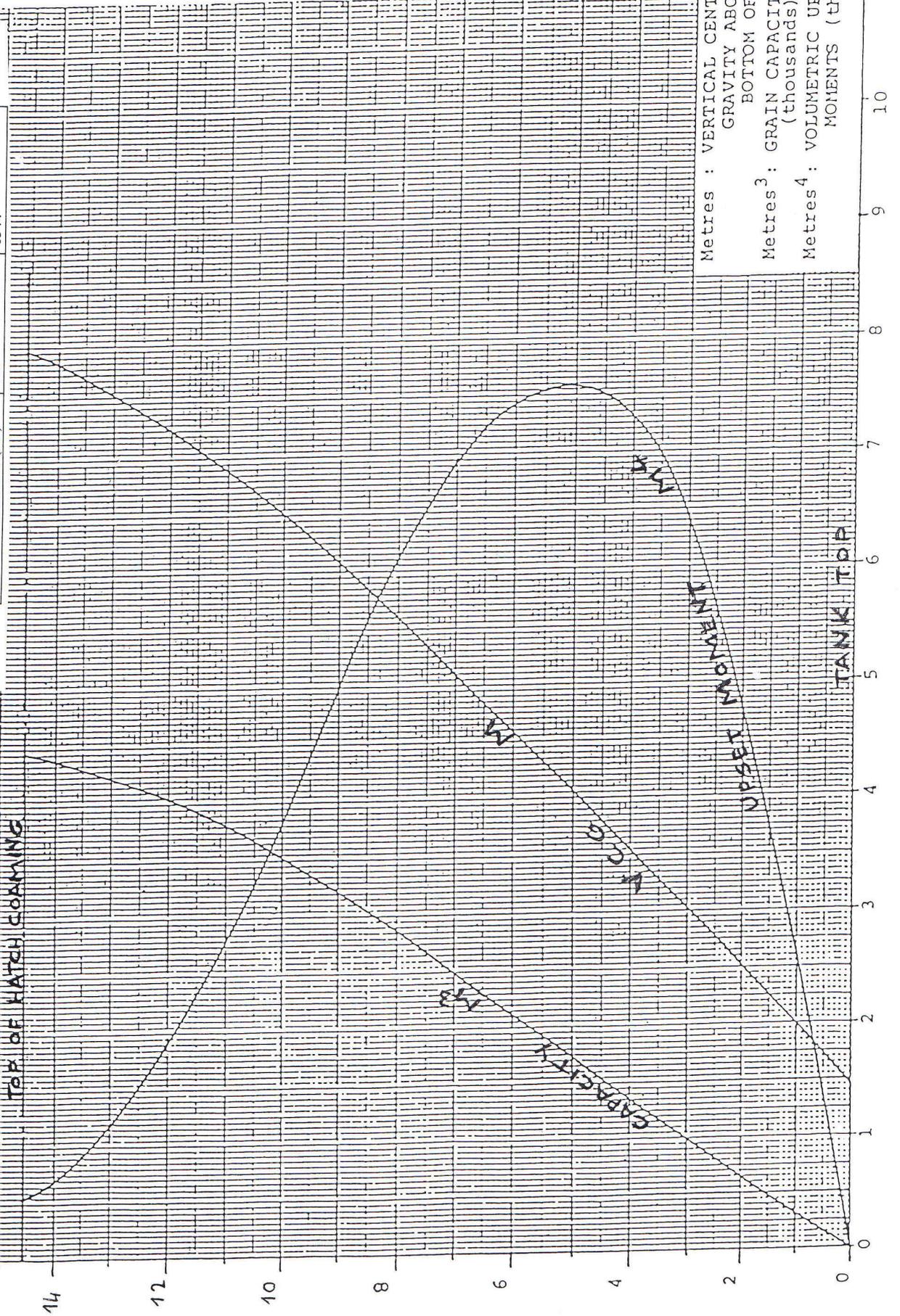
TANK TOP

CURVES OF UPSET MOMENTS, CAPACITY AND
VERTICAL CENTRE OF GRAVITY IN HOLDS Nos 2,4,6

M.V. "SAVA"

NOTE: - The Grain Shift Moments incorporate an allowance of 12 per cent to account for the adverse effect of vertical shift of grain except at zero ullage (compartment filled).

FOR FULL HOLD	TRIMMED	NOT TRIMMED
CAPACITY (M ³)	4446,10	4236,87
V.C.G.	7,955	7,955
UPSET MOMENTS (M ⁴)	505	1344



Metres : VERTICAL CENTRE OF GRAVITY ABOVE BOTTOM OF KEEL
Metres³ : GRAIN CAPACITY (thousands)
Metres⁴ : VOLUMETRIC UPSET MOMENTS (thousands)

TANK TOP

11
10
9
8
7
6
5
4
3
2
1
0

CURVES OF UPSET MOMENTS, CAPACITY AND VERTICAL CENTER OF GRAVITY IN HOLD Nos 3,5, and 7 similar M.V. "SAVA"

NOTE: - The Grain Shift Moments incorporate an allowance of 12 per cent to account for the adverse effect of vertical shift of grain except at zero ullage (compartment filled).

FOR FULL HOLD	TRIMMED	NOT TRIMMED
CAPACITY (M ³)	5358,30	5151,07
V.C.G.	7,974	7,974
UPSET MOMENTS (M ⁴)	601	1434

