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CCGS ANN HARVEY

TRIM & STABILITY BOOK

ADDITIONALLY, ALL S.W. CONDITIONS
HAVE BEEN

Transport Canada	Transport Canada
APPROVED - APPROUVE	
ON THE AUTHORITY OF THE CANADA SHIPPING ACT AND REGULATIONS MADE THEREUNDER.	
EN VERTU DE LA LOI SUR LE MARIN MARCHAND DU CANADA ET DES REGLEMENTS CONNEXES Y RELATIFS.	
<i>I. K. Bell</i>	
ON BEHALF OF THE BOARD OF STEAMSHIP INSPECTION DEPARTMENT OF TRANSPORT	POUR LE COMPTÉ DU BUREAU D'INSPECTION DES NAVIRES - MINISTÈRE DES TRANSPORTS
JUL 14 1988	
DATE	

FOR STABILITY ONLY

EXAMINED IN ACCORDANCE WITH SCHEDULE VI TO THE ACCIDENT PREVENTION REGULATION, ALL SHIPS	EXAMINÉ CONFORMÉMENT À L'ANNÉE DU RÈGLEMENT SUR LA PRÉVENTION DES ÉVÉNEMENTS ACCIDENTELS PAR LES NAVIRES ET TOUTES LES CONDUITES DES ÉVÉNEMENTS ACCIDENTELS PAR LES NAVIRES
ARCTIC CLASS 2	ARCTIC
<i>I. K. Bell</i>	
POLLUTION PREVENTION OFFICER - AGENT DE PRÉVENTION DE LA POLLUTION	
JUL 14 1988	
DATE	

ARCTIC WATERS POLLUTION PREVENTION ACT LOI SUR LA PRÉVENTION DE LA POLLUTION DES EAUX ARCTIQUES	
Extreme DEEPEST OPERATING LOAD WATERLINE LIGNE DE CHARGE MAXIMALE PRÉVUE	2 6.11 m 6.11 m
Lightest Operating Waterline LIGNE DE CHARGE MINIMALE PRÉVUE (EXTREME)	5.031 m 4.031 m
<i>I. K. Bell</i>	
POLLUTION PREVENTION OFFICER - AGENT DE PRÉVENTION DE LA POLLUTION	
JUL 14 1988	
DATE	

SUBJECT TO THE OWNER, HIS SHIPBUILDER OR NAVAL ARCHITECT BEING RESPONSIBLE FOR THE ACCURACY OF THE DESIGN OPERATING CONDITIONS PRESENTED HEREIN AND OF THE BASIC DATA FROM WHICH SUCH CONDITIONS WERE DEVELOPED, IT SHALL BE THE RESPONSIBILITY OF THE OWNER AND MASTER TO ENSURE THAT A PROPER MEASURE OF STABILITY IS MAINTAINED FOR ALL CONDITIONS OF LOADING AND BALLASTING.	SOUF RÉSERVE, QUE LE PROPRIÉTAIRE, SON ARCHITECTE NAVAL OU LE CONSTRUCTEUR DES NAVIRES SOIT RESPONSABLE DE L'EXACTITUDE DES CONDITIONS D'EXPLOITATION SOUMISES ET DES DONNÉES DE BASE D'APRÈS LESQUELLES LES CONDITIONS SONT ÉLABORÉES, IL COMBE AU PROPRIÉTAIRE ET AU CAPITAINE DE MAINTENIR UN DEGRÉ APPROPRIÉ DE STABILITÉ DANS TOUTES LES CONDITIONS DE CHARGEMENT ET DE LESTAGE.
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29 January 1988

STABILITY INFORMATION

BOOKLET

NOTES FOR MASTER

This Stability book has been compiled in accordance with Stab 6 of the Canadian Coast Guard Stability, Subdivision, and Load Line Standards.

Compliance with the stability criteria does not ensure immunity against capsizing, regardless of the circumstances or absolve the master from his responsibilities. Masters should therefore exercise prudence and good seamanship having regard to the season of the year, weather forecasts and the navigational zone and should take the appropriate action as to speed and course warranted by the prevailing circumstances.

Before a voyage commences, care should be taken to ensure that the cargo and sizeable pieces of equipment have been properly stowed or lashed, so as to minimize the possibility of both longitudinal and lateral shifting while at sea due to rolling and pitching accelerations.

TABLE OF CONTENTS

	<u>Page</u>
Notes for Master	i
Table of Contents	ii - iii
General Particulars	1
Tank Arrangement	2
Tank Capacities: Fuel Oil	3
Flume & Lub Oil	4
Water Ballast, Fresh Water & Miscellaneous Tanks	5 - 6
Hold & Voil Compartments	7
Table of Hydrostatics	8 - 10
Table of KN Values	11
Notes on the Cross Curves of Stability	12
Notes on the Use of Free Surface Moments	13
Notes on Calculation of Drafts at Perpendiculars	14

Free Floating Conditions

Condition 1 - Lightship	15
Condition 2 - Loaded Departure (100% Cons)	16 - 20
Condition 3 - Loaded Arrival (10% Cons)	21 - 25
Condition 3A- Arctic Loaded Arrival (10% Cons) (Worst Operation Condition)	21A - 25A
Condition 4 - Ballast Departure (100% Cons)	26 - 30
Condition 5 - Ballast Arrival (10% Cons)	31 - 35
Condition 6 - Buoy Handling (50% Cons)	36 - 40
Condition 7 - Summer Ice Breaking (50% Cons)	41 - 45
Condition 8 - Winter Ice Breaking S.W. (50% Cons)	46 - 50
Condition 9 - Winter Ice Breaking F.W. (50% Cons)	51 - 55

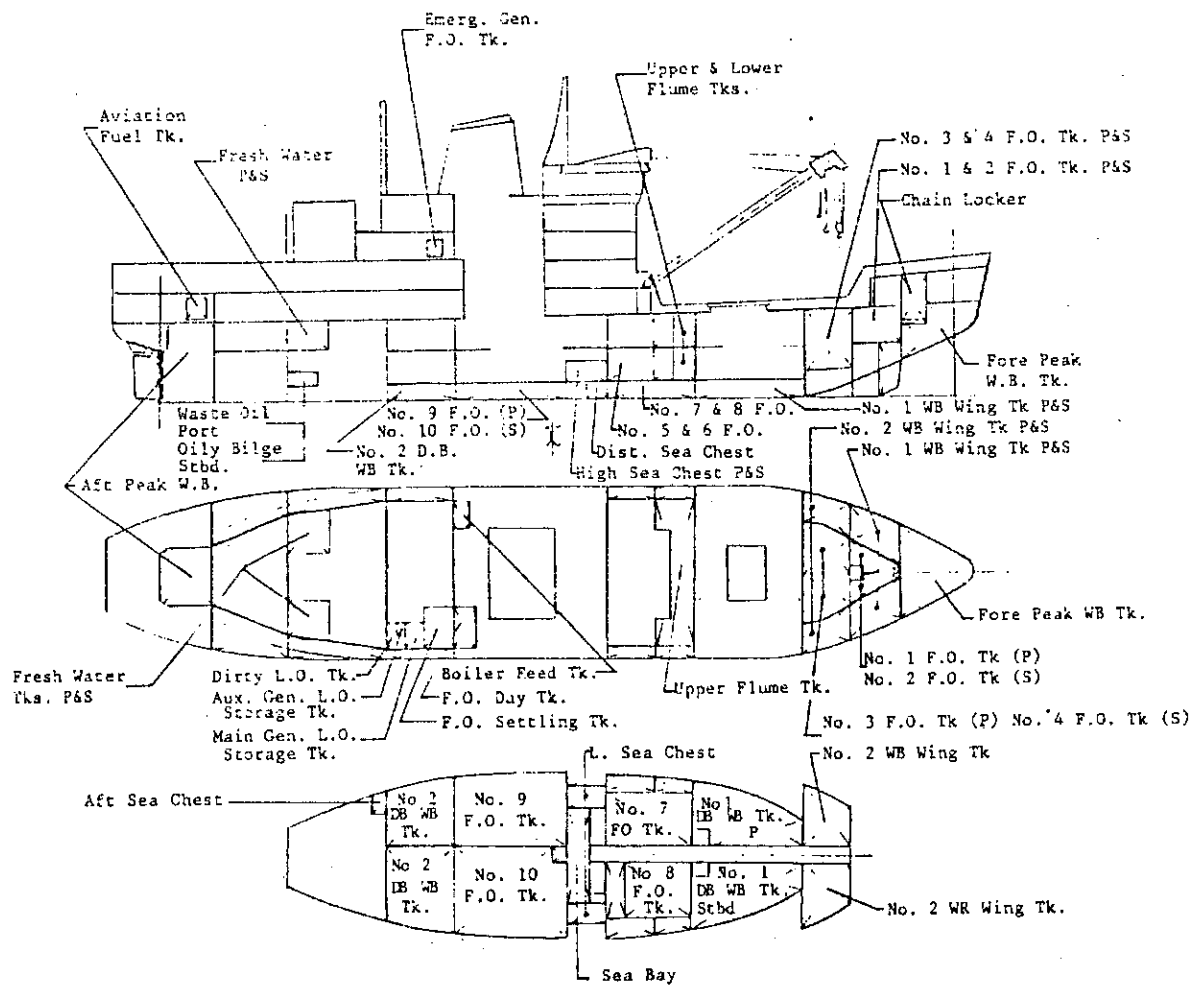
Attachments

- Cross Curves of Stability
- Hydrostatic Curves
- Capacity Plan

GENERAL PARTICULARS

Ship's Name	- ANN HARVEY
Type of Vessel	- Type 1100 Nav aids Tender/Light Icebreaker
Official Number	- 808715
Port of Registry	- Ottawa
Number of Passengers	- 8
Length O.A.	- 83.00 m
Length B.P.	- 75.00 m
Breadth mid	- 16.20 m
Depth mid	- 7.75 m
Design Draft mid	- 5.75 m
Subdivision Draft mid	- 6.00 m
All Season Freeboard	- 1679 mm
All Season Draft mid.	- 6.08 m
All Season Draft extreme	- 6.11 m
Displacement @ 6.11 m	- 5022 t extr S.W.
Lightship	- 3331 t
Gross Tonnage	- 3853.56
Net Tonnage	- 1528.46
Class of Voyages	- Hometrade 1 Arctic Class 2 (A.S.P.P.R.)
Owner	- Canadian Coast Guard

TANK ARRANGEMENT



CCGS ANN HARVEY

TANK CAPACITIES: FUEL OIL & LUB OIL

FUEL OIL CAPACITIES									
S.G. 0.85									
COMPARTMENT	FRAMES	100% CAPACITY m ³	98% OF OVERFLOW CAPACITY m ³	98% OF OVERFLOW CAPACITY t	VCG ABOVE BASE metres	LCG FROM BIN. 5 metres	FREE SURFACE MOMENT t m.		
NO.1 F.O. TANK PORT	163-175	54.8	46.1	39.2	6.743	29.947 F	24.20		
NO.2 F.O. TANK STBD.	163-175	56.9	47.6	40.5	6.767	29.946 F	27.63		
NO.3 F.O. TANK PORT	152-163	106.6	98.3	83.6	5.697	25.320 F	66.00		
NO.4 F.O. TANK STBD.	152-163	113.4	103.0	87.6	5.760	25.328 F	68.00		
NO.5 F.O. TANK PORT	106-121	119.5	101.9	86.6	2.958	7.674 F	120.66		
NO.6 F.O. TANK STBD.	106-121	119.5	101.9	86.6	2.958	7.674 F	120.66		
NO.7 F.O. TANK PORT	106-126	52.0	50.9	43.3	0.819	8.698 F	70.83		
NO.8 F.O. TANK STBD.	110-126	41.6	40.8	34.4	0.816	9.698 F	66.67		
NO.9 F.O. TANK PORT	70-96	81.5	80.0	67.7	0.854	4.261 A	226.93		
NO.10 F.O. TANK STBD.	70-96	104.5	102.4	86.8	0.828	4.402 A	426.81		
F.O. DAY TANK STBD.	70-76	28.7	25.4	21.6	6.201	8.300 A	10.88		
F.O. SETTLING TANK	63-70	33.5	29.6	25.1	6.196	10.900 A	12.69		
F.O. OVERFLOW TANK	106-110	10.4	10.2	8.7	0.821	5.700 F	14.17		
F.O. SPILLAGE TANK	93-66	3.0	2.9	2.5	0.739	0.300 F	0.42		
EMERG. GEN. F.O. TANK	64-68	1.1	1.1	0.9	14.358	11.100 A	0.01		
TOTAL FUEL OIL		929.2	842.1	715.2					

TANK CAPACITIES: FUEL OIL & LUB OIL

FLUME TANK CAPACITIES							
S.G. 0.85							
COMPARTMENT	FRAMES	100 % CAPACITY m ³	98 % or OVERFLOW CAPACITY t	WORKING CAPACITY t	VCG ABOVE BASE metres	LCG FROM STN.5 metres	FREE SURFACE MOMENT t.m. (sg 1.0)
UPR FLUME TANK	117-126	111.7	79.1	49.6	5.650	11.474 F	771.19
LOW FLUME TANK	117-126	113.0	94.1	43.8	2.325	11.523 F	658.85
TOTAL		224.7	173.2	93.4			

LUB. OIL CAPACITIES						
S.G. 0.80						
COMPARTMENT	FRAMES	100 % CAPACITY m ³	98 % CAPACITY t	VCG ABOVE BASE metres	LCG FROM STN.5 metres	FREE SURFACE MOMENT t.m.
MAIN GEN. L.O. TANK	56-63	16.6	12.6	6.296	13.300 A	2.77
AUX. GEN. L.O. TANK	56-58	3.6	2.7	6.271	14.700 A	0.18
DIRTY L.O. TANK	54-58	9.7	7.3	6.290	15.250 A	1.52
TOTAL LUB.OIL		29.9	22.6			

TANK CAPACITIES: WATER BALLAST, FRESH WATER & MISCELLANEOUS TANKS

WATER BALLAST CAPACITIES							
COMPARTMENT	FRAMES	100 % CAPACITY m ³	FRESH WATER t	SALT WATER t	VCG ABOVE BASE metres	LCG FROM STN.5 metres	FREE SURFACE max MOMENT t.m. SW
FORE PEAK TANK	176-STEM	84.0	84.0	86.1	7.057	35.033 F	130.48
NO.1 W.B. WING TANK PORT	163-175	41.3	41.3	42.3	5.556	29.943 F	16.16
NO.1 W.B. WING TANK STBD.	163-175	41.3	41.3	42.3	5.556	29.943 F	16.16
NO.2 W.B. WING TANK PORT	152-163	55.1	54.0	55.3	4.403	25.413 F	18.50
NO.2 W.B. WING TANK STBD.	152-163	55.1	54.0	55.3	4.403	25.413 F	18.50
NO.1 D.B. W.B. TANK PORT	126-152	50.8	50.8	52.1	0.881	17.501 F	122.23
NO.1 D.B. W.B. TANK STBD.	126-152	50.8	50.8	52.1	0.881	17.501 F	122.23
NO.2 D.B. W.B. TANK PORT	54-70	43.5	43.5	44.6	0.872	12.541 A	127.93
NO.2 D.B. W.B. TANK STBD.	54-70	43.5	43.5	44.6	0.872	12.541 A	127.93
AFT PEAK TANK	1-13	111.4	111.4	114.2	5.584	34.538 A	72.00
TOTAL WATER BALLAST			590.6	606.4			

FRESH WATER CAPACITIES						
COMPARTMENT	FRAMES	100 % CAPACITY m ³	OVERFLOW CAPACITY t	VCG ABOVE BASE metres	LCG FROM STN.5 metres	FREE SURFACE MOMENT t.m.
FRESH WATER TANK PORT	30-41	52.1	50.1	6.316	23.240 A	22.40
FRESH WATER TANK STBD.	30-41	52.1	50.1	6.316	23.240 A	22.40
BOILER FEED TANK PORT	70-75	14.9	14.4	6.316	8.600 A	3.12
TOTAL FRESH WATER			114.6			

TANK CAPACITIES: WATER BALLAST, FRESH WATER & MISCELLANEOUS TANKS

MISCELLANEOUS TANKS						
COMPARTMENT	FRAMES	100 % CAPACITY m ³	98 % CAPACITY t	VCG ABOVE BASE metres	LCG FROM STN 0 metres	FREE SURFACE MOMENT t.m.
AVIATION FUEL TANK	3-12	22.8	0.79	9.268	34.166 A	30.83
WASTE OIL TANK PORT	30-37	4.9	0.86	1.915	23.866 A	1.17
OILY BILGE TANK STBD.	30-37	4.9	0.85	1.915	23.866 A	1.17
PURIFIER SLUDGE TANK	55-64	2.5	0.86	1.792	13.597 A	1.29

EXPANSION, SYSTEM & OBSERVATION TANKS					
WEIGHTS AT WORKING LEVEL INCLUDED IN LIGHTSHIP WEIGHT					
COMPARTMENT	FRAMES	100% CAPACITY m ³	COMPARTMENT	FRAMES	100% CAPACITY m ³
AIRCOND. EXPANS. TK	69-71	0.24	SEWAGE TRANSFER TK	102-105	1.98
CENTR. COOLING EXPANS. TK	79-81	1.54	VACUUM SEWAGE UNIT	92-94	1.50
BEARING L.O. TK	36-37	0.23	WASH TANK	15-16	0.09
E.R. SERVICE TK AFT	36-37	0.23	MINIJECT ASSEMBLY	96-97	1.46
E.R. SERVICE TKS FOR'D	55-58	0.46	HOTWELL TK	71-75	0.83
RESERVE OIL TK	-5--8	0.90	BOILER OBSERVATION TK	72-74	0.35
HOT & COLD F.W. MODULE	37-41	2.60	SEA BAY	96-102	27.52
EQUALIZATION TK	102-105	0.06	SEA CHESTS P & S	51-53/96-106	45.08

CAPACITIES: HOLD & VOID COMPARTMENTS

HOLD CAPACITIES					
COMPARTMENT	FRAMES	GRAIN CAPACITY m ³	BALE CAPACITY m ³	VCG ABOVE BASE metres	LCG FROM STN. 5 metres
UPPER HOLD	126 - 152	566.4	546.6	6.000	18.099 F
LOWER HOLD	126 - 152	491.0	463.8	3.247	17.777 F
TOTAL incl. hatch		1057.4	1010.3	5.043	17.950 F

VOID COMPARTMENTS					
COMPARTMENT	FRAMES	100 % CAPACITY m ³	VCG ABOVE BASE metres	LCG FROM ST 5 metres	FREE SURFACE max MOMENT t m SW
NO 1 VOID P OR SB	117-126	30.1	3.969	11.081 F	1.44
NO 2 VOID P OR SB	106-117	38.3	3.836	7.089 F	2.28
NO 3 VOID P	102-106	7.2	0.805	4.100 F	4.91
NO 3 VOID SB	102-106	5.4	0.791	4.100 F	2.01
NO 4 VOID P OR SB	54-70	19.1	6.375	12.699 A	0.54
NO 5 VOID P OR SB	30-54	43.5	6.459	21.126 A	5.15
NO 6 VOID P OR SB	13-30	55.7	6.458	29.190 A	30.35
NO 7 VOID C L	-12-13	142.6	6.834	36.862 A	1161.64

HYDROSTATIC CURVES, DRAFTS FROM 3.0 m to 4.4 m (mld)

Appendages included: Shell, Bossings, Rudder, Propellers, Aft IceKnife
Forward Ice Forefoot, Bow Thruster Opening (negative).

FOLLOWING CALCULATION APPLIES FOR TRIM = 0.000

NAVAIDS ICEBREAKER TYPE 1100

	0	3 000	3 100	3 200	3 300	3 400	3 500	3 600	3 700	0	MOULDED DRAFT
1	2025	1	2111	4	2198	3	2285	8	2374	1	DISPL. TOT. S.W.
2	1975	7	2039	9	2144	7	2230	1	2316	2	DISPL. TOT. F.W.
3	1946	4	2029	6	2113	6	2198	4	2283	9	DISPL. MLD.
4	-1	162	-1	147	-1	128	-1	124	-1	118	L.C.F. FROM MID SHIP
5	-0	200	-0	227	-0	251	-0	273	-0	293	L.C.B. FROM MID SHIP
6	1	687	1	743	1	798	1	854	1	910	V.C.B. ABOVE BL
7	8	6	8	7	8	7	8	8	8	9	T.P.1 (TONNES/O.01 M)
8	28	327	28	854	29	322	29	919	30	513	M.C.T. O.01 H
9	9	232	9	090	8	941	8	806	8	681	TRANS. METACENTRE (KMT)
10	14946	15133	15318	15503	15688	15873	16058	16243	16428	16613	MOM OF INERT. TRANSV
11	0	5340	0	5389	0	5438	0	5487	0	5536	BLOCK COEFF. (CB)
12	0	6081	0	6109	0	6137	0	6165	0	6193	PRISM COEFF. (CP)
13	0	6818	0	6882	0	6944	0	7007	0	7070	W.P.A. COEFF. (CM)
14	0	8782	0	8821	0	8858	0	8893	0	8925	MID. SEC. COEFF. (CM)
15	828	4	836	1	843	7	851	4	859	0	W.P.A. MLD
16	1044	6	1061	8	1078	9	1096	2	1113	4	WETTED SURF.

FOLLOWING CALCULATION APPLIES FOR TRIM = 0.000

NAVAIDS ICEBREAKER TYPE 1100

	0	3 700	3 800	3 900	4 000	4 100	4 200	4 300	4 400	0	MOULDED DRAFT
1	2643	3	2734	4	2826	3	2918	7	3012	2	DISPL. TOT. S.W.
2	2578	8	2667	7	2757	4	2847	7	2938	8	DISPL. TOT. F.W.
3	2545	0	2633	5	2722	7	2812	6	2903	3	DISPL. MLD.
4	-1	121	-1	138	-1	162	-1	191	-1	221	L.C.F. FROM MID SHIP
5	-0	647	-0	683	-0	718	-0	754	-0	790	L.C.B. FROM MID SHIP
6	2	077	2	133	2	188	2	244	2	300	V.C.B. ABOVE BL
7	9	1	9	2	9	3	9	3	9	4	T.P.1 (TONNES/O.01 M)
8	32	482	33	183	33	898	34	625	35	403	M.C.T. O.01 H
9	8	359	8	268	8	185	8	108	8	039	TRANS. METACENTRE (KMT)
10	16201	16368	16534	16698	16863	17028	17192	17355	17519	17683	MOM OF INERT. TRANSV
11	0	5661	0	5704	0	5746	0	5787	0	5828	BLOCK COEFF. (CB)
12	0	6282	0	6311	0	6340	0	6369	0	6398	PRISM COEFF. (CP)
13	0	7254	0	7314	0	7372	0	7431	0	7491	W.P.A. COEFF. (CM)
14	0	9012	0	9038	0	9063	0	9086	0	9109	MID. SEC. COEFF. (CM)
15	881	4	888	6	895	8	902	9	910	2	W.P.A. MLD
16	1165	3	1182	5	1199	7	1216	9	1234	3	WETTED SURF.

HYDROSTATIC CURVES, DRAFTS FROM 4.4 m to 5.8 m (mld)

FOLLOWING CALCULATION APPLIES FOR TRIM - 0.000

NAVAIDS ICEBREAKER TYPE 1100

	4.400	4.500	4.600	4.700	4.800	4.900	5.000	5.100	0	MOULDED DRAFT
1	3296	3393	3490	3587	3684	3781	3878	3975	1	DISPL. TOT. S.W.
2	3216	3310	3404	3499	3594	3689	3784	3879	2	DISPL. TOT. F.W.
3	3179	3273	3367	3461	3555	3650	3744	3838	3	DISPL. MLD.
4	-1.240	-1.271	-1.322	-1.383	-1.422	-1.463	-1.509	-1.579	4	L.C.F. FROM MID SHIP
5	-0.734	-0.768	-0.783	-0.798	-0.814	-0.831	-0.848	-0.865	5	L.C.B. FROM MID SHIP
6	2.469	2.525	2.581	2.638	2.694	2.751	2.808	2.864	6	V.C.B. ABOVE BL
7	9.6	9.7	9.7	9.8	9.9	10.0	10.1	10.1	7	T.P.I. (TONNES/O.01 M)
8	37.694	38.548	39.488	40.488	41.401	42.316	43.240	44.289	8	M.C.T. O.01 M
9	7.865	7.817	7.772	7.732	7.693	7.662	7.634	7.610	9	TRANS. METACENTRE (KMT)
10	17355	17516	17674	17830	17986	18141	18297	18458	10	MOM. OF INERT. TRANSV
11	0.5948	0.5987	0.6026	0.6064	0.6102	0.6140	0.6178	0.6215	11	BLOCK COEFF. (CB)
12	0.6487	0.6516	0.6546	0.6576	0.6605	0.6635	0.6665	0.6695	12	PRISM COEFF. (CP)
13	0.7680	0.7742	0.7802	0.7861	0.7921	0.7982	0.8041	0.8106	13	W.P.A. COEFF
14	0.9169	0.9188	0.9205	0.9222	0.9239	0.9254	0.9269	0.9283	14	MID. SEC. COEFF. (CM)
15	933.1	940.6	947.9	955.1	962.4	969.8	977.0	984.8	15	W.P.A. MLD
16	1288.2	1306.0	1323.9	1341.7	1359.7	1377.8	1395.8	1414.6	16	WETTED SURF.

FOLLOWING CALCULATION APPLIES FOR TRIM - 0.000

NAVAIDS ICEBREAKER TYPE 1100

	5.100	5.200	5.300	5.400	5.500	5.600	5.700	5.800	0	MOULDED DRAFT
1	3987	4084	4191	4293	4400	4502	4611	4718	1	DISPL. TOT. S.W.
2	3890	3989	4089	4190	4292	4395	4499	4603	2	DISPL. TOT. F.W.
3	3851	3949	4049	4150	4251	4354	4457	4561	3	DISPL. MLD.
4	-1.579	-1.667	-1.742	-1.843	-1.935	-2.010	-2.096	-2.177	4	L.C.F. FROM MID SHIP
5	-0.865	-0.884	-0.904	-0.926	-0.949	-0.973	-0.998	-1.024	5	L.C.B. FROM MID SHIP
6	2.864	2.921	2.978	3.036	3.093	3.150	3.208	3.265	6	V.C.B. ABOVE BL
7	10.1	10.2	10.3	10.4	10.5	10.6	10.7	10.8	7	T.P.I. (TONNES/O.01 M)
8	44.289	45.420	46.504	47.821	49.151	50.341	51.557	52.703	8	M.C.T. O.01 M
9	7.610	7.589	7.573	7.559	7.548	7.540	7.534	7.530	9	TRANS. METACENTRE (KMT)
10	18458	18622	18789	18957	19124	19293	19462	19630	10	MOM. OF INERT. TRANSV
11	0.6215	0.6252	0.6289	0.6326	0.6363	0.6399	0.6436	0.6473	11	BLOCK COEFF. (CB)
12	0.6695	0.6724	0.6754	0.6785	0.6815	0.6846	0.6877	0.6908	12	PRISM COEFF. (CP)
13	0.8106	0.8174	0.8241	0.8317	0.8393	0.8466	0.8537	0.8605	13	W.P.A. COEFF
14	0.9283	0.9297	0.9310	0.9323	0.9335	0.9347	0.9359	0.9370	14	MID. SEC. COEFF. (CM)
15	984.8	993.1	1001.3	1010.5	1020.0	1028.6	1037.2	1045.5	15	W.P.A. MLD
16	1414.6	1433.9	1453.0	1473.5	1494.2	1514.1	1534.3	1554.0	16	WETTED SURF.

HYDROSTATIC CURVES, DRAFTS FROM 5.8 m to 6.8 m (mld)

FOLLOWING CALCULATION APPLIES FOR TRIM = 0.000

NAVAIDS ICEBREAKER TYPE 1100

	5 800	5 900	6 000	6 100	6 200	6 300	6 400	6 500	0	MIXED DRAFT
1	4718	4826	4935	5045	5155	5266	5378	5490	1	DISPL TOT S W
2	4603	4709	4815	4922	5029	5138	5247	5356	2	DISPL TOT F W
3	4561	4666	4772	4878	4983	5093	5202	5311	3	DISPL MLD
4	-2 177	-2 247	-2 321	-2 447	-2 524	-2 569	-2 624	-2 675	4	L C F FROM MID SHIP
5	-1 024	-1 050	-1 078	-1 104	-1 136	-1 165	-1 195	-1 225	5	L C B FROM MID SHIP
6	3 266	3 324	3 381	3 439	3 497	3 555	3 613	3 671	6	V C B ABOVE BL
7	10 8	10 8	10 9	11 0	11 1	11 1	11 2	11 3	7	T P I (TONNES/O 01 M)
8	52 70	53 75	54 92	56 18	57 25	58 15	59 06	59 91	8	M C T O 01 M
9	7 330	7 327	7 325	7 325	7 326	7 328	7 331	7 333	9	TRANS METACENTRE(KMT)
10	19630	19793	19952	20108	20261	20410	20554	20693	10	MOM OF INERT TRANSV
11	0 6473	0 6510	0 6546	0 6583	0 6619	0 6655	0 6691	0 6726	11	BLOCK COEFF (CB)
12	0 6908	0 6940	0 6971	0 7002	0 7033	0 7065	0 7096	0 7127	12	PRISM COEFF (CP)
13	0 8403	0 8446	0 8486	0 8522	0 8560	0 8597	0 8636	0 8676	13	W P A COEFF
14	0 9370	0 9381	0 9391	0 9401	0 9410	0 9420	0 9429	0 9438	14	MID SEC COEFF (CM)
15	1045 3	1052 9	1061 0	1069 1	1076 3	1083 2	1089 4	1095 1	15	W P A MLD
16	1554 0	1573 3	1593 3	1613 4	1632 9	1651 9	1670 5	1688 8	16	NETTED SURF

FOLLOWING CALCULATION APPLIES FOR TRIM = 0.000

NAVAIDS ICEBREAKER TYPE 1100

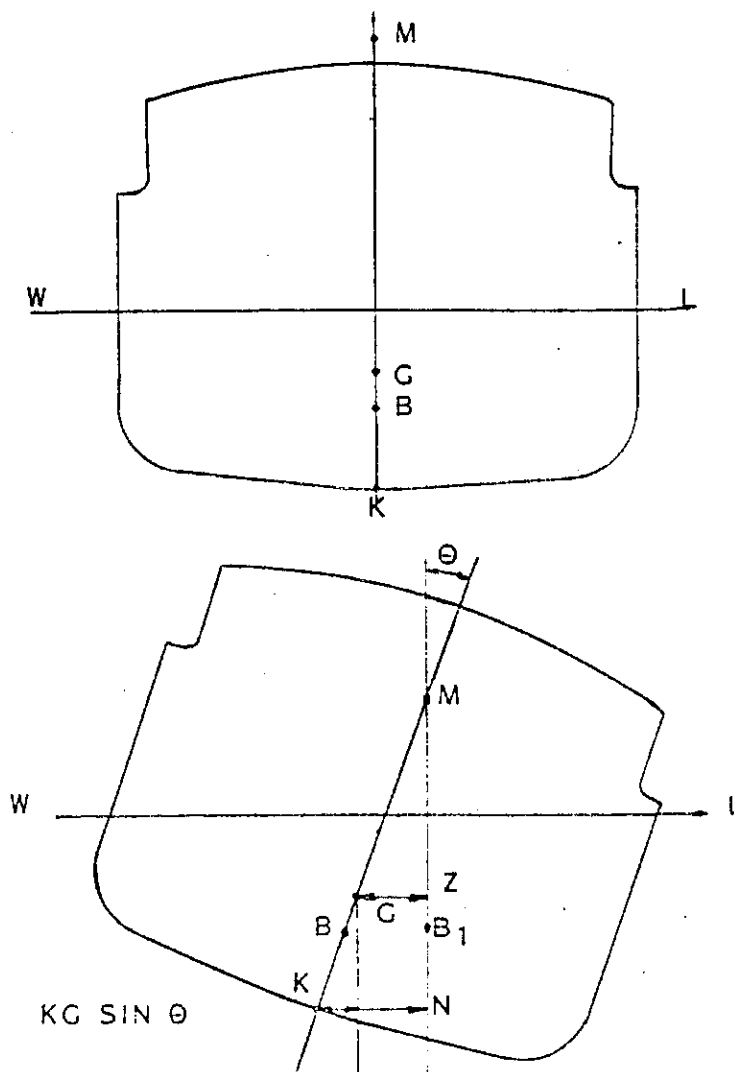
	6 500	6 600	6 700	6 800	6 800	6 800	6 800	6 800	0	MIXED DRAFT
1	5490	5603	5716	5830	5830	5830	5830	5830	1	DISPL TOT S W
2	5356	5466	5577	5688	5688	5688	5688	5688	2	DISPL TOT F W
3	5311	5421	5531	5642	5642	5642	5642	5642	3	DISPL MLD
4	-2 675	-2 719	-2 758	-2 793	-2 793	-2 793	-2 793	-2 793	4	L C F FROM MID SHIP
5	-1 223	-1 255	-1 284	-1 313	-1 313	-1 313	-1 313	-1 313	5	L C B FROM MID SHIP
6	3 671	3 729	3 787	3 845	3 845	3 845	3 845	3 845	6	V C B ABOVE BL
7	11 3	11 3	11 4	11 4	11 4	11 4	11 4	11 4	7	T P I (TONNES/O 01 M)
8	59 91	60 70	61 44	62 12	62 12	62 12	62 12	62 12	8	M C T O 01 M
9	7 333	7 340	7 345	7 352	7 352	7 352	7 352	7 352	9	TRANS METACENTRE(KMT)
10	20693	20829	20960	21088	21088	21088	21088	21088	10	MOM OF INERT TRANSV
11	0 6726	0 6761	0 6795	0 6830	0 6830	0 6830	0 6830	0 6830	11	BLOCK COEFF (CB)
12	0 7127	0 7157	0 7188	0 7218	0 7218	0 7218	0 7218	0 7218	12	PRISM COEFF (CP)
13	0 9013	0 9057	0 9098	0 9137	0 9137	0 9137	0 9137	0 9137	13	W P A COEFF
14	0 9438	0 9446	0 9454	0 9463	0 9463	0 9463	0 9463	0 9463	14	MID SEC COEFF (CM)
15	1095 1	1100 3	1105 4	1110 1	1110 1	1110 1	1110 1	1110 1	15	W P A MLD
16	1688 8	1706 8	1724 6	1742 2	1742 2	1742 2	1742 2	1742 2	16	NETTED SURF

NAVAIDS ICEBREAKER TYPE 1100
TABLE OF KN VALUES

THE TABLE APPLIES FOR TRIM= 0.000 IN UPRIGHT CONDITION
ANGLES OF HEEL.

- 11 -

NOTES ON THE CROSS CURVES OF STABILITY



$$GZ = KN - KG \sin \theta$$

NOTE: Poop and Forecastle Included

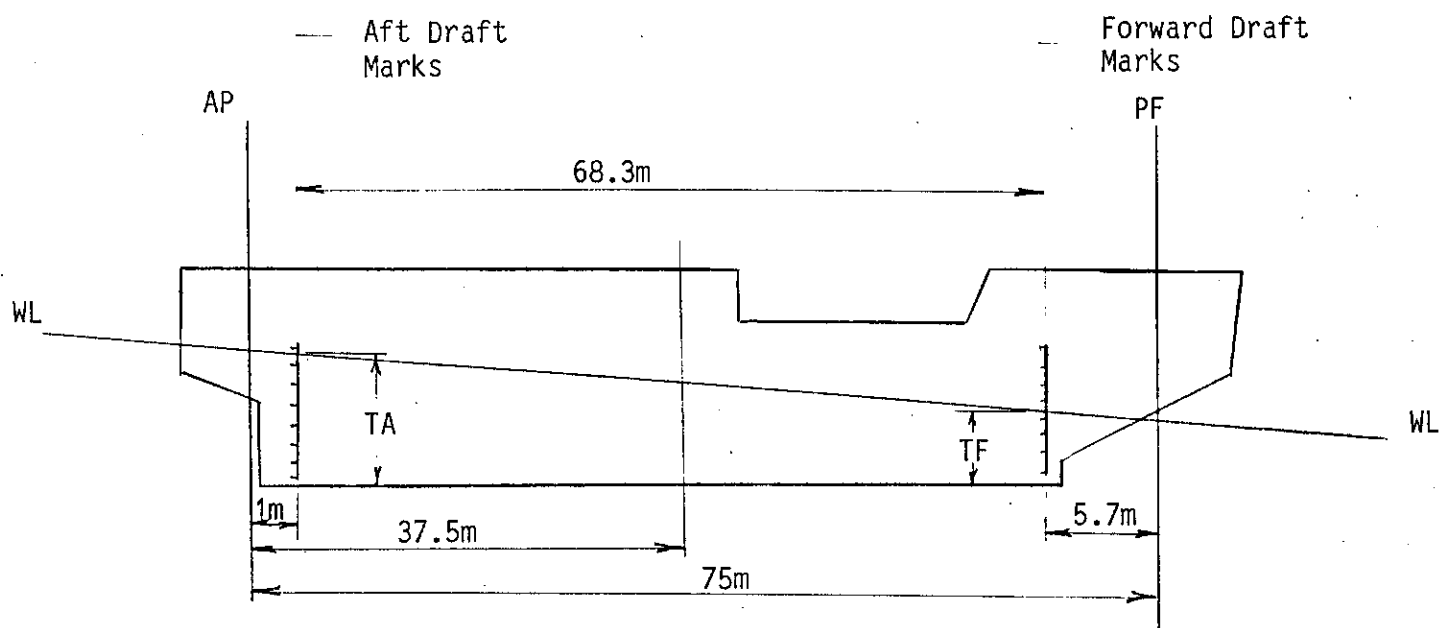
NOTES ON THE USE OF FREE SURFACE MOMENTS

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.

As soon as 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 EFFECT". This adverse effect on the stability is referred to as a "FREE SURFACE CORRECTION" and is calculated as follows:

$$\text{"Free Surface Correction" (m)} = \frac{\text{free surface moment (tonnes m)}}{\text{displacement of vessel (tonnes)}}$$

CALCULATION OF DRAFTS AT
PERPENDICULARS



$$TAP \text{ (Draft at AP)} = TA + \left(\frac{TA - TF}{68.3} \right)$$

$$TFP \text{ (Draft at PF)} = TF - 5.7 \left(\frac{TA - TF}{68.3} \right)$$

WHERE:

TA = Draft at Aft Draft Marks

TF = Draft at Forward Draft Marks

Example Calculation

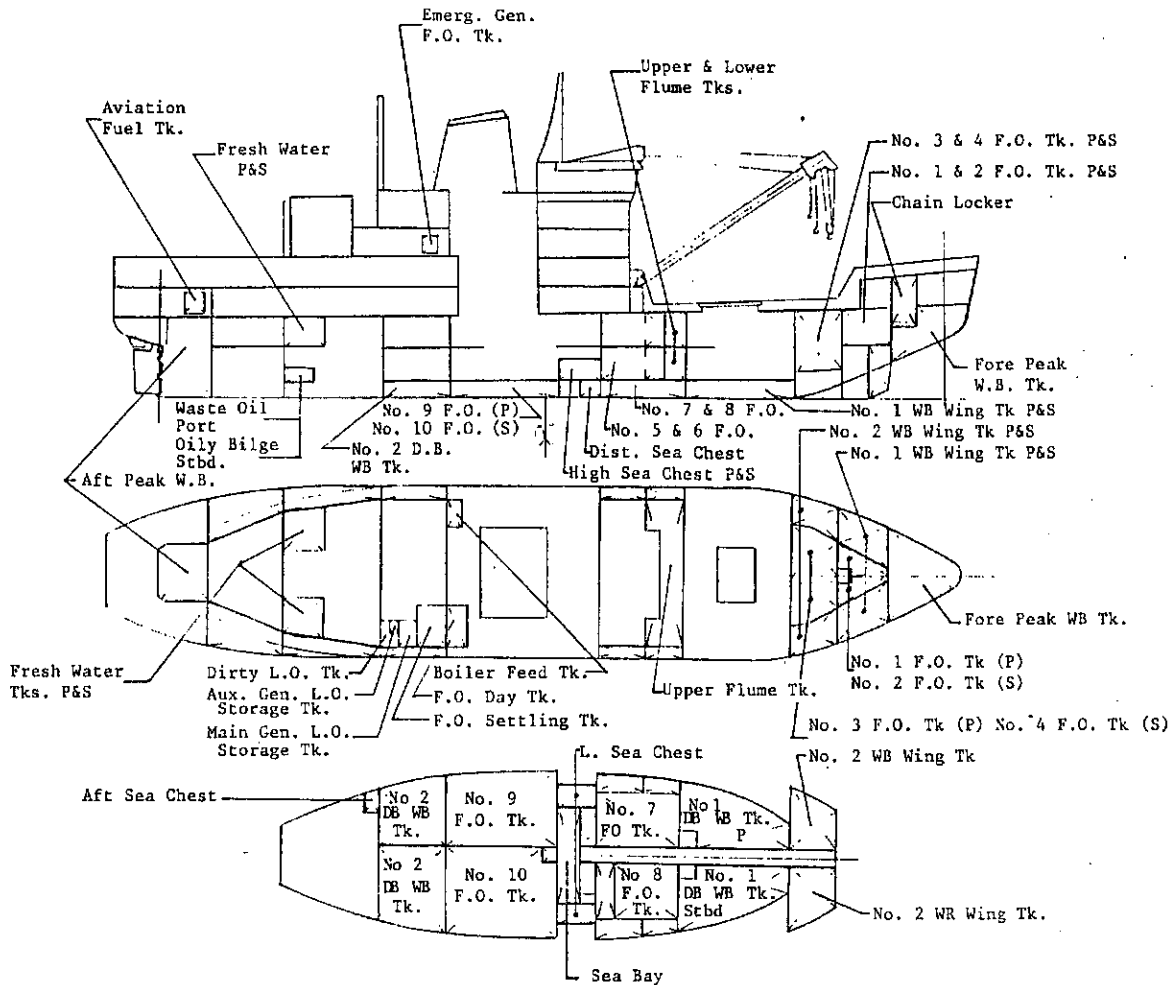
If TA = 5.90 and TF = 4.960












$$TAP = 5.90 + \left(\frac{5.90 - 4.96}{68.3} \right) = 5.90 + \left(\frac{0.94}{68.3} \right) = 5.914m$$

$$TFP = 4.96 - 5.7 \left(\frac{5.90 - 4.96}{68.3} \right) = 4.96 - 5.7 \left(\frac{0.94}{68.3} \right) = 4.882m$$

FREE FLOATING CONDITIONS

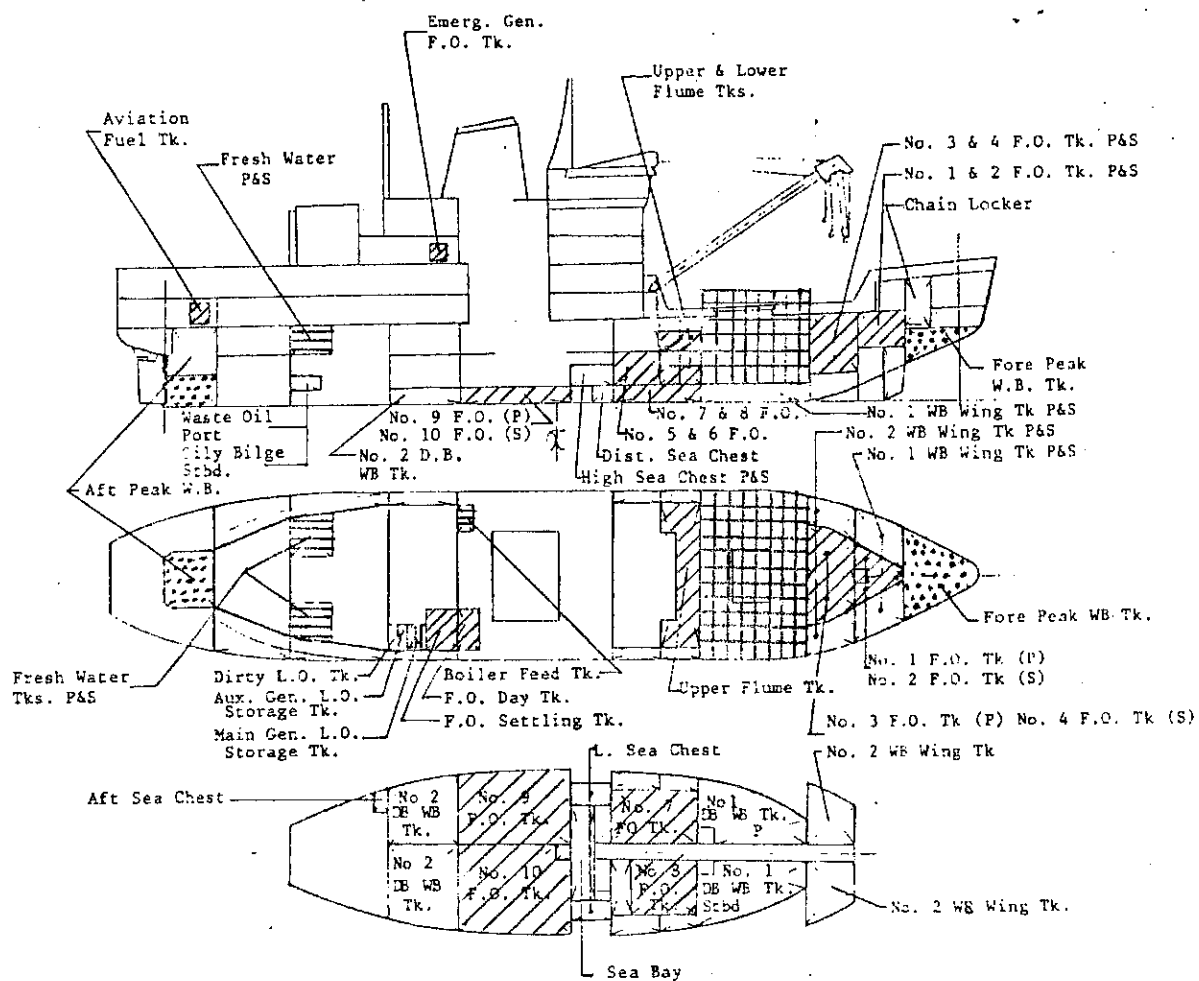
CONDITION NO. 1 - LIGHTSHIP



DEADWEIGHT	Fuel Oil		- t
	Lub Oil		- t
	Flume Tank		- t
	Water Ballast		- t
	Fresh Water		- t
	Aviation Fuel		- t
	Misc. Tanks		- t
	Cargo		- t
	Crew, Stores & Effects		- t
	Ice		- t
	Helicopter		- t
	Total Deadweight		- t
LIGHTSHIP		3331	t
TOTAL DISPLACEMENT		3331	

T ₀	4.319	m(mld)
TA =	6.120	m (extr)
TF =	2.750	m (extr)
Trim =	3.701	m by Stern
KMT =	7.858	m
VCG =	7.117	m
GM _s =	0.741	m
Fr. Surface Corrections =		m
GM _f =	0.741	m

1



DEADWEIGHT	Fuel Oil		703.80	- t
	Lub Oil		15.30	- t
	Flume Tank		93.40	- t
	Water Ballast		73.60	- t
	Fresh Water		114.60	- t
	Aviation Fuel		17.70	- t
	Misc. Tanks			- t
	Cargo		576.40	- t
	Crew, Stores & Effects		93.00	- t
	Ice			- t
	Helicopter		5.10	- t
	Total Deadweight		1692.90	- t
LIGHTSHIP			3331.00	- t
TOTAL DISPLACEMENT			5023.90	

HYDROSTATICS	6.080m	mld @ L.C.F.
TA =	6.110 m	(extr)
TF =	6.110 m	(extr)
Trim =	0.00 m	by Stern
KMT =	7.525 m	
VCG =	6.351 m	
GMs =	1.174 m	
Fr. Surface Corrections =	.587 m	
GMf =	.587 m	

NAVAIDS ICEBREAKER TYPE 1100

CONDITION NO. 2

LOADED DEPARTURE (100%CONS)

=====					
WEIGHT ITEM	: SPECIF.:	: VCG :	LCG :	FREE :	
	: WEIGHT :	WEIGHT :	FRDM :	FRDM :	SURFACE:
	: OR :	: BL :	STN.5 :	MOMENT :	
	: UNIT :				
	: WEIGHT :	tonnes :	m :	m :	tonnes-m:
=====					

FUEL OIL

=====

F.O. SETTLING TK.(63-70)	0.850	25.100	6.196	-10.900	12.690
F.O. DAY TANK (70-76)	0.850	21.600	6.201	-8.300	10.880
EMERG. GEN. F.O. TK.(64-68)	0.850	0.900	14.358	-11.100	0.010
NO. 3 FO TK P(152-163)	0.850	83.600	5.697	25.320	68.000
NO. 4 FO TK STBD(152-163)	0.850	87.600	5.760	25.328	68.000
NO. 5 FO TK P(106-121)	0.850	86.600	2.958	7.674	120.600
NO. 6 FO TK STBD(106-121)	0.850	86.600	2.958	7.674	120.600
NO. 7 FO TK P(106-126)	0.850	43.300	0.819	8.898	70.830
NO. 8 FO TK STBD(110-126)	0.850	34.400	0.815	9.698	56.670
NO. 9 FO TK P(70-96)	0.850	67.600	0.854	-4.261	228.930
NO. 10 FO TK STBD(70-96)	0.850	86.800	0.828	-4.402	426.810
NO. 1 F.O. TK P.(163-175)	0.850	39.200	6.743	29.947	24.200
NO. 2 F.O. TK STBD(163-175)	0.850	40.500	6.767	29.946	27.830
=====					
TOTAL F.O.		703.800	3.591	10.851	1236.050

LUB OIL

=====

MAIN GEN. L.O. OIL TANK(58-63)	0.800	12.600	6.296	-13.300	2.770
AUX GEN. L.O. TANK(56-58)	0.800	2.700	6.271	-14.700	0.180
=====					
TOTAL LUB OIL		15.300	6.292	-13.547	2.950

FLUME TANKS

=====

UPPER FLUME TK.(117-126)	0.850	49.600	5.650	11.474	771.190
LOWER FLUME TK.(117-126)	0.850	43.800	2.325	11.523	658.850
=====					
TOTAL FLUME TKS.		93.400	4.091	11.497	1430.040

WATER BALLAST

=====

AFT PEAK TK.	1.025	52.700	3.800	-34.600	72.000
FORE PEAK TK.	1.025	20.900	5.320	34.670	130.480
=====					
TOTAL WATER BALLAST		73.600	4.232	-14.930	202.480

NAVAIDS ICEBREAKER TYPE 1100
CONDITION NO. 2

LOADED DEPARTURE (100%CONS)

WEIGHT ITEM	SPECIF.:	VCB	LCG	FREE
	WEIGHT : WEIGHT :	FROM :	FROM :	SURFACE:
	OR :	BL :	STN.5 :	MOMENT :
	UNIT :			
	WEIGHT : tonnes :			tonnes-m:

FRESH WATER

FRESH WATER TK. P(30-41)	1.000	50.100	6.316	-23.240	22.400
FRESH WATER TK. S(30-41)	1.000	50.100	6.316	-23.240	22.400
BOILER FEED TK. P(70-75)	1.000	14.400	6.316	-8.600	3.120
TOTAL FRESH WATER		114.600	6.316	-21.400	47.920

AVIATION FUEL

AVIATION FUEL(3-12)	0.720	17.700	9.268	-34.160	30.830
		17.700	9.268	-34.160	30.830

CARGO

MAIN CARGO HOLD	476.400	5.000	17.970		
DECK CARGO	100.000	9.200	14.500		
TOTAL CARGO	576.400	5.729	17.368		

CREW,STORES,EFFECTS

CREW AND EFFECTS	8.000	13.000	-6.000		
DRY PROVISIONS	32.000	5.166	7.576		
CENTRAL STORES	20.000	5.140	-28.513		
STORES-CARGO HOLD	10.000	6.500	21.100		
MISC. STORES	23.000	7.930	-8.540		
TOTAL CREW,STORES,EFFECTS	93.000	6.661	-3.884		

HELICOPTER

HELICOTER	5.100	14.500	-26.500		
TOTAL HELICOPTER	5.100	14.500	-26.500		

TOTALS FOR CONDITION NO. 2, LOADED DEPARTURE (100% CONS.)

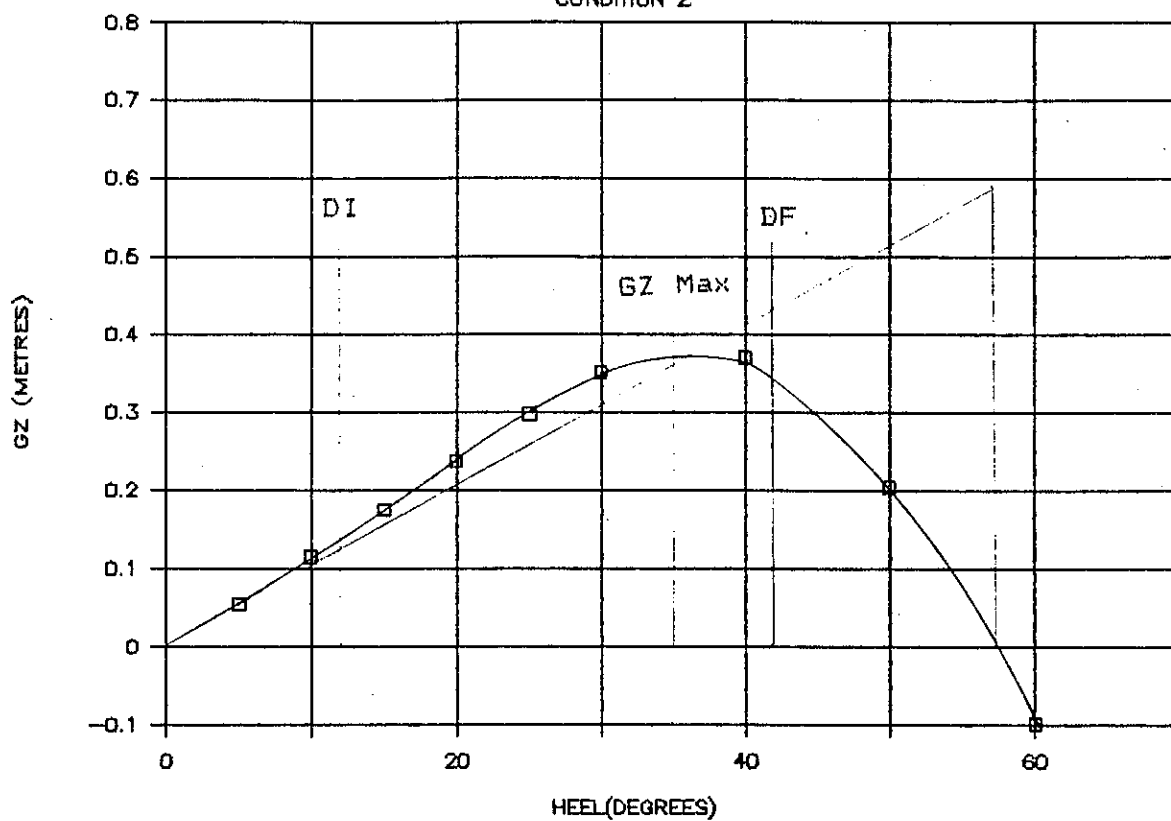
TOTAL DEAD WEIGHT	1692.900	4.844	8.189	2950.270
LIGHT SHIP	3331.000	7.117	-5.820	
TOTAL DISPLACEMENT	5023.900	6.351	-1.100	2950.270

MEAN DRAFT (MLD.) ■ 6.080
 DRAFT AFT (MLD.) ■ 6.080
 DRAFT FOR'D (MLD.) ■ 6.080
 TOTAL TRIM ■ 0.000
 DISP'T tonnes 5023.9
 LCG @ MIDSHIPS ■ -1.100
 VCB @ BASELINE ■ 6.351
 FREE SURF CORR. ■ 0.587
 KMT ■ 7.525
 GM UNCORRECTED ■ 1.174
 GM CORRECTED ■ 0.587

HEEL deg	5	10	15	20	25	30	40	50	60	70	80	90
KN ■	0.660	1.320	1.970	2.610	3.230	3.820	4.830	5.520	5.91	6.06	5.99	5.73
GZ SOLID ■	0.107	0.217	0.326	0.438	0.546	0.645	0.748	0.655	0.410	0.092	-0.264	-0.621
GZ FLUID ■	0.055	0.115	0.174	0.237	0.298	0.351	0.370	0.205	-0.098	-0.460	-0.843	-1.208
AREA TO 30	0.092 m*rad											
AREA TO 40	0.158 m*rad											
AREA 30-40	0.066 m*rad											

ANN HARVEY

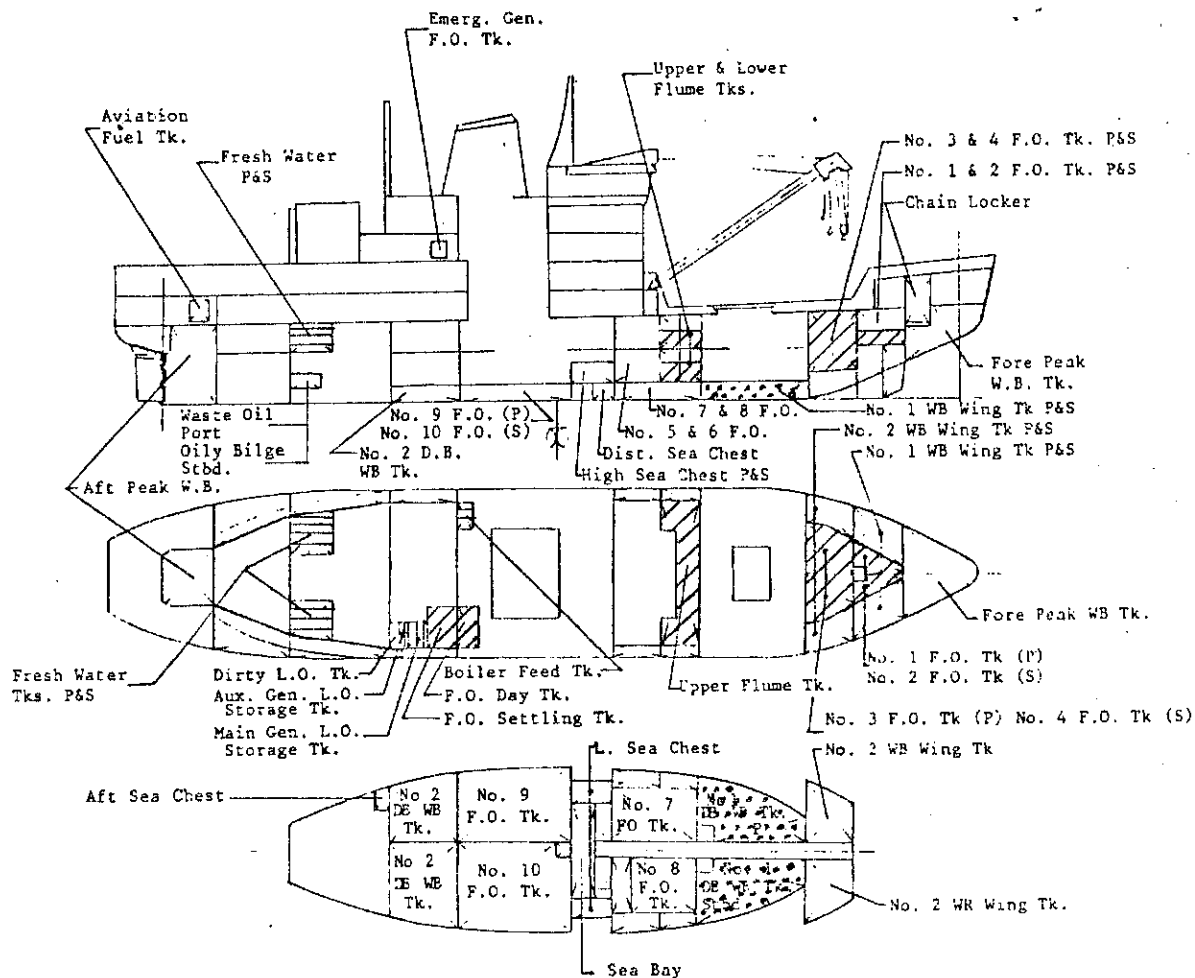
CONDITION 2



GM	0.587 m
GZ MAX	0.375 m at 35
DI (Deck Immersion)	12.000
DF (Down Flooding)	41.900

HYDROSTATICS	5.486	mld @ L.C.F.
TA =	5.614	m (extr)
TF =	5.421	m (extr)
Trim =	.237	m by Stern
KMT =	7.549	m
VCG =	6.641	m
GMs =	.908	m
Fr. Surface Corrections =	.426	m
GMF =	.482	m

CONDITION NO. 3A - ARCTIC LOADED ARRIVAL (10% CONS)
(WORST OPERATING CONDITON)



DEADWEIGHT	Fuel Oil	229.90 - t
	Lub Oil	15.30 - t
	Flume Tank	93.40 - t
	Water Ballast	104.20 - t
	Fresh Water	11.52 - t
	Aviation Fuel	1.80 - t
	Misc. Tanks	- t
	Cargo	576 - t
	Crew, Stores & Effects	65.0 - t
	Ice	- t
	Helicopter	5.10 - t
	Total Deadweight	1102.22 - t
LIGHTSHIP		3331.0 t
TOTAL DISPLACEMENT		4433.22 -

HYDROSTATICS		5.532m	mld @ L.C.F.
TA =	5.501	m (extr)	
TF =	5.620	m (extr)	
Trim =	- .13	m by Stern	
KMT =	7.548	m	
VCG =	6.663	m	
GMS =	.885	m	
Fr. Surface Corrections =	.444	m	
GMI =	.441	m	

CCGS ANN HARVEY

NAVAIDS ICEBREAKER TYPE 1100
CONDITION NO. 3

LOADED ARRIVAL (10% CONS.)

WEIGHT ITEM	SPECIF.:	VCG	LCG	FREE
	WEIGHT	WEIGHT	FROM	FROM
	OR	BL	STN. 5	SURFACE
	UNIT			MOMENT
	WEIGHT	tonnes		tonnes-m

FUEL OIL

F.O. SETTLING TK. (63-70)	0.850	25.100	6.196	-10.900	12.690
F.O. DAY TANK (70-76)	0.850	21.600	6.201	-8.300	10.880
EMERG. GEN. F.O. TK. (64-68)	0.850	0.900	14.358	-11.100	0.010
NO. 1 F.O. TK P. (163-175)	0.850	11.500	5.750	29.800	24.200
NO. 2 F.O. TK P. (163-175)	0.850	11.500	5.750	29.800	27.830
TOTAL F.O.		70.600	6.156	3.152	75.610

LUB OIL

MAIN GEN. L.O. OIL TANK (5B-63)	0.800	12.600	6.296	-13.300	2.770
AUX GEN. L.O. TANK (56-58)	0.800	2.700	6.271	-14.700	0.180
TOTAL LUB OIL		15.300	6.292	-13.547	2.950

FLUME TANKS

UPPER FLUME TK. (117-126)	0.850	49.600	5.650	11.474	771.190
LOWER FLUME TK. (117-126)	0.850	43.800	2.325	11.523	658.850
TOTAL FLUME TKS.		93.400	4.091	11.497	1430.040

WATER BALLAST

NO. 2 W.B. WING TK. (PORT)	1.025	55.300	4.403	25.413	18.500
NO. 2 W.B. WING TK. (STBD)	1.025	55.300	4.403	25.413	18.500
NO. 1 W.B. D.B. TK. (STBD)	1.025	52.100	0.881	12.501	122.230
NO. 1 W.B. D.B. TK. (PORT)	1.025	52.100	0.881	12.501	122.230
TOTAL WATER BALLAST		214.800	2.694	19.149	281.460

NAVAIDS ICEBREAKER TYPE 1100

CONDITION NO. 3 A

ARCTIC LOADED ARRIVAL (10% CONS.)

=====					
WEIGHT ITEM	SPECIF.	VCB	LCB	FREE	
	WEIGHT	WEIGHT	FROM	FROM	SURFACE
	OR	BL	STN.5	MOMENT	
	UNIT				
=====					
WEIGHT	tonnes				tonnes-m
=====					

FUEL OIL

=====

F.D. SETTLING TK. (63-70)	0.850	25.100	6.196	-10.900	12.690
F.D. DAY TANK (70-76)	0.850	21.600	6.201	-8.300	10.880
NO. 3 F.D. TK P. (152-163)	0.850	83.600	5.697	25.320	68.000
NO. 4 F.D. TK STBD (152-163)	0.850	87.600	5.760	25.328	68.000
EMERG. GEN. F.D. TK. (64-68)	0.850	0.900	14.358	-11.100	0.010
NO. 1 F.D. TK P. (163-175)	0.850	5.550	5.050	29.700	24.200
NO. 2 F.D. TK P. (163-175)	0.850	5.550	5.050	29.700	27.830
=====					
TOTAL F.O.		229.900	5.826	18.279	211.610

LUB OIL

=====

MAIN GEN. L.O. OIL TANK (58-63)	0.800	12.600	6.296	-13.300	2.770
AUX GEN. L.O. TANK (56-58)	0.800	2.700	6.271	-14.700	0.180
=====					
TOTAL LUB OIL		15.300	6.292	-13.547	2.950

FLUME TANKS

=====

UPPER FLUME TK. (117-126)	0.850	49.600	5.650	11.474	771.190
LOWER FLUME TK. (117-126)	0.850	43.800	2.325	11.523	658.850
=====					
TOTAL FLUME TKS.		93.400	4.091	11.497	1430.040

WATER BALLAST

=====

NO. 1 DB WB TK P&S	1.025	104.200	0.881	17.501	244.460
=====					
TOTAL WATER BALLAST		104.200	0.881	17.501	244.460

NAVAIDS ICEBREAKER TYPE 1100

CONDITION NO. 3

LOADED ARRIVAL (10% CONS.)

WEIGHT ITEM	SPECIF.	VCB	LCB	FREE
	WEIGHT	WEIGHT	FROM	FROM
	OR	BL	STN.5	MOMENT
	UNIT			
	WEIGHT	tonnes		tonnes-m

FRESH WATER

=====

FRESH WATER TK. P(30-41)	1.000	5.010	5.150	-23.240	22.400
FRESH WATER TK. S(30-41)	1.000	5.010	5.150	-23.240	22.400
BDILER FEED TK. P(70-75)	1.000	1.500	5.150	-8.600	3.120
TOTAL FRESH WATER		11.520	5.150	-21.334	47.920

AVIATION FUEL

=====

AVIATION FUEL(3-12)	0.720	1.800	8.050	-34.160	30.830
		1.800	8.050	-34.160	30.830

CARGO

=====

MAIN CARGO HOLD	476.400	5.000	17.970		
DECK CARGO	100.000	9.200	14.500		
TOTAL CARGO	576.400	5.729	17.368		

CREW, STORES, EFFECTS

=====

CREW AND EFFECTS	8.000	13.000	-6.000		
DRY PROVISIONS	4.000	4.900	7.576		
CENTRAL STORES	20.000	5.140	-28.513		
STORES-CARGO HOLD	10.000	6.500	21.100		
MISC. STORES	23.000	7.930	-8.540		
TOTAL CREW, STORES, EFFECTS	65.000	7.289	-8.821		

HELICOPTER

=====

HELICOTER	5.100	14.500	-26.500		
TOTAL HELICOPTER	5.100	14.500	-26.500		

NAVAIDS ICEBREAKER TYPE 1100

CONDITION NO. 3 A

ARCTIC LOADED ARRIVAL(10% CONS.)

WEIGHT ITEM	SPECIF.:	VCB :	LCB :	FREE :
	WEIGHT :	WEIGHT :	FROM :	FROM :
	OR :	BL :	STN.5 :	SURFACE :
	UNIT :			
	WEIGHT :	tonnes :	m :	m :

FRESH WATER

=====

FRESH WATER TK. P(30-41)	1.000	5.010	5.150	-23.240	22.400
FRESH WATER TK. S(30-41)	1.000	5.010	5.150	-23.240	22.400
BOILER FEED TK. P(70-75)	1.000	1.500	5.150	-8.600	3.120
TOTAL FRESH WATER		11.520	5.150	-21.334	47.920

AVIATION FUEL

=====

AVIATION FUEL(3-12)	0.720	1.800	8.050	-34.160	30.830
		1.800	8.050	-34.160	30.830

CARGO

=====

MAIN CARGO HOLD	476.000	5.000	17.970		
DECK CARGO	100.000	9.200	14.500		
TOTAL CARGO	576.000	5.729	17.368		

CREW,STORES,EFFECTS

=====

CREW AND EFFECTS	8.000	13.000	-6.000		
DRY PROVISIONS	4.000	4.900	7.576		
CENTRAL STORES	20.000	5.140	-28.513		
STORES-CARGO HOLD	10.000	6.500	21.100		
MISC. STORES	23.000	7.930	-8.540		
TOTAL CREW,STORES,EFFECTS	65.000	7.289	-8.821		

HELICOPTER

=====

HELICOPTER	5.100	14.500	-26.500		
TOTAL HELICOPTER	5.100	14.500	-26.500		

TOTALS FOR CONDITION NO. 3, LOADED ARRIVAL (10% CONS.)

TOTAL DEAD WEIGHT	1053.920	5.138	13.471	1868.810
LIGHT SHIP	3331.000	7.117	-5.820	
TOTAL DISPLACEMENT	4384.920	6.641	-1.183	1868.810

MEAN DRAFT (MLD.) ■ 5.486
 DRAFT AFT (MLD.) ■ 5.584
 DRAFT FOR'D (MLD.) ■ 5.391
 TOTAL TRIM ■ -0.237
 DISP'T tonnes 4384.9
 LCG @ MIDSHIPS ■ -1.183
 VCG @ BASELINE ■ 6.641
 FREE SURF CORR. ■ 0.426
 KNT ■ 7.549
 GM UNCORRECTED ■ 0.908
 GM CORRECTED ■ 0.482

HEEL deg	5.000	10.000	15.000	20.000	25.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000	
KN ■	0.659	1.321	1.987	2.653	3.292	3.897	4.955	5.649	6.032	6.160	6.064	5.758	
GZ SOLID ■	0.080	0.168	0.268	0.382	0.485	0.577	0.686	0.562	0.281	-0.081	-0.476	-0.883	
GZ FLUID ■	0.043	0.094	0.158	0.236	0.306	0.364	0.413	0.236	-0.088	-0.481	-0.896	-1.309	
AREA TO 30	0.089	■*rad											
AREA TO 40	0.158	■*rad											
AREA 30-40	0.069	■*rad											

TOTALS FOR CONDITION NO. 3 A, ARCTIC LOADED ARRIVAL (10% CONS.)

WEIGHT ITEM	SPECIF.:	VCB	LCB	FREE
	WEIGHT	WEIGHT	FROM	FROM SURFACE:
	OR	BL	STN.5	MOMENT
	UNIT			
	WEIGHT	tonnes		tonnes-m
TOTAL DEAD WEIGHT	1102.220	5.290	14.408	1967.810
LIGHT SHIP	3331.000	7.117	-5.820	
TOTAL DISPLACEMENT	4433.220	6.663	-0.791	1967.810

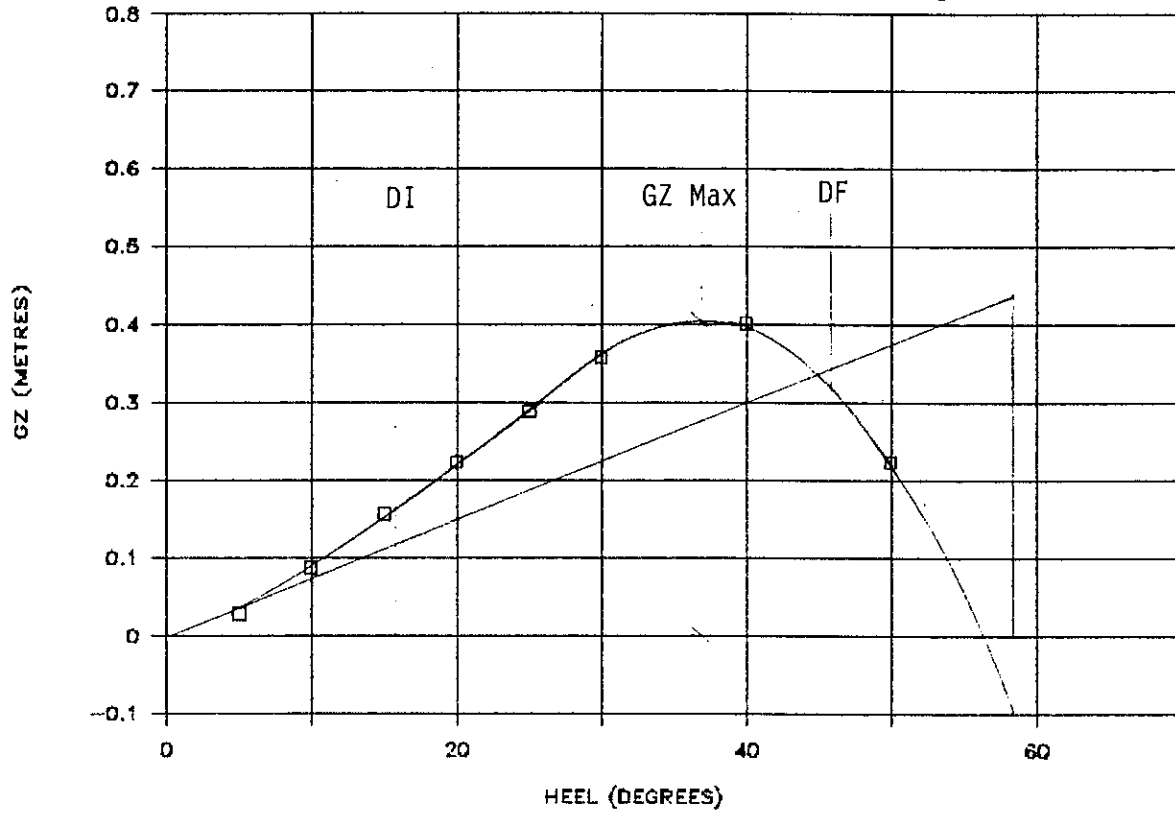
MEAN DRAFT (MLD.) m 5.532
 DRAFT AFT (MLD.) m 5.471
 DRAFT FOR'D (MLD.) 5.590
 TOTAL TRIM m 0.130
 DISP'T tonnes 4433.2
 LCB @ MIDSHIPS m -0.791
 VCB @ BASELINE m 6.663
 FREE SURF CORR. m 0.444
 KMT m 7.548
 GM UNCORRECTED m 0.885
 GM CORRECTED m 0.441

HEEL deg	5.000	10.000	15.000	20.000	25.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000
KN m	0.659	1.321	1.989	2.657	3.298	3.904	4.964	5.659	6.042	6.169	6.059	5.755
GZ SOLID m	0.078	0.164	0.265	0.378	0.482	0.573	0.681	0.555	0.272	-0.092	-0.502	-0.908
GZ FLUID m	0.040	0.087	0.150	0.227	0.295	0.351	0.396	0.215	-0.112	-0.509	-0.940	-1.352
AREA TO 30	0.085	m*rad										
AREA TO 40	0.151	m*rad										
AREA 30-40	0.067	m*rad										

ANN HARVEY

CONDITION 3

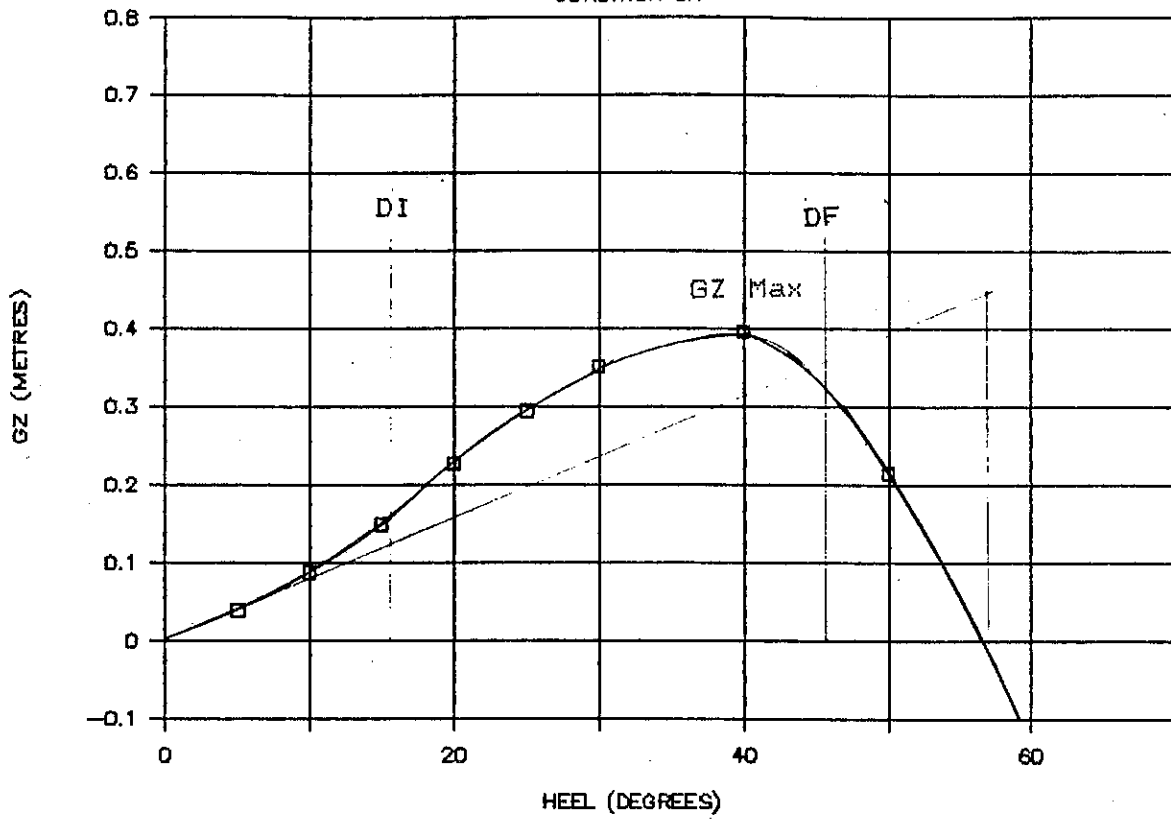
Worst Operating Condition














GM	0.436 m
GZ Max	0.405 m at 37°
DI (Deck Immersion)	16.2°
DF (Down Flooding)	46.1°

ANN HARVEY

CONDITION 3A



GM	0.441 m
GZ MAX	0.396 m at 40
DI (Deck Immersion)	15.700
DF (Down Flooding)	45.600

DEADWEIGHT	Fuel Oil		703.9	- t
	Lub Oil		15.3	- t
	Flume Tank		93.4	- t
	Water Ballast		385.5	- t
	Fresh Water		114.6	- t
	Aviation Fuel		17.7	- t
	Misc. Tanks			- t
	Cargo			- t
	Crew, Stores & Effects		93.0	- t
	Ice			- t
	Helicopter		5.1	- t
	Total Deadweight		1428.4	- t
LIGHTSHIP			3331.0	t
TOTAL DISPLACEMENT			4759.4	

HYDROSTATICS	5.838 mid @ L.C.F.
TA =	5.811 m (extr)
TF =	5.925 m (extr)
Trim =	-.126 m by Stern
KMT =	7.529 m
VCG =	6.293 m
GMs =	1.236 m
Fr. Surface Corrections =	.671 m
GMf =	.565 m

NAVAIDS ICEBREAKER TYPE 1100

CONDITION NO. 4

BALLAST DEPARTURE (100%CONS)

=====					
WEIGHT ITEM	: SPECIF.:	: VCB :	: LCB :	: FREE :	
	: WEIGHT :	: WEIGHT :	: FROM :	: FROM :	: SURFACE:
	: OR :	: BL :	: STN.5 :	: MOMENT :	
	: UNIT :	:-----:			
	: WEIGHT :	: tonnes :	: :	: :	: tonnes-m:
=====					

FUEL OIL

=====

F.O. SETTLING TK.(63-70)	0.850	25.100	6.196	-10.900	12.690
F.O. DAY TANK (70-76)	0.850	21.600	6.201	-8.300	10.880
EMERG. GEN. F.O. TK.(64-68)	0.850	0.900	14.358	-11.100	0.010
NO. 3 FO TK P(152-163)	0.850	83.600	5.697	25.320	68.000
NO. 4 FO TK STBD(152-163)	0.850	87.600	5.760	25.328	68.000
NO. 5 FO TK P(106-121)	0.850	86.600	2.958	7.674	120.600
NO. 6 FO TK STBD(106-121)	0.850	86.600	2.958	7.674	120.600
NO. 7 FO TK P(106-126)	0.850	43.300	0.819	8.898	70.830
NO. 8 FO TK STBD(110-126)	0.850	34.400	0.815	9.698	56.670
NO. 9 FO TK P(70-96)	0.850	67.600	0.854	-4.261	228.930
NO. 10 FO TK STBD(70-96)	0.850	86.800	0.828	-4.402	426.810
NO. 1 F.O. TK P.(163-175)	0.850	39.200	6.743	29.947	24.200
NO. 2 F.O. TK STBD(163-175)	0.850	40.500	6.767	29.946	27.830
=====					
TOTAL F.O.		703.800	3.591	10.851	1236.050

LUB OIL

=====

MAIN GEN. L.O. OIL TANK(58-53)	0.800	12.600	6.296	-13.300	2.770
AUX GEN. L.O. TANK(56-58)	0.800	2.700	6.271	-14.700	0.180
=====					
TOTAL LUB OIL		15.300	6.292	-13.547	2.950

FLUME TANKS

=====

UPPER FLUME TK.(117-126)	0.850	49.500	5.650	11.474	771.190
LOWER FLUME TK.(117-126)	0.850	43.800	2.325	11.523	658.850
=====					
TOTAL FLUME TKS.		93.400	4.091	11.497	1430.040

WATER BALLAST

=====

FDRE PEAK TK.	1.025	86.100	7.057	35.033	130.480
NO.1 WB WING TK P&S	1.025	84.6	5.556	29.943	32.36
NO.2 WB WING TK P&S	1.025	110.6	4.403	25.413	37
NO. 1 W.B. D.B. TK.(STBD)	1.025	52.100	0.881	17.501	122.230
NO. 1 W.B. D.B. TK.(PORT)	1.025	52.100	0.881	17.501	122.230
=====					
TOTAL WATER BALLAST		385.500	4.297	26.417	444.300

NAVAIDS ICEBREAKER TYPE 1100

CONDITION NO. 4

BALLAST DEPARTURE (100%CONS)

=====					
WEIGHT ITEM	: SPECIF.:	:	VCG :	LCG :	FREE :
	: WEIGHT :	WEIGHT :	FROM :	FROM :	SURFACE:
	: OR :	:	BL :	STN.5 :	MOMENT :
	: UNIT :	:	:	:	:
=====					
	: WEIGHT :	tonnes :	m :	m :	tonnes-m:
=====					

FRESH WATER

=====

FRESH WATER TK. P(30-41)	1.000	50.100	6.316	-23.240	22.400
FRESH WATER TK. S(30-41)	1.000	50.100	6.316	-23.240	22.400
BOILER FEED TK. P(70-75)	1.000	14.400	6.316	-8.600	3.120

TOTAL FRESH WATER		114.600	6.316	-21.400	47.920
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AVIATION FUEL

=====

AVIATION FUEL(3-12)	0.720	17.700	9.268	-34.160	30.830
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		17.700	9.268	-34.160	30.830
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CARGO

=====

MAIN CARGO HOLD	0.000	5.000	17.970		
DECK CARGO	0.000	9.200	14.500		

TOTAL CARGO	0.000				
-------------	-------	--	--	--	--

CREW, STORES, EFFECTS

=====

CREW AND EFFECTS	8.000	13.000	-6.000		
DRY PROVISIONS	32.000	5.166	7.576		
CENTRAL STORES	20.000	5.140	-28.513		
STORES-CARGO HOLD	10.000	6.500	21.100		
MISC. STORES	23.000	7.730	-8.540		

TOTAL CREW, STORES, EFFECTS	93.000	6.661	-3.884		
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HELICOPTER

=====

HELICOPTER	5.100	14.500	-26.500		
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TOTAL HELICOPTER	5.100	14.500	-26.500		
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TOTALS FOR CONDITION NO. 4, BALLAST DEPARTURE(100% CONS.)

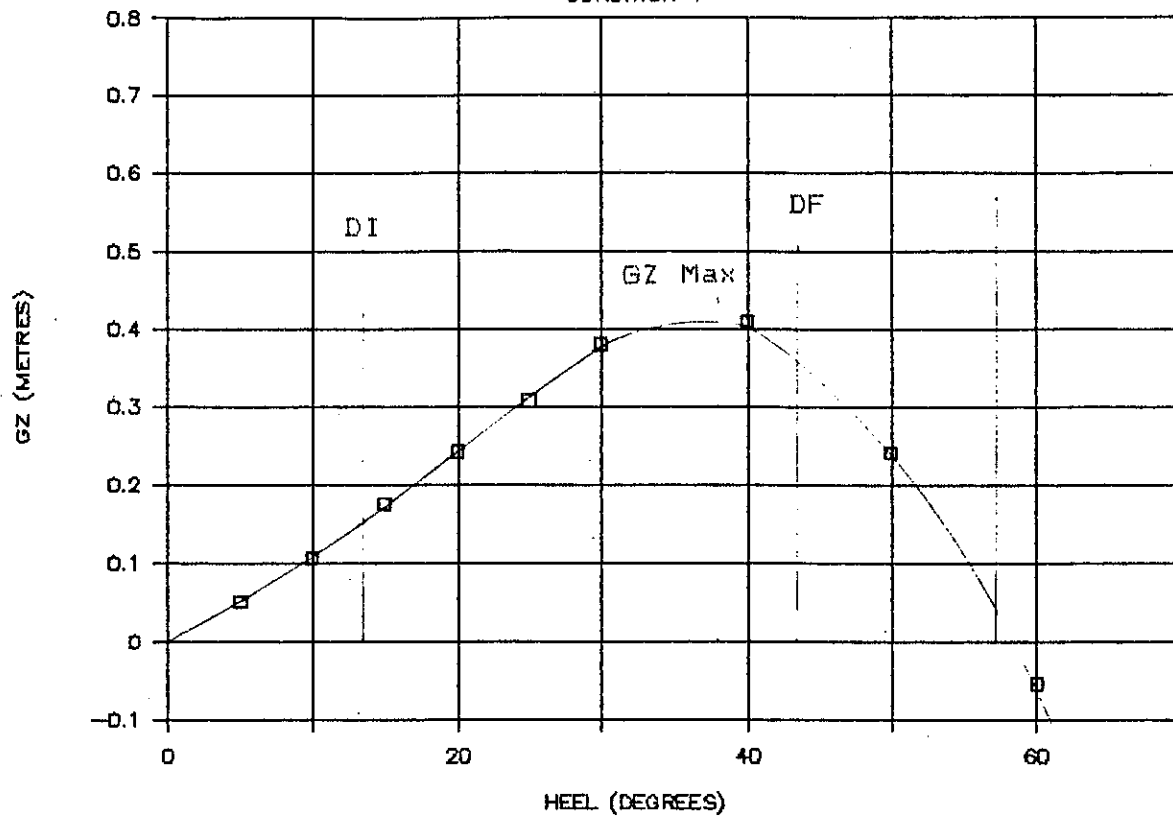
WEIGHT ITEM	SPECIF.:	VCB	LCG	FREE
	WEIGHT	WEIGHT	FROM	FROM
	OR	BL	STN.5	MOMENT
	UNIT			
	WEIGHT	tonnes		tonnes-m
TOTAL DEAD WEIGHT	1428.400	4.371	10.595	3192.090
LIGHT SHIP	3331.000	7.117	-5.820	
TOTAL DISPLACEMENT	4759.400	6.293	-0.893	3192.090

MEAN DRAFT(MLD.) ■ 5.838
 DRAFT AFT(MLD.) ■ 5.781
 DRAFT FOR'D(MLD.) 5.895
 TOTAL TRIM ■ 0.126
 DISP'T tonnes 4759.4
 LCG @ MIDSHIPS ■ -0.893
 VCB @ BASELINE ■ 6.293
 FREE SURF CORR. ■ 0.671
 KMT ■ 7.529
 BM UNCORRECTED ■ 1.236
 BM CORRECTED ■ 0.566

HEEL deg	5.000	10.000	15.000	20.000	25.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000
KN ■	0.657	1.316	1.978	2.623	3.251	3.851	4.881	5.569	5.957	6.093	6.019	5.738
GZ SOLID ■	0.109	0.223	0.349	0.471	0.592	0.705	0.836	0.749	0.508	0.180	-0.178	-0.555
GZ FLUID ■	0.050	0.107	0.176	0.242	0.308	0.369	0.405	0.235	-0.073	-0.450	-0.839	-1.225
AREA TO 30 DEG	0.0931	■*rad										
AREA TO 40 DEG	0.1625	■*rad										
AREA 30-40 DEG	0.0693	■*rad										

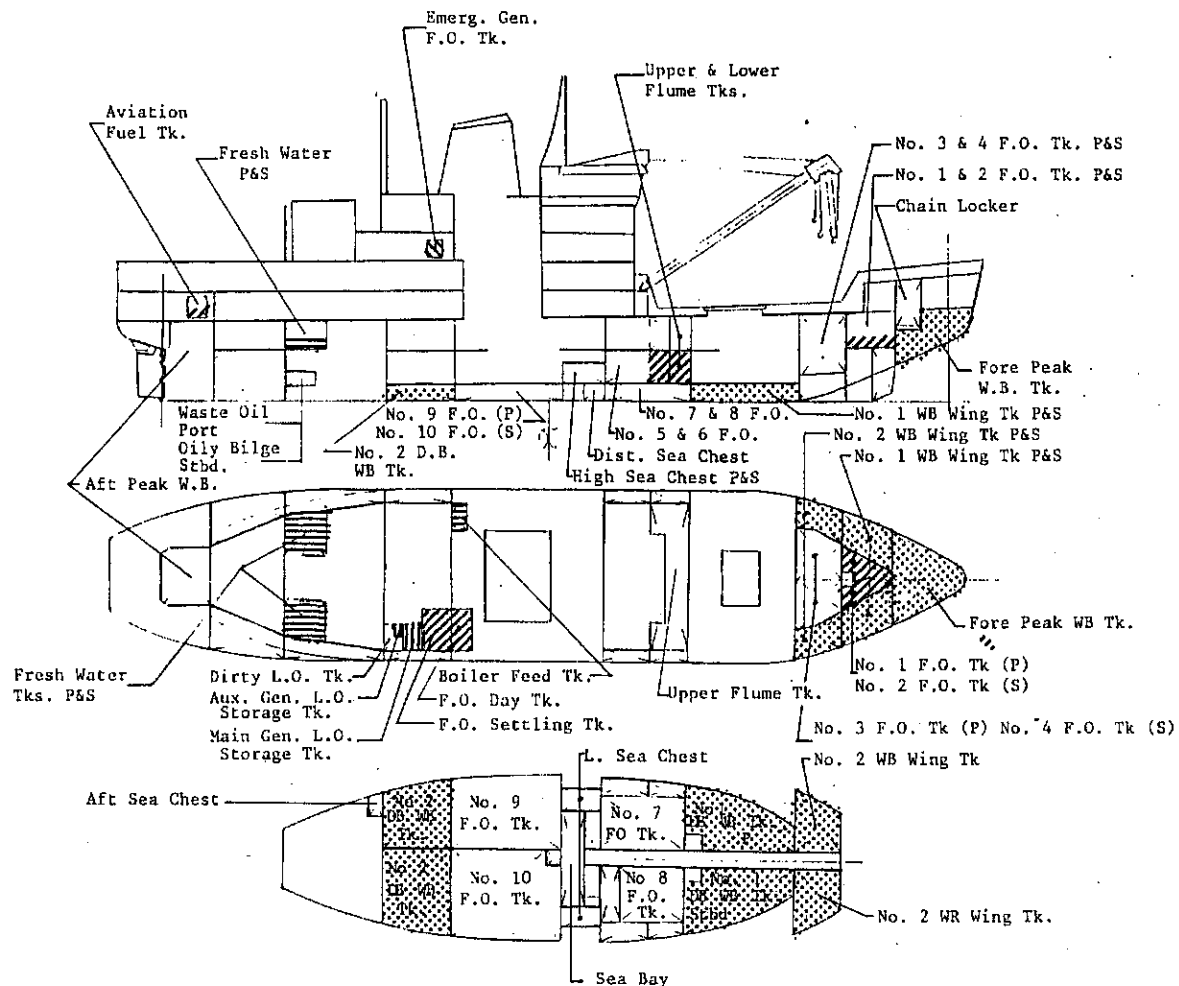
ANN HARVEY

CONDITION 4



GM	0.566 m
GZ MAX	0.410 m at 38
DI (Deck Immersion)	13.600
DF (Down Flooding)	43.400

CONDITION NO. 5 - BALLAST ARRIVAL (10% CONS)



DEADWEIGHT	Fuel Oil		73.0	- t
	Lub Oil		15.3	- t
	Flume Tank		93.4	- t
	Water Ballast		463.1	- t
	Fresh Water		11.52	- t
	Aviation Fuel		1.8	- t
	Misc. Tanks			- t
	Cargo			- t
	Crew, Stores & Effects		65.0	- t
	Ice			- t
	Helicopter		5.1	- t
	Total Deadweight		728.22	- t
	LIGHTSHIP		3331	t
TOTAL DISPLACEMENT			4059.22	

T ₀	5.143	m(mld)
TA =	5.792	m (extr)
TF =	4.633	m (extr)
Trim =	1.272	m by Stern
KMT =	7.605	m
VCG =	6.623	m
GMS =	0.982	m
Fr. Surface Corrections =	0.407	m
GME =	0.575	m

NAVAIDS ICEBREAKER TYPE 1100

CONDITION NO. 5

BALLAST ARRIVAL(10% CONS.)

WEIGHT ITEM	SPECIF.:		VCB	LCG	FREE
	WEIGHT	WEIGHT	FROM	FROM	SURFACE
	OR		BL	STN.5	MOMENT
	UNIT				
	WEIGHT	tonnes	m	m	tonnes-m

FUEL OIL

=====

F.O. BETTLING TK.(63-70)	0.850	25.100	6.196	-10.900	12.690
F.O. DAY TANK (70-76)	0.850	21.600	6.201	-8.300	10.880
EMERG. GEN. F.O. TK.(64-68)	0.850	0.900	14.358	-11.100	0.010
NO. 1 F.O. TK P.(163-175)	0.850	12.700	5.750	29.800	24.200
NO. 2 F.O. TK P.(163-175)	0.850	12.700	5.750	29.800	27.830
TOTAL F.O.		73.000	6.143	4.028	75.610

LUB OIL

=====

MAIN GEN. L.O. OIL TANK(58-63)	0.800	12.600	6.296	-13.300	2.770
AUX GEN. L.O. TANK(56-58)	0.800	2.700	6.271	-14.700	0.180
TOTAL LUB OIL		15.300	6.292	-13.547	2.950

FLUME TANKS

=====

UPPER FLUME TK.(117-126)	0.850	0.000	5.650	11.474	0.000
LOWER FLUME TK.(117-126)	0.850	93.400	3.200	11.523	658.850
TOTAL FLUME TKS.		93.400	3.200	11.523	658.850

WATER BALLAST

=====

FORE PEAK TANK	1.025	86.100	7.057	35.033	130.480
NO. 1 WB WING TKS. P&S	1.025	84.600	5.556	29.943	32.360
NO. 2 WB WING TKS. P&S	1.025	110.600	4.403	25.413	37.000
NO. 2 DB WB TANK STRD	1.025	38.800	0.660	-12.584	262.980
NO. 2 DB WB TANK PORT	1.025	38.800	0.800	-12.541	127.980
NO. 1 W.B. D.B. TK.(STRD)	1.025	52.100	0.891	17.501	122.230
NO. 1 W.B. D.B. TK.(PORT)	1.025	52.100	0.891	17.501	122.230
TOTAL WATER BALLAST		463.100	3.699	19.385	835.260

NAVAIDS ICEBREAKER TYPE 1100

CONDITION NO. 5

BALLAST ARRIVAL (10% CONS.)

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=====
: SPECIF.:      : VCG : LCG : FREE :
: WEIGHT : WEIGHT : FROM : FROM : SURFACE:
WEIGHT ITEM : OR :      : BL : STN.5 : MOMENT :
: UNIT :-----:-----:-----:-----:
: WEIGHT : tonnes : m : m : tonnes-m:
=====

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FRESH WATER

=====

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FRESH WATER TK. P(30-41)      1.000   5.010   5.150  -23.240   22.400
FRESH WATER TK. S(30-41)      1.000   5.010   5.150  -23.240   22.400
BOILER FEED TK. P(70-75)      1.000   1.500   5.150   -8.600    3.120
-----
TOTAL FRESH WATER              11.520   5.150  -21.334   47.920

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AVIATION FUEL

=====

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AVIATION FUEL(3-12)           0.720   1.800   8.050  -34.160   30.830
-----
                                1.800   8.050  -34.160   30.830

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CARGO

=====

```

MAIN CARGO HOLD                0.000   5.000   17.970
DECK CARGO                     0.000   9.200   14.500
-----
TOTAL CARGO                     0.000

```

CREW STORES EFFECTS

=====

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CREW AND EFFECTS              8.000  13.000   -6.000
DRY PROVISIONS                4.000   4.900   7.576
CENTRAL STORES                20.000   5.140  -28.513
STORES-CARGO HOLD             10.000   6.500   21.100
MISC. STORES                  23.000   7.930   -8.540
-----
TOTAL CREW STORES EFFECTS      65.000   7.289  -8.821

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HELICOPTER

=====

```

HELICOPTER                    5.100  14.500  -26.500
-----
TOTAL HELICOPTER              5.100  14.500  -26.500

```

TOTALS FOR CONDITION NO. 5.BALLAST ARRIVAL(10% CONS.)

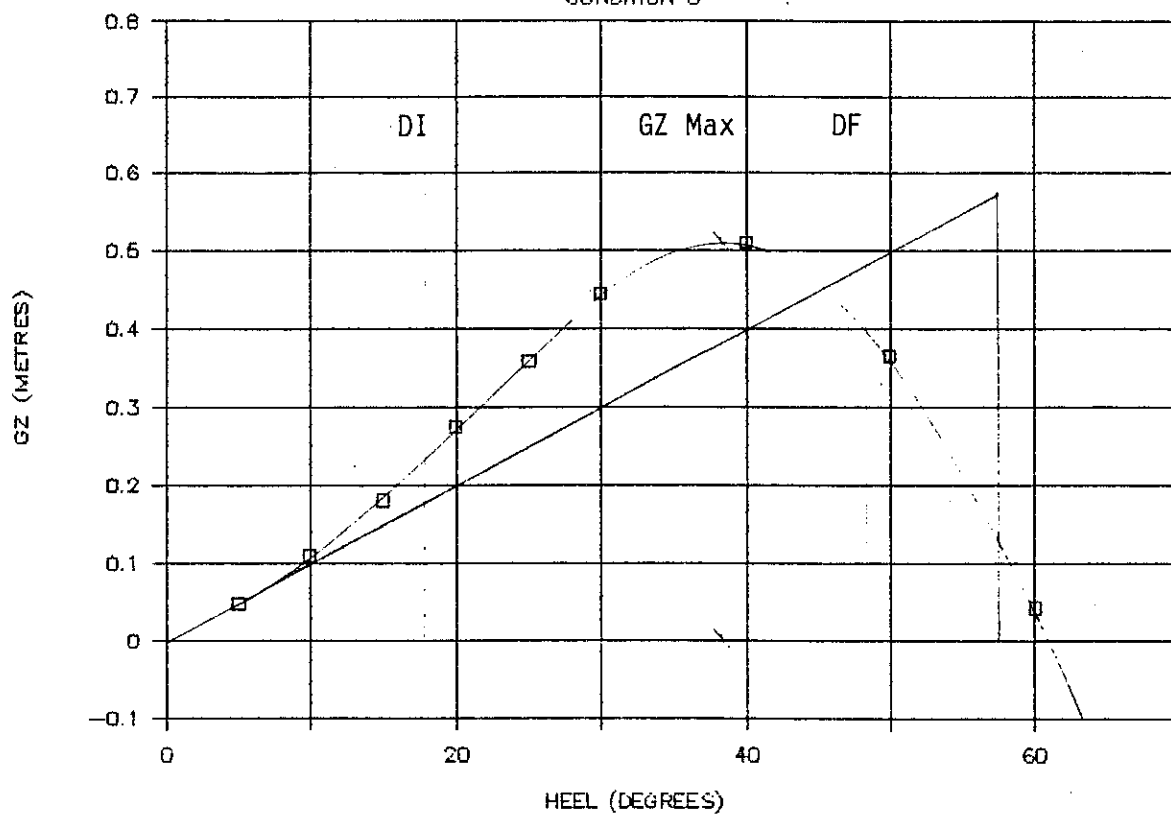
WEIGHT ITEM	SPECIF.:	VCG	LCG	FREE
	WEIGHT : WEIGHT :	FROM :	FROM :	SURFACE:
	OR :	BL :	STN.5 :	MOMENT :
	UNIT :			
	WEIGHT : tonnes :	m :	m :	tonnes-m :
TOTAL DEAD WEIGHT	728.220	4.364	12.848	1651.420
LIGHT SHIP	3331.000	7.117	-5.820	
TOTAL DISPLACEMENT	4059.220	6.623	-2.471	1651.420

MEAN DRAFT(MLD.) m 5.143
 DRAFT AFT(MLD.) m 5.762
 DRAFT FWD(MLD.) 4.603
 TOTAL TRIM m -1.273
 DISP'T tonnes 4059.2
 LCG @ MIDSHIPS m -2.471
 VCG @ BASELINE m 6.623
 FREE SURF CORR. m 0.407
 KMT m 7.605
 GM UNCORRECTED m 0.982
 GM CORRECTED m 0.575

HEEL deg	5.000	10.000	15.000	20.000	25.000	30.000	40.000	50.000	60.000	70.000	80.000	90.000
KN m	0.660	1.330	2.000	2.680	3.330	3.960	5.030	5.750	6.130	6.250	6.120	5.780
GZ SOLID m	0.083	0.160	0.286	0.415	0.531	0.649	0.773	0.677	0.394	0.026	-0.402	-0.843
GZ FLUID m	0.047	0.109	0.181	0.276	0.359	0.445	0.511	0.365	0.042	-0.356	-0.803	-1.250
AREA TO 30 DEG	0.104											
AREA TO 40 DEG	0.191											
AREA 30-40 DEG	0.087											

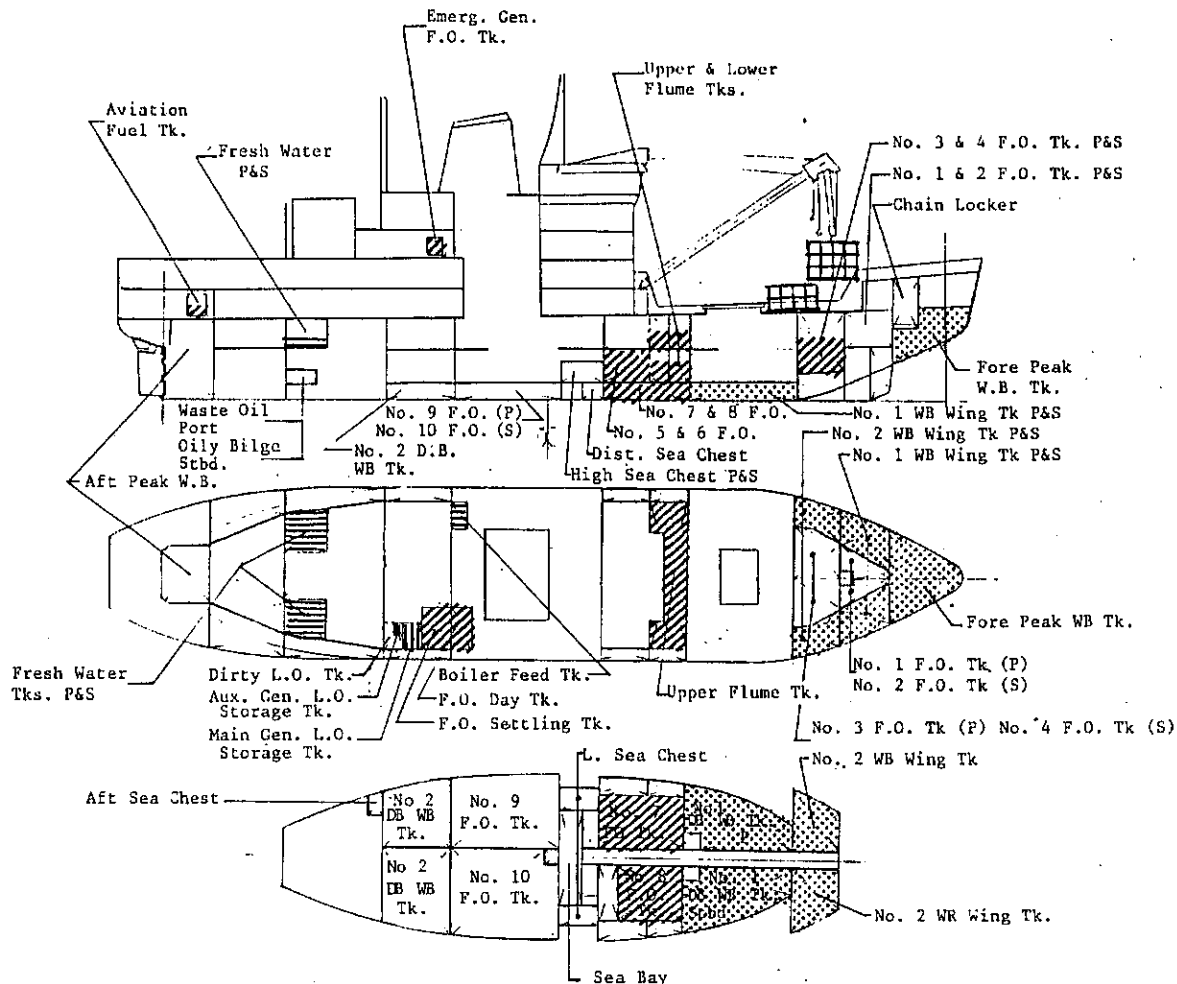
ANN HARVEY









CONDITION 5



GM	0.575m
GZ (max)	0.510m at 38°
DI (Deck Immersion)	18.2°
DF (Down Flooding)	48.4°

CONDITION NO. 6 - BOUY HANDLING (50% CONS)



DEADWEIGHT	Fuel Oil		351.9	- t
	Lub Oil		15.3	- t
	Engine Tank		93.4	- t
	Water Ballast		385.5	- t
	Fresh Water		57.2	- t
	Aviation Fuel		8.85	- t
	Misc. Tanks			- t
	Cargo		30	- t
	Crew, Stores & Effects		77.0	- t
	Ice			- t
	Helicopter		5.1	- t
	Total Deadweight		1024.3	- t
LIGHTSHIP			3331	t
TOTAL DISPLACEMENT			4355.3	

TØ	5.461	m(mld)
TA =	5.773	m (extr)
TF =	5.246	m (extr)
Trim =	0.579	m by Stern
KMT =	7.560	m
VCG =	6.544	m
GMs =	1.016	m
Fr. Surface Corrections =	0.570	m
GMf =	0.445	m

NAVAIDS ICEBREAKER TYPE 1100
CONDITION NO. 6

BOUY HANDLING (50%CONS)

WEIGHT ITEM	: SPECIF.:				
	: WEIGHT :		: VCG :		LCG : FREE :
	: OR :		: FROM :		FROM : SURFACE:
	: UNIT :		: BL :		STN.5 : MOMENT :
	: WEIGHT :		: tonnes :		m : tonnes-m :

FUEL OIL

=====

F.O. SETTLING TK.(63-70)	0.850	25.100	6.196	-10.900	12.690
F.O. DAY TANK (70-76)	0.850	21.600	6.201	-8.300	10.880
EMERG. GEN. F.O. TK.(64-68)	0.850	0.900	14.358	-11.100	0.010
NO. 3 FO TK P(152-163)	0.850	26.700	4.000	25.320	68.000
NO. 4 FO TK STBD(152-163)	0.850	26.700	4.000	25.328	68.000
NO. 5 FO TK P(106-121)	0.850	86.600	2.958	7.674	120.600
NO. 6 FO TK STBD(106-121)	0.850	86.600	2.958	7.674	120.600
NO. 7 FO TK P(106-126)	0.850	43.300	0.819	8.898	70.830
NO. 8 FO TK STBD(110-126)	0.850	34.400	0.815	9.698	56.670
NO. 9 FO TK P(70-96)	0.850	0.000	0.854	-4.261	0.000
NO. 10 FO TK STBD(70-96)	0.850	0.000	0.828	-4.402	0.000
NO. 1 F.O. TK P.(163-175)	0.850	0.000	6.743	29.947	0.000
NO. 2 F.O. TK STBD(163-175)	0.850	0.000	6.767	29.946	0.000

TOTAL F.O.		351.900	3.103	8.347	528.280
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LUB OIL

=====

MAIN GEN. L.O. OIL TANK(58-63)	0.800	12.600	6.296	-13.300	2.770
AUX GEN. L.O. TANK(56-58)	0.800	2.700	6.271	-14.700	0.180

TOTAL LUB OIL		15.300	6.292	-13.547	2.950
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FLUME TANKS

=====

UPPER FLUME TK.(117-126)	0.850	49.600	5.650	11.474	771.190
LOWER FLUME TK.(117-126)	0.850	43.800	2.325	11.523	658.950

TOTAL FLUME TKS.		93.400	4.091	11.497	1430.040
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WATER BALLAST

=====

FORE PEAK TK.	1.025	86.100	7.057	35.033	130.480
NO.1 WB WING TK P&S	1.025	84.6	5.556	29.943	32.36
NO.2 WB WING TK P&S	1.025	110.6	4.403	25.413	37
NO. 1 W.B. D.B. TK.(STBD)	1.025	52.100	0.881	17.501	122.230
NO. 1 W.B. D.B. TK.(PORT)	1.025	52.100	0.881	17.501	122.230

TOTAL WATER BALLAST		385.500	4.297	26.417	444.300
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NAVAIDS ICEBREAKER TYPE 1100

CONDITION NO. 6

BOUY HANDLING (50%CONS)

WEIGHT ITEM	: SPECIF. : VCG : LCG : FREE :				
	: WEIGHT : WEIGHT : FROM : FROM : SURFACE:				
	: OR : : BL : STN.5 : MOMENT :				
	: UNIT :				
	: WEIGHT : tonnes : : : tonnes-:				

FRESH WATER

=====

FRESH WATER TK. P(30-41)	1.000	25.000	5.658	-23.240	22.400
FRESH WATER TK. S(30-41)	1.000	25.000	5.658	-23.240	22.400
BOILER FEED TK. P(70-75)	1.000	7.200	5.658	-8.600	3.120

TOTAL FRESH WATER		57.200	5.658	-21.397	47.920
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AVIATION FUEL

=====

AVIATION FUEL(3-12)	0.720	8.850	8.534	-34.160	30.830
		8.850	8.534	-34.160	30.830

CARGO

=====

MAIN CARGO HOLD		0.000	5.000	17.970	
DECK CARGO		0.000	9.200	14.500	
BOUY ON DECK		15.000	9.200	24.000	
BOUY SUSPENDED FROM DERRICK		15.000	28.000	20.000	
TOTAL CARGO		30.000	18.600	22.000	

CREW, STORES, EFFECTS

=====

CREW AND EFFECTS		8.000	13.000	-6.000	
DRY PROVISIONS		16.000	5.166	7.576	
CENTRAL STORES		20.000	5.140	-28.513	
STORES-CARGO HOLD		10.000	6.500	21.100	
MISC. STORES		23.000	7.930	-8.540	
TOTAL CREW, STORES, EFFECTS		77.000	6.972	-6.266	

HELICOPTER

=====

HELICOTER		5.100	14.500	-26.500	
TOTAL HELICOPTER		5.100	14.500	-26.500	

TOTALS FOR CONDITION NO. 6, BOUY HANDLING (50% CONS.)

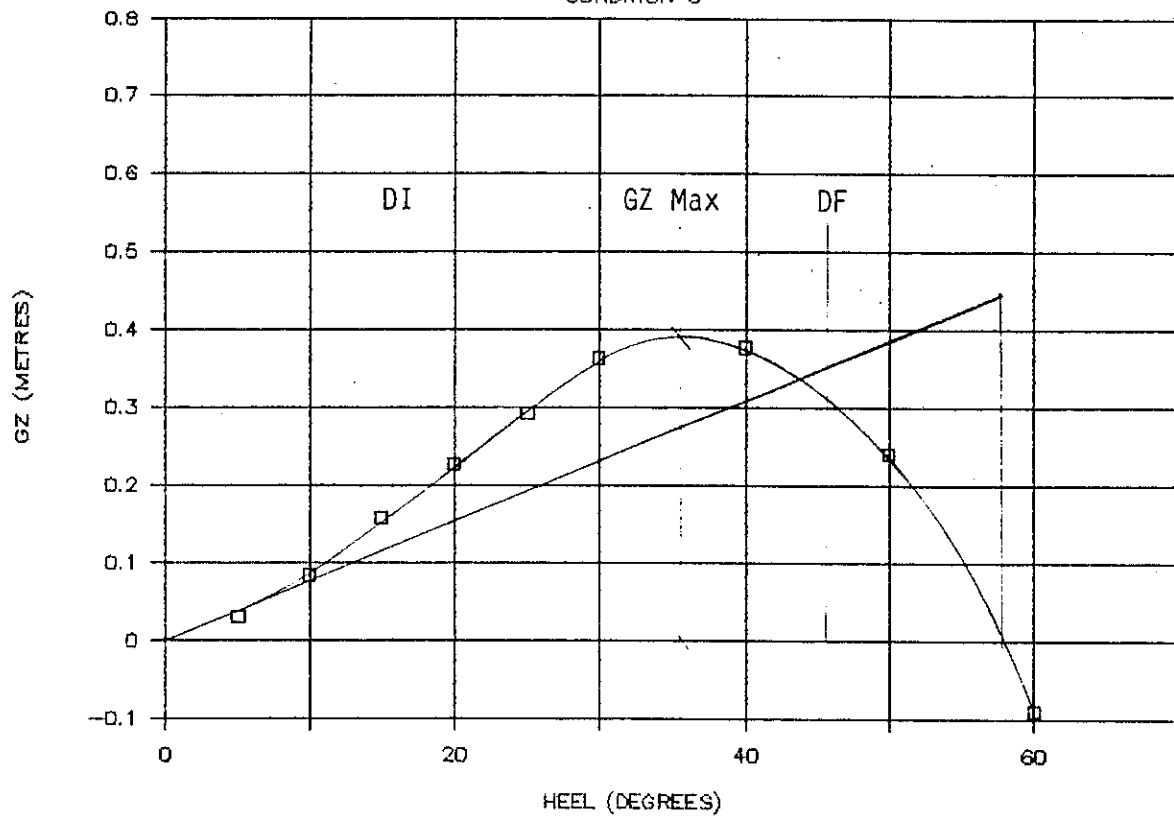
WEIGHT ITEM	SPECIF.:	VCB	LCG	FREE
	WEIGHT	FROM	FROM	SURFACE
	OR	BL	STN.5	MOMENT
	UNIT			
	WEIGHT	tonnes		tonnes-m
TOTAL DEAD WEIGHT	1024.250	4.681	12.208	2484.320
LIGHT SHIP	3331.000	7.117	-5.820	
TOTAL DISPLACEMENT	4355.250	6.544	-1.580	2484.320

MEAN DRAFT(MLD.) ■ 5.461
 DRAFT AFT(MLD.) ■ 5.743
 DRAFT FOR'D(MLD.) 5.216
 TOTAL TRIM ■ -0.579
 DISP'T tonnes 4355.3
 LCG @ MIDSHIPS ■ -1.580
 VCB @ BASELINE ■ 6.544
 FREE SURF CORR. ■ 0.570
 KMT ■ 7.560
 GM UNCORRECTED ■ 1.016
 GM CORRECTED ■ 0.445

HEEL deg	5	10	15	20	25	30	40	50	60	70	80	90
KN ■	0.650	1.320	2.000	2.660	3.300	3.920	4.950	5.690	6.070	6.200	6.080	5.770
6Z SOLID ■	0.080	0.184	0.306	0.422	0.535	0.648	0.744	0.677	0.403	0.051	-0.365	-0.774
6Z FLUID ■	0.030	0.085	0.159	0.227	0.293	0.363	0.377	0.240	-0.091	-0.485	-0.926	-1.345
AREA TO 30	0.083 m*rad											
AREA TO 40	0.152 m*rad											
AREA 30-40	0.069 m*rad											

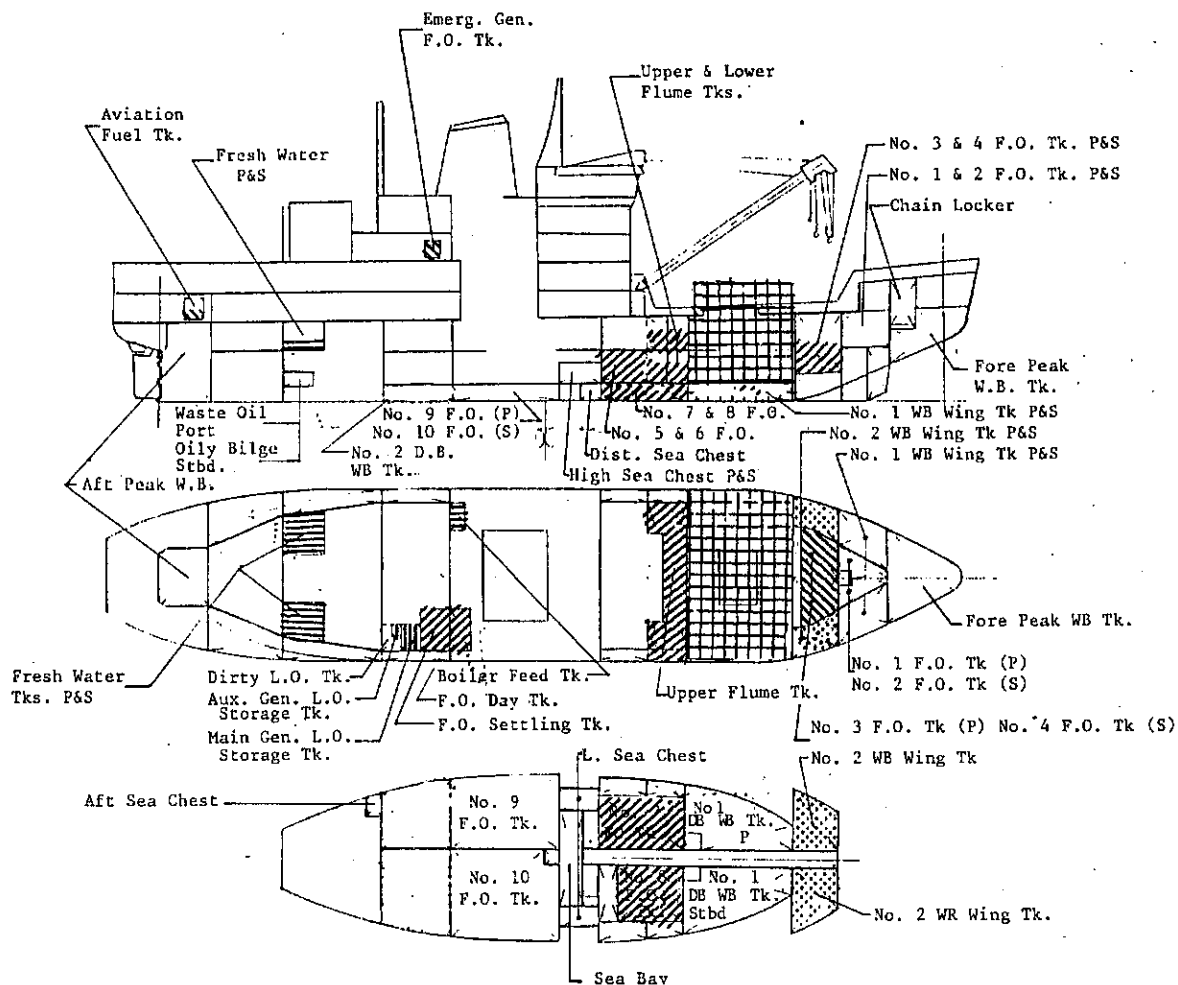
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CONDITION 6



GM	0.445 m
GZ Max	0.392 m at 36°
DI (Deck Immersion)	16.2°
DF (Down Flooding)	46.2°

CONDITION NO. 7 - SUMMER ICE BREAKING (50% CONS)



DEADWEIGHT	Fuel Oil		351.9	- t
	Lub Oil		15.3	- t
	Flume Tank		93.4	- t
	Water Ballast		110.6	- t
	Fresh Water		57.2	- t
	Aviation Fuel		8.85	- t
	Misc. Tanks			- t
	Cargo		450	- t
	Crew, Stores & Effects		77.0	- t
	Ice			- t
	Helicopter		5.1	- t
	Total Deadweight		1169.35	- t
LIGHTSHIP			3331	t
TOTAL DISPLACEMENT			4500.35	

T ϕ	5.586	m(mld)
TA =	5.840	m (extr)
TF =	5.420	m (extr)
Trim =	0.461	m by Stern
KMT =	7.547	m
VCG =	6.496	m
GMs =	1.051	m
Fr. Surface Corrections =	0.462	m
GMf =	0.590	m

NAVAIDS ICEBREAKER TYPE 1100

CONDITION NO. 7

SUMMER ICE BREAKING (50%CONS)

=====					
WEIGHT ITEM	SPECIF.:	VCG :	LCG :	FREE :	
	WEIGHT :	WEIGHT :	FROM :	FROM :	SURFACE :
	OR :	BL :	STN.5 :	MOMENT :	
	UNIT :				
	WEIGHT :	tonnes :	m :	m :	tonnes-m :
=====					

FUEL OIL

=====

F.O. SETTLING TK.(63-70)	0.850	25.100	6.196	-10.900	12.690
F.O. DAY TANK (70-76)	0.850	21.600	6.201	-8.300	10.980
EMERG. GEN. F.O. TK.(64-68)	0.850	0.900	14.358	-11.100	0.010
NO. 3 FO TK P(152-163)	0.850	26.700	4.000	25.320	68.000
NO. 4 FO TK STBD(152-163)	0.850	26.700	4.000	25.328	68.000
NO. 5 FO TK P(106-121)	0.850	86.600	2.958	7.674	120.600
NO. 6 FO TK STBD(106-121)	0.850	86.600	2.958	7.674	120.600
NO. 7 FO TK P(106-126)	0.850	43.300	0.819	8.898	70.830
NO. 8 FO TK STBD(110-126)	0.850	34.400	0.815	9.698	56.670
NO. 9 FO TK P(70-96)	0.850	0.000	0.854	-4.261	0.000
NO. 10 FO TK STBD(70-96)	0.850	0.000	0.828	-4.402	0.000
NO. 1 F.O. TK P.(163-175)	0.850	0.000	6.743	29.947	0.000
NO. 2 F.O. TK STBD(163-175)	0.850	0.000	6.767	29.946	0.000

TOTAL F.O.		351.900	3.103	8.347	528.280

LUB OIL

=====

MAIN GEN. L.O. OIL TANK(58-63)	0.800	12.600	6.296	-13.300	2.770
AUX GEN. L.O. TANK(56-58)	0.800	2.700	6.271	-14.700	0.180

TOTAL LUB OIL		15.300	6.292	-13.547	2.950

FLUME TANKS

=====

UPPER FLUME TK.(117-126)	0.850	49.600	5.650	11.474	771.190
LOWER FLUME TK.(117-126)	0.850	43.800	2.325	11.523	658.850

TOTAL FLUME TKS.		93.400	4.091	11.497	1430.040

WATER BALLAST

=====

AFT PEAK TK.	1.025	0.000	4.600	-34.600	0.000
NO 2 WB WING TK P&S	1.025	110.600	4.403	25.413	37.000
NO. 2 W.B. D.B. TK (PORT)	1.025	0.000	0.872	-12.540	0.000
NO. 2 W.B. D.B. TK.(STBD)	1.025	0.000	0.839	-12.584	0.000

TOTAL WATER BALLAST		110.600	4.403	25.413	37.000

NAVAIDS ICEBREAKER TYPE 1100
CONDITION NO. 7

SUMMER ICE BREAKING (50%CONS)

WEIGHT ITEM	SPECIF.	VCB	LCB	FREE
WEIGHT	WEIGHT	FROM	FROM	SURFACE
OR		BL	STN.5	MOMENT
UNIT				
WEIGHT	tonnes			tonnes-m

FRESH WATER

FRESH WATER TK. P(30-41)	1.000	25.000	5.658	-23.240	22.400
FRESH WATER TK. S(30-41)	1.000	25.000	5.658	-23.240	22.400
BOILER FEED TK. P(70-75)	1.000	7.200	5.658	-8.600	3.120
TOTAL FRESH WATER		57.200	5.658	-21.397	47.920

AVIATION FUEL

AVIATION FUEL(3-12)	0.720	8.850	8.534	-34.160	30.830
		8.850	8.534	-34.160	30.830

CARGO

MAIN CARGO HOLD		400.000	5.000	17.970	
DECK CARGO		50.000	9.200	14.500	
BOUY ON DECK		0.000	9.200	24.000	
BOUY SUSPENDED FROM DERRICK		0.000	30.000	20.000	
TOTAL CARGO		450.000	5.467	17.584	

CREW,STORES,EFFECTS

CREW AND EFFECTS		8.000	13.000	-6.000	
DRY PROVISIONS		16.000	5.166	7.576	
CENTRAL STORES		20.000	5.140	-28.513	
STORES-CARGO HOLD		10.000	6.500	21.100	
MISC. STORES		23.000	7.930	-8.540	
TOTAL CREW,STORES,EFFECTS		77.000	6.972	-6.266	

HELICOPTER

HELICOTER		5.100	14.500	-26.500	
TOTAL HELICOPTER		5.100	14.500	-26.500	

TOTALS FOR CONDITION NO. 7, SUMMER ICE BREAKING (50% CONS.)

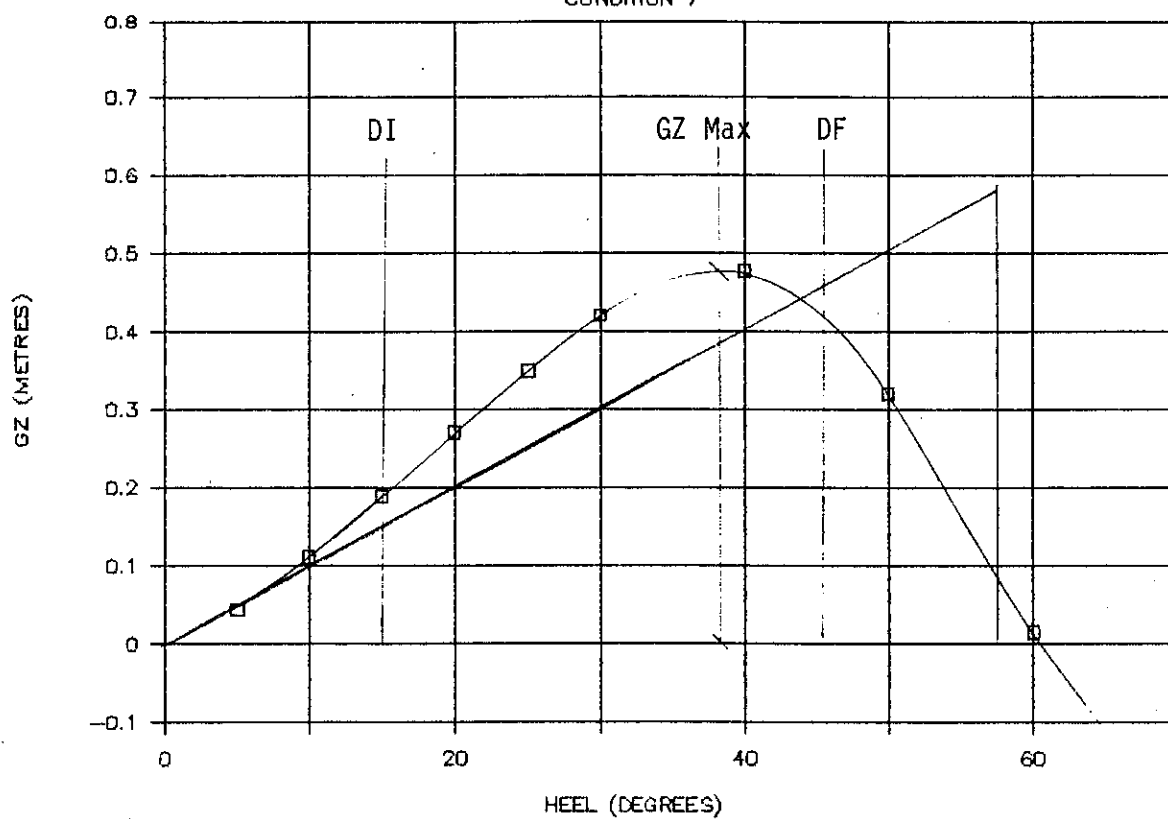
WEIGHT ITEM	SPECIF.:	VCB	LCB	FREE
	WEIGHT	WEIGHT	FROM	FROM
	OR	BL	STN.5	SURFACE:
	UNIT			MOMENT
	WEIGHT	tonnes	■	■ tonnes-m
TOTAL DEAD WEIGHT	1169.350	4.727	10.590	2077.020
LIGHT SHIP	3331.000	7.117	-5.820	
TOTAL DISPLACEMENT	4500.350	6.496	-1.556	2077.020

MEAN DRAFT (MLD.) ■ 5.586
 DRAFT AFT (MLD.) ■ 5.810
 DRAFT FOR'D (MLD.) 5.390
 TOTAL TRIM ■ -0.461
 DISP'T tonnes 4500.4
 LCB @ MIDSHIPS ■ -1.556
 VCB @ BASELINE ■ 6.496
 FREE SURF CORR. ■ 0.462
 KMT ■ 7.547
 GM UNCORRECTED ■ 1.051
 GM CORRECTED ■ 0.590

HEEL deg	5	10	15	20	25	30	40	50	60	70	80	90
KN ■	0.650	1.320	1.990	2.650	3.290	3.900	4.950	5.650	6.040	6.170	6.070	5.760
GZ SOLID ■	0.084	0.192	0.309	0.428	0.545	0.652	0.775	0.674	0.415	0.066	-0.327	-0.736
GZ FLUID ■	0.044	0.112	0.189	0.271	0.350	0.422	0.478	0.321	0.015	-0.368	-0.782	-1.197
AREA TO 30	0.100	■*rad										
AREA TO 40	0.183	■*rad										
AREA 30-40	0.084	■*rad										

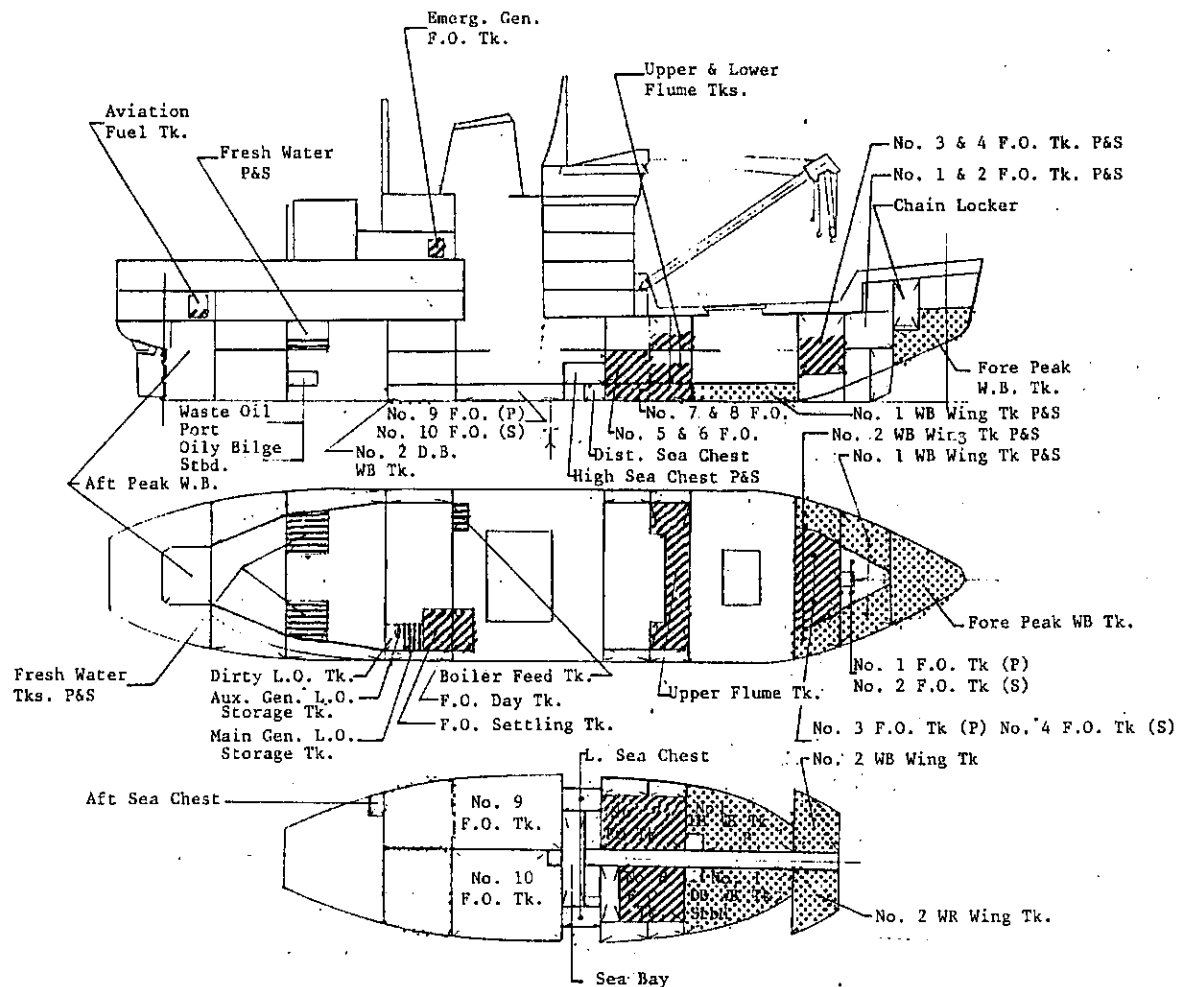
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CONDITION 7



GM	0.590 m
GZ Max	0.480 m at 38.5°
DI (Deck Immersion)	15.3°
DF (Down Flooding)	45.1°

CONDITION NO. 8 - WINTER ICE BREAKING S.W. (50% CONS)



DEADWEIGHT	Fuel Oil		351.9	- t
	Lub Oil		15.3	- t
	Flume Tank		93.4	- t
	Water Ballast		385.5	- t
	Fresh Water		57.2	- t
	Aviation Fuel		8.85	- t
	Misc. Tanks			- t
	Cargo			- t
	Crew, Stores & Effects		77.0	- t
	Ice			- t
	Helicopter		5.1	- t
	Total Deadweight		994.25	- t
	LIGHTSHIP		3331	t
TOTAL DISPLACEMENT			4325.25	

T ϕ	5.414	m(mld)
TA =	5.749	m (extr)
TF =	5.179	m (extr)
Trim =	0.626	m by Stern
KMT =	7.564	m
VCG =	6.460	m
GMS =	1.104	m
Fr. Surface Corrections =	0.574	m
GMF =	0.529	m

NAVAIDS ICEBREAKER TYPE 1100

CONDITION NO. 8

WINTER ICE BREAKING (50%CONS) S.W.

WEIGHT ITEM	: SPECIF. : VCG : LCG : FREE :				
	: WEIGHT : WEIGHT : FROM : FROM : SURFACE:				
	: OR : : BL : STN.5 : MOMENT :				
	: UNIT :-----:-----:-----:-----:-----:				
	: WEIGHT : tonnes : : : : tonnes-m:				

FUEL OIL

=====

F.D. SETTling TK.(63-70)	0.850	25.100	6.196	-10.900	12.690
F.D. DAY TANK (70-76)	0.850	21.600	6.201	-8.300	10.880
EMERG. GEN. F.D. TK.(64-68)	0.850	0.900	14.358	-11.100	0.010
NO. 3 FO TK P(152-163)	0.850	26.700	4.000	25.320	68.000
NO. 4 FO TK STBD(152-163)	0.850	26.700	4.000	25.328	68.000
NO. 5 FO TK P(106-121)	0.850	86.600	2.958	7.674	120.600
NO. 6 FO TK STBD(106-121)	0.850	86.600	2.958	7.674	120.600
NO. 7 FO TK P(106-126)	0.850	43.300	0.819	8.898	70.830
NO. 8 FO TK STBD(110-126)	0.850	34.400	0.815	9.698	56.670
NO. 9 FO TK P(70-96)	0.850	0.000	0.854	-4.261	0.000
NO. 10 FO TK STBD(70-96)	0.850	0.000	0.828	-4.402	0.000
NO. 1 F.D. TK P.(163-175)	0.850	0.000	6.743	29.947	0.000
NO. 2 F.D. TK STBD(163-175)	0.850	0.000	6.767	29.946	0.000

TOTAL F.D.	351.900	3.103	8.347	528.280
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LUB OIL

=====

MAIN GEN. L.O. OIL TANK(58-63)	0.800	12.600	6.296	-13.300	2.770
AUX GEN. L.O. TANK(56-58)	0.800	2.700	6.271	-14.700	0.180

TOTAL LUB OIL	15.300	6.292	-13.547	2.950
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FLUME TANKS

=====

UPPER FLUME TK.(117-126)	0.850	49.600	5.650	11.474	771.190
LOWER FLUME TK.(117-126)	0.850	43.800	2.325	11.523	658.850

TOTAL FLUME TKS.	93.400	4.091	11.497	1430.040
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WATER BALLAST

=====

NO. 2 DB WB TK. PORT	1.025	0.000	0.872	-12.541	0.000
NO. 2 DB WB TK. STBD	1.025	0.000	0.872	-12.584	0.000
FORE PEAK TANK	1.025	86.1	7.057	35.033	130.48
NO. 1 WB WING TK P&S	1.025	84.6	5.556	29.943	32.36
NO. 2 WB WING TK P&S	1.025	110.6	4.403	25.413	37
NO. 1 W.B. D.B. TK (STBD)	1.025	52.100	0.881	17.501	122.230
NO. 1 W.B. D.B. TK. (PORT)	1.025	52.100	0.881	17.501	122.230

TOTAL WATER BALLAST	385.500	4.297	26.417	444.300
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NAVAIDS ICEBREAKER TYPE 1100

CONDITION NO. 8

WINTER ICE BREAKING (50%CONS) S.W.

=====

WEIGHT ITEM	:-----:-----:-----:-----:-----:				
	: SPECIF.:	: VCG :	: LCG :	: FREE :	
	: WEIGHT :	: WEIGHT :	: FROM :	: FROM :	: SURFACE:
	: OR :	: BL :	: STN.5 :	: MOMENT :	
	: UNIT :				
	: WEIGHT :	tonnes :	■ :	■ :	tonnes-m:
	:-----:-----:-----:-----:-----:				

FRESH WATER

=====

FRESH WATER TK. P(30-41)	1.000	25.000	5.658	-23.240	22.400
FRESH WATER TK. S(30-41)	1.000	25.000	5.658	-23.240	22.400
BOTLER FEED TK. P(70-75)	1.000	7.200	5.658	-8.600	3.120
:-----:-----:-----:-----:-----:					
TOTAL FRESH WATER		57.200	5.658	-21.397	47.920

AVIATION FUEL

=====

AVIATION FUEL(3-12)	0.720	8.850	8.534	-34.160	30.830
:-----:-----:-----:-----:-----:					
		8.850	8.534	-34.160	30.830

CREW, STORES, EFFECTS

=====

CREW AND EFFECTS	8.000	13.000	-6.000		
DRY PROVISIONS	16.000	5.166	7.576		
CENTRAL STORES	20.000	5.140	-28.513		
STORES-CARGO HOLD	10.000	6.500	21.100		
MISC. STORES	23.000	7.930	-8.540		
:-----:-----:-----:-----:-----:					
TOTAL CREW, STORES, EFFECTS		77.000	6.972	-6.266	

HELICOPTER

=====

HELICOPTER	5.100	14.500	-26.500		
:-----:-----:-----:-----:-----:					
TOTAL HELICOPTER		5.100	14.500	-26.500	

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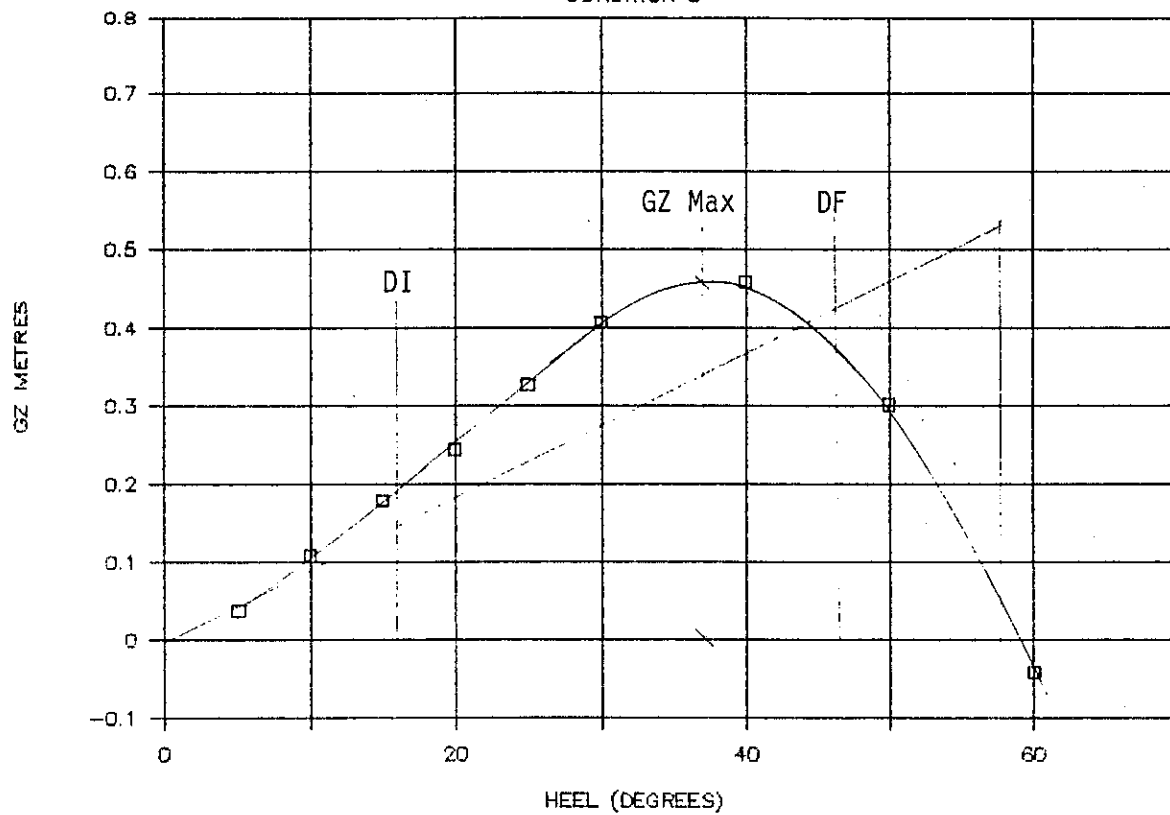
WEIGHT ITEM	SPECIF.:	WCG :	LCG :	FREE :
	WEIGHT :	WEIGHT :	FROM :	FROM :
	OR :	BL :	STN.5 :	MOMENT :
	UNIT :			
	WEIGHT :	tonnes :		tonnes-m :
TOTAL DEAD WEIGHT	994.250	4.261	11.912	2484.320
LIGHT SHIP	3331.000	7.117	-5.820	
TOTAL DISPLACEMENT	4325.250	6.460	-1.744	2484.320

MEAN DRAFT(MLD.)	5.414
DRAFT AFT(MLD.)	5.719
DRAFT FWD(MLD.)	5.149
TOTAL TRIM	-0.626
DISP'T tonnes	4325.3
LCG @ MIDSHIPS	-1.744
VCG @ BASELINE	6.460
FREE SURF CORR.	0.574
KMT	7.564
GM UNCORRECTED	1.104
GM CORRECTED	0.529

HEEL deg	5	10	15	20	25	30	40	50	60	70	80	90
KN ■	0.650	1.330	2.000	2.650	3.300	3.925	4.980	5.690	6.050	6.200	6.080	5.770
6Z SOLID ■	0.087	0.208	0.328	0.441	0.570	0.695	0.828	0.741	0.455	0.129	-0.282	-0.690
6Z FLUID ■	0.037	0.108	0.179	0.244	0.327	0.408	0.458	0.301	-0.042	-0.410	-0.848	-1.265
AREA TO 30	0.093 m*rad											
AREA TO 40	0.175 m*rad											
AREA 30-40	0.082 m*rad											

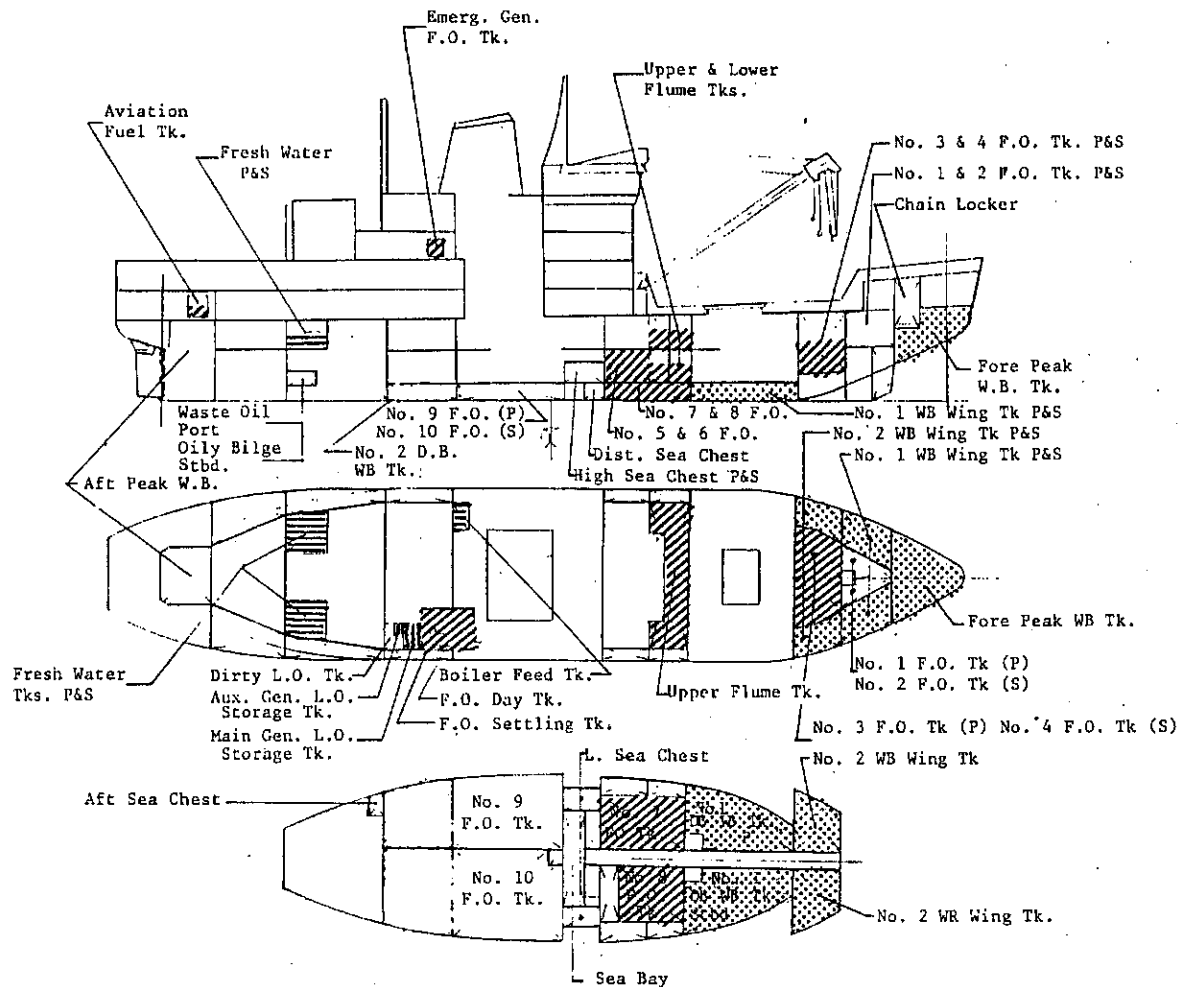
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CONDITION 8



GM	0.529 m
GZ Max	0.465 m at 37°
DI (Deck Immersion)	16.4°
DF (Down Flooding)	46.4°

CONDITION NO. 9 - WINTER ICE BREAKING F.W. (50% CONS)



DEADWEIGHT	Fuel Oil		351.9	- t
	Lub Oil		15.3	- t
	Flume Tank		93.4	- t
	Water Ballast		376.1	- t
	Fresh Water		57.2	- t
	Aviation Fuel		8.85	- t
	Misc. Tanks			- t
	Cargo			- t
	Crew, Stores & Effects		77.0	- t
	Ice			- t
	Helicopter		5.1	- t
	Total Deadweight		984.85	- t
	LIGHTSHIP		3331	t
TOTAL DISPLACEMENT			4315.85	

TØ	5.505	m(mld)
TA =	5.865	m (extr)
TF =	5.247	m (extr)
Trim =	0.679	m by Stern
KMT =	7.553	m
VCG =	6.465	m
GMS =	1.088	m
Pr. Surface Corrections =	0.573	m
GMf =	0.515	m

NAVAIDS ICEBREAKER TYPE 1100

CONDITION NO. 9

WINTER ICE BREAKING (50%CONS) F.W.

WEIGHT ITEM	: SPECIF.: : VCG : LCG : FREE :				
	: WEIGHT : WEIGHT : FROM : FROM : SURFACE:				
	: OR : : BL : STN.5 : MOMENT :				
	: UNIT :				
	: WEIGHT : tonnes : : : : tonnes-m:				

FUEL OIL

=====

F.O. SETTLING TK. (63-70)	0.850	25.100	6.196	-10.900	12.690
F.O. DAY TANK (70-76)	0.850	21.600	6.201	-8.300	10.880
EMERG. GEN. F.O. TK. (64-68)	0.850	0.900	14.358	-11.100	0.010
NO. 3 FO TK P(152-163)	0.850	26.700	4.000	25.320	68.000
NO. 4 FO TK STBD(152-163)	0.850	26.700	4.000	25.328	68.000
NO. 5 FO TK P(106-121)	0.850	86.600	2.958	7.674	120.600
NO. 6 FO TK STBD(106-121)	0.850	86.600	2.958	7.674	120.600
NO. 7 FO TK P(106-126)	0.850	43.300	0.319	8.898	70.830
NO. 8 FO TK STBD(110-126)	0.850	34.400	0.815	9.698	56.670
NO. 9 FO TK P(70-96)	0.850	0.000	0.854	-4.261	0.000
NO. 10 FO TK STBD(70-96)	0.850	0.000	0.828	-4.402	0.000
NO. 1 F.O. TK P. (163-175)	0.850	0.000	6.743	29.947	0.000
NO. 2 F.O. TK STBD(163-175)	0.850	0.000	6.767	29.946	0.000
TOTAL F.O.		351.900	3.103	8.347	528.280

LUB OIL

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MAIN GEN. L.O. OIL TANK(58-63)	0.800	12.600	6.296	-13.300	2.770
AUX GEN. L.O. TANK(56-58)	0.800	2.700	6.271	-14.700	0.180
TOTAL LUB OIL		15.300	6.292	-13.547	2.950

FLUME TANKS

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UPPER FLUME TK. (117-126)	0.850	49.600	5.650	11.474	771.190
LOWER FLUME TK. (117-126)	0.850	43.800	2.325	11.523	658.850
TOTAL FLUME TKS.		93.400	4.091	11.497	1430.040

WATER BALLAST

=====

NO. 2 DB WB TK. PORT	1.000	0.000	0.872	-12.541	0.000
NO. 2 DB WB TK. STBD	1.000	0.000	0.872	-12.584	0.000
FORE PEAK TANK	1.000	84.000	7.057	35.033	127.300
NO. 1 WB WING TK P&S	1.000	82.54	5.556	29.943	31.57
NO. 2 WB WING TK P&S	1.000	107.9	4.403	25.413	36.1
NO. 1 W.B. D.B. TK (STBD)	1.000	50.830	0.881	17.501	119.250
NO. 1 W.B. D.B. TK. (PORT)	1.000	50.830	0.881	17.501	119.250
TOTAL WATER BALLAST		376.100	4.297	26.417	433.470

NAVAIDS ICEBREAKER TYPE 1100

CONDITION NO. 9

WINTER ICE BREAKING (50%CONS) F.W.

=====					
WEIGHT ITEM	SPECIF.:		VCB :	LCS :	FREE :
	WEIGHT :	WEIGHT :	FROM :	FROM :	SURFACE:
	OR :		BL :	STN.5 :	MOMENT :
	UNIT :				
	WEIGHT :	tonnes :	m :	m :	tonnes-m:
=====					

FRESH WATER

=====

FRESH WATER TK. P(30-41)	1.000	25.000	5.658	-23.240	22.400
FRESH WATER TK. S(30-41)	1.000	25.000	5.658	-23.240	22.400
BOILER FEED TK. P(70-75)	1.000	7.200	5.658	-8.600	3.120

TOTAL FRESH WATER		57.200	5.658	-21.397	47.920

AVIATION FUEL

=====

AVIATION FUEL(3-12)	0.720	8.850	8.534	-34.160	30.830

		8.850	8.534	-34.160	30.830

CARGO

=====

MAIN CARGO HOLD	0.000	5.000	17.970		
DECK CARGO	0.000	9.200	14.500		
BOUY ON DECK	0.000	9.200	24.000		
BOUY SUSPENDED FROM DERRICK	0.000	30.000	20.000		

TOTAL CARGO		0.000			

CREW,STORES,EFFECTS

=====

CREW AND EFFECTS	9.000	13.000	-6.000		
DRY PROVISIONS	16.000	5.166	7.576		
CENTRAL STORES	20.000	5.140	-28.513		
STORES-CARGO HOLD	10.000	5.500	21.100		
MISC. STORES	23.000	7.930	-8.540		

TOTAL CREW,STORES,EFFECTS		77.000	6.972	-6.266	

HELICOPTER

=====

HELICOTER	5.100	14.500	-26.500		

TOTAL HELICOPTER		5.100	14.500	-26.500	

TOTALS FOR CONDITION NO. 9, WINTER ICE BREAKING (50% CONS.) F.W.

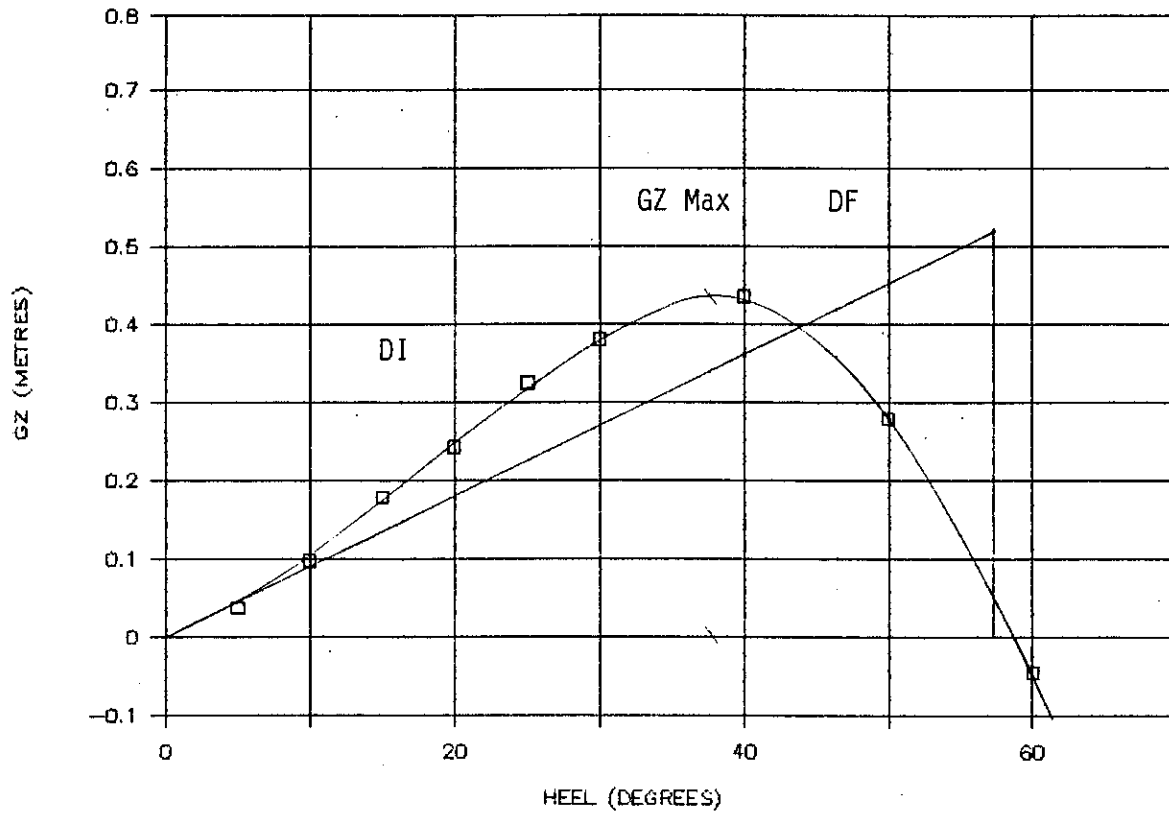
WEIGHT ITEM	SPECIF.	VCB	LCB	FREE
	WEIGHT	WEIGHT	FROM	FROM
	OR	BL	STN.5	SURFACE
	UNIT			
	WEIGHT	tonnes		tonnes-m
TOTAL DEAD WEIGHT	984.850	4.261	11.774	2473.490
LIGHT SHIP	3331.000	7.117	-5.820	
TOTAL DISPLACEMENT	4315.850	6.465	-1.805	2473.490

MEAN DRAFT(MLD.) ■ 5.505
 DRAFT AFT(MLD.) ■ 5.835
 DRAFT FOR'D(MLD.) 5.217
 TOTAL TRIM ■ -0.679
 DISP'T tonnes 4315.9
 LCB @ MIDSHIPS ■ -1.805
 VCB @ BASELINE ■ 6.465
 FREE SURF CORR. ■ 0.573
 KMT ■ 7.553
 GM UNCORRECTED ■ 1.088
 GM CORRECTED ■ 0.515

HEEL deg	5	10	15	20	25	30	40	50	60	70	80	90
KN ■	0.650	1.320	1.990	2.660	3.300	3.900	4.960	5.670	6.050	6.190	6.080	5.770
BZ SOLID ■	0.087	0.197	0.317	0.449	0.568	0.668	0.805	0.718	0.451	0.115	-0.287	-0.695
BZ FLUID ■	0.037	0.098	0.168	0.253	0.326	0.381	0.436	0.279	-0.045	-0.424	-0.851	-1.268
AREA TO 30	0.091	m*rad										
AREA TO 40	0.166	m*rad										
AREA 30-40	0.075	m*rad										

ANN HARVEY

CONDITION 9



GM	0.515 m
GZ Max	0.435 M at 38°
DI (Deck Immersion)	16.5°
DF (Down Flooding)	46.4°