Fast Vehicle Ferry — *M/V Chenega*

Intact and Damage Stability Report

Prepared for
Alaska Marine Highway System
Juneau, Alaska

File No. 11148.01
9 March 2012
Rev. A

THE GLOSTEN ASSOCIATES
Consulting Engineers Serving the Marine Community

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Revision History

Section	Rev	Description	Date	Approved
All	—	Initial Issue.	1/20/2012	RJVS
4,5,6 & 7	A	Load Cases Revised per USCG Comments	03/09/2012	RJVS

References

1. *International Code of Safety for High Speed Craft 2000* (2000 HSC Code), International Maritime Organization, 2008

2. *Fast Vehicle Ferry - M/V Chenega Trim and Stability Book*, Glosten Associates, Rev A, 9 March 2012

3. *Alaska Marine Highways FVF Stability Report – Chenega (US Units)*, BMT Nigel Gee, Reference: NG717-835-54 Issue 5, 6 July 2010

4. *General Arrangement,* BMT Nigel Gee, NG432-650-01-1, Issue 4

Section 1 Introduction

The stability of the AMHS FVF catamaran passenger-vehicle vessel has been assessed to the International Code of Safety for High Speed Craft 2000 (HSC Code 2000), Chapter 2 (and Annex 7). This report supersedes the previous Stability Report for 'Chenega' (Reference 3).

A total of 14 loading conditions have been analyzed including Lightship plus 10% Consumables, HSC Load Line, and 12 Load conditions for various vehicle arrangements. The calculations presented in this report confirm that the vessel passes all the specified intact and damaged stability criteria for the loading conditions and damage scenarios analyzed.

Section 2 General Information

2.1 Principal Particulars

Length Overall	235' 5"
Length between Perpendiculars	210' 4"
Maximum Beam	59' 1"
Mean Draft (Max Load)	8' 5 1/2"
Displacement (Max Load)	787.4 LT
Maximum No. of Passengers	250

2.2 Shipyard

Derecktor Shipyard Conn
LLC 837 Seaview Avenue
Bridgeport, CT 06607-1607

2.3 Safety Authority

United States Coast Guard

2.4 Lightship

The lightship weight and center of gravity used in this document are taken from the USCG letter dated March 25, 2010, based on the September 9, 2009 Lightship Survey (see Reference 3) This supersedes all previous lightship weights for this vessel.

This USCG letter states an approved lightship and center of gravity as indicated in the following table.

Item	Value	Units
Lightship Displacement	500.46	LT
LCG	84.77	ft Fwd AP (Fr 0)
VCG	23.23	ft Abv BL

2.5 Coordinate System

Logitudinal origin is AP (Frame 0, positive forward)
Transverse origin is centerline (positive starboard)
Vertical origin is baseline (positive up)
Aft trim, i.e. trim down by the stern, is considered to be positive, signed “a.”
Fwd trim, i.e. trim down by the bow, is considered to be negative, signed by “-” or “f.”

2.6 Assumptions

Fuel, fresh water, sewage, lube oil, and dirty oil tanks have been included in the stability model in order to account for free surface moments and allow free transfer of fluids during stability calculations.

All tank contents have been modeled as fluids in the stability calculations.

The stability model includes a 1/4" allowance for shell thickness.

Waterjet ducts, sea chests, and bow thrusters have been included in the stability model and are considered flooded at all times during calculations.

The buoyant effects of interceptors, fenders and waterjet nozzles are considered to be negligible and have not been modeled.

No counterflooding measures are required, therefore only final stages of flooding have been considered in the stability calculations.

The TCG values shown in the loading conditions have been ignored in the stability calculations, assuming that the Master of the vessel will ensure deadweight distribution to achieve level heel before leaving port.

All results are given for standard sea water, specific gravity = 1.025

All stability calculations have been performed using Creative Systems' General HydroStatics version 12.90A

2.7 Nomenclature

Symbol	Explanation	Units
∇	Volumetric displacement	ft^3
AB	Above Baseline	-
AEQ	Automotive Equivalent Unit (ie. 6000 lbs or 2.72t equivalent vehicle)	-
AMHS FVF	Alaska Marine Highways System Fast Vehicle Ferry	-
AP	Aft Perpendicular	-
FP	Fwd Perpendicular	-
FSf FSM	Free Surface / Free Surface Moment	LT.ft
GM (fluid)	GM_T corrected for FS effect	ft
GM (solid)	GM_T excluding FS effect	ft
GM/GM_T	Transverse Metacentric height above VCG	ft
GM_L	Longitudinal Metacentric height above VCG	ft
GZ	Righting Arm	ft
HSC	High Speed Craft	-

Symbol	Explanation	Units
IMO	International Maritime Organization	-
KG/VCG	Center of Gravity Above Baseline	ft
KM_L	Longitudinal Metacentric Height Above Baseline	ft
KM_T	Transverse Metacentric Height Above Baseline	ft
LCB	Longitudinal Center of Buoyancy	ft
LCF	Longitudinal Center of Flotation	ft
LPA	Lateral Projected Area	ft^2
MCT	Moment to Change Trim by 1 cm	$LT.ft.in^{-1}$
MES	Marine Evacuation Slide	-
T	Draft	ft
T_{AP}	Draft measured at AP	ft
T_{FP}	Draft measured at FP	ft
TPC	Tonnes per cm Immersion	$LT.in^{-1}$
USCG	US Coast Guard	-
VCB	Vertical Center of Buoyancy (above baseline)	ft
X	Longitudinal Coordinate	ft
y	Transverse Coordinate	ft
Z	Vertical Coordinate	ft
Δ	Displacement	LT
θ	Heel Angle	degrees
θ_t	Downflooding Angle	degrees

Section 3 Particulars of Stability

All calculations are undertaken to demonstrate compliance with the Stability Criteria specified in the IMO HSC 2000 (Reference 1). The criteria limits presented in the following sections are in metric Units.

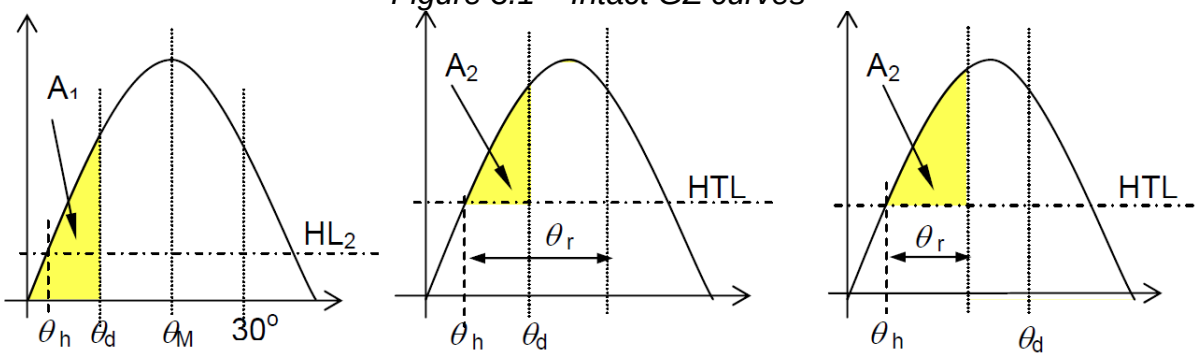
3.1 Intact Stability Criteria

The applicable intact stability criteria for multihull vessels are contained in Chapter 2 and in Annex 7 of the HSC Code 2000. The following table summarizes the intact stability criteria from the HSC Code.

Sec.	Criterion		Limit	Remarks
A7 1.1	Area A1 Under GZ Curve	≥	0.055·30°/θ m-rad (1)	See Figure 3.1
A7 1.2	Angle of Maximum GZ	≥	10°	
2.12	Heel due to Turning Lever TL	≤	8°	
2.11 & 2.12 & A7 3.2	Heel due to Max[Wind Gust (HL2) or Pax Lever (PL)]	≤	10°	
2.12	Heel due to HTL = Wind Gust (HL2) + Turning (TL)	≤	12°	
A7 1.5	Area A2 Rolling in Waves	≥	0.028 m-rad	See Figure 3.1

In the case of AMHS FVF, the beam wind gust effect on the craft attitude is greater than the passenger crowding effect, therefore the criteria 2.11 as shown above is superseded by 3.2.1 of Annex 7.

Figure 3.1 – Intact GZ curves



NOTES:

(1) θ to be the least of:

.1 The Downflooding angle
.2 The angle for GZ_{MAX}
.3 30°

(2) θ_h = Equilibrium heel angle with heeling moment.

(3) θ_d = Downflooding angle.

(4) θ_M = Angle for GZ_{MAX}.

(5) See Section 3.4 for heeling moment calculations.

(6) θ_r shall be taken as 15°, or as $(\theta_d - \theta_h)$ whichever is less.

3.2 Stability Criteria in the Damaged Condition

The applicable damage stability criteria for multihull vessels are contained in Chapter 2 and in Annex 7 of the HSC Code 2000. The following table summarizes the damage stability criteria from the HSC Code for all damage scenarios except 100% L raking damage.

Sec.	Criterion		Limit	Remarks
2.6	Downflooding Height at Equilibrium	≥	$0.5 \cdot H_{1/3} = 0.5 \cdot 4m$ (*)	
2.6	Freeboard at Evacuation Locations	≥	0 m	
2.13	Equilibrium Angle in Any direction	≤	10°	
A7 2.1	Area A2 Under GZ curve with HL4 = Wind Heeling (HL3) + Pax Heeling (PL)	≥	0.028 m-rad	See Figure 3.2
A7 2.6	Maximum GZ	≥	0.05 m	
A7 2.6	Range of Positive Stability	≥	7°	
A7 3.2	Resultant Heel Angle with Wind Heeling Moment (HL3) (**)	≤	15°	See Figure 3.2

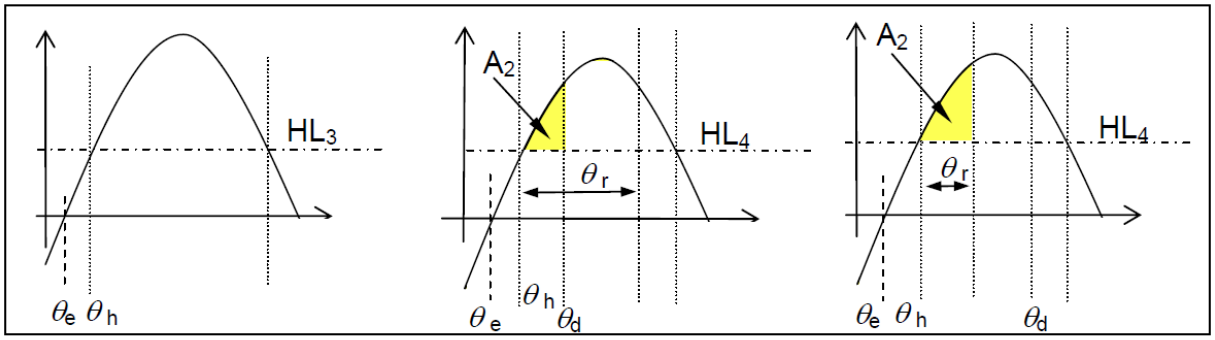
(*) $H_{1/3}$ … significant wave height for the worst intended sea state condition, 4m equates to 13.12 ft.

(**) To simplify the calculations, the combined Wind and Passenger Heeling moment (HL4) has been used to check that the resultant damaged heel angle is less than 15°. This is a conservative methodology since the value of the combined heeling moment (HL4) is greater than the wind heeling moment (HL3).

The table below summarizes the damage stability criteria from the HSC Code for the 100% L raking damage scenario.

Sec.	Criterion		Limit	Remarks
2.6	Freeboard at Evacuation Locations	≥	0 m	
2.13	Equilibrium Angle in Any direction	≤	20°	
2.13	Range of Stability	≥	15°	
2.13	Area A2 Under GZ curve (No Heeling Moment)	≥	0.015 m-rad	See Figure 3.2

Figure 3.2 – Damage GZ curves



θ_h not greater than 15° for Passenger craft and 20° for cargo vessels

NOTES:

(1) θ_e Angle of Equilibrium after damage.

(2) θ_h = Equilibrium heel angle with heeling moment.

(3) θ_d = Downflooding angle.

(4) θ_r shall be taken as 15°, or as $(\theta_d - \theta_h)$ whichever is less.

(5) See Section 3.4 for heeling moment calculations.

The compartment permeabilities utilized in the damage stability analysis have been established according to the HSC Code Chapter 2, 2.6.2. The permeabilities are summarized in the following table.

Spaces	Permeability
Appropriated to Cargo & Stores	60%
Occupied by Accommodation	95%
Occupied by Machinery	85%
Intended for Liquids	95%
Appropriated for Cargo Vehicles	90%
Void Spaces	95%

3.3 Envelope of Damage

As double bottom void spaces DB1.S and DB2.P are not provided with bilging facilities, Chapter 2 Section 2.6.5 of the HSC Code 2000 has been applied.

Chapter 2, 2.6.5 Void bottom spaces may be fitted without bilge system or air pipes provided that:

.2 …any damaged void space adjacent to the damaged zone shall be included in the calculation and the criteria in 2.6, 2.13, and 2.15 complied with.

Chapter 2, 2.6.7 Extent of Side Damage

The following side damage shall be assumed anywhere on the craft:

Section	Extent		Result
2.6.7.1	Longitudinal	The least of $0.75 \cdot \nabla^{1/3}$; or (9' 10" + $0.225 \cdot \nabla^{1/3}$); or 36' 1"	16' 8"
	Transverse	$0.20 \cdot \nabla^{1/3}$;	
	Vertical	No Limit	No Limit

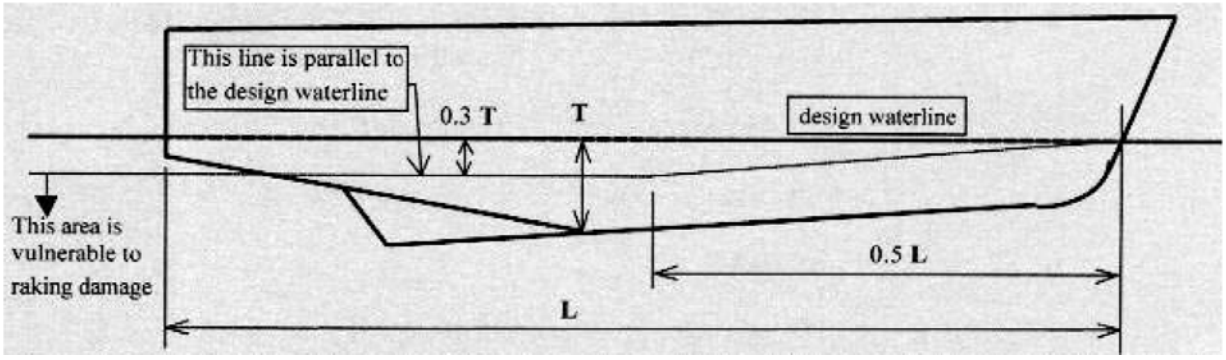
∇ … volume of displacement [m^3] for DWL.

Chapter 2, 2.6.8 Extent of bottom damage in areas vulnerable to raking damage

Chapter 2, 2.6.8.1.1

Application: Parts of the hull under consideration:

.1 Any part in contact with water at operational speed in calm water.
.2 As shown in figure below. (For multihulls, each hull shall be considered separately)
.3 Damage shall not be applied at the same time as Ch2, 2.6.7 or Ch2, 2.6.9



Chapter 2, 2.6.8.2

Extent: Extent of bottom damage vulnerable to raking.

Sec.	Extent		Result
2.6.8.2	Longitudinal	Case 1: 55% of L from FP towards Aft end	105' 10"
		Case 2.a: for L≥50m; 35% L anywhere on the craft length	73' 7 1/4"
		Case 2.b: for L<164' 1/2"; (L/2 +10)% anywhere	N/A
	Normal to Shell	The lesser of: $0.04 \cdot \nabla^{1/3}$ or 19" 1/2", in association with a girth = $0.1 \cdot \nabla^{1/3}$	1' 2 1/2"
	Vertical	See figure above	See Figure above

∇ … volume of displacement [m^3] for DWL.

Chapter 2, 2.6.9 Extent of bottom damage NOT vulnerable to raking

Not applicable when examining raking damage.

Sec.	Extent		Result
2.6.9.2	Longitudinal	The lesser of $0.75 \cdot \nabla^{1/3}$, (9' 10" + $0.225 \cdot \nabla^{1/3}$), or 36' 1"	16' 8"
	Athwartships Girth	$0.2 \times \nabla^{1/3}$	5' 11"
	Normal to shell	$0.02 \times \nabla^{1/3}$	7' 1/4"

∇ … volume of displacement [m^3] for DWL.

Chapter 2, 2.6.10

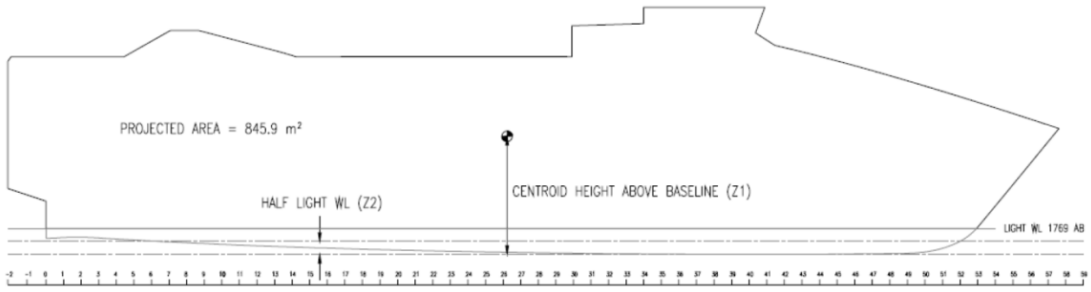
When applying bottom damage (raking or no raking) to multihulls, an obstruction at or below DWL of up to 23' width shall be considered in determining the number hulls damaged. In any damage case, if a lower extent produces more adverse conditions then it will have to be considered.

3.4 Heeling Moment Calculations

These example heeling moment calculations are shown for one loading condition only. Separate calculations have been made for each loading condition.

Wind Heeling

8.098	m	Z1	Windage Centriod Height Above Baseline
0.8845	m	Z2	Half Height of Light draft WL
7.2135	m	Z	Wind Lever = Z1 - Z2
845.9	m2	A	Windage Area
25.72	m/sec	Vw	Wind Speed
489.3	N/m^2	Pi	Intact Wind Pressure = 500*(Vw/26)^2
117.4	N/m^2	Pd	Damage Wind Pressure = 120*(Vw/26)^2
1.5		Gust	Gust Factor
304.7	MT-m	HL1	Wind Heeling Moment = Pi*A*Z / 9800
983.7	LT-ft		
457.0	MT-m	HL2	Gust Heeling Moment = HL1 * Gust
1475.6	LT-ft		
73.1	MT-m	HL3	Damage Wind Heeling Moment = Pd*A*Z / 9800
236.1	LT-ft		



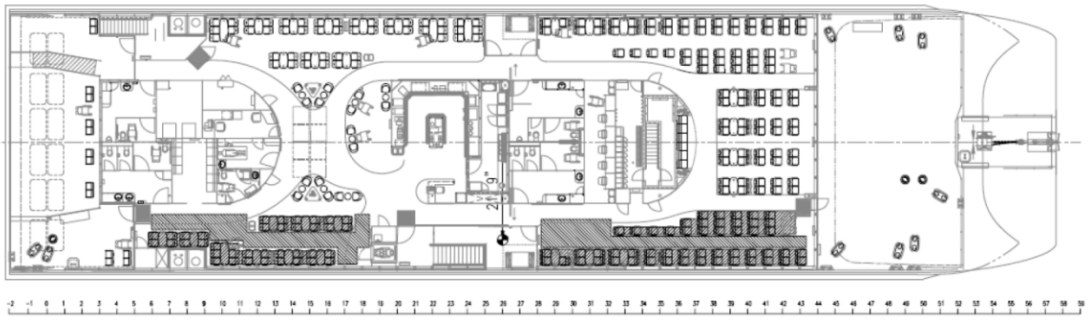
Center of windage area

Notes:

1. The HSC Code 2000 provides equations which use constants derived by metric derivations. Consequently the Wind Heeling Lever has been calculated using metric values and the final result converted to an imperial value.

Passenger Heeling

250	each	N	Total Number of Passengers
84	kg	m	Passenger Mass
21	MT	W_{pax}	Total Passenger Weight = N * m
6.632	m	Lever	Passenger Lever
139.3	MT-m	PL	Passenger Heeling Moment
449.7	LT-ft		= W_{pax}*Lever



Seated Passengers

Standing Passengers

Center of passenger crowding

Notes:

1. Passenger Lever is based on full passenger loading (93 seated/157 $_s$tanding
2. Standing passengers ar$_e$ assumed at 4 pe$_r$ square met$_e$r
3. Individual passenger weight assumed as 84 kg (185 lbs)

Turning Lever

18.01	m/sec	Vo	Vessel Speed in a Turn
320.48	m	R	Turning Radius (Assumed 5*LWL)
7.294	m	KG	Vertical Center of Gravity (Example for Loadline Draft)
1.769	m	d	Mean Draft (Taken as Light Draft to produce greatest lever)
9.81	m/sec^2	g	Acceleration of Gravity
800.04	MT	Disp	Displacement (Example for Loadline Draft)
529.03	MT-m	TL	Turning Heeling Moment
1708.3	LT-ft		= (1/g) * Vo^2/R * (KG - d/2) * Disp

Summary of Heeling Moments

At Loadline Displ: 787.4 LT

Heeling Moments at Loadline Displacement

983.7	LT-ft	HL1	
1475.6	LT-ft	HL2	
236.1	LT-ft	HL3	
449.7	LT-ft	PL	
1708.3	LT-ft	TL	
3183.9	LT-ft	HLT	= TL + HL2
685.8	LT-ft	HL4	= HL3 + PL

Equivalent Heeling Arms at Loadline Displacement

1.25	ft	HL1	
1.87	ft	HL2	
0.30	ft	HL3	
0.57	ft	PL	
2.17	ft	TL	
4.04	ft	HLT	= TL + HL2
0.87	ft	HL4	= HL3 + PL

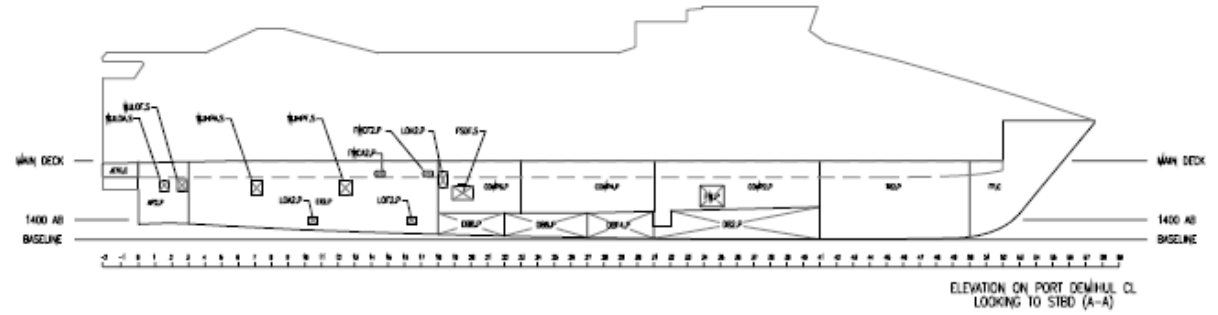
3.5 Damage Scenarios

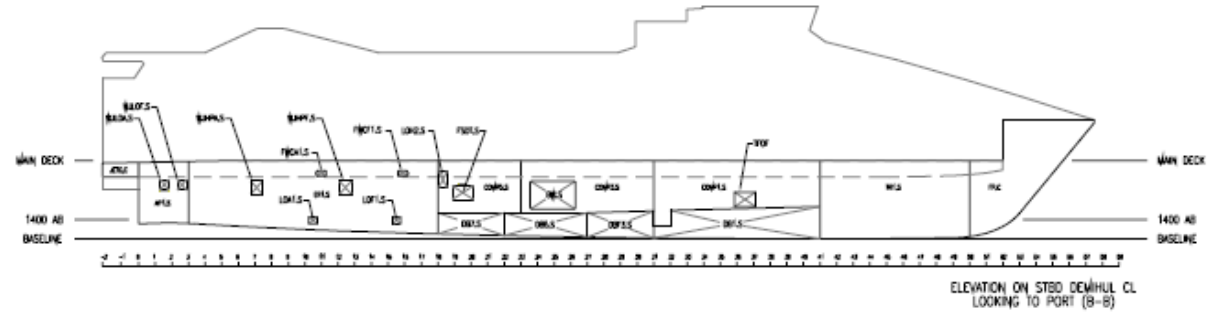
The table below shows the damaged compartments involved in each case scenario.

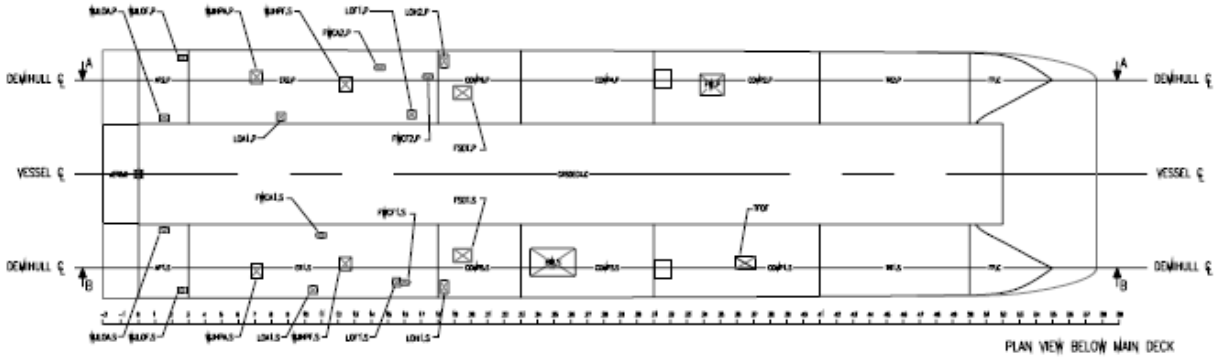
Damage Type	Scenario Number	Damaged Compartments	Number Damaged
Bottom Raking 55% L	1	FP.C, TR1.S, DB1.S, DBF3.S, DB5.S	5
Bottom Raking 35% L	2	FP.C, TR1.S, DB1.S	3
	3	TR1.S, DB1.S, DBF3.S, DB5.S	4
	4	DB1.S, DBF3.S, DB5.S, DB7.S	4
	5	DB1.S, DBF3.S, DB5.S, DB7.S, ER1.S	5
	6	DB5.S, DB7.S, ER1.S	3
	7	DB7.S, ER1.S, AP1.S	3
Bottom NOT Raking	8	TR1.S, DB1.S	2
	9	DB1.S, DBF3.S, DB5.S	3
	10	DB5.S, DB7.S	2
	11	DB7.S, ER1.S	2
Side Damage	12	TR1.S, DB1.S, COMP1.S	3
	13	DB1.S, COMP1.S, DBF3.S, COMP3.S, DB5.S	5
	14	DB1.S, DBF3.S, COMP3.S, BW.S, DB5.S, COMP5.S	6
	15	DB5.S, COMP5.S, DB7.S	3
	16	DB5.S, COMP5.S, DB7.S, ER1.S	4
	17	ER1.S, AP1.S	2
100% L Bottom Damaged	18	FP.C, TR1.S, DB1.S, DBF3.S, DB5.S, DB7.S, ER1.S, AP1.S	8

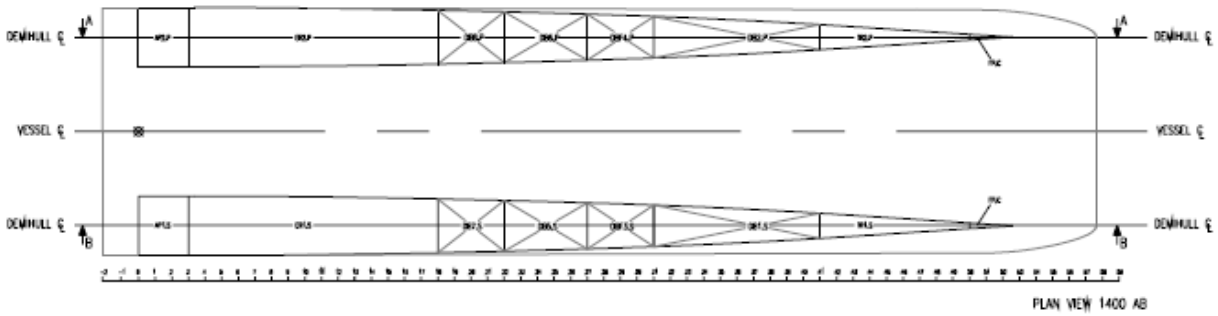
A compartment map is presented in the following section. Illustrations of each scenario are also presented, where the hatched regions represent the damaged tanks.

3.6 Compartment Map



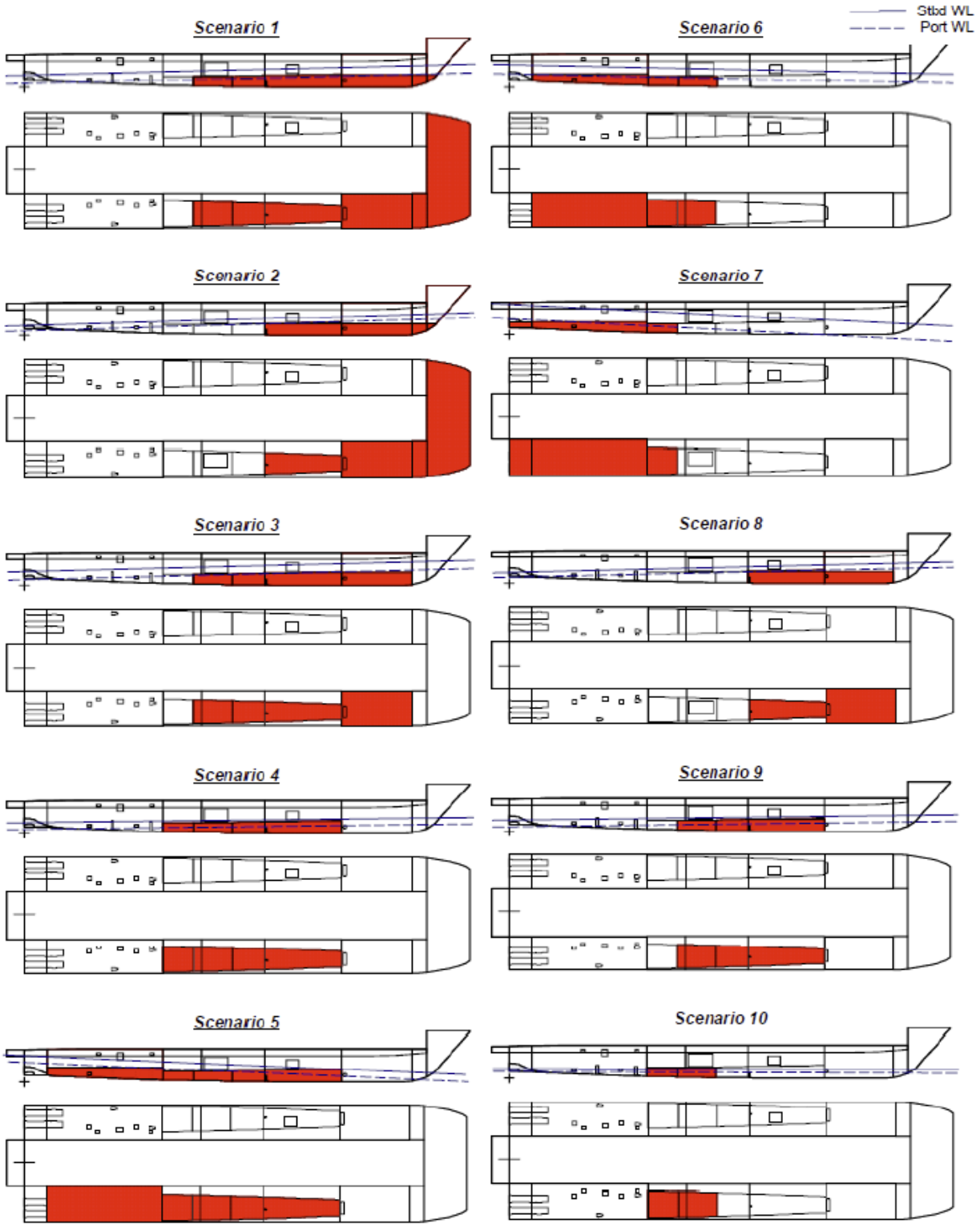


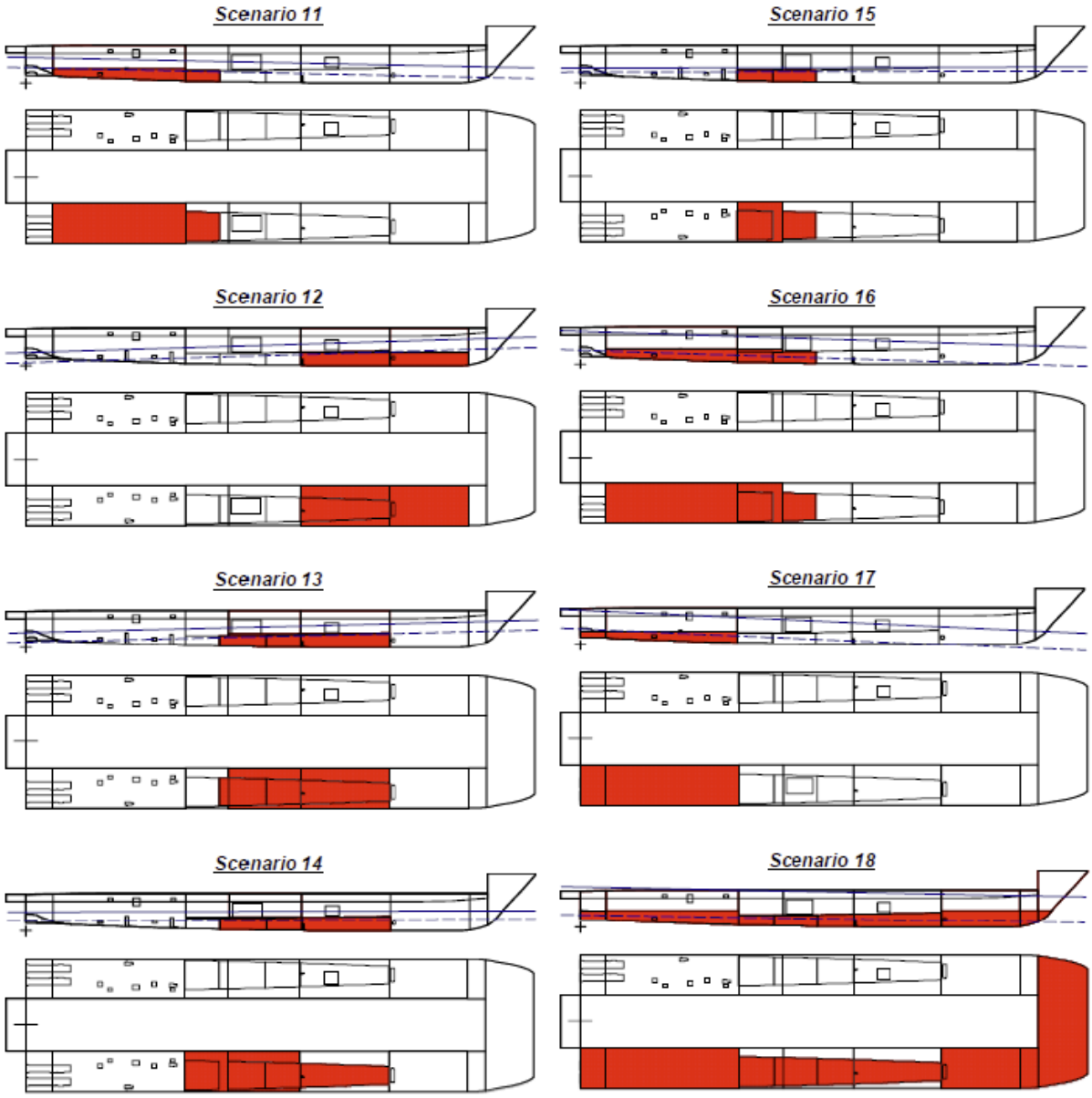




3.7 Damage Scenario Illustrations

The following illustrations depict the damaged compartments in each damage scenario.




Scenario 11
Scenario 15
Scenario 12
Scenario 16
Scenario 13
Scenario 17
Scenario 14
Scenario 18

3.8 Downflooding Point Locations

The table below shows the locations of the downflooding points, which have been set according to the compartment ventilation drawings NG408-240-01-1, NG408-240-01-2, NG408-02-01, NG408-240-02-2, and the Superstructure Construction Drawing NG408-146-11-2.

Means of ventilation for all compartments other than engine rooms, fore peak and the cross deck have been provided with vent check valves which prevent downflooding.

For the stability calculations the vessel is heeled to starboard only.

Downflooding Point Location

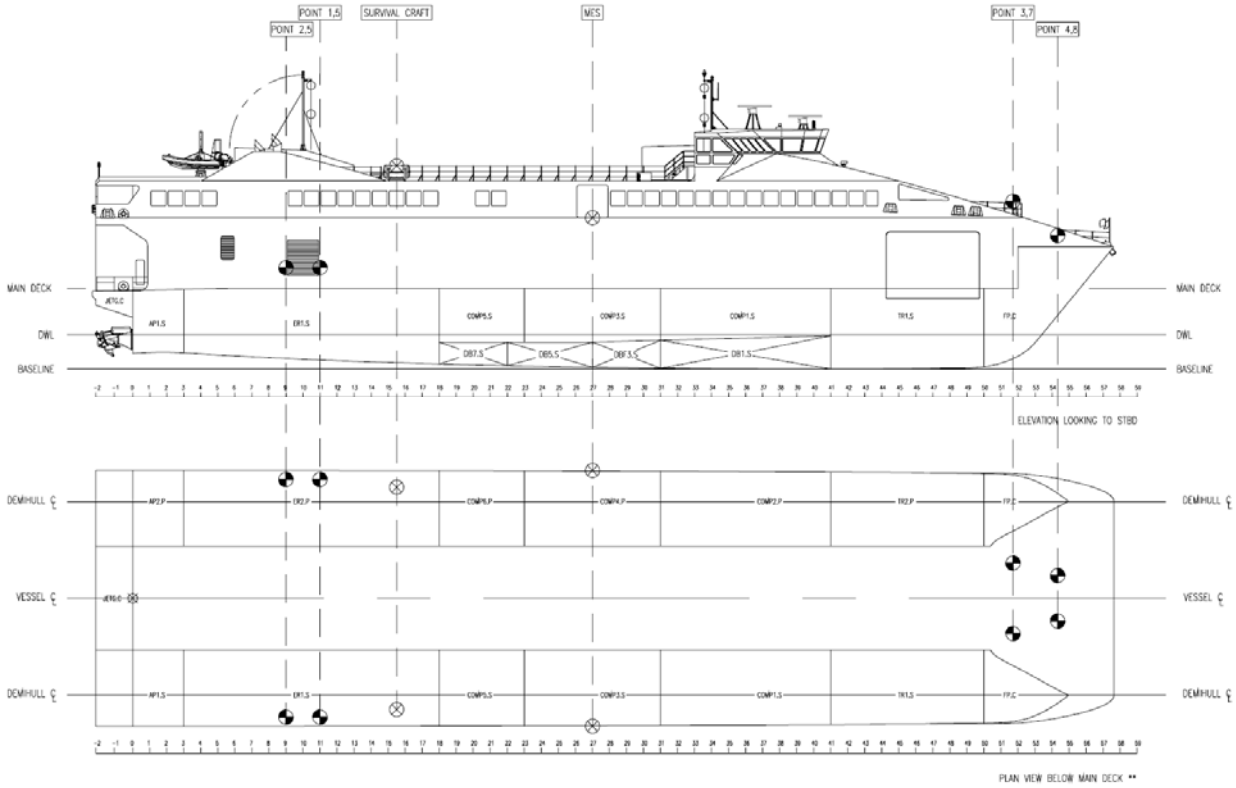
Flood Point	Point Name	Longitudinal ft (+Fwd AP)	Transverse ft (+Stbd)	Vertical ft (+Abv BL)	Linked Room
1	ER Air Fwd S	43.30	27.45	23.45	ER1.S
2	ER Air Aft S	35.42	27.45	23.45	ER1.S
3	EN 90 S"	213.86	5.25	30.90	FP.C
4	EN 91 S"	203.52	8.13	38.80	FP.C
5	ER Air FWD P	43.30	-27.45	23.45	ER1.P
6	ER Air Aft P	35.42	-27.45	23.45	ER1.P
7	EN 90 P"	213.86	-5.25	30.90	FP.C
8	EN 91 P"	203.52	-8.13	38.80	FP.C

Survival Craft Embarkation Positions

Flood Point	Point Name	Longitudinal ft (+Fwd AP)	Transverse ft (+Stbd)	Vertical ft (+Abv BL)
9	Survival Craft S	61.03	25.67	44.46
10	MES S	106.30	29.53	34.94

A drawing showing the downflooding points, MES location and survival craft location is shown in Section 3.9.

3.9 Downflooding Point Locations – Illustration



DOWNFLOODING POINT

SURVIVAL CRAFT / MES LOCATION

* All downflooding points are shown on starboard side as modelled. Downflooding points as per stability report NG408-900-01 Issue 4.

** All downflooding points are located above main deck. Plan view below main deck is shown to indicate compartment locations relative to downflooding points.

3.10 Tank Capacities

The following table summarizes the 100% tank capacities aboard the vessel.

Tank Capacity Table

Tank	Volume	Specific Gravity	Weight	Centroid			FSM Max	
				LCG	TCG	VCG		
	Cu. Ft	SG	LT	ft + Fwd AP	ft +Stbd	ft +Abv BL	ft-LT	
Fuel								
DBF4.P	890.4	0.840	20.85	114.15	-22.47	3.56	38.2	*
DBF3.S	890.4	0.840	20.85	114.15	22.47	3.56	38.2	*
Water Fluids								
FW.P	123.1	1.000	3.43	135.82	-21.23	10.24	1.8	*
BW.S	484.2	1.025	13.83	98.12	21.00	10.43	10.5	*
Lube Oil								
LOH2.P	26.2	0.880	0.64	49.21	-17.12	14.45	0.1	*
LOH1.S	26.2	0.880	0.64	49.21	17.12	14.45	0.1	*
Double Bottom								
DB2.P	1881.5	1.025	53.75	140.43	-22.47	3.97	66.4	
DB1.S	1881.5	1.025	53.75	140.43	22.47	3.97	66.4	
DB6.P	1158.0	1.025	33.08	96.37	-22.47	3.55	74.9	
DB5.S	1158.0	1.025	33.08	96.37	22.47	3.55	74.9	
DB8.P	948.7	1.025	27.10	78.74	-22.47	3.69	73.0	
DB7.S	948.7	1.025	27.10	78.74	22.47	3.69	73.0	
						Maximum Free Surface =	88.9	

(*) Maximum FSM values are given for level trim.

The tank sounding tables are presented in the Trim and Stability Book (Reference 2) at level trim, 0.5° aft trim and 0.5° fwd trim. Weights of all double bottom tanks other than fuel tanks have been calculated with a specific gravity (SpGr) of 1.025.

The tanks have been modeled in accordance with the Tank Capacity Plan drawing, NG408-525-01-1 Issue 1.

The tank sounding tubes have been modeled in accordance with the System Installation Detail Booklet NG408-950-03-1, Tank Penetration Details drawing NG408-151-01-1 and Hull and Bulkhead Penetration Details drawing NG408-152-02-4. Sounding rods can be calibrated.

Section 4 Detailed Maximum VCG Curves

4.1 General Information

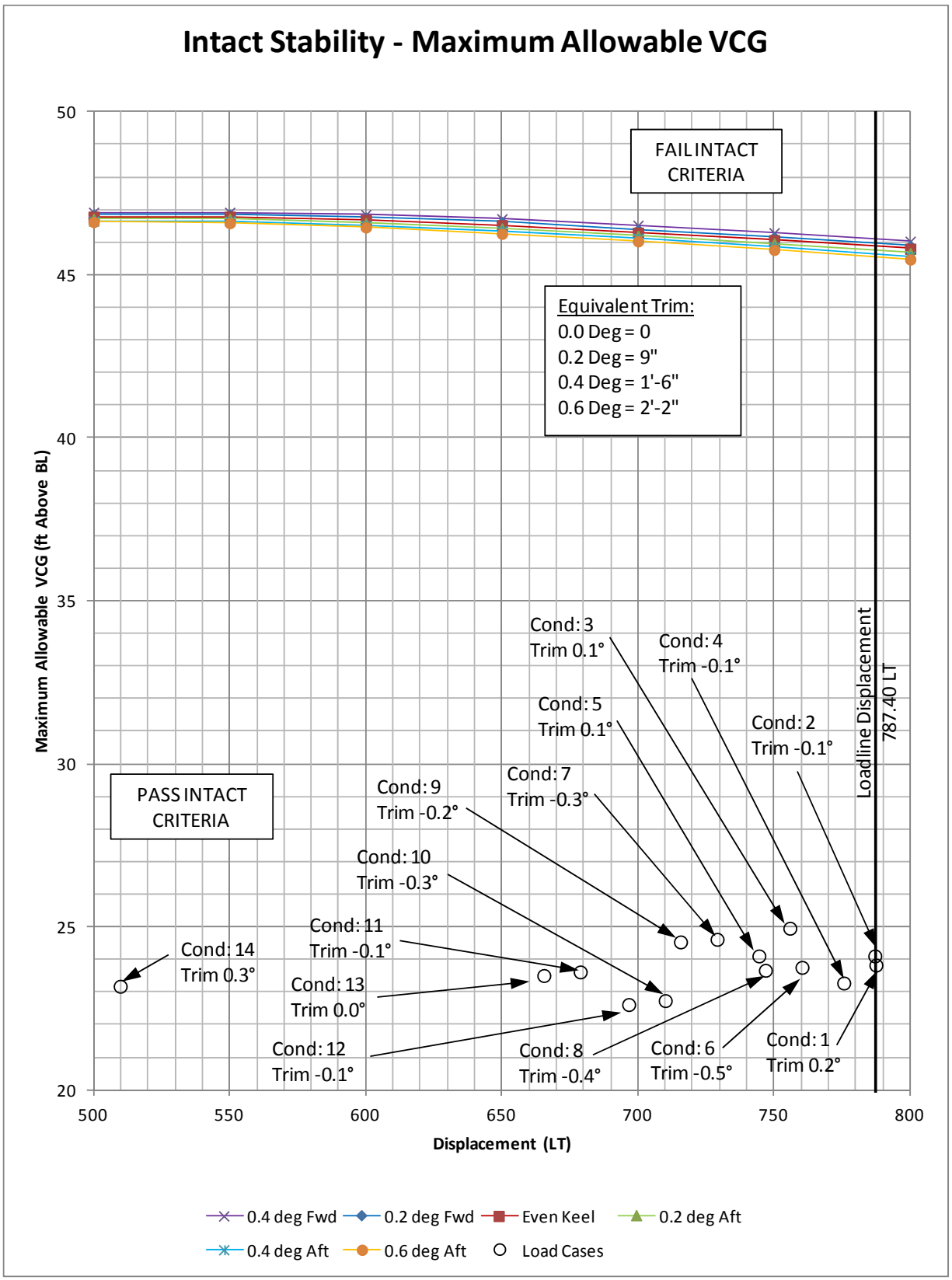
Maximum VCG curves for both intact and damaged stability are shown in Sections 4.2 and 4.3. The intact and damaged stability criteria used to generate the curves are based on the criteria shown in Sections 3.1 and 3.2. The final maximum VCG points plotted in the graphs represent the minimum values obtained from the results at each displacement and trim combination. The damage stability requirements govern the maximum allowable VCG over the full range of vessel displacements from lightship through loadline.

To make the damage stability maximum VCG calculations more practical, a simplification was made to the damage stability analysis. The simplification, substituting the combined wind and passenger heeling moment (HL4) in lieu of the wind heeling moment (HL3), results in a more onerous limit than those required by the HSC Code.

The limiting criterion of the stability of the AMHS FVF craft is the required equilibrium angle following damage, which excludes the action of heeling levers such as weather effects, vessel speed, and passenger crowding. The limiting criteria mentioned above are used for all calculations with no heeling moment applied. Therefore the calculated maximum VCG curves in the damaged stability case have not been affected by the simplified criteria, which make the results exact to the requirements of the HSC Code 2000.

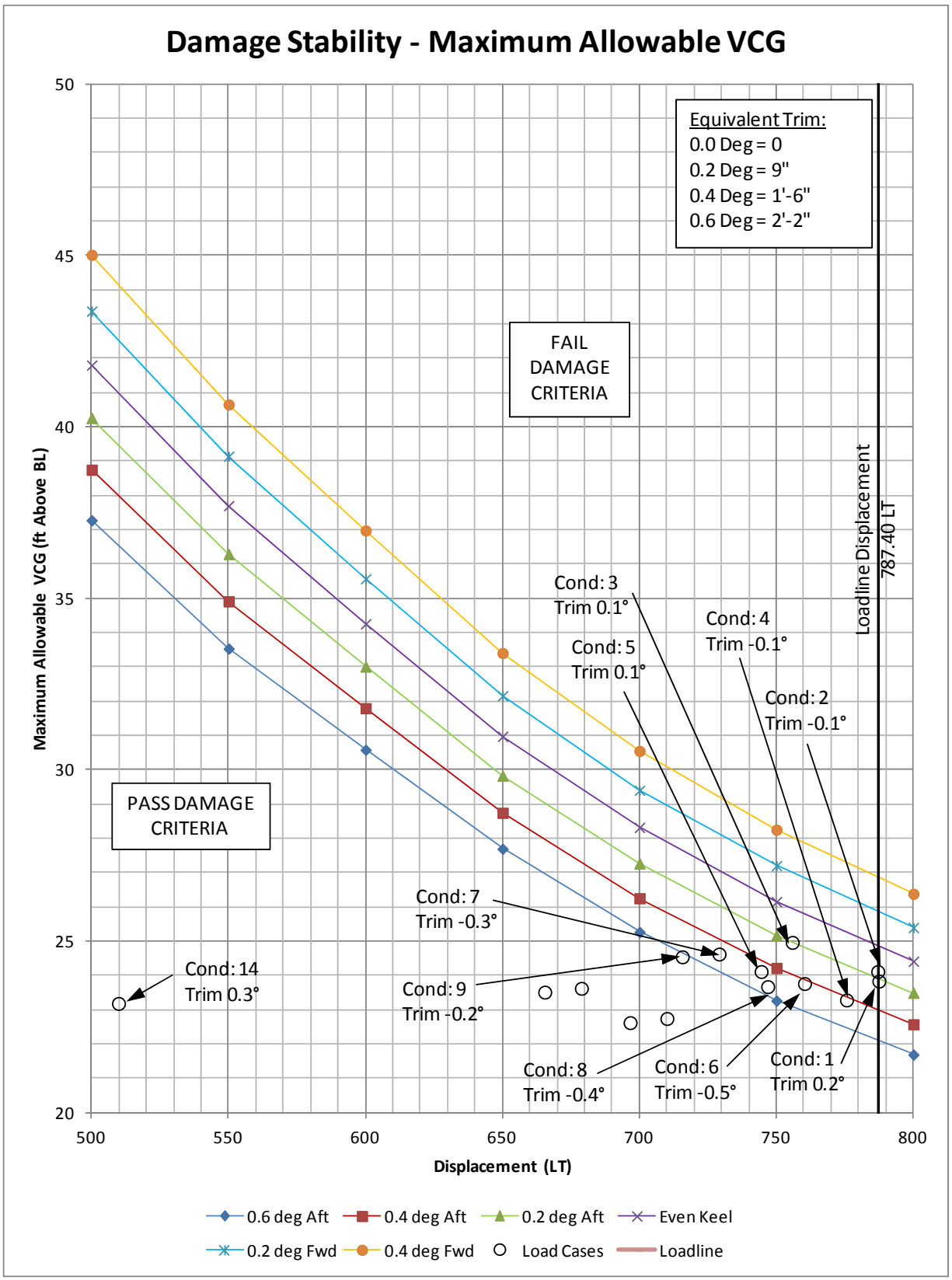
4.2 Intact Stability Case

The following chart shows each sample loading condition plotted against the maximum allowable VCG based on the intact stability criteria. The intact stability maximum allowable VCG curves were calculated for a range of trim angles from 0.6 degrees Aft to 0.4 degrees Forward. However, the resulting maximum allowable VCG curves for intact stability are similar for all angles of trim. The chart shows that all of the sample loading conditions comply with the intact stability requirements. Detailed intact stability calculations for each loading condition are presented in Section 5.


Intact Stability - Maximum Allowable VCG
FAIL INTACT CRITERIA
Equivalent Trim:
0.0 Deg = 0
0.2 Deg = 9"
0.4 Deg = 1'-6"
0.6 Deg = 2'-2"
PASS INTACT CRITERIA
Loadline Displacement 787.40 LT
Cond: 3 Trim 0.1°
Cond: 4 Trim -0.1°
Cond: 5 Trim 0.1°
Cond: 2 Trim -0.1°
Cond: 7 Trim -0.3°
Cond: 9 Trim -0.2°
Cond: 10 Trim -0.3°
Cond: 11 Trim -0.1°
Cond: 14 Trim 0.3°
Cond: 13 Trim 0.0°
Cond: 12 Trim -0.1°
Cond: 8 Trim -0.4°
Cond: 6 Trim -0.5°
Cond: 1 Trim 0.2°
Maximum Allowable VCG (ft Above BL)
Displacement (LT)
50
45
40
35
30
25
20
500
550
600
650
700
750
800
0.4 deg Fwd
0.2 deg Fwd
Even Keel
0.2 deg Aft
0.4 deg Aft
0.6 deg Aft
Load Cases

4.3 Damaged Stability Case

The following chart shows each sample loading condition plotted against the maximum allowable VCG based on the damage stability criteria. Each curve plotted on the chart represents a different initial trim angle. The curves are calculated for a range of trims from 0.6 degrees Aft to 0.4 degrees Forward. The chart shows that all of the sample loading conditions comply with the damage stability requirements. Detailed damage stability calculations for each loading condition are presented in Section 6 and Section 7.


Damage Stability - Maximum Allowable VCG
Equivalent Trim:
0.0 Deg = 0
0.2 Deg = 9"
0.4 Deg = 1'-6"
0.6 Deg = 2'-2"
FAIL DAMAGE CRITERIA
PASS DAMAGE CRITERIA
Loadline Displacement 787.40 LT
Cond: 3 Trim 0.1°
Cond: 4 Trim -0.1°
Cond: 5 Trim 0.1°
Cond: 2 Trim -0.1°
Cond: 7 Trim -0.3°
Cond: 14 Trim 0.3°
Cond: 9 Trim -0.2°
Cond: 8 Trim -0.4°
Cond: 6 Trim -0.5°
Cond: 1 Trim 0.2°
Maximum Allowable VCG (ft Above BL)
Displacement (LT)
50
45
40
35
30
25
20
500
550
600
650
700
750
800
0.6 deg Aft
0.4 deg Aft
0.2 deg Aft
Even Keel
0.2 deg Fwd
0.4 deg Fwd
Load Cases
Loadline

Section 5 Intact Stability: Detailed Results

Intact Stability Summary

Load Case	Scenario No	Draft AP	Trim	GMcorr	Area A1 Under GZ Curve	Angle of Max GZ	Heel due to Turning TL	Heel due to Wind HL2 or Pax PL	Heel due to Wind HL2 & Turn TL	Area A2 Rolling in Waves	PASS / FAIL
					> 18.07	> 10	< 8	< 10	< 12	> 5.26	
		ft	deg	ft	ft-deg	deg	deg	deg	deg	ft-deg	
HSC Loadline	1	8.79	0.2	64.8	163.0	17.2	1.9	1.7	3.6	118.3	PASS
18AEQ 4LT Departure with Ice	2	8.33	-0.1	65.2	163.4	17.2	1.7	1.4	3.3	119.2	PASS
18AEQ 4LT Arrival with Ice	3	8.34	0.0	66.6	156.5	16.7	2.1	1.8	3.7	118.0	PASS
22AEQ 5LT Departure with No Ice	4	8.32	-0.1	66.8	164.6	17.0	1.7	1.5	3.3	121.9	PASS
22AEQ 5LT Arrival with No Ice	5	8.32	0.1	68.3	157.5	16.5	2.0	1.9	3.7	120.6	PASS
20AEQ 6RV Fwd Departure with Ice	6	7.55	-0.5	68.2	165.0	17.0	2.0	1.8	3.6	121.2	PASS
20AEQ 6RV Fwd Arrival with Ice	7	7.55	-0.3	69.7	157.4	16.4	2.3	2.2	4.0	118.9	PASS
30AEQ 2ST Aft Departure with Ice	8	7.65	-0.4	69.1	163.6	16.7	1.6	1.5	3.2	124.1	PASS
30AEQ 2ST Aft Arrival with Ice	9	7.66	-0.2	70.8	156.0	16.2	2.0	1.8	3.6	122.2	PASS
20AEQ 2ST 6RV Fwd Departure with no Ice	10	7.47	-0.3	73.3	161.2	16.2	1.8	1.8	3.4	127.7	PASS
20AEQ 2ST 6RV Fwd Arrival with no Ice	11	7.48	-0.1	75.2	153.2	15.6	2.1	2.1	3.8	125.0	PASS
30AEQ 2ST Aft Departure with no Ice	12	7.59	-0.1	74.4	159.6	15.9	1.4	1.5	3.0	131.1	PASS
30AEQ 2ST Aft Arrival with no Ice	13	7.60	0.0	76.4	151.5	15.3	1.7	1.8	3.4	128.8	PASS
10% Lightship	14	6.73	0.3	99.0	130.9	12.6	1.3	1.7	2.9	142.5	PASS

Condition 1 - HSC Loadline

WEIGHT STATUS

Trim: Aft 0.68/210.33, Heel: 0.00 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	500.46	84.77f	0.01p	23.23
Pax @185 lb ea (Stand)	20.65	105.24f	0.00	38.55
Luggage @20 lb ea Pax	2.23	115.75f	0.00	21.33
Vehicles AEQ @6 kip ea	83.05	101.90f	0.15s	21.33
Vehicles LT @63 kip ea	56.25	22.00f	0.00	27.46
Vehicles ST @45 kip ea	20.09	55.00f	0.00	27.46
Bikes @30 lb ea	1.34	210.00f	0.00	19.69
Kayaks @ 75 lb ea	0.84	135.00f	6.56p	21.65
Crew	0.98	115.83f	2.23s	44.16
Food Stuffs	0.58	100.46f	1.05p	38.71
Loose Outfit/Gear	0.40	111.22f	0.00	37.07
Stores	0.67	101.71f	0.00	37.07
Art Allowance	0.54	111.22f	0.00	40.35
Trash	0.45	104.66f	25.13s	28.64
Video Games	0.45	28.46f	5.11p	38.71
Ice Accretion	50.21	112.83f	0.00	38.16
Total Fixed	**739.19**	**84.04f**	**0.02s**	**24.97**

	Load	SpGr	Weight(LT)	LCG	TCG	VCG	FSM
FW.P	0.980	1.000	3.36	135.82f	21.23p	10.19	0.2
BW.S	0.200	1.025	2.77	98.08f	20.99s	7.96	6.8
DBF4.P	0.980	0.840	20.43	114.06f	22.47p	3.50	22.5
DBF3.S	0.980	0.840	20.43	114.06f	22.47s	3.50	22.5
LOH2.P	0.980	0.880	0.63	49.21f	17.12p	14.41	0.1
LOH1.S	0.980	0.880	0.63	49.21f	17.12s	14.41	0.1
Total Tanks			**48.25**	**112.96f**	**0.28p**	**4.51**	**88.9***
Total Weight			**787.44**	**85.82f**	**0.00**	**23.71**	
Free Surface Adjustment						**0.11**	
Adjusted CG				**85.82f**	**0.00**	**23.83**	

Distances in FEET. Moments in Ft-LT.

Note: FSM values marked with an asterisk (*) are formal values which are not the same as the true values in the present condition.

HYDROSTATIC PROPERTIES

Trim: Aft 0.68/210.33, Heel: 0.00 deg., VCG = 23.71

LCF Draft	Displacement Weight(LT)	Buoyancy-Ctr. LCB	VCB	Weight/ Inch	LCF	Moment/ In trim	GML	GMT
8.516	787.44	85.76f	5.11	10.60	85.36f	138.32	443.4	64.80

Distances in FEET. Specific Gravity = 1.025. Moment in Ft-LT.

Trim is per 210.33Ft

Draft is from Baseline. Formal Free Surface included.

Note: GMT includes the formal free surface moment 88.9 Ft-LT

Condition 1 - HSC Loadline

RIGHTING ARMS vs HEEL ANGLE

Total CG: LCG = 85.82f TCG = 0.00 VCG = 23.71
Free Surface Adjustment: 0.11
Adjusted CG: LCG = 85.82f TCG = 0.00 VCG = 23.83

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Righting Arms in Trim	in Heel	Area	Flood Pt Height	
8.793	0.19a	0.00	787.43	0.00	0.000	0.00	14.77	(6)
8.783	0.25a	5.00s	787.40	0.00	5.634	14.09	12.34	(2)
8.803	0.45a	10.00s	787.44	0.00	11.262	56.33	9.80	(2)
8.805	0.48a	10.50s	787.43	0.00	11.820	62.10	9.55	(2)
8.804	0.51a	11.00s	787.43	0.00	12.374	68.15	9.29	(2)
8.798	0.54a	11.50s	787.43	0.00	12.920	74.47	9.04	(2)
8.787	0.56a	12.00s	787.43	0.00	13.458	81.07	8.79	(2)
8.770	0.59a	12.50s	787.43	0.00	13.985	87.93	8.55	(2)
8.745	0.61a	13.00s	787.43	0.00	14.494	95.05	8.31	(2)
8.710	0.63a	13.50s	787.43	0.00	14.981	102.42	8.08	(2)
8.664	0.65a	14.00s	787.43	0.00	15.440	110.02	7.85	(2)
8.605	0.67a	14.50s	787.43	0.00	15.864	117.85	7.64	(2)
8.534	0.69a	15.00s	787.43	0.00	16.245	125.87	7.44	(2)
8.448	0.70a	15.50s	787.43	0.00	16.574	134.08	7.25	(2)
8.346	0.72a	16.00s	787.43	0.00	16.838	142.43	7.07	(2)
8.227	0.73a	16.50s	787.43	0.00	17.020	150.90	6.91	(2)
8.087	0.75a	17.00s	787.43	0.00	17.108	159.43	6.78	(2)
8.022	0.76a	17.21s	787.43	0.00	17.116	162.99	6.72	(2)
7.729	0.77a	18.00s	787.43	0.00	17.002	176.50	6.57	(2)
7.282	0.78a	19.00s	787.44	0.00	16.655	193.35	6.43	(2)
6.827	0.78a	20.00s	787.20	0.00	16.296	209.83	6.30	(2)
4.552	0.80a	25.00s	787.43	0.00	14.435	286.87	5.60	(2)
2.293	0.85a	30.00s	787.42	0.00	12.467	354.17	4.81	(2)
0.098	0.92a	35.00s	787.42	0.00	10.403	411.38	3.93	(2)
-2.018	1.01a	40.00s	787.45	0.00	8.254	458.06	2.96	(2)
-4.048	1.11a	45.00s	787.57	0.00	6.038	493.82	1.90	(2)
-5.992	1.21a	50.00s	787.58	0.00	3.775	518.37	0.78	(2)
-7.249	1.27a	53.36s	787.41	0.01f	2.236	528.48	0.00	(2)
-7.838	1.30a	55.00s	787.45	0.00	1.486	531.53	*-0.39*	(2)
-8.972	1.36a	58.25s	787.46	0.00	-0.002	533.94	*-1.18*	(2)
-9.563	1.39a	60.00s	787.45	0.00	-0.803	533.23	*-1.62*	(2)

Distances in FEET. Specific Gravity = 1.025. Area in Ft-Deg.

Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 88.9 Ft-LT was applied to artificially modify the CG.

	Critical Points		LCP	TCP	VCP
(2)	ER Air Aft S	FLOOD	35.42f	27.45s	23.45
(6)	ER Air Aft P	FLOOD	35.42f	27.45p	23.45

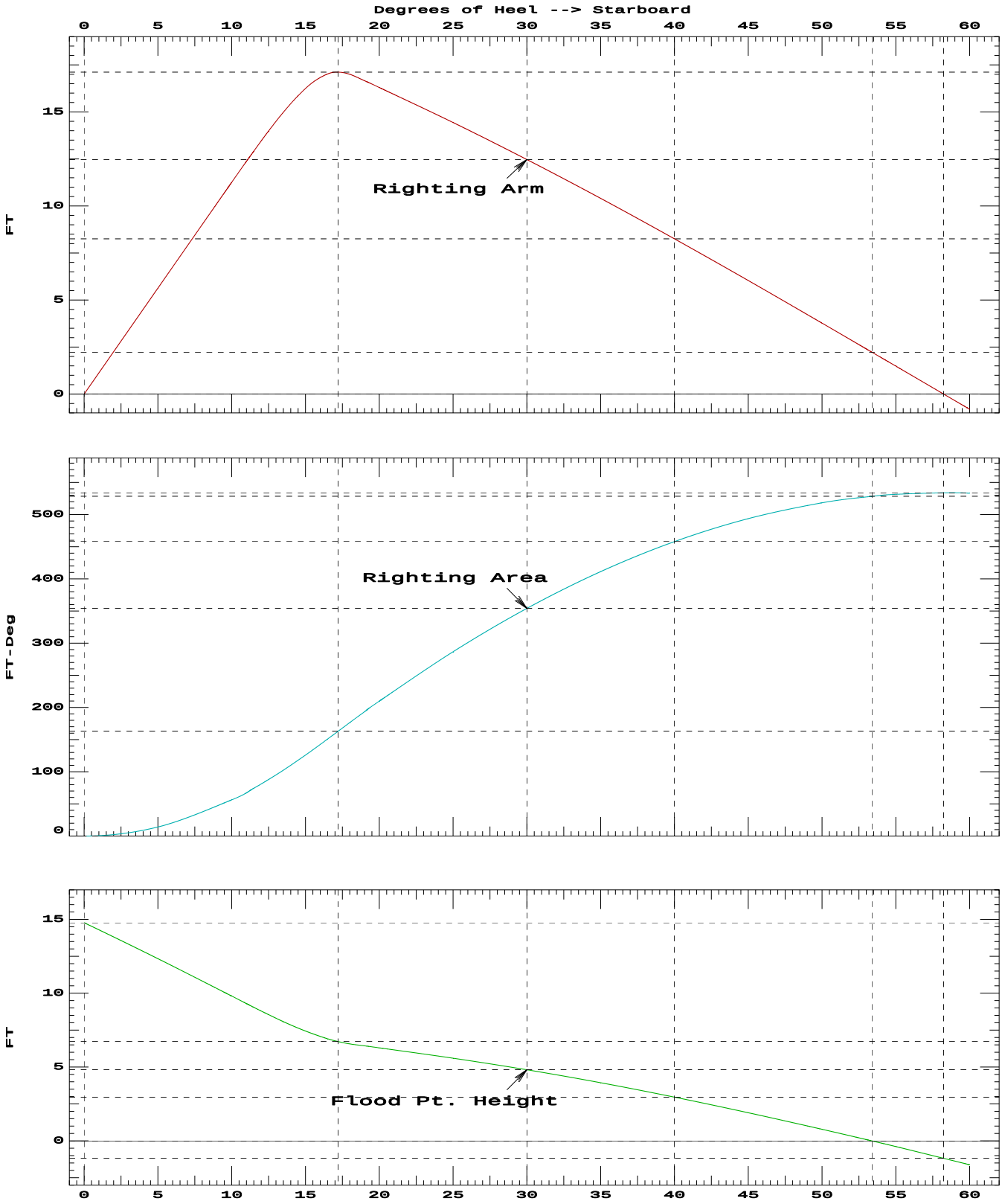
continued next page

Condition 1 - HSC Loadline

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	Area from abs -0.001 deg to 17.2	>	18.03	Ft-deg	162.99	P
(2)	Absolute Angle at MaxRA	>	10.00	deg	17.21	P

Relative angles measured from 0.001

Condition 1 - HSC Loadline



Condition 1 - HSC Loadline

```
*** Heel Angle Check ***

Calculated Heeling Moments
     LONG TONS - FEET
    HL1 =     983.8
    HL2 =    1475.7
    PL  =     449.7
    TL  =    1699.8
    HLT =    3175.5
```

```
With HMMT = TL
        1699.8
```

```
Vessel Heel <    8.00 deg
Calc Heel =      1.90 deg
```

```
With HMMT = max(PL,HL2)
                1475.7
```

```
Vessel Heel <   10.00 deg
Calc Heel =  1.65 deg
```

```
With HMMT = TL+HL2
            3175.5
```

```
Vessel Heel <   12.00 deg
Calc Heel =  3.57 deg
```

Condition 1 - HSC Loadline

*** Residual Area Check ***

RESIDUAL RIGHTING ARMS vs HEEL ANGLE

Total CG: LCG = 85.82f TCG = 0.00 VCG = 23.71
Free Surface Adjustment: 0.11
Adjusted CG: LCG = 85.82f TCG = 0.00p VCG = 23.83

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Area	Flood Pt Height	
8.787	0.22a	3.57s	787.45	0.00	0.000	0.00	13.04	(2)
8.790	0.37a	8.57s	787.44	0.00	5.624	14.06	10.54	(2)
8.704	0.64a	13.57s	787.37	0.00	11.020	55.77	8.04	(2)
8.656	0.66a	14.07s	787.43	0.00	11.473	61.39	7.82	(2)
8.595	0.67a	14.57s	787.43	0.00	11.892	67.23	7.61	(2)
8.522	0.69a	15.07s	787.43	0.00	12.266	73.27	7.41	(2)
8.434	0.71a	15.57s	787.43	0.00	12.587	79.48	7.22	(2)
8.330	0.72a	16.07s	787.43	0.00	12.840	85.84	7.05	(2)
8.208	0.74a	16.57s	787.44	0.00	13.009	92.30	6.89	(2)
8.065	0.75a	17.07s	787.43	0.00	13.083	98.83	6.76	(2)
8.020	0.75a	17.21s	787.45	0.00	**13.087**	100.64	6.72	(2)
7.896	0.76a	17.57s	787.44	0.00	13.063	105.36	6.64	(2)
7.698	0.77a	18.07s	787.43	0.00	12.952	111.87	6.56	(2)
7.475	0.77a	18.57s	787.43	0.00	12.778	118.30	6.49	(2)
7.250	0.78a	19.07s	787.43	0.00	12.601	124.65	6.42	(2)
7.024	0.78a	19.57s	787.43	0.00	12.422	130.90	6.36	(2)
6.795	0.78a	20.07s	787.17	0.01a	12.239	137.07	6.29	(2)
6.571	0.78a	20.57s	787.43	0.00	12.060	143.14	6.22	(2)
6.116	0.79a	21.57s	787.44	0.00	11.694	155.02	6.08	(2)
5.659	0.79a	22.57s	787.44	0.00	11.324	166.53	5.95	(2)
5.203	0.79a	23.57s	787.44	0.00	10.949	177.66	5.80	(2)
2.933	0.83a	28.57s	787.42	0.00	9.010	227.61	5.05	(2)
0.717	0.89a	33.57s	787.42	0.00	6.972	267.61	4.20	(2)
-1.423	0.98a	38.57s	787.43	0.00	4.846	297.19	3.25	(2)
-3.477	1.08a	43.57s	787.54	0.00	2.648	315.95	2.21	(2)
-5.447	1.18a	48.57s	787.57	0.00	0.395	323.58	1.11	(2)
-5.780	1.19a	49.44s	787.45	0.00	-0.001	323.75	0.91	(2)
-7.245	1.27a	53.36s	787.42	0.00	-1.793	320.24	0.00	(2)
-7.324	1.27a	53.57s	787.38	0.00	-1.890	319.85	*-0.05*	(2)
-9.083	1.37a	58.57s	787.45	0.00	-4.181	304.68	*-1.26*	(2)
-10.705	1.46a	63.57s	787.45	0.00	-6.453	278.09	*-2.53*	(2)

Distances in FEET. Specific Gravity = 1.025. Area in Ft-Deg.

Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 88.9 Ft-LT was applied to artificially modify the CG.

Condition 1 - HSC Loadline

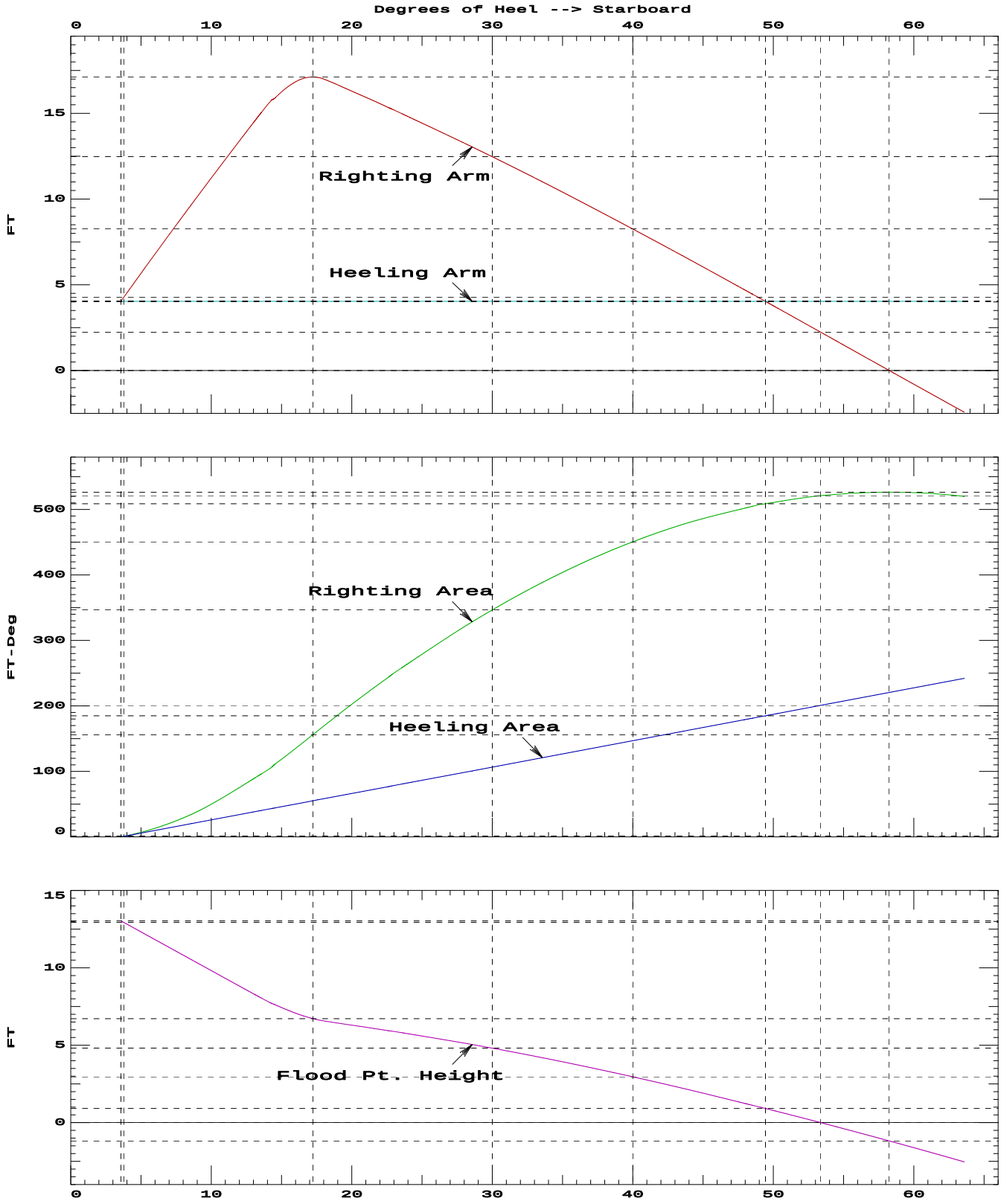
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 3175.46

	Critical Point		LCP	TCP	VCP
(2)	ER Air Aft S	FLOOD	35.42f	27.45s	23.45

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Area from Equilibrium to 15 deg**	**>**	**5.26**	**Ft-deg**	**118.30**	**P**
(2)	**Angle from Equilibrium to RAzero**	**>**	**15.00**	**deg**	**45.87**	**P**

Relative angles measured from 3.570s

Condition 1 - HSC Loadline



Condition 2 - 18AEQ 4LT Departure with Ice

WEIGHT STATUS

Trim: Fwd 0.44/210.33, Heel: Port 0.23 deg.

Part			Weight(LT)	LCG	TCG	VCG	
LIGHT SHIP			500.46	84.77f	0.01p	23.23	
Pax @185 lb ea (Stand)			20.65	105.24f	0.00	38.55	
Luggage @20 lb ea Pax			2.22	115.73f	5.24p	21.33	
Vehicles AEQ @6 kip ea			48.22	120.90f	3.80p	21.33	
Vehicles LT @63 kip ea			112.50	63.65f	0.00	27.46	
Bikes @30 lb ea			0.16	209.32f	0.00	19.69	
Kayaks @ 75 lb ea			0.20	131.39f	6.56p	21.65	
Crew			0.98	115.83f	2.23s	44.16	
Food Stuffs			0.58	100.46f	1.05p	38.71	
Loose Outfit/Gear			0.40	111.22f	0.00	37.07	
Stores			0.67	101.71f	0.00	37.07	
Art Allowance			0.54	111.22f	0.00	40.35	
Trash			0.45	104.66f	25.13s	28.64	
Video Games			0.45	28.46f	5.11p	38.71	
Ice Accretion			50.21	112.83f	0.00	38.16	
Total Fixed			**738.70**	**86.61f**	**0.26p**	**25.27**	
	Load	**SpGr**	**Weight(LT)**	**LCG**	**TCG**	**VCG**	**FSM**
FW.P	0.980	1.000	3.36	135.82f	21.23p	10.19	0.2
BW.S	0.200	1.025	2.77	98.14f	20.98s	7.96	6.8
DBF4.P	0.980	0.840	20.43	114.07f	22.48p	3.50	28.0
DBF3.S	0.980	0.840	20.43	114.07f	22.47s	3.50	28.0
LOH2.P	0.980	0.880	0.63	49.21f	17.12p	14.41	0.1
LOH1.S	0.980	0.880	0.63	49.21f	17.12s	14.41	0.1
Total Tanks			**48.25**	**112.98f**	**0.28p**	**4.51**	**88.9***
Total Weight			**786.95**	**88.22f**	**0.26p**	**24.00**	
Free Surface Adjustment						**0.11**	
Adjusted CG				**88.22f**	**0.26p**	**24.11**	

Distances in FEET. Moments in Ft-LT.

Note: FSM values marked with an asterisk (*) are formal values which are not the same as the true values in the present condition.

HYDROSTATIC PROPERTIES

Trim: Fwd 0.44/210.33, Heel: Port 0.23 deg., VCG = 24.00

LCF Draft	Displacement Weight(LT)	Buoyancy-Ctr. LCB	VCB	Weight/ Inch	LCF	Moment/ In trim	GML	GMT
8.512	786.97	88.26f	5.11	10.67	86.62f	141.61	454.2	65.14

Distances in FEET. Specific Gravity = 1.025. Moment in Ft-LT.

Trim is per 210.33Ft

Draft is from Baseline. Formal Free Surface included.

Note: GMT includes the formal free surface moment 88.9 Ft-LT

Condition 2 - 18AEQ 4LT Departure with Ice

RIGHTING ARMS vs HEEL ANGLE

Total CG: LCG = 88.22f TCG = 0.26p VCG = 24.00
Free Surface Adjustment: 0.11
Adjusted CG: LCG = 88.22f TCG = 0.26p VCG = 24.11

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Righting Arms in Trim	in Heel	Area	Flood Pt Height	
8.331	0.12f	0.23p	786.97	0.00	0.000	0.00	14.92	(5)
8.313	0.07f	4.77s	786.92	0.00	5.675	14.19	12.72	(1)
8.338	0.14a	9.77s	786.95	0.00	11.353	56.75	10.20	(2)
8.336	0.16a	10.27s	786.94	0.00	11.910	62.57	9.94	(2)
8.331	0.19a	10.77s	786.94	0.00	12.461	68.66	9.69	(2)
8.321	0.22a	11.27s	786.94	0.00	13.004	75.03	9.44	(2)
8.305	0.24a	11.77s	786.94	0.00	13.539	81.67	9.20	(2)
8.281	0.26a	12.27s	786.94	0.00	14.060	88.56	8.96	(2)
8.247	0.28a	12.77s	786.94	0.00	14.564	95.72	8.73	(2)
8.203	0.30a	13.27s	786.94	0.00	15.048	103.12	8.50	(2)
8.148	0.31a	13.77s	786.94	0.00	15.506	110.76	8.29	(2)
8.080	0.33a	14.27s	786.95	0.00	15.933	118.62	8.08	(2)
7.998	0.34a	14.77s	786.95	0.00	16.320	126.68	7.89	(2)
7.898	0.34a	15.27s	786.95	0.00	16.659	134.93	7.70	(2)
7.777	0.34a	15.77s	786.94	0.00	16.942	143.33	7.54	(2)
7.640	0.35a	16.27s	786.94	0.00	17.157	151.85	7.39	(2)
7.485	0.35a	16.77s	786.94	0.00	17.292	160.47	7.26	(2)
7.428	0.35a	16.94s	786.94	0.00	17.316	163.44	7.22	(2)
7.349	0.35a	17.17s	786.96	0.00	**17.327**	167.35	7.17	(2)
7.118	0.36a	17.77s	786.95	0.00	17.248	177.76	7.06	(2)
6.675	0.36a	18.77s	786.95	0.00	16.899	194.86	6.92	(2)
6.227	0.37a	19.77s	786.95	0.00	16.535	211.58	6.78	(2)
3.961	0.40a	24.77s	786.94	0.00	14.650	289.75	6.08	(2)
1.685	0.44a	29.77s	786.93	0.00	12.667	358.08	5.31	(2)
-0.529	0.51a	34.77s	786.97	0.00	10.586	416.25	4.45	(2)
-2.658	0.60a	39.77s	787.04	0.00	8.413	463.79	3.49	(2)
-4.704	0.69a	44.77s	787.05	0.00	6.168	500.27	2.45	(2)
-6.654	0.79a	49.77s	787.06	0.00	3.873	525.39	1.33	(2)
-8.491	0.89a	54.77s	787.04	0.01f	1.552	538.96	0.15	(2)
-8.699	0.90a	55.37s	786.98	0.00	1.276	539.80	0.00	(2)
-9.647	0.96a	58.12s	786.96	0.00	-0.001	541.56	*-0.68*	(2)
-10.195	1.00a	59.77s	786.96	0.00	-0.767	540.92	*-1.10*	(2)

Distances in FEET. Specific Gravity = 1.025. Area in Ft-Deg.

Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 88.9 Ft-LT was applied to artificially modify the CG.

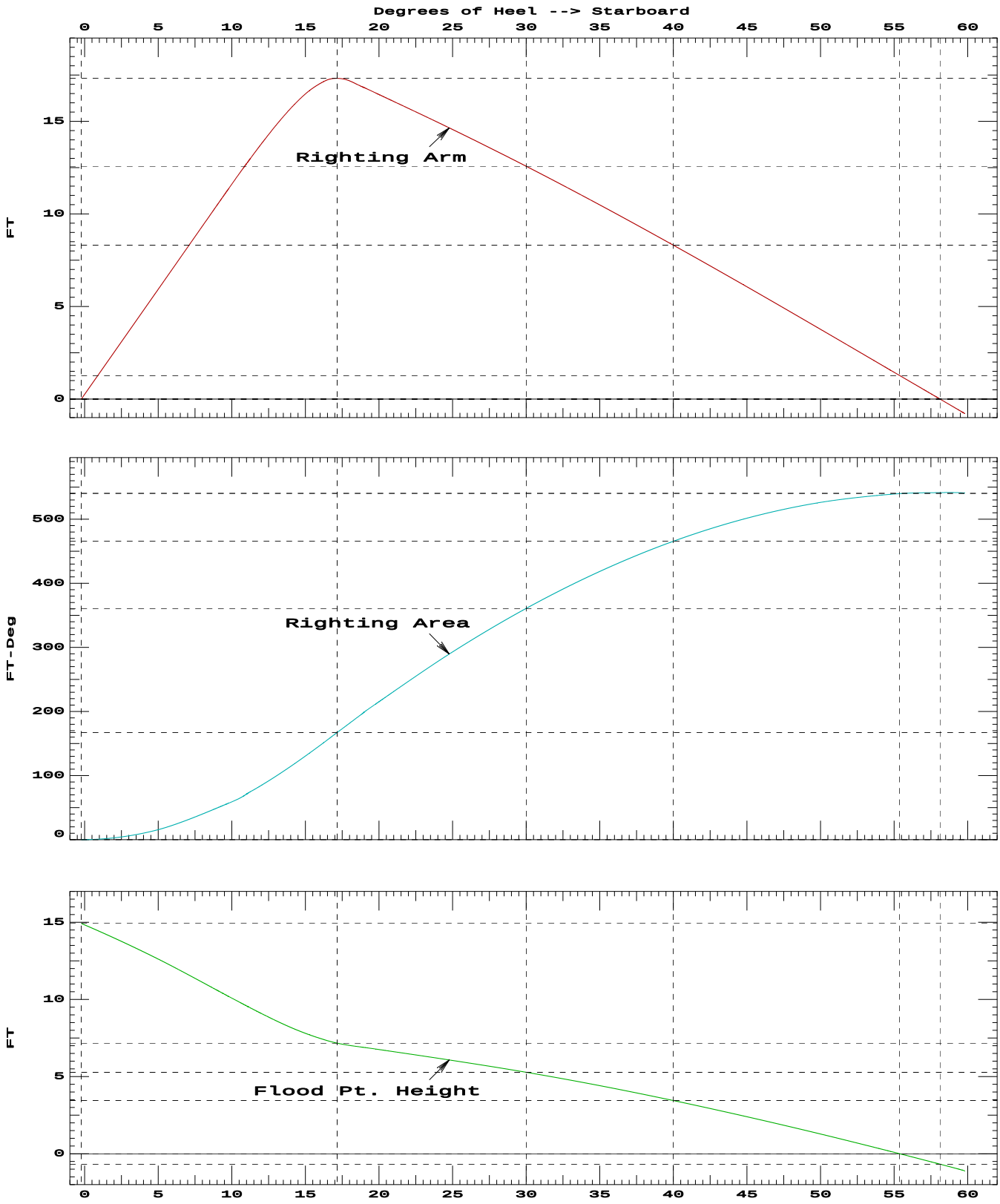
Condition 2 - 18AEQ 4LT Departure with Ice

	Critical Points		LCP	TCP	VCP
(1)	ER Air Fwd S	FLOOD	43.30f	27.45s	23.45
(2)	ER Air Aft S	FLOOD	35.42f	27.45s	23.45
(5)	ER Air FWD P	FLOOD	43.30f	27.45p	23.45

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Area from abs -0.227 deg to 17.2**	**>**	**18.06**	**Ft-deg**	**163.44**	**P**
(2)	**Absolute Angle at MaxRA**	**>**	**10.00**	**deg**	**17.17**	**P**

Relative angles measured from 0.227p

Condition 2 - 18AEQ 4LT Departure with Ice



Condition 2 - 18AEQ 4LT Departure with Ice

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*** Heel Angle Check ***

Calculated Heeling Moments
     LONG TONS - FEET
    HL1 =     983.8
    HL2 =    1475.7
    PL  =     449.7
    TL  =    1721.6
    HLT =    3197.3
```

With HMMT = TL 1721.6
Vessel Heel < 8.00 deg Calc Heel = 1.70 deg

With HMMT = max(PL,HL2) 1475.7
Vessel Heel < 10.00 deg Calc Heel = 1.42 deg

With HMMT = TL+HL2 3197.3
Vessel Heel < 12.00 deg Calc Heel = 3.35 deg

Condition 2 - 18AEQ 4LT Departure with Ice

*** Residual Area Check ***

RESIDUAL RIGHTING ARMS vs HEEL ANGLE

Total CG: LCG = 88.22f TCG = 0.26p VCG = 24.00
Free Surface Adjustment: 0.11
Adjusted CG: LCG = 88.22f TCG = 0.26p VCG = 24.11

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Area	Flood Pt Height	
8.317	0.10f	3.35s	786.99	0.00	0.000	0.00	13.42	(1)
8.327	0.06a	8.35s	786.95	0.00	5.678	14.20	10.93	(2)
8.194	0.30a	13.35s	786.88	0.00	11.058	56.16	8.47	(2)
8.138	0.32a	13.85s	786.94	0.00	11.512	61.80	8.26	(2)
8.068	0.33a	14.35s	786.94	0.00	11.933	67.66	8.05	(2)
7.983	0.34a	14.85s	786.94	0.00	12.314	73.73	7.86	(2)
7.881	0.34a	15.35s	786.95	0.00	12.645	79.97	7.68	(2)
7.758	0.34a	15.85s	786.94	0.00	12.918	86.36	7.52	(2)
7.617	0.35a	16.35s	786.94	0.00	13.123	92.87	7.37	(2)
7.460	0.35a	16.85s	786.94	0.00	13.244	99.46	7.24	(2)
7.348	0.35a	17.17s	786.96	0.00	**13.267**	103.77	7.17	(2)
7.285	0.35a	17.35s	786.94	0.00	13.260	106.09	7.13	(2)
7.086	0.36a	17.85s	786.93	0.00	13.167	112.69	7.04	(2)
6.864	0.36a	18.35s	786.94	0.00	12.992	119.23	6.98	(2)
6.641	0.36a	18.85s	786.94	0.00	12.812	125.69	6.91	(2)
6.417	0.37a	19.35s	786.94	0.00	12.630	132.05	6.84	(2)
6.193	0.37a	19.85s	786.94	0.00	12.448	138.32	6.77	(2)
5.968	0.37a	20.35s	786.94	0.00	12.264	144.49	6.70	(2)
5.517	0.38a	21.35s	786.94	0.00	11.893	156.57	6.57	(2)
5.063	0.38a	22.35s	786.95	0.00	11.518	168.28	6.43	(2)
4.611	0.39a	23.35s	786.95	0.00	11.138	179.61	6.28	(2)
2.330	0.43a	28.35s	786.93	0.00	9.182	230.45	5.54	(2)
0.093	0.49a	33.35s	786.95	0.00	7.128	271.26	4.71	(2)
-2.059	0.57a	38.35s	787.03	0.00	4.981	301.57	3.77	(2)
-4.131	0.67a	43.35s	787.05	0.00	2.754	320.94	2.75	(2)
-6.109	0.76a	48.35s	787.06	0.00	0.470	329.03	1.66	(2)
-6.500	0.78a	49.37s	786.95	0.00	-0.001	329.27	1.42	(2)
-7.980	0.86a	53.35s	787.01	0.00	-1.846	325.60	0.49	(2)
-8.703	0.90a	55.37s	786.94	0.00	-2.788	320.91	0.00	(2)
-9.724	0.97a	58.35s	786.98	0.00	-4.168	310.56	*-0.74*	(2)
-11.319	1.08a	63.35s	786.96	0.00	-6.471	283.95	*-2.02*	(2)

Distances in FEET. Specific Gravity = 1.025. Area in Ft-Deg.

Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 88.9 Ft-LT was applied to artificially modify the CG.

Condition 2 - 18AEQ 4LT Departure with Ice

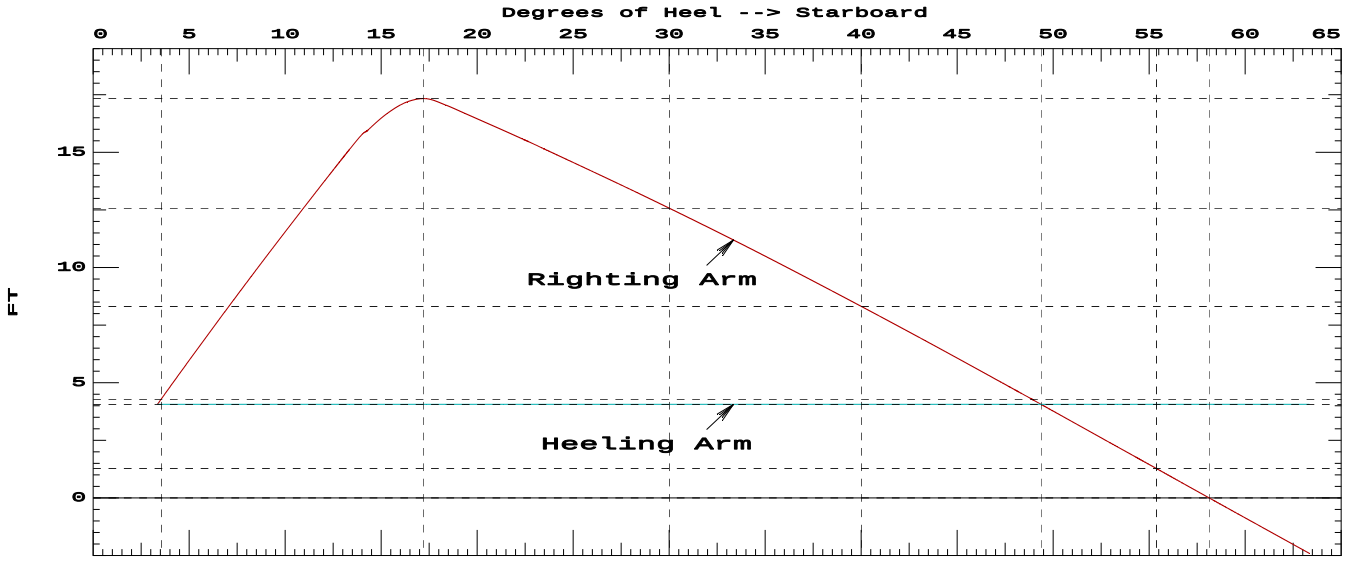
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 3197.30

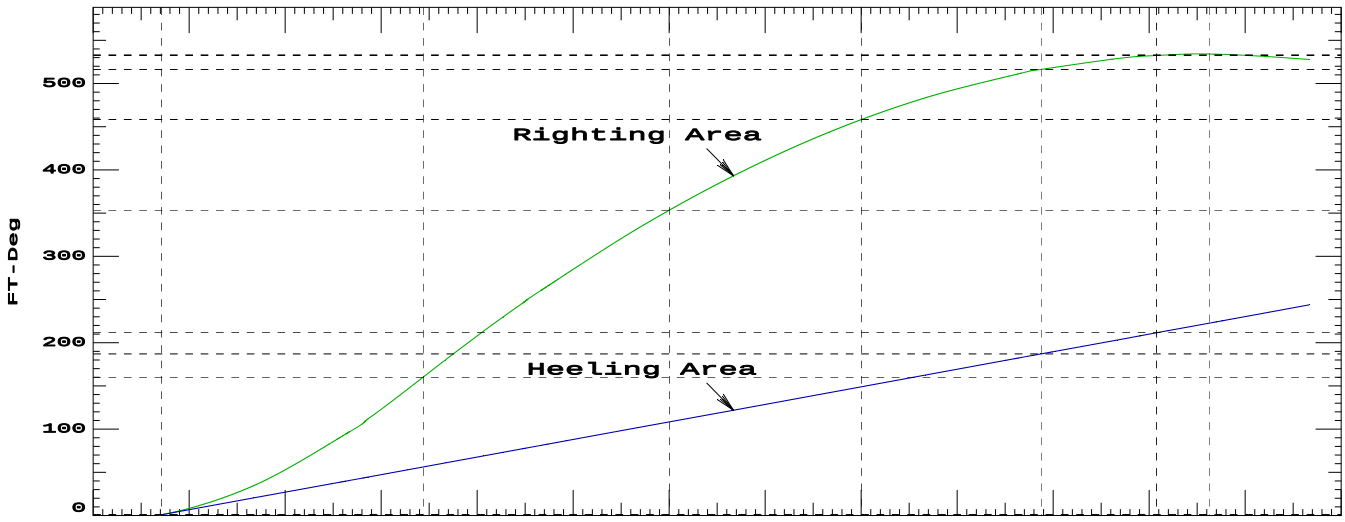
	Critical Points		LCP	TCP	VCP
(1)	ER Air Fwd S	FLOOD	43.30f	27.45s	23.45
(2)	ER Air Aft S	FLOOD	35.42f	27.45s	23.45

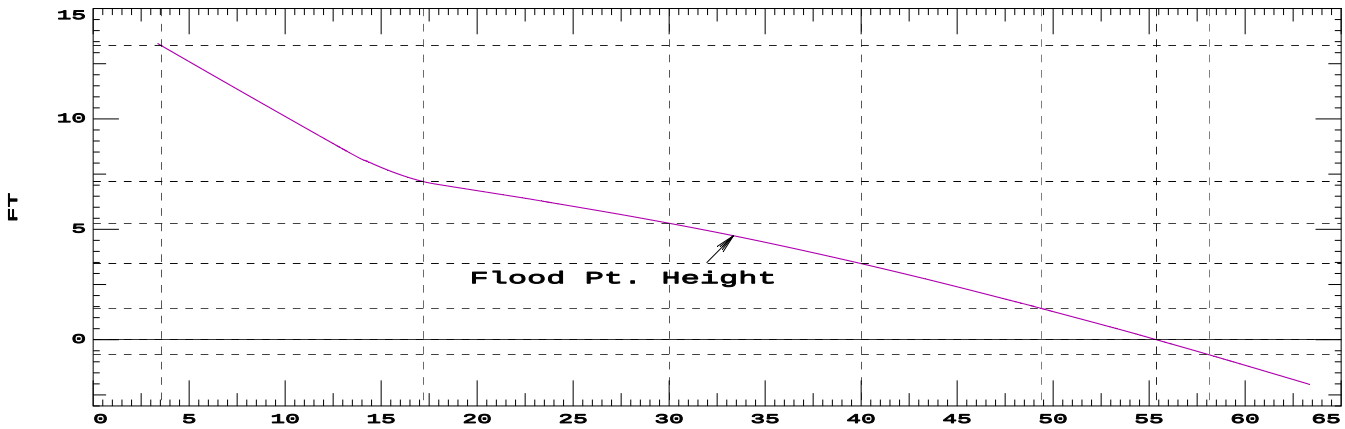
LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Area from Equilibrium to 15 deg**	**>**	**5.26**	**Ft-deg**	**119.23**	**P**
(2)	**Angle from Equilibrium to RAzero**	**>**	**15.00**	**deg**	**46.02**	**P**

Relative angles measured from 3.347s

Condition 2 - 18AEQ 4LT Departure with Ice







Condition 3 - 18AEQ 4LT Arrival with Ice

WEIGHT STATUS

Trim: Aft 0.17/210.33, Heel: Stbd 0.09 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	500.46	84.77f	0.01p	23.23
Pax @185 lb ea (Stand)	20.65	105.24f	0.00	38.55
Luggage @20 lb ea Pax	2.22	115.73f	5.24p	21.33
Vehicles AEQ @6 kip ea	48.22	120.90f	3.80p	21.33
Vehicles LT @63 kip ea	112.50	63.65f	0.00	27.46
Bikes @30 lb ea	0.16	209.32f	0.00	19.69
Kayaks @ 75 lb ea	0.20	131.39f	25.83p	21.65
Crew	0.98	115.83f	2.23s	44.16
Food Stuffs	0.06	100.46f	1.05p	38.71
Loose Outfit/Gear	0.40	111.22f	0.00	37.07
Stores	0.07	101.71f	0.00	37.07
Art Allowance	0.54	111.22f	0.00	40.35
Trash	0.45	104.66f	25.13s	28.64
Video Games	0.45	28.46f	5.11p	38.71
Ice Accretion	50.21	112.83f	0.00	38.16
Total Fixed	**737.58**	**86.58f**	**0.26p**	**25.25**

	Load	SpGr	Weight(LT)	LCG	TCG	VCG	FSM
FW.P	0.100	1.000	0.34	135.82f	21.23p	8.19	0.7
BW.S	0.980	1.025	13.55	98.12f	21.00s	10.37	0.9
DBF4.P	0.100	0.840	2.08	114.26f	22.46p	0.77	19.1
DBF3.S	0.100	0.840	2.08	114.26f	22.49s	0.77	19.1
LOH2.P	0.100	0.880	0.06	49.21f	17.12p	12.70	0.1
LOH1.S	0.100	0.880	0.06	49.21f	17.12s	12.70	0.1
Total Tanks			**18.20**	**102.18f**	**15.24s**	**8.14**	**88.9***
Total Weight			**755.77**	**86.96f**	**0.11s**	**24.84**	
Free Surface Adjustment						**0.12**	
Adjusted CG				**86.96f**	**0.11s**	**24.96**	

Distances in FEET. Moments in Ft-LT.

Note: FSM values marked with an asterisk (*) are formal values which are not the same as the true values in the present condition.

HYDROSTATIC PROPERTIES

Trim: Aft 0.17/210.33, Heel: Stbd 0.09 deg., VCG = 24.84

LCF Draft	Displacement Weight(LT)	Buoyancy-Ctr. LCB	VCB	Weight/ Inch	LCF	Moment/ In trim	GML	GMT
8.266	755.77	86.94f	4.97	10.54	85.58f	136.83	457.0	66.55

Distances in FEET. Specific Gravity = 1.025. Moment in Ft-LT.
Trim is per 210.33Ft
Draft is from Baseline. Formal Free Surface included.

Note: GMT includes the formal free surface moment 88.9 Ft-LT

Condition 3 - 18AEQ 4LT Arrival with Ice

RIGHTING ARMS vs HEEL ANGLE

Total CG: LCG = 86.96f TCG = 0.11s VCG = 24.84
Free Surface Adjustment: 0.12
Adjusted CG: LCG = 86.96f TCG = 0.11s VCG = 24.96

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Righting Arms in Trim	in Heel	Area	Flood Pt Height	
8.335	0.05a	0.09s	755.76	0.00	0.000	0.00	15.10	(2)
8.313	0.10a	5.09s	755.74	0.00	5.792	14.48	12.67	(2)
8.331	0.31a	10.09s	755.74	0.00	11.581	57.92	10.14	(2)
8.325	0.33a	10.59s	755.77	0.00	12.143	63.85	9.88	(2)
8.315	0.36a	11.09s	755.77	0.00	12.699	70.06	9.64	(2)
8.298	0.38a	11.59s	755.77	0.00	13.244	76.54	9.39	(2)
8.273	0.40a	12.09s	755.77	0.00	13.774	83.30	9.15	(2)
8.238	0.42a	12.59s	755.77	0.00	14.284	90.31	8.92	(2)
8.192	0.44a	13.09s	755.77	0.00	14.770	97.57	8.70	(2)
8.135	0.45a	13.59s	755.77	0.00	15.227	105.07	8.48	(2)
8.065	0.46a	14.09s	755.77	0.00	15.647	112.79	8.28	(2)
7.979	0.47a	14.59s	755.77	0.00	16.022	120.71	8.09	(2)
7.874	0.48a	15.09s	755.77	0.00	16.341	128.80	7.91	(2)
7.750	0.48a	15.59s	755.76	0.00	16.592	137.03	7.75	(2)
7.609	0.48a	16.09s	755.76	0.00	16.762	145.37	7.61	(2)
7.449	0.49a	16.59s	755.76	0.00	16.832	153.77	7.49	(2)
7.426	0.49a	16.66s	755.76	0.00	**16.833**	154.91	7.47	(2)
7.393	0.49a	16.76s	755.76	0.00	16.831	156.51	7.45	(2)
7.267	0.50a	17.09s	755.76	0.00	16.791	162.18	7.38	(2)
6.834	0.50a	18.09s	755.77	0.00	16.457	178.80	7.24	(2)
6.386	0.51a	19.09s	755.72	0.00	16.080	195.08	7.11	(2)
5.937	0.51a	20.09s	755.77	0.00	15.699	210.97	6.97	(2)
3.673	0.54a	25.09s	755.76	0.00	13.734	284.63	6.25	(2)
1.392	0.57a	30.09s	755.76	0.00	11.682	348.20	5.48	(2)
-0.836	0.63a	35.09s	755.75	0.00	9.548	401.31	4.63	(2)
-2.973	0.71a	40.09s	755.82	0.00	7.340	443.56	3.67	(2)
-5.013	0.81a	45.09s	755.89	0.00	5.069	474.61	2.62	(2)
-6.953	0.90a	50.09s	755.91	0.00	2.758	494.19	1.50	(2)
-8.777	1.01a	55.09s	755.92	0.00	0.430	502.17	0.31	(2)
-9.104	1.02a	56.02s	755.85	0.00	-0.002	502.37	0.08	(2)
-9.214	1.03a	56.34s	755.84	0.00	-0.150	502.34	0.00	(2)
-10.469	1.11a	60.09s	755.83	0.00	-1.887	498.52	*-0.95*	(2)

Distances in FEET. Specific Gravity = 1.025. Area in Ft-Deg.

Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 88.9 Ft-LT was applied to artificially modify the CG.

	Critical Point		LCP	TCP	VCP
(2)	ER Air Aft S	FLOOD	35.42f	27.45s	23.45

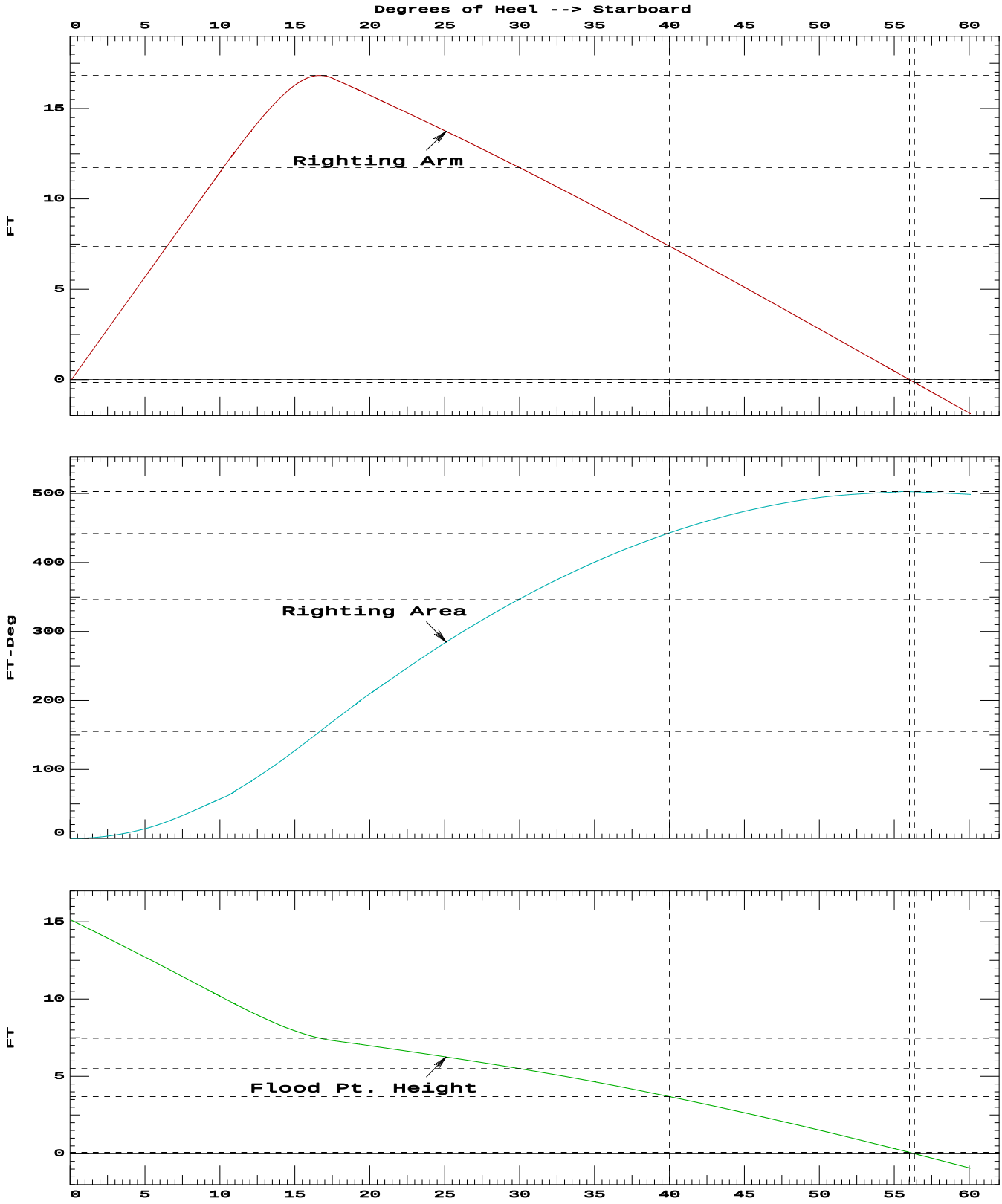
continued next page

Condition 3 - 18AEQ 4LT Arrival with Ice

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	Area from abs 0.095 deg to 16.7	>	18.61	Ft-deg	156.51	P
(2)	Absolute Angle at MaxRA	>	10.00	deg	16.66	P

Relative angles measured from 0.095

Condition 3 - 18AEQ 4LT Arrival with Ice



Condition 3 - 18AEQ 4LT Arrival with Ice

```
*** Heel Angle Check ***

Calculated Heeling Moments
     LONG TONS - FEET
    HL1 =     983.8
    HL2 =    1475.7
    PL  =     449.7
    TL  =    1719.8
    HLT =    3195.5
```

With HMMT = TL 1719.8
Vessel Heel < 8.00 deg Calc Heel = 2.05 deg

With HMMT = max(PL,HL2) 1475.7
Vessel Heel < 10.00 deg Calc Heel = 1.78 deg

With HMMT = TL+HL2 3195.5
Vessel Heel < 12.00 deg Calc Heel = 3.74 deg

Condition 3 - 18AEQ 4LT Arrival with Ice

*** Residual Area Check ***

RESIDUAL RIGHTING ARMS vs HEEL ANGLE

Total CG: LCG = 86.96f TCG = 0.11s VCG = 24.84
Free Surface Adjustment: 0.12
Adjusted CG: LCG = 86.96f TCG = 0.11s VCG = 24.96

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Area	Flood Pt Height	
8.319	0.07a	3.74s	755.79	0.00	0.001	0.00	13.34	(2)
8.327	0.24a	8.74s	755.77	0.00	5.801	14.51	10.83	(2)
8.116	0.45a	13.74s	755.80	0.00	11.129	57.03	8.42	(2)
8.041	0.46a	14.24s	755.77	0.00	11.537	62.69	8.22	(2)
7.951	0.47a	14.74s	755.77	0.00	11.897	68.55	8.04	(2)
7.840	0.48a	15.24s	755.77	0.00	12.197	74.58	7.86	(2)
7.711	0.48a	15.74s	755.76	0.00	12.427	80.73	7.71	(2)
7.564	0.48a	16.24s	755.76	0.00	12.569	86.98	7.57	(2)
7.426	0.49a	16.66s	755.78	0.00	**12.609**	92.29	7.47	(2)
7.399	0.49a	16.74s	755.76	0.00	12.607	93.28	7.45	(2)
7.210	0.50a	17.24s	755.76	0.00	12.535	99.56	7.36	(2)
6.992	0.50a	17.74s	755.77	0.00	12.365	105.79	7.29	(2)
6.769	0.50a	18.24s	755.77	0.00	12.178	111.92	7.22	(2)
6.546	0.50a	18.74s	755.77	0.00	11.990	117.96	7.15	(2)
6.322	0.51a	19.24s	755.77	0.00	11.801	123.91	7.08	(2)
6.098	0.51a	19.74s	755.77	0.00	11.611	129.77	7.02	(2)
5.873	0.51a	20.24s	755.77	0.00	11.419	135.52	6.95	(2)
5.648	0.51a	20.74s	755.77	0.00	11.227	141.18	6.88	(2)
5.193	0.52a	21.74s	755.62	0.00	10.838	152.22	6.74	(2)
4.744	0.52a	22.74s	755.77	0.00	10.447	162.86	6.60	(2)
4.289	0.53a	23.74s	755.77	0.00	10.051	173.11	6.45	(2)
2.008	0.56a	28.74s	755.76	0.00	8.021	218.33	5.70	(2)
-0.241	0.61a	33.74s	755.75	0.00	5.910	253.19	4.87	(2)
-2.404	0.69a	38.74s	755.78	0.00	3.720	277.29	3.94	(2)
-4.469	0.78a	43.74s	755.88	0.00	1.465	290.29	2.92	(2)
-5.737	0.84a	46.93s	755.78	0.00	0.000	292.63	2.22	(2)
-6.440	0.88a	48.74s	755.79	0.00	-0.839	291.87	1.81	(2)
-8.295	0.98a	53.74s	755.92	0.00	-3.164	281.87	0.64	(2)
-9.217	1.03a	56.35s	755.77	0.00	-4.379	272.04	0.00	(2)
-10.026	1.08a	58.74s	755.78	0.00	-5.488	260.24	*-0.60*	(2)
-11.600	1.19a	63.74s	755.83	0.00	-7.778	227.06	*-1.90*	(2)

Distances in FEET. Specific Gravity = 1.025. Area in Ft-Deg.

Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 88.9 Ft-LT was applied to artificially modify the CG.

Condition 3 - 18AEQ 4LT Arrival with Ice

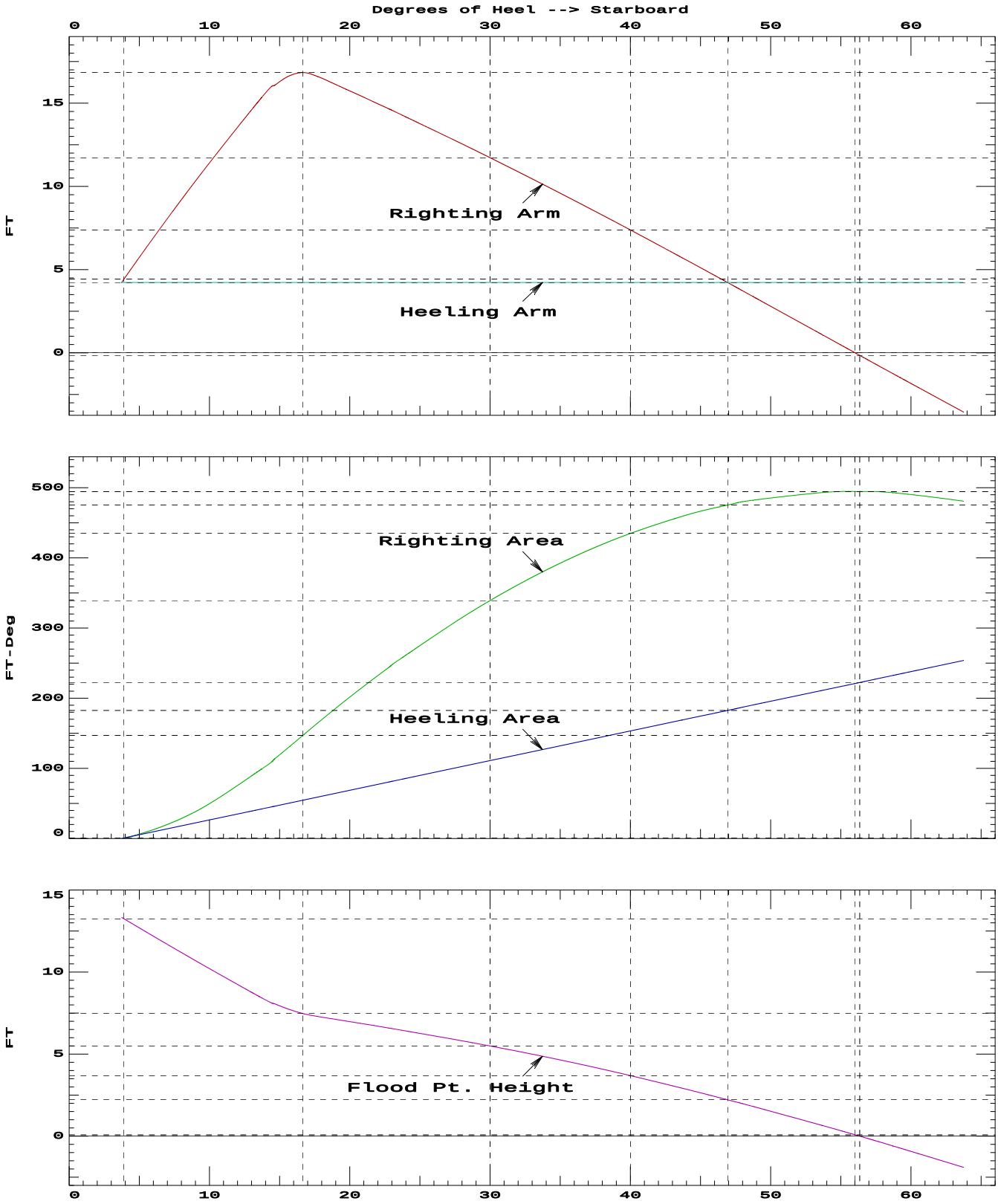
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 3195.45

	Critical Point		LCP	TCP	VCP
(2)	ER Air Aft S	FLOOD	35.42f	27.45s	23.45

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Area from Equilibrium to 15 deg**	**>**	**5.26**	**Ft-deg**	**117.96**	**P**
(2)	**Angle from Equilibrium to RAzero**	**>**	**15.00**	**deg**	**43.19**	**P**

Relative angles measured from 3.740s

Condition 3 - 18AEQ 4LT Arrival with Ice



Condition 4 - 22AEQ 5LT Departure with No Ice

WEIGHT STATUS

Trim: Fwd 0.26/210.33, Heel: Port 0.14 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	500.46	84.77f	0.01p	23.23
Pax @185 lb ea (Stand)	20.65	105.24f	0.00	38.55
Luggage @20 lb ea Pax	2.22	115.73f	5.24p	21.33
Vehicles AEQ @6 kip ea	58.94	112.70f	1.36s	21.33
Vehicles LT @63 kip ea	140.63	76.25f	1.28p	27.46
Bikes @30 lb ea	0.16	209.32f	0.00	19.69
Kayaks @ 75 lb ea	0.20	131.39f	25.83p	21.65
Crew	0.98	115.83f	2.23s	44.16
Food Stuffs	0.58	100.46f	1.05p	38.71
Loose Outfit/Gear	0.40	111.22f	0.00	37.07
Stores	0.67	101.71f	0.00	37.07
Art Allowance	0.54	111.22f	0.00	40.35
Trash	0.45	104.66f	25.13s	28.64
Video Games	0.45	28.46f	5.11p	38.71
Total Fixed	**727.33**	**86.18f**	**0.15p**	**24.41**

	Load	SpGr	Weight(LT)	LCG	TCG	VCG	FSM
FW.P	0.980	1.000	3.36	135.82f	21.23p	10.19	0.2
BW.S	0.200	1.025	2.77	98.13f	20.99s	7.96	6.8
DBF4.P	0.980	0.840	20.43	114.07f	22.48p	3.50	27.9
DBF3.S	0.980	0.840	20.43	114.07f	22.47s	3.50	27.9
LOH2.P	0.980	0.880	0.63	49.21f	17.12p	14.41	0.1
LOH1.S	0.980	0.880	0.63	49.21f	17.12s	14.41	0.1
Total Tanks			**48.25**	**112.97f**	**0.28p**	**4.51**	**88.9***
Total Weight			**775.58**	**87.85f**	**0.16p**	**23.17**	
Free Surface Adjustment						**0.11**	
Adjusted CG				**87.85f**	**0.16p**	**23.28**	

Distances in FEET. Moments in Ft-LT.

Note: FSM values marked with an asterisk (*) are formal values which are not the same as the true values in the present condition.

HYDROSTATIC PROPERTIES

Trim: Fwd 0.26/210.33, Heel: Port 0.14 deg., VCG = 23.17

LCF Draft	Displacement Weight(LT)	Buoyancy-Ctr. LCB	VCB	Weight/ Inch	LCF	Moment/ In trim	GML	GMT
8.422	775.57	87.87f	5.06	10.62	86.28f	140.31	456.6	66.78

Distances in FEET. Specific Gravity = 1.025. Moment in Ft-LT.

Trim is per 210.33Ft

Draft is from Baseline. Formal Free Surface included.

Note: GMT includes the formal free surface moment 88.9 Ft-LT

Condition 4 - 22AEQ 5LT Departure with No Ice

RIGHTING ARMS vs HEEL ANGLE

Total CG: LCG = 87.85f TCG = 0.16p VCG = 23.17
Free Surface Adjustment: 0.11
Adjusted CG: LCG = 87.85f TCG = 0.16p VCG = 23.28

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Righting Arms in Trim	in Heel	Area	Flood Pt Height	
8.317	0.07f	0.14p	775.56	0.00	0.000	0.00	15.01	(5)
8.297	0.02f	4.86s	775.55	0.00	5.816	14.54	12.73	(1)
8.319	0.19a	9.86s	775.58	0.00	11.634	58.17	10.20	(2)
8.316	0.21a	10.36s	775.57	0.00	12.203	64.13	9.95	(2)
8.309	0.24a	10.86s	775.57	0.00	12.766	70.37	9.70	(2)
8.297	0.26a	11.36s	775.57	0.00	13.320	76.89	9.45	(2)
8.278	0.29a	11.86s	775.57	0.00	13.864	83.69	9.21	(2)
8.249	0.31a	12.36s	775.57	0.00	14.392	90.75	8.97	(2)
8.211	0.33a	12.86s	775.58	0.00	14.901	98.07	8.74	(2)
8.163	0.34a	13.36s	775.58	0.00	15.388	105.64	8.52	(2)
8.103	0.35a	13.86s	775.58	0.00	15.845	113.45	8.31	(2)
8.029	0.37a	14.36s	775.58	0.00	16.267	121.48	8.10	(2)
7.939	0.37a	14.86s	775.58	0.00	16.645	129.71	7.92	(2)
7.830	0.38a	15.36s	775.58	0.00	16.968	138.11	7.74	(2)
7.702	0.38a	15.86s	775.57	0.00	17.229	146.66	7.59	(2)
7.557	0.38a	16.36s	775.57	0.00	17.415	155.32	7.45	(2)
7.394	0.38a	16.86s	775.57	0.00	17.506	164.05	7.32	(2)
7.384	0.38a	16.89s	775.57	0.00	17.508	164.60	7.31	(2)
7.336	0.39a	17.03s	775.57	0.00	**17.512**	167.00	7.28	(2)
7.002	0.39a	17.86s	775.58	0.00	17.360	181.50	7.14	(2)
6.556	0.40a	18.86s	775.58	0.00	17.013	198.70	7.01	(2)
6.107	0.40a	19.86s	775.58	0.00	16.662	215.54	6.87	(2)
3.843	0.43a	24.86s	775.57	0.00	14.838	294.47	6.16	(2)
1.565	0.47a	29.86s	775.56	0.00	12.917	363.90	5.40	(2)
-0.655	0.54a	34.86s	775.58	0.00	10.900	423.48	4.54	(2)
-2.787	0.63a	39.86s	775.67	0.00	8.793	472.75	3.58	(2)
-4.832	0.72a	44.86s	775.69	0.00	6.609	511.29	2.54	(2)
-6.779	0.82a	49.86s	775.70	0.00	4.372	538.76	1.42	(2)
-8.611	0.92a	54.86s	775.72	0.00	2.107	554.97	0.23	(2)
-8.934	0.94a	55.78s	775.67	0.00	1.689	556.71	0.00	(2)
-10.194	1.02a	59.51s	775.58	0.00	-0.001	559.86	*-0.93*	(2)
-10.310	1.03a	59.86s	775.58	0.00	-0.162	559.83	*-1.02*	(2)

Distances in FEET. Specific Gravity = 1.025. Area in Ft-Deg.

Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 88.9 Ft-LT was applied to artificially modify the CG.

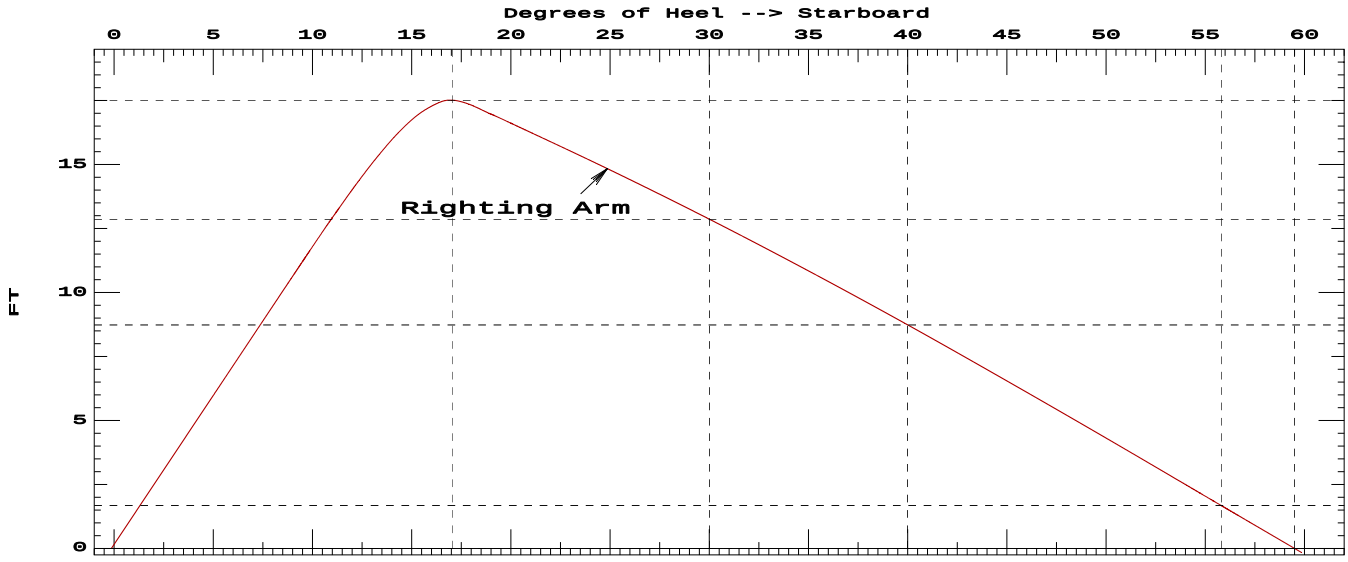
Condition 4 - 22AEQ 5LT Departure with No Ice

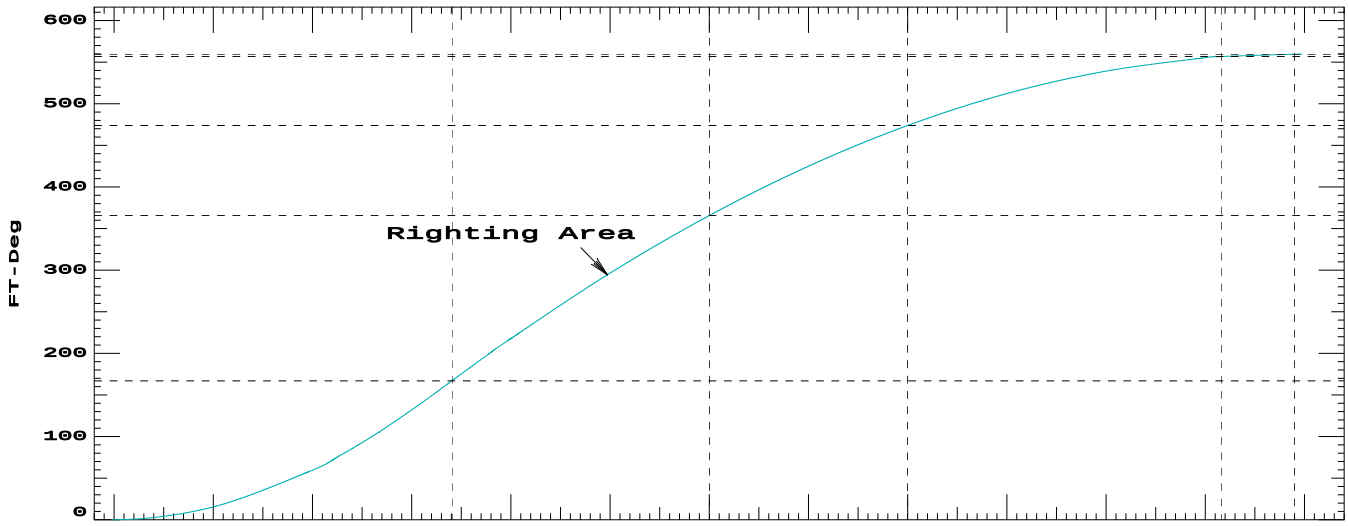
	Critical Points		LCP	TCP	VCP
(1)	ER Air Fwd S	FLOOD	43.30f	27.45s	23.45
(2)	ER Air Aft S	FLOOD	35.42f	27.45s	23.45
(5)	ER Air FWD P	FLOOD	43.30f	27.45p	23.45

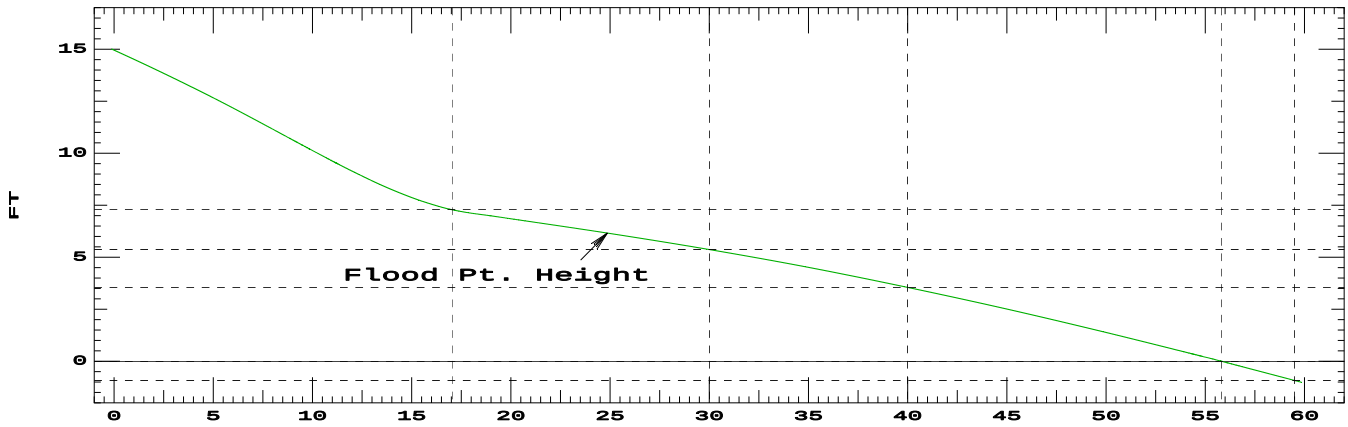
LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Area from abs -0.137 deg to 17**	**>**	**18.21**	**Ft-deg**	**164.60**	**P**
(2)	**Absolute Angle at MaxRA**	**>**	**10.00**	**deg**	**17.03**	**P**

Relative angles measured from 0.137

Condition 4 - 22AEQ 5LT Departure with No Ice







Condition 4 - 22AEQ 5LT Departure with No Ice

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*** Heel Angle Check ***

Calculated Heeling Moments
     LONG TONS - FEET
    HL1 =     983.8
    HL2 =    1475.7
    PL  =     449.7
    TL  =    1630.9
    HLT =    3106.6
```

```
With HMMT = TL
        1630.9
```

```
Vessel Heel <    8.00 deg
Calc Heel =      1.67 deg
```

```
With HMMT = max(PL,HL2)
                1475.7
```

```
Vessel Heel <   10.00 deg
Calc Heel =  1.49 deg
```

```
With HMMT = TL+HL2
            3106.6
```

```
Vessel Heel <   12.00 deg
Calc Heel =  3.30 deg
```

Condition 4 - 22AEQ 5LT Departure with No Ice

*** Residual Area Check ***

RESIDUAL RIGHTING ARMS vs HEEL ANGLE

Total CG: LCG = 87.85f TCG = 0.16p VCG = 23.17
Free Surface Adjustment: 0.11
Adjusted CG: LCG = 87.85f TCG = 0.16p VCG = 23.28

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Area	Flood Pt Height	
8.304	0.05f	3.30s	775.62	0.00	0.000	0.00	13.49	(1)
8.309	0.11a	8.30s	775.58	0.00	5.821	14.55	11.00	(2)
8.169	0.34a	13.30s	775.51	0.00	11.327	57.55	8.55	(2)
8.110	0.35a	13.80s	775.57	0.00	11.788	63.33	8.33	(2)
8.038	0.36a	14.30s	775.57	0.00	12.214	69.33	8.13	(2)
7.951	0.37a	14.80s	775.58	0.00	12.598	75.53	7.94	(2)
7.845	0.38a	15.30s	775.58	0.00	12.929	81.92	7.76	(2)
7.718	0.38a	15.80s	775.57	0.00	13.198	88.45	7.60	(2)
7.575	0.38a	16.30s	775.57	0.00	13.394	95.09	7.46	(2)
7.415	0.38a	16.80s	775.57	0.00	13.498	101.82	7.34	(2)
7.335	0.39a	17.03s	775.59	0.00	**13.510**	104.91	7.28	(2)
7.235	0.39a	17.30s	775.57	0.00	13.493	108.57	7.23	(2)
7.029	0.39a	17.80s	775.56	0.00	13.378	115.29	7.15	(2)
6.806	0.40a	18.30s	775.57	0.00	13.206	121.93	7.08	(2)
6.583	0.40a	18.80s	775.57	0.00	13.032	128.49	7.02	(2)
6.359	0.40a	19.30s	775.57	0.00	12.857	134.96	6.95	(2)
6.135	0.40a	19.80s	775.57	0.00	12.681	141.35	6.88	(2)
5.910	0.41a	20.30s	775.57	0.00	12.503	147.64	6.81	(2)
5.456	0.41a	21.30s	775.27	0.01a	12.143	159.97	6.67	(2)
5.007	0.42a	22.30s	775.58	0.00	11.783	171.93	6.53	(2)
4.554	0.42a	23.30s	775.58	0.00	11.416	183.53	6.39	(2)
2.273	0.46a	28.30s	775.57	0.00	9.524	235.92	5.64	(2)
0.029	0.52a	33.30s	775.57	0.00	7.537	278.62	4.82	(2)
-2.131	0.60a	38.30s	775.65	0.00	5.457	311.14	3.89	(2)
-4.203	0.69a	43.30s	775.69	0.00	3.295	333.06	2.87	(2)
-6.183	0.79a	48.30s	775.69	0.00	1.072	344.00	1.77	(2)
-7.087	0.83a	50.68s	775.56	0.00	0.000	345.28	1.23	(2)
-8.054	0.89a	53.30s	775.61	0.00	-1.188	343.72	0.61	(2)
-8.942	0.94a	55.80s	775.57	0.00	-2.323	339.34	0.00	(2)
-9.796	0.99a	58.30s	775.59	0.00	-3.458	332.11	*-0.62*	(2)
-11.389	1.10a	63.30s	775.59	0.00	-5.713	309.17	*-1.91*	(2)

Distances in FEET. Specific Gravity = 1.025. Area in Ft-Deg.

Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 88.9 Ft-LT was applied to artificially modify the CG.

Condition 4 - 22AEQ 5LT Departure with No Ice

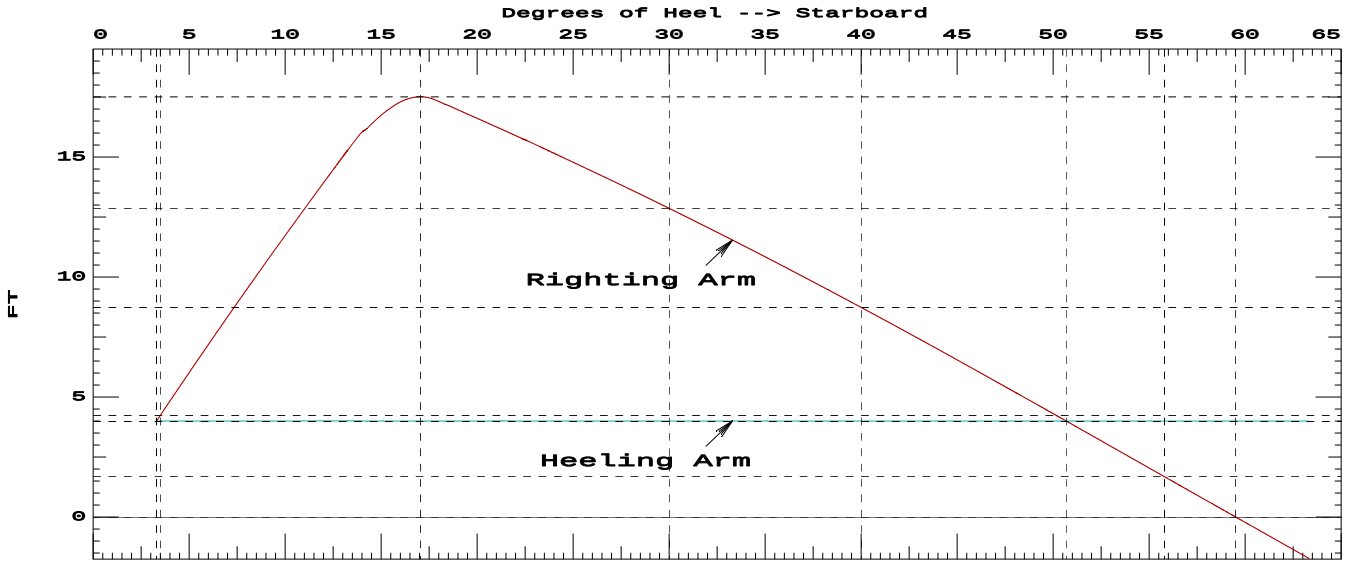
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 3106.63

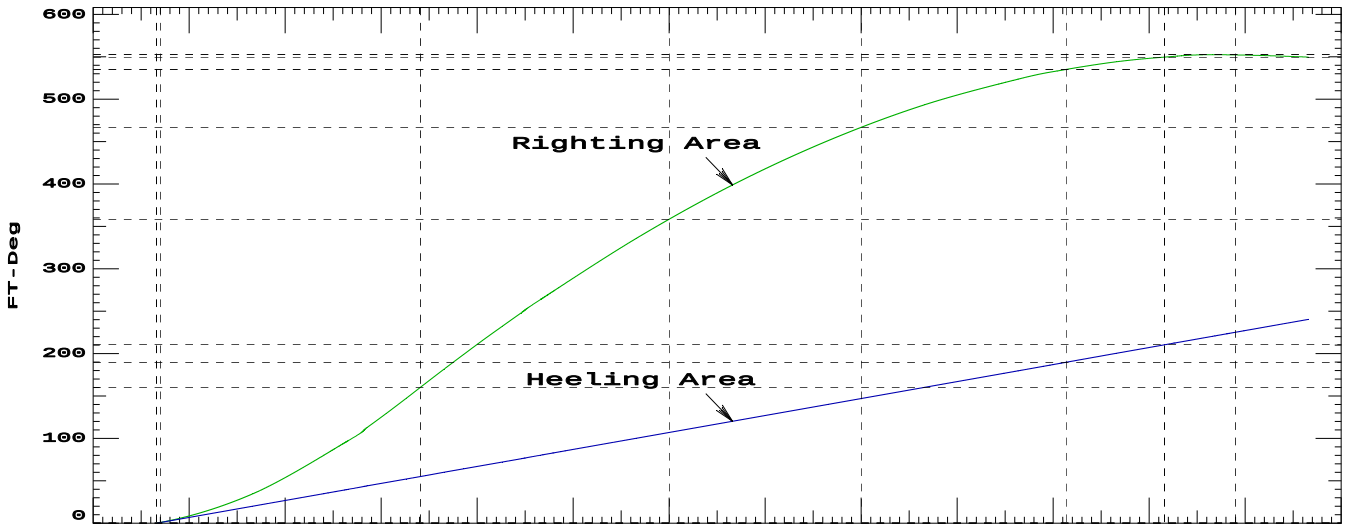
	Critical Points		LCP	TCP	VCP
(1)	ER Air Fwd S	FLOOD	43.30f	27.45s	23.45
(2)	ER Air Aft S	FLOOD	35.42f	27.45s	23.45

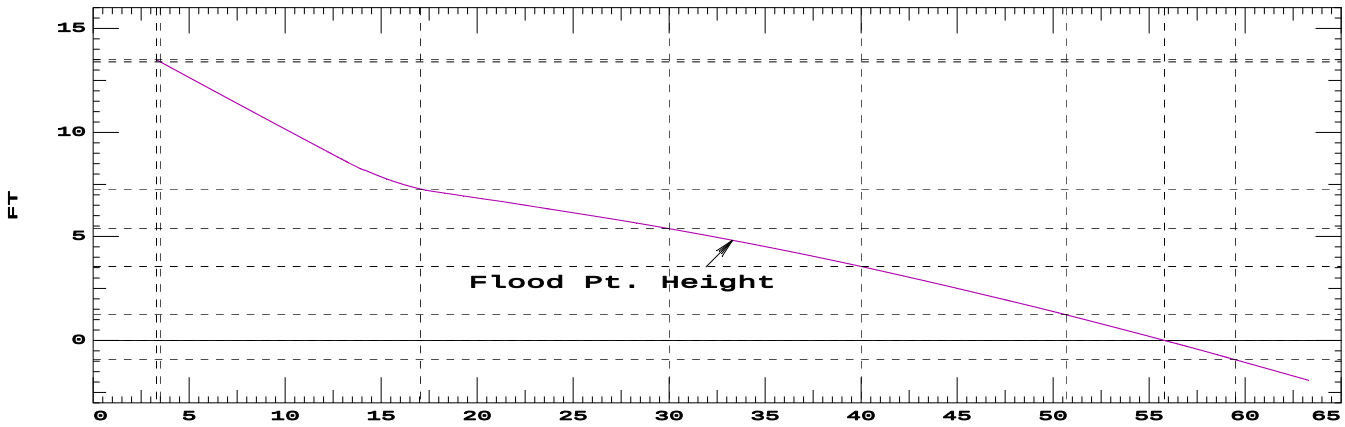
LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Area from Equilibrium to 15 deg**	**>**	**5.26**	**Ft-deg**	**121.93**	**P**
(2)	**Angle from Equilibrium to RAzero**	**>**	**15.00**	**deg**	**47.38**	**P**

Relative angles measured from 3.301s

Condition 4 - 22AEQ 5LT Departure with No Ice







Condition 5 - 22AEQ 5LT Arrival with No Ice

WEIGHT STATUS

Trim: Aft 0.36/210.33, Heel: Stbd 0.19 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	500.46	84.77f	0.01p	23.23
Pax @185 lb ea (Stand)	20.65	105.24f	0.00	38.55
Luggage @20 lb ea Pax	2.22	115.73f	5.24p	21.33
Vehicles AEQ @6 kip ea	58.94	112.70f	1.36s	21.33
Vehicles LT @63 kip ea	140.63	76.25f	1.28p	27.46
Bikes @30 lb ea	0.16	209.32f	0.00	19.69
Kayaks @ 75 lb ea	0.20	131.39f	25.83p	21.65
Crew	0.98	115.83f	2.23s	44.16
Food Stuffs	0.06	100.46f	1.05p	38.71
Loose Outfit/Gear	0.40	111.22f	0.00	37.07
Stores	0.07	101.71f	0.00	37.07
Art Allowance	0.54	111.22f	0.00	40.35
Trash	0.45	104.66f	25.13s	28.64
Video Games	0.45	28.46f	5.11p	38.71
Total Fixed	**726.21**	**86.16f**	**0.15p**	**24.39**

	Load	SpGr	Weight(LT)	LCG	TCG	VCG	FSM
FW.P	0.100	1.000	0.34	135.81f	21.23p	8.19	0.7
BW.S	0.980	1.025	13.56	98.12f	21.00s	10.37	0.9
DBF4.P	0.100	0.840	2.08	114.24f	22.44p	0.77	19.1
DBF3.S	0.100	0.840	2.08	114.24f	22.50s	0.77	19.1
LOH2.P	0.100	0.880	0.06	49.21f	17.12p	12.70	0.1
LOH1.S	0.100	0.880	0.06	49.21f	17.12s	12.70	0.1
Total Tanks			**18.20**	**102.17f**	**15.25s**	**8.14**	**88.9***
Total Weight			**744.40**	**86.55f**	**0.22s**	**23.99**	
Free Surface Adjustment						**0.12**	
Adjusted CG				**86.55f**	**0.22s**	**24.11**	

Distances in FEET. Moments in Ft-LT.

Note: FSM values marked with an asterisk (*) are formal values which are not the same as the true values in the present condition.

HYDROSTATIC PROPERTIES

Trim: Aft 0.36/210.33, Heel: Stbd 0.19 deg., VCG = 23.99

LCF Draft	Displacement Weight(LT)	Buoyancy-Ctr. LCB	VCB	Weight/ Inch	LCF	Moment/ In trim	GML	GMT
8.176	744.40	86.52f	4.93	10.49	85.28f	135.48	459.4	68.27

Distances in FEET. Specific Gravity = 1.025. Moment in Ft-LT.
Trim is per 210.33Ft
Draft is from Baseline. Formal Free Surface included.

Note: GMT includes the formal free surface moment 88.9 Ft-LT

Condition 5 - 22AEQ 5LT Arrival with No Ice

RIGHTING ARMS vs HEEL ANGLE

Total CG: LCG = 86.55f TCG = 0.22s VCG = 23.99
Free Surface Adjustment: 0.12
Adjusted CG: LCG = 86.55f TCG = 0.22s VCG = 24.11

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Righting Arms in Trim	in Heel	Area	Flood Pt Height	
8.324	0.10a	0.19s	744.39	0.00	0.000	0.00	15.10	(2)
8.300	0.16a	5.19s	744.37	0.00	5.943	14.86	12.67	(2)
8.314	0.36a	10.19s	744.37	0.00	11.877	59.41	10.14	(2)
8.307	0.39a	10.69s	744.40	0.00	12.452	65.50	9.88	(2)
8.294	0.41a	11.19s	744.40	0.00	13.019	71.86	9.64	(2)
8.274	0.43a	11.69s	744.40	0.00	13.573	78.51	9.40	(2)
8.245	0.45a	12.19s	744.40	0.00	14.110	85.43	9.16	(2)
8.206	0.47a	12.69s	744.40	0.00	14.624	92.62	8.93	(2)
8.156	0.48a	13.19s	744.40	0.00	15.111	100.05	8.71	(2)
8.093	0.50a	13.69s	744.40	0.00	15.565	107.72	8.50	(2)
8.016	0.51a	14.19s	744.40	0.00	15.977	115.60	8.30	(2)
7.923	0.51a	14.69s	744.40	0.00	16.338	123.68	8.12	(2)
7.809	0.52a	15.19s	744.40	0.00	16.635	131.93	7.95	(2)
7.678	0.52a	15.69s	744.39	0.00	16.856	140.30	7.80	(2)
7.528	0.53a	16.19s	744.39	0.00	16.982	148.76	7.66	(2)
7.419	0.53a	16.52s	744.42	0.00	**17.006**	154.35	7.59	(2)
7.359	0.53a	16.69s	744.39	0.00	17.000	157.26	7.55	(2)
7.353	0.53a	16.70s	744.39	0.00	16.999	157.55	7.55	(2)
7.163	0.54a	17.19s	744.39	0.00	16.907	165.73	7.46	(2)
6.719	0.54a	18.19s	744.40	0.00	16.553	182.46	7.33	(2)
6.271	0.55a	19.19s	744.35	0.00	16.189	198.84	7.19	(2)
5.823	0.55a	20.19s	744.36	0.00	15.821	214.84	7.05	(2)
3.558	0.57a	25.19s	744.40	0.00	13.919	289.24	6.33	(2)
1.277	0.60a	30.19s	744.39	0.00	11.931	353.90	5.56	(2)
-0.957	0.66a	35.19s	744.38	0.00	9.863	408.42	4.71	(2)
-3.100	0.74a	40.19s	744.39	0.00	7.720	452.41	3.76	(2)
-5.140	0.83a	45.19s	744.52	0.00	5.514	485.52	2.71	(2)
-7.077	0.93a	50.19s	744.54	0.00	3.265	507.49	1.58	(2)
-8.898	1.03a	55.19s	744.53	0.00	0.995	518.15	0.39	(2)
-9.439	1.06a	56.75s	744.40	0.00	0.287	519.15	0.00	(2)
-9.656	1.08a	57.38s	744.45	0.00	-0.001	519.24	*-0.16*	(2)
-10.583	1.14a	60.19s	744.41	0.00	-1.267	517.46	*-0.87*	(2)

Distances in FEET. Specific Gravity = 1.025. Area in Ft-Deg.

Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 88.9 Ft-LT was applied to artificially modify the CG.

	Critical Point		LCP	TCP	VCP
(2)	ER Air Aft S	FLOOD	35.42f	27.45s	23.45

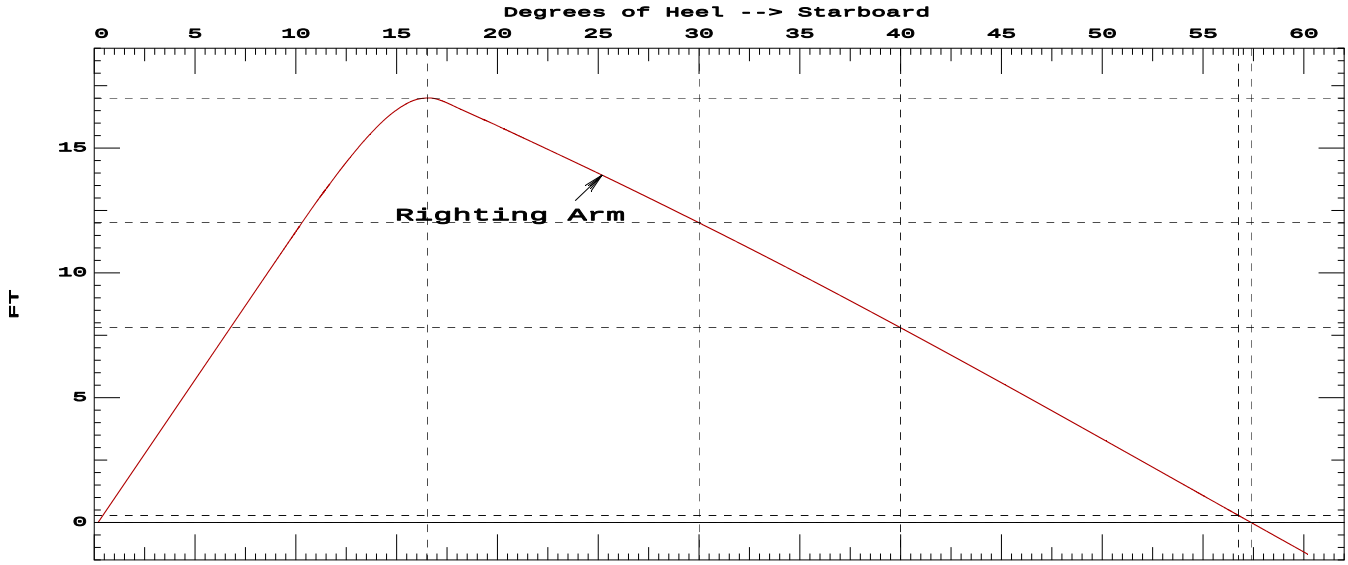
continued next page

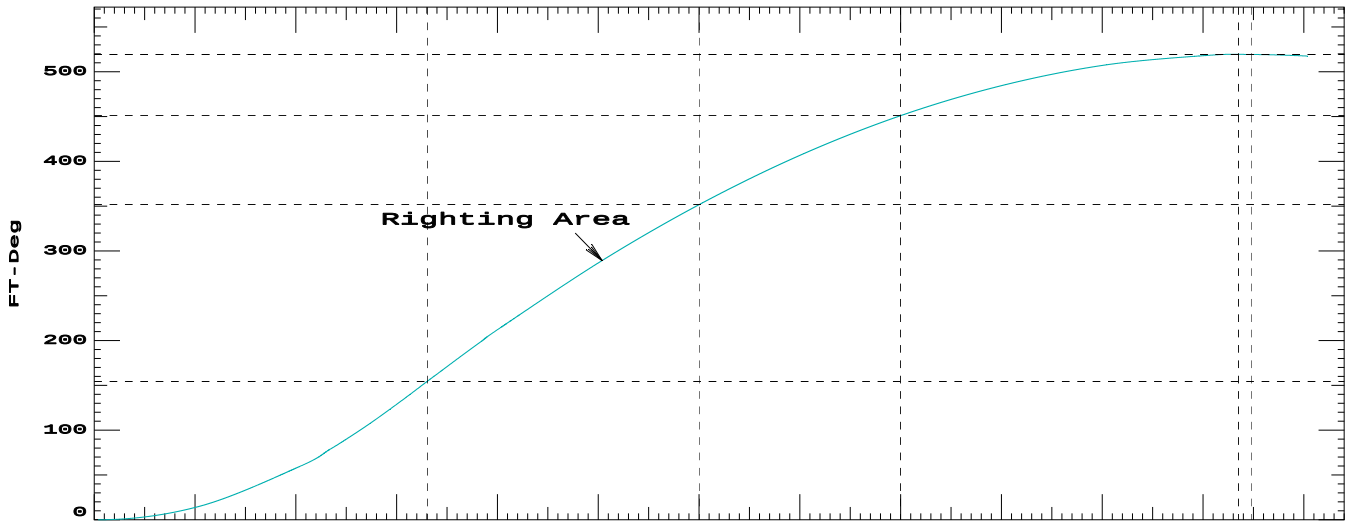
Condition 5 - 22AEQ 5LT Arrival with No Ice

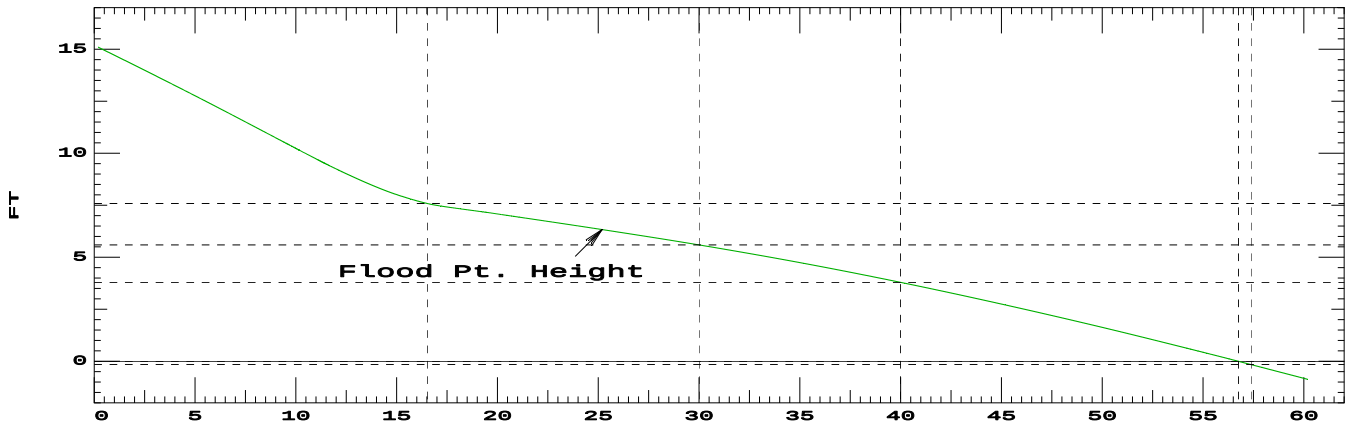
LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	Area from abs 0.188 deg to 16.5	>	18.78	Ft-deg	157.55	P
(2)	Absolute Angle at MaxRA	>	10.00	deg	16.52	P

Relative angles measured from 0.188s

Condition 5 - 22AEQ 5LT Arrival with No Ice







Condition 5 - 22AEQ 5LT Arrival with No Ice

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*** Heel Angle Check ***

Calculated Heeling Moments
     LONG TONS - FEET
    HL1 =     983.8
    HL2 =    1475.7
    PL  =     449.7
    TL  =    1628.8
    HLT =    3104.5
```

With HMMT = TL 1628.8
Vessel Heel < 8.00 deg Calc Heel = 2.02 deg

With HMMT = max(PL,HL2) 1475.7
Vessel Heel < 10.00 deg Calc Heel = 1.85 deg

With HMMT = TL+HL2 3104.5
Vessel Heel < 12.00 deg Calc Heel = 3.69 deg

Condition 5 - 22AEQ 5LT Arrival with No Ice

*** Residual Area Check ***

RESIDUAL RIGHTING ARMS vs HEEL ANGLE

Total CG: LCG = 86.55f TCG = 0.23s VCG = 23.99
Free Surface Adjustment: 0.12
Adjusted CG: LCG = 86.55f TCG = 0.22s VCG = 24.11

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Area	Flood Pt Height	
8.307	0.13a	3.69s	744.42	0.00	0.000	0.00	13.40	(2)
8.313	0.29a	8.69s	744.41	0.00	5.949	14.87	10.90	(2)
8.092	0.50a	13.69s	744.43	0.00	11.401	58.46	8.50	(2)
8.015	0.51a	14.19s	744.40	0.00	11.813	64.26	8.30	(2)
7.922	0.51a	14.69s	744.40	0.00	12.174	70.26	8.12	(2)
7.809	0.52a	15.19s	744.40	0.00	12.470	76.42	7.95	(2)
7.677	0.52a	15.69s	744.39	0.00	12.691	82.71	7.80	(2)
7.527	0.53a	16.19s	744.39	0.00	12.816	89.09	7.66	(2)
7.420	0.53a	16.52s	744.42	0.00	**12.840**	93.26	7.59	(2)
7.358	0.53a	16.69s	744.39	0.00	12.833	95.50	7.55	(2)
7.162	0.54a	17.19s	744.39	0.00	12.740	101.89	7.46	(2)
6.941	0.54a	17.69s	744.40	0.00	12.565	108.22	7.39	(2)
6.718	0.54a	18.19s	744.40	0.00	12.385	114.46	7.33	(2)
6.495	0.54a	18.69s	744.40	0.00	12.204	120.61	7.26	(2)
6.271	0.55a	19.19s	744.40	0.00	12.021	126.66	7.19	(2)
6.047	0.55a	19.69s	744.40	0.00	11.838	132.63	7.12	(2)
5.822	0.55a	20.19s	744.40	0.00	11.653	138.50	7.05	(2)
5.597	0.55a	20.69s	744.40	0.00	11.467	144.28	6.98	(2)
5.146	0.56a	21.69s	744.40	0.00	11.093	155.56	6.84	(2)
4.693	0.56a	22.69s	744.40	0.00	10.714	166.46	6.70	(2)
4.239	0.57a	23.69s	744.40	0.00	10.332	176.99	6.55	(2)
1.957	0.59a	28.69s	744.39	0.00	8.368	223.77	5.80	(2)
-0.297	0.64a	33.69s	744.39	0.00	6.323	260.53	4.98	(2)
-2.470	0.71a	38.69s	744.38	0.00	4.201	286.88	4.05	(2)
-4.539	0.80a	43.69s	744.50	0.00	2.013	302.44	3.03	(2)
-6.316	0.89a	48.19s	744.39	0.00	0.000	306.99	2.04	(2)
-6.511	0.90a	48.69s	744.41	0.00	-0.227	306.93	1.93	(2)
-8.366	1.00a	53.69s	744.53	0.00	-2.492	300.15	0.75	(2)
-9.443	1.06a	56.75s	744.40	0.00	-3.884	290.38	0.00	(2)
-10.096	1.10a	58.69s	744.41	0.00	-4.760	282.01	*-0.49*	(2)
-11.665	1.21a	63.69s	744.58	0.00	-6.999	252.60	*-1.79*	(2)

Distances in FEET. Specific Gravity = 1.025. Area in Ft-Deg.

Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 88.9 Ft-LT was applied to artificially modify the CG.

Condition 5 - 22AEQ 5LT Arrival with No Ice

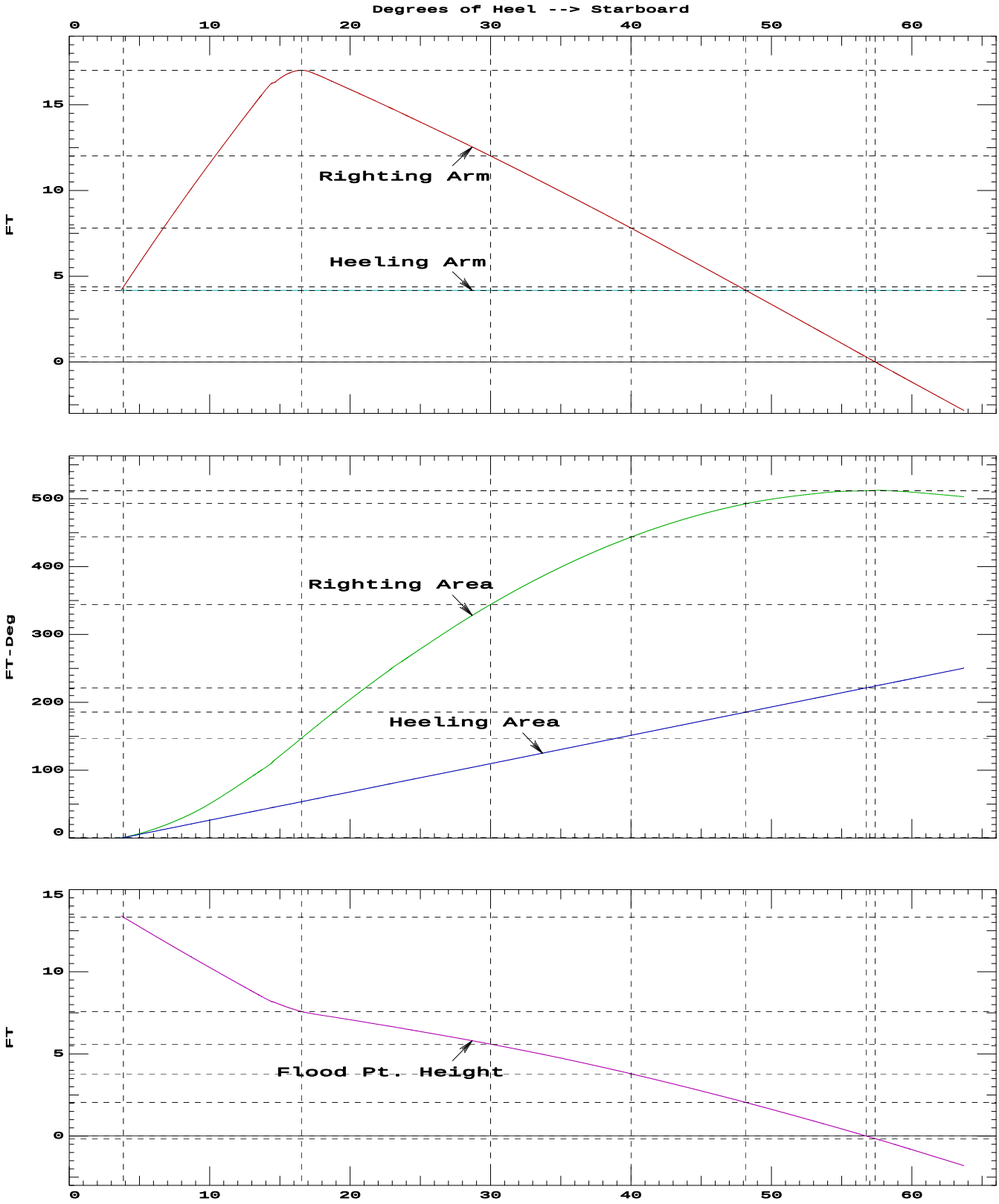
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 3104.52

	Critical Point		LCP	TCP	VCP
(2)	ER Air Aft S	FLOOD	35.42f	27.45s	23.45

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Area from Equilibrium to 15 deg**	**>**	**5.26**	**Ft-deg**	**120.61**	**P**
(2)	**Angle from Equilibrium to RAzero**	**>**	**15.00**	**deg**	**44.50**	**P**

Relative angles measured from 3.691s

Condition 5 - 22AEQ 5LT Arrival with No Ice



Condition 6 - 20AEQ 6RV Fwd Departure with Ice

WEIGHT STATUS

Trim: Fwd 1.81/210.33, Heel: Stbd 0.16 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	500.46	84.77f	0.01p	23.23
Pax @185 lb ea (Stand)	20.65	105.24f	0.00	38.55
Luggage @20 lb ea Pax	2.22	115.73f	5.24p	21.33
Vehicles AEQ @6 kip ea	53.58	103.08f	0.75p	21.33
Vehicles ST @45 kip ea	40.18	93.21f	6.00s	27.46
Vehicles RV @15 kip ea	40.18	92.52f	0.75p	23.82
Bikes @30 lb ea	0.16	209.32f	0.00	19.69
Kayaks @ 75 lb ea	0.20	131.39f	25.83p	21.65
Crew	0.98	115.83f	2.23s	44.16
Food Stuffs	0.58	100.46f	1.05p	38.71
Loose Outfit/Gear	0.40	111.22f	0.00	37.07
Stores	0.67	101.71f	0.00	37.07
Art Allowance	0.54	111.22f	0.00	40.35
Trash	0.45	104.66f	25.13s	28.64
Video Games	0.45	28.46f	5.11p	38.71
Ice Accretion	50.21	112.83f	0.00	38.16
Total Fixed	**711.91**	**89.86f**	**0.22s**	**24.94**

	Load	SpGr	Weight(LT)	LCG	TCG	VCG	FSM
FW.P	0.980	1.000	3.36	135.83f	21.23p	10.19	0.2
BW.S	0.200	1.025	2.77	98.20f	21.00s	7.96	6.8
DBF4.P	0.980	0.840	20.43	114.08f	22.47p	3.50	33.7
DBF3.S	0.980	0.840	20.43	114.08f	22.48s	3.50	33.7
LOH2.P	0.980	0.880	0.63	49.21f	17.12p	14.41	0.1
LOH1.S	0.980	0.880	0.63	49.21f	17.12s	14.41	0.1
Total Tanks			**48.25**	**112.99f**	**0.27p**	**4.51**	**88.9***
Total Weight			**760.16**	**91.32f**	**0.19s**	**23.64**	
Free Surface Adjustment						**0.12**	
Adjusted CG				**91.32f**	**0.19s**	**23.76**	

Distances in FEET. Moments in Ft-LT.

Note: FSM values marked with an asterisk (*) are formal values which are not the same as the true values in the present condition.

HYDROSTATIC PROPERTIES

Trim: Fwd 1.81/210.33, Heel: Stbd 0.16 deg., VCG = 23.64

LCF Draft	Displacement Weight(LT)	Buoyancy-Ctr. LCB	VCB	Weight/ Inch	LCF	Moment/ In trim	GML	GMT
8.310	760.15	91.49f	5.01	10.65	88.21f	142.57	473.4	68.19

Distances in FEET. Specific Gravity = 1.025. Moment in Ft-LT.

Trim is per 210.33Ft

Draft is from Baseline. Formal Free Surface included.

Note: GMT includes the formal free surface moment 88.9 Ft-LT

Condition 6 - 20AEQ 6RV Fwd Departure with Ice

RIGHTING ARMS vs HEEL ANGLE

Total CG: LCG = 91.32f TCG = 0.19s VCG = 23.64
Free Surface Adjustment: 0.12
Adjusted CG: LCG = 91.32f TCG = 0.19s VCG = 23.76

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Righting Arms in Trim	in Heel	Area	Flood Pt Height	
7.551	0.49f	0.16s	760.15	0.00	0.000	0.00	15.45	(1)
7.538	0.43f	5.16s	760.10	0.00	5.982	14.95	13.02	(1)
7.530	0.22f	10.16s	760.16	0.00	11.924	59.73	10.54	(1)
7.508	0.20f	10.66s	760.16	0.00	12.484	65.84	10.30	(1)
7.479	0.19f	11.16s	760.16	0.00	13.031	72.21	10.07	(1)
7.441	0.17f	11.66s	760.16	0.00	13.563	78.86	9.85	(1)
7.394	0.16f	12.16s	760.16	0.00	14.080	85.77	9.63	(1)
7.335	0.15f	12.66s	760.16	0.00	14.574	92.94	9.42	(1)
7.262	0.14f	13.16s	760.16	0.00	15.042	100.34	9.21	(1)
7.175	0.14f	13.66s	760.31	0.00	15.475	107.97	9.02	(1)
7.069	0.14f	14.16s	760.33	0.00	15.871	115.81	8.84	(1)
6.947	0.15f	14.66s	760.16	0.00	16.226	123.83	8.68	(1)
6.809	0.16f	15.16s	760.16	0.00	16.529	132.02	8.53	(1)
6.653	0.17f	15.66s	760.16	0.00	16.774	140.35	8.39	(1)
6.480	0.18f	16.16s	760.16	0.00	16.953	148.78	8.27	(1)
6.289	0.19f	16.66s	760.09	0.00	17.057	157.28	8.16	(1)
6.173	0.20f	16.96s	760.22	0.00	**17.075**	162.33	8.10	(1)
6.104	0.20f	17.12s	760.05	0.00	17.070	165.03	8.08	(1)
6.088	0.20f	17.16s	760.17	0.00	17.066	165.81	8.07	(1)
5.653	0.20f	18.16s	760.11	0.00	16.765	182.73	7.92	(1)
5.212	0.19f	19.16s	760.16	0.00	16.411	199.32	7.79	(1)
4.770	0.18f	20.16s	760.16	0.00	16.052	215.56	7.65	(1)
2.543	0.13f	25.16s	760.15	0.00	14.193	291.25	6.91	(1)
0.301	0.07f	30.16s	760.14	0.00	12.244	357.38	6.13	(1)
-1.934	0.01f	35.16s	760.21	0.00	10.221	413.58	5.29	(1)
-4.093	0.06a	40.16s	760.21	0.00	8.109	459.44	4.35	(2)
-6.148	0.15a	45.16s	760.23	0.00	5.925	494.55	3.31	(2)
-8.085	0.25a	50.16s	760.26	0.00	3.694	518.62	2.18	(2)
-9.886	0.36a	55.16s	760.29	0.00	1.441	531.46	0.97	(2)
-10.961	0.44a	58.37s	760.18	0.00	-0.003	533.77	0.16	(2)
-11.160	0.46a	58.98s	760.17	0.00	-0.280	533.68	0.00	(2)
-11.534	0.49a	60.16s	760.17	0.00	-0.807	533.04	*-0.31*	(2)

Distances in FEET. Specific Gravity = 1.025. Area in Ft-Deg.

Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 88.9 Ft-LT was applied to artificially modify the CG.

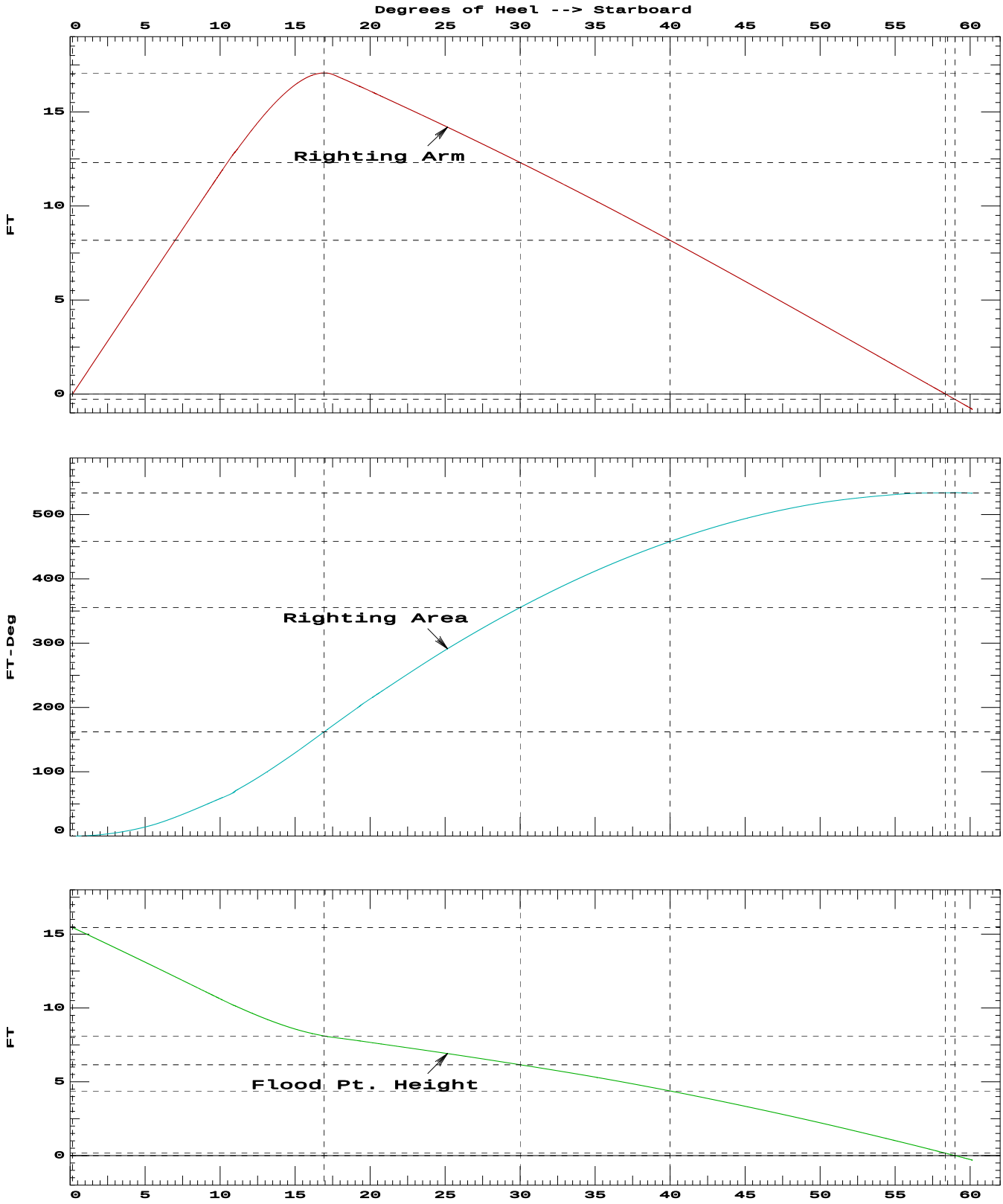
Condition 6 - 20AEQ 6RV Fwd Departure with Ice

	Critical Points		LCP	TCP	VCP
(1)	ER Air Fwd S	FLOOD	43.30f	27.45s	23.45
(2)	ER Air Aft S	FLOOD	35.42f	27.45s	23.45

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Area from abs 0.161 deg to 17**	**>**	**18.29**	**Ft-deg**	**165.03**	**P**
(2)	**Absolute Angle at MaxRA**	**>**	**10.00**	**deg**	**16.96**	**P**

Relative angles measured from 0.161

Condition 6 - 20AEQ 6RV Fwd Departure with Ice



Condition 6 - 20AEQ 6RV Fwd Departure with Ice

```
*** Heel Angle Check ***

Calculated Heeling Moments
     LONG TONS - FEET
    HL1 =     983.8
    HL2 =    1475.7
    PL  =     449.7
    TL  =    1635.8
    HLT =    3111.5
```

With HMMT = TL 1635.8
Vessel Heel < 8.00 deg Calc Heel = 1.96 deg

With HMMT = max(PL,HL2) 1475.7
Vessel Heel < 10.00 deg Calc Heel = 1.79 deg

With HMMT = TL+HL2 3111.5
Vessel Heel < 12.00 deg Calc Heel = 3.59 deg

Condition 6 - 20AEQ 6RV Fwd Departure with Ice

*** Residual Area Check ***

RESIDUAL RIGHTING ARMS vs HEEL ANGLE

Total CG: LCG = 91.33f TCG = 0.20s VCG = 23.64
Free Surface Adjustment: 0.12
Adjusted CG: LCG = 91.33f TCG = 0.19s VCG = 23.76

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Area	Flood Pt Height	
7.540	0.46f	3.58s	760.13	0.00	0.000	0.00	13.80	(1)
7.558	0.29f	8.58s	760.16	0.00	6.005	15.01	11.31	(1)
7.186	0.14f	13.58s	760.17	0.00	11.323	58.62	9.05	(1)
7.083	0.14f	14.08s	760.14	0.00	11.726	64.38	8.87	(1)
6.966	0.15f	14.58s	760.16	0.00	12.086	70.33	8.70	(1)
6.831	0.16f	15.08s	760.16	0.00	12.396	76.46	8.55	(1)
6.678	0.17f	15.58s	760.15	0.00	12.651	82.72	8.41	(1)
6.507	0.18f	16.08s	760.15	0.00	12.840	89.09	8.28	(1)
6.320	0.19f	16.58s	760.16	0.00	12.956	95.54	8.17	(1)
6.172	0.20f	16.96s	760.21	0.00	**12.985**	100.40	8.10	(1)
6.116	0.20f	17.08s	760.06	0.00	12.981	102.03	8.08	(1)
5.910	0.20f	17.58s	760.37	0.00	12.879	108.49	8.00	(1)
5.686	0.20f	18.08s	760.14	0.00	12.702	114.89	7.93	(1)
5.466	0.19f	18.58s	760.14	0.00	12.525	121.19	7.87	(1)
5.246	0.19f	19.08s	760.14	0.00	12.347	127.41	7.80	(1)
5.025	0.18f	19.58s	760.15	0.00	12.169	133.54	7.73	(1)
4.803	0.18f	20.08s	760.15	0.00	11.989	139.58	7.66	(1)
4.582	0.18f	20.58s	760.15	0.00	11.808	145.53	7.59	(1)
4.138	0.17f	21.58s	760.12	0.00	11.442	157.15	7.44	(1)
3.693	0.16f	22.58s	760.16	0.00	11.073	168.41	7.30	(1)
3.247	0.15f	23.58s	760.16	0.00	10.699	179.30	7.15	(1)
1.008	0.09f	28.58s	760.14	0.00	8.776	228.02	6.38	(1)
-1.234	0.03f	33.58s	760.21	0.00	6.778	266.94	5.56	(1)
-3.423	0.04a	38.58s	760.21	0.00	4.693	295.65	4.66	(2)
-5.513	0.12a	43.58s	760.23	0.00	2.529	313.74	3.65	(2)
-7.488	0.21a	48.58s	760.25	0.00	0.310	320.86	2.55	(2)
-7.755	0.23a	49.28s	759.98	0.00	-0.002	320.97	2.39	(2)
-9.334	0.32a	53.58s	760.25	0.00	-1.939	316.79	1.36	(2)
-11.031	0.44a	58.58s	760.33	0.00	-4.191	301.47	0.10	(2)
-11.157	0.45a	58.97s	760.34	0.00	-4.366	299.81	0.00	(2)
-12.570	0.58a	63.58s	760.36	0.00	-6.421	274.93	*-1.22*	(2)

Distances in FEET. Specific Gravity = 1.025. Area in Ft-Deg.

Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 88.9 Ft-LT was applied to artificially modify the CG.

Condition 6 - 20AEQ 6RV Fwd Departure with Ice

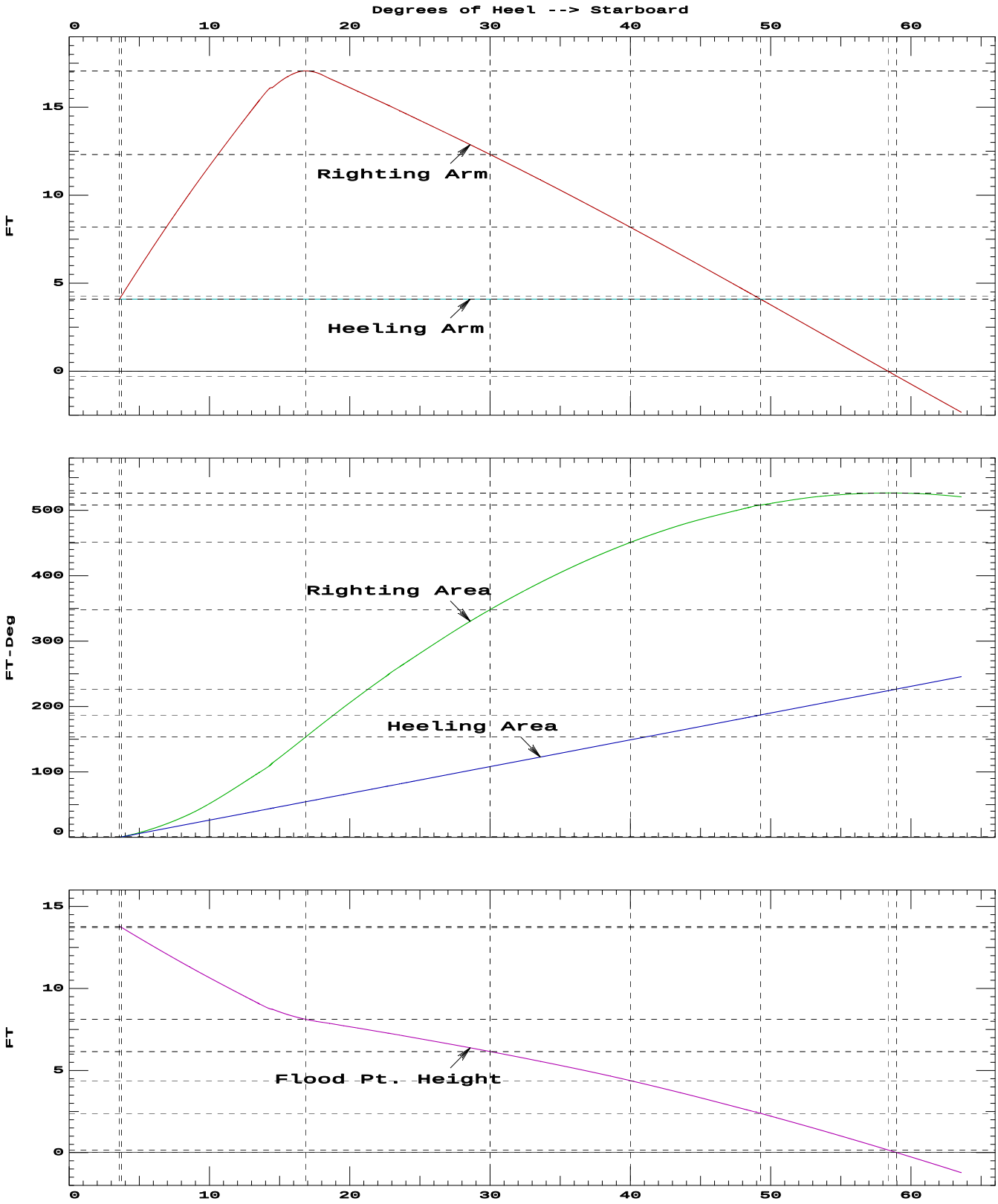
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 3111.50

	Critical Points		LCP	TCP	VCP
(1)	ER Air Fwd S	FLOOD	43.30f	27.45s	23.45
(2)	ER Air Aft S	FLOOD	35.42f	27.45s	23.45

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Area from Equilibrium to 15 deg**	**>**	**5.26**	**Ft-deg**	**121.19**	**P**
(2)	**Angle from Equilibrium to RAzero**	**>**	**15.00**	**deg**	**45.69**	**P**

Relative angles measured from 3.585s

Condition 6 - 20AEQ 6RV Fwd Departure with Ice



Condition 7 - 20AEQ 6RV Fwd Arrival with Ice

WEIGHT STATUS

Trim: Fwd 1.24/210.33, Heel: Stbd 0.49 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	500.46	84.77f	0.01p	23.23
Pax @185 lb ea (Stand)	20.65	105.24f	0.00	38.55
Luggage @20 lb ea Pax	2.22	115.73f	5.24p	21.33
Vehicles AEQ @6 kip ea	53.58	103.08f	0.75p	21.33
Vehicles ST @45 kip ea	40.18	93.21f	6.00s	27.46
Vehicles RV @15 kip ea	40.18	92.52f	0.75p	23.82
Bikes @30 lb ea	0.16	209.32f	0.00	19.69
Kayaks @ 75 lb ea	0.20	131.39f	25.83p	21.65
Crew	0.98	115.83f	2.23s	44.16
Food Stuffs	0.06	100.46f	1.05p	38.71
Loose Outfit/Gear	0.40	111.22f	0.00	37.07
Stores	0.07	101.71f	0.00	37.07
Art Allowance	0.54	111.22f	0.00	40.35
Trash	0.45	104.66f	25.13s	28.64
Video Games	0.45	28.46f	5.11p	38.71
Ice Accretion	50.21	112.83f	0.00	38.16
Total Fixed	**710.79**	**89.84f**	**0.23s**	**24.92**

	Load	SpGr	Weight(LT)	LCG	TCG	VCG	FSM
FW.P	0.100	1.000	0.34	135.86f	21.22p	8.19	0.7
BW.S	0.980	1.025	13.56	98.12f	21.00s	10.37	0.9
DBF4.P	0.100	0.840	2.08	114.47f	22.39p	0.77	19.0
DBF3.S	0.100	0.840	2.08	114.46f	22.55s	0.77	19.1
LOH2.P	0.100	0.880	0.06	49.23f	17.11p	12.70	0.1
LOH1.S	0.100	0.880	0.06	49.23f	17.13s	12.70	0.1
Total Tanks			**18.20**	**102.23f**	**15.26s**	**8.14**	**88.9***
Total Weight			**728.98**	**90.15f**	**0.60s**	**24.50**	
Free Surface Adjustment						**0.12**	
Adjusted CG				**90.15f**	**0.60s**	**24.62**	

Distances in FEET. Moments in Ft-LT.

Note: FSM values marked with an asterisk (*) are formal values which are not the same as the true values in the present condition.

HYDROSTATIC PROPERTIES

Trim: Fwd 1.24/210.33, Heel: Stbd 0.49 deg., VCG = 24.50

LCF Draft	Displacement Weight(LT)	Buoyancy-Ctr. LCB	VCB	Weight/ Inch	LCF	Moment/ In trim	GML	GMT
8.057	728.98	90.27f	4.87	10.51	87.21f	137.61	476.5	69.68

Distances in FEET. Specific Gravity = 1.025. Moment in Ft-LT.

Trim is per 210.33Ft

Draft is from Baseline. Formal Free Surface included.

Note: GMT includes the formal free surface moment 88.9 Ft-LT

Condition 7 - 20AEQ 6RV Fwd Arrival with Ice

RIGHTING ARMS vs HEEL ANGLE

Total CG: LCG = 90.15f TCG = 0.60s VCG = 24.50
Free Surface Adjustment: 0.12
Adjusted CG: LCG = 90.15f TCG = 0.60s VCG = 24.62

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Righting Arms in Trim	in Heel	Area	Flood Pt Height	
7.545	0.34f	0.49s	728.98	0.00	0.000	0.00	15.41	(1)
7.530	0.26f	5.49s	728.92	0.00	6.121	15.30	12.99	(1)
7.491	0.07f	10.49s	728.99	0.00	12.156	61.03	10.52	(1)
7.461	0.05f	10.99s	728.98	0.00	12.714	67.25	10.28	(1)
7.421	0.04f	11.49s	728.98	0.00	13.255	73.74	10.06	(1)
7.371	0.03f	11.99s	728.98	0.00	13.779	80.50	9.84	(1)
7.308	0.02f	12.49s	728.98	0.00	14.277	87.52	9.63	(1)
7.232	0.02f	12.99s	729.13	0.00	14.742	94.77	9.43	(1)
7.137	0.02f	13.49s	729.16	0.00	15.171	102.25	9.25	(1)
7.025	0.03f	13.99s	728.98	0.00	15.558	109.93	9.07	(1)
6.897	0.03f	14.49s	728.98	0.00	15.893	117.79	8.91	(1)
6.751	0.04f	14.99s	728.98	0.00	16.171	125.81	8.77	(1)
6.587	0.06f	15.49s	728.98	0.00	16.382	133.95	8.64	(1)
6.405	0.07f	15.99s	728.98	0.00	16.515	142.17	8.52	(1)
6.241	0.08f	16.42s	729.26	0.00	**16.555**	149.33	8.43	(1)
6.207	0.08f	16.49s	728.91	0.00	16.555	150.44	8.42	(1)
6.036	0.08f	16.92s	729.15	0.00	16.486	157.45	8.35	(1)
5.999	0.08f	16.99s	728.98	0.00	16.461	158.70	8.34	(1)
5.782	0.08f	17.49s	728.97	0.00	16.279	166.88	8.27	(1)
5.342	0.07f	18.49s	728.94	0.00	15.911	182.98	8.14	(1)
4.901	0.06f	19.49s	728.98	0.00	15.539	198.70	8.00	(1)
4.460	0.06f	20.49s	728.98	0.00	15.163	214.05	7.86	(1)
2.238	0.01f	25.49s	728.97	0.00	13.225	285.07	7.11	(1)
0.005	0.05a	30.49s	728.97	0.00	11.207	346.18	6.30	(2)
-2.222	0.11a	35.49s	728.96	0.00	9.131	397.05	5.44	(2)
-4.375	0.19a	40.49s	729.06	0.00	6.990	437.38	4.50	(2)
-6.423	0.27a	45.49s	729.08	0.00	4.784	466.84	3.46	(2)
-8.351	0.38a	50.49s	728.97	0.00	2.540	485.17	2.32	(2)
-10.141	0.49a	55.49s	728.99	0.00	0.284	492.23	1.11	(2)
-10.357	0.50a	56.13s	729.08	0.01f	-0.001	492.32	0.95	(2)
-11.556	0.59a	59.78s	728.99	0.00	-1.641	489.32	0.00	(2)
-11.778	0.61a	60.49s	728.99	0.00	-1.956	488.04	*-0.18*	(2)

Distances in FEET. Specific Gravity = 1.025. Area in Ft-Deg.

Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 88.9 Ft-LT was applied to artificially modify the CG.

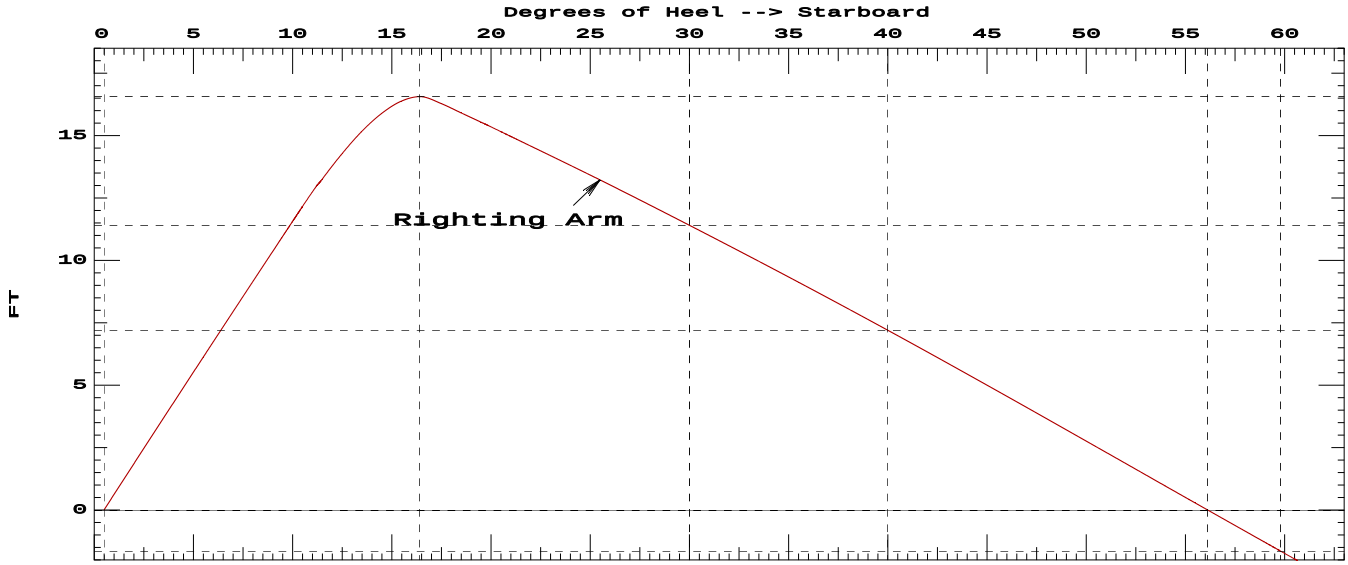
Condition 7 - 20AEQ 6RV Fwd Arrival with Ice

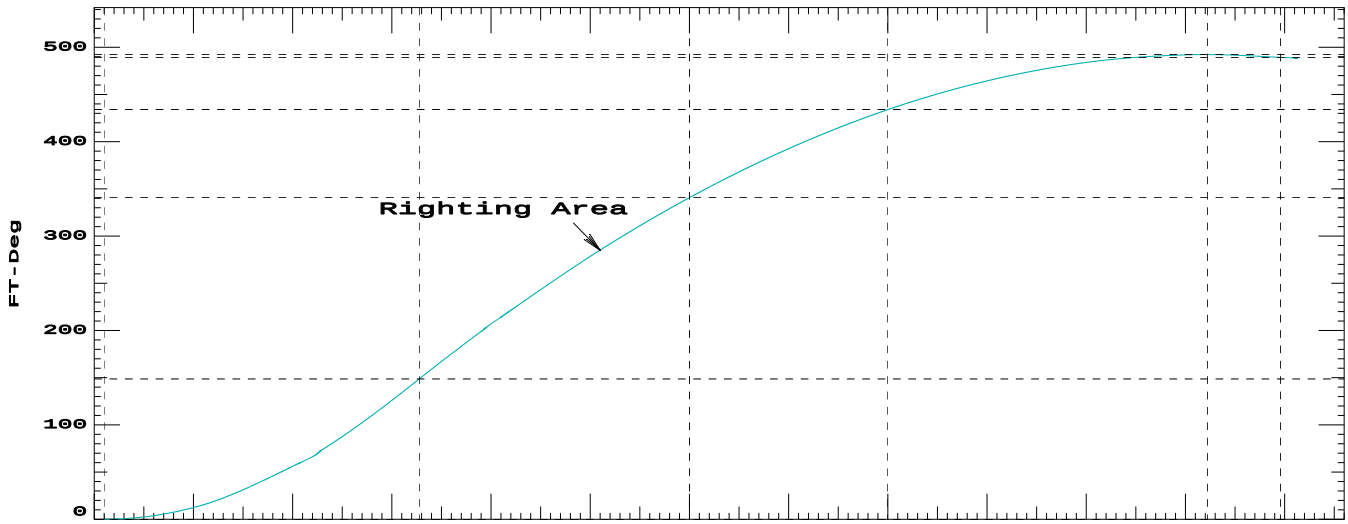
	Critical Points		LCP	TCP	VCP
(1)	ER Air Fwd S	FLOOD	43.30f	27.45s	23.45
(2)	ER Air Aft S	FLOOD	35.42f	27.45s	23.45

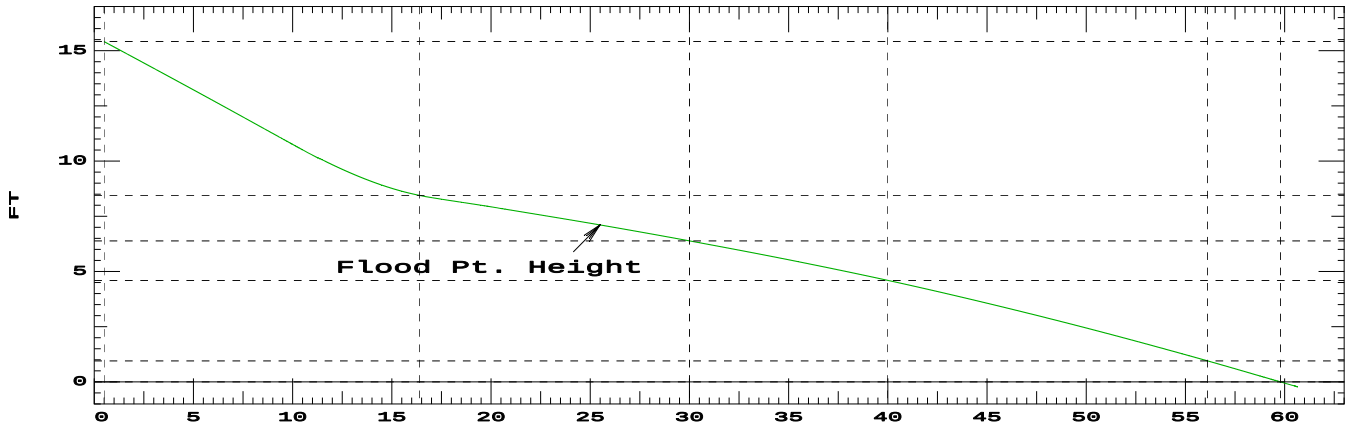
LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Area from abs 0.492 deg to 16.4**	**>**	**18.88**	**Ft-deg**	**157.45**	**P**
(2)	**Absolute Angle at MaxRA**	**>**	**10.00**	**deg**	**16.42**	**P**

Relative angles measured from 0.492s

Condition 7 - 20AEQ 6RV Fwd Arrival with Ice







Condition 7 - 20AEQ 6RV Fwd Arrival with Ice

```
*** Heel Angle Check ***

Calculated Heeling Moments
     LONG TONS - FEET
    HL1 =     983.8
    HL2 =    1475.7
    PL  =     449.7
    TL  =    1633.6
    HLT =    3109.3
```

```
With HMMT = TL
        1633.6
```

```
Vessel Heel <    8.00 deg
Calc Heel =      2.33 deg
```

```
With HMMT = max(PL,HL2)
                1475.7
```

```
Vessel Heel <   10.00 deg
Calc Heel =  2.15 deg
```

```
With HMMT = TL+HL2
            3109.3
```

```
Vessel Heel <   12.00 deg
Calc Heel =  3.98 deg
```

Condition 7 - 20AEQ 6RV Fwd Arrival with Ice

*** Residual Area Check ***

RESIDUAL RIGHTING ARMS vs HEEL ANGLE

Total CG: LCG = 90.15f TCG = 0.60s VCG = 24.50
Free Surface Adjustment: 0.12
Adjusted CG: LCG = 90.15f TCG = 0.60s VCG = 24.62

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Area	Flood Pt Height	
7.531	0.30f	3.98s	728.96	0.00	0.000	0.00	13.73	(1)
7.538	0.13f	8.98s	728.99	0.01f	6.131	15.33	11.24	(1)
7.025	0.03f	13.98s	728.75	0.00	11.289	59.28	9.08	(1)
6.901	0.03f	14.48s	728.98	0.00	11.624	65.01	8.92	(1)
6.755	0.04f	14.98s	728.98	0.00	11.903	70.89	8.77	(1)
6.591	0.06f	15.48s	728.98	0.00	12.116	76.90	8.64	(1)
6.410	0.07f	15.98s	728.98	0.00	12.252	82.99	8.52	(1)
6.212	0.08f	16.48s	728.89	0.00	12.294	89.13	8.43	(1)
6.010	0.08f	16.98s	729.18	0.00	12.206	95.25	8.34	(1)
5.787	0.08f	17.48s	728.97	0.00	12.023	101.31	8.28	(1)
5.568	0.07f	17.98s	728.97	0.00	11.839	107.27	8.21	(1)
5.348	0.07f	18.48s	728.97	0.00	11.655	113.15	8.14	(1)
5.128	0.07f	18.98s	728.97	0.00	11.469	118.93	8.07	(1)
4.908	0.06f	19.48s	728.97	0.00	11.283	124.62	8.00	(1)
4.687	0.06f	19.98s	728.97	0.00	11.095	130.21	7.93	(1)
4.466	0.05f	20.48s	728.97	0.00	10.907	135.71	7.86	(1)
4.245	0.05f	20.98s	728.97	0.00	10.717	141.12	7.78	(1)
3.801	0.04f	21.98s	728.93	0.00	10.335	151.64	7.64	(1)
3.357	0.03f	22.98s	728.98	0.00	9.949	161.79	7.49	(1)
2.913	0.02f	23.98s	728.98	0.00	9.560	171.54	7.34	(1)
0.681	0.03a	28.98s	728.96	0.00	7.563	214.38	6.55	(2)
-1.550	0.09a	33.98s	728.97	0.00	5.502	247.07	5.71	(2)
-3.734	0.16a	38.98s	729.05	0.00	3.384	269.31	4.80	(2)
-5.815	0.25a	43.98s	729.07	0.00	1.195	280.79	3.78	(2)
-6.885	0.30a	46.66s	728.99	0.00	0.000	282.40	3.20	(2)
-7.781	0.34a	48.98s	729.01	0.00	-1.041	281.19	2.68	(2)
-9.615	0.45a	53.98s	728.99	0.00	-3.296	270.36	1.48	(2)
-11.299	0.57a	58.98s	728.99	0.00	-5.544	248.26	0.21	(2)
-11.554	0.59a	59.78s	729.10	0.00	-5.903	243.65	0.00	(2)
-12.832	0.70a	63.98s	729.09	0.00	-7.760	214.99	*-1.12*	(2)

Distances in FEET. Specific Gravity = 1.025. Area in Ft-Deg.

Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 88.9 Ft-LT was applied to artificially modify the CG.

Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 3109.30

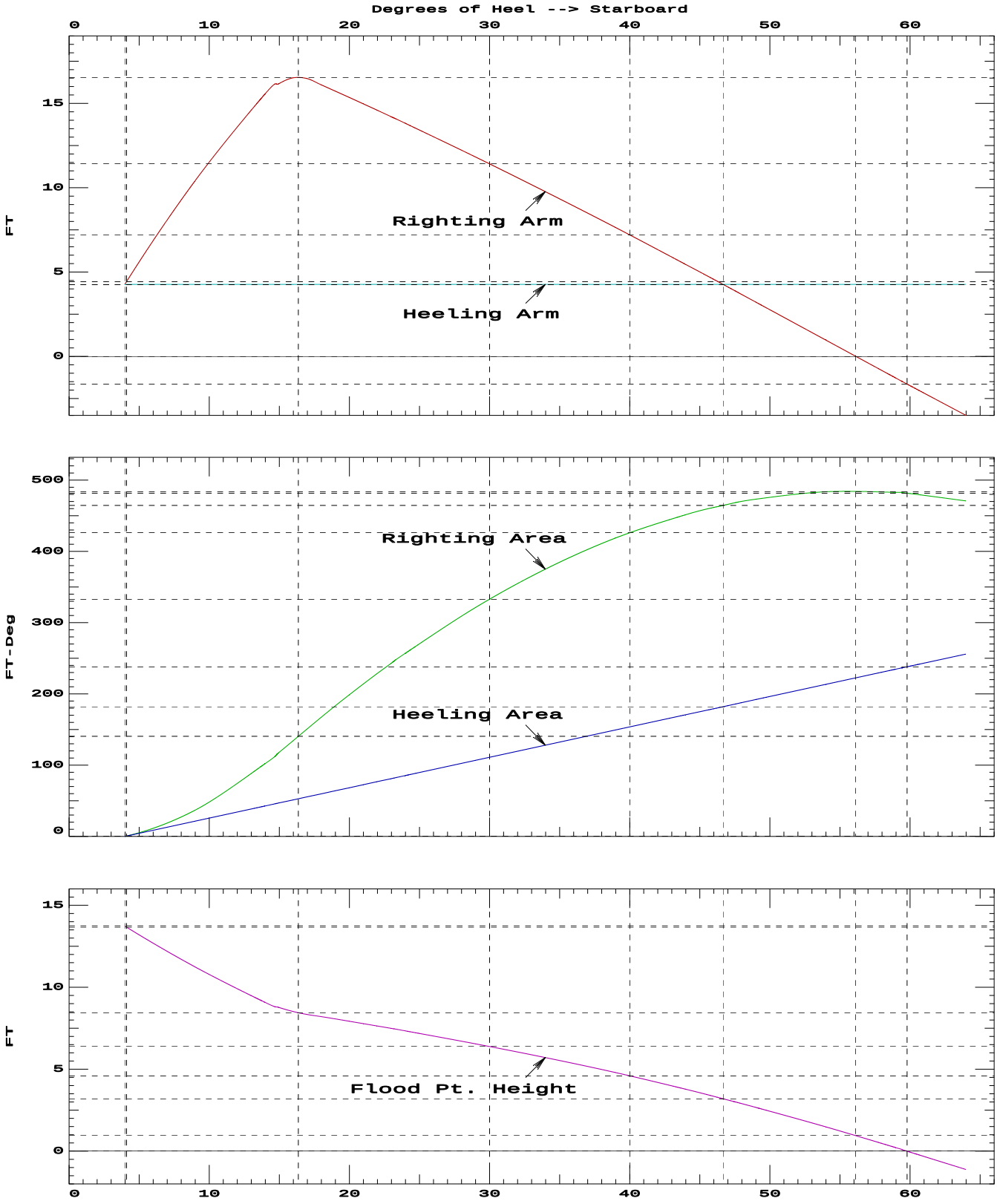
Condition 7 - 20AEQ 6RV Fwd Arrival with Ice

	Critical Points		LCP	TCP	VCP
(1)	ER Air Fwd S	FLOOD	43.30f	27.45s	23.45
(2)	ER Air Aft S	FLOOD	35.42f	27.45s	23.45

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Area from Equilibrium to 15 deg**	**>**	**5.26**	**Ft-deg**	**118.93**	**P**
(2)	**Angle from Equilibrium to RAzero**	**>**	**15.00**	**deg**	**42.68**	**P**

Relative angles measured from 3.978s

Condition 7 - 20AEQ 6RV Fwd Arrival with Ice



Condition 8 - 30AEQ 2ST Aft Departure with Ice

WEIGHT STATUS

Trim: Fwd 1.31/210.33, Heel: Port 0.17 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	500.46	84.77f	0.01p	23.23
Pax @185 lb ea (Stand)	20.65	105.24f	0.00	38.55
Luggage @20 lb ea Pax	2.22	115.73f	5.24p	21.33
Vehicles AEQ @6 kip ea	80.37	98.46f	1.64s	21.33
Vehicles ST @45 kip ea	40.18	75.92f	6.40p	27.46
Bikes @30 lb ea	0.16	209.32f	0.00	19.69
Kayaks @ 75 lb ea	0.20	131.39f	25.83p	21.65
Crew	0.98	115.83f	2.23s	44.16
Food Stuffs	0.58	100.46f	1.05p	38.71
Loose Outfit/Gear	0.40	111.22f	0.00	37.07
Stores	0.67	101.71f	0.00	37.07
Art Allowance	0.54	111.22f	0.00	40.35
Trash	0.45	104.66f	25.13s	28.64
Video Games	0.45	28.46f	5.11p	38.71
Ice Accretion	50.21	112.83f	0.00	38.16
Total Fixed	**698.53**	**88.68f**	**0.20p**	**24.86**

	Load	SpGr	Weight(LT)	LCG	TCG	VCG	FSM
FW.P	0.980	1.000	3.36	135.83f	21.23p	10.19	0.2
BW.S	0.200	1.025	2.77	98.18f	20.98s	7.96	6.8
DBF4.P	0.980	0.840	20.43	114.08f	22.48p	3.50	32.7
DBF3.S	0.980	0.840	20.43	114.08f	22.47s	3.50	32.7
LOH2.P	0.980	0.880	0.63	49.21f	17.12p	14.41	0.1
LOH1.S	0.980	0.880	0.63	49.21f	17.12s	14.41	0.1
Total Tanks			**48.25**	**112.99f**	**0.28p**	**4.51**	**88.9***
Total Weight			**746.77**	**90.25f**	**0.20p**	**23.55**	
Free Surface Adjustment						**0.12**	
Adjusted CG				**90.25f**	**0.20p**	**23.67**	

Distances in FEET. Moments in Ft-LT.

Note: FSM values marked with an asterisk (*) are formal values which are not the same as the true values in the present condition.

HYDROSTATIC PROPERTIES

Trim: Fwd 1.31/210.33, Heel: Port 0.17 deg., VCG = 23.55

LCF Draft	Displacement Weight(LT)	Buoyancy-Ctr. LCB	VCB	Weight/ Inch	LCF	Moment/ In trim	GML	GMT
8.200	746.77	90.37f	4.95	10.57	87.46f	139.76	472.4	69.14

Distances in FEET. Specific Gravity = 1.025. Moment in Ft-LT.
Trim is per 210.33Ft
Draft is from Baseline. Formal Free Surface included.

Note: GMT includes the formal free surface moment 88.9 Ft-LT

Condition 8 - 30AEQ 2ST Aft Departure with Ice

RIGHTING ARMS vs HEEL ANGLE

Total CG: LCG = 90.25f TCG = 0.20p VCG = 23.55
Free Surface Adjustment: 0.12
Adjusted CG: LCG = 90.25f TCG = 0.20p VCG = 23.67

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Righting Arms in Trim	in Heel	Area	Flood Pt Height	
7.655	0.36f	0.17p	746.77	0.00	0.000	0.00	15.45	(5)
7.637	0.30f	4.83s	746.74	0.00	6.057	15.14	13.19	(1)
7.639	0.11f	9.83s	746.78	0.00	12.097	60.53	10.70	(1)
7.624	0.09f	10.33s	746.77	0.00	12.673	66.72	10.46	(1)
7.601	0.07f	10.83s	746.77	0.00	13.236	73.20	10.22	(1)
7.569	0.05f	11.33s	746.77	0.00	13.786	79.96	9.99	(1)
7.529	0.04f	11.83s	746.77	0.00	14.320	86.98	9.77	(1)
7.478	0.03f	12.33s	746.77	0.00	14.836	94.27	9.55	(1)
7.415	0.02f	12.83s	746.77	0.00	15.326	101.81	9.34	(1)
7.337	0.01f	13.33s	746.77	0.00	15.785	109.59	9.14	(1)
7.244	0.01f	13.83s	746.96	0.00	16.203	117.59	8.95	(1)
7.130	0.02f	14.33s	746.77	0.00	16.582	125.78	8.78	(1)
7.001	0.02f	14.83s	746.77	0.00	16.908	134.16	8.62	(1)
6.855	0.03f	15.33s	746.77	0.00	17.177	142.68	8.48	(1)
6.690	0.04f	15.83s	746.77	0.00	17.379	151.32	8.35	(1)
6.506	0.06f	16.33s	746.71	0.00	17.504	160.04	8.24	(1)
6.429	0.06f	16.54s	746.73	0.00	17.527	163.56	8.19	(1)
6.366	0.06f	16.70s	746.85	0.00	**17.534**	166.47	8.16	(1)
6.309	0.06f	16.83s	746.68	0.00	17.530	168.80	8.14	(1)
5.881	0.06f	17.83s	746.73	0.00	17.245	186.19	7.99	(1)
5.440	0.05f	18.83s	746.77	0.00	16.890	203.26	7.85	(1)
4.998	0.04f	19.83s	746.77	0.00	16.529	219.97	7.72	(1)
2.770	0.00a	24.83s	746.76	0.00	14.663	298.06	6.98	(2)
0.528	0.06a	29.83s	746.76	0.00	12.704	366.51	6.19	(2)
-1.710	0.12a	34.83s	746.79	0.00	10.671	424.98	5.35	(2)
-3.872	0.19a	39.83s	746.84	0.00	8.555	473.08	4.41	(2)
-5.933	0.28a	44.83s	746.85	0.00	6.361	510.40	3.38	(2)
-7.879	0.38a	49.83s	746.82	0.01f	4.116	536.62	2.26	(2)
-9.691	0.49a	54.83s	746.86	0.01f	1.846	551.53	1.06	(2)
-11.055	0.58a	58.90s	746.78	0.00	-0.002	555.29	0.02	(2)
-11.084	0.59a	58.99s	746.78	0.00	-0.043	555.28	0.00	(2)
-11.353	0.61a	59.83s	746.78	0.00	-0.423	555.09	*-0.22*	(2)

Distances in FEET. Specific Gravity = 1.025. Area in Ft-Deg.

Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 88.9 Ft-LT was applied to artificially modify the CG.

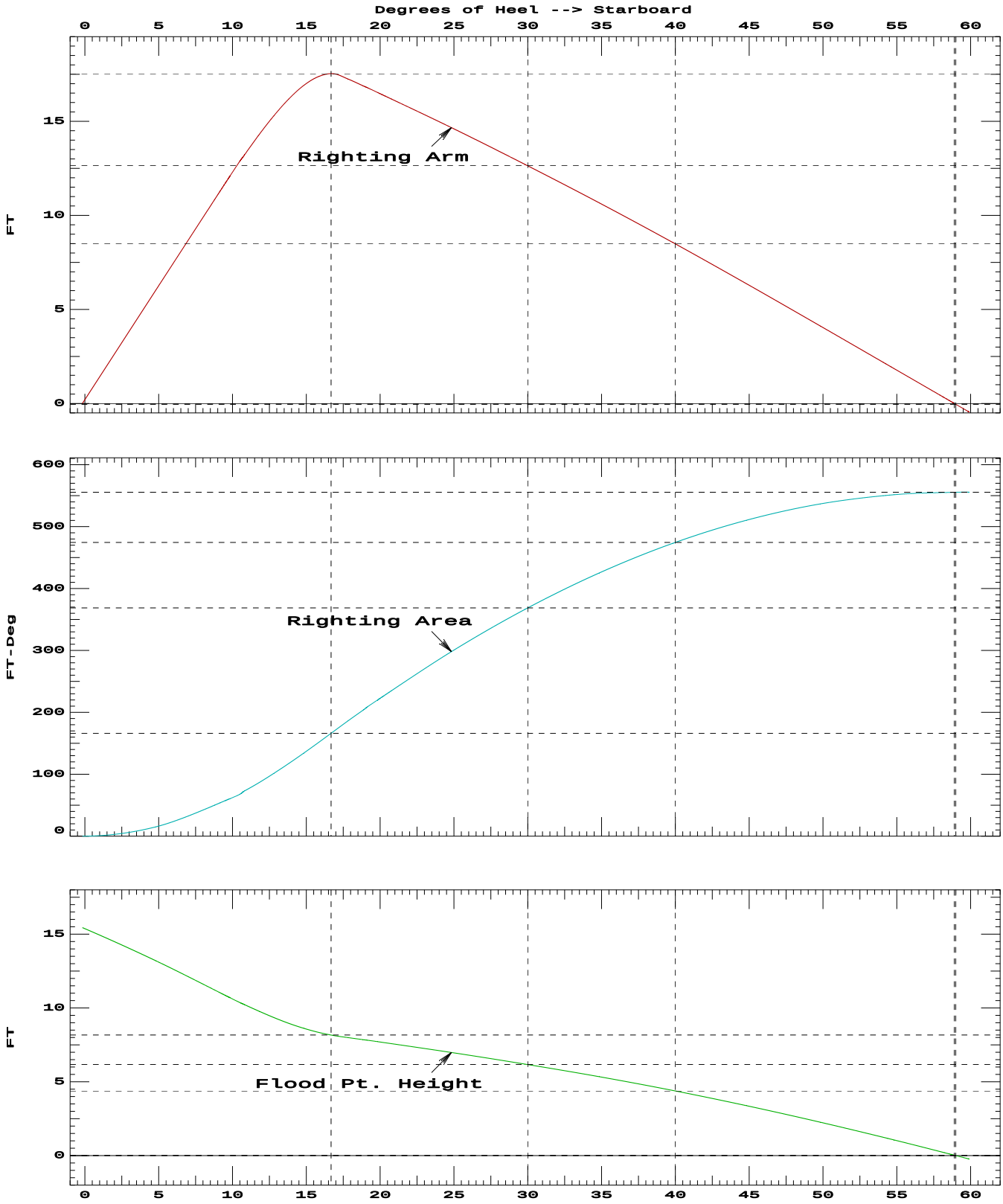
Condition 8 - 30AEQ 2ST Aft Departure with Ice

	Critical Points		LCP	TCP	VCP
(1)	ER Air Fwd S	FLOOD	43.30f	27.45s	23.45
(2)	ER Air Aft S	FLOOD	35.42f	27.45s	23.45
(5)	ER Air FWD P	FLOOD	43.30f	27.45p	23.45

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Area from abs -0.166 deg to 16.7**	**>**	**18.57**	**Ft-deg**	**163.56**	**P**
(2)	**Absolute Angle at MaxRA**	**>**	**10.00**	**deg**	**16.70**	**P**

Relative angles measured from 0.166

Condition 8 - 30AEQ 2ST Aft Departure with Ice



Condition 8 - 30AEQ 2ST Aft Departure with Ice

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*** Heel Angle Check ***

Calculated Heeling Moments
     LONG TONS - FEET
    HL1 =     983.8
    HL2 =    1475.7
    PL  =     449.7
    TL  =    1599.9
    HLT =    3075.6
```

With HMMT = TL 1599.9
Vessel Heel < 8.00 deg Calc Heel = 1.61 deg

With HMMT = max(PL,HL2) 1475.7
Vessel Heel < 10.00 deg Calc Heel = 1.47 deg

With HMMT = TL+HL2 3075.6
Vessel Heel < 12.00 deg Calc Heel = 3.24 deg

Condition 8 - 30AEQ 2ST Aft Departure with Ice

*** Residual Area Check ***

RESIDUAL RIGHTING ARMS vs HEEL ANGLE

Total CG: LCG = 90.26f TCG = 0.20p VCG = 23.55
Free Surface Adjustment: 0.12
Adjusted CG: LCG = 90.25f TCG = 0.20p VCG = 23.67

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Area	Flood Pt Height	
7.641	0.34f	3.23s	746.79	0.00	0.000	0.00	13.97	(1)
7.657	0.18f	8.23s	746.78	0.00	6.085	15.21	11.49	(1)
7.353	0.01f	13.23s	746.78	0.00	11.581	59.62	9.18	(1)
7.262	0.01f	13.73s	746.75	0.00	12.010	65.52	8.99	(1)
7.154	0.02f	14.23s	746.97	0.00	12.394	71.62	8.81	(1)
7.028	0.02f	14.73s	746.77	0.00	12.732	77.90	8.65	(1)
6.885	0.03f	15.23s	746.77	0.00	13.013	84.34	8.50	(1)
6.723	0.04f	15.73s	746.77	0.00	13.229	90.90	8.37	(1)
6.543	0.05f	16.23s	746.71	0.00	13.370	97.55	8.26	(1)
6.349	0.06f	16.73s	746.68	0.00	13.418	104.24	8.16	(1)
6.147	0.06f	17.23s	746.96	0.00	13.340	110.93	8.07	(1)
5.924	0.06f	17.73s	746.76	0.00	13.165	117.56	8.01	(1)
5.704	0.06f	18.23s	746.76	0.00	12.988	124.10	7.94	(1)
5.484	0.05f	18.73s	746.76	0.00	12.809	130.55	7.87	(1)
5.263	0.05f	19.23s	746.76	0.00	12.630	136.91	7.80	(1)
5.042	0.04f	19.73s	746.76	0.00	12.449	143.18	7.73	(1)
4.820	0.04f	20.23s	746.76	0.00	12.268	149.35	7.66	(1)
4.375	0.03f	21.23s	746.73	0.00	11.901	161.44	7.52	(1)
3.931	0.02f	22.23s	746.77	0.00	11.530	173.16	7.37	(1)
3.485	0.01f	23.23s	746.77	0.00	11.155	184.50	7.22	(1)
1.245	0.04a	28.23s	746.76	0.00	9.223	235.49	6.45	(2)
-0.999	0.09a	33.23s	746.75	0.00	7.213	276.61	5.63	(2)
-3.191	0.17a	38.23s	746.84	0.00	5.126	307.49	4.72	(2)
-5.285	0.25a	43.23s	746.85	0.00	2.954	327.72	3.72	(2)
-7.270	0.34a	48.23s	746.76	0.00	0.721	336.93	2.63	(2)
-7.881	0.38a	49.83s	746.46	0.01a	-0.003	337.51	2.26	(2)
-9.128	0.45a	53.23s	746.80	0.00	-1.544	334.88	1.45	(2)
-10.839	0.57a	58.23s	746.89	0.00	-3.815	321.49	0.20	(2)
-11.080	0.59a	58.98s	746.86	0.00	-4.152	318.53	0.00	(2)
-12.393	0.70a	63.23s	746.88	0.00	-6.068	296.77	*-1.12*	(2)

Distances in FEET. Specific Gravity = 1.025. Area in Ft-Deg.

Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 88.9 Ft-LT was applied to artificially modify the CG.

Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 3075.58

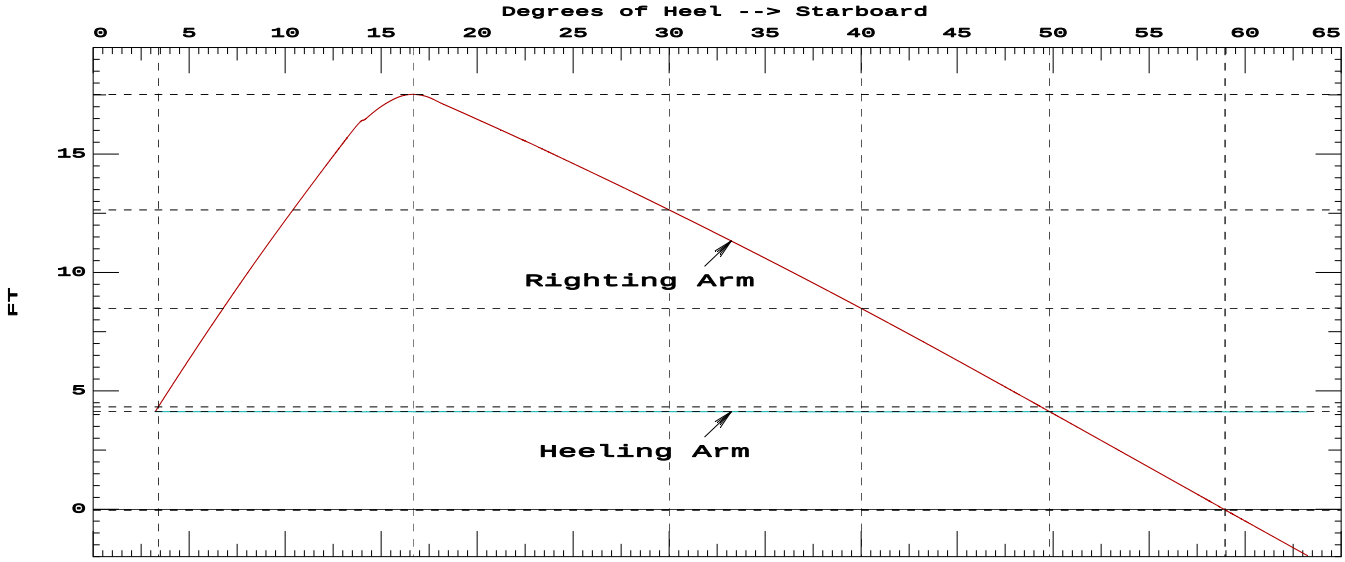
Condition 8 - 30AEQ 2ST Aft Departure with Ice

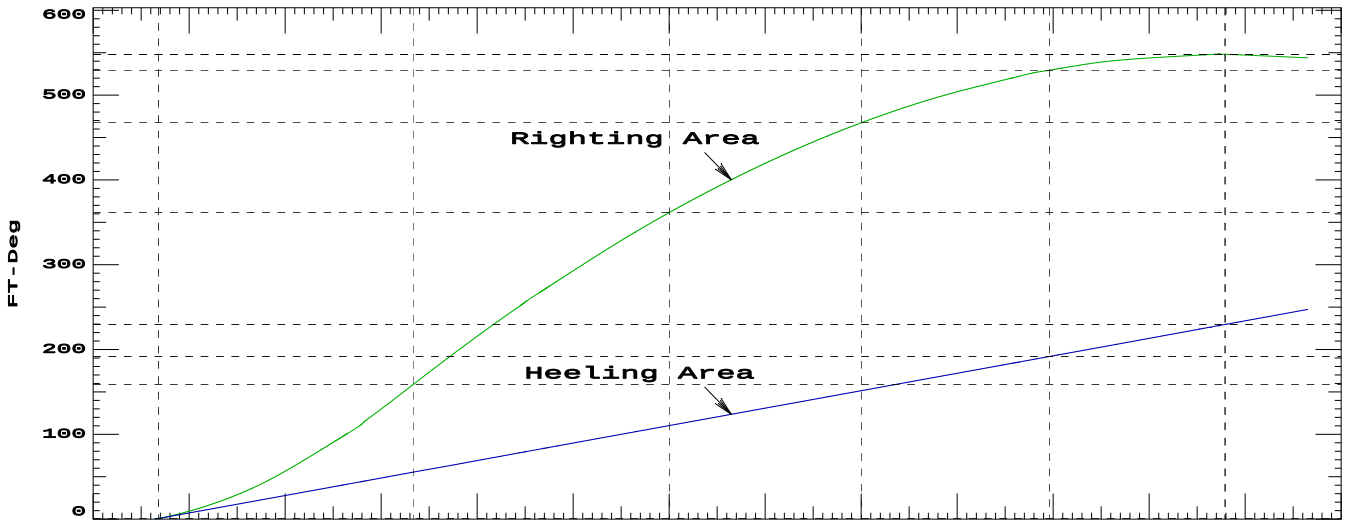
	Critical Points		LCP	TCP	VCP
(1)	ER Air Fwd S	FLOOD	43.30f	27.45s	23.45
(2)	ER Air Aft S	FLOOD	35.42f	27.45s	23.45

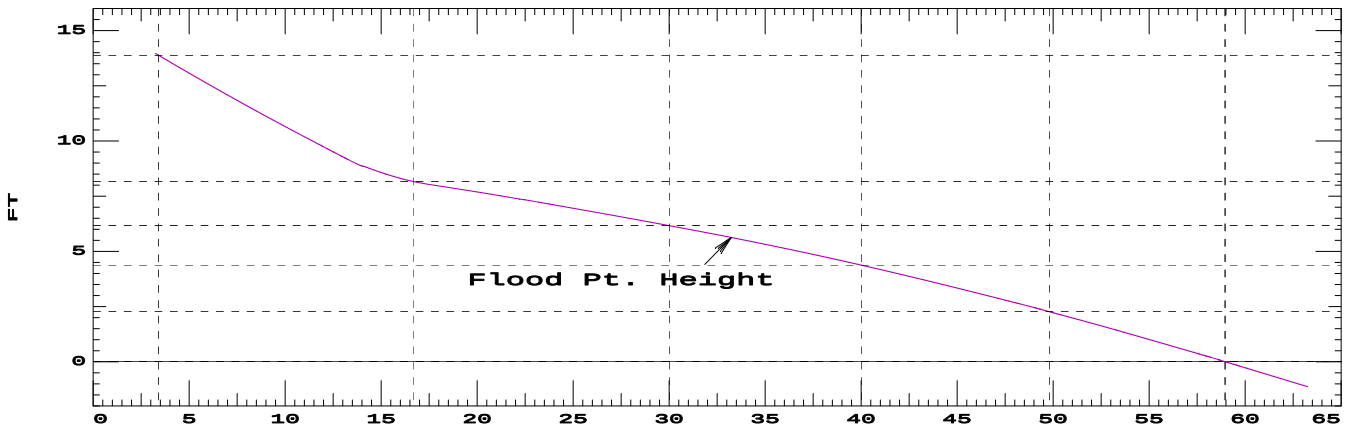
LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Area from Equilibrium to 15 deg**	**>**	**5.26**	**Ft-deg**	**124.10**	**P**
(2)	**Angle from Equilibrium to RAzero**	**>**	**15.00**	**deg**	**46.60**	**P**

Relative angles measured from 3.235s

Condition 8 - 30AEQ 2ST Aft Departure with Ice







Condition 9 - 30AEQ 2ST Aft Arrival with Ice

WEIGHT STATUS

Trim: Fwd 0.71/210.33, Heel: Stbd 0.16 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	500.46	84.77f	0.01p	23.23
Pax @185 lb ea (Stand)	20.65	105.24f	0.00	38.55
Luggage @20 lb ea Pax	2.22	115.73f	5.24p	21.33
Vehicles AEQ @6 kip ea	80.37	98.46f	1.64s	21.33
Vehicles ST @45 kip ea	40.18	75.92f	6.40p	27.46
Bikes @30 lb ea	0.16	209.32f	0.00	19.69
Kayaks @ 75 lb ea	0.20	131.39f	25.83p	21.65
Crew	0.98	115.83f	2.23s	44.16
Food Stuffs	0.06	100.46f	1.05p	38.71
Loose Outfit/Gear	0.40	111.22f	0.00	37.07
Stores	0.07	101.71f	0.00	37.07
Art Allowance	0.54	111.22f	0.00	40.35
Trash	0.45	104.66f	25.13s	28.64
Video Games	0.45	28.46f	5.11p	38.71
Ice Accretion	50.21	112.83f	0.00	38.16
Total Fixed	**697.40**	**88.66f**	**0.20p**	**24.84**

	Load	SpGr	Weight(LT)	LCG	TCG	VCG	FSM
FW.P	0.100	1.000	0.34	135.84f	21.23p	8.19	0.7
BW.S	0.980	1.025	13.56	98.12f	21.00s	10.37	0.9
DBF4.P	0.100	0.840	2.08	114.39f	22.45p	0.77	19.1
DBF3.S	0.100	0.840	2.08	114.39f	22.50s	0.77	19.1
LOH2.P	0.100	0.880	0.06	49.22f	17.12p	12.70	0.1
LOH1.S	0.100	0.880	0.06	49.22f	17.12s	12.70	0.1
Total Tanks			**18.20**	**102.21f**	**15.25s**	**8.14**	**88.9***
Total Weight			**715.60**	**89.01f**	**0.20s**	**24.42**	
Free Surface Adjustment						**0.12**	
Adjusted CG				**89.01f**	**0.20s**	**24.54**	

Distances in FEET. Moments in Ft-LT.

Note: FSM values marked with an asterisk (*) are formal values which are not the same as the true values in the present condition.

HYDROSTATIC PROPERTIES

Trim: Fwd 0.71/210.33, Heel: Stbd 0.16 deg., VCG = 24.42

LCF Draft	Displacement Weight(LT)	Buoyancy-Ctr. LCB	VCB	Weight/ Inch	LCF	Moment/ In trim	GML	GMT
7.947	715.59	89.07f	4.80	10.44	86.44f	134.86	475.7	70.77

Distances in FEET. Specific Gravity = 1.025. Moment in Ft-LT.

Trim is per 210.33Ft

Draft is from Baseline. Formal Free Surface included.

Note: GMT includes the formal free surface moment 88.9 Ft-LT

Condition 9 - 30AEQ 2ST Aft Arrival with Ice

RIGHTING ARMS vs HEEL ANGLE

Total CG: LCG = 89.01f TCG = 0.20s VCG = 24.42
Free Surface Adjustment: 0.12
Adjusted CG: LCG = 89.01f TCG = 0.20s VCG = 24.54

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Righting Arms in Trim	in Heel	Area	Flood Pt Height	
7.656	0.19f	0.16s	715.59	0.00	0.000	0.00	15.57	(1)
7.636	0.13f	5.16s	715.56	0.00	6.202	15.51	13.15	(1)
7.616	0.06a	10.16s	715.60	0.00	12.353	61.92	10.66	(2)
7.592	0.08a	10.66s	715.60	0.00	12.930	68.24	10.42	(2)
7.559	0.09a	11.16s	715.60	0.00	13.491	74.84	10.19	(2)
7.517	0.10a	11.66s	715.60	0.00	14.034	81.72	9.96	(2)
7.463	0.11a	12.16s	715.60	0.00	14.555	88.87	9.75	(2)
7.397	0.12a	12.66s	715.60	0.00	15.047	96.27	9.54	(2)
7.314	0.12a	13.16s	715.59	0.00	15.503	103.91	9.34	(2)
7.214	0.12a	13.66s	715.60	0.00	15.914	111.76	9.16	(2)
7.096	0.11a	14.16s	715.60	0.00	16.275	119.81	9.00	(2)
6.961	0.10a	14.66s	715.60	0.00	16.578	128.02	8.84	(2)
6.805	0.09a	15.16s	715.59	0.00	16.813	136.37	8.71	(2)
6.634	0.08a	15.66s	715.61	0.00	16.969	144.82	8.59	(2)
6.446	0.07a	16.16s	715.61	0.00	17.027	153.32	8.48	(2)
6.383	0.07a	16.32s	715.62	0.00	17.019	156.02	8.45	(2)
6.242	0.07a	16.66s	715.58	0.00	16.952	161.82	8.40	(2)
6.024	0.07a	17.16s	715.59	0.00	16.773	170.25	8.33	(2)
5.584	0.08a	18.16s	715.59	0.00	16.404	186.84	8.19	(2)
5.142	0.09a	19.16s	715.60	0.00	16.030	203.05	8.05	(2)
4.701	0.09a	20.16s	715.60	0.00	15.652	218.89	7.91	(2)
2.475	0.13a	25.16s	715.58	0.00	13.704	292.33	7.16	(2)
0.239	0.18a	30.16s	715.58	0.00	11.673	355.81	6.36	(2)
-1.993	0.24a	35.16s	715.57	0.00	9.581	408.97	5.50	(2)
-4.154	0.31a	40.16s	715.66	0.00	7.431	451.53	4.57	(2)
-6.207	0.40a	45.16s	715.70	0.00	5.217	483.17	3.53	(2)
-8.141	0.50a	50.16s	715.72	0.00	2.959	503.63	2.40	(2)
-9.941	0.61a	55.16s	715.78	0.00	0.685	512.75	1.19	(2)
-10.459	0.65a	56.67s	715.70	0.00	-0.003	513.26	0.81	(2)
-11.475	0.72a	59.78s	715.60	0.00	-1.407	511.07	0.00	(2)
-11.594	0.73a	60.16s	715.60	0.00	-1.576	510.51	*-0.10*	(2)

Distances in FEET. Specific Gravity = 1.025. Area in Ft-Deg.

Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 88.9 Ft-LT was applied to artificially modify the CG.

	Critical Points		LCP	TCP	VCP
(1)	ER Air Fwd S	FLOOD	43.30f	27.45s	23.45
(2)	ER Air Aft S	FLOOD	35.42f	27.45s	23.45

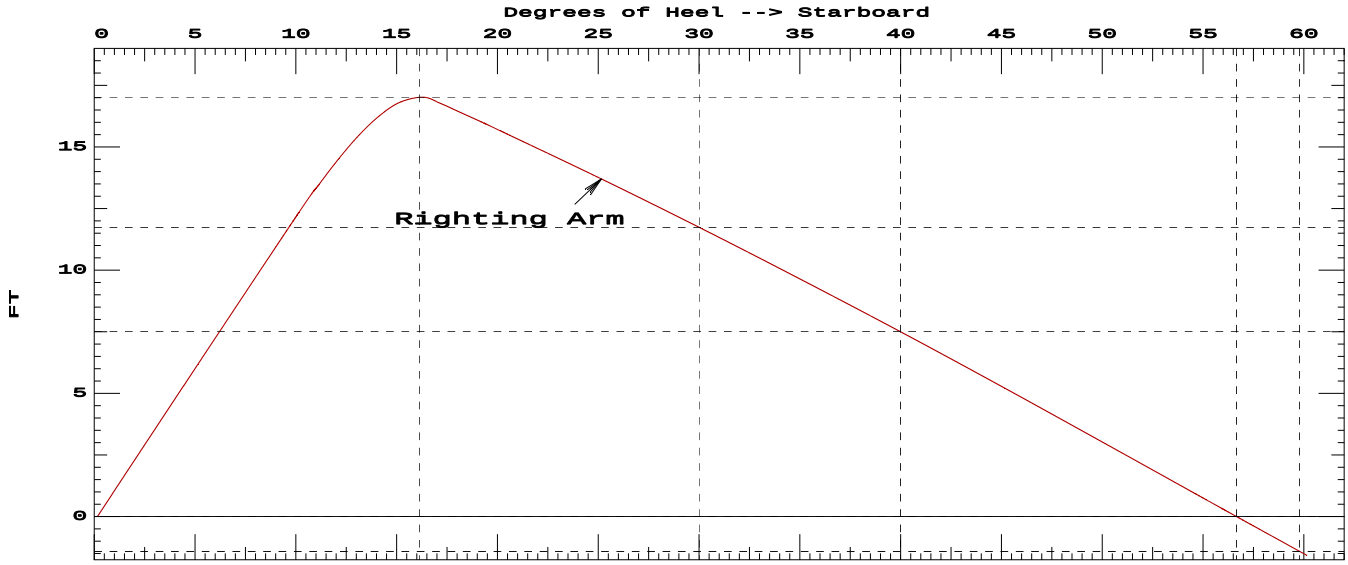
continued next page

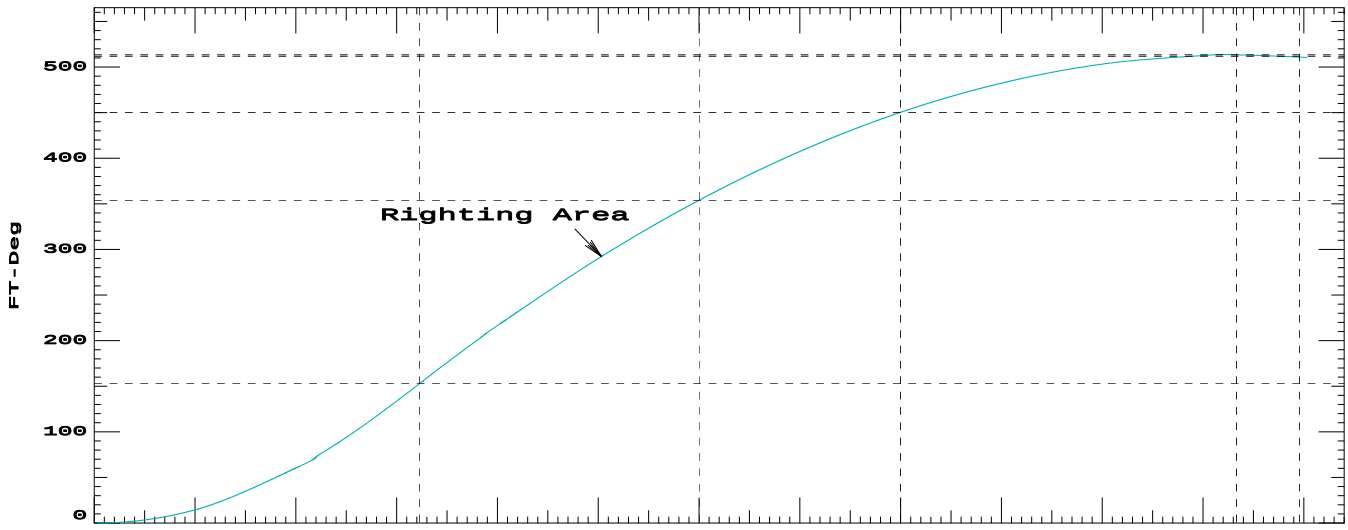
Condition 9 - 30AEQ 2ST Aft Arrival with Ice

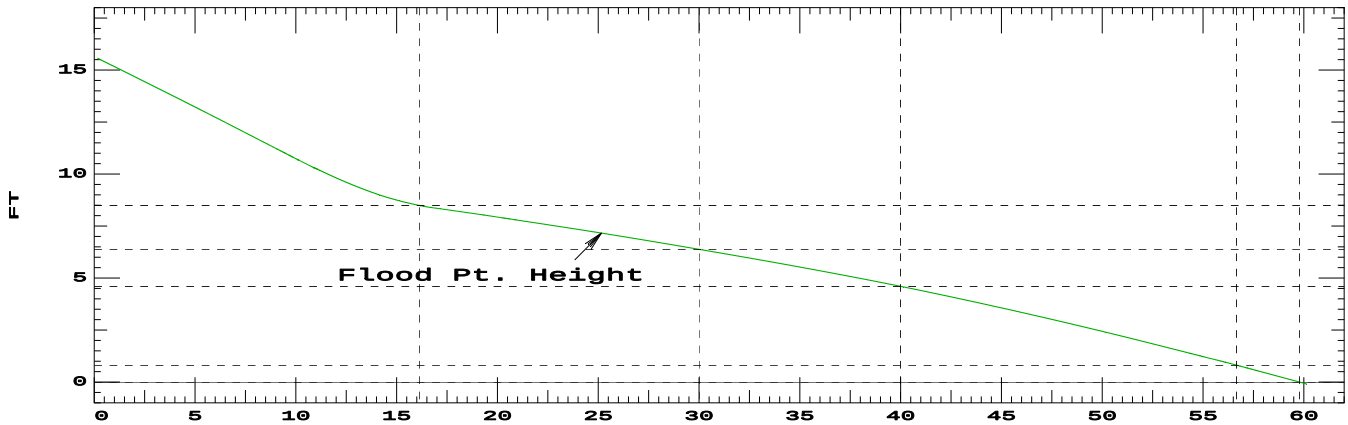
LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	Area from abs 0.159 deg to 16.2	>	19.19	Ft-deg	156.02	P
(2)	Absolute Angle at MaxRA	>	10.00	deg	16.16	P

Relative angles measured from 0.159

Condition 9 - 30AEQ 2ST Aft Arrival with Ice







Condition 9 - 30AEQ 2ST Aft Arrival with Ice

```
*** Heel Angle Check ***

Calculated Heeling Moments
     LONG TONS - FEET
    HL1 =     983.8
    HL2 =    1475.7
    PL  =     449.7
    TL  =    1597.7
    HLT =    3073.4
```

```
With HMMT = TL
        1597.7
```

```
Vessel Heel <    8.00 deg
Calc Heel =      1.96 deg
```

```
With HMMT = max(PL,HL2)
                1475.7
```

```
Vessel Heel <   10.00 deg
Calc Heel =  1.82 deg
```

```
With HMMT = TL+HL2
            3073.4
```

```
Vessel Heel <   12.00 deg
Calc Heel =  3.63 deg
```

Condition 9 - 30AEQ 2ST Aft Arrival with Ice

*** Residual Area Check ***

RESIDUAL RIGHTING ARMS vs HEEL ANGLE

Total CG: LCG = 89.01f TCG = 0.20s VCG = 24.42
Free Surface Adjustment: 0.12
Adjusted CG: LCG = 89.01f TCG = 0.19s VCG = 24.54

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Area	Flood Pt Height	
7.641	0.17f	3.62s	715.60	0.00	0.000	0.00	13.90	(1)
7.649	0.00f	8.62s	715.60	0.00	6.223	15.56	11.42	(1)
7.218	0.12a	13.62s	715.28	0.00	11.597	60.46	9.18	(2)
7.106	0.11a	14.12s	715.60	0.00	11.959	66.35	9.01	(2)
6.971	0.10a	14.62s	715.60	0.00	12.267	72.40	8.85	(2)
6.817	0.09a	15.12s	715.59	0.00	12.507	78.60	8.72	(2)
6.647	0.08a	15.62s	715.61	0.00	12.670	84.89	8.59	(2)
6.460	0.07a	16.12s	715.61	0.00	12.736	91.24	8.49	(2)
6.451	0.07a	16.14s	715.61	0.00	**12.736**	91.52	8.49	(2)
6.258	0.07a	16.62s	715.62	0.00	12.672	97.60	8.40	(2)
6.040	0.07a	17.12s	715.59	0.00	12.496	103.89	8.33	(2)
5.820	0.08a	17.62s	715.59	0.00	12.312	110.09	8.27	(2)
5.600	0.08a	18.12s	715.59	0.00	12.127	116.20	8.20	(2)
5.380	0.08a	18.62s	715.59	0.00	11.941	122.22	8.13	(2)
5.159	0.09a	19.12s	715.59	0.00	11.753	128.14	8.06	(2)
4.939	0.09a	19.62s	715.59	0.00	11.565	133.97	7.99	(2)
4.717	0.09a	20.12s	715.59	0.00	11.376	139.71	7.91	(2)
4.496	0.10a	20.62s	715.60	0.00	11.185	145.35	7.84	(2)
4.052	0.10a	21.62s	715.60	0.00	10.801	156.34	7.70	(2)
3.607	0.11a	22.62s	715.60	0.00	10.413	166.95	7.55	(2)
3.162	0.12a	23.62s	715.60	0.00	10.022	177.16	7.40	(2)
0.927	0.17a	28.62s	715.58	0.00	8.014	222.29	6.61	(2)
-1.309	0.22a	33.62s	715.58	0.00	5.938	257.20	5.77	(2)
-3.502	0.29a	38.62s	715.62	0.00	3.808	281.59	4.87	(2)
-5.588	0.37a	43.62s	715.70	0.00	1.612	295.17	3.86	(2)
-7.018	0.44a	47.21s	715.61	0.00	0.000	298.07	3.07	(2)
-7.561	0.47a	48.62s	715.61	0.00	-0.636	297.62	2.76	(2)
-9.403	0.58a	53.62s	715.75	0.00	-2.907	288.78	1.57	(2)
-11.101	0.69a	58.62s	715.81	0.00	-5.175	268.57	0.30	(2)
-11.468	0.72a	59.77s	715.75	0.00	-5.692	262.34	0.00	(2)
-12.650	0.81a	63.62s	715.59	0.00	-7.416	237.08	*-1.02*	(2)

Distances in FEET. Specific Gravity = 1.025. Area in Ft-Deg.

Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 88.9 Ft-LT was applied to artificially modify the CG.

Condition 9 - 30AEQ 2ST Aft Arrival with Ice

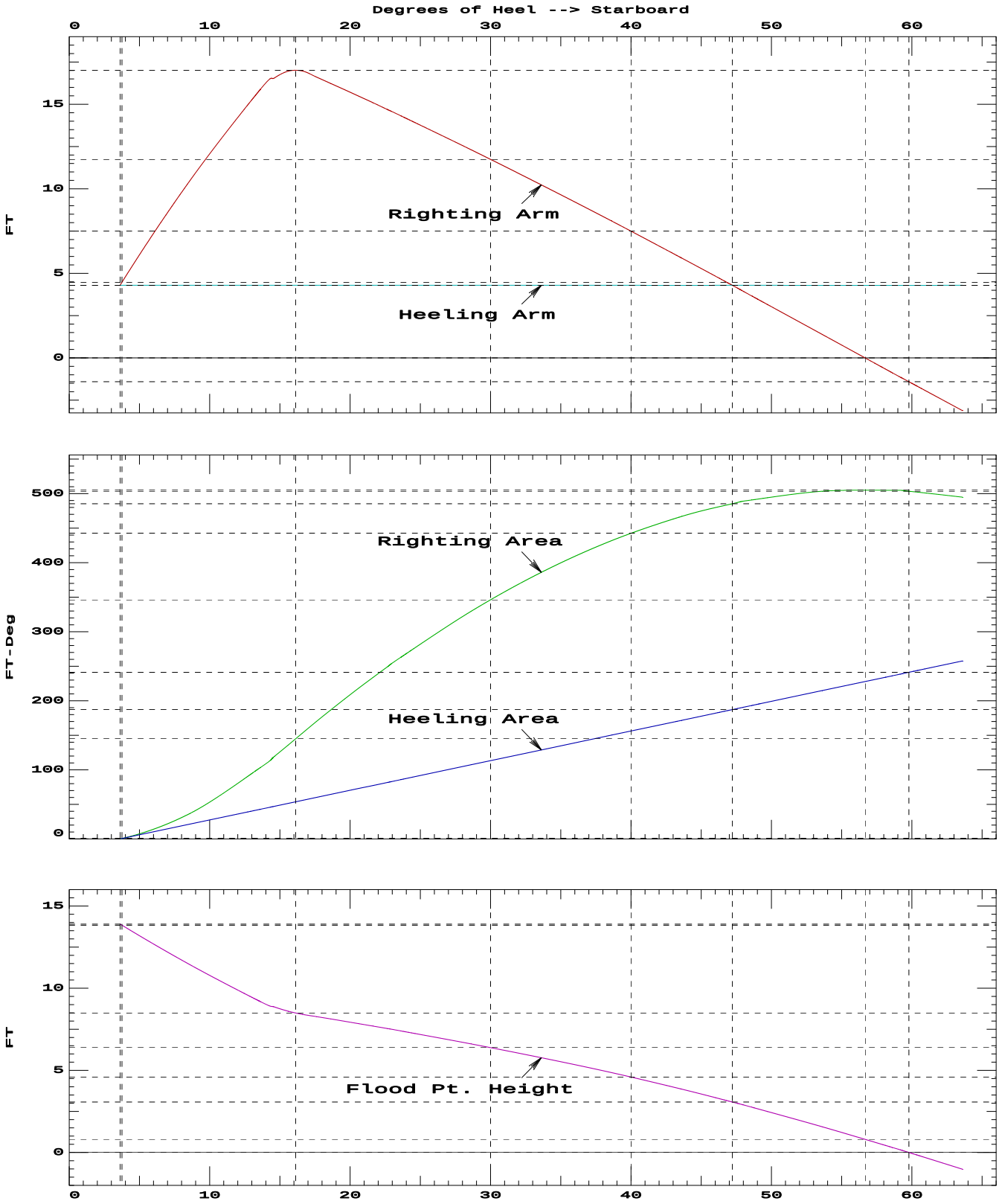
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 3073.37

	Critical Points		LCP	TCP	VCP
(1)	ER Air Fwd S	FLOOD	43.30f	27.45s	23.45
(2)	ER Air Aft S	FLOOD	35.42f	27.45s	23.45

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Area from Equilibrium to 15 deg**	**>**	**5.26**	**Ft-deg**	**122.22**	**P**
(2)	**Angle from Equilibrium to RAzero**	**>**	**15.00**	**deg**	**43.59**	**P**

Relative angles measured from 3.622s

Condition 9 - 30AEQ 2ST Aft Arrival with Ice



Condition 10 - 20AEQ 2ST 6RV Fwd Departure with no Ice

WEIGHT STATUS

Trim: Fwd 1.04/210.33, Heel: Stbd 0.16 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	500.46	84.77f	0.01p	23.23
Pax @185 lb ea (Stand)	20.65	105.24f	0.00	38.55
Luggage @20 lb ea Pax	2.22	115.73f	5.24p	21.33
Vehicles AEQ @6 kip ea	53.58	103.08f	0.75p	21.33
Vehicles ST @45 kip ea	40.18	93.21f	6.00s	27.46
Vehicles RV @15 kip ea	40.18	92.52f	0.75p	23.82
Bikes @30 lb ea	0.16	209.32f	0.00	19.69
Kayaks @ 75 lb ea	0.20	131.39f	25.83p	21.65
Crew	0.98	115.83f	2.23s	44.16
Food Stuffs	0.58	100.46f	1.05p	38.71
Loose Outfit/Gear	0.40	111.22f	0.00	37.07
Stores	0.67	101.71f	0.00	37.07
Art Allowance	0.54	111.22f	0.00	40.35
Trash	0.45	104.66f	25.13s	28.64
Video Games	0.45	28.46f	5.11p	38.71
Total Fixed	**661.70**	**88.11f**	**0.24s**	**23.93**

	Load	SpGr	Weight(LT)	LCG	TCG	VCG	FSM
FW.P	0.980	1.000	3.36	135.83f	21.23p	10.19	0.2
BW.S	0.200	1.025	2.77	98.17f	21.00s	7.96	6.8
DBF4.P	0.980	0.840	20.43	114.07f	22.47p	3.50	31.8
DBF3.S	0.980	0.840	20.43	114.07f	22.48s	3.50	31.8
LOH2.P	0.980	0.880	0.63	49.21f	17.12p	14.41	0.1
LOH1.S	0.980	0.880	0.63	49.21f	17.12s	14.41	0.1
Total Tanks			**48.25**	**112.98f**	**0.27p**	**4.51**	**88.9***
Total Weight			**709.95**	**89.80f**	**0.21s**	**22.61**	
Free Surface Adjustment						**0.13**	
Adjusted CG				**89.80f**	**0.21s**	**22.74**	

Distances in FEET. Moments in Ft-LT.

Note: FSM values marked with an asterisk (*) are formal values which are not the same as the true values in the present condition.

HYDROSTATIC PROPERTIES

Trim: Fwd 1.04/210.33, Heel: Stbd 0.16 deg., VCG = 22.61

LCF Draft	Displacement Weight(LT)	Buoyancy-Ctr. LCB	VCB	Weight/ Inch	LCF	Moment/ In trim	GML	GMT
7.904	709.95	89.89f	4.78	10.44	86.77f	135.84	482.9	73.29

Distances in FEET. Specific Gravity = 1.025. Moment in Ft-LT.
Trim is per 210.33Ft
Draft is from Baseline. Formal Free Surface included.

Note: GMT includes the formal free surface moment 88.9 Ft-LT

Condition 10 - 20AEQ 2ST 6RV Fwd Departure with no Ice

RIGHTING ARMS vs HEEL ANGLE

Total CG: LCG = 89.80f TCG = 0.21s VCG = 22.61
Free Surface Adjustment: 0.13
Adjusted CG: LCG = 89.80f TCG = 0.21s VCG = 22.74

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Righting Arms in Trim	in Heel	Area	Flood Pt Height	
7.473	0.28f	0.16s	709.95	0.00	0.000	0.00	15.68	(1)
7.457	0.22f	5.16s	709.91	0.00	6.429	16.07	13.26	(1)
7.418	0.04f	10.16s	709.95	0.00	12.781	64.13	10.79	(1)
7.389	0.02f	10.66s	709.95	0.00	13.371	70.67	10.56	(1)
7.349	0.01f	11.16s	709.95	0.00	13.944	77.50	10.33	(1)
7.300	0.00	11.66s	709.95	0.00	14.499	84.61	10.12	(1)
7.239	0.00a	12.16s	709.95	0.00	15.029	91.99	9.90	(2)
7.162	0.01a	12.66s	709.94	0.00	15.527	99.63	9.70	(2)
7.069	0.00a	13.16s	709.96	0.00	15.987	107.51	9.52	(2)
6.959	0.00	13.66s	709.95	0.00	16.402	115.60	9.34	(1)
6.832	0.01f	14.16s	709.95	0.00	16.766	123.89	9.18	(1)
6.687	0.02f	14.66s	709.95	0.00	17.071	132.35	9.03	(1)
6.523	0.04f	15.16s	709.94	0.00	17.308	140.95	8.90	(1)
6.342	0.05f	15.66s	709.98	0.00	17.466	149.64	8.79	(1)
6.144	0.06f	16.16s	709.86	0.00	17.530	158.39	8.69	(1)
6.079	0.07f	16.32s	709.85	0.00	17.524	161.21	8.66	(1)
5.941	0.06f	16.66s	710.08	0.00	17.457	167.14	8.61	(1)
5.721	0.06f	17.16s	709.94	0.00	17.290	175.83	8.54	(1)
5.282	0.06f	18.16s	709.91	0.00	16.950	192.95	8.40	(1)
4.843	0.05f	19.16s	709.95	0.00	16.606	209.73	8.26	(1)
4.403	0.04f	20.16s	709.95	0.00	16.258	226.16	8.12	(1)
2.188	0.00a	25.16s	709.93	0.00	14.454	302.98	7.37	(2)
-0.036	0.06a	30.16s	709.93	0.00	12.561	370.56	6.56	(2)
-2.254	0.12a	35.16s	709.93	0.00	10.601	428.49	5.69	(2)
-4.420	0.19a	40.16s	710.02	0.00	8.583	476.48	4.76	(2)
-6.476	0.28a	45.16s	710.05	0.00	6.489	514.19	3.72	(2)
-8.410	0.38a	50.16s	710.07	0.00	4.343	541.29	2.59	(2)
-10.207	0.49a	55.16s	710.08	0.01f	2.171	557.59	1.38	(2)
-11.853	0.61a	60.16s	710.12	0.00	0.000	563.01	0.09	(2)

Distances in FEET. Specific Gravity = 1.025. Area in Ft-Deg.

Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 88.9 Ft-LT was applied to artificially modify the CG.

	Critical Points		LCP	TCP	VCP
(1)	ER Air Fwd S	FLOOD	43.30f	27.45s	23.45
(2)	ER Air Aft S	FLOOD	35.42f	27.45s	23.45

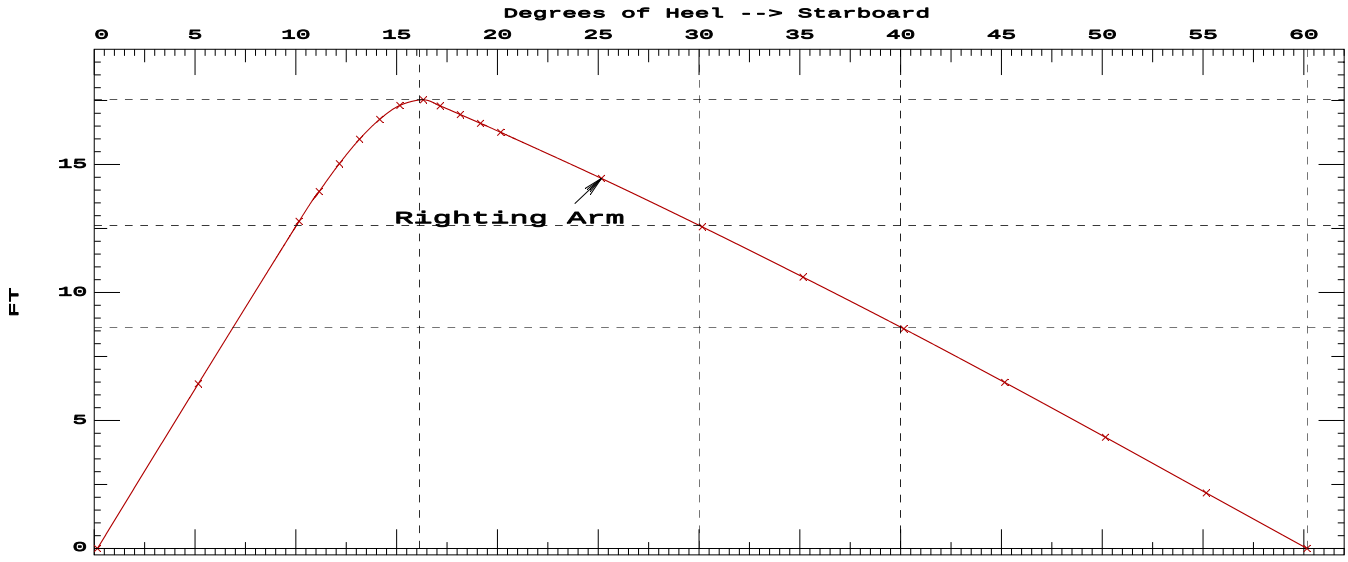
continued next page

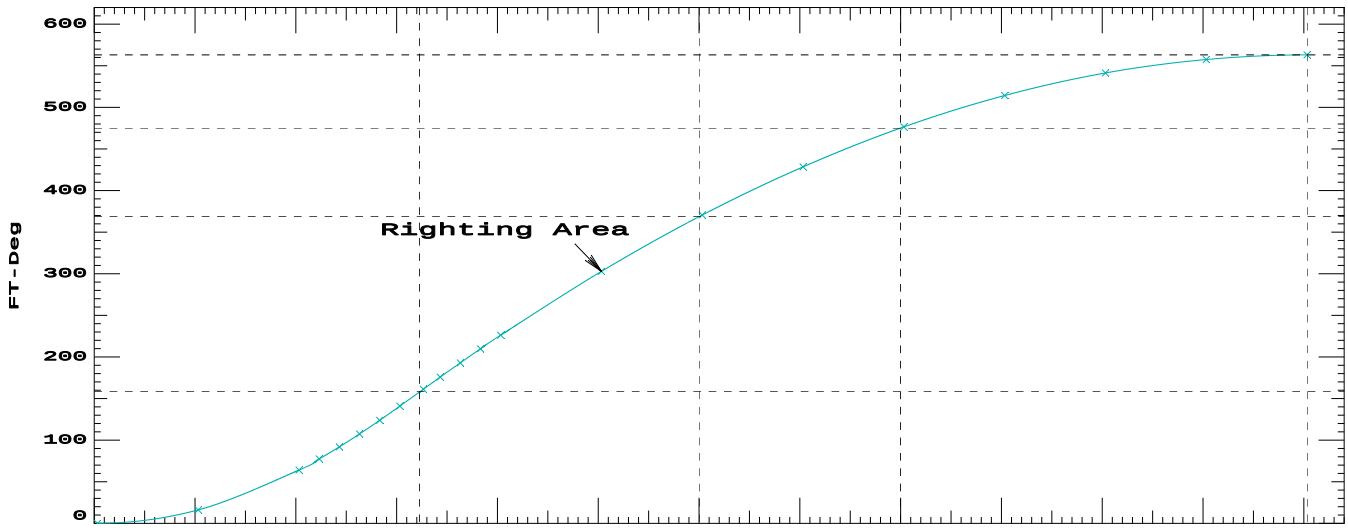
Condition 10 - 20AEQ 2ST 6RV Fwd Departure with no Ice

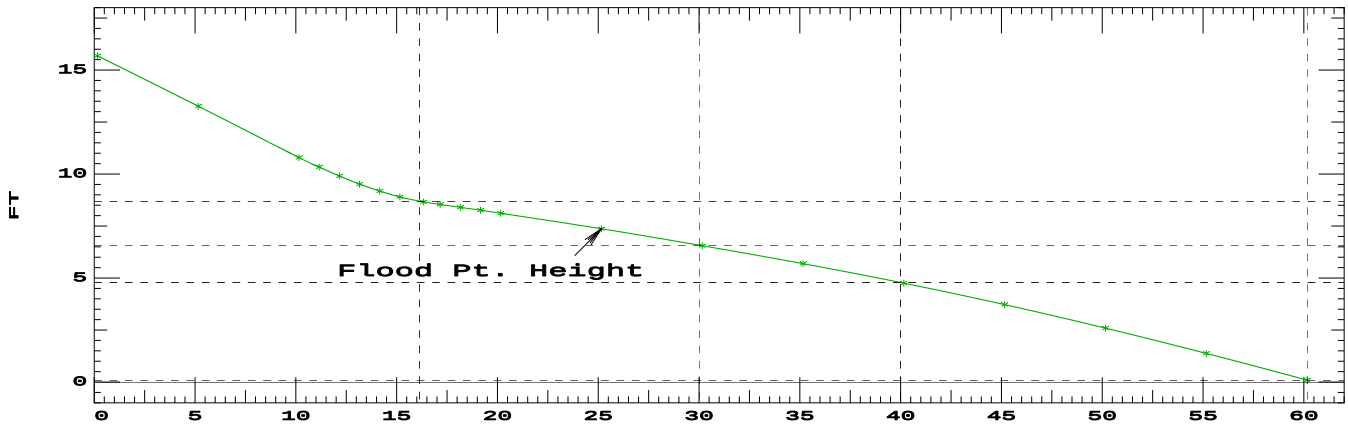
LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Area from abs 0.161 deg to 16.2**	**>**	**19.19**	**Ft-deg**	**161.21**	**P**
(2)	**Absolute Angle at MaxRA**	**>**	**10.00**	**deg**	**16.16**	**P**

Relative angles measured from 0.161

Condition 10 - 20AEQ 2ST 6RV Fwd Departure with no Ice







Condition 10 - 20AEQ 2ST 6RV Fwd Departure with no Ice

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*** Heel Angle Check ***

Calculated Heeling Moments
     LONG TONS - FEET
    HL1 =     983.8
    HL2 =    1475.7
    PL  =     449.7
    TL  =    1453.1
    HLT =    2928.8
```

With HMMT = TL 1453.1
Vessel Heel < 8.00 deg Calc Heel = 1.76 deg

With HMMT = max(PL,HL2) 1475.7
Vessel Heel < 10.00 deg Calc Heel = 1.78 deg

With HMMT = TL+HL2 2928.8
Vessel Heel < 12.00 deg Calc Heel = 3.37 deg

Condition 10 - 20AEQ 2ST 6RV Fwd Departure with no Ice

*** Residual Area Check ***

RESIDUAL RIGHTING ARMS vs HEEL ANGLE

Total CG: LCG = 89.80f TCG = 0.21s VCG = 22.61
Free Surface Adjustment: 0.13
Adjusted CG: LCG = 89.80f TCG = 0.20s VCG = 22.74

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Area	Flood Pt Height	
7.461	0.26f	3.37s	709.95	0.00	0.000	0.00	14.14	(1)
7.466	0.11f	8.37s	709.95	0.00	6.452	16.13	11.66	(1)
7.021	0.00	13.37s	709.71	0.00	12.048	62.74	9.44	(2)
6.907	0.01f	13.87s	709.95	0.00	12.441	68.86	9.27	(1)
6.772	0.02f	14.37s	709.95	0.00	12.780	75.16	9.12	(1)
6.619	0.03f	14.87s	709.94	0.00	13.058	81.62	8.98	(1)
6.448	0.04f	15.37s	709.94	0.00	13.263	88.20	8.85	(1)
6.261	0.06f	15.87s	709.95	0.00	13.384	94.86	8.74	(1)
6.145	0.06f	16.17s	710.12	0.00	**13.407**	98.81	8.69	(1)
6.059	0.07f	16.37s	709.95	0.00	13.396	101.56	8.65	(1)
5.848	0.06f	16.87s	710.05	0.00	13.265	108.23	8.58	(1)
5.627	0.06f	17.37s	709.94	0.00	13.096	114.82	8.51	(1)
5.409	0.06f	17.87s	709.94	0.00	12.926	121.32	8.44	(1)
5.189	0.05f	18.37s	709.93	0.00	12.755	127.74	8.37	(1)
4.970	0.05f	18.87s	709.93	0.00	12.583	134.08	8.30	(1)
4.750	0.05f	19.37s	709.93	0.00	12.410	140.33	8.23	(1)
4.530	0.04f	19.87s	709.93	0.00	12.236	146.49	8.16	(1)
4.309	0.04f	20.37s	709.93	0.00	12.061	152.56	8.09	(1)
3.867	0.03f	21.37s	709.90	0.00	11.707	164.45	7.94	(1)
3.425	0.02f	22.37s	709.95	0.00	11.349	175.98	7.79	(1)
2.982	0.01f	23.37s	709.95	0.00	10.987	187.14	7.64	(1)
0.760	0.04a	28.37s	709.93	0.00	9.124	237.46	6.85	(2)
-1.463	0.10a	33.37s	709.93	0.00	7.186	278.27	6.01	(2)
-3.659	0.16a	38.37s	709.98	0.00	5.191	309.23	5.10	(2)
-5.754	0.25a	43.37s	710.04	0.00	3.123	330.05	4.10	(2)
-7.734	0.35a	48.37s	710.06	0.00	0.992	340.36	3.01	(2)
-8.601	0.39a	50.67s	709.96	0.00	-0.001	341.50	2.47	(2)
-9.583	0.45a	53.37s	709.99	0.00	-1.174	339.91	1.82	(2)
-11.282	0.57a	58.37s	710.13	0.00	-3.348	328.61	0.56	(2)
-11.963	0.62a	60.51s	709.95	0.00	-4.274	320.48	0.00	(2)
-12.837	0.69a	63.37s	710.01	0.00	-5.510	306.46	*-0.76*	(2)

Distances in FEET. Specific Gravity = 1.025. Area in Ft-Deg.

Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 88.9 Ft-LT was applied to artificially modify the CG.

Condition 10 - 20AEQ 2ST 6RV Fwd Departure with no Ice

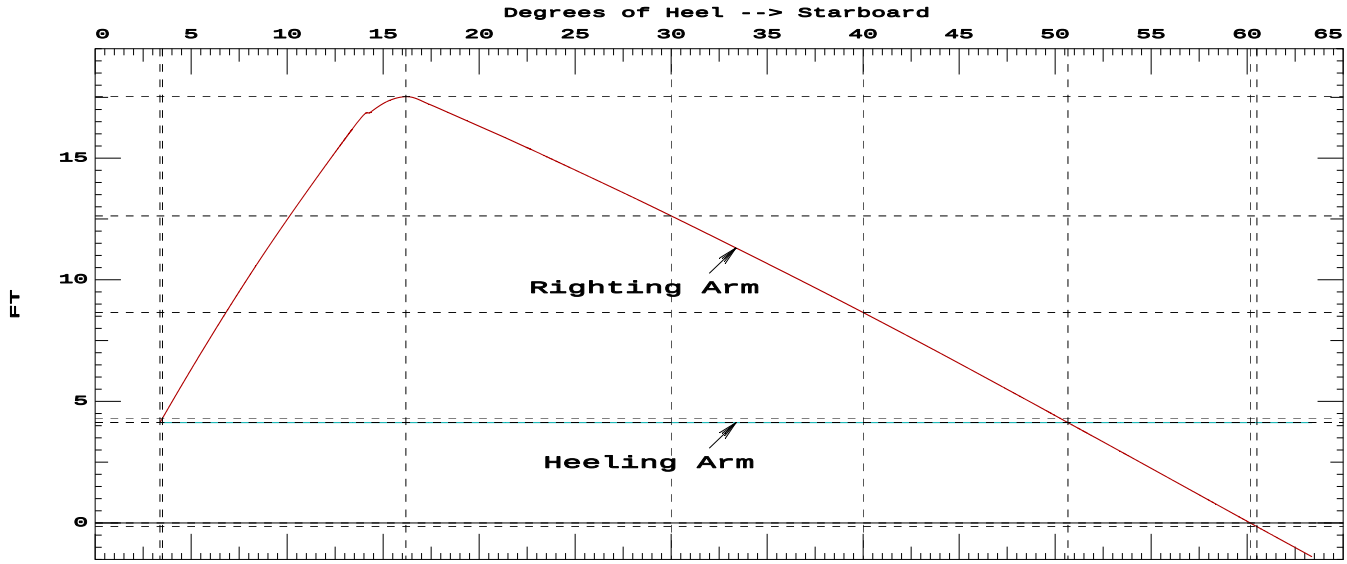
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 2928.77

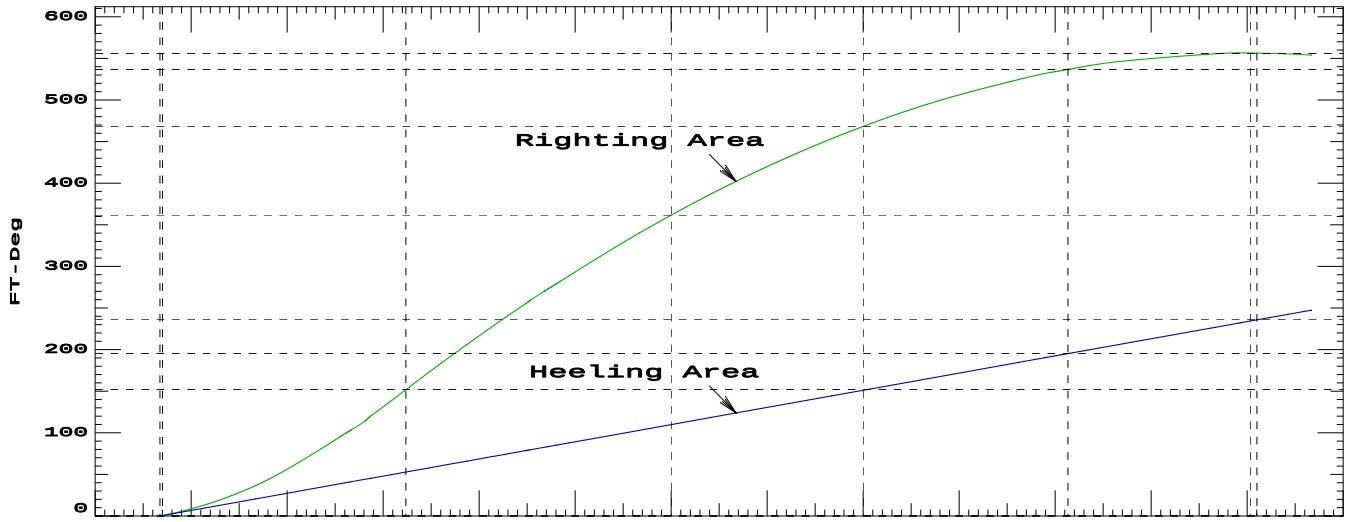
	Critical Points		LCP	TCP	VCP
(1)	ER Air Fwd S	FLOOD	43.30f	27.45s	23.45
(2)	ER Air Aft S	FLOOD	35.42f	27.45s	23.45

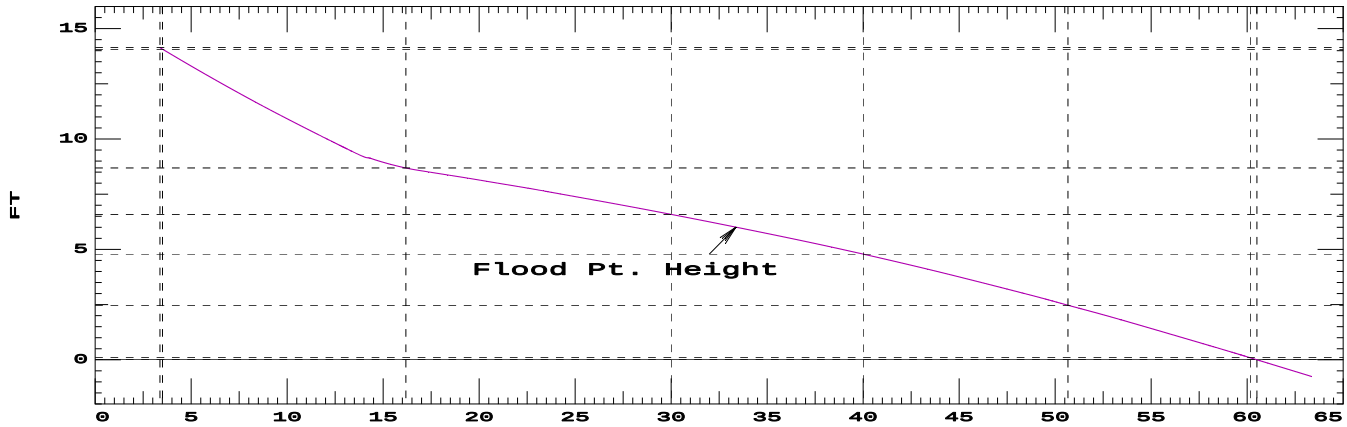
LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Area from Equilibrium to 15 deg**	**>**	**5.26**	**Ft-deg**	**127.74**	**P**
(2)	**Angle from Equilibrium to RAzero**	**>**	**15.00**	**deg**	**47.30**	**P**

Relative angles measured from 3.373s

Condition 10 - 20AEQ 2ST 6RV Fwd Departure with no Ice







Condition 11 - 20AEQ 2ST 6RV Fwd Arrival with no Ice

WEIGHT STATUS

Trim: Fwd 0.41/210.33, Heel: Stbd 0.49 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	500.46	84.77f	0.01p	23.23
Pax @185 lb ea (Stand)	20.65	105.24f	0.00	38.55
Luggage @20 lb ea Pax	2.22	115.73f	5.24p	21.33
Vehicles AEQ @6 kip ea	53.58	103.08f	0.75p	21.33
Vehicles ST @45 kip ea	40.18	93.21f	6.00s	27.46
Vehicles RV @15 kip ea	40.18	92.52f	0.75p	23.82
Bikes @30 lb ea	0.16	209.32f	0.00	19.69
Kayaks @ 75 lb ea	0.20	131.39f	25.83p	21.65
Crew	0.98	115.83f	2.23s	44.16
Food Stuffs	0.06	100.46f	1.05p	38.71
Loose Outfit/Gear	0.40	111.22f	0.00	37.07
Stores	0.07	101.71f	0.00	37.07
Art Allowance	0.54	111.22f	0.00	40.35
Trash	0.45	104.66f	25.13s	28.64
Video Games	0.45	28.46f	5.11p	38.71
Total Fixed	**660.58**	**88.09f**	**0.24s**	**23.91**

	Load	SpGr	Weight(LT)	LCG	TCG	VCG	FSM
FW.P	0.100	1.000	0.34	135.84f	21.22p	8.19	0.7
BW.S	0.980	1.025	13.56	98.12f	21.00s	10.37	0.9
DBF4.P	0.100	0.840	2.08	114.35f	22.39p	0.77	19.1
DBF3.S	0.100	0.840	2.08	114.35f	22.55s	0.77	19.1
LOH2.P	0.100	0.880	0.06	49.22f	17.11p	12.70	0.1
LOH1.S	0.100	0.880	0.06	49.22f	17.13s	12.70	0.1
Total Tanks			**18.20**	**102.20f**	**15.26s**	**8.14**	**88.9***
Total Weight			**678.77**	**88.47f**	**0.64s**	**23.49**	
Free Surface Adjustment						**0.13**	
Adjusted CG				**88.47f**	**0.64s**	**23.62**	

Distances in FEET. Moments in Ft-LT.

Note: FSM values marked with an asterisk (*) are formal values which are not the same as the true values in the present condition.

HYDROSTATIC PROPERTIES

Trim: Fwd 0.41/210.33, Heel: Stbd 0.49 deg., VCG = 23.49

LCF Draft	Displacement Weight(LT)	Buoyancy-Ctr. LCB	VCB	Weight/ Inch	LCF	Moment/ In trim	GML	GMT
7.649	678.77	88.51f	4.64	10.30	85.78f	131.13	487.6	75.20

Distances in FEET. Specific Gravity = 1.025. Moment in Ft-LT.
Trim is per 210.33Ft
Draft is from Baseline. Formal Free Surface included.

Note: GMT includes the formal free surface moment 88.9 Ft-LT

Condition 11 - 20AEQ 2ST 6RV Fwd Arrival with no Ice

RIGHTING ARMS vs HEEL ANGLE

Total CG: LCG = 88.47f TCG = 0.64s VCG = 23.49
Free Surface Adjustment: 0.13
Adjusted CG: LCG = 88.47f TCG = 0.64s VCG = 23.62

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Righting Arms in Trim	in Heel	Area	Flood Pt Height	
7.482	0.11f	0.49s	678.77	0.00	0.000	0.00	15.65	(1)
7.462	0.05f	5.49s	678.73	0.00	6.606	16.51	13.22	(1)
7.386	0.13a	10.49s	678.47	0.00	13.072	65.77	10.75	(2)
7.348	0.14a	10.99s	678.77	0.00	13.652	72.45	10.52	(2)
7.297	0.15a	11.49s	678.77	0.00	14.216	79.41	10.31	(2)
7.232	0.15a	11.99s	678.77	0.00	14.750	86.66	10.10	(2)
7.152	0.15a	12.49s	678.78	0.00	15.247	94.16	9.90	(2)
7.053	0.15a	12.99s	678.77	0.00	15.699	101.89	9.72	(2)
6.937	0.14a	13.49s	678.77	0.00	16.099	109.84	9.55	(2)
6.803	0.13a	13.99s	678.77	0.00	16.439	117.98	9.39	(2)
6.649	0.11a	14.49s	678.77	0.00	16.710	126.26	9.26	(2)
6.478	0.10a	14.99s	678.79	0.00	16.899	134.66	9.13	(2)
6.291	0.09a	15.49s	678.79	0.00	16.989	143.14	9.03	(2)
6.250	0.09a	15.59s	678.76	0.00	**16.993**	144.91	9.01	(2)
6.090	0.08a	15.99s	678.80	0.00	16.944	151.62	8.94	(2)
6.049	0.08a	16.08s	678.76	0.00	16.918	153.21	8.93	(2)
5.873	0.09a	16.49s	678.77	0.00	16.777	160.05	8.87	(2)
5.655	0.09a	16.99s	678.77	0.00	16.601	168.40	8.81	(2)
5.436	0.09a	17.49s	678.77	0.00	16.424	176.66	8.74	(2)
4.998	0.10a	18.49s	678.77	0.00	16.067	192.90	8.60	(2)
4.558	0.10a	19.49s	678.77	0.00	15.705	208.79	8.45	(2)
4.118	0.11a	20.49s	678.77	0.00	15.339	224.31	8.31	(2)
1.904	0.15a	25.49s	678.76	0.00	13.454	296.33	7.54	(2)
-0.316	0.19a	30.49s	678.75	0.00	11.491	358.73	6.71	(2)
-2.528	0.25a	35.49s	678.75	0.00	9.472	411.16	5.84	(2)
-4.695	0.31a	40.49s	678.76	0.00	7.414	453.39	4.90	(2)
-6.743	0.40a	45.49s	678.88	0.00	5.306	485.21	3.86	(2)
-8.666	0.51a	50.49s	678.92	0.00	3.155	506.38	2.72	(2)
-10.450	0.62a	55.49s	678.95	0.00	0.987	516.74	1.50	(2)
-11.220	0.67a	57.78s	678.82	0.00	-0.003	517.87	0.91	(2)
-12.093	0.73a	60.49s	678.82	0.00	-1.171	516.27	0.21	(2)

Distances in FEET. Specific Gravity = 1.025. Area in Ft-Deg.

Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 88.9 Ft-LT was applied to artificially modify the CG.

	Critical Points		LCP	TCP	VCP
(1)	ER Air Fwd S	FLOOD	43.30f	27.45s	23.45
(2)	ER Air Aft S	FLOOD	35.42f	27.45s	23.45

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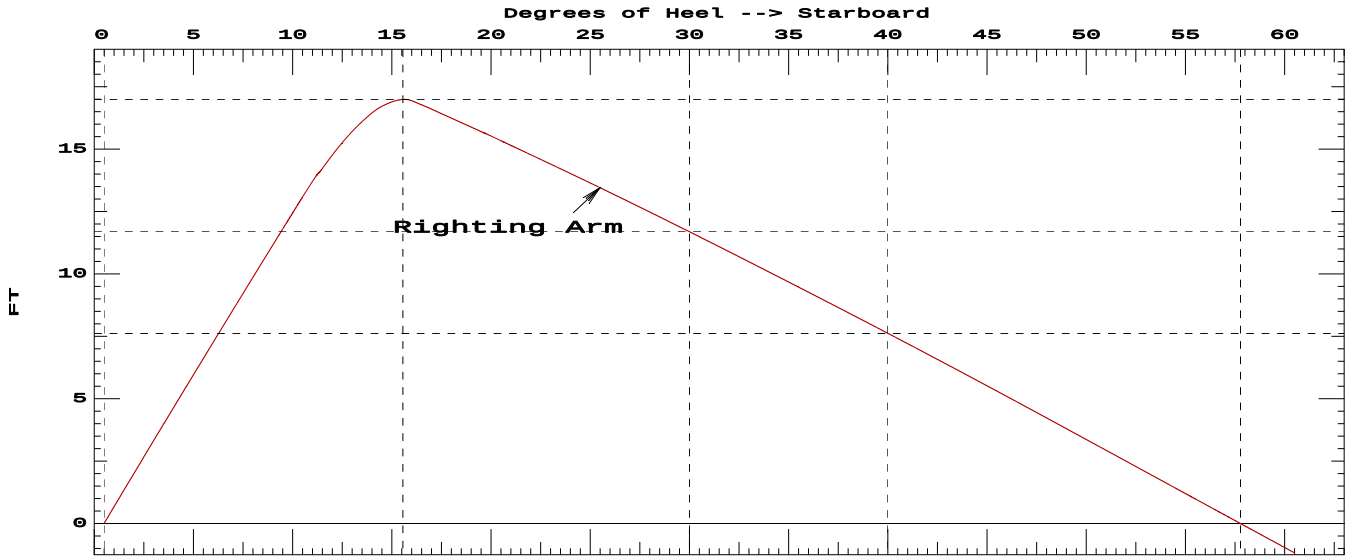
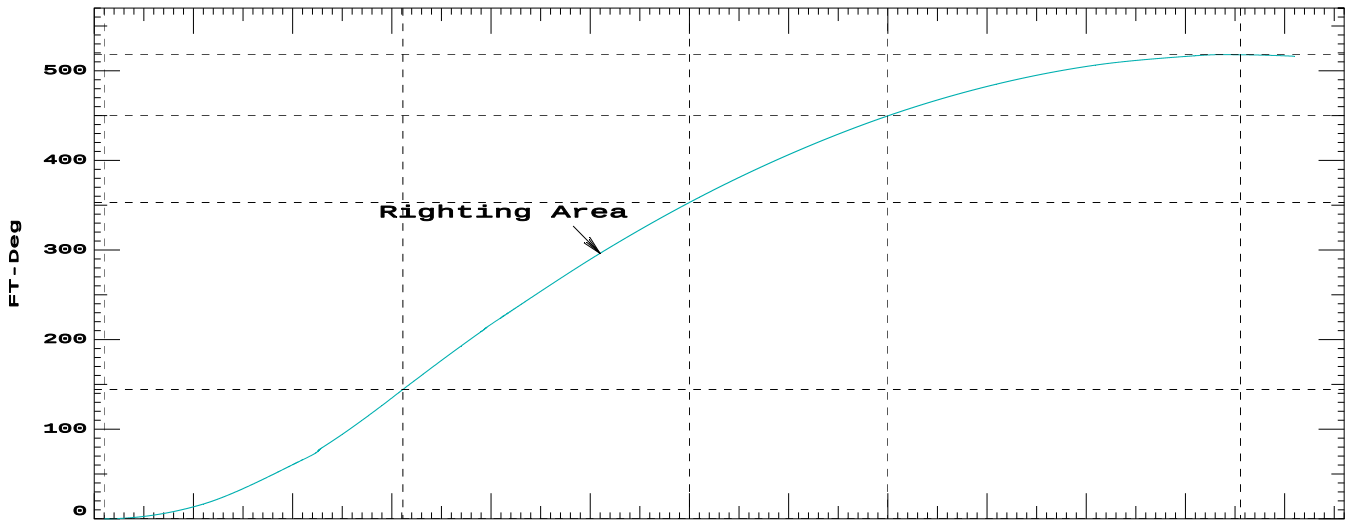
Condition 11 - 20AEQ 2ST 6RV Fwd Arrival with no Ice

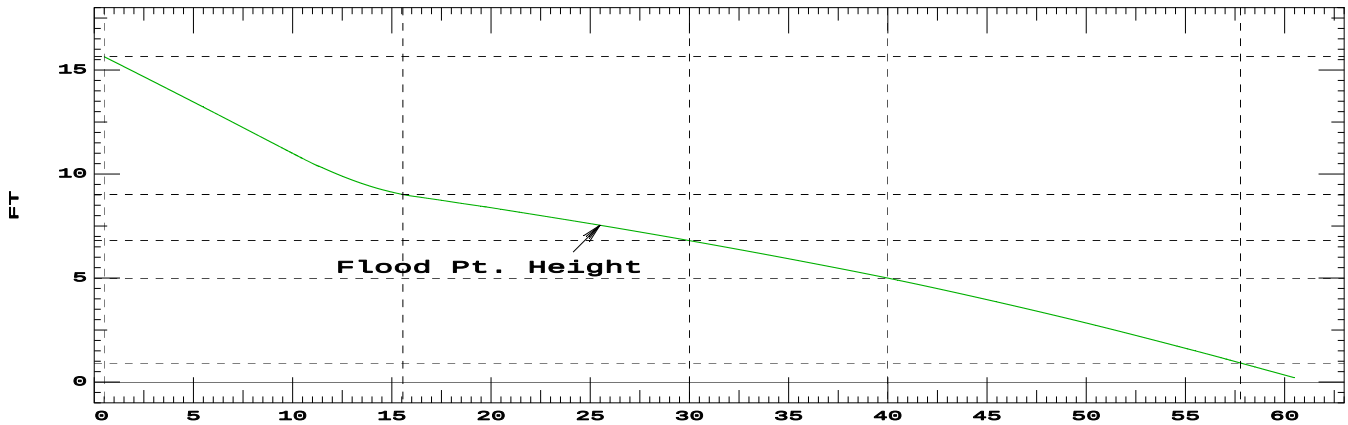
LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Area from abs 0.490 deg to 15.6**	**>**	**19.89**	**Ft-deg**	**153.21**	**P**
(2)	**Absolute Angle at MaxRA**	**>**	**10.00**	**deg**	**15.59**	**P**

Relative angles measured from 0.490s

Condition 11 - 20AEQ 2ST 6RV Fwd Arrival with no Ice







Condition 11 - 20AEQ 2ST 6RV Fwd Arrival with no Ice

```
*** Heel Angle Check ***

Calculated Heeling Moments
     LONG TONS - FEET
    HL1 =     983.8
    HL2 =    1475.7
    PL  =     449.7
    TL  =    1450.8
    HLT =    2926.5
```

```
With HMMT = TL
        1450.8
```

```
Vessel Heel <    8.00 deg
Calc Heel =      2.11 deg
```

```
With HMMT = max(PL,HL2)
                1475.7
```

```
Vessel Heel <   10.00 deg
Calc Heel =  2.14 deg
```

```
With HMMT = TL+HL2
            2926.5
```

```
Vessel Heel <   12.00 deg
Calc Heel =  3.76 deg
```

Condition 11 - 20AEQ 2ST 6RV Fwd Arrival with no Ice

*** Residual Area Check ***

RESIDUAL RIGHTING ARMS vs HEEL ANGLE

Total CG: LCG = 88.47f TCG = 0.65s VCG = 23.49
Free Surface Adjustment: 0.13
Adjusted CG: LCG = 88.47f TCG = 0.64s VCG = 23.62

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Area	Flood Pt Height	
7.466	0.08f	3.76s	678.75	0.00	0.000	0.00	14.07	(1)
7.460	0.07a	8.76s	678.56	0.00	6.608	16.52	11.58	(2)
6.866	0.13a	13.76s	678.69	0.00	11.982	63.51	9.46	(2)
6.723	0.12a	14.26s	678.77	0.00	12.285	69.58	9.32	(2)
6.560	0.10a	14.76s	678.77	0.00	12.515	75.78	9.19	(2)
6.380	0.09a	15.26s	678.79	0.00	12.654	82.07	9.08	(2)
6.253	0.09a	15.59s	678.76	0.00	**12.685**	86.24	9.01	(2)
6.186	0.08a	15.76s	678.84	0.00	12.677	88.41	8.98	(2)
5.974	0.08a	16.26s	678.76	0.00	12.551	94.71	8.91	(2)
5.756	0.09a	16.76s	678.77	0.00	12.376	100.94	8.84	(2)
5.538	0.09a	17.26s	678.77	0.00	12.199	107.09	8.77	(2)
5.319	0.09a	17.76s	678.77	0.00	12.021	113.14	8.70	(2)
5.100	0.09a	18.26s	678.77	0.00	11.843	119.11	8.63	(2)
4.881	0.10a	18.76s	678.77	0.00	11.663	124.99	8.56	(2)
4.661	0.10a	19.26s	678.77	0.00	11.482	130.77	8.49	(2)
4.441	0.10a	19.76s	678.77	0.00	11.300	136.47	8.41	(2)
4.221	0.11a	20.26s	678.77	0.00	11.117	142.07	8.34	(2)
4.001	0.11a	20.76s	678.77	0.00	10.933	147.58	8.27	(2)
3.559	0.12a	21.76s	678.77	0.00	10.563	158.33	8.12	(2)
3.116	0.12a	22.76s	678.77	0.00	10.188	168.71	7.97	(2)
2.673	0.13a	23.76s	678.77	0.00	9.810	178.71	7.81	(2)
0.452	0.17a	28.76s	678.75	0.00	7.871	222.94	7.01	(2)
-1.763	0.23a	33.76s	678.75	0.00	5.868	257.32	6.15	(2)
-3.956	0.29a	38.76s	678.73	0.00	3.824	281.56	5.23	(2)
-6.047	0.37a	43.76s	678.86	0.00	1.735	295.48	4.23	(2)
-7.655	0.45a	47.82s	678.78	0.00	0.000	299.01	3.34	(2)
-8.016	0.47a	48.76s	678.78	0.00	-0.406	298.82	3.13	(2)
-9.848	0.58a	53.76s	678.94	0.00	-2.569	291.39	1.93	(2)
-11.539	0.69a	58.76s	678.93	0.00	-4.733	273.14	0.66	(2)
-12.336	0.75a	61.27s	678.78	0.00	-5.815	259.89	0.00	(2)
-13.092	0.80a	63.76s	678.84	0.00	-6.877	244.10	*-0.66*	(2)

Distances in FEET. Specific Gravity = 1.025. Area in Ft-Deg.

Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 88.9 Ft-LT was applied to artificially modify the CG.

Condition 11 - 20AEQ 2ST 6RV Fwd Arrival with no Ice

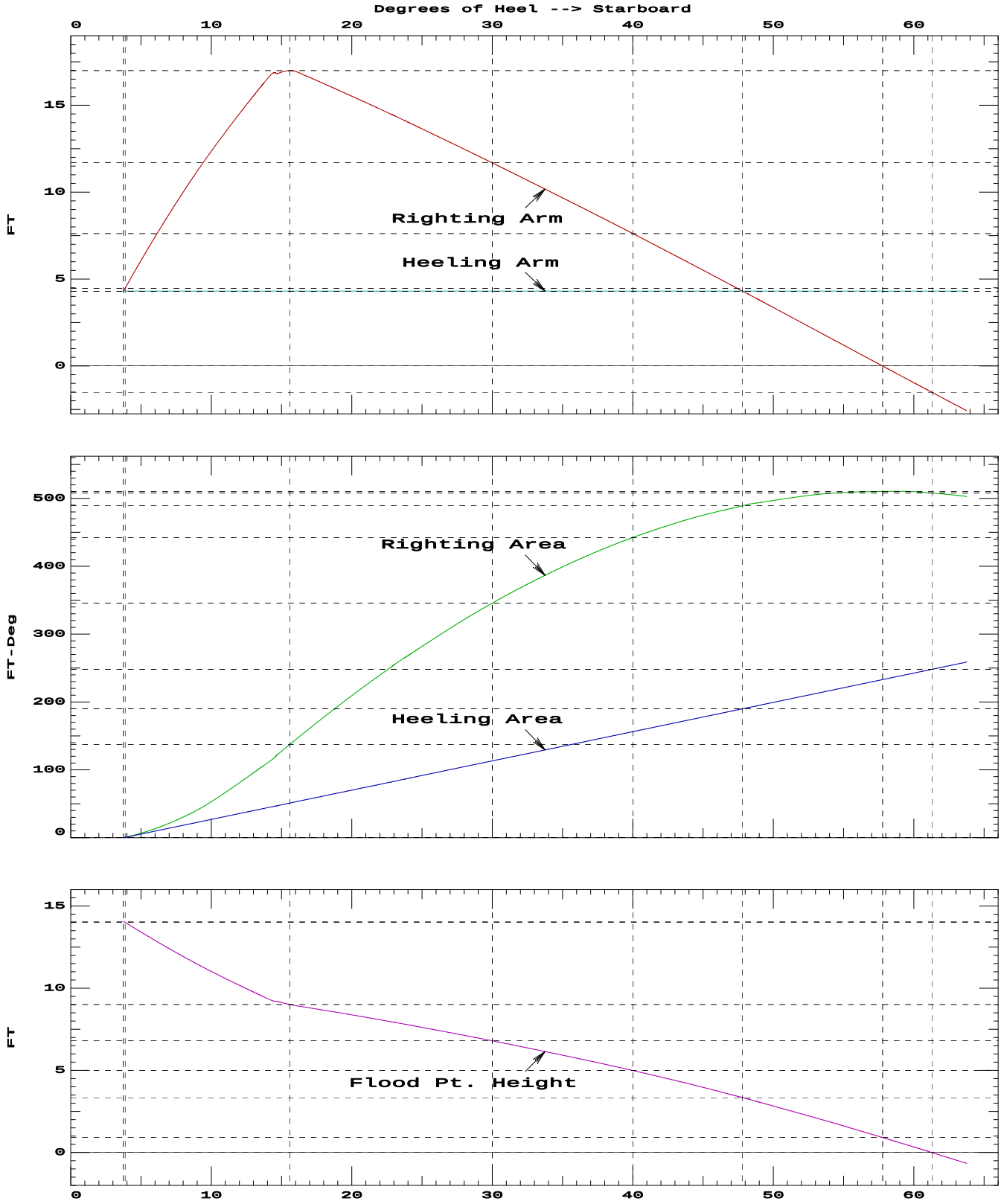
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 2926.50

	Critical Points		LCP	TCP	VCP
(1)	ER Air Fwd S	FLOOD	43.30f	27.45s	23.45
(2)	ER Air Aft S	FLOOD	35.42f	27.45s	23.45

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Area from Equilibrium to 15 deg**	**>**	**5.26**	**Ft-deg**	**124.99**	**P**
(2)	**Angle from Equilibrium to RAzero**	**>**	**15.00**	**deg**	**44.06**	**P**

Relative angles measured from 3.757s

Condition 11 - 20AEQ 2ST 6RV Fwd Arrival with no Ice



Condition 12 - 30AEQ 2ST Aft Departure with no Ice

WEIGHT STATUS

Trim: Fwd 0.51/210.33, Heel: Port 0.17 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	500.46	84.77f	0.01p	23.23
Pax @185 lb ea (Stand)	20.65	105.24f	0.00	38.55
Luggage @20 lb ea Pax	2.22	115.73f	5.24p	21.33
Vehicles AEQ @6 kip ea	80.37	98.46f	1.64s	21.33
Vehicles ST @45 kip ea	40.18	75.92f	6.40p	27.46
Bikes @30 lb ea	0.16	209.32f	0.00	19.69
Kayaks @ 75 lb ea	0.20	131.39f	25.83p	21.65
Crew	0.98	115.83f	2.23s	44.16
Food Stuffs	0.58	100.46f	1.05p	38.71
Loose Outfit/Gear	0.40	111.22f	0.00	37.07
Stores	0.67	101.71f	0.00	37.07
Art Allowance	0.54	111.22f	0.00	40.35
Trash	0.45	104.66f	25.13s	28.64
Video Games	0.45	28.46f	5.11p	38.71
Total Fixed	**648.32**	**86.81f**	**0.21p**	**23.83**

	Load	SpGr	Weight(LT)	LCG	TCG	VCG	FSM
FW.P	0.980	1.000	3.36	135.82f	21.23p	10.19	0.2
BW.S	0.200	1.025	2.77	98.14f	20.98s	7.96	6.8
DBF4.P	0.980	0.840	20.43	114.07f	22.48p	3.50	30.6
DBF3.S	0.980	0.840	20.43	114.07f	22.47s	3.50	30.6
LOH2.P	0.980	0.880	0.63	49.21f	17.12p	14.41	0.1
LOH1.S	0.980	0.880	0.63	49.21f	17.12s	14.41	0.1
Total Tanks			**48.25**	**112.98f**	**0.28p**	**4.51**	**88.9***
Total Weight			**696.56**	**88.63f**	**0.22p**	**22.50**	
Free Surface Adjustment						**0.13**	
Adjusted CG				**88.63f**	**0.22p**	**22.62**	

Distances in FEET. Moments in Ft-LT.

Note: FSM values marked with an asterisk (*) are formal values which are not the same as the true values in the present condition.

HYDROSTATIC PROPERTIES

Trim: Fwd 0.51/210.33, Heel: Port 0.17 deg., VCG = 22.50

LCF Draft	Displacement Weight(LT)	Buoyancy-Ctr. LCB	VCB	Weight/ Inch	LCF	Moment/ In trim	GML	GMT
7.794	696.56	88.67f	4.72	10.36	86.05f	133.17	482.5	74.41

Distances in FEET. Specific Gravity = 1.025. Moment in Ft-LT.

Trim is per 210.33Ft

Draft is from Baseline. Formal Free Surface included.

Note: GMT includes the formal free surface moment 88.9 Ft-LT

Condition 12 - 30AEQ 2ST Aft Departure with no Ice

RIGHTING ARMS vs HEEL ANGLE

Total CG: LCG = 88.63f TCG = 0.22p VCG = 22.50
Free Surface Adjustment: 0.13
Adjusted CG: LCG = 88.63f TCG = 0.22p VCG = 22.62

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Righting Arms in Trim	in Heel	Area	Flood Pt Height	
7.586	0.14f	0.17p	696.56	0.00	0.000	0.00	15.68	(5)
7.565	0.09f	4.83s	696.54	0.00	6.521	16.30	13.42	(1)
7.543	0.09a	9.83s	696.28	0.00	13.001	65.12	10.93	(2)
7.522	0.11a	10.33s	696.56	0.00	13.606	71.77	10.69	(2)
7.490	0.12a	10.83s	696.56	0.00	14.200	78.73	10.46	(2)
7.448	0.13a	11.33s	696.56	0.00	14.776	85.97	10.23	(2)
7.396	0.14a	11.83s	696.56	0.00	15.329	93.50	10.01	(2)
7.331	0.15a	12.33s	696.56	0.00	15.853	101.29	9.80	(2)
7.249	0.15a	12.83s	696.56	0.00	16.340	109.34	9.61	(2)
7.150	0.14a	13.33s	696.56	0.00	16.782	117.62	9.43	(2)
7.033	0.14a	13.83s	696.56	0.00	17.172	126.11	9.26	(2)
6.898	0.13a	14.33s	696.56	0.00	17.502	134.78	9.10	(2)
6.744	0.12a	14.83s	696.56	0.00	17.764	143.59	8.97	(2)
6.573	0.10a	15.33s	696.58	0.00	17.944	152.52	8.85	(2)
6.425	0.10a	15.73s	696.58	0.00	18.017	159.64	8.76	(2)
6.385	0.09a	15.83s	696.58	0.00	18.024	161.52	8.74	(2)
6.361	0.09a	15.90s	696.55	0.00	**18.025**	162.62	8.73	(2)
6.182	0.09a	16.33s	696.59	0.00	17.967	170.51	8.66	(2)
5.964	0.10a	16.83s	696.56	0.00	17.803	179.46	8.59	(2)
5.526	0.10a	17.83s	696.56	0.00	17.462	197.09	8.45	(2)
5.086	0.11a	18.83s	696.56	0.00	17.117	214.38	8.31	(2)
4.645	0.11a	19.83s	696.56	0.00	16.768	231.32	8.17	(2)
2.426	0.15a	24.83s	696.55	0.00	14.956	310.68	7.42	(2)
0.197	0.20a	29.83s	696.54	0.00	13.053	380.74	6.61	(2)
-2.027	0.25a	34.83s	696.54	0.00	11.080	441.10	5.75	(2)
-4.204	0.32a	39.83s	696.57	0.00	9.049	491.45	4.82	(2)
-6.265	0.41a	44.83s	696.67	0.00	6.950	531.47	3.79	(2)
-8.206	0.51a	49.83s	696.70	0.00	4.793	560.85	2.67	(2)
-10.011	0.62a	54.83s	696.75	0.00	2.607	579.37	1.46	(2)
-11.668	0.73a	59.83s	696.80	0.01a	0.417	586.93	0.17	(2)

Distances in FEET. Specific Gravity = 1.025. Area in Ft-Deg.

Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 88.9 Ft-LT was applied to artificially modify the CG.

	Critical Points		LCP	TCP	VCP
(1)	ER Air Fwd S	FLOOD	43.30f	27.45s	23.45
(2)	ER Air Aft S	FLOOD	35.42f	27.45s	23.45
(5)	ER Air FWD P	FLOOD	43.30f	27.45p	23.45

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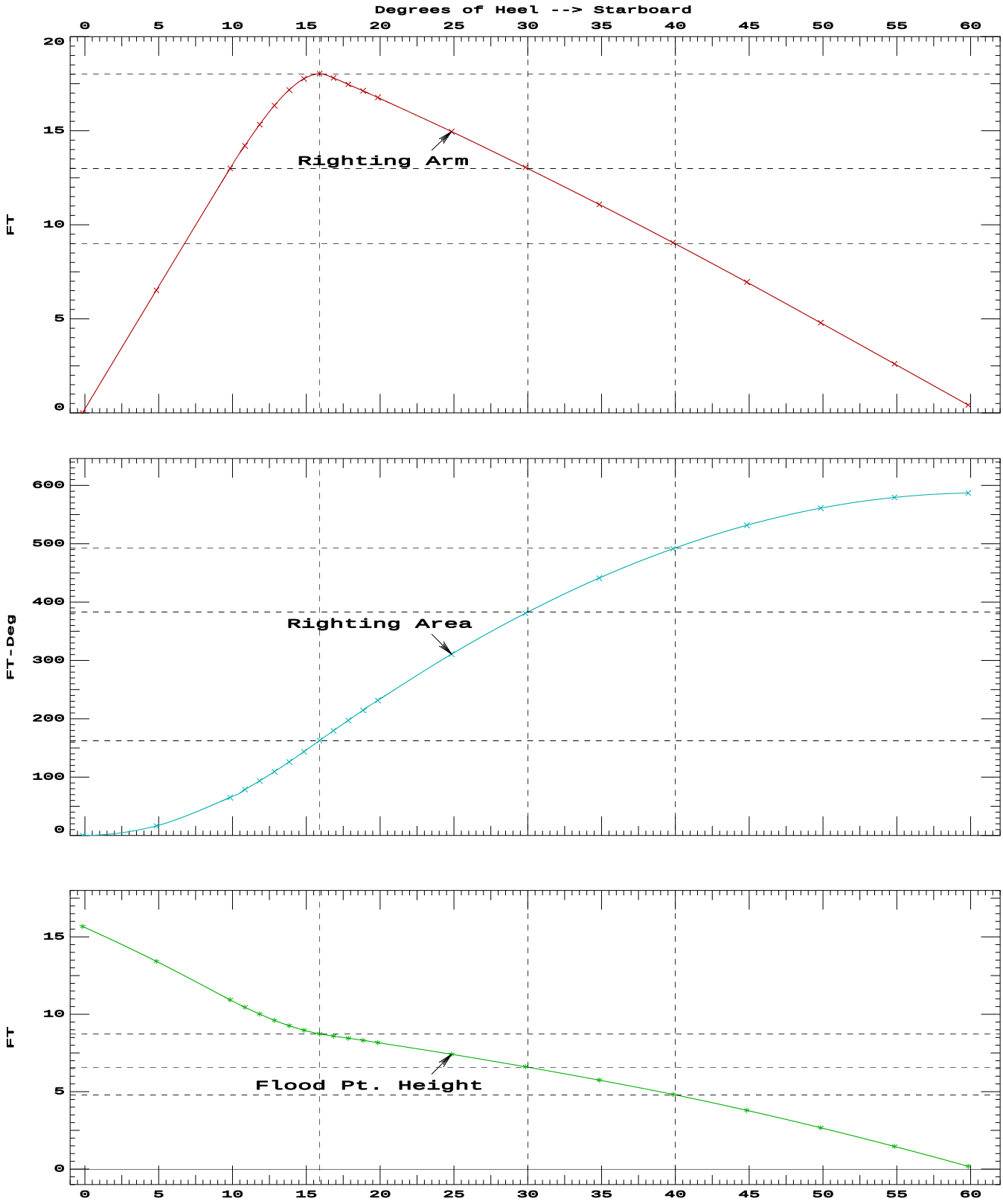
Condition 12 - 30AEQ 2ST Aft Departure with no Ice

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	Area from abs -0.165 deg to 15.9	>	19.51	Ft-deg	159.64	P
(2)	Absolute Angle at MaxRA	>	10.00	deg	15.90	P

Relative angles measured from 0.165

Condition 12 - 30AEQ 2ST Aft Departure with no Ice



Condition 12 - 30AEQ 2ST Aft Departure with no Ice

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*** Heel Angle Check ***

Calculated Heeling Moments
     LONG TONS - FEET
    HL1 =     983.8
    HL2 =    1475.7
    PL  =     449.7
    TL  =    1417.2
    HLT =    2892.9
```

With HMMT = TL 1417.2
Vessel Heel < 8.00 deg Calc Heel = 1.40 deg

With HMMT = max(PL,HL2) 1475.7
Vessel Heel < 10.00 deg Calc Heel = 1.46 deg

With HMMT = TL+HL2 2892.9
Vessel Heel < 12.00 deg Calc Heel = 3.02 deg

Condition 12 - 30AEQ 2ST Aft Departure with no Ice

*** Residual Area Check ***

RESIDUAL RIGHTING ARMS vs HEEL ANGLE

Total CG: LCG = 88.63f TCG = 0.21p VCG = 22.50
Free Surface Adjustment: 0.13
Adjusted CG: LCG = 88.63f TCG = 0.22p VCG = 22.62

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Area	Flood Pt Height	
7.574	0.12f	3.02s	696.57	0.00	0.000	0.00	14.31	(1)
7.576	0.02a	8.02s	696.56	0.00	6.548	16.37	11.83	(2)
7.211	0.15a	13.02s	696.26	0.00	12.363	63.95	9.54	(2)
7.108	0.14a	13.52s	696.55	0.00	12.783	70.24	9.36	(2)
6.985	0.13a	14.02s	696.55	0.00	13.152	76.72	9.20	(2)
6.842	0.12a	14.52s	696.55	0.00	13.458	83.38	9.05	(2)
6.681	0.11a	15.02s	696.55	0.00	13.691	90.16	8.92	(2)
6.504	0.10a	15.52s	696.57	0.00	13.837	97.05	8.81	(2)
6.362	0.09a	15.89s	696.57	0.00	**13.874**	102.15	8.73	(2)
6.311	0.09a	16.02s	696.58	0.00	13.870	103.98	8.71	(2)
6.101	0.09a	16.52s	696.54	0.00	13.758	110.88	8.63	(2)
5.882	0.10a	17.02s	696.55	0.00	13.589	117.72	8.56	(2)
5.663	0.10a	17.52s	696.55	0.00	13.419	124.47	8.50	(2)
5.444	0.10a	18.02s	696.55	0.00	13.248	131.14	8.43	(2)
5.224	0.10a	18.52s	696.55	0.00	13.075	137.72	8.36	(2)
5.004	0.11a	19.02s	696.55	0.00	12.902	144.21	8.29	(2)
4.783	0.11a	19.52s	696.55	0.00	12.727	150.62	8.21	(2)
4.563	0.11a	20.02s	696.55	0.00	12.551	156.94	8.14	(2)
4.120	0.12a	21.02s	696.55	0.00	12.197	169.31	8.00	(2)
3.677	0.13a	22.02s	696.55	0.00	11.837	181.33	7.85	(2)
3.233	0.13a	23.02s	696.55	0.00	11.474	192.99	7.70	(2)
1.005	0.18a	28.02s	696.54	0.00	9.602	245.72	6.91	(2)
-1.223	0.23a	33.02s	696.53	0.00	7.651	288.88	6.07	(2)
-3.427	0.29a	38.02s	696.53	0.00	5.642	322.14	5.17	(2)
-5.531	0.37a	43.02s	696.64	0.00	3.569	345.19	4.18	(2)
-7.517	0.47a	48.02s	696.68	0.00	1.430	357.72	3.09	(2)
-8.754	0.54a	51.31s	696.56	0.00	-0.001	360.07	2.32	(2)
-9.375	0.58a	53.02s	696.58	0.00	-0.750	359.43	1.91	(2)
-11.085	0.69a	58.02s	696.77	0.00	-2.941	350.21	0.65	(2)
-11.883	0.75a	60.50s	696.56	0.00	-4.027	341.56	0.00	(2)
-12.655	0.81a	63.02s	696.62	0.00	-5.123	330.04	*-0.67*	(2)

Distances in FEET. Specific Gravity = 1.025. Area in Ft-Deg.

Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 88.9 Ft-LT was applied to artificially modify the CG.

Condition 12 - 30AEQ 2ST Aft Departure with no Ice

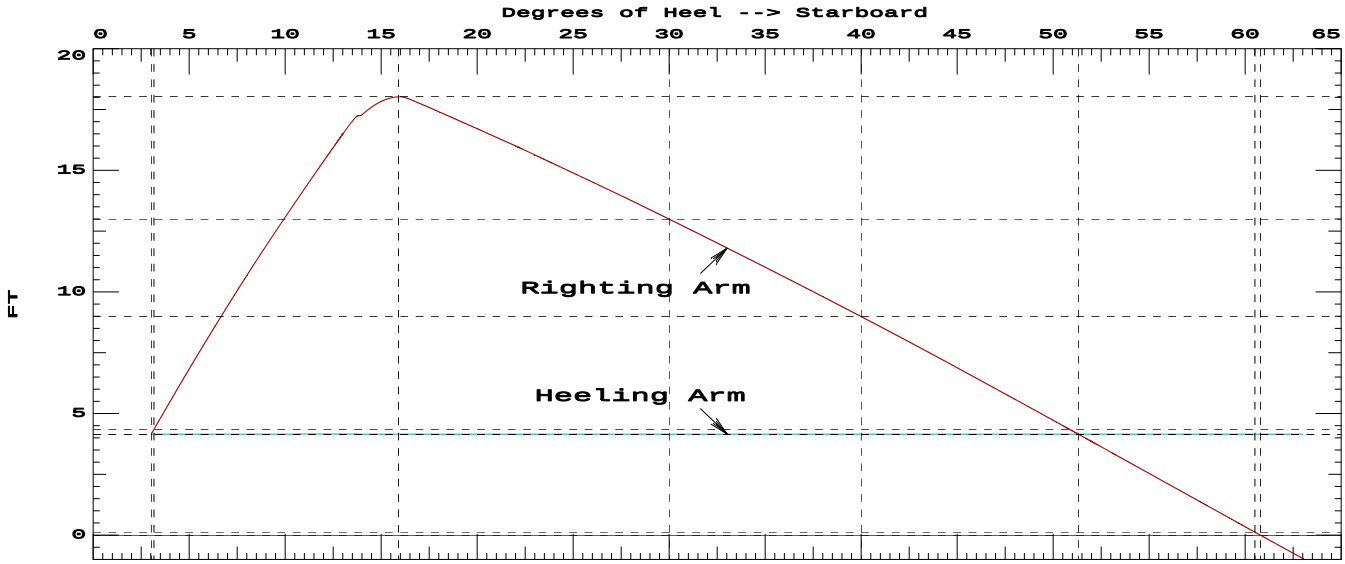
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 2892.92

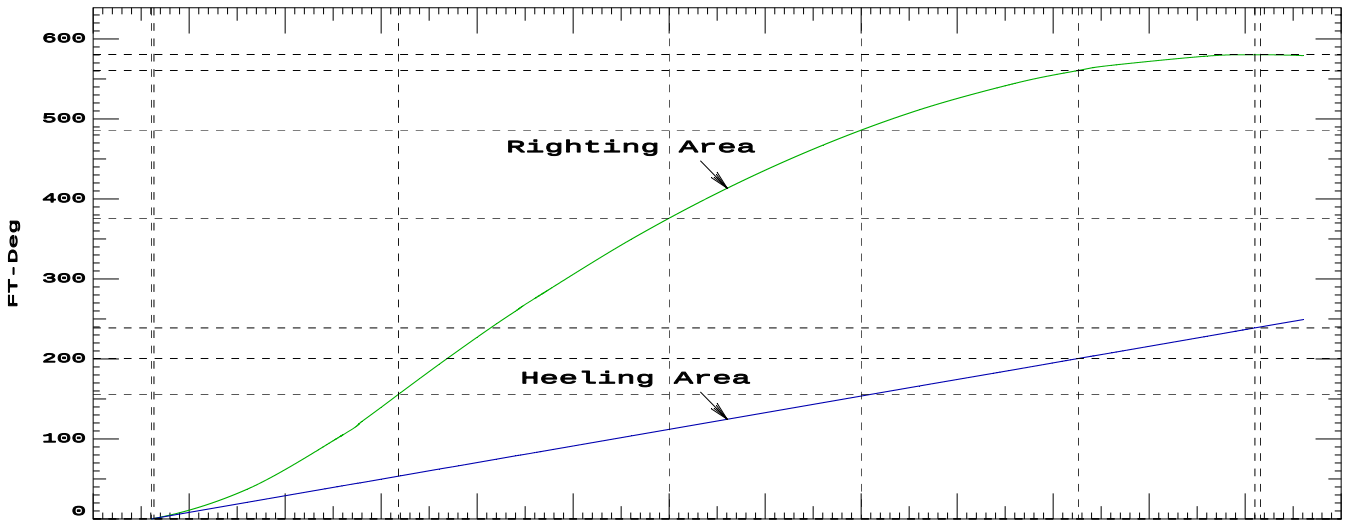
	Critical Points		LCP	TCP	VCP
(1)	ER Air Fwd S	FLOOD	43.30f	27.45s	23.45
(2)	ER Air Aft S	FLOOD	35.42f	27.45s	23.45

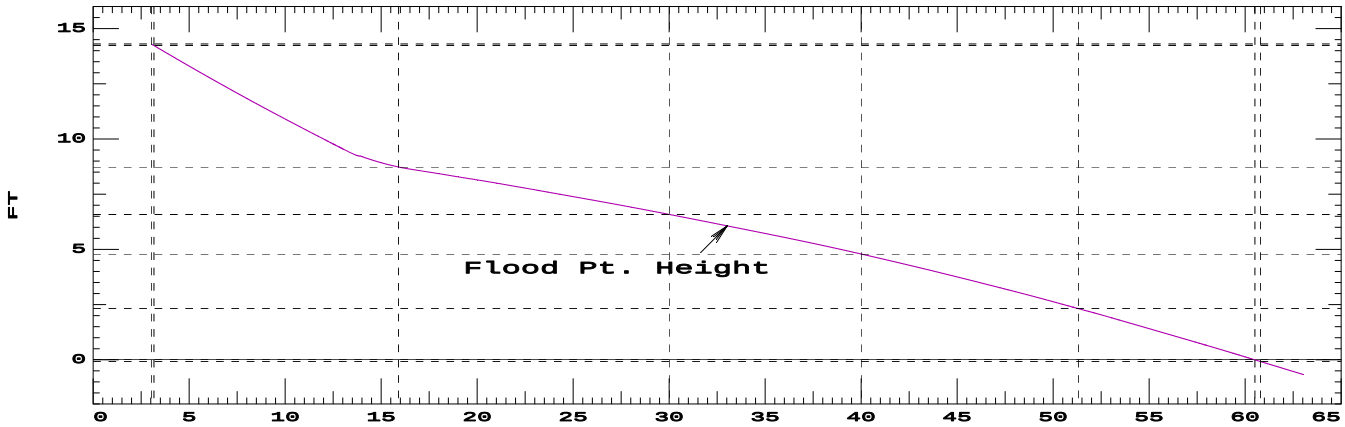
LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Area from Equilibrium to 15 deg**	**>**	**5.26**	**Ft-deg**	**131.14**	**P**
(2)	**Angle from Equilibrium to RAzero**	**>**	**15.00**	**deg**	**48.29**	**P**

Relative angles measured from 3.021s

Condition 12 - 30AEQ 2ST Aft Departure with no Ice







Condition 13 - 30AEQ 2ST Aft Arrival with no Ice

WEIGHT STATUS

Trim: Aft 0.15/210.33, Heel: Stbd 0.16 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	500.46	84.77f	0.01p	23.23
Pax @185 lb ea (Stand)	20.65	105.24f	0.00	38.55
Luggage @20 lb ea Pax	2.22	115.73f	5.24p	21.33
Vehicles AEQ @6 kip ea	80.37	98.46f	1.64s	21.33
Vehicles ST @45 kip ea	40.18	75.92f	6.40p	27.46
Bikes @30 lb ea	0.16	209.32f	0.00	19.69
Kayaks @ 75 lb ea	0.20	131.39f	25.83p	21.65
Crew	0.98	115.83f	2.23s	44.16
Food Stuffs	0.06	100.46f	1.05p	38.71
Loose Outfit/Gear	0.40	111.22f	0.00	37.07
Stores	0.07	101.71f	0.00	37.07
Art Allowance	0.54	111.22f	0.00	40.35
Trash	0.45	104.66f	25.13s	28.64
Video Games	0.45	28.46f	5.11p	38.71
Total Fixed	**647.19**	**86.79f**	**0.21p**	**23.81**

	Load	SpGr	Weight(LT)	LCG	TCG	VCG	FSM
FW.P	0.100	1.000	0.34	135.82f	21.23p	8.19	0.7
BW.S	0.980	1.025	13.56	98.12f	21.00s	10.37	0.9
DBF4.P	0.100	0.840	2.08	114.27f	22.45p	0.77	19.1
DBF3.S	0.100	0.840	2.08	114.27f	22.50s	0.77	19.1
LOH2.P	0.100	0.880	0.06	49.21f	17.12p	12.70	0.1
LOH1.S	0.100	0.880	0.06	49.21f	17.12s	12.70	0.1
Total Tanks			**18.20**	**102.18f**	**15.25s**	**8.14**	**88.9***
Total Weight			**665.39**	**87.21f**	**0.21s**	**23.38**	
Free Surface Adjustment						**0.13**	
Adjusted CG				**87.21f**	**0.21s**	**23.51**	

Distances in FEET. Moments in Ft-LT.

Note: FSM values marked with an asterisk (*) are formal values which are not the same as the true values in the present condition.

HYDROSTATIC PROPERTIES

Trim: Aft 0.15/210.33, Heel: Stbd 0.16 deg., VCG = 23.38

LCF Draft	Displacement Weight(LT)	Buoyancy-Ctr. LCB	VCB	Weight/ Inch	LCF	Moment/ In trim	GML	GMT
7.541	665.39	87.20f	4.58	10.23	85.05f	128.53	487.5	76.45

Distances in FEET. Specific Gravity = 1.025. Moment in Ft-LT.

Trim is per 210.33Ft

Draft is from Baseline. Formal Free Surface included.

Note: GMT includes the formal free surface moment 88.9 Ft-LT

Condition 13 - 30AEQ 2ST Aft Arrival with no Ice

RIGHTING ARMS vs HEEL ANGLE

Total CG: LCG = 87.21f TCG = 0.21s VCG = 23.38
Free Surface Adjustment: 0.13
Adjusted CG: LCG = 87.21f TCG = 0.21s VCG = 23.51

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Righting Arms in Trim	in Heel	Flood Pt Area	Height	
7.602	0.04a	0.16s	665.38	0.00	0.000	0.00	15.80	(2)
7.577	0.10a	5.16s	665.36	0.00	6.706	16.76	13.37	(2)
7.530	0.27a	10.16s	665.11	0.00	13.320	66.87	10.88	(2)
7.500	0.28a	10.66s	665.39	0.00	13.923	73.68	10.64	(2)
7.457	0.29a	11.16s	665.39	0.00	14.509	80.79	10.42	(2)
7.402	0.30a	11.66s	665.39	0.00	15.069	88.18	10.20	(2)
7.334	0.30a	12.16s	665.39	0.00	15.595	95.85	10.00	(2)
7.250	0.30a	12.66s	665.40	0.00	16.077	103.77	9.80	(2)
7.145	0.30a	13.16s	665.39	0.00	16.507	111.91	9.62	(2)
7.023	0.29a	13.66s	665.39	0.00	16.875	120.26	9.46	(2)
6.880	0.28a	14.16s	665.38	0.00	17.172	128.77	9.31	(2)
6.720	0.27a	14.66s	665.38	0.00	17.385	137.41	9.19	(2)
6.544	0.26a	15.16s	665.41	0.00	17.493	146.13	9.07	(2)
6.487	0.26a	15.31s	665.41	0.00	**17.499**	148.75	9.04	(2)
6.426	0.26a	15.47s	665.45	0.00	17.492	151.53	9.01	(2)
6.349	0.26a	15.66s	665.37	0.00	17.463	154.87	8.98	(2)
6.135	0.26a	16.16s	665.38	0.00	17.305	163.56	8.91	(2)
5.916	0.26a	16.66s	665.38	0.00	17.129	172.17	8.84	(2)
5.697	0.26a	17.16s	665.38	0.00	16.952	180.69	8.77	(2)
5.259	0.27a	18.16s	665.38	0.00	16.593	197.47	8.63	(2)
4.818	0.27a	19.16s	665.39	0.00	16.231	213.88	8.49	(2)
4.378	0.28a	20.16s	665.39	0.00	15.864	229.93	8.35	(2)
2.158	0.30a	25.16s	665.38	0.00	13.969	304.55	7.59	(2)
-0.072	0.34a	30.16s	665.37	0.00	11.992	369.48	6.77	(2)
-2.291	0.38a	35.16s	665.37	0.00	9.957	424.38	5.89	(2)
-4.470	0.44a	40.16s	665.36	0.00	7.882	468.99	4.96	(2)
-6.535	0.52a	45.16s	665.36	0.00	5.761	503.12	3.93	(2)
-8.467	0.62a	50.16s	665.44	0.00	3.599	526.54	2.80	(2)
-10.261	0.73a	55.16s	665.47	0.00	1.418	539.09	1.58	(2)
-11.352	0.81a	58.42s	665.40	0.00	-0.002	541.39	0.75	(2)
-11.911	0.84a	60.16s	665.40	0.00	-0.758	540.73	0.29	(2)

Distances in FEET. Specific Gravity = 1.025. Area in Ft-Deg.

Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 88.9 Ft-LT was applied to artificially modify the CG.

	Critical Point		LCP	TCP	VCP
(2)	ER Air Aft S	FLOOD	35.42f	27.45s	23.45

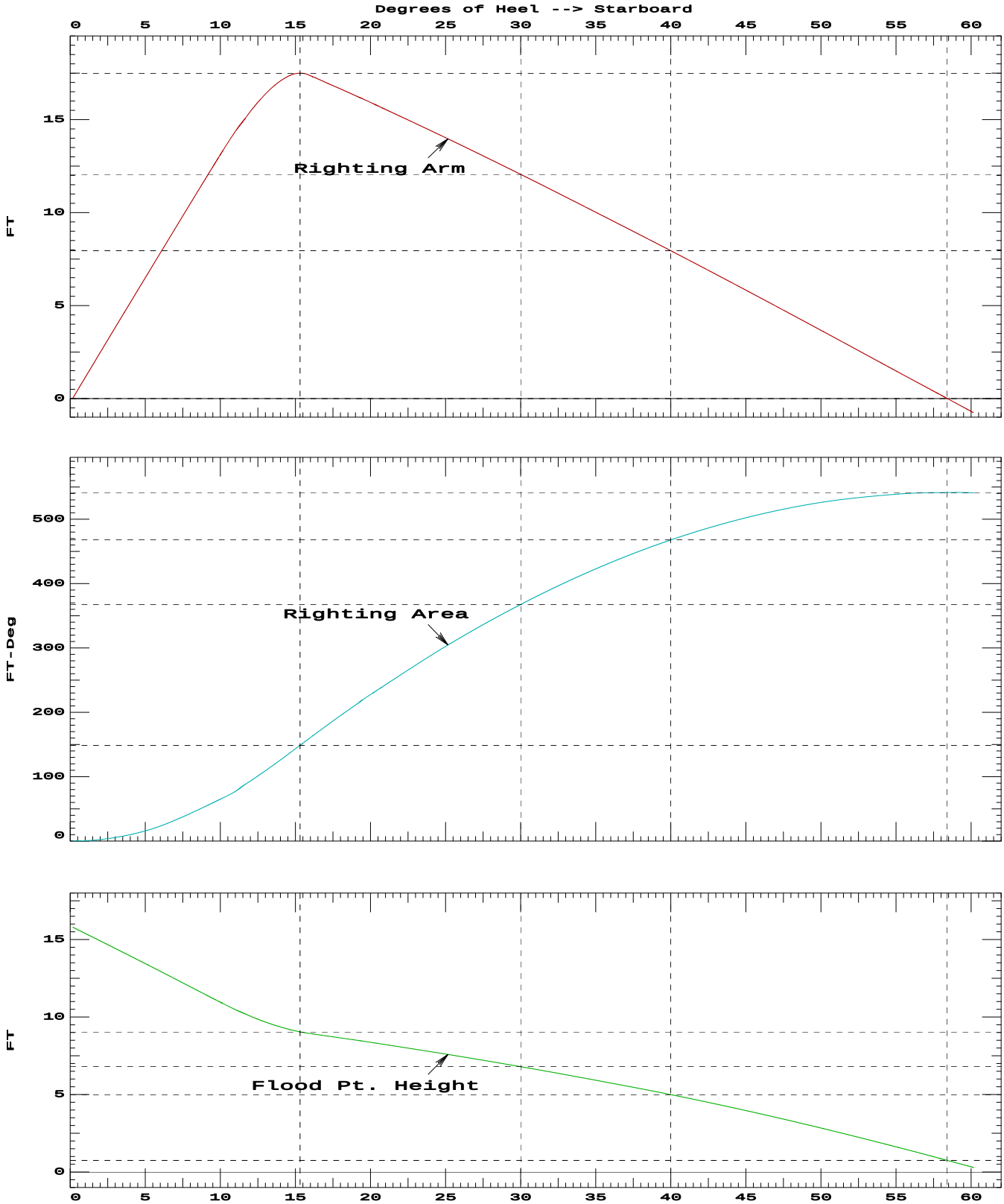
continued next page

Condition 13 - 30AEQ 2ST Aft Arrival with no Ice

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	Area from abs 0.159 deg to 15.3	>	20.26	Ft-deg	151.53	P
(2)	Absolute Angle at MaxRA	>	10.00	deg	15.31	P

Relative angles measured from 0.159

Condition 13 - 30AEQ 2ST Aft Arrival with no Ice



Condition 13 - 30AEQ 2ST Aft Arrival with no Ice

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*** Heel Angle Check ***

Calculated Heeling Moments
     LONG TONS - FEET
    HL1 =     983.8
    HL2 =    1475.7
    PL  =     449.7
    TL  =    1415.1
    HLT =    2890.8
```

With HMMT = TL 1415.1
Vessel Heel < 8.00 deg Calc Heel = 1.75 deg

With HMMT = max(PL,HL2) 1475.7
Vessel Heel < 10.00 deg Calc Heel = 1.82 deg

With HMMT = TL+HL2 2890.8
Vessel Heel < 12.00 deg Calc Heel = 3.40 deg

Condition 13 - 30AEQ 2ST Aft Arrival with no Ice

*** Residual Area Check ***

RESIDUAL RIGHTING ARMS vs HEEL ANGLE

Total CG: LCG = 87.21f TCG = 0.22s VCG = 23.38
Free Surface Adjustment: 0.13
Adjusted CG: LCG = 87.21f TCG = 0.21s VCG = 23.51

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Area	Flood Pt Height	
7.586	0.06a	3.40s	665.40	0.00	0.000	0.00	14.23	(2)
7.581	0.21a	8.40s	665.20	0.00	6.720	16.80	11.74	(2)
7.086	0.29a	13.40s	665.22	0.00	12.354	64.94	9.55	(2)
6.956	0.28a	13.90s	665.39	0.00	12.688	71.20	9.39	(2)
6.805	0.27a	14.40s	665.38	0.00	12.946	77.61	9.25	(2)
6.637	0.26a	14.90s	665.41	0.00	13.112	84.12	9.13	(2)
6.487	0.26a	15.31s	665.41	0.00	**13.159**	89.48	9.04	(2)
6.452	0.26a	15.40s	665.41	0.00	13.157	90.69	9.03	(2)
6.244	0.26a	15.90s	665.10	0.01a	13.053	97.24	8.95	(2)
6.029	0.26a	16.40s	665.38	0.00	12.880	103.73	8.88	(2)
5.811	0.26a	16.90s	665.38	0.00	12.703	110.12	8.81	(2)
5.592	0.26a	17.40s	665.38	0.00	12.525	116.43	8.74	(2)
5.372	0.27a	17.90s	665.38	0.00	12.346	122.65	8.67	(2)
5.153	0.27a	18.40s	665.38	0.00	12.166	128.78	8.60	(2)
4.933	0.27a	18.90s	665.38	0.00	11.984	134.81	8.53	(2)
4.713	0.27a	19.40s	665.38	0.00	11.802	140.76	8.46	(2)
4.492	0.27a	19.90s	665.38	0.00	11.618	146.61	8.38	(2)
4.271	0.28a	20.40s	665.38	0.00	11.434	152.38	8.31	(2)
3.829	0.28a	21.40s	665.39	0.00	11.061	163.63	8.16	(2)
3.385	0.29a	22.40s	665.39	0.00	10.685	174.50	8.01	(2)
2.941	0.29a	23.40s	665.39	0.00	10.305	184.99	7.86	(2)
0.713	0.33a	28.40s	665.37	0.00	8.354	231.68	7.06	(2)
-1.512	0.37a	33.40s	665.37	0.00	6.337	268.43	6.21	(2)
-3.714	0.42a	38.40s	665.36	0.00	4.275	294.98	5.30	(2)
-5.823	0.49a	43.40s	665.39	0.00	2.171	311.11	4.30	(2)
-7.802	0.59a	48.40s	665.43	0.00	0.022	316.62	3.21	(2)
-7.822	0.59a	48.45s	665.41	0.00	0.000	316.62	3.20	(2)
-9.646	0.69a	53.40s	665.46	0.00	-2.156	311.29	2.02	(2)
-11.346	0.81a	58.40s	665.39	0.00	-4.336	295.06	0.75	(2)
-12.253	0.87a	61.25s	665.40	0.00	-5.573	280.94	0.00	(2)
-12.911	0.91a	63.40s	665.40	0.00	-6.500	267.97	*-0.57*	(2)

Distances in FEET. Specific Gravity = 1.025. Area in Ft-Deg.

Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 88.9 Ft-LT was applied to artificially modify the CG.

Condition 13 - 30AEQ 2ST Aft Arrival with no Ice

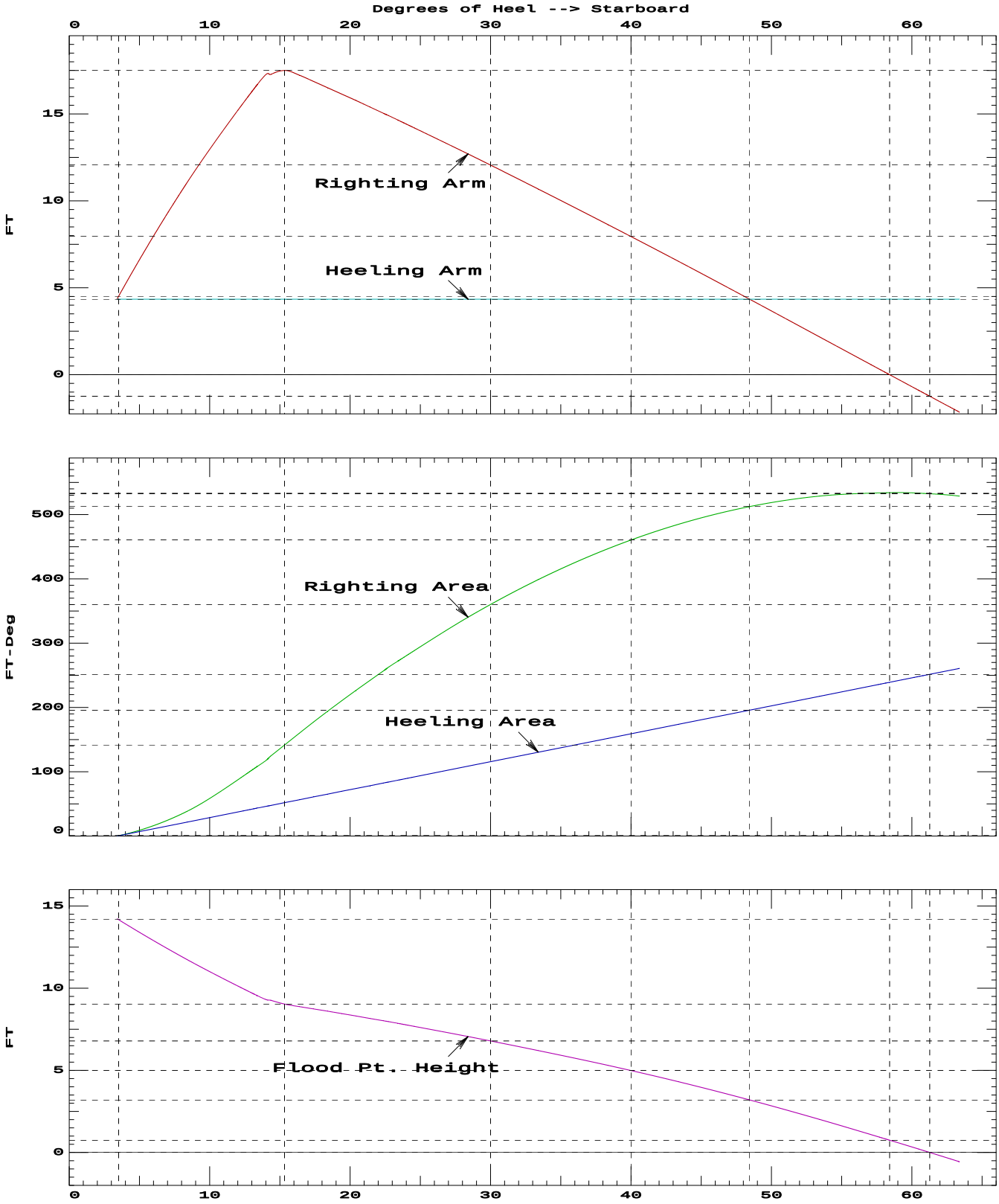
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 2890.76

	Critical Point		LCP	TCP	VCP
(2)	ER Air Aft S	FLOOD	35.42f	27.45s	23.45

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Area from Equilibrium to 15 deg**	**>**	**5.26**	**Ft-deg**	**128.78**	**P**
(2)	**Angle from Equilibrium to RAzero**	**>**	**15.00**	**deg**	**45.05**	**P**

Relative angles measured from 3.400s

Condition 13 - 30AEQ 2ST Aft Arrival with no Ice



Condition 14 - 10% Lightship

WEIGHT STATUS

Trim: Aft 1.24/210.33, Heel: Stbd 0.06 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	500.46	84.77f	0.01p	23.23
Food Stuffs	0.06	100.46f	1.05p	38.71
Loose Outfit/Gear	0.40	111.22f	0.00	37.07
Stores	0.07	101.71f	0.00	37.07
Art Allowance	0.54	111.22f	0.00	40.35
Trash	0.45	104.66f	25.13s	28.64
Video Games	0.45	28.46f	5.11p	38.71
Total Fixed	**502.42**	**84.79f**	**0.01s**	**23.28**

	Load	SpGr	Weight(LT)	LCG	TCG	VCG	FSM
FW.P	0.100	1.000	0.34	135.79f	21.23p	8.19	0.7
BW.S	0.200	1.025	2.77	98.06f	20.99s	7.96	6.8
DBF4.P	0.100	0.840	2.08	114.11f	22.46p	0.77	19.1
DBF3.S	0.100	0.840	2.08	114.11f	22.48s	0.77	19.1
LOH2.P	0.100	0.880	0.06	49.20f	17.12p	12.70	0.1
LOH1.S	0.100	0.880	0.06	49.20f	17.12s	12.70	0.1
Total Tanks			**7.41**	**107.99f**	**6.86s**	**4.01**	**88.9***
Total Weight			**509.83**	**85.13f**	**0.11s**	**23.00**	
Free Surface Adjustment						**0.17**	
Adjusted CG				**85.13f**	**0.11s**	**23.18**	

Distances in FEET. Moments in Ft-LT.

Note: FSM values marked with an asterisk (*) are formal values which are not the same as the true values in the present condition.

HYDROSTATIC PROPERTIES

Trim: Aft 1.24/210.33, Heel: Stbd 0.06 deg., VCG = 23.00

LCF Draft	Displacement Weight(LT)	Buoyancy-Ctr. LCB	VCB	Weight/ Inch	LCF	Moment/ In trim	GML	GMT
6.249	509.86	85.02f	3.88	9.72	82.55f	114.61	567.4	99.02

Distances in FEET. Specific Gravity = 1.025. Moment in Ft-LT.

Trim is per 210.33Ft

Draft is from Baseline. Formal Free Surface included.

Note: GMT includes the formal free surface moment 88.9 Ft-LT

Condition 14 - 10% Lightship

RIGHTING ARMS vs HEEL ANGLE

Total CG: LCG = 85.13f TCG = 0.11s VCG = 23.00
Free Surface Adjustment: 0.17
Adjusted CG: LCG = 85.13f TCG = 0.11s VCG = 23.18

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Righting Arms in Trim	in Heel	Area	Flood Pt Height	
6.734	0.34a	0.06s	509.83	0.00	0.000	0.00	16.89	(2)
6.739	0.40a	5.06s	509.80	0.00	8.701	21.75	14.45	(2)
6.415	0.45a	10.06s	509.80	0.00	16.633	85.41	12.15	(2)
6.304	0.43a	10.56s	509.83	0.00	17.196	93.86	11.98	(2)
6.172	0.41a	11.06s	509.82	0.00	17.675	102.58	11.83	(2)
6.018	0.38a	11.56s	509.81	0.00	18.054	111.51	11.69	(2)
5.846	0.36a	12.06s	509.83	0.00	18.313	120.61	11.57	(2)
5.659	0.35a	12.56s	509.84	0.00	18.414	129.79	11.47	(2)
5.654	0.35a	12.57s	509.83	0.00	**18.415**	130.02	11.47	(2)
5.634	0.35a	12.62s	509.84	0.00	18.413	130.93	11.46	(2)
5.454	0.34a	13.06s	509.83	0.00	18.314	138.97	11.40	(2)
5.240	0.34a	13.56s	509.68	0.00	18.139	148.09	11.33	(2)
5.026	0.34a	14.06s	509.59	0.00	17.963	157.11	11.26	(2)
4.813	0.34a	14.56s	509.57	0.00	17.786	166.05	11.20	(2)
4.604	0.35a	15.06s	509.83	0.00	17.608	174.90	11.12	(2)
4.391	0.35a	15.56s	509.83	0.00	17.429	183.66	11.05	(2)
4.177	0.35a	16.06s	509.83	0.00	17.248	192.33	10.98	(2)
3.963	0.35a	16.56s	509.83	0.00	17.066	200.90	10.90	(2)
3.749	0.35a	17.06s	509.83	0.00	16.883	209.39	10.83	(2)
3.320	0.35a	18.06s	509.83	0.00	16.513	226.09	10.68	(2)
2.890	0.35a	19.06s	509.83	0.00	16.139	242.42	10.53	(2)
2.459	0.35a	20.06s	509.83	0.00	15.761	258.37	10.37	(2)
0.297	0.36a	25.06s	509.83	0.00	13.813	332.34	9.54	(2)
-1.865	0.38a	30.06s	509.83	0.00	11.785	396.37	8.64	(2)
-4.010	0.40a	35.06s	509.83	0.00	9.706	450.12	7.68	(2)
-6.120	0.42a	40.06s	509.82	0.00	7.607	493.41	6.66	(2)
-8.178	0.46a	45.06s	509.80	0.00	5.532	526.25	5.59	(2)
-10.153	0.51a	50.06s	509.81	0.00	3.511	548.83	4.48	(2)
-12.002	0.59a	55.06s	509.86	0.00	1.502	561.36	3.29	(2)
-13.300	0.64a	58.77s	509.90	0.00	0.000	564.14	2.38	(2)
-13.743	0.65a	60.06s	509.83	0.00	-0.529	563.80	2.06	(2)

Distances in FEET. Specific Gravity = 1.025. Area in Ft-Deg.

Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 88.9 Ft-LT was applied to artificially modify the CG.

	Critical Point		LCP	TCP	VCP
(2)	ER Air Aft S	FLOOD	35.42f	27.45s	23.45

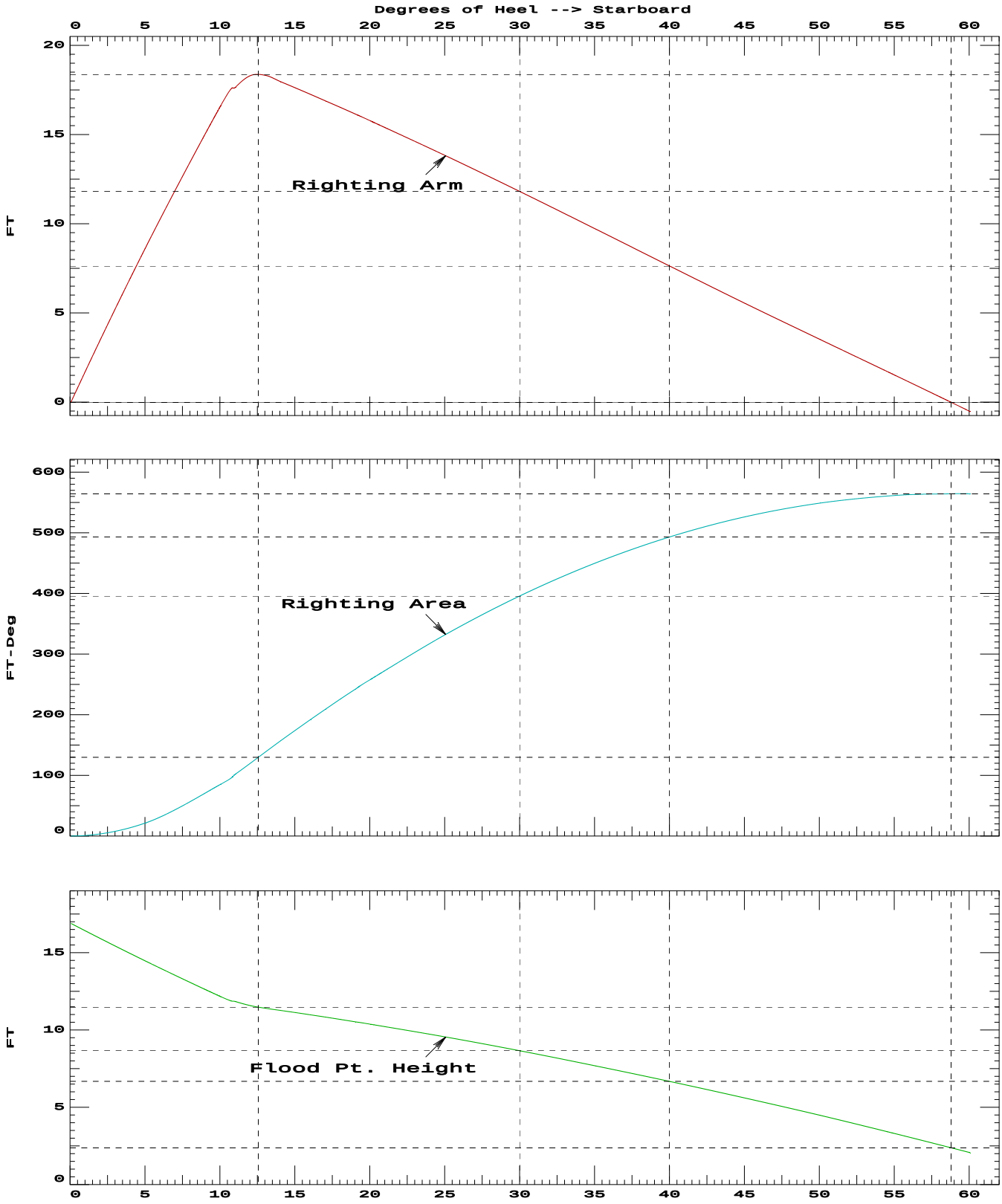
continued next page

Condition 14 - 10% Lightship

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Area from abs 0.062 deg to 12.6**	**>**	**24.69**	**Ft-deg**	**130.93**	**P**
(2)	**Absolute Angle at MaxRA**	**>**	**10.00**	**deg**	**12.57**	**P**

Relative angles measured from 0.062

Condition 14 - 10% Lightship



Condition 14 - 10% Lightship

```
*** Heel Angle Check ***

Calculated Heeling Moments
     LONG TONS - FEET
    HL1 =     983.8
    HL2 =    1475.7
    PL  =     449.7
    TL  =    1066.3
    HLT =    2542.0
```

With HMMT = TL 1066.3
Vessel Heel < 8.00 deg Calc Heel = 1.27 deg

With HMMT = max(PL,HL2) 1475.7
Vessel Heel < 10.00 deg Calc Heel = 1.73 deg

With HMMT = TL+HL2 2542.0
Vessel Heel < 12.00 deg Calc Heel = 2.93 deg

Condition 14 - 10% Lightship

*** Residual Area Check ***

RESIDUAL RIGHTING ARMS vs HEEL ANGLE

Total CG: LCG = 85.13f TCG = 0.11s VCG = 23.00
Free Surface Adjustment: 0.17
Adjusted CG: LCG = 85.13f TCG = 0.10s VCG = 23.18

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Area	Flood Pt Height	
6.734	0.36a	2.93s	509.83	0.00	0.000	0.00	15.50	(2)
6.679	0.47a	7.93s	509.75	0.00	8.602	21.50	13.04	(2)
5.508	0.34a	12.93s	509.84	0.00	13.376	80.08	11.41	(2)
5.297	0.34a	13.43s	509.83	0.00	13.202	86.73	11.35	(2)
5.080	0.34a	13.93s	509.60	0.00	13.024	93.29	11.28	(2)
4.867	0.34a	14.43s	509.57	0.00	12.847	99.75	11.21	(2)
4.659	0.35a	14.93s	509.83	0.00	12.672	106.13	11.14	(2)
4.446	0.35a	15.43s	509.83	0.00	12.493	112.42	11.07	(2)
4.232	0.35a	15.93s	509.83	0.00	12.312	118.63	11.00	(2)
4.018	0.35a	16.43s	509.83	0.00	12.131	124.74	10.92	(2)
3.804	0.35a	16.93s	509.83	0.00	11.948	130.76	10.85	(2)
3.589	0.35a	17.43s	509.83	0.00	11.764	136.68	10.77	(2)
3.375	0.35a	17.93s	509.83	0.00	11.579	142.52	10.70	(2)
3.160	0.35a	18.43s	509.83	0.00	11.393	148.26	10.62	(2)
2.945	0.35a	18.93s	509.83	0.00	11.205	153.91	10.55	(2)
2.729	0.35a	19.43s	509.83	0.00	11.017	159.47	10.47	(2)
2.514	0.35a	19.93s	509.83	0.00	10.828	164.93	10.39	(2)
2.082	0.35a	20.93s	509.83	0.00	10.446	175.57	10.23	(2)
1.650	0.36a	21.93s	509.83	0.00	10.060	185.82	10.07	(2)
1.217	0.36a	22.93s	509.83	0.00	9.671	195.68	9.90	(2)
-0.946	0.37a	27.93s	509.83	0.00	7.674	239.08	9.03	(2)
-3.100	0.39a	32.93s	509.83	0.00	5.612	272.32	8.10	(2)
-5.228	0.41a	37.93s	509.83	0.00	3.517	295.16	7.10	(2)
-7.310	0.44a	42.93s	509.81	0.00	1.426	307.52	6.05	(2)
-8.720	0.47a	46.41s	509.82	0.00	0.000	309.99	5.30	(2)
-9.327	0.49a	47.93s	509.83	0.00	-0.617	309.52	4.96	(2)
-11.231	0.55a	52.93s	509.82	0.00	-2.625	301.40	3.80	(2)
-13.013	0.63a	57.93s	509.83	0.00	-4.645	283.23	2.59	(2)
-14.699	0.68a	62.93s	509.83	0.00	-6.691	254.90	1.35	(2)

Distances in FEET. Specific Gravity = 1.025. Area in Ft-Deg.

Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 88.9 Ft-LT was applied to artificially modify the CG.

Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 2542.04

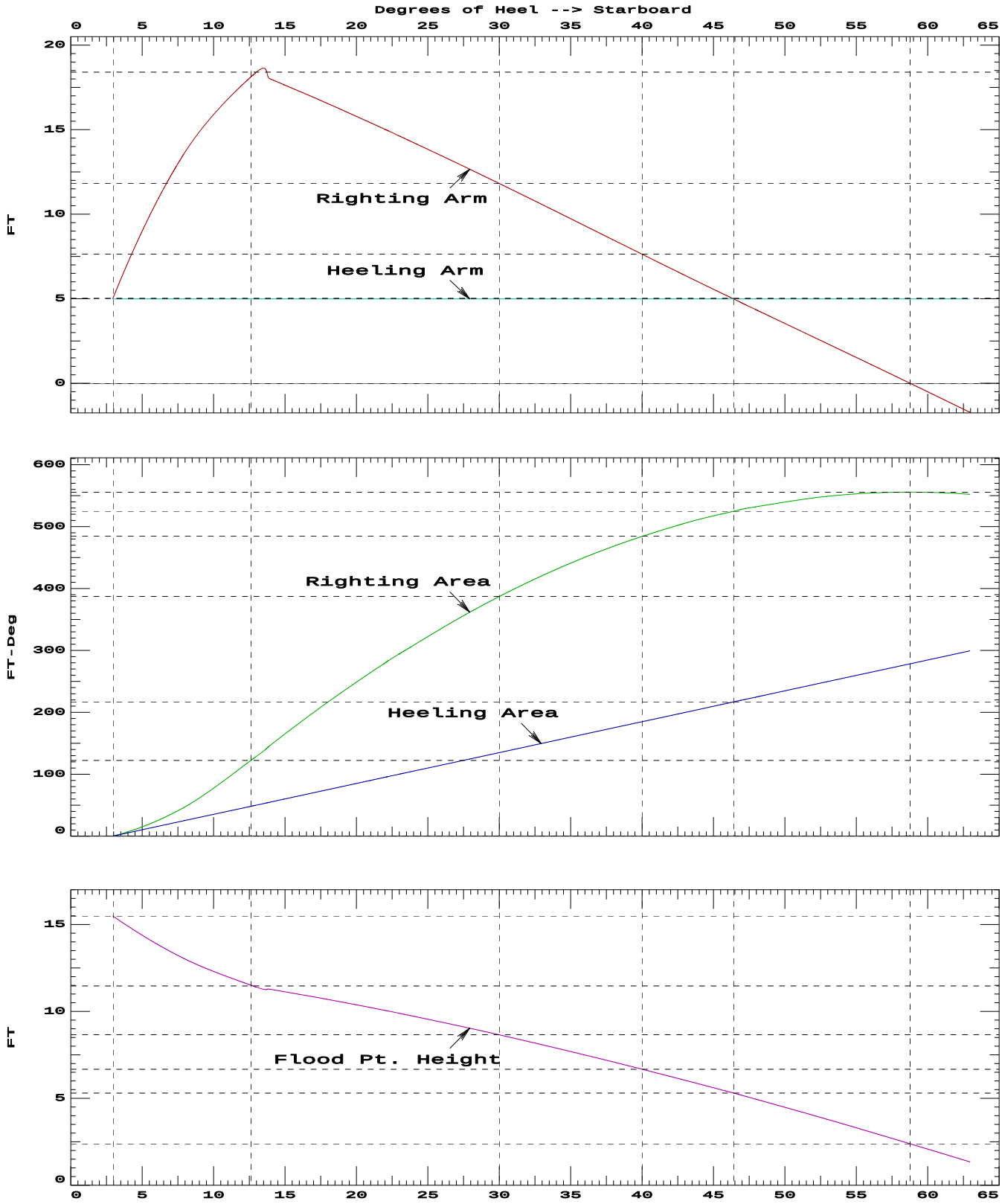
Condition 14 - 10% Lightship

	Critical Point		LCP	TCP	VCP	
	(2) ER Air Aft S	FLOOD	35.42f	27.45s	23.45	

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Area from Equilibrium to 15 deg**	**>**	**5.26**	**Ft-deg**	**142.52**	**P**
(2)	**Angle from Equilibrium to RAzero**	**>**	**15.00**	**deg**	**43.48**	**P**

Relative angles measured from 2.934s

Condition 14 - 10% Lightship



Section 6 Damaged Stability: Equilibrium Particulars

6.1 General Information

All the sample loading conditions shown in the Trim and Stability Book (Reference 2) and the damage scenarios shown in Section 3.5 have been considered in the damaged stability analysis.

A summary table per loading condition has been produced showing the floating particulars at equilibrium in the final stage of flooding for each damage scenario. These summary tables are shown in Sections 6.3 to 6.16.

The worst damage scenarios have been assessed on the basis of the equilibrium particulars shown in the tables mentioned above. From the previous stability analyses it has been found that the limiting criterion for the AMHS FVF vessel following damage is the heel angle at equilibrium, therefore the worst cases can be found by inspection of the equilibrium particulars for each combination of loading condition and the damage scenario.

The worst cases of damaged stability have been highlighted in the tables mentioned above. Detailed calculations of the worst cases showing the results achieved for each criterion, as well as the corresponding GZ and GZ area curves and further parameters are presented in Section 7. The detailed results show that criteria other than the heel angle at equilibrium are satisfied with relatively large margins. This confirms that the damaged stability of the AMHS FVF is limited by its floating particulars at equilibrium following damage.

6.2 Downflooding Point Information

In certain scenarios, some of the damaged tanks may be related to one or more of the downflooding points as described in Section 3.8. The following table shows, for each scenario, those points which are included in the analysis, and those points which are excluded from the analysis due to the related tank being damaged.

Case	Points Included	Points Excluded
1	ER Air IN S, ER Air Out S, ER Air IN P, ER Air Out P, EN90 P, EN91 P	EN90 S, EN91 S
2	ER Air IN S, ER Air Out S, ER Air IN P, ER Air Out P, EN90 P, EN91 P	EN90 S, EN91 S
3	ER Air IN S, ER Air Out S, EN90 S, EN91 S, ER Air IN P, ER Air Out P, EN90 P, EN91 P	None
4	ER Air IN S, ER Air Out S, EN90 S, EN91 S, ER Air IN P, ER Air Out P, EN90 P, EN91 P	None
5	EN90 S, EN91 S, EN90 P, EN91 P, ER Air IN P, ER Air Out P,	ER Air IN S, ER Air Out S,
6	EN90 S, EN91 S, EN90 P, EN91 P, ER Air IN P, ER Air Out P,	ER Air IN S, ER Air Out S,
7	EN90 S, EN91 S, EN90 P, EN91 P, ER Air IN P, ER Air Out P,	ER Air IN S, ER Air Out S,
8	ER Air IN S, ER Air Out S, EN90 S, EN91 S, ER Air IN P, ER Air Out P, EN90 P, EN91 P	None
9	ER Air IN S, ER Air Out S, EN90 S, EN91 S, ER Air IN P, ER Air Out P, EN90 P, EN91 P	None
10	ER Air IN S, ER Air Out S, EN90 S, EN91 S, ER Air IN P, ER Air Out P, EN90 P, EN91 P	None
11	EN90 S, EN91 S, EN90 P, EN91 P, ER Air IN P, ER Air Out P,	ER Air IN S, ER Air Out S,
12	ER Air IN S, ER Air Out S, EN90 S, EN91 S, ER Air IN P, ER Air Out P, EN90 P, EN91 P	None
13	ER Air IN S, ER Air Out S, EN90 S, EN91 S, ER Air IN P, ER Air Out P, EN90 P, EN91 P	None
14	ER Air IN S, ER Air Out S, EN90 S, EN91 S, ER Air IN P, ER Air Out P, EN90 P, EN91 P	None
15	ER Air IN S, ER Air Out S, EN90 S, EN91 S, ER Air IN P, ER Air Out P, EN90 P, EN91 P	None
16	EN90 S, EN91 S, EN90 P, EN91 P, ER Air IN P, ER Air Out P,	ER Air IN S, ER Air Out S,
17	EN90 S, EN91 S, EN90 P, EN91 P, ER Air IN P, ER Air Out P,	ER Air IN S, ER Air Out S,
18	ER Air IN P, ER Air Out P, EN90 P, EN91 P	ER Air IN S, ER Air Out S, EN90 S, EN91 S

6.3 Load Case 1 - HSC Loadline

Damage Type	Scenario No.	Draft AP ft	FldPt No. Closest to WL	2.6.12 Downflood Point Height at Equilibrium > 6.56 ft	2.6.12 Freeboard to MES at Equilibrium > 0.00 ft	2.13.1 Equilibrium Heel Angle < 10 deg	2.13.1 Equilibrium Trim Angle < 10 deg	A7 2.1 Area A2 Under GZ Curve > 5.26 ft-deg	A7 2.6 Maximum Righting Arm > 0.16 ft	A7 2.6 Range of Positive Stability > 7 deg	A7 3.2 Resultant Heel Angle from HL4 < 15 deg	PASS / FAIL
Bottom Raking 55%L	1	7.82	1	12.94	22.96	3.6	-1.2	121.9	15.0	51.3	4.4	PASS
Bottom Raking 35%L	2	7.73	1	13.66	23.88	2.6	-1.1	118.0	14.9	54.7	3.4	PASS
Bottom Raking 35%L	3	8.05	1	13.00	23.26	3.4	-1.0	130.4	16.6	48.9	4.1	PASS
Bottom Raking 35%L	4	9.00	1	12.89	23.98	2.8	-0.3	136.5	17.5	44.7	3.5	PASS
Bottom Raking 35%L	5	14.11	6	14.70	19.26	9.1	1.8	82.8	9.2	48.5	10.0	PASS
Bottom Raking 35%L	6	14.10	6	14.30	20.63	7.8	2.2	80.4	9.1	48.7	8.7	PASS
Bottom Raking 35%L	7	15.94	6	13.91	19.71	9.6	3.2	59.6	6.4	41.5	10.6	PASS
Bottom NOT Raking	8	7.91	1	13.70	24.11	2.4	-0.9	125.0	16.3	52.2	3.2	PASS
Bottom NOT Raking	9	8.72	1	13.43	24.48	2.2	-0.3	135.2	17.6	48.1	2.9	PASS
Bottom NOT Raking	10	9.23	2	13.61	25.25	1.5	0.2	128.2	17.0	47.2	2.2	PASS
Bottom NOT Raking	11	13.70	6	14.21	21.51	6.8	2.1	82.8	9.6	49.6	7.7	PASS
Side Damage	12	7.52	1	12.81	22.51	4.1	-1.5	108.5	14.2	45.7	4.9	PASS
Side Damage	13	8.72	1	11.94	22.36	4.5	-0.8	118.4	15.5	31.9	5.3	PASS
Side Damage	14	9.28	1	11.89	22.81	4.1	-0.4	121.4	16.1	25.0	5.0	PASS
Side Damage	15	9.47	2	13.08	24.73	2.1	0.2	122.2	16.6	38.2	2.9	PASS
Side Damage	16	15.14	6	14.44	18.87	10.0	2.4	61.2	6.7	42.5	11.1	PASS
Side Damage	17	15.52	6	13.83	20.48	8.6	3.1	63.9	7.0	43.0	9.7	PASS
100%L Bottom Damaged	18	15.51	6	15.19	15.73	13.2	1.9	59.3	5.9	40.6	13.2	PASS

*Notes for 100%L Bottom Damage

1. Equilibrium Heel and Trim must be less than 20 deg (No Heeling Moment)
2. The total GZ area has been reported for the 100% bottom damage type.
3. Range of Positive Stability must be greater than 15 deg.

6.4 Load Case 2 – 18AEQ 4LT Departure with Ice

Damage Type	Scenario No.	Draft AP ft	FldPt No. Closest to WL	2.6.12 Downflood Point Height at Equilibrium > 6.56 ft	2.6.12 Freeboard to MES at Equilibrium > 0.00 ft	2.13.1 Equilibrium Heel Angle < 10 deg	2.13.1 Equilibrium Trim Angle < 10 deg	A7 2.1 Area A2 Under GZ Curve > 5.26 ft-deg	A7 2.6 Maximum Righting Arm > 0.16 ft	A7 2.6 Range of Positive Stability > 7 deg	A7 3.2 Resultant Heel Angle from HL4 < 15 deg	PASS / FAIL
Bottom Raking 55%L	1	7.33	1	13.24	22.89	3.5	-1.5	120.3	14.7	53.1	4.3	PASS
Bottom Raking 35%L	2	7.23	1	13.95	23.82	2.5	-1.4	116.5	14.7	56.5	3.3	PASS
Bottom Raking 35%L	3	7.60	1	13.31	23.25	3.2	-1.3	130.0	16.5	50.7	4.0	PASS
Bottom Raking 35%L	4	8.56	1	13.23	24.02	2.6	-0.5	137.3	17.7	47.6	3.3	PASS
Bottom Raking 35%L	5	13.55	6	14.84	19.45	8.7	1.5	87.8	9.9	49.4	9.6	PASS
Bottom Raking 35%L	6	13.50	6	14.46	20.82	7.3	1.8	85.3	9.8	49.7	8.2	PASS
Bottom Raking 35%L	7	15.39	6	13.98	19.91	9.0	2.8	66.0	7.2	43.2	10.0	PASS
Bottom NOT Raking	8	7.44	1	14.01	24.09	2.3	-1.2	124.8	16.2	53.9	3.0	PASS
Bottom NOT Raking	9	8.29	1	13.77	24.52	2.0	-0.6	135.9	17.7	50.6	2.7	PASS
Bottom NOT Raking	10	8.78	1	13.97	25.28	1.2	-0.1	129.1	17.3	50.0	2.0	PASS
Bottom NOT Raking	11	13.02	6	14.39	21.74	6.2	1.7	86.9	10.3	50.6	7.2	PASS
Side Damage	12	7.07	1	13.08	22.45	4.0	-1.8	107.7	14.1	47.4	4.9	PASS
Side Damage	13	8.30	1	12.26	22.40	4.3	-1.1	118.4	15.5	35.0	5.1	PASS
Side Damage	14	8.85	1	12.26	22.90	3.8	-0.6	122.4	16.5	29.0	4.7	PASS
Side Damage	15	9.01	1	13.47	24.78	1.8	-0.1	123.1	16.9	42.2	2.6	PASS
Side Damage	16	14.58	6	14.53	19.12	9.4	2.1	66.8	7.4	44.1	10.5	PASS
Side Damage	17	14.91	6	13.92	20.69	8.0	2.7	69.7	7.8	44.7	9.1	PASS
100%L Bottom Damaged	18	14.92	6	15.33	15.87	12.8	1.5	62.1	6.4	42.3	12.8	PASS

*Notes for 100%L Bottom Damage

1. Equilibrium Heel and Trim must be less than 20 deg (No Heeling Moment)
2. The total GZ area has been reported for the 100% bottom damage type.
3. Range of Positive Stability must be greater than 15 deg.

6.5 Load Case 3 – 18AEQ 4LT Arrival with Ice

Damage Type	Scenario No.	Draft AP ft	FldPt No. Closest to WL	2.6.12 Downflood Point Height at Equilibrium > 6.56 ft	2.6.12 Freeboard to MES at Equilibrium > 0.00 ft	2.13.1 Equilibrium Heel Angle < 10 deg	2.13.1 Equilibrium Trim Angle < 10 deg	A7 2.1 Area A2 Under GZ Curve > 5.26 ft-deg	A7 2.6 Maximum Righting Arm > 0.16 ft	A7 2.6 Range of Positive Stability > 7 deg	A7 3.2 Resultant Heel Angle from HL4 < 15 deg	PASS / FAIL
Bottom Raking 55%L	1	7.31	1	12.92	22.60	4.3	-1.5	118.1	14.0	52.9	5.0	PASS
Bottom Raking 35%L	2	7.24	1	13.95	24.00	2.8	-1.2	117.7	14.5	54.8	3.6	PASS
Bottom Raking 35%L	3	7.59	1	13.00	22.96	4.0	-1.2	128.6	15.6	50.5	4.7	PASS
Bottom Raking 35%L	4	8.58	1	12.91	23.75	3.3	-0.5	136.5	16.8	47.3	4.0	PASS
Bottom Raking 35%L	5	13.73	6	15.19	19.03	9.6	1.7	82.1	9.0	46.4	10.5	PASS
Bottom Raking 35%L	6	13.57	6	14.74	20.85	7.8	2.0	82.6	9.3	46.9	8.8	PASS
Bottom Raking 35%L	7	15.52	6	14.28	19.90	9.6	3.1	60.8	6.5	39.9	10.7	PASS
Bottom NOT Raking	8	7.43	1	14.00	24.24	2.5	-1.0	125.8	15.8	54.8	3.3	PASS
Bottom NOT Raking	9	8.29	1	13.44	24.25	2.7	-0.5	135.2	16.8	50.2	3.4	PASS
Bottom NOT Raking	10	8.77	2	13.93	25.39	1.6	0.0	130.7	16.7	50.8	2.3	PASS
Bottom NOT Raking	11	13.10	6	14.67	21.78	6.7	1.9	84.8	9.7	47.9	7.7	PASS
Side Damage	12	7.05	1	13.12	22.66	4.2	-1.6	107.9	13.8	49.1	5.1	PASS
Side Damage	13	8.31	1	11.88	22.05	5.1	-1.0	117.5	14.7	35.4	5.9	PASS
Side Damage	14	8.79	1	12.10	22.81	4.4	-0.5	123.7	15.9	31.3	5.2	PASS
Side Damage	15	9.00	2	13.43	24.90	2.2	0.1	124.6	16.4	43.9	3.0	PASS
Side Damage	16	14.66	6	14.83	19.10	10.0	2.3	63.0	6.9	41.1	11.1	PASS
Side Damage	17	15.05	6	14.21	20.69	8.6	2.9	65.2	7.1	41.5	9.7	PASS
100%L Bottom Damaged	18	15.17	6	15.69	15.33	13.9	1.7	56.9	5.6	38.6	13.9	PASS

*Notes for 100%L Bottom Damage

1. Equilibrium Heel and Trim must be less than 20 deg (No Heeling Moment)
2. The total GZ area has been reported for the 100% bottom damage type.
3. Range of Positive Stability must be greater than 15 deg.

6.6 Load Case 4 – 22AEQ 5LT Departure with no Ice

Damage Type	Scenario No.	Draft AP	FldPt No. Closest to WL	2.6.12 Downflood Point Height at Equilibrium	2.6.12 Freeboard to MES at Equilibrium	2.13.1 Equilibrium Heel Angle	2.13.1 Equilibrium Trim Angle	A7 2.1 Area A2 Under GZ Curve	A7 2.6 Maximum Righting Arm	A7 2.6 Range of Positive Stability	A7 3.2 Resultant Heel Angle from HL4	PASS / FAIL
		ft		> 6.56 ft	> 0.00 ft	< 10 deg	< 10 deg	> 5.26 ft-deg	> 0.16 ft	> 7 deg	< 15 deg	
Bottom Raking 55%L	1	7.33	1	13.28	23.01	3.5	-1.5	123.3	15.1	53.6	4.3	PASS
Bottom Raking 35%L	2	7.22	1	13.99	23.92	2.5	-1.3	119.4	15.0	57.0	3.3	PASS
Bottom Raking 35%L	3	7.59	1	13.35	23.34	3.2	-1.2	133.0	16.8	51.2	4.0	PASS
Bottom Raking 35%L	4	8.54	1	13.26	24.09	2.6	-0.5	140.3	17.9	48.1	3.3	PASS
Bottom Raking 35%L	5	13.51	6	14.89	19.57	8.6	1.5	90.9	10.3	51.5	9.5	PASS
Bottom Raking 35%L	6	13.46	6	14.51	20.94	7.3	1.8	87.9	10.1	51.6	8.2	PASS
Bottom Raking 35%L	7	15.36	6	14.02	20.05	8.9	2.9	68.5	7.5	45.3	10.0	PASS
Bottom NOT Raking	8	7.43	1	14.04	24.18	2.3	-1.1	127.6	16.5	54.3	3.0	PASS
Bottom NOT Raking	9	8.26	1	13.79	24.59	2.0	-0.6	138.9	18.0	51.1	2.7	PASS
Bottom NOT Raking	10	8.76	1	13.99	25.34	1.3	-0.1	132.0	17.4	50.4	2.1	PASS
Bottom NOT Raking	11	12.98	6	14.45	21.86	6.2	1.7	89.4	10.6	52.4	7.2	PASS
Side Damage	12	7.06	1	13.15	22.59	4.0	-1.7	110.4	14.5	48.2	4.8	PASS
Side Damage	13	8.27	1	12.33	22.51	4.3	-1.0	121.6	15.9	36.3	5.1	PASS
Side Damage	14	8.81	1	12.32	23.00	3.9	-0.6	125.5	16.8	30.4	4.7	PASS
Side Damage	15	8.99	1	13.50	24.86	1.9	-0.1	126.0	17.1	43.0	2.7	PASS
Side Damage	16	14.52	6	14.57	19.27	9.4	2.1	69.5	7.8	46.3	10.4	PASS
Side Damage	17	14.88	6	13.97	20.83	8.0	2.7	72.1	8.1	46.7	9.0	PASS
100%L Bottom Damaged	18	14.89	6	15.33	16.08	12.6	1.6	66.8	6.9	44.6	12.6	PASS

*Notes for 100%L Bottom Damage

1. Equilibrium Heel and Trim must be less than 20 deg (No Heeling Moment)
2. The total GZ area has been reported for the 100% bottom damage type.
3. Range of Positive Stability must be greater than 15 deg.

6.7 Load Case 5 – 22AEQ 5LT Arrival with no Ice

Damage Type	Scenario No.	Draft AP	FldPt No. Closest to WL	2.6.12 Downflood Point Height at Equilibrium	2.6.12 Freeboard to MES at Equilibrium	2.13.1 Equilibrium Heel Angle	2.13.1 Equilibrium Trim Angle	A7 2.1 Area A2 Under GZ Curve	A7 2.6 Maximum Righting Arm	A7 2.6 Range of Positive Stability	A7 3.2 Resultant Heel Angle from HL4	PASS / FAIL
		ft		> 6.56 ft	> 0.00 ft	< 10 deg	< 10 deg	> 5.26 ft-deg	> 0.16 ft	> 7 deg	< 15 deg	
Bottom Raking 55%L	1	7.31	1	12.97	22.71	4.3	-1.4	121.2	14.3	53.3	5.0	PASS
Bottom Raking 35%L	2	7.24	1	13.99	24.10	2.8	-1.1	120.8	14.8	56.3	3.6	PASS
Bottom Raking 35%L	3	7.58	1	13.03	23.05	4.0	-1.2	131.5	15.9	51.0	4.7	PASS
Bottom Raking 35%L	4	8.55	1	12.93	23.81	3.4	-0.4	139.3	17.0	47.8	4.1	PASS
Bottom Raking 35%L	5	13.69	6	15.24	19.16	9.6	1.7	85.2	9.3	48.4	10.5	PASS
Bottom Raking 35%L	6	13.53	6	14.79	20.98	7.8	2.0	85.3	9.6	48.8	8.7	PASS
Bottom Raking 35%L	7	15.50	6	14.32	20.04	9.6	3.1	63.3	6.8	41.9	10.6	PASS
Bottom NOT Raking	8	7.42	1	14.04	24.33	2.6	-1.0	128.7	16.1	55.1	3.3	PASS
Bottom NOT Raking	9	8.28	1	13.46	24.31	2.8	-0.5	138.1	17.0	50.7	3.5	PASS
Bottom NOT Raking	10	8.76	2	13.94	25.46	1.7	0.1	133.6	16.9	51.3	2.4	PASS
Bottom NOT Raking	11	13.06	6	14.72	21.90	6.7	2.0	87.2	10.0	49.6	7.7	PASS
Side Damage	12	7.04	1	13.19	22.80	4.2	-1.5	110.6	14.1	49.8	5.0	PASS
Side Damage	13	8.28	1	11.96	22.17	5.1	-1.0	120.8	15.1	36.7	5.9	PASS
Side Damage	14	8.76	1	12.16	22.91	4.4	-0.5	126.7	16.3	32.7	5.2	PASS
Side Damage	15	8.98	2	13.45	24.98	2.2	0.1	127.5	16.6	44.7	3.0	PASS
Side Damage	16	14.60	6	14.87	19.26	9.9	2.3	65.8	7.2	43.2	11.0	PASS
Side Damage	17	15.02	6	14.26	20.83	8.6	3.0	67.6	7.4	43.5	9.7	PASS
100%L Bottom Damaged	18	15.14	6	15.68	15.56	13.7	1.8	61.6	6.1	40.9	13.7	PASS

*Notes for 100%L Bottom Damage

1. Equilibrium Heel and Trim must be less than 20 deg (No Heeling Moment)
2. The total GZ area has been reported for the 100% bottom damage type.
3. Range of Positive Stability must be greater than 15 deg.

6.8 Load Case 6 – 20AEQ 2ST 6RV Fwd Departure with Ice

Damage Type	Scenario No.	Draft AP ft	FldPt No. Closest to WL	2.6.12 Downflood Point Height at Equilibrium > 6.56 ft	2.6.12 Freeboard to MES at Equilibrium > 0.00 ft	2.13.1 Equilibrium Heel Angle < 10 deg	2.13.1 Equilibrium Trim Angle < 10 deg	A7 2.1 Area A2 Under GZ Curve > 5.26 ft-deg	A7 2.6 Maximum Righting Arm > 0.16 ft	A7 2.6 Range of Positive Stability > 7 deg	A7 3.2 Resultant Heel Angle from HL4 < 15 deg	PASS / FAIL
Bottom Raking 55%L	1	6.51	1	13.53	22.71	4.0	-1.9	119.0	14.1	56.4	4.7	PASS
Bottom Raking 35%L	2	6.38	1	14.24	23.61	3.0	-1.8	115.7	14.1	56.7	3.7	PASS
Bottom Raking 35%L	3	6.83	1	13.61	23.13	3.6	-1.7	131.3	16.0	53.9	4.3	PASS
Bottom Raking 35%L	4	7.82	1	13.56	23.96	2.9	-0.9	141.6	17.5	51.9	3.6	PASS
Bottom Raking 35%L	5	12.62	6	15.47	19.64	8.6	1.1	95.6	10.8	51.0	9.5	PASS
Bottom Raking 35%L	6	12.51	6	15.12	21.01	7.2	1.3	92.1	10.7	51.1	8.2	PASS
Bottom Raking 35%L	7	14.54	6	14.53	20.06	8.9	2.4	73.5	8.1	45.6	9.9	PASS
Bottom NOT Raking	8	6.65	1	14.31	23.95	2.7	-1.6	126.4	15.7	56.7	3.4	PASS
Bottom NOT Raking	9	7.54	1	14.09	24.46	2.3	-0.9	140.3	17.5	54.4	3.0	PASS
Bottom NOT Raking	10	8.02	1	14.29	25.18	1.6	-0.5	133.9	17.1	54.0	2.3	PASS
Bottom NOT Raking	11	11.99	6	15.08	21.93	6.1	1.2	93.2	11.2	51.8	7.1	PASS
Side Damage	12	6.32	1	13.33	22.28	4.4	-2.1	107.5	13.8	50.9	5.3	PASS
Side Damage	13	7.58	1	12.58	22.35	4.6	-1.4	121.1	15.3	41.3	5.4	PASS
Side Damage	14	8.10	1	12.63	22.90	4.1	-0.9	127.5	16.5	38.0	4.9	PASS
Side Damage	15	8.25	1	13.81	24.72	2.2	-0.5	128.3	16.8	48.4	2.9	PASS
Side Damage	16	13.72	6	15.09	19.32	9.3	1.7	74.3	8.3	46.4	10.3	PASS
Side Damage	17	13.93	6	14.54	20.90	7.8	2.2	76.5	8.6	47.0	8.9	PASS
100%L Bottom Damaged	18	14.03	6	15.90	15.97	12.7	1.1	68.0	7.2	44.8	12.7	PASS

*Notes for 100%L Bottom Damage

1. Equilibrium Heel and Trim must be less than 20 deg (No Heeling Moment)
2. The total GZ area has been reported for the 100% bottom damage type.
3. Range of Positive Stability must be greater than 15 deg.

6.9 Load Case 7 – 20AEQ 2ST 6RV Fwd Arrival with Ice

Damage Type	Scenario No.	Draft AP ft	FldPt No. Closest to WL	2.6.12 Downflood Point Height at Equilibrium > 6.56 ft	2.6.12 Freeboard to MES at Equilibrium > 0.00 ft	2.13.1 Equilibrium Heel Angle < 10 deg	2.13.1 Equilibrium Trim Angle < 10 deg	A7 2.1 Area A2 Under GZ Curve > 5.26 ft-deg	A7 2.6 Maximum Righting Arm > 0.16 ft	A7 2.6 Range of Positive Stability > 7 deg	A7 3.2 Resultant Heel Angle from HL4 < 15 deg	PASS / FAIL
Bottom Raking 55%L	1	6.49	1	13.22	22.42	4.7	-1.9	115.6	13.3	53.9	5.5	PASS
Bottom Raking 35%L	2	6.39	1	14.24	23.79	3.2	-1.6	116.1	13.8	54.3	4.0	PASS
Bottom Raking 35%L	3	6.82	1	13.30	22.84	4.3	-1.6	128.7	15.1	53.5	5.0	PASS
Bottom Raking 35%L	4	7.83	1	13.24	23.69	3.6	-0.8	139.8	16.5	51.5	4.3	PASS
Bottom Raking 35%L	5	12.83	6	15.80	19.21	9.6	1.3	90.1	9.9	47.9	10.4	PASS
Bottom Raking 35%L	6	12.58	6	15.40	21.03	7.7	1.5	90.0	10.1	48.2	8.7	PASS
Bottom Raking 35%L	7	14.68	6	14.83	20.04	9.5	2.7	68.8	7.4	42.4	10.6	PASS
Bottom NOT Raking	8	6.62	1	14.30	24.09	3.0	-1.4	126.9	15.3	55.5	3.7	PASS
Bottom NOT Raking	9	7.55	1	13.77	24.19	3.0	-0.9	138.5	16.5	54.0	3.7	PASS
Bottom NOT Raking	10	8.01	1	14.25	25.29	2.0	-0.3	135.1	16.5	54.7	2.7	PASS
Bottom NOT Raking	11	12.06	6	15.36	21.96	6.6	1.4	91.5	10.6	49.0	7.6	PASS
Side Damage	12	6.28	1	13.37	22.46	4.7	-2.0	106.9	13.3	52.4	5.5	PASS
Side Damage	13	7.59	1	12.21	22.00	5.4	-1.3	119.3	14.4	41.5	6.2	PASS
Side Damage	14	8.04	1	12.48	22.81	4.6	-0.9	128.2	16.0	40.0	5.5	PASS
Side Damage	15	8.23	1	13.78	24.83	2.5	-0.3	129.5	16.2	49.6	3.3	PASS
Side Damage	16	13.78	6	15.39	19.31	9.8	1.9	70.9	7.8	43.4	10.9	PASS
Side Damage	17	14.08	6	14.82	20.88	8.4	2.5	72.5	8.0	43.8	9.6	PASS
100%L Bottom Damaged	18	14.30	6	16.23	15.44	13.8	1.3	63.3	6.4	41.3	13.8	PASS

*Notes for 100%L Bottom Damage

1. Equilibrium Heel and Trim must be less than 20 deg (No Heeling Moment)
2. The total GZ area has been reported for the 100% bottom damage type.
3. Range of Positive Stability must be greater than 15 deg.

6.10 Load Case 8 – 30AEQ 2ST Aft Departure with Ice

Damage Type	Scenario No.	Draft AP	FldPt No. Closest to WL	2.6.12 Downflood Point Height at Equilibrium	2.6.12 Freeboard to MES at Equilibrium	2.13.1 Equilibrium Heel Angle	2.13.1 Equilibrium Trim Angle	A7 2.1 Area A2 Under GZ Curve	A7 2.6 Maximum Righting Arm	A7 2.6 Range of Positive Stability	A7 3.2 Resultant Heel Angle from HL4	PASS / FAIL
		ft		> 6.56 ft	> 0.00 ft	< 10 deg	< 10 deg	> 5.26 ft-deg	> 0.16 ft	> 7 deg	< 15 deg	
Bottom Raking 55%L	1	6.65	1	13.71	23.10	3.6	-1.8	123.3	14.8	57.1	4.3	PASS
Bottom Raking 35%L	2	6.54	1	14.43	24.01	2.6	-1.6	119.6	14.8	57.8	3.3	PASS
Bottom Raking 35%L	3	6.93	1	13.79	23.46	3.2	-1.5	134.8	16.6	54.4	4.0	PASS
Bottom Raking 35%L	4	7.90	1	13.71	24.24	2.6	-0.8	144.2	18.0	52.2	3.3	PASS
Bottom Raking 35%L	5	12.63	6	15.36	19.96	8.3	1.2	98.2	11.2	52.0	9.2	PASS
Bottom Raking 35%L	6	12.54	6	14.99	21.36	6.9	1.4	94.1	11.0	52.2	7.8	PASS
Bottom Raking 35%L	7	14.56	6	14.40	20.44	8.5	2.5	75.4	8.4	46.7	9.6	PASS
Bottom NOT Raking	8	6.76	1	14.48	24.30	2.3	-1.4	129.4	16.3	57.2	3.1	PASS
Bottom NOT Raking	9	7.62	1	14.24	24.74	2.0	-0.8	142.9	18.0	54.7	2.7	PASS
Bottom NOT Raking	10	8.11	1	14.44	25.49	1.3	-0.4	136.2	17.5	54.4	2.0	PASS
Bottom NOT Raking	11	12.01	6	14.94	22.30	5.8	1.3	94.9	11.5	52.8	6.7	PASS
Side Damage	12	6.42	1	13.58	22.73	4.0	-2.0	110.7	14.4	51.8	4.8	PASS
Side Damage	13	7.63	1	12.81	22.73	4.2	-1.3	124.4	15.9	42.5	5.0	PASS
Side Damage	14	8.14	1	12.86	23.26	3.7	-0.8	129.7	17.1	39.0	4.5	PASS
Side Damage	15	8.33	1	13.99	25.05	1.8	-0.3	130.2	17.2	48.9	2.6	PASS
Side Damage	16	13.71	6	14.97	19.70	8.9	1.8	76.6	8.7	47.5	9.9	PASS
Side Damage	17	13.94	6	14.40	21.30	7.4	2.3	78.2	8.9	48.0	8.5	PASS
100%L Bottom Damaged	18	14.09	6	15.73	16.41	12.2	1.2	73.8	7.8	46.0	12.2	PASS

*Notes for 100%L Bottom Damage

1. Equilibrium Heel and Trim must be less than 20 deg (No Heeling Moment)
2. The total GZ area has been reported for the 100% bottom damage type.
3. Range of Positive Stability must be greater than 15 deg.

6.11 Load Case 9 – 30AEQ 2ST Aft Arrival with Ice

Damage Type	Scenario No.	Draft AP	FldPt No. Closest to WL	2.6.12 Downflood Point Height at Equilibrium	2.6.12 Freeboard to MES at Equilibrium	2.13.1 Equilibrium Heel Angle	2.13.1 Equilibrium Trim Angle	A7 2.1 Area A2 Under GZ Curve	A7 2.6 Maximum Righting Arm	A7 2.6 Range of Positive Stability	A7 3.2 Resultant Heel Angle from HL4	PASS / FAIL
		ft		> 6.56 ft	> 0.00 ft	< 10 deg	< 10 deg	> 5.26 ft-deg	> 0.16 ft	> 7 deg	< 15 deg	
Bottom Raking 55%L	1	6.64	1	13.40	22.81	4.3	-1.7	120.2	14.0	55.0	5.1	PASS
Bottom Raking 35%L	2	6.55	1	14.43	24.20	2.8	-1.5	120.4	14.5	55.4	3.6	PASS
Bottom Raking 35%L	3	6.92	1	13.47	23.18	4.0	-1.5	132.5	15.7	54.0	4.7	PASS
Bottom Raking 35%L	4	7.91	1	13.39	23.97	3.3	-0.7	142.6	17.0	51.8	4.1	PASS
Bottom Raking 35%L	5	12.85	6	15.69	19.53	9.2	1.3	92.9	10.2	49.0	10.1	PASS
Bottom Raking 35%L	6	12.61	6	15.27	21.39	7.4	1.6	92.1	10.5	49.3	8.3	PASS
Bottom Raking 35%L	7	14.70	6	14.69	20.43	9.1	2.8	70.7	7.7	43.4	10.2	PASS
Bottom NOT Raking	8	6.75	1	14.48	24.45	2.6	-1.3	130.2	15.9	56.3	3.3	PASS
Bottom NOT Raking	9	7.63	1	13.92	24.47	2.7	-0.8	141.4	17.0	54.3	3.5	PASS
Bottom NOT Raking	10	8.10	1	14.40	25.60	1.6	-0.2	137.6	16.9	55.0	2.4	PASS
Bottom NOT Raking	11	12.09	6	15.22	22.35	6.2	1.5	93.3	10.9	50.0	7.2	PASS
Side Damage	12	6.40	1	13.63	22.93	4.2	-1.8	110.4	13.9	53.2	5.0	PASS
Side Damage	13	7.64	1	12.44	22.38	5.0	-1.2	123.0	15.0	42.7	5.8	PASS
Side Damage	14	8.08	1	12.71	23.17	4.3	-0.8	130.6	16.5	40.9	5.1	PASS
Side Damage	15	8.31	1	13.96	25.17	2.2	-0.2	131.7	16.7	50.1	3.0	PASS
Side Damage	16	13.77	6	15.27	19.71	9.4	2.0	73.3	8.1	44.5	10.5	PASS
Side Damage	17	14.10	6	14.68	21.29	8.0	2.6	74.3	8.2	44.8	9.2	PASS
100%L Bottom Damaged	18	14.35	6	16.06	15.92	13.3	1.4	69.0	7.0	42.4	13.3	PASS

*Notes for 100%L Bottom Damage

1. Equilibrium Heel and Trim must be less than 20 deg (No Heeling Moment)
2. The total GZ area has been reported for the 100% bottom damage type.
3. Range of Positive Stability must be greater than 15 deg.

6.12 Load Case 10 – 20AEQ 2ST 6RV Fwd Departure with no Ice

Damage Type	Scenario No.	Draft AP	FldPt No. Closest to WL	2.6.12 Downflood Point Height at Equilibrium	2.6.12 Freeboard to MES at Equilibrium	2.13.1 Equilibrium Heel Angle	2.13.1 Equilibrium Trim Angle	A7 2.1 Area A2 Under GZ Curve	A7 2.6 Maximum Righting Arm	A7 2.6 Range of Positive Stability	A7 3.2 Resultant Heel Angle from HL4	PASS / FAIL
		ft		> 6.56 ft	> 0.00 ft	< 10 deg	< 10 deg	> 5.26 ft-deg	> 0.16 ft	> 7 deg	< 15 deg	
Bottom Raking 55%L	1	6.48	1	13.85	23.32	3.8	-1.7	127.9	15.2	58.8	4.5	PASS
Bottom Raking 35%L	2	6.37	1	14.56	24.23	2.8	-1.5	124.1	15.1	59.0	3.5	PASS
Bottom Raking 35%L	3	6.74	1	13.91	23.65	3.5	-1.5	139.9	16.9	56.0	4.2	PASS
Bottom Raking 35%L	4	7.70	1	13.81	24.38	2.9	-0.7	150.2	18.0	53.8	3.6	PASS
Bottom Raking 35%L	5	12.37	6	15.70	20.21	8.4	1.2	103.9	11.8	53.9	9.3	PASS
Bottom Raking 35%L	6	12.29	6	15.33	21.62	7.0	1.5	98.8	11.5	53.9	8.0	PASS
Bottom Raking 35%L	7	14.36	6	14.71	20.71	8.7	2.6	78.8	8.7	48.8	9.7	PASS
Bottom NOT Raking	8	6.57	1	14.61	24.49	2.5	-1.4	134.2	16.5	58.7	3.3	PASS
Bottom NOT Raking	9	7.42	1	14.34	24.88	2.3	-0.8	148.8	18.0	56.1	3.0	PASS
Bottom NOT Raking	10	7.93	1	14.53	25.63	1.6	-0.3	142.3	17.5	55.9	2.3	PASS
Bottom NOT Raking	11	11.77	6	15.29	22.56	5.9	1.4	99.6	11.9	54.4	6.9	PASS
Side Damage	12	6.24	1	13.78	23.01	4.1	-1.9	114.4	14.6	54.1	4.9	PASS
Side Damage	13	7.41	1	13.00	22.97	4.3	-1.2	130.6	16.3	46.0	5.1	PASS
Side Damage	14	7.90	1	13.04	23.47	3.9	-0.8	136.0	17.4	43.3	4.7	PASS
Side Damage	15	8.13	1	14.11	25.22	2.1	-0.3	136.4	17.2	51.3	2.9	PASS
Side Damage	16	13.44	6	15.30	20.01	9.0	1.8	81.2	9.2	49.8	10.0	PASS
Side Damage	17	13.69	6	14.74	21.59	7.5	2.4	81.5	9.3	50.0	8.7	PASS
100%L Bottom Damaged	18	13.92	6	15.96	16.75	12.3	1.3	83.2	8.7	48.3	12.3	PASS

*Notes for 100%L Bottom Damage

1. Equilibrium Heel and Trim must be less than 20 deg (No Heeling Moment)
2. The total GZ area has been reported for the 100% bottom damage type.
3. Range of Positive Stability must be greater than 15 deg.

6.13 Load Case 11 – 20AEQ 2ST 6RV Fwd Arrival with no Ice

Damage Type	Scenario No.	Draft AP ft	FldPt No. Closest to WL	2.6.12 Downflood Point Height at Equilibrium > 6.56 ft	2.6.12 Freeboard to MES at Equilibrium > 0.00 ft	2.13.1 Equilibrium Heel Angle < 10 deg	2.13.1 Equilibrium Trim Angle < 10 deg	A7 2.1 Area A2 Under GZ Curve > 5.26 ft-deg	A7 2.6 Maximum Righting Arm > 0.16 ft	A7 2.6 Range of Positive Stability > 7 deg	A7 3.2 Resultant Heel Angle from HL4 < 15 deg	PASS / FAIL
Bottom Raking 55%L	1	6.48	1	13.54	23.04	4.5	-1.6	124.4	14.3	56.2	5.2	PASS
Bottom Raking 35%L	2	6.39	1	14.56	24.42	3.0	-1.4	124.9	14.8	56.5	3.8	PASS
Bottom Raking 35%L	3	6.74	1	13.60	23.38	4.2	-1.4	136.9	15.9	55.6	4.9	PASS
Bottom Raking 35%L	4	7.71	1	13.49	24.12	3.6	-0.6	147.4	16.9	53.4	4.3	PASS
Bottom Raking 35%L	5	12.59	6	16.02	19.78	9.4	1.4	98.2	10.7	50.7	10.3	PASS
Bottom Raking 35%L	6	12.37	6	15.61	21.66	7.5	1.7	96.4	10.8	50.8	8.5	PASS
Bottom Raking 35%L	7	14.51	6	14.99	20.71	9.3	2.9	73.5	8.0	45.4	10.3	PASS
Bottom NOT Raking	8	6.57	1	14.60	24.65	2.8	-1.2	134.7	16.0	57.2	3.6	PASS
Bottom NOT Raking	9	7.43	1	14.02	24.62	3.0	-0.7	146.2	16.9	55.7	3.7	PASS
Bottom NOT Raking	10	7.93	1	14.48	25.75	1.9	-0.1	143.1	16.9	56.5	2.7	PASS
Bottom NOT Raking	11	11.85	6	15.56	22.61	6.4	1.6	97.6	11.3	51.4	7.4	PASS
Side Damage	12	6.23	1	13.83	23.23	4.3	-1.7	114.0	14.1	55.4	5.1	PASS
Side Damage	13	7.42	1	12.63	22.63	5.1	-1.1	128.6	15.3	46.0	6.0	PASS
Side Damage	14	7.84	1	12.89	23.39	4.4	-0.7	136.4	16.6	44.7	5.3	PASS
Side Damage	15	8.12	1	14.07	25.35	2.4	-0.1	137.5	16.6	52.2	3.2	PASS
Side Damage	16	13.51	6	15.58	20.03	9.5	2.0	77.4	8.5	46.6	10.6	PASS
Side Damage	17	13.88	6	15.00	21.58	8.2	2.7	76.9	8.5	46.7	9.3	PASS
100%L Bottom Damaged	18	14.18	6	16.27	16.28	13.3	1.5	78.0	7.7	44.7	13.3	PASS

*Notes for 100%L Bottom Damage

1. Equilibrium Heel and Trim must be less than 20 deg (No Heeling Moment)
2. The total GZ area has been reported for the 100% bottom damage type.
3. Range of Positive Stability must be greater than 15 deg.

6.14 Load Case 12 – 30AEQ 2ST Aft Departure with no Ice

Damage Type	Scenario No.	Draft AP ft	FldPt No. Closest to WL	2.6.12 Downflood Point Height at Equilibrium > 6.56 ft	2.6.12 Freeboard to MES at Equilibrium > 0.00 ft	2.13.1 Equilibrium Heel Angle < 10 deg	2.13.1 Equilibrium Trim Angle < 10 deg	A7 2.1 Area A2 Under GZ Curve > 5.26 ft-deg	A7 2.6 Maximum Righting Arm > 0.16 ft	A7 2.6 Range of Positive Stability > 7 deg	A7 3.2 Resultant Heel Angle from HL4 < 15 deg	PASS / FAIL
Bottom Raking 55%L	1	6.63	1	14.03	23.72	3.4	-1.5	132.7	16.0	59.4	4.1	PASS
Bottom Raking 35%L	2	6.53	1	14.75	24.64	2.3	-1.4	128.4	15.8	60.1	3.1	PASS
Bottom Raking 35%L	3	6.85	1	14.09	24.00	3.1	-1.3	143.6	17.5	56.5	3.8	PASS
Bottom Raking 35%L	4	7.79	1	13.95	24.67	2.6	-0.6	153.3	18.5	54.1	3.3	PASS
Bottom Raking 35%L	5	12.39	6	15.59	20.53	8.1	1.3	106.6	12.2	54.9	9.0	PASS
Bottom Raking 35%L	6	12.32	6	15.20	21.98	6.6	1.6	100.9	11.8	55.0	7.6	PASS
Bottom Raking 35%L	7	14.38	6	14.58	21.11	8.3	2.7	80.7	9.0	50.0	9.3	PASS
Bottom NOT Raking	8	6.70	1	14.79	24.86	2.2	-1.2	137.6	17.0	59.2	2.9	PASS
Bottom NOT Raking	9	7.51	1	14.48	25.17	2.0	-0.7	151.9	18.5	56.5	2.7	PASS
Bottom NOT Raking	10	8.03	1	14.68	25.94	1.3	-0.2	145.0	17.9	56.2	2.0	PASS
Bottom NOT Raking	11	11.80	6	15.15	22.94	5.5	1.5	101.4	12.3	55.5	6.5	PASS
Side Damage	12	6.37	1	14.04	23.49	3.6	-1.7	117.9	15.2	55.0	4.4	PASS
Side Damage	13	7.48	1	13.24	23.38	3.9	-1.1	133.9	16.9	47.0	4.7	PASS
Side Damage	14	7.94	1	13.27	23.85	3.5	-0.7	138.4	17.9	44.1	4.3	PASS
Side Damage	15	8.22	1	14.29	25.56	1.7	-0.1	138.8	17.7	51.7	2.5	PASS
Side Damage	16	13.44	6	15.17	20.41	8.6	1.9	83.5	9.5	51.0	9.6	PASS
Side Damage	17	13.70	6	14.60	22.00	7.1	2.5	83.1	9.6	51.2	8.3	PASS
100%L Bottom Damaged	18	14.00	6	15.80	17.17	11.9	1.5	88.6	9.2	49.3	11.9	PASS

*Notes for 100%L Bottom Damage

1. Equilibrium Heel and Trim must be less than 20 deg (No Heeling Moment)
2. The total GZ area has been reported for the 100% bottom damage type.
3. Range of Positive Stability must be greater than 15 deg.

6.15 Load Case 13 – 30AEQ 2ST Aft Arrival with no Ice

Damage Type	Scenario No.	Draft AP	FldPt No. Closest to WL	2.6.12 Downflood Point Height at Equilibrium	2.6.12 Freeboard to MES at Equilibrium	2.13.1 Equilibrium Heel Angle	2.13.1 Equilibrium Trim Angle	A7 2.1 Area A2 Under GZ Curve	A7 2.6 Maximum Righting Arm	A7 2.6 Range of Positive Stability	A7 3.2 Resultant Heel Angle from HL4	PASS / FAIL
		ft		> 6.56 ft	> 0.00 ft	< 10 deg	< 10 deg	> 5.26 ft-deg	> 0.16 ft	> 7 deg	< 15 deg	
Bottom Raking 55%L	1	6.63	1	13.72	23.44	4.1	-1.4	129.6	15.1	57.3	4.8	PASS
Bottom Raking 35%L	2	6.56	1	14.74	24.84	2.6	-1.2	129.8	15.5	57.5	3.4	PASS
Bottom Raking 35%L	3	6.85	1	13.77	23.72	3.8	-1.2	141.0	16.5	56.1	4.6	PASS
Bottom Raking 35%L	4	7.80	1	13.63	24.41	3.3	-0.5	150.8	17.4	53.7	4.0	PASS
Bottom Raking 35%L	5	12.61	6	15.91	20.11	9.0	1.5	101.0	11.1	51.8	9.9	PASS
Bottom Raking 35%L	6	12.40	6	15.47	22.04	7.1	1.8	98.5	11.2	51.9	8.1	PASS
Bottom Raking 35%L	7	14.55	6	14.85	21.12	8.9	3.0	75.3	8.2	46.5	10.0	PASS
Bottom NOT Raking	8	6.71	1	14.78	25.03	2.4	-1.0	138.4	16.6	58.2	3.2	PASS
Bottom NOT Raking	9	7.52	1	14.16	24.91	2.7	-0.6	149.6	17.4	56.0	3.5	PASS
Bottom NOT Raking	10	8.04	2	14.64	26.08	1.6	0.0	146.2	17.4	56.8	2.4	PASS
Bottom NOT Raking	11	11.89	6	15.41	23.01	6.0	1.7	99.5	11.6	52.5	7.0	PASS
Side Damage	12	6.37	1	14.09	23.73	3.8	-1.5	118.0	14.7	56.2	4.6	PASS
Side Damage	13	7.49	1	12.87	23.03	4.7	-1.0	132.3	16.0	47.0	5.5	PASS
Side Damage	14	7.89	1	13.12	23.77	4.1	-0.6	139.1	17.1	45.5	4.9	PASS
Side Damage	15	8.21	2	14.25	25.70	2.1	0.0	140.2	17.1	52.7	2.9	PASS
Side Damage	16	13.51	6	15.45	20.44	9.1	2.1	79.8	8.9	47.8	10.1	PASS
Side Damage	17	13.91	6	14.85	22.00	7.7	2.8	78.6	8.8	47.8	8.9	PASS
100%L Bottom Damaged	18	14.26	6	16.11	16.71	12.9	1.7	83.1	8.2	45.7	12.9	PASS

*Notes for 100%L Bottom Damage

1. Equilibrium Heel and Trim must be less than 20 deg (No Heeling Moment)
2. The total GZ area has been reported for the 100% bottom damage type.
3. Range of Positive Stability must be greater than 15 deg.

6.16 Load Case 14 – 10% Lightship

Damage Type	Scenario No.	Draft AP ft	FldPt No. Closest to WL	2.6.12 Downflood Point Height at Equilibrium > 6.56 ft	2.6.12 Freeboard to MES at Equilibrium > 0.00 ft	2.13.1 Equilibrium Heel Angle < 10 deg	2.13.1 Equilibrium Trim Angle < 10 deg	A7 2.1 Area A2 Under GZ Curve > 5.26 ft-deg	A7 2.6 Maximum Righting Arm > 0.16 ft	A7 2.6 Range of Positive Stability > 7 deg	A7 3.2 Resultant Heel Angle from HL4 < 15 deg	PASS / FAIL
Bottom Raking 55%L	1	5.87	1	14.99	25.13	3.6	-1.1	149.9	16.6	58.7	4.4	PASS
Bottom Raking 35%L	2	5.81	1	16.02	26.57	2.1	-0.8	151.7	16.8	58.5	2.9	PASS
Bottom Raking 35%L	3	5.99	1	15.01	25.28	3.5	-1.0	159.5	17.4	59.3	4.2	PASS
Bottom Raking 35%L	4	6.82	1	14.75	25.71	3.3	-0.4	171.0	18.0	59.3	4.0	PASS
Bottom Raking 35%L	5	11.00	6	17.07	22.02	8.2	1.4	126.9	13.7	54.8	9.1	PASS
Bottom Raking 35%L	6	10.86	6	16.56	24.14	6.1	1.8	119.6	13.4	54.5	7.1	PASS
Bottom Raking 35%L	7	12.84	6	15.93	23.50	7.5	3.0	87.4	10.0	50.7	8.8	PASS
Bottom NOT Raking	8	5.88	1	16.03	26.66	2.1	-0.7	158.3	17.4	59.0	2.8	PASS
Bottom NOT Raking	9	6.55	1	15.30	26.23	2.7	-0.4	170.1	18.0	59.3	3.4	PASS
Bottom NOT Raking	10	7.15	2	15.72	27.49	1.6	0.3	169.3	18.1	58.8	2.3	PASS
Bottom NOT Raking	11	10.35	6	16.49	25.16	5.0	1.7	120.4	13.7	54.8	6.0	PASS
Side Damage	12	5.70	1	15.73	26.06	2.6	-1.0	135.1	16.0	58.6	3.5	PASS
Side Damage	13	6.49	1	14.51	25.04	3.9	-0.7	152.2	17.1	57.4	4.7	PASS
Side Damage	14	6.80	1	14.52	25.35	3.7	-0.5	158.0	17.6	56.9	4.5	PASS
Side Damage	15	7.23	2	15.53	27.31	1.8	0.3	163.7	17.9	58.2	2.6	PASS
Side Damage	16	11.69	6	16.54	22.94	7.6	2.1	100.6	11.3	51.8	8.7	PASS
Side Damage	17	11.87	6	16.02	24.61	6.1	2.6	88.7	10.5	51.7	7.4	PASS
100%L Bottom Damaged	18	12.95	6	16.97	19.01	11.7	1.9	113.5	10.9	50.0	11.7	PASS

*Notes for 100%L Bottom Damage

1. Equilibrium Heel and Trim must be less than 20 deg (No Heeling Moment)
2. The total GZ area has been reported for the 100% bottom damage type.
3. Range of Positive Stability must be greater than 15 deg.

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Condition 1 - HSC Loadline
Damage Case 16

WEIGHT STATUS

Trim: Aft 8.93/210.33, Heel: Stbd 9.99 deg.

Part	**Weight(LT)**	**LCG**	**TCG**	**VCG**
LIGHT SHIP	500.46	84.77f	0.01p	23.23
Pax @185 lb ea (Stand)	20.65	105.24f	0.00	38.55
Luggage @20 lb ea Pax	2.23	115.75f	0.00	21.33
Vehicles AEQ @6 kip ea	83.05	101.90f	0.15s	21.33
Vehicles LT @63 kip ea	56.25	22.00f	0.00	27.46
Vehicles ST @45 kip ea	20.09	55.00f	0.00	27.46
Bikes @30 lb ea	1.34	210.00f	0.00	19.69
Kayaks @ 75 lb ea	0.84	135.00f	6.56p	21.65
Crew	0.98	115.83f	2.23s	44.16
Food Stuffs	0.58	100.46f	1.05p	38.71
Loose Outfit/Gear	0.40	111.22f	0.00	37.07
Stores	0.67	101.71f	0.00	37.07
Art Allowance	0.54	111.22f	0.00	40.35
Trash	0.45	104.66f	25.13s	28.64
Video Games	0.45	28.46f	5.11p	38.71
Ice Accretion	50.21	112.83f	0.00	38.16
Total Fixed	**739.19**	**84.04f**	**0.02s**	**24.97**

	Load	**SpGr**	**Weight(LT)**	**LCG**	**TCG**	**VCG**	**FSM**
FW.P	0.980	1.000	3.36	135.81f	21.22p	10.19	0.2
BW.S	0.200	1.025	2.77	97.69f	21.43s	8.01	6.9
DBF4.P	0.980	0.840	20.42	114.07f	22.40p	3.50	2.6
DBF3.S	0.980	0.840	20.42	114.07f	22.55s	3.50	2.6
LOH2.P	0.980	0.880	0.63	49.21f	17.11p	14.41	0.0
LOH1.S	0.980	0.880	0.63	49.21f	17.13s	14.41	0.0
Total Tanks			**48.23**	**112.95f**	**0.18p**	**4.51**	**88.9***
Total Weight			**787.42**	**85.82f**	**0.00s**	**23.71**	
Free Surface Adjustment						**0.11**	
Adjusted CG				**85.82f**	**0.01p**	**23.82**	

Distances in FEET. Moments in Ft-LT.

Note: FSM values marked with an asterisk (*) are formal values which are not the same as the true values in the present condition.

Condition 1 - HSC Loadline
Damage Case 16

DISPLACEMENT STATUS
Baseline draft: 15.138 @ Origin
Trim: Aft 8.93/210.33, Heel: Stbd 9.99 deg.

Part		SpGr	Displ(LT)	LCB	TCB	VCB	RefHt
HULL		1.025	1,218.68	74.01f	9.82s	8.02	-14.89
DB5.S	Flooded	1.025	-33.08	96.37f	22.47s	3.55	-14.89
COMP5.S	Flooded	1.025	-67.52	80.48f	22.71s	11.08	-14.89
DB7.S	Flooded	1.025	-27.10	78.74f	22.47s	3.69	-14.89
ER1.S	Flooded	1.025	-303.55	40.93f	22.41s	9.97	-14.89
Total Displacement		**1.025**	**787.43**	**85.11f**	**2.89s**	**7.35**	

Distances in FEET.

CRITICAL POINT STATUS
Baseline draft: 15.138 @ Origin
Trim: Aft 8.93/210.33, Heel: Stbd 9.99 deg.

	Critical Points		LCP	TCP	VCP	Height
(3)	EN 90 S	FLOOD	213.86f	5.25s	30.90	23.67
(4)	EN 91 S	FLOOD	203.52f	8.13s	38.80	30.50
(5)	ER Air FWD P	FLOOD	43.30f	27.45p	23.45	14.77
(6)	ER Air Aft P	FLOOD	35.42f	27.45p	23.45	14.44
(7)	EN 90 P	FLOOD	213.86f	5.25p	30.90	25.49
(8)	EN 91 P	FLOOD	203.52f	8.13p	38.80	33.32
(9)	Survival Craft S	TIGHT	61.03f	25.67s	44.46	26.99
(10)	MES S	TIGHT	106.30f	29.53s	34.94	18.87

Distances in FEET.

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Angle from Equ0 to Flood or Tflood**	**>**	**0.00**	**deg**	**34.49**	**P**
(2)	**Absolute Angle at Equ0 (no moments)**	**<**	**10.00**	**deg**	**9.99**	**P**
(3)	**Angle from Equ0 to RAzero or Flood**	**>**	**7.00**	**deg**	**42.33**	**P**
(4)	**Flood Height at Point 1 to 8**	**>**	**6.56**	**Ft**	**14.44**	**P**
(5)	**Righting Arm at MaxRA**	**>**	**0.16**	**Ft**	**6.70**	**P**

Condition 1 - HSC Loadline
Damage Case 16

RESIDUAL RIGHTING ARMS vs HEEL ANGLE with FLOODING

Total CG: LCG = 85.82f TCG = 0.00s VCG = 23.71
Free Surface Adjustment: 0.11
Adjusted CG: LCG = 85.82f TCG = 0.02p VCG = 23.82

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Flood Pt Area	Height	
14.893	2.43a	9.99s	787.25	0.00	-0.868	0.00	14.44	(6)
14.987	2.49a	10.55s	787.39	0.00	-0.431	-0.36	14.61	(6)
15.081	2.56a	11.11s	787.38	0.00	0.000	-0.48	14.77	(6)
15.256	2.68a	12.11s	787.23	0.00	0.763	-0.10	15.05	(6)
15.441	2.81a	13.11s	787.16	0.00	1.503	1.04	15.32	(6)
15.640	2.96a	14.11s	787.43	0.00	2.212	2.90	15.58	(6)
15.846	3.11a	15.11s	787.43	0.00	2.882	5.44	15.83	(6)
16.066	3.28a	16.11s	787.42	0.00	3.499	8.63	16.05	(6)
16.300	3.46a	17.11s	787.42	0.00	4.053	12.41	16.27	(6)
16.550	3.65a	18.11s	787.49	0.00	4.534	16.70	16.46	(6)
16.811	3.86a	19.11s	787.46	0.00	4.937	21.44	16.64	(6)
17.083	4.08a	20.11s	787.40	0.00	5.260	26.54	16.81	(6)
17.363	4.31a	21.11s	787.41	0.00	5.505	31.92	16.97	(6)
17.646	4.54a	22.11s	787.41	0.00	5.676	37.52	17.12	(6)
17.932	4.79a	23.11s	787.41	0.00	5.783	43.25	17.25	(6)
18.216	5.04a	24.11s	787.39	0.00	5.831	49.06	17.39	(6)
18.337	5.15a	24.53s	787.42	0.00	**5.834**	51.56	17.44	(6)
18.498	5.29a	25.11s	787.42	0.00	5.826	54.89	17.51	(6)
18.774	5.55a	26.11s	787.40	0.00	5.780	60.70	17.63	(6)
19.045	5.80a	27.11s	787.40	0.00	5.695	66.43	17.75	(6)
19.310	6.06a	28.11s	787.40	0.00	5.577	72.07	17.86	(6)
19.568	6.32a	29.11s	787.40	0.00	5.433	77.58	17.96	(6)
19.819	6.57a	30.11s	787.41	0.00	5.264	82.92	18.07	(6)
20.062	6.82a	31.11s	787.41	0.00	5.076	88.09	18.16	(6)
20.298	7.08a	32.11s	787.41	0.00	4.869	93.07	18.26	(6)
20.526	7.33a	33.11s	787.42	0.00	4.647	97.83	18.34	(6)
20.749	7.57a	34.11s	787.71	0.00	4.409	102.36	18.42	(6)
20.956	7.82a	35.11s	787.42	0.00	4.166	106.64	18.51	(6)
21.157	8.06a	36.11s	787.41	0.01f	3.912	110.68	18.58	(6)
21.351	8.29a	37.11s	787.46	0.00	3.646	114.46	18.65	(6)
21.535	8.53a	38.11s	787.43	0.00	3.375	117.97	18.72	(6)
21.708	8.76a	39.11s	787.43	0.00	3.097	121.21	18.78	(6)
21.872	8.98a	40.11s	787.42	0.00	2.815	124.17	18.84	(6)
22.027	9.20a	41.11s	787.44	0.00	2.527	126.84	18.89	(6)
22.173	9.42a	42.11s	787.44	0.00	2.234	129.22	18.94	(6)
22.310	9.63a	43.11s	787.47	0.00	1.939	131.30	18.99	(6)
22.436	9.84a	44.11s	787.46	0.00	1.640	133.09	19.03	(6)
22.482	9.92a	44.49s	787.43	0.00	1.526	133.70	0.00	(10)
22.553	10.05a	45.11s	787.42	0.00	1.340	134.58	19.07	(6)
22.661	10.24a	46.11s	787.41	0.00	1.038	135.77	19.10	(6)
22.760	10.44a	47.11s	787.42	0.00	0.734	136.66	19.13	(6)
22.851	10.63a	48.11s	787.42	0.00	0.428	137.24	19.16	(6)
22.934	10.82a	49.11s	787.42	0.00	0.121	137.51	19.17	(6)
22.964	10.89a	49.50s	787.42	0.00	0.000	137.54	19.18	(6)

Condition 1 - HSC Loadline
Damage Case 16

Distances in FEET. Specific Gravity = 1.025. Area in Ft-Deg.

Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 88.9 Ft-LT was applied to artificially modify the CG.

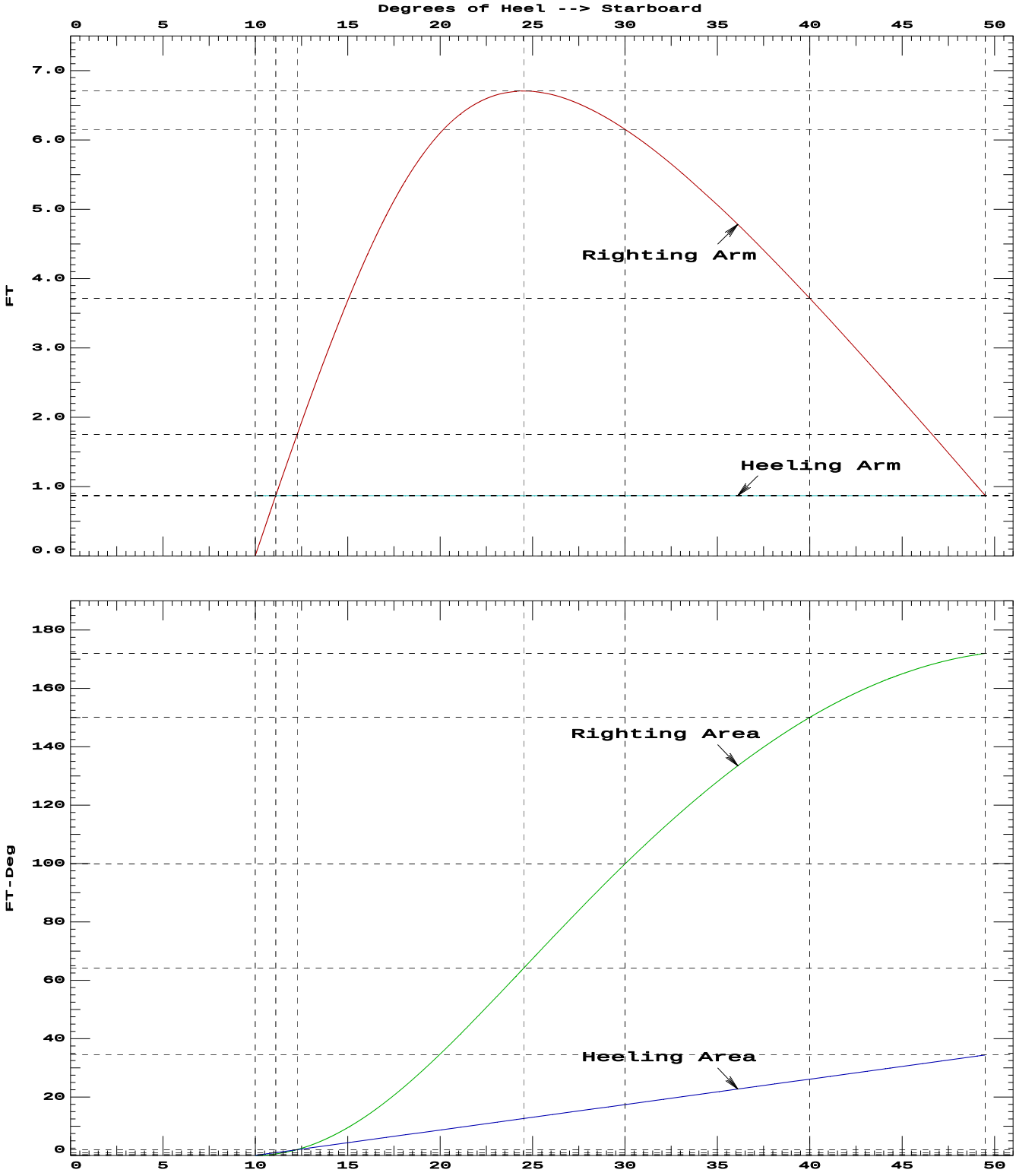
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 685.82

	Critical Points		LCP	TCP	VCP
(6)	ER Air Aft P	FLOOD	35.42f	27.45p	23.45
(10)	MES S	TIGHT	106.30f	29.53s	34.94

LIM	STABILITY CRITERION		Min/Max		Attained
(1)	**Absolute Angle at Equilibrium**	**<**	**15.00**	**deg**	**11.11 P**
(4)	**Area from Equilibrium to 15 deg or Flood**	**>**	**5.26**	**Ft-deg**	**61.18 P**

Relative angles measured from 11.105s

Condition 1 - HSC Loadline
Damage Case 16



Condition 2 - 18AEQ 4LT Departure with Ice
Damage Case 16

WEIGHT STATUS

Trim: Aft 7.67/210.33, Heel: Stbd 9.42 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	500.46	84.77f	0.01p	23.23
Pax @185 lb ea (Stand)	20.65	105.24f	0.00	38.55
Luggage @20 lb ea Pax	2.22	115.73f	5.24p	21.33
Vehicles AEQ @6 kip ea	48.22	120.90f	3.80p	21.33
Vehicles LT @63 kip ea	112.50	63.65f	0.00	27.46
Bikes @30 lb ea	0.16	209.32f	0.00	19.69
Kayaks @ 75 lb ea	0.20	131.39f	6.56p	21.65
Crew	0.98	115.83f	2.23s	44.16
Food Stuffs	0.58	100.46f	1.05p	38.71
Loose Outfit/Gear	0.40	111.22f	0.00	37.07
Stores	0.67	101.71f	0.00	37.07
Art Allowance	0.54	111.22f	0.00	40.35
Trash	0.45	104.66f	25.13s	28.64
Video Games	0.45	28.46f	5.11p	38.71
Ice Accretion	50.21	112.83f	0.00	38.16
Total Fixed	**738.70**	**86.61f**	**0.26p**	**25.27**

	Load	SpGr	Weight(LT)	LCG	TCG	VCG	FSM
FW.P	0.980	1.000	3.36	135.81f	21.22p	10.19	0.2
BW.S	0.200	1.025	2.77	97.75f	21.40s	8.00	6.9
DBF4.P	0.980	0.840	20.42	114.07f	22.40p	3.50	2.7
DBF3.S	0.980	0.840	20.42	114.07f	22.55s	3.50	2.7
LOH2.P	0.980	0.880	0.63	49.21f	17.11p	14.41	0.0
LOH1.S	0.980	0.880	0.63	49.21f	17.13s	14.41	0.0
Total Tanks			**48.23**	**112.96f**	**0.19p**	**4.51**	**88.9***
Total Weight			**786.93**	**88.22f**	**0.25p**	**24.00**	
Free Surface Adjustment						**0.11**	
Adjusted CG				**88.22f**	**0.27p**	**24.11**	

Distances in FEET. Moments in Ft-LT.

Note: FSM values marked with an asterisk (*) are formal values which are not the same as the true values in the present condition.

DISPLACEMENT STATUS

Baseline draft: 14.579 @ Origin

Trim: Aft 7.67/210.33, Heel: Stbd 9.42 deg.

Part		SpGr	Displ(LT)	LCB	TCB	VCB	RefHt
HULL		1.025	1,204.98	75.92f	9.47s	7.82	-14.37
DB5.S	Flooded	1.025	-33.08	96.37f	22.47s	3.55	-14.37
COMP5.S	Flooded	1.025	-65.13	80.50f	22.71s	10.91	-14.37
DB7.S	Flooded	1.025	-27.10	78.74f	22.47s	3.69	-14.37
ER1.S	Flooded	1.025	-292.74	40.95f	22.48s	9.72	-14.37
Total Displacement		**1.025**	**786.93**	**87.60f**	**2.54s**	**7.19**	

Distances in FEET.

Condition 2 - 18AEQ 4LT Departure with Ice
Damage Case 16

CRITICAL POINT STATUS
Baseline draft: 14.579 @ Origin
Trim: Aft 7.67/210.33, Heel: Stbd 9.42 deg.

	Critical Points		LCP	TCP	VCP	Height
(3)	EN 90 S	FLOOD	213.86f	5.25s	30.90	23.03
(4)	EN 91 S	FLOOD	203.52f	8.13s	38.80	29.97
(5)	ER Air FWD P	FLOOD	43.30f	27.45p	23.45	14.82
(6)	ER Air Aft P	FLOOD	35.42f	27.45p	23.45	14.53
(7)	EN 90 P	FLOOD	213.86f	5.25p	30.90	24.75
(8)	EN 91 P	FLOOD	203.52f	8.13p	38.80	32.63
(9)	Survival Craft S	TIGHT	61.03f	25.67s	44.46	27.48
(10)	MES S	TIGHT	106.30f	29.53s	34.94	19.12

Distances in FEET.

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Angle from Equ0 to Flood or Tflood**	**>**	**0.00**	**deg**	**34.82**	**P**
(2)	**Absolute Angle at Equ0 (no moments)**	**<**	**10.00**	**deg**	**9.42**	**P**
(3)	**Angle from Equ0 to RAzero or Flood**	**>**	**7.00**	**deg**	**43.89**	**P**
(4)	**Flood Height at Point 1 to 8**	**>**	**6.56**	**Ft**	**14.53**	**P**
(5)	**Righting Arm at MaxRA**	**>**	**0.16**	**Ft**	**7.42**	**P**

Condition 2 - 18AEQ 4LT Departure with Ice
Damage Case 16

RESIDUAL RIGHTING ARMS vs HEEL ANGLE with FLOODING

Total CG: LCG = 88.22f TCG = 0.25p VCG = 24.00
Free Surface Adjustment: 0.11
Adjusted CG: LCG = 88.22f TCG = 0.27p VCG = 24.11

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Flood Pt Area	Height	
14.371	2.09a	9.42s	786.78	0.00	-0.870	0.00	14.53	(6)
14.462	2.15a	9.96s	786.90	0.00	-0.431	-0.35	14.69	(6)
14.555	2.21a	10.50s	786.89	0.00	0.002	-0.46	14.85	(6)
14.730	2.33a	11.50s	786.77	0.00	0.793	-0.06	15.14	(6)
14.912	2.46a	12.50s	786.72	0.00	1.562	1.12	15.41	(6)
15.104	2.59a	13.50s	786.95	0.00	2.309	3.05	15.68	(6)
15.303	2.74a	14.50s	786.94	0.00	3.025	5.72	15.93	(6)
15.512	2.90a	15.50s	786.94	0.00	3.697	9.08	16.17	(6)
15.733	3.07a	16.50s	786.94	0.00	4.314	13.08	16.40	(6)
15.968	3.25a	17.50s	786.93	0.00	4.865	17.67	16.61	(6)
16.217	3.44a	18.50s	786.93	0.00	5.341	22.78	16.80	(6)
16.478	3.64a	19.50s	786.91	0.00	5.736	28.32	16.98	(6)
16.749	3.86a	20.50s	786.92	0.00	6.047	34.21	17.14	(6)
17.026	4.09a	21.50s	786.92	0.00	6.277	40.38	17.30	(6)
17.306	4.32a	22.50s	786.92	0.00	6.432	46.74	17.44	(6)
17.585	4.56a	23.50s	786.89	0.00	6.520	53.22	17.58	(6)
17.862	4.81a	24.50s	786.91	0.00	6.548	59.75	17.71	(6)
18.135	5.06a	25.50s	786.92	0.00	6.525	66.29	17.84	(6)
18.401	5.31a	26.50s	786.91	0.00	6.457	72.78	17.97	(6)
18.662	5.56a	27.50s	786.91	0.00	6.352	79.18	18.09	(6)
18.915	5.81a	28.50s	786.91	0.00	6.215	85.47	18.20	(6)
19.160	6.06a	29.50s	786.92	0.00	6.050	91.60	18.31	(6)
19.397	6.31a	30.50s	786.92	0.00	5.862	97.56	18.42	(6)
19.625	6.55a	31.50s	786.93	0.00	5.654	103.31	18.53	(6)
19.844	6.80a	32.50s	786.94	0.00	5.428	108.86	18.63	(6)
20.053	7.03a	33.50s	786.93	0.01f	5.189	114.17	18.73	(6)
20.257	7.27a	34.50s	786.94	0.00	4.935	119.23	18.82	(6)
20.448	7.51a	35.50s	786.92	0.01f	4.671	124.03	18.91	(6)
20.632	7.74a	36.50s	786.96	0.00	4.395	128.57	19.00	(6)
20.805	7.97a	37.50s	786.95	0.00	4.112	132.82	19.08	(6)
20.969	8.19a	38.50s	786.93	0.01f	3.822	136.79	19.16	(6)
21.127	8.41a	39.50s	786.94	0.00	3.524	140.46	19.23	(6)
21.274	8.63a	40.50s	786.94	0.00	3.223	143.83	19.30	(6)
21.411	8.84a	41.50s	786.96	0.00	2.917	146.90	19.36	(6)
21.540	9.05a	42.50s	786.97	0.00	2.606	149.66	19.42	(6)
21.658	9.26a	43.50s	786.95	0.00	2.293	152.11	19.48	(6)
21.742	9.41a	44.24s	786.93	0.00	2.058	153.73	0.00	(10)
21.770	9.46a	44.50s	786.93	0.00	1.977	154.25	19.53	(6)
21.870	9.65a	45.50s	786.92	0.01f	1.660	156.07	19.57	(6)
21.965	9.85a	46.50s	786.92	0.01f	1.340	157.57	19.61	(6)
22.053	10.04a	47.50s	786.94	0.00	1.017	158.75	19.65	(6)
22.133	10.22a	48.50s	786.96	0.00	0.694	159.60	19.68	(6)
22.205	10.40a	49.50s	786.97	0.00	0.370	160.14	19.70	(6)
22.270	10.58a	50.50s	786.99	0.00	0.045	160.34	19.72	(6)

Condition 2 - 18AEQ 4LT Departure with Ice
Damage Case 16

22.277	10.61a	50.64s	786.96	0.00	-0.002	160.35	19.72 (6)

Distances in FEET. Specific Gravity = 1.025. Area in Ft-Deg.

Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 88.9 Ft-LT was applied to artificially modify the CG.

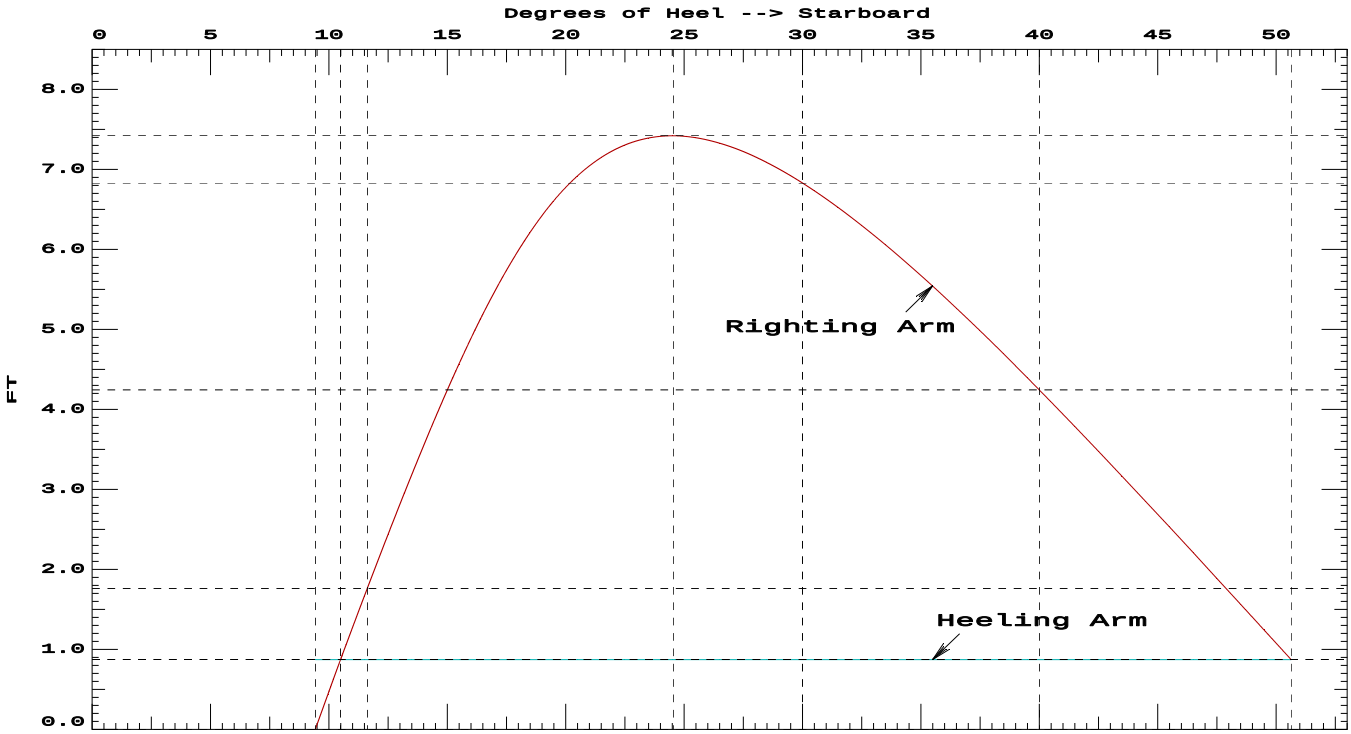
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 685.82

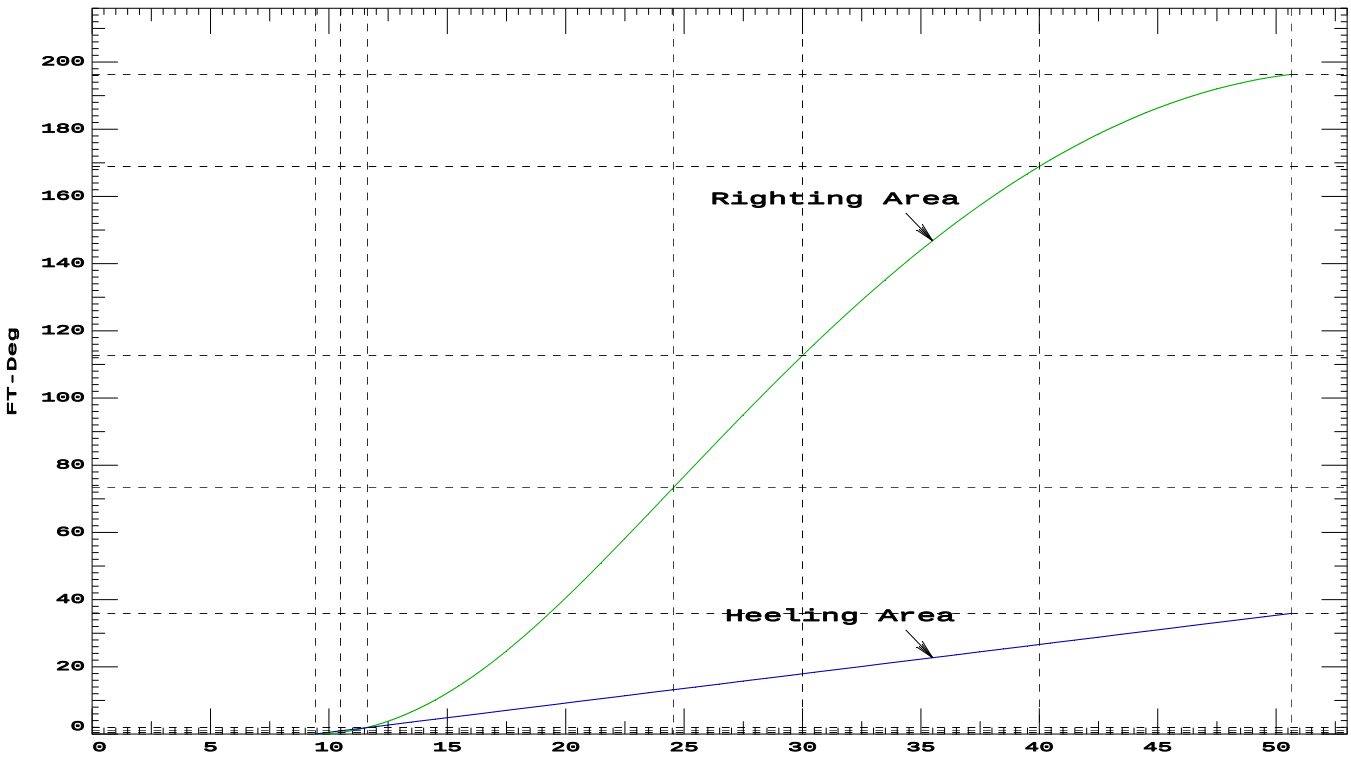
	Critical Points		**LCP**	**TCP**	**VCP**
(6)	ER Air Aft P	FLOOD	35.42f	27.45p	23.45
(10)	MES S	TIGHT	106.30f	29.53s	34.94

LIM	**STABILITY CRITERION**		**Min/Max**		**Attained**
(1)	**Absolute Angle at Equilibrium**	**<**	**15.00**	**deg**	**10.50 P**
(4)	**Area from Equilibrium to 15 deg or Flood**	**>**	**5.26**	**Ft-deg**	**66.75 P**

Relative angles measured from 10.496s

Condition 2 - 18AEQ 4LT Departure with Ice
Damage Case 16





Condition 3 - 18AEQ 4LT Arrival with Ice
Damage Case 16

WEIGHT STATUS

Trim: Aft 8.44/210.33, Heel: Stbd 9.99 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	500.46	84.77f	0.01p	23.23
Pax @185 lb ea (Stand)	20.65	105.24f	0.00	38.55
Luggage @20 lb ea Pax	2.22	115.73f	5.24p	21.33
Vehicles AEQ @6 kip ea	48.22	120.90f	3.80p	21.33
Vehicles LT @63 kip ea	112.50	63.65f	0.00	27.46
Bikes @30 lb ea	0.16	209.32f	0.00	19.69
Kayaks @ 75 lb ea	0.20	131.39f	25.83p	21.65
Crew	0.98	115.83f	2.23s	44.16
Food Stuffs	0.06	100.46f	1.05p	38.71
Loose Outfit/Gear	0.40	111.22f	0.00	37.07
Stores	0.07	101.71f	0.00	37.07
Art Allowance	0.54	111.22f	0.00	40.35
Trash	0.45	104.66f	25.13s	28.64
Video Games	0.45	28.46f	5.11p	38.71
Ice Accretion	50.21	112.83f	0.00	38.16
Total Fixed	**737.58**	**86.58f**	**0.26p**	**25.25**

	Load	SpGr	Weight(LT)	LCG	TCG	VCG	FSM
FW.P	0.100	1.000	0.34	135.58f	20.87p	8.23	0.7
BW.S	0.980	1.025	13.55	98.08f	21.01s	10.37	0.9
DBF4.P	0.100	0.840	2.08	113.13f	20.99p	0.92	15.3
DBF3.S	0.100	0.840	2.08	113.13f	23.96s	0.92	15.3
LOH2.P	0.100	0.880	0.06	49.12f	16.95p	12.71	0.1
LOH1.S	0.100	0.880	0.06	49.12f	17.29s	12.71	0.1
Total Tanks			**18.20**	**101.89f**	**15.60s**	**8.18**	**88.9***
Total Weight			**755.77**	**86.95f**	**0.12s**	**24.84**	
Free Surface Adjustment						**0.12**	
Adjusted CG				**86.96f**	**0.10s**	**24.96**	

Distances in FEET. Moments in Ft-LT.

Note: FSM values marked with an asterisk (*) are formal values which are not the same as the true values in the present condition.

DISPLACEMENT STATUS

Baseline draft: 14.659 @ Origin

Trim: Aft 8.44/210.33, Heel: Stbd 9.99 deg.

Part		SpGr	Displ(LT)	LCB	TCB	VCB	RefHt
HULL		1.025	1,176.69	74.64f	10.13s	7.86	-14.42
DB5.S	Flooded	1.025	-33.08	96.37f	22.47s	3.55	-14.42
COMP5.S	Flooded	1.025	-65.14	80.49f	22.74s	10.92	-14.42
DB7.S	Flooded	1.025	-27.10	78.74f	22.47s	3.69	-14.42
ER1.S	Flooded	1.025	-295.59	40.90f	22.47s	9.79	-14.42
Total Displacement		**1.025**	**755.77**	**86.23f**	**3.23s**	**7.17**	

Distances in FEET.

Condition 3 - 18AEQ 4LT Arrival with Ice
Damage Case 16

CRITICAL POINT STATUS
Baseline draft: 14.659 @ Origin
Trim: Aft 8.44/210.33, Heel: Stbd 9.99 deg.

	Critical Points		LCP	TCP	VCP	Height
(3)	EN 90 S	FLOOD	213.86f	5.25s	30.90	23.65
(4)	EN 91 S	FLOOD	203.52f	8.13s	38.80	30.51
(5)	ER Air FWD P	FLOOD	43.30f	27.45p	23.45	15.15
(6)	ER Air Aft P	FLOOD	35.42f	27.45p	23.45	14.83
(7)	EN 90 P	FLOOD	213.86f	5.25p	30.90	25.47
(8)	EN 91 P	FLOOD	203.52f	8.13p	38.80	33.33
(9)	Survival Craft S	TIGHT	61.03f	25.67s	44.46	27.32
(10)	MES S	TIGHT	106.30f	29.53s	34.94	19.10

Distances in FEET.

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Angle from Equ0 to Flood or Tflood**	**>**	**0.00**	**deg**	**35.48**	**P**
(2)	**Absolute Angle at Equ0 (no moments)**	**<**	**10.00**	**deg**	**9.99**	**P**
(3)	**Angle from Equ0 to RAzero or Flood**	**>**	**7.00**	**deg**	**40.89**	**P**
(4)	**Flood Height at Point 1 to 8**	**>**	**6.56**	**Ft**	**14.83**	**P**
(5)	**Righting Arm at MaxRA**	**>**	**0.16**	**Ft**	**6.87**	**P**

Condition 3 - 18AEQ 4LT Arrival with Ice
Damage Case 16

RESIDUAL RIGHTING ARMS vs HEEL ANGLE with FLOODING

Total CG: LCG = 86.95f TCG = 0.12s VCG = 24.84
Free Surface Adjustment: 0.12
Adjusted CG: LCG = 86.96f TCG = 0.10s VCG = 24.96

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Flood Pt Area	Height	
14.423	2.30a	9.99s	755.60	0.00	-0.905	0.00	14.83	(6)
14.523	2.36a	10.55s	755.73	0.00	-0.450	-0.38	14.99	(6)
14.623	2.43a	11.11s	755.73	0.00	-0.002	-0.51	15.15	(6)
14.804	2.55a	12.11s	755.60	0.00	0.785	-0.11	15.43	(6)
14.992	2.69a	13.11s	755.52	0.00	1.550	1.06	15.70	(6)
15.194	2.83a	14.11s	755.79	0.00	2.283	2.97	15.96	(6)
15.402	2.99a	15.11s	755.78	0.00	2.978	5.60	16.20	(6)
15.622	3.15a	16.11s	755.78	0.00	3.620	8.90	16.43	(6)
15.855	3.34a	17.11s	755.77	0.00	4.196	12.81	16.64	(6)
16.102	3.53a	18.11s	755.77	0.00	4.695	17.26	16.84	(6)
16.360	3.74a	19.11s	755.75	0.00	5.108	22.16	17.03	(6)
16.627	3.96a	20.11s	755.76	0.00	5.434	27.43	17.20	(6)
16.901	4.19a	21.11s	755.76	0.00	5.675	32.98	17.36	(6)
17.177	4.43a	22.11s	755.76	0.00	5.838	38.75	17.52	(6)
17.453	4.67a	23.11s	755.76	0.00	5.931	44.64	17.67	(6)
17.725	4.92a	24.11s	755.73	0.00	5.964	50.59	17.81	(6)
17.993	5.17a	25.11s	755.76	0.00	5.941	56.54	17.95	(6)
18.254	5.43a	26.11s	755.75	0.00	5.874	62.45	18.09	(6)
18.509	5.68a	27.11s	755.75	0.00	5.767	68.27	18.22	(6)
18.757	5.93a	28.11s	755.75	0.00	5.628	73.97	18.34	(6)
18.996	6.19a	29.11s	755.76	0.00	5.460	79.51	18.47	(6)
19.226	6.44a	30.11s	755.76	0.00	5.269	84.88	18.59	(6)
19.448	6.68a	31.11s	755.76	0.00	5.057	90.04	18.70	(6)
19.661	6.93a	32.11s	755.77	0.00	4.827	94.98	18.82	(6)
19.865	7.17a	33.11s	755.78	0.00	4.581	99.69	18.92	(6)
20.058	7.41a	34.11s	755.76	0.00	4.323	104.14	19.03	(6)
20.244	7.65a	35.11s	755.78	0.00	4.052	108.33	19.13	(6)
20.419	7.88a	36.11s	755.78	0.00	3.771	112.24	19.23	(6)
20.586	8.11a	37.11s	755.78	0.00	3.482	115.87	19.32	(6)
20.742	8.34a	38.11s	755.78	0.00	3.187	119.20	19.41	(6)
20.890	8.56a	39.11s	755.80	0.00	2.884	122.24	19.50	(6)
21.028	8.77a	40.11s	755.76	0.01f	2.577	124.97	19.58	(6)
21.160	8.99a	41.11s	755.78	0.00	2.264	127.39	19.65	(6)
21.282	9.20a	42.11s	755.78	0.00	1.948	129.49	19.72	(6)
21.395	9.40a	43.11s	755.78	0.00	1.629	131.28	19.79	(6)
21.500	9.61a	44.11s	755.78	0.00	1.307	132.75	19.85	(6)
21.596	9.80a	45.11s	755.78	0.00	0.984	133.89	19.91	(6)
21.629	9.87a	45.47s	755.77	0.00	0.869	134.22	0.00	(10)
21.686	10.00a	46.11s	755.79	0.00	0.658	134.72	19.96	(6)
21.767	10.19a	47.11s	755.82	0.00	0.332	135.21	20.00	(6)
21.841	10.37a	48.11s	755.83	0.00	0.004	135.38	20.04	(6)

Distances in FEET. Specific Gravity = 1.025. Area in Ft-Deg.

Condition 3 - 18AEQ 4LT Arrival with Ice
Damage Case 16

Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 88.9 Ft-LT was applied to artificially modify the CG.

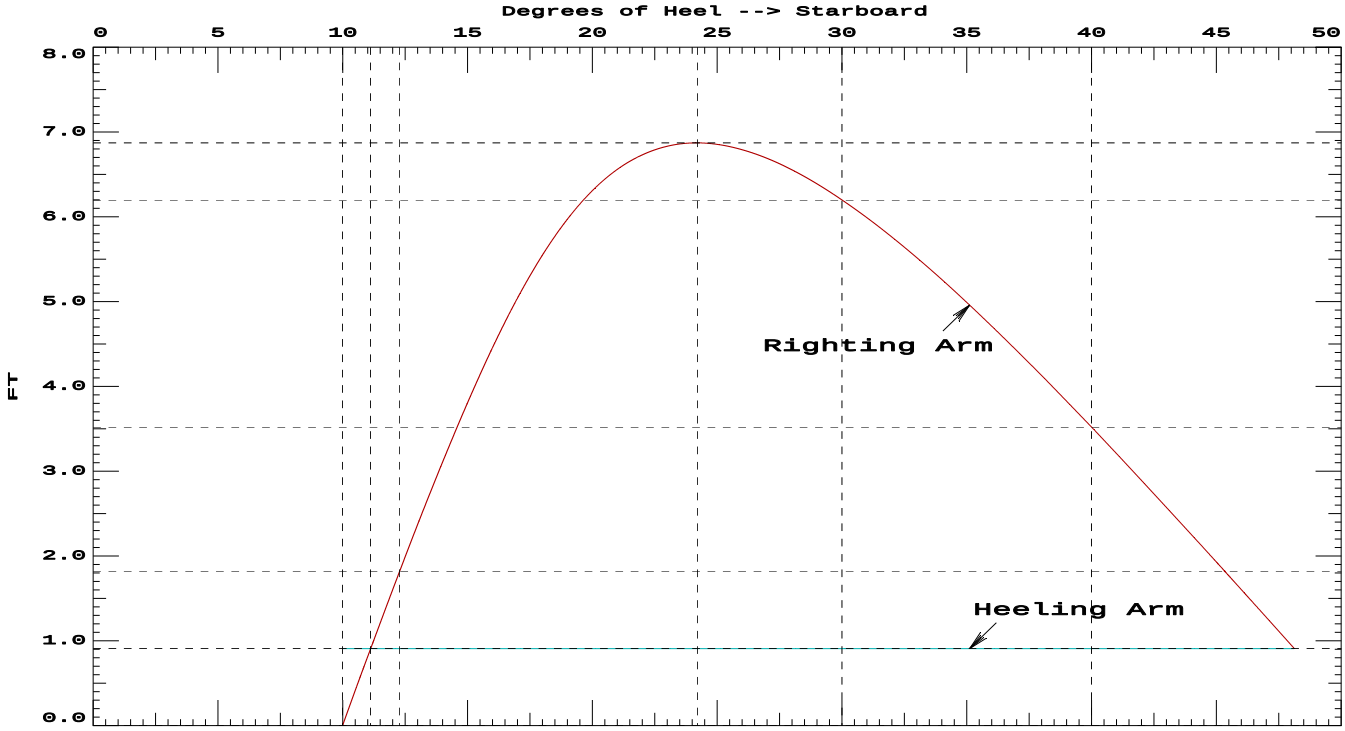
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 685.82

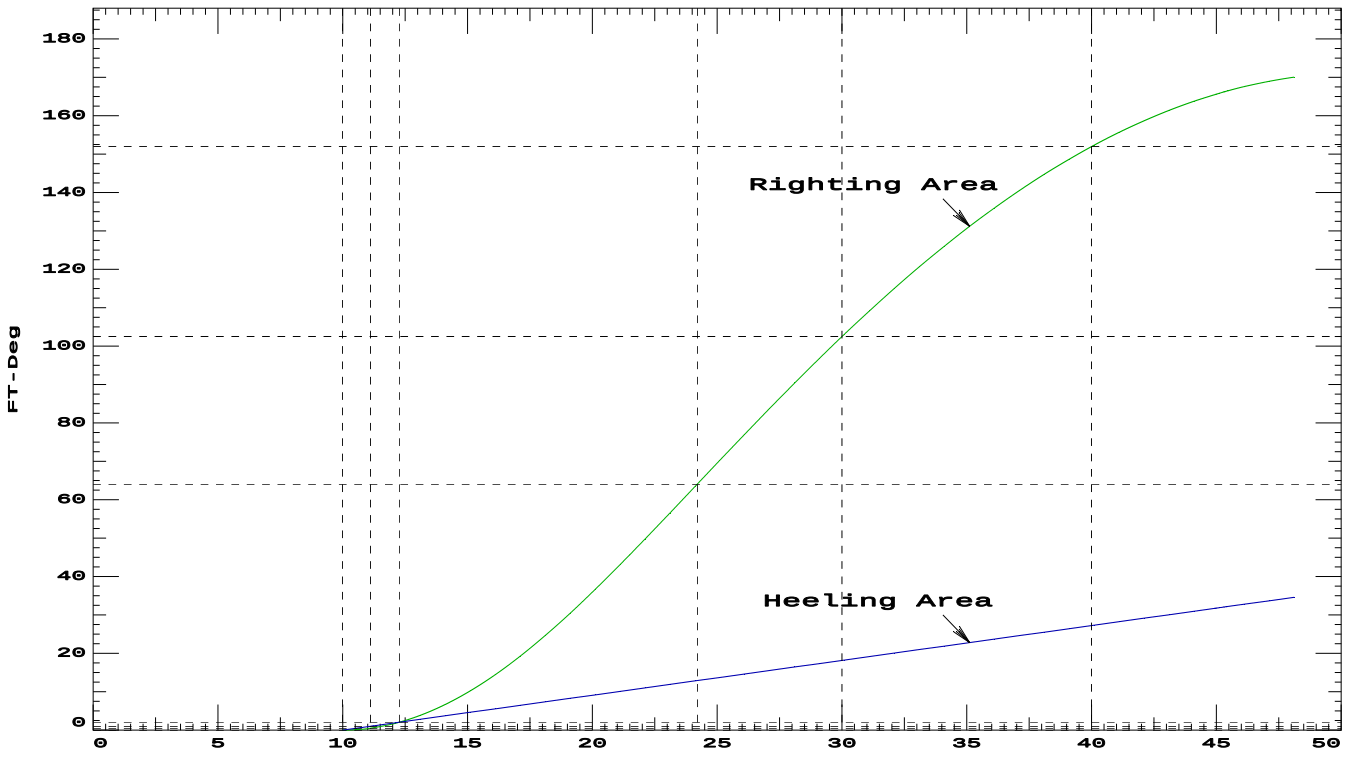
	Critical Points		LCP	TCP	VCP
(6)	ER Air Aft P	FLOOD	35.42f	27.45p	23.45
(10)	MES S	TIGHT	106.30f	29.53s	34.94

LIM	STABILITY CRITERION		Min/Max		Attained
(1)	**Absolute Angle at Equilibrium**	**<**	**15.00**	**deg**	**11.11 P**
(4)	**Area from Equilibrium to 15 deg or Flood**	**>**	**5.26**	**Ft-deg**	**62.96 P**

Relative angles measured from 11.115s

Condition 3 - 18AEQ 4LT Arrival with Ice
Damage Case 16





Condition 4 - 22AEQ 5LT Departure with No Ice
Damage Case 16

WEIGHT STATUS

Trim: Aft 7.79/210.33, Heel: Stbd 9.35 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	500.46	84.77f	0.01p	23.23
Pax @185 lb ea (Stand)	20.65	105.24f	0.00	38.55
Luggage @20 lb ea Pax	2.22	115.73f	5.24p	21.33
Vehicles AEQ @6 kip ea	58.94	112.70f	1.36s	21.33
Vehicles LT @63 kip ea	140.63	76.25f	1.28p	27.46
Bikes @30 lb ea	0.16	209.32f	0.00	19.69
Kayaks @ 75 lb ea	0.20	131.39f	25.83p	21.65
Crew	0.98	115.83f	2.23s	44.16
Food Stuffs	0.58	100.46f	1.05p	38.71
Loose Outfit/Gear	0.40	111.22f	0.00	37.07
Stores	0.67	101.71f	0.00	37.07
Art Allowance	0.54	111.22f	0.00	40.35
Trash	0.45	104.66f	25.13s	28.64
Video Games	0.45	28.46f	5.11p	38.71
Total Fixed	**727.33**	**86.18f**	**0.15p**	**24.41**

	Load	SpGr	Weight(LT)	LCG	TCG	VCG	FSM
FW.P	0.980	1.000	3.36	135.81f	21.22p	10.19	0.2
BW.S	0.200	1.025	2.77	97.74f	21.40s	8.00	6.9
DBF4.P	0.980	0.840	20.42	114.07f	22.40p	3.50	2.8
DBF3.S	0.980	0.840	20.42	114.07f	22.55s	3.50	2.8
LOH2.P	0.980	0.880	0.63	49.21f	17.11p	14.41	0.0
LOH1.S	0.980	0.880	0.63	49.21f	17.13s	14.41	0.0
Total Tanks			**48.23**	**112.96f**	**0.19p**	**4.51**	**88.9***
Total Weight			**775.57**	**87.85f**	**0.15p**	**23.17**	
Free Surface Adjustment						**0.11**	
Adjusted CG				**87.85f**	**0.17p**	**23.28**	

Distances in FEET. Moments in Ft-LT.

Note: FSM values marked with an asterisk (*) are formal values which are not the same as the true values in the present condition.

DISPLACEMENT STATUS

Baseline draft: 14.524 @ Origin

Trim: Aft 7.79/210.33, Heel: Stbd 9.35 deg.

Part		SpGr	Displ(LT)	LCB	TCB	VCB	RefHt
HULL		1.025	1,190.20	75.64f	9.47s	7.77	-14.32
DB5.S	Flooded	1.025	-33.08	96.37f	22.47s	3.55	-14.32
COMP5.S	Flooded	1.025	-64.11	80.50f	22.72s	10.84	-14.32
DB7.S	Flooded	1.025	-27.10	78.74f	22.47s	3.69	-14.32
ER1.S	Flooded	1.025	-290.36	40.93f	22.50s	9.66	-14.32
Total Displacement		**1.025**	**775.56**	**87.25f**	**2.49s**	**7.12**	

Distances in FEET.

Condition 4 - 22AEQ 5LT Departure with No Ice
Damage Case 16

CRITICAL POINT STATUS
Baseline draft: 14.524 @ Origin
Trim: Aft 7.79/210.33, Heel: Stbd 9.35 deg.

	Critical Points		LCP	TCP	VCP	Height
(3)	EN 90 S	FLOOD	213.86f	5.25s	30.90	23.21
(4)	EN 91 S	FLOOD	203.52f	8.13s	38.80	30.15
(5)	ER Air FWD P	FLOOD	43.30f	27.45p	23.45	14.86
(6)	ER Air Aft P	FLOOD	35.42f	27.45p	23.45	14.57
(7)	EN 90 P	FLOOD	213.86f	5.25p	30.90	24.91
(8)	EN 91 P	FLOOD	203.52f	8.13p	38.80	32.79
(9)	Survival Craft S	TIGHT	61.03f	25.67s	44.46	27.61
(10)	MES S	TIGHT	106.30f	29.53s	34.94	19.27

Distances in FEET.

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Angle from Equ0 to Flood or Tflood**	**>**	**0.00**	**deg**	**35.31**	**P**
(2)	**Absolute Angle at Equ0 (no moments)**	**<**	**10.00**	**deg**	**9.35**	**P**
(3)	**Angle from Equ0 to RAzero or Flood**	**>**	**7.00**	**deg**	**46.03**	**P**
(4)	**Flood Height at Point 1 to 8**	**>**	**6.56**	**Ft**	**14.57**	**P**
(5)	**Righting Arm at MaxRA**	**>**	**0.16**	**Ft**	**7.76**	**P**

Condition 4 - 22AEQ 5LT Departure with No Ice
Damage Case 16

RESIDUAL RIGHTING ARMS vs HEEL ANGLE with FLOODING

Total CG: LCG = 87.85f TCG = 0.15p VCG = 23.17
Free Surface Adjustment: 0.11
Adjusted CG: LCG = 87.85f TCG = 0.18p VCG = 23.28

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Flood Pt Area	Height	
14.319	2.12a	9.35s	775.42	0.00	-0.882	0.00	14.57	(6)
14.409	2.18a	9.88s	775.53	0.00	-0.439	-0.35	14.73	(6)
14.500	2.24a	10.40s	775.53	0.00	-0.002	-0.46	14.88	(6)
14.677	2.35a	11.40s	775.41	0.00	0.814	-0.06	15.17	(6)
14.859	2.48a	12.40s	775.37	0.00	1.609	1.16	15.45	(6)
15.050	2.62a	13.40s	775.58	0.00	2.381	3.15	15.71	(6)
15.248	2.76a	14.40s	775.57	0.00	3.124	5.91	15.97	(6)
15.457	2.92a	15.40s	775.57	0.00	3.824	9.38	16.21	(6)
15.678	3.09a	16.40s	775.57	0.00	4.468	13.53	16.43	(6)
15.912	3.27a	17.40s	775.57	0.00	5.047	18.28	16.64	(6)
16.160	3.46a	18.40s	775.57	0.00	5.549	23.58	16.84	(6)
16.419	3.67a	19.40s	775.55	0.00	5.968	29.34	17.02	(6)
16.688	3.89a	20.40s	775.55	0.00	6.301	35.47	17.19	(6)
16.963	4.11a	21.40s	775.55	0.00	6.552	41.91	17.35	(6)
17.240	4.35a	22.40s	775.55	0.00	6.726	48.55	17.49	(6)
17.517	4.59a	23.40s	775.53	0.00	6.833	55.34	17.64	(6)
17.791	4.84a	24.40s	775.53	0.00	6.879	62.19	17.77	(6)
17.894	4.93a	24.78s	775.56	0.00	**6.881**	64.79	17.82	(6)
18.061	5.09a	25.40s	775.57	0.00	6.872	69.07	17.91	(6)
18.324	5.34a	26.40s	775.54	0.00	6.821	75.92	18.04	(6)
18.581	5.59a	27.40s	775.55	0.00	6.732	82.70	18.16	(6)
18.830	5.84a	28.40s	775.55	0.00	6.610	89.37	18.28	(6)
19.071	6.09a	29.40s	775.55	0.00	6.460	95.90	18.40	(6)
19.303	6.34a	30.40s	775.55	0.00	6.287	102.28	18.51	(6)
19.527	6.58a	31.40s	775.55	0.00	6.093	108.47	18.62	(6)
19.742	6.82a	32.40s	775.57	0.00	5.881	114.45	18.73	(6)
19.946	7.06a	33.40s	775.55	0.00	5.655	120.22	18.83	(6)
20.144	7.30a	34.40s	775.57	0.00	5.415	125.76	18.93	(6)
20.332	7.54a	35.40s	775.57	0.00	5.161	131.05	19.03	(6)
20.510	7.77a	36.40s	775.57	0.00	4.899	136.08	19.12	(6)
20.677	7.99a	37.40s	775.58	0.00	4.628	140.84	19.21	(6)
20.837	8.22a	38.40s	775.58	0.00	4.349	145.33	19.29	(6)
20.989	8.44a	39.40s	775.60	0.00	4.064	149.54	19.37	(6)
21.129	8.65a	40.40s	775.55	0.01f	3.775	153.46	19.44	(6)
21.263	8.86a	41.40s	775.56	0.00	3.479	157.08	19.51	(6)
21.387	9.07a	42.40s	775.56	0.00	3.180	160.41	19.58	(6)
21.504	9.28a	43.40s	775.57	0.00	2.876	163.44	19.64	(6)
21.609	9.48a	44.40s	775.57	0.01f	2.571	166.16	19.69	(6)
21.636	9.53a	44.66s	775.56	0.00	2.491	166.82	0.00	(10)
21.710	9.67a	45.40s	775.58	0.00	2.262	168.58	19.74	(6)
21.802	9.87a	46.40s	775.61	0.00	1.951	170.69	19.78	(6)
21.885	10.06a	47.40s	775.60	0.00	1.639	172.48	19.82	(6)
21.960	10.24a	48.40s	775.58	0.00	1.326	173.96	19.86	(6)
22.029	10.42a	49.40s	775.59	0.00	1.012	175.13	19.89	(6)

Condition 4 - 22AEQ 5LT Departure with No Ice
Damage Case 16

22.089	10.60a	50.40s	775.58	0.00	0.696	175.99	19.91 (6)
22.140	10.77a	51.40s	775.57	0.00	0.380	176.53	19.93 (6)
22.183	10.94a	52.40s	775.58	0.00	0.064	176.75	19.94 (6)
22.191	10.97a	52.60s	775.59	0.00	-0.001	176.75	19.94 (6)

Distances in FEET. Specific Gravity = 1.025. Area in Ft-Deg.

Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 88.9 Ft-LT was applied to artificially modify the CG.

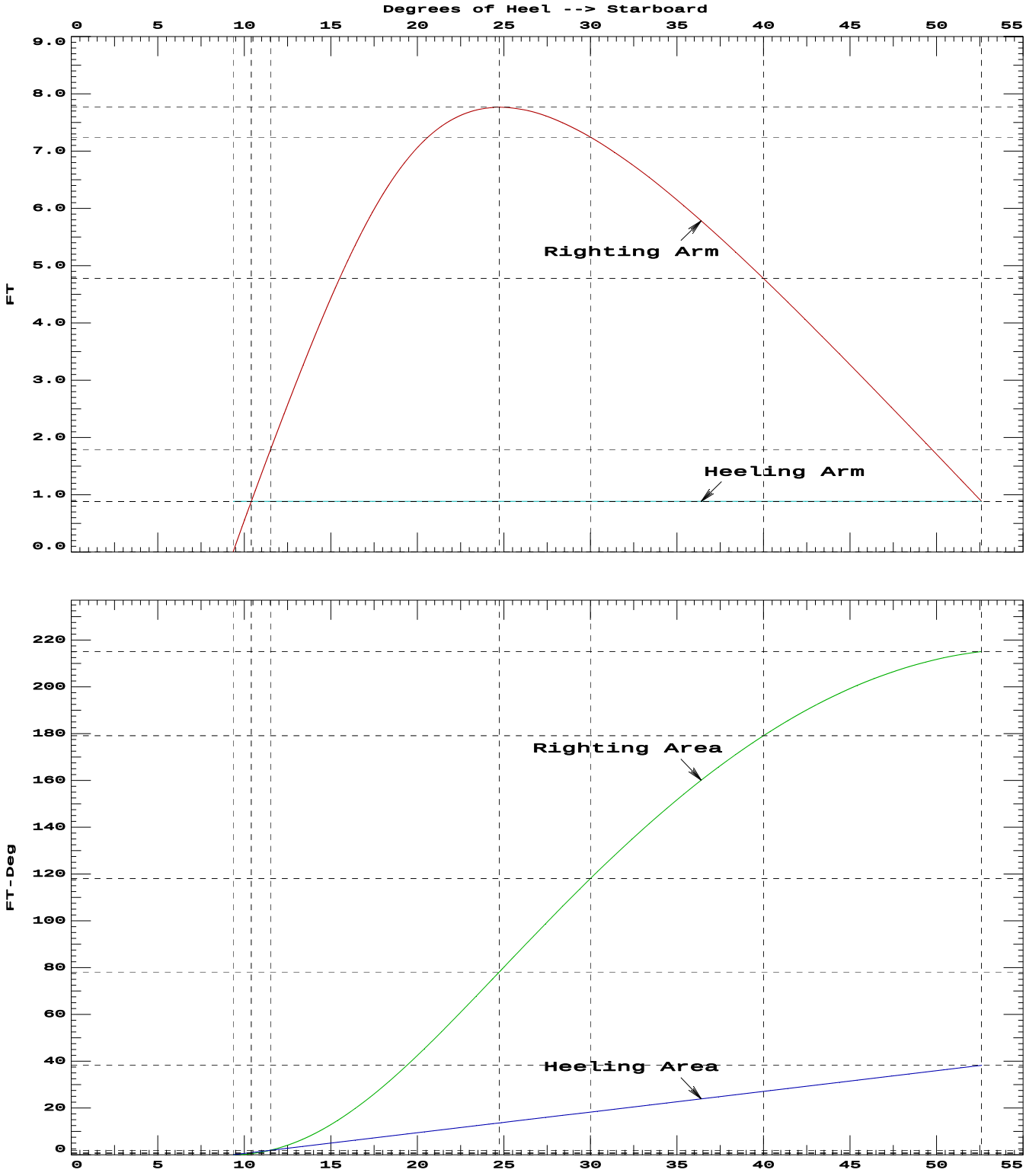
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 685.82

	Critical Points		**LCP**	**TCP**	**VCP**
(6)	ER Air Aft P	FLOOD	35.42f	27.45p	23.45
(10)	MES S	TIGHT	106.30f	29.53s	34.94

LIM	**STABILITY CRITERION**		**Min/Max**		**Attained**
(1)	**Absolute Angle at Equilibrium**	**<**	**15.00**	**deg**	**10.40 P**
(4)	**Area from Equilibrium to 15 deg or Flood**	**>**	**5.26**	**Ft-deg**	**69.53 P**

Relative angles measured from 10.402s

Condition 4 - 22AEQ 5LT Departure with No Ice
Damage Case 16



Condition 5 - 22AEQ 5LT Arrival with No Ice
Damage Case 16

WEIGHT STATUS

Trim: Aft 8.56/210.33, Heel: Stbd 9.91 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	500.46	84.77f	0.01p	23.23
Pax @185 lb ea (Stand)	20.65	105.24f	0.00	38.55
Luggage @20 lb ea Pax	2.22	115.73f	5.24p	21.33
Vehicles AEQ @6 kip ea	58.94	112.70f	1.36s	21.33
Vehicles LT @63 kip ea	140.63	76.25f	1.28p	27.46
Bikes @30 lb ea	0.16	209.32f	0.00	19.69
Kayaks @ 75 lb ea	0.20	131.39f	25.83p	21.65
Crew	0.98	115.83f	2.23s	44.16
Food Stuffs	0.06	100.46f	1.05p	38.71
Loose Outfit/Gear	0.40	111.22f	0.00	37.07
Stores	0.07	101.71f	0.00	37.07
Art Allowance	0.54	111.22f	0.00	40.35
Trash	0.45	104.66f	25.13s	28.64
Video Games	0.45	28.46f	5.11p	38.71
Total Fixed	**726.21**	**86.16f**	**0.15p**	**24.39**

	Load	SpGr	Weight(LT)	LCG	TCG	VCG	FSM
FW.P	0.100	1.000	0.34	135.58f	20.87p	8.23	0.7
BW.S	0.980	1.025	13.55	98.08f	21.01s	10.37	0.9
DBF4.P	0.100	0.840	2.08	113.11f	21.00p	0.92	15.4
DBF3.S	0.100	0.840	2.08	113.11f	23.94s	0.92	15.4
LOH2.P	0.100	0.880	0.06	49.12f	16.95p	12.71	0.1
LOH1.S	0.100	0.880	0.06	49.12f	17.29s	12.71	0.1
Total Tanks			**18.20**	**101.88f**	**15.59s**	**8.18**	**88.9***
Total Weight			**744.40**	**86.55f**	**0.23s**	**23.99**	
Free Surface Adjustment						**0.12**	
Adjusted CG				**86.55f**	**0.21s**	**24.11**	

Distances in FEET. Moments in Ft-LT.

Note: FSM values marked with an asterisk (*) are formal values which are not the same as the true values in the present condition.

DISPLACEMENT STATUS

Baseline draft: 14.603 @ Origin

Trim: Aft 8.56/210.33, Heel: Stbd 9.91 deg.

Part		SpGr	Displ(LT)	LCB	TCB	VCB	RefHt
HULL		1.025	1,161.87	74.34f	10.13s	7.80	-14.37
DB5.S	Flooded	1.025	-33.08	96.37f	22.47s	3.55	-14.37
COMP5.S	Flooded	1.025	-64.08	80.48f	22.75s	10.85	-14.37
DB7.S	Flooded	1.025	-27.10	78.74f	22.47s	3.69	-14.37
ER1.S	Flooded	1.025	-293.20	40.88f	22.49s	9.73	-14.37
Total Displacement		**1.025**	**744.41**	**85.85f**	**3.18s**	**7.11**	

Distances in FEET.

Condition 5 - 22AEQ 5LT Arrival with No Ice
Damage Case 16

CRITICAL POINT STATUS
Baseline draft: 14.603 @ Origin
Trim: Aft 8.56/210.33, Heel: Stbd 9.91 deg.

	Critical Points		LCP	TCP	VCP	Height
(3)	EN 90 S	FLOOD	213.86f	5.25s	30.90	23.83
(4)	EN 91 S	FLOOD	203.52f	8.13s	38.80	30.69
(5)	ER Air FWD P	FLOOD	43.30f	27.45p	23.45	15.19
(6)	ER Air Aft P	FLOOD	35.42f	27.45p	23.45	14.87
(7)	EN 90 P	FLOOD	213.86f	5.25p	30.90	25.64
(8)	EN 91 P	FLOOD	203.52f	8.13p	38.80	33.49
(9)	Survival Craft S	TIGHT	61.03f	25.67s	44.46	27.45
(10)	MES S	TIGHT	106.30f	29.53s	34.94	19.26

Distances in FEET.

LIM	STABILITY CRITERION		Min/Max		Attained
(1)	**Angle from Equ0 to Flood or Tflood**	**>**	**0.00**	**deg**	**LARGE**
(2)	**Absolute Angle at Equ0 (no moments)**	**<**	**10.00**	**deg**	**9.91 P**
(3)	**Angle from Equ0 to RAzero or Flood**	**>**	**7.00**	**deg**	**42.97 P**
(4)	**Flood Height at Point 1 to 8**	**>**	**6.56**	**Ft**	**14.87 P**
(5)	**Righting Arm at MaxRA**	**>**	**0.16**	**Ft**	**7.20 P**

Condition 5 - 22AEQ 5LT Arrival with No Ice
Damage Case 16

RESIDUAL RIGHTING ARMS vs HEEL ANGLE with FLOODING

Total CG: LCG = 86.54f TCG = 0.23s VCG = 23.99
Free Surface Adjustment: 0.12
Adjusted CG: LCG = 86.55f TCG = 0.21s VCG = 24.11

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Flood Pt Area	Height	
14.372	2.33a	9.91s	744.25	0.00	-0.919	0.00	14.87	(6)
14.471	2.39a	10.46s	744.37	0.00	-0.456	-0.38	15.03	(6)
14.569	2.46a	11.02s	744.37	0.00	0.000	-0.51	15.19	(6)
14.751	2.58a	12.02s	744.24	0.00	0.813	-0.10	15.47	(6)
14.939	2.71a	13.02s	744.16	0.00	1.604	1.11	15.74	(6)
15.140	2.86a	14.02s	744.42	0.00	2.363	3.10	15.99	(6)
15.349	3.01a	15.02s	744.41	0.00	3.085	5.82	16.23	(6)
15.568	3.18a	16.02s	744.41	0.00	3.754	9.24	16.46	(6)
15.801	3.36a	17.02s	744.41	0.00	4.357	13.30	16.68	(6)
16.046	3.56a	18.02s	744.41	0.00	4.882	17.92	16.88	(6)
16.303	3.76a	19.02s	744.38	0.00	5.319	23.02	17.07	(6)
16.569	3.99a	20.02s	744.39	0.00	5.668	28.51	17.25	(6)
16.840	4.22a	21.02s	744.39	0.00	5.931	34.31	17.41	(6)
17.114	4.46a	22.02s	744.39	0.00	6.114	40.34	17.57	(6)
17.387	4.70a	23.02s	744.39	0.00	6.227	46.52	17.72	(6)
17.656	4.95a	24.02s	744.37	0.00	6.277	52.77	17.87	(6)
17.768	5.06a	24.43s	744.41	0.00	**6.281**	55.39	17.93	(6)
17.921	5.20a	25.02s	744.41	0.00	6.272	59.05	18.01	(6)
18.178	5.46a	26.02s	744.37	0.00	6.223	65.30	18.15	(6)
18.430	5.71a	27.02s	744.38	0.00	6.133	71.48	18.29	(6)
18.673	5.96a	28.02s	744.38	0.00	6.010	77.55	18.42	(6)
18.908	6.22a	29.02s	744.38	0.00	5.858	83.48	18.55	(6)
19.135	6.47a	30.02s	744.39	0.00	5.682	89.25	18.67	(6)
19.352	6.71a	31.02s	744.39	0.00	5.484	94.84	18.80	(6)
19.560	6.96a	32.02s	744.40	0.00	5.269	100.21	18.91	(6)
19.760	7.20a	33.02s	744.41	0.00	5.037	105.37	19.03	(6)
19.947	7.44a	34.02s	744.36	0.01f	4.794	110.28	19.14	(6)
20.126	7.68a	35.02s	744.39	0.01f	4.536	114.95	19.25	(6)
20.298	7.91a	36.02s	744.41	0.00	4.268	119.35	19.35	(6)
20.459	8.14a	37.02s	744.41	0.00	3.992	123.48	19.45	(6)
20.609	8.36a	38.02s	744.40	0.01f	3.709	127.33	19.55	(6)
20.753	8.58a	39.02s	744.40	0.00	3.419	130.90	19.64	(6)
20.888	8.80a	40.02s	744.43	0.00	3.123	134.17	19.72	(6)
21.012	9.01a	41.02s	744.41	0.00	2.823	137.14	19.80	(6)
21.129	9.22a	42.02s	744.40	0.01f	2.519	139.81	19.88	(6)
21.240	9.43a	43.02s	744.41	0.00	2.210	142.17	19.95	(6)
21.339	9.63a	44.02s	744.39	0.01f	1.900	144.23	20.02	(6)
21.434	9.83a	45.02s	744.42	0.00	1.587	145.97	20.08	(6)
21.511	10.00a	45.91s	744.40	0.00	1.306	147.26	0.00	(10)
21.520	10.02a	46.02s	744.40	0.00	1.272	147.40	20.13	(6)
21.599	10.21a	47.02s	744.44	0.00	0.955	148.52	20.18	(6)
21.669	10.39a	48.02s	744.45	0.00	0.638	149.31	20.22	(6)
21.730	10.58a	49.02s	744.45	0.00	0.319	149.79	20.26	(6)
21.783	10.75a	50.02s	744.46	0.00	0.000	149.95	20.29	(6)

Condition 5 - 22AEQ 5LT Arrival with No Ice
Damage Case 16

Distances in FEET. Specific Gravity = 1.025. Area in Ft-Deg.

Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 88.9 Ft-LT was applied to artificially modify the CG.

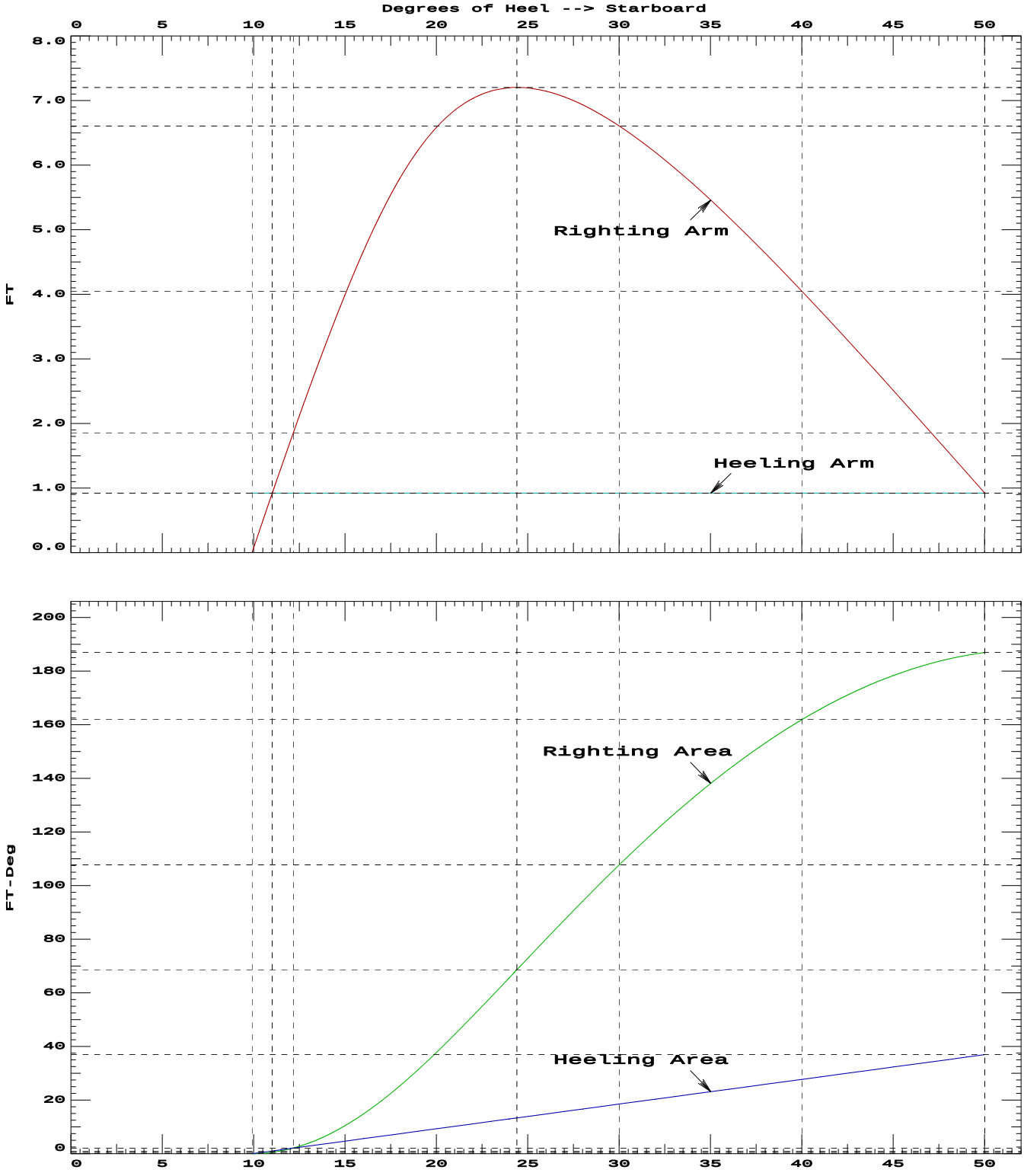
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 685.82

	Critical Points		LCP	TCP	VCP
(6)	ER Air Aft P	FLOOD	35.42f	27.45p	23.45
(10)	MES S	TIGHT	106.30f	29.53s	34.94

LIM	STABILITY CRITERION		Min/Max		Attained
(1)	**Absolute Angle at Equilibrium**	**<**	**15.00**	**deg**	**11.02 P**
(4)	**Area from Equilibrium to 15 deg or Flood**	**>**	**5.26**	**Ft-deg**	**65.80 P**

Relative angles measured from 11.017s

Condition 5 - 22AEQ 5LT Arrival with No Ice
Damage Case 16



Condition 6 - 20AEQ 6RV Fwd Departure with Ice
Damage Case 16

WEIGHT STATUS

Trim: Aft 6.26/210.33, Heel: Stbd 9.31 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	500.46	84.77f	0.01p	23.23
Pax @185 lb ea (Stand)	20.65	105.24f	0.00	38.55
Luggage @20 lb ea Pax	2.22	115.73f	5.24p	21.33
Vehicles AEQ @6 kip ea	53.58	103.08f	0.75p	21.33
Vehicles ST @45 kip ea	40.18	93.21f	6.00s	27.46
Vehicles RV @15 kip ea	40.18	92.52f	0.75p	23.82
Bikes @30 lb ea	0.16	209.32f	0.00	19.69
Kayaks @ 75 lb ea	0.20	131.39f	25.83p	21.65
Crew	0.98	115.83f	2.23s	44.16
Food Stuffs	0.58	100.46f	1.05p	38.71
Loose Outfit/Gear	0.40	111.22f	0.00	37.07
Stores	0.67	101.71f	0.00	37.07
Art Allowance	0.54	111.22f	0.00	40.35
Trash	0.45	104.66f	25.13s	28.64
Video Games	0.45	28.46f	5.11p	38.71
Ice Accretion	50.21	112.83f	0.00	38.16
Total Fixed	**711.91**	**89.86f**	**0.22s**	**24.94**

	Load	SpGr	Weight(LT)	LCG	TCG	VCG	FSM
FW.P	0.980	1.000	3.36	135.81f	21.22p	10.19	0.2
BW.S	0.200	1.025	2.77	97.82f	21.40s	8.00	7.0
DBF4.P	0.980	0.840	20.42	114.08f	22.40p	3.50	2.6
DBF3.S	0.980	0.840	20.42	114.08f	22.55s	3.50	2.6
LOH2.P	0.980	0.880	0.63	49.21f	17.11p	14.41	0.0
LOH1.S	0.980	0.880	0.63	49.21f	17.13s	14.41	0.0
Total Tanks			**48.24**	**112.97f**	**0.18p**	**4.51**	**88.9***

Total Weight	**760.15**	**91.32f**	**0.20s**	**23.64**
Free Surface Adjustment				**0.12**
Adjusted CG		**91.33f**	**0.18s**	**23.76**

Distances in FEET. Moments in Ft-LT.

Note: FSM values marked with an asterisk (*) are formal values which are not the same as the true values in the present condition.

Condition 6 - 20AEQ 6RV Fwd Departure with Ice
Damage Case 16

DISPLACEMENT STATUS
Baseline draft: 13.718 @ Origin
Trim: Aft 6.26/210.33, Heel: Stbd 9.31 deg.

Part		SpGr	Displ(LT)	LCB	TCB	VCB	RefHt
HULL		1.025	1,160.88	78.23f	9.71s	7.58	-13.53
DB5.S	Flooded	1.025	-33.08	96.37f	22.47s	3.55	-13.53
COMP5.S	Flooded	1.025	-62.28	80.52f	22.74s	10.72	-13.53
DB7.S	Flooded	1.025	-27.10	78.74f	22.47s	3.69	-13.53
ER1.S	Flooded	1.025	-278.23	41.10f	22.57s	9.38	-13.53
Total Displacement		**1.025**	**760.18**	**90.82f**	**2.93s**	**6.99**	

Distances in FEET.

CRITICAL POINT STATUS
Baseline draft: 13.718 @ Origin
Trim: Aft 6.26/210.33, Heel: Stbd 9.31 deg.

	Critical Points		LCP	TCP	VCP	Height
(3)	EN 90 S	FLOOD	213.86f	5.25s	30.90	22.46
(4)	EN 91 S	FLOOD	203.52f	8.13s	38.80	29.48
(5)	ER Air FWD P	FLOOD	43.30f	27.45p	23.45	15.33
(6)	ER Air Aft P	FLOOD	35.42f	27.45p	23.45	15.09
(7)	EN 90 P	FLOOD	213.86f	5.25p	30.90	24.16
(8)	EN 91 P	FLOOD	203.52f	8.13p	38.80	32.11
(9)	Survival Craft S	TIGHT	61.03f	25.67s	44.46	27.99
(10)	MES S	TIGHT	106.30f	29.53s	34.94	19.32

Distances in FEET.

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Angle from Equ0 to Flood or Tflood**	**>**	**0.00**	**deg**	**35.59**	**P**
(2)	**Absolute Angle at Equ0 (no moments)**	**<**	**10.00**	**deg**	**9.31**	**P**
(3)	**Angle from Equ0 to RAzero or Flood**	**>**	**7.00**	**deg**	**46.19**	**P**
(4)	**Flood Height at Point 1 to 8**	**>**	**6.56**	**Ft**	**15.09**	**P**
(5)	**Righting Arm at MaxRA**	**>**	**0.16**	**Ft**	**8.32**	**P**

Condition 6 - 20AEQ 6RV Fwd Departure with Ice
Damage Case 16

RESIDUAL RIGHTING ARMS vs HEEL ANGLE with FLOODING

Total CG: LCG = 91.32f TCG = 0.20s VCG = 23.64
Free Surface Adjustment: 0.12
Adjusted CG: LCG = 91.33f TCG = 0.18s VCG = 23.76

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Flood Pt Area	Height	
13.531	1.70a	9.31s	760.00	0.00	-0.900	0.00	15.09	(6)
13.627	1.76a	9.82s	760.11	0.00	-0.446	-0.34	15.24	(6)
13.724	1.82a	10.33s	760.10	0.00	0.000	-0.46	15.38	(6)
13.917	1.95a	11.33s	759.95	0.00	0.855	-0.03	15.66	(6)
14.114	2.08a	12.33s	759.93	0.00	1.687	1.25	15.93	(6)
14.313	2.22a	13.33s	759.89	0.00	2.498	3.34	16.19	(6)
14.515	2.37a	14.33s	759.85	0.00	3.287	6.23	16.44	(6)
14.728	2.52a	15.33s	760.16	0.00	4.031	9.89	16.68	(6)
14.947	2.69a	16.33s	760.15	0.00	4.725	14.27	16.90	(6)
15.177	2.86a	17.33s	760.15	0.00	5.356	19.31	17.12	(6)
15.417	3.05a	18.33s	760.15	0.00	5.912	24.94	17.32	(6)
15.668	3.25a	19.33s	760.13	0.00	6.381	31.09	17.50	(6)
15.928	3.46a	20.33s	760.13	0.00	6.757	37.66	17.68	(6)
16.194	3.68a	21.33s	760.13	0.00	7.042	44.56	17.84	(6)
16.462	3.91a	22.33s	760.13	0.00	7.241	51.71	18.00	(6)
16.728	4.14a	23.33s	760.13	0.00	7.362	59.02	18.15	(6)
16.988	4.38a	24.33s	760.12	0.00	7.416	66.41	18.30	(6)
17.090	4.48a	24.73s	760.15	0.00	**7.419**	69.34	18.36	(6)
17.242	4.62a	25.33s	760.15	0.00	7.409	73.83	18.45	(6)
17.487	4.86a	26.33s	760.13	0.00	7.355	81.21	18.59	(6)
17.722	5.11a	27.33s	760.14	0.00	7.259	88.51	18.73	(6)
17.946	5.34a	28.33s	760.14	0.00	7.127	95.71	18.88	(6)
18.160	5.58a	29.33s	760.14	0.00	6.966	102.75	19.02	(6)
18.363	5.82a	30.33s	760.14	0.00	6.779	109.63	19.15	(6)
18.555	6.05a	31.33s	760.15	0.00	6.570	116.30	19.29	(6)
18.736	6.28a	32.33s	760.14	0.00	6.342	122.76	19.43	(6)
18.905	6.50a	33.33s	760.13	0.01f	6.099	128.98	19.56	(6)
19.068	6.73a	34.33s	760.16	0.00	5.840	134.95	19.69	(6)
19.220	6.94a	35.33s	760.16	0.00	5.570	140.66	19.81	(6)
19.363	7.16a	36.33s	760.16	0.00	5.291	146.09	19.93	(6)
19.498	7.37a	37.33s	760.16	0.00	5.004	151.23	20.05	(6)
19.625	7.58a	38.33s	760.17	0.00	4.709	156.09	20.16	(6)
19.746	7.79a	39.33s	760.21	0.00	4.407	160.65	20.26	(6)
19.860	8.00a	40.33s	760.22	0.00	4.099	164.90	20.36	(6)
19.965	8.20a	41.33s	760.23	0.00	3.788	168.84	20.46	(6)
20.063	8.39a	42.33s	760.23	0.01a	3.471	172.47	20.54	(6)
20.146	8.59a	43.33s	759.99	0.00	3.155	175.79	20.63	(6)
20.233	8.78a	44.33s	760.25	0.01a	2.828	178.78	20.71	(6)
20.271	8.88a	44.90s	760.17	0.00	2.646	180.33	-0.00	(10)
20.302	8.96a	45.33s	760.17	0.00	2.504	181.45	20.78	(6)
20.362	9.14a	46.33s	760.15	0.00	2.176	183.79	20.86	(6)
20.416	9.32a	47.33s	760.17	0.00	1.845	185.80	20.92	(6)
20.460	9.49a	48.33s	760.17	0.00	1.513	187.47	20.98	(6)
20.493	9.66a	49.33s	760.19	0.00	1.178	188.82	21.04	(6)

Condition 6 - 20AEQ 6RV Fwd Departure with Ice
Damage Case 16

20.509	9.82a	50.33s	759.91	0.00	0.845	189.83	21.10 (6)
20.529	9.98a	51.33s	760.18	0.00	0.506	190.51	21.15 (6)
20.522	10.13a	52.33s	759.88	0.00	0.171	190.84	21.20 (6)
20.525	10.20a	52.84s	760.14	0.00	-0.001	190.89	21.22 (6)

Distances in FEET. Specific Gravity = 1.025. Area in Ft-Deg.

Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 88.9 Ft-LT was applied to artificially modify the CG.

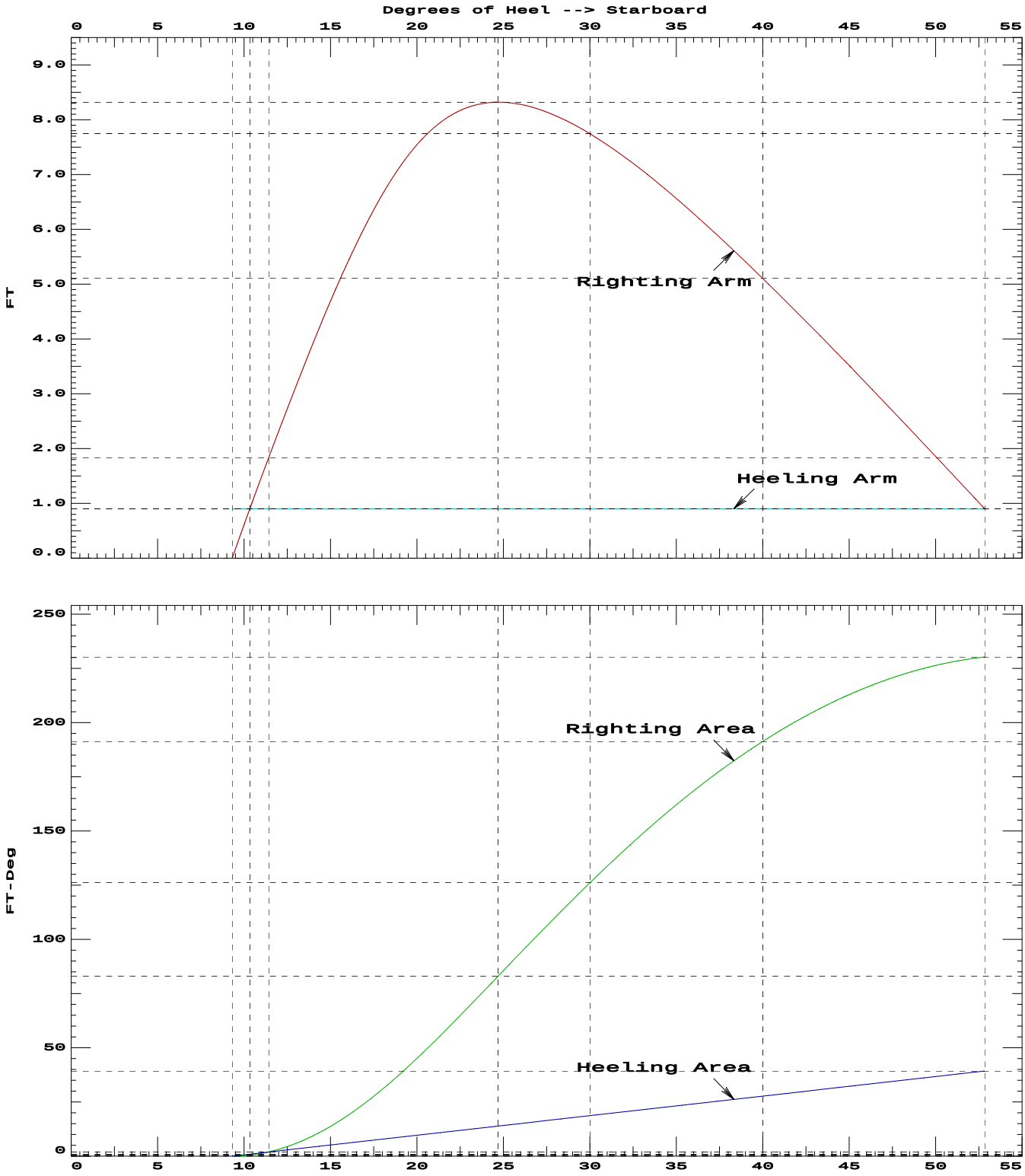
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 685.82

	Critical Points		**LCP**	**TCP**	**VCP**
(6)	ER Air Aft P	FLOOD	35.42f	27.45p	23.45
(10)	MES S	TIGHT	106.30f	29.53s	34.94

LIM	**STABILITY CRITERION**		**Min/Max**		**Attained**
(1)	**Absolute Angle at Equilibrium**	**<**	**15.00**	**deg**	**10.33 P**
(4)	**Area from Equilibrium to 15 deg or Flood**	**>**	**5.26**	**Ft-deg**	**74.28 P**

Relative angles measured from 10.333s

Condition 6 - 20AEQ 6RV Fwd Departure with Ice
Damage Case 16



Condition 7 - 20AEQ 6RV Fwd Arrival with Ice
Damage Case 16

WEIGHT STATUS

Trim: Aft 6.98/210.33, Heel: Stbd 9.85 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	500.46	84.77f	0.01p	23.23
Pax @185 lb ea (Stand)	20.65	105.24f	0.00	38.55
Luggage @20 lb ea Pax	2.22	115.73f	5.24p	21.33
Vehicles AEQ @6 kip ea	53.58	103.08f	0.75p	21.33
Vehicles ST @45 kip ea	40.18	93.21f	6.00s	27.46
Vehicles RV @15 kip ea	40.18	92.52f	0.75p	23.82
Bikes @30 lb ea	0.16	209.32f	0.00	19.69
Kayaks @ 75 lb ea	0.20	131.39f	25.83p	21.65
Crew	0.98	115.83f	2.23s	44.16
Food Stuffs	0.06	100.46f	1.05p	38.71
Loose Outfit/Gear	0.40	111.22f	0.00	37.07
Stores	0.07	101.71f	0.00	37.07
Art Allowance	0.54	111.22f	0.00	40.35
Trash	0.45	104.66f	25.13s	28.64
Video Games	0.45	28.46f	5.11p	38.71
Ice Accretion	50.21	112.83f	0.00	38.16
Total Fixed	**710.79**	**89.84f**	**0.23s**	**24.92**

	Load	SpGr	Weight(LT)	LCG	TCG	VCG	FSM
FW.P	0.100	1.000	0.34	135.63f	20.87p	8.23	0.7
BW.S	0.980	1.025	13.55	98.08f	21.01s	10.37	0.9
DBF4.P	0.100	0.840	2.08	113.32f	21.01p	0.91	15.4
DBF3.S	0.100	0.840	2.08	113.32f	23.94s	0.91	15.4
LOH2.P	0.100	0.880	0.06	49.14f	16.96p	12.71	0.1
LOH1.S	0.100	0.880	0.06	49.14f	17.28s	12.71	0.1
Total Tanks			**18.20**	**101.94f**	**15.59s**	**8.18**	**88.9***
Total Weight			**728.98**	**90.14f**	**0.61s**	**24.50**	
Free Surface Adjustment						**0.12**	
Adjusted CG				**90.14f**	**0.59s**	**24.62**	

Distances in FEET. Moments in Ft-LT.

Note: FSM values marked with an asterisk (*) are formal values which are not the same as the true values in the present condition.

Condition 7 - 20AEQ 6RV Fwd Arrival with Ice
Damage Case 16

DISPLACEMENT STATUS
Baseline draft: 13.780 @ Origin
Trim: Aft 6.98/210.33, Heel: Stbd 9.85 deg.

Part		SpGr	Displ(LT)	LCB	TCB	VCB	RefHt
HULL		1.025	1,132.49	76.95f	10.40s	7.61	-13.57
DB5.S	Flooded	1.025	-33.08	96.37f	22.47s	3.55	-13.57
COMP5.S	Flooded	1.025	-62.21	80.51f	22.76s	10.72	-13.57
DB7.S	Flooded	1.025	-27.10	78.74f	22.47s	3.69	-13.57
ER1.S	Flooded	1.025	-281.11	41.01f	22.57s	9.45	-13.57
Total Displacement		**1.025**	**728.99**	**89.55f**	**3.65s**	**6.96**	

Distances in FEET.

CRITICAL POINT STATUS
Baseline draft: 13.780 @ Origin
Trim: Aft 6.98/210.33, Heel: Stbd 9.85 deg.

	Critical Points		LCP	TCP	VCP	Height
(3)	EN 90 S	FLOOD	213.86f	5.25s	30.90	23.05
(4)	EN 91 S	FLOOD	203.52f	8.13s	38.80	30.00
(5)	ER Air FWD P	FLOOD	43.30f	27.45p	23.45	15.65
(6)	ER Air Aft P	FLOOD	35.42f	27.45p	23.45	15.39
(7)	EN 90 P	FLOOD	213.86f	5.25p	30.90	24.85
(8)	EN 91 P	FLOOD	203.52f	8.13p	38.80	32.78
(9)	Survival Craft S	TIGHT	61.03f	25.67s	44.46	27.85
(10)	MES S	TIGHT	106.30f	29.53s	34.94	19.31

Distances in FEET.

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Angle from Equ0 to Flood or Tflood**	**>**	**0.00**	**deg**	**36.33**	**P**
(2)	**Absolute Angle at Equ0 (no moments)**	**<**	**10.00**	**deg**	**9.85**	**P**
(3)	**Angle from Equ0 to RAzero or Flood**	**>**	**7.00**	**deg**	**43.19**	**P**
(4)	**Flood Height at Point 1 to 8**	**>**	**6.56**	**Ft**	**15.39**	**P**
(5)	**Righting Arm at MaxRA**	**>**	**0.16**	**Ft**	**7.77**	**P**

Condition 7 - 20AEQ 6RV Fwd Arrival with Ice
Damage Case 16

RESIDUAL RIGHTING ARMS vs HEEL ANGLE with FLOODING

Total CG: LCG = 90.14f TCG = 0.61s VCG = 24.50
Free Surface Adjustment: 0.12
Adjusted CG: LCG = 90.14f TCG = 0.59s VCG = 24.62

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Flood Pt Area	Height	
13.568	1.90a	9.85s	728.80	0.00	-0.938	0.00	15.39	(6)
13.673	1.97a	10.39s	728.94	0.00	-0.465	-0.38	15.54	(6)
13.779	2.03a	10.92s	728.94	0.00	0.002	-0.50	15.69	(6)
13.977	2.16a	11.92s	728.81	0.00	0.855	-0.07	15.95	(6)
14.179	2.30a	12.92s	728.76	0.00	1.685	1.20	16.21	(6)
14.383	2.44a	13.92s	728.70	0.00	2.493	3.29	16.47	(6)
14.595	2.60a	14.92s	729.00	0.00	3.266	6.17	16.71	(6)
14.815	2.76a	15.92s	728.99	0.00	3.990	9.80	16.94	(6)
15.043	2.94a	16.92s	728.99	0.00	4.650	14.12	17.16	(6)
15.282	3.13a	17.92s	728.96	0.00	5.234	19.06	17.36	(6)
15.532	3.33a	18.92s	728.96	0.00	5.727	24.54	17.56	(6)
15.790	3.54a	19.92s	728.97	0.00	6.124	30.47	17.74	(6)
16.053	3.76a	20.92s	728.97	0.00	6.424	36.74	17.91	(6)
16.317	4.00a	21.92s	728.97	0.00	6.634	43.28	18.08	(6)
16.578	4.23a	22.92s	728.97	0.00	6.764	49.98	18.24	(6)
16.834	4.48a	23.92s	728.95	0.00	6.822	56.78	18.40	(6)
16.947	4.59a	24.38s	728.98	0.00	**6.827**	59.86	18.47	(6)
17.082	4.72a	24.92s	728.99	0.00	6.819	63.61	18.56	(6)
17.321	4.97a	25.92s	728.96	0.00	6.766	70.40	18.71	(6)
17.549	5.21a	26.92s	728.96	0.00	6.669	77.12	18.87	(6)
17.767	5.45a	27.92s	728.97	0.00	6.536	83.72	19.02	(6)
17.974	5.69a	28.92s	728.98	0.00	6.371	90.17	19.17	(6)
18.169	5.93a	29.92s	728.98	0.00	6.180	96.45	19.32	(6)
18.353	6.16a	30.92s	728.97	0.00	5.967	102.52	19.47	(6)
18.525	6.39a	31.92s	728.98	0.00	5.734	108.37	19.62	(6)
18.687	6.62a	32.92s	728.99	0.00	5.484	113.98	19.77	(6)
18.839	6.84a	33.92s	728.99	0.00	5.220	119.33	19.91	(6)
18.981	7.06a	34.92s	728.99	0.00	4.945	124.42	20.05	(6)
19.116	7.28a	35.92s	728.99	0.00	4.660	129.22	20.18	(6)
19.240	7.49a	36.92s	728.98	0.01f	4.368	133.73	20.31	(6)
19.360	7.70a	37.92s	729.02	0.00	4.066	137.95	20.44	(6)
19.472	7.91a	38.92s	729.04	0.00	3.758	141.86	20.55	(6)
19.576	8.11a	39.92s	729.06	0.00	3.445	145.46	20.67	(6)
19.671	8.31a	40.92s	729.06	0.01a	3.127	148.75	20.77	(6)
19.751	8.51a	41.92s	728.85	0.00	2.808	151.72	20.88	(6)
19.833	8.70a	42.92s	729.06	0.00	2.480	154.36	20.98	(6)
19.897	8.89a	43.92s	728.93	0.00	2.152	156.68	21.08	(6)
19.957	9.07a	44.92s	728.95	0.00	1.820	158.66	21.17	(6)
20.007	9.25a	45.92s	728.99	0.00	1.485	160.32	21.25	(6)
20.021	9.30a	46.18s	729.06	0.01a	1.399	160.68	-0.00	(10)
20.048	9.42a	46.92s	729.04	0.00	1.148	161.63	21.33	(6)
20.068	9.59a	47.92s	728.74	0.00	0.811	162.61	21.42	(6)
20.094	9.76a	48.92s	729.06	0.00	0.468	163.25	21.49	(6)
20.100	9.91a	49.92s	729.03	0.00	0.127	163.55	21.56	(6)

Condition 7 - 20AEQ 6RV Fwd Arrival with Ice
Damage Case 16

20.100	9.97a	50.30s	729.02	0.00	-0.001	163.57	21.59 (6)

Distances in FEET. Specific Gravity = 1.025. Area in Ft-Deg.

Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 88.9 Ft-LT was applied to artificially modify the CG.

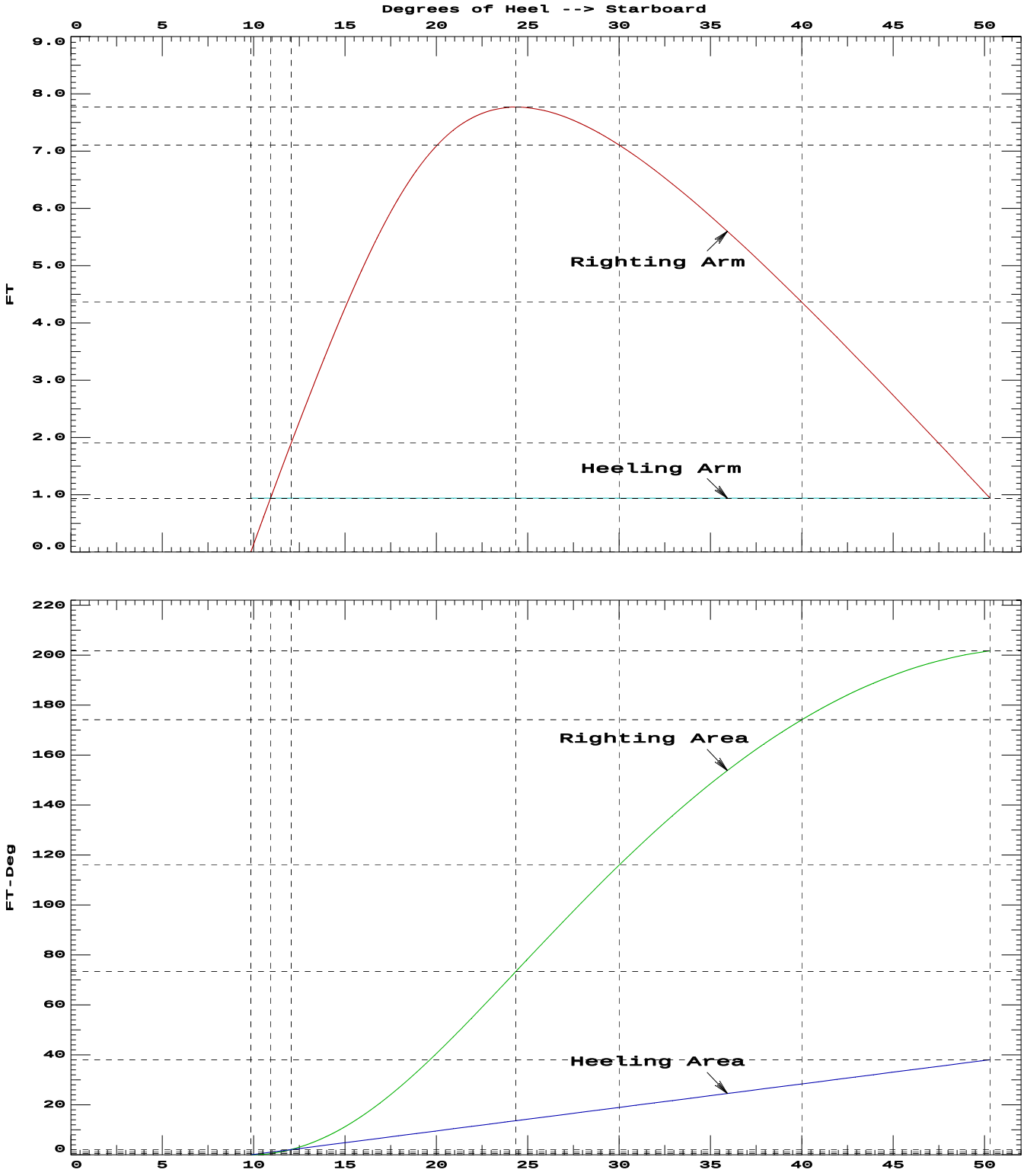
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 685.82

	Critical Points		LCP	TCP	VCP
(6)	ER Air Aft P	FLOOD	35.42f	27.45p	23.45
(10)	MES S	TIGHT	106.30f	29.53s	34.94

LIM	STABILITY CRITERION		Min/Max		Attained
(1)	**Absolute Angle at Equilibrium**	**<**	**15.00**	**deg**	**10.92 P**
(4)	**Area from Equilibrium to 15 deg or Flood**	**>**	**5.26**	**Ft-deg**	**70.90 P**

Relative angles measured from 10.924s

Condition 7 - 20AEQ 6RV Fwd Arrival with Ice
Damage Case 16



Condition 8 - 30AEQ 2ST Aft Departure with Ice
Damage Case 16

WEIGHT STATUS

Trim: Aft 6.55/210.33, Heel: Stbd 8.91 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	500.46	84.77f	0.01p	23.23
Pax @185 lb ea (Stand)	20.65	105.24f	0.00	38.55
Luggage @20 lb ea Pax	2.22	115.73f	5.24p	21.33
Vehicles AEQ @6 kip ea	80.37	98.46f	1.64s	21.33
Vehicles ST @45 kip ea	40.18	75.92f	6.40p	27.46
Bikes @30 lb ea	0.16	209.32f	0.00	19.69
Kayaks @ 75 lb ea	0.20	131.39f	25.83p	21.65
Crew	0.98	115.83f	2.23s	44.16
Food Stuffs	0.58	100.46f	1.05p	38.71
Loose Outfit/Gear	0.40	111.22f	0.00	37.07
Stores	0.67	101.71f	0.00	37.07
Art Allowance	0.54	111.22f	0.00	40.35
Trash	0.45	104.66f	25.13s	28.64
Video Games	0.45	28.46f	5.11p	38.71
Ice Accretion	50.21	112.83f	0.00	38.16
Total Fixed	**698.53**	**88.68f**	**0.20p**	**24.86**

	Load	SpGr	Weight(LT)	LCG	TCG	VCG	FSM
FW.P	0.980	1.000	3.36	135.81f	21.22p	10.19	0.2
BW.S	0.200	1.025	2.77	97.80f	21.38s	8.00	7.0
DBF4.P	0.980	0.840	20.42	114.08f	22.40p	3.50	2.9
DBF3.S	0.980	0.840	20.42	114.08f	22.55s	3.50	2.9
LOH2.P	0.980	0.880	0.63	49.21f	17.11p	14.41	0.0
LOH1.S	0.980	0.880	0.63	49.21f	17.13s	14.41	0.0
Total Tanks			**48.24**	**112.96f**	**0.19p**	**4.51**	**88.9***
Total Weight			**746.76**	**90.25f**	**0.19p**	**23.55**	
Free Surface Adjustment						**0.12**	
Adjusted CG				**90.26f**	**0.21p**	**23.67**	

Distances in FEET. Moments in Ft-LT.

Note: FSM values marked with an asterisk (*) are formal values which are not the same as the true values in the present condition.

DISPLACEMENT STATUS

Baseline draft: 13.706 @ Origin

Trim: Aft 6.55/210.33, Heel: Stbd 8.91 deg.

Part		SpGr	Displ(LT)	LCB	TCB	VCB	RefHt
HULL		1.025	1,140.04	77.52f	9.38s	7.46	-13.53
DB5.S	Flooded	1.025	-33.08	96.37f	22.47s	3.55	-13.53
COMP5.S	Flooded	1.025	-60.07	80.51f	22.75s	10.57	-13.53
DB7.S	Flooded	1.025	-27.10	78.74f	22.47s	3.69	-13.53
ER1.S	Flooded	1.025	-273.05	41.07f	22.58s	9.25	-13.53
Total Displacement		**1.025**	**746.73**	**89.73f**	**2.42s**	**6.86**	

Distances in FEET.

Condition 8 - 30AEQ 2ST Aft Departure with Ice
Damage Case 16

CRITICAL POINT STATUS
Baseline draft: 13.706 @ Origin
Trim: Aft 6.55/210.33, Heel: Stbd 8.91 deg.

	Critical Points		LCP	TCP	VCP	Height
(3)	EN 90 S	FLOOD	213.86f	5.25s	30.90	22.82
(4)	EN 91 S	FLOOD	203.52f	8.13s	38.80	29.85
(5)	ER Air FWD P	FLOOD	43.30f	27.45p	23.45	15.22
(6)	ER Air Aft P	FLOOD	35.42f	27.45p	23.45	14.97
(7)	EN 90 P	FLOOD	213.86f	5.25p	30.90	24.44
(8)	EN 91 P	FLOOD	203.52f	8.13p	38.80	32.37
(9)	Survival Craft S	TIGHT	61.03f	25.67s	44.46	28.29
(10)	MES S	TIGHT	106.30f	29.53s	34.94	19.70

Distances in FEET.

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Angle from Equ0 to Flood or Tflood**	**>**	**0.00**	**deg**	**36.58**	**P**
(2)	**Absolute Angle at Equ0 (no moments)**	**<**	**10.00**	**deg**	**8.91**	**P**
(3)	**Angle from Equ0 to RAzero or Flood**	**>**	**7.00**	**deg**	**47.31**	**P**
(4)	**Flood Height at Point 1 to 8**	**>**	**6.56**	**Ft**	**14.97**	**P**
(5)	**Righting Arm at MaxRA**	**>**	**0.16**	**Ft**	**8.65**	**P**

Condition 8 - 30AEQ 2ST Aft Departure with Ice
Damage Case 16

RESIDUAL RIGHTING ARMS vs HEEL ANGLE with FLOODING

Total CG: LCG = 90.25f TCG = 0.19p VCG = 23.55
Free Surface Adjustment: 0.12
Adjusted CG: LCG = 90.26f TCG = 0.22p VCG = 23.67

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Flood Pt Area	Height	
13.535	1.78a	8.91s	746.63	0.00	-0.916	0.00	14.97	(6)
13.630	1.84a	9.42s	746.73	0.00	-0.453	-0.35	15.12	(6)
13.725	1.90a	9.93s	746.73	0.00	0.002	-0.47	15.27	(6)
13.915	2.02a	10.93s	746.60	0.00	0.872	-0.03	15.55	(6)
14.109	2.15a	11.93s	746.57	0.00	1.719	1.27	15.82	(6)
14.307	2.28a	12.93s	746.53	0.00	2.544	3.40	16.08	(6)
14.508	2.43a	13.93s	746.48	0.00	3.349	6.35	16.34	(6)
14.718	2.58a	14.93s	746.77	0.00	4.116	10.08	16.58	(6)
14.935	2.74a	15.93s	746.77	0.00	4.836	14.56	16.81	(6)
15.162	2.92a	16.93s	746.77	0.00	5.494	19.72	17.03	(6)
15.400	3.10a	17.93s	746.76	0.00	6.078	25.51	17.23	(6)
15.648	3.30a	18.93s	746.74	0.00	6.575	31.84	17.43	(6)
15.907	3.51a	19.93s	746.74	0.00	6.979	38.61	17.61	(6)
16.172	3.73a	20.93s	746.75	0.00	7.290	45.75	17.78	(6)
16.439	3.96a	21.93s	746.75	0.00	7.512	53.16	17.94	(6)
16.705	4.20a	22.93s	746.75	0.00	7.654	60.75	18.09	(6)
16.966	4.44a	23.93s	746.73	0.00	7.725	68.44	18.25	(6)
17.158	4.62a	24.68s	746.76	0.00	**7.738**	74.24	18.36	(6)
17.221	4.68a	24.93s	746.73	0.00	7.736	76.17	18.40	(6)
17.467	4.93a	25.93s	746.74	0.00	7.695	83.89	18.55	(6)
17.704	5.17a	26.93s	746.75	0.00	7.610	91.54	18.69	(6)
17.931	5.41a	27.93s	746.75	0.00	7.488	99.09	18.84	(6)
18.148	5.65a	28.93s	746.75	0.00	7.335	106.50	18.98	(6)
18.354	5.89a	29.93s	746.76	0.00	7.155	113.75	19.12	(6)
18.549	6.13a	30.93s	746.76	0.00	6.951	120.80	19.26	(6)
18.734	6.36a	31.93s	746.76	0.00	6.728	127.64	19.40	(6)
18.908	6.59a	32.93s	746.77	0.00	6.488	134.25	19.53	(6)
19.072	6.81a	33.93s	746.77	0.00	6.233	140.61	19.67	(6)
19.226	7.04a	34.93s	746.77	0.00	5.966	146.71	19.79	(6)
19.371	7.26a	35.93s	746.77	0.00	5.688	152.54	19.92	(6)
19.509	7.47a	36.93s	746.77	0.00	5.401	158.08	20.04	(6)
19.636	7.68a	37.93s	746.76	0.01f	5.108	163.34	20.15	(6)
19.759	7.89a	38.93s	746.78	0.00	4.806	168.29	20.26	(6)
19.874	8.10a	39.93s	746.80	0.00	4.498	172.95	20.36	(6)
19.983	8.31a	40.93s	746.83	0.00	4.185	177.29	20.46	(6)
20.084	8.51a	41.93s	746.85	0.01a	3.867	181.31	20.55	(6)
20.169	8.70a	42.93s	746.61	0.00	3.550	185.02	20.64	(6)
20.252	8.90a	43.93s	746.60	0.00	3.226	188.41	20.73	(6)
20.327	9.08a	44.93s	746.63	0.00	2.898	191.47	20.80	(6)
20.367	9.19a	45.49s	746.77	0.00	2.715	193.02	-0.00	(10)
20.395	9.27a	45.93s	746.78	0.00	2.567	194.21	20.87	(6)
20.452	9.45a	46.93s	746.80	0.00	2.234	196.61	20.94	(6)
20.498	9.62a	47.93s	746.75	0.00	1.900	198.67	21.00	(6)
20.536	9.79a	48.93s	746.77	0.00	1.563	200.40	21.06	(6)

Condition 8 - 30AEQ 2ST Aft Departure with Ice
Damage Case 16

20.566	9.96a	49.93s	746.85	0.01a	1.224	201.80	21.12 (6)
20.572	10.12a	50.93s	746.50	0.01a	0.888	202.85	21.18 (6)
20.588	10.27a	51.93s	746.85	0.01a	0.545	203.57	21.22 (6)
20.574	10.42a	52.93s	746.53	0.01a	0.207	203.95	21.28 (6)
20.571	10.51a	53.54s	746.76	0.00	-0.001	204.01	21.30 (6)

Distances in FEET. Specific Gravity = 1.025. Area in Ft-Deg.

Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 88.9 Ft-LT was applied to artificially modify the CG.

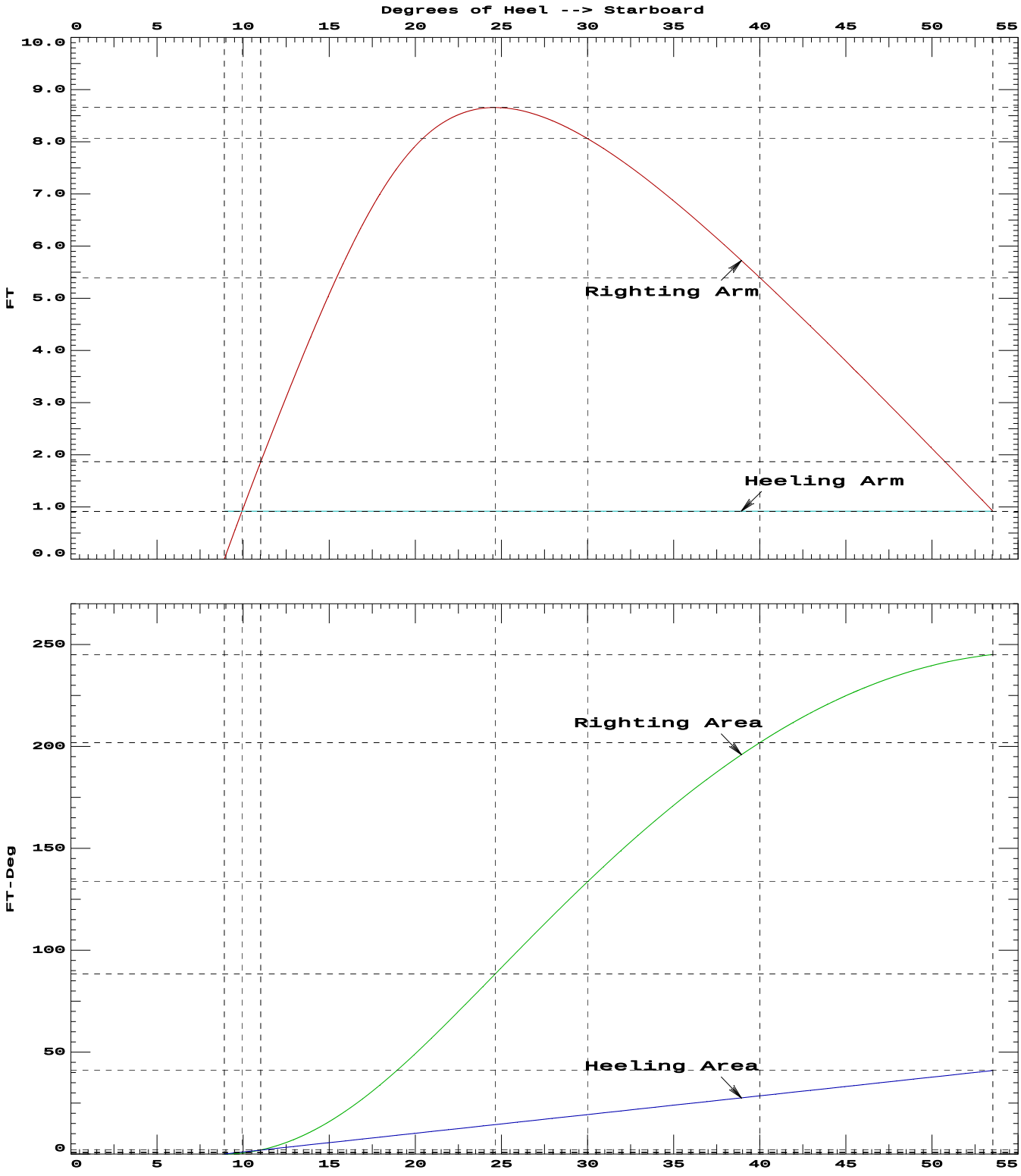
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 685.82

	Critical Points		LCP	TCP	VCP
(6)	ER Air Aft P	FLOOD	35.42f	27.45p	23.45
(10)	MES S	TIGHT	106.30f	29.53s	34.94

LIM	STABILITY CRITERION		Min/Max		Attained
(1)	**Absolute Angle at Equilibrium**	**<**	**15.00**	**deg**	**9.93 P**
(4)	**Area from Equilibrium to 15 deg or Flood**	**>**	**5.26**	**Ft-deg**	**76.64 P**

Relative angles measured from 9.933s

Condition 8 - 30AEQ 2ST Aft Departure with Ice
Damage Case 16



Condition 9 - 30AEQ 2ST Aft Arrival with Ice
Damage Case 16

WEIGHT STATUS

Trim: Aft 7.28/210.33, Heel: Stbd 9.43 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	500.46	84.77f	0.01p	23.23
Pax @185 lb ea (Stand)	20.65	105.24f	0.00	38.55
Luggage @20 lb ea Pax	2.22	115.73f	5.24p	21.33
Vehicles AEQ @6 kip ea	80.37	98.46f	1.64s	21.33
Vehicles ST @45 kip ea	40.18	75.92f	6.40p	27.46
Bikes @30 lb ea	0.16	209.32f	0.00	19.69
Kayaks @ 75 lb ea	0.20	131.39f	25.83p	21.65
Crew	0.98	115.83f	2.23s	44.16
Food Stuffs	0.06	100.46f	1.05p	38.71
Loose Outfit/Gear	0.40	111.22f	0.00	37.07
Stores	0.07	101.71f	0.00	37.07
Art Allowance	0.54	111.22f	0.00	40.35
Trash	0.45	104.66f	25.13s	28.64
Video Games	0.45	28.46f	5.11p	38.71
Ice Accretion	50.21	112.83f	0.00	38.16
Total Fixed	**697.40**	**88.66f**	**0.20p**	**24.84**

	Load	SpGr	Weight(LT)	LCG	TCG	VCG	FSM
FW.P	0.100	1.000	0.34	135.62f	20.89p	8.22	0.7
BW.S	0.980	1.025	13.55	98.08f	21.01s	10.37	0.9
DBF4.P	0.100	0.840	2.08	113.28f	21.06p	0.90	15.7
DBF3.S	0.100	0.840	2.08	113.28f	23.88s	0.90	15.7
LOH2.P	0.100	0.880	0.06	49.14f	16.96p	12.71	0.1
LOH1.S	0.100	0.880	0.06	49.14f	17.28s	12.71	0.1
Total Tanks			**18.20**	**101.93f**	**15.58s**	**8.17**	**88.9***
Total Weight			**715.60**	**89.00f**	**0.21s**	**24.42**	
Free Surface Adjustment						**0.12**	
Adjusted CG				**89.01f**	**0.19s**	**24.54**	

Distances in FEET. Moments in Ft-LT.

Note: FSM values marked with an asterisk (*) are formal values which are not the same as the true values in the present condition.

DISPLACEMENT STATUS

Baseline draft: 13.769 @ Origin

Trim: Aft 7.28/210.33, Heel: Stbd 9.43 deg.

Part		SpGr	Displ(LT)	LCB	TCB	VCB	RefHt
HULL		1.025	1,111.51	76.20f	10.06s	7.48	-13.57
DB5.S	Flooded	1.025	-33.08	96.37f	22.47s	3.55	-13.57
COMP5.S	Flooded	1.025	-59.93	80.50f	22.77s	10.56	-13.57
DB7.S	Flooded	1.025	-27.10	78.74f	22.47s	3.69	-13.57
ER1.S	Flooded	1.025	-275.80	40.98f	22.58s	9.32	-13.57
Total Displacement		**1.025**	**715.60**	**88.38f**	**3.13s**	**6.83**	

Distances in FEET.

Condition 9 - 30AEQ 2ST Aft Arrival with Ice
Damage Case 16

CRITICAL POINT STATUS
Baseline draft: 13.769 @ Origin
Trim: Aft 7.28/210.33, Heel: Stbd 9.43 deg.

	Critical Points		LCP	TCP	VCP	Height
(3)	EN 90 S	FLOOD	213.86f	5.25s	30.90	23.43
(4)	EN 91 S	FLOOD	203.52f	8.13s	38.80	30.39
(5)	ER Air FWD P	FLOOD	43.30f	27.45p	23.45	15.54
(6)	ER Air Aft P	FLOOD	35.42f	27.45p	23.45	15.27
(7)	EN 90 P	FLOOD	213.86f	5.25p	30.90	25.15
(8)	EN 91 P	FLOOD	203.52f	8.13p	38.80	33.05
(9)	Survival Craft S	TIGHT	61.03f	25.67s	44.46	28.17
(10)	MES S	TIGHT	106.30f	29.53s	34.94	19.71

Distances in FEET.

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Angle from Equ0 to Flood or Tflood**	**>**	**0.00**	**deg**	**37.36**	**P**
(2)	**Absolute Angle at Equ0 (no moments)**	**<**	**10.00**	**deg**	**9.43**	**P**
(3)	**Angle from Equ0 to RAzero or Flood**	**>**	**7.00**	**deg**	**44.32**	**P**
(4)	**Flood Height at Point 1 to 8**	**>**	**6.56**	**Ft**	**15.27**	**P**
(5)	**Righting Arm at MaxRA**	**>**	**0.16**	**Ft**	**8.09**	**P**

Condition 9 - 30AEQ 2ST Aft Arrival with Ice
Damage Case 16

RESIDUAL RIGHTING ARMS vs HEEL ANGLE with FLOODING

Total CG: LCG = 89.00f TCG = 0.21s VCG = 24.42
Free Surface Adjustment: 0.12
Adjusted CG: LCG = 89.01f TCG = 0.18s VCG = 24.54

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Flood Pt Area	Height	
13.572	1.98a	9.43s	715.44	0.00	-0.956	0.00	15.27	(6)
13.676	2.04a	9.97s	715.56	0.00	-0.474	-0.38	15.42	(6)
13.779	2.11a	10.50s	715.56	0.00	0.000	-0.51	15.57	(6)
13.975	2.23a	11.50s	715.45	0.00	0.868	-0.07	15.84	(6)
14.174	2.37a	12.50s	715.40	0.00	1.714	1.22	16.10	(6)
14.377	2.51a	13.50s	715.35	0.00	2.536	3.34	16.36	(6)
14.587	2.66a	14.50s	715.62	0.00	3.326	6.27	16.60	(6)
14.804	2.82a	15.50s	715.61	0.00	4.074	9.97	16.84	(6)
15.031	2.99a	16.50s	715.61	0.00	4.761	14.39	17.06	(6)
15.267	3.18a	17.50s	715.60	0.00	5.372	19.46	17.27	(6)
15.515	3.38a	18.50s	715.58	0.00	5.895	25.09	17.47	(6)
15.771	3.59a	19.50s	715.58	0.00	6.321	31.20	17.66	(6)
16.032	3.82a	20.50s	715.58	0.00	6.649	37.69	17.84	(6)
16.296	4.05a	21.50s	715.58	0.00	6.885	44.46	18.01	(6)
16.558	4.29a	22.50s	715.58	0.00	7.038	51.43	18.17	(6)
16.814	4.53a	23.50s	715.56	0.00	7.117	58.51	18.34	(6)
17.002	4.72a	24.25s	715.60	0.00	**7.133**	63.86	18.46	(6)
17.064	4.78a	24.50s	715.57	0.00	7.132	65.64	18.50	(6)
17.305	5.03a	25.50s	715.57	0.00	7.093	72.75	18.66	(6)
17.537	5.28a	26.50s	715.58	0.00	7.009	79.80	18.81	(6)
17.757	5.52a	27.50s	715.58	0.00	6.887	86.75	18.97	(6)
17.968	5.76a	28.50s	715.59	0.00	6.732	93.56	19.13	(6)
18.167	6.00a	29.50s	715.59	0.00	6.549	100.20	19.28	(6)
18.354	6.24a	30.50s	715.59	0.00	6.342	106.65	19.43	(6)
18.531	6.47a	31.50s	715.59	0.00	6.114	112.87	19.58	(6)
18.696	6.70a	32.50s	715.61	0.00	5.869	118.87	19.73	(6)
18.851	6.93a	33.50s	715.61	0.00	5.609	124.61	19.88	(6)
18.997	7.15a	34.50s	715.61	0.00	5.336	130.08	20.02	(6)
19.134	7.37a	35.50s	715.61	0.00	5.053	135.28	20.15	(6)
19.262	7.59a	36.50s	715.61	0.00	4.761	140.18	20.29	(6)
19.382	7.80a	37.50s	715.60	0.00	4.462	144.79	20.42	(6)
19.497	8.02a	38.50s	715.63	0.00	4.154	149.10	20.54	(6)
19.604	8.22a	39.50s	715.66	0.00	3.840	153.10	20.65	(6)
19.702	8.43a	40.50s	715.66	0.00	3.523	156.78	20.76	(6)
19.792	8.63a	41.50s	715.67	0.01a	3.200	160.14	20.87	(6)
19.867	8.82a	42.50s	715.47	0.00	2.876	163.18	20.98	(6)
19.945	9.01a	43.50s	715.69	0.01a	2.544	165.89	21.07	(6)
20.003	9.20a	44.50s	715.54	0.00	2.212	168.27	21.16	(6)
20.057	9.38a	45.50s	715.55	0.00	1.876	170.31	21.25	(6)
20.105	9.56a	46.50s	715.69	0.01a	1.536	172.02	21.33	(6)
20.114	9.61a	46.79s	715.66	0.00	1.441	172.44	-0.00	(10)
20.135	9.73a	47.50s	715.63	0.00	1.197	173.39	21.41	(6)
20.150	9.90a	48.50s	715.33	0.01a	0.857	174.41	21.50	(6)
20.169	10.06a	49.50s	715.65	0.00	0.511	175.10	21.57	(6)

Condition 9 - 30AEQ 2ST Aft Arrival with Ice
Damage Case 16

20.162	10.22a	50.50s	715.34	0.01a	0.168	175.44	21.64 (6)
20.167	10.29a	50.99s	715.62	0.00	-0.001	175.48	21.67 (6)

Distances in FEET. Specific Gravity = 1.025. Area in Ft-Deg.

Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 88.9 Ft-LT was applied to artificially modify the CG.

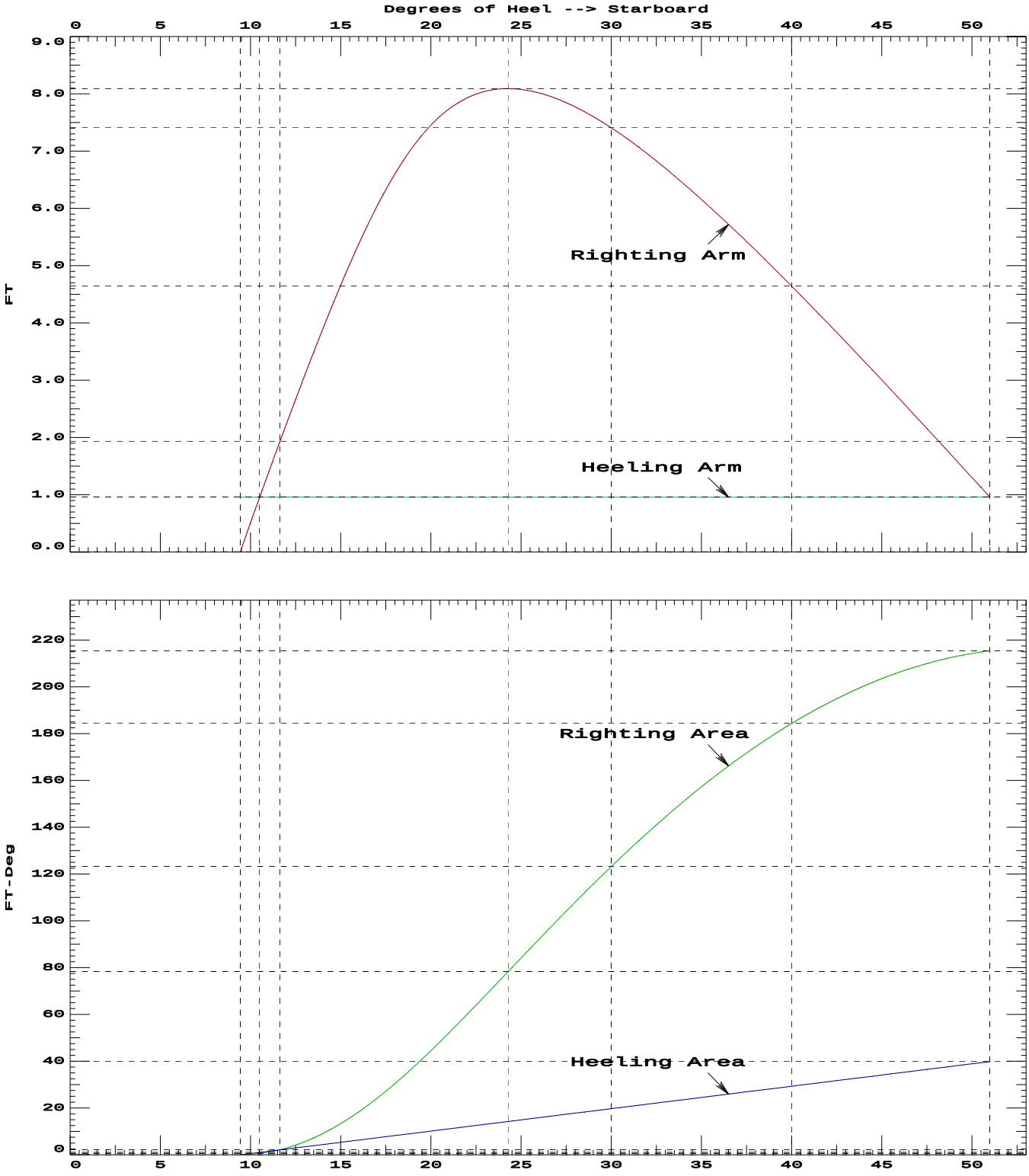
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 685.82

	Critical Points		LCP	TCP	VCP
(6)	ER Air Aft P	FLOOD	35.42f	27.45p	23.45
(10)	MES S	TIGHT	106.30f	29.53s	34.94

LIM	STABILITY CRITERION		Min/Max		Attained
(1)	**Absolute Angle at Equilibrium**	**<**	**15.00**	**deg**	**10.50 P**
(4)	**Area from Equilibrium to 15 deg or Flood**	**>**	**5.26**	**Ft-deg**	**73.26 P**

Relative angles measured from 10.504s

Condition 9 - 30AEQ 2ST Aft Arrival with Ice
Damage Case 16



Condition 10 - 20AEQ 2ST 6RV Fwd Departure with no Ice
Damage Case 16

WEIGHT STATUS

Trim: Aft 6.71/210.33, Heel: Stbd 8.98 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	500.46	84.77f	0.01p	23.23
Pax @185 lb ea (Stand)	20.65	105.24f	0.00	38.55
Luggage @20 lb ea Pax	2.22	115.73f	5.24p	21.33
Vehicles AEQ @6 kip ea	53.58	103.08f	0.75p	21.33
Vehicles ST @45 kip ea	40.18	93.21f	6.00s	27.46
Vehicles RV @15 kip ea	40.18	92.52f	0.75p	23.82
Bikes @30 lb ea	0.16	209.32f	0.00	19.69
Kayaks @ 75 lb ea	0.20	131.39f	25.83p	21.65
Crew	0.98	115.83f	2.23s	44.16
Food Stuffs	0.58	100.46f	1.05p	38.71
Loose Outfit/Gear	0.40	111.22f	0.00	37.07
Stores	0.67	101.71f	0.00	37.07
Art Allowance	0.54	111.22f	0.00	40.35
Trash	0.45	104.66f	25.13s	28.64
Video Games	0.45	28.46f	5.11p	38.71
Total Fixed	**661.70**	**88.11f**	**0.24s**	**23.93**

	Load	SpGr	Weight(LT)	LCG	TCG	VCG	FSM
FW.P	0.980	1.000	3.36	135.81f	21.22p	10.19	0.2
BW.S	0.200	1.025	2.77	97.80f	21.39s	8.00	7.0
DBF4.P	0.980	0.840	20.42	114.08f	22.40p	3.50	2.9
DBF3.S	0.980	0.840	20.42	114.08f	22.55s	3.50	2.9
LOH2.P	0.980	0.880	0.63	49.21f	17.11p	14.41	0.0
LOH1.S	0.980	0.880	0.63	49.21f	17.13s	14.41	0.0
Total Tanks			**48.24**	**112.96f**	**0.19p**	**4.51**	**88.9***
Total Weight			**709.94**	**89.80f**	**0.21s**	**22.61**	
Free Surface Adjustment						**0.13**	
Adjusted CG				**89.81f**	**0.19s**	**22.74**	

Distances in FEET. Moments in Ft-LT.

Note: FSM values marked with an asterisk (*) are formal values which are not the same as the true values in the present condition.

DISPLACEMENT STATUS

Baseline draft: 13.442 @ Origin

Trim: Aft 6.71/210.33, Heel: Stbd 8.98 deg.

Part		SpGr	Displ(LT)	LCB	TCB	VCB	RefHt
HULL		1.025	1,094.73	77.03f	9.72s	7.31	-13.27
DB5.S	Flooded	1.025	-33.08	96.37f	22.47s	3.55	-13.27
COMP5.S	Flooded	1.025	-57.76	80.51f	22.77s	10.41	-13.27
DB7.S	Flooded	1.025	-27.10	78.74f	22.47s	3.69	-13.27
ER1.S	Flooded	1.025	-266.88	41.07f	22.60s	9.10	-13.27
Total Displacement		**1.025**	**709.91**	**89.29f**	**2.73s**	**6.70**	

Distances in FEET.

Condition 10 - 20AEQ 2ST 6RV Fwd Departure with no Ice
Damage Case 16

CRITICAL POINT STATUS
Baseline draft: 13.442 @ Origin
Trim: Aft 6.71/210.33, Heel: Stbd 8.98 deg.

	Critical Points		LCP	TCP	VCP	Height
(3)	EN 90 S	FLOOD	213.86f	5.25s	30.90	23.24
(4)	EN 91 S	FLOOD	203.52f	8.13s	38.80	30.26
(5)	ER Air FWD P	FLOOD	43.30f	27.45p	23.45	15.55
(6)	ER Air Aft P	FLOOD	35.42f	27.45p	23.45	15.29
(7)	EN 90 P	FLOOD	213.86f	5.25p	30.90	24.87
(8)	EN 91 P	FLOOD	203.52f	8.13p	38.80	32.79
(9)	Survival Craft S	TIGHT	61.03f	25.67s	44.46	28.56
(10)	MES S	TIGHT	106.30f	29.53s	34.94	20.00

Distances in FEET.

LIM	STABILITY CRITERION		Min/Max		Attained
(1)	**Angle from Equ0 to Flood or Tflood**	**>**	**0.00**	**deg**	**LARGE**
(2)	**Absolute Angle at Equ0 (no moments)**	**<**	**10.00**	**deg**	**8.98 P**
(3)	**Angle from Equ0 to RAzero or Flood**	**>**	**7.00**	**deg**	**49.52 P**
(4)	**Flood Height at Point 1 to 8**	**>**	**6.56**	**Ft**	**15.29 P**
(5)	**Righting Arm at MaxRA**	**>**	**0.16**	**Ft**	**9.15 P**

Condition 10 - 20AEQ 2ST 6RV Fwd Departure with no Ice
Damage Case 16

RESIDUAL RIGHTING ARMS vs HEEL ANGLE with FLOODING

Total CG: LCG = 89.80f TCG = 0.21s VCG = 22.61
Free Surface Adjustment: 0.13
Adjusted CG: LCG = 89.81f TCG = 0.19s VCG = 22.74

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Flood Pt Area	Height	
13.271	1.83a	8.98s	709.81	0.00	-0.964	0.00	15.29	(6)
13.370	1.89a	9.49s	709.91	0.00	-0.479	-0.37	15.44	(6)
13.469	1.95a	10.00s	709.90	0.00	0.000	-0.49	15.58	(6)
13.668	2.07a	11.00s	709.79	0.00	0.924	-0.02	15.85	(6)
13.870	2.20a	12.00s	709.76	0.00	1.825	1.35	16.11	(6)
14.075	2.34a	13.00s	709.72	0.00	2.704	3.62	16.37	(6)
14.282	2.49a	14.00s	709.65	0.00	3.558	6.75	16.62	(6)
14.498	2.64a	15.00s	709.95	0.00	4.373	10.71	16.86	(6)
14.719	2.81a	16.00s	709.95	0.00	5.139	15.47	17.09	(6)
14.951	2.99a	17.00s	709.94	0.00	5.837	20.96	17.30	(6)
15.191	3.18a	18.00s	709.91	0.00	6.452	27.10	17.51	(6)
15.441	3.38a	19.00s	709.92	0.00	6.972	33.81	17.70	(6)
15.698	3.60a	20.00s	709.92	0.00	7.391	41.00	17.89	(6)
15.958	3.83a	21.00s	709.92	0.00	7.711	48.55	18.06	(6)
16.217	4.06a	22.00s	709.92	0.00	7.940	56.38	18.24	(6)
16.471	4.30a	23.00s	709.92	0.00	8.088	64.40	18.41	(6)
16.718	4.54a	24.00s	709.91	0.00	8.165	72.53	18.57	(6)
16.899	4.73a	24.75s	709.94	0.00	**8.181**	78.66	18.70	(6)
16.957	4.79a	25.00s	709.91	0.00	8.181	80.71	18.74	(6)
17.185	5.03a	26.00s	709.92	0.00	8.146	88.87	18.90	(6)
17.402	5.27a	27.00s	709.92	0.00	8.069	96.98	19.07	(6)
17.608	5.51a	28.00s	709.92	0.00	7.954	104.99	19.23	(6)
17.802	5.75a	29.00s	709.93	0.00	7.809	112.87	19.39	(6)
17.983	5.98a	30.00s	709.93	0.00	7.637	120.60	19.56	(6)
18.152	6.21a	31.00s	709.93	0.00	7.442	128.14	19.72	(6)
18.310	6.44a	32.00s	709.93	0.00	7.228	135.47	19.88	(6)
18.458	6.66a	33.00s	709.95	0.00	6.997	142.59	20.04	(6)
18.594	6.88a	34.00s	709.90	0.01f	6.754	149.46	20.19	(6)
18.724	7.10a	35.00s	709.90	0.00	6.498	156.09	20.34	(6)
18.845	7.31a	36.00s	709.93	0.00	6.231	162.45	20.48	(6)
18.959	7.52a	37.00s	709.95	0.00	5.955	168.55	20.62	(6)
19.065	7.73a	38.00s	709.96	0.00	5.672	174.36	20.76	(6)
19.162	7.94a	39.00s	709.98	0.00	5.381	179.89	20.89	(6)
19.250	8.14a	40.00s	710.00	0.00	5.084	185.12	21.01	(6)
19.327	8.33a	41.00s	709.99	0.00	4.783	190.05	21.13	(6)
19.397	8.52a	42.00s	710.00	0.00	4.475	194.68	21.25	(6)
19.447	8.71a	43.00s	709.63	0.00	4.168	199.00	21.37	(6)
19.507	8.89a	44.00s	710.03	0.01a	3.848	203.01	21.47	(6)
19.535	9.07a	45.00s	709.65	0.01a	3.532	206.70	21.59	(6)
19.571	9.24a	46.00s	709.99	0.00	3.207	210.07	21.68	(6)
19.583	9.40a	46.97s	709.89	0.00	2.892	213.03	0.00	(10)
19.578	9.40a	47.00s	709.68	0.00	2.884	213.12	21.79	(6)
19.594	9.57a	48.00s	709.99	0.00	2.553	215.83	21.88	(6)
19.582	9.72a	49.00s	709.68	0.01a	2.225	218.22	21.98	(6)

Condition 10 - 20AEQ 2ST 6RV Fwd Departure with no Ice
Damage Case 16

19.576	9.87a	50.00s	709.99	0.00	1.891	220.28	22.06 (6)
19.544	10.02a	51.00s	709.67	0.01a	1.560	222.01	22.16 (6)
19.513	10.16a	52.00s	709.76	0.00	1.225	223.40	22.24 (6)
19.469	10.29a	53.00s	709.77	0.01a	0.889	224.46	22.32 (6)
19.417	10.43a	54.00s	709.77	0.01a	0.553	225.18	22.39 (6)
19.364	10.55a	55.00s	709.98	0.01a	0.215	225.56	22.45 (6)
19.315	10.63a	55.64s	709.94	0.00	0.000	225.63	22.50 (6)

Distances in FEET. Specific Gravity = 1.025. Area in Ft-Deg.

Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 88.9 Ft-LT was applied to artificially modify the CG.

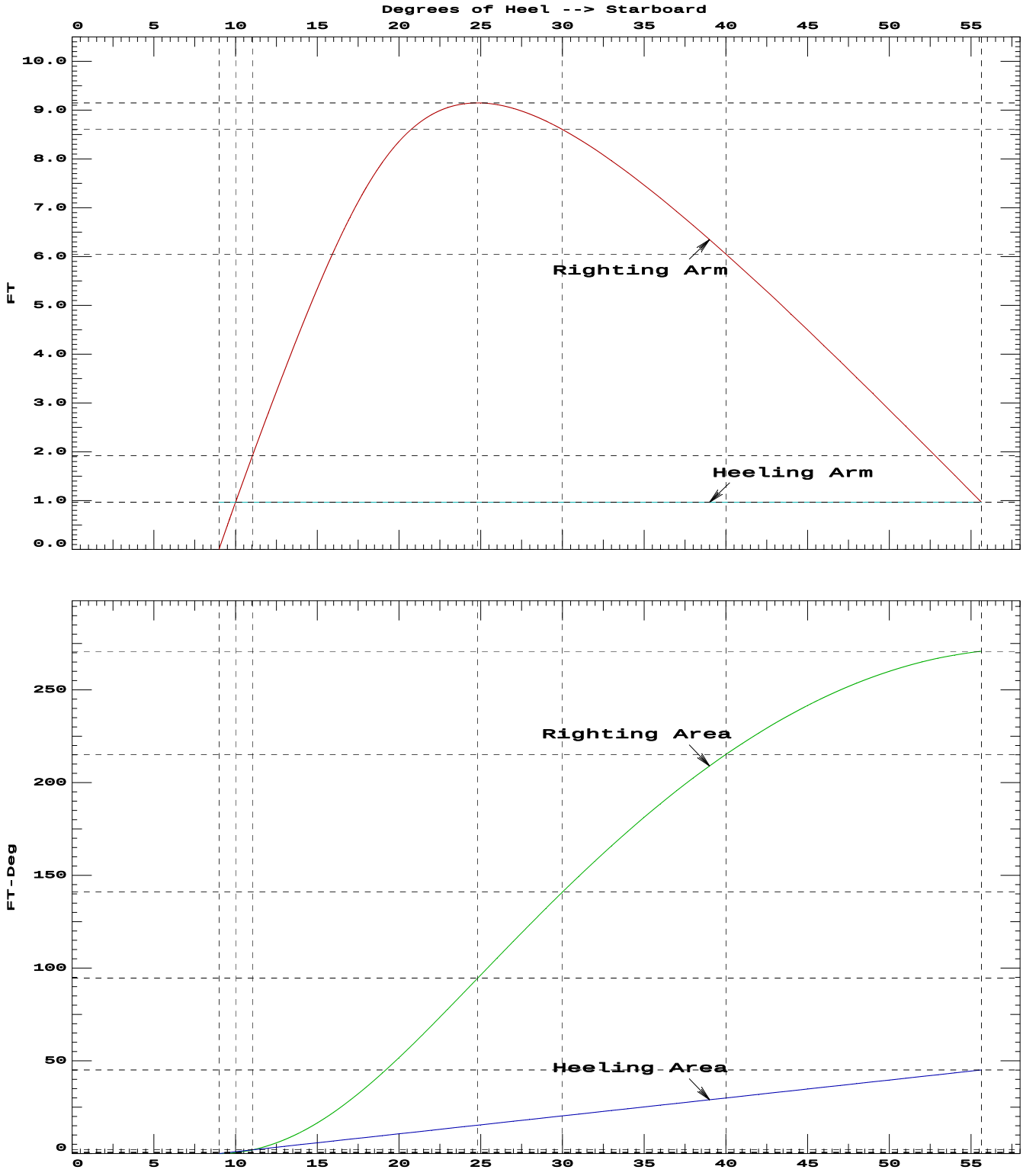
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 685.82

	Critical Points		**LCP**	**TCP**	**VCP**
(6)	ER Air Aft P	FLOOD	35.42f	27.45p	23.45
(10)	MES S	TIGHT	106.30f	29.53s	34.94

LIM	**STABILITY CRITERION**		**Min/Max**		**Attained**
(1)	**Absolute Angle at Equilibrium**	**<**	**15.00**	**deg**	**10.00 P**
(4)	**Area from Equilibrium to 15 deg or Flood**	**>**	**5.26**	**Ft-deg**	**81.20 P**

Relative angles measured from 9.999s

Condition 10 - 20AEQ 2ST 6RV Fwd Departure with no Ice
Damage Case 16



Condition 11 - 20AEQ 2ST 6RV Fwd Arrival with no Ice
Damage Case 16

WEIGHT STATUS

Trim: Aft 7.48/210.33, Heel: Stbd 9.50 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	500.46	84.77f	0.01p	23.23
Pax @185 lb ea (Stand)	20.65	105.24f	0.00	38.55
Luggage @20 lb ea Pax	2.22	115.73f	5.24p	21.33
Vehicles AEQ @6 kip ea	53.58	103.08f	0.75p	21.33
Vehicles ST @45 kip ea	40.18	93.21f	6.00s	27.46
Vehicles RV @15 kip ea	40.18	92.52f	0.75p	23.82
Bikes @30 lb ea	0.16	209.32f	0.00	19.69
Kayaks @ 75 lb ea	0.20	131.39f	25.83p	21.65
Crew	0.98	115.83f	2.23s	44.16
Food Stuffs	0.06	100.46f	1.05p	38.71
Loose Outfit/Gear	0.40	111.22f	0.00	37.07
Stores	0.07	101.71f	0.00	37.07
Art Allowance	0.54	111.22f	0.00	40.35
Trash	0.45	104.66f	25.13s	28.64
Video Games	0.45	28.46f	5.11p	38.71
Total Fixed	**660.58**	**88.09f**	**0.24s**	**23.91**

	Load	SpGr	Weight(LT)	LCG	TCG	VCG	FSM
FW.P	0.100	1.000	0.34	135.61f	20.89p	8.22	0.7
BW.S	0.980	1.025	13.55	98.08f	21.01s	10.37	0.9
DBF4.P	0.100	0.840	2.08	113.25f	21.05p	0.91	15.7
DBF3.S	0.100	0.840	2.08	113.25f	23.89s	0.91	15.6
LOH2.P	0.100	0.880	0.06	49.13f	16.96p	12.71	0.1
LOH1.S	0.100	0.880	0.06	49.13f	17.28s	12.71	0.1
Total Tanks			**18.20**	**101.92f**	**15.58s**	**8.17**	**88.9***
Total Weight			**678.77**	**88.46f**	**0.65s**	**23.49**	
Free Surface Adjustment						**0.13**	
Adjusted CG				**88.47f**	**0.63s**	**23.62**	

Distances in FEET. Moments in Ft-LT.

Note: FSM values marked with an asterisk (*) are formal values which are not the same as the true values in the present condition.

DISPLACEMENT STATUS

Baseline draft: 13.511 @ Origin

Trim: Aft 7.48/210.33, Heel: Stbd 9.50 deg.

Part		SpGr	Displ(LT)	LCB	TCB	VCB	RefHt
HULL		1.025	1,066.08	75.64f	10.42s	7.34	-13.32
DB5.S	Flooded	1.025	-33.08	96.37f	22.47s	3.55	-13.32
COMP5.S	Flooded	1.025	-57.55	80.49f	22.79s	10.40	-13.32
DB7.S	Flooded	1.025	-27.10	78.74f	22.47s	3.69	-13.32
ER1.S	Flooded	1.025	-269.57	40.98f	22.61s	9.17	-13.32
Total Displacement		**1.025**	**678.77**	**87.86f**	**3.47s**	**6.68**	

Distances in FEET.

Condition 11 - 20AEQ 2ST 6RV Fwd Arrival with no Ice
Damage Case 16

CRITICAL POINT STATUS
Baseline draft: 13.511 @ Origin
Trim: Aft 7.48/210.33, Heel: Stbd 9.50 deg.

	Critical Points		LCP	TCP	VCP	Height
(3)	EN 90 S	FLOOD	213.86f	5.25s	30.90	23.87
(4)	EN 91 S	FLOOD	203.52f	8.13s	38.80	30.82
(5)	ER Air FWD P	FLOOD	43.30f	27.45p	23.45	15.86
(6)	ER Air Aft P	FLOOD	35.42f	27.45p	23.45	15.58
(7)	EN 90 P	FLOOD	213.86f	5.25p	30.90	25.60
(8)	EN 91 P	FLOOD	203.52f	8.13p	38.80	33.50
(9)	Survival Craft S	TIGHT	61.03f	25.67s	44.46	28.44
(10)	MES S	TIGHT	106.30f	29.53s	34.94	20.03

Distances in FEET.

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Angle from Equ0 to Flood or Tflood**	**>**	**0.00**	**deg**	**38.89**	**P**
(2)	**Absolute Angle at Equ0 (no moments)**	**<**	**10.00**	**deg**	**9.50**	**P**
(3)	**Angle from Equ0 to RAzero or Flood**	**>**	**7.00**	**deg**	**46.36**	**P**
(4)	**Flood Height at Point 1 to 8**	**>**	**6.56**	**Ft**	**15.58**	**P**
(5)	**Righting Arm at MaxRA**	**>**	**0.16**	**Ft**	**8.53**	**P**

Condition 11 - 20AEQ 2ST 6RV Fwd Arrival with no Ice
Damage Case 16

RESIDUAL RIGHTING ARMS vs HEEL ANGLE with FLOODING

Total CG: LCG = 88.46f TCG = 0.65s VCG = 23.49
Free Surface Adjustment: 0.13
Adjusted CG: LCG = 88.47f TCG = 0.63s VCG = 23.62

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Flood Pt Area	Height	
13.316	2.04a	9.50s	678.63	0.00	-1.008	0.00	15.58	(6)
13.422	2.10a	10.03s	678.74	0.00	-0.500	-0.40	15.73	(6)
13.529	2.16a	10.56s	678.74	0.00	0.000	-0.53	15.87	(6)
13.732	2.29a	11.56s	678.62	0.00	0.927	-0.07	16.14	(6)
13.939	2.43a	12.56s	678.58	0.00	1.827	1.31	16.39	(6)
14.149	2.57a	13.56s	678.52	0.00	2.700	3.58	16.64	(6)
14.366	2.73a	14.56s	678.78	0.00	3.535	6.69	16.88	(6)
14.589	2.89a	15.56s	678.79	0.00	4.325	10.62	17.11	(6)
14.821	3.07a	16.56s	678.78	0.00	5.050	15.31	17.33	(6)
15.061	3.26a	17.56s	678.75	0.00	5.690	20.68	17.55	(6)
15.310	3.47a	18.56s	678.75	0.00	6.233	26.64	17.75	(6)
15.564	3.69a	19.56s	678.76	0.00	6.672	33.10	17.94	(6)
15.821	3.92a	20.56s	678.76	0.00	7.010	39.94	18.12	(6)
16.076	4.16a	21.56s	678.76	0.00	7.253	47.08	18.30	(6)
16.326	4.40a	22.56s	678.75	0.00	7.412	54.42	18.48	(6)
16.568	4.65a	23.56s	678.74	0.00	7.496	61.88	18.66	(6)
16.745	4.83a	24.31s	678.77	0.00	**7.518**	67.51	18.79	(6)
16.802	4.89a	24.56s	678.75	0.00	**7.518**	69.39	18.84	(6)
17.025	5.14a	25.56s	678.75	0.00	7.487	76.89	19.01	(6)
17.236	5.38a	26.56s	678.76	0.00	7.411	84.34	19.19	(6)
17.435	5.63a	27.56s	678.76	0.00	7.297	91.69	19.37	(6)
17.622	5.87a	28.56s	678.77	0.00	7.150	98.92	19.54	(6)
17.796	6.10a	29.56s	678.76	0.00	6.976	105.98	19.72	(6)
17.958	6.33a	30.56s	678.77	0.00	6.778	112.86	19.89	(6)
18.107	6.56a	31.56s	678.77	0.00	6.559	119.52	20.06	(6)
18.245	6.78a	32.56s	678.73	0.00	6.326	125.97	20.23	(6)
18.375	7.00a	33.56s	678.73	0.00	6.077	132.17	20.40	(6)
18.496	7.22a	34.56s	678.74	0.00	5.817	138.12	20.56	(6)
18.609	7.44a	35.56s	678.76	0.00	5.545	143.80	20.72	(6)
18.713	7.65a	36.56s	678.77	0.00	5.265	149.21	20.87	(6)
18.807	7.85a	37.56s	678.78	0.00	4.977	154.33	21.02	(6)
18.893	8.05a	38.56s	678.80	0.00	4.682	159.16	21.17	(6)
18.969	8.25a	39.56s	678.81	0.00	4.380	163.69	21.31	(6)
19.035	8.45a	40.56s	678.82	0.01a	4.072	167.91	21.45	(6)
19.081	8.63a	41.56s	678.47	0.00	3.763	171.83	21.59	(6)
19.134	8.82a	42.56s	678.83	0.00	3.443	175.43	21.71	(6)
19.158	9.00a	43.56s	678.47	0.01a	3.125	178.72	21.85	(6)
19.187	9.17a	44.56s	678.82	0.00	2.797	181.68	21.97	(6)
19.197	9.34a	45.56s	678.81	0.00	2.468	184.31	22.09	(6)
19.197	9.50a	46.56s	678.81	0.01a	2.137	186.61	22.21	(6)
19.184	9.65a	47.56s	678.80	0.00	1.804	188.58	22.33	(6)
19.164	9.78a	48.38s	678.77	0.00	1.528	189.96	0.00	(10)
19.159	9.80a	48.56s	678.78	0.00	1.469	190.22	22.44	(6)
19.129	9.95a	49.56s	678.79	0.01a	1.131	191.52	22.55	(6)

Condition 11 - 20AEQ 2ST 6RV Fwd Arrival with no Ice
Damage Case 16

19.086	10.09a	50.56s	678.78	0.00	0.793	192.48	22.66 (6)
19.035	10.23a	51.56s	678.79	0.00	0.453	193.10	22.76 (6)
18.973	10.36a	52.56s	678.78	0.00	0.113	193.39	22.86 (6)
18.949	10.40a	52.89s	678.78	0.00	0.000	193.41	22.89 (6)

Distances in FEET. Specific Gravity = 1.025. Area in Ft-Deg.

Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 88.9 Ft-LT was applied to artificially modify the CG.

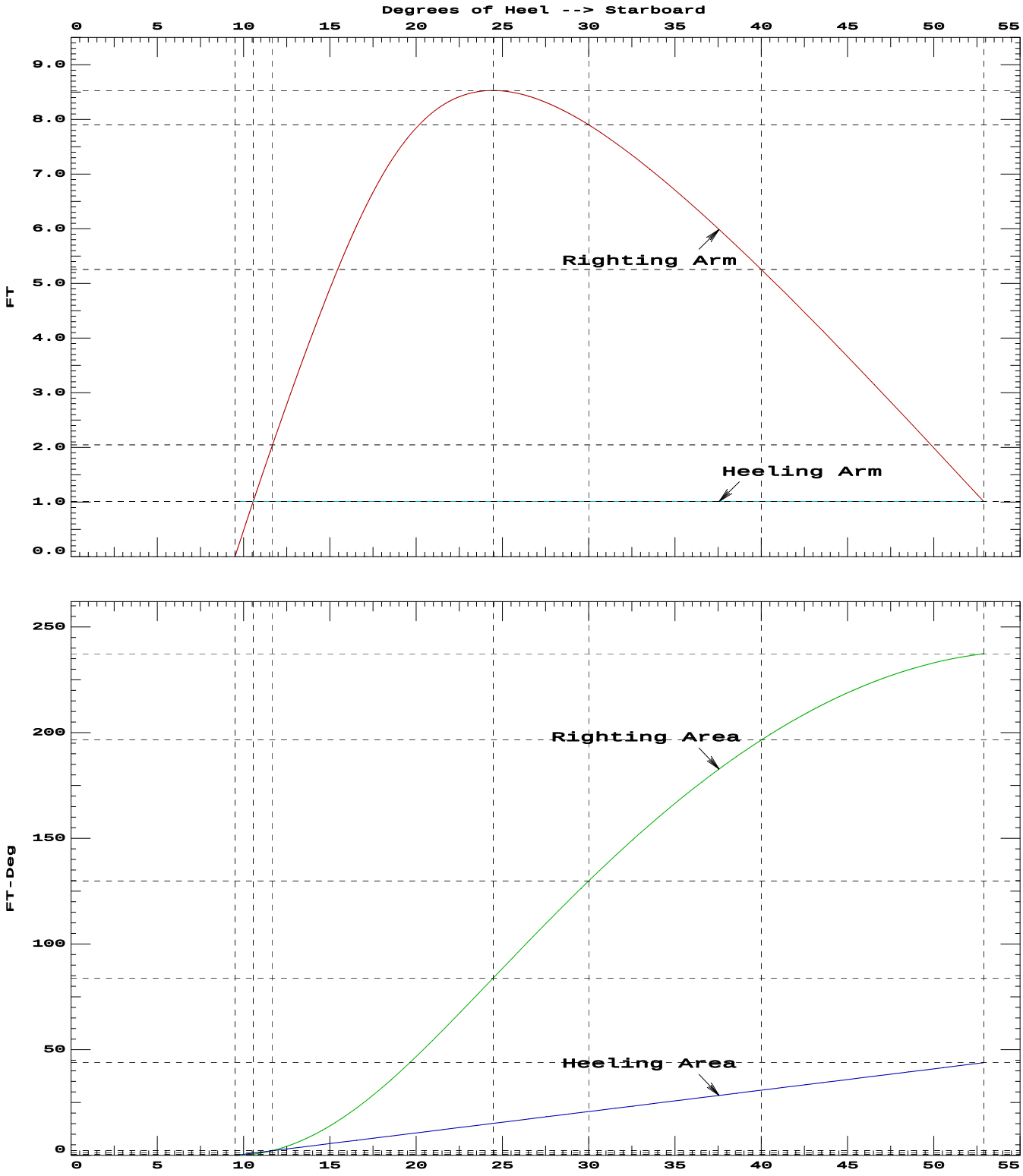
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 685.82

	Critical Points		**LCP**	**TCP**	**VCP**
(6)	ER Air Aft P	FLOOD	35.42f	27.45p	23.45
(10)	MES S	TIGHT	106.30f	29.53s	34.94

LIM	**STABILITY CRITERION**		**Min/Max**		**Attained**
(1)	**Absolute Angle at Equilibrium**	**<**	**15.00**	**deg**	**10.56 P**
(4)	**Area from Equilibrium to 15 deg or Flood**	**>**	**5.26**	**Ft-deg**	**77.42 P**

Relative angles measured from 10.559s

Condition 11 - 20AEQ 2ST 6RV Fwd Arrival with no Ice
Damage Case 16



Condition 12 - 30AEQ 2ST Aft Departure with no Ice
Damage Case 16

WEIGHT STATUS

Trim: Aft 7.04/210.33, Heel: Stbd 8.57 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	500.46	84.77f	0.01p	23.23
Pax @185 lb ea (Stand)	20.65	105.24f	0.00	38.55
Luggage @20 lb ea Pax	2.22	115.73f	5.24p	21.33
Vehicles AEQ @6 kip ea	80.37	98.46f	1.64s	21.33
Vehicles ST @45 kip ea	40.18	75.92f	6.40p	27.46
Bikes @30 lb ea	0.16	209.32f	0.00	19.69
Kayaks @ 75 lb ea	0.20	131.39f	25.83p	21.65
Crew	0.98	115.83f	2.23s	44.16
Food Stuffs	0.58	100.46f	1.05p	38.71
Loose Outfit/Gear	0.40	111.22f	0.00	37.07
Stores	0.67	101.71f	0.00	37.07
Art Allowance	0.54	111.22f	0.00	40.35
Trash	0.45	104.66f	25.13s	28.64
Video Games	0.45	28.46f	5.11p	38.71
Total Fixed	**648.32**	**86.81f**	**0.21p**	**23.83**

	Load	SpGr	Weight(LT)	LCG	TCG	VCG	FSM
FW.P	0.980	1.000	3.36	135.81f	21.22p	10.19	0.2
BW.S	0.200	1.025	2.77	97.78f	21.37s	7.99	7.0
DBF4.P	0.980	0.840	20.42	114.07f	22.40p	3.50	3.1
DBF3.S	0.980	0.840	20.42	114.07f	22.55s	3.50	3.1
LOH2.P	0.980	0.880	0.63	49.21f	17.11p	14.41	0.0
LOH1.S	0.980	0.880	0.63	49.21f	17.13s	14.41	0.0
Total Tanks			**48.24**	**112.96f**	**0.19p**	**4.51**	**88.9***
Total Weight			**696.55**	**88.62f**	**0.21p**	**22.50**	
Free Surface Adjustment						**0.13**	
Adjusted CG				**88.63f**	**0.23p**	**22.62**	

Distances in FEET. Moments in Ft-LT.

Note: FSM values marked with an asterisk (*) are formal values which are not the same as the true values in the present condition.

DISPLACEMENT STATUS

Baseline draft: 13.437 @ Origin

Trim: Aft 7.04/210.33, Heel: Stbd 8.57 deg.

Part		SpGr	Displ(LT)	LCB	TCB	VCB	RefHt
HULL		1.025	1,074.05	76.25f	9.37s	7.19	-13.28
DB5.S	Flooded	1.025	-33.08	96.37f	22.47s	3.55	-13.28
COMP5.S	Flooded	1.025	-55.52	80.49f	22.77s	10.26	-13.28
DB7.S	Flooded	1.025	-27.10	78.74f	22.47s	3.69	-13.28
ER1.S	Flooded	1.025	-261.80	41.04f	22.61s	8.98	-13.28
Total Displacement		**1.025**	**696.55**	**88.09f**	**2.19s**	**6.58**	

Distances in FEET.

Condition 12 - 30AEQ 2ST Aft Departure with no Ice
Damage Case 16

CRITICAL POINT STATUS
Baseline draft: 13.437 @ Origin
Trim: Aft 7.04/210.33, Heel: Stbd 8.57 deg.

	Critical Points		LCP	TCP	VCP	Height
(3)	EN 90 S	FLOOD	213.86f	5.25s	30.90	23.63
(4)	EN 91 S	FLOOD	203.52f	8.13s	38.80	30.66
(5)	ER Air FWD P	FLOOD	43.30f	27.45p	23.45	15.43
(6)	ER Air Aft P	FLOOD	35.42f	27.45p	23.45	15.17
(7)	EN 90 P	FLOOD	213.86f	5.25p	30.90	25.19
(8)	EN 91 P	FLOOD	203.52f	8.13p	38.80	33.08
(9)	Survival Craft S	TIGHT	61.03f	25.67s	44.46	28.88
(10)	MES S	TIGHT	106.30f	29.53s	34.94	20.41

Distances in FEET.

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Angle from Equ0 to Flood or Tflood**	**>**	**0.00**	**deg**	**39.02**	**P**
(2)	**Absolute Angle at Equ0 (no moments)**	**<**	**10.00**	**deg**	**8.57**	**P**
(3)	**Angle from Equ0 to RAzero or Flood**	**>**	**7.00**	**deg**	**50.73**	**P**
(4)	**Flood Height at Point 1 to 8**	**>**	**6.56**	**Ft**	**15.17**	**P**
(5)	**Righting Arm at MaxRA**	**>**	**0.16**	**Ft**	**9.49**	**P**

Condition 12 - 30AEQ 2ST Aft Departure with no Ice
Damage Case 16

RESIDUAL RIGHTING ARMS vs HEEL ANGLE with FLOODING

Total CG: LCG = 88.62f TCG = 0.21p VCG = 22.50
Free Surface Adjustment: 0.13
Adjusted CG: LCG = 88.63f TCG = 0.23p VCG = 22.62

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Flood Pt Area	Height
13.279	1.92a	8.57s	696.45	0.00	-0.982	0.00	15.17 (6)
13.379	1.97a	9.08s	696.53	0.00	-0.491	-0.38	15.31 (6)
13.477	2.03a	9.59s	696.52	0.00	0.000	-0.50	15.46 (6)
13.672	2.15a	10.59s	696.43	0.00	0.943	-0.03	15.73 (6)
13.871	2.28a	11.59s	696.40	0.00	1.861	1.38	16.00 (6)
14.074	2.41a	12.59s	696.35	0.00	2.756	3.68	16.26 (6)
14.281	2.56a	13.59s	696.30	0.00	3.624	6.87	16.51 (6)
14.493	2.71a	14.59s	696.55	0.01f	4.457	10.91	16.76 (6)
14.714	2.87a	15.59s	696.56	0.00	5.245	15.77	16.99 (6)
14.943	3.05a	16.59s	696.56	0.00	5.968	21.37	17.21 (6)
15.182	3.24a	17.59s	696.53	0.00	6.611	27.66	17.42 (6)
15.430	3.44a	18.59s	696.53	0.00	7.160	34.55	17.62 (6)
15.685	3.66a	19.59s	696.53	0.00	7.607	41.93	17.81 (6)
15.944	3.89a	20.59s	696.54	0.00	7.955	49.71	17.99 (6)
16.203	4.12a	21.59s	696.53	0.00	8.209	57.80	18.17 (6)
16.458	4.36a	22.59s	696.53	0.00	8.379	66.10	18.34 (6)
16.706	4.61a	23.59s	696.51	0.00	8.477	74.54	18.51 (6)
16.947	4.86a	24.59s	696.52	0.00	8.510	83.03	18.68 (6)
17.179	5.10a	25.59s	696.56	0.00	8.490	91.53	18.85 (6)
17.398	5.35a	26.59s	696.53	0.00	8.426	99.99	19.02 (6)
17.607	5.59a	27.59s	696.54	0.00	8.323	108.36	19.18 (6)
17.805	5.83a	28.59s	696.54	0.00	8.188	116.62	19.35 (6)
17.990	6.07a	29.59s	696.54	0.00	8.024	124.72	19.51 (6)
18.163	6.30a	30.59s	696.54	0.00	7.836	132.66	19.68 (6)
18.325	6.53a	31.59s	696.54	0.00	7.628	140.39	19.84 (6)
18.476	6.76a	32.59s	696.56	0.00	7.401	147.90	20.00 (6)
18.617	6.98a	33.59s	696.56	0.00	7.161	155.19	20.15 (6)
18.749	7.20a	34.59s	696.56	0.00	6.908	162.22	20.31 (6)
18.872	7.42a	35.59s	696.53	0.00	6.645	169.00	20.45 (6)
18.988	7.63a	36.59s	696.56	0.00	6.371	175.50	20.60 (6)
19.097	7.84a	37.59s	696.57	0.00	6.088	181.73	20.73 (6)
19.196	8.05a	38.59s	696.57	0.00	5.800	187.68	20.87 (6)
19.288	8.25a	39.59s	696.58	0.00	5.504	193.33	20.99 (6)
19.370	8.45a	40.59s	696.59	0.00	5.202	198.68	21.12 (6)
19.444	8.65a	41.59s	696.62	0.01a	4.895	203.73	21.23 (6)
19.504	8.84a	42.59s	696.50	0.00	4.585	208.47	21.35 (6)
19.558	9.02a	43.59s	696.52	0.00	4.269	212.90	21.46 (6)
19.605	9.20a	44.59s	696.63	0.00	3.948	217.01	21.57 (6)
19.629	9.38a	45.59s	696.29	0.01a	3.627	220.80	21.68 (6)
19.659	9.55a	46.59s	696.62	0.01a	3.298	224.26	21.77 (6)
19.661	9.71a	47.59s	696.33	0.01a	2.971	227.39	21.88 (6)
19.671	9.87a	48.59s	696.62	0.01a	2.637	230.20	21.97 (6)
19.652	10.03a	49.59s	696.30	0.01a	2.306	232.67	22.07 (6)
19.635	10.18a	50.59s	696.39	0.00	1.970	234.81	22.15 (6)

Condition 12 - 30AEQ 2ST Aft Departure with no Ice
Damage Case 16

19.606	10.32a	51.59s	696.39	0.00	1.633	236.61	22.23 (6)
19.567	10.46a	52.59s	696.39	0.01a	1.295	238.07	22.31 (6)
19.517	10.59a	53.59s	696.32	0.01a	0.957	239.20	22.39 (6)
19.459	10.72a	54.59s	696.31	0.01a	0.617	239.99	22.46 (6)
19.403	10.85a	55.59s	696.58	0.01a	0.276	240.43	22.52 (6)
19.340	10.94a	56.41s	696.55	0.00	0.000	240.54	22.57 (6)

Distances in FEET. Specific Gravity = 1.025. Area in Ft-Deg.

Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 88.9 Ft-LT was applied to artificially modify the CG.

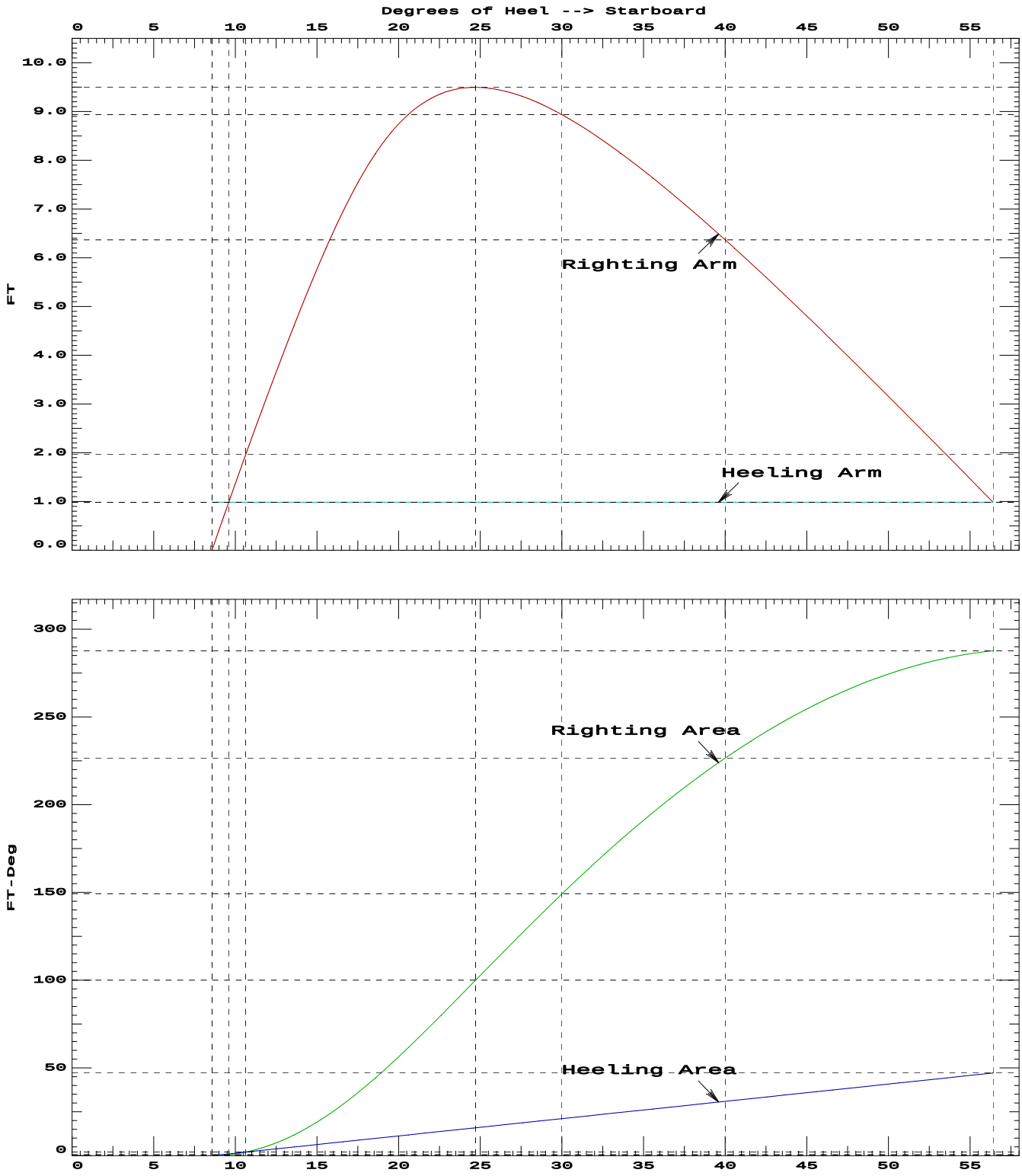
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 685.82

	Critical Point		**LCP**	**TCP**	**VCP**
(6)	ER Air Aft P	FLOOD	35.42f	27.45p	23.45

LIM	**STABILITY CRITERION**		**Min/Max**		**Attained**
(1)	**Absolute Angle at Equilibrium**	**<**	**15.00**	**deg**	**9.59 P**
(4)	**Area from Equilibrium to 15 deg or Flood**	**>**	**5.26**	**Ft-deg**	**83.53 P**

Relative angles measured from 9.594s

Condition 12 - 30AEQ 2ST Aft Departure with no Ice
Damage Case 16



Condition 13 - 30AEQ 2ST Aft Arrival with no Ice
Damage Case 16

WEIGHT STATUS

Trim: Aft 7.82/210.33, Heel: Stbd 9.08 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	500.46	84.77f	0.01p	23.23
Pax @185 lb ea (Stand)	20.65	105.24f	0.00	38.55
Luggage @20 lb ea Pax	2.22	115.73f	5.24p	21.33
Vehicles AEQ @6 kip ea	80.37	98.46f	1.64s	21.33
Vehicles ST @45 kip ea	40.18	75.92f	6.40p	27.46
Bikes @30 lb ea	0.16	209.32f	0.00	19.69
Kayaks @ 75 lb ea	0.20	131.39f	25.83p	21.65
Crew	0.98	115.83f	2.23s	44.16
Food Stuffs	0.06	100.46f	1.05p	38.71
Loose Outfit/Gear	0.40	111.22f	0.00	37.07
Stores	0.07	101.71f	0.00	37.07
Art Allowance	0.54	111.22f	0.00	40.35
Trash	0.45	104.66f	25.13s	28.64
Video Games	0.45	28.46f	5.11p	38.71
Total Fixed	**647.19**	**86.79f**	**0.21p**	**23.81**

	Load	SpGr	Weight(LT)	LCG	TCG	VCG	FSM
FW.P	0.100	1.000	0.34	135.60f	20.90p	8.22	0.7
BW.S	0.980	1.025	13.55	98.08f	21.01s	10.37	0.9
DBF4.P	0.100	0.840	2.08	113.20f	21.11p	0.90	16.0
DBF3.S	0.100	0.840	2.08	113.20f	23.84s	0.90	15.9
LOH2.P	0.100	0.880	0.06	49.13f	16.97p	12.71	0.1
LOH1.S	0.100	0.880	0.06	49.13f	17.27s	12.71	0.1
Total Tanks			**18.20**	**101.91f**	**15.57s**	**8.17**	**88.9***
Total Weight			**665.39**	**87.20f**	**0.22s**	**23.38**	
Free Surface Adjustment						**0.13**	
Adjusted CG				**87.21f**	**0.20s**	**23.51**	

Distances in FEET. Moments in Ft-LT.

Note: FSM values marked with an asterisk (*) are formal values which are not the same as the true values in the present condition.

DISPLACEMENT STATUS

Baseline draft: 13.510 @ Origin
Trim: Aft 7.82/210.33, Heel: Stbd 9.08 deg.

Part		SpGr	Displ(LT)	LCB	TCB	VCB	RefHt
HULL		1.025	1,045.19	74.81f	10.07s	7.21	-13.33
DB5.S	Flooded	1.025	-33.08	96.37f	22.47s	3.55	-13.33
COMP5.S	Flooded	1.025	-55.26	80.48f	22.79s	10.24	-13.33
DB7.S	Flooded	1.025	-27.10	78.74f	22.47s	3.69	-13.33
ER1.S	Flooded	1.025	-264.36	40.94f	22.61s	9.05	-13.33
Total Displacement		**1.025**	**665.39**	**86.57f**	**2.91s**	**6.55**	

Distances in FEET.

Condition 13 - 30AEQ 2ST Aft Arrival with no Ice
Damage Case 16

CRITICAL POINT STATUS
Baseline draft: 13.510 @ Origin
Trim: Aft 7.82/210.33, Heel: Stbd 9.08 deg.

	Critical Points		LCP	TCP	VCP	Height
(3)	EN 90 S	FLOOD	213.86f	5.25s	30.90	24.28
(4)	EN 91 S	FLOOD	203.52f	8.13s	38.80	31.24
(5)	ER Air FWD P	FLOOD	43.30f	27.45p	23.45	15.75
(6)	ER Air Aft P	FLOOD	35.42f	27.45p	23.45	15.45
(7)	EN 90 P	FLOOD	213.86f	5.25p	30.90	25.94
(8)	EN 91 P	FLOOD	203.52f	8.13p	38.80	33.80
(9)	Survival Craft S	TIGHT	61.03f	25.67s	44.46	28.76
(10)	MES S	TIGHT	106.30f	29.53s	34.94	20.44

Distances in FEET.

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Angle from Equ0 to Flood or Tflood**	**>**	**0.00**	**deg**	**39.95**	**P**
(2)	**Absolute Angle at Equ0 (no moments)**	**<**	**10.00**	**deg**	**9.08**	**P**
(3)	**Angle from Equ0 to RAzero or Flood**	**>**	**7.00**	**deg**	**47.57**	**P**
(4)	**Flood Height at Point 1 to 8**	**>**	**6.56**	**Ft**	**15.45**	**P**
(5)	**Righting Arm at MaxRA**	**>**	**0.16**	**Ft**	**8.86**	**P**

Condition 13 - 30AEQ 2ST Aft Arrival with no Ice
Damage Case 16

RESIDUAL RIGHTING ARMS vs HEEL ANGLE with FLOODING

Total CG: LCG = 87.20f TCG = 0.22s VCG = 23.38
Free Surface Adjustment: 0.13
Adjusted CG: LCG = 87.21f TCG = 0.20s VCG = 23.51

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Flood Pt Area	Height	
13.331	2.13a	9.08s	665.28	0.00	-1.029	0.00	15.46	(6)
13.433	2.19a	9.61s	665.36	0.00	-0.511	-0.41	15.60	(6)
13.537	2.25a	10.14s	665.36	0.00	0.000	-0.54	15.75	(6)
13.737	2.38a	11.14s	665.25	0.00	0.946	-0.07	16.02	(6)
13.941	2.51a	12.14s	665.21	0.00	1.864	1.34	16.28	(6)
14.150	2.65a	13.14s	665.16	0.00	2.752	3.65	16.53	(6)
14.363	2.80a	14.14s	665.09	0.00	3.607	6.83	16.78	(6)
14.587	2.96a	15.14s	665.41	0.00	4.410	10.84	17.01	(6)
14.817	3.14a	16.14s	665.40	0.00	5.157	15.62	17.23	(6)
15.056	3.33a	17.14s	665.36	0.00	5.824	21.11	17.45	(6)
15.303	3.54a	18.14s	665.37	0.00	6.395	27.22	17.65	(6)
15.556	3.76a	19.14s	665.37	0.00	6.864	33.85	17.85	(6)
15.812	3.99a	20.14s	665.37	0.00	7.230	40.90	18.04	(6)
16.067	4.22a	21.14s	665.37	0.00	7.500	48.27	18.23	(6)
16.318	4.47a	22.14s	665.37	0.00	7.683	55.87	18.41	(6)
16.562	4.72a	23.14s	665.35	0.00	7.790	63.61	18.59	(6)
16.798	4.96a	24.14s	665.36	0.00	7.831	71.42	18.77	(6)
16.829	5.00a	24.27s	665.38	0.00	**7.831**	72.45	18.79	(6)
17.024	5.21a	25.14s	665.36	0.00	7.816	79.25	18.95	(6)
17.239	5.46a	26.14s	665.37	0.00	7.755	87.03	19.13	(6)
17.442	5.71a	27.14s	665.37	0.00	7.653	94.74	19.30	(6)
17.633	5.95a	28.14s	665.38	0.00	7.518	102.32	19.48	(6)
17.812	6.19a	29.14s	665.38	0.00	7.353	109.76	19.66	(6)
17.978	6.43a	30.14s	665.38	0.00	7.163	117.02	19.83	(6)
18.132	6.66a	31.14s	665.38	0.00	6.951	124.07	20.01	(6)
18.276	6.89a	32.14s	665.40	0.00	6.722	130.91	20.18	(6)
18.407	7.11a	33.14s	665.32	0.00	6.479	137.51	20.35	(6)
18.532	7.33a	34.14s	665.34	0.00	6.222	143.87	20.52	(6)
18.647	7.55a	35.14s	665.35	0.00	5.954	149.95	20.68	(6)
18.754	7.76a	36.14s	665.35	0.00	5.676	155.77	20.83	(6)
18.854	7.97a	37.14s	665.39	0.00	5.389	161.30	20.98	(6)
18.944	8.18a	38.14s	665.41	0.00	5.095	166.54	21.13	(6)
19.024	8.38a	39.14s	665.41	0.00	4.795	171.49	21.27	(6)
19.095	8.58a	40.14s	665.43	0.00	4.489	176.13	21.41	(6)
19.156	8.77a	41.14s	665.43	0.01a	4.177	180.46	21.55	(6)
19.204	8.96a	42.14s	665.39	0.00	3.861	184.48	21.68	(6)
19.244	9.14a	43.14s	665.43	0.00	3.539	188.18	21.81	(6)
19.264	9.32a	44.14s	665.12	0.01a	3.217	191.56	21.94	(6)
19.287	9.49a	45.14s	665.42	0.00	2.886	194.61	22.06	(6)
19.292	9.65a	46.14s	665.41	0.01a	2.553	197.33	22.18	(6)
19.286	9.81a	47.14s	665.41	0.01a	2.219	199.72	22.30	(6)
19.269	9.97a	48.14s	665.40	0.01a	1.882	201.77	22.41	(6)
19.242	10.10a	49.03s	665.30	0.00	1.580	203.32	0.00	(10)
19.240	10.12a	49.14s	665.39	0.00	1.544	203.48	22.52	(6)

Condition 13 - 30AEQ 2ST Aft Arrival with no Ice
Damage Case 16

19.197	10.26a	50.14s	665.15	0.01a	1.204	204.86	22.63 (6)
19.151	10.40a	51.14s	665.17	0.01a	0.863	205.89	22.74 (6)
19.095	10.53a	52.14s	665.13	0.01a	0.520	206.58	22.84 (6)
19.039	10.66a	53.14s	665.39	0.00	0.175	206.93	22.92 (6)
19.001	10.73a	53.65s	665.39	0.00	0.000	206.97	22.97 (6)

Distances in FEET. Specific Gravity = 1.025. Area in Ft-Deg.

Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 88.9 Ft-LT was applied to artificially modify the CG.

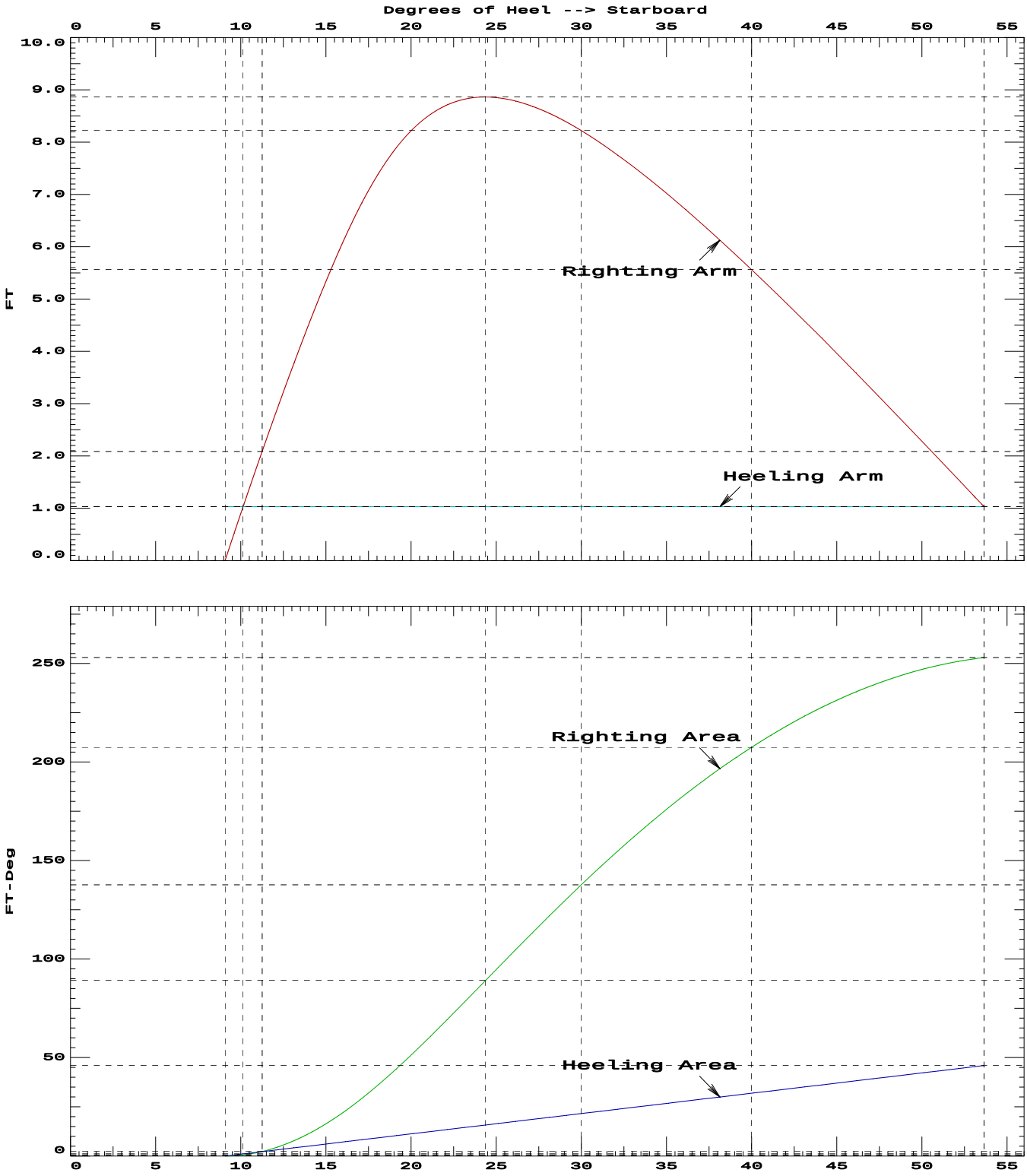
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 685.82

	Critical Points		LCP	TCP	VCP
(6)	ER Air Aft P	FLOOD	35.42f	27.45p	23.45
(10)	MES S	TIGHT	106.30f	29.53s	34.94

LIM	STABILITY CRITERION		Min/Max		Attained
(1)	**Absolute Angle at Equilibrium**	**<**	**15.00**	**deg**	**10.14 P**
(4)	**Area from Equilibrium to 15 deg or Flood**	**>**	**5.26**	**Ft-deg**	**79.79 P**

Relative angles measured from 10.138s

Condition 13 - 30AEQ 2ST Aft Arrival with no Ice
Damage Case 16



Condition 14 - 10% Lightship
Damage Case 16

WEIGHT STATUS

Trim: Aft 7.55/210.33, Heel: Stbd 7.60 deg.

Part			Weight(LT)	LCG	TCG	VCG	
LIGHT SHIP			500.46	84.77f	0.01p	23.23	
Food Stuffs			0.06	100.46f	1.05p	38.71	
Loose Outfit/Gear			0.40	111.22f	0.00	37.07	
Stores			0.07	101.71f	0.00	37.07	
Art Allowance			0.54	111.22f	0.00	40.35	
Trash			0.45	104.66f	25.13s	28.64	
Video Games			0.45	28.46f	5.11p	38.71	
Total Fixed			**502.42**	**84.79f**	**0.01s**	**23.28**	
	Load	**SpGr**	**Weight(LT)**	**LCG**	**TCG**	**VCG**	**FSM**
FW.P	0.100	1.000	0.34	135.61f	20.95p	8.21	0.7
BW.S	0.200	1.025	2.77	97.75f	21.33s	7.99	7.0
DBF4.P	0.100	0.840	2.08	113.24f	21.31p	0.87	16.9
DBF3.S	0.100	0.840	2.08	113.23f	23.64s	0.87	16.8
LOH2.P	0.100	0.880	0.06	49.13f	16.99p	12.71	0.1
LOH1.S	0.100	0.880	0.06	49.13f	17.25s	12.71	0.1
Total Tanks			**7.41**	**107.38f**	**7.65s**	**4.07**	**88.9***
Total Weight			**509.83**	**85.12f**	**0.12s**	**23.00**	
Free Surface Adjustment						**0.17**	
Adjusted CG				**85.13f**	**0.10s**	**23.18**	

Distances in FEET. Moments in Ft-LT.

Note: FSM values marked with an asterisk (*) are formal values which are not the same as the true values in the present condition.

DISPLACEMENT STATUS

Baseline draft: 11.694 @ Origin
Trim: Aft 7.55/210.33, Heel: Stbd 7.60 deg.

Part		SpGr	Displ(LT)	LCB	TCB	VCB	RefHt
HULL		1.025	823.46	73.24f	10.15s	6.17	-11.58
DB5.S	Flooded	1.025	-33.08	96.37f	22.47s	3.55	-11.58
COMP5.S	Flooded	1.025	-38.51	80.41f	22.85s	9.06	-11.58
DB7.S	Flooded	1.025	-27.10	78.74f	22.47s	3.69	-11.58
ER1.S	Flooded	1.025	-214.95	41.04f	22.68s	7.82	-11.58
Total Displacement		**1.025**	**509.83**	**84.49f**	**2.45s**	**5.55**	

Distances in FEET.

Condition 14 - 10% Lightship
Damage Case 16

CRITICAL POINT STATUS
Baseline draft: 11.694 @ Origin
Trim: Aft 7.55/210.33, Heel: Stbd 7.60 deg.

	Critical Points		LCP	TCP	VCP	Height
(3)	EN 90 S	FLOOD	213.86f	5.25s	30.90	26.00
(4)	EN 91 S	FLOOD	203.52f	8.13s	38.80	33.07
(5)	ER Air FWD P	FLOOD	43.30f	27.45p	23.45	16.82
(6)	ER Air Aft P	FLOOD	35.42f	27.45p	23.45	16.54
(7)	EN 90 P	FLOOD	213.86f	5.25p	30.90	27.39
(8)	EN 91 P	FLOOD	203.52f	8.13p	38.80	35.22
(9)	Survival Craft S	TIGHT	61.03f	25.67s	44.46	31.25
(10)	MES S	TIGHT	106.30f	29.53s	34.94	22.94

Distances in FEET.

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Angle from Equ0 to Flood or Tflood**	**>**	**0.00**	**deg**	**49.85**	**P**
(2)	**Absolute Angle at Equ0 (no moments)**	**<**	**10.00**	**deg**	**7.60**	**P**
(3)	**Angle from Equ0 to RAzero or Flood**	**>**	**7.00**	**deg**	**51.55**	**P**
(4)	**Flood Height at Point 1 to 8**	**>**	**6.56**	**Ft**	**16.54**	**P**
(5)	**Righting Arm at MaxRA**	**>**	**0.16**	**Ft**	**11.23**	**P**

Condition 14 - 10% Lightship
Damage Case 16

RESIDUAL RIGHTING ARMS vs HEEL ANGLE with FLOODING

Total CG: LCG = 85.12f TCG = 0.12s VCG = 23.00
Free Surface Adjustment: 0.17
Adjusted CG: LCG = 85.13f TCG = 0.09s VCG = 23.18

Origin	Degrees of		Displacement	Residual Arms			Flood Pt
Depth	Trim	Heel	Weight(LT)	in Trim	in Heel	Area	Height
11.581	2.05a	7.60s	509.65	0.00	-1.341	0.00	16.54 (6)
11.726	2.13a	8.17s	509.78	0.00	-0.672	-0.57	16.68 (6)
11.868	2.20a	8.74s	509.78	0.00	0.001	-0.76	16.82 (6)
12.114	2.34a	9.74s	509.64	0.01f	1.186	-0.17	17.06 (6)
12.356	2.48a	10.74s	509.64	0.00	2.371	1.61	17.30 (6)
12.593	2.63a	11.74s	509.58	0.00	3.538	4.56	17.54 (6)
12.847	2.79a	12.74s	509.84	0.00	4.623	8.64	17.77 (6)
13.107	2.97a	13.74s	509.84	0.00	5.628	13.77	17.99 (6)
13.370	3.17a	14.74s	509.80	0.00	6.537	19.85	18.20 (6)
13.632	3.37a	15.74s	509.80	0.00	7.341	26.79	18.42 (6)
13.889	3.59a	16.74s	509.80	0.00	8.030	34.48	18.63 (6)
14.140	3.83a	17.74s	509.80	0.00	8.598	42.79	18.85 (6)
14.378	4.07a	18.74s	509.80	0.00	9.050	51.61	19.08 (6)
14.600	4.31a	19.74s	509.79	0.00	9.394	60.85	19.32 (6)
14.804	4.55a	20.74s	509.79	0.00	9.639	70.37	19.56 (6)
14.989	4.80a	21.74s	509.79	0.00	9.796	80.10	19.81 (6)
15.154	5.03a	22.74s	509.81	0.00	9.874	89.93	20.07 (6)
15.263	5.21a	23.49s	509.83	0.00	**9.888**	97.34	20.27 (6)
15.297	5.27a	23.74s	509.82	0.00	9.885	99.81	20.33 (6)
15.420	5.50a	24.74s	509.82	0.00	9.839	109.68	20.61 (6)
15.526	5.72a	25.74s	509.82	0.00	9.746	119.47	20.88 (6)
15.615	5.94a	26.74s	509.82	0.00	9.615	129.15	21.16 (6)
15.689	6.15a	27.74s	509.83	0.00	9.451	138.68	21.44 (6)
15.748	6.36a	28.74s	509.83	0.00	9.260	148.04	21.73 (6)
15.789	6.56a	29.74s	509.83	0.00	9.044	157.19	22.01 (6)
15.807	6.75a	30.74s	509.62	0.00	8.807	166.12	22.30 (6)
15.809	6.93a	31.74s	509.52	0.01a	8.545	174.79	22.60 (6)
15.798	7.11a	32.74s	509.80	0.00	8.262	183.20	22.89 (6)
15.756	7.27a	33.74s	509.54	0.01a	7.969	191.32	23.20 (6)
15.710	7.43a	34.74s	509.79	0.00	7.659	199.13	23.49 (6)
15.640	7.59a	35.74s	509.53	0.01a	7.341	206.63	23.80 (6)
15.571	7.74a	36.74s	509.81	0.00	7.013	213.81	24.09 (6)
15.480	7.88a	37.74s	509.58	0.01a	6.680	220.65	24.39 (6)
15.389	8.02a	38.74s	509.82	0.00	6.338	227.16	24.67 (6)
15.272	8.15a	39.74s	509.59	0.01a	5.991	233.33	24.97 (6)
15.152	8.28a	40.74s	509.82	0.00	5.636	239.14	25.26 (6)
15.007	8.39a	41.74s	509.58	0.01a	5.277	244.60	25.55 (6)
14.860	8.50a	42.74s	509.82	0.00	4.912	249.69	25.84 (6)
14.697	8.61a	43.74s	509.81	0.01a	4.542	254.42	26.12 (6)
14.522	8.71a	44.74s	509.82	0.00	4.169	258.78	26.40 (6)
14.339	8.80a	45.74s	509.81	0.00	3.794	262.76	26.68 (6)
14.145	8.89a	46.74s	509.82	0.00	3.416	266.36	26.96 (6)
13.946	8.97a	47.74s	509.82	0.00	3.036	269.59	27.22 (6)
13.740	9.06a	48.74s	509.82	0.00	2.655	272.43	27.48 (6)

Condition 14 - 10% Lightship
Damage Case 16

13.528	9.13a	49.74s	509.81	0.00	2.273	274.90	27.74 (6)
13.313	9.21a	50.74s	509.82	0.00	1.890	276.98	27.98 (6)
13.094	9.28a	51.74s	509.83	0.00	1.506	278.68	28.22 (6)
12.869	9.34a	52.74s	509.82	0.00	1.122	279.99	28.45 (6)
12.639	9.41a	53.74s	509.82	0.00	0.738	280.92	28.67 (6)
12.406	9.47a	54.74s	509.83	0.00	0.353	281.47	28.88 (6)
12.200	9.53a	55.65s	510.04	0.00	-0.001	281.63	29.06 (6)

Distances in FEET. Specific Gravity = 1.025. Area in Ft-Deg.

Note: The Weight and Center of Gravity used for the righting arms above include tank loads. However, the tank load centers were NOT ALLOWED TO SHIFT with heel and trim changes. Rather, a constant Free Surface Moment of 88.9 Ft-LT was applied to artificially modify the CG.

Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 685.82

	Critical Point		**LCP**	**TCP**	**VCP**
(6)	ER Air Aft P	FLOOD	35.42f	27.45p	23.45

LIM	**STABILITY CRITERION**		**Min/Max**		**Attained**
(1)	**Absolute Angle at Equilibrium**	**<**	**15.00**	**deg**	**8.74 P**
(4)	**Area from Equilibrium to 15 deg or Flood**	**>**	**5.26**	**Ft-deg**	**100.58 P**

Relative angles measured from 8.736s

Condition 14 - 10% Lightship
Damage Case 16