

BL-0005

FREEBOARD FROM DECK LINE		LOAD LINE
Tropical	74 inches (T)	7 inches above (S)
Summer	81 inches (S)	*
Winter	88 inches (W)	7 inches below (S)
Fresh water allowance	10 inches	

bl0005wm

BL-0006

FREEBOARD FROM DECK LINE		LOAD LINE
Tropical	75 inches (T)	8 inches above (S)
Summer	83 inches (S)	*
Winter	91 inches (W)	8 inches below (S)
Fresh water allowance	7 inches	

bl0006wm

BL-0007

FREEBOARD FROM DECK LINE		LOAD LINE
Tropical	81 inches (T)	7 inches above (S)
Summer	88 inches (S)	*
Winter	95 inches (W)	7 inches below (S)
Fresh water allowance	6 inches	

bl0007wm

BL-0008

FREEBOARD FROM DECK LINE		LOAD LINE
Tropical	71 inches (T)	7 inches above (S)
Summer	78 inches (S)	*
Winter	85 inches (W)	7 inches below (S)
Fresh water allowance	6 inches	

bl0008wm

BL-0010

FREEBOARD FROM DECK LINE		LOAD LINE
Tropical	76 inches (T)	7 inches above (S)
Summer	83 inches (S)	*
Winter	90 inches (W)	7 inches below (S)
Fresh water allowance	10 inches	

bl0010wm

BL-0011

FREEBOARD FROM DECK LINE		LOAD LINE
Tropical	81 inches (T)	7 inches above (S)
Summer	88 inches (S)	*
Winter	95 inches (W)	7 inches below (S)
Fresh water allowance	6 inches	

bl0011wm

BL-0012

FREEBOARD FROM DECK LINE		LOAD LINE
Tropical	61 inches (T)	5 inches above (S)
Summer	66 inches (S)	*
Winter	71 inches (W)	5 inches below (S)
Fresh water allowance	5 inches	

bl0012wm

BL-0013

FREEBOARD FROM DECK LINE		LOAD LINE
Tropical	72 inches (T)	5 inches above (S)
Summer	77 inches (S)	*
Winter	82 inches (W)	5 inches below (S)
Fresh water allowance	4 inches	

bl0013wm

BL-0015

FREEBOARD FROM DECK LINE		LOAD LINE
Tropical	66 inches (T)	6 inches above (S)
Summer	72 inches (S)	*
Winter	78 inches (W)	6 inches below (S)
Fresh water allowance	6 inches	

bl0015wm

BL-0016

FREEBOARD FROM DECK LINE		LOAD LINE
Tropical	75 inches (T)	8 inches above (S)
Summer	83 inches (S)	*
Winter	91 inches (W)	8 inches below (S)
Fresh water allowance	9 inches	

bl0016wm

BL-0017

FREEBOARD FROM DECK LINE		LOAD LINE
Tropical	73 inches (T)	6 inches above (S)
Summer	79 inches (S)	*
Winter	85 inches (W)	6 inches below (S)
Fresh water allowance	6 inches	

bl0017wm

BL-0018

FREEBOARD FROM DECK LINE		LOAD LINE
Tropical	68 inches (T)	6 inches above (S)
Summer	74 inches (S)	*
Winter	80 inches (W)	6 inches below (S)
Fresh water allowance	6 inches	

bl0018wm

BL-0019

FREEBOARD FROM DECK LINE		LOAD LINE
Tropical	43 inches (T)	6 inches above (S)
Summer	49 inches (S)	*
Winter	54 inches (W)	6 inches below (S)
Fresh water allowance	5 inches	

bl0019wm

BL-0020

FREEBOARD FROM DECK LINE		LOAD LINE
Tropical	72 inches (T)	7 inches above (S)
Summer	79 inches (S)	*
Winter	86 inches (W)	7 inches below (S)
Fresh water allowance	6 inches	

bl0020wm

BL-0021

FREEBOARD FROM DECK LINE		LOAD LINE
Tropical	69 inches (T)	7 inches above (S)
Summer	76 inches (S)	*
Winter	83 inches (W)	7 inches below (S)
Fresh water allowance	6 inches	

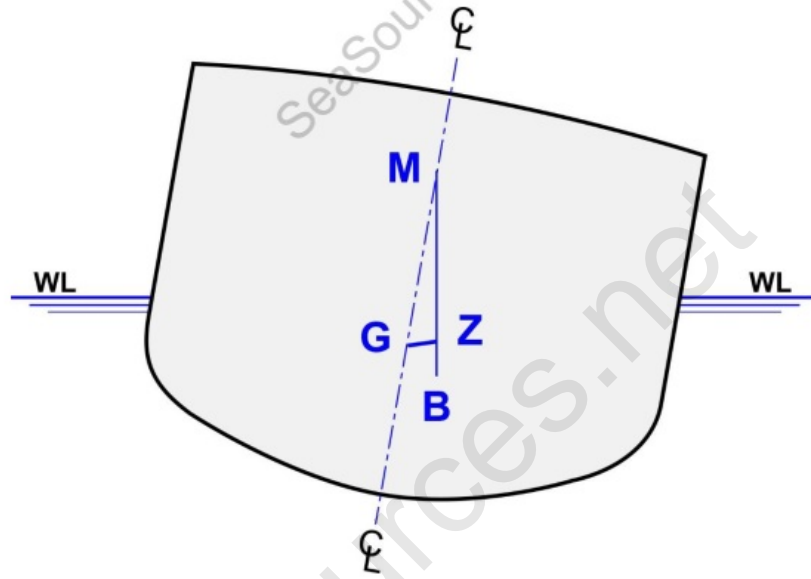
bl0021wm

BL-0022

FREEBOARD FROM DECK LINE		LOAD LINE
Tropical	77 inches (T)	7 inches above (S)
Summer	84 inches (S)	*
Winter	91 inches (W)	7 inches below (S)
Fresh water allowance	8 inches	

bl0022wm

D001SA




d001sa_wm_110618

D032DG



d032dg_wm_081618

D036DG
Part 1 of 3

US Department of Transportation United States Coast Guard		Commandant United States Coast Guard	Washington, D.C. 20593-0001 Staff Symbol: Phone:
		16710 8 Apr 87	
Master, M/V HUDSON, O.N. 666666			
Subj: M/V HUDSON Stability			
Dear Sir:			
A stability test, supervised by the U.S. Coast Guard, was conducted on the M/V HUDSON at San Diego, California on 08 April 1987. On the basis of this test, stability calculations have been performed. Results indicate that the stability of the M/V HUDSON, as presently outfitted and equipped, is satisfactory for operation in Ocean Service as indicated on the Certificate of Inspection, provided the following restrictions are strictly observed:			
1. a. The vessel shall only be loaded according to the instructions on the attached LOADING DIAGRAM bearing U.S. Coast Guard approval stamp dated 8 April 1986.			
b. Drilling fluids may be carried. The maximum specific gravity of the fluids shall not exceed 2.60.			
c. The vessel may engage in towing operations when loaded in accordance with the attached LOADING DIAGRAM.			
2. The height above the main deck of the center of gravity of the deck cargo shall not exceed the value shown on the LOADING DIAGRAM (3.0 feet). Such cargo must be positively secured against shifting prior to leaving protected waters.			
3. Permanent ballast, in the form of 64.4 long tons of high density fluids (sg. = 2.87), is to be maintained in the after peak tank. No permanent ballast shall be added, removed, altered and/or relocated without the authorization and supervision of the cognizant Officer in Charge, Marine Inspection.			
4. The maximum summer load line draft is 13 feet 8 3/8 inches. Trim shall be minimized and shall always result in a freeboard of at least 22 inches at the stern.			
5. No more than one centerline or P/S pair of the following tanks may be partially filled at any one time: fuel oil, lube oil, potable water, ballast/cargo water, fuel oil day tanks, drilling fluid. Cross-connections between all port and starboard tank pairs shall be kept closed at all times when underway.			

D036DG
Part 2 of 3

6. Main deck hatches and weather doors to the forecastle and machinery spaces shall be kept closed and fully secured at all times when underway, except when actually used for transit under safe conditions.

7. Main deck freeing ports shall be maintained operable and completely unobstructed at all times.

8. Bilges shall be kept pumped to minimum content at all times.

9. Suitable tables or curves for determining the capacities of full or partially full tanks shall be maintained aboard the vessel.

10. The Master should make every effort to determine the cause of any list of the vessel before taking corrective action.

It shall be the Master's responsibility to maintain the vessel in a satisfactory stability condition at all times.

This stability letter shall be posted under suitable transparent material in the pilothouse of the vessel so that all pages and the diagram are visible. It supersedes any stability information previously furnished the vessel.

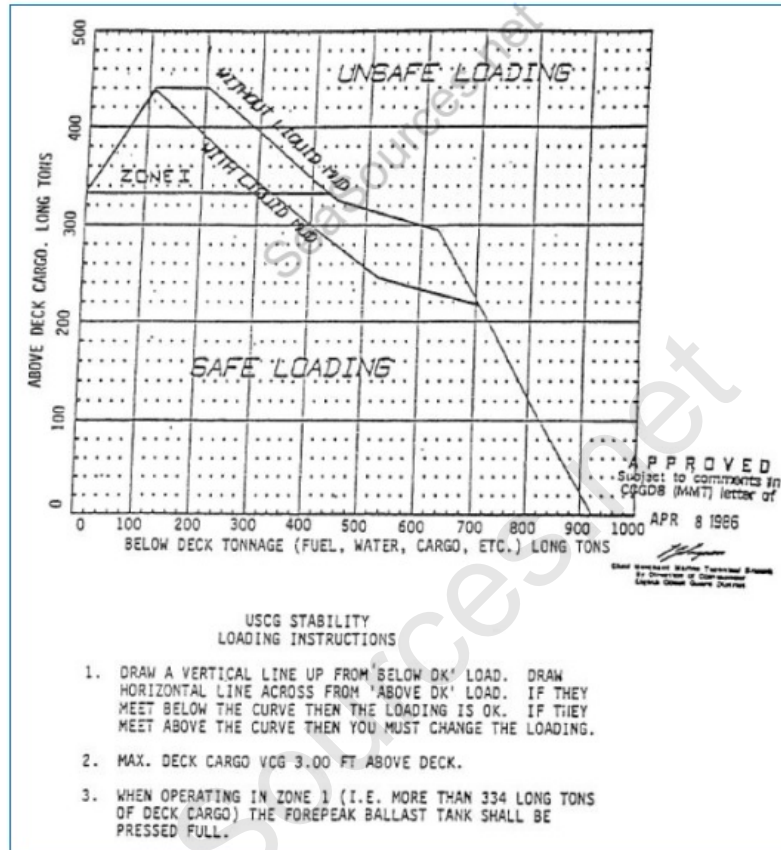
Sincerely,



A. B. SEA
Lieutenant Commander
U.S. Coast Guard

Attachment: LOADING DIAGRAM for the subject vessel bearing U.S. Coast Guard approval stamp dated 8 April 1987


D036DG
Part 3 of 3



d036dg3_wm_072120



D037DG
Part 1 of 2

U.S. Department of Transportation United States Coast Guard		Commandant United States Coast Guard	Washington, D.C. 20593-0001 Staff Symbol: Phone:
		16710	
		13 May 87	
Master, M/V SURVEYOR, O.N. 678678			
Subj: M/V SURVEYOR Stability			
Dear Sir:			
A stability test, supervised by the U.S. Coast Guard, was conducted on the M/V SURVEYOR at New Orleans, Louisiana, on 7 May 1987. On the basis of this test, stability calculations have been performed. Results indicate that the stability of the M/V SURVEYOR, as presently outfitted and equipped, is satisfactory for operation in Ocean Service as indicated on the Certificate of Inspection, provided the following restrictions are strictly observed:			
<ol style="list-style-type: none">1. A maximum of 78 persons may be carried. In no case shall the number of persons exceed that allowed on the Certificate of Inspection.2. The drafts as read on the draft marks shall not exceed 6 feet 3 inches forward or 7 feet 1 inch aft. Trim should be minimized. A loadline is not authorized.3. The height above the main deck of the center of gravity of deck cargo shall not exceed 2.0 feet. Such cargo must be positively secured before leaving protected waters.4. A maximum of 50 long tons of deck cargo may be carried when no other below deck ballast or cargo is carried. When rig water is carried, a maximum of 35 long tons of deck cargo may be carried, and no other below deck cargo or ballast is permitted.5. No permanent ballast or other such weights shall be added, removed, altered, and/or relocated without the authorization and supervision of the cognizant Officer in Charge, Marine Inspection.6. No watertight bulkheads shall be removed or altered without the authorization and supervision of the cognizant Officer in Charge, Marine Inspection.7. The watertight door in the bulkhead at frame 18 shall be closed and properly dogged at all times when underway except when actually used for transit under safe conditions.			

d037dg1_wm_072020

D037DG
Part 2 of 2

8. Cross-connections between all tank sets shall be kept closed at all times when underway.
9. Bilges shall be kept pumped to minimum content at all times.
10. Jet fuel may be carried on deck in eight DOT tanks. The total weight of the fuel and tanks shall not exceed 23.16 long tons and the vertical center of gravity shall not exceed 3 feet 6 inches above the deck. Such tanks must be positively secured against shifting in a seaway prior to leaving protected waters. Neither passengers nor other deck cargo shall be carried when such tanks are aboard the vessel.
11. The Master should make every effort to determine the cause of any list of the vessel before taking corrective action.

It shall be the Master's responsibility to maintain the vessel in a satisfactory stability condition at all times.

This temporary stability letter shall be posted under suitable transparent material in the pilothouse of the vessel so that all pages are visible. It supersedes any stability information previously furnished the vessel.

Sincerely,

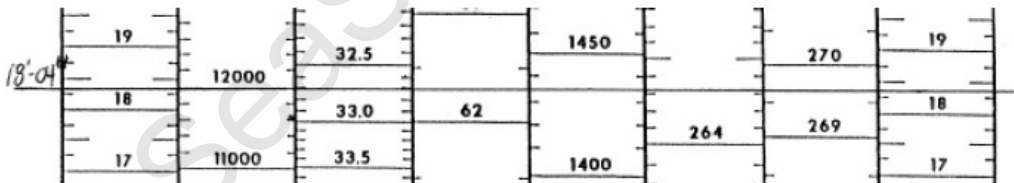


W. T. DOOR
Lieutenant Commander
U.S. Coast Guard

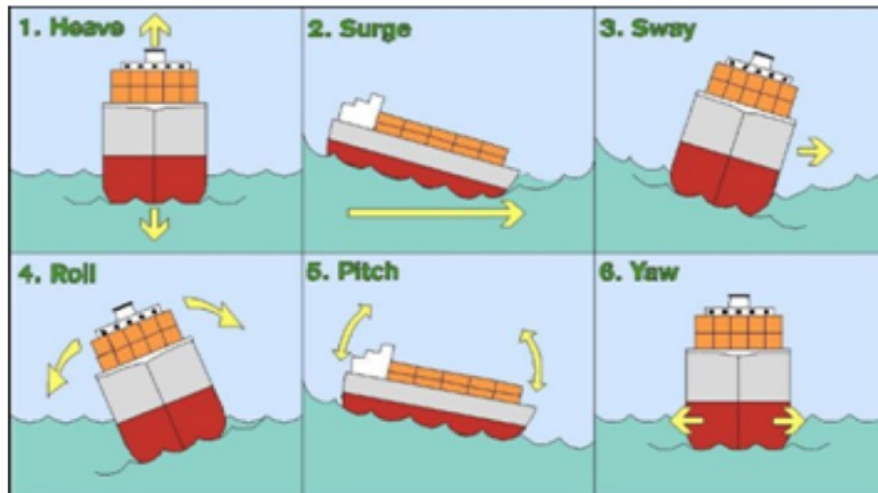
TANK	FRAMES	TANK CAPACITY		FREE SURFACE CORRECTION		i SLACK	i 97%	Bunker Loaded	Free Surface Corr.
		F.O. TONS	S.W. TONS	COL A	COL B				
		97%	100%						
D.B.1	€ 14-24	48.2	52.8	106	67	48.2	67		
D.B.1A	€ 24-36	81.9	89.8	464	204	81.9	204		
D.B.2	P 36-57	71.2	78.1	428	158	71.2	158		
	S 36-57	71.2	78.1	428	158	71.2	158		
D.B.3	€ 57-82	227.6	249.5	3777	944	227.6	944		
	P 57-82	55.6	61.0	300	120	55.6	120		
	S 57-82	55.6	61.0	300	120	55.6	120		
D.B.4	€ 82-106	224.1	245.7	3626	943	224.1	943		
	P 82-106	128.1	140.5	1138	364	128.1	364		
	S 82-106	128.1	140.5	1138	364	128.1	364		
D.B.5	€ 106-127	196.2	215.1	3173	825	196.2	825		
	P 106-134	178.0	195.2	2048	676	—	—		
	S 106-134	180.0	197.4	2048	676	—	—		
D.B.6	€ 134-160	242.3	265.7	3928	1021	242.3	1021		
	P 134-160	87.0	95.4	615	221	87.0	221		
	S 134-160	87.0	95.4	615	221	87.0	221		
D.B.7	P 160-184	94.6	103.7	768	269	94.6	269		
	S 160-184	94.6	103.7	768	269	94.6	269		
D.T.1	€ 14-24	125.3	137.4	134	130	125.3	130		
D.T.1A	€ 24-36	257.6	282.5	945	680	257.6	680		
D.T.2	P 106-113	100.7		20	20	—	—		
	S 106-113	100.7		20	20	—	—		
D.T.3	P 113-119	86.1		17	17	86.1	17		
	S 113-119	86.1		17	17	86.1	17		
D.T.6	P 160-172	201.2	220.7	1242	634	201.2	634		
	S 160-172	201.2	220.7	1242	634	201.2	634		
D.T.7	P 172-184	128.8	141.2	618	358	128.8	358		
	S 172-184	128.8	141.2	618	358	128.8	358		
D.T.8	P 184-190	50.5	55.4	68	58	—	—		
	S 184-190	50.5	55.4	68	58	—	—		

TOTALS: 3024.0 17309

fscorrection5234



hydroprotable5234



pitch_roll_yaw

ST-0001

Deck cargo	170 Tons
Upper tween deck layer	1800 Tons
Lower tween deck layer	2000 Tons
Hold layer	3200 Tons

st0001wm

ST-0002

I. Fifty drums of cement. Each drum weighs 600 pounds and is stowed on end. Each drum measures 28 inches in diameter and is 32 inches high.

II. Two reels of 1 inch diameter wire rope. Each reel contains 3000 linear feet of wire weighing 1.55 pounds per linear foot. The tare weight of each reel is 450 pounds. The reels are stowed on the flat and are 36 inches high.

III. Twelve pallets of general supplies. Each pallet measures 8'L x 4'W x 3'H. The pallets are stowed singly and weigh 580 pounds each.

IV. Twelve crates of machine parts and pipe fittings. Each weighs 880 pounds. Each crate measures 8'L x 3'W x 4'H and is stowed singly.

st0002wm

ST-0003

I. Drill casing - 16 inches in diameter by 30 feet long. Twenty lengths each weighing 1.72 long tons and stowed in a single tier on deck.

II. Six pallets of oak planking - stowed two pallets high. Each pallet weighs 2.2 long tons. Each pallet is 3.0 feet high.

III. Crated piping and machine parts - Eight crates each 8'L x 4'W x 3'H. Each crate is stowed singly and weighs 660 pounds.

IV. Drill pipe - 6 inches in diameter by 30 feet long. One hundred and twenty lengths, each weighing 0.644 long ton. The center of gravity of the pipes is 1.11 feet above the main deck.

st0003wm

ST-0004

I. Fifty lengths of drill casing - stowed in a block 8 feet high. Each pipe weighs 326 lbs.

II. Ten crates of valves - stowed 2 high. Each crate is 36" L x 30" W x 15" H and weighs 1020 lbs.

III. Fourteen containers of dry stores - stowed 2 high. Each container weighs 2 long tons and measures 6'L x 6'W x 6'H.

IV. Four anchors - on deck. The center of gravity of each anchor is 9" from the deck and each weighs 6120 lbs.

st0004wm

ST-0005

Deck 200 Tons
 Upper tween deck layer 2800 Tons
 Lower tween deck layer 1000 Tons
 Hold layer 4300 Tons

st0005wm

st0006

<u>Item</u>	<u>Tons</u>	<u>LCG-PP</u>
P.O. & SALT WATER	1805	269.0
FRESH WATER	230	303.6
DRY CARGO	7190	267.5
REEFER CARGO	195	354.0
DECK CARGO	155	60.2

st0006wm

st0007

Load 200 tons-- -180 feet fwd of amidships
 Discharge 60 tons--- 25 feet fwd of amidships
 Discharge 80 tons---165 feet aft of amidships
 Discharge 40 tons---230 feet aft of amidships

st0007wm

ST-0008

No. 1 Second Deck 140
 No. 2 Second Deck 80
 No. 2 Third Deck 180
 No. 2 Tank Top 360
 No. 3 Tank Top 380
 No. 4 Second Deck 240
 No. 4 Third Deck 280
 No. 4 Tank Top 470
 No. 5 Upper Level Flat 80
 No. 5 Third Deck 260
 No. 5 Tank Top 410
 No. 6 Second Deck 360

st0008wm

st0009

Load 200 tons--- 180 feet fwd of amidships
 Discharge 60 tons- 25 feet fwd of amidships
 Load 80 tons-- 165 feet aft of amidships
 Load 40 tons-- 200 feet aft of amidships

st0009wm

ST-0010

Deck cargo 200 Tons
 Upper tween deck layer 2800 Tons
 Lower tween deck layer 3000 Tons
 Hold layer 2300 Tons

st0010wm

ST-0011

Deck cargo 170 Tons
 Upper tween deck layer 2800 Tons
 Lower tween deck layer 2000 Tons
 Hold layer 3200 Tons

st0011wm

st0012

Load 225 tons-- 110 ft fwd of amidships
 Discharge 120 tons- 37 ft fwd of amidships
 Load 125 tons-- 30 ft aft of amidships
 Load 75 tons-- 200 ft aft of amidships

st0012wm

st0013

Discharge 120 tons 145 feet fwd of amidships
 Load 160 tons--- 87 feet fwd of amidships
 Discharge 85 tons--- 50 feet fwd of amidships
 Discharge 100 tons--- 30 feet aft of amidships

st0013wm

ST-0014

Stores	50 Tons
Lube oil	13 Tons
Cargo	2105 Tons
Fuel oil	1035 Tons
Fresh water	150 Tons
Ballast	100 Tons

st0014wm

ST-0015

I. Two reels of hoisting wire. Each reel is 8 feet in circumference, 4 feet wide and has 3000 feet of wire. Both reels are stowed on the flat. Wire weighs 1.55 pounds per linear foot. The tare weight of each reel is 500 pounds.

II. Eight pallets of case goods stowed singly. Each pallet is 8'L x 4'W x 4'H and weighs 1 long ton.

III. Twelve steel containers of cement. Each container weighs 1 1/2 tons. Each container is 8'L x 4'W x 4'H. The containers are stowed singly fore and aft.

IV. Ten crates of stewards stores. Each crate measures 4'L x 4'W 3'H and weighs 420 pounds. Each crate is stowed on deck.

st0015wm

st0016

ITEM	TONS	LCG-PP
F.O. & SALT WATER	2824	262.8
FRESH WATER	140	308.0
DRY CARGO	6290	268.5
REEFER CARGO	170	354.0
DECK CARGO	151	58.4

st0016wm

st0017

Item	Tons	LCG-PP
F.O. & SALT WATER	3215	263.2
FRESH WATER	185	312.0
DRY CARGO	7780	261.5
REEFER CARGO	70	350.8
DECK CARGO	155	353.0

st0017wm

ST-0018

- I. Twenty drums of lube oil stowed on end. Each drum weighs 436 pounds. Diameter of drums is 24 inches and their height is 30 inches overall.
- II. General supplies – Twenty six boxes stowed 2 high. Each box weighs 360 pounds and measures 6'L x 3'W x 2'H.
- III. One electric generator weighing 2684 lbs. Stowed so the center of gravity is 3.2 feet above the main deck.
- IV. Casing pipe – Twenty nine each. Each pipe weighs 1.7 long tons. The pipe is stacked 3 high across the main deck. The center of gravity of the 10 casings in the 3rd tier is 3.75 feet; the 9 casings in the second tier is 2.3 feet; the 10 casings in the lower tier is 0.833 foot.

st0018wm

ST-0019

- I. Two danforth mooring anchors. Each anchor weighs 15,750 pounds. The center of gravity is 15 inches above the main deck.
- II. Ninety fathoms of 3-inch diameter wire rope. The weight per linear foot is 18.7 pounds. The center of gravity of the wire is 22 inches above the main deck.
- III. Ten cases of machine parts. Each case measures 6'L x 6'W x 4'H. The total weight of all of the cases is 6000 lbs. Each case is stowed on deck.
- IV. Eight crates of galley stores. Each crate measures 4'L x 3'W x 2.5'H and weighs 380 pounds. Each crate is stowed on deck.

st0019wm

ST-0020

- I. Two reels of hoisting wire. Each reel is 8 feet in circumference and 4 feet wide. Both reels are stowed on the flat and each has 3000 feet of wire. Wire weighs 1.55 pounds per linear foot. Tare weight of each reel is 500 pounds.
- II. Eight pallets of case goods stowed singly. Each pallet is 8'L x 4'W x 4'H and weighs 1 long ton.
- III. Twelve steel containers of cement. Each container weighs 1 1/2 long tons. Each container is 8'L X 4'W 4'H. The containers are stowed singly fore and aft.
- IV. Ten crates of stewards stores. Each crate measures 4'L x 4'W x 3'H and weighs 420 pounds. Each crate is stowed on deck.

st0020wm

st0021

Stores	50 Tons
Lube oil	13 Tons
Cargo	8400 Tons
Fuel oil	3015 Tons
Fresh water	200 Tons
Ballast	450 Tons

st0021wm

ST-0022

No. 1 Main Deck	60
No. 2 Second Deck	90
No. 2 Tank Top	120
No. 3 Second Deck	90
No. 3 Third Deck	250
No. 3 Tank Top	400
No. 4 Second Deck	110
No. 5 Second deck	50
No. 5 Tank Top	480
No. 5 Upper Reefer	90
No. 6 Second Deck	120
No. 7 Third Deck	250

st0022wm

ST-0023

Stores	50 Tons
Lube oil	13 Tons
Cargo	1853 Tons
Fuel oil	1324 Tons
Fresh water	130 Tons
Ballast	370 Tons

st0023wm

st0024

<u>ITEM</u>	<u>TONS</u>	<u>LCG-PP</u>
P.O. & SALT WATER	3215	263.2
FRESH WATER	185	312.0
DRY CARGO	7880	263.5
REEFER CARGO	170	350.8
DECK CARGO	155	223.0

st0024wm

ST-0025

Stores	50 Tons
Lube oil	13 Tons
Cargo	8040 Tons
Fuel oil	3115 Tons
Fresh water	200 Tons

st0025wm

ST-0026

Stores	50 Tons
Lube oil	13 Tons
Cargo	3390 Tons
Fuel oil	2580 Tons
Fresh water	175 Tons
Ballast	345 Tons

st0026wm

ST-0027

- I. Motor generator - one unit weighing 4850 pounds. The center of gravity is 32 inches above the main deck.
- II. Fifty drums of cement - each drum weighs 400 pounds and is stowed on end. Each drum is 28 inches in diameter and 32 inches high.
- III. Ten pallets of cased lube oil - each pallet measures 8'L x 4'W x 4'H. Each pallet is stowed on deck and weighs 2.7 long tons.
- IV. Drill collars - Ten lengths each 8" in diameter by 30 feet long, stowed in a single layer on deck. Each length weighs 1.15 long tons.

st0027wm

ST-0028

No. 1 Main Deck	100
No. 1 Third Deck	60
No. 2 Second Deck	90
No. 3 Second Deck	120
No. 3 Third Deck	30
No. 3 Tank Top	230
No. 4 Second Deck	120
No. 5 Upper Level Flat	110
No. 5 Third Deck	140
No. 5 Upper Reefer	90
No. 5 Third Deck Reefer	110
No. 7 Second Deck	240

st0028wm

ST-0029

Stores	50 Tons
Lube oil	13 Tons
Cargo	2345 Tons
Fuel oil	1324 Tons
Fresh water	170 Tons
Ballast	400 Tons

st0029wm

ST-0030

I. Intermediate drill casing - Ten lengths each 16 inches in diameter. Each length weighs 1.7 long tons. The center of gravity above the main deck of the casing stow is 1.8 feet.

II. Crated machine parts and assorted pipe fittings – Six crates stowed two high. Each crate is 4'L x 3.5'W x3'H. Each crate weighs 840 lbs.

III. Ten each - 55 gallon drums of lube oil stowed on end. Each drum weighs 462 pounds, is 26 inches in diameter and 32 inches high.

IV. Dry stores - Twelve containers stowed two high. Each container weighs 0.9 long ton and measures 6'L x 4'W x 3'H.

st0030wm

ST-0031

No. 1 Second Deck	80
No. 2 Second Deck	100
No. 2 Third Deck	70
No. 2 Tank Top	340
No. 3 Third Deck	120
No. 3 Tank Top	260
No. 4 Second Deck	70
No. 4 Tank Top	220
No. 5 Second Deck	120
No. 5 Tank Top	380
No. 6 Third Deck	260
No. 7 Second Deck	340

st0031wm

ST-0032

Stores	50 Tons
Lube oil	13 Tons
Cargo	2860 Tons
Fuel oil	1324 Tons
Fresh water	170 Tons
Ballast	400 Tons

st0032wm

ST-0033

Stores	50 Tons
Lube oil	13 Tons
Cargo	5390 Tons
Fuel oil	2890 Tons
Fresh water	275 Tons
Ballast	945 Tons

st0033wm

ST-0034

Stores	50 Tons
Lube oil	13 Tons
Cargo	3035 Tons
Fuel oil	1775 Tons
Fresh water	270 Tons
Ballast	440 Tons

st0034wm

ST-0035

No. 1 Main Deck	80
No. 2 Third Deck	220
No. 2 Tank Top	315
No. 3 Second Deck	305
No. 3 Third Deck	220
No. 3 Tank Top	480
No. 4 Second Deck	150
No. 4 Third Deck	260
No. 5 Upper Level Flat	120
No. 5 Tank Top	360
No. 6 Second Deck	320
No. 7 Second Deck	440

st0035wm

ST-0036

- I. Fifty drums of cement - each drum weighs 400 pounds and is stowed on end. Each drum is 28 inches in diameter and 32 inches high.
- II. Crated piping and valves - Eight crates stowed 2 high. Each crate measures 8'L x 4'W x 2.5'H and weighs 640 pounds.
- III. Stewards stores - Twelve containers measuring 6'H x 6'W x 6'L. Each container weighs 960 pounds. The center of gravity of each container is 30 inches above the main deck.
- IV. Twenty lengths of drill casing - 16 inches in diameter by 30 feet long. Each length weighs 1.72 long tons and is stowed in a single tier on deck.

st0036wm

ST-0037

Stores	50 Tons
Lube oil	13 Tons
Cargo	3450 Tons
Fuel oil	1970 Tons
Fresh water	220 Tons
Ballast	440 Tons

st0037wm

ST-0038

No. 1 Third Deck	80
No. 2 Second Deck	140
No. 2 Tank Top	360
No. 3 Second Deck	40
No. 3 Third Deck	220
No. 3 Tank Top	490
No. 4 Second Deck	80
No. 5 Upper Level Flat	110
No. 5 Third Deck	140
No. 5 Tank Top	550
No. 5 Upper Reefer	85
No. 6 Third Deck	260

st0038wm

ST-0039

- I. One hundred and sixteen lengths of drill pipe. Each pipe weighs 0.644 long ton. The center of gravity is 1.11 feet above the main deck.
- II. Ten containers 8'L x 4'W x 3'H containing assorted pipe fittings and machine parts. Each container weighs 1-1/4 long tons, and the center of gravity of each box is 1.35 feet above the main deck.
- III. Two 90-fathom lengths of 3-inch diameter wire rope coiled on the main deck. Each foot of wire rope weighs 18.7 pounds. The center of gravity of the coil is 27 inches above the main deck.
- IV. Six pallets of oak planking. Each pallet weighs 2-1/2 long tons with a center of gravity of 2.2 feet above the main deck.

st0039wm

ST-0040

ITEM	TONS	KG
CREW and STORES	50	43.7
LUBE OIL	13	25.8
F.O. & SALT WATER	2824	7.5
FRESH WATER	160	21.0
DRY CARGO	7190	27.0
REEFER CARGO	170	29.2
DECK CARGO	155	55.0
TOTAL FREE SURFACE MOMENTS	15138	
FOR ALL LIQUIDS ON BOARD		

st0040wm

ST-0041

Stores	50 Tons
Lube oil	13 Tons
Cargo	4780 Tons
Fuel oil	1970 Tons
Fresh water	110 Tons
Ballast	390 Tons

st0041wm

st0042

No. 1	Second Deck	80
No. 2	Second Deck	140
No. 2	Third Deck	240
No. 2	Tank Top	460
No. 4	Second Deck	180
No. 4	Third Deck	160
No. 4	Tank Top	70
No. 5	Second Deck	320
No. 5	Thrd Dk (Reef)	180
No. 6	Second Deck	220
No. 6	Third Deck	360
No. 7	Second Deck	90
No. 7	Third Deck	50

st0042wm

ST-0043

No. 1 Second Deck	140
No. 2 Second Deck	80
No. 2 Third Deck	260
No. 3 Second Deck	180
No. 3 Third Deck	320
No. 3 Tank Top	480
No. 4 Second Deck	90
No. 4 Tank Top	90
No. 5 Second Deck	260
No. 5 Third Deck	380
No. 5 Tank Top	580
No. 6 Third Deck	360

st0043wm

ST-0045

Stores	50 Tons
Lube oil	13 Tons
Cargo	5880 Tons
Fuel oil	2210 Tons
Fresh water	200 Tons
Ballast	600 Tons

st0045wm

ST-0046

ITEM	TONS	KG
CREW and STORES	50	43.7
LUBE OIL	13	25.8
F.O. & SALT WATER	3710	7.5
FRESH WATER	115	21.0
DRY CARGO	7815	27.0
REEFER CARGO	175	29.2
DECK CARGO	120	55.0
TOTAL FREE SURFACE MOMENTS		9640
FOR ALL LIQUIDS ON BOARD		

st0046wm

ST-0047

Stores	50 Tons
Lube oil	13 Tons
Cargo	7325 Tons
Fuel oil	2210 Tons
Fresh water	200 Tons
Ballast	100 Tons

st0047wm

ST-0048

Deck cargo	350 Tons
Upper tween deck layer	1700 Tons
Lower tween deck layer	2900 Tons
Hold layer	3400 Tons

st0048wm

ST-0049

Deck cargo	350 Tons
Upper tween deck layer	1780 Tons
Lower tween deck layer	1990 Tons
Hold layer	3230 Tons

st0049wm

ST-0050

No. 1 Third Deck	220
No. 2 Second Deck	140
No. 2 Third Deck	80
No. 3 Second Deck	240
No. 3 Third Deck	220
No. 3 Tank Top	280
No. 4 Second Deck	260
No. 4 Third Deck	180
No. 4 Tank Top	210
No. 5 Third Deck	340
No. 6 Second Deck	260
No. 7 Third Deck	240

st0050wm

ST-0051

Deck cargo	190 Tons
Upper tween deck layer	740 Tons
Lower tween deck layer	1420 Tons
Hold layer	2840 Tons

st0051wm

ST-0052

ITEM	TONS	KG
CREW and STORES	50	43.7
LUBE OIL	13	25.8
F.O. & SALT WATER	2824	7.5
FRESH WATER	160	21.0
DRY CARGO	7190	27.0
REEFER CARGO	170	29.2
DECK CARGO	155	55.0

TOTAL FREE SURFACE MOMENTS 20972
 FOR ALL LIQUIDS ON BOARD

st0052wm

ST-0053

Deck cargo	220 Tons
Upper tween deck layer	1950 Tons
Lower tween deck layer	1300 Tons
Hold layer	2750 Tons

st0053wm

ST-0054

ITEM	TONS	KG
CREW and STORES	50	43.7
LUBE OIL	13	25.8
F.O. & SALT WATER	1906	7.5
FRESH WATER	140	21.0
DRY CARGO	4286	27.0
REEFER CARGO	125	29.2
DECK CARGO	140	55.0
TOTAL FREE SURFACE MOMENTS FOR ALL LIQUIDS ON BOARD	11468	

st0054wm

ST-0055

No. 2 Second Deck	140
No. 2 Third Deck	220
No. 2 Tank Top	140
No. 3 Second Deck	180
No. 3 Third Deck	160
No. 3 Tank top	160
No. 4 Second Deck	110
No. 4 Tank Top	420
No. 5 Upper Level Flat	90
No. 5 Third Deck	170
No. 6 Second Deck	180
No. 6 Third Deck	310

st0055wm

ST-0056

ITEM	TONS	KG
CREW and STORES	50	43.7
LUBE OIL	13	25.8
F.O. & SALT WATER	1906	7.5
FRESH WATER	140	21.0
DRY CARGO	4286	27.0
REEFER CARGO	125	29.2
DECK CARGO	140	55.0
TOTAL FREE SURFACE MOMENTS FOR ALL LIQUIDS ON BOARD	4157	

st0056wm

ST-0057

DB 1 CL 48.2	DB 7 P	94.6
DB 1A CL 81.9	DB 7 S	94.6
DB 4 CL 224.1	DT 2 P	100.7
DB 4 P 128.1	DT 2 S	100.7
DB 4 S 128.1	DT 3 P	86.1
DB 5 CL 196.2	DT 3 S	86.1
DB 5 P 178.0	DT 4 P/S	110.0
DB 5 S 180.0	DT 5 P/S	108.4
DB 6 CL 242.3	DIS/WATER	24.9

st0057wm

ST-0058

Deck cargo	250 Tons
Upper tween deck layer	1520 Tons
Lower tween deck layer	1410 Tons
Hold layer	2070 Tons

st0058wm

ST-0059

ITEM	TONS	KG
CREW and STORES	50	43.7
LUBE OIL	13	25.8
F.O. & SALT WATER	2608	7.5
FRESH WATER	80	21.0
DRY CARGO	5469	27.0
REEFER CARGO	225	29.2
DECK CARGO	113	55.0
TOTAL FREE SURFACE MOMENTS FOR ALL LIQUIDS ON BOARD		15585

st0059wm

ST-0060

ITEM	TONS	KG
CREW and STORES	50	43.7
LUBE OIL	13	25.8
F.O. & SALT WATER	2824	7.5
FRESH WATER	80	21.0
DRY CARGO	4286	27.0
REEFER CARGO	225	29.2
DECK CARGO	155	55.0
TOTAL FREE SURFACE MOMENTS FOR ALL LIQUIDS ON BOARD		15585

st0060wm

st0061

<u>Item</u>	<u>Tons</u>	<u>LCG-FP</u>
F.O. & SALT WATER	1805	269.0
FRESH WATER	185	312.0
DRY CARGO	6290	268.5
REEFER CARGO	170	354.5
DECK CARGO	155	223.0

st0061wm

ST-0062

Deck cargo	320 Tons
Upper tween deck layer	1320 Tons
Lower tween deck layer	1010 Tons
Hold layer	1670 Tons

st0062wm

ST-0063

DB 1 CL	48.2	DB 6 CL	242.3
DB 1A CL	81.9	DB 7 P	94.6
DB 3 P	55.6	DB 7 S	94.6
DB 3 S	55.6	DT 3 P	86.1
DB 4 CL	224.1	DT 3 S	86.1
DB 4 P	128.1	DT 4 P/S	120.0
DB 4 S	128.1	DT 5 P/S	108.4
DB 5 CL	196.2		

st0063wm

ST-0064

DB 2 P	71.2	DB 5 P	178.0
DB 2 S	71.2	DB 5 S	180.0
DB 3 CL	220.0	DB 6 CL	242.3
DB 3 P	55.6	DB 6 P	87.0
DB 3 S	55.6	DB 6 S	87.0
DB 4 CL	224.1	DB 7 P	94.6
DB 4 P	128.1	DB 7 S	94.6
DB 4 S	128.1	DT 4 P/S	110.0
DB 5 CL	196.2	DT 5 P/S	108.4

st0064wm

ST-0065

ITEM	TONS	KG
CREW and STORES	50	43.7
LUBE OIL	13	25.8
F.O. & SALT WATER	3710	7.5
FRESH WATER	115	21.0
DRY CARGO	7815	27.0
REEFER CARGO	175	29.2
DECK CARGO	120	55.0

TOTAL FREE SURFACE MOMENTS 17706
 FOR ALL LIQUIDS ON BOARD

st0065wm

ST-0066

Deck cargo	280 Tons
Upper tween deck layer	1320 Tons
Lower tween deck layer	1260 Tons
Hold layer	1420 Tons

st0066wm

ST-0067

DB 1 CL	48.2	DB 6 P	87.0
DB 1A CL	81.9	DB 6 S	87.0
DB 2 P	71.2	DB 7 P	94.6
DB 2 S	71.2	DB 7 S	94.6
DB 4 CL	224.1	DT 3 P	86.1
DB 4 P	128.1	DT 3 S	86.1
DB 4 S	128.1	DT 4 P/S	120.0
DB 5 CL	196.2		

st0067wm

ST-0068

ITEM	TONS	KG
CREW and STORES	50	43.7
LUBE OIL	13	25.8
F.O. & SALT WATER	2824	7.5
FRESH WATER	80	21.0
DRY CARGO	4286	27.0
REEFER CARGO	225	29.2
DECK CARGO	155	55.0

TOTAL FREE SURFACE MOMENTS 17604
 FOR ALL LIQUIDS ON BOARD

st0068wm

ST-0069

ITEM	TONS	KG
CREW and STORES	50	43.7
LUBE OIL	13	25.8
F.O. & SALT WATER	2710	7.5
FRESH WATER	115	21.0
DRY CARGO	7815	27.0
REEFER CARGO	175	29.2
DECK CARGO	120	55.0

TOTAL FREE SURFACE MOMENTS 17706
 FOR ALL LIQUIDS ON BOARD

st0069wm

ST-0070

Deck cargo	210 Tons
Upper tween deck layer	1220 Tons
Lower tween deck layer	910 Tons
Hold layer	870 Tons

st0070wm

ST-0071

ITEM	TONS	KG
CREW and STORES	50	43.7
LUBE OIL	13	25.8
F.O. & SALT WATER	3670	7.5
FRESH WATER	140	21.0
DRY CARGO	5965	27.0
REEFER CARGO	265	29.2
DECK CARGO	115	55.0

TOTAL FREE SURFACE MOMENTS 20219
 FOR ALL LIQUIDS ON BOARD

st0071wm

st0072

Discharge	170 tons--150 ft fwd of amidships
Load	220 tons--100 ft fwd of amidships
Load	160 tons-- 75 ft aft of amidships
Discharge	80 tons--225 ft aft of amidships

st0072wm

ST-0073

Deck cargo	320 Tons
Upper tween deck layer	820 Tons
Lower tween deck layer	910 Tons
Hold layer	270 Tons

st0073wm

ST-0074

ITEM	TONS	KG
CREW and STORES	50	43.7
LUBE OIL	13	25.8
F.O. & SALT WATER	2608	7.5
FRESH WATER	80	21.0
DRY CARGO	5469	25.2
REEFER CARGO	225	29.2
DECK CARGO	113	55.0

TOTAL FREE SURFACE MOMENTS 18585
 FOR ALL LIQUIDS ON BOARD

st0074wm

ST-0075

DB 1 CL	48.2	DB 6 CL	242.3
DB 1A CL	81.9	DB 6 P	87.0
DB 3 P	55.6	DB 6 S	87.0
DB 3 S	55.6	DB 7 P	94.6
DB 4 CL	224.1	DB 7 S	94.6
DB 4 P	128.1	DT 3 P	86.1
DB 4 S	128.1	DT 3 S	86.1
DB 5 CL	196.2	DT 4 P/S	120.0

st0075wm

ST-0076

Deck cargo	250 Tons
Upper tween deck layer	1320 Tons
Lower tween deck layer	310 Tons
Hold layer	370 Tons

st0076wm

ST-0077

DB 1 CL	48.2	DB 4 S	128.1
DB 2 P	71.2	DB 5 CL	196.2
DB 2 S	71.2	DB 6 CL	242.3
DB 3 P	55.6	DB 7 P	94.6
DB 3 S	55.6	DB 7 S	94.6
DB 4 CL	224.1	DT 5 P/S	108.4
DB 4 P	128.1		

st0077wm

ST-0078

ITEM	TONS	KG
CREW and STORES	50	43.7
LUBE OIL	13	25.8
F.O. & SALT WATER	2024	7.5
FRESH WATER	160	21.0
DRY CARGO	7090	27.4
REEFER CARGO	170	29.2
DECK CARGO	155	55.0

TOTAL FREE SURFACE MOMENTS 15538
 FOR ALL LIQUIDS ON BOARD

st0078wm

st0079

Load 170 tons--165 ft fwd of amidships
 Load 150 tons--120 ft fwd of amidships
 Load 160 tons--112 ft aft of amidships
 Load 155 tons--202 ft aft of amidships

st0079wm

ST-0080

ITEM	TONS	KG
CREW and STORES	50	43.7
LUBE OIL	13	25.8
F.O. & SALT WATER	1906	7.5
FRESH WATER	140	21.0
DRY CARGO	4826	27.3
REEFER CARGO	125	29.2
DECK CARGO	140	55.0

TOTAL FREE SURFACE MOMENTS 14168
 FOR ALL LIQUIDS ON BOARD

st0080wm

st0081

Load	120 tons---	145 feet fwd	of amidships
Discharge	160 tons---	38 feet fwd	of amidships
Load	85 tons---	35 feet aft	of amidships
Discharge	170 tons---	205 feet aft	of amidships

st0081wm

st0082

Item	Tons	LCG-FP
F.O. & SALT WATER	3865	280.0
FRESH WATER	140	308.0
DRY CARGO	6200	254.0
REEFER CARGO	265	351.0
DECK CARGO	151	58.4

st0082wm

ST-0083

DB 1 CL	48.2	DB 7 S	94.6
DB 2 P	71.2	DT 2 P	100.0
DB 2 S	71.2	DT 2 S	100.0
DB 3 P	55.6	DT 3 P	86.0
DB 3 S	55.6	DT 3 S	86.0
DB 4 CL	224.1	DT 4 P/S	120.0
DB 5 CL	196.2	DT 5 P/S	108.4
DB 6 CL	242.3	DT 6 P	201.0
DB 7 P	94.6	DT 6 S	201.0

st0083wm

st0084

Item	Tons	LCG-FP
P.O. & SALT WATER	2120	298.0
FRESH WATER	250	297.0
DRY CARGO	9111	264.7
REEFER CARGO	210	350.0
DECK CARGO	95	60.0

st0084wm

ST-0085

DB 1 CL	48.2	DB 7 P	94.6
DB 1A CL	81.9	DB 7 S	94.6
DB 2 P	71.2	DT 1A CL	150.0
DB 2 S	71.2	DT 2 P	50.0
DB 3 CL	227.6	DT 2 S	50.0
DB 3 P	55.6	DT 6 P	201.2
DB 3 S	55.6	DT 6 S	201.2
DB 4 CL	224.1		
DB 4 P	128.1		
DB 4 S	128.1		
DB 5 CL	180.0		
DB 6 CL	242.3		

st0085wm

ST-0086

DB 1 CL	48.2	DB 6 CL	242.3
DB 1A CL	81.9	DB 7 P	94.6
DB 2 P	71.2	DB 7 S	94.6
DB 2 S	71.2	DT 1 CL	125.3
DB 3 CL	227.6	DT 1A CL	257.6
DB 3 P	55.6	DT 2 P	80.0
DB 3 S	55.6	DT 2 S	80.0
DB 4 CL	224.1	DT 6 P	201.2
DB 4 P	128.1	DT 6 S	201.2
DB 4 S	128.1	DT 7 P	128.8
		DT 7 S	128.8

st0086wm

st0087

Load	170 tons--120 ft fwd of amidships
Discharge	100 tons- 28 ft fwd of amidships
Discharge	70 tons-- 122 ft aft of amidships
Load	200 tons--163 ft aft of amidships

st0087wm

ST-0088

ITEM	TONS	KG
CREW and STORES	50	43.7
LUBE OIL	13	25.8
F.O. & SALT WATER	2608	8.5
FRESH WATER	80	20.0
DRY CARGO	5469	25.5
REEFER CARGO	225	28.2
DECK CARGO	113	55.0

TOTAL FREE SURFACE MOMENTS 17531
 FOR ALL LIQUIDS ON BOARD

st0088wm

st0089

Discharge	280 tons--200 ft fwd of amidships
Load	150 tons--150 ft fwd of amidships
Load	150 tons--100 ft fwd of amidships
Discharge	90 tons--247 ft aft of amidships

st0089wm

st0090

Item	Tons	LCG-FP
F.O. & SALT WATER	960	294.0
FRESH WATER	150	299.0
DRY CARGO	4880	265.0
REEFER CARGO	200	354.0
DECK CARGO	70	60.0

st0090wm

ST-0091			
DB 1 CL	48.2	DB 7 P	94.6
DB 1A CL	81.9	DB 7 S	94.6
DB 2 P	71.2	DT 1 CL	125.3
DB 2 S	71.2	DT 1A CL	257.6
DB 3 CL	227.6	DT 2 P	78.5
DB 3 P	55.6	DT 2 S	78.5
DB 3 S	55.6	DT 6 P	201.2
DB 4 CL	224.1	DT 6 S	201.2
DB 4 P	128.1	DT 7 P	128.8
DB 4 S	128.1	DT 7 S	128.8
DB 6 CL	242.3	DT 8 P	50.5
		DT 8 S	50.5

st0091wm

st0092

Load	180 tons---	155 feet fwd of amidships
Discharge	160 tons---	38 feet fwd of amidships
Load	140 tons---	75 feet aft of amidships
Discharge	170 tons---	205 feet aft of amidships

st0092wm

ST-0093

DB 4 CL	224.1	DT 2 P	100.7
DB 4 P	128.1	DT 2 S	100.7
DB 4 S	128.1	DT 3 P	86.1
DB 5 CL	180.0	DT 3 S	86.1
DB 5 P	178.0	DT 4 P/S	105.0
DB 5 S	180.0	DT 5 P/S	108.4
DB 6 CL	242.3		
DB 6 P	87.0		
DB 6 S	87.0		
DIS/WATER	20.0		

st0093wm

st0094

Item	Tons	LCG-FP
F.O. & SALT WATER	1300	280.5
FRESH WATER	230	298.0
DRY CARGO	8412	260.5
REEFER CARGO	310	355.5
DECK CARGO	150	55.0

st0094wm

ST-0095

DB 2 P	71.2	DB 6 CL	242.3
DB 2 S	71.2	DB 6 P	87.0
DB 3 CL	227.6	DB 6 S	87.0
DB 3 P	55.6	DB 7 P	90.0
DB 3 S	55.6	DB 7 S	90.0
DB 4 CL	224.1	DT 3 P	86.1
DB 4 P	128.1	DT 3 S	86.1
DB 4 S	128.1	DT 6 P	201.2
DB 5 CL	196.2	DT 6 S	201.2
DB 5 P	178.0	DT 4 P/S	100.0
DB 5 S	180.0	DT 5 P/S	108.4
		DIS/WATER	20.0

st0095wm

ST-0096

ITEM	TONS	KG
CREW and STORES	50	43.7
LUBE OIL	13	25.8
F.O. & SALT WATER	2608	8.5
FRESH WATER	80	20.0
DRY CARGO	5469	25.5
REEFER CARGO	225	28.2
DECK CARGO	113	55.0

TOTAL FREE SURFACE MOMENTS 18993
 FOR ALL LIQUIDS ON BOARD

st0096wm

ST-0097

DB 1 CL	48.2	DT 2 P	100.0
DB 1A CL	81.9	DT 2 S	100.0
DB 2 P	71.2	DT 3 P	86.0
DB 2 S	71.2	DT 3 S	86.0
DB 3 P	55.6	DT 4 P/S	120.0
DB 3 S	55.6	DT 5 P/S	108.4
DB 5 CL	196.2	DT 6 P	201.0
DB 7 P	94.6	DT 6 S	201.0
DB 7 S	94.6		

st0097wm

ST-0098

DB 2 P	71.2	DB 5 CL	196.2
DB 2 S	71.2	DB 5 P	178.0
DB 3 CL	220.0	DB 5 S	180.0
DB 3 P	55.6	DB 6 CL	242.3
DB 3 S	55.6	DB 6 P	87.0
DB 4 CL	224.1	DB 6 S	87.0
DB 4 P	128.1	DB 7 P	94.6
DB 4 S	128.1	DB 7 S	94.6
		DT 4 P/S	110.0
		DT 5 P/S	108.4

st0098wm

ST-0099

DB 1 CL	48.2	DB 5 CL	180.0
DB 1A CL	81.9	DB 5 P	178.0
DB 2 P	71.2	DB 5 S	180.0
DB 2 S	71.2	DB 6CL	242.3
DB 3 CL	227.6	DB 7 P	94.6
DB 3 P	55.6	DB 7 S	94.6
DB 3 S	55.6	DT 6 P	201.2
DB 4 P	128.1	DT 7 P	128.8
DB 4 S	128.1	DT 7 S	128.8

st0099wm

ST-0100

DB 4 CL	224.1	DB 6 CL	200.0
DB 4 P	128.1	DB 6 P	87.0
DB 4 S	128.1	DB 6 S	87.0
DB 5 CL	196.2	DT 1A CL	257.6
DB 5 P	178.0	DT 5 P/S	108.4
DB 5 S	180.0		

st0100wm

ST-0101

No. 1 Second Deck	60
No. 1 Third Deck	70
No. 2 Second Deck	40
No. 2 Tank Top	100
No. 3 Third Deck	60
No. 3 Tank Top	70
No. 4 Second Deck	50
No. 4 Tank Top	80
No. 5 Second Deck	60
No. 5 Tank Top	60
No. 6 Second Deck	100
No. 7 Third Deck	80

st0101wm

st0102

Discharge 240 tons---155 feet fwd of amidships
 Discharge 160 tons--- 38 feet fwd of amidships
 Load 115 tons--- 35 feet aft of amidships
 Discharge 170 tons---205 feet aft of amidships

st0102wm

ST-0103

DB 3 CL	180.0	DT 2 P	80.0
DB 3 P	55.6	DT 2 S	80.0
DB 3 S	55.6	DT 3 P	86.1
DB 4 CL	224.1	DT 3 S	86.1
DB 4 P	128.1	DT 6 P	201.2
DB 4 S	128.1	DT 6 S	201.2
DB 5 CL	180.0		
DB 5 P	178.0		
DB 5	80.0		

st0103wm

ST-0104

DB 1 CL	48.2	DT 2 P	100.0
DB 1A CL	81.9	DT 2 S	100.0
DB 2 P	71.2	DT 3 P	86.0
DB 2 S	71.2	DT 3 S	86.0
DB 3 P	55.6	DT 4 P/S	120.0
DB 3 S	55.6	DT 5 P/S	108.4
DB 5 CL	196.2	DT 6 P	201.0
DB 7 P	87.0	DT 6 S	201.0
DB 7 S	87.0		

st0104wm

ST-0105

No. 1 Second Deck	70
No. 1 Third Deck	70
No. 2 Third Deck	80
No. 2 Tank Top	65
No. 3 Third Deck	55
No. 3 Tank Top	80
No. 4 Second Deck	50
No. 4 Tank Top	90
No. 5 Upper Level Flat	70
No. 5 Tank Top	70
No. 6 Second Deck	80
No. 6 Third Deck	60

st0105wm

ST-0106

DB 1 CL	48.2	DB 5 CL	196.2
DB 1A CL	81.9	DB 6 CL	242.3
DB 2 P	71.2	DB 6 P	87.0
DB 2 S	71.2	DB 6 S	87.0
DB 3 CL	227.6	DB 7 P	94.6
DB 4 CL	224.1	DB 7 S	94.6
DB 4 P	128.1	DT 4 P/S	120.0
DB 4 S	128.1		

st0106wm

ST-0107

No. 1 Third Deck	150
No. 2 Tank Top	100
No. 3 Third Deck	75
No. 3 Tank Top	50
No. 4 Second Deck	80
No. 4 Third Deck	100
No. 5 Third Deck	90
No. 5 Tank Top	100
No. 6 Third Deck	120

st0107wm

ST-0108

ITEM	TONS	KG
CREW and STORES	50	43.7
LUBE OIL	13	25.8
F.O. & SALT WATER	2608	8.5
FRESH WATER	80	20.0
DRY CARGO	5469	25.5
REEFER CARGO	225	28.2
DECK CARGO	113	55.0

TOTAL FREE SURFACE MOMENTS 15585
 FOR ALL LIQUIDS ON BOARD

st0108wm

ST-0109	
No. 1 Third Deck	90
No. 2 Third Deck	80
No. 2 Tank Top	100
No. 3 Second Deck	50
No. 3 Third Deck	80
No. 3 Tank Top	75
No. 4 Tank Top	100
No. 5 Third Deck	80
No. 5 26'-6" Flat REEFER	50
No. 5 Third Deck REEFER	60
No. 6 Second Deck	100
No. 7 Second Deck	80

st0109wm

st0110

Load	125 tons---	155 feet fwd of amidships
Discharge	160 tons---	68 feet fwd of amidships
Load	140 tons---	75 feet aft of amidships
Load	170 tons---	185 feet aft of amidships

st0110wm

ST-0111	
No. 1 Second Deck	75
No. 1 Third Deck	80
No. 2 Third Deck	60
No. 2 Tank Top	90
No. 3 Second Deck	80
No. 3 Third Deck	75
No. 4 Third Deck	90
No. 4 Tank Top	60
No. 5 Second Deck	50
No. 5 26'-6" Flat	50
No. 5 Third Deck	50
No. 5 26'-6" Flat REEFER	70
No. 6 Second Deck	75
No. 6 Third Deck	60
No. 7 Third Deck	80

st0111wm

st0112

Item	Tons	LCG-FP
P.O. & SALT WATER	2824	268.5
FRESH WATER	160	312.0
DRY CARGO	7190	267.5
REEFER CARGO	170	354.0
DECK CARGO	155	60.2

st0112wm

st0113

Item	Tons	LCG-FP
P.O. & SALT WATER	1810	260.5
FRESH WATER	120	296.0
DRY CARGO	3450	262.5
REEFER CARGO	100	354.0
DECK CARGO	60	59.0

st0113wm

st0114

Load	120 tons---	210 feet fwd of amidships
Discharge	350 tons---	40 feet fwd of amidships
Load	340 tons---	60 feet aft of amidships
Discharge	60 tons---	190 feet aft of amidships

st0114wm

st0015

I. Two reels of hoisting wire. Each reel is 8 feet in circumference and 4 feet wide and has 3000 feet of wire. Both reels are stowed on the flat. Wire weighs 1.55 pounds per linear foot. The tare weight of each reel is 500 pounds.

II. Eight pallets of case goods stowed singly. Each pallet is 8'L X 4'W X 4'H and weighs 1 long ton.

III. 12 steel containers of cement. Each container weighs 1 1/2 tons. Each container is 8'L X 4'W X 4'H. The containers are stowed singly fore and aft.

IV. 10 crates of stewards stores. Each crate measures 4'L X 4'W 3'H and weighs 420 pounds. Each crate is stowed on deck.

st0115wm

ST-0116			
DB 1 CL	48.2	DB 6 CL	200.0
DB 1A CL	81.9	DB 6 P	87.0
DB 2 P	71.2	DB 6 S	87.0
DB 2 S	71.2	DT 1A CL	257.6
DB 4 CL	224.1	DT 4 P/S	50.0
DB 4 P	128.1	DT 5 P/S	108.4
DB 4 S	128.1	DIS/WATER	10.0
DB 5 CL	196.2		
DB 5 P	178.0		
DB 5 S	180.0		

st0116wm

st0117

<u>Item</u>	<u>Tons</u>	<u>LCG-PP</u>
F.O. & SALT WATER	1950	269.3
FRESH WATER	232	303.6
DRY CARGO	3280	260.5
REEFER CARGO	195	354.0
DECK CARGO	122	60.0

st0117wm

ST-0118

DB 1 CL	48.2	DB 7 P	94.6
DB 1A CL	81.9	DB 7 S	94.6
DB 2 P	71.2	DT 2 P	100.7
DB 2 S	71.2	DT 2 S	100.7
DB 4 P	128.1	DT 6 P	201.2
DB 4 S	128.1	DT 6 S	201.2
DB 5 CL	196.2	DT 7 P	128.8
DB 5 P	178.0	DT 7 S	128.8
DB 5 S	180.0	DT 4 P/S	110.0
DB 6 CL	200.0	DT 5 P/S	108.4
DB 6 P	87.0	DIS/WATER	20.0
DB 6 S	87.0		

st0118wm

ST-0119

DB 1 CL	48.2	DB 6 CL	242.3
DB 1A CL	81.9	DB 6 P	87.0
DB 2 P	71.2	DB 6 S	87.0
DB 2 S	71.2	DB 7 P	94.6
DB 3 CL	227.6	DB 7 S	94.6
DB 3 P	55.6	DT 1 CL	125.3
DB 3 S	55.6	DT 1A CL	257.6
DB 4 CL	224.1	DT 6 P	201.2
DB 4 P	128.1	DT 6 S	201.2
DB 4 S	128.1	DT 4 P/S	120.0
DB 5 CL	196.2	DT 5 P/S	108.4
DB 5 P	150.0	DIS/WATER	20.0
DB 5 S	150.0		

st0119wm

st0120

<u>Item</u>	<u>Tons</u>	<u>LCG-FP</u>
P.O. & SALT WATER	3215	263.2
FRESH WATER	160	312.0
DRY CARGO	7880	268.5
REEFER CARGO	140	354.5
DECK CARGO	120	60.0

st0120wm

ST-0121

ITEM	TONS	KG
CREW and STORES	50	43.7
LUBE OIL	13	25.8
F.O. & SALT WATER	2608	8.5
FRESH WATER	80	20.0
DRY CARGO	5469	25.5
REEFER CARGO	225	28.2
DECK CARGO	113	55.0

TOTAL FREE SURFACE MOMENTS 20454
 FOR ALL LIQUIDS ON BOARD

st0121wm

ST-0122

DB 1 CL	48.2	DB 6 P	87.0
DB 1A CL	81.9	DB 6 S	87.0
DB 2 P	71.2	DB 7 P	94.6
DB 2 S	71.2	DB 7 S	94.6
DB 4 P	128.1	DT 2 P	100.7
DB 4 S	128.1	DT 2 S	100.7
DB 5 CL	196.2	DT 7 P	128.8
DB 5 P	178.0	DT 7 S	128.8
DB 5 S	180.0	DT 4 P/S	110.0
DB 6 CL	200.0	DT 5 P/S	108.4
		DIS/WATER	20.0

st0122wm

st0123

Load	140 tons---	170 feet fwd of amidships
Discharge	320 tons---	60 feet fwd of amidships
Load	270 tons---	132 feet aft of amidships
Discharge	230 tons---	190 feet aft of amidships

st0123wm

ST-0124

Deck cargo	180 Tons
Upper tween deck layer	800 Tons
Lower tween deck layer	800 Tons
Hold layer	2300 Tons

st0124wm

ST-0125

No. 1 Second Deck	80
No. 1 Third Deck	75
No. 2 Third Deck	60
No. 2 Tank Top	94
No. 3 Second Deck	101
No. 3 Tank Top	57
No. 4 Third Deck	75
No. 4 Tank Top	83
No. 5 Tank Top	90
No. 5 26'-6" Flat (Reefer)	30
No. 5 Third Dk Reefer	30

st0125wm

ST-0126

Deck cargo	250 Tons
Upper tween deck layer	2800 Tons
Lower tween deck layer	3200 Tons
Hold layer	3200 Tons

st0126wm

ST-0127

DB 4 CL	224.1	DT 2 P	100.7
DB 4 P	128.1	DT 2 S	100.7
DB 4 S	128.1	DT 3 P	86.1
DB 5 CL	180.0	DT 3 S	86.1
DB 5 P	178.0	DT 4 P/S	105.0
DB 5 S	180.0	DT 5 P/S	108.4
DB 6 CL	242.3	DIS/WATER	20.0
DB 6 P	87.0		
DB 6 S	87.0		

st0127wm

ST-0128

Deck cargo	300 Tons
Upper tween deck layer	2700 Tons
Lower tween deck layer	3650 Tons
Hold layer	2650 Tons

st0128wm

ST-0129

DB 4 CL	224.1	DB 6 CL	200.0
DB 4 P	128.1	DB 6 P	87.0
DB 4 S	128.1	DB 6 S	87.0
DB 5 CL	196.2	DT 1A CL	257.6
DB 5 P	178.0	DT 5 P/S	108.4
DB 5 S	180.0		

st0129wm

ST-0130

No. 1 Second Deck	70
No. 1 Third Deck	70
No. 2 Third Deck	80
No. 2 Tank Top	65
No. 3 Third Deck	55
No. 3 Tank Top	80
No. 4 Second Deck	50
No. 4 Tank Top	90
No. 5 Upper Level Flat	70
No. 5 Tank Top	70
No. 6 Second Deck	80
No. 6 Third Deck	60

st0130wm

ST-0131

No. 1 Second Deck	160
No. 2 Third Deck	85
No. 2 Tank Top	70
No. 3 Second Deck	80
No. 3 Tank Top	75
No. 4 Second Deck	40
No. 4 Tank Top	120
No. 5 26'-6", Flat	150
No. 6 Second Deck	85
No. 6 Third Deck	70

st0131wm

ST-0132

No. 1 Second Deck	420
No. 2 Third Deck	410
No. 3 Third Deck	406
No. 4 Third Deck	418
No. 5 Tank Top	421
No. 6 Third Deck	412

st0132wm

ST-0133

DB 2 P	71.2	DB 5 CL	196.2
DB 2 S	71.2	DB 5 P	178.0
DB 3 CL	227.6	DB 5 S	180.0
DB 3 P	55.6	DB 6 CL	242.3
DB 3 S	55.6	DB 6 P	87.0
DB 4 CL	150.0	DB 6 S	87.0
DB 4 P	100.0	DB 7 P	94.6
DB 4 S	90.0	DB 7 S	94.6
		DT 1 CL	125.3
		DT 1A CL	257.6

st0133wm

st0134

Load	95 tons---	210 feet fwd of amidships
Discharge	160 tons---	60 feet fwd of amidships
Load	140 tons---	60 feet aft of amidships
Load	170 tons---	190 feet aft of amidships

st0134wm

ST-0135

No. 1 Second Deck	90
No. 1 Third Deck	70
No. 2 Third Deck	80
No. 2 Tank Top	85
No. 4 Second Deck	100
No. 4 Third Deck	75
No. 4 Tank Top	60
No. 5 Tank Top	100
No. 5 Upper (Reefer)	75
No. 5 Third Deck Reefer	70
No. 6 Second Deck	40
No. 6 Third Deck	40
No. 7 Second Deck	100
No. 7 Third Deck	50

st0135wm

ST-0136

DB 4 CL	224.1	DB 7 P	90.0
DB 4 P	128.1	DB 7 S	90.0
DB 4 S	128.1	DT 1 CL	125.3
DB 5 CL	196.2	DT 1A CL	257.6
DB 5 P	178.0	DT 4 P/S	100.0
DB 5 S	180.0	DT 5 P/S	108.4
DB 6 CL	242.3	DIS/WATER	24.9
DB 6 P	87.0		
DB 6 S	87.0		

st0136wm

ST-0137

DB 1 CL	48.2	DB 6 P	87.0
DB 1A CL	81.9	DB 6 S	87.0
DB 2 P	71.2	DB 7 P	94.6
DB 2 S	71.2	DB 7 S	94.6
DB 4 P	128.1	DT 2 P	100.7
DB 4 S	128.1	DT 2 S	100.7
DB 5 CL	196.2	DT 6 P	201.2
DB 5 P	178.0	DT 6 S	201.2
DB 5 S	180.0	DT 4 P/S	110.0
DB 6 CL	200.0	DT 5 P/S	108.4
		DIS/WATER	20.0

st0137wm

ST-0138

Stores	50 Tons
Lube oil	13 Tons
Cargo	8240 Tons
Fuel oil	3200 Tons
Fresh water	240 Tons
Ballast	0 Tons

st0138wm

ST-0139

ITEM	TONS	KG
CREW and STORES	50	43.7
LUBE OIL	13	25.8
F.O. & SALT WATER	2608	7.5
FRESH WATER	80	21.0
DRY CARGO	5469	27.0
REEFER CARGO	225	29.2
DECK CARGO	113	55.0

TOTAL FREE SURFACE MOMENTS 22273
 FOR ALL LIQUIDS ON BOARD

st0139wm

st0140

Load	140 tons---	170 feet fwd of amidships
Discharge	160 tons---	60 feet fwd of amidships
Discharge	140 tons---	60 feet aft of amidships
Load	230 tons---	190 feet aft of amidships

st0140wm

ST-0141

Deck cargo	300 Tons
Upper tween deck layer	1800 Tons
Lower tween deck layer	2900 Tons
Hold layer	3100 Tons

st0141wm

ST-0142

DB 2 P	71.2	DB 5 CL	196.2
DB 2 S	71.2	DB 5 P	178.0
DB 3 CL	220.0	DB 5 S	180.0
DB 3 P	55.6	DB 6 CL	242.3
DB 3 S	55.6	DB 6 P	87.0
DB 4 CL	224.1	DB 6 S	87.0
DB 4 P	128.1	DB 7 P	94.6
DB 4 S	128.1	DB 7 S	94.6
		DT 4 P/S	110.0
		DT 5 P/S	108.4

st0142wm

ST-0143

Deck cargo	180 Tons
Upper tween deck layer	3000 Tons
Lower tween deck layer	3500 Tons
Hold layer	2500 Tons

st0143wm

ST-0144

Stores	50 Tons
Lube oil	13 Tons
Cargo	2105 Tons
Fuel oil	1860 Tons
Fresh water	108 Tons
Ballast	0 Tons

st0144wm

ST-0145

DB 1 CL	48.2	DB 6 CL	200.0
DB 1A CL	81.9	DB 6 P	87.0
DB 2 P	71.2	DB 6 S	87.0
DB 2 S	71.2	DB 7 P	94.6
DB 4 CL	224.1	DB 7 S	94.6
DB 4 P	128.1	DT 2 P	100.7
DB 4 S	128.1	DT 2 S	100.7
DB 5 CL	196.2	DT 4 P/S	110.0
DB 5 P	178.0	DT 5 P/S	108.4
DB 5 S	180.0	DIS/WATER	20.0

st0145wm

ST-0146

Deck cargo	300 Tons
Upper tween deck layer	3000 Tons
Lower tween deck layer	1500 Tons
Hold layer	2500 Tons

st0146wm

ST-0147

Stores	50 Tons
Lube oil	13 Tons
Cargo	3036 Tons
Fuel oil	2636 Tons
Fresh water	154 Tons
Ballast	204 Tons

st0147wm

ST-0148

DB 1 CL	48.2	DB 5 P	178.0
DB 1A CL	81.9	DB 5 S	180.0
DB 2 P	71.2	DB 6 CL	200.0
DB 2 S	71.2	DB 6 P	87.0
DB 3 CL	227.6	DB 6 S	87.0
DB 4 CL	224.1	DT 2 P	100.7
DB 4 P	128.1	DT 2 S	100.7
DB 4 S	128.1	DT 4 P/S	110.0
DB 5 CL	196.2	DT 5 P/S	108.4
		DIS/WATER	20.0

st0148wm

ST-0149

ITEM	TONS	KG
CREW and STORES	50	43.7
LUBE OIL	13	25.8
F.O. & SALT WATER	1906	7.5
FRESH WATER	160	21.0
DRY CARGO	7815	27.0
REEFER CARGO	125	29.2
DECK CARGO	155	55.0
TOTAL FREE SURFACE MOMENTS 17899		
FOR ALL LIQUIDS ON BOARD		

st0149wm

ST-0150

DB 1 CL	48.2	DB 5 P	178.0
DB 1A CL	81.9	DB 5 S	180.0
DB 2 P	71.2	DB 6 CL	200.0
DB 2 S	71.2	DB 6 P	87.0
DB 3 CL	227.6	DB 6 S	87.0
DB 4 CL	224.1	DT 1A CL	257.6
DB 4 P	128.1	DT 2 P	100.7
DB 4 S	128.1	DT 2 S	100.7
DB 5 CL	196.2	DT 4 P/S	110.0
		DT 5 P/S	108.4
		DIS/WATER	20.0

st0150wm

st0152

Load	140 tons---	170 feet fwd of amidships
Discharge	160 tons---	60 feet fwd of amidships
Load	140 tons---	132 feet aft of amidships
Discharge	230 tons---	190 feet aft of amidships

st0152wm

ST-0153

Stores	50 Tons
Lube oil	13 Tons
Cargo	7212 Tons
Fuel oil	2485 Tons
Fresh water	98 Tons
Ballast	0 Tons

st0153wm

st0154

Load	90 tons--210 ft fwd of amidships
Discharge	240 tons-- 38 ft fwd of amidships
Discharge	120 tons-- 94 ft aft of amidships
Load	140 tons--150 ft aft of amidships

st0154wm

ST-0155

DB 1 CL	48.2	DB 6 CL	200.0
DB 1A CL	81.9	DB 6 P	87.0
DB 2 P	71.2	DB 6 S	87.0
DB 2 S	71.2	DT 1A CL	257.6
DB 4 P	128.1	DT 2 P	100.7
DB 4 S	128.1	DT 2 S	100.7
DB 5 CL	196.2	DT 4 P/S	110.0
DB 5 P	178.0	DT 5 P/S	108.4
DB 5 S	180.0	DIS/WATER	20.0

st0155wm

ST-0156

DB 1 CL	48.2	DB 6 CL	200.0
DB 1A CL	81.9	DB 6 P	87.0
DB 2 P	71.2	DB 6 S	87.0
DB 2 S	71.2	DT 1A CL	257.6
DB 3 P	55.6	DT 2 P	100.7
DB 3 S	55.6	DT 2 S	100.7
DB 4 P	128.1	DT 7 P	128.8
DB 4 S	128.1	DT 7 S	128.8
DB 5 CL	196.2	DT 4 P/S	110.0
DB 5 P	178.0	DT 5 P/S	108.4
DB 5 S	180.0	DIS/WATER	20.0

st0156wm

ST-0157

DB 1 CL	48.2	DB 5 P	178.0
DB 1A CL	81.9	DB 5 S	180.0
DB 2 P	71.2	DB 6 CL	200.0
DB 2 S	71.2	DT 2 P	100.7
DB 3 P	55.6	DT 2 S	100.7
DB 3 S	55.6	DT 6 P	201.2
DB 4 P	128.1	DT 6 S	201.2
DB 4 S	128.1	DT 4 P/S	110.0
DB 5 CL	196.2	DT 5 P/S	80.0
		DIS/WATER	20.0

st0157wm

ST-0158

DB 1 CL	48.2	DB 7 P	94.6
DB 1A CL	60.0	DB 7 S	94.6
DB 2 P	71.2	DT 1A CL	251.6
DB 2 S	71.2	DT 2 P	100.7
DB 4 CL	224.1	DT 2 S	100.7
DB 4 P	105.0	DT 3 P	86.1
DB 4 S	105.0	DT 3 S	86.1
DB 5 CL	196.2	DT 6 P	165.0
DB 6 CL	200.0	DT 6 S	165.0
DB 6 P	87.0	DT 7 P	128.8
DB 6 S	87.0	DT 7 S	128.8

st0158wm

ST-0159

No. 1 Main Deck	60
No. 1 Third Deck	80
No. 2 Second Deck	70
No. 2 Tank Top	220
No. 3 Second Deck	50
No. 4 Third Deck	110
No. 4 Tank Top	350
No. 5 26'-6" Flat CL	110
No. 5 26'-6" Flat P/S REEFER	80
No. 6 Second Deck	90
No. 6 Third Deck	110
No. 7 Third Deck	80

st0159wm

ST-0160

No. 1 Third Deck	80
No. 2 Second Deck	70
No. 2 Tank Top	120
No. 3 Second Deck	50
No. 3 Tank Top	410
No. 4 Tank Top	350
No. 5 26'-6" Flat CL	110
No. 5 26'-6" Flat P/S REEFER	80
No. 5 Tank Top	180
No. 6 Second Deck	90
No. 6 Third Deck	180
No. 7 Third Deck	140

st0160wm

ST-0161

No. 1 Second Deck	60
No. 2 Second Deck	70
No. 2 Tank Top	120
No. 3 Second Deck	180
No. 3 Tank Top	410
No. 4 Second Deck	140
No. 5 Upper Level Flat	110
No. 5 Tank Top	180
No. 6 Second Deck	90
No. 6 Third Deck	70
No. 7 Second Deck	130
No. 7 Third Deck	140

st0161wm

ST-0162

No. 1 Second Deck	60
No. 2 Second Deck	120
No. 2 Tank Top	140
No. 3 Second Deck	180
No. 4 Second Deck	140
No. 4 Tank Top	320
No. 5 Second Deck	70
No. 5 Tank Top	180
No. 6 Second Deck	90
No. 6 Third Deck	70
No. 7 Second Deck	130
No. 7 Third Deck	140

st0162wm

ST-0163

No. 1 Main Deck	70
No. 2 Second Deck	120
No. 2 Third Deck	130
No. 3 Second Deck	180
No. 3 Tank Top	430
No. 4 Tank Top	320
No. 5 Tank Top	320
No. 6 Second Deck	70
No. 6 Third Deck	180
No. 7 Second Deck	120
No. 7 Third Deck	140

st0163wm

ST-0164

No. 1 Main Deck	70
No. 2 Second Deck	120
No. 2 Third Deck	130
No. 3 Second Deck	180
No. 3 Tank Top	430
No. 4 Tank Top	320
No. 5 Tank Top	320
No. 6 Second Deck	70
No. 6 Third Deck	180
No. 7 Second Deck	120
No. 7 Third Deck	140

st0164wm

ST-0165

No. 1 Main Deck	120
No. 2 Third Deck	120
No. 3 Second Deck	80
No. 3 Tank Top	320
No. 5 Second Deck	90
No. 5 Third Deck	210
No. 5 Tank Top	450
No. 7 Second Deck	110
No. 7 Third Deck	140

st0165wm

ST-0166

No. 1 Main Deck	90
No. 1 Second Deck	100
No. 2 Second Deck	160
No. 2 Third Deck	130
No. 3 Tank Top	380
No. 4 Tank Top	320
No. 5 Tank Top	360
No. 5 26'-6" Flat P/S REEFER	110
No. 6 Second Deck	120
No. 6 Third Deck	110
No. 7 Second Deck	120
No. 7 Third Deck	140

st0166wm

ST-0167

DB 1 CL	48.2	DT 6 P	201.2
DB 2 P	65.0	DT 6 S	201.2
DB 2 S	65.0		
DB 3 CL	227.6		
DB 4 CL	224.1		
DB 5 CL	196.2		
DB 5 P	178.0		
DB 5 S	180.0		
DB 6 CL	220.0		
DB 7 P	90.0		
DB 7 S	90.0		

st0167wm

ST-0168

No. 1 Main Deck	90
No. 1 Second Deck	100
No. 2 Second Deck	160
No. 2 Third Deck	130
No. 3 Second Deck	180
No. 3 Tank Top	380
No. 4 Tank Top	320
No. 5 Second Deck	160
No. 5 26'-6" Flat P/S REEFER	110
No. 5 Tank Top	360
No. 6 Second Deck	110
No. 7 Second Deck	120
No. 7 Third Deck	140

st0168wm

ST-0169

No. 1 Main Deck	120
No. 2 Second Deck	120
No. 2 Third Deck	130
No. 3 Tank Top	380
No. 4 Tank Top	320
No. 5 26'-6" Flat P/S REEFER	110
No. 6 Second Deck	120
No. 6 Third Deck	110
No. 7 Second Deck	120
No. 7 Third Deck	140

st0169wm

ST-0170

DB 1 CL	48.2	DB 6 CL	242.3
DB 1A CL	81.9	DB 6 P	87.0
DB 2 P	71.2	DB 6 S	87.0
DB 2 S	71.2	DB 7 P	66.2
DB 3 CL	227.6	DB 7 S	58.4
DB 3 P	55.6	DT 1	84.2
DB 3 S	55.6	DT 1A CL	235.6
DB 4 CL	224.1	DT 3 P	86.1
DB 4 P	128.1	DT 3 S	86.1
DB 4 S	128.1	DT 6 P	201.2
DB 5 CL	196.2	DT 6 S	201.2
		DT 7 P	128.8
		DT 7 S	128.8

st0170wm

ST-0171

DB 1 CL	48.2	DB 6 P	87.0
DB 1A CL	81.9	DB 6 S	87.0
DB 2 P	71.2	DB 7 P	94.6
DB 2 S	71.2	DB 7 S	94.6
DB 3 CL	227.6	DT 2 P	100.7
DB 4 CL	224.1	DT 2 S	100.7
DB 4 P	128.1	DT 3 P	86.1
DB 4 S	128.1	DT 3 S	86.1
DB 5 CL	180.0	DT 6 P	201.2
DB 5 P	178.0	DT 6 S	201.2
DB 5 S	180.0	DT 7 P	128.8
DB 6 CL	212.0	DT 7 S	128.8

st0171wm

ST-0172

DB 1 CL	48.2	DB 7 P	94.6
DB 1A CL	81.9	DB 7 S	94.6
DB 2 P	71.2	DT 1 CL	125.3
DB 2 S	71.2	DT 1A CL	235.6
DB 3 CL	214.4	DT 2 P	100.7
DB 4 CL	224.1	DT 2 S	100.7
DB 4 P	128.1	DT 3 P	86.1
DB 4 S	128.1	DT 3 S	86.1
DB 6 CL	212.0	DT 6 P	201.2
DB 6 P	87.0	DT 6 S	201.2
DB 6 S	87.0	DT 7 P	128.8
		DT 7 S	128.8

st0172wm

ST-0173

DB 1 CL	48.2	DB 7 P	94.6
DB 1A CL	81.9	DB 7 S	94.6
DB 2 P	71.2	DT 1 CL	125.3
DB 2 S	71.2	DT 1A CL	235.6
DB 3 CL	227.6	DT 3 P	86.1
DB 3 P	55.6	DT 3 S	86.1
DB 3 S	55.6	DT 6 P	201.2
DB 4 CL	224.1	DT 6 S	201.2
DB 4 P	128.1	DT 7 P	128.8
DB 4 S	128.1	DT 7 S	128.8
DB 5 CL	170.4		
DB 6 CL	212.0		

st0173wm

ST-0174

DB 1 CL	48.2	DB 6 P	87.0
DB 1A CL	81.9	DB 6 S	87.0
DB 2 P	71.2	DB 7 P	94.6
DB 2 S	71.2	DB 7 S	94.6
DB 3 CL	227.6	DT 1 CL	125.3
DB 3 P	55.6	DT 1A CL	235.6
DB 3 S	55.6	DT 3 P	86.1
DB 4 CL	208.6	DT 3 S	86.1
DB 4 P	128.1	DT 6 P	201.2
DB 4 S	128.1	DT 6 S	201.2
DB 5 CL	180.4	DT 7 P	128.8
DB 6 CL	212.0	DT 7 S	128.8

st0174_wm_090622

ST-0175

DB 1 CL	48.2	DB 7 P	94.6
DB 1A CL	81.9	DB 7 S	94.6
DB 2 P	71.2	DT 1 CL	125.3
DB 2 S	71.2	DT 1A CL	235.6
DB 3 CL	227.6	DT 3 P	86.1
DB 3 P	55.6	DT 3 S	86.1
DB 3 S	55.6	DT 6 P	201.2
DB 4 CL	208.6	DT 6 S	201.2
DB 4 P	128.1	DT 7 P	128.8
DB 4 S	128.1	DT 7 S	128.8
DB 5 CL	196.2		
DB 6 CL	212.0		
DB 6 P	87.0		
DB 6 S	87.0		

st0175wm

ST-0176

DB 1 CL	48.2	DB 7 P	94.6
DB 1A CL	81.9	DB 7 S	94.6
DB 2 P	71.2	DT 1 CL	125.3
DB 2 S	71.2	DT 1A CL	235.6
DB 3 CL	227.6	DT 3 P	86.1
DB 3 P	55.6	DT 3 S	86.1
DB 3 S	55.6	DT 6 P	201.2
DB 4 CL	208.6	DT 6 S	201.2
DB 4 P	128.1	DT 7 P	128.8
DB 4 S	128.1	DT 7 S	128.8
DB 5 CL	170.4		
DB 6 CL	212.0		

st0176wm

ST-0177

DB 1 CL	48.2	DB 7 P	66.2
DB 1A CL	81.9	DB 7 S	58.4
DB 2 P	71.2	DT 1 CL	125.3
DB 2 S	71.2	DT 1A CL	235.6
DB 3 CL	227.6	DT 3 P	86.1
DB 3 P	55.6	DT 3 S	86.1
DB 3 S	55.6	DT 6 P	201.2
DB 4 CL	224.1	DT 6 S	201.2
DB 4 P	87.0	DT 7 P	128.8
DB 4 S	87.0	DT 7 S	128.8
DB 5 CL	196.2		
DB 6 CL	242.3		
DB 6 P	87.0		
DB 6 S	87.0		

st0177wm

ST-0178

DB 1 CL	48.2	DB 7 P	44.6
DB 1A CL	81.9	DB 7 S	20.8
DB 2 P	71.2	DT 1 CL	125.3
DB 2 S	71.2	DT 1A CL	235.6
DB 3 CL	140.6	DT 3 P	86.1
DB 3 P	55.6	DT 3 S	86.1
DB 3 S	55.6	DT 6 P	201.2
DB 4 CL	224.1	DT 6 S	201.2
DB 4 P	87.0	DT 7 P	128.8
DB 4 S	87.0	DT 7 S	128.8
DB 5 CL	170.4		
DB 6 CL	212.0		

st0178wm

ST-0179

DB 1 CL	40.0	DT 6 P	201.2
DB 2 P	65.0	DT 6 S	201.2
DB 2 S	65.0	DT 7 P	110.0
DB 3 CL	227.6	DT 7 S	110.0
DB 4 CL	224.1		
DB 4 P	128.1		
DB 4 S	128.1		
DB 5 CL	196.2		
DB 5 P	170.0		
DB 5 S	170.0		
DB 6 CL	242.3		

st0179wm

ST-0180

DB 1 CL	48.2	DB 7 P	44.6
DB 1A CL	81.9	DB 7 S	94.6
DB 2 P	71.2	DT 1 CL	125.3
DB 2 S	71.2	DT 1A CL	235.6
DB 3 CL	140.6	DT 3 P	86.1
DB 3 P	55.6	DT 3 S	86.1
DB 3 S	55.6	DT 6 P	201.2
DB 4 CL	224.1	DT 6 S	201.2
DB 4 P	87.0	DT 7 P	128.8
DB 4 S	87.0	DT 7 S	128.8
DB 5 CL	170.4		
DB 6 CL	212.0		

st0180wm

ST-0181

ITEM	TONS	KG
CREW and STORES	50	43.7
LUBE OIL	13	25.8
F.O. & SALT WATER	1664	7.5
FRESH WATER	160	21.0
DRY CARGO	7190	27.0
REEFER CARGO	170	29.2
DECK CARGO	155	55.0

TOTAL FREE SURFACE MOMENTS 15138
 FOR ALL LIQUIDS ON BOARD

st0181wm

ST-0182

ITEM	TONS	KG
CREW and STORES	50	43.7
LUBE OIL	13	25.8
F.O. & SALT WATER	1870	7.5
FRESH WATER	210	21.0
DRY CARGO	4882	27.0
REEFER CARGO	170	29.2
DECK CARGO	452	55.0

TOTAL FREE SURFACE MOMENTS 17555
 FOR ALL LIQUIDS ON BOARD

st0182wm

ST-0183

ITEM	TONS	KG
CREW and STORES	50	43.7
LUBE OIL	13	25.8
F.O. & SALT WATER	2335	7.5
FRESH WATER	190	21.0
DRY CARGO	5440	27.0
REEFER CARGO	225	29.2
DECK CARGO	377	55.0

TOTAL FREE SURFACE MOMENTS 15322
 FOR ALL LIQUIDS ON BOARD

st0183wm

ST-0184

ITEM	TONS	KG
CREW and STORES	50	43.7
LUBE OIL	13	25.8
F.O. & SALT WATER	2685	7.5
FRESH WATER	190	21.0
DRY CARGO	5440	27.0
REEFER CARGO	225	29.2
DECK CARGO	365	55.0

TOTAL FREE SURFACE MOMENTS 16854
 FOR ALL LIQUIDS ON BOARD

st0184wm

ST-0185

ITEM	TONS	KG
CREW and STORES	50	43.7
LUBE OIL	13	25.8
F.O. & SALT WATER	2685	7.5
FRESH WATER	190	21.0
DRY CARGO	5440	27.0
REEFER CARGO	225	29.2
DECK CARGO	185	55.0

TOTAL FREE SURFACE MOMENTS 17324
 FOR ALL LIQUIDS ON BOARD

st0185wm

ST-0186

ITEM	TONS	KG
CREW and STORES	50	43.7
LUBE OIL	13	25.8
F.O. & SALT WATER	2246	7.5
FRESH WATER	190	21.0
DRY CARGO	3556	27.0
REEFER CARGO	180	29.2
DECK CARGO	120	55.0
TOTAL FREE SURFACE MOMENTS 12366		
FOR ALL LIQUIDS ON BOARD		

st0186wm

ST-0187

DB 1 CL	40.0	DT 6 P	201.2
DB 2 P	65.0	DT 6 S	201.2
DB 2 S	65.0	DT 7 P	128.8
DB 3 CL	227.6	DT 7 S	128.8
DB 4 CL	224.1		
DB 4 P	128.1		
DB 4 S	128.1		
DB 5 CL	196.2		
DB 5 P	178.0		
DB 5 S	180.0		
DB 6 CL	242.3		

st0187wm

ST-0188

ITEM	TONS	KG
CREW and STORES	50	43.7
LUBE OIL	13	25.8
F.O. & SALT WATER	2145	6.7
FRESH WATER	190	21.0
DRY CARGO	3710	26.4
REEFER CARGO	180	29.2
DECK CARGO	120	55.0
TOTAL FREE SURFACE MOMENTS 12088		
FOR ALL LIQUIDS ON BOARD		

st0188wm

ST-0189

ITEM	TONS	KG
CREW and STORES	50	43.7
LUBE OIL	13	25.8
F.O. & SALT WATER	2045	6.7
FRESH WATER	240	21.0
DRY CARGO	3112	25.8
REEFER CARGO	90	29.2
DECK CARGO	80	55.0
TOTAL FREE SURFACE MOMENTS 11542		
FOR ALL LIQUIDS ON BOARD		

st0189wm

ST-0190

ITEM	TONS	KG
CREW and STORES	50	43.7
LUBE OIL	13	25.8
F.O. & SALT WATER	2845	7.3
FRESH WATER	180	21.0
DRY CARGO	3188	25.3
REEFER CARGO	40	29.2
DECK CARGO	257	55.0

TOTAL FREE SURFACE MOMENTS 11980
 FOR ALL LIQUIDS ON BOARD

st0190wm

ST-0191

No. 1 Third Deck	40
No. 2 Second Deck	30
No. 2 Third Deck	50
No. 2 Tank Top	80
No. 3 Tank Top	80
No. 4 Tank Top	220
No. 5 Tank Top	110
No. 5 Third Deck REEFER	40
No. 6 Second Deck	160
No. 6 Third Deck	80

st0191wm

ST-0192

ITEM	TONS	KG
CREW and STORES	50	43.7
LUBE OIL	13	25.8
F.O. & SALT WATER	2845	7.3
FRESH WATER	180	21.0
DRY CARGO	3188	25.3
REEFER CARGO	40	29.2
DECK CARGO	60	55.0

TOTAL FREE SURFACE MOMENTS 12600
 FOR ALL LIQUIDS ON BOARD

st0192wm

ST-0193

No. 1 Third Deck	60
No. 2 Second Deck	50
No. 2 Third Deck	90
No. 2 Tank Top	40
No. 3 Second Deck	120
No. 3 Tank Top	70
No. 5 Second Deck	120
No. 5 Tank Top	280
No. 6 Second Deck	30

st0193wm

ST-0194

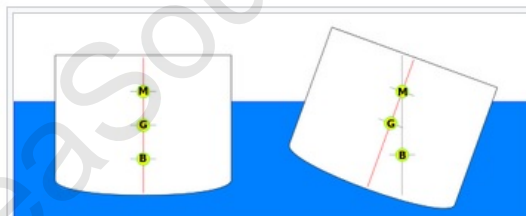
No. 1 Second Deck	80
No. 2 Second Deck	110
No. 2 Tank Top	70
No. 3 Tank Top	90
No. 4 Third Deck	35
No. 5 Second Deck	60
No. 5 Tank Top	220
No. 6 Second Deck	40
No. 6 Third Deck	70
No. 7 Second Deck	100

st0194wm

ST-0195

No. 1 Second	75
No. 2 Tank Top	120
No. 3 Second Deck	60
No. 3 Third Deck	100
No. 3 Tank Top	80
No. 4 Third Deck	150
No. 5 Upper Level Flat	120
No. 5 Tank Top	90
No. 5 Third Deck REEFER	80
No. 6 Third Deck	40
No. 7 Second Deck	125

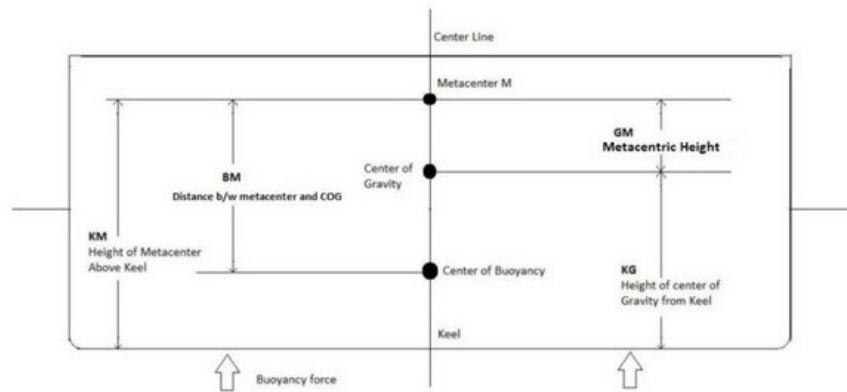
st0195wm



Ship stability diagram showing centre of gravity (G), centre of buoyancy (B), and metacenter (M) with ship upright and heeled over to one side.

As long as the load of a ship remains stable, G is fixed. For small angles M can also be considered to be fixed, while B moves as the ship heels.

stabilitydiagram1



Here we will define some of the basic terms related to ships stability. These includes:

- **Centre of Gravity (COG):** It is the point at which the whole weight of the ship (or object) is assumed to be acting vertically downwards.
- **Centre of Buoyancy (COB):** It is the point at which the whole buoyancy force on the ship (or object) is assumed to be acting vertically upwards.
- **Metacenter (M):** It is point through which the force of buoyancy acts on a ship. In detail if a line of buoyancy force is extended it will meet the line of gravitational force, this point of intersection is called as Metacenter.
- **The height of Metacenter above keel (KM):** It is the distance between keel of the ship to Metacentre.
- **The height of Centre of Gravity above keel (KG):** It is the distance between keel of the ship to Centre of Gravity (COG).
- **Metacentric Height (GM):** It is the distance between Centre of Gravity(COG) to Metacenter. It should always be positive for any ship to be stable.

stabilitydiagram2

The following equations are of use when making basic stability calculations:

$$(1) \quad \text{Roll Period} = T = \frac{0.44 \times \text{Beam}}{\sqrt{GM}}$$

$$(2) \quad \text{Loll} = \tan(\theta) = \sqrt{\frac{2GM}{BM}}$$

$$(3) \quad \text{Moment} = KG \times \text{Weight}$$

$$(4) \quad \text{Total KG} = \frac{\text{Total Moment}}{\text{Total Weight}}$$

$$(5) \quad \text{Shift} = \frac{\text{Weight} \times \text{Distance}}{\text{Displacement}}$$

$$(6) \quad KB = 0.53 \times \text{Draft}$$

$$(7) \quad \text{Parallel Sinkage} = \frac{\text{Weight}}{\text{Tons Per Inch Immersion}}$$

$$(8) \quad \text{Tons Per Inch Immersion} = \frac{\text{Waterplane}}{420}$$

$$(9) \quad \text{Waterplane} = \text{Length} \times \text{Beam} \times \text{Coefficient}$$

stabilityformulas