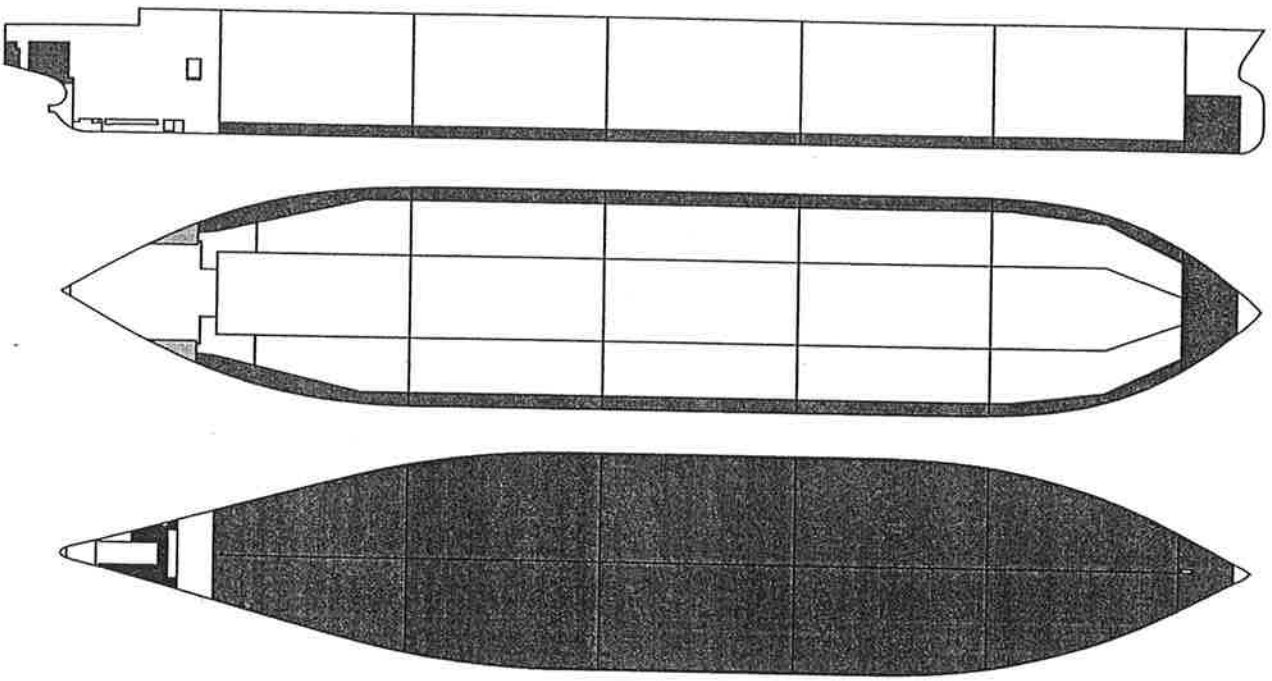
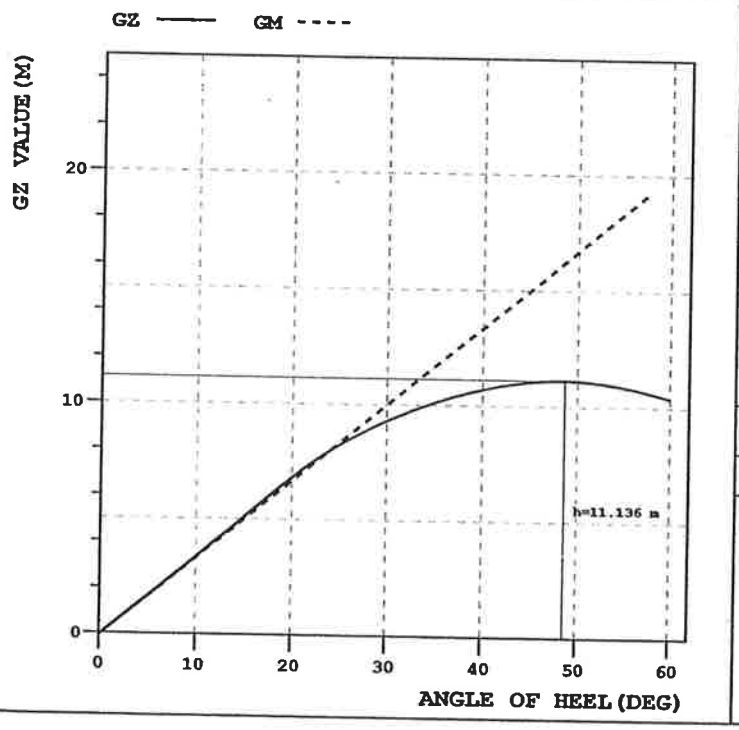
1. STEP 0 - BALLAST ARR.COND.

CRUDE OIL
FRESH WATER
DIESEL OIL
WATER BALLAST
HEAVY FUEL OIL
LUBRICATING OIL





DISPLACEMENT	146893 Ton
KGo=KG+GGo	12.005 m
FLOODING ANGLE	40.000 Degree

AREA UNDER GZ CURVE

CRITERIA	RESULT	REQUIREMENT
0 Up to 30	2.596	0.055 M-RAD
0 Up to Flooding Ang.	4.354	0.090 M-RAD
30 Up to Flooding Ang.	1.758	0.030 M-RAD

LEVER AFTER FREE SURFACE CORR.

CRITERIA	RESULT	REQUIREMENT
GZ at 30 Deg	9.296	0.200 M
GoM	19.218	0.150 M
Angle of MAX GZ	48.4	25.00 DEG
Maximum GZ	11.1	

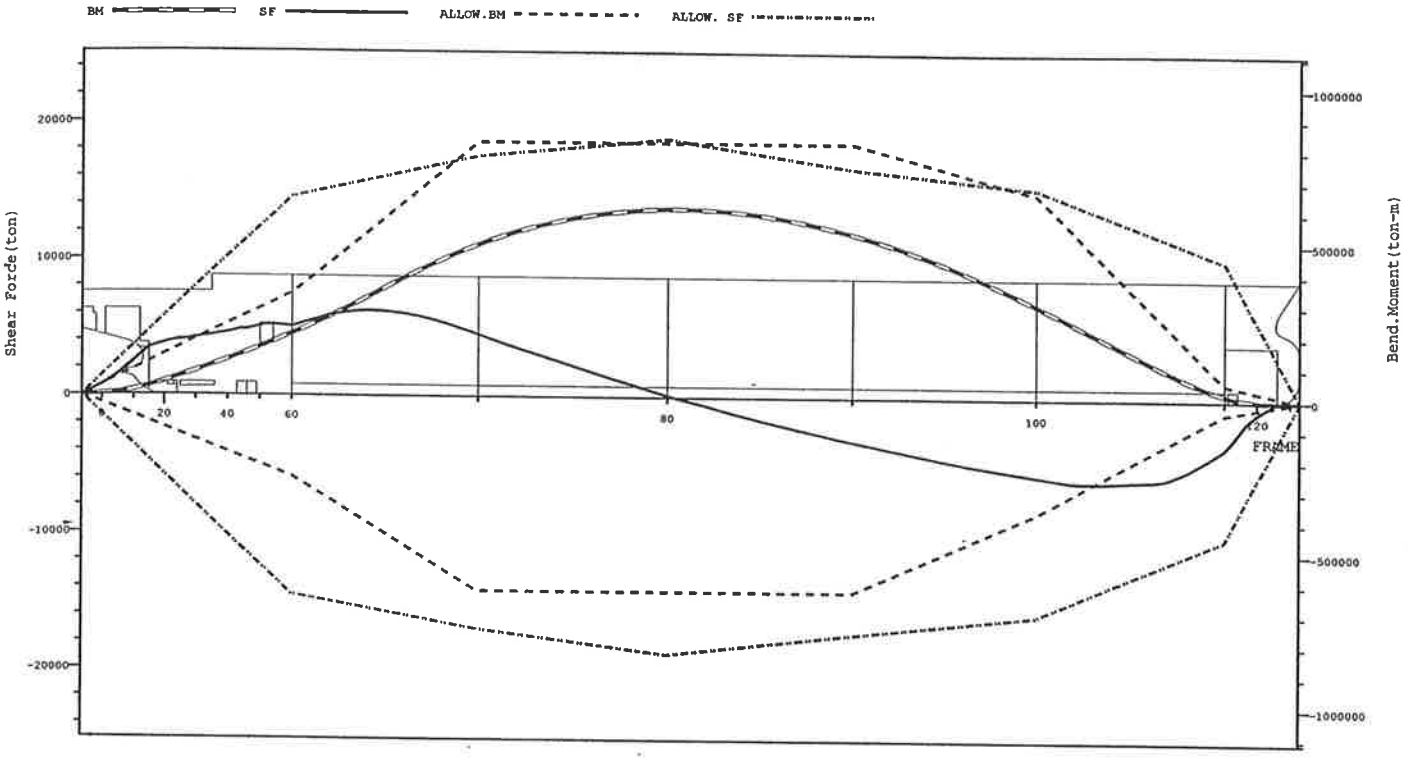
CONDITION 1. STEP 0 - BALLAST ARR.COND.

WEIGHT ITEMS	FILL. (%)	S.G	WEIGHT (MT)	L.C.G (M)	V.C.G (M)	T.C.G (M)	F.S.M (MT-M)
NO.1 W.B.TK(P)	100.0	1.0250	8790.0	279.870	11.198	18.224	0
NO.1 W.B.TK(S)	100.0	1.0250	8790.0	279.870	11.198	-18.224	0
NO.2 W.B.TK(P)	100.0	1.0250	10126.4	229.326	9.652	21.363	0
NO.2 W.B.TK(S)	100.0	1.0250	10126.4	229.326	9.652	-21.363	0
NO.3 W.B.TK(P)	100.0	1.0250	10218.2	178.500	9.593	21.421	0
NO.3 W.B.TK(S)	100.0	1.0250	10218.2	178.500	9.593	-21.421	0
NO.4 W.B.TK(P)	100.0	1.0250	9973.0	127.896	9.777	21.274	0
NO.4 W.B.TK(S)	100.0	1.0250	9973.0	127.896	9.777	-21.274	0
NO.5 W.B.TK(P)	100.0	1.0250	9136.8	75.928	11.734	19.496	0
NO.5 W.B.TK(S)	100.0	1.0250	9176.6	75.805	11.752	-19.503	0
F.P.TK	100.0	1.0250	4173.3	312.027	8.426	-0.001	0
A.P.TK	100.0	1.0250	2275.5	5.346	20.407	-0.025	0
TOTAL WATER BALLAST			102977.4	179.333	10.488	-0.009	0
F.W.TK(P)	10.0	1.0000	28.9	9.157	23.804	10.705	424
F.W.TK(S)	10.0	1.0000	20.6	8.409	23.803	-11.338	312
DIST.W.TK(S)	10.0	1.0000	8.3	11.050	23.807	-9.100	45
TOTAL FRESH WATER			57.8	9.161	23.804	0.004	782
NO.1 H.F.O.TK(P)	4.5	1.0000	110.6	41.999	11.394	14.507	2048
NO.1 H.F.O.TK(S)	4.5	1.0000	129.9	41.789	11.647	-14.598	2048
H.F.O.SETT.TK(P)	98.0	1.0000	235.5	39.651	17.685	14.679	78
H.F.O.SERV.TK(P)	98.0	1.0000	292.3	41.650	24.663	17.332	396
TOTAL HEAVY FUEL OIL			768.4	41.111	18.414	10.716	4570
D.O.STOR.TK(P)	10.0	0.8500	12.8	36.265	0.386	3.255	214
D.O.STOR.TK(S)	10.0	0.8500	16.7	35.642	0.451	-3.376	271
D.O.SETT.TK(S)	10.0	0.8500	3.2	43.350	21.748	-13.571	6
D.O.SERV.TK(S)	10.0	0.8500	6.3	40.800	21.748	-13.571	11
TOTAL DIESEL OIL			39.1	37.308	5.610	-3.678	503
M/E CYL.O.STOR.TK(P)	10.0	0.9000	7.4	44.200	14.430	4.095	24
M/E SYS.O.STOR.TK(S)	10.0	0.9000	7.4	44.200	14.430	-4.095	24
M/E SYS.O.SETT.TK(C)	10.0	0.9000	5.9	44.200	14.430	0.000	12
G/E L.O.STOR.TK(P)	10.0	0.9000	1.4	22.100	15.573	7.162	3
G/E L.O.SETT.TK(P)	10.0	0.9000	1.4	20.400	15.573	7.162	3
TOTAL LUBRICATING OIL			23.4	41.547	14.562	0.828	65
TOTAL DEADWEIGHT CONSTANT			427.0	66.630	10.135	0.000	0
TOTAL DEADWEIGHT			104293.1	177.675	10.552	0.069	5919
LIGHT SHIP			42600.0	152.000	15.425	0.029	0
TOTAL DISPLACEMENT			146893.1	170.229	11.965	0.058	5919

EQUIV. DRAFT(EXT)	= 10.131 M	M.T.C.	= 2947.85 MT-M
AFT. DRAFT(EXT)	= 11.630 M	T.P.C	= 155.46 MT/CM
FORE DRAFT(EXT)	= 8.865 M	K.M.T.	= 31.224 M
TRIM	= 2.765 M	V.C.G.	= 11.965 M
DISPLACEMENT	= 146893.1 MT	UNCORRECTED GM	= 19.259 M
L.C.G.	= 170.229 M	GGO	= 0.040 M
L.C.B.	= 170.161 M	CORRECTED GM(GOM)	= 19.218 M
L.C.F.	= 172.863 M	PROPELLER IMMER.	= 106.9 %
		BLIND DISTANCE	= 496.5 M

HEEL ANGLES(DEG.) =	0.000	5.000	10.000	15.000	20.000	30.000	40.000	50.000	60.000
GZ VALUE (M) =	-0.058	1.623	3.327	5.071	6.809	9.296	10.712	11.120	10.401
GZ AREA (M*RAD.) =	0.000	0.068	0.284	0.650	1.169	2.595	4.354	6.276	8.166

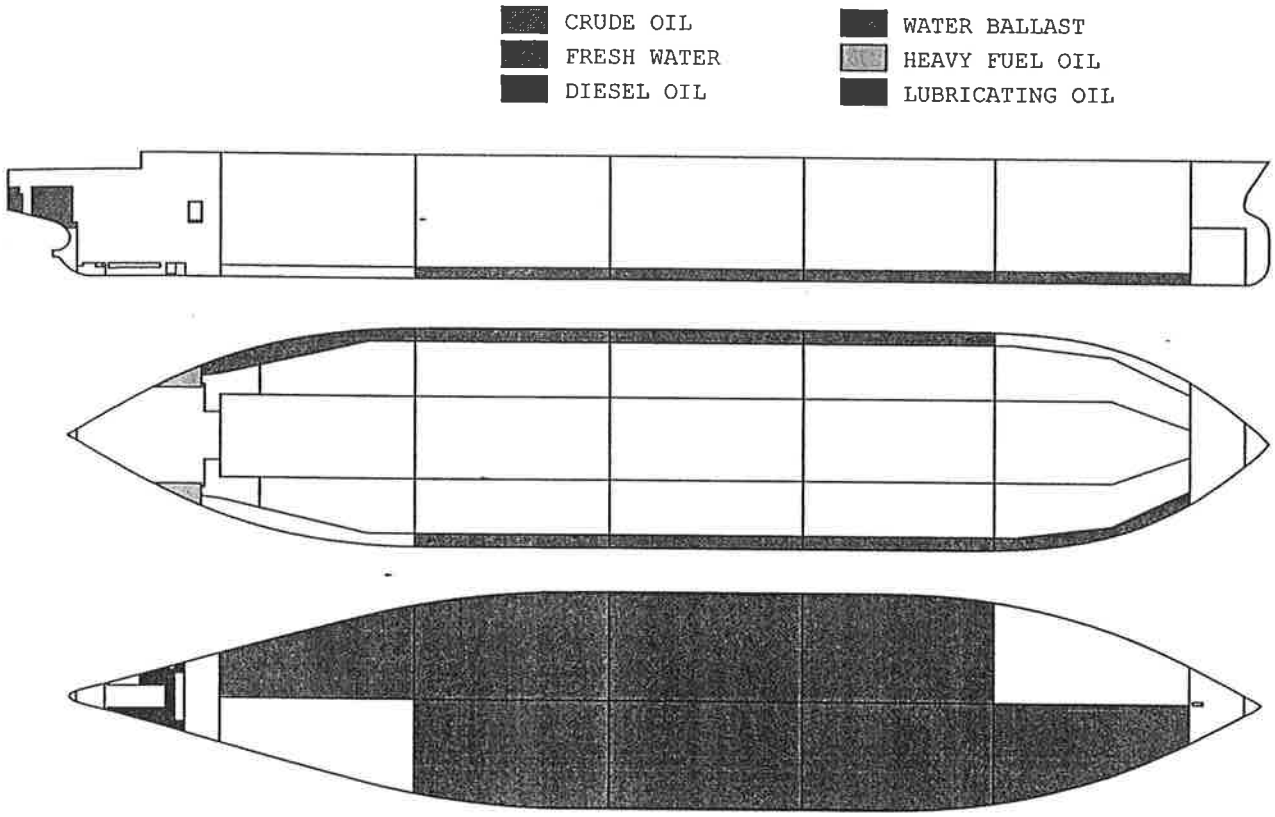
1. STEP 0 - BALLAST ARR.COND.

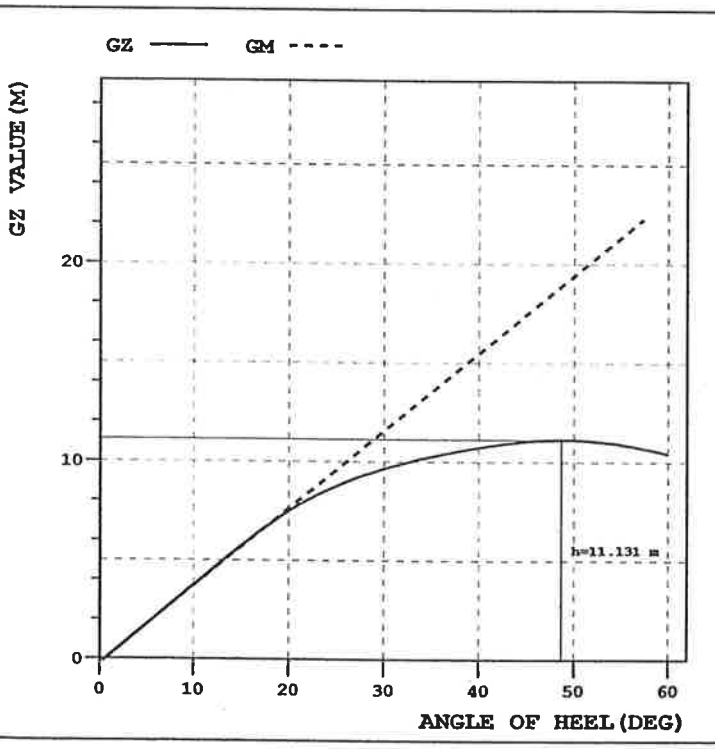


FR. NO.	DISTANCE M	SHEAR FORCE T	%	BENDING MOMENT TM	%	WEIGHT T/M	BOUY. T/M
-6	-5.500	0.0	-	0.0	-	93.9	0.0
0	-0.000	693.1	49.10	1936.2	6.03	168.6	18.8
60	51.000	5029.2	34.68	199074.1	60.33	324.9	341.0
70	102.000	4515.8	25.80	490573.8	59.83	499.8	594.4
80	153.000	162.9	0.87	607695.6	74.11	534.9	611.6
90	204.000	-3150.3	18.21	529522.6	64.58	529.2	585.2
100	255.000	-5622.1	35.36	302992.1	45.98	496.0	537.3
110	306.000	-3481.9	34.14	20353.1	37.69	421.5	232.7
133	326.500	0.0	-	-0.0	-	20.2	0.2

SHEAR FORCE (Negative)	: -6061 Ton (43.0%)	POSITION	: Fr103 + 0.87 m
SHEAR FORCE (Positive)	: 6212 Ton (39.3%)	POSITION	: Fr 64 + 1.70 m
SAGGING MOMENT (Max.)	: -143 T-m (1.1%)	POSITION	: Fr125 + 0.50 m
HOGGING MOMENT (Max.)	: 607924 T-m (74.1%)	POSITION	: Fr 80 + 3.10 m

2. STEP 1 - BALLAST EXCHANGE





DISPLACEMENT	124753 Ton
KGo=KG+GGo	12.201 m
FLOODING ANGLE	40.000 Degree

AREA UNDER GZ CURVE

CRITERIA	RESULT	REQUIREMENT
0 Up to 30	2.817	0.055 M-RAD
0 Up to Flooding Ang.	4.602	0.090 M-RAD
30 Up to Flooding Ang.	1.786	0.030 M-RAD

LEVER AFTER FREE SURFACE CORR.

CRITERIA	RESULT	REQUIREMENT
GZ at 30 Deg	9.638	0.200 M
GoM	22.478	0.150 M
Angle of MAX GZ	48.9	25.00 DEG
Maximum GZ	11.1	

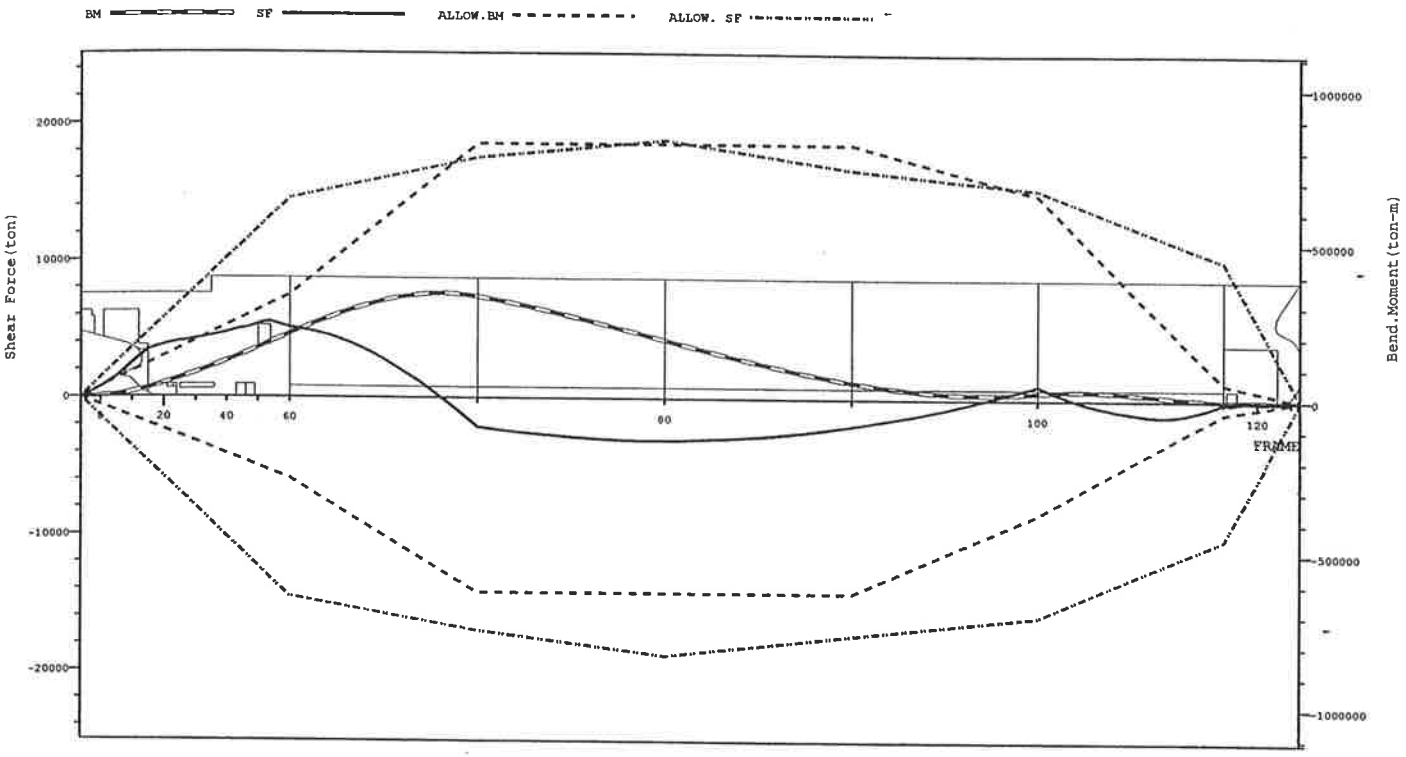
CONDITION 2. STEP 1 - BALLAST EXCHANGE

WEIGHT ITEMS	FILL. (%)	S.G	WEIGHT (MT)	L.C.G (M)	V.C.G (M)	T.C.G (M)	F.S.M (MT-M)
NO.1 W.B.TK(S)	100.0	1.0250	8790.0	279.870	11.198	-18.224	0
NO.2 W.B.TK(P)	100.0	1.0250	10126.4	229.326	9.652	21.363	0
NO.2 W.B.TK(S)	100.0	1.0250	10126.4	229.326	9.652	-21.363	0
NO.3 W.B.TK(P)	100.0	1.0250	10218.2	178.500	9.593	21.421	0
NO.3 W.B.TK(S)	100.0	1.0250	10218.2	178.500	9.593	-21.421	0
NO.4 W.B.TK(P)	100.0	1.0250	9973.0	127.896	9.777	21.274	0
NO.4 W.B.TK(S)	100.0	1.0250	9973.0	127.896	9.777	-21.274	0
NO.5 W.B.TK(P)	100.0	1.0250	9136.8	75.928	11.734	19.496	0
A.P.TK	100.0	1.0250	2275.5	5.346	20.407	-0.025	0
TOTAL WATER BALLAST			80837.5	173.303	10.374	0.221	0
F.W.TK(P)	10.0	1.0000	28.9	9.157	23.804	10.705	424
F.W.TK(S)	10.0	1.0000	20.6	8.409	23.803	-11.338	312
DIST.W.TK(S)	10.0	1.0000	8.3	11.050	23.807	-9.100	45
TOTAL FRESH WATER			57.8	9.161	23.804	0.004	782
NO.1 H.F.O.TK(P)	4.5	1.0000	110.6	41.999	11.394	14.507	2048
NO.1 H.F.O.TK(S)	4.5	1.0000	129.9	41.789	11.647	-14.598	2048
H.F.O.SETT.TK(P)	98.0	1.0000	235.5	39.651	17.685	14.679	78
H.F.O.SERV.TK(P)	98.0	1.0000	292.3	41.650	24.663	17.332	396
TOTAL HEAVY FUEL OIL			768.4	41.111	18.414	10.716	4570
D.O.STOR.TK(P)	10.0	0.8500	12.8	36.265	0.386	3.255	214
D.O.STOR.TK(S)	10.0	0.8500	16.7	35.642	0.451	-3.376	271
D.O.SETT.TK(S)	10.0	0.8500	3.2	43.350	21.748	-13.571	6
D.O.SERV.TK(S)	10.0	0.8500	6.3	40.800	21.748	-13.571	11
TOTAL DIESEL OIL			39.1	37.308	5.610	-3.678	503
M/E CYL.O.STOR.TK(P)	10.0	0.9000	7.4	44.200	14.430	4.095	24
M/E SYS.O.STOR.TK(S)	10.0	0.9000	7.4	44.200	14.430	-4.095	24
M/E SYS.O.SETT.TK(C)	10.0	0.9000	5.9	44.200	14.430	0.000	12
G/E L.O.STOR.TK(P)	10.0	0.9000	1.4	22.100	15.573	7.162	3
G/E L.O.SETT.TK(P)	10.0	0.9000	1.4	20.400	15.573	7.162	3
TOTAL LUBRICATING OIL			23.4	41.547	14.562	0.828	65
TOTAL DEADWEIGHT CONSTANT			427.0	66.630	10.135	0.000	0
TOTAL DEADWEIGHT			82153.3	171.294	10.456	0.316	5919
LIGHT SHIP			42600.0	152.000	15.425	0.029	0
TOTAL DISPLACEMENT			124753.3	164.706	12.153	0.218	5919

EQUIV. DRAFT(EXT)	= 8.698 M	:	M.T.C.	= 2872.20 MT-M
AFT. DRAFT(EXT)	= 11.367 M	:	T.P.C	= 153.80 MT/CM
FORE DRAFT(EXT)	= 6.455 M	:	K.M.T.	= 34.679 M
TRIM	= 4.912 M	:	V.C.G.	= 12.153 M
DISPLACEMENT	= 124753.3 MT	:	UNCORRECTED GM	= 22.526 M
L.C.G.	= 164.706 M	:	GGO	= 0.047 M
L.C.B.	= 164.589 M	:	CORRECTED GM(GOM)	= 22.478 M
L.C.F.	= 172.795 M	:	PROPELLER IMMER.	= 103.8 %
			BLIND DISTANCE	= 628.5 M

HEEL ANGLES(DEG.)	= 0.000	5.000	10.000	15.000	20.000	30.000	40.000	50.000	60.000
GZ VALUE (M)	= -0.219	1.746	3.728	5.720	7.494	9.638	10.725	11.123	10.431
GZ AREA (M*RAD.)	= 0.000	0.067	0.305	0.718	1.297	2.815	4.601	6.521	8.415

2. STEP 1 - BALLAST EXCHANGE

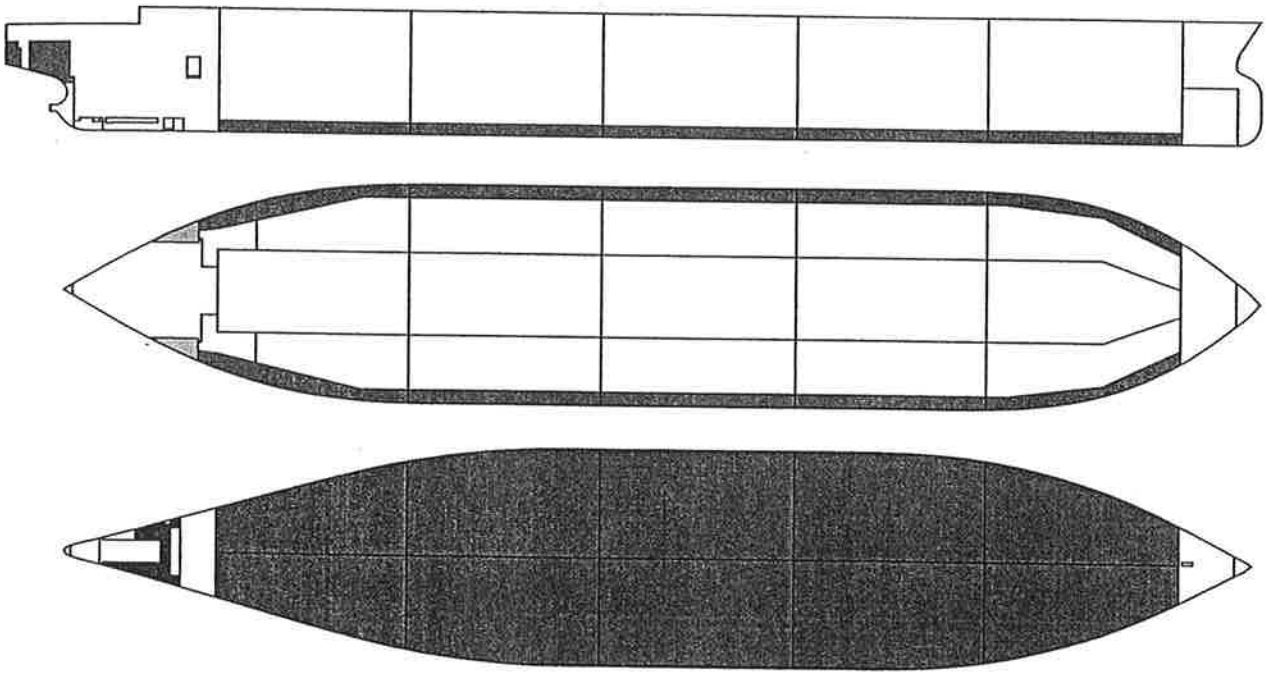


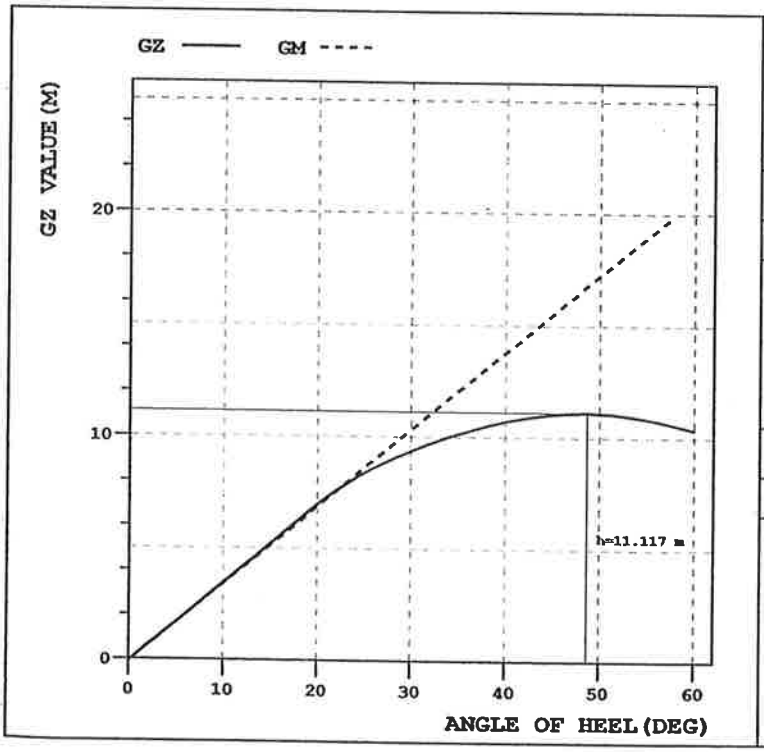
FR. NO.	DISTANCE M	SHEAR FORCE T	SHEAR FORCE %	BENDING MOMENT TM	BENDING MOMENT %	WEIGHT T/M	BOUY. T/M
-6	-5.500	0.0	-	0.0	-	93.9	0.0
0	-0.000	694.3	49.19	1999.9	6.23	168.5	18.3
60	51.000	5077.1	35.01	204366.0	61.93	240.5	316.7
70	102.000	-2109.2	12.41	326365.4	39.80	499.6	538.2
80	153.000	-3069.4	16.33	188276.4	22.96	534.7	534.8
90	204.000	-1950.9	11.28	54442.2	6.64	529.1	488.0
100	255.000	1043.2	6.82	24719.9	3.75	495.8	420.4
110	306.000	-140.2	1.37	883.4	1.64	270.1	159.3
133	326.500	0.0	-	-0.0	-	20.2	0.0

SHEAR FORCE (Negative)	: -3069 Ton (16.3%)	POSITION	: Fr 80 + 0.00 m
SHEAR FORCE (Positive)	: 5468 Ton (41.5%)	POSITION	: Fr 54 +-0.00 m
SAGGING MOMENT (Max.)	: -60 T-m (0.8%)	POSITION	: Fr128 + 0.84 m
HOGGING MOMENT (Max.)	: 336055 T-m (45.6%)	POSITION	: Fr 68 + 1.62 m

3. STEP 2 - BALLAST EXCHANGE

CRUDE OIL
FRESH WATER
DIESEL OIL
WATER BALLAST
HEAVY FUEL OIL
LUBRICATING OIL





DISPLACEMENT	142720 Ton
KGo=KG+GGo	12.110 m
FLOODING ANGLE	40.000 Degree

AREA UNDER GZ CURVE

CRITERIA	RESULT	REQUIREMENT
0 Up to 30	2.651	0.055 M-RAD
0 Up to Flooding Ang.	4.415	0.090 M-RAD
30 Up to Flooding Ang.	1.764	0.030 M-RAD

LEVER AFTER FREE SURFACE CORR.

CRITERIA	RESULT	REQUIREMENT
GZ at 30 Deg	9.373	0.200 M
GoM	19.843	0.150 M
Angle of MAX GZ	48.4	25.00 DEG
Maximum GZ	11.1	

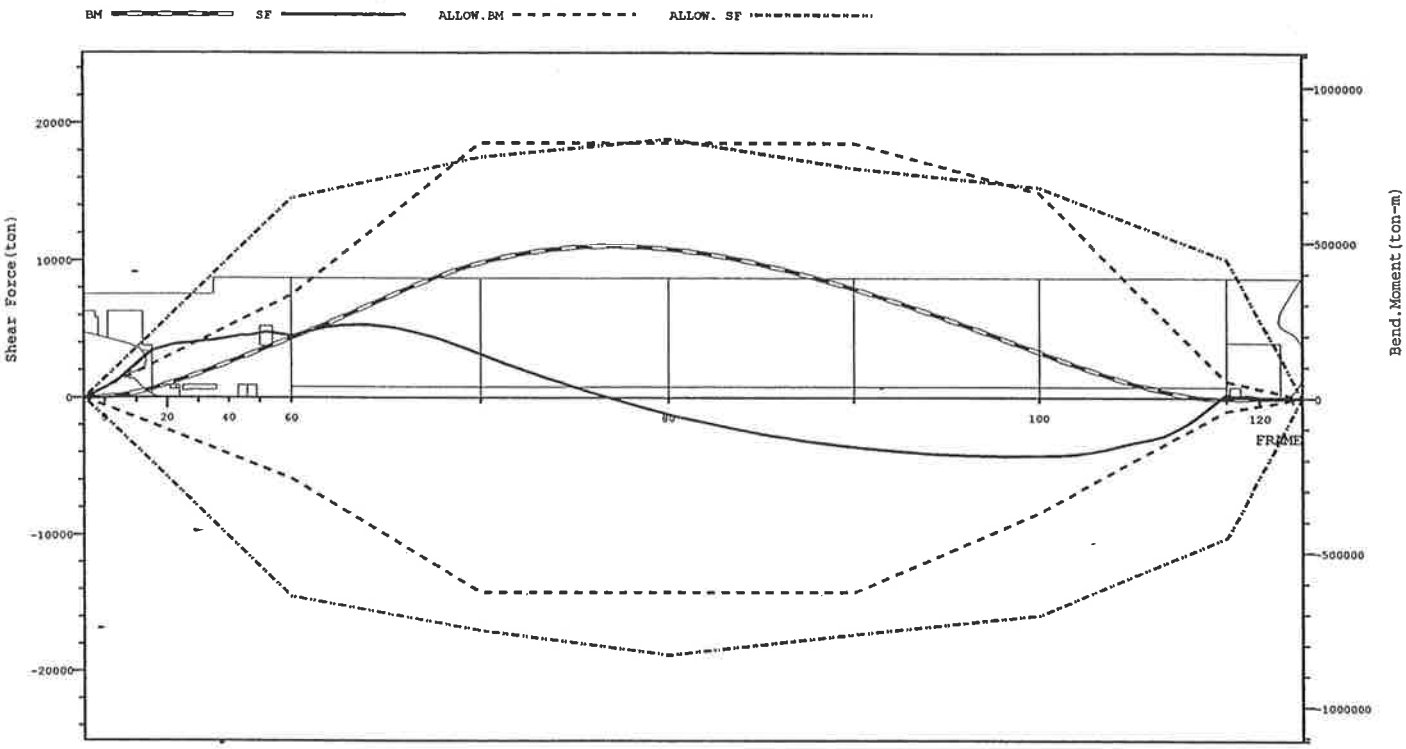
CONDITION 3. STEP 2 - BALLAST EXCHANGE

WEIGHT ITEMS	FILL. (%)	S.G	WEIGHT (MT)	L.C.G (M)	V.C.G (M)	T.C.G (M)	F.S.M (MT-M)
NO.1 W.B.TK(P)	100.0	1.0250	8790.0	279.870	11.198	18.224	0
NO.1 W.B.TK(S)	100.0	1.0250	8790.0	279.870	11.198	-18.224	0
NO.2 W.B.TK(P)	100.0	1.0250	10126.4	229.326	9.652	21.363	0
NO.2 W.B.TK(S)	100.0	1.0250	10126.4	229.326	9.652	-21.363	0
NO.3 W.B.TK(P)	100.0	1.0250	10218.2	178.500	9.593	21.421	0
NO.3 W.B.TK(S)	100.0	1.0250	10218.2	178.500	9.593	-21.421	0
NO.4 W.B.TK(P)	100.0	1.0250	9973.0	127.896	9.777	21.274	0
NO.4 W.B.TK(S)	100.0	1.0250	9973.0	127.896	9.777	-21.274	0
NO.5 W.B.TK(P)	100.0	1.0250	9136.8	75.928	11.734	19.496	0
NO.5 W.B.TK(S)	100.0	1.0250	9176.6	75.805	11.752	-19.503	0
A.P.TK	100.0	1.0250	2275.5	5.346	20.407	-0.025	0
TOTAL WATER BALLAST			98804.1	173.728	10.575	-0.009	0
F.W.TK(P)	10.0	1.0000	28.9	9.157	23.804	10.705	424
F.W.TK(S)	10.0	1.0000	20.6	8.409	23.803	-11.338	312
DIST.W.TK(S)	10.0	1.0000	8.3	11.050	23.807	-9.100	45
TOTAL FRESH WATER			57.8	9.161	23.804	0.004	782
NO.1 H.F.O.TK(P)	4.5	1.0000	110.6	41.999	11.394	14.507	2048
NO.1 H.F.O.TK(S)	4.5	1.0000	129.9	41.789	11.647	-14.598	2048
H.F.O.SETT.TK(P)	98.0	1.0000	235.5	39.651	17.685	14.679	78
H.F.O.SERV.TK(P)	98.0	1.0000	292.3	41.650	24.663	17.332	396
TOTAL HEAVY FUEL OIL			768.4	41.111	18.414	10.716	4570
D.O.STOR.TK(P)	10.0	0.8500	12.8	36.265	0.386	3.255	214
D.O.STOR.TK(S)	10.0	0.8500	16.7	35.642	0.451	-3.376	271
D.O.SETT.TK(S)	10.0	0.8500	3.2	43.350	21.748	-13.571	6
D.O.SERV.TK(S)	10.0	0.8500	6.3	40.800	21.748	-13.571	11
TOTAL DIESEL OIL			39.1	37.308	5.610	-3.678	503
M/E CYL.O.STOR.TK(P)	10.0	0.9000	7.4	44.200	14.430	4.095	24
M/E SYS.O.STOR.TK(S)	10.0	0.9000	7.4	44.200	14.430	-4.095	24
M/E SYS.O.SETT.TK(C)	10.0	0.9000	5.9	44.200	14.430	0.000	12
G/E L.O.STOR.TK(P)	10.0	0.9000	1.4	22.100	15.573	7.162	3
G/E L.O.SETT.TK(P)	10.0	0.9000	1.4	20.400	15.573	7.162	3
TOTAL LUBRICATING OIL			23.4	41.547	14.562	0.828	65
TOTAL DEADWEIGHT CONSTANT			427.0	66.630	10.135	0.000	0
TOTAL DEADWEIGHT			100119.8	172.074	10.640	0.072	5919
LIGHT SHIP			42600.0	152.000	15.425	0.029	0
TOTAL DISPLACEMENT			142719.9	166.082	12.069	0.059	5919

EQUIV. DRAFT(EXT)	= 9.862 M	M.T.C.	= 2936.77 MT-M
AFT. DRAFT(EXT)	= 12.417 M	T.P.C.	= 155.22 MT/CM
FORE DRAFT(EXT)	= 7.697 M	K.M.T.	= 31.953 M
TRIM	= 4.720 M	V.C.G.	= 12.069 M
DISPLACEMENT	= 142719.9 MT	UNCORRECTED GM	= 19.885 M
L.C.G.	= 166.082 M	GGO	= 0.041 M
L.C.B.	= 165.980 M	CORRECTED GM(GOM)	= 19.843 M
L.C.F.	= 172.070 M	PROPELLER IMMER.	= 114.6 %
		BLIND DISTANCE	= 592.0 M

HEEL ANGLES(DEG.) =	0.000	5.000	10.000	15.000	20.000	30.000	40.000	50.000	60.000
GZ VALUE (M) =	-0.060	1.675	3.430	5.219	6.969	9.373	10.709	11.101	10.374
GZ AREA (M*RAD.) =	0.000	0.070	0.293	0.670	1.203	2.651	4.415	6.334	8.221

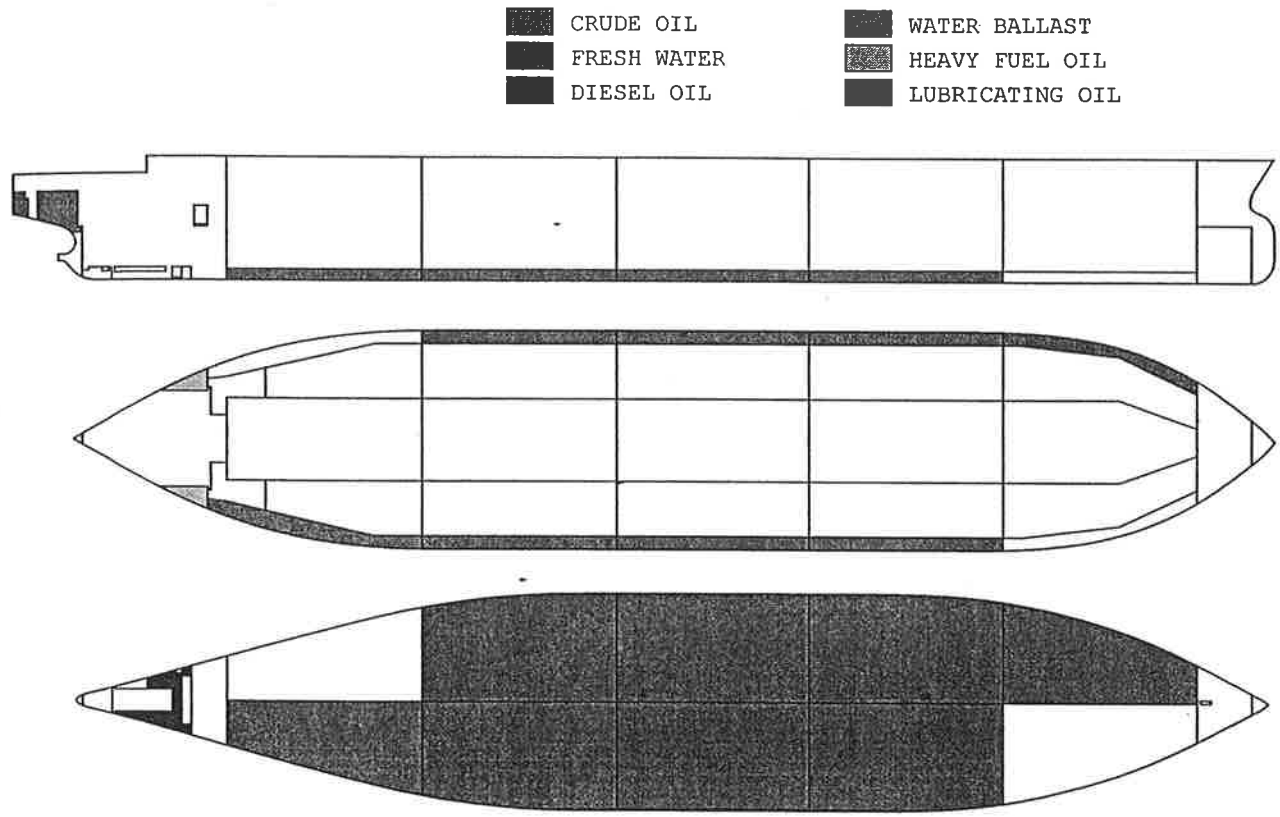
3. STEP 2 - BALLAST EXCHANGE

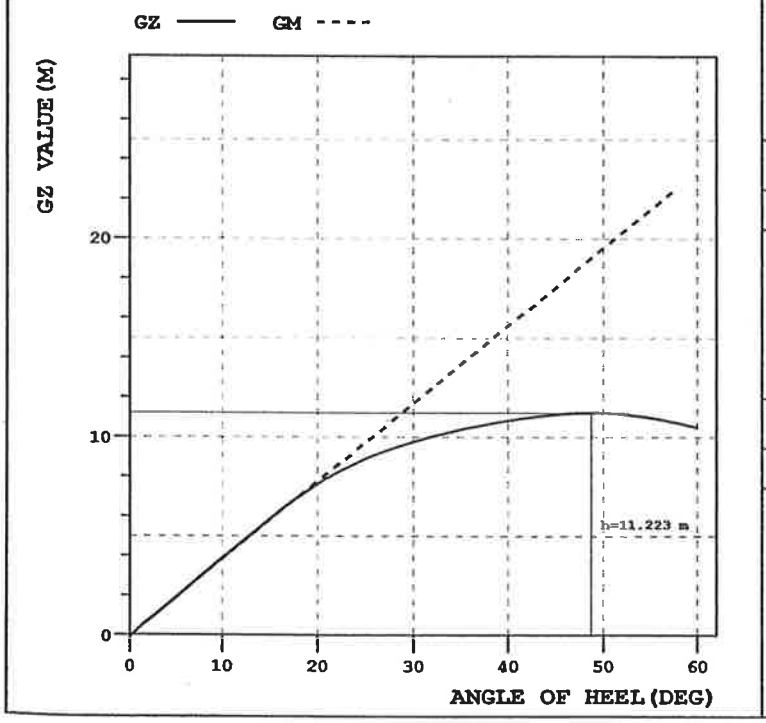


FR. NO.	DISTANCE M	SHEAR FORCE T	SHEAR FORCE %	BENDING MOMENT TM	BENDING MOMENT %	WEIGHT T/M	BOUY. T/M
-6	-5.500	0.0	-	0.0	-	93.9	0.0
0	-0.000	688.4	48.77	1984.7	6.18	168.6	20.2
60	51.000	4521.1	31.18	191749.5	58.11	324.9	360.3
70	102.000	3172.5	18.13	434341.9	52.97	499.7	604.0
80	153.000	-1203.4	6.40	478910.2	58.40	534.9	602.8
90	204.000	-3595.4	20.78	351083.3	42.82	529.2	557.8
100	255.000	-4202.8	26.43	145959.1	22.15	496.0	491.7
110	306.000	279.6	2.77	-2034.8	4.84	421.5	197.9
133	326.500	0.0	-	-0.0	-	20.2	0.1

SHEAR FORCE (Negative)	:	-4241 Ton (26.2%)	POSITION : Fr 98 + 0.59 m
SHEAR FORCE (Positive)	:	5323 Ton (34.3%)	POSITION : Fr 63 + 1.70 m
SAGGING MOMENT (Max.)	:	-2242 T-m (4.2%)	POSITION : Fr109 + 3.30 m
HOGGING MOMENT (Max.)	:	488327 T-m (59.6%)	POSITION : Fr 76 + 4.60 m

4. STEP 3 - BALLAST EXCHANGE





DISPLACEMENT	124793 Ton
KGo=KG+GGo	12.202 m
FLOODING ANGLE	40.000 Degree

AREA UNDER GZ CURVE

CRITERIA	RESULT	REQUIREMENT
0 Up to 30	2.887	0.055 M-RAD
0 Up to Flooding Ang.	4.692	0.090 M-RAD
30 Up to Flooding Ang.	1.806	0.030 M-RAD

LEVER AFTER FREE SURFACE CORR.

CRITERIA	RESULT	REQUIREMENT
GZ at 30 Deg	9.759	0.200 M
GoM	22.472	0.150 M
Angle of MAX GZ	48.7	25.00 DEG
Maximum GZ	11.2	

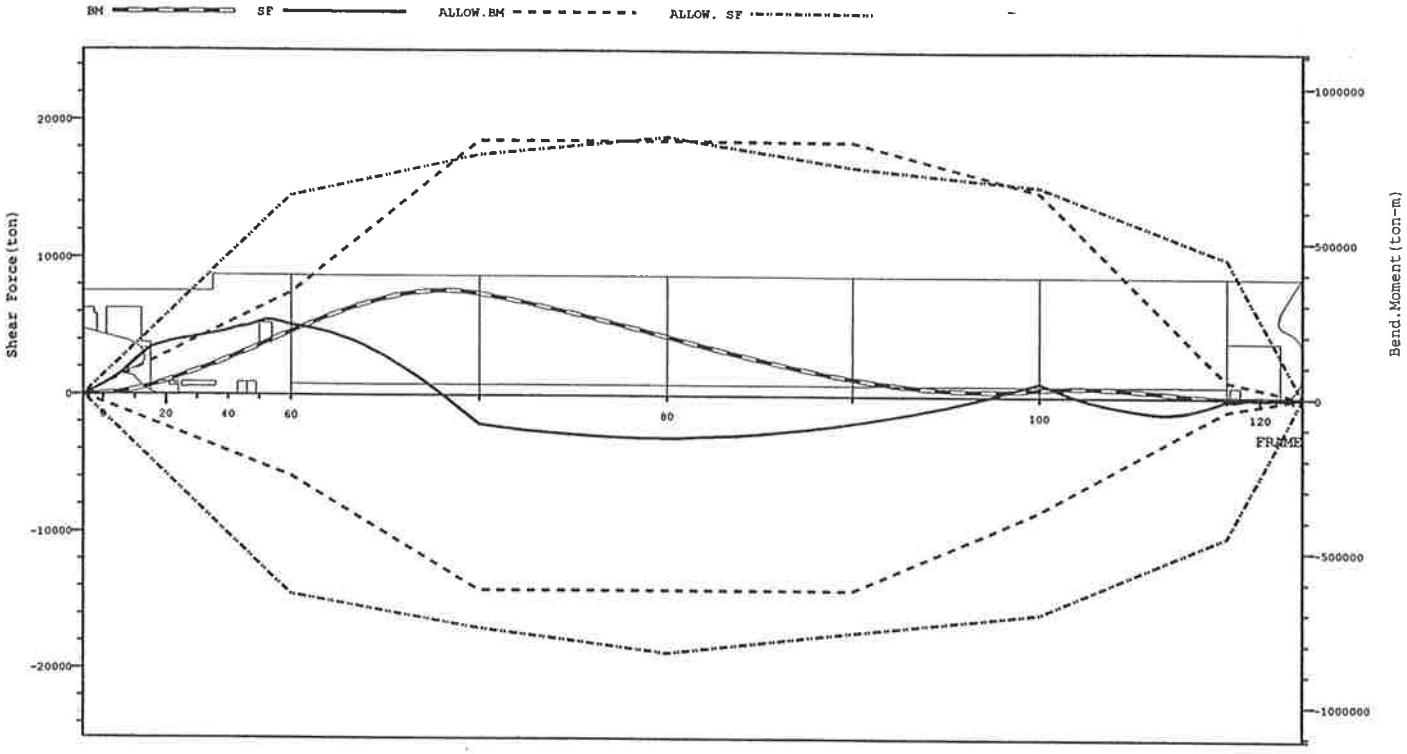
CONDITION 4. STEP 3 - BALLAST EXCHANGE

WEIGHT ITEMS	FILL. (%)	S.G	WEIGHT (MT)	L.C.G (M)	V.C.G (M)	T.C.G (M)	F.S.M (MT-M)
NO.1 W.B.TK(P)	100.0	1.0250	8790.0	279.870	11.198	18.224	0
NO.2 W.B.TK(P)	100.0	1.0250	10126.4	229.326	9.652	21.363	0
NO.2 W.B.TK(S)	100.0	1.0250	10126.4	229.326	9.652	-21.363	0
NO.3 W.B.TK(P)	100.0	1.0250	10218.2	178.500	9.593	21.421	0
NO.3 W.B.TK(S)	100.0	1.0250	10218.2	178.500	9.593	-21.421	0
NO.4 W.B.TK(P)	100.0	1.0250	9973.0	127.896	9.777	21.274	0
NO.4 W.B.TK(S)	100.0	1.0250	9973.0	127.896	9.777	-21.274	0
NO.5 W.B.TK(S)	100.0	1.0250	9176.6	75.805	11.752	-19.503	0
A.P.TK	100.0	1.0250	2275.5	5.346	20.407	-0.025	0
TOTAL WATER BALLAST			80877.3	173.241	10.377	-0.233	0
F.W.TK(P)	10.0	1.0000	28.9	9.157	23.804	10.705	424
F.W.TK(S)	10.0	1.0000	20.6	8.409	23.803	-11.338	312
DIST.W.TK(S)	10.0	1.0000	8.3	11.050	23.807	-9.100	45
TOTAL FRESH WATER			57.8	9.161	23.804	0.004	782
NO.1 H.F.O.TK(P)	4.5	1.0000	110.6	41.999	11.394	14.507	2048
NO.1 H.F.O.TK(S)	4.5	1.0000	129.9	41.789	11.647	-14.598	2048
H.F.O.SETT.TK(P)	98.0	1.0000	235.5	39.651	17.685	14.679	78
H.F.O.SERV.TK(P)	98.0	1.0000	292.3	41.650	24.663	17.332	396
TOTAL HEAVY FUEL OIL			768.4	41.111	18.414	10.716	4570
D.O.STOR.TK(P)	10.0	0.8500	12.8	36.265	0.386	3.255	214
D.O.STOR.TK(S)	10.0	0.8500	16.7	35.642	0.451	-3.376	271
D.O.SETT.TK(S)	10.0	0.8500	3.2	43.350	21.748	-13.571	6
D.O.SERV.TK(S)	10.0	0.8500	6.3	40.800	21.748	-13.571	11
TOTAL DIESEL OIL			39.1	37.308	5.610	-3.678	503
M/E CYL.O.STOR.TK(P)	10.0	0.9000	7.4	44.200	14.430	4.095	24
M/E SYS.O.STOR.TK(S)	10.0	0.9000	7.4	44.200	14.430	-4.095	24
M/E SYS.O.SETT.TK(C)	10.0	0.9000	5.9	44.200	14.430	0.000	12
G/E L.O.STOR.TK(P)	10.0	0.9000	1.4	22.100	15.573	7.162	3
G/E L.O.SETT.TK(P)	10.0	0.9000	1.4	20.400	15.573	7.162	3
TOTAL LUBRICATING OIL			23.4	41.547	14.562	0.828	65
TOTAL DEADWEIGHT CONSTANT			427.0	66.630	10.135	0.000	0
TOTAL DEADWEIGHT			82193.1	171.234	10.459	-0.131	5919
LIGHT SHIP			42600.0	152.000	15.425	0.029	0
TOTAL DISPLACEMENT			124793.1	164.668	12.154	-0.076	5919

EQUIV. DRAFT(EXT)	= 8.700 M	:	M.T.C.	= 2872.41	MT-M
AFT. DRAFT(EXT)	= 11.380 M	:	T.P.C	= 153.81	MT/CM
FORE DRAFT(EXT)	= 6.450 M	:	K.M.T.	= 34.674	M
TRIM	= 4.930 M	:	V.C.G.	= 12.154	M
DISPLACEMENT	= 124793.1 MT	:	UNCORRECTED GM	= 22.519	M
L.C.G.	= 164.668 M	:	GGO	= 0.047	M
L.C.B.	= 164.551 M	:	CORRECTED GM(GOM)	= 22.472	M
L.C.F.	= 172.786 M	:	PROPELLER IMMER.	= 103.9	%
			BLIND DISTANCE	= 629.4	M

HEEL ANGLES(DEG.) =	0.000	5.000	10.000	15.000	20.000	30.000	40.000	50.000	60.000
GZ VALUE (M) =	-0.075	1.888	3.868	5.856	7.627	9.759	10.833	11.213	10.500
GZ AREA (M*RAD.) =	0.000	0.079	0.330	0.755	1.346	2.886	4.692	6.630	8.538

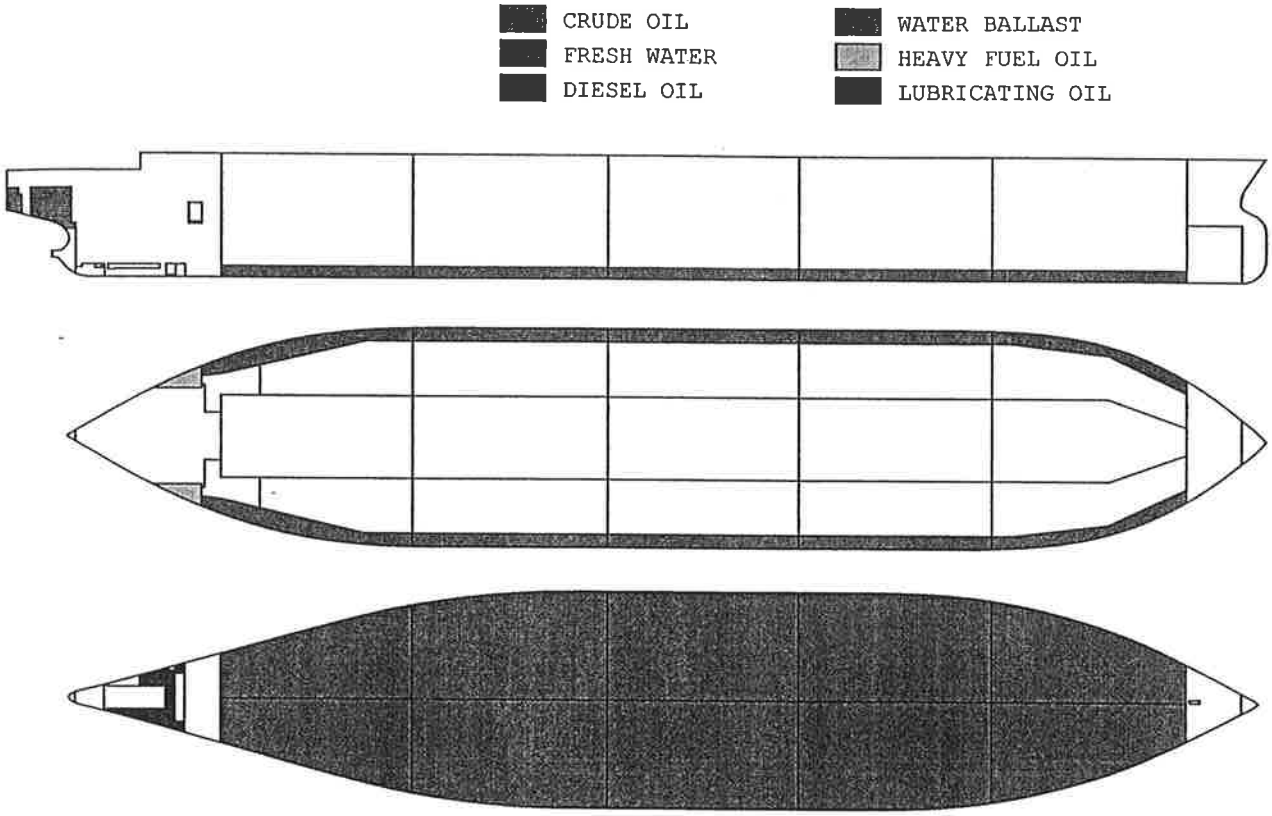
4. STEP 3 - BALLAST EXCHANGE

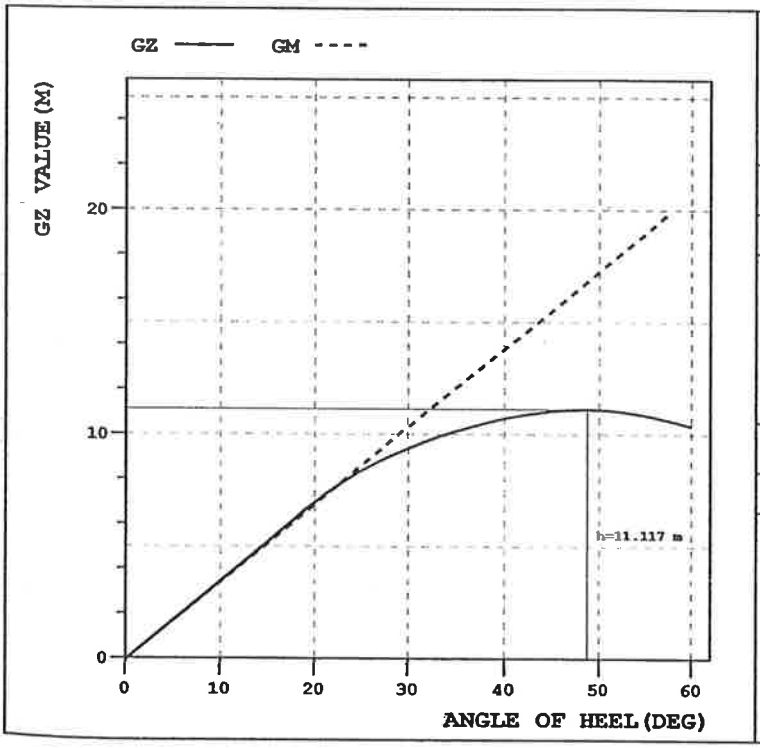


FR. NO.	DISTANCE M	SHEAR FORCE T	%	BENDING MOMENT TM	%	WEIGHT T/M	BOUY. T/M
-6	-5.500	0.0	-	0.0	-	93.9	0.0
0	-0.000	694.2	49.18	2023.3	6.30	168.5	18.3
60	51.000	5108.1	35.23	204615.6	62.00	240.5	317.1
70	102.000	-2100.1	12.35	327858.8	39.98	499.6	538.6
80	153.000	-3077.5	16.37	189976.9	23.17	534.7	535.0
90	204.000	-1967.6	11.37	55691.6	6.79	529.1	488.1
100	255.000	1026.2	6.71	25292.4	3.84	495.8	420.3
110	306.000	-150.5	1.48	969.4	1.80	270.1	159.2
133	326.500	0.0	-	0.0	-	20.2	0.0

SHEAR FORCE (Negative)	:	-3078 Ton (16.4%)	POSITION : Fr 80 + 0.00 m
SHEAR FORCE (Positive)	:	5461 Ton (41.4%)	POSITION : Fr 54 + 0.00 m
SAGGING MOMENT (Max.)	:	-60 T-m (0.8%)	POSITION : Fr128 + 0.84 m
HOGGING MOMENT (Max.)	:	337419 T-m (45.7%)	POSITION : Fr 68 + 1.62 m

5. STEP 4 - BALLAST EXCHANGE





DISPLACEMENT	142720 Ton
KGo=KG+GGo	12.110 m
FLOODING ANGLE	40.000 Degree

AREA UNDER GZ CURVE

CRITERIA	RESULT	REQUIREMENT
0 Up to 30	2.651	0.055 M-RAD
0 Up to Flooding Ang.	4.415	0.090 M-RAD
30 Up to Flooding Ang.	1.764	0.030 M-RAD

LEVER AFTER FREE SURFACE CORR.

CRITERIA	RESULT	REQUIREMENT
GZ at 30 Deg	9.373	0.200 M
GoM	19.843	0.150 M
Angle of MAX GZ	48.4	25.00 DEG
Maximum GZ	11.1	

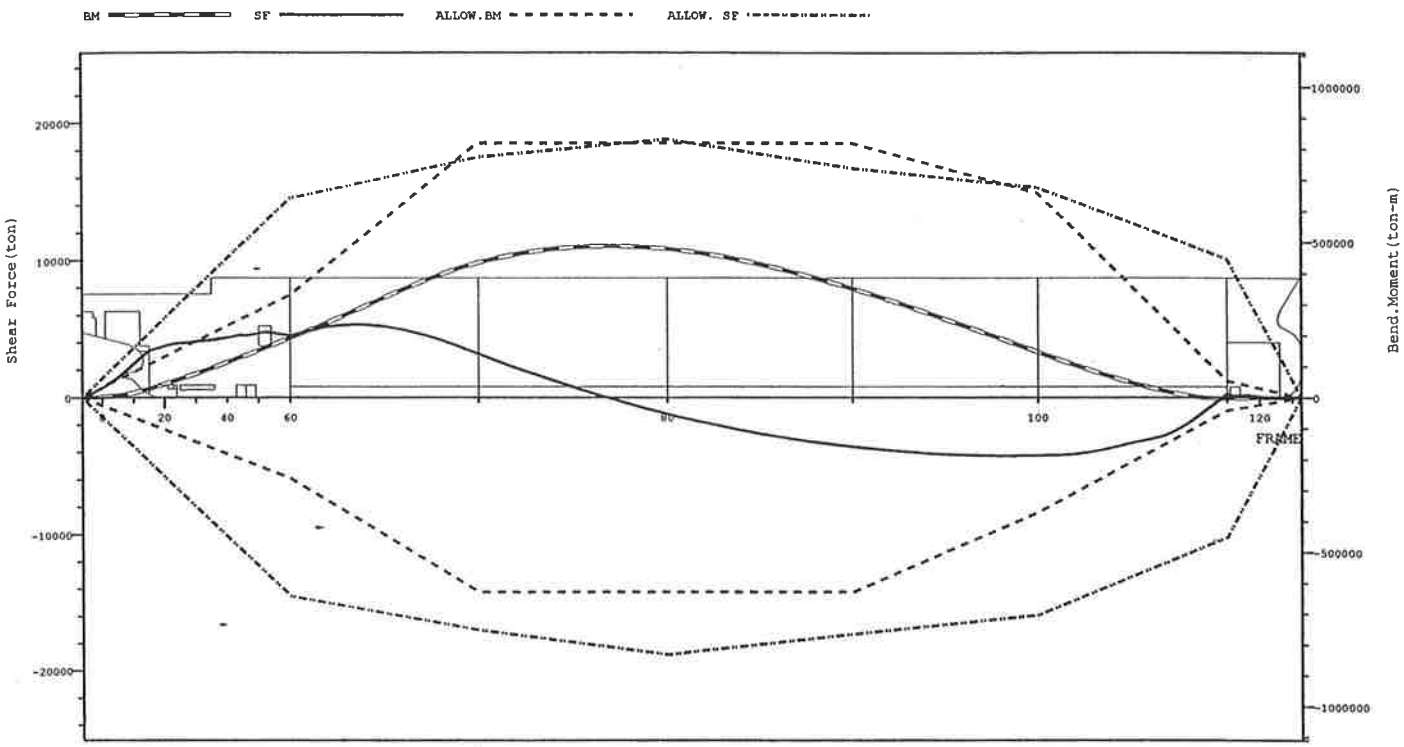
CONDITION 5. STEP 4 - BALLAST EXCHANGE

WEIGHT ITEMS	FILL. (%)	S.G	WEIGHT (MT)	L.C.G (M)	V.C.G (M)	T.C.G (M)	F.S.M (MT-M)
NO.1 W.B.TK(P)	100.0	1.0250	8790.0	279.870	11.198	18.224	0
NO.1 W.B.TK(S)	100.0	1.0250	8790.0	279.870	11.198	-18.224	0
NO.2 W.B.TK(P)	100.0	1.0250	10126.4	229.326	9.652	21.363	0
NO.2 W.B.TK(S)	100.0	1.0250	10126.4	229.326	9.652	-21.363	0
NO.3 W.B.TK(P)	100.0	1.0250	10218.2	178.500	9.593	21.421	0
NO.3 W.B.TK(S)	100.0	1.0250	10218.2	178.500	9.593	-21.421	0
NO.4 W.B.TK(P)	100.0	1.0250	9973.0	127.896	9.777	21.274	0
NO.4 W.B.TK(S)	100.0	1.0250	9973.0	127.896	9.777	-21.274	0
NO.5 W.B.TK(P)	100.0	1.0250	9136.8	75.928	11.734	19.496	0
NO.5 W.B.TK(S)	100.0	1.0250	9176.6	75.805	11.752	-19.503	0
A.P.TK	100.0	1.0250	2275.5	5.346	20.407	-0.025	0
TOTAL WATER BALLAST			98804.1	173.728	10.575	-0.009	0
F.W.TK(P)	10.0	1.0000	28.9	9.157	23.804	10.705	424
F.W.TK(S)	10.0	1.0000	20.6	8.409	23.803	-11.338	312
DIST.W.TK(S)	10.0	1.0000	8.3	11.050	23.807	-9.100	45
TOTAL FRESH WATER			57.8	9.161	23.804	0.004	782
NO.1 H.F.O.TK(P)	4.5	1.0000	110.6	41.999	11.394	14.507	2048
NO.1 H.F.O.TK(S)	4.5	1.0000	129.9	41.789	11.647	-14.598	2048
H.F.O.SETT.TK(P)	98.0	1.0000	235.5	39.651	17.685	14.679	78
H.F.O.SERV.TK(P)	98.0	1.0000	292.3	41.650	24.663	17.332	396
TOTAL HEAVY FUEL OIL			768.4	41.111	18.414	10.716	4570
D.O.STOR.TK(P)	10.0	0.8500	12.8	36.265	0.386	3.255	214
D.O.STOR.TK(S)	10.0	0.8500	16.7	35.642	0.451	-3.376	271
D.O.SETT.TK(S)	10.0	0.8500	3.2	43.350	21.748	-13.571	6
D.O.SERV.TK(S)	10.0	0.8500	6.3	40.800	21.748	-13.571	11
TOTAL DIESEL OIL			39.1	37.308	5.610	-3.678	503
M/E CYL.O.STOR.TK(P)	10.0	0.9000	7.4	44.200	14.430	4.095	24
M/E SYS.O.STOR.TK(S)	10.0	0.9000	7.4	44.200	14.430	-4.095	24
M/E SYS.O.SETT.TK(C)	10.0	0.9000	5.9	44.200	14.430	0.000	12
G/E L.O.STOR.TK(P)	10.0	0.9000	1.4	22.100	15.573	7.162	3
G/E L.O.SETT.TK(P)	10.0	0.9000	1.4	20.400	15.573	7.162	3
TOTAL LUBRICATING OIL			23.4	41.547	14.562	0.828	65
TOTAL DEADWEIGHT CONSTANT			427.0	66.630	10.135	0.000	0
TOTAL DEADWEIGHT			100119.8	172.074	10.640	0.072	5919
LIGHT SHIP			42600.0	152.000	15.425	0.029	0
TOTAL DISPLACEMENT			142719.9	166.082	12.069	0.059	5919

EQUIV. DRAFT(EXT)	= 9.862 M	:	M.T.C.	= 2936.77	MT-M
AFT. DRAFT(EXT)	= 12.417 M	:	T.P.C	= 155.22	MT/CM
FORE DRAFT(EXT)	= 7.697 M	:	K.M.T.	= 31.953	M
TRIM	= 4.720 M	:	V.C.G.	= 12.069	M
DISPLACEMENT	= 142719.9 MT	:	UNCORRECTED GM	= 19.885	M
L.C.G.	= 166.082 M	:	GGO	= 0.041	M
L.C.B.	= 165.980 M	:	CORRECTED GM(GOM)	= 19.843	M
L.C.F.	= 172.070 M	:	PROPELLER IMMER.	= 114.6	%
			BLIND DISTANCE	= 592.0	M

HEEL ANGLES(DEG.) =	0.000	5.000	10.000	15.000	20.000	30.000	40.000	50.000	60.000
GZ VALUE (M) =	-0.060	1.675	3.430	5.219	6.969	9.373	10.709	11.101	10.374
GZ AREA (M*RAD.) =	0.000	0.070	0.293	0.670	1.203	2.651	4.415	6.334	8.221

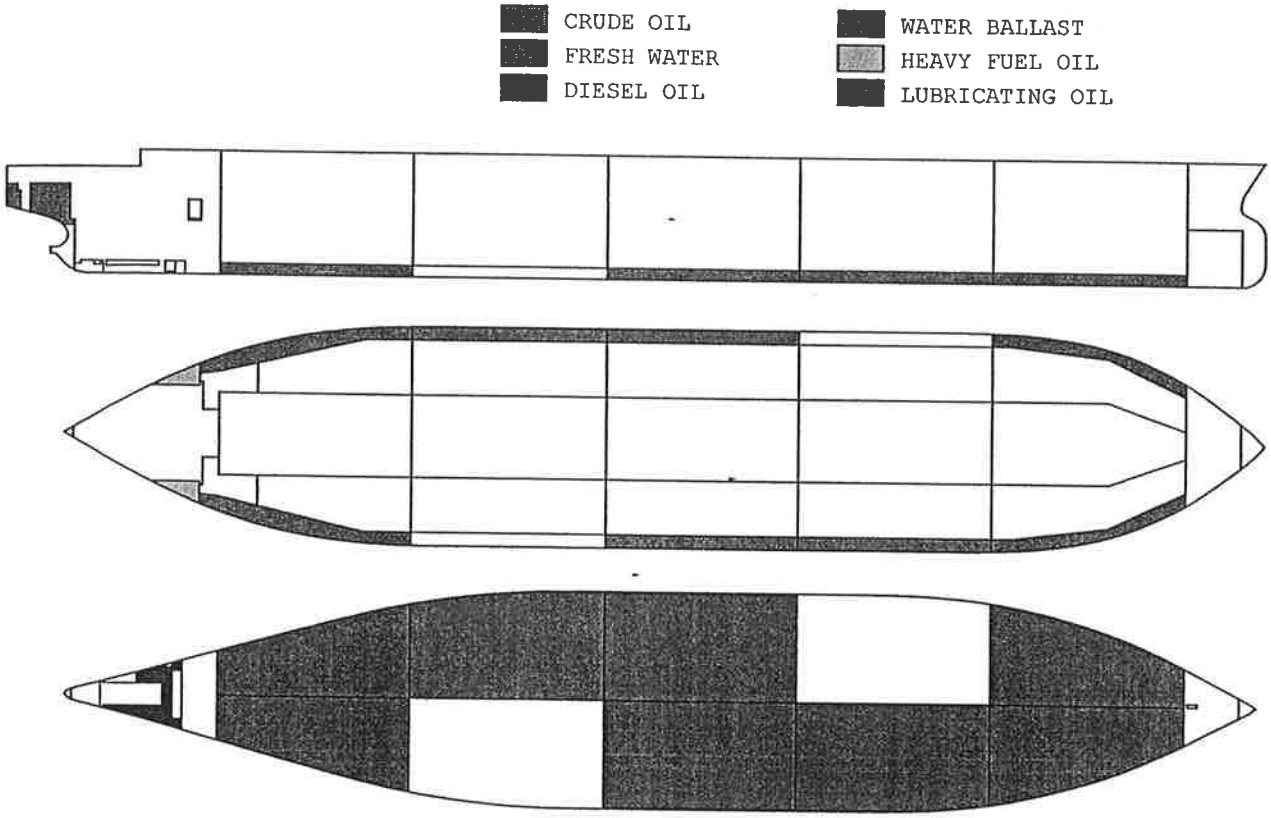
5. STEP 4 - BALLAST EXCHANGE

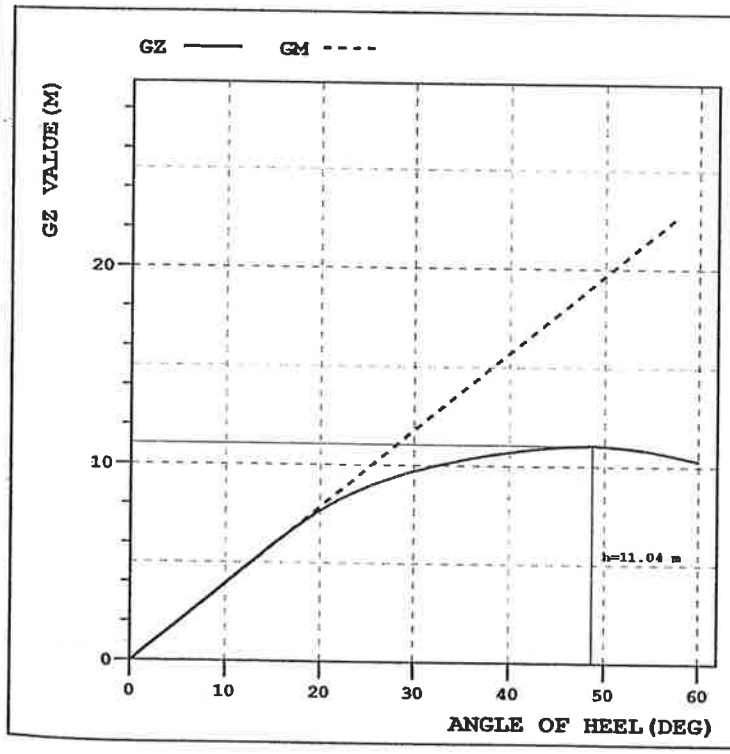


FR. NO.	DISTANCE M	SHEAR FORCE T	%	BENDING MOMENT TM	%	WEIGHT T/M	BOUY. T/M
-6	-5.500	0.0	-	0.0	-	93.9	0.0
0	-0.000	688.4	48.77	1984.7	6.18	168.6	20.2
60	51.000	4521.1	31.18	191749.5	58.11	324.9	360.3
70	102.000	3172.5	18.13	434341.9	52.97	499.7	604.0
80	153.000	-1203.4	6.40	478910.2	58.40	534.9	602.8
90	204.000	-3595.4	20.78	351083.3	42.82	529.2	557.8
100	255.000	-4202.8	26.43	145959.1	22.15	496.0	491.7
110	306.000	279.6	2.77	-2034.8	4.84	421.5	197.9
133	326.500	0.0	-	-0.0	-	20.2	0.1

SHEAR FORCE (Negative)	:	-4241 Ton (26.2%)	POSITION : Fr 98 + 0.59 m
SHEAR FORCE (Positive)	:	5323 Ton (34.3%)	POSITION : Fr 63 + 1.70 m
SAGGING MOMENT (Max.)	:	-2242 T-m (4.2%)	POSITION : Fr109 + 3.30 m
HOGGING MOMENT (Max.)	:	488327 T-m (59.6%)	POSITION : Fr 76 + 4.60 m

6. STEP 5 - BALLAST EXCHANGE





DISPLACEMENT	122620 Ton
KGo=KG+GGo	12.503 m
FLOODING ANGLE	40.000 Degree

AREA UNDER GZ CURVE

CRITERIA	RESULT	REQUIREMENT
0 Up to 30	2.902	0.055 M-RAD
0 Up to Flooding Ang.	4.691	0.090 M-RAD
30 Up to Flooding Ang.	1.789	0.030 M-RAD

LEVER AFTER FREE SURFACE CORR.

CRITERIA	RESULT	REQUIREMENT
GZ at 30 Deg	9.703	0.200 M
GoM	22.582	0.150 M
Angle of MAX GZ	48.4	25.00 DEG
Maximum GZ	11.0	

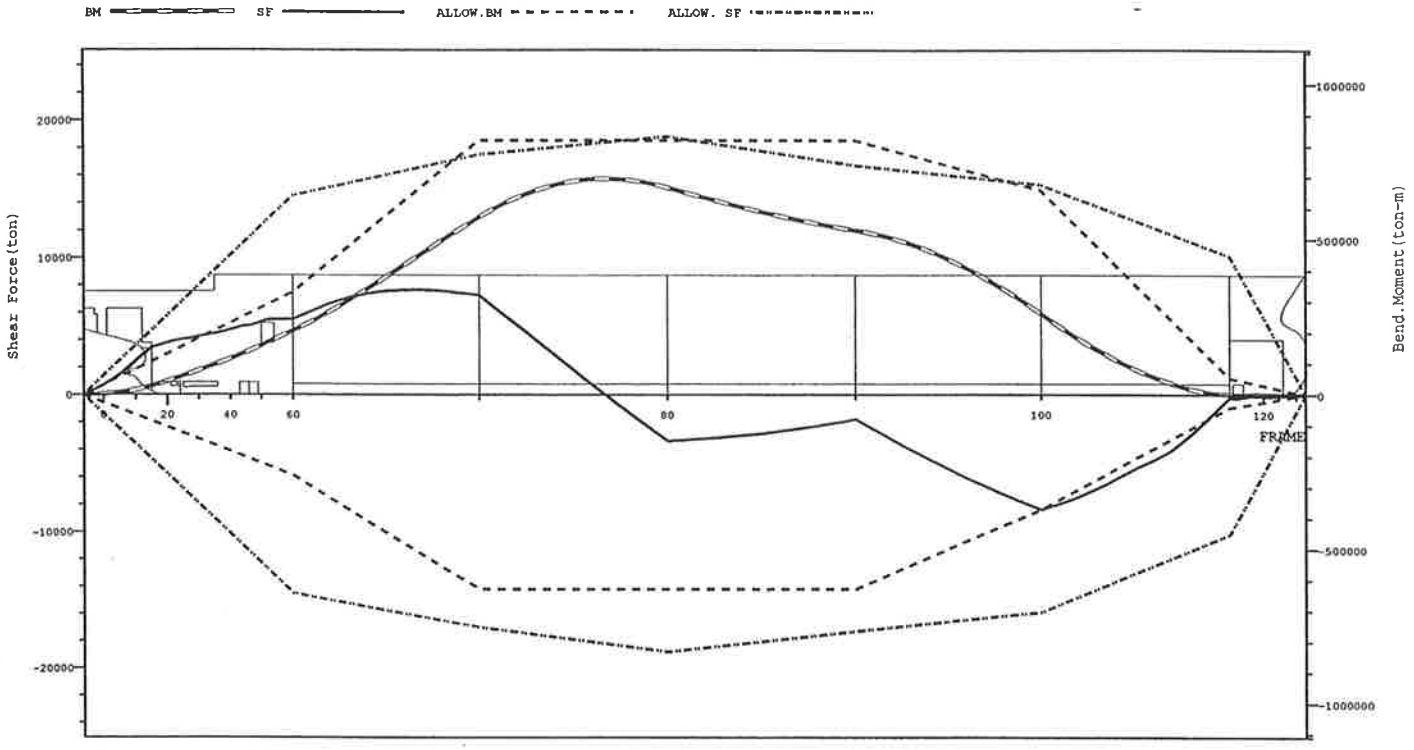
CONDITION 6. STEP 5 - BALLAST EXCHANGE

WEIGHT ITEMS	FILL. (%)	S.G	WEIGHT (MT)	L.C.G (M)	V.C.G (M)	T.C.G (M)	F.S.M (MT-M)
NO.1 W.B.TK(P)	100.0	1.0250	8790.0	279.870	11.198	18.224	0
NO.1 W.B.TK(S)	100.0	1.0250	8790.0	279.870	11.198	-18.224	0
NO.2 W.B.TK(S)	100.0	1.0250	10126.4	229.326	9.652	-21.363	0
NO.3 W.B.TK(P)	100.0	1.0250	10218.2	178.500	9.593	21.421	0
NO.3 W.B.TK(S)	100.0	1.0250	10218.2	178.500	9.593	-21.421	0
NO.4 W.B.TK(P)	100.0	1.0250	9973.0	127.896	9.777	21.274	0
NO.5 W.B.TK(P)	100.0	1.0250	9136.8	75.928	11.734	19.496	0
NO.5 W.B.TK(S)	100.0	1.0250	9176.6	75.805	11.752	-19.503	0
A.P.TK	100.0	1.0250	2275.5	5.346	20.407	-0.025	0
TOTAL WATER BALLAST			78704.6	172.382	10.795	-0.064	0
F.W.TK(P)	10.0	1.0000	28.9	9.157	23.804	10.705	424
F.W.TK(S)	10.0	1.0000	20.6	8.409	23.803	-11.338	312
DIST.W.TK(S)	10.0	1.0000	8.3	11.050	23.807	-9.100	45
TOTAL FRESH WATER			57.8	9.161	23.804	0.004	782
NO.1 H.F.O.TK(P)	4.5	1.0000	110.6	41.999	11.394	14.507	2048
NO.1 H.F.O.TK(S)	4.5	1.0000	129.9	41.789	11.647	-14.598	2048
H.F.O.SETT.TK(P)	98.0	1.0000	235.5	39.651	17.685	14.679	78
H.F.O.SERV.TK(P)	98.0	1.0000	292.3	41.650	24.663	17.332	396
TOTAL HEAVY FUEL OIL			768.4	41.111	18.414	10.716	4570
D.O.STOR.TK(P)	10.0	0.8500	12.8	36.265	0.386	3.255	214
D.O.STOR.TK(S)	10.0	0.8500	16.7	35.642	0.451	-3.376	271
D.O.SETT.TK(S)	10.0	0.8500	3.2	43.350	21.748	-13.571	6
D.O.SERV.TK(S)	10.0	0.8500	6.3	40.800	21.748	-13.571	11
TOTAL DIESEL OIL			39.1	37.308	5.610	-3.678	503
M/E CYL.O.STOR.TK(P)	10.0	0.9000	7.4	44.200	14.430	4.095	24
M/E SYS.O.STOR.TK(S)	10.0	0.9000	7.4	44.200	14.430	-4.095	24
M/E SYS.O.SETT.TK(C)	10.0	0.9000	5.9	44.200	14.430	0.000	12
G/E L.O.STOR.TK(P)	10.0	0.9000	1.4	22.100	15.573	7.162	3
G/E L.O.SETT.TK(P)	10.0	0.9000	1.4	20.400	15.573	7.162	3
TOTAL LUBRICATING OIL			23.4	41.547	14.562	0.828	65
TOTAL DEADWEIGHT CONSTANT			427.0	66.630	10.135	0.000	0
TOTAL DEADWEIGHT			80020.4	170.335	10.873	0.038	5919
LIGHT SHIP			42600.0	152.000	15.425	0.029	0
TOTAL DISPLACEMENT			122620.4	163.965	12.455	0.035	5919

EQUIV. DRAFT(EXT)	= 8.559 M	:	M.T.C.	= 2865.29 MT-M
AFT. DRAFT(EXT)	= 11.369 M	:	T.P.C	= 153.65 MT/CM
FORE DRAFT(EXT)	= 6.200 M	:	K.M.T.	= 35.084 M
TRIM	= 5.169 M	:	V.C.G.	= 12.455 M
DISPLACEMENT	= 122620.4 MT	:	UNCORRECTED GM	= 22.630 M
L.C.G.	= 163.965 M	:	GGO	= 0.048 M
L.C.B.	= 163.837 M	:	CORRECTED GM(GOM)	= 22.582 M
L.C.F.	= 172.734 M	:	PROPELLER IMMER.	= 103.8 %
			BLIND DISTANCE	= 646.3 M

HEEL ANGLES(DEG.) =	0.000	5.000	10.000	15.000	20.000	30.000	40.000	50.000	60.000
GZ VALUE (M) =	-0.036	1.937	3.925	5.916	7.655	9.703	10.698	11.024	10.281
GZ AREA (M*RAD.) =	0.000	0.083	0.339	0.768	1.364	2.902	4.691	6.599	8.471

6. STEP 5 - BALLAST EXCHANGE

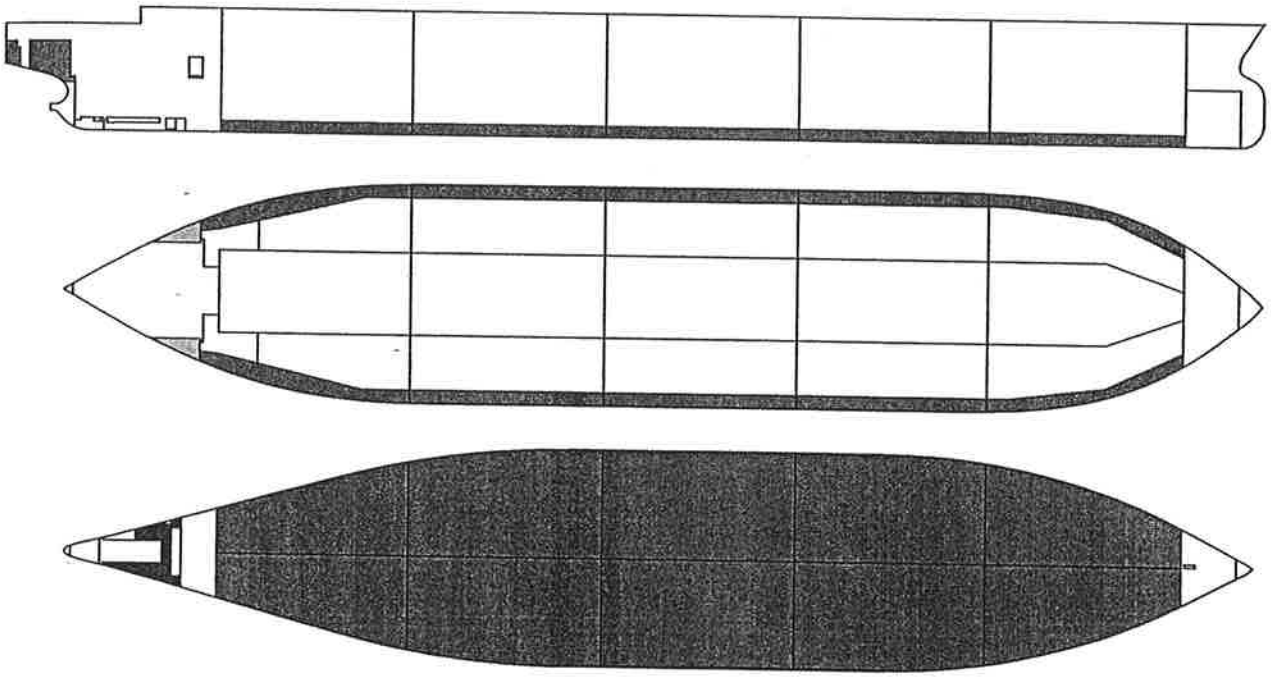


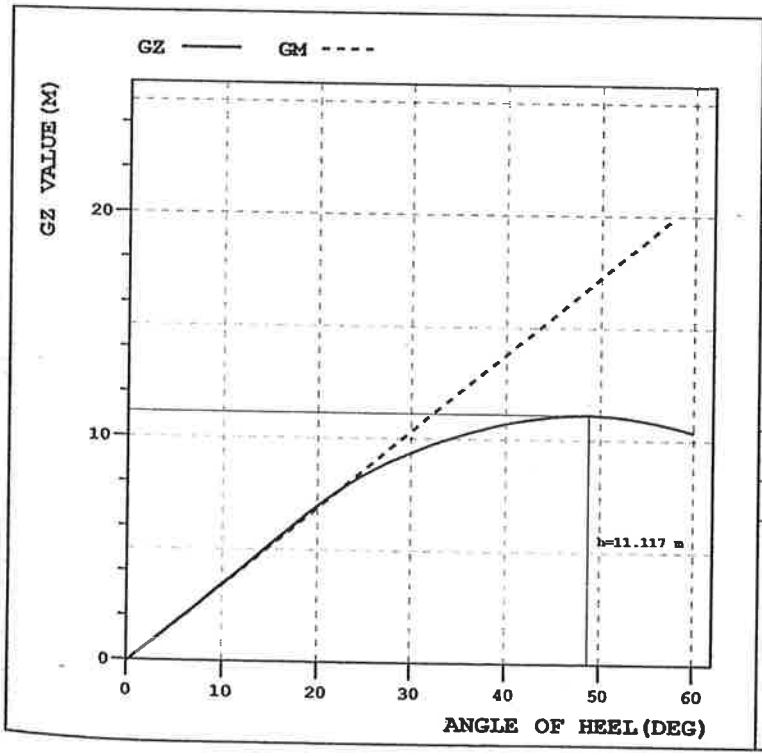
FR. NO.	DISTANCE M	SHEAR FORCE T	SHEAR FORCE %	BENDING MOMENT TM	BENDING MOMENT %	WEIGHT T/M	BOUY. T/M
-6	-5.500	0.0	-	0.0	-	93.9	0.0
0	-0.000	694.5	49.20	1958.7	6.10	168.6	18.3
60	51.000	5497.0	37.91	205258.4	62.20	324.9	315.1
70	102.000	7263.3	41.50	571277.3	69.67	320.2	533.4
80	153.000	-3355.8	17.85	667950.5	81.46	334.4	527.5
90	204.000	-1797.9	10.39	529802.9	64.61	529.2	478.3
100	255.000	-8367.7	52.63	261265.4	39.65	308.1	408.4
110	306.000	-224.7	2.20	1652.1	3.06	421.5	151.8
133	326.500	0.0	-	0.0	-	20.2	0.0

SHEAR FORCE (Negative)	: -8368 Ton (52.6%)	POSITION	: Fr100 + 0.00 m
SHEAR FORCE (Positive)	: 7652 Ton (46.5%)	POSITION	: Fr 66 + 2.55 m
SAGGING MOMENT (Max.)	: -28 T-m (0.4%)	POSITION	: Fr128 + 0.84 m
HOGGING MOMENT (Max.)	: 695810 T-m (84.9%)	POSITION	: Fr 76 + 4.60 m

7. STEP 6 - BALLAST EXCHANGE

CRUDE OIL
FRESH WATER
DIESEL OIL
WATER BALLAST
HEAVY FUEL OIL
LUBRICATING OIL





DISPLACEMENT	142720 Ton
KGo=KG+GGo	12.110 m
FLOODING ANGLE	40.000 Degree

AREA UNDER GZ CURVE

CRITERIA	RESULT	REQUIREMENT
0 Up to 30	2.651	0.055 M-RAD
0 Up to Flooding Ang.	4.415	0.090 M-RAD
30 Up to Flooding Ang.	1.764	0.030 M-RAD

LEVER AFTER FREE SURFACE CORR.

CRITERIA	RESULT	REQUIREMENT
GZ at 30 Deg	9.373	0.200 M
GoM	19.843	0.150 M
Angle of MAX GZ	48.4	25.00 DEG
Maximum GZ	11.1	

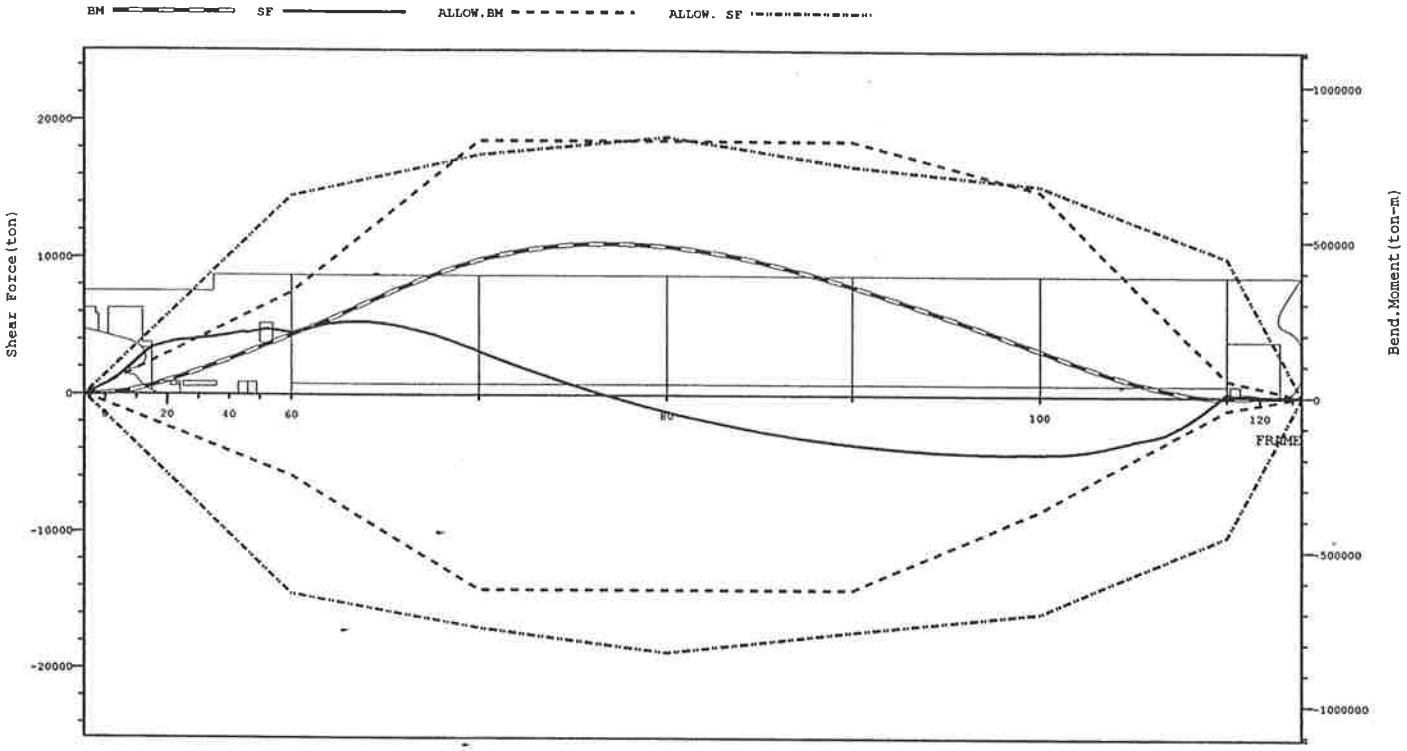
CONDITION 7. STEP 6 - BALLAST EXCHANGE

WEIGHT ITEMS	FILL. (%)	S.G	WEIGHT (MT)	L.C.G (M)	V.C.G (M)	T.C.G (M)	F.S.M (MT-M)
NO.1 W.B.TK(P)	100.0	1.0250	8790.0	279.870	11.198	18.224	0
NO.1 W.B.TK(S)	100.0	1.0250	8790.0	279.870	11.198	-18.224	0
NO.2 W.B.TK(P)	100.0	1.0250	10126.4	229.326	9.652	21.363	0
NO.2 W.B.TK(S)	100.0	1.0250	10126.4	229.326	9.652	-21.363	0
NO.3 W.B.TK(P)	100.0	1.0250	10218.2	178.500	9.593	21.421	0
NO.3 W.B.TK(S)	100.0	1.0250	10218.2	178.500	9.593	-21.421	0
NO.4 W.B.TK(P)	100.0	1.0250	9973.0	127.896	9.777	21.274	0
NO.4 W.B.TK(S)	100.0	1.0250	9973.0	127.896	9.777	-21.274	0
NO.5 W.B.TK(P)	100.0	1.0250	9136.8	75.928	11.734	19.496	0
NO.5 W.B.TK(S)	100.0	1.0250	9176.6	75.805	11.752	-19.503	0
A.P.TK	100.0	1.0250	2275.5	5.346	20.407	-0.025	0
TOTAL WATER BALLAST			98804.1	173.728	10.575	-0.009	0
F.W.TK(P)	10.0	1.0000	28.9	9.157	23.804	10.705	424
F.W.TK(S)	10.0	1.0000	20.6	8.409	23.803	-11.338	312
DIST.W.TK(S)	10.0	1.0000	8.3	11.050	23.807	-9.100	45
TOTAL FRESH WATER			57.8	9.161	23.804	0.004	782
NO.1 H.F.O.TK(P)	4.5	1.0000	110.6	41.999	11.394	14.507	2048
NO.1 H.F.O.TK(S)	4.5	1.0000	129.9	41.789	11.647	-14.598	2048
H.F.O.SETT.TK(P)	98.0	1.0000	235.5	39.651	17.685	14.679	78
H.F.O.SERV.TK(P)	98.0	1.0000	292.3	41.650	24.663	17.332	396
TOTAL HEAVY FUEL OIL			768.4	41.111	18.414	10.716	4570
D.O.STOR.TK(P)	10.0	0.8500	12.8	36.265	0.386	3.255	214
D.O.STOR.TK(S)	10.0	0.8500	16.7	35.642	0.451	-3.376	271
D.O.SETT.TK(S)	10.0	0.8500	3.2	43.350	21.748	-13.571	6
D.O.SERV.TK(S)	10.0	0.8500	6.3	40.800	21.748	-13.571	11
TOTAL DIESEL OIL			39.1	37.308	5.610	-3.678	503
M/E CYL.O.STOR.TK(P)	10.0	0.9000	7.4	44.200	14.430	4.095	24
M/E SYS.O.STOR.TK(S)	10.0	0.9000	7.4	44.200	14.430	-4.095	24
M/E SYS.O.SETT.TK(C)	10.0	0.9000	5.9	44.200	14.430	0.000	12
G/E L.O.STOR.TK(P)	10.0	0.9000	1.4	22.100	15.573	7.162	3
G/E L.O.SETT.TK(P)	10.0	0.9000	1.4	20.400	15.573	7.162	3
TOTAL LUBRICATING OIL			23.4	41.547	14.562	0.828	65
TOTAL DEADWEIGHT CONSTANT			427.0	66.630	10.135	0.000	0
TOTAL DEADWEIGHT			100119.8	172.074	10.640	0.072	5919
LIGHT SHIP			42600.0	152.000	15.425	0.029	0
TOTAL DISPLACEMENT			142719.9	166.082	12.069	0.059	5919

EQUIV. DRAFT(EXT)	= 9.862 M	:	M.T.C.	= 2936.77	MT-M
AFT. DRAFT(EXT)	= 12.417 M	:	T.P.C	= 155.22	MT/CM
FORE DRAFT(EXT)	= 7.697 M	:	K.M.T.	= 31.953	M
TRIM	= 4.720 M	:	V.C.G.	= 12.069	M
DISPLACEMENT	= 142719.9 MT	:	UNCORRECTED GM	= 19.885	M
L.C.G.	= 166.082 M	:	GGO	= 0.041	M
L.C.B.	= 165.980 M	:	CORRECTED GM(GOM)	= 19.843	M
L.C.F.	= 172.070 M	:	PROPELLER IMMER.	= 114.6	%
			BLIND DISTANCE	= 592.0	M

HEEL ANGLES(DEG.) =	0.000	5.000	10.000	15.000	20.000	30.000	40.000	50.000	60.000
GZ VALUE (M) =	-0.060	1.675	3.430	5.219	6.969	9.373	10.709	11.101	10.374
GZ AREA (M*RAD.) =	0.000	0.070	0.293	0.670	1.203	2.651	4.415	6.334	8.221

7. STEP 6 - BALLAST EXCHANGE

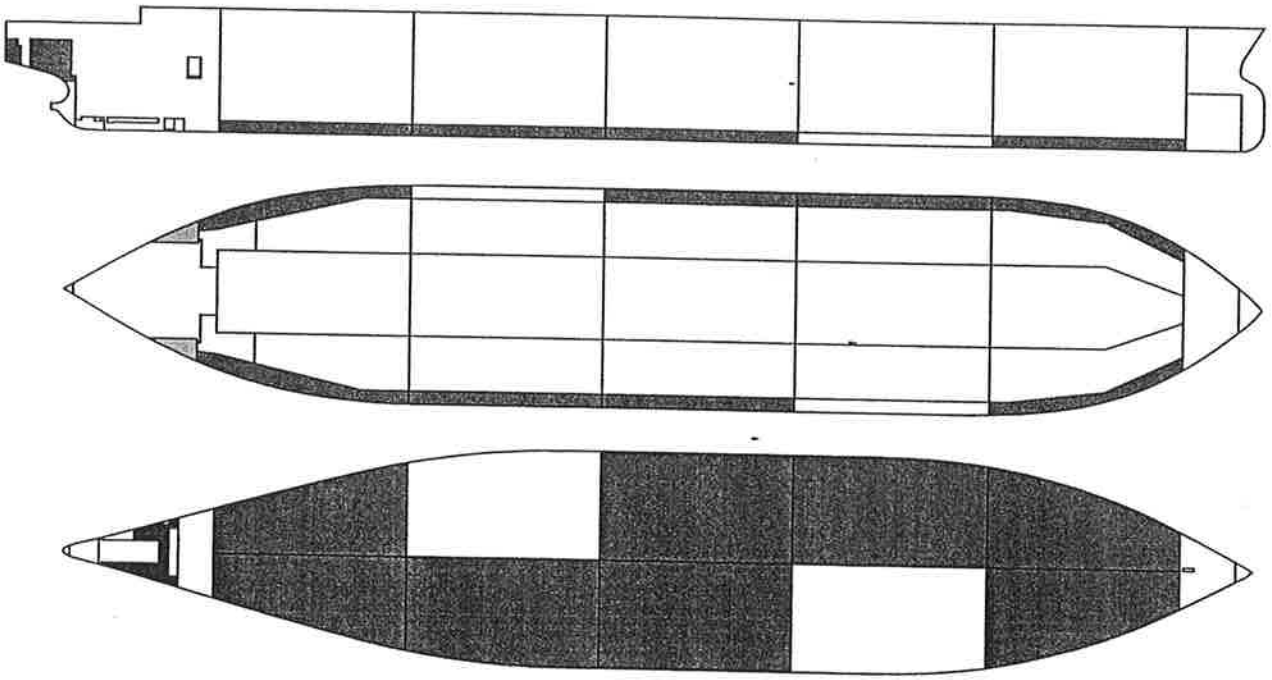


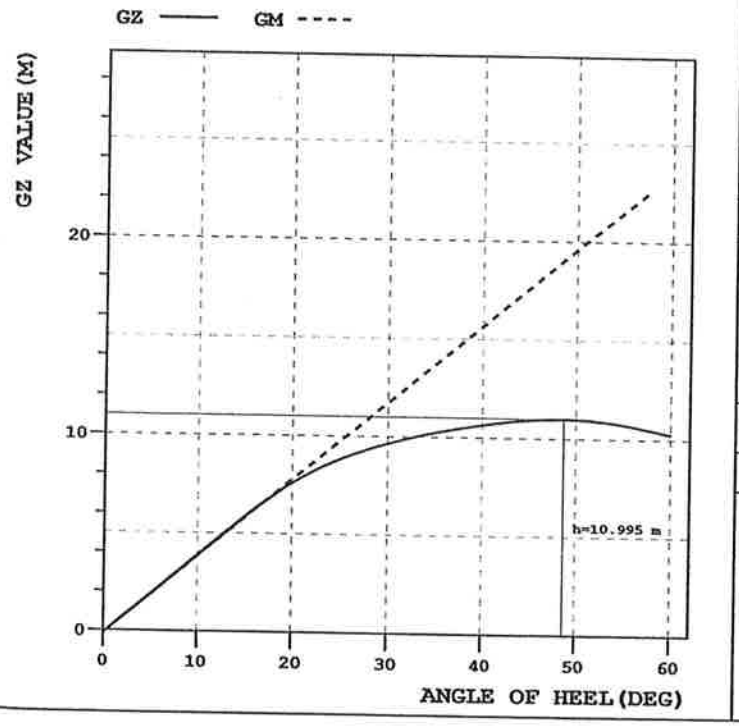
FR. NO.	DISTANCE M	SHEAR FORCE T	%	BENDING MOMENT TM	%	WEIGHT T/M	BOUY. T/M
-6	-5.500	0.0	-	0.0	-	93.9	0.0
0	-0.000	688.4	48.77	1984.7	6.18	168.6	20.2
60	51.000	4521.1	31.18	191749.5	58.11	324.9	360.3
70	102.000	3172.5	18.13	434341.9	52.97	499.7	604.0
80	153.000	-1203.4	6.40	478910.2	58.40	534.9	602.8
90	204.000	-3595.4	20.78	351083.3	42.82	529.2	557.8
100	255.000	-4202.8	26.43	145959.1	22.15	496.0	491.7
110	306.000	279.6	2.77	-2034.8	4.84	421.5	197.9
133	326.500	0.0	-	-0.0	-	20.2	0.1

SHEAR FORCE (Negative)	: -4241 Ton (26.2%)	POSITION	: Fr 98 + 0.59 m
SHEAR FORCE (Positive)	: 5323 Ton (34.3%)	POSITION	: Fr 63 + 1.70 m
SAGGING MOMENT (Max.)	: -2242 T-m (4.2%)	POSITION	: Fr109 + 3.30 m
HOGGING MOMENT (Max.)	: 488327 T-m (59.6%)	POSITION	: Fr 76 + 4.60 m

8. STEP 7 - BALLAST EXCHANGE

CRUDE OIL
FRESH WATER
DIESEL OIL
WATER BALLAST
HEAVY FUEL OIL
LUBRICATING OIL





DISPLACEMENT	122620 Ton
KGo=KG+GGo	12.503 m
FLOODING ANGLE	40.000 Degree

AREA UNDER GZ CURVE

CRITERIA	RESULT	REQUIREMENT
0 Up to 30	2.868	0.055 M-RAD
0 Up to Flooding Ang.	4.647	0.090 M-RAD
30 Up to Flooding Ang.	1.779	0.030 M-RAD

LEVER AFTER FREE SURFACE CORR.

CRITERIA	RESULT	REQUIREMENT
GZ at 30 Deg	9.645	0.200 M
GoM	22.582	0.150 M
Angle of MAX GZ	48.5	25.00 DEG
Maximum GZ	11.0	

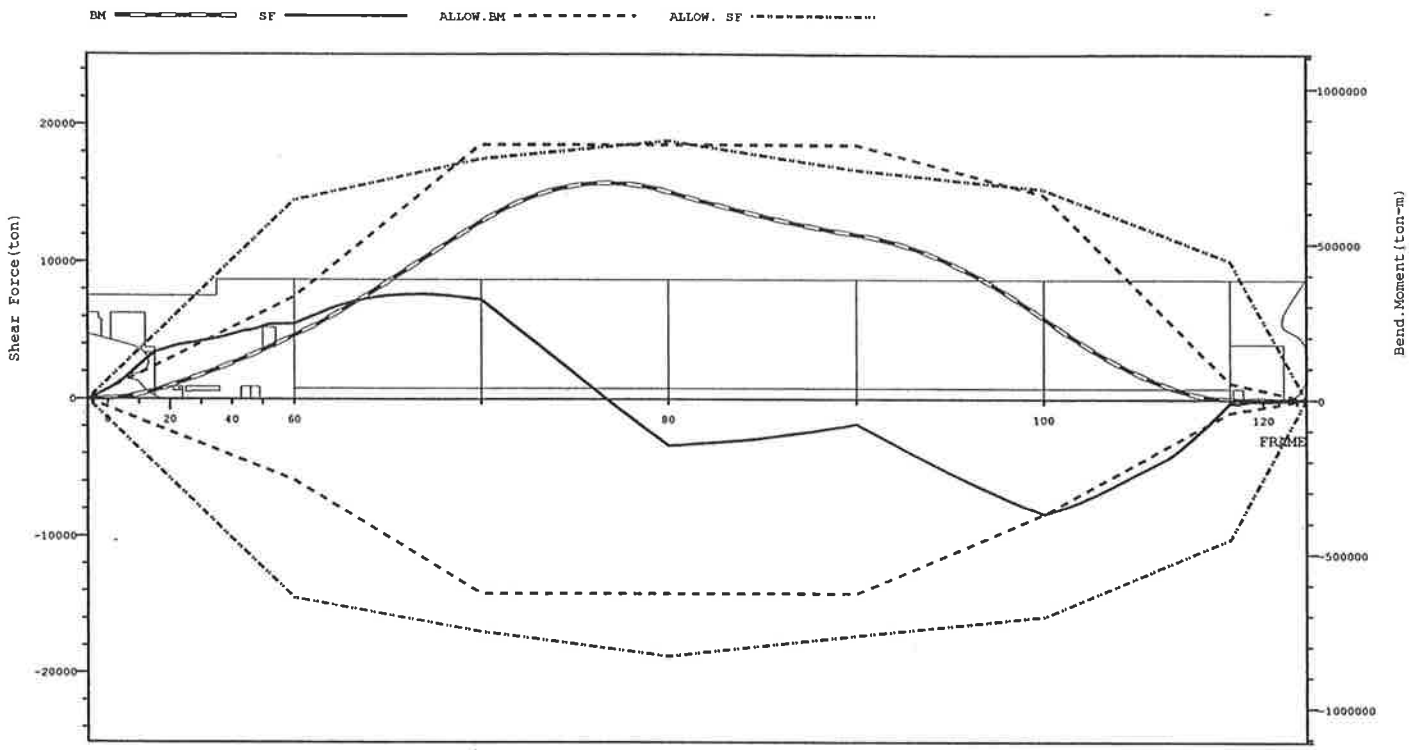
CONDITION 8. STEP 7 - BALLAST EXCHANGE

WEIGHT ITEMS	FILL. (%)	S.G	WEIGHT (MT)	L.C.G (M)	V.C.G (M)	T.C.G (M)	F.S.M (MT-M)
NO.1 W.B.TK(P)	100.0	1.0250	8790.0	279.870	11.198	18.224	0
NO.1 W.B.TK(S)	100.0	1.0250	8790.0	279.870	11.198	-18.224	0
NO.2 W.B.TK(P)	100.0	1.0250	10126.4	229.326	9.652	21.363	0
NO.3 W.B.TK(P)	100.0	1.0250	10218.2	178.500	9.593	21.421	0
NO.3 W.B.TK(S)	100.0	1.0250	10218.2	178.500	9.593	-21.421	0
NO.4 W.B.TK(S)	100.0	1.0250	9973.0	127.896	9.777	-21.274	0
NO.5 W.B.TK(P)	100.0	1.0250	9136.8	75.928	11.734	19.496	0
NO.5 W.B.TK(S)	100.0	1.0250	9176.6	75.805	11.752	-19.503	0
A.P.TK	100.0	1.0250	2275.5	5.346	20.407	-0.025	0
TOTAL WATER BALLAST			78704.6	172.382	10.795	0.042	0
F.W.TK(P)	10.0	1.0000	28.9	9.157	23.804	10.705	424
F.W.TK(S)	10.0	1.0000	20.6	8.409	23.803	-11.338	312
DIST.W.TK(S)	10.0	1.0000	8.3	11.050	23.807	-9.100	45
TOTAL FRESH WATER			57.8	9.161	23.804	0.004	782
NO.1 H.F.O.TK(P)	4.5	1.0000	110.6	41.999	11.394	14.507	2048
NO.1 H.F.O.TK(S)	4.5	1.0000	129.9	41.789	11.647	-14.598	2048
H.F.O.SETT.TK(P)	98.0	1.0000	235.5	39.651	17.685	14.679	78
H.F.O.SERV.TK(P)	98.0	1.0000	292.3	41.650	24.663	17.332	396
TOTAL HEAVY FUEL OIL			768.4	41.111	18.414	10.716	4570
D.O.STOR.TK(P)	10.0	0.8500	12.8	36.265	0.386	3.255	214
D.O.STOR.TK(S)	10.0	0.8500	16.7	35.642	0.451	-3.376	271
D.O.SETT.TK(S)	10.0	0.8500	3.2	43.350	21.748	-13.571	6
D.O.SERV.TK(S)	10.0	0.8500	6.3	40.800	21.748	-13.571	11
TOTAL DIESEL OIL			39.1	37.308	5.610	-3.678	503
M/E CYL.O.STOR.TK(P)	10.0	0.9000	7.4	44.200	14.430	4.095	24
M/E SYS.O.STOR.TK(S)	10.0	0.9000	7.4	44.200	14.430	-4.095	24
M/E SYS.O.SETT.TK(C)	10.0	0.9000	5.9	44.200	14.430	0.000	12
G/E L.O.STOR.TK(P)	10.0	0.9000	1.4	22.100	15.573	7.162	3
G/E L.O.SETT.TK(P)	10.0	0.9000	1.4	20.400	15.573	7.162	3
TOTAL LUBRICATING OIL			23.4	41.547	14.562	0.828	65
TOTAL DEADWEIGHT CONSTANT			427.0	66.630	10.135	0.000	0
TOTAL DEADWEIGHT			80020.4	170.335	10.873	0.142	5919
LIGHT SHIP			42600.0	152.000	15.425	0.029	0
TOTAL DISPLACEMENT			122620.4	163.965	12.455	0.103	5919

EQUIV. DRAFT(EXT)	= 8.559 M	:	M.T.C.	= 2865.28	MT-M
AFT. DRAFT(EXT)	= 11.368 M	:	T.P.C	= 153.64	MT/CM
FORE DRAFT(EXT)	= 6.200 M	:	K.M.T.	= 35.084	M
TRIM	= 5.168 M	:	V.C.G.	= 12.455	M
DISPLACEMENT	= 122620.4 MT	:	UNCORRECTED GM	= 22.630	M
L.C.G.	= 163.965 M	:	GGO	= 0.048	M
L.C.B.	= 163.837 M	:	CORRECTED GM(GOM)	= 22.582	M
L.C.F.	= 172.734 M	:	PROPELLER IMMER.	= 103.8	%
			BLIND DISTANCE	= 646.3	M

HEEL ANGLES(DEG.)	= 0.000	5.000	10.000	15.000	20.000	30.000	40.000	50.000	60.000
GZ VALUE (M)	= -0.104	1.869	3.858	5.850	7.591	9.645	10.646	10.980	10.247
GZ AREA (M*RAD.)	= 0.000	0.077	0.327	0.751	1.340	2.868	4.647	6.547	8.413

8. STEP 7 - BALLAST EXCHANGE

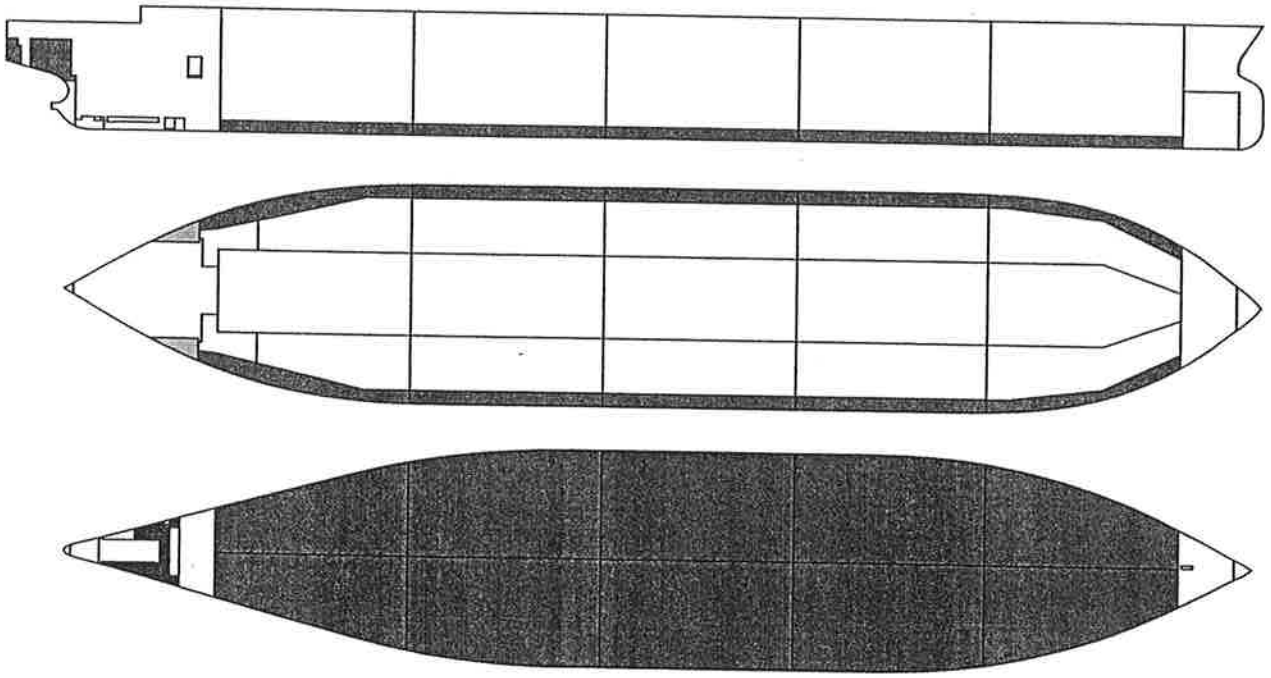


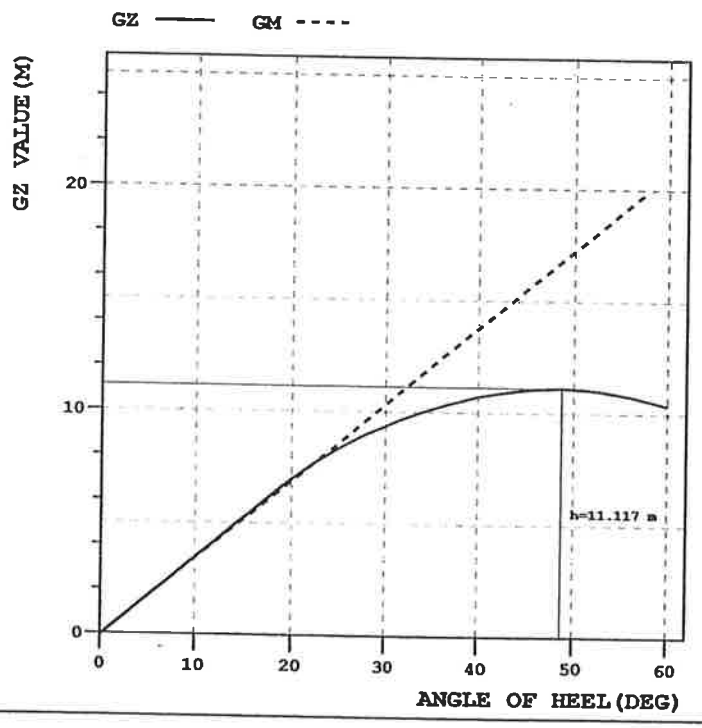
FR. NO.	DISTANCE M	SHEAR FORCE T	%	BENDING MOMENT TM	%	WEIGHT T/M	BOUY. T/M
-6	-5.500	0.0	-	0.0	-	93.9	0.0
0	-0.000	694.5	49.20	1979.3	6.16	168.6	18.3
60	51.000	5496.6	37.91	205463.8	62.26	324.9	315.2
70	102.000	7261.4	41.49	571618.4	69.71	320.2	533.4
80	153.000	-3359.4	17.87	668343.3	81.51	334.4	527.5
90	204.000	-1803.1	10.42	530161.5	64.65	529.2	478.3
100	255.000	-8374.4	52.67	261511.1	39.68	308.1	408.4
110	306.000	-232.3	2.28	1719.9	3.19	421.5	151.8
133	326.500	0.0	-	0.0	-	20.2	0.0

SHEAR FORCE (Negative) :	-8374 Ton (52.7%)	POSITION : Fr100 + 0.00 m
SHEAR FORCE (Positive) :	7651 Ton (46.5%)	POSITION : Fr 66 + 2.55 m
SAGGING MOMENT (Max.) :	-28 T-m (0.4%)	POSITION : Fr128 + 0.84 m
HOGGING MOMENT (Max.) :	696196 T-m (84.9%)	POSITION : Fr 76 + 4.60 m

9. STEP 8 - BALLAST EXCHANGE

CRUDE OIL
FRESH WATER
DIESEL OIL
WATER BALLAST
HEAVY FUEL OIL
LUBRICATING OIL





DISPLACEMENT	142720 Ton
KGo=KG+GGo	12.110 m
FLOODING ANGLE	40.000 Degree

AREA UNDER GZ CURVE

CRITERIA	RESULT	REQUIREMENT
0 Up to 30	2.651	0.055 M-RAD
0 Up to Flooding Ang.	4.415	0.090 M-RAD
30 Up to Flooding Ang.	1.764	0.030 M-RAD

LEVER AFTER FREE SURFACE CORR.

CRITERIA	RESULT	REQUIREMENT
GZ at 30 Deg	9.373	0.200 M
GoM	19.843	0.150 M
Angle of MAX GZ	48.4	25.00 DEG
Maximum GZ	11.1	

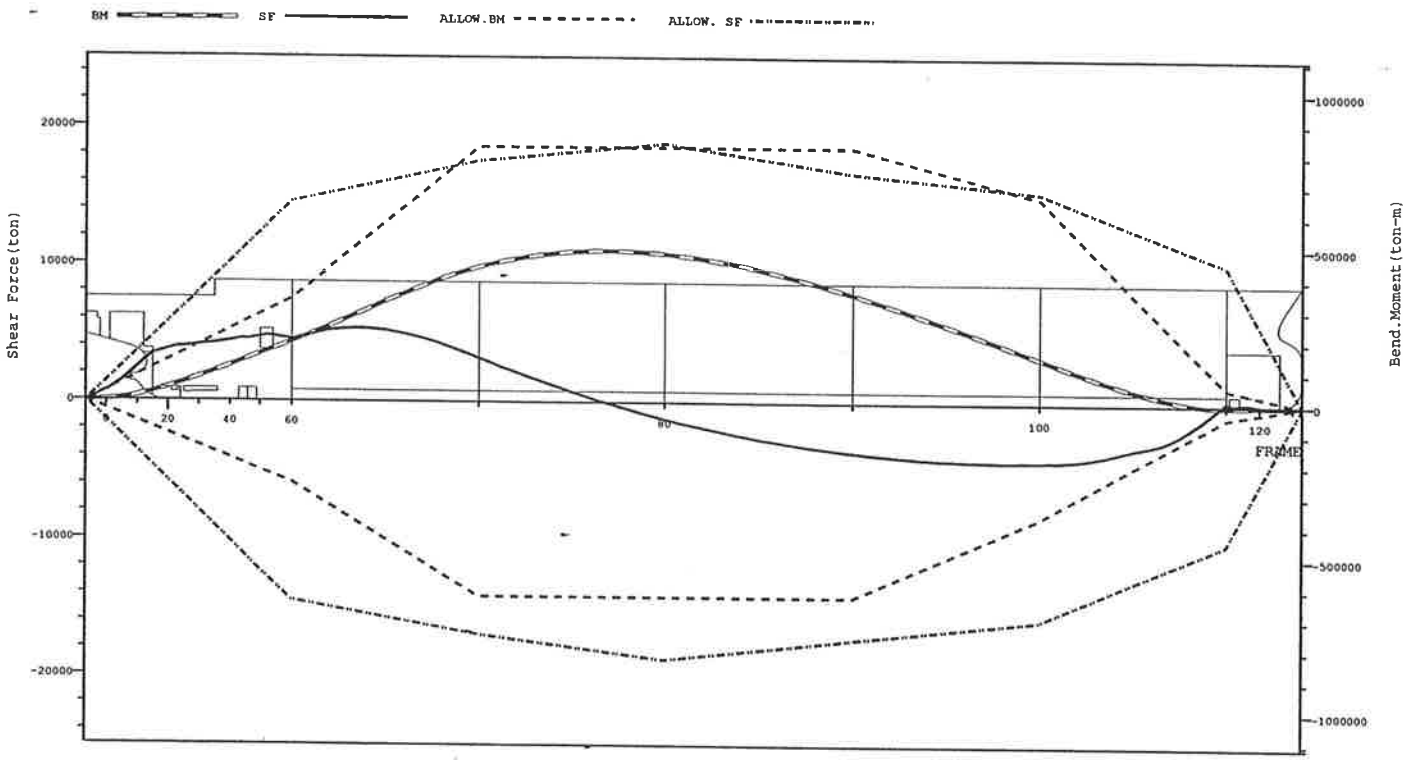
CONDITION 9. STEP 8 - BALLAST EXCHANGE

WEIGHT ITEMS	FILL. (%)	S.G	WEIGHT (MT)	L.C.G (M)	V.C.G (M)	T.C.G (M)	F.S.M (MT-M)
NO.1 W.B.TK(P)	100.0	1.0250	8790.0	279.870	11.198	18.224	0
NO.1 W.B.TK(S)	100.0	1.0250	8790.0	279.870	11.198	-18.224	0
NO.2 W.B.TK(P)	100.0	1.0250	10126.4	229.326	9.652	21.363	0
NO.2 W.B.TK(S)	100.0	1.0250	10126.4	229.326	9.652	-21.363	0
NO.3 W.B.TK(P)	100.0	1.0250	10218.2	178.500	9.593	21.421	0
NO.3 W.B.TK(S)	100.0	1.0250	10218.2	178.500	9.593	-21.421	0
NO.4 W.B.TK(P)	100.0	1.0250	9973.0	127.896	9.777	21.274	0
NO.4 W.B.TK(S)	100.0	1.0250	9973.0	127.896	9.777	-21.274	0
NO.5 W.B.TK(P)	100.0	1.0250	9136.8	75.928	11.734	19.496	0
NO.5 W.B.TK(S)	100.0	1.0250	9176.6	75.805	11.752	-19.503	0
A.P.TK	100.0	1.0250	2275.5	5.346	20.407	-0.025	0
TOTAL WATER BALLAST			98804.1	173.728	10.575	-0.009	0
F.W.TK(P)	10.0	1.0000	28.9	9.157	23.804	10.705	424
F.W.TK(S)	10.0	1.0000	20.6	8.409	23.803	-11.338	312
DIST.W.TK(S)	10.0	1.0000	8.3	11.050	23.807	-9.100	45
TOTAL FRESH WATER			57.8	9.161	23.804	0.004	782
NO.1 H.F.O.TK(P)	4.5	1.0000	110.6	41.999	11.394	14.507	2048
NO.1 H.F.O.TK(S)	4.5	1.0000	129.9	41.789	11.647	-14.598	2048
H.F.O.SETT.TK(P)	98.0	1.0000	235.5	39.651	17.685	14.679	78
H.F.O.SERV.TK(P)	98.0	1.0000	292.3	41.650	24.663	17.332	396
TOTAL HEAVY FUEL OIL			768.4	41.111	18.414	10.716	4570
D.O.STOR.TK(P)	10.0	0.8500	12.8	36.265	0.386	3.255	214
D.O.STOR.TK(S)	10.0	0.8500	16.7	35.642	0.451	-3.376	271
D.O.SETT.TK(S)	10.0	0.8500	3.2	43.350	21.748	-13.571	6
D.O.SERV.TK(S)	10.0	0.8500	6.3	40.800	21.748	-13.571	11
TOTAL DIESEL OIL			39.1	37.308	5.610	-3.678	503
M/E CYL.O.STOR.TK(P)	10.0	0.9000	7.4	44.200	14.430	4.095	24
M/E SYS.O.STOR.TK(S)	10.0	0.9000	7.4	44.200	14.430	-4.095	24
M/E SYS.O.SETT.TK(C)	10.0	0.9000	5.9	44.200	14.430	0.000	12
G/E L.O.STOR.TK(P)	10.0	0.9000	1.4	22.100	15.573	7.162	3
G/E L.O.SETT.TK(P)	10.0	0.9000	1.4	20.400	15.573	7.162	3
TOTAL LUBRICATING OIL			23.4	41.547	14.562	0.828	65
TOTAL DEADWEIGHT CONSTANT			427.0	66.630	10.135	0.000	0
TOTAL DEADWEIGHT			100119.8	172.074	10.640	0.072	5919
LIGHT SHIP			42600.0	152.000	15.425	0.029	0
TOTAL DISPLACEMENT			142719.9	166.082	12.069	0.059	5919

EQUIV. DRAFT(EXT)	= 9.862 M	M.T.C.	= 2936.77 MT-M
AFT. DRAFT(EXT)	= 12.417 M	T.P.C	= 155.22 MT/CM
FORE DRAFT(EXT)	= 7.697 M	K.M.T.	= 31.953 M
TRIM	= 4.720 M	V.C.G.	= 12.069 M
DISPLACEMENT	= 142719.9 MT	UNCORRECTED GM	= 19.885 M
L.C.G.	= 166.082 M	GGO	= 0.041 M
L.C.B.	= 165.980 M	CORRECTED GM(GOM)	= 19.843 M
L.C.F.	= 172.070 M	PROPELLER IMMER.	= 114.6 %
		BLIND DISTANCE	= 592.0 M

HEEL ANGLES(DEG.) =	0.000	5.000	10.000	15.000	20.000	30.000	40.000	50.000	60.000
GZ VALUE (M) =	-0.060	1.675	3.430	5.219	6.969	9.373	10.709	11.101	10.374
GZ AREA (M*RAD.) =	0.000	0.070	0.293	0.670	1.203	2.651	4.415	6.334	8.221

9. STEP 8 - BALLAST EXCHANGE

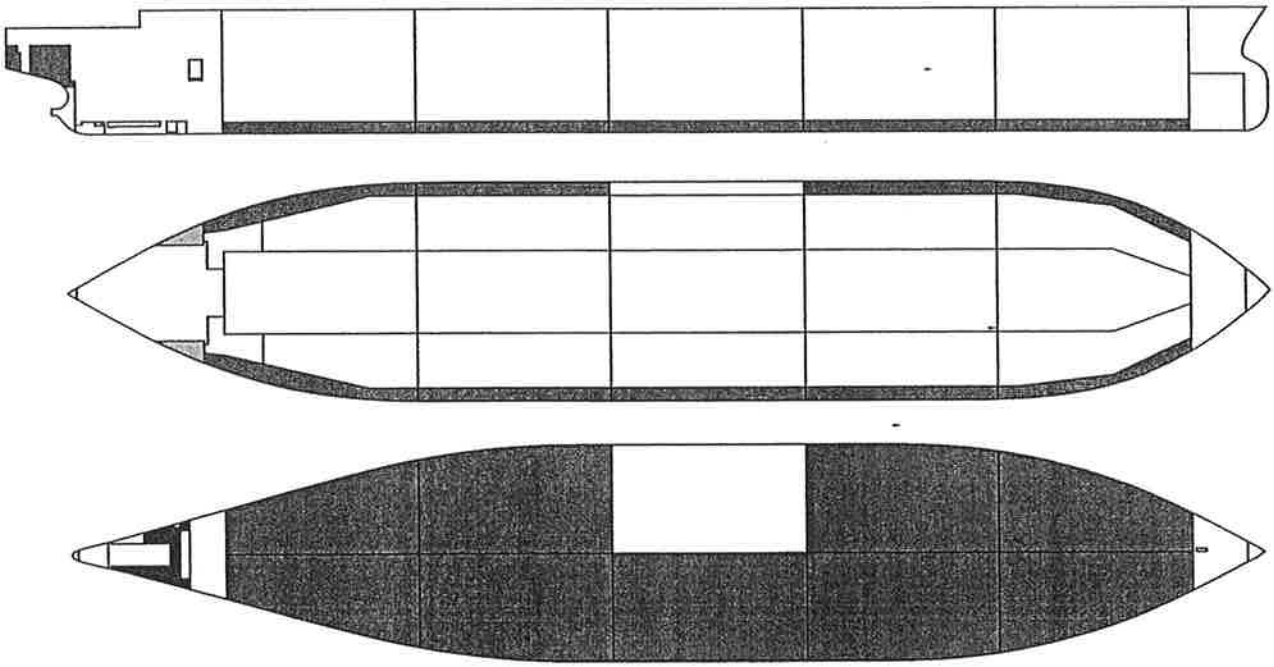


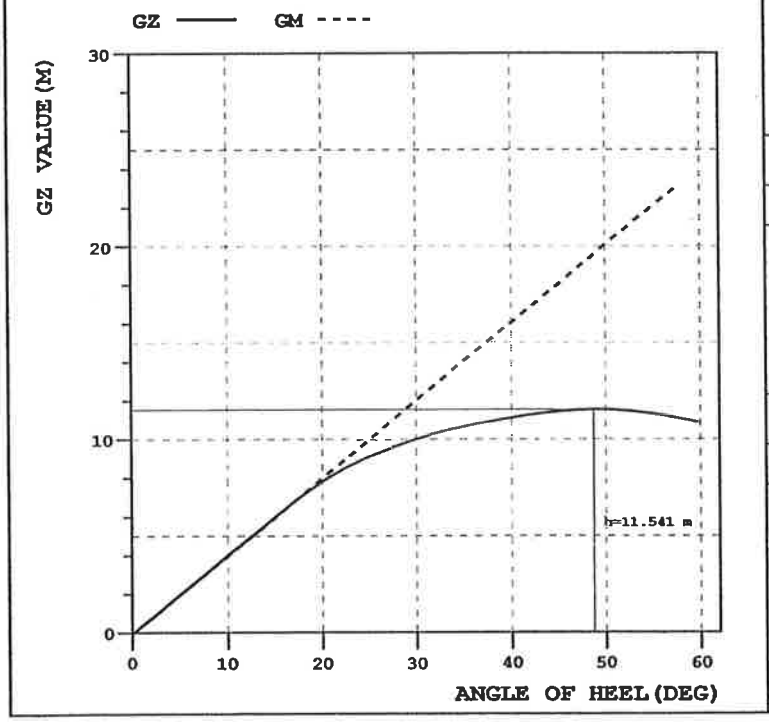
FR. NO.	DISTANCE M	SHEAR FORCE T	SHEAR FORCE %	BENDING MOMENT TM	BENDING MOMENT %	WEIGHT T/M	BOUY. T/M
-6	-5.500	0.0	-	0.0	-	93.9	0.0
0	-0.000	688.4	48.77	1984.7	6.18	168.6	20.2
60	51.000	4521.1	31.18	191749.5	58.11	324.9	360.3
70	102.000	3172.5	18.13	434341.9	52.97	499.7	604.0
80	153.000	-1203.4	6.40	478910.2	58.40	534.9	602.8
90	204.000	-3595.4	20.78	351083.3	42.82	529.2	557.8
100	255.000	-4202.8	26.43	145959.1	22.15	496.0	491.7
110	306.000	279.6	2.77	-2034.8	4.84	421.5	197.9
133	326.500	0.0	-	-0.0	-	20.2	0.1

SHEAR FORCE (Negative)	: -4241 Ton (26.2%)	POSITION	: Fr 98 + 0.59 m
SHEAR FORCE (Positive)	: 5323 Ton (34.3%)	POSITION	: Fr 63 + 1.70 m
SAGGING MOMENT (Max.)	: -2242 T-m (4.2%)	POSITION	: Fr109 + 3.30 m
HOGGING MOMENT (Max.)	: 488327 T-m (59.6%)	POSITION	: Fr 76 + 4.60 m

10. STEP 9 - BALLAST EXCHANGE

CRUDE OIL
FRESH WATER
DIESEL OIL
WATER BALLAST
HEAVY FUEL OIL
LUBRICATING OIL





DISPLACEMENT	123518 Ton
KGo=KG+GGo	11.826 m
FLOODING ANGLE	40.000 Degree

AREA UNDER GZ CURVE

CRITERIA	RESULT	REQUIREMENT
0 Up to 30	2.968	0.055 M-RAD
0 Up to Flooding Ang.	4.820	0.090 M-RAD
30 Up to Flooding Ang.	1.852	0.030 M-RAD

LEVER AFTER FREE SURFACE CORR.

CRITERIA	RESULT	REQUIREMENT
GZ at 30 Deg	10.007	0.200 M
GoM	23.081	0.150 M
Angle of MAX GZ	49.0	25.00 DEG
Maximum GZ	11.5	

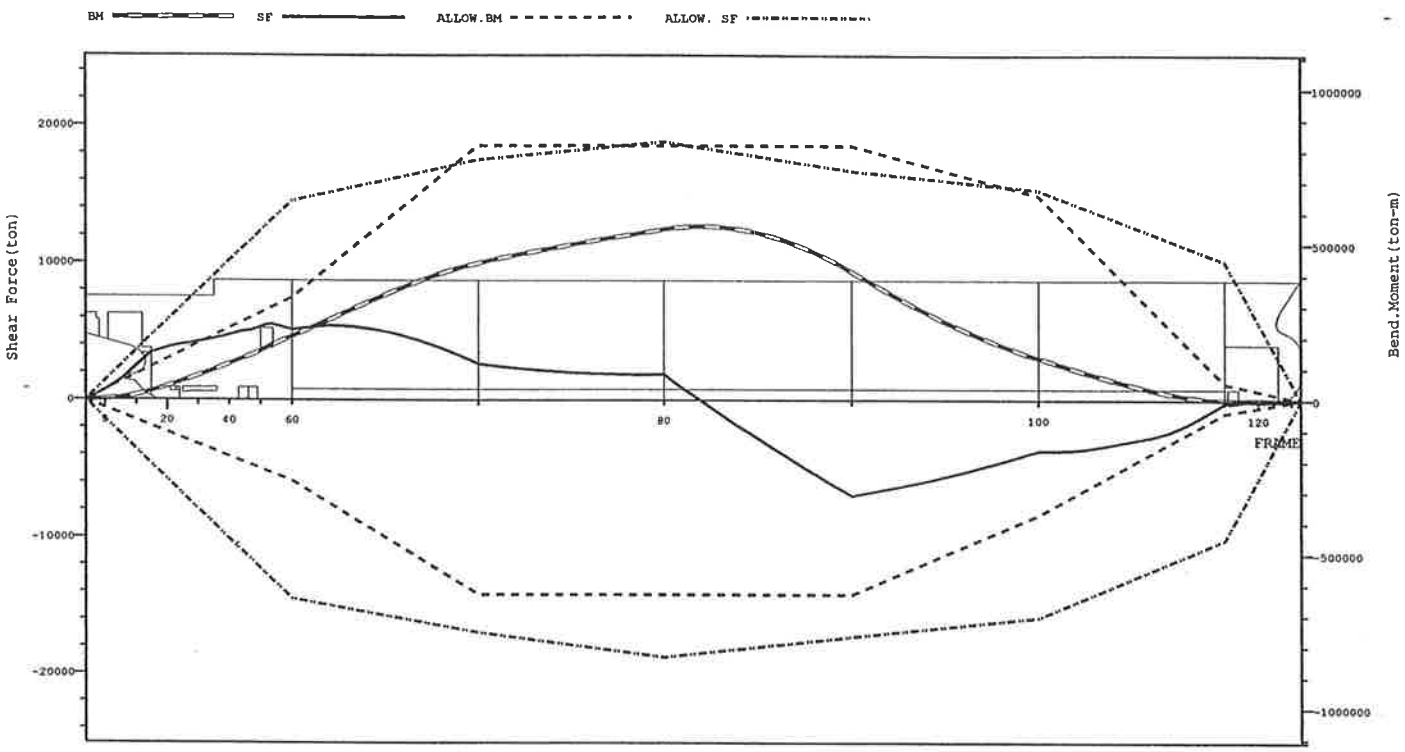
CONDITION 10. STEP 9 - BALLAST EXCHANGE

WEIGHT ITEMS	FILL. (%)	S.G	WEIGHT (MT)	L.C.G (M)	V.C.G (M)	T.C.G (M)	F.S.M (MT-M)
NO.1 W.B.TK(P)	100.0	1.0250	8790.0	279.870	11.198	18.224	0
NO.1 W.B.TK(S)	50.0	1.0250	4395.0	278.199	2.826	-13.541	5327
NO.2 W.B.TK(P)	100.0	1.0250	10126.4	229.326	9.652	21.363	0
NO.2 W.B.TK(S)	100.0	1.0250	10126.4	229.326	9.652	-21.363	0
NO.3 W.B.TK(S)	100.0	1.0250	10218.2	178.500	9.593	-21.421	0
NO.4 W.B.TK(P)	100.0	1.0250	9973.0	127.896	9.777	21.274	0
NO.4 W.B.TK(S)	100.0	1.0250	9973.0	127.896	9.777	-21.274	0
NO.5 W.B.TK(P)	100.0	1.0250	9136.8	75.928	11.734	19.496	0
NO.5 W.B.TK(S)	50.0	1.0250	4588.3	78.083	3.390	-13.553	3380
A.P.TK	100.0	1.0250	2275.5	5.346	20.407	-0.025	0
TOTAL WATER BALLAST			79602.6	172.939	9.655	-0.029	8707
F.W.TK(P)	10.0	1.0000	28.9	9.157	23.804	10.705	424
F.W.TK(S)	10.0	1.0000	20.6	8.409	23.803	-11.338	312
DIST.W.TK(S)	10.0	1.0000	8.3	11.050	23.807	-9.100	45
TOTAL FRESH WATER			57.8	9.161	23.804	0.004	782
NO.1 H.F.O.TK(P)	4.5	1.0000	110.6	41.999	11.394	14.507	2048
NO.1 H.F.O.TK(S)	4.5	1.0000	129.9	41.789	11.647	-14.598	2048
H.F.O.SETT.TK(P)	98.0	1.0000	235.5	39.651	17.685	14.679	78
H.F.O.SERV.TK(P)	98.0	1.0000	292.3	41.650	24.663	17.332	396
TOTAL HEAVY FUEL OIL			768.4	41.111	18.414	10.716	4570
D.O.STOR.TK(P)	10.0	0.8500	12.8	36.265	0.386	3.255	214
D.O.STOR.TK(S)	10.0	0.8500	16.7	35.642	0.451	-3.376	271
D.O.SETT.TK(S)	10.0	0.8500	3.2	43.350	21.748	-13.571	6
D.O.SERV.TK(S)	10.0	0.8500	6.3	40.800	21.748	-13.571	11
TOTAL DIESEL OIL			39.1	37.308	5.610	-3.678	503
M/E CYL.O.STOR.TK(P)	10.0	0.9000	7.4	44.200	14.430	4.095	24
M/E SYS.O.STOR.TK(S)	10.0	0.9000	7.4	44.200	14.430	-4.095	24
M/E SYS.O.SETT.TK(C)	10.0	0.9000	5.9	44.200	14.430	0.000	12
G/E L.O.STOR.TK(P)	10.0	0.9000	1.4	22.100	15.573	7.162	3
G/E L.O.SETT.TK(P)	10.0	0.9000	1.4	20.400	15.573	7.162	3
TOTAL LUBRICATING OIL			23.4	41.547	14.562	0.828	65
TOTAL DEADWEIGHT CONSTANT			427.0	66.630	10.135	0.000	0
TOTAL DEADWEIGHT			80918.4	170.905	9.750	0.072	14625
LIGHT SHIP			42600.0	152.000	15.425	0.029	0
TOTAL DISPLACEMENT			123518.4	164.385	11.707	0.057	14625

EQUIV. DRAFT(EXT)	= 8.617 M	:	M.T.C.	= 2868.08	MT-M
AFT. DRAFT(EXT)	= 11.342 M	:	T.P.C	= 153.71	MT/CM
FORE DRAFT(EXT)	= 6.330 M	:	K.M.T.	= 34.907	M
TRIM	= 5.012 M	:	V.C.G.	= 11.707	M
DISPLACEMENT	= 123518.4 MT	:	UNCORRECTED GM	= 23.200	M
L.C.G.	= 164.385 M	:	GGO	= 0.118	M
L.C.B.	= 164.273 M	:	CORRECTED GM(GOM)	= 23.081	M
L.C.F.	= 172.789 M	:	PROPELLER IMMER.	= 103.5	%
			BLIND DISTANCE	= 635.9	M

HEEL ANGLES(DEG.)	=	0.000	5.000	10.000	15.000	20.000	30.000	40.000	50.000	60.000
GZ VALUE (M)	=	-0.058	1.959	3.992	6.030	7.831	10.007	11.117	11.536	10.857
GZ AREA (M*RAD.)	=	0.000	0.083	0.342	0.780	1.388	2.968	4.820	6.810	8.778

10. STEP 9 - BALLAST EXCHANGE

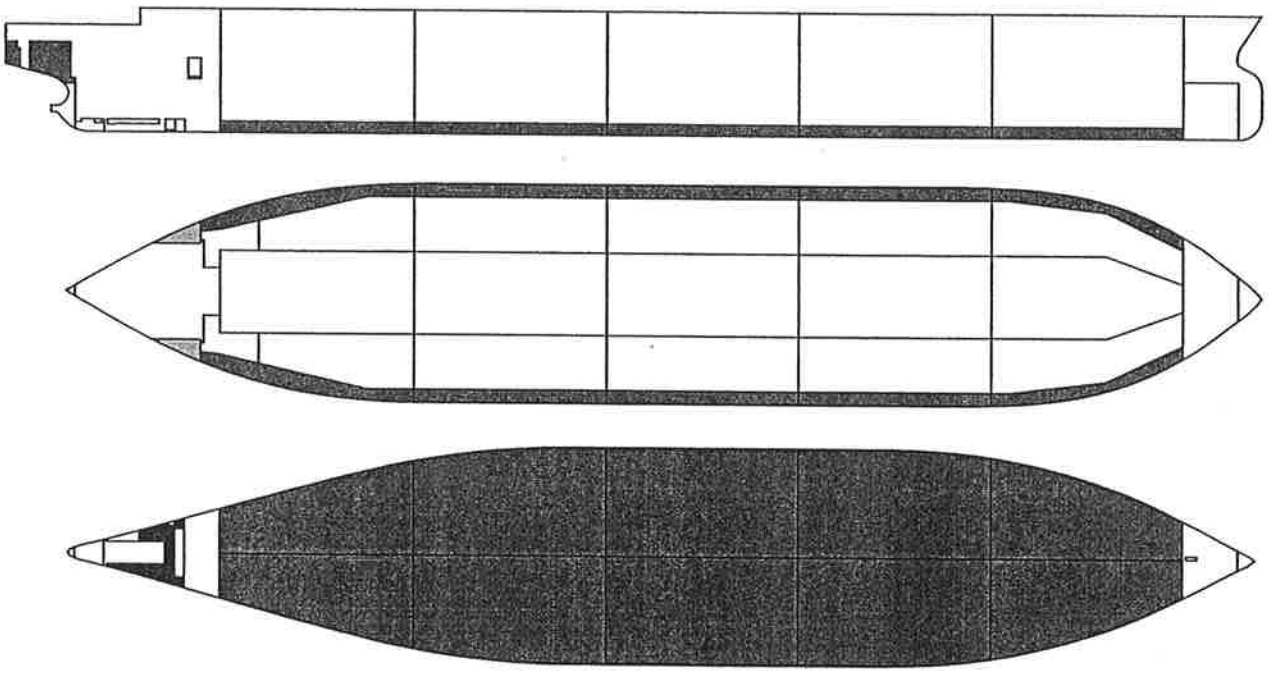


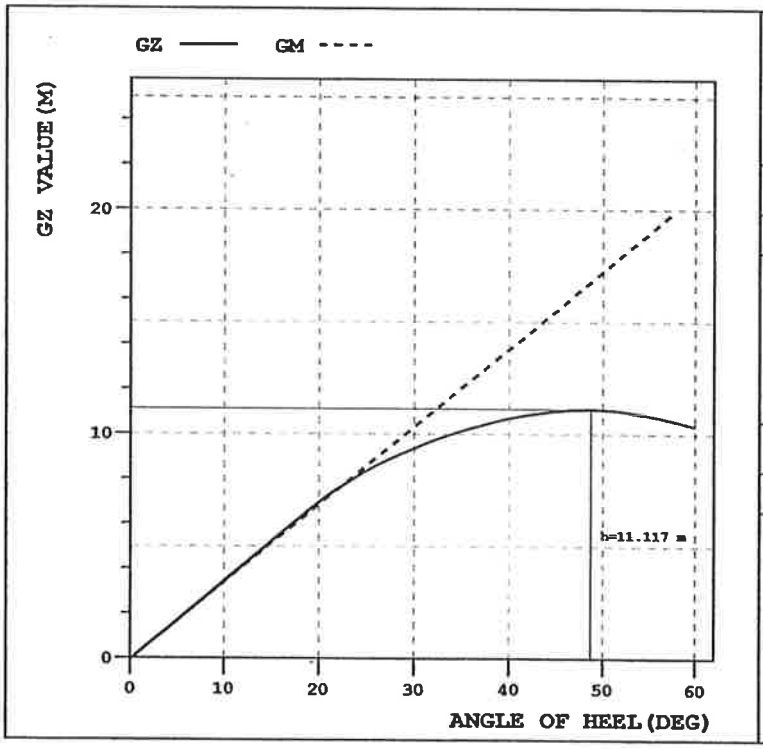
FR. NO.	DISTANCE M	SHEAR FORCE T	SHEAR FORCE %	BENDING MOMENT TM	BENDING MOMENT %	WEIGHT T/M	BOUY. T/M
-6	-5.500	0.0	-	0.0	-	93.9	0.0
0	-0.000	694.5	49.20	1973.8	6.14	168.6	18.3
60	51.000	5126.6	35.36	204574.1	61.99	244.8	315.1
70	102.000	2644.1	15.11	441629.3	53.86	499.7	534.8
80	153.000	1883.5	10.02	550595.2	67.15	534.8	530.4
90	204.000	-6972.3	40.30	414563.3	50.56	328.7	482.7
100	255.000	-3682.3	23.16	135851.0	20.61	495.9	414.2
110	306.000	-191.0	1.87	1456.0	2.70	325.6	155.6
133	326.500	0.0	-	-0.0	-	20.2	0.0

SHEAR FORCE (Negative)	:	-6972 Ton (40.3%)	POSITION : Fr 90 + 0.00 m
SHEAR FORCE (Positive)	:	5493 Ton (41.6%)	POSITION : Fr 54 +-0.00 m
SAGGING MOMENT (Max.)	:	-25 T-m (0.4%)	POSITION : Fr128 + 0.84 m
HOGGING MOMENT (Max.)	:	560247 T-m (68.3%)	POSITION : Fr 81 + 4.00 m

11. STEP 10 - BALLAST EXCHANGE

CRUDE OIL
FRESH WATER
DIESEL OIL
WATER BALLAST
HEAVY FUEL OIL
LUBRICATING OIL





DISPLACEMENT	142720 Ton
KGo=KG+GGo	12.110 m
FLOODING ANGLE	40.000 Degree

AREA UNDER GZ CURVE

CRITERIA	RESULT	REQUIREMENT
0 Up to 30	2.651	0.055 M-RAD
0 Up to Flooding Ang.	4.415	0.090 M-RAD
30 Up to Flooding Ang.	1.764	0.030 M-RAD

LEVER AFTER FREE SURFACE CORR.

CRITERIA	RESULT	REQUIREMENT
GZ at 30 Deg	9.373	0.200 M
GoM	19.843	0.150 M
Angle of MAX GZ	48.4	25.00 DEG
Maximum GZ	11.1	

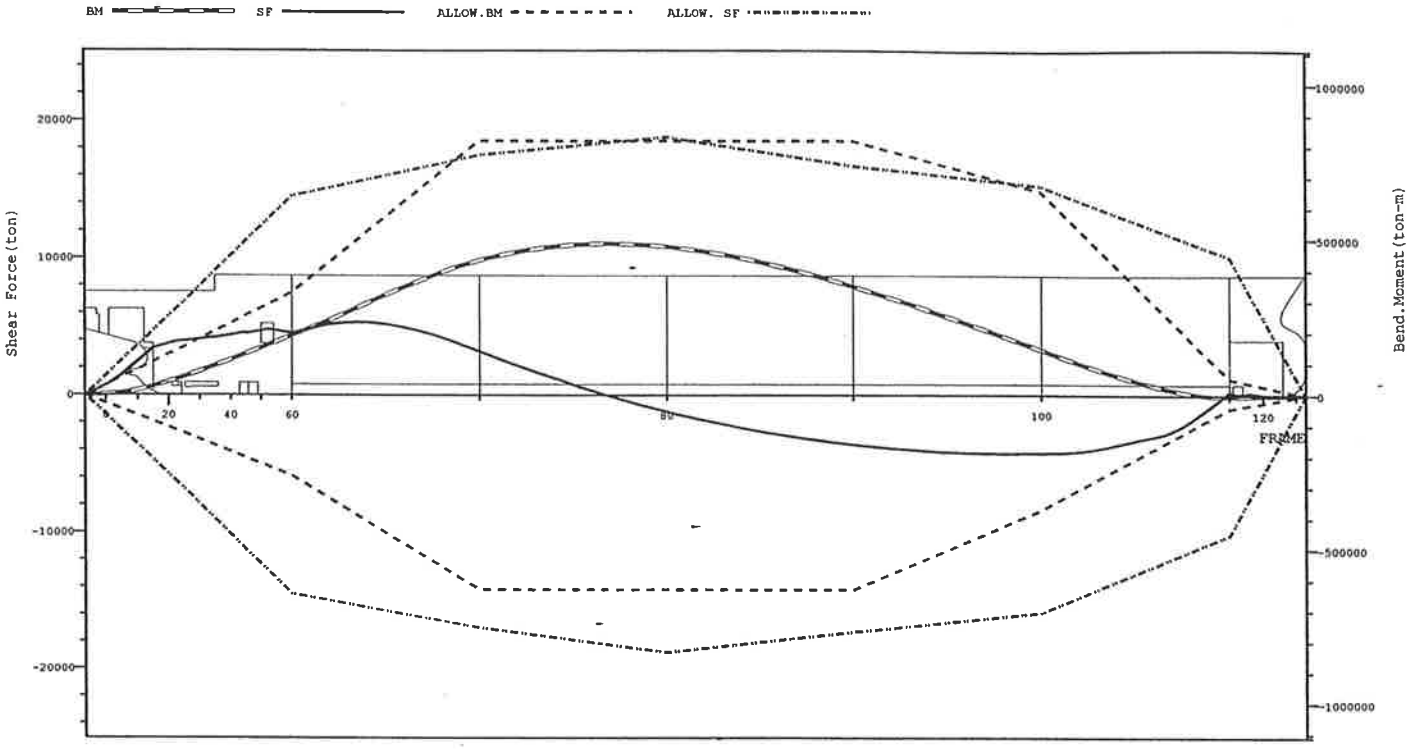
CONDITION 11. STEP 10 - BALLAST EXCHANGE

WEIGHT ITEMS	FILL. (%)	S.G	WEIGHT (MT)	L.C.G (M)	V.C.G (M)	T.C.G (M)	F.S.M (MT-M)
NO.1 W.B.TK(P)	100.0	1.0250	8790.0	279.870	11.198	18.224	0
NO.1 W.B.TK(S)	100.0	1.0250	8790.0	279.870	11.198	-18.224	0
NO.2 W.B.TK(P)	100.0	1.0250	10126.4	229.326	9.652	21.363	0
NO.2 W.B.TK(S)	100.0	1.0250	10126.4	229.326	9.652	-21.363	0
NO.3 W.B.TK(P)	100.0	1.0250	10218.2	178.500	9.593	21.421	0
NO.3 W.B.TK(S)	100.0	1.0250	10218.2	178.500	9.593	-21.421	0
NO.4 W.B.TK(P)	100.0	1.0250	9973.0	127.896	9.777	21.274	0
NO.4 W.B.TK(S)	100.0	1.0250	9973.0	127.896	9.777	-21.274	0
NO.5 W.B.TK(P)	100.0	1.0250	9136.8	75.928	11.734	19.496	0
NO.5 W.B.TK(S)	100.0	1.0250	9176.6	75.805	11.752	-19.503	0
A.P.TK	100.0	1.0250	2275.5	5.346	20.407	-0.025	0
TOTAL WATER BALLAST			98804.1	173.728	10.575	-0.009	0
F.W.TK(P)	10.0	1.0000	28.9	9.157	23.804	10.705	424
F.W.TK(S)	10.0	1.0000	20.6	8.409	23.803	-11.338	312
DIST.W.TK(S)	10.0	1.0000	8.3	11.050	23.807	-9.100	45
TOTAL FRESH WATER			57.8	9.161	23.804	0.004	782
NO.1 H.F.O.TK(P)	4.5	1.0000	110.6	41.999	11.394	14.507	2048
NO.1 H.F.O.TK(S)	4.5	1.0000	129.9	41.789	11.647	-14.598	2048
H.F.O.SETT.TK(P)	98.0	1.0000	235.5	39.651	17.685	14.679	78
H.F.O.SERV.TK(P)	98.0	1.0000	292.3	41.650	24.663	17.332	396
TOTAL HEAVY FUEL OIL			768.4	41.111	18.414	10.716	4570
D.O.STOR.TK(P)	10.0	0.8500	12.8	36.265	0.386	3.255	214
D.O.STOR.TK(S)	10.0	0.8500	16.7	35.642	0.451	-3.376	271
D.O.SETT.TK(S)	10.0	0.8500	3.2	43.350	21.748	-13.571	6
D.O.SERV.TK(S)	10.0	0.8500	6.3	40.800	21.748	-13.571	11
TOTAL DIESEL OIL			39.1	37.308	5.610	-3.678	503
M/E CYL.O.STOR.TK(P)	10.0	0.9000	7.4	44.200	14.430	4.095	24
M/E SYS.O.STOR.TK(S)	10.0	0.9000	7.4	44.200	14.430	-4.095	24
M/E SYS.O.SETT.TK(C)	10.0	0.9000	5.9	44.200	14.430	0.000	12
G/E L.O.STOR.TK(P)	10.0	0.9000	1.4	22.100	15.573	7.162	3
G/E L.O.SETT.TK(P)	10.0	0.9000	1.4	20.400	15.573	7.162	3
TOTAL LUBRICATING OIL			23.4	41.547	14.562	0.828	65
TOTAL DEADWEIGHT CONSTANT			427.0	66.630	10.135	0.000	0
TOTAL DEADWEIGHT			100119.8	172.074	10.640	0.072	5919
LIGHT SHIP			42600.0	152.000	15.425	0.029	0
TOTAL DISPLACEMENT			142719.9	166.082	12.069	0.059	5919

EQUIV. DRAFT(EXT)	= 9.862 M	M.T.C.	= 2936.77	MT-M
AFT. DRAFT(EXT)	= 12.417 M	T.P.C	= 155.22	MT/CM
FORE DRAFT(EXT)	= 7.697 M	K.M.T.	= 31.953	M
TRIM	= 4.720 M	V.C.G.	= 12.069	M
DISPLACEMENT	= 142719.9 MT	UNCORRECTED GM	= 19.885	M
L.C.G.	= 166.082 M	GGO	= 0.041	M
L.C.B.	= 165.980 M	CORRECTED GM(GOM)	= 19.843	M
L.C.F.	= 172.070 M	PROPELLER IMMER.	= 114.6	%
		BLIND DISTANCE	= 592.0	M

HEEL ANGLES(DEG.)	=	0.000	5.000	10.000	15.000	20.000	30.000	40.000	50.000	60.000
GZ VALUE (M)	=	-0.060	1.675	3.430	5.219	6.969	9.373	10.709	11.101	10.374
GZ AREA (M*RAD.)	=	0.000	0.070	0.293	0.670	1.203	2.651	4.415	6.334	8.221

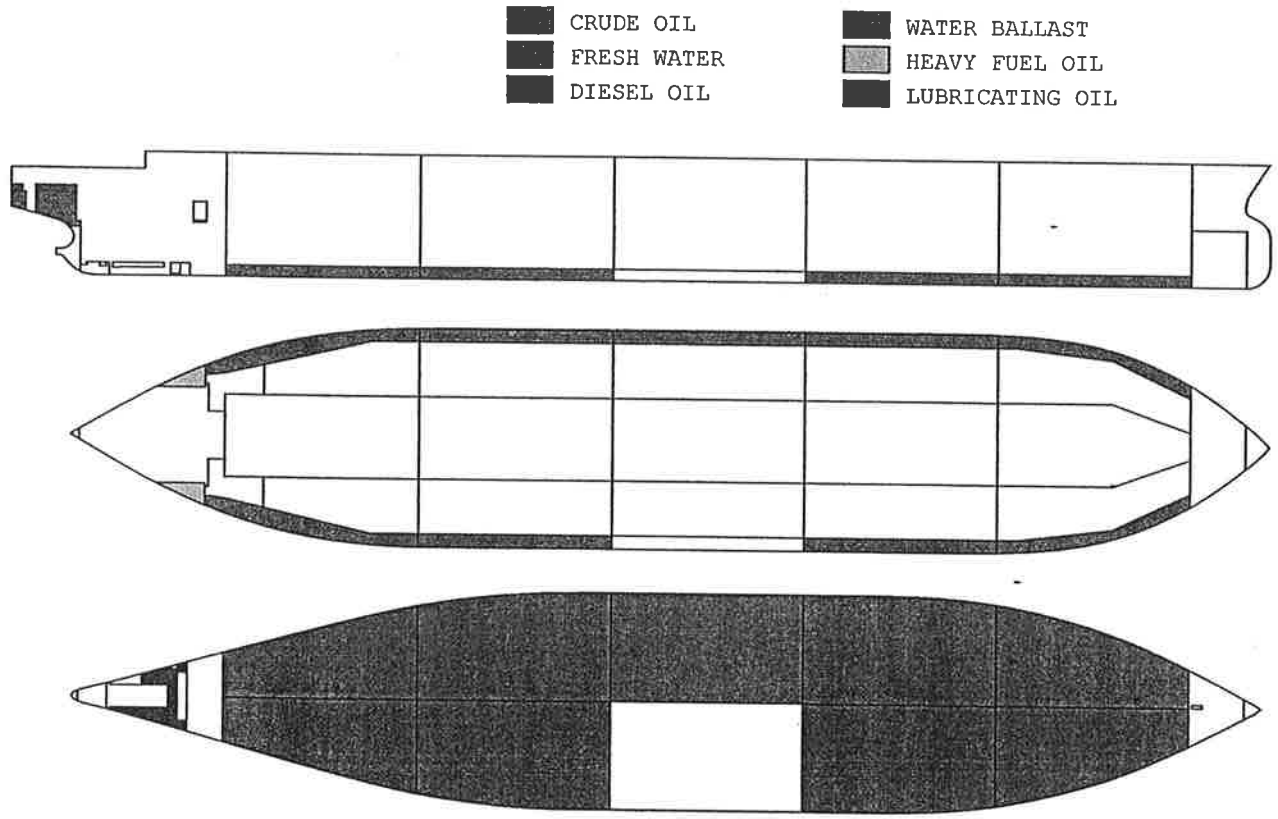
11. STEP 10 - BALLAST EXCHANGE

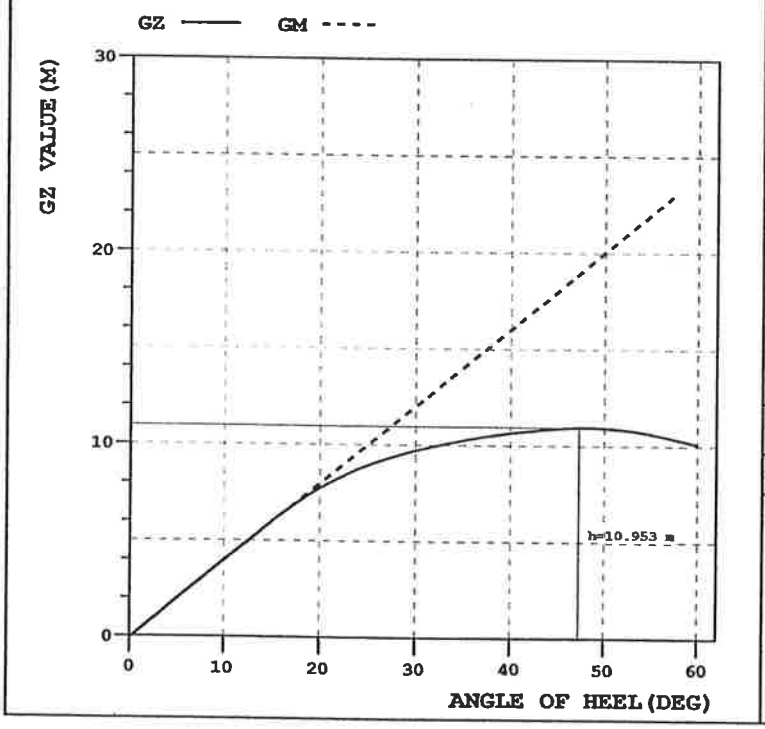


FR. NO.	DISTANCE M	SHEAR FORCE T	%	BENDING MOMENT TM	%	WEIGHT T/M	BOUY. T/M
-6	-5.500	0.0	-	0.0	-	93.9	0.0
0	-0.000	688.4	48.77	1984.7	6.18	168.6	20.2
60	51.000	4521.1	31.18	191749.5	58.11	324.9	360.3
70	102.000	3172.5	18.13	434341.9	52.97	499.7	604.0
80	153.000	-1203.4	6.40	478910.2	58.40	534.9	602.8
90	204.000	-3595.4	20.78	351083.3	42.82	529.2	557.8
100	255.000	-4202.8	26.43	145959.1	22.15	496.0	491.7
110	306.000	279.6	2.77	-2034.8	4.84	421.5	197.9
133	326.500	0.0	-	-0.0	-	20.2	0.1

SHEAR FORCE (Negative)	:	-4241 Ton (26.2%)	POSITION : Fr 98 + 0.59 m
SHEAR FORCE (Positive)	:	5323 Ton (34.3%)	POSITION : Fr 63 + 1.70 m
SAGGING MOMENT (Max.)	:	-2242 T-m (4.2%)	POSITION : Fr109 + 3.30 m
HOGGING MOMENT (Max.)	:	488327 T-m (59.6%)	POSITION : Fr 76 + 4.60 m

12. STEP 11 - BALLAST EXCHANGE





DISPLACEMENT	123538 Ton
KGo=KG+GGo	11.828 m
FLOODING ANGLE	40.000 Degree

AREA UNDER GZ CURVE

CRITERIA	RESULT	REQUIREMENT
0 Up to 30	2.920	0.055 M-RAD
0 Up to Flooding Ang.	4.706	0.090 M-RAD
30 Up to Flooding Ang.	1.786	0.030 M-RAD

LEVER AFTER FREE SURFACE CORR.

CRITERIA	RESULT	REQUIREMENT
GZ at 30 Deg	9.714	0.200 M
GoM	23.077	0.150 M
Angle of MAX GZ	47.9	25.00 DEG
Maximum GZ	11.0	

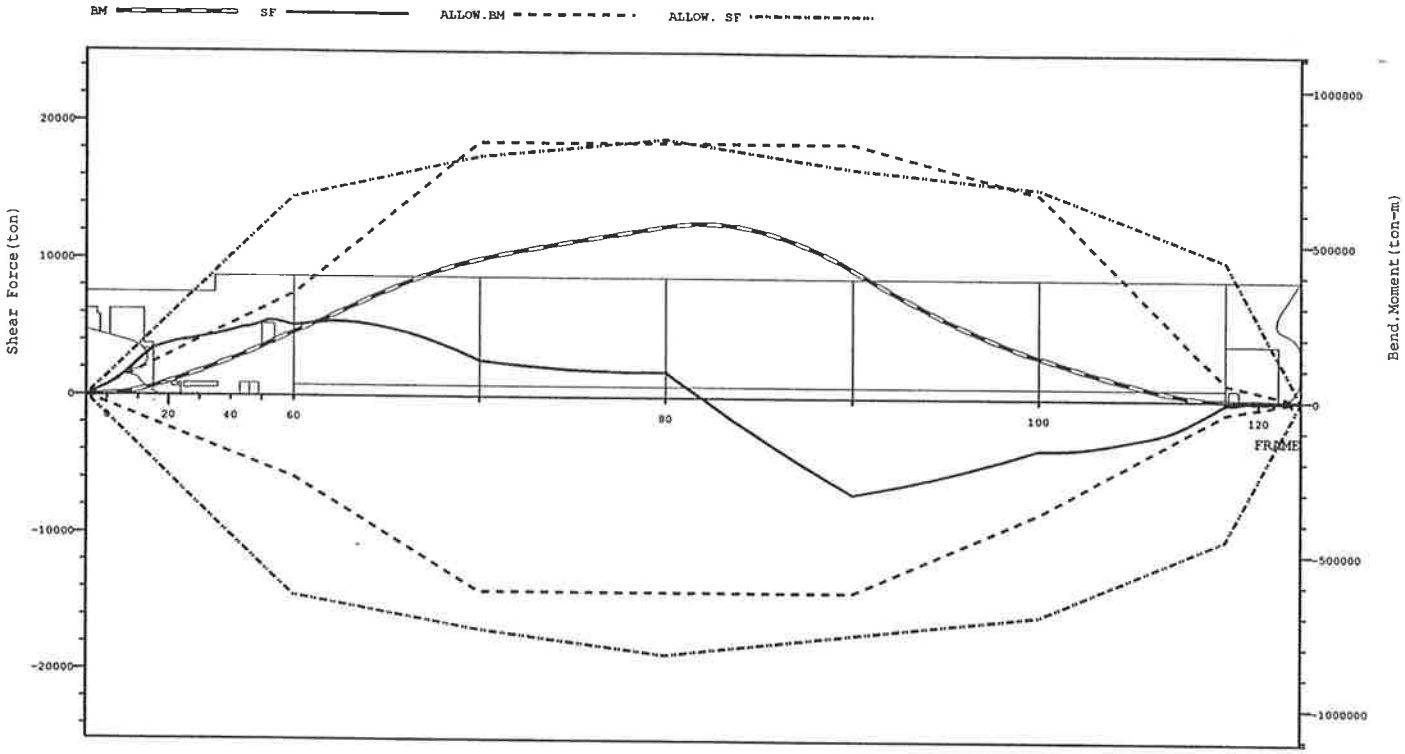
CONDITION 12. STEP 11 - BALLAST EXCHANGE

WEIGHT ITEMS	FILL. (%)	S.G	WEIGHT (MT)	L.C.G (M)	V.C.G (M)	T.C.G (M)	F.S.M (MT-M)
NO.1 W.B.TK(P)	50.0	1.0250	4395.0	278.199	2.826	13.541	5327
NO.1 W.B.TK(S)	100.0	1.0250	8790.0	279.870	11.198	-18.224	0
NO.2 W.B.TK(P)	100.0	1.0250	10126.4	229.326	9.652	21.363	0
NO.2 W.B.TK(S)	100.0	1.0250	10126.4	229.326	9.652	-21.363	0
NO.3 W.B.TK(P)	100.0	1.0250	10218.2	178.500	9.593	21.421	0
NO.4 W.B.TK(P)	100.0	1.0250	9973.0	127.896	9.777	21.274	0
NO.4 W.B.TK(S)	100.0	1.0250	9973.0	127.896	9.777	-21.274	0
NO.5 W.B.TK(P)	50.0	1.0250	4568.4	78.100	3.364	13.516	3427
NO.5 W.B.TK(S)	100.0	1.0250	9176.6	75.805	11.752	-19.503	0
A.P.TK	100.0	1.0250	2275.5	5.346	20.407	-0.025	0
TOTAL WATER BALLAST			79622.5	172.901	9.658	0.012	8754
F.W.TK(P)	10.0	1.0000	28.9	9.157	23.804	10.705	424
F.W.TK(S)	10.0	1.0000	20.6	8.409	23.803	-11.338	312
DIST.W.TK(S)	10.0	1.0000	8.3	11.050	23.807	-9.100	45
TOTAL FRESH WATER			57.8	9.161	23.804	0.004	782
NO.1 H.F.O.TK(P)	4.5	1.0000	110.6	41.999	11.394	14.507	2048
NO.1 H.F.O.TK(S)	4.5	1.0000	129.9	41.789	11.647	-14.598	2048
H.F.O.SETT.TK(P)	98.0	1.0000	235.5	39.651	17.685	14.679	78
H.F.O.SERV.TK(P)	98.0	1.0000	292.3	41.650	24.663	17.332	396
TOTAL HEAVY FUEL OIL			768.4	41.111	18.414	10.716	4570
D.O.STOR.TK(P)	10.0	0.8500	12.8	36.265	0.386	3.255	214
D.O.STOR.TK(S)	10.0	0.8500	16.7	35.642	0.451	-3.376	271
D.O.SETT.TK(S)	10.0	0.8500	3.2	43.350	21.748	-13.571	6
D.O.SERV.TK(S)	10.0	0.8500	6.3	40.800	21.748	-13.571	11
TOTAL DIESEL OIL			39.1	37.308	5.610	-3.678	503
M/E CYL.O.STOR.TK(P)	10.0	0.9000	7.4	44.200	14.430	4.095	24
M/E SYS.O.STOR.TK(S)	10.0	0.9000	7.4	44.200	14.430	-4.095	24
M/E SYS.O.SETT.TK(C)	10.0	0.9000	5.9	44.200	14.430	0.000	12
G/E L.O.STOR.TK(P)	10.0	0.9000	1.4	22.100	15.573	7.162	3
G/E L.O.SETT.TK(P)	10.0	0.9000	1.4	20.400	15.573	7.162	3
TOTAL LUBRICATING OIL			23.4	41.547	14.562	0.828	65
TOTAL DEADWEIGHT CONSTANT			427.0	66.630	10.135	0.000	0
TOTAL DEADWEIGHT			80938.3	170.868	9.753	0.112	14672
LIGHT SHIP			42600.0	152.000	15.425	0.029	0
TOTAL DISPLACEMENT			123538.3	164.362	11.709	0.083	14672

EQUIV. DRAFT(EXT)	= 8.619 M	:	M.T.C.	= 2868.17	MT-M
AFT. DRAFT(EXT)	= 11.349 M	:	T.P.C	= 153.71	MT/CM
FORE DRAFT(EXT)	= 6.327 M	:	K.M.T.	= 34.905	M
TRIM	= 5.022 M	:	V.C.G.	= 11.709	M
DISPLACEMENT	= 123538.3 MT	:	UNCORRECTED GM	= 23.195	M
L.C.G.	= 164.362 M	:	GGO	= 0.119	M
L.C.B.	= 164.249 M	:	CORRECTED GM(GOM)	= 23.077	M
L.C.F.	= 172.782 M	:	PROPELLER IMMER.	= 103.6	%
			BLIND DISTANCE	= 636.5	M

HEEL ANGLES(DEG.)	= 0.000	5.000	10.000	15.000	20.000	30.000	40.000	50.000	60.000
GZ VALUE (M)	= -0.084	1.932	3.960	5.984	7.728	9.714	10.657	10.926	10.098
GZ AREA (M*RAD.)	= 0.000	0.081	0.338	0.772	1.374	2.919	4.706	6.602	8.451

12. STEP 11 - BALLAST EXCHANGE

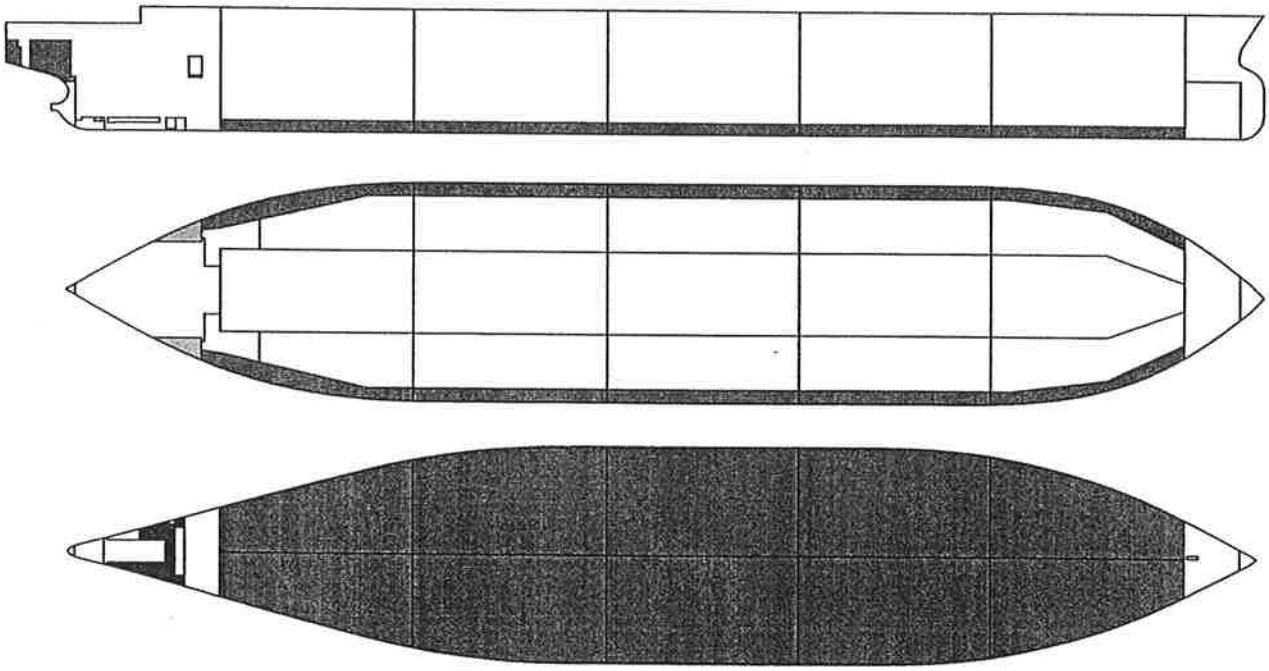


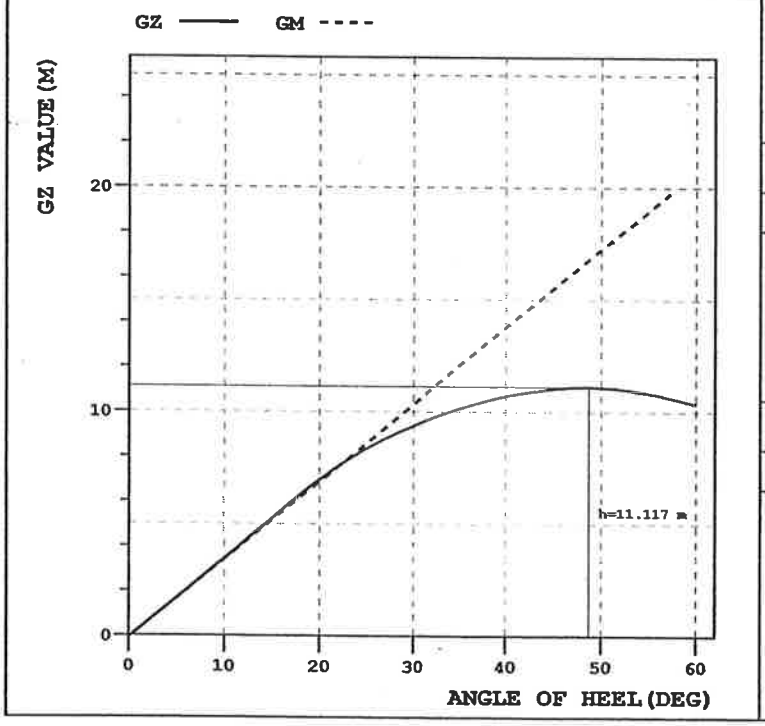
FR. NO.	DISTANCE M	SHEAR FORCE T	%	BENDING MOMENT TM	%	WEIGHT T/M	BOUY. T/M
-6	-5.500	0.0	-	0.0	-	93.9	0.0
0	-0.000	694.5	49.20	1971.8	6.14	168.6	18.3
60	51.000	5160.6	35.59	204620.7	62.01	244.5	315.3
70	102.000	2647.7	15.13	442606.5	53.98	499.7	535.0
80	153.000	1879.0	9.99	551510.8	67.26	534.8	530.5
90	204.000	-6980.0	40.35	415127.1	50.63	328.7	482.7
100	255.000	-3688.2	23.20	136029.8	20.64	495.9	414.1
110	306.000	-191.4	1.88	1457.6	2.70	325.6	155.5
133	326.500	0.0	-	-0.0	-	20.2	0.0

SHEAR FORCE (Negative)	: -6980 Ton	(40.3%)	POSITION : Fr 90 + 0.00 m
SHEAR FORCE (Positive)	: 5489 Ton	(41.6%)	POSITION : Fr 54 + 0.00 m
SAGGING MOMENT (Max.)	: -25 T-m	(0.4%)	POSITION : Fr128 + 0.84 m
HOGGING MOMENT (Max.)	: 561113 T-m	(68.4%)	POSITION : Fr 81 + 4.00 m

13. STEP 12 - BALLAST EXCHANGE

CRUDE OIL
FRESH WATER
DIESEL OIL
WATER BALLAST
HEAVY FUEL OIL
LUBRICATING OIL





DISPLACEMENT	142720 Ton
KGo=KG+GGo	12.110 m
FLOODING ANGLE	40.000 Degree

AREA UNDER GZ CURVE

CRITERIA	RESULT	REQUIREMENT
0 Up to 30	2.651	0.055 M-RAD
0 Up to Flooding Ang.	4.415	0.090 M-RAD
30 Up to Flooding Ang.	1.764	0.030 M-RAD

LEVER AFTER FREE SURFACE CORR.

CRITERIA	RESULT	REQUIREMENT
GZ at 30 Deg	9.373	0.200 M
GoM	19.843	0.150 M
Angle of MAX GZ	48.4	25.00 DEG
Maximum GZ	11.1	

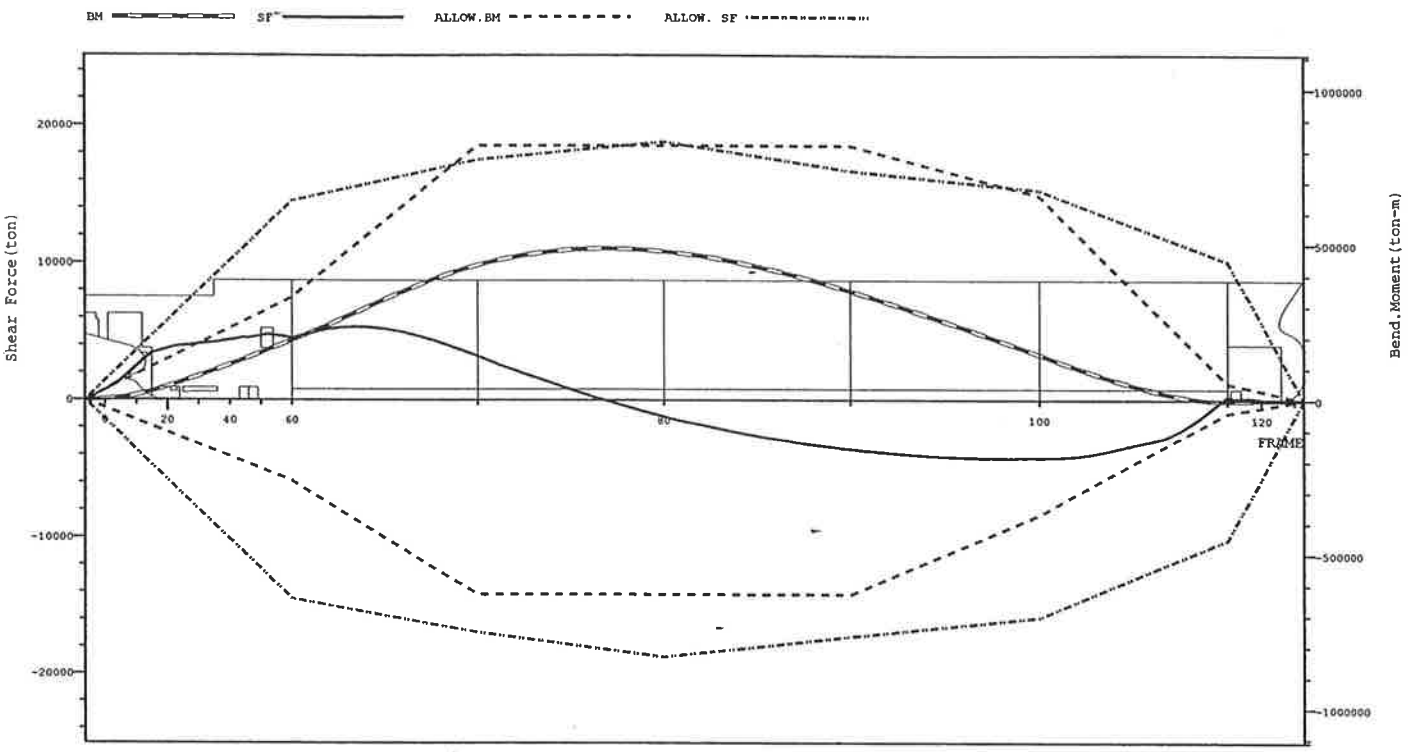
CONDITION 13. STEP 12 - BALLAST EXCHANGE

WEIGHT ITEMS	FILL. (%)	S.G	WEIGHT (MT)	L.C.G (M)	V.C.G (M)	T.C.G (M)	F.S.M (MT-M)
NO.1 W.B.TK(P)	100.0	1.0250	8790.0	279.870	11.198	18.224	0
NO.1 W.B.TK(S)	100.0	1.0250	8790.0	279.870	11.198	-18.224	0
NO.2 W.B.TK(P)	100.0	1.0250	10126.4	229.326	9.652	21.363	0
NO.2 W.B.TK(S)	100.0	1.0250	10126.4	229.326	9.652	-21.363	0
NO.3 W.B.TK(P)	100.0	1.0250	10218.2	178.500	9.593	21.421	0
NO.3 W.B.TK(S)	100.0	1.0250	10218.2	178.500	9.593	-21.421	0
NO.4 W.B.TK(P)	100.0	1.0250	9973.0	127.896	9.777	21.274	0
NO.4 W.B.TK(S)	100.0	1.0250	9973.0	127.896	9.777	-21.274	0
NO.5 W.B.TK(P)	100.0	1.0250	9136.8	75.928	11.734	19.496	0
NO.5 W.B.TK(S)	100.0	1.0250	9176.6	75.805	11.752	-19.503	0
A.P.TK	100.0	1.0250	2275.5	5.346	20.407	-0.025	0
TOTAL WATER BALLAST			98804.1	173.728	10.575	-0.009	0
F.W.TK(P)	10.0	1.0000	28.9	9.157	23.804	10.705	424
F.W.TK(S)	10.0	1.0000	20.6	8.409	23.803	-11.338	312
DIST.W.TK(S)	10.0	1.0000	8.3	11.050	23.807	-9.100	45
TOTAL FRESH WATER			57.8	9.161	23.804	0.004	782
NO.1 H.F.O.TK(P)	4.5	1.0000	110.6	41.999	11.394	14.507	2048
NO.1 H.F.O.TK(S)	4.5	1.0000	129.9	41.789	11.647	-14.598	2048
H.F.O.SETT.TK(P)	98.0	1.0000	235.5	39.651	17.685	14.679	78
H.F.O.SERV.TK(P)	98.0	1.0000	292.3	41.650	24.663	17.332	396
TOTAL HEAVY FUEL OIL			768.4	41.111	18.414	10.716	4570
D.O.STOR.TK(P)	10.0	0.8500	12.8	36.265	0.386	3.255	214
D.O.STOR.TK(S)	10.0	0.8500	16.7	35.642	0.451	-3.376	271
D.O.SETT.TK(S)	10.0	0.8500	3.2	43.350	21.748	-13.571	6
D.O.SERV.TK(S)	10.0	0.8500	6.3	40.800	21.748	-13.571	11
TOTAL DIESEL OIL			39.1	37.308	5.610	-3.678	503
M/E CYL.O.STOR.TK(P)	10.0	0.9000	7.4	44.200	14.430	4.095	24
M/E SYS.O.STOR.TK(S)	10.0	0.9000	7.4	44.200	14.430	-4.095	24
M/E SYS.O.SETT.TK(C)	10.0	0.9000	5.9	44.200	14.430	0.000	12
G/E L.O.STOR.TK(P)	10.0	0.9000	1.4	22.100	15.573	7.162	3
G/E L.O.SETT.TK(P)	10.0	0.9000	1.4	20.400	15.573	7.162	3
TOTAL LUBRICATING OIL			23.4	41.547	14.562	0.828	65
TOTAL DEADWEIGHT CONSTANT			427.0	66.630	10.135	0.000	0
TOTAL DEADWEIGHT			100119.8	172.074	10.640	0.072	5919
LIGHT SHIP			42600.0	152.000	15.425	0.029	0
TOTAL DISPLACEMENT			142719.9	166.082	12.069	0.059	5919

EQUIV. DRAFT(EXT)	= 9.862 M	M.T.C.	= 2936.77 MT-M
AFT. DRAFT(EXT)	= 12.417 M	T.P.C	= 155.22 MT/CM
FORE DRAFT(EXT)	= 7.697 M	K.M.T.	= 31.953 M
TRIM	= 4.720 M	V.C.G.	= 12.069 M
DISPLACEMENT	= 142719.9 MT	UNCORRECTED GM	= 19.885 M
L.C.G.	= 166.082 M	GGO	= 0.041 M
L.C.B.	= 165.980 M	CORRECTED GM(GOM)	= 19.843 M
L.C.F.	= 172.070 M	PROPELLER IMMER.	= 114.6 %
		BLIND DISTANCE	= 592.0 M

HEEL ANGLES(DEG.)	=	0.000	5.000	10.000	15.000	20.000	30.000	40.000	50.000	60.000
GZ VALUE (M)	=	-0.060	1.675	3.430	5.219	6.969	9.373	10.709	11.101	10.374
GZ AREA (M*RAD.)	=	0.000	0.070	0.293	0.670	1.203	2.651	4.415	6.334	8.221

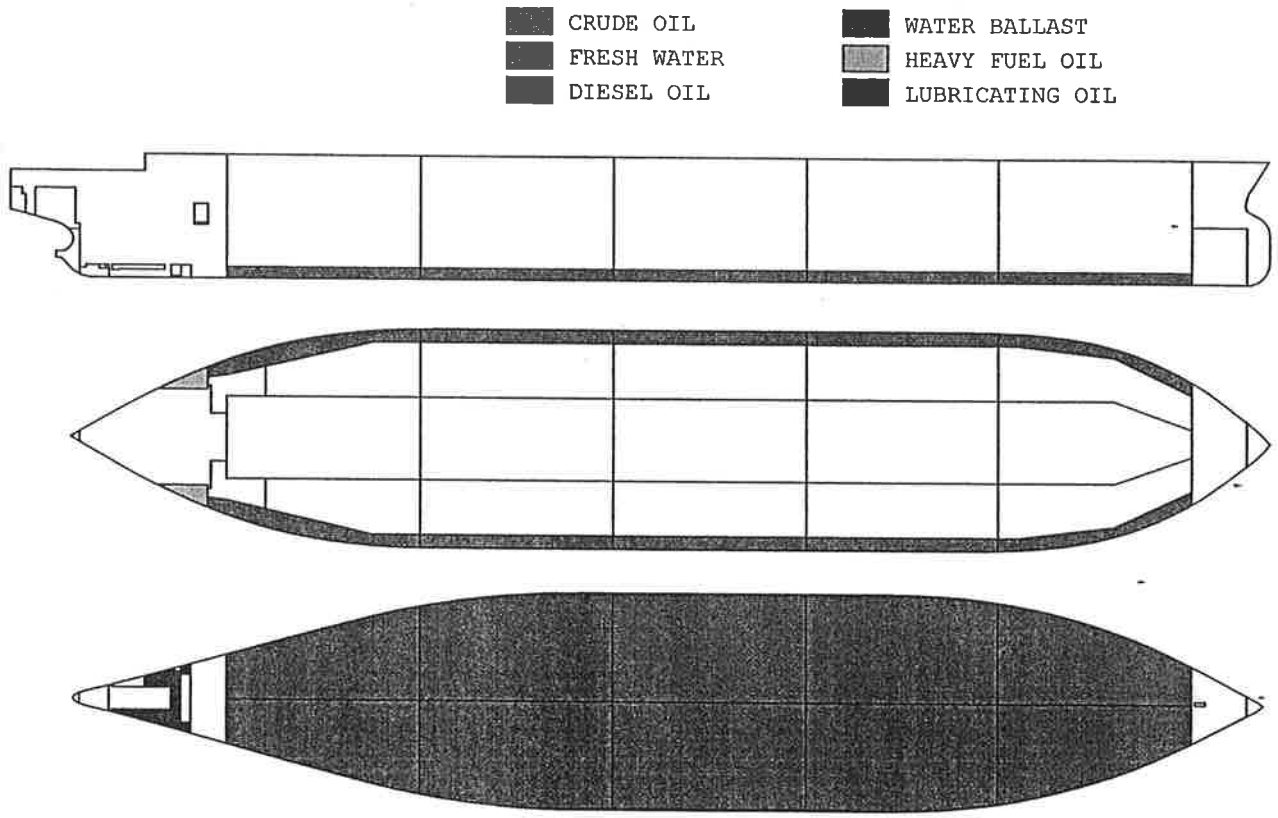
13. STEP 12 - BALLAST EXCHANGE

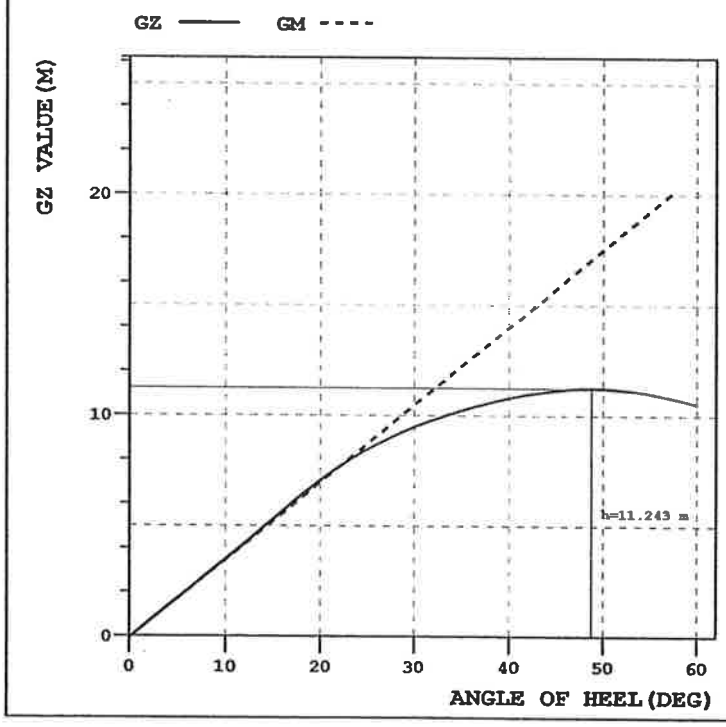


FR. NO.	DISTANCE M	SHEAR FORCE T	%	BENDING MOMENT TM	%	WEIGHT T/M	BOUY. T/M
-6	-5.500	0.0	-	0.0	-	93.9	0.0
0	-0.000	688.4	48.77	1984.7	6.18	168.6	20.2
60	51.000	4521.1	31.18	191749.5	58.11	324.9	360.3
70	102.000	3172.5	18.13	434341.9	52.97	499.7	604.0
80	153.000	-1203.4	6.40	478910.2	58.40	534.9	602.8
90	204.000	-3595.4	20.78	351083.3	42.82	529.2	557.8
100	255.000	-4202.8	26.43	145959.1	22.15	496.0	491.7
110	306.000	279.6	2.77	-2034.8	4.84	421.5	197.9
133	326.500	0.0	-	-0.0	-	20.2	0.1

SHEAR FORCE (Negative)	: -4241 Ton (26.2%)	POSITION	: Fr 98 + 0.59 m
SHEAR FORCE (Positive)	: 5323 Ton (34.3%)	POSITION	: Fr 63 + 1.70 m
SAGGING MOMENT (Max.)	: -2242 T-m (4.2%)	POSITION	: Fr109 + 3.30 m
HOGGING MOMENT (Max.)	: 488327 T-m (59.6%)	POSITION	: Fr 76 + 4.60 m

14. STEP 13 - BALLAST EXCHANGE





DISPLACEMENT	140444 Ton
KGo=KG+GGo	11.976 m
FLOODING ANGLE	40.000 Degree

AREA UNDER GZ CURVE

CRITERIA	RESULT	REQUIREMENT
0 Up to 30	2.687	0.055 M-RAD
0 Up to Flooding Ang.	4.468	0.090 M-RAD
30 Up to Flooding Ang.	1.781	0.030 M-RAD

LEVER AFTER FREE SURFACE CORR.

CRITERIA	RESULT	REQUIREMENT
GZ at 30 Deg	9.473	0.200 M
GoM	20.145	0.150 M
Angle of MAX GZ	48.7	25.00 DEG
Maximum GZ	11.2	

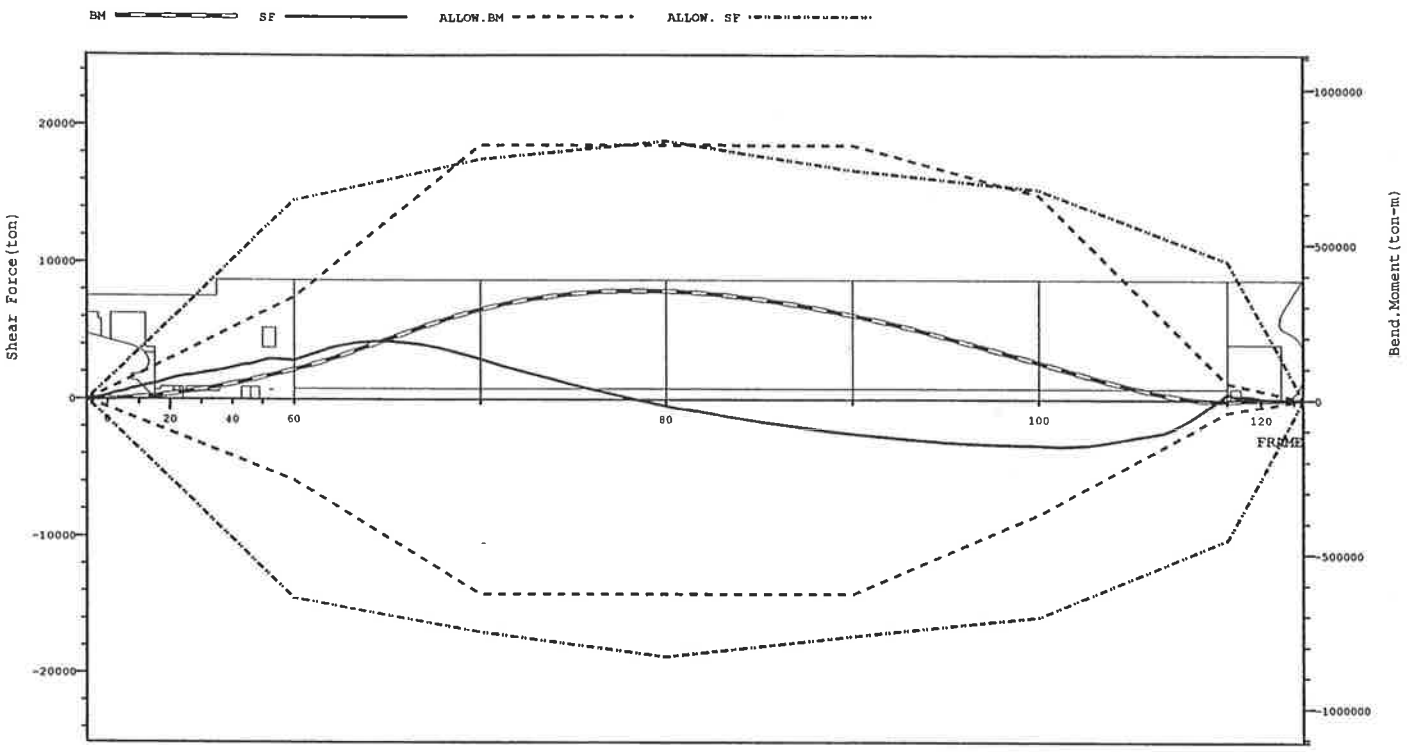
CONDITION 14. STEP 13 - BALLAST EXCHANGE

WEIGHT ITEMS	FILL. (%)	S.G	WEIGHT (MT)	L.C.G (M)	V.C.G (M)	T.C.G (M)	F.S.M (MT-M)
NO.1 W.B.TK(P)	100.0	1.0250	8790.0	279.870	11.198	18.224	0
NO.1 W.B.TK(S)	100.0	1.0250	8790.0	279.870	11.198	-18.224	0
NO.2 W.B.TK(P)	100.0	1.0250	10126.4	229.326	9.652	21.363	0
NO.2 W.B.TK(S)	100.0	1.0250	10126.4	229.326	9.652	-21.363	0
NO.3 W.B.TK(P)	100.0	1.0250	10218.2	178.500	9.593	21.421	0
NO.3 W.B.TK(S)	100.0	1.0250	10218.2	178.500	9.593	-21.421	0
NO.4 W.B.TK(P)	100.0	1.0250	9973.0	127.896	9.777	21.274	0
NO.4 W.B.TK(S)	100.0	1.0250	9973.0	127.896	9.777	-21.274	0
NO.5 W.B.TK(P)	100.0	1.0250	9136.8	75.928	11.734	19.496	0
NO.5 W.B.TK(S)	100.0	1.0250	9176.6	75.805	11.752	-19.503	0
TOTAL WATER BALLAST			96528.6	177.697	10.344	-0.009	0
F.W.TK(P)	10.0	1.0000	28.9	9.157	23.804	10.705	424
F.W.TK(S)	10.0	1.0000	20.6	8.409	23.803	-11.338	312
DIST.W.TK(S)	10.0	1.0000	8.3	11.050	23.807	-9.100	45
TOTAL FRESH WATER			57.8	9.161	23.804	0.004	782
NO.1 H.F.O.TK(P)	4.5	1.0000	110.6	41.999	11.394	14.507	2048
NO.1 H.F.O.TK(S)	4.5	1.0000	129.9	41.789	11.647	-14.598	2048
H.F.O.SETT.TK(P)	98.0	1.0000	235.5	39.651	17.685	14.679	78
H.F.O.SERV.TK(P)	98.0	1.0000	292.3	41.650	24.663	17.332	396
TOTAL HEAVY FUEL OIL			768.4	41.111	18.414	10.716	4570
D.O.STOR.TK(P)	10.0	0.8500	12.8	36.265	0.386	3.255	214
D.O.STOR.TK(S)	10.0	0.8500	16.7	35.642	0.451	-3.376	271
D.O.SETT.TK(S)	10.0	0.8500	3.2	43.350	21.748	-13.571	6
D.O.SERV.TK(S)	10.0	0.8500	6.3	40.800	21.748	-13.571	11
TOTAL DIESEL OIL			39.1	37.308	5.610	-3.678	503
M/E CYL.O.STOR.TK(P)	10.0	0.9000	7.4	44.200	14.430	4.095	24
M/E SYS.O.STOR.TK(S)	10.0	0.9000	7.4	44.200	14.430	-4.095	24
M/E SYS.O.SETT.TK(C)	10.0	0.9000	5.9	44.200	14.430	0.000	12
G/E L.O.STOR.TK(P)	10.0	0.9000	1.4	22.100	15.573	7.162	3
G/E L.O.SETT.TK(P)	10.0	0.9000	1.4	20.400	15.573	7.162	3
TOTAL LUBRICATING OIL			23.4	41.547	14.562	0.828	65
TOTAL DEADWEIGHT CONSTANT			427.0	66.630	10.135	0.000	0
TOTAL DEADWEIGHT			97844.3	175.952	10.413	0.074	5919
LIGHT SHIP			42600.0	152.000	15.425	0.029	0
TOTAL DISPLACEMENT			140444.3	168.687	11.933	0.061	5919

EQUIV. DRAFT(EXT)	= 9.715 M	M.T.C.	= 2925.43 MT-M
AFT. DRAFT(EXT)	= 11.581 M	T.P.C	= 154.98 MT/CM
FORE DRAFT(EXT)	= 8.142 M	K.M.T.	= 32.121 M
TRIM	= 3.439 M	V.C.G.	= 11.933 M
DISPLACEMENT	= 140444.3 MT	UNCORRECTED GM	= 20.187 M
L.C.G.	= 168.687 M	GGO	= 0.042 M
L.C.B.	= 168.613 M	CORRECTED GM(GOM)	= 20.145 M
L.C.F.	= 172.870 M	PROPELLER IMMER.	= 106.3 %
		BLIND DISTANCE	= 533.3 M

HEEL ANGLES(DEG.)	=	0.000	5.000	10.000	15.000	20.000	30.000	40.000	50.000	60.000
GZ VALUE (M)	=	-0.061	1.700	3.482	5.300	7.071	9.473	10.803	11.232	10.519
GZ AREA (M*RAD.)	=	0.000	0.072	0.297	0.680	1.221	2.687	4.468	6.407	8.318

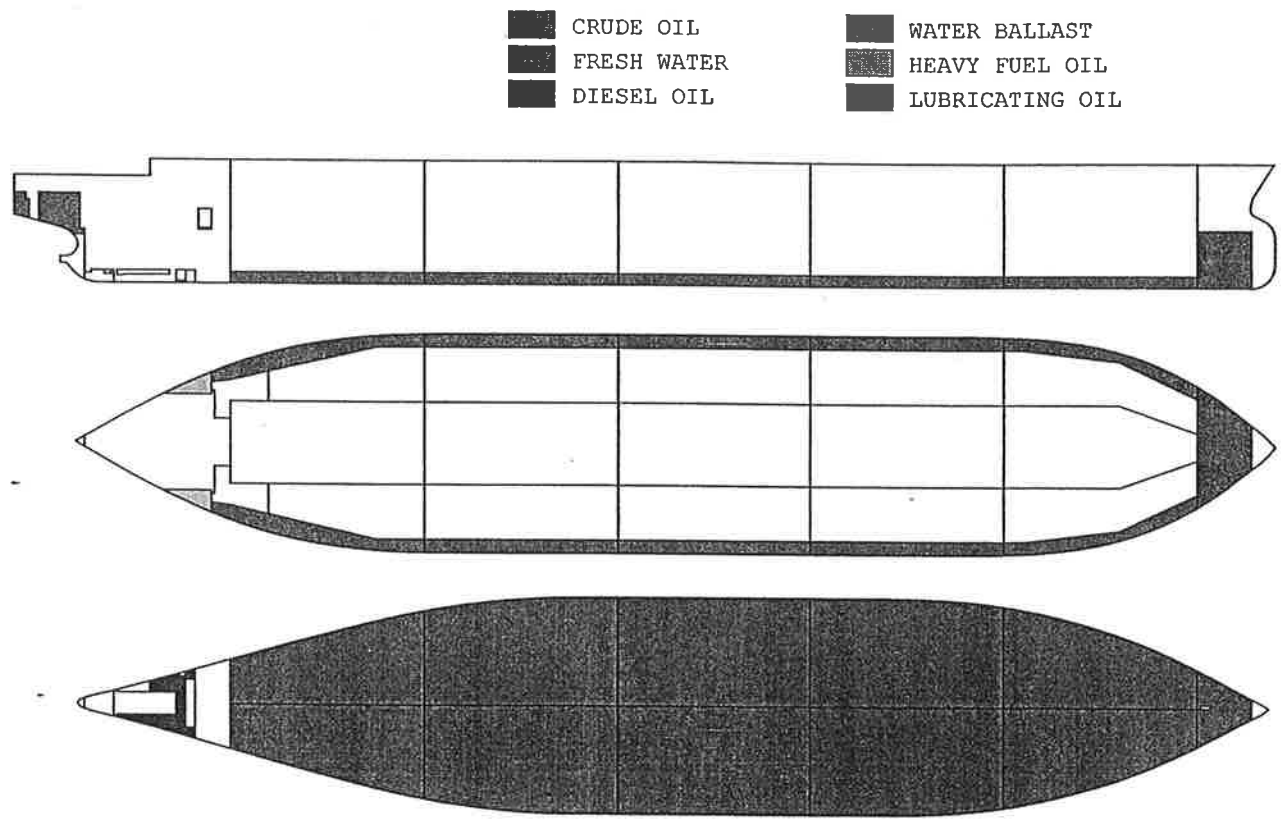
14. STEP 13 - BALLAST EXCHANGE

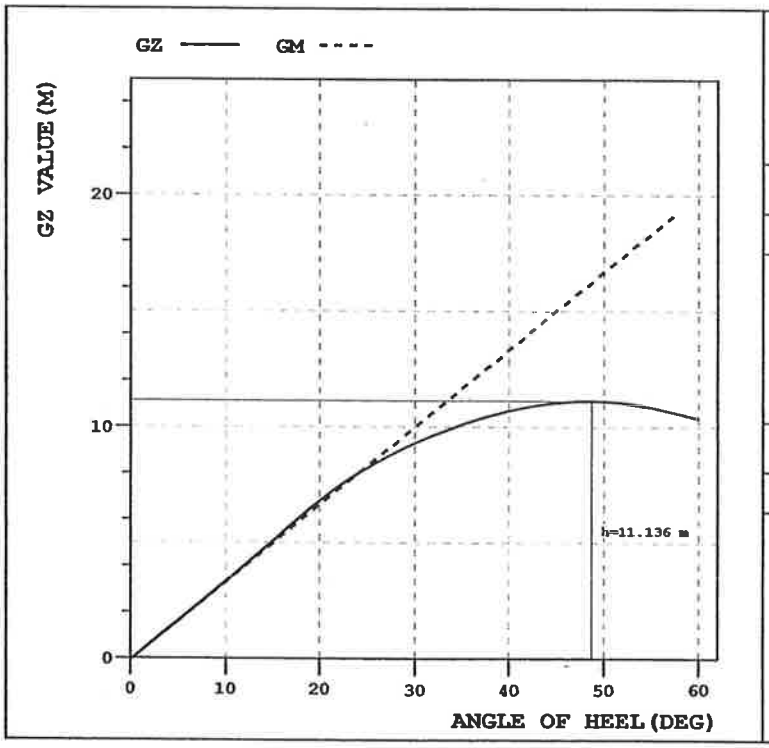


FR. NO.	DISTANCE M	SHEAR FORCE T	%	BENDING MOMENT TM	%	WEIGHT T/M	BOUY. T/M
-6	-5.500	0.0	-	0.0	-	35.5	0.0
0	-0.000	289.0	20.47	894.8	2.79	86.5	18.7
60	51.000	2863.7	19.75	96604.1	29.27	324.9	334.6
70	102.000	2929.1	16.74	290531.3	35.43	499.8	578.7
80	153.000	-459.2	2.44	350086.7	42.69	534.9	589.5
90	204.000	-2483.4	14.35	271820.5	33.15	529.2	556.7
100	255.000	-3342.9	21.02	119200.3	18.09	496.0	502.7
110	306.000	428.1	4.24	-3003.1	7.15	421.5	210.4
133	326.500	0.0	-	-0.0	-	20.2	0.1

SHEAR FORCE (Negative)	:	-3402 Ton (22.8%)	POSITION : Fr101 + 3.40 m
SHEAR FORCE (Positive)	:	4239 Ton (26.5%)	POSITION : Fr 64 + 5.02 m
SAGGING MOMENT (Max.)	:	-3484 T-m (6.5%)	POSITION : Fr109 + 3.30 m
HOGGING MOMENT (Max.)	:	351721 T-m (42.9%)	POSITION : Fr 78 + 2.58 m

15. STEP 14 - BALLAST ARR.COND.





DISPLACEMENT	146893 Ton
KGo=KG+GGo	12.005 m
FLOODING ANGLE	40.000 Degree

AREA UNDER GZ CURVE

CRITERIA	RESULT	REQUIREMENT
0 Up to 30	2.596	0.055 M-RAD
0 Up to Flooding Ang.	4.354	0.090 M-RAD
30 Up to Flooding Ang.	1.758	0.030 M-RAD

LEVER AFTER FREE SURFACE CORR.

CRITERIA	RESULT	REQUIREMENT
GZ at 30 Deg	9.296	0.200 M
GoM	19.218	0.150 M
Angle of MAX GZ	48.4	25.00 DEG
Maximum GZ	11.1	

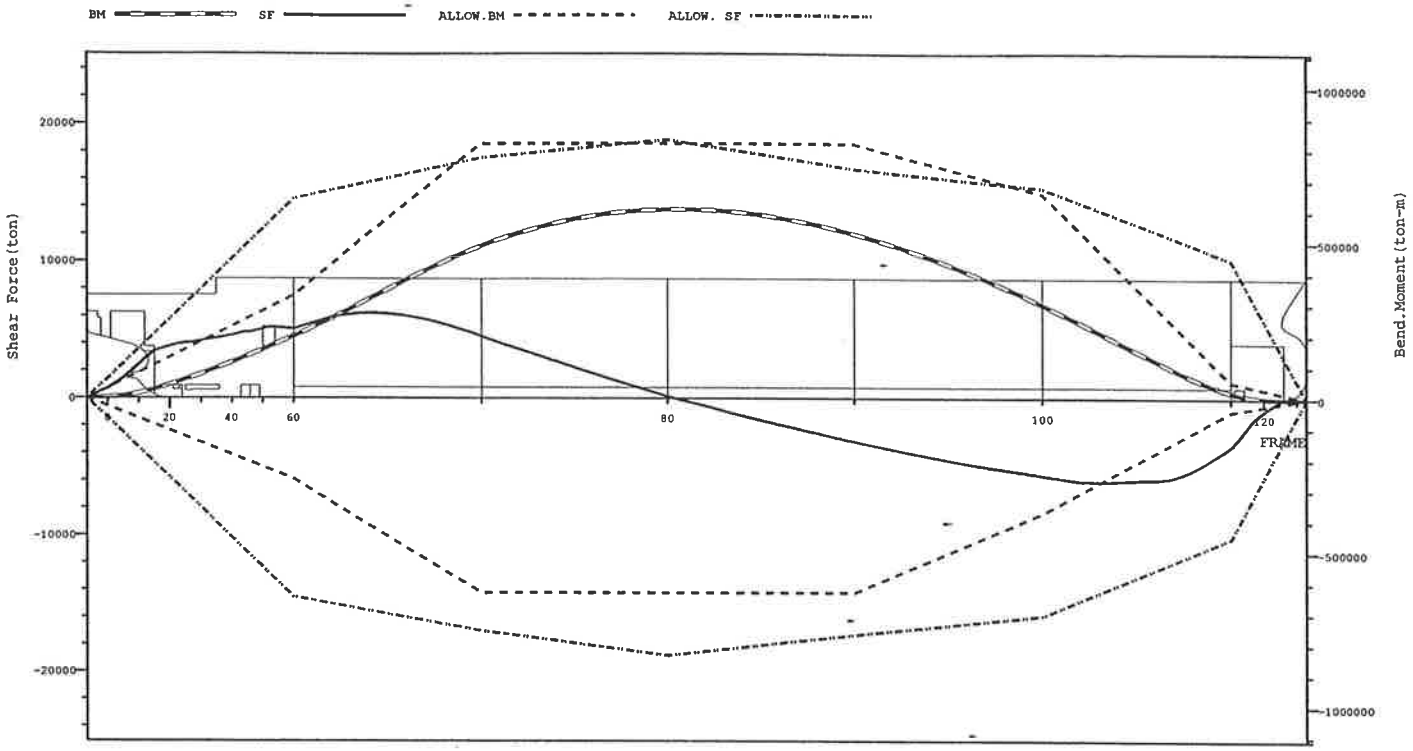
CONDITION 15. STEP 14 - BALLAST ARR.COND.

WEIGHT ITEMS	FILL. (%)	S.G	WEIGHT (MT)	L.C.G (M)	V.C.G (M)	T.C.G (M)	F.S.M (MT-M)
NO.1 W.B.TK(P)	100.0	1.0250	8790.0	279.870	11.198	18.224	0
NO.1 W.B.TK(S)	100.0	1.0250	8790.0	279.870	11.198	-18.224	0
NO.2 W.B.TK(P)	100.0	1.0250	10126.4	229.326	9.652	21.363	0
NO.2 W.B.TK(S)	100.0	1.0250	10126.4	229.326	9.652	-21.363	0
NO.3 W.B.TK(P)	100.0	1.0250	10218.2	178.500	9.593	21.421	0
NO.3 W.B.TK(S)	100.0	1.0250	10218.2	178.500	9.593	-21.421	0
NO.4 W.B.TK(P)	100.0	1.0250	9973.0	127.896	9.777	21.274	0
NO.4 W.B.TK(S)	100.0	1.0250	9973.0	127.896	9.777	-21.274	0
NO.5 W.B.TK(P)	100.0	1.0250	9136.8	75.928	11.734	19.496	0
NO.5 W.B.TK(S)	100.0	1.0250	9176.6	75.805	11.752	-19.503	0
F.P.TK	100.0	1.0250	4173.3	312.027	8.426	-0.001	0
A.P.TK	100.0	1.0250	2275.5	5.346	20.407	-0.025	0
TOTAL WATER BALLAST			102977.4	179.333	10.488	-0.009	0
F.W.TK(P)	10.0	1.0000	28.9	9.157	23.804	10.705	424
F.W.TK(S)	10.0	1.0000	20.6	8.409	23.803	-11.338	312
DIST.W.TK(S)	10.0	1.0000	8.3	11.050	23.807	-9.100	45
TOTAL FRESH WATER			57.8	9.161	23.804	0.004	782
NO.1 H.F.O.TK(P)	4.5	1.0000	110.6	41.999	11.394	14.507	2048
NO.1 H.F.O.TK(S)	4.5	1.0000	129.9	41.789	11.647	-14.598	2048
H.F.O.SETT.TK(P)	98.0	1.0000	235.5	39.651	17.685	14.679	78
H.F.O.SERV.TK(P)	98.0	1.0000	292.3	41.650	24.663	17.332	396
TOTAL HEAVY FUEL OIL			768.4	41.111	18.414	10.716	4570
D.O.STOR.TK(P)	10.0	0.8500	12.8	36.265	0.386	3.255	214
D.O.STOR.TK(S)	10.0	0.8500	16.7	35.642	0.451	-3.376	271
D.O.SETT.TK(S)	10.0	0.8500	3.2	43.350	21.748	-13.571	6
D.O.SERV.TK(S)	10.0	0.8500	6.3	40.800	21.748	-13.571	11
TOTAL DIESEL OIL			39.1	37.308	5.610	-3.678	503
M/E CYL.O.STOR.TK(P)	10.0	0.9000	7.4	44.200	14.430	4.095	24
M/E SYS.O.STOR.TK(S)	10.0	0.9000	7.4	44.200	14.430	-4.095	24
M/E SYS.O.SETT.TK(C)	10.0	0.9000	5.9	44.200	14.430	0.000	12
G/E L.O.STOR.TK(P)	10.0	0.9000	1.4	22.100	15.573	7.162	3
G/E L.O.SETT.TK(P)	10.0	0.9000	1.4	20.400	15.573	7.162	3
TOTAL LUBRICATING OIL			23.4	41.547	14.562	0.828	65
TOTAL DEADWEIGHT CONSTANT			427.0	66.630	10.135	0.000	0
TOTAL DEADWEIGHT			104293.1	177.675	10.552	0.069	5919
LIGHT SHIP			42600.0	152.000	15.425	0.029	0
TOTAL DISPLACEMENT			146893.1	170.229	11.965	0.058	5919

EQUIV. DRAFT(EXT)	= 10.131 M	M.T.C.	= 2947.85 MT-M
AFT. DRAFT(EXT)	= 11.630 M	T.P.C	= 155.46 MT/CM
FORE DRAFT(EXT)	= 8.865 M	K.M.T.	= 31.224 M
TRIM	= 2.765 M	V.C.G.	= 11.965 M
DISPLACEMENT	= 146893.1 MT	UNCORRECTED GM	= 19.259 M
L.C.G.	= 170.229 M	GGO	= 0.040 M
L.C.B.	= 170.161 M	CORRECTED GM(GOM)	= 19.218 M
L.C.F.	= 172.863 M	PROPELLER IMMER.	= 106.9 %
		BLIND DISTANCE	= 496.5 M

HEEL ANGLES(DEG.)	=	0.000	5.000	10.000	15.000	20.000	30.000	40.000	50.000	60.000
GZ VALUE (M)	=	-0.058	1.623	3.327	5.071	6.809	9.296	10.712	11.120	10.401
GZ AREA (M*RAD.)	=	0.000	0.068	0.284	0.650	1.169	2.595	4.354	6.276	8.166

15. STEP 14 - BALLAST ARR.COND.



FR. NO.	DISTANCE M	SHEAR FORCE T	SHEAR FORCE %	BENDING MOMENT TM	BENDING MOMENT %	WEIGHT T/M	BOUY. T/M
-6	-5.500	0.0	-	0.0	-	93.9	0.0
0	-0.000	693.1	49.10	1938.6	6.03	168.6	18.8
60	51.000	5029.2	34.68	199099.2	60.33	324.9	341.0
70	102.000	4515.8	25.80	490620.1	59.83	499.8	594.4
80	153.000	162.6	0.86	607755.5	74.12	534.9	611.6
90	204.000	-3150.9	18.21	529584.2	64.58	529.2	585.2
100	255.000	-5623.0	35.36	303039.8	45.98	496.0	537.3
110	306.000	-3483.1	34.15	20367.9	37.72	421.5	232.7
133	326.500	0.0	-	-0.0	-	20.2	0.2

SHEAR FORCE (Negative)	:	-6062 Ton (43.0%)	POSITION : Fr103 + 0.87 m
SHEAR FORCE (Positive)	:	6212 Ton (39.3%)	POSITION : Fr 64 + 1.70 m
SAGGING MOMENT (Max.)	:	-140 T-m (1.1%)	POSITION : Fr125 + 0.50 m
HOGGING MOMENT (Max.)	:	607984 T-m (74.1%)	POSITION : Fr 80 + 3.10 m