Fast Vehicle Ferry — *M/V Fairweather*

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	Revise Sample Load Conditions 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 Fairweather Trim and Stability Book*, Glosten Associates, Rev A, 9 March 2012

3. *Alaska Marine Highways FVF Stability Report – Fairweather (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 'Fairweather' (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 December 10, 2009, based on the June 12, 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	492.24	LT
LCG	84.19	ft Fwd AP (Fr 0)
VCG	23.20	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.

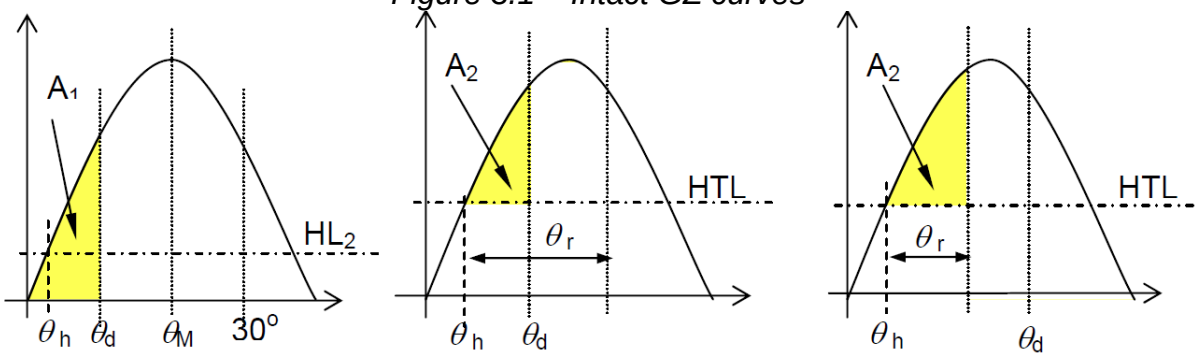
3.1 Intact Stability Criteria

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

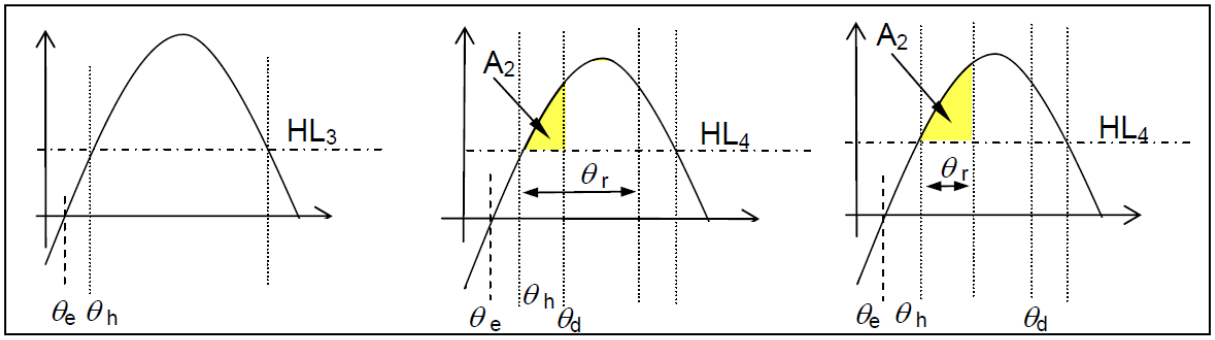
(*) $H_{1/3}$ … significant wave height for the worst intended sea state condition, 4m equates to 13.12 ft.

(**) 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

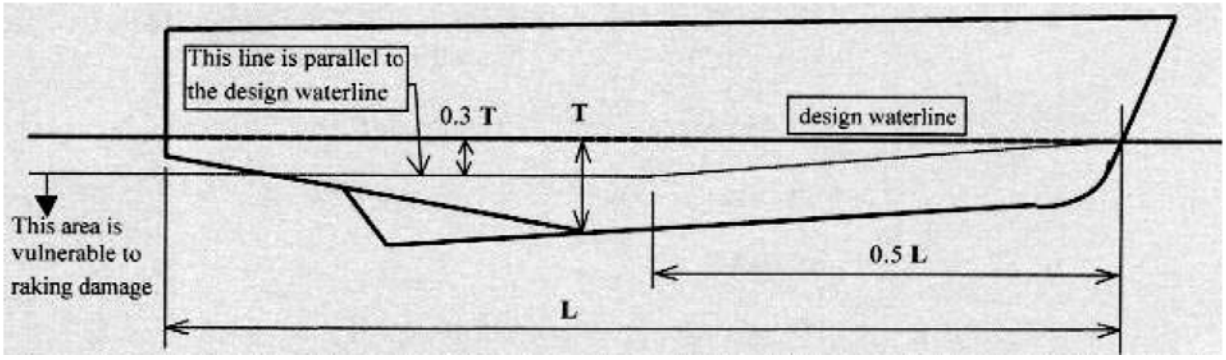
∇ … volume of displacement [m^3] for DWL.

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

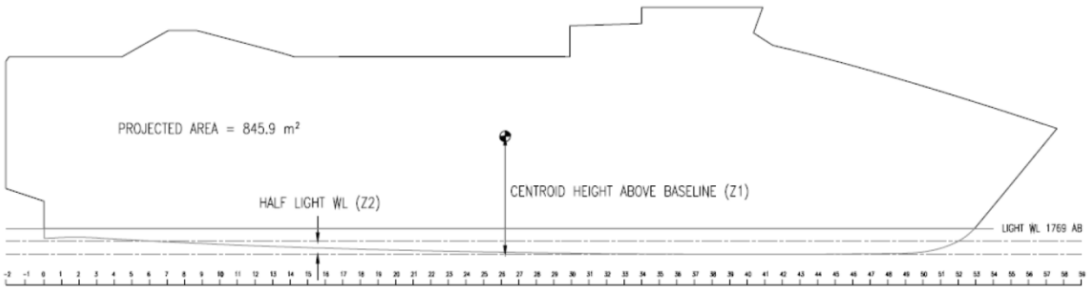
When applying bottom damage (raking or no raking) to multihulls, an obstruction at or below DWL of up to 23' width shall be considered in determining the number hulls damaged. In any damage case, if a lower extent produces more adverse conditions then it will have to be considered.

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		



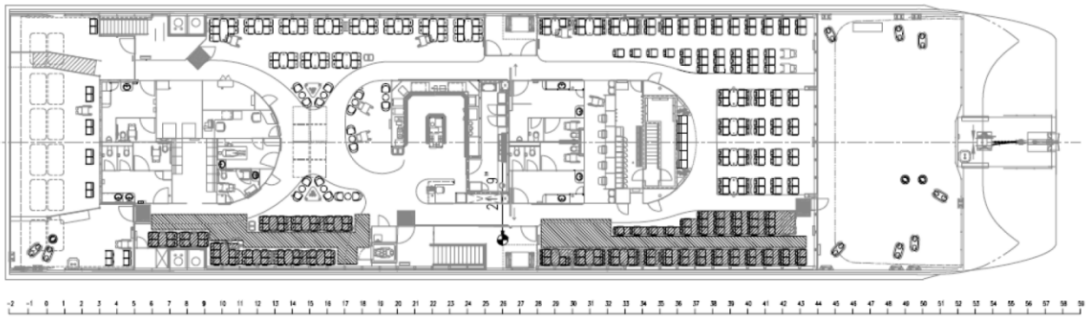
Center of windage area

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 standing
2. Standing passengers are assumed at 4 per square meter
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

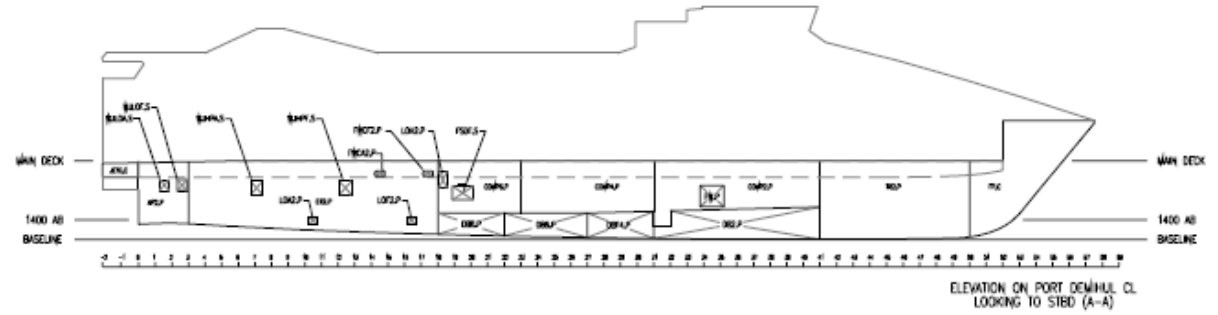
3.5 Damage Scenarios

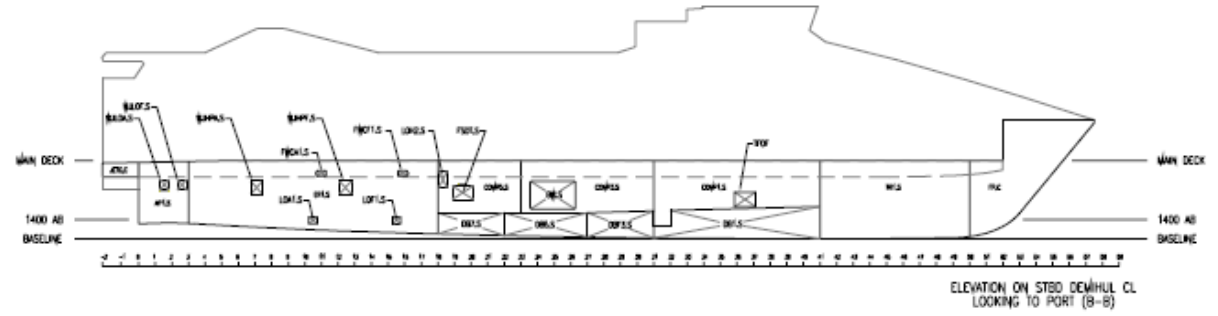
The table below shows the damaged compartments involved in each case scenario.

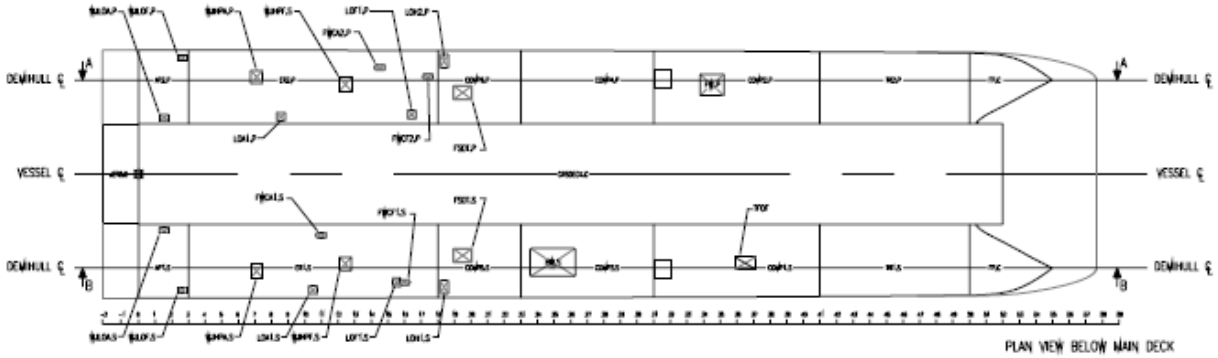
Damage Type	Scenario Number	Damaged Compartments	Number Damaged
Bottom Raking 55% L	1	FP.C, TR1.S, DB1.S, DBF3.S, DB5.S	5
Bottom Raking 35% L	2	FP.C, TR1.S, DB1.S	3
	3	TR1.S, DB1.S, DBF3.S, DB5.S	4
	4	DB1.S, DBF3.S, DB5.S, DB7.S	4
	5	DB1.S, DBF3.S, DB5.S, DB7.S, ER1.S	5
	6	DB5.S, DB7.S, ER1.S	3
	7	DB7.S, 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

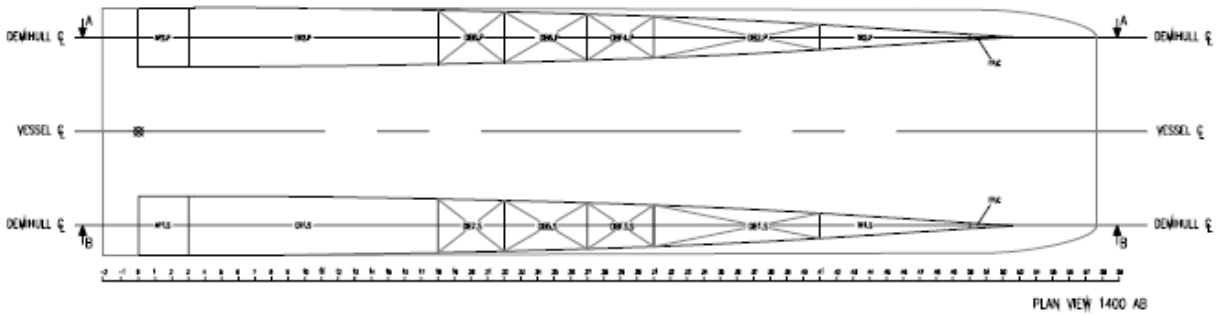
A compartment map is presented in the following section. Illustrations of each scenario are also presented, where the hatched regions represent the damaged tanks.

3.6 Compartment Map



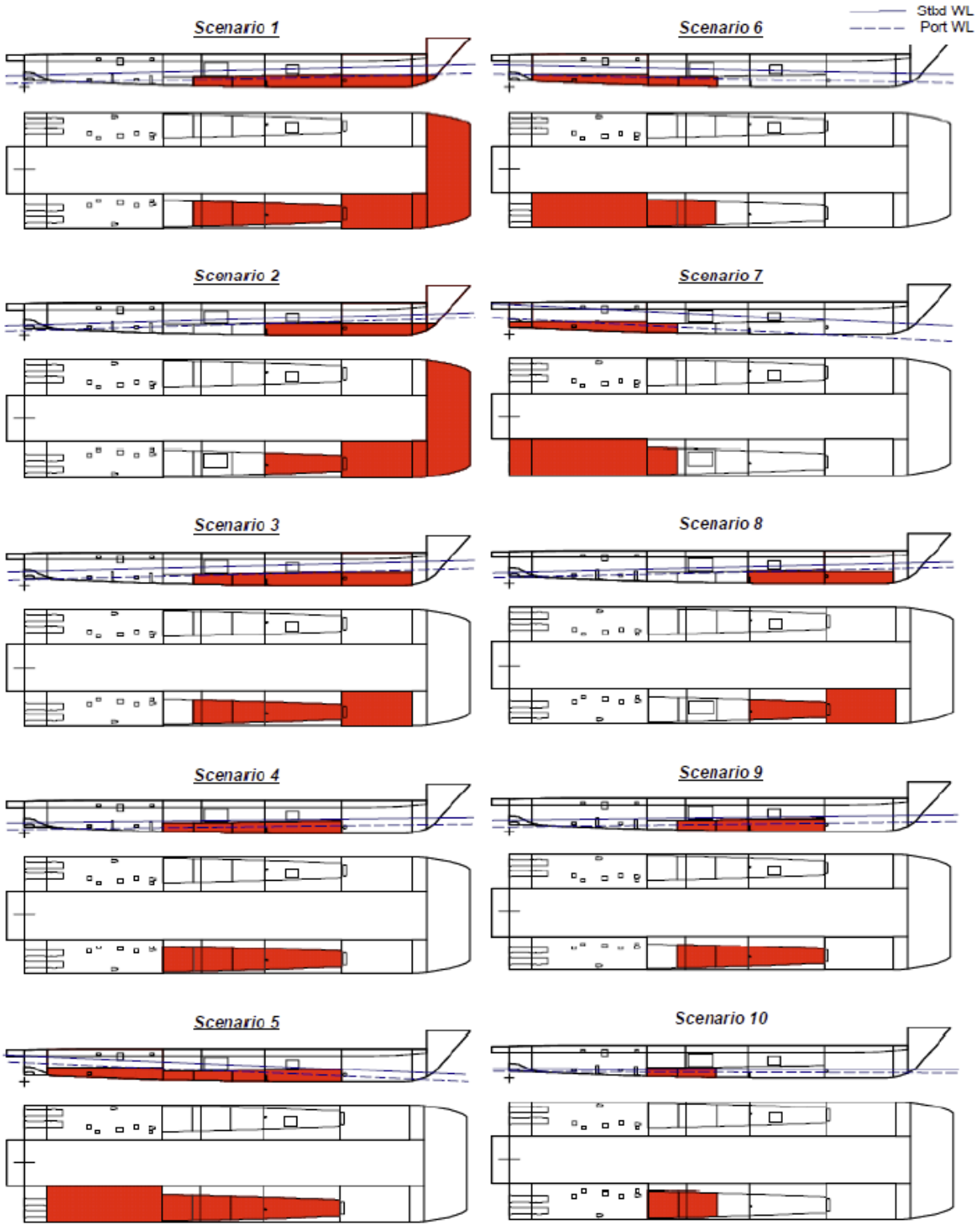


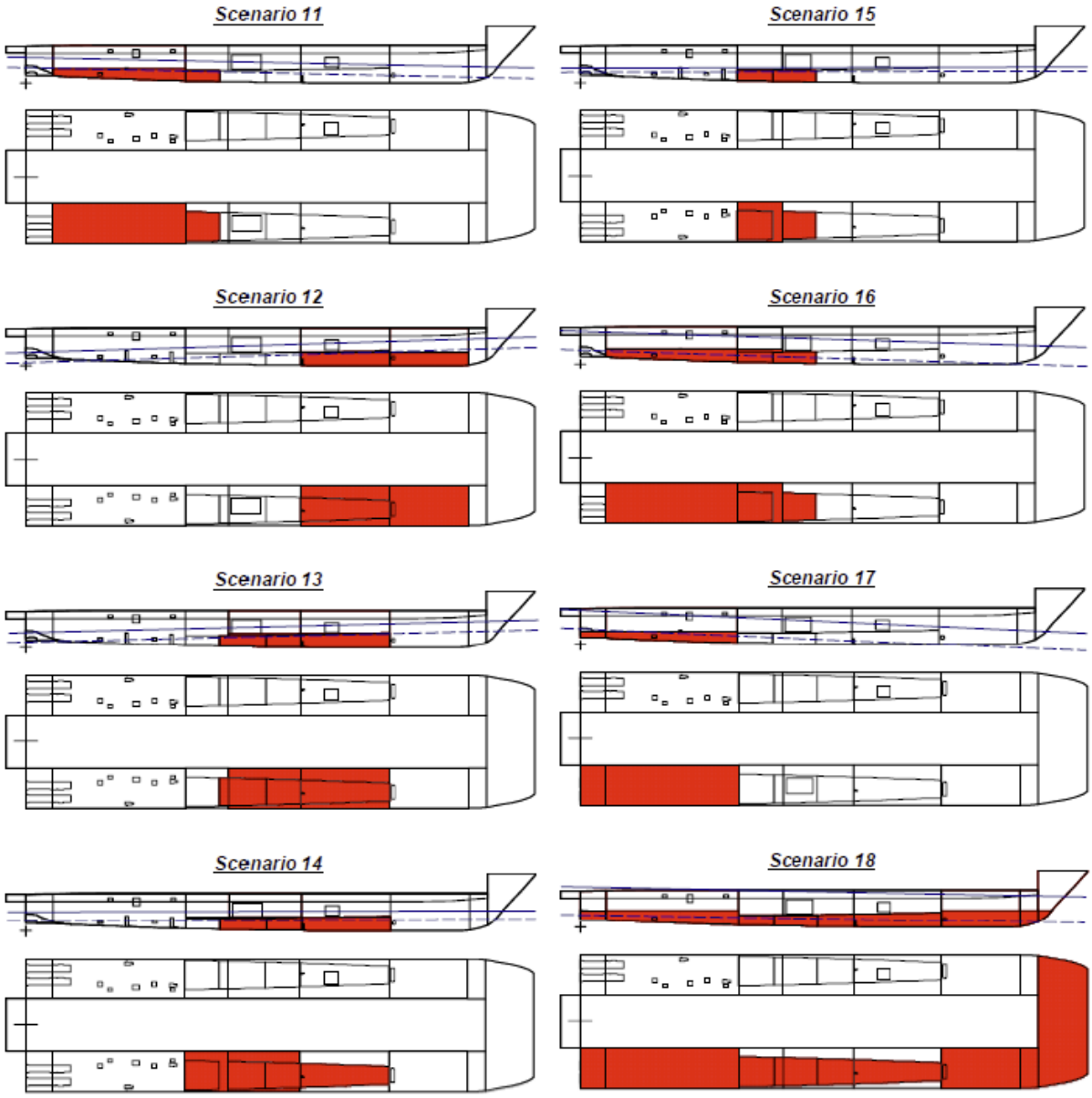




3.7 Damage Scenario Illustrations

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

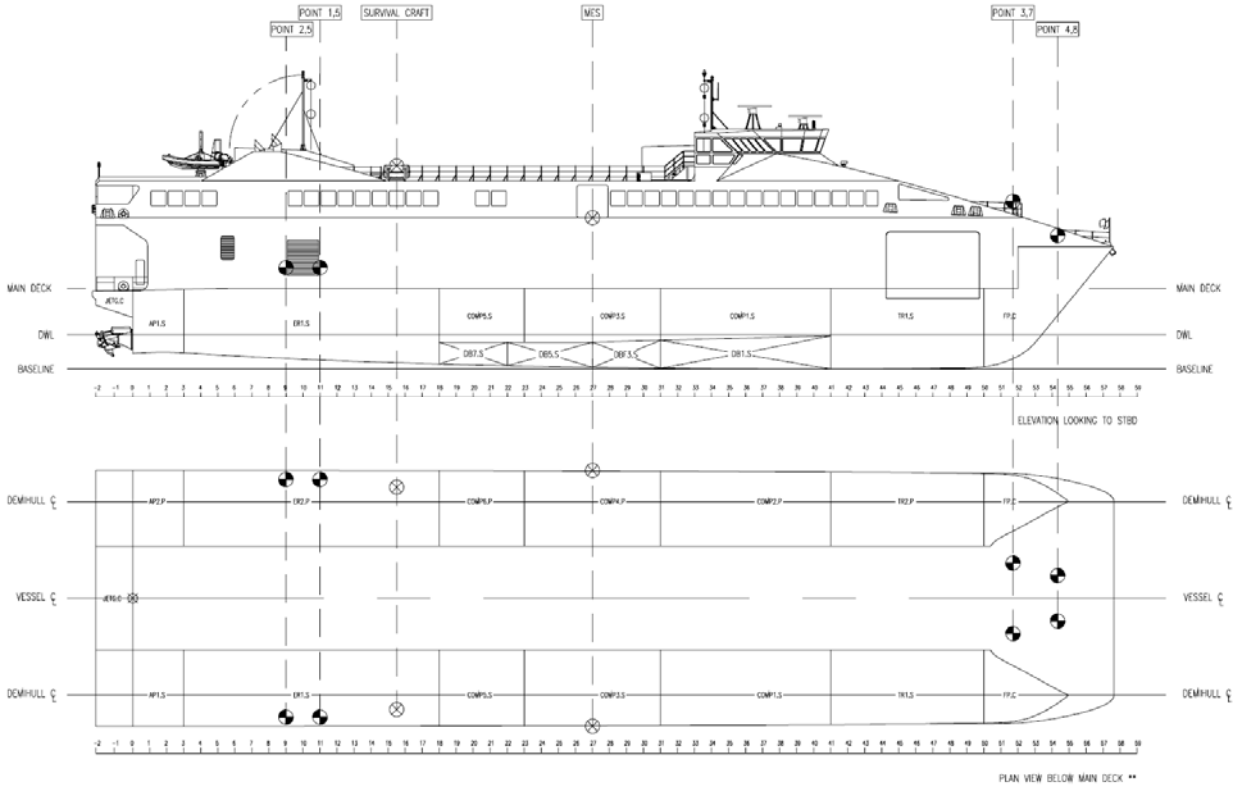
Flood Point	Point Name	Longitudinal ft (+Fwd AP)	Transverse ft (+Stbd)	Vertical ft (+Abv BL)	Linked Room
1	ER Air Fwd S	43.30	27.45	23.45	ER1.S
2	ER Air Aft S	35.42	27.45	23.45	ER1.S
3	EN 90 S"	213.86	5.25	30.90	FP.C
4	EN 91 S"	203.52	8.13	38.80	FP.C
5	ER Air FWD P	43.30	-27.45	23.45	ER1.P
6	ER Air Aft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

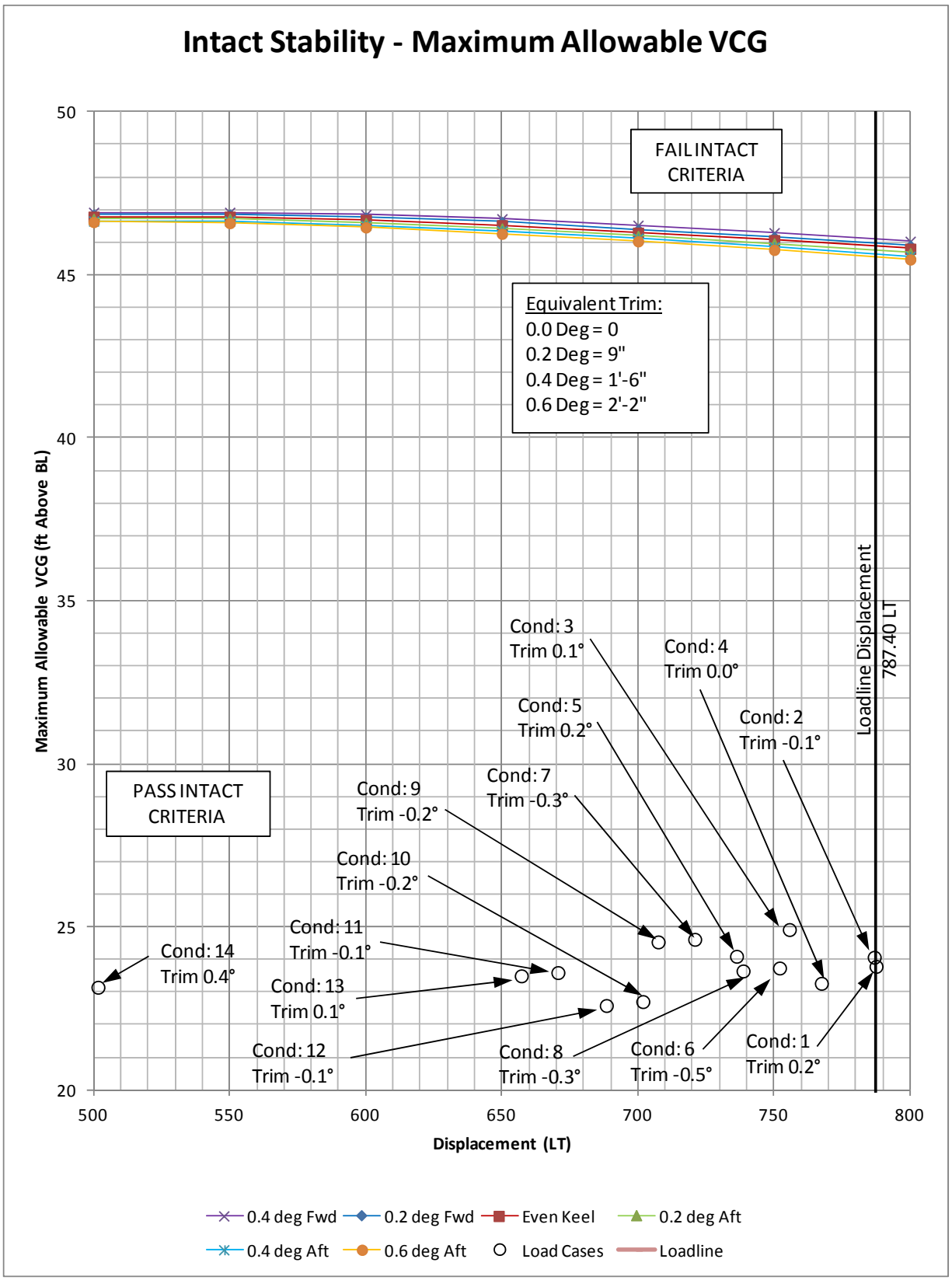
Maximum VCG curves for both intact and damaged stability are shown in Sections 4.2 and 4.3. The intact and damaged stability criteria used to generate the curves are based on the criteria shown in Sections 3.1 and 3.2. The final maximum VCG points plotted in the graphs represent the minimum values obtained 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.

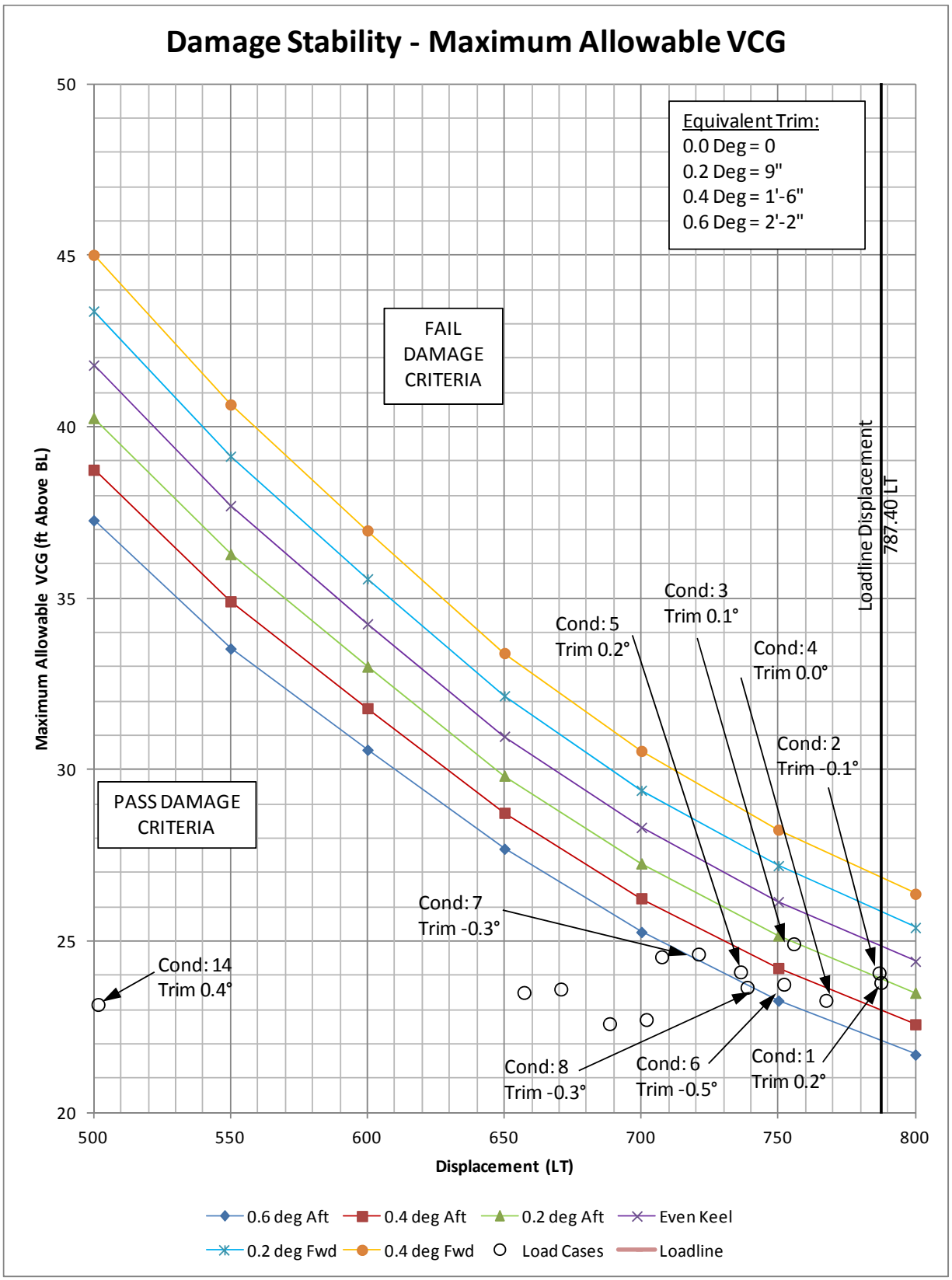
4.2 Intact Stability Case

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 0.0°
Cond: 5 Trim 0.2°
Cond: 2 Trim -0.1°
Cond: 7 Trim -0.3°
Cond: 9 Trim -0.2°
Cond: 10 Trim -0.2°
Cond: 11 Trim -0.1°
Cond: 14 Trim 0.4°
Cond: 13 Trim 0.1°
Cond: 12 Trim -0.1°
Cond: 8 Trim -0.3°
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
Loadline

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
Maximum Allowable VCG (ft Above BL)
Displacement (LT)
50
45
40
35
30
25
20
500
550
600
650
700
750
800
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: 5
Trim 0.2°
Cond: 4
Trim 0.0°
Cond: 2
Trim -0.1°
Cond: 7
Trim -0.3°
Cond: 14
Trim 0.4°
Cond: 8
Trim -0.3°
Cond: 6
Trim -0.5°
Cond: 1
Trim 0.2°
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	8.80	0.2	64.8	163.1	17.2	1.9	1.7	3.6	118.4	PASS
21AEQ 4LT Departure with Ice	2	8.39	-0.1	65.1	163.4	17.2	1.7	1.4	3.3	119.4	PASS
21AEQ 4LT Arrival with Ice	3	8.40	0.1	66.6	156.5	16.7	2.0	1.7	3.7	118.1	PASS
22AEQ 5LT Departure with No Ice	4	8.32	0.0	67.4	163.6	16.9	1.6	1.5	3.3	122.7	PASS
22AEQ 5LT Arrival with No Ice	5	8.33	0.1	68.9	156.6	16.4	2.0	1.8	3.7	121.3	PASS
20AEQ 6RV Fwd Departure with Ice	6	7.55	-0.5	68.8	163.9	16.8	1.9	1.8	3.6	121.9	PASS
20AEQ 6RV Fwd Arrival with Ice	7	7.55	-0.3	70.4	156.1	16.3	2.3	2.1	4.0	119.5	PASS
30AEQ 2ST Aft Departure with Ice	8	7.66	-0.3	69.8	162.3	16.6	1.6	1.5	3.2	124.9	PASS
30AEQ 2ST Aft Arrival with Ice	9	7.66	-0.1	71.5	154.6	16.0	1.9	1.8	3.6	122.9	PASS
20AEQ 2ST 6RV Fwd Departure with no Ice	10	7.48	-0.2	74.0	160.2	16.0	1.7	1.8	3.3	128.5	PASS
20AEQ 2ST 6RV Fwd Arrival with no Ice	11	7.49	-0.1	76.0	152.6	15.5	2.1	2.1	3.7	125.6	PASS
30AEQ 2ST Aft Departure with no Ice	12	7.59	-0.1	75.2	158.3	15.7	1.4	1.5	3.0	132.0	PASS
30AEQ 2ST Aft Arrival with no Ice	13	7.61	0.1	77.2	150.3	15.2	1.7	1.8	3.4	129.5	PASS
10% Lightship	14	6.75	0.4	100.5	129.3	12.4	1.2	1.7	2.9	143.3	PASS

Condition 1 - HSC Loadline

WEIGHT STATUS

Trim: Aft 0.71/210.33, Heel: zero

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	492.24	84.19f	0.03p	23.20
Pax @185 lb ea (Stand)	20.65	105.24f	0.00	38.55
Luggage @20 lb ea Pax	2.22	115.75f	0.00	21.33
Vehicles AEQ @6 kip ea	91.09	102.80f	0.25s	21.33
Vehicles LT @63 kip ea	56.25	22.00f	0.01s	27.46
Vehicles ST @45 kip ea	20.09	55.00f	0.00	27.46
Bikes @30 lb ea	1.53	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**	**83.99f**	**0.02s**	**24.93**

	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	26.2
DBF3.S	0.980	0.840	20.43	114.06f	22.47s	3.50	26.2
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**	**85.76f**	**0.00**	**23.67**	
Free Surface Adjustment						**0.11**	
Adjusted CG				**85.76f**	**0.00**	**23.79**	

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 0.71/210.33, No Heel, VCG = 23.67

LCF Draft	Displacement Weight(LT)	Buoyancy-Ctr. LCB	VCB	Weight/ Inch	LCF	Moment/ In trim	GML	GMT
8.516	787.44	85.70f	5.11	10.59	85.33f	138.24	443.1	64.82

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 = 85.76f TCG = 0.00 VCG = 23.67
Free Surface Adjustment: 0.11
Adjusted CG: LCG = 85.76f TCG = 0.00 VCG = 23.79

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Righting Arms in Trim	in Heel	Area	Flood Pt Height	
8.804	0.19a	0.00	787.43	0.00	0.000	0.00	14.77	(2)
8.794	0.25a	5.00s	787.40	0.00	5.636	14.09	12.33	(2)
8.813	0.46a	10.00s	787.44	0.00	11.265	56.34	9.80	(2)
8.816	0.49a	10.50s	787.43	0.00	11.824	62.12	9.54	(2)
8.814	0.51a	11.00s	787.43	0.00	12.378	68.17	9.28	(2)
8.808	0.54a	11.50s	787.43	0.00	12.924	74.49	9.03	(2)
8.798	0.57a	12.00s	787.43	0.00	13.463	81.09	8.78	(2)
8.781	0.60a	12.50s	787.43	0.00	13.990	87.95	8.54	(2)
8.757	0.62a	13.00s	787.43	0.00	14.500	95.08	8.30	(2)
8.722	0.64a	13.50s	787.43	0.00	14.987	102.45	8.07	(2)
8.676	0.66a	14.00s	787.43	0.00	15.447	110.06	7.84	(2)
8.617	0.68a	14.50s	787.43	0.00	15.871	117.88	7.63	(2)
8.546	0.70a	15.00s	787.43	0.00	16.253	125.92	7.43	(2)
8.461	0.71a	15.50s	787.43	0.00	16.582	134.12	7.24	(2)
8.360	0.73a	16.00s	787.43	0.00	16.847	142.48	7.06	(2)
8.241	0.74a	16.50s	787.43	0.00	17.028	150.95	6.90	(2)
8.102	0.76a	17.00s	787.43	0.00	17.116	159.49	6.77	(2)
8.035	0.76a	17.21s	787.43	0.00	17.125	163.12	6.71	(2)
7.744	0.78a	18.00s	787.42	0.00	17.012	176.57	6.56	(2)
7.297	0.79a	19.00s	787.43	0.00	16.666	193.42	6.42	(2)
6.842	0.79a	20.00s	787.19	0.00	16.308	209.92	6.29	(2)
4.567	0.81a	25.00s	787.43	0.00	14.450	287.02	5.59	(2)
2.309	0.86a	30.00s	787.41	0.00	12.485	354.40	4.80	(2)
0.114	0.93a	35.00s	787.42	0.00	10.423	411.71	3.92	(2)
-2.002	1.02a	40.00s	787.44	0.00	8.276	458.49	2.95	(2)
-4.032	1.12a	45.00s	787.56	0.00	6.063	494.37	1.89	(2)
-5.976	1.21a	50.00s	787.56	0.00	3.802	519.05	0.77	(2)
-7.216	1.28a	53.32s	787.41	0.01f	2.287	529.15	0.00	(2)
-7.822	1.31a	55.00s	787.45	0.00	1.516	532.35	*-0.40*	(2)
-8.979	1.37a	58.31s	787.45	0.00	-0.002	534.86	*-1.21*	(2)
-9.547	1.40a	60.00s	787.44	0.00	-0.771	534.21	*-1.63*	(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

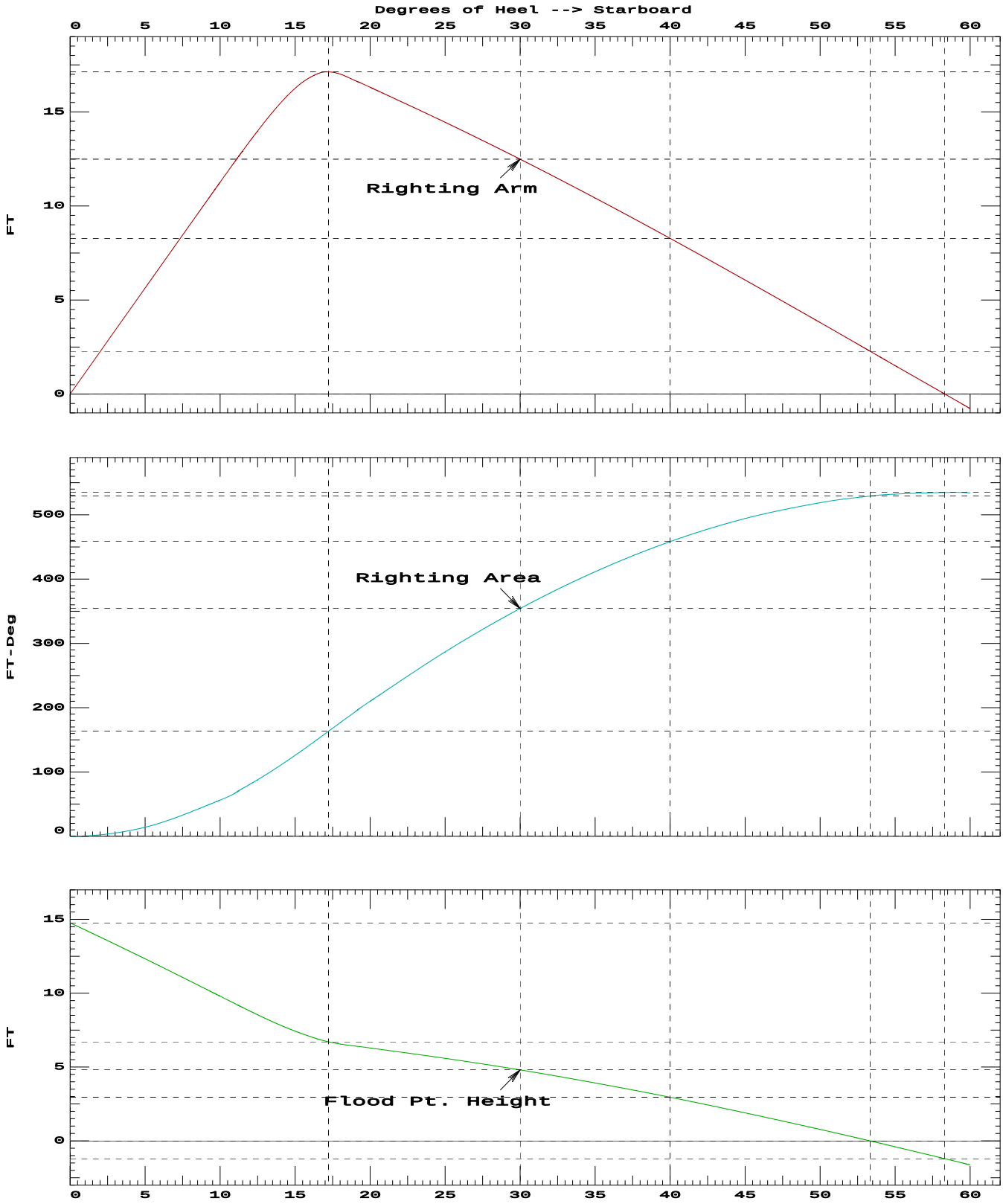
continued next page

Condition 1 - HSC Loadline

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	Area from abs 0.000 deg to 17.2	>	18.02	Ft-deg	163.12	P
(2)	Absolute Angle at MaxRA	>	10.00	deg	17.21	P

Relative angles measured from 0.000

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  =    1696.7
    HLT =    3172.4
```

With HMMT = TL 1696.7
Vessel Heel < 8.00 deg Calc Heel = 1.90 deg

With HMMT = max(PL,HL2) 1475.7
Vessel Heel < 10.00 deg Calc Heel = 1.66 deg

With HMMT = TL+HL2 3172.4
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 = 85.76f TCG = 0.00s VCG = 23.67
Free Surface Adjustment: 0.11
Adjusted CG: LCG = 85.76f TCG = 0.00 VCG = 23.79

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Area	Flood Pt Height	
8.798	0.22a	3.57s	787.45	0.00	0.000	0.00	13.04	(2)
8.800	0.38a	8.57s	787.43	0.00	5.626	14.07	10.53	(2)
8.715	0.64a	13.57s	787.36	0.00	11.026	55.79	8.04	(2)
8.668	0.66a	14.07s	787.43	0.00	11.480	61.42	7.82	(2)
8.608	0.68a	14.57s	787.43	0.00	11.899	67.26	7.60	(2)
8.535	0.70a	15.07s	787.43	0.00	12.275	73.30	7.40	(2)
8.447	0.71a	15.57s	787.43	0.00	12.596	79.52	7.22	(2)
8.345	0.73a	16.07s	787.43	0.00	12.850	85.88	7.04	(2)
8.223	0.74a	16.57s	787.43	0.00	13.020	92.35	6.88	(2)
8.081	0.76a	17.07s	787.42	0.00	13.095	98.88	6.75	(2)
8.034	0.76a	17.21s	787.44	0.00	**13.100**	100.79	6.71	(2)
7.912	0.77a	17.57s	787.43	0.00	13.076	105.43	6.64	(2)
7.715	0.78a	18.07s	787.42	0.00	12.967	111.94	6.55	(2)
7.492	0.78a	18.57s	787.43	0.00	12.794	118.38	6.48	(2)
7.267	0.79a	19.07s	787.43	0.00	12.617	124.73	6.41	(2)
7.041	0.79a	19.57s	787.43	0.00	12.438	130.99	6.35	(2)
6.812	0.79a	20.07s	787.17	0.01a	12.256	137.17	6.28	(2)
6.588	0.79a	20.57s	787.43	0.00	12.077	143.25	6.21	(2)
6.133	0.79a	21.57s	787.43	0.00	11.712	155.14	6.07	(2)
5.677	0.80a	22.57s	787.43	0.00	11.342	166.67	5.94	(2)
5.220	0.80a	23.57s	787.43	0.00	10.968	177.83	5.79	(2)
2.950	0.84a	28.57s	787.42	0.00	9.033	227.87	5.04	(2)
0.735	0.90a	33.57s	787.41	0.00	6.997	267.99	4.19	(2)
-1.405	0.99a	38.57s	787.42	0.00	4.873	297.70	3.24	(2)
-3.459	1.09a	43.57s	787.53	0.00	2.678	316.61	2.20	(2)
-5.429	1.19a	48.57s	787.57	0.00	0.428	324.40	1.10	(2)
-5.790	1.20a	49.51s	787.44	0.00	-0.001	324.60	0.89	(2)
-7.212	1.28a	53.31s	787.43	0.00	-1.738	321.30	0.00	(2)
-7.305	1.28a	53.57s	787.43	0.00	-1.855	320.84	*-0.06*	(2)
-9.066	1.38a	58.57s	787.44	0.00	-4.144	305.85	*-1.27*	(2)
-10.689	1.47a	63.57s	787.44	0.00	-6.415	279.44	*-2.54*	(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

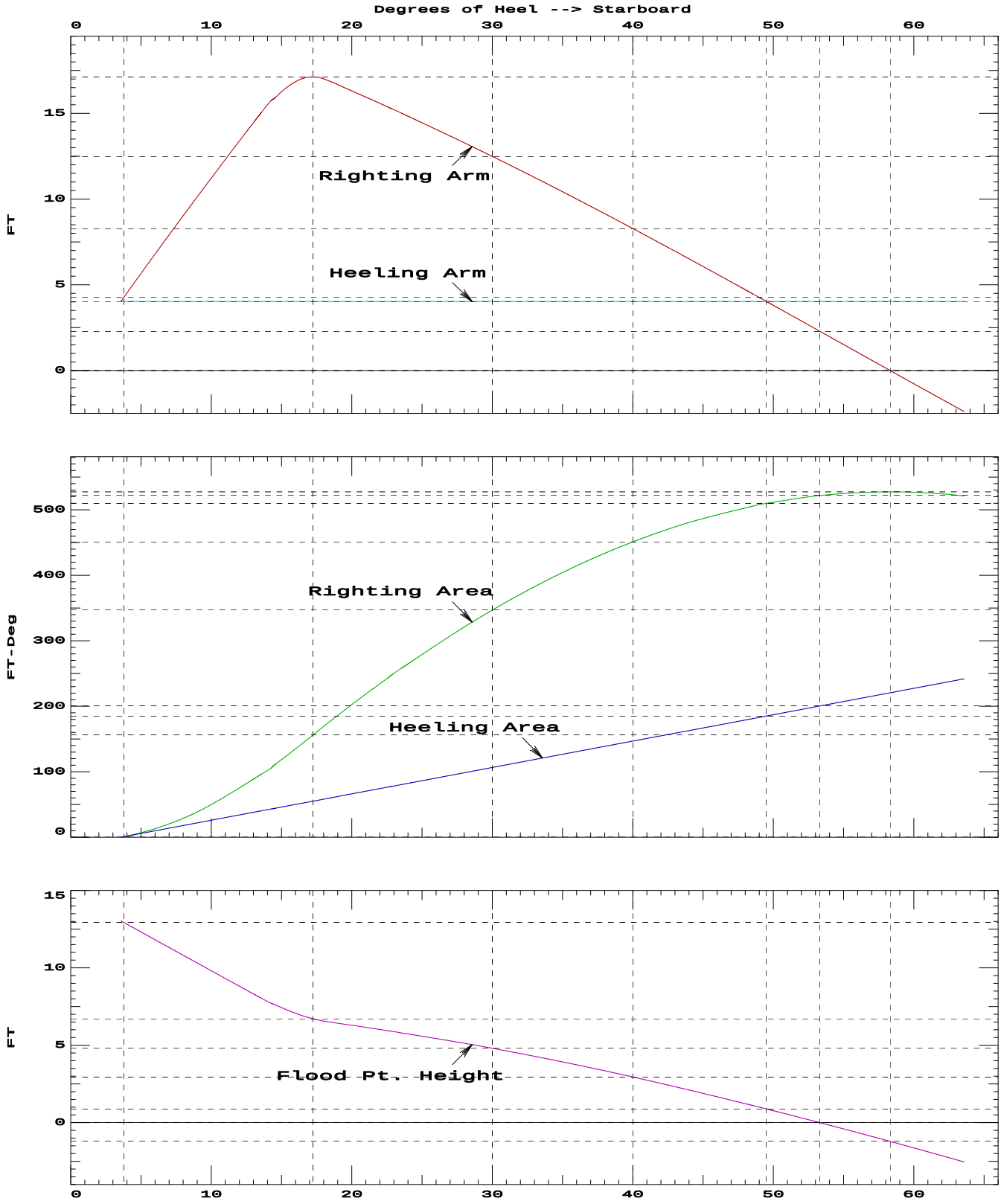
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 3172.40

	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**	**118.38**	**P**
(2)	**Angle from Equilibrium to RAzero**	**>**	**15.00**	**deg**	**45.94**	**P**

Relative angles measured from 3.567s

Condition 1 - HSC Loadline



Condition 2 - 21AEQ 4LT Departure with Ice

WEIGHT STATUS

Trim: Fwd 0.29/210.33, Heel: Port 0.25 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	492.24	84.19f	0.03p	23.20
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	56.26	116.10f	3.50p	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	**738.52**	**86.25f**	**0.29p**	**25.23**

	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	20.98s	7.96	6.8
DBF4.P	0.980	0.840	20.43	114.07f	22.48p	3.50	26.5
DBF3.S	0.980	0.840	20.43	114.07f	22.47s	3.50	26.5
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**	**112.97f**	**0.28p**	**4.51**	**88.9***
Total Weight			**786.77**	**87.89f**	**0.29p**	**23.96**	
Free Surface Adjustment						**0.11**	
Adjusted CG				**87.89f**	**0.29p**	**24.07**	

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 0.29/210.33, Heel: Port 0.25 deg., VCG = 23.96

LCF Draft	Displacement Weight(LT)	Buoyancy-Ctr. LCB	VCB	Weight/ Inch	LCF	Moment/ In trim	GML	GMT
8.510	786.76	87.91f	5.11	10.66	86.42f	141.18	452.9	65.12

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 - 21AEQ 4LT Departure with Ice

RIGHTING ARMS vs HEEL ANGLE

Total CG: LCG = 87.89f TCG = 0.29p VCG = 23.96
Free Surface Adjustment: 0.11
Adjusted CG: LCG = 87.89f TCG = 0.29p VCG = 24.07

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Righting Arms in Trim	in Heel	Area	Flood Pt Height	
8.393	0.08f	0.25p	786.76	0.00	0.000	0.00	14.88	(5)
8.376	0.03f	4.75s	786.74	0.00	5.671	14.18	12.70	(1)
8.401	0.18a	9.75s	786.76	0.00	11.344	56.71	10.17	(2)
8.400	0.20a	10.25s	786.76	0.00	11.902	62.53	9.92	(2)
8.396	0.23a	10.75s	786.76	0.00	12.453	68.61	9.67	(2)
8.387	0.26a	11.25s	786.76	0.00	12.999	74.98	9.42	(2)
8.372	0.28a	11.75s	786.76	0.00	13.535	81.61	9.17	(2)
8.350	0.30a	12.25s	786.76	0.00	14.058	88.51	8.93	(2)
8.319	0.33a	12.75s	786.76	0.00	14.565	95.66	8.70	(2)
8.277	0.34a	13.25s	786.76	0.00	15.052	103.07	8.47	(2)
8.224	0.36a	13.75s	786.76	0.00	15.514	110.71	8.25	(2)
8.159	0.37a	14.25s	786.76	0.00	15.944	118.57	8.04	(2)
8.080	0.38a	14.75s	786.76	0.00	16.336	126.64	7.85	(2)
7.984	0.39a	15.25s	786.76	0.00	16.681	134.90	7.66	(2)
7.868	0.40a	15.75s	786.77	0.00	16.968	143.31	7.50	(2)
7.734	0.40a	16.25s	786.76	0.00	17.188	151.85	7.34	(2)
7.584	0.40a	16.75s	786.76	0.00	17.325	160.48	7.21	(2)
7.530	0.40a	16.91s	786.76	0.00	17.350	163.36	7.17	(2)
7.443	0.41a	17.17s	786.76	0.00	**17.364**	167.76	7.11	(2)
7.222	0.41a	17.75s	786.76	0.00	17.291	177.81	7.00	(2)
6.780	0.42a	18.75s	786.77	0.00	16.946	194.96	6.86	(2)
6.332	0.42a	19.75s	786.77	0.00	16.583	211.73	6.73	(2)
4.064	0.45a	24.75s	786.76	0.00	14.701	290.14	6.02	(2)
1.788	0.50a	29.75s	786.75	0.00	12.718	358.73	5.26	(2)
-0.423	0.57a	34.75s	786.78	0.00	10.637	417.16	4.40	(2)
-2.551	0.65a	39.75s	786.86	0.00	8.466	464.95	3.43	(2)
-4.596	0.75a	44.75s	786.88	0.00	6.221	501.70	2.39	(2)
-6.546	0.85a	49.75s	786.88	0.00	3.926	527.08	1.27	(2)
-8.385	0.95a	54.75s	786.88	0.01f	1.606	540.92	0.09	(2)
-8.513	0.96a	55.11s	786.82	0.00	1.435	541.48	0.00	(2)
-9.581	1.02a	58.21s	786.80	0.00	-0.001	543.70	*-0.76*	(2)
-10.094	1.05a	59.75s	786.78	0.00	-0.715	543.15	*-1.15*	(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.

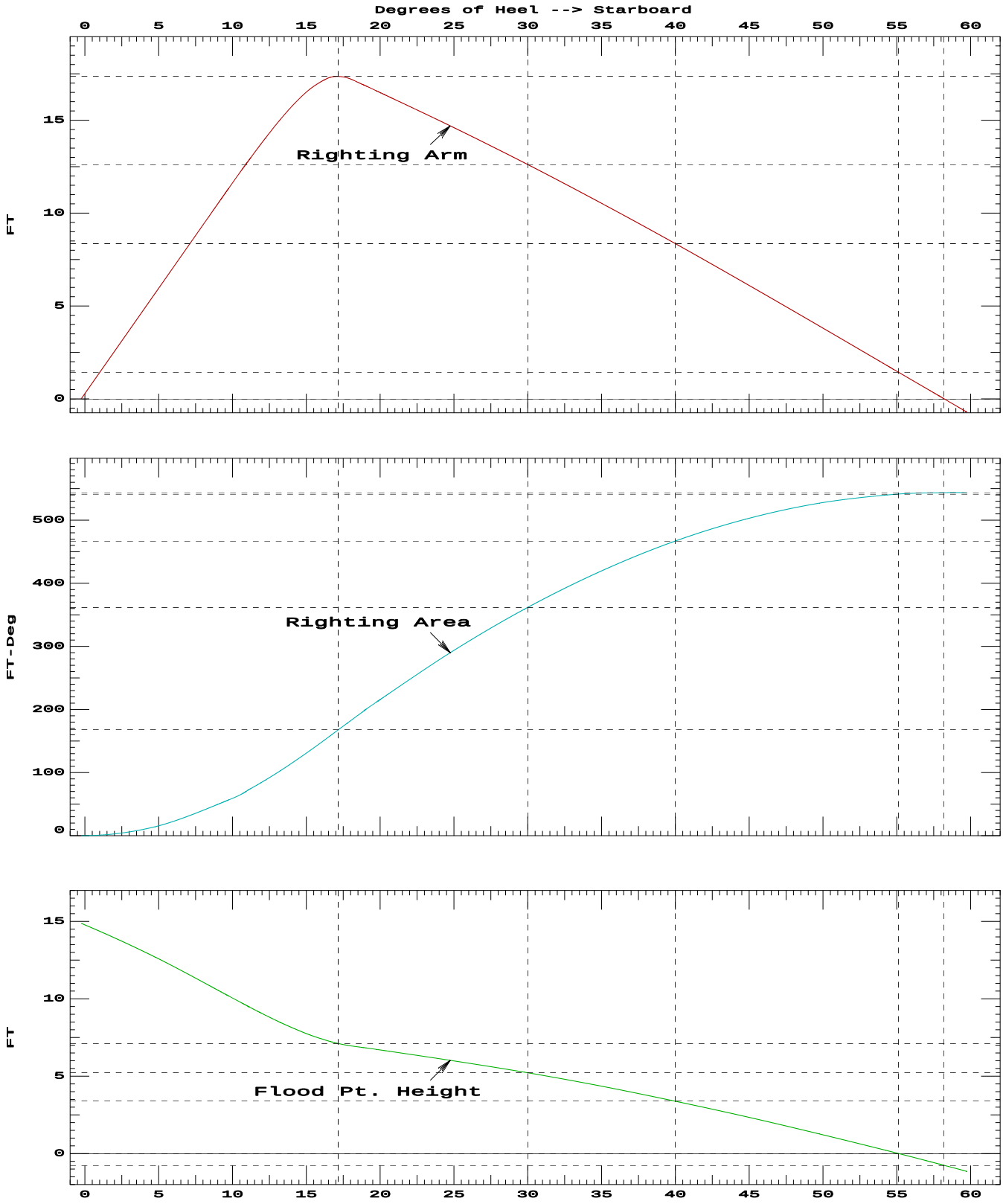
Condition 2 - 21AEQ 4LT Departure with Ice

	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 -0.254 deg to 17.2**	**>**	**18.07**	**Ft-deg**	**163.36 P**
(2)	**Absolute Angle at MaxRA**	**>**	**10.00**	**deg**	**17.17 P**

Relative angles measured from 0.254p

Condition 2 - 21AEQ 4LT Departure with Ice



Condition 2 - 21AEQ 4LT Departure with Ice

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

Calculated Heeling Moments
     LONG TONS - FEET
    HL1 =     983.8
    HL2 =    1475.7
    PL  =     449.7
    TL  =    1718.5
    HLT =    3194.2
```

```
With HMMT = TL
        1718.5
```

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

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

```
Vessel Heel <   10.00 deg
Calc Heel =  1.40 deg
```

```
With HMMT = TL+HL2
            3194.2
```

```
Vessel Heel <   12.00 deg
Calc Heel =  3.32 deg
```

Condition 2 - 21AEQ 4LT Departure with Ice

*** Residual Area Check ***

RESIDUAL RIGHTING ARMS vs HEEL ANGLE

Total CG: LCG = 87.89f TCG = 0.29p VCG = 23.96
Free Surface Adjustment: 0.11
Adjusted CG: LCG = 87.89f TCG = 0.29p VCG = 24.07

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Area	Flood Pt Height	
8.382	0.05f	3.32s	786.80	0.00	0.000	0.00	13.40	(1)
8.388	0.10a	8.32s	786.76	0.00	5.671	14.18	10.91	(2)
8.269	0.35a	13.32s	786.70	0.00	11.066	56.13	8.44	(2)
8.215	0.36a	13.82s	786.76	0.00	11.523	61.78	8.22	(2)
8.148	0.37a	14.32s	786.76	0.00	11.948	67.65	8.01	(2)
8.067	0.38a	14.82s	786.76	0.00	12.333	73.72	7.82	(2)
7.968	0.39a	15.32s	786.76	0.00	12.670	79.97	7.64	(2)
7.849	0.40a	15.82s	786.76	0.00	12.948	86.37	7.47	(2)
7.713	0.40a	16.32s	786.76	0.00	13.157	92.90	7.32	(2)
7.559	0.40a	16.82s	786.75	0.00	13.281	99.51	7.19	(2)
7.443	0.41a	17.17s	786.77	0.00	**13.307**	104.11	7.11	(2)
7.388	0.41a	17.32s	786.75	0.00	13.301	106.16	7.08	(2)
7.191	0.41a	17.82s	786.75	0.00	13.214	112.79	6.99	(2)
6.971	0.42a	18.32s	786.76	0.00	13.043	119.35	6.92	(2)
6.747	0.42a	18.82s	786.76	0.00	12.863	125.83	6.85	(2)
6.523	0.42a	19.32s	786.76	0.00	12.682	132.21	6.79	(2)
6.298	0.43a	19.82s	786.76	0.00	12.499	138.51	6.72	(2)
6.073	0.43a	20.32s	786.76	0.00	12.316	144.71	6.65	(2)
5.622	0.43a	21.32s	786.76	0.00	11.945	156.84	6.51	(2)
5.169	0.44a	22.32s	786.76	0.00	11.570	168.60	6.37	(2)
4.715	0.45a	23.32s	786.76	0.00	11.191	179.98	6.23	(2)
2.433	0.48a	28.32s	786.75	0.00	9.236	231.09	5.49	(2)
0.198	0.54a	33.32s	786.76	0.00	7.183	272.18	4.65	(2)
-1.953	0.63a	38.32s	786.85	0.00	5.036	302.77	3.72	(2)
-4.022	0.72a	43.32s	786.87	0.00	2.810	322.42	2.70	(2)
-6.001	0.82a	48.32s	786.88	0.00	0.527	330.78	1.60	(2)
-6.438	0.84a	49.46s	786.77	0.00	-0.001	331.08	1.34	(2)
-7.873	0.92a	53.32s	786.84	0.00	-1.789	327.64	0.43	(2)
-8.517	0.95a	55.12s	786.77	0.00	-2.625	323.67	0.00	(2)
-9.621	1.02a	58.32s	786.82	0.00	-4.112	312.88	*-0.79*	(2)
-11.221	1.13a	63.32s	786.78	0.00	-6.417	286.55	*-2.07*	(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 - 21AEQ 4LT Departure with Ice

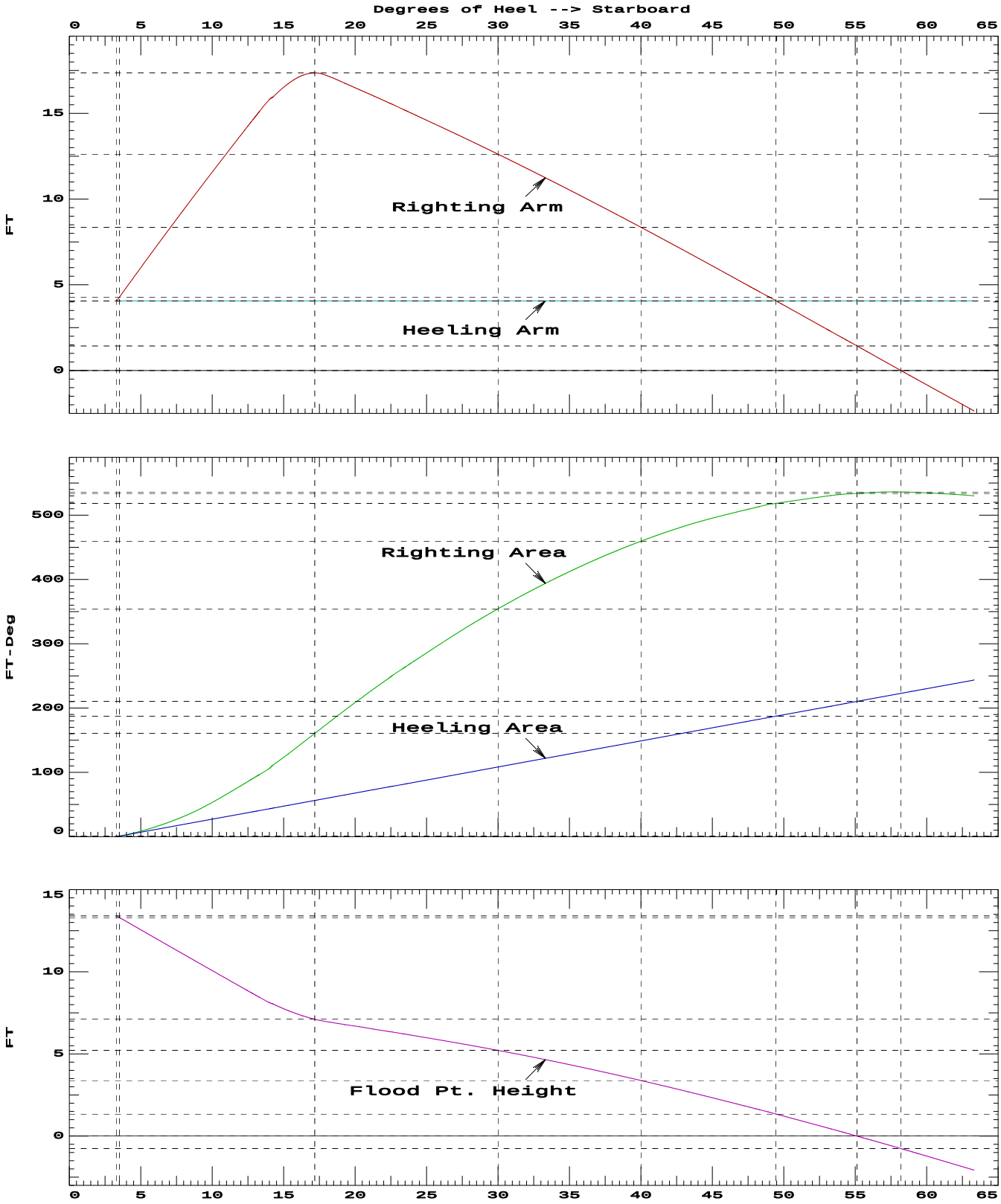
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 3194.17

	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**	**119.35**	**P**
(2)	**Angle from Equilibrium to RAzero**	**>**	**15.00**	**deg**	**46.14**	**P**

Relative angles measured from 3.320s

Condition 2 - 21AEQ 4LT Departure with Ice



Condition 3 - 21AEQ 4LT Arrival with Ice

WEIGHT STATUS

Trim: Aft 0.33/210.33, Heel: Stbd 0.07 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	492.24	84.19f	0.03p	23.20
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	56.26	116.10f	3.50p	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	**737.39**	**86.22f**	**0.29p**	**25.21**

	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	13.55	98.12f	21.00s	10.37	0.9
DBF4.P	0.100	0.840	2.08	114.24f	22.46p	0.77	19.1
DBF3.S	0.100	0.840	2.08	114.24f	22.48s	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			**755.59**	**86.61f**	**0.08s**	**24.80**	
Free Surface Adjustment						**0.12**	
Adjusted CG				**86.61f**	**0.08s**	**24.92**	

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 0.33/210.33, Heel: Stbd 0.07 deg., VCG = 24.80

LCF Draft	Displacement Weight(LT)	Buoyancy-Ctr. LCB	VCB	Weight/ Inch	LCF	Moment/ In trim	GML	GMT
8.265	755.59	86.58f	4.97	10.53	85.35f	136.60	456.3	66.58

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 - 21AEQ 4LT Arrival with Ice

RIGHTING ARMS vs HEEL ANGLE

Total CG: LCG = 86.61f TCG = 0.08s VCG = 24.80
Free Surface Adjustment: 0.12
Adjusted CG: LCG = 86.61f TCG = 0.08s VCG = 24.92

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Righting Arms in Trim	in Heel	Area	Flood Pt Height	
8.399	0.09a	0.07s	755.58	0.00	0.000	0.00	15.07	(2)
8.378	0.15a	5.07s	755.56	0.00	5.788	14.47	12.65	(2)
8.396	0.35a	10.07s	755.56	0.00	11.573	57.88	10.11	(2)
8.392	0.38a	10.57s	755.58	0.00	12.136	63.80	9.86	(2)
8.383	0.40a	11.07s	755.58	0.00	12.693	70.01	9.61	(2)
8.368	0.43a	11.57s	755.58	0.00	13.240	76.49	9.36	(2)
8.345	0.45a	12.07s	755.58	0.00	13.773	83.25	9.12	(2)
8.312	0.47a	12.57s	755.58	0.00	14.286	90.26	8.89	(2)
8.269	0.48a	13.07s	755.58	0.00	14.776	97.53	8.67	(2)
8.214	0.50a	13.57s	755.59	0.00	15.236	105.03	8.45	(2)
8.147	0.51a	14.07s	755.59	0.00	15.661	112.76	8.24	(2)
8.065	0.52a	14.57s	755.59	0.00	16.040	120.68	8.05	(2)
7.965	0.53a	15.07s	755.59	0.00	16.364	128.78	7.87	(2)
7.846	0.53a	15.57s	755.59	0.00	16.620	137.03	7.71	(2)
7.708	0.54a	16.07s	755.58	0.00	16.794	145.38	7.56	(2)
7.553	0.55a	16.57s	755.58	0.00	16.867	153.80	7.43	(2)
7.522	0.55a	16.66s	755.60	0.00	**16.869**	155.32	7.41	(2)
7.499	0.55a	16.73s	755.58	0.00	16.868	156.46	7.40	(2)
7.374	0.55a	17.07s	755.58	0.00	16.833	162.22	7.33	(2)
6.944	0.56a	18.07s	755.58	0.00	16.507	178.89	7.18	(2)
6.496	0.56a	19.07s	755.54	0.00	16.130	195.22	7.05	(2)
6.046	0.57a	20.07s	755.54	0.00	15.750	211.16	6.91	(2)
3.778	0.59a	25.07s	755.58	0.00	13.787	285.08	6.20	(2)
1.496	0.62a	30.07s	755.58	0.00	11.736	348.93	5.43	(2)
-0.731	0.68a	35.07s	755.57	0.00	9.602	402.31	4.57	(2)
-2.869	0.76a	40.07s	755.60	0.00	7.394	444.83	3.62	(2)
-4.908	0.86a	45.07s	755.71	0.00	5.124	476.15	2.57	(2)
-6.849	0.96a	50.07s	755.73	0.00	2.813	496.00	1.44	(2)
-8.676	1.06a	55.07s	755.72	0.00	0.485	504.26	0.25	(2)
-9.042	1.08a	56.11s	755.67	0.00	-0.002	504.51	*-0.00*	(2)
-10.372	1.16a	60.07s	755.65	0.00	-1.833	500.88	*-1.00*	(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

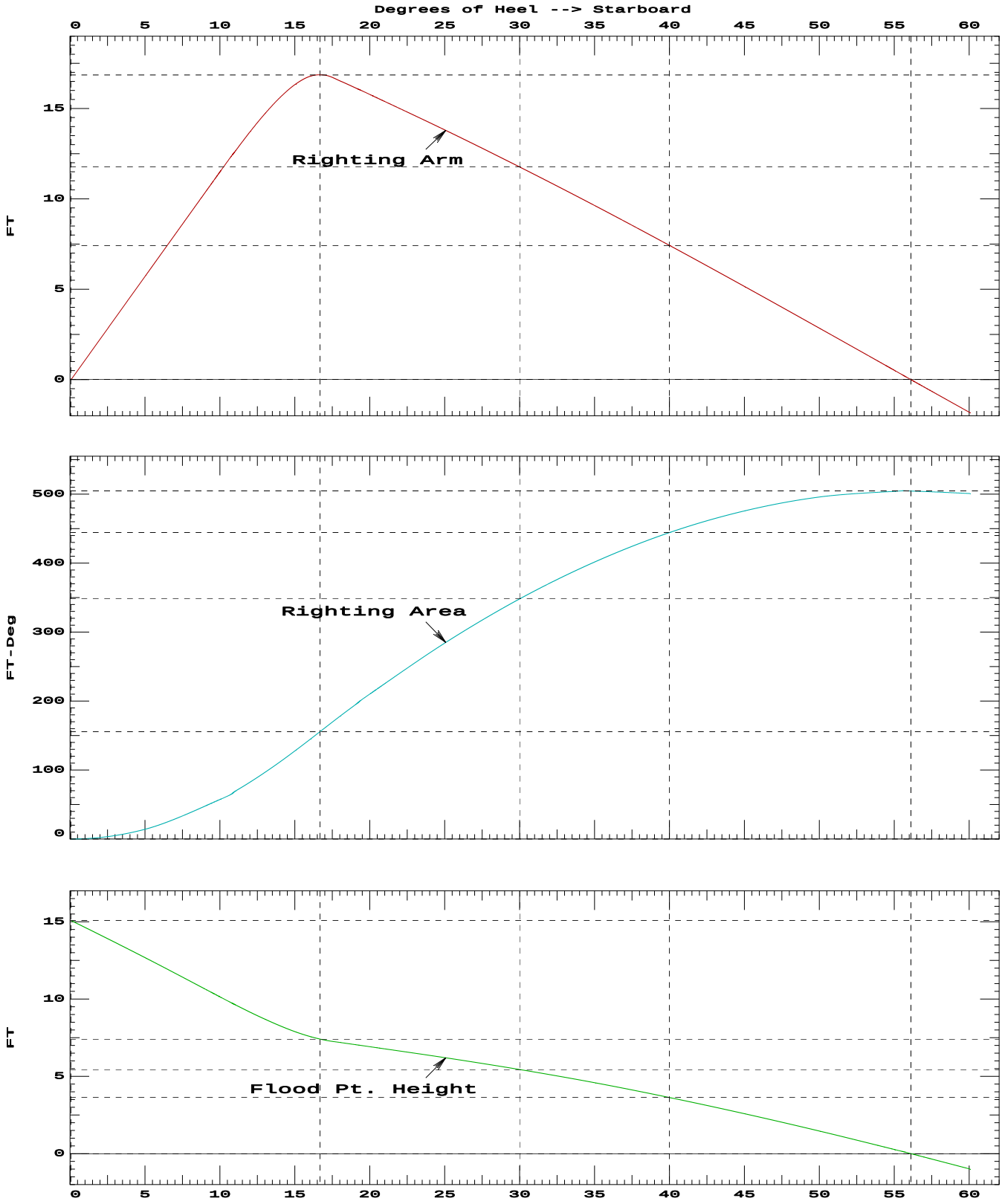
continued next page

Condition 3 - 21AEQ 4LT Arrival with Ice

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	Area from abs 0.068 deg to 16.7	>	18.62	Ft-deg	156.46	P
(2)	Absolute Angle at MaxRA	>	10.00	deg	16.66	P

Relative angles measured from 0.068

Condition 3 - 21AEQ 4LT Arrival with Ice



Condition 3 - 21AEQ 4LT Arrival 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  =    1716.3
    HLT =    3192.0
```

With HMMT = TL 1716.3
Vessel Heel < 8.00 deg Calc Heel = 2.02 deg

With HMMT = max(PL,HL2) 1475.7
Vessel Heel < 10.00 deg Calc Heel = 1.75 deg

With HMMT = TL+HL2 3192.0
Vessel Heel < 12.00 deg Calc Heel = 3.71 deg

Condition 3 - 21AEQ 4LT Arrival with Ice

*** Residual Area Check ***

RESIDUAL RIGHTING ARMS vs HEEL ANGLE

Total CG: LCG = 86.61f TCG = 0.08s VCG = 24.80
Free Surface Adjustment: 0.12
Adjusted CG: LCG = 86.61f TCG = 0.08s VCG = 24.92

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Area	Flood Pt Height	
8.384	0.12a	3.71s	755.60	0.00	0.000	0.00	13.31	(2)
8.391	0.28a	8.71s	755.59	0.00	5.792	14.48	10.81	(2)
8.196	0.50a	13.71s	755.61	0.00	11.141	57.00	8.39	(2)
8.125	0.51a	14.21s	755.59	0.00	11.554	62.67	8.19	(2)
8.038	0.52a	14.71s	755.59	0.00	11.918	68.54	8.00	(2)
7.933	0.53a	15.21s	755.59	0.00	12.225	74.58	7.82	(2)
7.808	0.53a	15.71s	755.59	0.00	12.459	80.75	7.66	(2)
7.666	0.54a	16.21s	755.58	0.00	12.605	87.01	7.52	(2)
7.504	0.55a	16.71s	755.58	0.00	12.648	93.33	7.40	(2)
7.318	0.56a	17.21s	755.58	0.00	12.583	99.63	7.30	(2)
7.103	0.56a	17.71s	755.58	0.00	12.419	105.88	7.23	(2)
6.880	0.56a	18.21s	755.59	0.00	12.232	112.05	7.16	(2)
6.656	0.56a	18.71s	755.58	0.00	12.045	118.12	7.10	(2)
6.432	0.56a	19.21s	755.59	0.00	11.856	124.09	7.03	(2)
6.208	0.57a	19.71s	755.58	0.00	11.666	129.97	6.96	(2)
5.983	0.57a	20.21s	755.59	0.00	11.475	135.76	6.89	(2)
5.757	0.57a	20.71s	755.59	0.00	11.282	141.45	6.82	(2)
5.303	0.58a	21.71s	755.32	0.01a	10.893	152.53	6.68	(2)
4.852	0.58a	22.71s	755.59	0.00	10.504	163.23	6.54	(2)
4.397	0.58a	23.71s	755.59	0.00	10.108	173.54	6.40	(2)
2.113	0.61a	28.71s	755.58	0.00	8.080	219.04	5.65	(2)
-0.135	0.66a	33.71s	755.57	0.00	5.968	254.20	4.82	(2)
-2.299	0.74a	38.71s	755.57	0.00	3.778	278.60	3.89	(2)
-4.364	0.83a	43.71s	755.70	0.00	1.524	291.88	2.86	(2)
-5.681	0.90a	47.03s	755.60	0.00	0.000	294.41	2.14	(2)
-6.334	0.93a	48.71s	755.61	0.00	-0.779	293.76	1.76	(2)
-8.192	1.03a	53.71s	755.72	0.00	-3.104	284.06	0.58	(2)
-9.042	1.08a	56.11s	755.58	0.00	-4.221	275.29	0.00	(2)
-9.926	1.13a	58.71s	755.60	0.00	-5.429	262.72	*-0.65*	(2)
-11.505	1.24a	63.71s	755.77	0.00	-7.720	229.84	*-1.95*	(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.

Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 3192.00

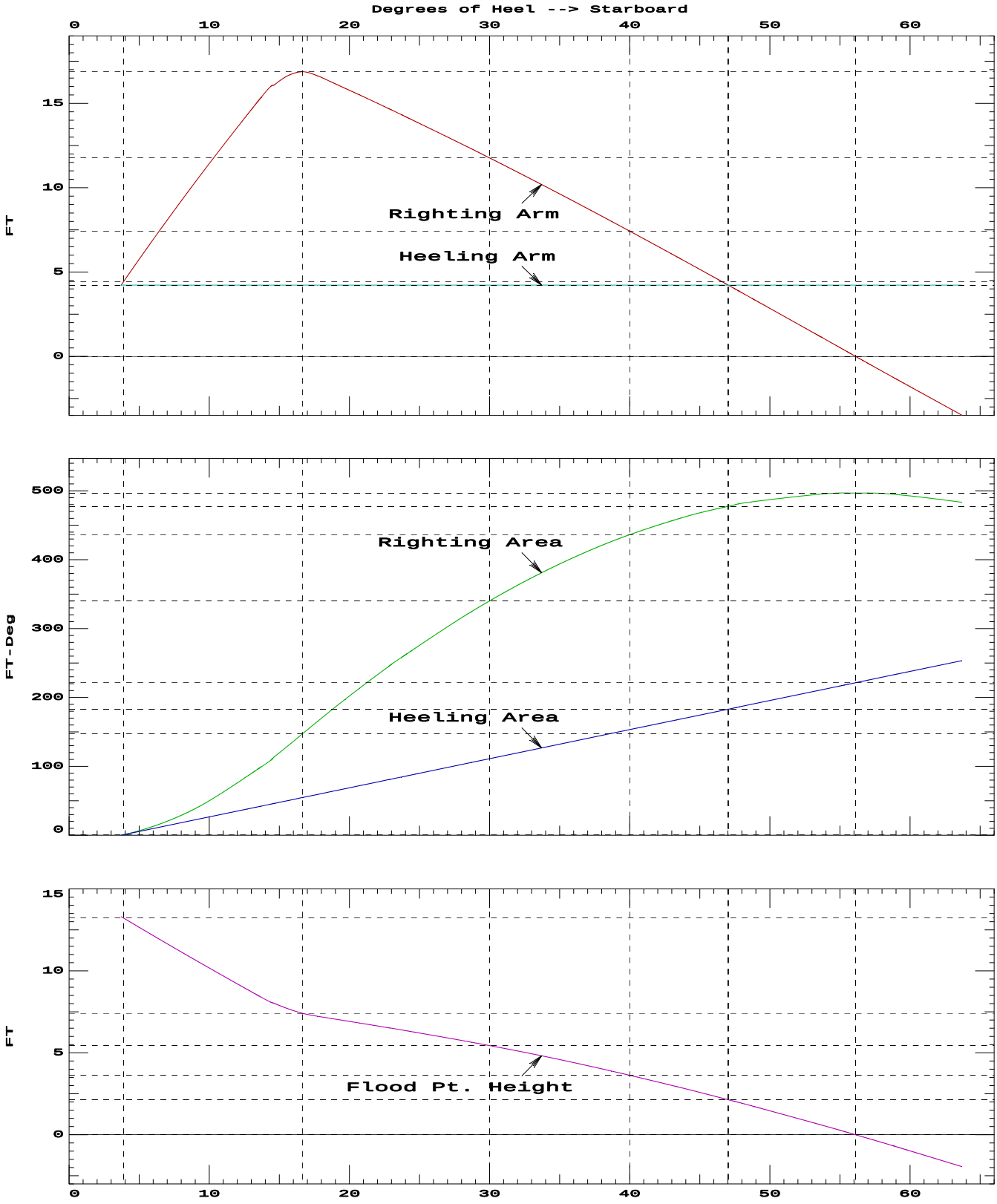
Condition 3 - 21AEQ 4LT Arrival with Ice

	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**	**118.12**	**P**
(2)	**Angle from Equilibrium to RAzero**	**>**	**15.00**	**deg**	**43.32**	**P**

Relative angles measured from 3.711s

Condition 3 - 21AEQ 4LT Arrival with Ice



Condition 4 - 22AEQ 5LT Departure with No Ice

WEIGHT STATUS

Trim: Fwd 0.10/210.33, Heel: Port 0.15 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	492.24	84.19f	0.03p	23.20
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	**719.11**	**85.80f**	**0.17p**	**24.40**

	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	98.12f	20.99s	7.96	6.8
DBF4.P	0.980	0.840	20.43	114.06f	22.48p	3.50	25.6
DBF3.S	0.980	0.840	20.43	114.06f	22.47s	3.50	25.6
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**	**112.97f**	**0.28p**	**4.51**	**88.9***
Total Weight			**767.36**	**87.51f**	**0.18p**	**23.15**	
Free Surface Adjustment						**0.12**	
Adjusted CG				**87.51f**	**0.17p**	**23.27**	

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 0.10/210.33, Heel: Port 0.15 deg., VCG = 23.15

LCF Draft	Displacement Weight(LT)	Buoyancy-Ctr. LCB	VCB	Weight/ Inch	LCF	Moment/ In trim	GML	GMT
8.357	767.35	87.52f	5.03	10.59	86.01f	139.08	457.5	67.39

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 = 87.51f TCG = 0.18p VCG = 23.15
Free Surface Adjustment: 0.12
Adjusted CG: LCG = 87.51f TCG = 0.17p VCG = 23.27

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Righting Arms in Trim	in Heel	Area	Flood Pt Height	
8.319	0.03f	0.15p	767.35	0.00	0.000	0.00	15.04	(5)
8.299	0.03a	4.85s	767.33	0.00	5.868	14.67	12.76	(2)
8.319	0.23a	9.85s	767.33	0.00	11.737	58.68	10.23	(2)
8.315	0.25a	10.35s	767.35	0.00	12.310	64.70	9.98	(2)
8.308	0.28a	10.85s	767.35	0.00	12.877	70.99	9.73	(2)
8.295	0.30a	11.35s	767.35	0.00	13.436	77.57	9.48	(2)
8.275	0.33a	11.85s	767.36	0.00	13.983	84.43	9.24	(2)
8.246	0.35a	12.35s	767.36	0.00	14.514	91.55	9.00	(2)
8.207	0.36a	12.85s	767.36	0.00	15.025	98.93	8.77	(2)
8.157	0.38a	13.35s	767.36	0.00	15.512	106.57	8.55	(2)
8.095	0.39a	13.85s	767.36	0.00	15.968	114.44	8.34	(2)
8.020	0.40a	14.35s	767.36	0.00	16.387	122.53	8.14	(2)
7.928	0.41a	14.85s	767.36	0.00	16.759	130.81	7.96	(2)
7.816	0.41a	15.35s	767.35	0.00	17.074	139.27	7.79	(2)
7.686	0.42a	15.85s	767.35	0.00	17.322	147.87	7.63	(2)
7.538	0.42a	16.35s	767.35	0.00	17.489	156.57	7.49	(2)
7.407	0.42a	16.75s	767.35	0.00	17.551	163.58	7.40	(2)
7.372	0.42a	16.85s	767.35	0.00	17.556	165.34	7.37	(2)
7.355	0.42a	16.90s	767.37	0.00	**17.557**	166.18	7.36	(2)
6.970	0.43a	17.85s	767.36	0.00	17.364	182.80	7.20	(2)
6.524	0.44a	18.85s	767.36	0.00	17.017	200.01	7.07	(2)
6.076	0.44a	19.85s	767.36	0.00	16.665	216.85	6.93	(2)
3.812	0.47a	24.85s	767.35	0.00	14.838	295.77	6.22	(2)
1.533	0.51a	29.85s	767.35	0.00	12.914	365.19	5.46	(2)
-0.693	0.57a	34.85s	767.35	0.00	10.898	424.76	4.60	(2)
-2.828	0.65a	39.85s	767.44	0.00	8.793	474.03	3.65	(2)
-4.873	0.75a	44.85s	767.48	0.00	6.613	512.57	2.60	(2)
-6.819	0.85a	49.85s	767.48	0.00	4.380	540.07	1.48	(2)
-8.650	0.95a	54.85s	767.53	0.00	2.118	556.33	0.29	(2)
-9.073	0.97a	56.05s	767.36	0.00	1.572	558.55	0.00	(2)
-10.244	1.05a	59.53s	767.36	0.00	0.000	561.28	*-0.87*	(2)
-10.349	1.05a	59.85s	767.36	0.00	-0.148	561.25	*-0.96*	(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.

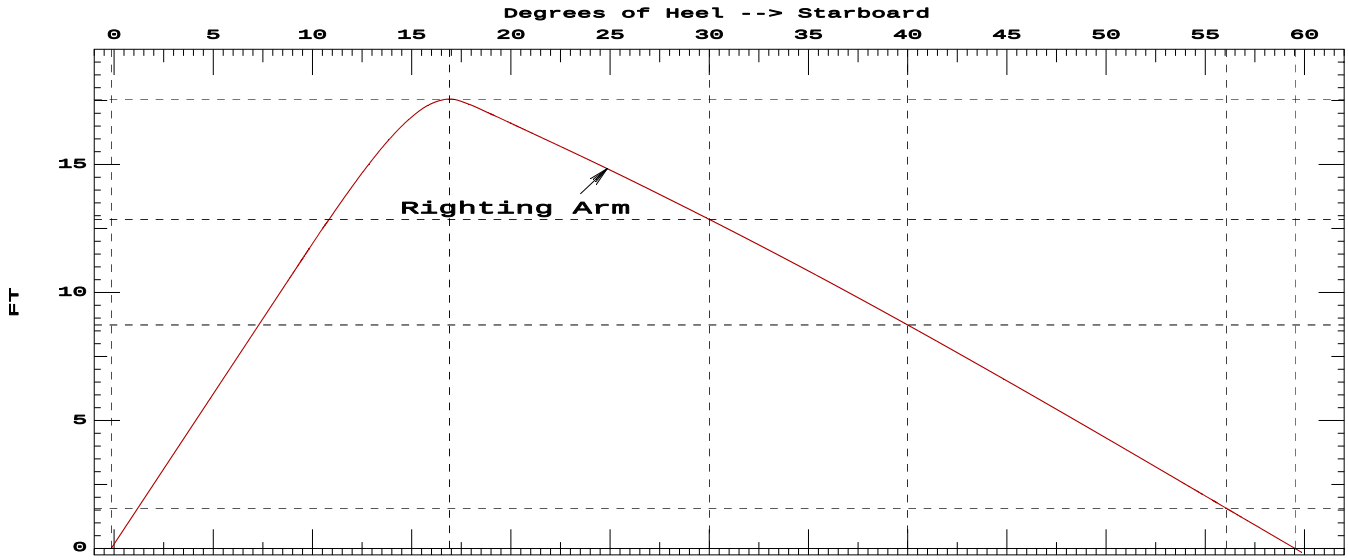
Condition 4 - 22AEQ 5LT Departure with No Ice

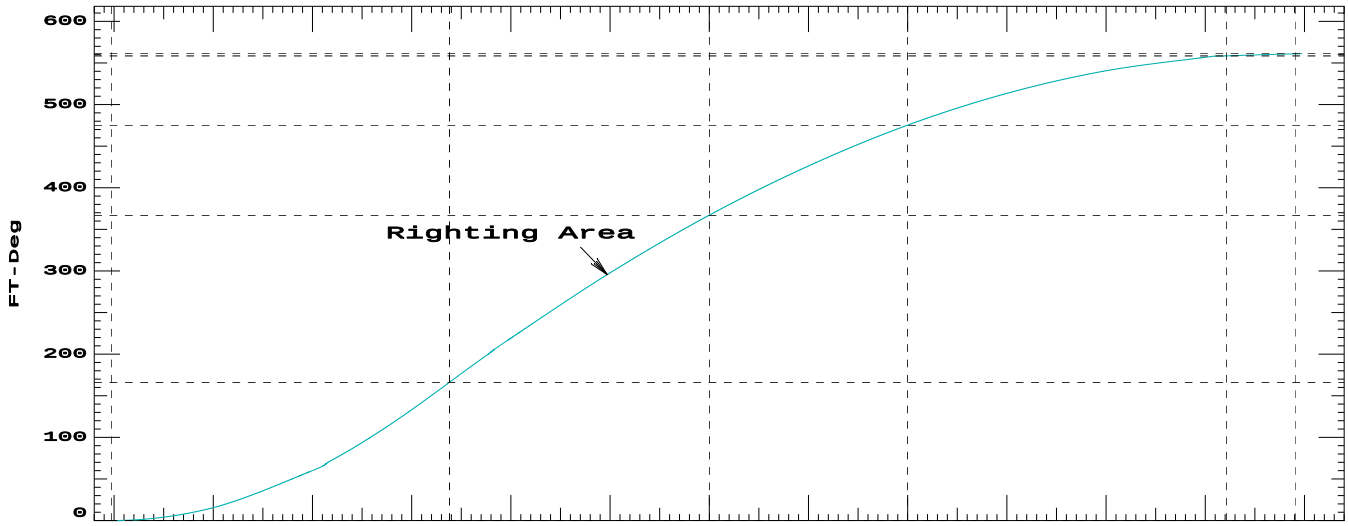
	Critical Points		LCP	TCP	VCP
(2)	ER Air Aft S	FLOOD	35.42f	27.45s	23.45
(5)	ER Air FWD P	FLOOD	43.30f	27.45p	23.45

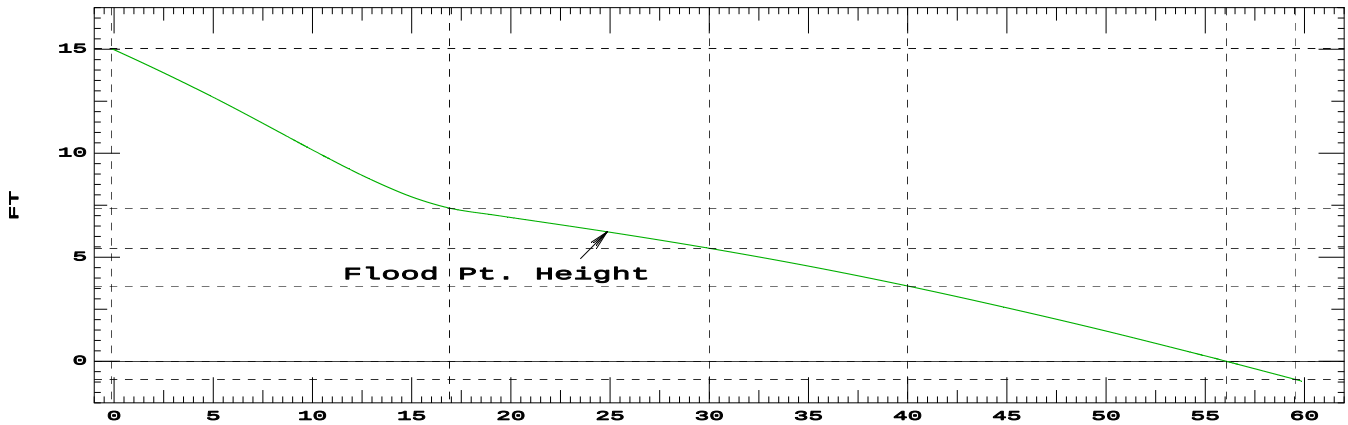
LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Area from abs -0.148 deg to 16.9**	**>**	**18.35**	**Ft-deg**	**163.58**	**P**
(2)	**Absolute Angle at MaxRA**	**>**	**10.00**	**deg**	**16.90**	**P**

Relative angles measured from 0.148

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  =    1612.2
    HLT =    3087.9
```

With HMMT = TL 1612.2
Vessel Heel < 8.00 deg Calc Heel = 1.64 deg

With HMMT = max(PL,HL2) 1475.7
Vessel Heel < 10.00 deg Calc Heel = 1.49 deg

With HMMT = TL+HL2 3087.9
Vessel Heel < 12.00 deg Calc Heel = 3.28 deg

Condition 4 - 22AEQ 5LT Departure with No Ice

*** Residual Area Check ***

RESIDUAL RIGHTING ARMS vs HEEL ANGLE

Total CG: LCG = 87.51f TCG = 0.17p VCG = 23.15
Free Surface Adjustment: 0.12
Adjusted CG: LCG = 87.51f TCG = 0.18p VCG = 23.27

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Area	Flood Pt Height	
8.306	0.00f	3.27s	767.39	0.00	0.000	0.00	13.53	(1)
8.309	0.15a	8.27s	767.36	0.00	5.872	14.68	11.04	(2)
8.164	0.38a	13.27s	767.30	0.00	11.419	58.04	8.59	(2)
8.105	0.39a	13.77s	767.35	0.00	11.879	63.87	8.38	(2)
8.032	0.40a	14.27s	767.36	0.00	12.304	69.91	8.17	(2)
7.943	0.41a	14.77s	767.36	0.00	12.684	76.16	7.98	(2)
7.834	0.41a	15.27s	767.36	0.00	13.008	82.58	7.81	(2)
7.706	0.41a	15.77s	767.35	0.00	13.267	89.15	7.65	(2)
7.561	0.42a	16.27s	767.35	0.00	13.448	95.83	7.51	(2)
7.399	0.42a	16.77s	767.35	0.00	13.532	102.57	7.39	(2)
7.354	0.42a	16.90s	767.37	0.00	**13.536**	104.32	7.36	(2)
7.215	0.43a	17.27s	767.36	0.00	13.504	109.34	7.29	(2)
7.004	0.43a	17.77s	767.35	0.00	13.370	116.05	7.21	(2)
6.781	0.43a	18.27s	767.35	0.00	13.197	122.70	7.15	(2)
6.558	0.44a	18.77s	767.35	0.00	13.022	129.25	7.08	(2)
6.334	0.44a	19.27s	767.35	0.00	12.847	135.72	7.01	(2)
6.110	0.44a	19.77s	767.35	0.00	12.671	142.10	6.94	(2)
5.885	0.44a	20.27s	767.35	0.00	12.493	148.39	6.87	(2)
5.432	0.45a	21.27s	767.25	0.00	12.133	160.70	6.74	(2)
4.983	0.45a	22.27s	767.36	0.00	11.771	172.65	6.59	(2)
4.529	0.46a	23.27s	767.36	0.00	11.404	184.24	6.45	(2)
2.249	0.49a	28.27s	767.35	0.00	9.509	236.57	5.70	(2)
-0.001	0.55a	33.27s	767.34	0.00	7.522	279.18	4.88	(2)
-2.165	0.63a	38.27s	767.40	0.00	5.444	311.64	3.96	(2)
-4.239	0.72a	43.27s	767.47	0.00	3.286	333.50	2.94	(2)
-6.218	0.82a	48.27s	767.48	0.00	1.067	344.40	1.84	(2)
-7.122	0.86a	50.64s	767.05	0.01a	-0.003	345.67	1.30	(2)
-8.089	0.92a	53.27s	767.39	0.00	-1.190	344.10	0.68	(2)
-9.074	0.97a	56.05s	767.35	0.00	-2.450	339.05	0.00	(2)
-9.832	1.02a	58.27s	767.37	0.01f	-3.457	332.48	*-0.55*	(2)
-11.422	1.13a	63.27s	767.37	0.00	-5.708	309.56	*-1.85*	(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

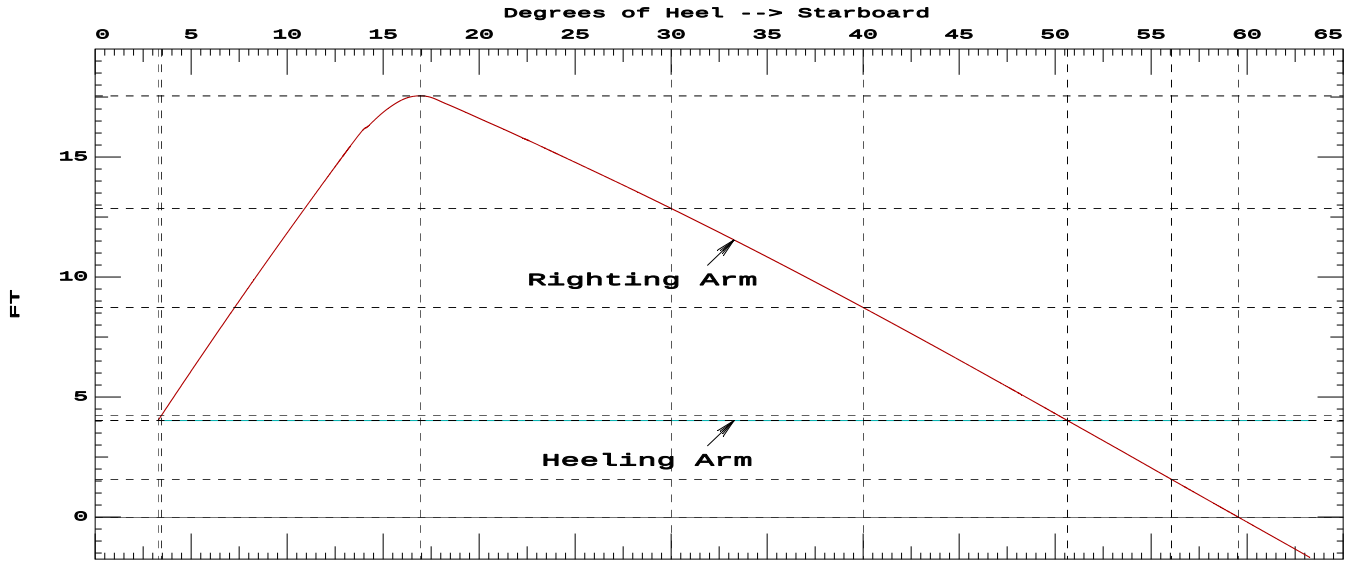
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 3087.87

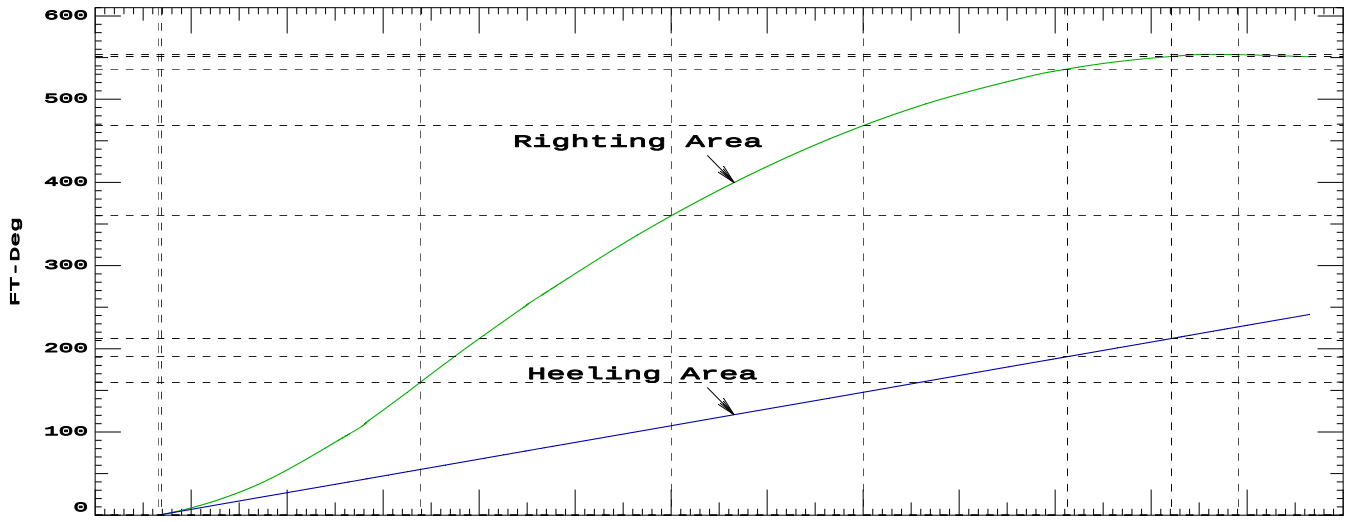
	Critical Points		LCP	TCP	VCP
(1)	ER Air Fwd S	FLOOD	43.30f	27.45s	23.45
(2)	ER Air Aft S	FLOOD	35.42f	27.45s	23.45

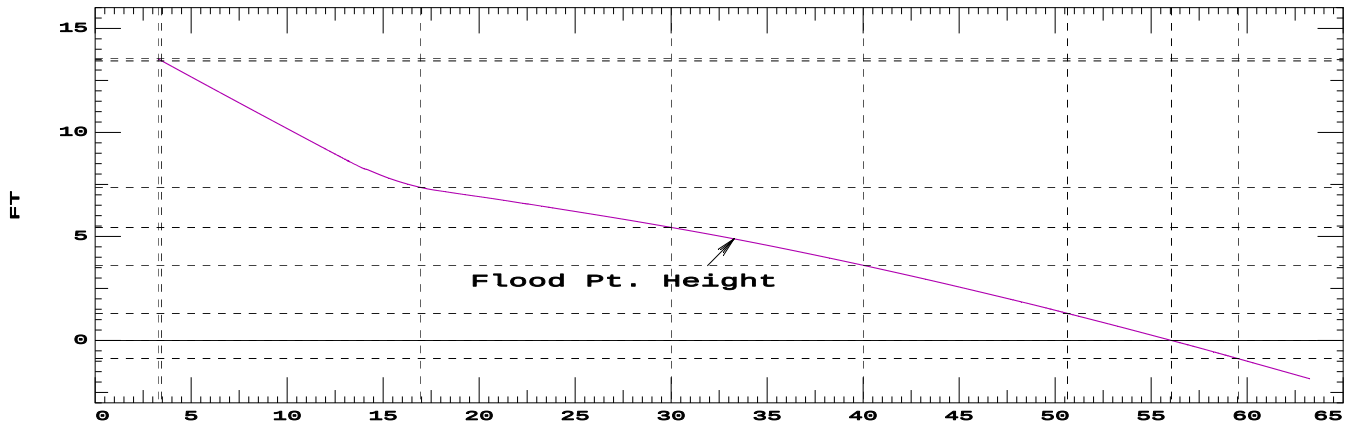
LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Area from Equilibrium to 15 deg**	**>**	**5.26**	**Ft-deg**	**122.70**	**P**
(2)	**Angle from Equilibrium to RAzero**	**>**	**15.00**	**deg**	**47.37**	**P**

Relative angles measured from 3.275s

Condition 4 - 22AEQ 5LT Departure with No Ice







Condition 5 - 22AEQ 5LT Arrival with No Ice

WEIGHT STATUS

Trim: Aft 0.54/210.33, Heel: Stbd 0.18 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	492.24	84.19f	0.03p	23.20
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	**717.99**	**85.78f**	**0.17p**	**24.38**

	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	98.11f	21.00s	10.37	0.9
DBF4.P	0.100	0.840	2.08	114.21f	22.44p	0.77	19.1
DBF3.S	0.100	0.840	2.08	114.21f	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			**736.18**	**86.18f**	**0.21s**	**23.98**	
Free Surface Adjustment						**0.12**	
Adjusted CG				**86.18f**	**0.21s**	**24.10**	

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 0.54/210.33, Heel: Stbd 0.18 deg., VCG = 23.98

LCF Draft	Displacement Weight(LT)	Buoyancy-Ctr. LCB	VCB	Weight/ Inch	LCF	Moment/ In trim	GML	GMT
8.111	736.18	86.14f	4.89	10.46	85.01f	134.33	460.5	68.93

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 = 86.18f TCG = 0.21s VCG = 23.98
Free Surface Adjustment: 0.12
Adjusted CG: LCG = 86.18f TCG = 0.21s VCG = 24.10

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Righting Arms in Trim	in Heel	Area	Flood Pt Height	
8.329	0.15a	0.18s	736.17	0.00	0.000	0.00	15.13	(2)
8.305	0.20a	5.18s	736.15	0.00	6.000	15.00	12.70	(2)
8.316	0.41a	10.18s	736.15	0.00	11.987	59.97	10.17	(2)
8.309	0.43a	10.68s	736.18	0.00	12.567	66.11	9.92	(2)
8.295	0.45a	11.18s	736.18	0.00	13.139	72.54	9.67	(2)
8.275	0.48a	11.68s	736.18	0.00	13.696	79.25	9.43	(2)
8.245	0.49a	12.18s	736.18	0.00	14.235	86.23	9.19	(2)
8.205	0.51a	12.68s	736.18	0.00	14.751	93.48	8.96	(2)
8.153	0.53a	13.18s	736.18	0.00	15.238	100.98	8.75	(2)
8.089	0.54a	13.68s	736.18	0.00	15.689	108.71	8.54	(2)
8.011	0.55a	14.18s	736.18	0.00	16.096	116.65	8.34	(2)
7.916	0.55a	14.68s	736.18	0.00	16.449	124.79	8.16	(2)
7.800	0.56a	15.18s	736.18	0.00	16.734	133.09	7.99	(2)
7.666	0.56a	15.68s	736.18	0.00	16.936	141.50	7.84	(2)
7.514	0.57a	16.18s	736.17	0.00	17.038	150.00	7.71	(2)
7.444	0.57a	16.39s	736.17	0.00	**17.048**	153.59	7.66	(2)
7.382	0.58a	16.56s	736.17	0.00	17.040	156.61	7.62	(2)
7.340	0.58a	16.68s	736.17	0.00	17.029	158.52	7.60	(2)
7.138	0.58a	17.18s	736.17	0.00	16.911	167.00	7.52	(2)
6.693	0.59a	18.18s	736.18	0.00	16.551	183.73	7.39	(2)
6.245	0.59a	19.18s	736.14	0.00	16.187	200.10	7.25	(2)
5.796	0.59a	20.18s	736.14	0.00	15.817	216.10	7.11	(2)
3.531	0.61a	25.18s	736.18	0.00	13.912	290.47	6.39	(2)
1.249	0.64a	30.18s	736.17	0.00	11.920	355.09	5.62	(2)
-0.989	0.69a	35.18s	736.16	0.00	9.851	409.55	4.77	(2)
-3.138	0.76a	40.18s	736.17	0.00	7.710	453.48	3.82	(2)
-5.180	0.86a	45.18s	736.25	0.00	5.507	486.55	2.77	(2)
-7.118	0.96a	50.18s	736.29	0.00	3.262	508.49	1.65	(2)
-8.938	1.06a	55.18s	736.28	0.00	0.997	519.14	0.45	(2)
-9.565	1.10a	56.99s	736.18	0.00	0.175	520.20	0.00	(2)
-9.698	1.10a	57.38s	736.20	0.00	0.000	520.24	*-0.10*	(2)
-10.621	1.16a	60.18s	736.19	0.00	-1.261	518.47	*-0.81*	(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

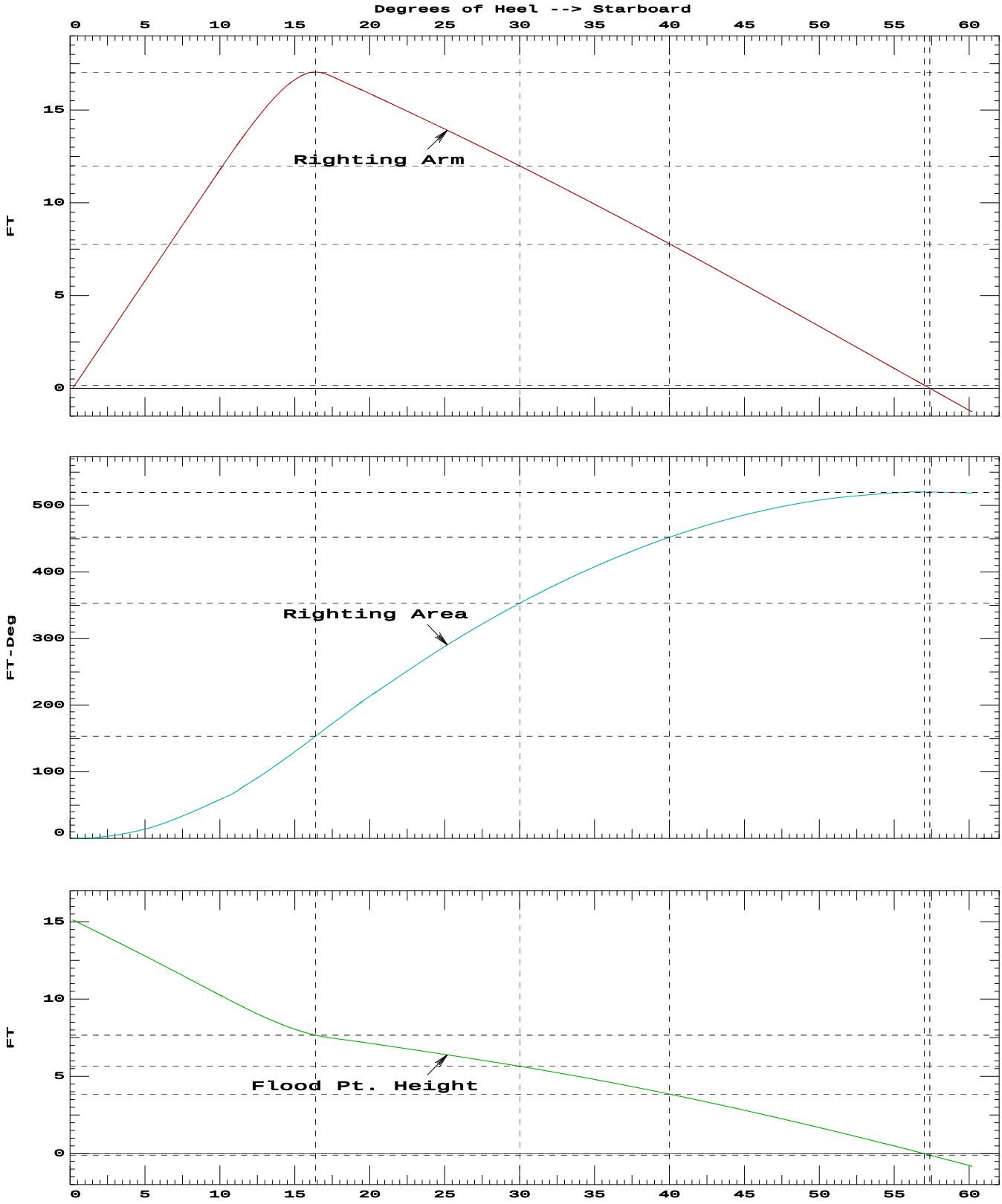
continued next page

Condition 5 - 22AEQ 5LT Arrival with No Ice

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	Area from abs 0.177 deg to 16.4	>	18.93	Ft-deg	156.61	P
(2)	Absolute Angle at MaxRA	>	10.00	deg	16.39	P

Relative angles measured from 0.177s

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  =    1610.0
    HLT =    3085.7
```

With HMMT = TL 1610.0
Vessel Heel < 8.00 deg Calc Heel = 1.99 deg

With HMMT = max(PL,HL2) 1475.7
Vessel Heel < 10.00 deg Calc Heel = 1.84 deg

With HMMT = TL+HL2 3085.7
Vessel Heel < 12.00 deg Calc Heel = 3.66 deg

Condition 5 - 22AEQ 5LT Arrival with No Ice

*** Residual Area Check ***

RESIDUAL RIGHTING ARMS vs HEEL ANGLE

Total CG: LCG = 86.18f TCG = 0.22s VCG = 23.98
Free Surface Adjustment: 0.12
Adjusted CG: LCG = 86.18f TCG = 0.21s VCG = 24.10

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Area	Flood Pt Height	
8.312	0.17a	3.66s	736.20	0.00	0.000	0.00	13.44	(2)
8.316	0.33a	8.66s	736.19	0.00	6.004	15.01	10.94	(2)
8.090	0.54a	13.66s	736.21	0.00	11.491	58.96	8.54	(2)
8.012	0.55a	14.16s	736.18	0.00	11.899	64.81	8.34	(2)
7.918	0.55a	14.66s	736.18	0.00	12.253	70.85	8.16	(2)
7.803	0.56a	15.16s	736.18	0.00	12.540	77.05	7.99	(2)
7.670	0.56a	15.66s	736.18	0.00	12.744	83.37	7.85	(2)
7.518	0.57a	16.16s	736.17	0.00	12.849	89.76	7.71	(2)
7.444	0.57a	16.39s	736.20	0.00	**12.860**	92.64	7.66	(2)
7.345	0.58a	16.66s	736.18	0.00	12.843	96.19	7.60	(2)
7.144	0.58a	17.16s	736.17	0.00	12.727	102.58	7.52	(2)
6.921	0.58a	17.66s	736.18	0.00	12.549	108.90	7.45	(2)
6.699	0.59a	18.16s	736.18	0.00	12.368	115.13	7.39	(2)
6.475	0.59a	18.66s	736.18	0.00	12.186	121.27	7.32	(2)
6.251	0.59a	19.16s	736.18	0.00	12.004	127.32	7.25	(2)
6.027	0.59a	19.66s	736.18	0.00	11.820	133.27	7.18	(2)
5.803	0.59a	20.16s	736.18	0.00	11.634	139.14	7.11	(2)
5.578	0.59a	20.66s	736.18	0.00	11.448	144.91	7.04	(2)
5.126	0.60a	21.66s	736.18	0.00	11.073	156.17	6.90	(2)
4.673	0.60a	22.66s	736.18	0.00	10.694	167.05	6.76	(2)
4.220	0.61a	23.66s	736.18	0.00	10.311	177.56	6.62	(2)
1.938	0.63a	28.66s	736.18	0.00	8.343	224.23	5.86	(2)
-0.321	0.67a	33.66s	736.17	0.00	6.297	260.86	5.04	(2)
-2.498	0.74a	38.66s	736.17	0.00	4.176	287.07	4.12	(2)
-4.574	0.83a	43.66s	736.20	0.00	1.990	302.52	3.10	(2)
-6.335	0.92a	48.12s	736.17	0.00	0.000	306.97	2.12	(2)
-6.545	0.93a	48.66s	736.18	0.00	-0.245	306.90	2.00	(2)
-8.401	1.03a	53.66s	736.29	0.00	-2.506	300.04	0.82	(2)
-9.567	1.10a	56.99s	736.18	0.00	-4.016	289.18	0.00	(2)
-10.129	1.13a	58.66s	736.19	0.00	-4.770	281.84	*-0.42*	(2)
-11.700	1.24a	63.66s	736.19	0.00	-7.005	252.40	*-1.73*	(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

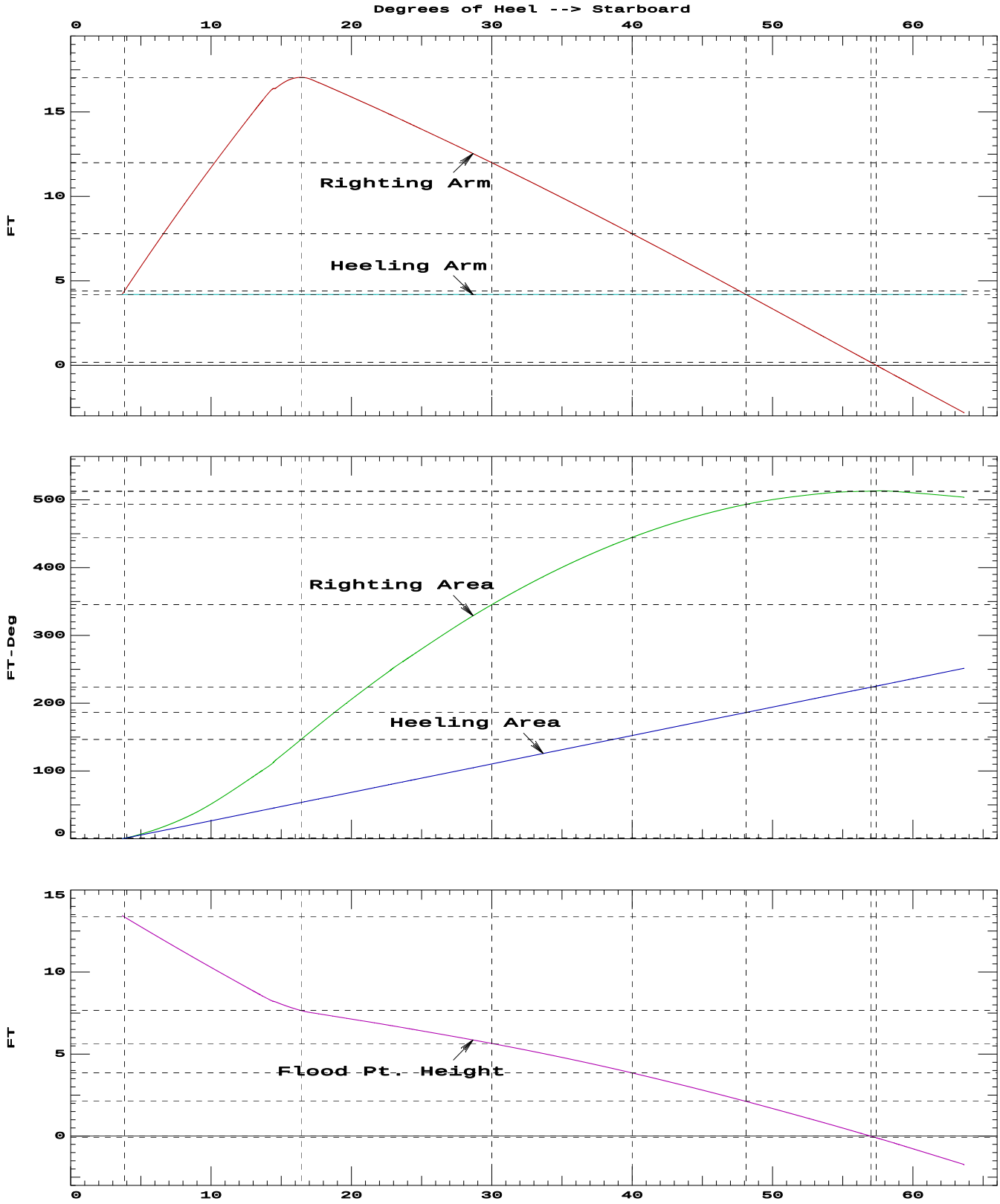
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 3085.72

	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**	**121.27**	**P**
(2)	**Angle from Equilibrium to RAzero**	**>**	**15.00**	**deg**	**44.46**	**P**

Relative angles measured from 3.664s

Condition 5 - 22AEQ 5LT Arrival with No Ice



Condition 6 - 20AEQ 6RV Fwd Departure with Ice

WEIGHT STATUS

Trim: Fwd 1.66/210.33, Heel: Stbd 0.15 deg.

Part	Load	SpGr	Weight(LT)	LCG	TCG	VCG	FSM
LIGHT SHIP			492.24	84.19f	0.03p	23.20	
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			**703.69**	**89.51f**	**0.21s**	**24.94**	
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	33.9
DBF3.S	0.980	0.840	20.43	114.08f	22.48s	3.50	33.9
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**	**112.99f**	**0.27p**	**4.51**	**88.9***
Total Weight			**751.94**	**91.02f**	**0.18s**	**23.63**	
Free Surface Adjustment						**0.12**	
Adjusted CG				**91.02f**	**0.18s**	**23.74**	

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 1.66/210.33, Heel: Stbd 0.15 deg., VCG = 23.63

LCF Draft	Displacement Weight(LT)	Buoyancy-Ctr. LCB	VCB	Weight/ Inch	LCF	Moment/ In trim	GML	GMT
8.244	751.93	91.16f	4.97	10.61	87.93f	141.30	474.3	68.81

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 = 91.02f TCG = 0.18s VCG = 23.63
Free Surface Adjustment: 0.12
Adjusted CG: LCG = 91.02f TCG = 0.18s VCG = 23.74

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Righting Arms in Trim	in Heel	Area	Flood Pt Height	
7.550	0.45f	0.15s	751.93	0.00	0.000	0.00	15.49	(1)
7.536	0.39f	5.15s	751.89	0.00	6.036	15.09	13.06	(1)
7.525	0.19f	10.15s	751.93	0.00	12.029	60.27	10.58	(1)
7.503	0.17f	10.65s	751.94	0.00	12.593	66.42	10.34	(1)
7.472	0.15f	11.15s	751.94	0.00	13.143	72.86	10.11	(1)
7.433	0.14f	11.65s	751.94	0.00	13.679	79.56	9.89	(1)
7.384	0.12f	12.15s	751.94	0.00	14.198	86.53	9.67	(1)
7.324	0.12f	12.65s	751.94	0.00	14.694	93.75	9.46	(1)
7.248	0.11f	13.15s	751.94	0.00	15.161	101.22	9.26	(1)
7.159	0.11f	13.65s	752.10	0.00	15.592	108.91	9.07	(1)
7.049	0.11f	14.15s	751.94	0.00	15.987	116.80	8.89	(1)
6.926	0.12f	14.65s	751.94	0.00	16.334	124.88	8.73	(1)
6.784	0.13f	15.15s	751.94	0.00	16.628	133.12	8.58	(1)
6.625	0.14f	15.65s	751.93	0.00	16.863	141.49	8.44	(1)
6.449	0.15f	16.15s	751.94	0.00	17.028	149.97	8.32	(1)
6.255	0.17f	16.65s	751.87	0.00	17.112	158.50	8.22	(1)
6.188	0.17f	16.83s	752.02	0.00	**17.119**	161.50	8.19	(1)
6.124	0.17f	16.97s	751.83	0.00	17.115	163.95	8.16	(1)
6.052	0.17f	17.15s	752.00	0.00	17.092	167.06	8.13	(1)
5.614	0.16f	18.15s	751.89	0.00	16.763	183.99	7.99	(1)
5.174	0.16f	19.15s	751.94	0.00	16.408	200.57	7.86	(1)
4.732	0.15f	20.15s	751.94	0.00	16.048	216.80	7.71	(1)
2.507	0.10f	25.15s	751.93	0.00	14.186	292.45	6.98	(1)
0.268	0.04f	30.15s	751.92	0.00	12.234	358.54	6.19	(1)
-1.965	0.02a	35.15s	751.99	0.00	10.212	414.68	5.35	(2)
-4.125	0.09a	40.15s	751.99	0.00	8.103	460.51	4.41	(2)
-6.181	0.18a	45.15s	752.01	0.00	5.923	495.60	3.37	(2)
-8.117	0.28a	50.15s	752.04	0.00	3.695	519.66	2.24	(2)
-9.918	0.39a	55.15s	752.07	0.00	1.445	532.52	1.03	(2)
-10.998	0.47a	58.37s	751.96	0.00	-0.002	534.85	0.22	(2)
-11.264	0.49a	59.20s	751.95	0.00	-0.372	534.69	0.00	(2)
-11.567	0.52a	60.15s	751.95	0.00	-0.799	534.13	*-0.25*	(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.

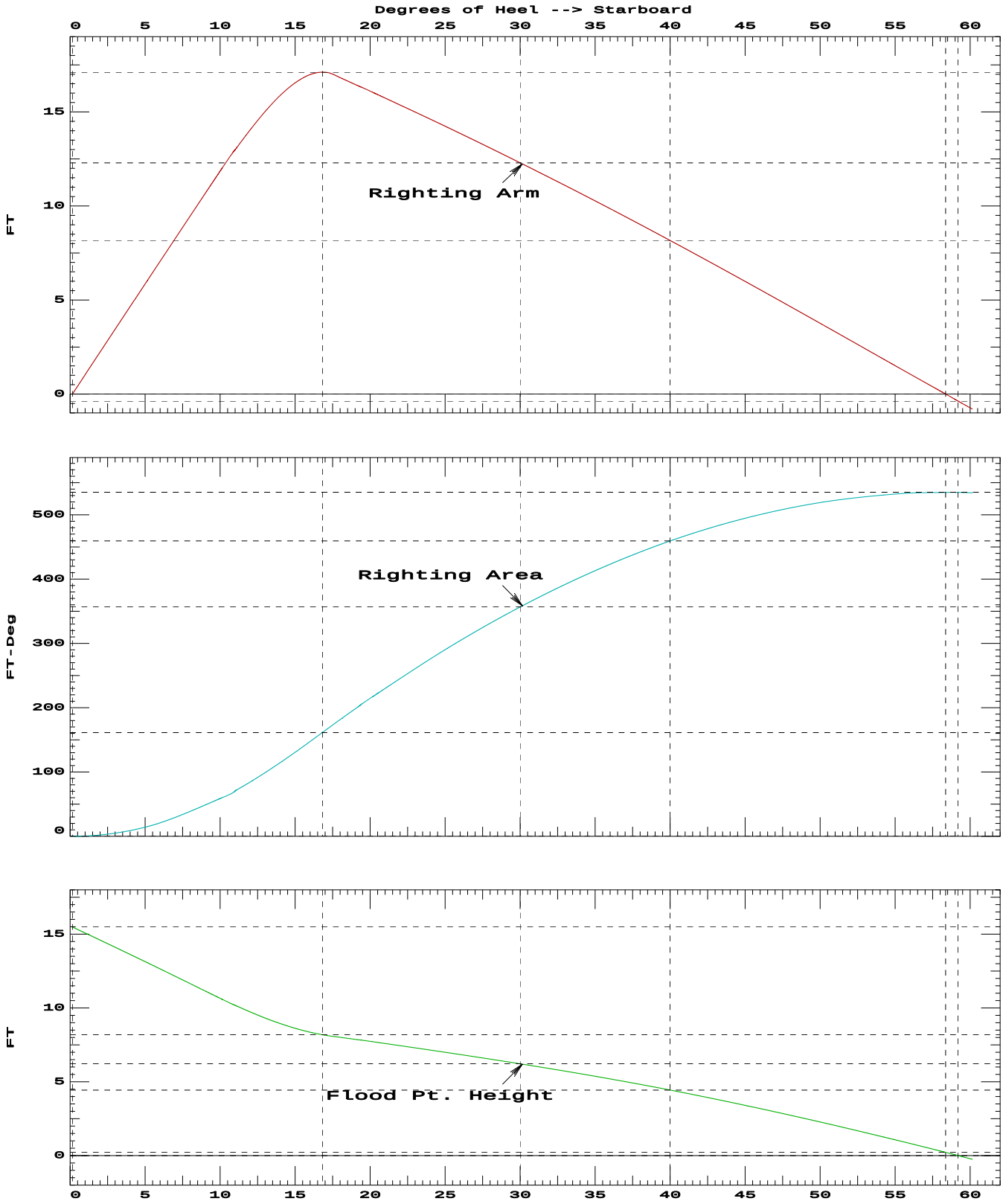
Condition 6 - 20AEQ 6RV Fwd Departure with Ice

	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 0.151 deg to 16.8**	**>**	**18.44**	**Ft-deg**	**163.95**	**P**
(2)	**Absolute Angle at MaxRA**	**>**	**10.00**	**deg**	**16.83**	**P**

Relative angles measured from 0.151

Condition 6 - 20AEQ 6RV Fwd Departure with Ice



Condition 6 - 20AEQ 6RV Fwd 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  =    1617.0
    HLT =    3092.7
```

With HMMT = TL 1617.0
Vessel Heel < 8.00 deg Calc Heel = 1.94 deg

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

With HMMT = TL+HL2 3092.7
Vessel Heel < 12.00 deg Calc Heel = 3.56 deg

Condition 6 - 20AEQ 6RV Fwd Departure with Ice

*** Residual Area Check ***

RESIDUAL RIGHTING ARMS vs HEEL ANGLE

Total CG: LCG = 91.02f TCG = 0.19s VCG = 23.63
Free Surface Adjustment: 0.12
Adjusted CG: LCG = 91.02f TCG = 0.18s VCG = 23.74

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Area	Flood Pt Height	
7.539	0.42f	3.56s	751.94	0.00	0.000	0.00	13.84	(1)
7.555	0.25f	8.56s	751.94	0.00	6.059	15.15	11.36	(1)
7.173	0.11f	13.56s	751.95	0.00	11.408	59.11	9.10	(1)
7.068	0.11f	14.06s	751.93	0.00	11.809	64.92	8.92	(1)
6.949	0.12f	14.56s	751.94	0.00	12.165	70.91	8.76	(1)
6.811	0.13f	15.06s	751.94	0.00	12.469	77.07	8.61	(1)
6.654	0.14f	15.56s	751.93	0.00	12.715	83.37	8.47	(1)
6.481	0.15f	16.06s	751.93	0.00	12.894	89.77	8.35	(1)
6.290	0.16f	16.56s	751.87	0.00	12.994	96.24	8.24	(1)
6.191	0.17f	16.82s	752.11	0.00	**13.009**	99.62	8.19	(1)
6.088	0.17f	17.06s	751.94	0.00	12.996	102.74	8.15	(1)
5.876	0.17f	17.56s	752.07	0.00	12.862	109.21	8.07	(1)
5.654	0.17f	18.06s	751.92	0.00	12.685	115.59	8.01	(1)
5.434	0.16f	18.56s	751.92	0.00	12.508	121.89	7.94	(1)
5.214	0.16f	19.06s	751.92	0.00	12.330	128.10	7.87	(1)
4.993	0.15f	19.56s	751.92	0.00	12.151	134.22	7.80	(1)
4.772	0.15f	20.06s	751.92	0.00	11.971	140.25	7.73	(1)
4.551	0.14f	20.56s	751.93	0.00	11.789	146.19	7.66	(1)
4.107	0.13f	21.56s	751.90	0.00	11.423	157.80	7.51	(1)
3.662	0.13f	22.56s	751.94	0.00	11.053	169.04	7.37	(1)
3.216	0.12f	23.56s	751.94	0.00	10.679	179.90	7.22	(1)
0.980	0.06f	28.56s	751.92	0.00	8.753	228.52	6.45	(1)
-1.259	0.00	33.56s	751.95	0.00	6.752	267.32	5.62	(1)
-3.449	0.07a	38.56s	751.99	0.00	4.673	295.91	4.72	(2)
-5.540	0.15a	43.56s	751.99	0.00	2.512	313.91	3.71	(2)
-7.516	0.25a	48.56s	752.03	0.00	0.297	320.95	2.61	(2)
-7.768	0.26a	49.22s	751.95	0.00	-0.001	321.05	2.46	(2)
-9.362	0.35a	53.56s	752.02	0.00	-1.949	316.83	1.43	(2)
-11.059	0.48a	58.56s	752.11	0.00	-4.198	301.47	0.17	(2)
-11.260	0.49a	59.18s	752.08	0.00	-4.477	298.77	0.00	(2)
-12.600	0.61a	63.56s	752.11	0.00	-6.424	274.90	*-1.16*	(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

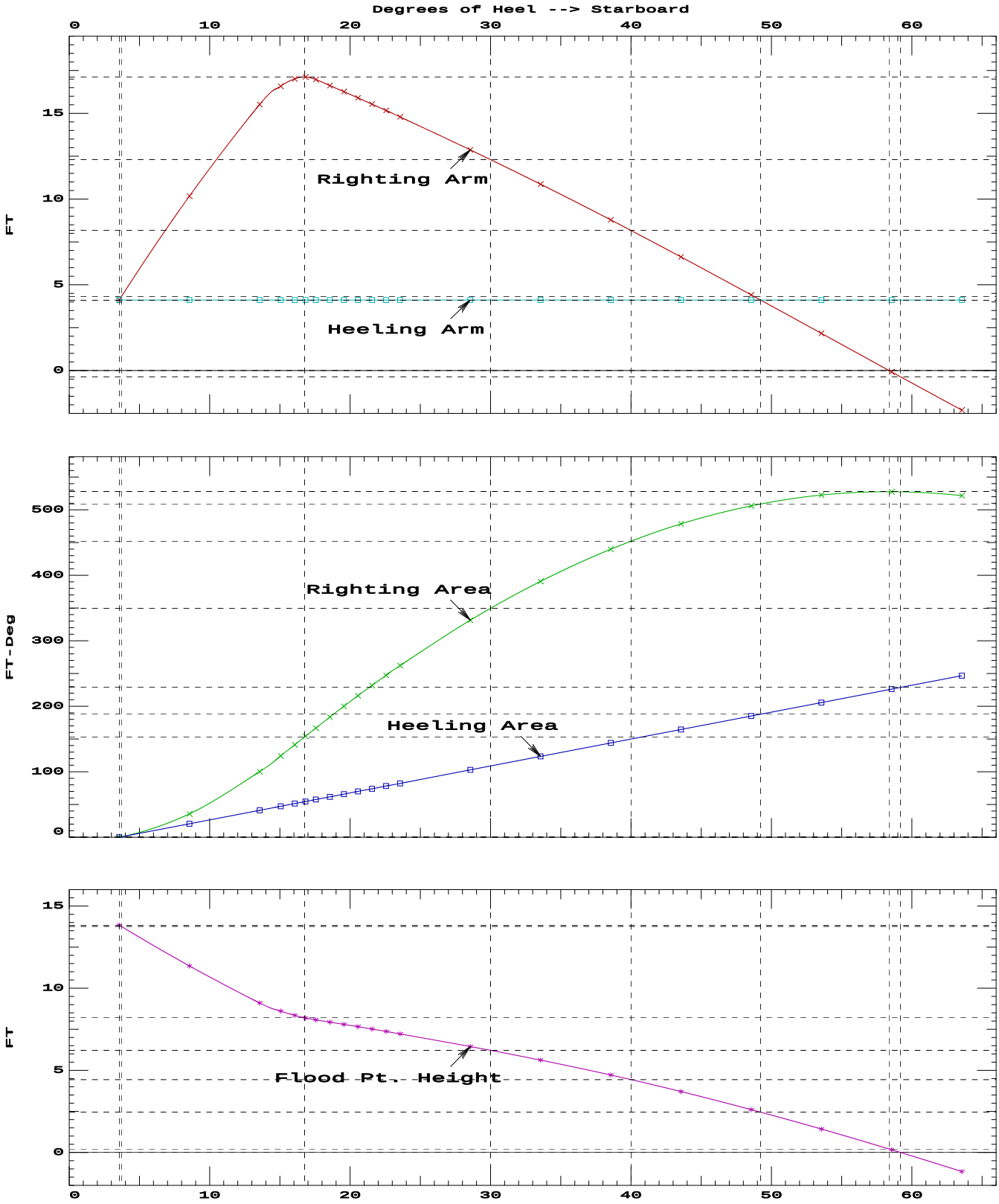
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 3092.73

	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**	**121.89**	**P**
(2)	**Angle from Equilibrium to RAzero**	**>**	**15.00**	**deg**	**45.66**	**P**

Relative angles measured from 3.560s

Condition 6 - 20AEQ 6RV Fwd Departure with Ice



Condition 7 - 20AEQ 6RV Fwd Arrival with Ice

WEIGHT STATUS

Trim: Fwd 1.07/210.33, Heel: Stbd 0.48 deg.

Part	Load	SpGr	Weight(LT)	LCG	TCG	VCG	FSM
LIGHT SHIP			492.24	84.19f	0.03p	23.20	
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			**702.57**	**89.49f**	**0.21s**	**24.92**	
FW.P	0.100	1.000	0.34	135.85f	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	114.44f	22.40p	0.77	19.0
DBF3.S	0.100	0.840	2.08	114.44f	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**	**102.23f**	**15.26s**	**8.14**	**88.9***
Total Weight			**720.76**	**89.81f**	**0.59s**	**24.49**	
Free Surface Adjustment						**0.12**	
Adjusted CG				**89.81f**	**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.

HYDROSTATIC PROPERTIES

Trim: Fwd 1.07/210.33, Heel: Stbd 0.48 deg., VCG = 24.49

LCF Draft	Displacement Weight(LT)	Buoyancy-Ctr. LCB	VCB	Weight/ Inch	LCF	Moment/ In trim	GML	GMT
7.990	720.76	89.92f	4.83	10.47	86.93f	136.37	477.6	70.36

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 = 89.81f TCG = 0.59s VCG = 24.49
Free Surface Adjustment: 0.12
Adjusted CG: LCG = 89.81f TCG = 0.59s VCG = 24.62

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Righting Arms in Trim	in Heel	Area	Flood Pt Height	
7.547	0.29f	0.48s	720.76	0.00	0.000	0.00	15.45	(1)
7.531	0.22f	5.48s	720.71	0.00	6.180	15.45	13.02	(1)
7.489	0.03f	10.48s	720.77	0.00	12.269	61.61	10.55	(1)
7.457	0.01f	10.98s	720.76	0.00	12.830	67.88	10.32	(1)
7.416	0.00	11.48s	720.76	0.00	13.375	74.44	10.10	(1)
7.364	0.01a	11.98s	720.76	0.00	13.901	81.26	9.88	(2)
7.300	0.01a	12.48s	720.76	0.00	14.400	88.33	9.67	(2)
7.220	0.02a	12.98s	720.76	0.00	14.866	95.65	9.47	(2)
7.123	0.01a	13.48s	720.77	0.00	15.291	103.19	9.29	(2)
7.009	0.01a	13.98s	720.76	0.00	15.671	110.93	9.12	(2)
6.878	0.00	14.48s	720.76	0.00	15.999	118.84	8.96	(1)
6.728	0.01f	14.98s	720.76	0.00	16.265	126.91	8.82	(1)
6.561	0.03f	15.48s	720.76	0.00	16.462	135.09	8.69	(1)
6.375	0.04f	15.98s	720.70	0.00	16.577	143.35	8.58	(1)
6.266	0.04f	16.27s	720.88	0.00	**16.597**	148.12	8.52	(1)
6.176	0.05f	16.48s	720.67	0.00	16.587	151.65	8.49	(1)
6.068	0.05f	16.75s	720.86	0.00	16.533	156.10	8.44	(1)
5.967	0.04f	16.98s	720.81	0.00	16.454	159.91	8.41	(1)
5.747	0.04f	17.48s	720.75	0.00	16.271	168.09	8.34	(1)
5.308	0.03f	18.48s	720.72	0.00	15.902	184.18	8.21	(1)
4.867	0.03f	19.48s	720.76	0.00	15.529	199.90	8.06	(1)
4.426	0.02f	20.48s	720.76	0.00	15.152	215.24	7.92	(1)
2.205	0.03a	25.48s	720.75	0.00	13.210	286.18	7.17	(2)
-0.026	0.08a	30.48s	720.74	0.00	11.188	347.21	6.36	(2)
-2.251	0.14a	35.48s	720.74	0.00	9.109	397.98	5.50	(2)
-4.406	0.22a	40.48s	720.84	0.00	6.972	438.20	4.56	(2)
-6.454	0.31a	45.48s	720.86	0.00	4.771	467.59	3.51	(2)
-8.380	0.41a	50.48s	720.89	0.00	2.531	485.86	2.38	(2)
-10.171	0.52a	55.48s	720.88	0.01f	0.279	492.88	1.16	(2)
-10.383	0.53a	56.10s	720.88	0.00	-0.001	492.97	1.01	(2)
-11.654	0.63a	59.99s	720.77	0.00	-1.737	489.59	0.00	(2)
-11.809	0.64a	60.48s	720.77	0.00	-1.957	488.68	*-0.13*	(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.

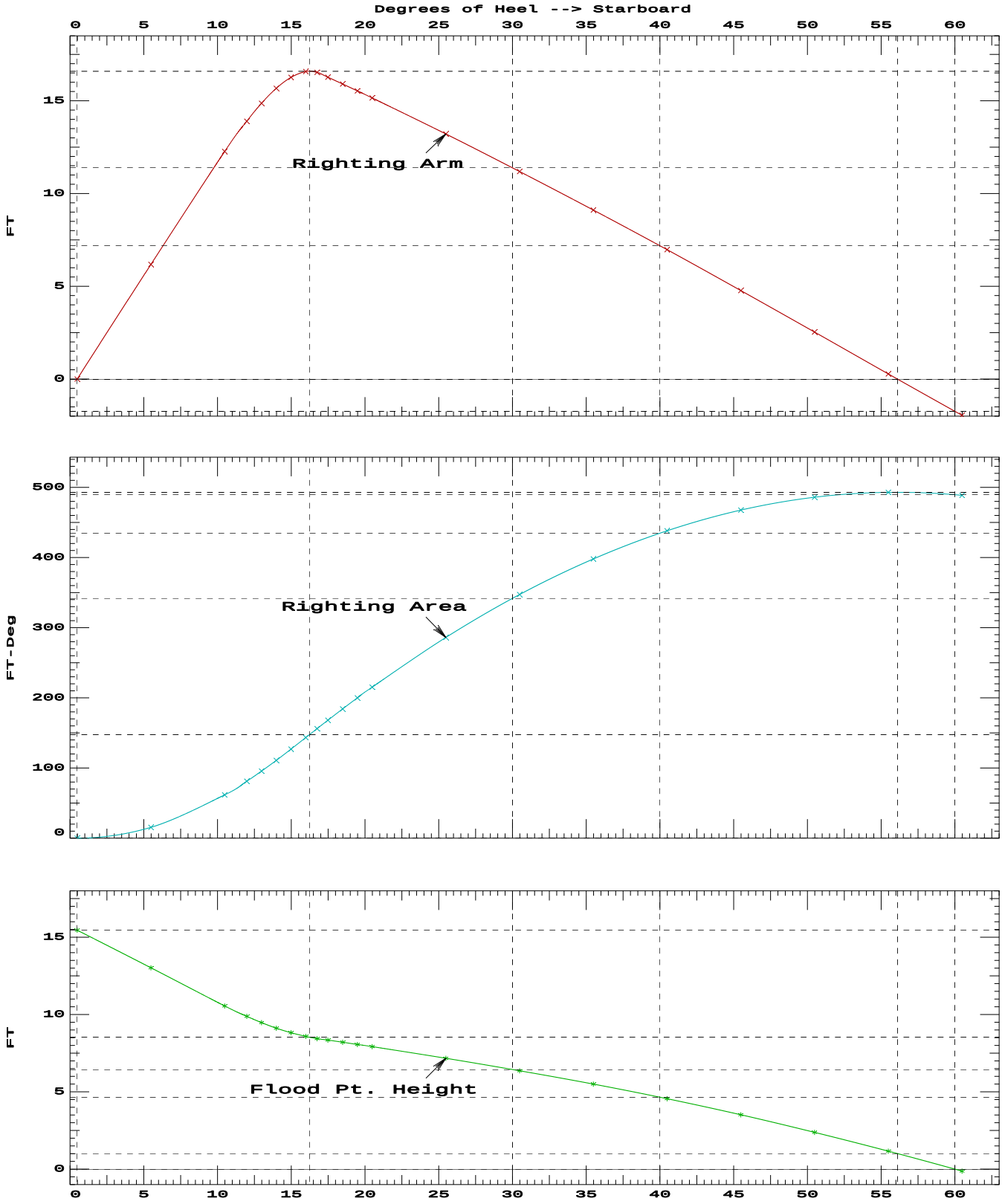
Condition 7 - 20AEQ 6RV Fwd Arrival with Ice

	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 0.482 deg to 16.3**	**>**	**19.06**	**Ft-deg**	**156.10**	**P**
(2)	**Absolute Angle at MaxRA**	**>**	**10.00**	**deg**	**16.27**	**P**

Relative angles measured from 0.482s

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  =    1614.8
    HLT =    3090.5
```

```
With HMMT = TL
        1614.8
```

```
Vessel Heel <    8.00 deg
Calc Heel =      2.30 deg
```

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

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

```
With HMMT = TL+HL2
            3090.5
```

```
Vessel Heel <   12.00 deg
Calc Heel =  3.95 deg
```

Condition 7 - 20AEQ 6RV Fwd Arrival with Ice

*** Residual Area Check ***

RESIDUAL RIGHTING ARMS vs HEEL ANGLE

Total CG: LCG = 89.81f TCG = 0.60s VCG = 24.49
Free Surface Adjustment: 0.12
Adjusted CG: LCG = 89.81f TCG = 0.59s VCG = 24.62

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Area	Flood Pt Height	
7.533	0.26f	3.95s	720.74	0.00	0.000	0.00	13.77	(1)
7.538	0.09f	8.95s	720.77	0.00	6.189	15.47	11.29	(1)
7.014	0.01a	13.95s	720.56	0.00	11.369	59.79	9.13	(2)
6.886	0.00	14.45s	720.76	0.00	11.698	65.55	8.97	(2)
6.737	0.01f	14.95s	720.76	0.00	11.968	71.47	8.83	(1)
6.571	0.02f	15.45s	720.76	0.00	12.169	77.50	8.70	(1)
6.387	0.04f	15.95s	720.76	0.00	12.289	83.62	8.59	(1)
6.264	0.04f	16.27s	720.90	0.00	**12.314**	87.52	8.52	(1)
6.193	0.05f	16.45s	721.03	0.00	12.307	89.77	8.49	(1)
5.981	0.04f	16.95s	720.93	0.00	12.182	95.89	8.41	(1)
5.759	0.04f	17.45s	720.75	0.00	11.998	101.94	8.35	(1)
5.540	0.04f	17.95s	720.75	0.00	11.814	107.89	8.28	(1)
5.320	0.03f	18.45s	720.75	0.00	11.629	113.75	8.21	(1)
5.100	0.03f	18.95s	720.75	0.00	11.443	119.52	8.14	(1)
4.880	0.03f	19.45s	720.75	0.00	11.256	125.19	8.07	(1)
4.660	0.02f	19.95s	720.75	0.00	11.068	130.77	8.00	(1)
4.439	0.02f	20.45s	720.75	0.00	10.879	136.26	7.93	(1)
4.218	0.02f	20.95s	720.75	0.00	10.689	141.65	7.85	(1)
3.774	0.01f	21.95s	720.72	0.00	10.305	152.15	7.71	(1)
3.330	0.00	22.95s	720.76	0.00	9.919	162.26	7.56	(2)
2.886	0.01a	23.95s	720.76	0.00	9.529	171.99	7.41	(2)
0.656	0.06a	28.95s	720.74	0.00	7.529	214.67	6.61	(2)
-1.573	0.12a	33.95s	720.75	0.00	5.465	247.18	5.77	(2)
-3.758	0.19a	38.95s	720.83	0.00	3.349	269.23	4.86	(2)
-5.840	0.28a	43.95s	720.86	0.00	1.164	280.54	3.84	(2)
-6.885	0.33a	46.57s	720.76	0.00	0.000	282.07	3.27	(2)
-7.807	0.38a	48.95s	720.79	0.00	-1.067	280.80	2.74	(2)
-9.640	0.48a	53.95s	720.77	0.00	-3.319	269.84	1.54	(2)
-11.324	0.60a	58.95s	720.92	0.00	-5.561	247.64	0.27	(2)
-11.650	0.63a	59.98s	720.88	0.00	-6.019	241.70	0.00	(2)
-12.861	0.73a	63.95s	720.75	0.00	-7.775	214.28	*-1.05*	(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

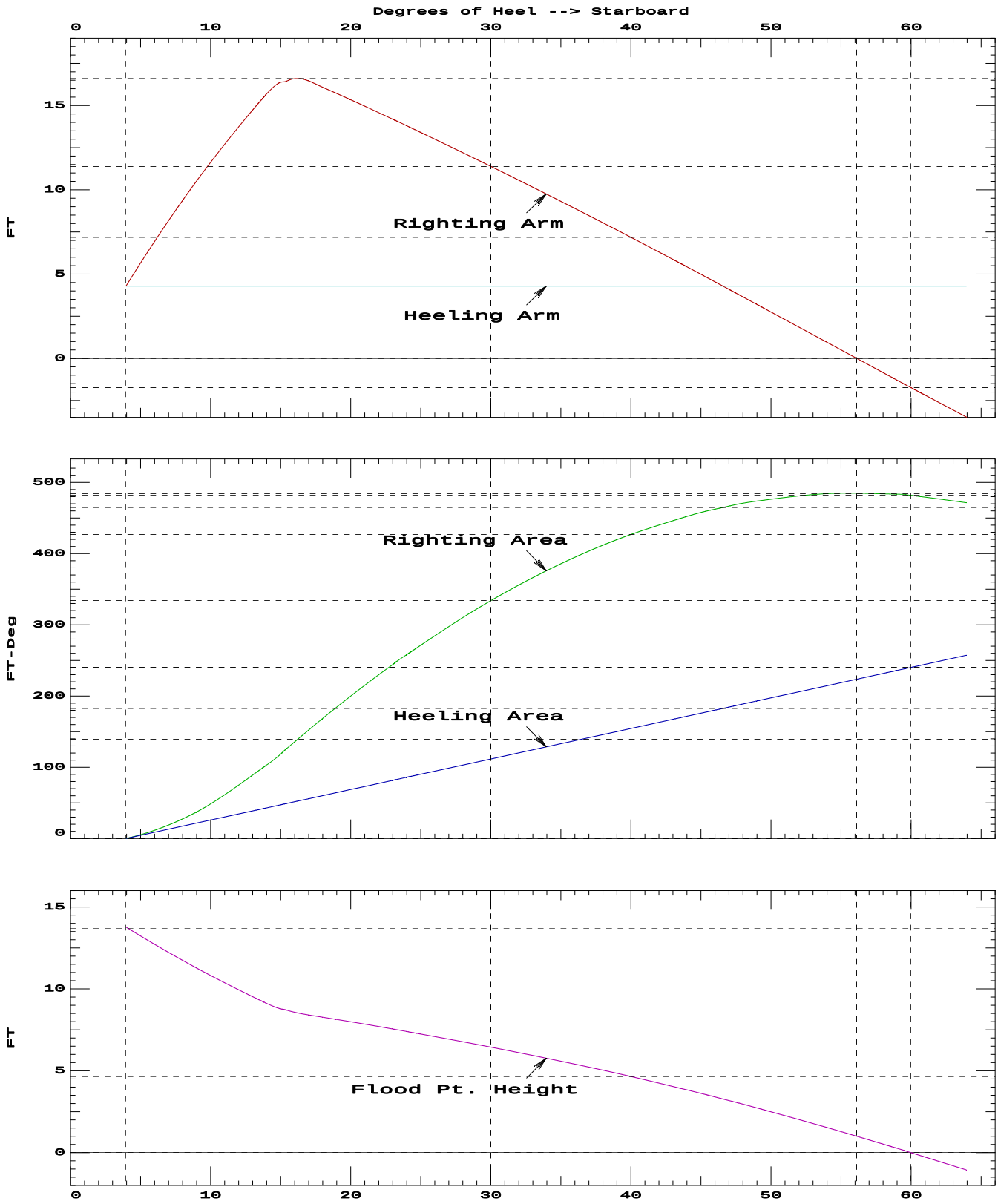
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 3090.53

	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**	**119.52**	**P**
(2)	**Angle from Equilibrium to RAzero**	**>**	**15.00**	**deg**	**42.62**	**P**

Relative angles measured from 3.954s

Condition 7 - 20AEQ 6RV Fwd Arrival with Ice



Condition 8 - 30AEQ 2ST Aft Departure with Ice

WEIGHT STATUS

Trim: Fwd 1.15/210.33, Heel: Port 0.18 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	492.24	84.19f	0.03p	23.20
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	**690.31**	**88.32f**	**0.21p**	**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	98.17f	20.98s	7.96	6.8
DBF4.P	0.980	0.840	20.43	114.08f	22.48p	3.50	32.3
DBF3.S	0.980	0.840	20.43	114.08f	22.47s	3.50	32.3
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			**738.55**	**89.93f**	**0.22p**	**23.53**	
Free Surface Adjustment						**0.12**	
Adjusted CG				**89.93f**	**0.22p**	**23.65**	

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 1.15/210.33, Heel: Port 0.18 deg., VCG = 23.53

LCF Draft	Displacement Weight(LT)	Buoyancy-Ctr. LCB	VCB	Weight/ Inch	LCF	Moment/ In trim	GML	GMT
8.133	738.56	90.03f	4.91	10.54	87.19f	138.51	473.4	69.79

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 = 89.93f TCG = 0.22p VCG = 23.53
Free Surface Adjustment: 0.12
Adjusted CG: LCG = 89.93f TCG = 0.22p VCG = 23.65

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Righting Arms in Trim	in Heel	Area	Flood Pt Height	
7.656	0.31f	0.18p	738.55	0.00	0.000	0.00	15.47	(5)
7.638	0.26f	4.82s	738.52	0.00	6.113	15.28	13.22	(1)
7.637	0.07f	9.82s	738.56	0.00	12.207	61.09	10.74	(1)
7.621	0.05f	10.32s	738.55	0.00	12.787	67.34	10.50	(1)
7.597	0.03f	10.82s	738.55	0.00	13.355	73.87	10.26	(1)
7.564	0.01f	11.32s	738.55	0.00	13.909	80.69	10.03	(1)
7.523	0.00	11.82s	738.55	0.00	14.446	87.78	9.81	(2)
7.470	0.01a	12.32s	738.55	0.00	14.963	95.13	9.59	(2)
7.405	0.02a	12.82s	738.55	0.00	15.454	102.74	9.38	(2)
7.325	0.02a	13.32s	738.55	0.00	15.911	110.58	9.18	(2)
7.227	0.02a	13.82s	738.56	0.00	16.328	118.64	9.00	(2)
7.112	0.02a	14.32s	738.55	0.00	16.700	126.89	8.83	(2)
6.981	0.01a	14.82s	738.55	0.00	17.019	135.32	8.67	(2)
6.831	0.00	15.32s	738.55	0.00	17.277	143.90	8.53	(1)
6.663	0.01f	15.82s	738.55	0.00	17.465	152.58	8.40	(1)
6.477	0.02f	16.32s	738.48	0.00	17.570	161.34	8.30	(1)
6.455	0.02f	16.38s	738.54	0.00	17.575	162.34	8.28	(1)
6.387	0.03f	16.56s	738.67	0.00	**17.584**	165.48	8.25	(1)
6.279	0.03f	16.82s	738.56	0.00	17.566	170.13	8.20	(1)
5.845	0.02f	17.82s	738.51	0.00	17.249	187.54	8.06	(1)
5.405	0.02f	18.82s	738.55	0.00	16.893	204.61	7.92	(1)
4.963	0.01f	19.82s	738.55	0.00	16.531	221.32	7.78	(1)
2.736	0.04a	24.82s	738.54	0.00	14.661	299.38	7.05	(2)
0.496	0.09a	29.82s	738.54	0.00	12.699	367.82	6.25	(2)
-1.742	0.15a	34.82s	738.54	0.00	10.665	426.26	5.41	(2)
-3.904	0.22a	39.82s	738.63	0.00	8.552	474.33	4.47	(2)
-5.964	0.31a	44.82s	738.65	0.00	6.362	511.65	3.44	(2)
-7.911	0.41a	49.82s	738.64	0.01f	4.121	537.88	2.32	(2)
-9.723	0.52a	54.82s	738.56	0.00	1.854	552.83	1.12	(2)
-11.095	0.62a	58.92s	738.56	0.00	-0.001	556.62	0.08	(2)
-11.187	0.62a	59.20s	738.56	0.00	-0.132	556.60	0.00	(2)
-11.385	0.64a	59.82s	738.56	0.00	-0.411	556.43	*-0.16*	(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.

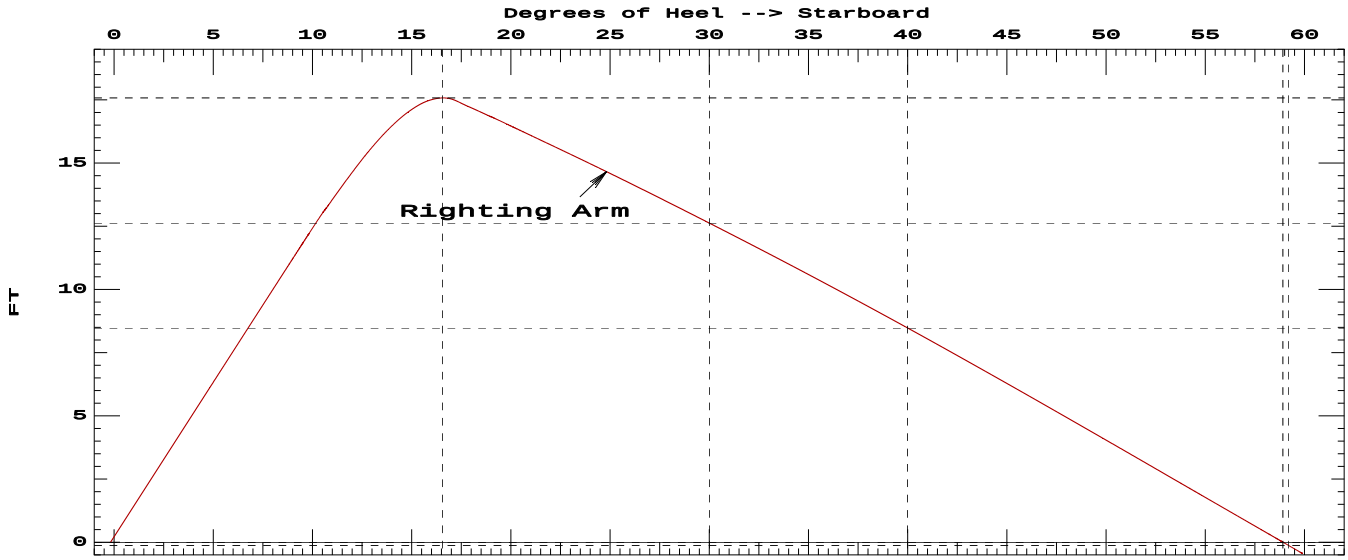
Condition 8 - 30AEQ 2ST Aft Departure with Ice

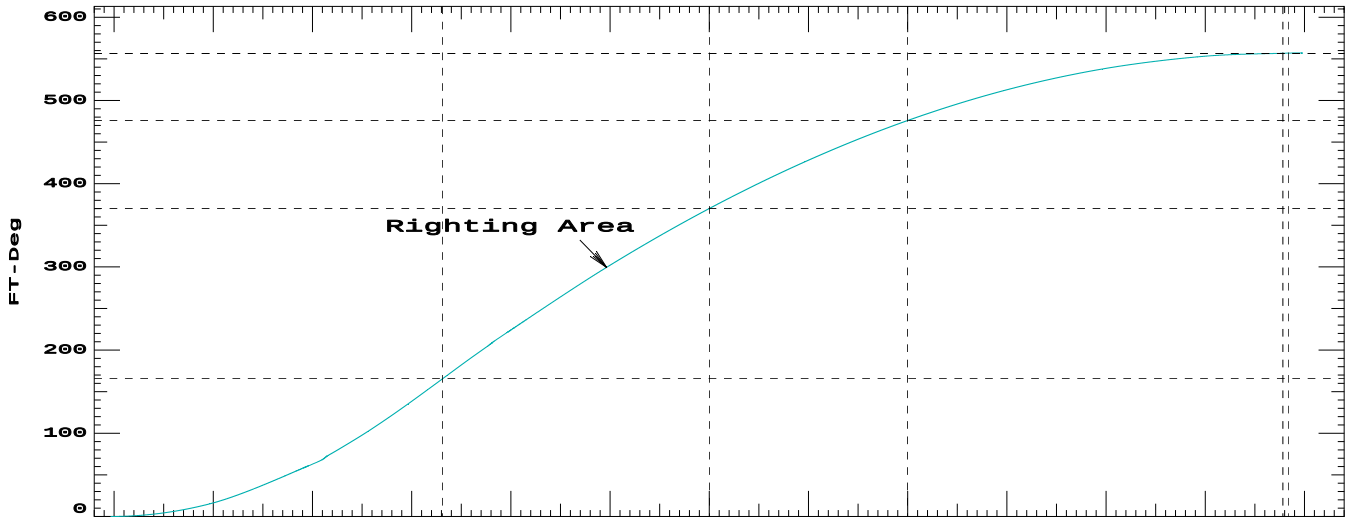
	Critical Points		LCP	TCP	VCP
(1)	ER Air Fwd S	FLOOD	43.30f	27.45s	23.45
(2)	ER Air Aft S	FLOOD	35.42f	27.45s	23.45
(5)	ER Air FWD P	FLOOD	43.30f	27.45p	23.45

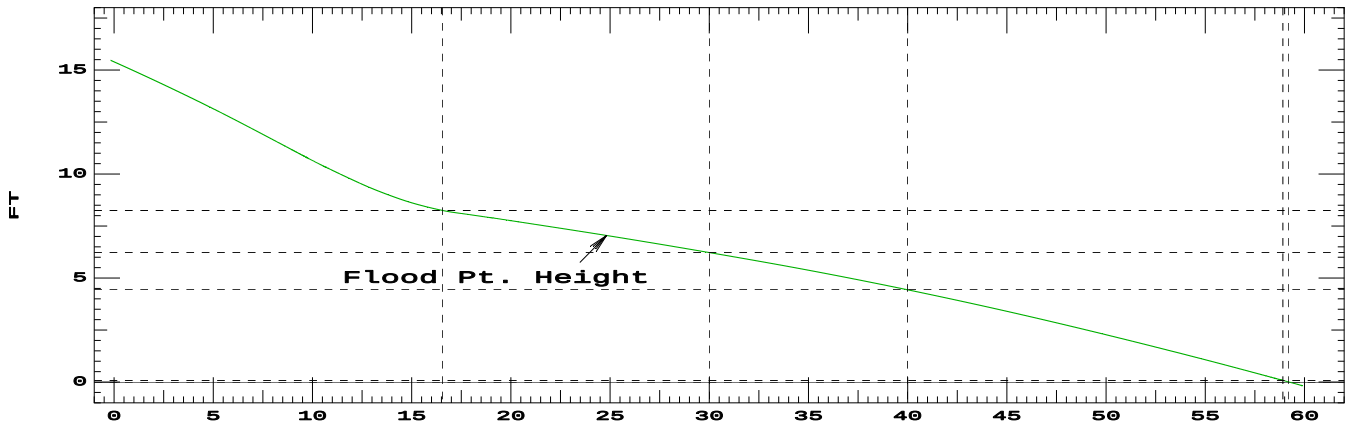
LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Area from abs -0.177 deg to 16.6**	**>**	**18.73**	**Ft-deg**	**162.34**	**P**
(2)	**Absolute Angle at MaxRA**	**>**	**10.00**	**deg**	**16.56**	**P**

Relative angles measured from 0.177p

Condition 8 - 30AEQ 2ST Aft Departure with Ice







Condition 8 - 30AEQ 2ST Aft Departure with Ice

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

Calculated Heeling Moments
     LONG TONS - FEET
    HL1 =     983.8
    HL2 =    1475.7
    PL  =     449.7
    TL  =    1581.2
    HLT =    3056.9
```

```
With HMMT = TL
        1581.2
```

```
Vessel Heel <    8.00 deg
Calc Heel =      1.58 deg
```

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

```
Vessel Heel <   10.00 deg
Calc Heel =  1.46 deg
```

```
With HMMT = TL+HL2
            3056.9
```

```
Vessel Heel <   12.00 deg
Calc Heel =  3.21 deg
```

Condition 8 - 30AEQ 2ST Aft Departure with Ice

*** Residual Area Check ***

RESIDUAL RIGHTING ARMS vs HEEL ANGLE

Total CG: LCG = 89.93f TCG = 0.21p VCG = 23.53
Free Surface Adjustment: 0.12
Adjusted CG: LCG = 89.93f TCG = 0.22p VCG = 23.65

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Area	Flood Pt Height	
7.642	0.29f	3.21s	738.57	0.00	0.000	0.00	14.01	(1)
7.655	0.14f	8.21s	738.56	0.00	6.141	15.35	11.53	(1)
7.344	0.02a	13.21s	738.56	0.00	11.674	60.14	9.23	(2)
7.250	0.02a	13.71s	738.55	0.00	12.101	66.09	9.04	(2)
7.140	0.02a	14.21s	738.56	0.00	12.484	72.23	8.87	(2)
7.012	0.01a	14.71s	738.55	0.00	12.815	78.56	8.71	(2)
6.867	0.00	15.21s	738.55	0.00	13.088	85.03	8.56	(2)
6.702	0.01f	15.71s	738.55	0.00	13.293	91.63	8.43	(1)
6.520	0.02f	16.21s	738.49	0.00	13.418	98.31	8.32	(1)
6.377	0.03f	16.58s	738.58	0.00	**13.448**	103.34	8.24	(1)
6.323	0.03f	16.71s	738.46	0.00	13.442	105.02	8.22	(1)
6.118	0.03f	17.21s	738.73	0.00	13.331	111.72	8.14	(1)
5.895	0.02f	17.71s	738.54	0.00	13.153	118.34	8.08	(1)
5.675	0.02f	18.21s	738.54	0.00	12.976	124.87	8.01	(1)
5.455	0.02f	18.71s	738.54	0.00	12.797	131.31	7.94	(1)
5.234	0.01f	19.21s	738.54	0.00	12.617	137.67	7.87	(1)
5.013	0.01f	19.71s	738.54	0.00	12.436	143.93	7.80	(1)
4.791	0.01f	20.21s	738.54	0.00	12.254	150.10	7.73	(1)
4.347	0.00	21.21s	738.55	0.00	11.887	162.17	7.59	(2)
3.902	0.01a	22.21s	738.55	0.00	11.515	173.87	7.44	(2)
3.457	0.02a	23.21s	738.55	0.00	11.140	185.20	7.29	(2)
1.219	0.07a	28.21s	738.53	0.00	9.204	236.10	6.51	(2)
-1.023	0.13a	33.21s	738.54	0.00	7.191	277.12	5.69	(2)
-3.217	0.20a	38.21s	738.62	0.00	5.107	307.90	4.79	(2)
-5.312	0.28a	43.21s	738.64	0.00	2.940	328.05	3.78	(2)
-7.296	0.38a	48.21s	738.66	0.00	0.712	337.21	2.69	(2)
-7.897	0.41a	49.79s	738.56	0.00	-0.001	337.77	2.33	(2)
-9.154	0.48a	53.21s	738.59	0.00	-1.550	335.12	1.51	(2)
-10.866	0.60a	58.21s	738.56	0.00	-3.819	321.70	0.26	(2)
-11.182	0.62a	59.19s	738.65	0.00	-4.261	317.74	0.00	(2)
-12.422	0.73a	63.21s	738.65	0.00	-6.068	296.97	*-1.06*	(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.

Condition 8 - 30AEQ 2ST Aft Departure with Ice

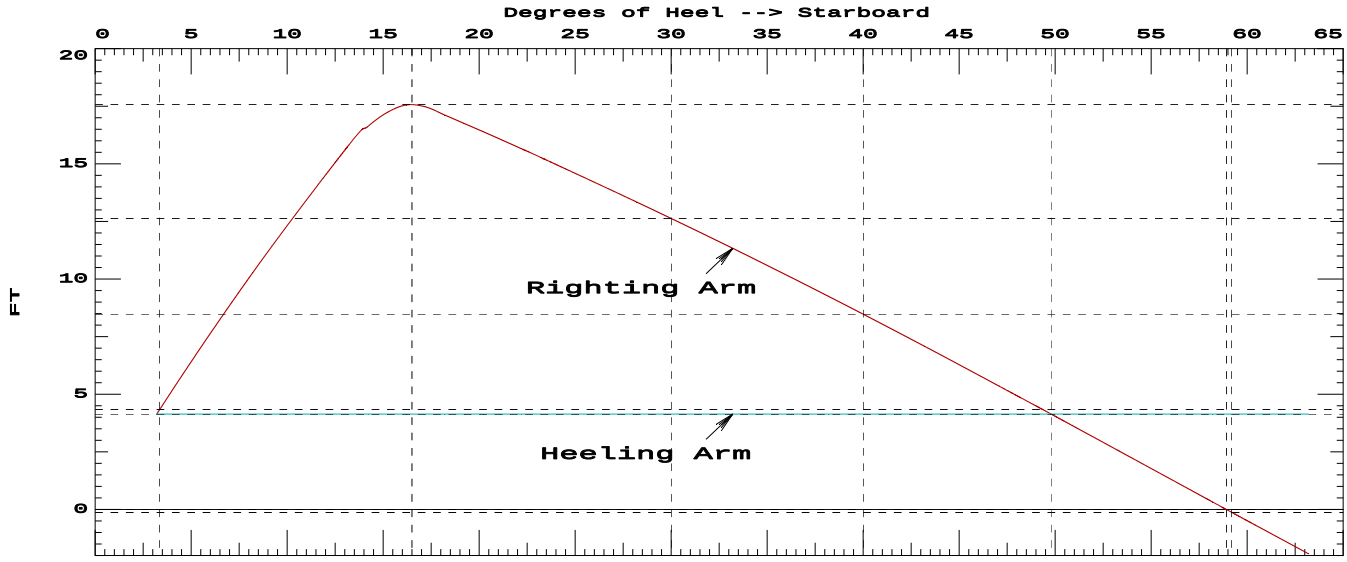
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 3056.86

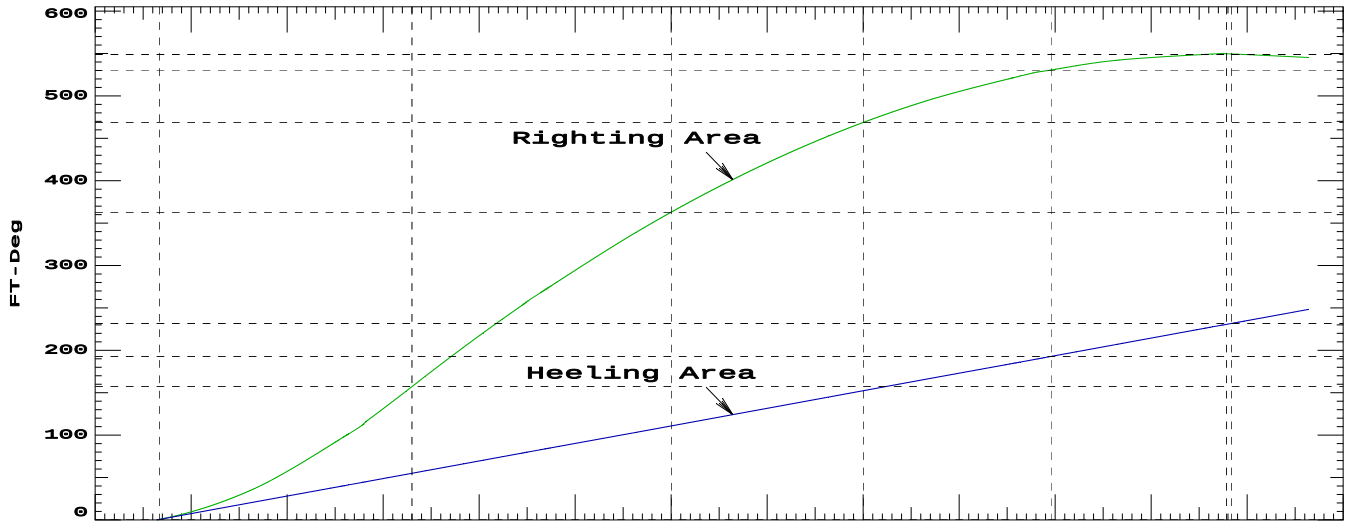
	Critical Points		LCP	TCP	VCP
(1)	ER Air Fwd S	FLOOD	43.30f	27.45s	23.45
(2)	ER Air Aft S	FLOOD	35.42f	27.45s	23.45

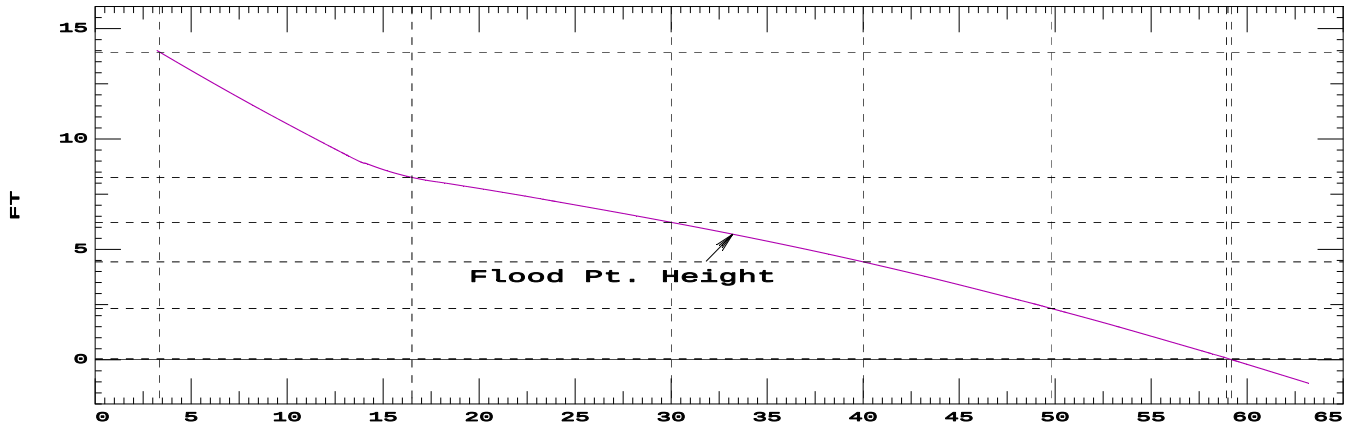
LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Area from Equilibrium to 15 deg**	**>**	**5.26**	**Ft-deg**	**124.87**	**P**
(2)	**Angle from Equilibrium to RAzero**	**>**	**15.00**	**deg**	**46.58**	**P**

Relative angles measured from 3.209s

Condition 8 - 30AEQ 2ST Aft Departure with Ice







Condition 9 - 30AEQ 2ST Aft Arrival with Ice

WEIGHT STATUS

Trim: Fwd 0.54/210.33, Heel: Stbd 0.15 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	492.24	84.19f	0.03p	23.20
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	**689.18**	**88.30f**	**0.21p**	**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	114.37f	22.45p	0.77	19.1
DBF3.S	0.100	0.840	2.08	114.37f	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			**707.38**	**88.65f**	**0.19s**	**24.41**	
Free Surface Adjustment						**0.13**	
Adjusted CG				**88.65f**	**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.

HYDROSTATIC PROPERTIES

Trim: Fwd 0.54/210.33, Heel: Stbd 0.15 deg., VCG = 24.41

LCF Draft	Displacement Weight(LT)	Buoyancy-Ctr. LCB	VCB	Weight/ Inch	LCF	Moment/ In trim	GML	GMT
7.881	707.37	88.70f	4.76	10.40	86.17f	133.67	477.0	71.48

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 = 88.65f TCG = 0.19s VCG = 24.41
Free Surface Adjustment: 0.13
Adjusted CG: LCG = 88.65f TCG = 0.19s VCG = 24.54

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Righting Arms in Trim	in Heel	Area	Flood Pt Height	
7.660	0.15f	0.15s	707.37	0.00	0.000	0.00	15.61	(1)
7.638	0.09f	5.15s	707.34	0.00	6.264	15.66	13.19	(1)
7.616	0.10a	10.15s	707.38	0.00	12.472	62.52	10.69	(2)
7.592	0.12a	10.65s	707.38	0.00	13.053	68.90	10.45	(2)
7.558	0.13a	11.15s	707.38	0.00	13.618	75.57	10.22	(2)
7.514	0.14a	11.65s	707.38	0.00	14.164	82.52	10.00	(2)
7.459	0.15a	12.15s	707.38	0.00	14.687	89.73	9.78	(2)
7.391	0.16a	12.65s	707.38	0.00	15.179	97.20	9.58	(2)
7.306	0.16a	13.15s	707.37	0.00	15.632	104.90	9.38	(2)
7.203	0.15a	13.65s	707.38	0.00	16.038	112.82	9.20	(2)
7.082	0.15a	14.15s	707.38	0.00	16.392	120.93	9.04	(2)
6.943	0.14a	14.65s	707.38	0.00	16.684	129.19	8.89	(2)
6.785	0.13a	15.15s	707.37	0.00	16.905	137.59	8.76	(2)
6.611	0.12a	15.65s	707.39	0.00	17.042	146.08	8.64	(2)
6.478	0.11a	16.00s	707.36	0.00	**17.074**	152.04	8.57	(2)
6.421	0.11a	16.15s	707.40	0.00	17.068	154.61	8.54	(2)
6.212	0.11a	16.65s	707.36	0.00	16.954	163.12	8.46	(2)
5.993	0.11a	17.15s	707.37	0.00	16.771	171.55	8.39	(2)
5.554	0.12a	18.15s	707.37	0.00	16.401	188.13	8.25	(2)
5.112	0.12a	19.15s	707.38	0.00	16.026	204.35	8.11	(2)
4.671	0.13a	20.15s	707.38	0.00	15.647	220.18	7.97	(2)
2.445	0.17a	25.15s	707.36	0.00	13.694	293.58	7.22	(2)
0.210	0.22a	30.15s	707.36	0.00	11.660	357.00	6.41	(2)
-2.021	0.27a	35.15s	707.35	0.00	9.564	410.08	5.56	(2)
-4.186	0.34a	40.15s	707.41	0.00	7.416	452.56	4.62	(2)
-6.238	0.43a	45.15s	707.49	0.00	5.206	484.14	3.58	(2)
-8.173	0.53a	50.15s	707.51	0.00	2.952	504.55	2.46	(2)
-9.972	0.64a	55.15s	707.57	0.00	0.683	513.64	1.24	(2)
-10.490	0.68a	56.66s	707.44	0.00	-0.003	514.16	0.86	(2)
-11.574	0.76a	59.99s	707.38	0.00	-1.501	511.66	0.00	(2)
-11.625	0.76a	60.15s	707.38	0.00	-1.574	511.41	*-0.04*	(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

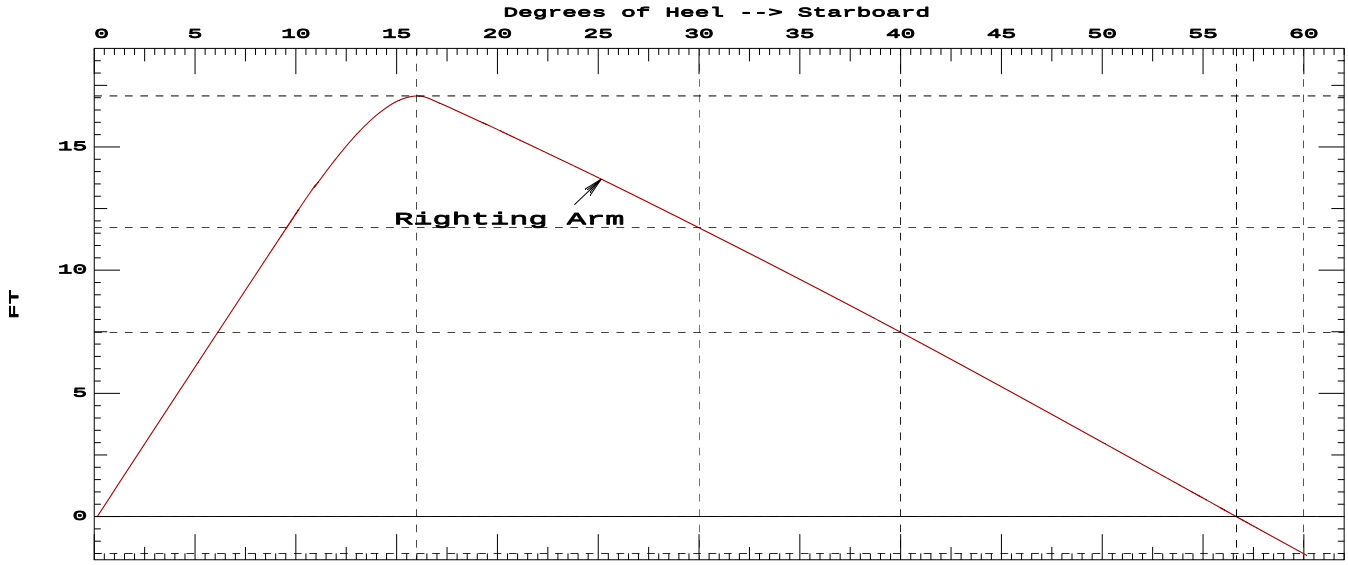
continued next page

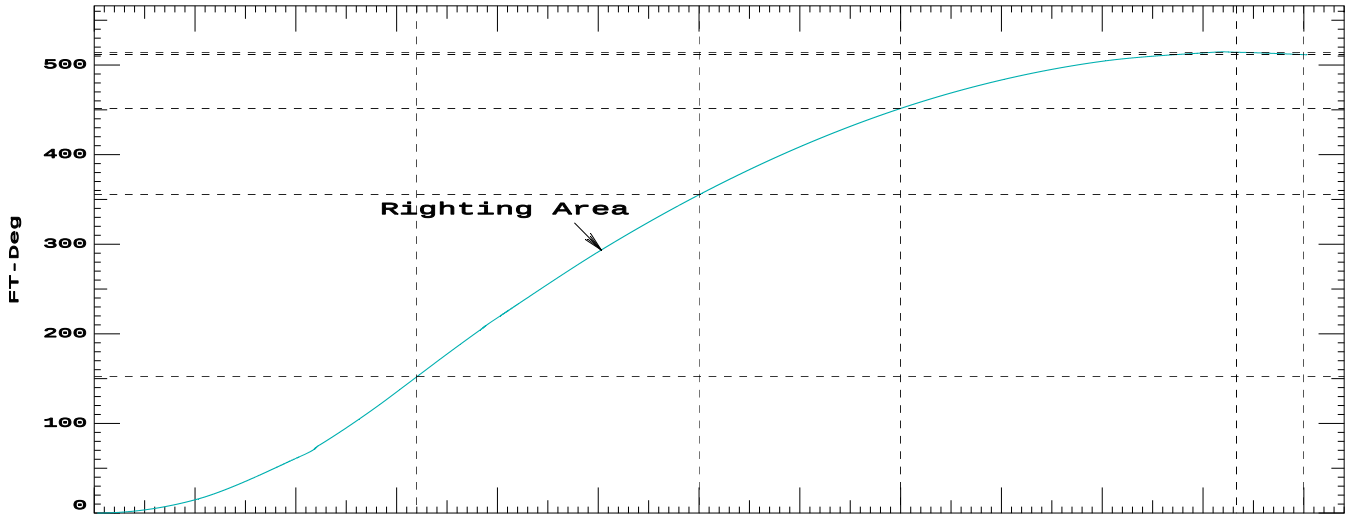
Condition 9 - 30AEQ 2ST Aft Arrival with Ice

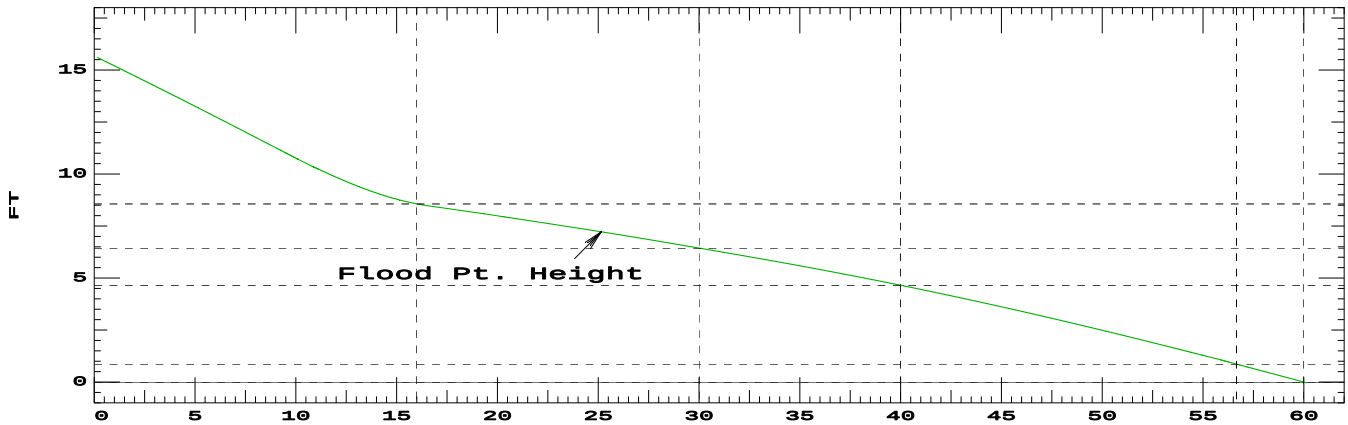
LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	Area from abs 0.149 deg to 16	>	19.39	Ft-deg	154.61	P
(2)	Absolute Angle at MaxRA	>	10.00	deg	16.00	P

Relative angles measured from 0.149

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  =    1578.9
    HLT =    3054.6
```

```
With HMMT = TL
        1578.9
```

```
Vessel Heel <    8.00 deg
Calc Heel =      1.93 deg
```

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

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

```
With HMMT = TL+HL2
            3054.6
```

```
Vessel Heel <   12.00 deg
Calc Heel =  3.60 deg
```

Condition 9 - 30AEQ 2ST Aft Arrival with Ice

*** Residual Area Check ***

RESIDUAL RIGHTING ARMS vs HEEL ANGLE

Total CG: LCG = 88.65f TCG = 0.19s VCG = 24.41
Free Surface Adjustment: 0.13
Adjusted CG: LCG = 88.65f TCG = 0.18s VCG = 24.54

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Area	Flood Pt Height	
7.644	0.12f	3.60s	707.38	0.00	0.002	0.00	13.95	(1)
7.650	0.04a	8.60s	707.38	0.00	6.285	15.72	11.46	(2)
7.211	0.15a	13.60s	707.09	0.00	11.688	61.01	9.22	(2)
7.096	0.15a	14.10s	707.38	0.00	12.044	66.94	9.05	(2)
6.959	0.14a	14.60s	707.38	0.00	12.343	73.04	8.90	(2)
6.802	0.13a	15.10s	707.37	0.00	12.572	79.27	8.77	(2)
6.629	0.12a	15.60s	707.39	0.00	12.718	85.59	8.65	(2)
6.478	0.11a	16.00s	707.40	0.00	**12.760**	90.73	8.57	(2)
6.440	0.11a	16.10s	707.40	0.00	12.758	91.96	8.55	(2)
6.235	0.11a	16.60s	707.36	0.00	12.659	98.32	8.47	(2)
6.015	0.11a	17.10s	707.37	0.00	12.476	104.60	8.40	(2)
5.796	0.12a	17.60s	707.37	0.00	12.291	110.79	8.33	(2)
5.576	0.12a	18.10s	707.37	0.00	12.106	116.89	8.26	(2)
5.356	0.12a	18.60s	707.37	0.00	11.919	122.90	8.19	(2)
5.135	0.13a	19.10s	707.37	0.00	11.731	128.81	8.12	(2)
4.914	0.13a	19.60s	707.37	0.00	11.542	134.63	8.05	(2)
4.693	0.13a	20.10s	707.37	0.00	11.352	140.35	7.98	(2)
4.472	0.13a	20.60s	707.38	0.00	11.162	145.98	7.91	(2)
4.028	0.14a	21.60s	707.38	0.00	10.777	156.95	7.76	(2)
3.583	0.15a	22.60s	707.38	0.00	10.388	167.53	7.61	(2)
3.138	0.16a	23.60s	707.38	0.00	9.996	177.73	7.46	(2)
0.904	0.20a	28.60s	707.36	0.00	7.984	222.71	6.67	(2)
-1.330	0.25a	33.60s	707.36	0.00	5.905	257.46	5.83	(2)
-3.527	0.32a	38.60s	707.38	0.00	3.774	281.68	4.92	(2)
-5.614	0.40a	43.60s	707.48	0.00	1.583	295.10	3.92	(2)
-7.021	0.47a	47.13s	707.38	0.00	0.000	297.90	3.15	(2)
-7.588	0.50a	48.60s	707.39	0.00	-0.661	297.42	2.82	(2)
-9.429	0.61a	53.60s	707.55	0.00	-2.927	288.46	1.63	(2)
-11.126	0.72a	58.60s	707.60	0.00	-5.191	268.16	0.36	(2)
-11.578	0.75a	59.99s	707.22	0.00	-5.819	260.50	0.00	(2)
-12.678	0.84a	63.60s	707.47	0.00	-7.427	236.60	*-0.96*	(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

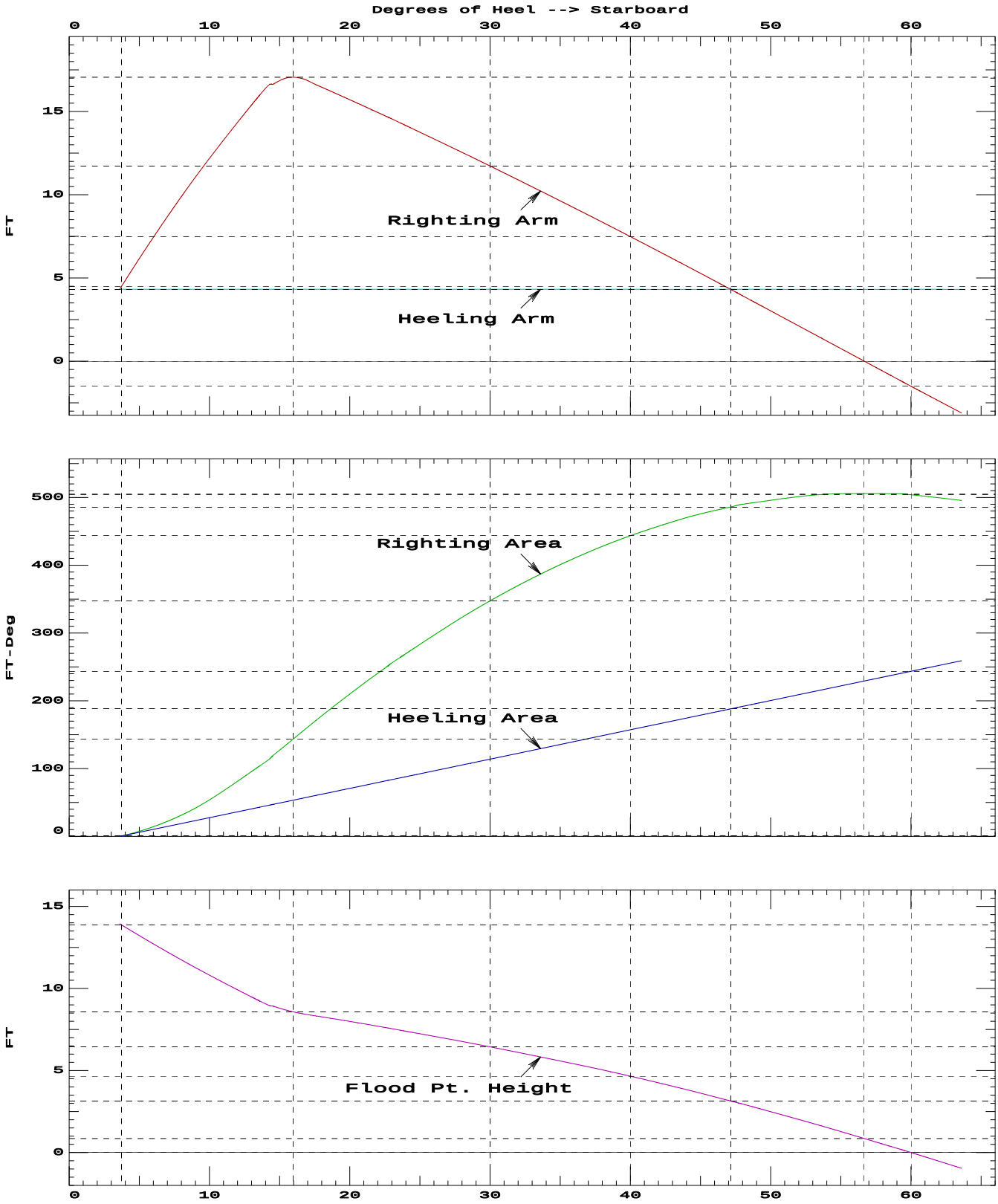
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 3054.61

	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**	**122.90**	**P**
(2)	**Angle from Equilibrium to RAzero**	**>**	**15.00**	**deg**	**43.53**	**P**

Relative angles measured from 3.598s

Condition 9 - 30AEQ 2ST Aft Arrival with Ice



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

WEIGHT STATUS

Trim: Fwd 0.88/210.33, Heel: Stbd 0.15 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	492.24	84.19f	0.03p	23.20
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	**653.48**	**87.72f**	**0.23s**	**23.92**

	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	98.16f	21.00s	7.96	6.8
DBF4.P	0.980	0.840	20.43	114.07f	22.47p	3.50	31.3
DBF3.S	0.980	0.840	20.43	114.07f	22.48s	3.50	31.3
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			**701.73**	**89.45f**	**0.19s**	**22.59**	
Free Surface Adjustment						**0.13**	
Adjusted CG				**89.45f**	**0.19s**	**22.71**	

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 0.88/210.33, Heel: Stbd 0.15 deg., VCG = 22.59

LCF Draft	Displacement Weight(LT)	Buoyancy-Ctr. LCB	VCB	Weight/ Inch	LCF	Moment/ In trim	GML	GMT
7.837	701.73	89.53f	4.74	10.40	86.52f	134.60	484.1	73.97

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 = 89.45f TCG = 0.19s VCG = 22.59
Free Surface Adjustment: 0.13
Adjusted CG: LCG = 89.45f TCG = 0.19s VCG = 22.71

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Righting Arms in Trim	in Heel	Area	Flood Pt Height	
7.476	0.24f	0.15s	701.73	0.00	0.000	0.00	15.72	(1)
7.458	0.18f	5.15s	701.69	0.00	6.493	16.23	13.30	(1)
7.417	0.00	10.15s	701.73	0.00	12.905	64.76	10.83	(2)
7.387	0.02a	10.65s	701.73	0.00	13.499	71.36	10.60	(2)
7.346	0.03a	11.15s	701.73	0.00	14.077	78.26	10.37	(2)
7.296	0.04a	11.65s	701.73	0.00	14.634	85.44	10.15	(2)
7.233	0.04a	12.15s	701.73	0.00	15.166	92.89	9.94	(2)
7.154	0.04a	12.65s	701.72	0.00	15.663	100.59	9.74	(2)
7.058	0.04a	13.15s	701.74	0.00	16.120	108.54	9.56	(2)
6.945	0.03a	13.65s	701.73	0.00	16.530	116.70	9.39	(2)
6.815	0.02a	14.15s	701.73	0.00	16.886	125.06	9.23	(2)
6.666	0.01a	14.65s	701.72	0.00	17.181	133.57	9.09	(2)
6.500	0.00f	15.15s	701.72	0.00	17.404	142.22	8.96	(1)
6.316	0.02f	15.65s	701.73	0.00	17.543	150.96	8.85	(1)
6.170	0.02f	16.03s	701.79	0.00	**17.579**	157.54	8.77	(1)
6.115	0.03f	16.15s	701.64	0.00	17.575	159.74	8.75	(1)
6.109	0.03f	16.18s	701.76	0.00	17.573	160.18	8.75	(1)
5.909	0.03f	16.65s	701.88	0.00	17.462	168.50	8.67	(1)
5.688	0.02f	17.15s	701.72	0.00	17.293	177.19	8.61	(1)
5.250	0.02f	18.15s	701.69	0.00	16.953	194.31	8.47	(1)
4.811	0.01f	19.15s	701.73	0.00	16.609	211.09	8.33	(1)
4.371	0.00	20.15s	701.73	0.00	16.259	227.53	8.19	(1)
2.156	0.04a	25.15s	701.71	0.00	14.452	304.35	7.43	(2)
-0.066	0.09a	30.15s	701.71	0.00	12.557	371.91	6.61	(2)
-2.282	0.15a	35.15s	701.71	0.00	10.596	429.82	5.75	(2)
-4.450	0.22a	40.15s	701.79	0.00	8.580	477.78	4.81	(2)
-6.506	0.31a	45.15s	701.83	0.00	6.493	515.49	3.78	(2)
-8.440	0.41a	50.15s	701.86	0.00	4.352	542.63	2.65	(2)
-10.235	0.53a	55.15s	701.92	0.00	2.186	558.98	1.43	(2)
-11.882	0.64a	60.15s	701.95	0.00	0.020	564.50	0.14	(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

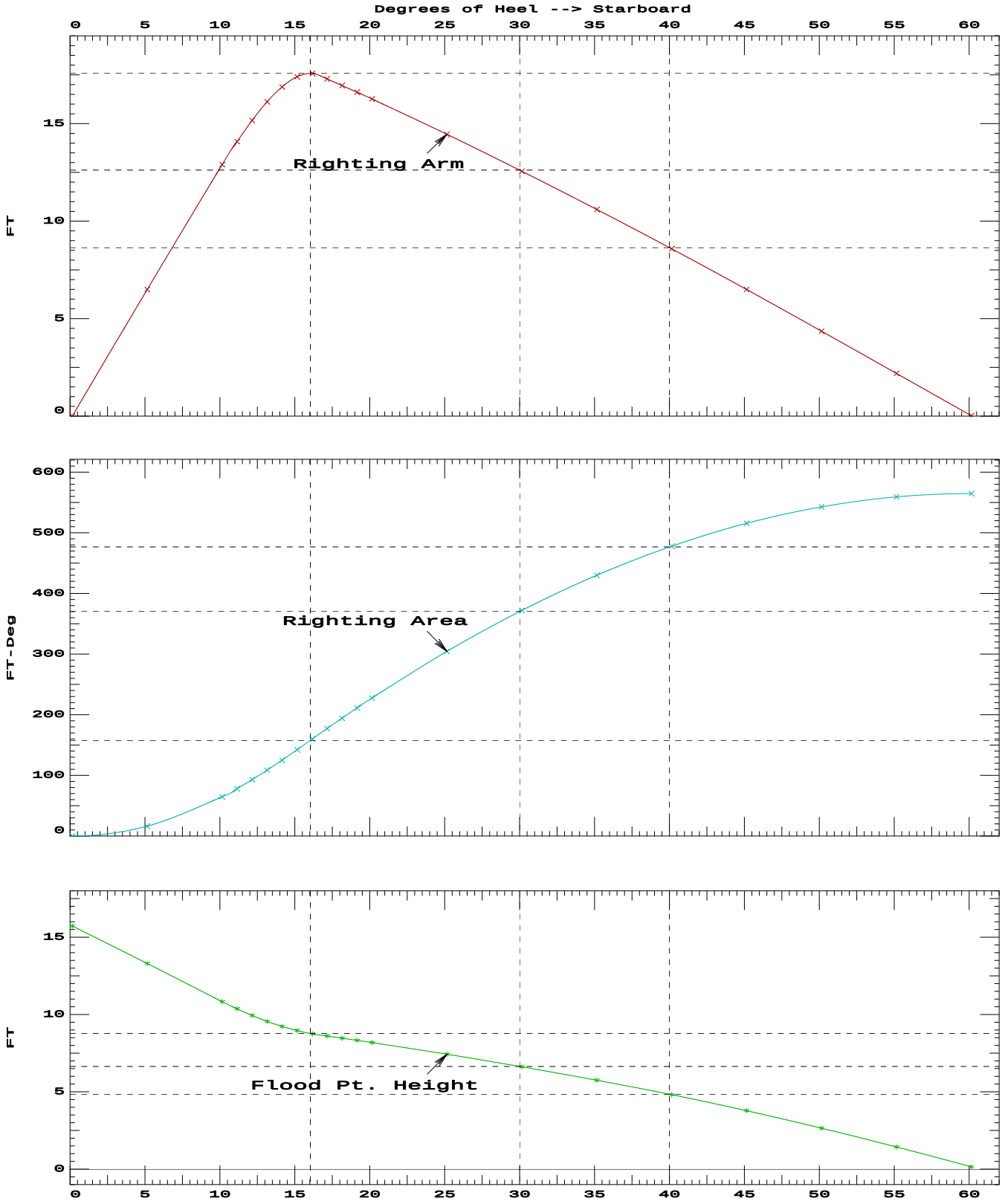
continued next page

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

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	Area from abs 0.150 deg to 16	>	19.35	Ft-deg	160.18	P
(2)	Absolute Angle at MaxRA	>	10.00	deg	16.03	P

Relative angles measured from 0.150

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  =    1434.3
    HLT =    2910.0
```

With HMMT = TL 1434.3
Vessel Heel < 8.00 deg Calc Heel = 1.73 deg

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

With HMMT = TL+HL2 2910.0
Vessel Heel < 12.00 deg Calc Heel = 3.35 deg

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

*** Residual Area Check ***

RESIDUAL RIGHTING ARMS vs HEEL ANGLE

Total CG: LCG = 89.46f TCG = 0.20s VCG = 22.59
Free Surface Adjustment: 0.13
Adjusted CG: LCG = 89.46f TCG = 0.19s VCG = 22.71

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Area	Flood Pt Height	
7.463	0.22f	3.35s	701.74	0.00	0.003	0.00	14.18	(1)
7.467	0.06f	8.35s	701.73	0.00	6.519	16.30	11.70	(1)
7.012	0.04a	13.35s	701.52	0.00	12.147	63.34	9.49	(2)
6.895	0.03a	13.85s	701.73	0.00	12.535	69.51	9.32	(2)
6.758	0.02a	14.35s	701.72	0.00	12.868	75.86	9.17	(2)
6.601	0.00a	14.85s	701.72	0.00	13.135	82.36	9.03	(2)
6.428	0.01f	15.35s	701.72	0.00	13.326	88.98	8.91	(1)
6.236	0.02f	15.85s	701.65	0.00	13.426	95.66	8.81	(1)
6.166	0.03f	16.03s	701.72	0.00	**13.435**	98.09	8.77	(1)
6.034	0.03f	16.35s	701.72	0.00	13.404	102.38	8.72	(1)
5.819	0.03f	16.85s	701.72	0.00	13.251	109.04	8.65	(1)
5.601	0.02f	17.35s	701.72	0.00	13.082	115.62	8.58	(1)
5.382	0.02f	17.85s	701.72	0.00	12.912	122.12	8.51	(1)
5.163	0.02f	18.35s	701.72	0.00	12.741	128.53	8.44	(1)
4.943	0.01f	18.85s	701.72	0.00	12.569	134.86	8.37	(1)
4.723	0.01f	19.35s	701.72	0.00	12.395	141.10	8.30	(1)
4.503	0.00f	19.85s	701.71	0.00	12.221	147.26	8.23	(1)
4.283	0.00	20.35s	701.71	0.00	12.045	153.32	8.16	(1)
3.841	0.01a	21.35s	701.73	0.00	11.691	165.19	8.01	(2)
3.399	0.01a	22.35s	701.73	0.00	11.332	176.70	7.86	(2)
2.956	0.02a	23.35s	701.73	0.00	10.970	187.85	7.71	(2)
0.734	0.07a	28.35s	701.71	0.00	9.104	238.08	6.91	(2)
-1.487	0.13a	33.35s	701.70	0.00	7.164	278.78	6.06	(2)
-3.683	0.19a	38.35s	701.72	0.00	5.169	309.64	5.16	(2)
-5.779	0.28a	43.35s	701.82	0.00	3.108	330.36	4.16	(2)
-7.759	0.38a	48.35s	701.85	0.00	0.983	340.61	3.07	(2)
-8.620	0.43a	50.63s	701.74	0.00	-0.001	341.73	2.54	(2)
-9.608	0.48a	53.35s	701.77	0.00	-1.177	340.13	1.88	(2)
-11.306	0.60a	58.35s	701.95	0.00	-3.345	328.83	0.62	(2)
-12.059	0.66a	60.71s	701.73	0.00	-4.366	319.75	0.00	(2)
-12.866	0.72a	63.35s	701.78	0.00	-5.502	306.71	*-0.70*	(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

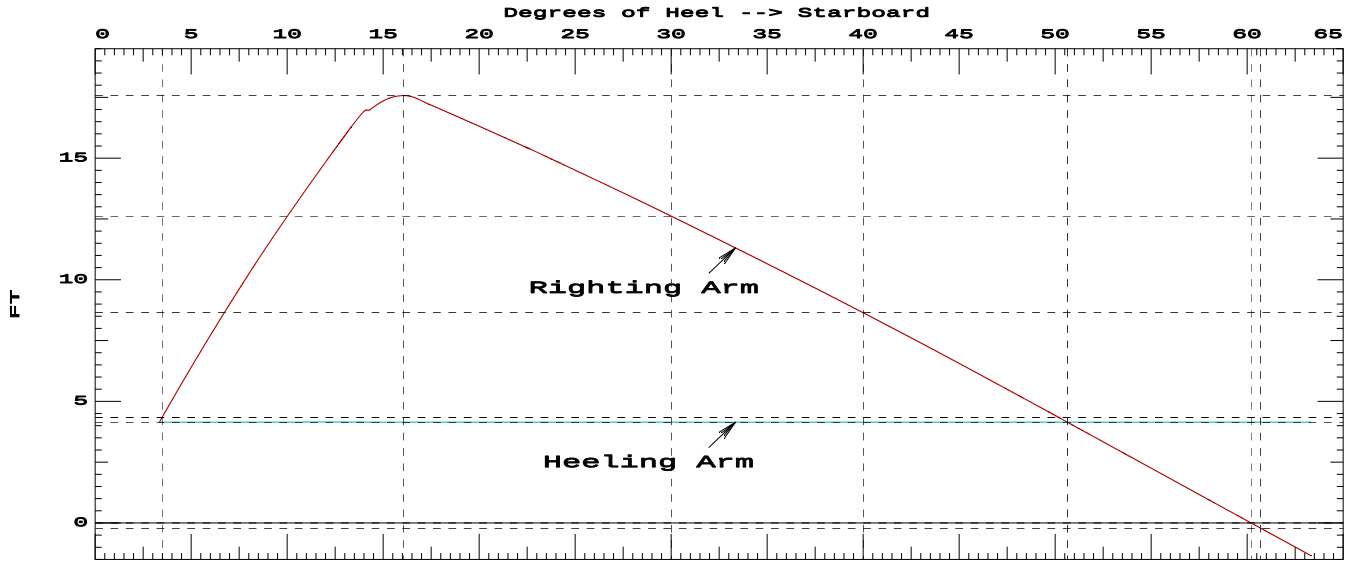
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 2910.02

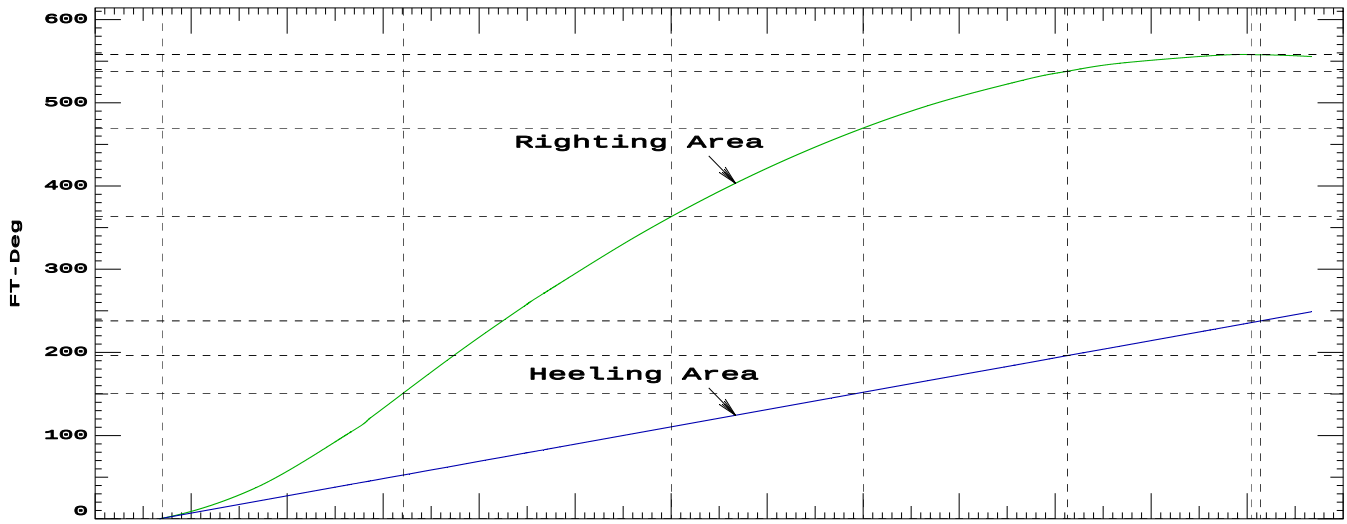
	Critical Points		LCP	TCP	VCP
(1)	ER Air Fwd S	FLOOD	43.30f	27.45s	23.45
(2)	ER Air Aft S	FLOOD	35.42f	27.45s	23.45

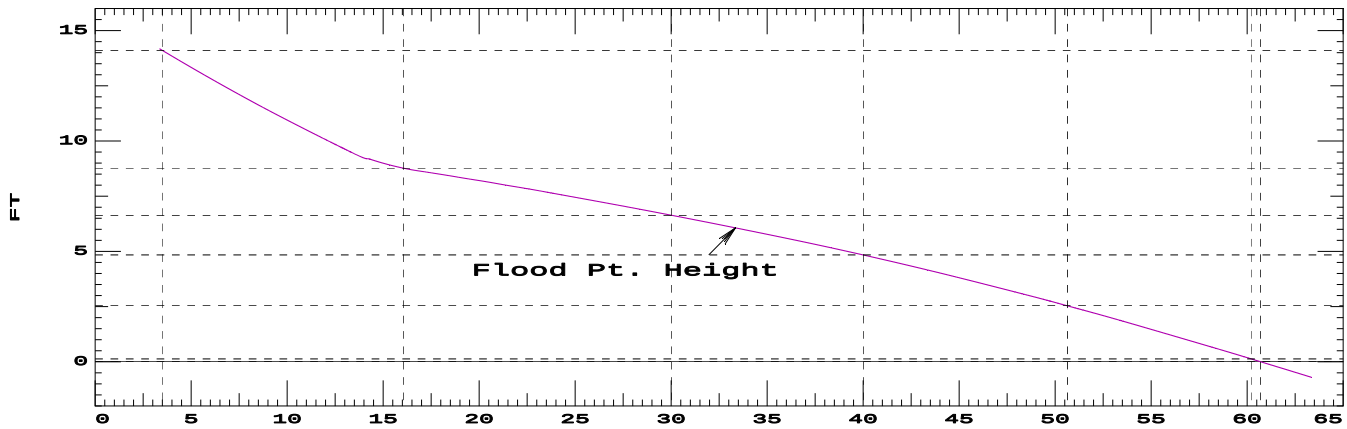
LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Area from Equilibrium to 15 deg**	**>**	**5.26**	**Ft-deg**	**128.53**	**P**
(2)	**Angle from Equilibrium to RAzero**	**>**	**15.00**	**deg**	**47.28**	**P**

Relative angles measured from 3.350s

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







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

WEIGHT STATUS

Trim: Fwd 0.23/210.33, Heel: Stbd 0.48 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	492.24	84.19f	0.03p	23.20
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	**652.36**	**87.69f**	**0.23s**	**23.90**

	Load	SpGr	Weight(LT)	LCG	TCG	VCG	FSM
FW.P	0.100	1.000	0.34	135.83f	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	114.32f	22.40p	0.77	19.1
DBF3.S	0.100	0.840	2.08	114.32f	22.55s	0.77	19.1
LOH2.P	0.100	0.880	0.06	49.21f	17.11p	12.70	0.1
LOH1.S	0.100	0.880	0.06	49.21f	17.13s	12.70	0.1
Total Tanks			**18.20**	**102.20f**	**15.26s**	**8.14**	**88.9***
Total Weight			**670.55**	**88.09f**	**0.64s**	**23.47**	
Free Surface Adjustment						**0.13**	
Adjusted CG				**88.09f**	**0.64s**	**23.60**	

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 0.23/210.33, Heel: Stbd 0.48 deg., VCG = 23.47

LCF Draft	Displacement Weight(LT)	Buoyancy-Ctr. LCB	VCB	Weight/ Inch	LCF	Moment/ In trim	GML	GMT
7.582	670.55	88.11f	4.60	10.27	85.51f	129.97	489.2	76.01

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 = 88.09f TCG = 0.64s VCG = 23.47
Free Surface Adjustment: 0.13
Adjusted CG: LCG = 88.09f TCG = 0.64s VCG = 23.60

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Righting Arms in Trim	in Heel	Area	Flood Pt Height	
7.488	0.06f	0.48s	670.55	0.00	0.000	0.00	15.68	(1)
7.467	0.00	5.48s	670.51	0.00	6.676	16.69	13.26	(2)
7.388	0.17a	10.48s	670.25	0.00	13.206	66.46	10.78	(2)
7.349	0.18a	10.98s	670.55	0.00	13.790	73.21	10.56	(2)
7.296	0.19a	11.48s	670.55	0.00	14.355	80.24	10.34	(2)
7.230	0.19a	11.98s	670.55	0.00	14.890	87.55	10.13	(2)
7.147	0.19a	12.48s	670.56	0.00	15.386	95.12	9.94	(2)
7.046	0.19a	12.98s	670.55	0.00	15.833	102.93	9.75	(2)
6.927	0.18a	13.48s	670.55	0.00	16.226	110.94	9.59	(2)
6.789	0.17a	13.98s	670.55	0.00	16.556	119.14	9.44	(2)
6.633	0.15a	14.48s	670.55	0.00	16.812	127.48	9.30	(2)
6.459	0.14a	14.98s	670.57	0.00	16.981	135.93	9.18	(2)
6.270	0.13a	15.48s	670.58	0.00	17.038	144.43	9.08	(2)
6.069	0.13a	15.96s	670.24	0.01a	16.955	152.59	9.01	(2)
6.060	0.13a	15.98s	670.24	0.01a	16.948	152.93	9.01	(2)
5.846	0.13a	16.48s	670.55	0.00	16.774	161.36	8.93	(2)
5.628	0.13a	16.98s	670.55	0.00	16.598	169.70	8.87	(2)
5.409	0.14a	17.48s	670.55	0.00	16.420	177.96	8.80	(2)
4.971	0.14a	18.48s	670.55	0.00	16.062	194.20	8.66	(2)
4.531	0.15a	19.48s	670.55	0.00	15.700	210.08	8.51	(2)
4.092	0.15a	20.48s	670.55	0.00	15.333	225.60	8.37	(2)
1.877	0.19a	25.48s	670.54	0.00	13.444	297.58	7.60	(2)
-0.343	0.23a	30.48s	670.53	0.00	11.478	359.92	6.77	(2)
-2.553	0.28a	35.48s	670.53	0.00	9.456	412.28	5.89	(2)
-4.724	0.34a	40.48s	670.50	0.00	7.399	454.43	4.95	(2)
-6.773	0.43a	45.48s	670.66	0.00	5.296	486.19	3.91	(2)
-8.696	0.54a	50.48s	670.69	0.00	3.152	507.32	2.78	(2)
-10.480	0.65a	55.48s	670.72	0.00	0.992	517.69	1.55	(2)
-11.255	0.70a	57.78s	670.61	0.00	-0.002	518.83	0.96	(2)
-12.124	0.76a	60.48s	670.60	0.00	-1.160	517.26	0.26	(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

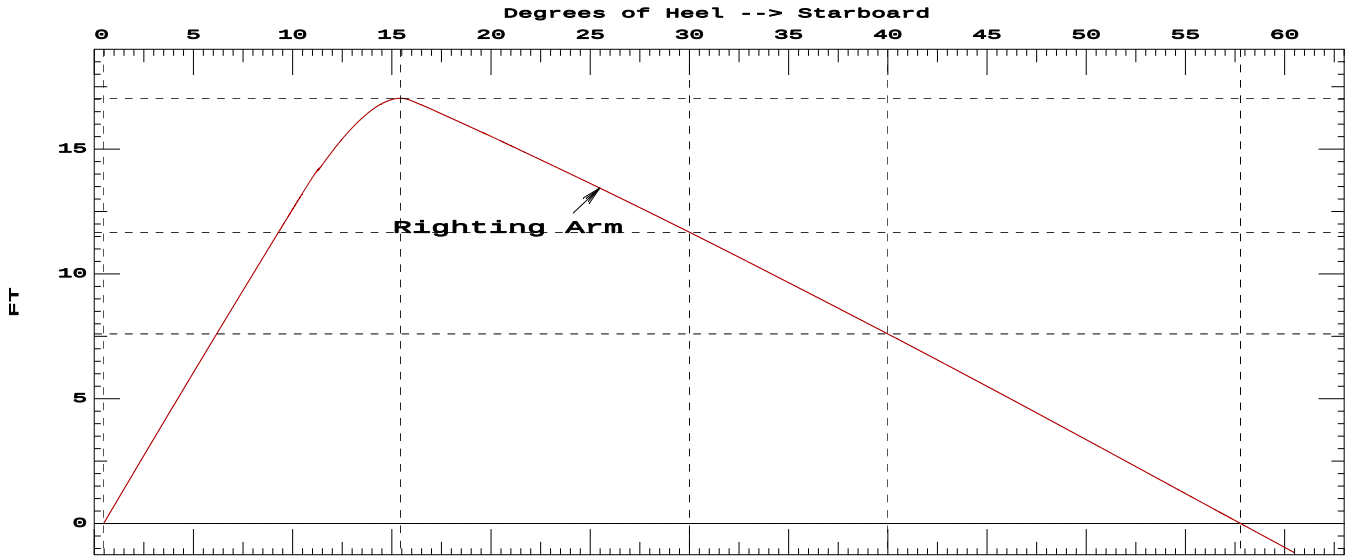
continued next page

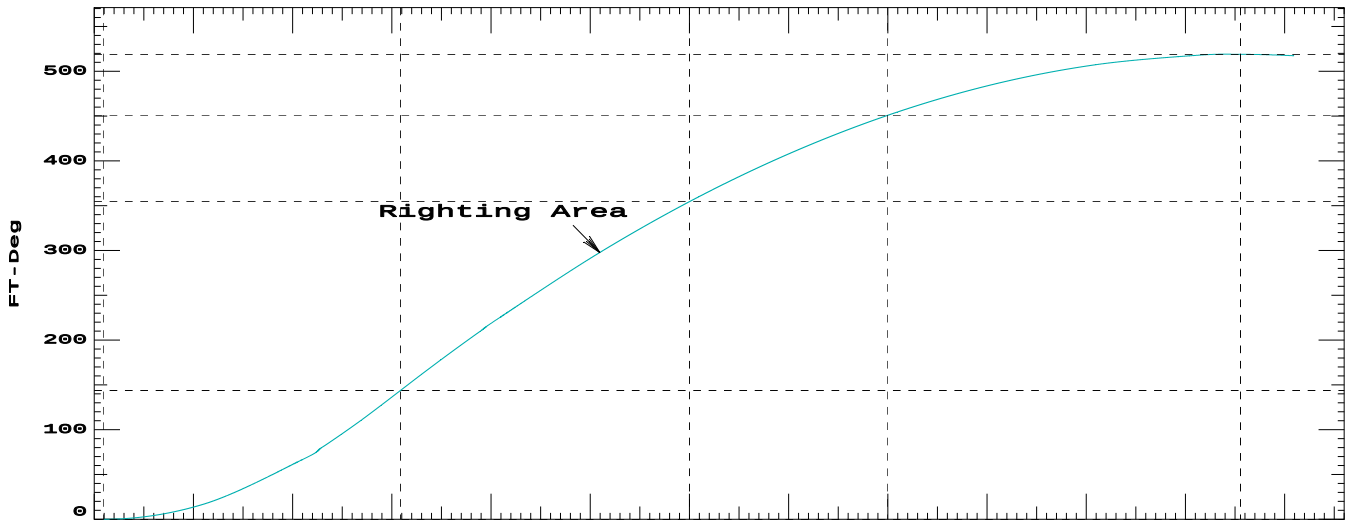
Condition 11 - 20AEQ 2ST 6RV Fwd Arrival with no Ice

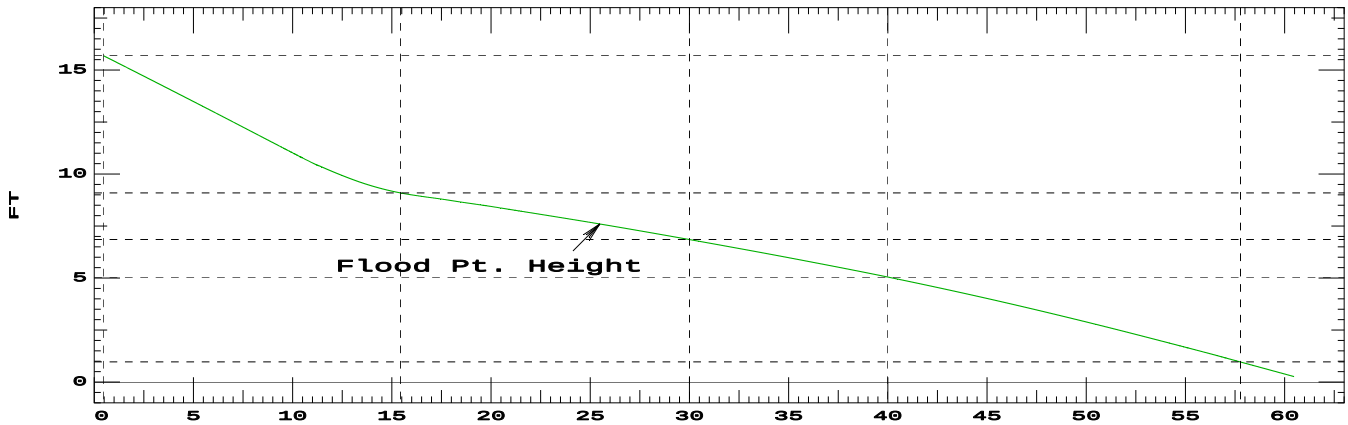
LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	Area from abs 0.480 deg to 15.5	>	20.04	Ft-deg	152.59	P
(2)	Absolute Angle at MaxRA	>	10.00	deg	15.48	P

Relative angles measured from 0.480s

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







Condition 11 - 20AEQ 2ST 6RV Fwd 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  =    1432.0
    HLT =    2907.7
```

With HMMT = TL 1432.0
Vessel Heel < 8.00 deg Calc Heel = 2.09 deg

With HMMT = max(PL,HL2) 1475.7
Vessel Heel < 10.00 deg Calc Heel = 2.13 deg

With HMMT = TL+HL2 2907.7
Vessel Heel < 12.00 deg Calc Heel = 3.73 deg

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

*** Residual Area Check ***

RESIDUAL RIGHTING ARMS vs HEEL ANGLE

Total CG: LCG = 88.09f TCG = 0.64s VCG = 23.47
Free Surface Adjustment: 0.13
Adjusted CG: LCG = 88.09f TCG = 0.63s VCG = 23.60

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Area	Flood Pt Height	
7.472	0.04f	3.73s	670.55	0.00	0.000	0.00	14.11	(1)
7.464	0.12a	8.73s	670.35	0.00	6.677	16.69	11.62	(2)
6.859	0.17a	13.73s	670.48	0.00	12.068	64.09	9.51	(2)
6.713	0.16a	14.23s	670.55	0.00	12.362	70.20	9.37	(2)
6.547	0.14a	14.73s	670.55	0.00	12.577	76.43	9.24	(2)
6.366	0.13a	15.23s	670.57	0.00	12.694	82.75	9.13	(2)
6.285	0.13a	15.44s	670.54	0.00	**12.707**	85.37	9.09	(2)
6.169	0.13a	15.73s	670.58	0.00	12.681	89.10	9.04	(2)
5.954	0.13a	16.23s	670.55	0.00	12.529	95.40	8.97	(2)
5.736	0.13a	16.73s	670.55	0.00	12.353	101.62	8.90	(2)
5.518	0.13a	17.23s	670.55	0.00	12.176	107.75	8.83	(2)
5.299	0.14a	17.73s	670.55	0.00	11.998	113.80	8.76	(2)
5.080	0.14a	18.23s	670.55	0.00	11.819	119.75	8.69	(2)
4.861	0.14a	18.73s	670.55	0.00	11.639	125.62	8.62	(2)
4.641	0.14a	19.23s	670.55	0.00	11.458	131.39	8.55	(2)
4.422	0.15a	19.73s	670.55	0.00	11.276	137.07	8.48	(2)
4.201	0.15a	20.23s	670.55	0.00	11.092	142.67	8.40	(2)
3.981	0.15a	20.73s	670.55	0.00	10.908	148.17	8.33	(2)
3.539	0.16a	21.73s	670.55	0.00	10.537	158.89	8.18	(2)
3.097	0.17a	22.73s	670.55	0.00	10.161	169.24	8.03	(2)
2.654	0.17a	23.73s	670.55	0.00	9.783	179.21	7.87	(2)
0.432	0.21a	28.73s	670.53	0.00	7.840	223.30	7.07	(2)
-1.782	0.26a	33.73s	670.53	0.00	5.835	257.52	6.20	(2)
-3.975	0.32a	38.73s	670.52	0.00	3.790	281.60	5.29	(2)
-6.071	0.40a	43.73s	670.60	0.00	1.704	295.35	4.29	(2)
-7.657	0.48a	47.73s	670.56	0.00	0.000	298.77	3.41	(2)
-8.040	0.50a	48.73s	670.56	0.00	-0.429	298.55	3.18	(2)
-9.873	0.61a	53.73s	670.71	0.00	-2.586	291.03	1.99	(2)
-11.564	0.72a	58.73s	670.70	0.00	-4.743	272.71	0.72	(2)
-12.426	0.78a	61.45s	670.58	0.00	-5.909	258.23	0.00	(2)
-13.122	0.83a	63.73s	670.58	0.00	-6.882	243.64	*-0.60*	(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

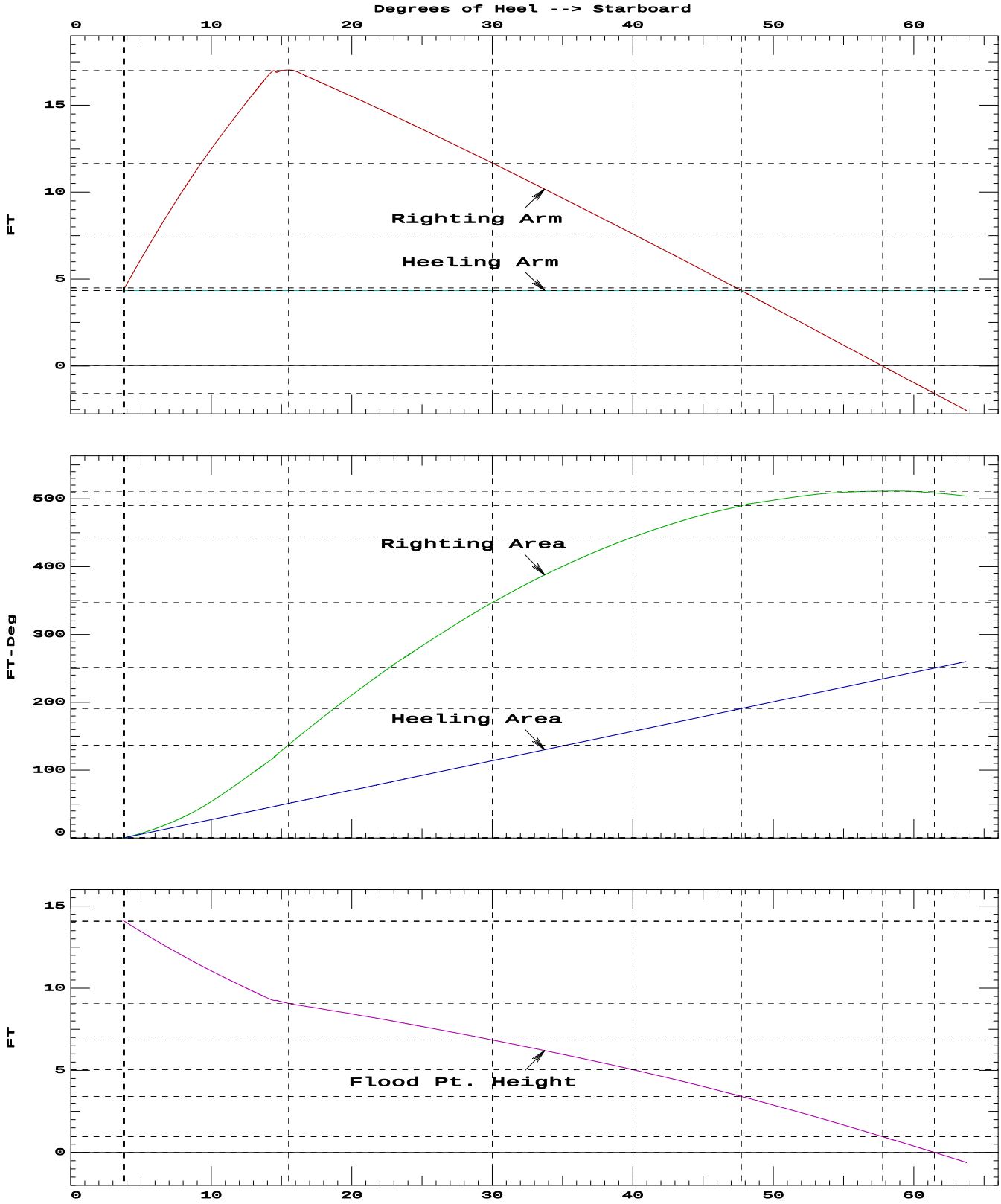
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 2907.73

	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**	**125.62**	**P**
(2)	**Angle from Equilibrium to RAzero**	**>**	**15.00**	**deg**	**44.00**	**P**

Relative angles measured from 3.731s

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



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

WEIGHT STATUS

Trim: Fwd 0.33/210.33, Heel: Port 0.18 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	492.24	84.19f	0.03p	23.20
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	**640.10**	**86.39f**	**0.23p**	**23.82**

	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	20.98s	7.96	6.8
DBF4.P	0.980	0.840	20.43	114.07f	22.48p	3.50	27.8
DBF3.S	0.980	0.840	20.43	114.07f	22.47s	3.50	27.8
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**	**112.97f**	**0.28p**	**4.51**	**88.9***
Total Weight			**688.34**	**88.26f**	**0.23p**	**22.46**	
Free Surface Adjustment						**0.13**	
Adjusted CG				**88.26f**	**0.23p**	**22.59**	

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 0.33/210.33, Heel: Port 0.18 deg., VCG = 22.46

LCF Draft	Displacement Weight(LT)	Buoyancy-Ctr. LCB	VCB	Weight/ Inch	LCF	Moment/ In trim	GML	GMT
7.727	688.35	88.29f	4.68	10.33	85.79f	131.98	484.0	75.16

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 = 88.26f TCG = 0.23p VCG = 22.46
Free Surface Adjustment: 0.13
Adjusted CG: LCG = 88.26f TCG = 0.23p VCG = 22.59

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Righting Arms in Trim	in Heel	Area	Flood Pt Height	
7.591	0.09f	0.18p	688.35	0.00	0.000	0.00	15.71	(5)
7.569	0.04f	4.82s	688.32	0.00	6.588	16.47	13.46	(1)
7.544	0.14a	9.82s	688.08	0.00	13.132	65.79	10.96	(2)
7.523	0.15a	10.32s	688.34	0.00	13.742	72.51	10.72	(2)
7.490	0.16a	10.82s	688.34	0.00	14.341	79.53	10.49	(2)
7.447	0.18a	11.32s	688.34	0.00	14.920	86.84	10.27	(2)
7.393	0.18a	11.82s	688.34	0.00	15.475	94.44	10.05	(2)
7.326	0.19a	12.32s	688.34	0.00	15.999	102.31	9.84	(2)
7.243	0.19a	12.82s	688.34	0.00	16.484	110.43	9.65	(2)
7.141	0.18a	13.32s	688.34	0.00	16.922	118.78	9.47	(2)
7.022	0.18a	13.82s	688.34	0.00	17.305	127.34	9.30	(2)
6.883	0.17a	14.32s	688.34	0.00	17.625	136.07	9.15	(2)
6.726	0.15a	14.82s	688.34	0.00	17.872	144.94	9.02	(2)
6.552	0.14a	15.32s	688.36	0.00	18.031	153.92	8.90	(2)
6.461	0.14a	15.57s	688.36	0.00	18.071	158.33	8.85	(2)
6.392	0.14a	15.74s	688.33	0.00	**18.080**	161.52	8.81	(2)
6.362	0.14a	15.82s	688.37	0.00	18.078	162.95	8.80	(2)
6.155	0.14a	16.32s	688.33	0.00	17.981	171.97	8.72	(2)
5.936	0.14a	16.82s	688.34	0.00	17.812	180.92	8.65	(2)
5.498	0.14a	17.82s	688.34	0.00	17.472	198.56	8.51	(2)
5.057	0.15a	18.82s	688.34	0.00	17.126	215.86	8.37	(2)
4.617	0.15a	19.82s	688.34	0.00	16.776	232.81	8.23	(2)
2.398	0.19a	24.82s	688.33	0.00	14.961	312.19	7.48	(2)
0.169	0.23a	29.82s	688.32	0.00	13.055	382.27	6.67	(2)
-2.054	0.28a	34.82s	688.32	0.00	11.080	442.64	5.80	(2)
-4.233	0.35a	39.82s	688.33	0.00	9.051	492.99	4.88	(2)
-6.296	0.44a	44.82s	688.45	0.00	6.957	533.03	3.85	(2)
-8.236	0.54a	49.82s	688.49	0.00	4.806	562.47	2.72	(2)
-10.042	0.65a	54.82s	688.51	0.00	2.626	581.06	1.51	(2)
-11.702	0.76a	59.82s	688.50	0.00	0.442	588.73	0.23	(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

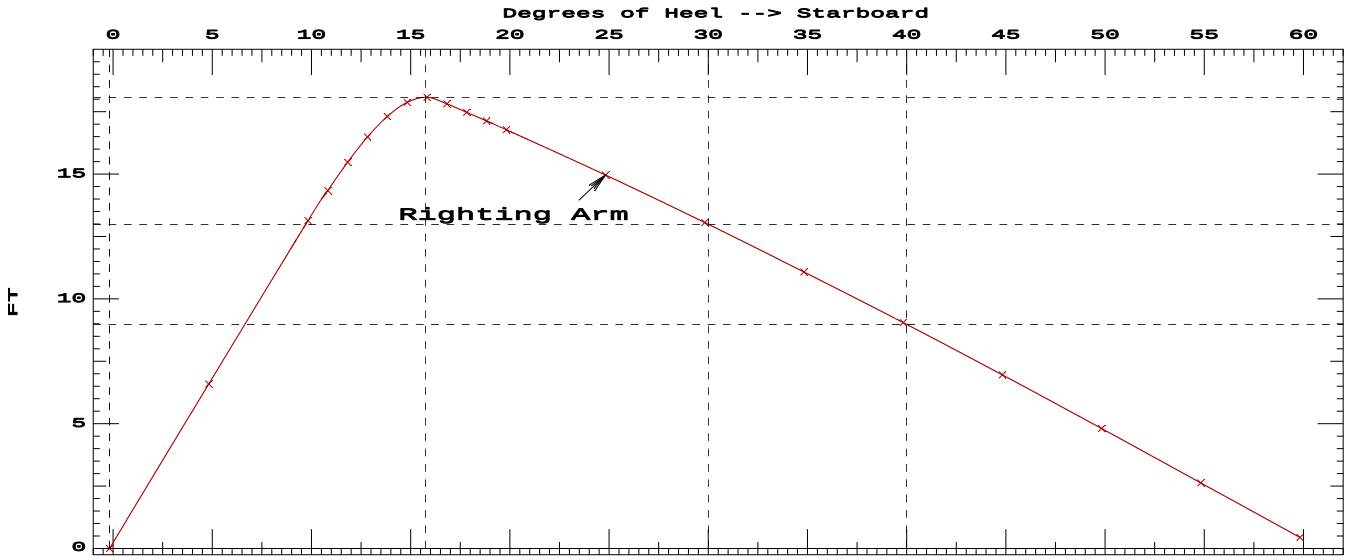
continued next page

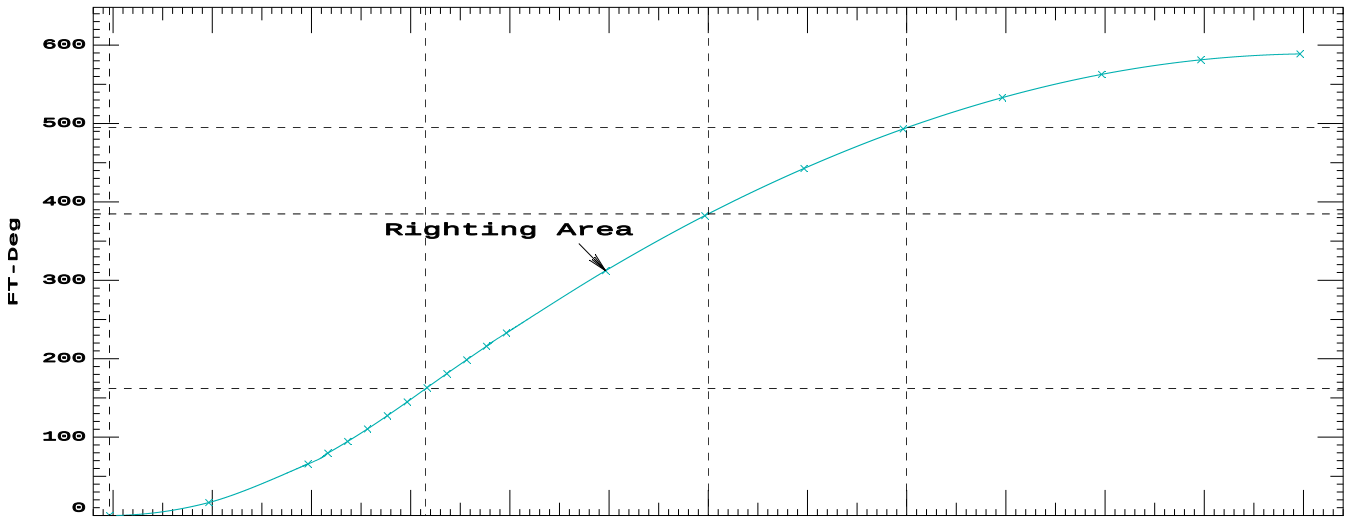
Condition 12 - 30AEQ 2ST Aft Departure with no Ice

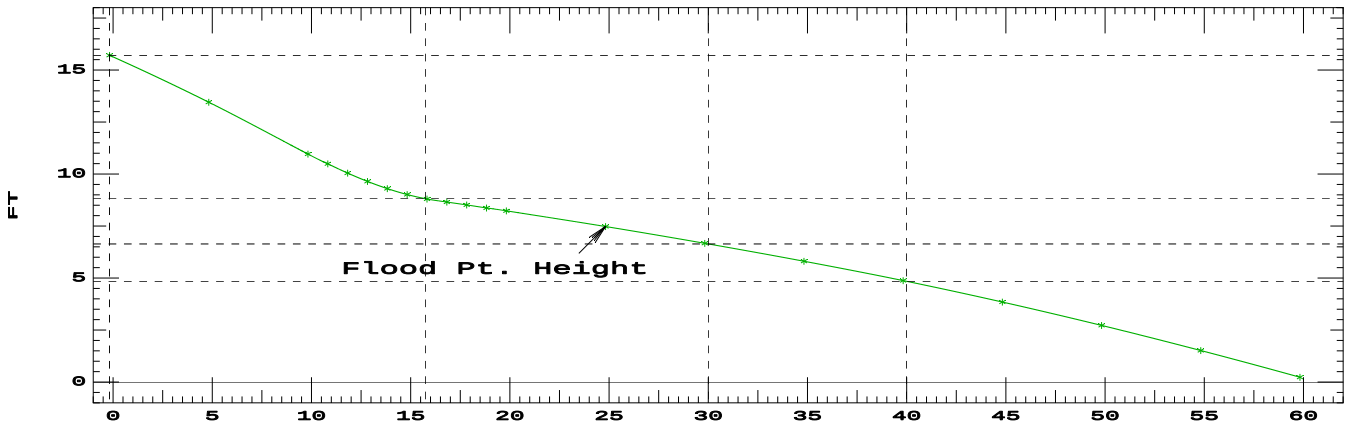
LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	Area from abs -0.176 deg to 15.7	>	19.70	Ft-deg	158.33	P
(2)	Absolute Angle at MaxRA	>	10.00	deg	15.74	P

Relative angles measured from 0.176p

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  =    1398.5
    HLT =    2874.2
```

With HMMT = TL 1398.5
Vessel Heel < 8.00 deg Calc Heel = 1.37 deg

With HMMT = max(PL,HL2) 1475.7
Vessel Heel < 10.00 deg Calc Heel = 1.45 deg

With HMMT = TL+HL2 2874.2
Vessel Heel < 12.00 deg Calc Heel = 3.00 deg

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

*** Residual Area Check ***

RESIDUAL RIGHTING ARMS vs HEEL ANGLE

Total CG: LCG = 88.26f TCG = 0.23p VCG = 22.47
Free Surface Adjustment: 0.13
Adjusted CG: LCG = 88.26f TCG = 0.23p VCG = 22.59

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Area	Flood Pt Height	
7.578	0.07f	2.99s	688.35	0.00	0.000	0.00	14.35	(1)
7.577	0.07a	7.99s	688.16	0.00	6.616	16.54	11.87	(2)
7.207	0.19a	12.99s	688.06	0.00	12.470	64.57	9.59	(2)
7.102	0.18a	13.49s	688.34	0.00	12.887	70.91	9.41	(2)
6.976	0.17a	13.99s	688.34	0.00	13.249	77.45	9.25	(2)
6.831	0.16a	14.49s	688.34	0.00	13.545	84.15	9.10	(2)
6.668	0.15a	14.99s	688.34	0.00	13.764	90.97	8.97	(2)
6.488	0.14a	15.49s	688.36	0.00	13.890	97.89	8.86	(2)
6.392	0.14a	15.74s	688.33	0.00	**13.907**	101.35	8.81	(2)
6.293	0.13a	15.99s	688.36	0.00	13.889	104.84	8.77	(2)
6.079	0.14a	16.49s	688.33	0.00	13.751	111.75	8.70	(2)
5.861	0.14a	16.99s	688.34	0.00	13.582	118.58	8.63	(2)
5.642	0.14a	17.49s	688.34	0.00	13.411	125.33	8.56	(2)
5.422	0.14a	17.99s	688.34	0.00	13.240	131.99	8.49	(2)
5.202	0.15a	18.49s	688.34	0.00	13.067	138.57	8.42	(2)
4.982	0.15a	18.99s	688.34	0.00	12.894	145.06	8.35	(2)
4.762	0.15a	19.49s	688.34	0.00	12.719	151.46	8.28	(2)
4.541	0.16a	19.99s	688.34	0.00	12.543	157.78	8.20	(2)
4.099	0.16a	20.99s	688.34	0.00	12.187	170.14	8.06	(2)
3.656	0.17a	21.99s	688.34	0.00	11.827	182.15	7.91	(2)
3.212	0.17a	22.99s	688.34	0.00	11.464	193.79	7.76	(2)
0.984	0.21a	27.99s	688.32	0.00	9.588	246.46	6.97	(2)
-1.242	0.26a	32.99s	688.32	0.00	7.636	289.56	6.13	(2)
-3.448	0.32a	37.99s	688.31	0.00	5.627	322.74	5.23	(2)
-5.555	0.40a	42.99s	688.42	0.00	3.557	345.72	4.24	(2)
-7.542	0.50a	47.99s	688.47	0.00	1.425	358.21	3.15	(2)
-8.779	0.57a	51.28s	688.35	0.00	-0.001	360.55	2.38	(2)
-9.401	0.61a	52.99s	688.36	0.00	-0.749	359.91	1.97	(2)
-11.111	0.72a	57.99s	688.54	0.00	-2.933	350.71	0.71	(2)
-11.980	0.78a	60.70s	688.35	0.00	-4.115	341.17	0.00	(2)
-12.681	0.83a	62.99s	688.41	0.00	-5.110	330.60	*-0.61*	(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

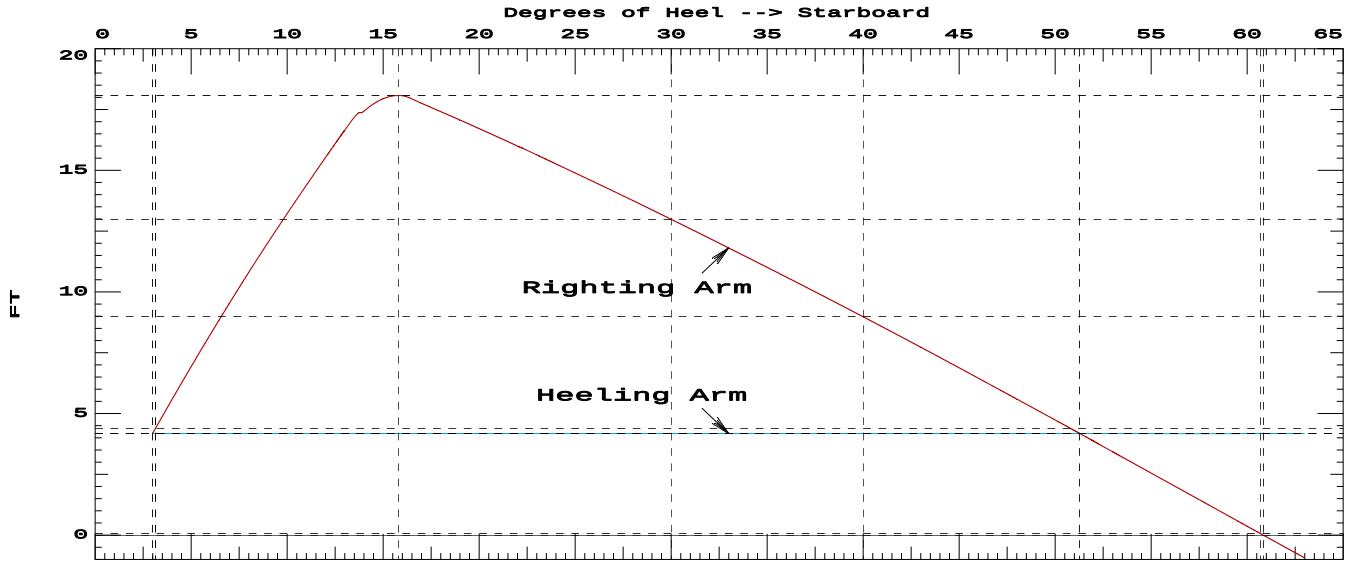
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 2874.18

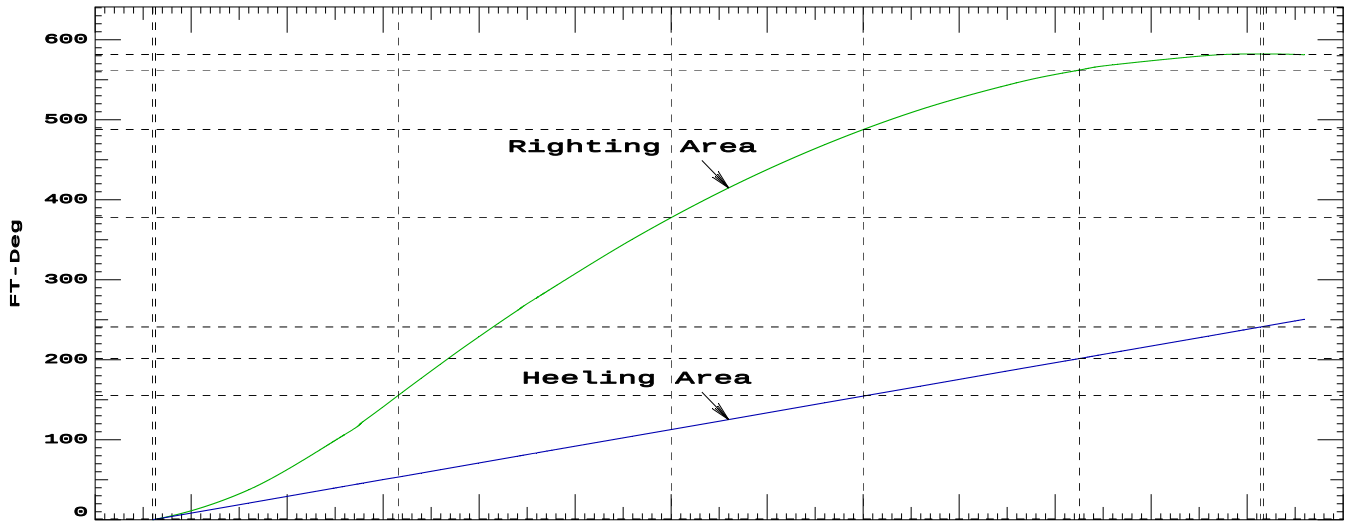
	Critical Points		LCP	TCP	VCP
(1)	ER Air Fwd S	FLOOD	43.30f	27.45s	23.45
(2)	ER Air Aft S	FLOOD	35.42f	27.45s	23.45

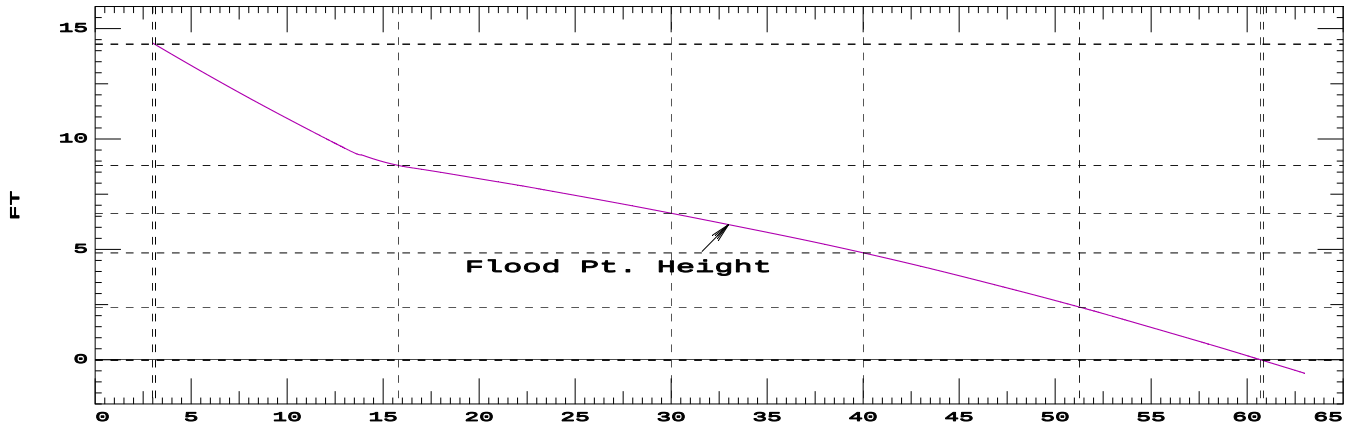
LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Area from Equilibrium to 15 deg**	**>**	**5.26**	**Ft-deg**	**131.99**	**P**
(2)	**Angle from Equilibrium to RAzero**	**>**	**15.00**	**deg**	**48.28**	**P**

Relative angles measured from 2.995s

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







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

WEIGHT STATUS

Trim: Aft 0.34/210.33, Heel: Stbd 0.15 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	492.24	84.19f	0.03p	23.20
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	**638.97**	**86.37f**	**0.23p**	**23.79**

	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	22.45p	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**	**102.18f**	**15.25s**	**8.14**	**88.9***
Total Weight			**657.17**	**86.81f**	**0.20s**	**23.36**	
Free Surface Adjustment						**0.14**	
Adjusted CG				**86.81f**	**0.20s**	**23.50**	

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 0.34/210.33, Heel: Stbd 0.15 deg., VCG = 23.36

LCF Draft	Displacement Weight(LT)	Buoyancy-Ctr. LCB	VCB	Weight/ Inch	LCF	Moment/ In trim	GML	GMT
7.474	657.18	86.78f	4.54	10.19	84.79f	127.36	489.1	77.24

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 = 86.81f TCG = 0.20s VCG = 23.36
Free Surface Adjustment: 0.14
Adjusted CG: LCG = 86.81f TCG = 0.20s VCG = 23.50

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Righting Arms in Trim	in Heel	Area	Flood Pt Height	
7.610	0.09a	0.15s	657.16	0.00	0.000	0.00	15.83	(2)
7.584	0.14a	5.15s	657.14	0.00	6.780	16.95	13.40	(2)
7.535	0.32a	10.15s	656.89	0.00	13.462	67.60	10.91	(2)
7.503	0.33a	10.65s	657.17	0.00	14.069	74.48	10.67	(2)
7.459	0.34a	11.15s	657.17	0.00	14.659	81.66	10.45	(2)
7.404	0.35a	11.65s	657.17	0.00	15.220	89.13	10.23	(2)
7.334	0.35a	12.15s	657.17	0.00	15.746	96.87	10.03	(2)
7.248	0.35a	12.65s	657.18	0.00	16.224	104.86	9.84	(2)
7.141	0.34a	13.15s	657.17	0.00	16.647	113.08	9.66	(2)
7.015	0.33a	13.65s	657.17	0.00	17.005	121.49	9.50	(2)
6.870	0.32a	14.15s	657.16	0.00	17.287	130.07	9.36	(2)
6.708	0.31a	14.65s	657.19	0.00	17.478	138.76	9.23	(2)
6.529	0.31a	15.15s	657.19	0.00	17.551	147.52	9.12	(2)
6.521	0.31a	15.17s	657.19	0.00	**17.551**	147.82	9.12	(2)
6.469	0.31a	15.30s	657.15	0.00	17.545	150.25	9.09	(2)
6.326	0.31a	15.65s	656.86	0.01a	17.481	156.28	9.04	(2)
6.112	0.31a	16.15s	657.16	0.00	17.309	164.98	8.97	(2)
5.894	0.31a	16.65s	657.16	0.00	17.132	173.59	8.90	(2)
5.675	0.31a	17.15s	657.16	0.00	16.955	182.11	8.83	(2)
5.237	0.32a	18.15s	657.16	0.00	16.596	198.88	8.69	(2)
4.796	0.32a	19.15s	657.16	0.00	16.232	215.30	8.55	(2)
4.355	0.32a	20.15s	657.17	0.00	15.864	231.35	8.40	(2)
2.136	0.35a	25.15s	657.16	0.00	13.966	305.96	7.64	(2)
-0.095	0.38a	30.15s	657.15	0.00	11.986	370.88	6.82	(2)
-2.314	0.42a	35.15s	657.15	0.00	9.947	425.73	5.95	(2)
-4.494	0.47a	40.15s	657.15	0.00	7.872	470.30	5.01	(2)
-6.563	0.55a	45.15s	657.18	0.00	5.755	504.38	3.98	(2)
-8.496	0.65a	50.15s	657.16	0.00	3.600	527.79	2.85	(2)
-10.290	0.76a	55.15s	657.16	0.00	1.426	540.36	1.64	(2)
-11.390	0.84a	58.44s	657.18	0.00	-0.002	542.70	0.79	(2)
-11.941	0.87a	60.15s	657.18	0.00	-0.743	542.06	0.35	(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.

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

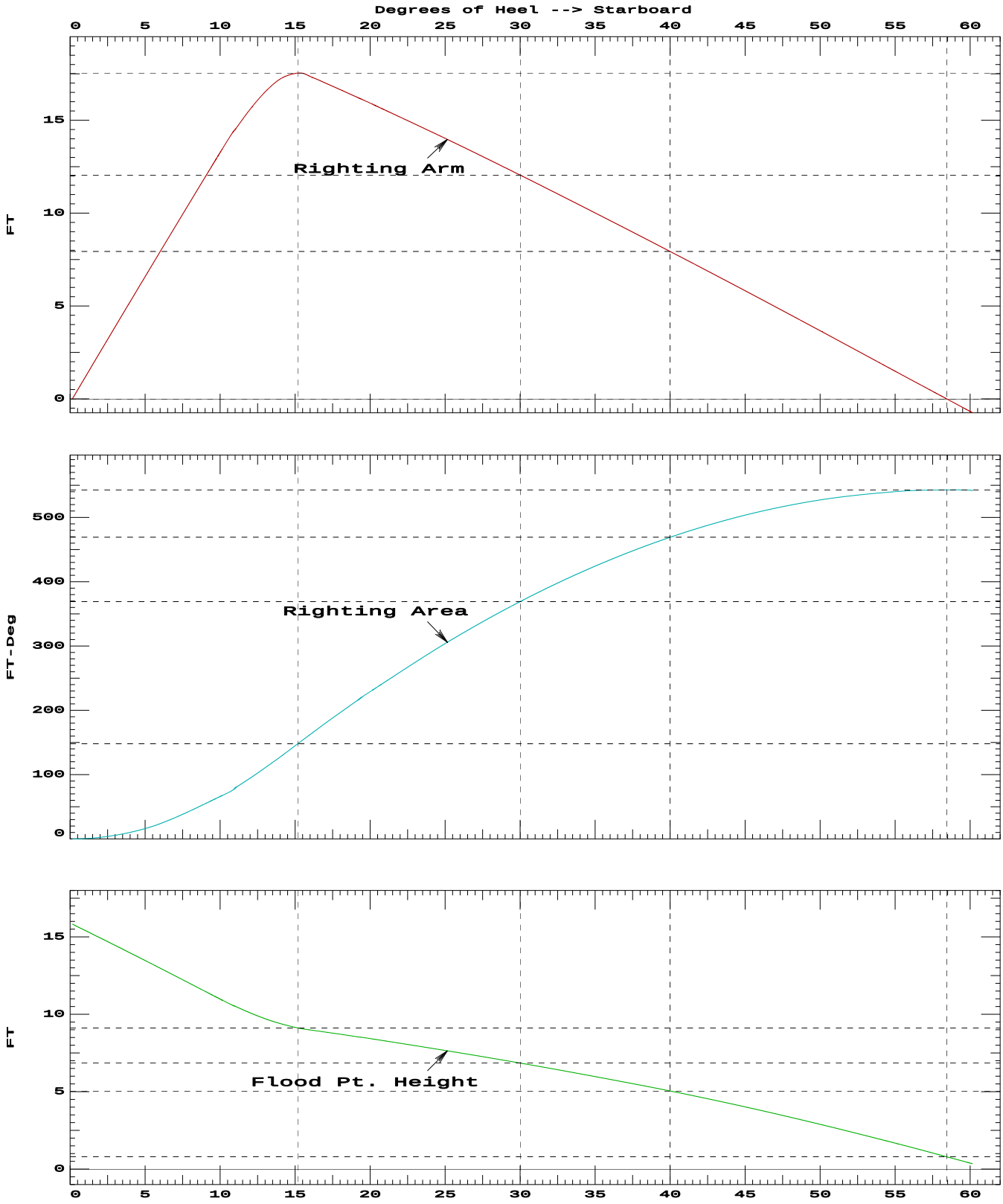
continued next page

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

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	Area from abs 0.148 deg to 15.2	>	20.47	Ft-deg	150.25	P
(2)	Absolute Angle at MaxRA	>	10.00	deg	15.17	P

Relative angles measured from 0.148

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  =    1396.2
    HLT =    2871.9
```

With HMMT = TL 1396.2
Vessel Heel < 8.00 deg Calc Heel = 1.72 deg

With HMMT = max(PL,HL2) 1475.7
Vessel Heel < 10.00 deg Calc Heel = 1.81 deg

With HMMT = TL+HL2 2871.9
Vessel Heel < 12.00 deg Calc Heel = 3.37 deg

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

*** Residual Area Check ***

RESIDUAL RIGHTING ARMS vs HEEL ANGLE

Total CG: LCG = 86.81f TCG = 0.20s VCG = 23.36
Free Surface Adjustment: 0.14
Adjusted CG: LCG = 86.81f TCG = 0.20s VCG = 23.50

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Area	Flood Pt Height	
7.593	0.11a	3.37s	657.18	0.00	0.000	0.00	14.27	(2)
7.588	0.26a	8.37s	656.99	0.00	6.792	16.98	11.77	(2)
7.085	0.34a	13.37s	657.01	0.00	12.452	65.56	9.59	(2)
6.952	0.33a	13.87s	657.17	0.00	12.776	71.87	9.44	(2)
6.799	0.32a	14.37s	657.16	0.00	13.020	78.32	9.30	(2)
6.629	0.31a	14.87s	657.19	0.00	13.162	84.86	9.18	(2)
6.524	0.31a	15.16s	657.15	0.00	**13.185**	88.63	9.12	(2)
6.442	0.31a	15.37s	657.19	0.00	13.172	91.45	9.08	(2)
6.228	0.31a	15.87s	656.86	0.01a	13.037	98.00	9.01	(2)
6.014	0.31a	16.37s	657.16	0.00	12.864	104.48	8.94	(2)
5.796	0.31a	16.87s	657.16	0.00	12.687	110.87	8.87	(2)
5.577	0.31a	17.37s	657.16	0.00	12.508	117.17	8.80	(2)
5.357	0.31a	17.87s	657.16	0.00	12.329	123.38	8.73	(2)
5.138	0.32a	18.37s	657.16	0.00	12.148	129.49	8.66	(2)
4.918	0.32a	18.87s	657.16	0.00	11.967	135.52	8.59	(2)
4.698	0.32a	19.37s	657.16	0.00	11.784	141.46	8.52	(2)
4.477	0.32a	19.87s	657.16	0.00	11.600	147.31	8.44	(2)
4.256	0.32a	20.37s	657.16	0.00	11.415	153.06	8.37	(2)
3.814	0.33a	21.37s	657.17	0.00	11.042	164.29	8.22	(2)
3.370	0.33a	22.37s	657.17	0.00	10.665	175.14	8.07	(2)
2.926	0.34a	23.37s	657.17	0.00	10.285	185.62	7.92	(2)
0.697	0.37a	28.37s	657.16	0.00	8.330	232.19	7.12	(2)
-1.528	0.41a	33.37s	657.15	0.00	6.310	268.82	6.26	(2)
-3.730	0.45a	38.37s	657.14	0.00	4.246	295.23	5.35	(2)
-5.843	0.52a	43.37s	657.16	0.00	2.145	311.22	4.36	(2)
-7.825	0.62a	48.37s	657.16	0.00	0.001	316.60	3.27	(2)
-9.670	0.72a	53.37s	657.17	0.00	-2.169	311.19	2.08	(2)
-11.369	0.83a	58.37s	657.17	0.00	-4.342	294.92	0.81	(2)
-12.347	0.90a	61.44s	657.18	0.00	-5.670	279.54	0.00	(2)
-12.938	0.94a	63.37s	657.18	0.00	-6.500	267.80	*-0.51*	(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 = 2871.87

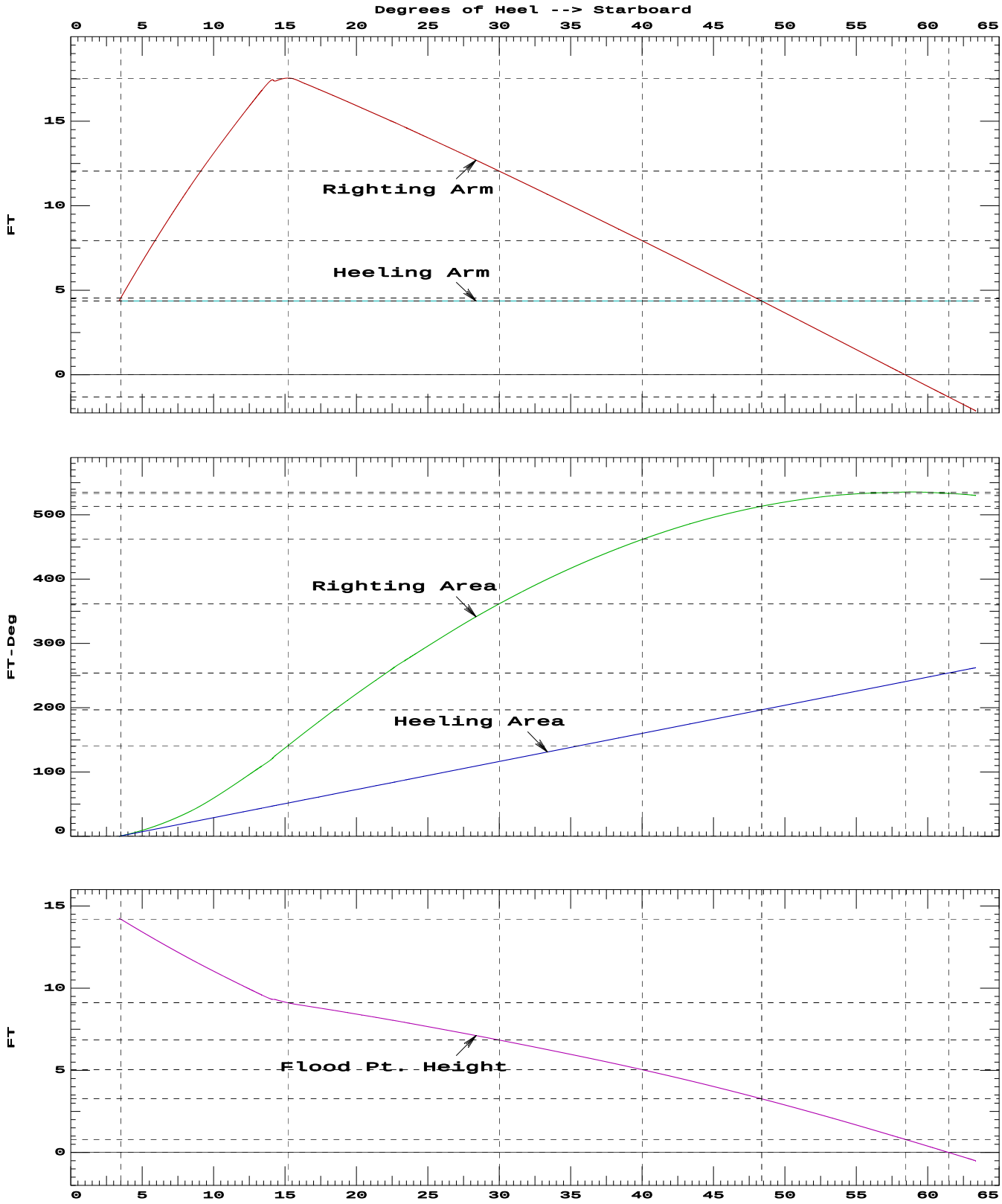
Condition 13 - 30AEQ 2ST Aft Arrival with no Ice

	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**	**129.49**	**P**
(2)	**Angle from Equilibrium to RAzero**	**>**	**15.00**	**deg**	**45.00**	**P**

Relative angles measured from 3.373s

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



Condition 14 - 10% Lightship

WEIGHT STATUS

Trim: Aft 1.46/210.33, Heel: Stbd 0.05 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	492.24	84.19f	0.03p	23.20
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	**494.21**	**84.21f**	**0.01p**	**23.25**

	Load	SpGr	Weight(LT)	LCG	TCG	VCG	FSM
FW.P	0.100	1.000	0.34	135.78f	21.23p	8.19	0.7
BW.S	0.200	1.025	2.77	98.05f	20.99s	7.96	6.8
DBF4.P	0.100	0.840	2.08	114.08f	22.47p	0.77	19.1
DBF3.S	0.100	0.840	2.08	114.08f	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**	**107.97f**	**6.86s**	**4.01**	**88.9***
Total Weight			**501.61**	**84.56f**	**0.09s**	**22.97**	
Free Surface Adjustment						**0.18**	
Adjusted CG				**84.57f**	**0.09s**	**23.15**	

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 1.46/210.33, Heel: Stbd 0.05 deg., VCG = 22.97

LCF Draft	Displacement Weight(LT)	Buoyancy-Ctr. LCB	VCB	Weight/ Inch	LCF	Moment/ In trim	GML	GMT
6.180	501.64	84.43f	3.84	9.69	82.28f	113.57	571.4	100.54

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 = 84.56f TCG = 0.09s VCG = 22.97
Free Surface Adjustment: 0.18
Adjusted CG: LCG = 84.57f TCG = 0.09s VCG = 23.15

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Righting Arms in Trim	in Heel	Area	Flood Pt Height	
6.750	0.40a	0.05s	501.61	0.00	0.000	0.00	16.92	(2)
6.755	0.46a	5.05s	501.58	0.00	8.830	22.08	14.47	(2)
6.429	0.51a	10.05s	501.58	0.00	16.852	86.62	12.18	(2)
6.317	0.49a	10.55s	501.61	0.00	17.407	95.18	12.01	(2)
6.181	0.47a	11.05s	501.60	0.00	17.871	104.00	11.86	(2)
6.026	0.45a	11.55s	501.60	0.00	18.225	113.03	11.73	(2)
5.853	0.43a	12.05s	501.61	0.00	18.443	122.20	11.61	(2)
5.726	0.42a	12.39s	501.61	0.00	**18.490**	128.45	11.55	(2)
5.707	0.42a	12.44s	501.62	0.00	18.489	129.34	11.54	(2)
5.663	0.42a	12.55s	501.62	0.00	18.479	131.43	11.52	(2)
5.454	0.42a	13.05s	501.61	0.00	18.330	140.63	11.45	(2)
5.240	0.42a	13.55s	501.41	0.00	18.155	149.75	11.38	(2)
5.026	0.42a	14.05s	501.38	0.00	17.979	158.79	11.32	(2)
4.813	0.42a	14.55s	501.35	0.00	17.802	167.73	11.25	(2)
4.605	0.42a	15.05s	501.61	0.00	17.624	176.59	11.17	(2)
4.391	0.42a	15.55s	501.61	0.00	17.444	185.36	11.10	(2)
4.177	0.42a	16.05s	501.61	0.00	17.263	194.03	11.03	(2)
3.964	0.42a	16.55s	501.61	0.00	17.081	202.62	10.96	(2)
3.749	0.42a	17.05s	501.61	0.00	16.898	211.11	10.88	(2)
3.320	0.42a	18.05s	501.61	0.00	16.528	227.83	10.73	(2)
2.890	0.42a	19.05s	501.61	0.00	16.153	244.17	10.58	(2)
2.459	0.42a	20.05s	501.61	0.00	15.775	260.13	10.42	(2)
0.296	0.43a	25.05s	501.61	0.00	13.824	334.17	9.59	(2)
-1.867	0.44a	30.05s	501.61	0.00	11.795	398.25	8.69	(2)
-4.013	0.45a	35.05s	501.61	0.00	9.713	452.04	7.73	(2)
-6.126	0.47a	40.05s	501.61	0.00	7.612	495.37	6.71	(2)
-8.187	0.50a	45.05s	501.60	0.00	5.536	528.23	5.64	(2)
-10.169	0.55a	50.05s	501.63	0.00	3.515	550.83	4.52	(2)
-12.026	0.61a	55.05s	501.61	0.00	1.513	563.39	3.34	(2)
-13.343	0.66a	58.80s	501.69	0.00	0.000	566.23	2.42	(2)
-13.771	0.68a	60.05s	501.61	0.00	-0.508	565.91	2.11	(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

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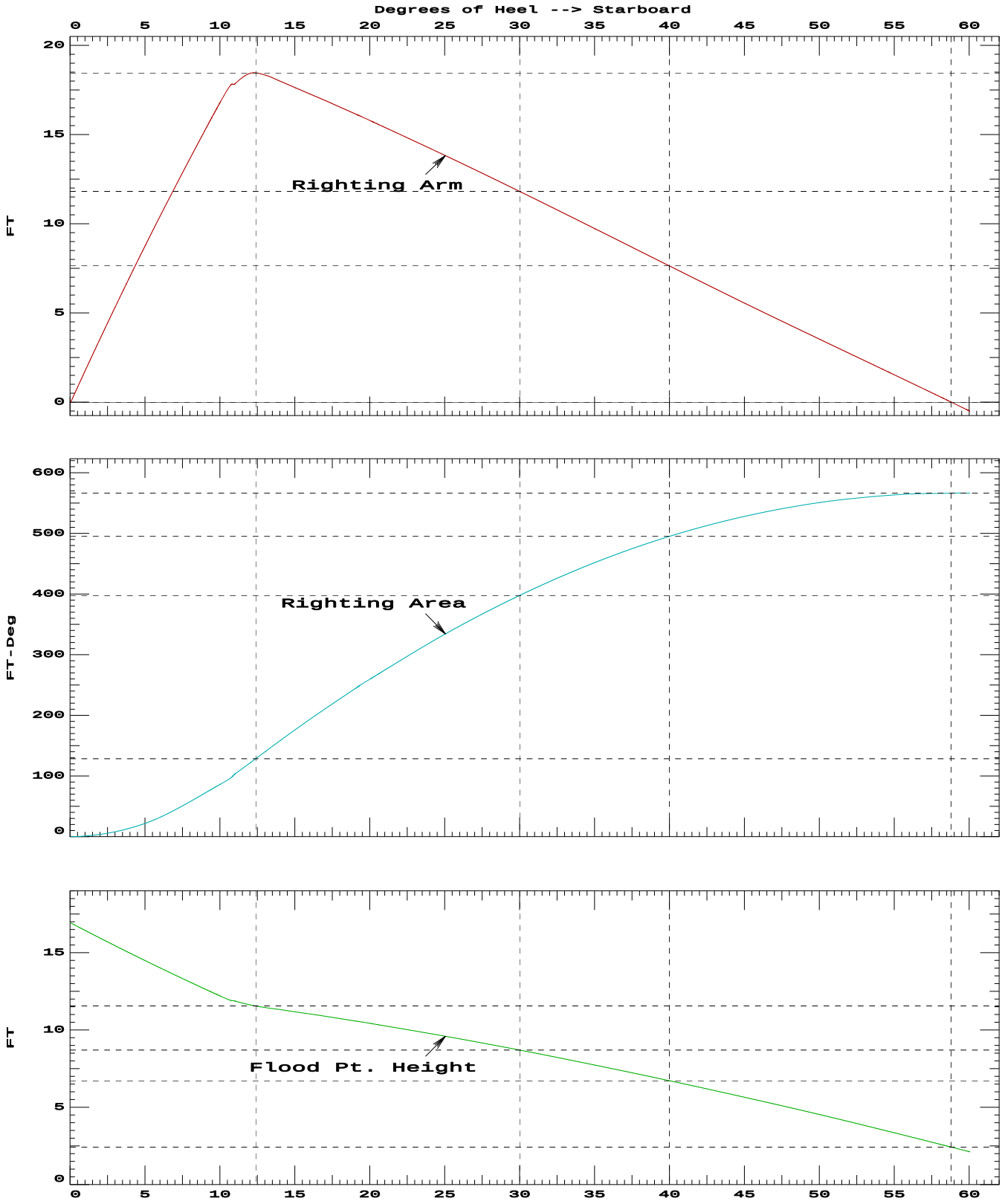
Condition 14 - 10% Lightship

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	Area from abs 0.051 deg to 12.4	>	25.04	Ft-deg	129.34	P
(2)	Absolute Angle at MaxRA	>	10.00	deg	12.39	P

Relative angles measured from 0.051

Condition 14 - 10% Lightship



Condition 14 - 10% Lightship

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*** Heel Angle Check ***

Calculated Heeling Moments
     LONG TONS - FEET
    HL1 =     983.8
    HL2 =    1475.7
    PL  =     449.7
    TL  =    1047.6
    HLT =    2523.3
```

With HMMT = TL 1047.6
Vessel Heel < 8.00 deg Calc Heel = 1.24 deg

With HMMT = max(PL,HL2) 1475.7
Vessel Heel < 10.00 deg Calc Heel = 1.72 deg

With HMMT = TL+HL2 2523.3
Vessel Heel < 12.00 deg Calc Heel = 2.91 deg

Condition 14 - 10% Lightship

*** Residual Area Check ***

RESIDUAL RIGHTING ARMS vs HEEL ANGLE

Total CG: LCG = 84.56f TCG = 0.09s VCG = 22.97
Free Surface Adjustment: 0.18
Adjusted CG: LCG = 84.57f TCG = 0.09s VCG = 23.15

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Area	Flood Pt Height	
6.751	0.42a	2.91s	501.61	0.00	0.000	0.00	15.53	(2)
6.697	0.53a	7.91s	501.53	0.00	8.732	21.83	13.08	(2)
5.512	0.42a	12.91s	501.47	0.00	13.353	81.00	11.47	(2)
5.302	0.42a	13.41s	501.49	0.00	13.178	87.63	11.40	(2)
5.088	0.42a	13.91s	501.38	0.00	13.002	94.18	11.34	(2)
4.875	0.42a	14.41s	501.36	0.00	12.824	100.64	11.27	(2)
4.666	0.42a	14.91s	501.61	0.00	12.649	107.00	11.19	(2)
4.453	0.42a	15.41s	501.61	0.00	12.470	113.28	11.12	(2)
4.239	0.42a	15.91s	501.61	0.00	12.289	119.47	11.05	(2)
4.025	0.42a	16.41s	501.61	0.00	12.107	125.57	10.98	(2)
3.811	0.42a	16.91s	501.61	0.00	11.924	131.58	10.90	(2)
3.597	0.42a	17.41s	501.61	0.00	11.740	137.50	10.83	(2)
3.382	0.42a	17.91s	501.61	0.00	11.555	143.32	10.75	(2)
3.167	0.42a	18.41s	501.61	0.00	11.369	149.05	10.68	(2)
2.952	0.42a	18.91s	501.61	0.00	11.181	154.69	10.60	(2)
2.737	0.42a	19.41s	501.61	0.00	10.993	160.23	10.52	(2)
2.521	0.42a	19.91s	501.61	0.00	10.803	165.68	10.44	(2)
2.089	0.43a	20.91s	501.61	0.00	10.421	176.29	10.28	(2)
1.657	0.43a	21.91s	501.61	0.00	10.035	186.52	10.12	(2)
1.224	0.43a	22.91s	501.61	0.00	9.645	196.36	9.96	(2)
-0.940	0.44a	27.91s	501.61	0.00	7.647	239.63	9.09	(2)
-3.096	0.45a	32.91s	501.61	0.00	5.584	272.73	8.15	(2)
-5.225	0.46a	37.91s	501.61	0.00	3.486	295.42	7.15	(2)
-7.310	0.49a	42.91s	501.60	0.00	1.393	307.62	6.10	(2)
-8.689	0.51a	46.30s	501.60	0.00	0.000	309.97	5.36	(2)
-9.332	0.52a	47.91s	501.61	0.00	-0.651	309.45	5.01	(2)
-11.246	0.58a	52.91s	501.59	0.00	-2.656	301.16	3.85	(2)
-13.034	0.65a	57.91s	501.65	0.00	-4.665	282.86	2.64	(2)
-14.726	0.71a	62.91s	501.62	0.01f	-6.702	254.46	1.40	(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 = 2523.33

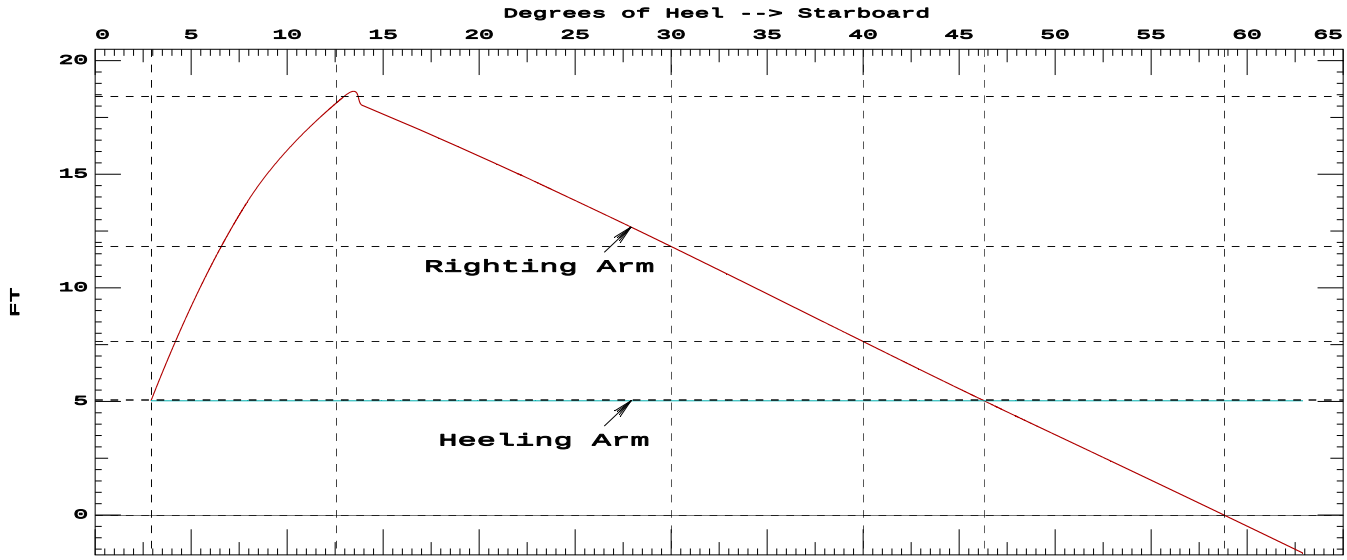
Condition 14 - 10% Lightship

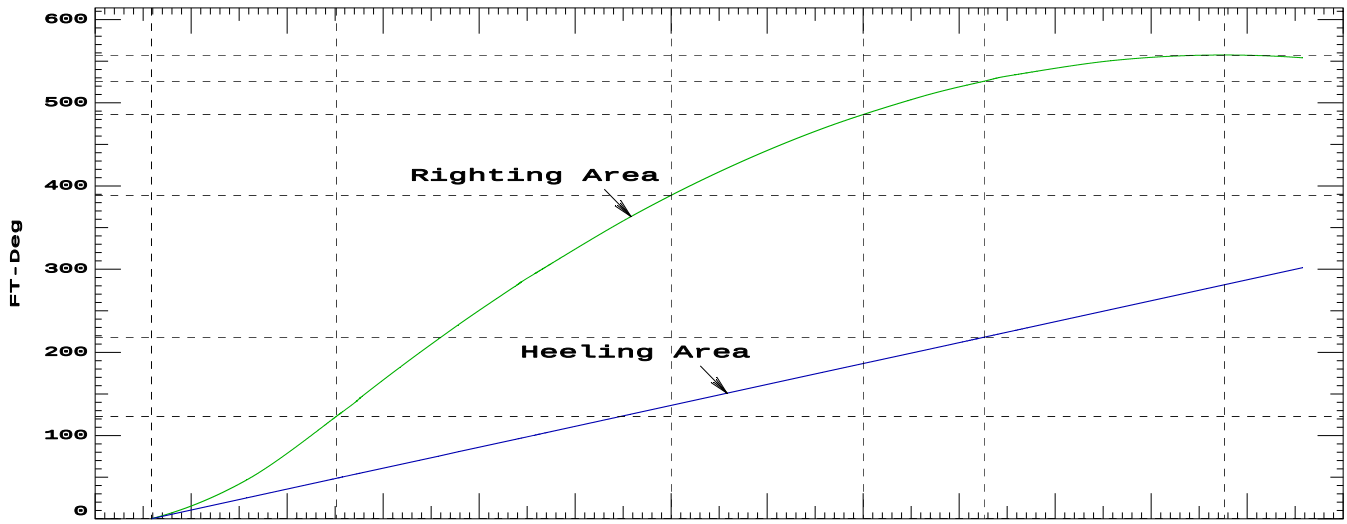
	Critical Point		LCP	TCP	VCP	
	(2) ER Air Aft S	FLOOD	35.42f	27.45s	23.45	

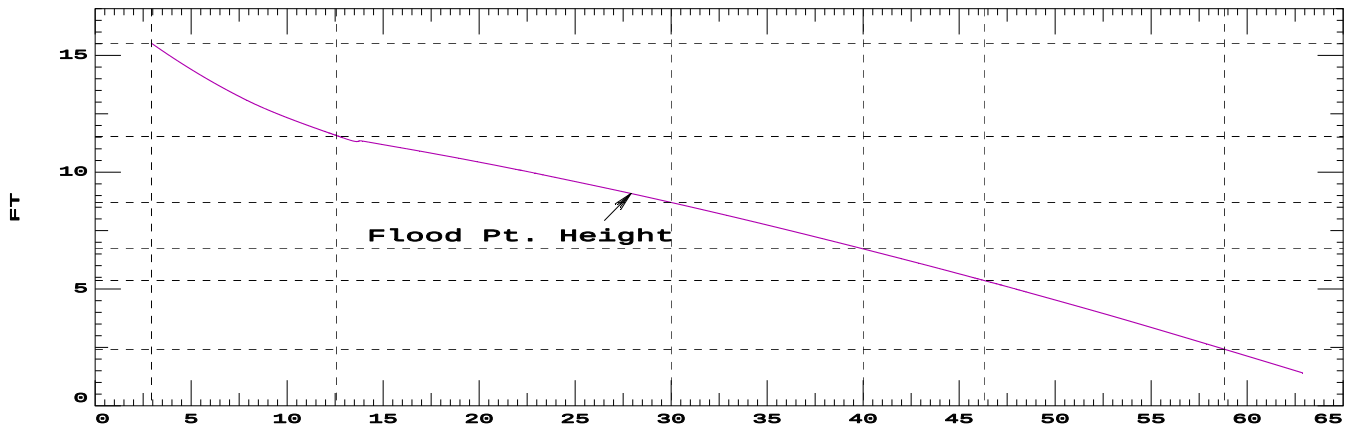
LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Area from Equilibrium to 15 deg**	**>**	**5.26**	**Ft-deg**	**143.32**	**P**
(2)	**Angle from Equilibrium to RAzero**	**>**	**15.00**	**deg**	**43.39**	**P**

Relative angles measured from 2.906s

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	7.83	1	12.94	22.96	3.6	-1.2	122.0	15.0	51.3	4.4	PASS
Bottom Raking 35%L	2	7.74	1	13.65	23.89	2.6	-1.0	118.1	15.0	54.7	3.4	PASS
Bottom Raking 35%L	3	8.06	1	13.00	23.26	3.4	-1.0	130.5	16.6	48.9	4.1	PASS
Bottom Raking 35%L	4	9.01	1	12.89	23.98	2.8	-0.3	136.6	17.6	44.7	3.5	PASS
Bottom Raking 35%L	5	14.12	6	14.70	19.26	9.1	1.8	82.8	9.2	48.5	10.0	PASS
Bottom Raking 35%L	6	14.11	6	14.30	20.63	7.8	2.2	80.4	9.1	48.7	8.7	PASS
Bottom Raking 35%L	7	15.96	6	13.90	19.71	9.6	3.2	59.6	6.4	41.5	10.6	PASS
Bottom NOT Raking	8	7.92	1	13.70	24.12	2.4	-0.9	125.1	16.3	52.2	3.2	PASS
Bottom NOT Raking	9	8.73	1	13.43	24.49	2.2	-0.3	135.2	17.6	48.0	2.9	PASS
Bottom NOT Raking	10	9.24	2	13.61	25.25	1.5	0.2	128.3	17.0	47.2	2.2	PASS
Bottom NOT Raking	11	13.71	6	14.20	21.51	6.8	2.1	82.8	9.6	49.7	7.7	PASS
Side Damage	12	7.53	1	12.81	22.52	4.1	-1.5	108.6	14.3	45.7	4.9	PASS
Side Damage	13	8.73	1	11.94	22.37	4.5	-0.8	118.5	15.5	31.8	5.3	PASS
Side Damage	14	9.30	1	11.88	22.81	4.1	-0.3	121.4	16.1	24.9	5.0	PASS
Side Damage	15	9.48	2	13.07	24.73	2.1	0.2	122.2	16.6	38.1	2.9	PASS
Side Damage	16	15.15	6	14.44	18.87	10.0	2.4	61.2	6.7	42.6	11.1	PASS
Side Damage	17	15.52	6	13.82	20.48	8.6	3.1	63.9	7.0	43.1	9.7	PASS
100%L Bottom Damaged	18	15.52	6	15.19	15.74	13.2	1.9	59.4	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 – 21AEQ 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	7.40	1	13.23	22.94	3.5	-1.5	120.7	14.8	53.0	4.3	PASS
Bottom Raking 35%L	2	7.30	1	13.94	23.86	2.5	-1.3	116.9	14.8	56.4	3.3	PASS
Bottom Raking 35%L	3	7.66	1	13.29	23.28	3.2	-1.2	130.2	16.5	50.6	3.9	PASS
Bottom Raking 35%L	4	8.62	1	13.22	24.05	2.5	-0.5	137.3	17.8	47.3	3.3	PASS
Bottom Raking 35%L	5	13.62	6	14.80	19.46	8.7	1.5	87.5	9.9	49.5	9.6	PASS
Bottom Raking 35%L	6	13.58	6	14.41	20.83	7.3	1.8	85.0	9.8	49.7	8.2	PASS
Bottom Raking 35%L	7	15.45	6	13.95	19.93	9.0	2.9	65.6	7.1	43.2	10.1	PASS
Bottom NOT Raking	8	7.51	1	14.00	24.13	2.2	-1.2	125.0	16.3	53.7	3.0	PASS
Bottom NOT Raking	9	8.34	1	13.75	24.55	1.9	-0.6	135.9	17.8	50.3	2.7	PASS
Bottom NOT Raking	10	8.84	1	13.96	25.30	1.2	-0.1	129.1	17.3	49.7	2.0	PASS
Bottom NOT Raking	11	13.10	6	14.34	21.75	6.2	1.8	86.7	10.2	50.6	7.2	PASS
Side Damage	12	7.14	1	13.07	22.50	4.0	-1.7	108.0	14.2	47.3	4.8	PASS
Side Damage	13	8.35	1	12.25	22.43	4.2	-1.0	118.5	15.6	34.6	5.1	PASS
Side Damage	14	8.90	1	12.24	22.93	3.8	-0.6	122.3	16.5	28.5	4.7	PASS
Side Damage	15	9.07	1	13.45	24.81	1.8	-0.1	123.0	16.9	41.7	2.6	PASS
Side Damage	16	14.64	6	14.49	19.13	9.4	2.1	66.4	7.4	44.1	10.5	PASS
Side Damage	17	14.98	6	13.88	20.71	8.0	2.7	69.4	7.7	44.6	9.1	PASS
100%L Bottom Damaged	18	14.99	6	15.29	15.90	12.7	1.6	62.2	6.4	42.3	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.

6.5 Load Case 3 – 21AEQ 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	7.39	1	12.91	22.64	4.2	-1.4	118.7	14.1	52.7	5.0	PASS
Bottom Raking 35%L	2	7.32	1	13.94	24.05	2.7	-1.2	118.2	14.6	55.0	3.5	PASS
Bottom Raking 35%L	3	7.65	1	12.98	22.99	3.9	-1.2	128.9	15.7	50.3	4.7	PASS
Bottom Raking 35%L	4	8.63	1	12.89	23.77	3.3	-0.4	136.5	16.8	47.0	4.0	PASS
Bottom Raking 35%L	5	13.80	6	15.15	19.05	9.6	1.7	81.8	8.9	46.4	10.5	PASS
Bottom Raking 35%L	6	13.65	6	14.69	20.87	7.8	2.0	82.3	9.2	46.9	8.8	PASS
Bottom Raking 35%L	7	15.59	6	14.25	19.91	9.6	3.1	60.4	6.5	39.9	10.7	PASS
Bottom NOT Raking	8	7.50	1	13.99	24.28	2.5	-1.0	126.1	15.9	54.6	3.3	PASS
Bottom NOT Raking	9	8.36	1	13.42	24.27	2.7	-0.5	135.2	16.8	50.0	3.4	PASS
Bottom NOT Raking	10	8.84	2	13.90	25.42	1.6	0.1	130.7	16.8	50.6	2.3	PASS
Bottom NOT Raking	11	13.18	6	14.62	21.79	6.7	2.0	84.5	9.7	47.9	7.7	PASS
Side Damage	12	7.12	1	13.12	22.71	4.1	-1.6	108.3	13.8	49.0	5.0	PASS
Side Damage	13	8.37	1	11.87	22.08	5.1	-1.0	117.8	14.8	35.1	5.9	PASS
Side Damage	14	8.85	1	12.09	22.83	4.4	-0.5	123.6	16.0	30.8	5.2	PASS
Side Damage	15	9.06	2	13.41	24.93	2.2	0.1	124.6	16.4	43.5	3.0	PASS
Side Damage	16	14.72	6	14.80	19.11	10.0	2.3	62.6	6.9	41.0	11.1	PASS
Side Damage	17	15.12	6	14.18	20.71	8.6	3.0	64.8	7.1	41.5	9.7	PASS
100%L Bottom Damaged	18	15.24	6	15.65	15.36	13.9	1.8	57.0	5.6	38.5	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	7.34	1	13.33	23.11	3.5	-1.4	124.6	15.3	54.1	4.3	PASS
Bottom Raking 35%L	2	7.24	1	14.04	24.03	2.5	-1.3	120.6	15.2	57.3	3.3	PASS
Bottom Raking 35%L	3	7.58	1	13.40	23.43	3.2	-1.2	134.1	16.9	51.6	3.9	PASS
Bottom Raking 35%L	4	8.53	1	13.29	24.16	2.6	-0.5	141.4	18.0	48.4	3.3	PASS
Bottom Raking 35%L	5	13.49	6	14.92	19.65	8.6	1.6	91.7	10.3	51.6	9.5	PASS
Bottom Raking 35%L	6	13.45	6	14.54	21.04	7.3	1.9	88.5	10.2	51.7	8.2	PASS
Bottom Raking 35%L	7	15.35	6	14.04	20.15	8.9	2.9	68.8	7.5	45.4	10.0	PASS
Bottom NOT Raking	8	7.43	1	14.09	24.28	2.3	-1.1	128.6	16.6	54.6	3.0	PASS
Bottom NOT Raking	9	8.26	1	13.83	24.67	2.0	-0.5	140.0	18.0	51.4	2.7	PASS
Bottom NOT Raking	10	8.76	1	14.03	25.42	1.3	0.0	133.1	17.5	50.8	2.1	PASS
Bottom NOT Raking	11	12.96	6	14.48	21.96	6.2	1.8	89.9	10.7	52.6	7.2	PASS
Side Damage	12	7.06	1	13.22	22.72	3.9	-1.7	111.2	14.6	48.7	4.7	PASS
Side Damage	13	8.25	1	12.39	22.62	4.2	-1.0	122.8	16.0	37.2	5.1	PASS
Side Damage	14	8.79	1	12.38	23.10	3.8	-0.6	126.5	16.9	31.3	4.7	PASS
Side Damage	15	8.99	1	13.55	24.95	1.9	0.0	127.0	17.2	43.6	2.7	PASS
Side Damage	16	14.50	6	14.60	19.37	9.3	2.2	70.1	7.9	46.4	10.4	PASS
Side Damage	17	14.88	6	13.99	20.93	7.9	2.8	72.4	8.1	46.8	9.0	PASS
100%L Bottom Damaged	18	14.90	6	15.33	16.19	12.6	1.7	68.6	7.1	44.7	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 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	13.02	22.82	4.2	-1.4	122.4	14.5	53.7	5.0	PASS
Bottom Raking 35%L	2	7.26	1	14.04	24.22	2.7	-1.1	122.0	14.9	56.3	3.5	PASS
Bottom Raking 35%L	3	7.58	1	13.08	23.14	4.0	-1.1	132.6	16.0	51.3	4.7	PASS
Bottom Raking 35%L	4	8.55	1	12.97	23.89	3.4	-0.4	140.4	17.0	48.1	4.1	PASS
Bottom Raking 35%L	5	13.67	6	15.27	19.24	9.6	1.7	85.9	9.4	48.6	10.5	PASS
Bottom Raking 35%L	6	13.52	6	14.82	21.07	7.8	2.1	85.7	9.6	48.9	8.7	PASS
Bottom Raking 35%L	7	15.50	6	14.34	20.14	9.6	3.2	63.4	6.8	42.0	10.6	PASS
Bottom NOT Raking	8	7.43	1	14.08	24.43	2.5	-0.9	129.7	16.2	55.5	3.3	PASS
Bottom NOT Raking	9	8.27	1	13.50	24.39	2.8	-0.4	139.1	17.0	51.0	3.5	PASS
Bottom NOT Raking	10	8.76	2	13.97	25.54	1.7	0.1	134.6	16.9	51.6	2.4	PASS
Bottom NOT Raking	11	13.05	6	14.75	22.00	6.7	2.0	87.7	10.1	49.7	7.7	PASS
Side Damage	12	7.05	1	13.26	22.94	4.1	-1.5	111.5	14.2	50.3	5.0	PASS
Side Damage	13	8.26	1	12.02	22.27	5.0	-0.9	122.0	15.2	37.6	5.9	PASS
Side Damage	14	8.74	1	12.22	23.01	4.4	-0.5	127.8	16.4	33.6	5.2	PASS
Side Damage	15	8.98	2	13.49	25.08	2.2	0.1	128.5	16.6	45.2	3.0	PASS
Side Damage	16	14.59	6	14.90	19.36	9.9	2.4	66.2	7.3	43.3	11.0	PASS
Side Damage	17	15.02	6	14.28	20.93	8.5	3.0	67.7	7.4	43.5	9.7	PASS
100%L Bottom Damaged	18	15.15	6	15.68	15.68	13.7	1.8	63.3	6.2	41.0	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	13.58	22.82	3.9	-1.9	120.2	14.3	56.5	4.7	PASS
Bottom Raking 35%L	2	6.39	1	14.29	23.72	2.9	-1.8	116.8	14.2	56.8	3.7	PASS
Bottom Raking 35%L	3	6.82	1	13.66	23.22	3.6	-1.6	132.4	16.1	54.2	4.3	PASS
Bottom Raking 35%L	4	7.81	1	13.60	24.04	2.9	-0.8	142.7	17.6	52.2	3.6	PASS
Bottom Raking 35%L	5	12.60	6	15.51	19.72	8.6	1.1	96.4	10.9	51.1	9.5	PASS
Bottom Raking 35%L	6	12.49	6	15.15	21.10	7.2	1.4	92.8	10.8	51.2	8.2	PASS
Bottom Raking 35%L	7	14.53	6	14.56	20.16	8.9	2.5	73.8	8.1	45.7	9.9	PASS
Bottom NOT Raking	8	6.65	1	14.35	24.05	2.6	-1.5	127.5	15.8	57.0	3.4	PASS
Bottom NOT Raking	9	7.53	1	14.13	24.53	2.3	-0.9	141.3	17.5	54.6	3.0	PASS
Bottom NOT Raking	10	8.02	1	14.32	25.26	1.6	-0.4	135.0	17.1	54.3	2.3	PASS
Bottom NOT Raking	11	11.98	6	15.11	22.02	6.1	1.3	93.8	11.2	51.9	7.1	PASS
Side Damage	12	6.32	1	13.40	22.40	4.4	-2.1	108.3	13.9	51.4	5.2	PASS
Side Damage	13	7.56	1	12.64	22.45	4.6	-1.3	122.4	15.4	42.1	5.4	PASS
Side Damage	14	8.07	1	12.70	23.00	4.1	-0.9	128.6	16.7	38.9	4.9	PASS
Side Damage	15	8.24	1	13.85	24.80	2.1	-0.4	129.3	16.8	48.8	2.9	PASS
Side Damage	16	13.69	6	15.12	19.42	9.3	1.7	74.9	8.4	46.6	10.3	PASS
Side Damage	17	13.91	6	14.57	21.00	7.8	2.3	76.9	8.7	47.1	8.9	PASS
100%L Bottom Damaged	18	14.04	6	15.90	16.10	12.6	1.2	70.0	7.4	45.0	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.

6.9 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	6.50	1	13.26	22.52	4.7	-1.8	116.7	13.5	53.9	5.4	PASS
Bottom Raking 35%L	2	6.41	1	14.29	23.90	3.2	-1.6	117.3	13.9	54.4	4.0	PASS
Bottom Raking 35%L	3	6.81	1	13.35	22.93	4.3	-1.6	129.8	15.2	53.8	5.0	PASS
Bottom Raking 35%L	4	7.82	1	13.28	23.76	3.6	-0.8	140.7	16.5	51.8	4.3	PASS
Bottom Raking 35%L	5	12.81	6	15.83	19.29	9.6	1.3	90.9	9.9	48.0	10.4	PASS
Bottom Raking 35%L	6	12.57	6	15.43	21.12	7.7	1.6	90.6	10.2	48.3	8.7	PASS
Bottom Raking 35%L	7	14.67	6	14.85	20.13	9.5	2.7	69.0	7.4	42.4	10.6	PASS
Bottom NOT Raking	8	6.63	1	14.35	24.19	2.9	-1.4	127.9	15.4	55.5	3.7	PASS
Bottom NOT Raking	9	7.54	1	13.81	24.26	3.0	-0.8	139.5	16.5	54.2	3.7	PASS
Bottom NOT Raking	10	8.00	1	14.28	25.37	1.9	-0.3	136.0	16.5	54.9	2.7	PASS
Bottom NOT Raking	11	12.05	6	15.38	22.06	6.6	1.5	92.0	10.6	49.1	7.6	PASS
Side Damage	12	6.28	1	13.44	22.59	4.6	-1.9	107.8	13.4	52.8	5.4	PASS
Side Damage	13	7.57	1	12.27	22.10	5.4	-1.3	120.6	14.5	42.3	6.2	PASS
Side Damage	14	8.02	1	12.54	22.90	4.6	-0.8	129.2	16.0	40.8	5.4	PASS
Side Damage	15	8.22	1	13.82	24.92	2.5	-0.3	130.5	16.3	50.0	3.3	PASS
Side Damage	16	13.76	6	15.42	19.42	9.8	1.9	71.4	7.8	43.5	10.9	PASS
Side Damage	17	14.08	6	14.84	20.98	8.4	2.5	72.7	8.0	43.9	9.6	PASS
100%L Bottom Damaged	18	14.30	6	16.23	15.57	13.7	1.4	65.2	6.6	41.4	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.

6.10 Load Case 8 – 30AEQ 2ST Aft 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	6.66	1	13.76	23.21	3.5	-1.7	124.5	15.0	57.5	4.3	PASS
Bottom Raking 35%L	2	6.55	1	14.48	24.12	2.5	-1.6	120.7	14.9	57.9	3.3	PASS
Bottom Raking 35%L	3	6.93	1	13.83	23.56	3.2	-1.5	135.9	16.7	54.7	3.9	PASS
Bottom Raking 35%L	4	7.89	1	13.74	24.31	2.6	-0.7	145.4	18.0	52.5	3.3	PASS
Bottom Raking 35%L	5	12.61	6	15.39	20.05	8.3	1.2	99.1	11.3	52.1	9.1	PASS
Bottom Raking 35%L	6	12.52	6	15.02	21.46	6.8	1.5	94.8	11.1	52.3	7.8	PASS
Bottom Raking 35%L	7	14.55	6	14.43	20.54	8.5	2.6	75.8	8.4	46.8	9.6	PASS
Bottom NOT Raking	8	6.76	1	14.53	24.40	2.3	-1.4	130.5	16.4	57.5	3.0	PASS
Bottom NOT Raking	9	7.61	1	14.28	24.82	2.0	-0.8	144.0	18.0	55.0	2.7	PASS
Bottom NOT Raking	10	8.11	1	14.48	25.56	1.3	-0.3	137.3	17.5	54.6	2.0	PASS
Bottom NOT Raking	11	12.00	6	14.97	22.40	5.7	1.4	95.5	11.5	52.9	6.7	PASS
Side Damage	12	6.42	1	13.65	22.85	3.9	-1.9	111.5	14.4	52.3	4.7	PASS
Side Damage	13	7.62	1	12.88	22.83	4.1	-1.2	125.7	16.0	43.2	5.0	PASS
Side Damage	14	8.11	1	12.92	23.36	3.7	-0.8	130.7	17.2	39.8	4.5	PASS
Side Damage	15	8.32	1	14.04	25.13	1.8	-0.3	131.3	17.3	49.3	2.6	PASS
Side Damage	16	13.68	6	15.00	19.81	8.9	1.8	77.2	8.8	47.7	9.9	PASS
Side Damage	17	13.92	6	14.43	21.40	7.4	2.4	78.6	9.0	48.1	8.5	PASS
100%L Bottom Damaged	18	14.10	6	15.73	16.52	12.2	1.3	75.8	7.9	46.1	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 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	6.65	1	13.45	22.92	4.3	-1.7	121.5	14.2	55.1	5.0	PASS
Bottom Raking 35%L	2	6.56	1	14.48	24.31	2.8	-1.4	121.7	14.6	55.5	3.6	PASS
Bottom Raking 35%L	3	6.92	1	13.52	23.27	4.0	-1.4	133.6	15.8	54.4	4.7	PASS
Bottom Raking 35%L	4	7.90	1	13.42	24.05	3.3	-0.7	143.6	17.0	52.1	4.0	PASS
Bottom Raking 35%L	5	12.83	6	15.73	19.61	9.2	1.4	93.7	10.3	49.0	10.1	PASS
Bottom Raking 35%L	6	12.60	6	15.30	21.49	7.3	1.7	92.6	10.5	49.4	8.3	PASS
Bottom Raking 35%L	7	14.70	6	14.71	20.53	9.1	2.8	70.9	7.7	43.5	10.2	PASS
Bottom NOT Raking	8	6.75	1	14.52	24.55	2.5	-1.2	131.2	16.0	56.3	3.3	PASS
Bottom NOT Raking	9	7.62	1	13.96	24.54	2.7	-0.7	142.4	17.0	54.5	3.5	PASS
Bottom NOT Raking	10	8.11	1	14.44	25.68	1.6	-0.2	138.7	17.0	55.3	2.4	PASS
Bottom NOT Raking	11	12.08	6	15.24	22.45	6.2	1.6	93.8	11.0	50.1	7.2	PASS
Side Damage	12	6.40	1	13.70	23.06	4.1	-1.8	111.4	14.0	53.7	4.9	PASS
Side Damage	13	7.63	1	12.51	22.49	5.0	-1.2	124.2	15.1	43.4	5.8	PASS
Side Damage	14	8.06	1	12.77	23.27	4.2	-0.7	131.7	16.6	41.6	5.1	PASS
Side Damage	15	8.31	1	14.01	25.26	2.1	-0.1	132.7	16.7	50.5	2.9	PASS
Side Damage	16	13.75	6	15.30	19.82	9.4	2.0	73.8	8.2	44.6	10.5	PASS
Side Damage	17	14.10	6	14.70	21.39	8.0	2.6	74.4	8.3	44.9	9.2	PASS
100%L Bottom Damaged	18	14.36	6	16.06	16.03	13.3	1.5	70.9	7.1	42.5	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 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	6.50	1	13.90	23.43	3.7	-1.6	129.3	15.4	59.0	4.5	PASS
Bottom Raking 35%L	2	6.38	1	14.61	24.34	2.7	-1.5	125.4	15.2	59.1	3.5	PASS
Bottom Raking 35%L	3	6.74	1	13.96	23.75	3.4	-1.4	141.1	17.0	56.3	4.2	PASS
Bottom Raking 35%L	4	7.69	1	13.84	24.46	2.9	-0.7	151.3	18.0	54.1	3.6	PASS
Bottom Raking 35%L	5	12.35	6	15.73	20.29	8.4	1.2	104.8	11.9	54.0	9.3	PASS
Bottom Raking 35%L	6	12.27	6	15.36	21.72	7.0	1.5	99.5	11.5	54.0	7.9	PASS
Bottom Raking 35%L	7	14.35	6	14.74	20.81	8.6	2.6	79.1	8.8	49.0	9.7	PASS
Bottom NOT Raking	8	6.58	1	14.66	24.59	2.5	-1.3	135.3	16.5	59.0	3.2	PASS
Bottom NOT Raking	9	7.41	1	14.37	24.96	2.3	-0.7	150.0	18.0	56.4	3.0	PASS
Bottom NOT Raking	10	7.93	1	14.56	25.72	1.6	-0.3	143.4	17.5	56.1	2.3	PASS
Bottom NOT Raking	11	11.76	6	15.32	22.66	5.9	1.4	100.2	12.0	54.5	6.9	PASS
Side Damage	12	6.24	1	13.85	23.14	4.0	-1.8	115.4	14.7	54.6	4.8	PASS
Side Damage	13	7.40	1	13.06	23.08	4.3	-1.2	131.9	16.4	46.6	5.1	PASS
Side Damage	14	7.88	1	13.10	23.58	3.9	-0.8	137.2	17.4	44.0	4.7	PASS
Side Damage	15	8.12	1	14.15	25.31	2.1	-0.2	137.5	17.3	51.6	2.9	PASS
Side Damage	16	13.42	6	15.32	20.11	8.9	1.9	81.8	9.2	50.0	10.0	PASS
Side Damage	17	13.68	6	14.76	21.70	7.5	2.4	81.8	9.3	50.2	8.7	PASS
100%L Bottom Damaged	18	13.93	6	15.96	16.86	12.2	1.4	85.2	8.8	48.4	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.

6.13 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	6.49	1	13.59	23.15	4.4	-1.6	125.7	14.5	56.3	5.2	PASS
Bottom Raking 35%L	2	6.41	1	14.61	24.53	3.0	-1.3	126.2	14.9	56.5	3.7	PASS
Bottom Raking 35%L	3	6.74	1	13.65	23.47	4.2	-1.3	138.0	16.0	55.9	4.9	PASS
Bottom Raking 35%L	4	7.70	1	13.52	24.19	3.6	-0.6	148.4	16.9	53.6	4.3	PASS
Bottom Raking 35%L	5	12.57	6	16.06	19.87	9.4	1.4	99.0	10.8	50.8	10.2	PASS
Bottom Raking 35%L	6	12.36	6	15.63	21.76	7.5	1.7	96.9	10.9	50.9	8.5	PASS
Bottom Raking 35%L	7	14.51	6	15.02	20.81	9.2	2.9	73.6	8.0	45.5	10.3	PASS
Bottom NOT Raking	8	6.58	1	14.65	24.75	2.8	-1.2	135.8	16.0	57.3	3.5	PASS
Bottom NOT Raking	9	7.42	1	14.05	24.69	3.0	-0.7	147.3	16.9	55.9	3.7	PASS
Bottom NOT Raking	10	7.93	1	14.52	25.84	1.9	-0.1	144.2	16.9	56.7	2.7	PASS
Bottom NOT Raking	11	11.84	6	15.58	22.72	6.4	1.6	98.1	11.3	51.5	7.4	PASS
Side Damage	12	6.24	1	13.90	23.37	4.2	-1.7	115.0	14.2	55.8	5.0	PASS
Side Damage	13	7.41	1	12.70	22.74	5.1	-1.1	129.8	15.4	46.6	5.9	PASS
Side Damage	14	7.83	1	12.95	23.49	4.4	-0.7	137.5	16.7	45.4	5.2	PASS
Side Damage	15	8.11	1	14.12	25.44	2.4	-0.1	138.5	16.7	52.6	3.2	PASS
Side Damage	16	13.49	6	15.61	20.14	9.5	2.1	77.9	8.6	46.7	10.5	PASS
Side Damage	17	13.87	6	15.02	21.69	8.1	2.7	77.1	8.5	46.7	9.3	PASS
100%L Bottom Damaged	18	14.19	6	16.28	16.40	13.2	1.6	79.8	7.9	44.8	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.

6.14 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	6.65	1	14.08	23.83	3.3	-1.5	134.2	16.1	59.8	4.1	PASS
Bottom Raking 35%L	2	6.54	1	14.80	24.75	2.3	-1.3	129.8	15.9	60.2	3.1	PASS
Bottom Raking 35%L	3	6.86	1	14.13	24.10	3.1	-1.3	144.9	17.6	56.8	3.8	PASS
Bottom Raking 35%L	4	7.78	1	13.99	24.75	2.6	-0.6	154.5	18.5	54.4	3.3	PASS
Bottom Raking 35%L	5	12.37	6	15.62	20.63	8.1	1.3	107.5	12.3	55.1	8.9	PASS
Bottom Raking 35%L	6	12.30	6	15.23	22.09	6.6	1.6	101.6	11.9	55.1	7.6	PASS
Bottom Raking 35%L	7	14.38	6	14.60	21.21	8.2	2.8	80.9	9.0	50.1	9.3	PASS
Bottom NOT Raking	8	6.71	1	14.83	24.96	2.1	-1.2	138.7	17.1	59.5	2.9	PASS
Bottom NOT Raking	9	7.50	1	14.52	25.25	2.0	-0.6	153.2	18.5	56.7	2.7	PASS
Bottom NOT Raking	10	8.03	1	14.71	26.03	1.3	-0.1	146.2	18.0	56.5	2.0	PASS
Bottom NOT Raking	11	11.79	6	15.17	23.04	5.5	1.5	102.1	12.3	55.6	6.5	PASS
Side Damage	12	6.37	1	14.11	23.63	3.5	-1.7	119.0	15.3	55.4	4.3	PASS
Side Damage	13	7.47	1	13.31	23.49	3.9	-1.0	135.2	17.1	47.6	4.7	PASS
Side Damage	14	7.93	1	13.33	23.95	3.5	-0.7	139.5	18.0	44.8	4.3	PASS
Side Damage	15	8.21	1	14.33	25.65	1.7	-0.1	139.9	17.7	52.1	2.5	PASS
Side Damage	16	13.41	6	15.20	20.52	8.5	2.0	84.1	9.6	51.2	9.6	PASS
Side Damage	17	13.70	6	14.62	22.11	7.1	2.5	83.4	9.6	51.3	8.2	PASS
100%L Bottom Damaged	18	14.01	6	15.80	17.28	11.8	1.5	90.3	9.3	49.4	11.8	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.

6.15 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	6.65	1	13.77	23.55	4.1	-1.4	131.0	15.2	57.4	4.8	PASS
Bottom Raking 35%L	2	6.57	1	14.79	24.95	2.6	-1.1	131.2	15.6	57.6	3.3	PASS
Bottom Raking 35%L	3	6.86	1	13.82	23.82	3.8	-1.2	142.2	16.6	56.4	4.6	PASS
Bottom Raking 35%L	4	7.80	1	13.66	24.48	3.3	-0.5	151.9	17.4	54.0	4.0	PASS
Bottom Raking 35%L	5	12.60	6	15.94	20.20	9.0	1.5	101.8	11.2	52.0	9.9	PASS
Bottom Raking 35%L	6	12.40	6	15.50	22.14	7.1	1.8	99.1	11.2	52.0	8.1	PASS
Bottom Raking 35%L	7	14.55	6	14.88	21.22	8.8	3.0	75.4	8.3	46.6	9.9	PASS
Bottom NOT Raking	8	6.72	1	14.82	25.13	2.4	-1.0	139.5	16.6	58.2	3.2	PASS
Bottom NOT Raking	9	7.52	1	14.20	24.99	2.7	-0.5	150.7	17.4	56.2	3.5	PASS
Bottom NOT Raking	10	8.04	2	14.66	26.16	1.6	0.1	147.4	17.4	57.0	2.4	PASS
Bottom NOT Raking	11	11.88	6	15.44	23.11	6.0	1.8	100.0	11.6	52.6	7.0	PASS
Side Damage	12	6.39	1	14.16	23.88	3.7	-1.5	119.1	14.8	56.7	4.5	PASS
Side Damage	13	7.48	1	12.94	23.15	4.7	-1.0	133.5	16.1	47.6	5.5	PASS
Side Damage	14	7.88	1	13.18	23.87	4.0	-0.6	140.2	17.2	46.1	4.8	PASS
Side Damage	15	8.21	2	14.29	25.80	2.1	0.1	141.3	17.1	53.0	2.9	PASS
Side Damage	16	13.49	6	15.48	20.55	9.0	2.2	80.2	8.9	47.9	10.1	PASS
Side Damage	17	13.90	6	14.88	22.12	7.7	2.8	78.7	8.8	47.9	8.9	PASS
100%L Bottom Damaged	18	14.27	6	16.12	16.83	12.8	1.7	84.7	8.3	45.8	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.

6.16 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	5.89	1	15.03	25.25	3.6	-1.0	151.8	16.7	58.8	4.3	PASS
Bottom Raking 35%L	2	5.84	1	16.06	26.69	2.1	-0.7	153.7	16.9	58.6	2.9	PASS
Bottom Raking 35%L	3	6.00	1	15.06	25.39	3.5	-0.9	160.9	17.4	59.4	4.2	PASS
Bottom Raking 35%L	4	6.83	1	14.79	25.79	3.3	-0.3	172.2	18.1	59.4	4.0	PASS
Bottom Raking 35%L	5	10.99	6	17.10	22.12	8.2	1.4	127.8	13.8	54.9	9.1	PASS
Bottom Raking 35%L	6	10.86	6	16.58	24.26	6.1	1.9	120.2	13.4	54.6	7.1	PASS
Bottom Raking 35%L	7	12.86	6	15.94	23.61	7.5	3.0	87.2	10.0	50.8	8.8	PASS
Bottom NOT Raking	8	5.90	1	16.08	26.78	2.0	-0.6	159.9	17.4	59.0	2.8	PASS
Bottom NOT Raking	9	6.55	1	15.33	26.32	2.7	-0.4	171.4	18.1	59.4	3.4	PASS
Bottom NOT Raking	10	7.17	2	15.74	27.59	1.5	0.3	170.6	18.1	58.9	2.3	PASS
Bottom NOT Raking	11	10.35	6	16.51	25.28	4.9	1.8	121.0	13.7	54.9	6.0	PASS
Side Damage	12	5.73	1	15.81	26.24	2.5	-0.9	136.8	16.1	58.7	3.4	PASS
Side Damage	13	6.50	1	14.59	25.19	3.8	-0.7	153.4	17.2	57.5	4.7	PASS
Side Damage	14	6.79	1	14.58	25.47	3.6	-0.4	159.1	17.6	57.2	4.5	PASS
Side Damage	15	7.24	2	15.57	27.41	1.7	0.3	165.0	17.9	58.3	2.6	PASS
Side Damage	16	11.68	6	16.56	23.07	7.5	2.1	101.0	11.3	51.9	8.7	PASS
Side Damage	17	11.88	6	16.04	24.73	6.1	2.7	88.6	10.5	51.8	7.4	PASS
100%L Bottom Damaged	18	12.97	6	16.98	19.14	11.6	1.9	114.1	10.9	50.2	11.6	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.

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Condition 1 - HSC Loadline
Damage Case 16

WEIGHT STATUS

Trim: Aft 8.95/210.33, Heel: Stbd 9.99 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	492.24	84.19f	0.03p	23.20
Pax @185 lb ea (Stand)	20.65	105.24f	0.00	38.55
Luggage @20 lb ea Pax	2.22	115.75f	0.00	21.33
Vehicles AEQ @6 kip ea	91.09	102.80f	0.25s	21.33
Vehicles LT @63 kip ea	56.25	22.00f	0.01s	27.46
Vehicles ST @45 kip ea	20.09	55.00f	0.00	27.46
Bikes @30 lb ea	1.53	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**	**83.99f**	**0.02s**	**24.93**

	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	97.69f	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**	**85.76f**	**0.01s**	**23.67**
Free Surface Adjustment				**0.11**
Adjusted CG		**85.77f**	**0.01p**	**23.79**

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: 15.147 @ Origin
Trim: Aft 8.95/210.33, Heel: Stbd 9.99 deg.

Part		SpGr	Displ(LT)	LCB	TCB	VCB	RefHt
HULL		1.025	1,218.78	73.98f	9.81s	8.02	-14.90
DB5.S	Flooded	1.025	-33.08	96.37f	22.47s	3.55	-14.90
COMP5.S	Flooded	1.025	-67.53	80.48f	22.71s	11.08	-14.90
DB7.S	Flooded	1.025	-27.10	78.74f	22.47s	3.69	-14.90
ER1.S	Flooded	1.025	-303.64	40.93f	22.40s	9.97	-14.90
Total Displacement		**1.025**	**787.42**	**85.06f**	**2.88s**	**7.35**	

Distances in FEET.

CRITICAL POINT STATUS
Baseline draft: 15.147 @ Origin
Trim: Aft 8.95/210.33, Heel: Stbd 9.99 deg.

	Critical Points		LCP	TCP	VCP	Height
(3)	EN 90 S	FLOOD	213.86f	5.25s	30.90	23.68
(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	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	25.50
(8)	EN 91 P	FLOOD	203.52f	8.13p	38.80	33.33
(9)	Survival Craft S	TIGHT	61.03f	25.67s	44.46	26.98
(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**	**34.50**	**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**	**42.40**	**P**
(4)	**Flood Height at Point 1 to 8**	**>**	**6.56**	**Ft**	**14.44**	**P**
(5)	**Righting Arm at MaxRA**	**>**	**0.16**	**Ft**	**6.71**	**P**

Condition 1 - HSC Loadline
Damage Case 16

RESIDUAL RIGHTING ARMS vs HEEL ANGLE with FLOODING

Total CG: LCG = 85.76f TCG = 0.01s VCG = 23.67
Free Surface Adjustment: 0.11
Adjusted CG: LCG = 85.77f TCG = 0.02p VCG = 23.79

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Flood Pt Area	Height	
14.902	2.44a	9.99s	787.25	0.00	-0.868	0.00	14.44	(6)
14.996	2.50a	10.55s	787.38	0.00	-0.431	-0.36	14.60	(6)
15.090	2.56a	11.11s	787.37	0.00	0.000	-0.48	14.76	(6)
15.265	2.68a	12.11s	787.23	0.00	0.763	-0.10	15.05	(6)
15.450	2.82a	13.11s	787.16	0.00	1.504	1.04	15.32	(6)
15.649	2.96a	14.11s	787.43	0.00	2.212	2.90	15.58	(6)
15.855	3.12a	15.11s	787.42	0.00	2.883	5.44	15.82	(6)
16.075	3.28a	16.11s	787.42	0.00	3.500	8.64	16.05	(6)
16.310	3.46a	17.11s	787.42	0.00	4.054	12.41	16.26	(6)
16.559	3.66a	18.11s	787.48	0.00	4.534	16.71	16.46	(6)
16.821	3.86a	19.11s	787.48	0.00	4.937	21.44	16.64	(6)
17.093	4.08a	20.11s	787.40	0.00	5.261	26.54	16.81	(6)
17.372	4.31a	21.11s	787.40	0.00	5.506	31.92	16.96	(6)
17.656	4.55a	22.11s	787.40	0.00	5.677	37.52	17.11	(6)
17.942	4.80a	23.11s	787.40	0.00	5.784	43.26	17.25	(6)
18.226	5.05a	24.11s	787.38	0.00	5.832	49.07	17.38	(6)
18.350	5.16a	24.54s	787.42	0.00	**5.836**	51.62	17.43	(6)
18.508	5.30a	25.11s	787.42	0.00	5.829	54.90	17.50	(6)
18.784	5.55a	26.11s	787.39	0.00	5.783	60.71	17.62	(6)
19.056	5.81a	27.11s	787.39	0.00	5.698	66.45	17.74	(6)
19.321	6.07a	28.11s	787.40	0.00	5.581	72.09	17.85	(6)
19.579	6.32a	29.11s	787.40	0.00	5.438	77.60	17.96	(6)
19.830	6.58a	30.11s	787.40	0.00	5.270	82.95	18.06	(6)
20.074	6.83a	31.11s	787.41	0.00	5.082	88.13	18.16	(6)
20.309	7.08a	32.11s	787.41	0.00	4.876	93.11	18.25	(6)
20.541	7.33a	33.11s	787.73	0.00	4.651	97.87	18.33	(6)
20.761	7.58a	34.11s	787.71	0.00	4.417	102.41	18.42	(6)
20.968	7.82a	35.11s	787.42	0.00	4.176	106.71	18.50	(6)
21.169	8.06a	36.11s	787.40	0.01f	3.922	110.75	18.57	(6)
21.363	8.30a	37.11s	787.45	0.00	3.657	114.54	18.64	(6)
21.547	8.54a	38.11s	787.42	0.00	3.387	118.07	18.71	(6)
21.722	8.77a	39.11s	787.43	0.00	3.110	121.31	18.77	(6)
21.886	8.99a	40.11s	787.42	0.00	2.828	124.28	18.83	(6)
22.041	9.21a	41.11s	787.43	0.00	2.540	126.97	18.89	(6)
22.187	9.43a	42.11s	787.44	0.00	2.249	129.36	18.94	(6)
22.324	9.64a	43.11s	787.46	0.00	1.954	131.46	18.98	(6)
22.451	9.85a	44.11s	787.45	0.00	1.656	133.27	19.02	(6)
22.497	9.93a	44.49s	787.42	0.00	1.540	133.89	0.00	(10)
22.568	10.06a	45.11s	787.41	0.00	1.357	134.77	19.06	(6)
22.676	10.25a	46.11s	787.41	0.00	1.055	135.98	19.09	(6)
22.775	10.45a	47.11s	787.41	0.00	0.751	136.88	19.12	(6)
22.867	10.64a	48.11s	787.41	0.00	0.446	137.48	19.15	(6)
22.950	10.83a	49.11s	787.42	0.00	0.140	137.78	19.16	(6)
22.985	10.91a	49.56s	787.41	0.00	0.000	137.81	19.17	(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.

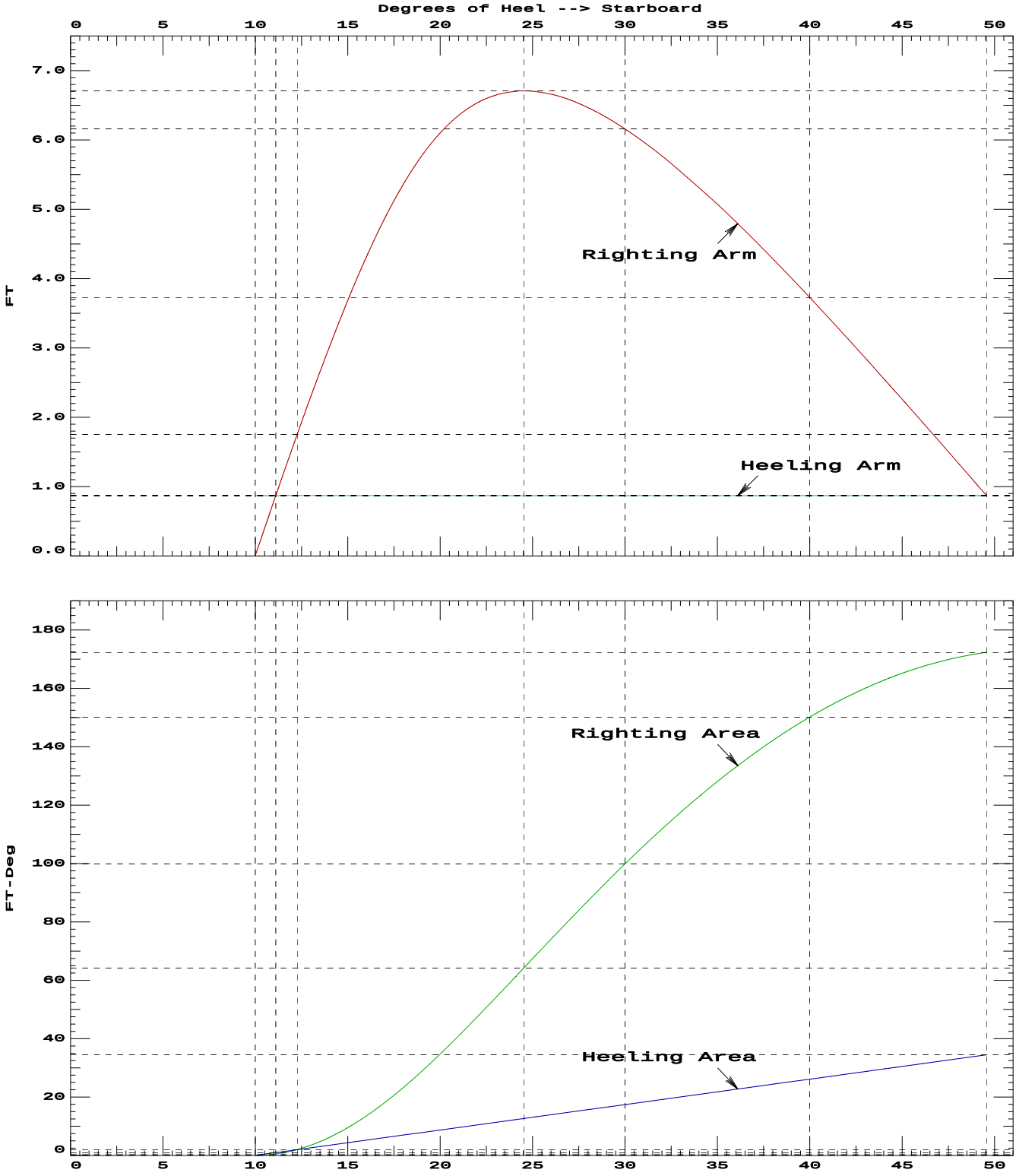
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 685.82

	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**	**61.19 P**

Relative angles measured from 11.105s

Condition 1 - HSC Loadline
Damage Case 16



Condition 2 - 21AEQ 4LT Departure with Ice
Damage Case 16

WEIGHT STATUS

Trim: Aft 7.82/210.33, Heel: Stbd 9.42 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	492.24	84.19f	0.03p	23.20
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	56.26	116.10f	3.50p	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	**738.52**	**86.25f**	**0.29p**	**25.23**

	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			**786.75**	**87.88f**	**0.28p**	**23.96**	
Free Surface Adjustment						**0.11**	
Adjusted CG				**87.89f**	**0.30p**	**24.07**	

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: 14.638 @ Origin

Trim: Aft 7.82/210.33, Heel: Stbd 9.42 deg.

Part		SpGr	Displ(LT)	LCB	TCB	VCB	RefHt
HULL		1.025	1,205.49	75.67f	9.45s	7.83	-14.43
DB5.S	Flooded	1.025	-33.08	96.37f	22.47s	3.55	-14.43
COMP5.S	Flooded	1.025	-65.16	80.50f	22.71s	10.92	-14.43
DB7.S	Flooded	1.025	-27.10	78.74f	22.47s	3.69	-14.43
ER1.S	Flooded	1.025	-293.41	40.94f	22.48s	9.73	-14.43
Total Displacement		**1.025**	**786.75**	**87.25f**	**2.50s**	**7.19**	

Distances in FEET.

Condition 2 - 21AEQ 4LT Departure with Ice
Damage Case 16

CRITICAL POINT STATUS
Baseline draft: 14.638 @ Origin
Trim: Aft 7.82/210.33, Heel: Stbd 9.42 deg.

	Critical Points		LCP	TCP	VCP	Height
(3)	EN 90 S	FLOOD	213.86f	5.25s	30.90	23.12
(4)	EN 91 S	FLOOD	203.52f	8.13s	38.80	30.05
(5)	ER Air FWD P	FLOOD	43.30f	27.45p	23.45	14.79
(6)	ER Air Aft P	FLOOD	35.42f	27.45p	23.45	14.49
(7)	EN 90 P	FLOOD	213.86f	5.25p	30.90	24.83
(8)	EN 91 P	FLOOD	203.52f	8.13p	38.80	32.71
(9)	Survival Craft S	TIGHT	61.03f	25.67s	44.46	27.47
(10)	MES S	TIGHT	106.30f	29.53s	34.94	19.13

Distances in FEET.

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Angle from Equ0 to Flood or Tflood**	**>**	**0.00**	**deg**	**34.86**	**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**	**43.88**	**P**
(4)	**Flood Height at Point 1 to 8**	**>**	**6.56**	**Ft**	**14.49**	**P**
(5)	**Righting Arm at MaxRA**	**>**	**0.16**	**Ft**	**7.38**	**P**

Condition 2 - 21AEQ 4LT Departure with Ice
Damage Case 16

RESIDUAL RIGHTING ARMS vs HEEL ANGLE with FLOODING

Total CG: LCG = 87.88f TCG = 0.28p VCG = 23.96
Free Surface Adjustment: 0.11
Adjusted CG: LCG = 87.89f TCG = 0.30p VCG = 24.07

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Flood Pt Area	Height	
14.429	2.13a	9.42s	786.60	0.00	-0.869	0.00	14.49	(6)
14.520	2.19a	9.96s	786.71	0.00	-0.431	-0.35	14.65	(6)
14.612	2.25a	10.50s	786.71	0.00	0.000	-0.46	14.81	(6)
14.787	2.37a	11.50s	786.59	0.00	0.788	-0.07	15.10	(6)
14.968	2.49a	12.50s	786.54	0.00	1.556	1.11	15.38	(6)
15.160	2.63a	13.50s	786.76	0.00	2.300	3.03	15.64	(6)
15.359	2.78a	14.50s	786.76	0.00	3.014	5.69	15.90	(6)
15.568	2.94a	15.50s	786.75	0.00	3.683	9.04	16.14	(6)
15.790	3.10a	16.50s	786.75	0.00	4.297	13.03	16.36	(6)
16.026	3.28a	17.50s	786.75	0.00	4.844	17.60	16.57	(6)
16.275	3.48a	18.50s	786.75	0.00	5.317	22.68	16.76	(6)
16.537	3.68a	19.50s	786.73	0.00	5.708	28.19	16.94	(6)
16.808	3.90a	20.50s	786.73	0.00	6.016	34.06	17.11	(6)
17.086	4.13a	21.50s	786.74	0.00	6.243	40.19	17.26	(6)
17.367	4.37a	22.50s	786.74	0.00	6.396	46.52	17.41	(6)
17.647	4.61a	23.50s	786.71	0.00	6.483	52.96	17.54	(6)
17.925	4.86a	24.50s	786.72	0.00	6.511	59.46	17.68	(6)
18.198	5.10a	25.50s	786.74	0.00	6.487	65.96	17.80	(6)
18.466	5.36a	26.50s	786.73	0.00	6.420	72.41	17.93	(6)
18.728	5.61a	27.50s	786.73	0.00	6.315	78.78	18.05	(6)
18.982	5.86a	28.50s	786.73	0.00	6.178	85.03	18.16	(6)
19.229	6.11a	29.50s	786.73	0.00	6.014	91.12	18.27	(6)
19.467	6.36a	30.50s	786.74	0.00	5.827	97.04	18.38	(6)
19.697	6.60a	31.50s	786.75	0.00	5.620	102.77	18.49	(6)
19.918	6.85a	32.50s	786.75	0.00	5.395	108.28	18.58	(6)
20.131	7.09a	33.50s	786.76	0.00	5.156	113.55	18.68	(6)
20.335	7.33a	34.50s	786.75	0.00	4.904	118.58	18.77	(6)
20.528	7.56a	35.50s	786.75	0.00	4.642	123.36	18.86	(6)
20.714	7.80a	36.50s	786.78	0.00	4.368	127.86	18.94	(6)
20.890	8.03a	37.50s	786.75	0.00	4.086	132.09	19.02	(6)
21.056	8.25a	38.50s	786.75	0.01f	3.797	136.03	19.10	(6)
21.214	8.47a	39.50s	786.74	0.01f	3.502	139.68	19.17	(6)
21.364	8.69a	40.50s	786.78	0.00	3.201	143.03	19.24	(6)
21.504	8.91a	41.50s	786.79	0.00	2.895	146.08	19.30	(6)
21.634	9.12a	42.50s	786.79	0.00	2.587	148.82	19.36	(6)
21.754	9.32a	43.50s	786.77	0.00	2.276	151.25	19.41	(6)
21.844	9.48a	44.28s	786.75	0.00	2.028	152.95	0.00	(10)
21.868	9.52a	44.50s	786.75	0.00	1.960	153.37	19.46	(6)
21.972	9.72a	45.50s	786.75	0.00	1.643	155.17	19.51	(6)
22.066	9.91a	46.50s	786.73	0.01f	1.326	156.66	19.55	(6)
22.155	10.10a	47.50s	786.75	0.00	1.005	157.82	19.58	(6)
22.235	10.29a	48.50s	786.76	0.00	0.683	158.67	19.61	(6)
22.308	10.47a	49.50s	786.77	0.00	0.360	159.19	19.63	(6)
22.374	10.65a	50.50s	786.79	0.00	0.037	159.39	19.65	(6)

Condition 2 - 21AEQ 4LT Departure with Ice
Damage Case 16

22.380	10.67a	50.62s	786.77	0.00	-0.002	159.39	19.65 (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.

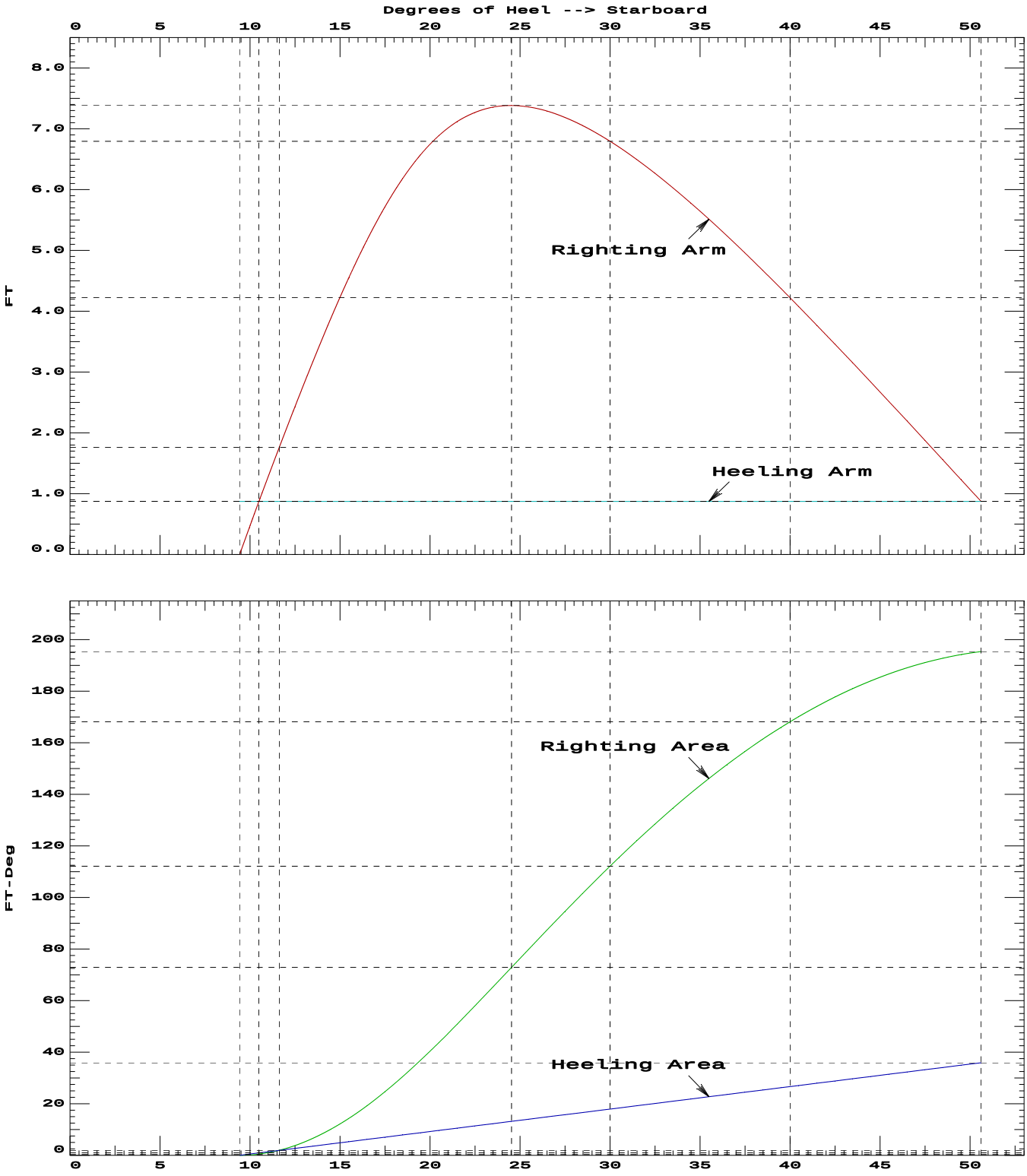
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 685.82

	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**	**66.42 P**

Relative angles measured from 10.495s

Condition 2 - 21AEQ 4LT Departure with Ice
Damage Case 16



Condition 3 - 21AEQ 4LT Arrival with Ice
Damage Case 16

WEIGHT STATUS

Trim: Aft 8.59/210.33, Heel: Stbd 9.99 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	492.24	84.19f	0.03p	23.20
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	56.26	116.10f	3.50p	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	**737.39**	**86.22f**	**0.29p**	**25.21**

	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	20.99p	0.92	15.3
DBF3.S	0.100	0.840	2.08	113.11f	23.95s	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**	**101.88f**	**15.60s**	**8.18**	**88.9***
Total Weight			**755.59**	**86.60f**	**0.09s**	**24.80**	
Free Surface Adjustment						**0.12**	
Adjusted CG				**86.61f**	**0.07s**	**24.92**	

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: 14.720 @ Origin

Trim: Aft 8.59/210.33, Heel: Stbd 9.99 deg.

Part		SpGr	Displ(LT)	LCB	TCB	VCB	RefHt
HULL		1.025	1,177.20	74.38f	10.11s	7.87	-14.48
DB5.S	Flooded	1.025	-33.08	96.37f	22.47s	3.55	-14.48
COMP5.S	Flooded	1.025	-65.17	80.48f	22.74s	10.92	-14.48
DB7.S	Flooded	1.025	-27.10	78.74f	22.47s	3.69	-14.48
ER1.S	Flooded	1.025	-296.26	40.90f	22.47s	9.80	-14.48
Total Displacement		**1.025**	**755.58**	**85.87f**	**3.19s**	**7.18**	

Distances in FEET.

Condition 3 - 21AEQ 4LT Arrival with Ice
Damage Case 16

CRITICAL POINT STATUS
Baseline draft: 14.720 @ Origin
Trim: Aft 8.59/210.33, Heel: Stbd 9.99 deg.

	Critical Points		LCP	TCP	VCP	Height
(3)	EN 90 S	FLOOD	213.86f	5.25s	30.90	23.74
(4)	EN 91 S	FLOOD	203.52f	8.13s	38.80	30.59
(5)	ER Air FWD P	FLOOD	43.30f	27.45p	23.45	15.12
(6)	ER Air Aft P	FLOOD	35.42f	27.45p	23.45	14.80
(7)	EN 90 P	FLOOD	213.86f	5.25p	30.90	25.56
(8)	EN 91 P	FLOOD	203.52f	8.13p	38.80	33.41
(9)	Survival Craft S	TIGHT	61.03f	25.67s	44.46	27.30
(10)	MES S	TIGHT	106.30f	29.53s	34.94	19.11

Distances in FEET.

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Angle from Equ0 to Flood or Tflood**	**>**	**0.00**	**deg**	**35.52**	**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**	**40.87**	**P**
(4)	**Flood Height at Point 1 to 8**	**>**	**6.56**	**Ft**	**14.80**	**P**
(5)	**Righting Arm at MaxRA**	**>**	**0.16**	**Ft**	**6.83**	**P**

Condition 3 - 21AEQ 4LT Arrival with Ice
Damage Case 16

RESIDUAL RIGHTING ARMS vs HEEL ANGLE with FLOODING

Total CG: LCG = 86.60f TCG = 0.09s VCG = 24.80
Free Surface Adjustment: 0.12
Adjusted CG: LCG = 86.61f TCG = 0.07s VCG = 24.92

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Flood Pt Area	Height	
14.483	2.34a	9.99s	755.42	0.00	-0.905	0.00	14.80	(6)
14.583	2.40a	10.56s	755.55	0.00	-0.450	-0.38	14.96	(6)
14.683	2.47a	11.12s	755.55	0.00	0.000	-0.51	15.12	(6)
14.864	2.59a	12.12s	755.42	0.00	0.785	-0.11	15.40	(6)
15.051	2.73a	13.12s	755.34	0.00	1.547	1.05	15.67	(6)
15.253	2.87a	14.12s	755.60	0.00	2.276	2.97	15.92	(6)
15.462	3.03a	15.12s	755.60	0.00	2.968	5.59	16.17	(6)
15.682	3.20a	16.12s	755.59	0.00	3.606	8.87	16.40	(6)
15.916	3.38a	17.12s	755.59	0.00	4.178	12.77	16.61	(6)
16.163	3.57a	18.12s	755.59	0.00	4.671	17.19	16.81	(6)
16.422	3.78a	19.12s	755.57	0.00	5.080	22.07	16.99	(6)
16.690	4.00a	20.12s	755.57	0.00	5.402	27.31	17.17	(6)
16.965	4.23a	21.12s	755.57	0.00	5.640	32.83	17.33	(6)
17.241	4.47a	22.12s	755.58	0.00	5.801	38.56	17.48	(6)
17.518	4.72a	23.12s	755.57	0.00	5.892	44.41	17.63	(6)
17.791	4.97a	24.12s	755.55	0.00	5.923	50.32	17.78	(6)
18.060	5.22a	25.12s	755.57	0.00	5.900	56.23	17.91	(6)
18.322	5.48a	26.12s	755.56	0.00	5.832	62.10	18.05	(6)
18.578	5.73a	27.12s	755.57	0.00	5.726	67.88	18.18	(6)
18.827	5.99a	28.12s	755.57	0.00	5.587	73.53	18.30	(6)
19.068	6.24a	29.12s	755.58	0.00	5.420	79.04	18.43	(6)
19.300	6.49a	30.12s	755.58	0.00	5.230	84.36	18.54	(6)
19.524	6.74a	31.12s	755.58	0.00	5.018	89.49	18.66	(6)
19.739	6.99a	32.12s	755.59	0.00	4.789	94.39	18.77	(6)
19.944	7.23a	33.12s	755.59	0.00	4.545	99.06	18.88	(6)
20.139	7.47a	34.12s	755.56	0.01f	4.289	103.48	18.98	(6)
20.329	7.71a	35.12s	755.59	0.00	4.018	107.63	19.08	(6)
20.506	7.94a	36.12s	755.59	0.00	3.739	111.51	19.18	(6)
20.674	8.17a	37.12s	755.61	0.00	3.452	115.11	19.27	(6)
20.834	8.40a	38.12s	755.61	0.00	3.157	118.41	19.35	(6)
20.984	8.62a	39.12s	755.61	0.00	2.856	121.42	19.44	(6)
21.125	8.84a	40.12s	755.59	0.00	2.550	124.12	19.52	(6)
21.258	9.06a	41.12s	755.59	0.00	2.239	126.52	19.59	(6)
21.380	9.27a	42.12s	755.59	0.00	1.926	128.60	19.66	(6)
21.495	9.47a	43.12s	755.59	0.00	1.608	130.37	19.72	(6)
21.601	9.68a	44.12s	755.59	0.00	1.288	131.82	19.79	(6)
21.699	9.87a	45.12s	755.60	0.00	0.966	132.94	19.84	(6)
21.736	9.95a	45.51s	755.59	0.00	0.839	133.30	0.00	(10)
21.790	10.07a	46.12s	755.61	0.00	0.641	133.75	19.89	(6)
21.873	10.26a	47.12s	755.64	0.00	0.316	134.22	19.93	(6)
21.947	10.44a	48.09s	755.79	0.00	-0.001	134.38	19.97	(6)

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

Condition 3 - 21AEQ 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.

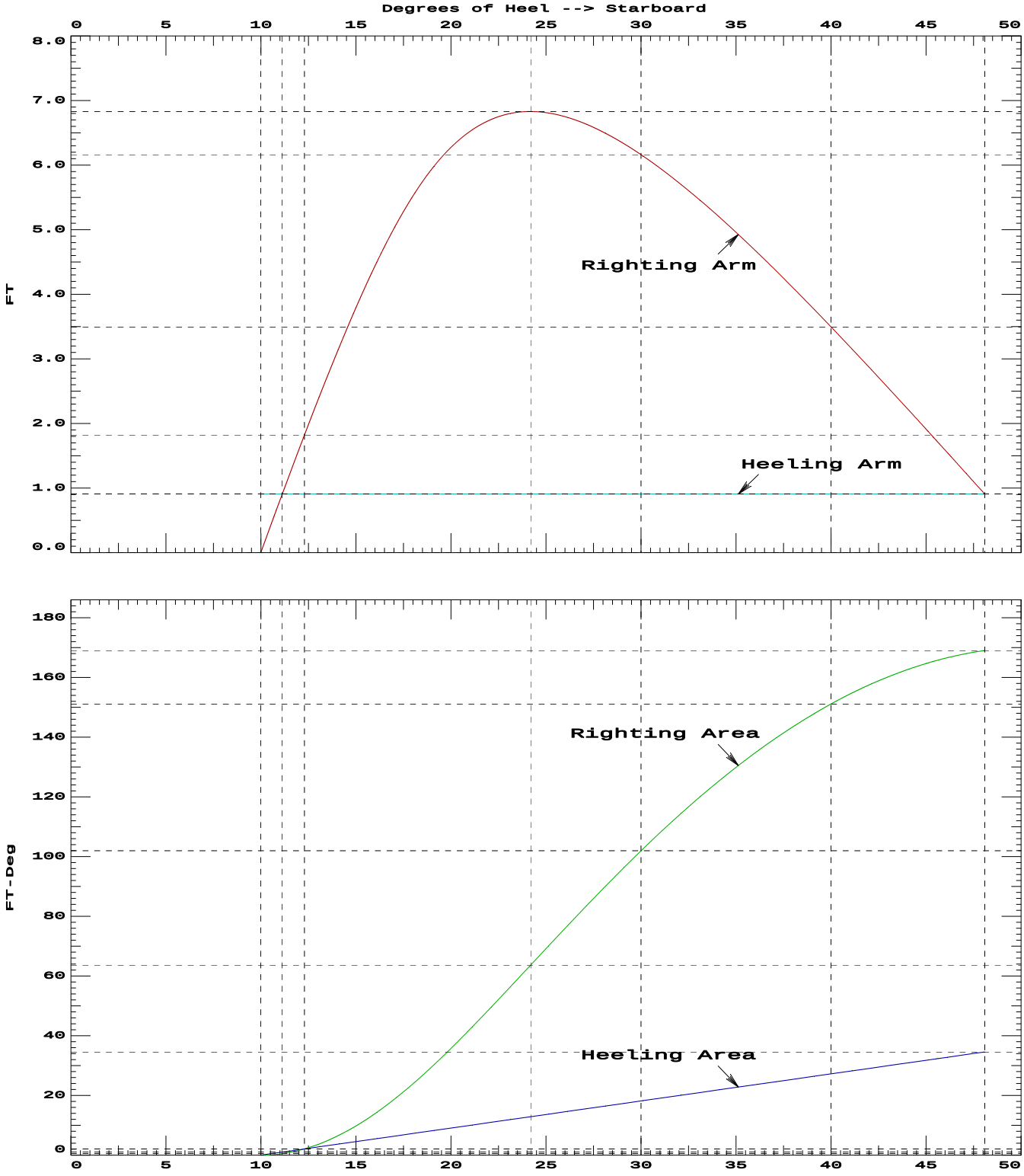
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 685.82

	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**	**11.12 P**
(4)	**Area from Equilibrium to 15 deg or Flood**	**>**	**5.26**	**Ft-deg**	**62.61 P**

Relative angles measured from 11.121s

Condition 3 - 21AEQ 4LT Arrival with Ice
Damage Case 16



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

WEIGHT STATUS

Trim: Aft 7.91/210.33, Heel: Stbd 9.32 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	492.24	84.19f	0.03p	23.20
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	**719.11**	**85.80f**	**0.17p**	**24.40**

	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			**767.35**	**87.51f**	**0.17p**	**23.15**	
Free Surface Adjustment						**0.12**	
Adjusted CG				**87.51f**	**0.19p**	**23.27**	

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: 14.504 @ Origin
Trim: Aft 7.91/210.33, Heel: Stbd 9.32 deg.

Part		SpGr	Displ(LT)	LCB	TCB	VCB	RefHt
HULL		1.025	1,180.04	75.37f	9.48s	7.73	-14.30
DB5.S	Flooded	1.025	-33.08	96.37f	22.47s	3.55	-14.30
COMP5.S	Flooded	1.025	-63.45	80.49f	22.73s	10.80	-14.30
DB7.S	Flooded	1.025	-27.10	78.74f	22.47s	3.69	-14.30
ER1.S	Flooded	1.025	-289.06	40.91f	22.50s	9.63	-14.30
Total Displacement		**1.025**	**767.34**	**86.90f**	**2.47s**	**7.09**	

Distances in FEET.

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

CRITICAL POINT STATUS
Baseline draft: 14.504 @ Origin
Trim: Aft 7.91/210.33, Heel: Stbd 9.32 deg.

	Critical Points		LCP	TCP	VCP	Height
(3)	EN 90 S	FLOOD	213.86f	5.25s	30.90	23.36
(4)	EN 91 S	FLOOD	203.52f	8.13s	38.80	30.29
(5)	ER Air FWD P	FLOOD	43.30f	27.45p	23.45	14.89
(6)	ER Air Aft P	FLOOD	35.42f	27.45p	23.45	14.60
(7)	EN 90 P	FLOOD	213.86f	5.25p	30.90	25.06
(8)	EN 91 P	FLOOD	203.52f	8.13p	38.80	32.93
(9)	Survival Craft S	TIGHT	61.03f	25.67s	44.46	27.68
(10)	MES S	TIGHT	106.30f	29.53s	34.94	19.37

Distances in FEET.

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Angle from Equ0 to Flood or Tflood**	**>**	**0.00**	**deg**	**35.66**	**P**
(2)	**Absolute Angle at Equ0 (no moments)**	**<**	**10.00**	**deg**	**9.32**	**P**
(3)	**Angle from Equ0 to RAzero or Flood**	**>**	**7.00**	**deg**	**46.21**	**P**
(4)	**Flood Height at Point 1 to 8**	**>**	**6.56**	**Ft**	**14.60**	**P**
(5)	**Righting Arm at MaxRA**	**>**	**0.16**	**Ft**	**7.82**	**P**

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

RESIDUAL RIGHTING ARMS vs HEEL ANGLE with FLOODING

Total CG: LCG = 87.51f TCG = 0.17p VCG = 23.15
Free Surface Adjustment: 0.12
Adjusted CG: LCG = 87.51f TCG = 0.19p VCG = 23.27

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Flood Pt Area	Height	
14.302	2.15a	9.32s	767.21	0.00	-0.891	0.00	14.60	(6)
14.392	2.21a	9.85s	767.31	0.00	-0.443	-0.35	14.75	(6)
14.484	2.27a	10.38s	767.31	0.00	0.000	-0.47	14.91	(6)
14.661	2.39a	11.38s	767.20	0.00	0.822	-0.06	15.19	(6)
14.843	2.52a	12.38s	767.15	0.00	1.624	1.17	15.47	(6)
15.032	2.65a	13.38s	767.08	0.01f	2.405	3.18	15.74	(6)
15.234	2.80a	14.38s	767.35	0.00	3.151	5.96	15.99	(6)
15.443	2.96a	15.38s	767.35	0.00	3.857	9.46	16.23	(6)
15.665	3.12a	16.38s	767.35	0.00	4.507	13.65	16.46	(6)
15.899	3.31a	17.38s	767.35	0.00	5.091	18.45	16.67	(6)
16.147	3.50a	18.38s	767.34	0.00	5.596	23.79	16.87	(6)
16.406	3.71a	19.38s	767.33	0.00	6.017	29.60	17.05	(6)
16.675	3.93a	20.38s	767.33	0.00	6.351	35.78	17.22	(6)
16.949	4.16a	21.38s	767.33	0.00	6.602	42.26	17.38	(6)
17.226	4.39a	22.38s	767.33	0.00	6.777	48.96	17.53	(6)
17.501	4.64a	23.38s	767.31	0.00	6.883	55.79	17.67	(6)
17.774	4.88a	24.38s	767.31	0.00	6.929	62.70	17.81	(6)
17.874	4.98a	24.75s	767.34	0.00	**6.931**	65.28	17.86	(6)
18.042	5.13a	25.38s	767.35	0.00	6.921	69.63	17.95	(6)
18.302	5.39a	26.38s	767.32	0.00	6.870	76.52	18.08	(6)
18.557	5.64a	27.38s	767.32	0.00	6.781	83.35	18.21	(6)
18.804	5.89a	28.38s	767.33	0.00	6.659	90.07	18.33	(6)
19.043	6.14a	29.38s	767.33	0.00	6.510	96.65	18.45	(6)
19.273	6.39a	30.38s	767.33	0.00	6.336	103.08	18.57	(6)
19.494	6.63a	31.38s	767.34	0.00	6.142	109.32	18.68	(6)
19.707	6.88a	32.38s	767.35	0.00	5.930	115.35	18.79	(6)
19.908	7.12a	33.38s	767.31	0.00	5.705	121.17	18.90	(6)
20.102	7.35a	34.38s	767.34	0.00	5.464	126.76	19.00	(6)
20.288	7.59a	35.38s	767.35	0.00	5.210	132.09	19.09	(6)
20.463	7.82a	36.38s	767.35	0.00	4.947	137.17	19.19	(6)
20.627	8.04a	37.38s	767.35	0.01f	4.677	141.98	19.28	(6)
20.785	8.27a	38.38s	767.36	0.00	4.398	146.52	19.37	(6)
20.934	8.49a	39.38s	767.38	0.00	4.112	150.78	19.45	(6)
21.071	8.70a	40.38s	767.33	0.01f	3.823	154.74	19.52	(6)
21.204	8.92a	41.38s	767.35	0.00	3.526	158.42	19.60	(6)
21.325	9.13a	42.38s	767.35	0.00	3.226	161.79	19.66	(6)
21.439	9.33a	43.38s	767.35	0.00	2.923	164.87	19.73	(6)
21.542	9.53a	44.38s	767.35	0.00	2.618	167.64	19.78	(6)
21.603	9.65a	44.98s	767.34	0.00	2.431	169.17	0.00	(10)
21.641	9.73a	45.38s	767.35	0.00	2.309	170.10	19.84	(6)
21.731	9.92a	46.38s	767.38	0.00	1.998	172.26	19.88	(6)
21.813	10.11a	47.38s	767.39	0.00	1.685	174.10	19.92	(6)
21.887	10.29a	48.38s	767.40	0.00	1.372	175.63	19.96	(6)
21.953	10.47a	49.38s	767.39	0.00	1.057	176.84	19.99	(6)

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

22.009	10.65a	50.38s	767.38	0.00	0.742	177.74	20.01 (6)
22.059	10.82a	51.38s	767.38	0.00	0.425	178.32	20.03 (6)
22.100	10.99a	52.38s	767.39	0.00	0.108	178.59	20.05 (6)
22.112	11.05a	52.72s	767.41	0.00	0.000	178.61	20.05 (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.

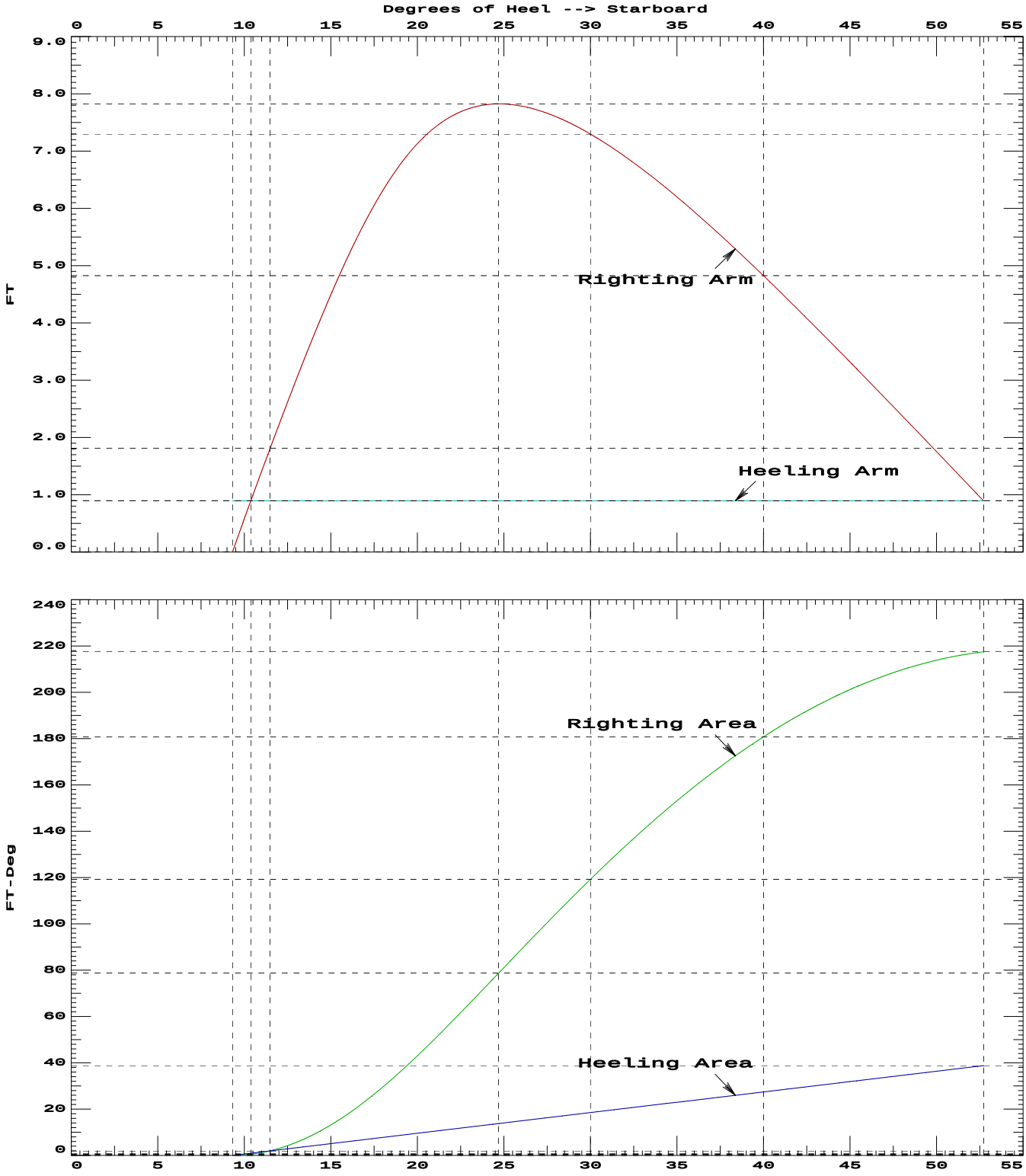
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 685.82

	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**	**10.38 P**
(4)	**Area from Equilibrium to 15 deg or Flood**	**>**	**5.26**	**Ft-deg**	**70.10 P**

Relative angles measured from 10.376s

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 8.70/210.33, Heel: Stbd 9.88 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	492.24	84.19f	0.03p	23.20
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	**717.99**	**85.78f**	**0.17p**	**24.38**

	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	98.07f	21.01s	10.37	0.9
DBF4.P	0.100	0.840	2.08	113.09f	21.01p	0.92	15.4
DBF3.S	0.100	0.840	2.08	113.09f	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			**736.18**	**86.18f**	**0.22s**	**23.98**	
Free Surface Adjustment						**0.12**	
Adjusted CG				**86.18f**	**0.20s**	**24.10**	

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: 14.586 @ Origin

Trim: Aft 8.70/210.33, Heel: Stbd 9.88 deg.

Part		SpGr	Displ(LT)	LCB	TCB	VCB	RefHt
HULL		1.025	1,151.70	74.04f	10.15s	7.77	-14.36
DB5.S	Flooded	1.025	-33.08	96.37f	22.47s	3.55	-14.36
COMP5.S	Flooded	1.025	-63.41	80.48f	22.75s	10.80	-14.36
DB7.S	Flooded	1.025	-27.10	78.74f	22.47s	3.69	-14.36
ER1.S	Flooded	1.025	-291.93	40.85f	22.50s	9.71	-14.36
Total Displacement		**1.025**	**736.18**	**85.47f**	**3.17s**	**7.08**	

Distances in FEET.

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

CRITICAL POINT STATUS
Baseline draft: 14.586 @ Origin
Trim: Aft 8.70/210.33, Heel: Stbd 9.88 deg.

	Critical Points		LCP	TCP	VCP	Height
(3)	EN 90 S	FLOOD	213.86f	5.25s	30.90	23.99
(4)	EN 91 S	FLOOD	203.52f	8.13s	38.80	30.85
(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	14.89
(7)	EN 90 P	FLOOD	213.86f	5.25p	30.90	25.79
(8)	EN 91 P	FLOOD	203.52f	8.13p	38.80	33.64
(9)	Survival Craft S	TIGHT	61.03f	25.67s	44.46	27.53
(10)	MES S	TIGHT	106.30f	29.53s	34.94	19.36

Distances in FEET.

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Angle from Equ0 to Flood or Tflood**	**>**	**0.00**	**deg**	**36.36**	**P**
(2)	**Absolute Angle at Equ0 (no moments)**	**<**	**10.00**	**deg**	**9.88**	**P**
(3)	**Angle from Equ0 to RAzero or Flood**	**>**	**7.00**	**deg**	**43.13**	**P**
(4)	**Flood Height at Point 1 to 8**	**>**	**6.56**	**Ft**	**14.89**	**P**
(5)	**Righting Arm at MaxRA**	**>**	**0.16**	**Ft**	**7.25**	**P**

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

RESIDUAL RIGHTING ARMS vs HEEL ANGLE with FLOODING

Total CG: LCG = 86.18f TCG = 0.22s VCG = 23.98
Free Surface Adjustment: 0.12
Adjusted CG: LCG = 86.18f TCG = 0.20s VCG = 24.10

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Flood Pt Area	Height	
14.356	2.37a	9.88s	736.04	0.00	-0.929	0.00	14.90	(6)
14.455	2.43a	10.43s	736.15	0.00	-0.461	-0.39	15.06	(6)
14.554	2.49a	10.99s	736.15	0.00	0.001	-0.51	15.21	(6)
14.737	2.62a	11.99s	736.02	0.00	0.821	-0.10	15.49	(6)
14.925	2.75a	12.99s	735.95	0.00	1.617	1.12	15.76	(6)
15.127	2.89a	13.99s	736.20	0.00	2.381	3.12	16.01	(6)
15.336	3.05a	14.99s	736.19	0.00	3.108	5.86	16.26	(6)
15.556	3.22a	15.99s	736.19	0.00	3.782	9.31	16.49	(6)
15.789	3.40a	16.99s	736.19	0.00	4.389	13.39	16.71	(6)
16.035	3.60a	17.99s	736.18	0.00	4.916	18.05	16.91	(6)
16.292	3.81a	18.99s	736.16	0.00	5.355	23.18	17.10	(6)
16.557	4.03a	19.99s	736.17	0.00	5.704	28.71	17.27	(6)
16.828	4.26a	20.99s	736.17	0.00	5.967	34.55	17.44	(6)
17.101	4.50a	21.99s	736.17	0.00	6.151	40.61	17.60	(6)
17.372	4.75a	22.99s	736.17	0.00	6.263	46.83	17.76	(6)
17.640	5.00a	23.99s	736.15	0.00	6.313	53.12	17.91	(6)
17.750	5.11a	24.40s	736.19	0.00	**6.317**	55.73	17.97	(6)
17.904	5.25a	24.99s	736.19	0.00	6.308	59.43	18.05	(6)
18.159	5.51a	25.99s	736.15	0.00	6.259	65.72	18.20	(6)
18.408	5.76a	26.99s	736.16	0.00	6.169	71.93	18.33	(6)
18.649	6.02a	27.99s	736.16	0.00	6.046	78.04	18.47	(6)
18.882	6.27a	28.99s	736.17	0.00	5.894	84.01	18.60	(6)
19.106	6.52a	29.99s	736.17	0.00	5.718	89.81	18.73	(6)
19.321	6.77a	30.99s	736.17	0.00	5.521	95.43	18.85	(6)
19.527	7.01a	31.99s	736.18	0.00	5.305	100.85	18.97	(6)
19.723	7.26a	32.99s	736.19	0.00	5.074	106.04	19.09	(6)
19.908	7.50a	33.99s	736.14	0.01f	4.831	110.99	19.20	(6)
20.085	7.73a	34.99s	736.17	0.00	4.573	115.69	19.31	(6)
20.252	7.96a	35.99s	736.18	0.00	4.305	120.13	19.42	(6)
20.411	8.19a	36.99s	736.19	0.00	4.028	124.30	19.52	(6)
20.561	8.42a	37.99s	736.19	0.00	3.745	128.19	19.62	(6)
20.701	8.64a	38.99s	736.19	0.00	3.455	131.79	19.71	(6)
20.832	8.85a	39.99s	736.20	0.00	3.160	135.09	19.80	(6)
20.954	9.07a	40.99s	736.17	0.00	2.860	138.10	19.89	(6)
21.069	9.27a	41.99s	736.19	0.00	2.555	140.81	19.97	(6)
21.175	9.48a	42.99s	736.19	0.00	2.247	143.21	20.04	(6)
21.274	9.68a	43.99s	736.19	0.00	1.937	145.30	20.11	(6)
21.366	9.88a	44.99s	736.20	0.00	1.623	147.08	20.17	(6)
21.450	10.07a	45.99s	736.20	0.00	1.308	148.55	20.22	(6)
21.471	10.12a	46.25s	736.19	0.00	1.227	148.87	0.00	(10)
21.527	10.26a	46.99s	736.20	0.00	0.992	149.70	20.27	(6)
21.594	10.45a	47.99s	736.21	0.00	0.674	150.53	20.32	(6)
21.654	10.63a	48.99s	736.22	0.00	0.355	151.05	20.36	(6)
21.705	10.80a	49.99s	736.23	0.00	0.035	151.24	20.40	(6)

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

21.710	10.82a	50.10s	736.23	0.00	0.000	151.24	20.40 (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.

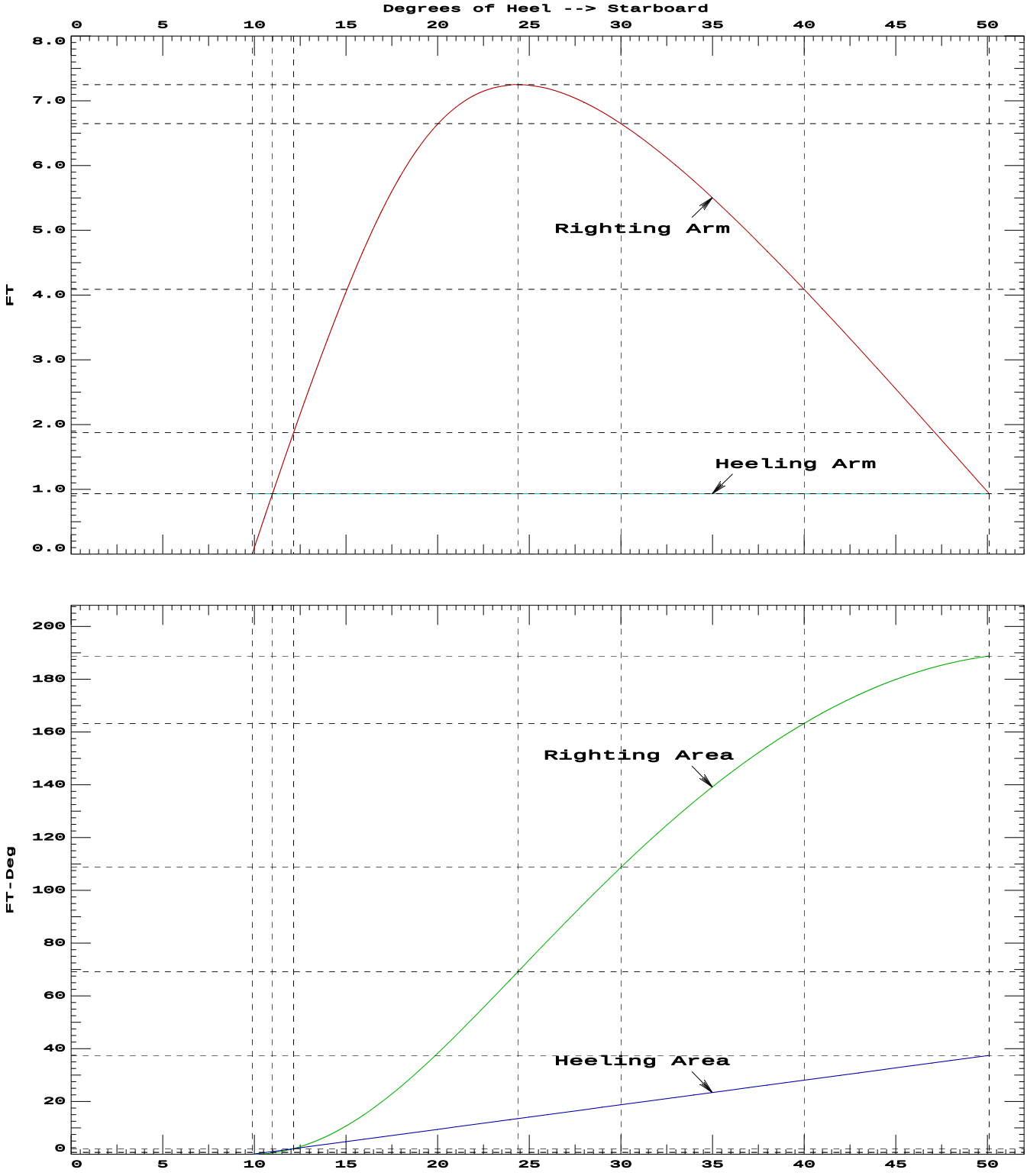
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 685.82

	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**	**10.99 P**
(4)	**Area from Equilibrium to 15 deg or Flood**	**>**	**5.26**	**Ft-deg**	**66.23 P**

Relative angles measured from 10.988s

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 6.37/210.33, Heel: Stbd 9.28 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	492.24	84.19f	0.03p	23.20
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	**703.69**	**89.51f**	**0.21s**	**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	97.81f	21.40s	8.00	7.0
DBF4.P	0.980	0.840	20.42	114.08f	22.40p	3.50	2.7
DBF3.S	0.980	0.840	20.42	114.08f	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			**48.24**	**112.97f**	**0.18p**	**4.51**	**88.9***

Total Weight	**751.93**	**91.01f**	**0.19s**	**23.63**
Free Surface Adjustment				**0.12**
Adjusted CG		**91.02f**	**0.17s**	**23.74**

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.

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

DISPLACEMENT STATUS
Baseline draft: 13.693 @ Origin
Trim: Aft 6.37/210.33, Heel: Stbd 9.28 deg.

Part		SpGr	Displ(LT)	LCB	TCB	VCB	RefHt
HULL		1.025	1,150.60	77.97f	9.73s	7.55	-13.51
DB5.S	Flooded	1.025	-33.08	96.37f	22.47s	3.55	-13.51
COMP5.S	Flooded	1.025	-61.64	80.52f	22.75s	10.68	-13.51
DB7.S	Flooded	1.025	-27.10	78.74f	22.47s	3.69	-13.51
ER1.S	Flooded	1.025	-276.84	41.09f	22.57s	9.34	-13.51
Total Displacement		**1.025**	**751.94**	**90.50f**	**2.91s**	**6.94**	

Distances in FEET.

CRITICAL POINT STATUS
Baseline draft: 13.693 @ Origin
Trim: Aft 6.37/210.33, Heel: Stbd 9.28 deg.

	Critical Points		LCP	TCP	VCP	Height
(3)	EN 90 S	FLOOD	213.86f	5.25s	30.90	22.60
(4)	EN 91 S	FLOOD	203.52f	8.13s	38.80	29.62
(5)	ER Air FWD P	FLOOD	43.30f	27.45p	23.45	15.36
(6)	ER Air Aft P	FLOOD	35.42f	27.45p	23.45	15.12
(7)	EN 90 P	FLOOD	213.86f	5.25p	30.90	24.30
(8)	EN 91 P	FLOOD	203.52f	8.13p	38.80	32.24
(9)	Survival Craft S	TIGHT	61.03f	25.67s	44.46	28.06
(10)	MES S	TIGHT	106.30f	29.53s	34.94	19.42

Distances in FEET.

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Angle from Equ0 to Flood or Tflood**	**>**	**0.00**	**deg**	**35.95**	**P**
(2)	**Absolute Angle at Equ0 (no moments)**	**<**	**10.00**	**deg**	**9.28**	**P**
(3)	**Angle from Equ0 to RAzero or Flood**	**>**	**7.00**	**deg**	**46.34**	**P**
(4)	**Flood Height at Point 1 to 8**	**>**	**6.56**	**Ft**	**15.12**	**P**
(5)	**Righting Arm at MaxRA**	**>**	**0.16**	**Ft**	**8.38**	**P**

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

RESIDUAL RIGHTING ARMS vs HEEL ANGLE with FLOODING

Total CG: LCG = 91.01f TCG = 0.19s VCG = 23.63
Free Surface Adjustment: 0.12
Adjusted CG: LCG = 91.02f TCG = 0.17s VCG = 23.74

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Flood Pt Area	Height	
13.507	1.74a	9.28s	751.78	0.00	-0.910	0.00	15.12	(6)
13.604	1.79a	9.79s	751.89	0.00	-0.451	-0.35	15.27	(6)
13.702	1.85a	10.31s	751.88	0.00	0.000	-0.46	15.41	(6)
13.895	1.98a	11.31s	751.74	0.00	0.862	-0.03	15.69	(6)
14.093	2.11a	12.31s	751.72	0.00	1.701	1.25	15.96	(6)
14.293	2.25a	13.31s	751.67	0.00	2.519	3.36	16.21	(6)
14.495	2.40a	14.31s	751.63	0.00	3.315	6.28	16.47	(6)
14.709	2.55a	15.31s	751.94	0.00	4.067	9.97	16.70	(6)
14.929	2.72a	16.31s	751.93	0.00	4.768	14.39	16.93	(6)
15.159	2.90a	17.31s	751.93	0.00	5.405	19.47	17.15	(6)
15.399	3.08a	18.31s	751.90	0.00	5.965	25.16	17.35	(6)
15.651	3.28a	19.31s	751.91	0.00	6.437	31.36	17.53	(6)
15.911	3.49a	20.31s	751.91	0.00	6.815	37.99	17.71	(6)
16.176	3.72a	21.31s	751.91	0.00	7.100	44.94	17.87	(6)
16.443	3.95a	22.31s	751.91	0.00	7.298	52.15	18.03	(6)
16.707	4.18a	23.31s	751.91	0.00	7.419	59.52	18.19	(6)
16.966	4.42a	24.31s	751.90	0.00	7.471	66.97	18.34	(6)
17.065	4.52a	24.70s	751.93	0.00	**7.474**	69.88	18.40	(6)
17.218	4.67a	25.31s	751.93	0.00	7.464	74.44	18.49	(6)
17.459	4.91a	26.31s	751.91	0.00	7.410	81.88	18.64	(6)
17.692	5.15a	27.31s	751.91	0.00	7.313	89.24	18.78	(6)
17.913	5.39a	28.31s	751.92	0.00	7.181	96.48	18.93	(6)
18.124	5.63a	29.31s	751.92	0.00	7.019	103.58	19.07	(6)
18.324	5.86a	30.31s	751.92	0.00	6.832	110.51	19.21	(6)
18.513	6.09a	31.31s	751.92	0.00	6.622	117.24	19.35	(6)
18.691	6.32a	32.31s	751.92	0.00	6.394	123.75	19.49	(6)
18.859	6.55a	33.31s	751.94	0.00	6.149	130.02	19.63	(6)
19.016	6.77a	34.31s	751.94	0.00	5.891	136.04	19.76	(6)
19.165	6.99a	35.31s	751.94	0.00	5.621	141.80	19.89	(6)
19.305	7.21a	36.31s	751.94	0.00	5.342	147.28	20.01	(6)
19.437	7.42a	37.31s	751.94	0.00	5.054	152.48	20.13	(6)
19.561	7.63a	38.31s	751.95	0.00	4.760	157.38	20.24	(6)
19.679	7.84a	39.31s	751.98	0.00	4.457	161.99	20.35	(6)
19.790	8.04a	40.31s	752.00	0.00	4.149	166.30	20.45	(6)
19.892	8.24a	41.31s	752.01	0.01a	3.836	170.29	20.55	(6)
19.986	8.44a	42.31s	752.00	0.00	3.521	173.97	20.64	(6)
20.072	8.63a	43.31s	752.02	0.01a	3.200	177.33	20.73	(6)
20.143	8.82a	44.31s	751.83	0.00	2.879	180.37	20.82	(6)
20.207	8.99a	45.23s	751.93	0.00	2.578	182.88	0.00	(10)
20.212	9.00a	45.31s	751.93	0.00	2.552	183.08	20.89	(6)
20.271	9.18a	46.31s	751.91	0.00	2.223	185.47	20.97	(6)
20.320	9.36a	47.31s	751.95	0.00	1.891	187.53	21.04	(6)
20.358	9.53a	48.31s	751.93	0.00	1.558	189.25	21.10	(6)
20.380	9.70a	49.31s	751.65	0.00	1.225	190.64	21.17	(6)

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

20.408	9.86a	50.31s	752.00	0.01a	0.886	191.70	21.22 (6)
20.416	10.01a	51.31s	752.00	0.01a	0.548	192.42	21.28 (6)
20.414	10.16a	52.31s	752.01	0.01a	0.210	192.79	21.33 (6)
20.403	10.25a	52.93s	751.94	0.00	0.000	192.86	21.36 (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.

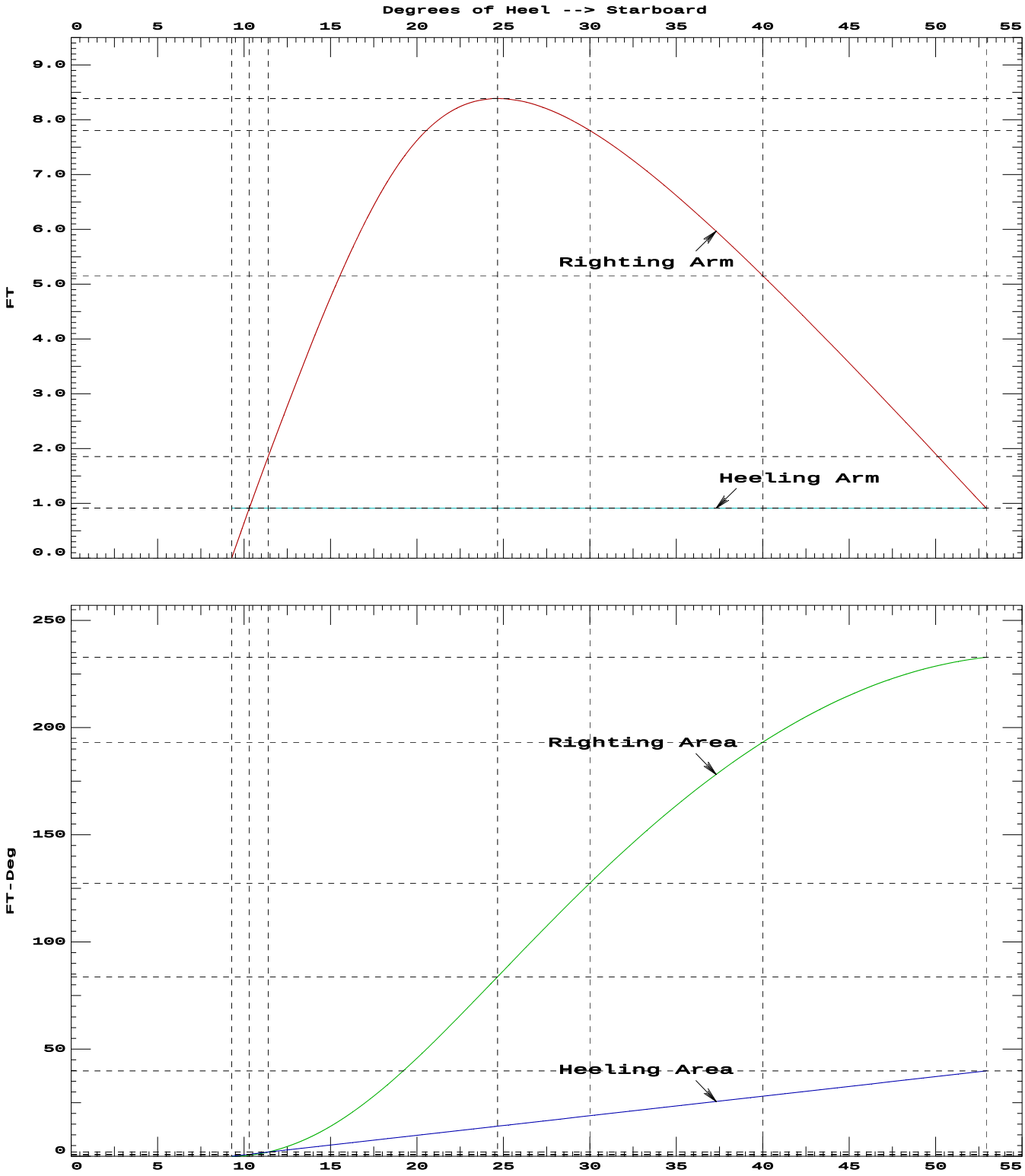
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 685.82

	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**	**10.31 P**
(4)	**Area from Equilibrium to 15 deg or Flood**	**>**	**5.26**	**Ft-deg**	**74.90 P**

Relative angles measured from 10.305s

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 7.10/210.33, Heel: Stbd 9.82 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	492.24	84.19f	0.03p	23.20
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	**702.57**	**89.49f**	**0.21s**	**24.92**

	Load	SpGr	Weight(LT)	LCG	TCG	VCG	FSM
FW.P	0.100	1.000	0.34	135.62f	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	113.30f	21.01p	0.91	15.5
DBF3.S	0.100	0.840	2.08	113.30f	23.93s	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**	**101.93f**	**15.59s**	**8.18**	**88.9***
Total Weight			**720.76**	**89.81f**	**0.60s**	**24.49**	
Free Surface Adjustment						**0.12**	
Adjusted CG				**89.81f**	**0.58s**	**24.61**	

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: 13.757 @ Origin
Trim: Aft 7.10/210.33, Heel: Stbd 9.82 deg.

Part		SpGr	Displ(LT)	LCB	TCB	VCB	RefHt
HULL		1.025	1,122.23	76.67f	10.42s	7.57	-13.55
DB5.S	Flooded	1.025	-33.08	96.37f	22.47s	3.55	-13.55
COMP5.S	Flooded	1.025	-61.55	80.51f	22.77s	10.68	-13.55
DB7.S	Flooded	1.025	-27.10	78.74f	22.47s	3.69	-13.55
ER1.S	Flooded	1.025	-279.72	41.00f	22.57s	9.42	-13.55
Total Displacement		**1.025**	**720.77**	**89.20f**	**3.64s**	**6.92**	

Distances in FEET.

CRITICAL POINT STATUS
Baseline draft: 13.757 @ Origin
Trim: Aft 7.10/210.33, Heel: Stbd 9.82 deg.

	Critical Points		LCP	TCP	VCP	Height
(3)	EN 90 S	FLOOD	213.86f	5.25s	30.90	23.20
(4)	EN 91 S	FLOOD	203.52f	8.13s	38.80	30.14
(5)	ER Air FWD P	FLOOD	43.30f	27.45p	23.45	15.68
(6)	ER Air Aft P	FLOOD	35.42f	27.45p	23.45	15.42
(7)	EN 90 P	FLOOD	213.86f	5.25p	30.90	24.99
(8)	EN 91 P	FLOOD	203.52f	8.13p	38.80	32.92
(9)	Survival Craft S	TIGHT	61.03f	25.67s	44.46	27.92
(10)	MES S	TIGHT	106.30f	29.53s	34.94	19.42

Distances in FEET.

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Angle from Equ0 to Flood or Tflood**	**>**	**0.00**	**deg**	**36.71**	**P**
(2)	**Absolute Angle at Equ0 (no moments)**	**<**	**10.00**	**deg**	**9.82**	**P**
(3)	**Angle from Equ0 to RAzero or Flood**	**>**	**7.00**	**deg**	**43.31**	**P**
(4)	**Flood Height at Point 1 to 8**	**>**	**6.56**	**Ft**	**15.42**	**P**
(5)	**Righting Arm at MaxRA**	**>**	**0.16**	**Ft**	**7.82**	**P**

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

RESIDUAL RIGHTING ARMS vs HEEL ANGLE with FLOODING

Total CG: LCG = 89.80f TCG = 0.60s VCG = 24.49
Free Surface Adjustment: 0.12
Adjusted CG: LCG = 89.81f TCG = 0.58s VCG = 24.61

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Flood Pt Area	Height	
13.546	1.93a	9.82s	720.58	0.00	-0.949	0.00	15.42	(6)
13.652	2.00a	10.35s	720.73	0.00	-0.471	-0.38	15.57	(6)
13.758	2.07a	10.89s	720.72	0.00	0.000	-0.51	15.71	(6)
13.957	2.20a	11.89s	720.59	0.00	0.860	-0.08	15.98	(6)
14.159	2.33a	12.89s	720.55	0.00	1.698	1.20	16.24	(6)
14.364	2.48a	13.89s	720.49	0.00	2.512	3.31	16.49	(6)
14.577	2.63a	14.89s	720.78	0.00	3.291	6.21	16.73	(6)
14.797	2.80a	15.89s	720.77	0.00	4.021	9.87	16.97	(6)
15.027	2.97a	16.89s	720.77	0.00	4.687	14.22	17.18	(6)
15.266	3.16a	17.89s	720.74	0.00	5.275	19.20	17.39	(6)
15.516	3.36a	18.89s	720.74	0.00	5.770	24.72	17.58	(6)
15.774	3.58a	19.89s	720.75	0.00	6.167	30.69	17.77	(6)
16.036	3.80a	20.89s	720.75	0.00	6.468	37.01	17.94	(6)
16.299	4.04a	21.89s	720.75	0.00	6.678	43.59	18.11	(6)
16.559	4.28a	22.89s	720.75	0.00	6.807	50.34	18.27	(6)
16.812	4.52a	23.89s	720.74	0.00	6.864	57.18	18.44	(6)
16.923	4.63a	24.34s	720.77	0.00	**6.869**	60.23	18.51	(6)
17.059	4.77a	24.89s	720.77	0.00	6.860	64.05	18.60	(6)
17.295	5.01a	25.89s	720.74	0.00	6.808	70.88	18.76	(6)
17.521	5.25a	26.89s	720.75	0.00	6.710	77.64	18.91	(6)
17.736	5.50a	27.89s	720.75	0.00	6.576	84.28	19.07	(6)
17.940	5.74a	28.89s	720.75	0.00	6.412	90.78	19.23	(6)
18.132	5.97a	29.89s	720.76	0.00	6.220	97.09	19.38	(6)
18.313	6.21a	30.89s	720.76	0.00	6.006	103.21	19.53	(6)
18.482	6.44a	31.89s	720.76	0.00	5.773	109.10	19.68	(6)
18.640	6.66a	32.89s	720.78	0.00	5.523	114.75	19.83	(6)
18.789	6.89a	33.89s	720.77	0.00	5.259	120.14	19.98	(6)
18.928	7.11a	34.89s	720.77	0.00	4.984	125.26	20.12	(6)
19.060	7.32a	35.89s	720.77	0.00	4.699	130.10	20.26	(6)
19.181	7.54a	36.89s	720.75	0.00	4.406	134.65	20.39	(6)
19.298	7.75a	37.89s	720.79	0.00	4.104	138.91	20.52	(6)
19.407	7.95a	38.89s	720.82	0.00	3.796	142.86	20.64	(6)
19.508	8.16a	39.89s	720.83	0.00	3.482	146.50	20.76	(6)
19.599	8.36a	40.89s	720.85	0.01a	3.164	149.82	20.87	(6)
19.680	8.55a	41.89s	720.84	0.00	2.843	152.82	20.97	(6)
19.754	8.74a	42.89s	720.85	0.01a	2.516	155.50	21.08	(6)
19.814	8.93a	43.89s	720.74	0.00	2.188	157.86	21.18	(6)
19.869	9.11a	44.89s	720.79	0.00	1.855	159.88	21.27	(6)
19.908	9.29a	45.89s	720.51	0.00	1.522	161.57	21.37	(6)
19.936	9.40a	46.53s	720.78	0.00	1.305	162.47	-0.00	(10)
19.947	9.46a	46.89s	720.77	0.00	1.183	162.92	21.45	(6)
19.965	9.63a	47.89s	720.54	0.00	0.845	163.93	21.54	(6)
19.985	9.79a	48.89s	720.83	0.00	0.501	164.61	21.61	(6)
19.978	9.95a	49.89s	720.52	0.01a	0.161	164.94	21.70	(6)

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

19.982	10.02a	50.36s	720.79	0.00	-0.001	164.98	21.73 (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.

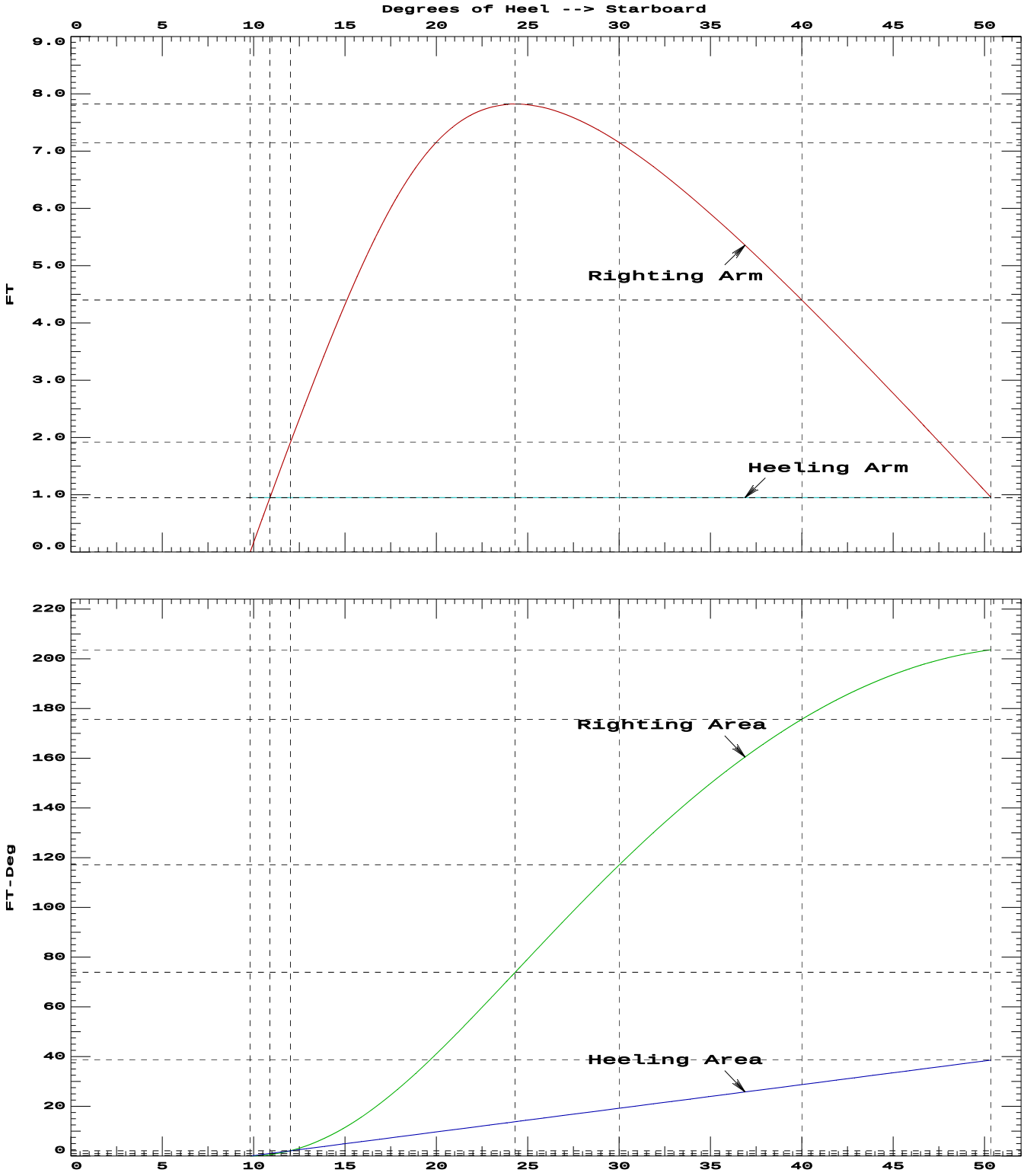
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 685.82

	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**	**10.89 P**
(4)	**Area from Equilibrium to 15 deg or Flood**	**>**	**5.26**	**Ft-deg**	**71.39 P**

Relative angles measured from 10.893s

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 6.67/210.33, Heel: Stbd 8.88 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	492.24	84.19f	0.03p	23.20
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	**690.31**	**88.32f**	**0.21p**	**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			**738.54**	**89.93f**	**0.21p**	**23.53**	
Free Surface Adjustment						**0.12**	
Adjusted CG				**89.93f**	**0.23p**	**23.65**	

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: 13.683 @ Origin

Trim: Aft 6.67/210.33, Heel: Stbd 8.88 deg.

Part		SpGr	Displ(LT)	LCB	TCB	VCB	RefHt
HULL		1.025	1,129.84	77.25f	9.39s	7.42	-13.51
DB5.S	Flooded	1.025	-33.08	96.37f	22.47s	3.55	-13.51
COMP5.S	Flooded	1.025	-59.42	80.51f	22.75s	10.53	-13.51
DB7.S	Flooded	1.025	-27.10	78.74f	22.47s	3.69	-13.51
ER1.S	Flooded	1.025	-271.69	41.06f	22.58s	9.22	-13.51
Total Displacement		**1.025**	**738.54**	**89.39f**	**2.40s**	**6.82**	

Distances in FEET.

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

CRITICAL POINT STATUS
Baseline draft: 13.683 @ Origin
Trim: Aft 6.67/210.33, Heel: Stbd 8.88 deg.

	Critical Points		LCP	TCP	VCP	Height
(3)	EN 90 S	FLOOD	213.86f	5.25s	30.90	22.97
(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	15.25
(6)	ER Air Aft P	FLOOD	35.42f	27.45p	23.45	15.00
(7)	EN 90 P	FLOOD	213.86f	5.25p	30.90	24.59
(8)	EN 91 P	FLOOD	203.52f	8.13p	38.80	32.51
(9)	Survival Craft S	TIGHT	61.03f	25.67s	44.46	28.37
(10)	MES S	TIGHT	106.30f	29.53s	34.94	19.81

Distances in FEET.

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Angle from Equ0 to Flood or Tflood**	**>**	**0.00**	**deg**	**36.95**	**P**
(2)	**Absolute Angle at Equ0 (no moments)**	**<**	**10.00**	**deg**	**8.88**	**P**
(3)	**Angle from Equ0 to RAzero or Flood**	**>**	**7.00**	**deg**	**47.47**	**P**
(4)	**Flood Height at Point 1 to 8**	**>**	**6.56**	**Ft**	**15.00**	**P**
(5)	**Righting Arm at MaxRA**	**>**	**0.16**	**Ft**	**8.72**	**P**

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

RESIDUAL RIGHTING ARMS vs HEEL ANGLE with FLOODING

Total CG: LCG = 89.93f TCG = 0.21p VCG = 23.53
Free Surface Adjustment: 0.12
Adjusted CG: LCG = 89.93f TCG = 0.23p VCG = 23.65

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Flood Pt Area	Height	
13.512	1.82a	8.88s	738.41	0.00	-0.926	0.00	15.00	(6)
13.607	1.87a	9.39s	738.51	0.00	-0.459	-0.36	15.15	(6)
13.703	1.93a	9.90s	738.51	0.00	0.000	-0.47	15.30	(6)
13.894	2.05a	10.90s	738.39	0.00	0.877	-0.03	15.57	(6)
14.089	2.18a	11.90s	738.36	0.00	1.731	1.27	15.84	(6)
14.287	2.32a	12.90s	738.31	0.00	2.564	3.42	16.11	(6)
14.488	2.46a	13.90s	738.26	0.00	3.376	6.39	16.36	(6)
14.699	2.61a	14.90s	738.55	0.00	4.150	10.15	16.60	(6)
14.917	2.78a	15.90s	738.55	0.00	4.876	14.67	16.84	(6)
15.144	2.95a	16.90s	738.55	0.00	5.540	19.88	17.06	(6)
15.383	3.14a	17.90s	738.54	0.00	6.129	25.71	17.26	(6)
15.632	3.34a	18.90s	738.52	0.00	6.629	32.09	17.45	(6)
15.890	3.55a	19.90s	738.52	0.00	7.035	38.92	17.63	(6)
16.154	3.77a	20.90s	738.53	0.00	7.346	46.11	17.81	(6)
16.421	4.00a	21.90s	738.53	0.00	7.568	53.58	17.97	(6)
16.685	4.24a	22.90s	738.53	0.00	7.710	61.22	18.13	(6)
16.944	4.48a	23.90s	738.51	0.00	7.781	68.98	18.28	(6)
17.135	4.67a	24.65s	738.54	0.00	**7.793**	74.82	18.40	(6)
17.197	4.73a	24.90s	738.51	0.00	7.791	76.76	18.44	(6)
17.441	4.97a	25.90s	738.52	0.00	7.750	84.53	18.59	(6)
17.676	5.22a	26.90s	738.52	0.00	7.665	92.24	18.74	(6)
17.900	5.46a	27.90s	738.53	0.00	7.543	99.85	18.89	(6)
18.114	5.70a	28.90s	738.53	0.00	7.389	107.31	19.03	(6)
18.317	5.94a	29.90s	738.53	0.00	7.209	114.61	19.18	(6)
18.510	6.17a	30.90s	738.54	0.00	7.006	121.72	19.32	(6)
18.691	6.41a	31.90s	738.54	0.00	6.782	128.61	19.46	(6)
18.862	6.64a	32.90s	738.55	0.00	6.542	135.28	19.60	(6)
19.022	6.86a	33.90s	738.55	0.00	6.287	141.69	19.73	(6)
19.173	7.08a	34.90s	738.55	0.00	6.019	147.85	19.87	(6)
19.316	7.30a	35.90s	738.55	0.00	5.741	153.73	19.99	(6)
19.450	7.52a	36.90s	738.55	0.00	5.454	159.32	20.12	(6)
19.576	7.73a	37.90s	738.55	0.00	5.160	164.63	20.23	(6)
19.695	7.94a	38.90s	738.57	0.00	4.859	169.64	20.35	(6)
19.808	8.15a	39.90s	738.60	0.00	4.550	174.35	20.45	(6)
19.914	8.35a	40.90s	738.62	0.00	4.237	178.74	20.55	(6)
20.003	8.55a	41.90s	738.35	0.00	3.923	182.82	20.65	(6)
20.098	8.75a	42.90s	738.63	0.00	3.599	186.58	20.74	(6)
20.178	8.94a	43.90s	738.62	0.01a	3.274	190.02	20.82	(6)
20.244	9.13a	44.90s	738.43	0.00	2.949	193.13	20.91	(6)
20.303	9.30a	45.82s	738.54	0.00	2.644	195.70	-0.00	(10)
20.307	9.31a	45.90s	738.54	0.00	2.617	195.91	20.98	(6)
20.360	9.49a	46.90s	738.54	0.00	2.284	198.36	21.05	(6)
20.403	9.66a	47.90s	738.53	0.00	1.949	200.48	21.12	(6)
20.436	9.83a	48.90s	738.55	0.00	1.612	202.26	21.18	(6)

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

20.459	10.00a	49.90s	738.57	0.00	1.273	203.70	21.24 (6)
20.463	10.16a	50.90s	738.29	0.01a	0.935	204.81	21.31 (6)
20.465	10.31a	51.90s	738.37	0.00	0.594	205.57	21.36 (6)
20.455	10.46a	52.90s	738.31	0.00	0.252	205.99	21.41 (6)
20.447	10.56a	53.64s	738.54	0.00	-0.001	206.09	21.44 (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.

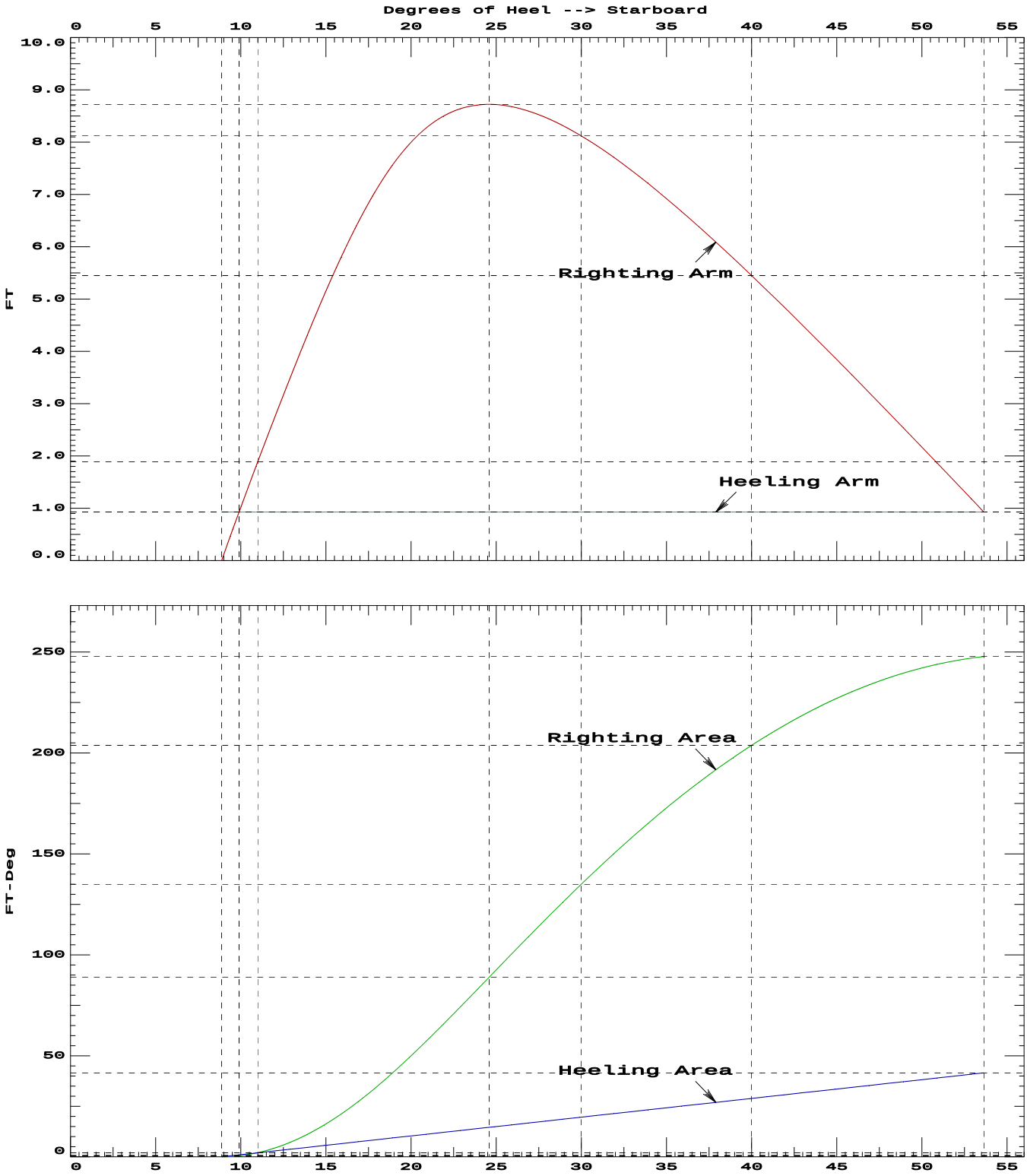
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 685.82

	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**	**9.90 P**
(4)	**Area from Equilibrium to 15 deg or Flood**	**>**	**5.26**	**Ft-deg**	**77.24 P**

Relative angles measured from 9.901s

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 7.41/210.33, Heel: Stbd 9.40 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	492.24	84.19f	0.03p	23.20
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	**689.18**	**88.30f**	**0.21p**	**24.84**

	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	113.26f	21.07p	0.90	15.8
DBF3.S	0.100	0.840	2.08	113.26f	23.88s	0.90	15.7
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			**707.38**	**88.65f**	**0.19s**	**24.41**	
Free Surface Adjustment						**0.13**	
Adjusted CG				**88.65f**	**0.17s**	**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: 13.746 @ Origin

Trim: Aft 7.41/210.33, Heel: Stbd 9.40 deg.

Part		SpGr	Displ(LT)	LCB	TCB	VCB	RefHt
HULL		1.025	1,101.22	75.91f	10.08s	7.44	-13.55
DB5.S	Flooded	1.025	-33.08	96.37f	22.47s	3.55	-13.55
COMP5.S	Flooded	1.025	-59.26	80.49f	22.77s	10.52	-13.55
DB7.S	Flooded	1.025	-27.10	78.74f	22.47s	3.69	-13.55
ER1.S	Flooded	1.025	-274.40	40.97f	22.58s	9.29	-13.55
Total Displacement		**1.025**	**707.38**	**88.02f**	**3.11s**	**6.79**	

Distances in FEET.

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

CRITICAL POINT STATUS
Baseline draft: 13.746 @ Origin
Trim: Aft 7.41/210.33, Heel: Stbd 9.40 deg.

	Critical Points		LCP	TCP	VCP	Height
(3)	EN 90 S	FLOOD	213.86f	5.25s	30.90	23.59
(4)	EN 91 S	FLOOD	203.52f	8.13s	38.80	30.54
(5)	ER Air FWD P	FLOOD	43.30f	27.45p	23.45	15.57
(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	25.30
(8)	EN 91 P	FLOOD	203.52f	8.13p	38.80	33.19
(9)	Survival Craft S	TIGHT	61.03f	25.67s	44.46	28.24
(10)	MES S	TIGHT	106.30f	29.53s	34.94	19.82

Distances in FEET.

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Angle from Equ0 to Flood or Tflood**	**>**	**0.00**	**deg**	**37.75**	**P**
(2)	**Absolute Angle at Equ0 (no moments)**	**<**	**10.00**	**deg**	**9.40**	**P**
(3)	**Angle from Equ0 to RAzero or Flood**	**>**	**7.00**	**deg**	**44.44**	**P**
(4)	**Flood Height at Point 1 to 8**	**>**	**6.56**	**Ft**	**15.29**	**P**
(5)	**Righting Arm at MaxRA**	**>**	**0.16**	**Ft**	**8.14**	**P**

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

RESIDUAL RIGHTING ARMS vs HEEL ANGLE with FLOODING

Total CG: LCG = 88.65f TCG = 0.20s VCG = 24.41
Free Surface Adjustment: 0.13
Adjusted CG: LCG = 88.65f TCG = 0.17s VCG = 24.54

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Flood Pt Area	Height	
13.552	2.02a	9.40s	707.23	0.00	-0.967	0.00	15.29	(6)
13.656	2.08a	9.94s	707.35	0.00	-0.479	-0.39	15.45	(6)
13.760	2.14a	10.48s	707.34	0.00	0.003	-0.52	15.60	(6)
13.956	2.27a	11.48s	707.23	0.00	0.878	-0.08	15.87	(6)
14.156	2.40a	12.48s	707.18	0.00	1.732	1.23	16.13	(6)
14.360	2.54a	13.48s	707.14	0.00	2.560	3.38	16.38	(6)
14.570	2.69a	14.48s	707.38	0.01f	3.356	6.33	16.63	(6)
14.789	2.86a	15.48s	707.39	0.00	4.108	10.07	16.86	(6)
15.016	3.03a	16.48s	707.39	0.00	4.800	14.52	17.09	(6)
15.253	3.22a	17.48s	707.35	0.00	5.415	19.63	17.30	(6)
15.501	3.42a	18.48s	707.36	0.00	5.939	25.30	17.50	(6)
15.757	3.64a	19.48s	707.36	0.00	6.365	31.46	17.69	(6)
16.018	3.86a	20.48s	707.36	0.00	6.693	37.99	17.87	(6)
16.281	4.10a	21.48s	707.36	0.00	6.929	44.80	18.04	(6)
16.541	4.34a	22.48s	707.36	0.00	7.080	51.82	18.21	(6)
16.796	4.58a	23.48s	707.35	0.00	7.159	58.94	18.37	(6)
16.982	4.77a	24.23s	707.38	0.00	**7.175**	64.32	18.50	(6)
17.043	4.83a	24.48s	707.35	0.00	7.173	66.11	18.54	(6)
17.282	5.08a	25.48s	707.35	0.00	7.135	73.27	18.70	(6)
17.511	5.32a	26.48s	707.36	0.00	7.050	80.36	18.86	(6)
17.730	5.57a	27.48s	707.36	0.00	6.927	87.35	19.02	(6)
17.937	5.81a	28.48s	707.37	0.00	6.772	94.20	19.18	(6)
18.133	6.05a	29.48s	707.37	0.00	6.589	100.88	19.33	(6)
18.318	6.29a	30.48s	707.37	0.00	6.382	107.36	19.49	(6)
18.491	6.52a	31.48s	707.37	0.00	6.154	113.63	19.64	(6)
18.653	6.75a	32.48s	707.39	0.00	5.908	119.66	19.79	(6)
18.805	6.98a	33.48s	707.39	0.00	5.647	125.44	19.94	(6)
18.948	7.20a	34.48s	707.39	0.00	5.375	130.95	20.09	(6)
19.082	7.42a	35.48s	707.39	0.00	5.092	136.19	20.23	(6)
19.208	7.64a	36.48s	707.39	0.00	4.800	141.13	20.36	(6)
19.324	7.85a	37.48s	707.38	0.00	4.500	145.78	20.50	(6)
19.436	8.06a	38.48s	707.41	0.00	4.192	150.13	20.62	(6)
19.539	8.27a	39.48s	707.43	0.00	3.879	154.16	20.74	(6)
19.635	8.48a	40.48s	707.45	0.00	3.561	157.88	20.85	(6)
19.721	8.67a	41.48s	707.46	0.01a	3.238	161.28	20.96	(6)
19.793	8.87a	42.48s	707.27	0.00	2.914	164.36	21.07	(6)
19.866	9.06a	43.48s	707.47	0.01a	2.581	167.11	21.17	(6)
19.921	9.24a	44.48s	707.36	0.00	2.249	169.52	21.27	(6)
19.970	9.43a	45.48s	707.36	0.00	1.913	171.60	21.36	(6)
20.013	9.60a	46.48s	707.47	0.01a	1.572	173.35	21.44	(6)
20.029	9.72a	47.15s	707.39	0.00	1.344	174.33	-0.00	(10)
20.037	9.77a	47.48s	707.39	0.00	1.232	174.75	21.53	(6)
20.049	9.94a	48.48s	707.18	0.00	0.891	175.81	21.62	(6)
20.064	10.10a	49.48s	707.45	0.01a	0.544	176.53	21.69	(6)

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

20.059	10.25a	50.48s	707.42	0.00	0.199	176.90	21.77 (6)
20.049	10.34a	51.05s	707.38	0.00	0.000	176.96	21.81 (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.

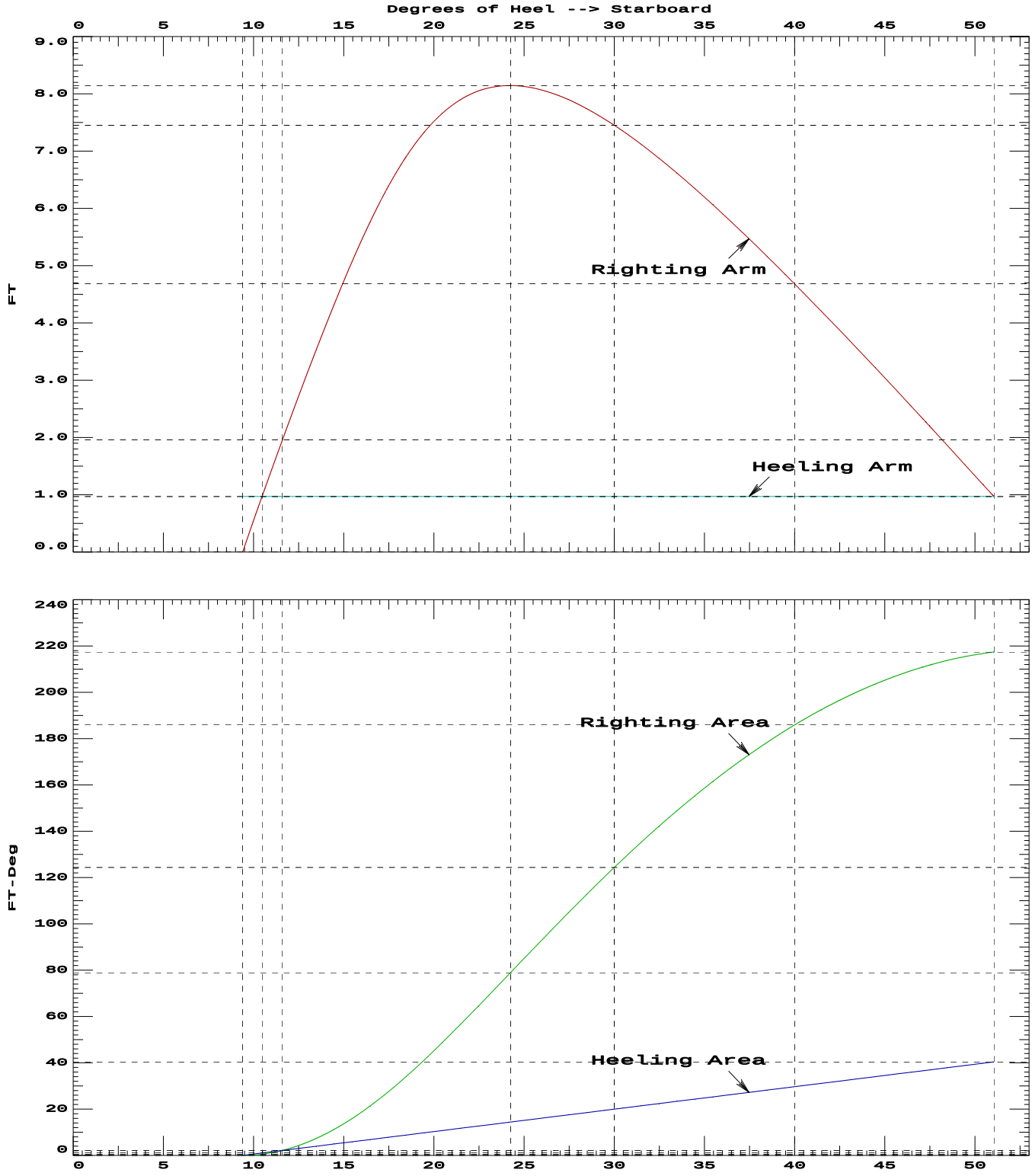
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 685.82

	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**	**10.48 P**
(4)	**Area from Equilibrium to 15 deg or Flood**	**>**	**5.26**	**Ft-deg**	**73.78 P**

Relative angles measured from 10.475s

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 6.84/210.33, Heel: Stbd 8.95 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	492.24	84.19f	0.03p	23.20
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	**653.48**	**87.72f**	**0.23s**	**23.92**

	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	97.79f	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			**701.72**	**89.45f**	**0.20s**	**22.59**	
Free Surface Adjustment						**0.13**	
Adjusted CG				**89.46f**	**0.18s**	**22.71**	

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: 13.419 @ Origin

Trim: Aft 6.84/210.33, Heel: Stbd 8.95 deg.

Part		SpGr	Displ(LT)	LCB	TCB	VCB	RefHt
HULL		1.025	1,084.51	76.74f	9.73s	7.28	-13.25
DB5.S	Flooded	1.025	-33.08	96.37f	22.47s	3.55	-13.25
COMP5.S	Flooded	1.025	-57.10	80.50f	22.77s	10.37	-13.25
DB7.S	Flooded	1.025	-27.10	78.74f	22.47s	3.69	-13.25
ER1.S	Flooded	1.025	-265.51	41.06f	22.61s	9.07	-13.25
Total Displacement		**1.025**	**701.72**	**88.93f**	**2.71s**	**6.66**	

Distances in FEET.

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

CRITICAL POINT STATUS
Baseline draft: 13.419 @ Origin
Trim: Aft 6.84/210.33, Heel: Stbd 8.95 deg.

	Critical Points		LCP	TCP	VCP	Height
(3)	EN 90 S	FLOOD	213.86f	5.25s	30.90	23.39
(4)	EN 91 S	FLOOD	203.52f	8.13s	38.80	30.41
(5)	ER Air FWD P	FLOOD	43.30f	27.45p	23.45	15.58
(6)	ER Air Aft P	FLOOD	35.42f	27.45p	23.45	15.32
(7)	EN 90 P	FLOOD	213.86f	5.25p	30.90	25.02
(8)	EN 91 P	FLOOD	203.52f	8.13p	38.80	32.94
(9)	Survival Craft S	TIGHT	61.03f	25.67s	44.46	28.64
(10)	MES S	TIGHT	106.30f	29.53s	34.94	20.11

Distances in FEET.

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Angle from Equ0 to Flood or Tflood**	**>**	**0.00**	**deg**	**38.39**	**P**
(2)	**Absolute Angle at Equ0 (no moments)**	**<**	**10.00**	**deg**	**8.95**	**P**
(3)	**Angle from Equ0 to RAzero or Flood**	**>**	**7.00**	**deg**	**49.69**	**P**
(4)	**Flood Height at Point 1 to 8**	**>**	**6.56**	**Ft**	**15.32**	**P**
(5)	**Righting Arm at MaxRA**	**>**	**0.16**	**Ft**	**9.21**	**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 = 89.45f TCG = 0.20s VCG = 22.59
Free Surface Adjustment: 0.13
Adjusted CG: LCG = 89.46f TCG = 0.18s VCG = 22.71

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Flood Pt Area	Height	
13.248	1.86a	8.95s	701.60	0.00	-0.975	0.00	15.32	(6)
13.348	1.92a	9.46s	701.69	0.00	-0.485	-0.37	15.47	(6)
13.448	1.98a	9.97s	701.69	0.00	0.000	-0.50	15.61	(6)
13.647	2.10a	10.97s	701.58	0.00	0.933	-0.03	15.88	(6)
13.850	2.24a	11.97s	701.55	0.00	1.842	1.36	16.14	(6)
14.056	2.37a	12.97s	701.50	0.00	2.729	3.65	16.40	(6)
14.264	2.52a	13.97s	701.44	0.00	3.589	6.81	16.65	(6)
14.480	2.68a	14.97s	701.73	0.00	4.410	10.81	16.88	(6)
14.703	2.84a	15.97s	701.73	0.00	5.182	15.60	17.11	(6)
14.935	3.02a	16.97s	701.72	0.00	5.885	21.14	17.33	(6)
15.176	3.22a	17.97s	701.69	0.00	6.503	27.33	17.54	(6)
15.426	3.42a	18.97s	701.70	0.00	7.024	34.09	17.73	(6)
15.682	3.64a	19.97s	701.70	0.00	7.444	41.33	17.92	(6)
15.941	3.87a	20.97s	701.70	0.00	7.765	48.93	18.10	(6)
16.199	4.11a	21.97s	701.70	0.00	7.994	56.82	18.27	(6)
16.451	4.35a	22.97s	701.69	0.00	8.141	64.89	18.44	(6)
16.696	4.59a	23.97s	701.68	0.00	8.218	73.08	18.61	(6)
16.878	4.78a	24.73s	701.71	0.00	**8.234**	79.35	18.74	(6)
16.933	4.83a	24.97s	701.70	0.00	8.234	81.31	18.78	(6)
17.159	5.08a	25.97s	701.70	0.00	8.199	89.52	18.95	(6)
17.373	5.32a	26.97s	701.70	0.00	8.121	97.68	19.12	(6)
17.576	5.56a	27.97s	701.70	0.00	8.007	105.75	19.28	(6)
17.767	5.80a	28.97s	701.71	0.00	7.862	113.68	19.45	(6)
17.945	6.03a	29.97s	701.71	0.00	7.690	121.46	19.62	(6)
18.111	6.26a	30.97s	701.71	0.00	7.495	129.05	19.78	(6)
18.265	6.49a	31.97s	701.71	0.00	7.280	136.44	19.94	(6)
18.410	6.71a	32.97s	701.73	0.00	7.049	143.61	20.10	(6)
18.543	6.93a	33.97s	701.68	0.01f	6.807	150.53	20.26	(6)
18.670	7.15a	34.97s	701.69	0.00	6.551	157.21	20.41	(6)
18.788	7.36a	35.97s	701.69	0.00	6.284	163.63	20.56	(6)
18.899	7.57a	36.97s	701.73	0.00	6.008	169.78	20.70	(6)
19.001	7.78a	37.97s	701.76	0.00	5.725	175.64	20.84	(6)
19.094	7.98a	38.97s	701.75	0.00	5.434	181.22	20.98	(6)
19.177	8.18a	39.97s	701.76	0.00	5.138	186.51	21.10	(6)
19.251	8.37a	40.97s	701.76	0.00	4.836	191.50	21.23	(6)
19.316	8.56a	41.97s	701.77	0.00	4.529	196.18	21.35	(6)
19.363	8.75a	42.97s	701.44	0.00	4.220	200.55	21.48	(6)
19.415	8.93a	43.97s	701.79	0.00	3.901	204.61	21.58	(6)
19.449	9.11a	44.97s	701.77	0.01a	3.581	208.36	21.69	(6)
19.471	9.28a	45.97s	701.77	0.01a	3.258	211.78	21.80	(6)
19.482	9.44a	46.97s	701.77	0.01a	2.932	214.87	21.91	(6)
19.482	9.50a	47.34s	701.74	0.00	2.810	215.94	-0.00	(10)
19.482	9.60a	47.97s	701.74	0.01a	2.603	217.64	22.01	(6)
19.464	9.75a	48.97s	701.47	0.01a	2.275	220.08	22.12	(6)

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

19.446	9.90a	49.97s	701.53	0.01a	1.942	222.19	22.21 (6)
19.417	10.05a	50.97s	701.53	0.01a	1.608	223.96	22.30 (6)
19.377	10.19a	51.97s	701.52	0.01a	1.273	225.40	22.39 (6)
19.328	10.32a	52.97s	701.50	0.01a	0.937	226.51	22.47 (6)
19.271	10.45a	53.97s	701.49	0.01a	0.600	227.28	22.55 (6)
19.204	10.57a	54.97s	701.50	0.01a	0.263	227.71	22.62 (6)
19.152	10.67a	55.75s	701.71	0.00	0.000	227.81	22.67 (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.

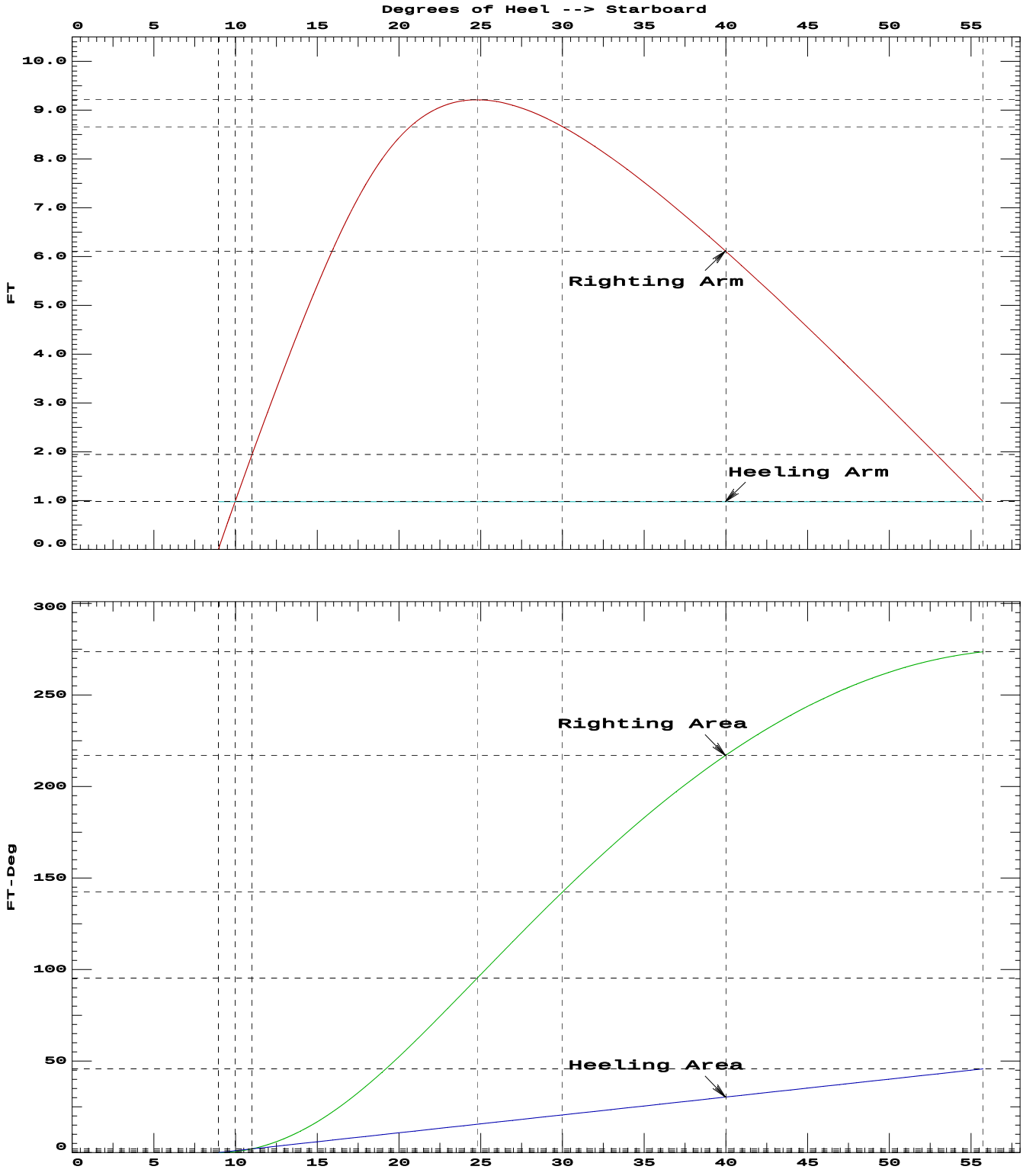
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 685.82

	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**	**9.97 P**
(4)	**Area from Equilibrium to 15 deg or Flood**	**>**	**5.26**	**Ft-deg**	**81.80 P**

Relative angles measured from 9.967s

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 7.61/210.33, Heel: Stbd 9.46 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	492.24	84.19f	0.03p	23.20
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	**652.36**	**87.69f**	**0.23s**	**23.90**

	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	113.23f	21.06p	0.91	15.7
DBF3.S	0.100	0.840	2.08	113.23f	23.89s	0.91	15.7
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**	**101.91f**	**15.58s**	**8.17**	**88.9***
Total Weight			**670.55**	**88.08f**	**0.65s**	**23.47**	
Free Surface Adjustment						**0.13**	
Adjusted CG				**88.09f**	**0.63s**	**23.60**	

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: 13.490 @ Origin

Trim: Aft 7.61/210.33, Heel: Stbd 9.46 deg.

Part		SpGr	Displ(LT)	LCB	TCB	VCB	RefHt
HULL		1.025	1,055.78	75.33f	10.45s	7.30	-13.30
DB5.S	Flooded	1.025	-33.08	96.37f	22.47s	3.55	-13.30
COMP5.S	Flooded	1.025	-56.88	80.48f	22.80s	10.36	-13.30
DB7.S	Flooded	1.025	-27.10	78.74f	22.47s	3.69	-13.30
ER1.S	Flooded	1.025	-268.17	40.96f	22.61s	9.14	-13.30
Total Displacement		**1.025**	**670.55**	**87.46f**	**3.45s**	**6.64**	

Distances in FEET.

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

CRITICAL POINT STATUS
Baseline draft: 13.490 @ Origin
Trim: Aft 7.61/210.33, Heel: Stbd 9.46 deg.

	Critical Points		LCP	TCP	VCP	Height
(3)	EN 90 S	FLOOD	213.86f	5.25s	30.90	24.04
(4)	EN 91 S	FLOOD	203.52f	8.13s	38.80	30.98
(5)	ER Air FWD P	FLOOD	43.30f	27.45p	23.45	15.89
(6)	ER Air Aft P	FLOOD	35.42f	27.45p	23.45	15.61
(7)	EN 90 P	FLOOD	213.86f	5.25p	30.90	25.76
(8)	EN 91 P	FLOOD	203.52f	8.13p	38.80	33.65
(9)	Survival Craft S	TIGHT	61.03f	25.67s	44.46	28.52
(10)	MES S	TIGHT	106.30f	29.53s	34.94	20.14

Distances in FEET.

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Angle from Equ0 to Flood or Tflood**	**>**	**0.00**	**deg**	**39.31**	**P**
(2)	**Absolute Angle at Equ0 (no moments)**	**<**	**10.00**	**deg**	**9.46**	**P**
(3)	**Angle from Equ0 to RAzero or Flood**	**>**	**7.00**	**deg**	**46.49**	**P**
(4)	**Flood Height at Point 1 to 8**	**>**	**6.56**	**Ft**	**15.61**	**P**
(5)	**Righting Arm at MaxRA**	**>**	**0.16**	**Ft**	**8.58**	**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 = 88.08f TCG = 0.65s VCG = 23.47
Free Surface Adjustment: 0.13
Adjusted CG: LCG = 88.09f TCG = 0.62s VCG = 23.60

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Flood Pt Area	Height	
13.297	2.07a	9.46s	670.42	0.00	-1.020	0.00	15.61	(6)
13.403	2.14a	9.99s	670.52	0.00	-0.507	-0.41	15.76	(6)
13.509	2.20a	10.53s	670.52	0.00	0.000	-0.54	15.90	(6)
13.713	2.33a	11.53s	670.40	0.00	0.936	-0.07	16.16	(6)
13.921	2.46a	12.53s	670.36	0.00	1.844	1.32	16.42	(6)
14.132	2.61a	13.53s	670.30	0.00	2.724	3.61	16.67	(6)
14.350	2.76a	14.53s	670.56	0.00	3.563	6.75	16.91	(6)
14.574	2.93a	15.53s	670.57	0.00	4.358	10.71	17.14	(6)
14.807	3.11a	16.53s	670.56	0.00	5.085	15.43	17.36	(6)
15.048	3.31a	17.53s	670.53	0.00	5.728	20.84	17.57	(6)
15.297	3.51a	18.53s	670.53	0.00	6.272	26.84	17.77	(6)
15.551	3.74a	19.53s	670.54	0.00	6.711	33.33	17.97	(6)
15.807	3.97a	20.53s	670.54	0.00	7.048	40.21	18.15	(6)
16.060	4.20a	21.53s	670.54	0.00	7.291	47.39	18.34	(6)
16.309	4.45a	22.53s	670.54	0.00	7.449	54.77	18.52	(6)
16.549	4.69a	23.53s	670.52	0.00	7.534	62.26	18.70	(6)
16.724	4.88a	24.28s	670.55	0.00	**7.555**	67.92	18.83	(6)
16.780	4.94a	24.53s	670.52	0.00	**7.556**	69.81	18.88	(6)
17.001	5.19a	25.53s	670.53	0.00	7.525	77.35	19.06	(6)
17.209	5.43a	26.53s	670.54	0.00	7.448	84.84	19.24	(6)
17.406	5.68a	27.53s	670.54	0.00	7.334	92.23	19.41	(6)
17.590	5.92a	28.53s	670.54	0.00	7.188	99.49	19.59	(6)
17.760	6.15a	29.53s	670.54	0.00	7.014	106.59	19.77	(6)
17.919	6.38a	30.53s	670.55	0.00	6.816	113.51	19.95	(6)
18.065	6.61a	31.53s	670.55	0.00	6.597	120.21	20.13	(6)
18.200	6.83a	32.53s	670.50	0.00	6.364	126.69	20.30	(6)
18.327	7.05a	33.53s	670.51	0.00	6.116	132.94	20.47	(6)
18.445	7.27a	34.53s	670.52	0.00	5.855	138.92	20.64	(6)
18.555	7.48a	35.53s	670.54	0.00	5.584	144.64	20.80	(6)
18.655	7.69a	36.53s	670.56	0.00	5.304	150.09	20.95	(6)
18.746	7.90a	37.53s	670.56	0.00	5.016	155.25	21.11	(6)
18.828	8.10a	38.53s	670.57	0.00	4.721	160.12	21.25	(6)
18.900	8.30a	39.53s	670.58	0.01a	4.419	164.68	21.40	(6)
18.958	8.49a	40.53s	670.52	0.00	4.113	168.95	21.54	(6)
19.012	8.68a	41.53s	670.61	0.00	3.799	172.91	21.68	(6)
19.042	8.86a	42.53s	670.25	0.01a	3.485	176.55	21.82	(6)
19.077	9.04a	43.53s	670.59	0.00	3.161	179.87	21.95	(6)
19.094	9.21a	44.53s	670.58	0.01a	2.835	182.87	22.08	(6)
19.098	9.38a	45.53s	670.58	0.01a	2.506	185.54	22.21	(6)
19.091	9.54a	46.53s	670.58	0.01a	2.174	187.88	22.33	(6)
19.073	9.69a	47.53s	670.58	0.00	1.840	189.89	22.46	(6)
19.046	9.84a	48.53s	670.58	0.00	1.504	191.56	22.57	(6)
19.037	9.87a	48.77s	670.56	0.00	1.422	191.92	0.00	(10)
19.007	9.98a	49.53s	670.56	0.00	1.167	192.90	22.69	(6)

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

18.959	10.12a	50.53s	670.57	0.00	0.828	193.89	22.80 (6)
18.902	10.25a	51.53s	670.55	0.00	0.488	194.55	22.91 (6)
18.835	10.38a	52.53s	670.54	0.00	0.148	194.87	23.01 (6)
18.804	10.44a	52.96s	670.55	0.00	0.000	194.90	23.05 (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.

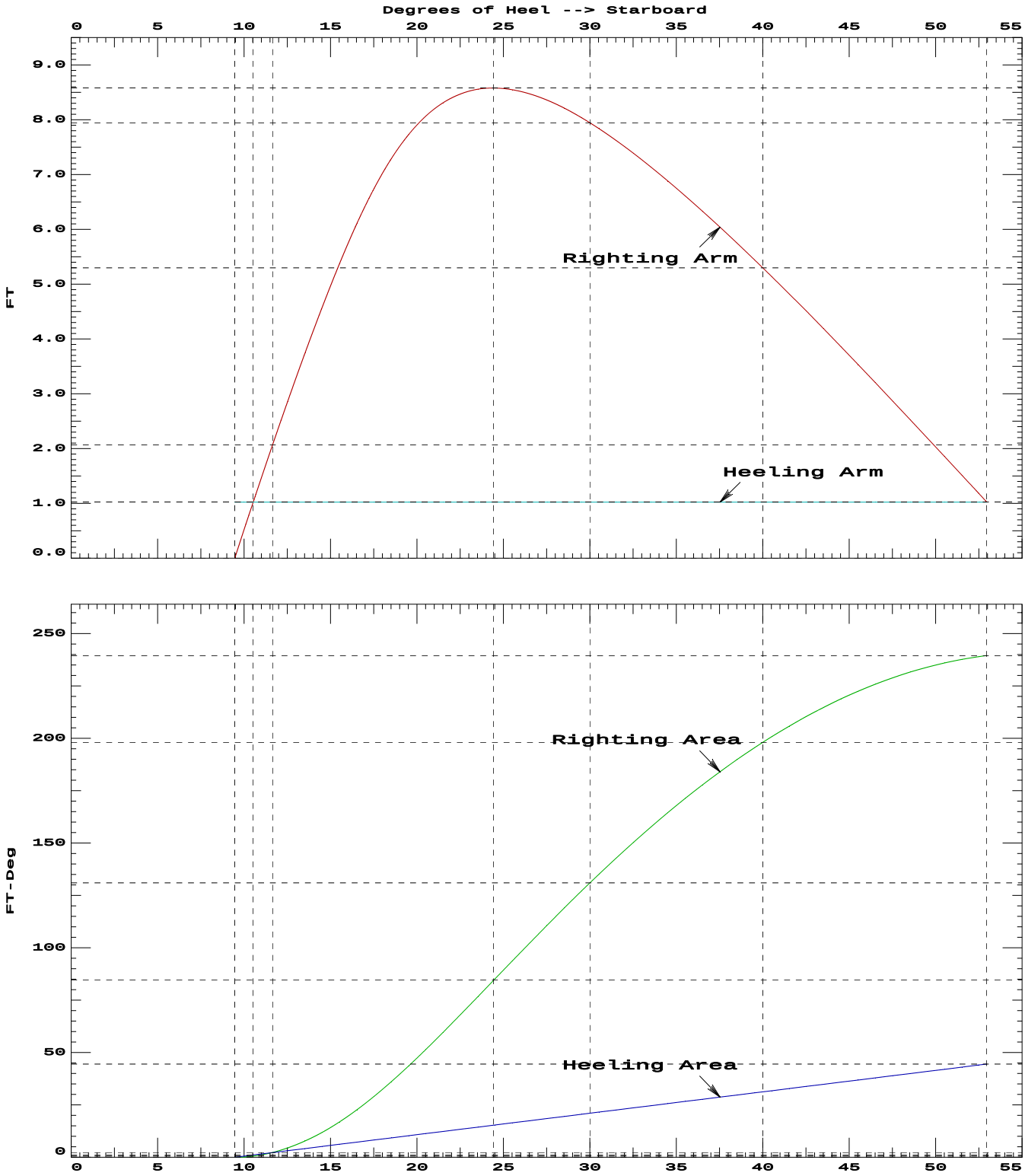
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 685.82

	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**	**10.53 P**
(4)	**Area from Equilibrium to 15 deg or Flood**	**>**	**5.26**	**Ft-deg**	**77.89 P**

Relative angles measured from 10.526s

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 7.17/210.33, Heel: Stbd 8.54 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	492.24	84.19f	0.03p	23.20
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	**640.10**	**86.39f**	**0.23p**	**23.82**

	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	97.77f	21.37s	7.99	7.0
DBF4.P	0.980	0.840	20.42	114.07f	22.40p	3.50	3.2
DBF3.S	0.980	0.840	20.42	114.07f	22.55s	3.50	3.2
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			**688.33**	**88.26f**	**0.23p**	**22.47**	
Free Surface Adjustment						**0.13**	
Adjusted CG				**88.26f**	**0.25p**	**22.59**	

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: 13.414 @ Origin

Trim: Aft 7.17/210.33, Heel: Stbd 8.54 deg.

Part		SpGr	Displ(LT)	LCB	TCB	VCB	RefHt
HULL		1.025	1,063.74	75.95f	9.38s	7.15	-13.26
DB5.S	Flooded	1.025	-33.08	96.37f	22.47s	3.55	-13.26
COMP5.S	Flooded	1.025	-54.85	80.49f	22.77s	10.21	-13.26
DB7.S	Flooded	1.025	-27.10	78.74f	22.47s	3.69	-13.26
ER1.S	Flooded	1.025	-260.38	41.03f	22.61s	8.95	-13.26
Total Displacement		**1.025**	**688.33**	**87.71f**	**2.16s**	**6.54**	

Distances in FEET.

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

CRITICAL POINT STATUS
Baseline draft: 13.414 @ Origin
Trim: Aft 7.17/210.33, Heel: Stbd 8.54 deg.

	Critical Points		LCP	TCP	VCP	Height
(3)	EN 90 S	FLOOD	213.86f	5.25s	30.90	23.79
(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	15.47
(6)	ER Air Aft P	FLOOD	35.42f	27.45p	23.45	15.20
(7)	EN 90 P	FLOOD	213.86f	5.25p	30.90	25.35
(8)	EN 91 P	FLOOD	203.52f	8.13p	38.80	33.23
(9)	Survival Craft S	TIGHT	61.03f	25.67s	44.46	28.96
(10)	MES S	TIGHT	106.30f	29.53s	34.94	20.52

Distances in FEET.

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Angle from Equ0 to Flood or Tflood**	**>**	**0.00**	**deg**	**39.43**	**P**
(2)	**Absolute Angle at Equ0 (no moments)**	**<**	**10.00**	**deg**	**8.54**	**P**
(3)	**Angle from Equ0 to RAzero or Flood**	**>**	**7.00**	**deg**	**50.91**	**P**
(4)	**Flood Height at Point 1 to 8**	**>**	**6.56**	**Ft**	**15.20**	**P**
(5)	**Righting Arm at MaxRA**	**>**	**0.16**	**Ft**	**9.56**	**P**

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

RESIDUAL RIGHTING ARMS vs HEEL ANGLE with FLOODING

Total CG: LCG = 88.26f TCG = 0.23p VCG = 22.47
Free Surface Adjustment: 0.13
Adjusted CG: LCG = 88.26f TCG = 0.25p VCG = 22.59

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Flood Pt Area	Height	
13.257	1.95a	8.54s	688.23	0.00	-0.994	0.00	15.20	(6)
13.359	2.01a	9.05s	688.31	0.00	-0.497	-0.38	15.34	(6)
13.457	2.07a	9.56s	688.30	0.00	0.000	-0.51	15.49	(6)
13.652	2.19a	10.56s	688.21	0.00	0.952	-0.03	15.76	(6)
13.852	2.31a	11.56s	688.18	0.00	1.879	1.39	16.03	(6)
14.055	2.45a	12.56s	688.13	0.00	2.782	3.72	16.29	(6)
14.263	2.59a	13.56s	688.09	0.00	3.656	6.93	16.54	(6)
14.477	2.74a	14.56s	688.34	0.01f	4.495	11.01	16.78	(6)
14.698	2.91a	15.56s	688.34	0.00	5.288	15.90	17.01	(6)
14.928	3.09a	16.56s	688.34	0.00	6.016	21.55	17.24	(6)
15.167	3.28a	17.56s	688.31	0.00	6.662	27.89	17.45	(6)
15.416	3.48a	18.56s	688.31	0.00	7.212	34.83	17.65	(6)
15.671	3.70a	19.56s	688.31	0.00	7.660	42.26	17.84	(6)
15.929	3.93a	20.56s	688.32	0.00	8.008	50.10	18.02	(6)
16.186	4.17a	21.56s	688.32	0.00	8.262	58.24	18.20	(6)
16.440	4.41a	22.56s	688.31	0.00	8.432	66.60	18.38	(6)
16.686	4.66a	23.56s	688.29	0.00	8.530	75.08	18.55	(6)
16.925	4.90a	24.56s	688.30	0.00	8.563	83.63	18.72	(6)
17.154	5.15a	25.56s	688.31	0.00	8.544	92.18	18.89	(6)
17.371	5.40a	26.56s	688.31	0.00	8.480	100.70	19.06	(6)
17.578	5.64a	27.56s	688.31	0.00	8.377	109.12	19.23	(6)
17.772	5.88a	28.56s	688.32	0.00	8.242	117.43	19.40	(6)
17.955	6.12a	29.56s	688.32	0.00	8.078	125.59	19.57	(6)
18.125	6.35a	30.56s	688.32	0.00	7.891	133.58	19.73	(6)
18.283	6.58a	31.56s	688.32	0.00	7.682	141.36	19.90	(6)
18.431	6.81a	32.56s	688.34	0.00	7.456	148.93	20.06	(6)
18.569	7.03a	33.56s	688.34	0.00	7.215	156.27	20.22	(6)
18.699	7.25a	34.56s	688.34	0.00	6.963	163.36	20.38	(6)
18.818	7.47a	35.56s	688.31	0.00	6.700	170.19	20.53	(6)
18.932	7.68a	36.56s	688.33	0.00	6.426	176.76	20.67	(6)
19.037	7.89a	37.56s	688.35	0.00	6.144	183.04	20.81	(6)
19.132	8.10a	38.56s	688.35	0.00	5.856	189.04	20.95	(6)
19.221	8.30a	39.56s	688.36	0.00	5.560	194.75	21.08	(6)
19.299	8.50a	40.56s	688.37	0.00	5.258	200.16	21.21	(6)
19.369	8.69a	41.56s	688.38	0.01a	4.951	205.26	21.33	(6)
19.424	8.88a	42.56s	688.30	0.00	4.641	210.06	21.45	(6)
19.478	9.07a	43.56s	688.41	0.01a	4.323	214.54	21.56	(6)
19.507	9.24a	44.56s	688.05	0.01a	4.006	218.71	21.69	(6)
19.543	9.42a	45.56s	688.41	0.00	3.680	222.55	21.79	(6)
19.550	9.59a	46.56s	688.07	0.01a	3.355	226.07	21.90	(6)
19.564	9.75a	47.56s	688.38	0.00	3.023	229.26	22.00	(6)
19.562	9.82a	47.97s	688.34	0.00	2.889	230.46	-0.00	(10)
19.559	9.91a	48.56s	688.35	0.00	2.691	232.12	22.10	(6)
19.537	10.06a	49.56s	688.08	0.01a	2.359	234.64	22.20	(6)

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

19.514	10.21a	50.56s	688.17	0.00	2.023	236.83	22.29 (6)
19.480	10.35a	51.56s	688.16	0.01a	1.685	238.69	22.38 (6)
19.436	10.49a	52.56s	688.16	0.01a	1.347	240.20	22.46 (6)
19.383	10.62a	53.56s	688.16	0.01a	1.007	241.38	22.54 (6)
19.320	10.75a	54.56s	688.14	0.01a	0.667	242.22	22.62 (6)
19.258	10.87a	55.56s	688.35	0.00	0.326	242.71	22.68 (6)
19.181	10.98a	56.52s	688.33	0.00	0.000	242.87	22.74 (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.

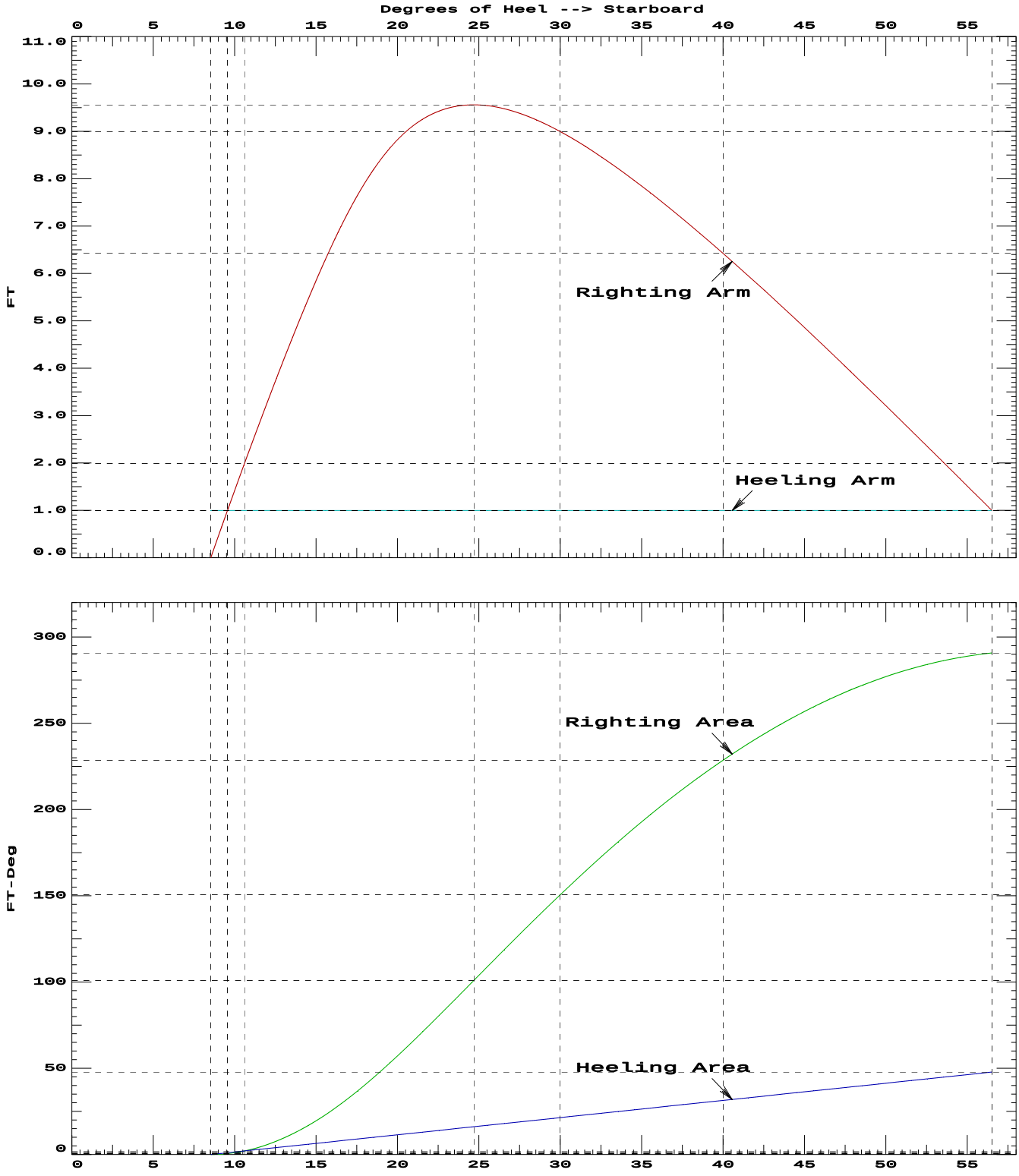
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 685.82

	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**	**9.56 P**
(4)	**Area from Equilibrium to 15 deg or Flood**	**>**	**5.26**	**Ft-deg**	**84.14 P**

Relative angles measured from 9.560s

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 7.97/210.33, Heel: Stbd 9.04 deg.

Part	Weight(LT)	LCG	TCG	VCG
LIGHT SHIP	492.24	84.19f	0.03p	23.20
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	**638.97**	**86.37f**	**0.23p**	**23.79**

	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	113.18f	21.11p	0.90	16.0
DBF3.S	0.100	0.840	2.08	113.18f	23.83s	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**	**101.90f**	**15.57s**	**8.17**	**88.9***
Total Weight			**657.17**	**86.80f**	**0.21s**	**23.36**	
Free Surface Adjustment						**0.14**	
Adjusted CG				**86.80f**	**0.19s**	**23.49**	

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: 13.490 @ Origin

Trim: Aft 7.97/210.33, Heel: Stbd 9.04 deg.

Part		SpGr	Displ(LT)	LCB	TCB	VCB	RefHt
HULL		1.025	1,034.88	74.49f	10.09s	7.17	-13.31
DB5.S	Flooded	1.025	-33.08	96.37f	22.47s	3.55	-13.31
COMP5.S	Flooded	1.025	-54.58	80.47f	22.80s	10.20	-13.31
DB7.S	Flooded	1.025	-27.10	78.74f	22.47s	3.69	-13.31
ER1.S	Flooded	1.025	-262.95	40.93f	22.62s	9.01	-13.31
Total Displacement		**1.025**	**657.16**	**86.15f**	**2.89s**	**6.51**	

Distances in FEET.

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

CRITICAL POINT STATUS
Baseline draft: 13.490 @ Origin
Trim: Aft 7.97/210.33, Heel: Stbd 9.04 deg.

	Critical Points		LCP	TCP	VCP	Height
(3)	EN 90 S	FLOOD	213.86f	5.25s	30.90	24.45
(4)	EN 91 S	FLOOD	203.52f	8.13s	38.80	31.41
(5)	ER Air FWD P	FLOOD	43.30f	27.45p	23.45	15.78
(6)	ER Air Aft P	FLOOD	35.42f	27.45p	23.45	15.48
(7)	EN 90 P	FLOOD	213.86f	5.25p	30.90	26.10
(8)	EN 91 P	FLOOD	203.52f	8.13p	38.80	33.96
(9)	Survival Craft S	TIGHT	61.03f	25.67s	44.46	28.84
(10)	MES S	TIGHT	106.30f	29.53s	34.94	20.56

Distances in FEET.

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Angle from Equ0 to Flood or Tflood**	**>**	**0.00**	**deg**	**40.38**	**P**
(2)	**Absolute Angle at Equ0 (no moments)**	**<**	**10.00**	**deg**	**9.04**	**P**
(3)	**Angle from Equ0 to RAzero or Flood**	**>**	**7.00**	**deg**	**47.71**	**P**
(4)	**Flood Height at Point 1 to 8**	**>**	**6.56**	**Ft**	**15.48**	**P**
(5)	**Righting Arm at MaxRA**	**>**	**0.16**	**Ft**	**8.91**	**P**

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

RESIDUAL RIGHTING ARMS vs HEEL ANGLE with FLOODING

Total CG: LCG = 86.80f TCG = 0.21s VCG = 23.36
Free Surface Adjustment: 0.14
Adjusted CG: LCG = 86.80f TCG = 0.19s VCG = 23.49

Origin Depth	Degrees of Trim	Heel	Displacement Weight(LT)	Residual Arms in Trim	in Heel	Flood Pt Area	Height	
13.312	2.17a	9.04s	657.07	0.00	-1.042	0.00	15.48	(6)
13.415	2.23a	9.57s	657.14	0.00	-0.519	-0.41	15.63	(6)
13.519	2.29a	10.10s	657.14	0.00	-0.002	-0.55	15.77	(6)
13.719	2.41a	11.10s	657.03	0.00	0.953	-0.07	16.04	(6)
13.924	2.55a	12.10s	656.99	0.00	1.879	1.35	16.30	(6)
14.134	2.69a	13.10s	656.94	0.00	2.774	3.67	16.56	(6)
14.348	2.84a	14.10s	656.87	0.00	3.634	6.88	16.80	(6)
14.573	3.00a	15.10s	657.19	0.00	4.441	10.91	17.03	(6)
14.804	3.18a	16.10s	657.18	0.00	5.191	15.73	17.26	(6)
15.043	3.37a	17.10s	657.14	0.00	5.860	21.26	17.47	(6)
15.291	3.58a	18.10s	657.15	0.00	6.432	27.40	17.68	(6)
15.543	3.80a	19.10s	657.15	0.00	6.901	34.07	17.88	(6)
15.798	4.03a	20.10s	657.15	0.00	7.267	41.15	18.07	(6)
16.052	4.27a	21.10s	657.15	0.00	7.537	48.56	18.26	(6)
16.302	4.52a	22.10s	657.15	0.00	7.720	56.20	18.44	(6)
16.544	4.77a	23.10s	657.13	0.00	7.827	63.98	18.63	(6)
16.778	5.02a	24.10s	657.13	0.00	7.869	71.83	18.81	(6)
16.805	5.04a	24.21s	657.16	0.00	**7.869**	72.73	18.83	(6)
17.002	5.27a	25.10s	657.14	0.00	7.854	79.69	18.99	(6)
17.214	5.51a	26.10s	657.15	0.00	7.793	87.51	19.17	(6)
17.415	5.76a	27.10s	657.15	0.00	7.692	95.25	19.35	(6)
17.603	6.00a	28.10s	657.15	0.00	7.557	102.88	19.53	(6)
17.779	6.24a	29.10s	657.16	0.00	7.393	110.35	19.71	(6)
17.942	6.48a	30.10s	657.16	0.00	7.203	117.65	19.89	(6)
18.093	6.71a	31.10s	657.16	0.00	6.991	124.75	20.07	(6)
18.234	6.94a	32.10s	657.18	0.00	6.762	131.63	20.24	(6)
18.362	7.16a	33.10s	657.11	0.00	6.520	138.27	20.42	(6)
18.483	7.38a	34.10s	657.10	0.00	6.264	144.66	20.59	(6)
18.596	7.60a	35.10s	657.12	0.00	5.996	150.79	20.75	(6)
18.701	7.81a	36.10s	657.14	0.00	5.718	156.65	20.91	(6)
18.797	8.02a	37.10s	657.17	0.00	5.432	162.23	21.06	(6)
18.884	8.23a	38.10s	657.18	0.00	5.138	167.51	21.21	(6)
18.960	8.43a	39.10s	657.18	0.00	4.838	172.50	21.36	(6)
19.027	8.63a	40.10s	657.19	0.01a	4.532	177.18	21.50	(6)
19.080	8.82a	41.10s	657.13	0.00	4.221	181.56	21.64	(6)
19.129	9.00a	42.10s	657.23	0.00	3.903	185.62	21.78	(6)
19.154	9.18a	43.10s	656.89	0.01a	3.585	189.37	21.92	(6)
19.184	9.36a	44.10s	657.20	0.00	3.257	192.79	22.04	(6)
19.195	9.53a	45.10s	657.19	0.01a	2.927	195.88	22.17	(6)
19.186	9.69a	46.10s	656.89	0.01a	2.597	198.64	22.30	(6)
19.181	9.85a	47.10s	657.19	0.00	2.261	201.07	22.42	(6)
19.162	10.01a	48.10s	657.19	0.00	1.923	203.16	22.54	(6)
19.129	10.15a	49.10s	657.18	0.00	1.584	204.92	22.65	(6)
19.115	10.20a	49.43s	657.17	0.00	1.473	205.42	0.00	(10)

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

19.086	10.30a	50.10s	657.18	0.00	1.243	206.33	22.76 (6)
19.035	10.43a	51.10s	657.17	0.00	0.901	207.40	22.87 (6)
18.974	10.57a	52.10s	657.16	0.00	0.558	208.13	22.97 (6)
18.905	10.69a	53.10s	657.16	0.00	0.214	208.52	23.07 (6)
18.858	10.77a	53.72s	657.17	0.00	0.000	208.58	23.13 (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.

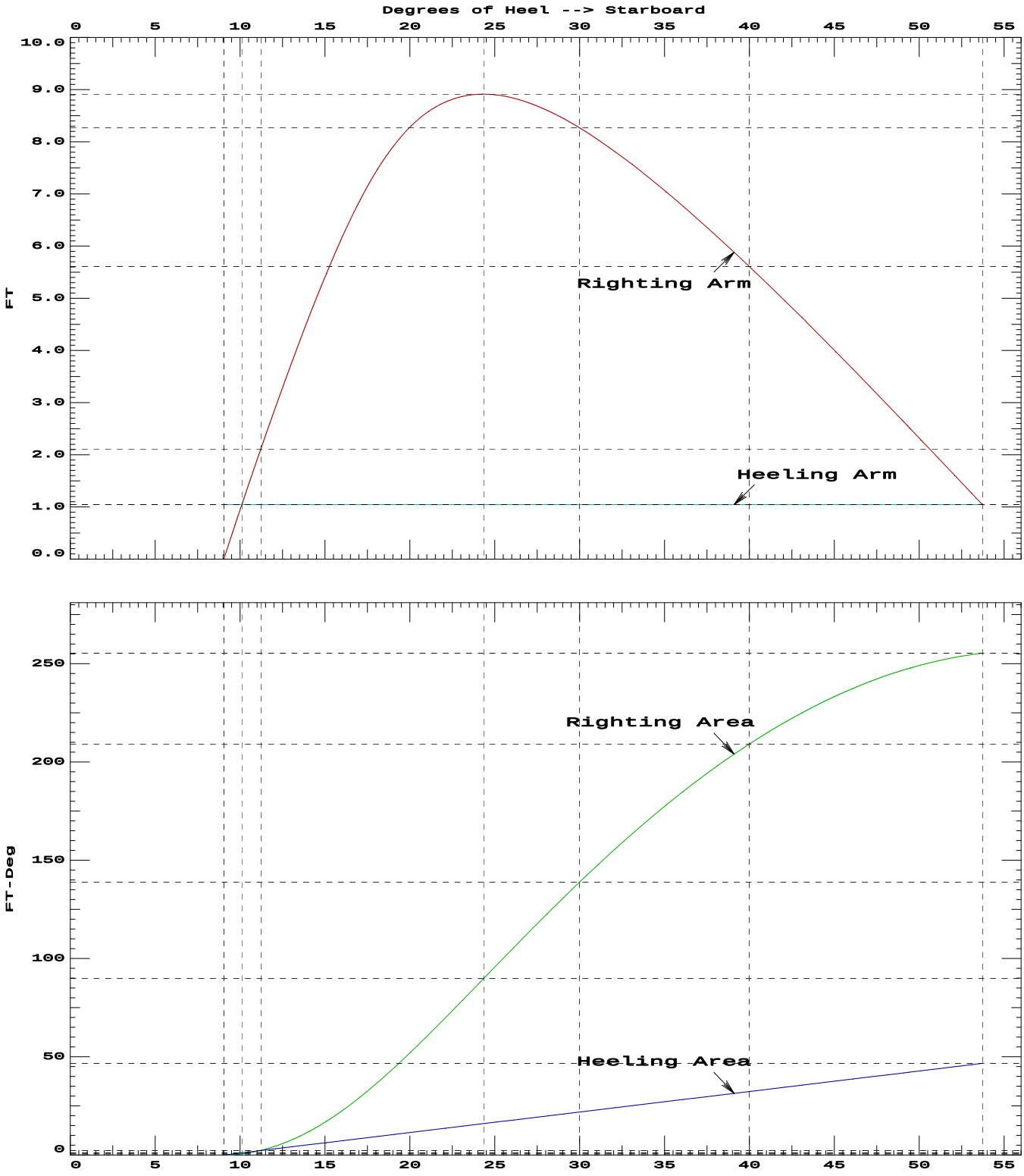
Note: The Residual Righting Arms shown above are in excess of the overturning arms derived from these moments (in Ft-LT):
Stbd heeling moment = 685.82

	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**	**10.10 P**
(4)	**Area from Equilibrium to 15 deg or Flood**	**>**	**5.26**	**Ft-deg**	**80.24 P**

Relative angles measured from 10.100s

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



Condition 14 - 10% Lightship
Damage Case 16

WEIGHT STATUS

Trim: Aft 7.72/210.33, Heel: Stbd 7.55 deg.

Part	Load	SpGr	Weight(LT)	LCG	TCG	VCG	FSM
LIGHT SHIP			492.24	84.19f	0.03p	23.20	
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			**494.21**	**84.21f**	**0.01p**	**23.25**	
FW.P	0.100	1.000	0.34	135.60f	20.96p	8.21	0.7
BW.S	0.200	1.025	2.77	97.75f	21.32s	7.99	7.0
DBF4.P	0.100	0.840	2.08	113.21f	21.32p	0.87	16.9
DBF3.S	0.100	0.840	2.08	113.21f	23.63s	0.87	16.9
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**	**107.36f**	**7.65s**	**4.07**	**88.9***
Total Weight			**501.61**	**84.56f**	**0.10s**	**22.97**	
Free Surface Adjustment						**0.18**	
Adjusted CG				**84.56f**	**0.08s**	**23.15**	

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: 11.676 @ Origin

Trim: Aft 7.72/210.33, Heel: Stbd 7.55 deg.

Part		SpGr	Displ(LT)	LCB	TCB	VCB	RefHt
HULL		1.025	813.01	72.82f	10.17s	6.13	-11.57
DB5.S	Flooded	1.025	-33.08	96.37f	22.47s	3.55	-11.57
COMP5.S	Flooded	1.025	-37.75	80.40f	22.85s	9.01	-11.57
DB7.S	Flooded	1.025	-27.10	78.74f	22.47s	3.69	-11.57
ER1.S	Flooded	1.025	-213.47	41.02f	22.68s	7.78	-11.57
Total Displacement		**1.025**	**501.61**	**83.91f**	**2.41s**	**5.52**	

Distances in FEET.

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Damage Case 16

CRITICAL POINT STATUS
Baseline draft: 11.676 @ Origin
Trim: Aft 7.72/210.33, Heel: Stbd 7.55 deg.

	Critical Points		LCP	TCP	VCP	Height
(3)	EN 90 S	FLOOD	213.86f	5.25s	30.90	26.20
(4)	EN 91 S	FLOOD	203.52f	8.13s	38.80	33.27
(5)	ER Air FWD P	FLOOD	43.30f	27.45p	23.45	16.85
(6)	ER Air Aft P	FLOOD	35.42f	27.45p	23.45	16.57
(7)	EN 90 P	FLOOD	213.86f	5.25p	30.90	27.58
(8)	EN 91 P	FLOOD	203.52f	8.13p	38.80	35.40
(9)	Survival Craft S	TIGHT	61.03f	25.67s	44.46	31.35
(10)	MES S	TIGHT	106.30f	29.53s	34.94	23.07

Distances in FEET.

LIM	STABILITY CRITERION		Min/Max		Attained	
(1)	**Angle from Equ0 to Flood or Tflood**	**>**	**0.00**	**deg**	**50.37**	**P**
(2)	**Absolute Angle at Equ0 (no moments)**	**<**	**10.00**	**deg**	**7.55**	**P**
(3)	**Angle from Equ0 to RAzero or Flood**	**>**	**7.00**	**deg**	**51.69**	**P**
(4)	**Flood Height at Point 1 to 8**	**>**	**6.56**	**Ft**	**16.57**	**P**
(5)	**Righting Arm at MaxRA**	**>**	**0.16**	**Ft**	**11.28**	**P**

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RESIDUAL RIGHTING ARMS vs HEEL ANGLE with FLOODING

Total CG: LCG = 84.55f TCG = 0.10s VCG = 22.97
Free Surface Adjustment: 0.18
Adjusted CG: LCG = 84.56f TCG = 0.08s VCG = 23.14

Origin	Degrees of		Displacement	Residual Arms			Flood Pt
Depth	Trim	Heel	Weight(LT)	in Trim	in Heel	Area	Height
11.564	2.10a	7.55s	501.42	0.00	-1.363	0.00	16.57 (6)
11.711	2.18a	8.12s	501.56	0.00	-0.683	-0.58	16.71 (6)
11.854	2.25a	8.69s	501.56	0.00	0.001	-0.78	16.84 (6)
12.100	2.39a	9.69s	501.42	0.01f	1.200	-0.18	17.09 (6)
12.344	2.53a	10.69s	501.42	0.00	2.395	1.62	17.33 (6)
12.582	2.68a	11.69s	501.36	0.00	3.574	4.60	17.57 (6)
12.837	2.84a	12.69s	501.62	0.00	4.667	8.72	17.79 (6)
13.098	3.03a	13.69s	501.58	0.00	5.675	13.89	18.01 (6)
13.363	3.22a	14.69s	501.58	0.00	6.583	20.02	18.23 (6)
13.625	3.43a	15.69s	501.58	0.00	7.385	27.01	18.44 (6)
13.882	3.65a	16.69s	501.58	0.00	8.069	34.73	18.66 (6)
14.131	3.89a	17.69s	501.58	0.00	8.632	43.08	18.88 (6)
14.368	4.13a	18.69s	501.58	0.00	9.079	51.94	19.11 (6)
14.588	4.37a	19.69s	501.57	0.00	9.420	61.20	19.35 (6)
14.790	4.62a	20.69s	501.57	0.00	9.665	70.75	19.59 (6)
14.973	4.86a	21.69s	501.57	0.00	9.820	80.50	19.85 (6)
15.134	5.10a	22.69s	501.59	0.00	9.899	90.36	20.11 (6)
15.242	5.27a	23.44s	501.61	0.00	**9.913**	97.79	20.31 (6)
15.274	5.33a	23.69s	501.60	0.00	9.911	100.27	20.38 (6)
15.395	5.56a	24.69s	501.60	0.00	9.866	110.16	20.65 (6)
15.497	5.78a	25.69s	501.60	0.00	9.774	119.98	20.93 (6)
15.582	6.00a	26.69s	501.60	0.00	9.644	129.68	21.22 (6)
15.653	6.21a	27.69s	501.61	0.00	9.482	139.25	21.50 (6)
15.708	6.42a	28.69s	501.61	0.00	9.292	148.63	21.79 (6)
15.746	6.61a	29.69s	501.61	0.00	9.076	157.82	22.08 (6)
15.758	6.81a	30.69s	501.36	0.00	8.840	166.78	22.37 (6)
15.755	6.99a	31.69s	501.31	0.01a	8.579	175.49	22.67 (6)
15.739	7.16a	32.69s	501.59	0.00	8.296	183.93	22.97 (6)
15.692	7.33a	33.69s	501.33	0.01a	8.002	192.08	23.28 (6)
15.641	7.49a	34.69s	501.58	0.00	7.693	199.93	23.58 (6)
15.567	7.64a	35.69s	501.31	0.01a	7.376	207.46	23.89 (6)
15.494	7.79a	36.69s	501.58	0.00	7.048	214.67	24.19 (6)
15.399	7.93a	37.69s	501.36	0.01a	6.715	221.55	24.49 (6)
15.303	8.07a	38.69s	501.60	0.00	6.373	228.10	24.78 (6)
15.180	8.19a	39.69s	501.38	0.01a	6.026	234.30	25.08 (6)
15.055	8.32a	40.69s	501.60	0.00	5.671	240.14	25.37 (6)
14.904	8.43a	41.69s	501.35	0.01a	5.311	245.64	25.67 (6)
14.753	8.54a	42.69s	501.60	0.00	4.945	250.76	25.96 (6)
14.584	8.64a	43.69s	501.59	0.00	4.575	255.53	26.25 (6)
14.406	8.74a	44.69s	501.60	0.01a	4.202	259.91	26.54 (6)
14.217	8.83a	45.69s	501.59	0.00	3.827	263.93	26.82 (6)
14.020	8.92a	46.69s	501.59	0.00	3.449	267.57	27.10 (6)
13.818	9.00a	47.69s	501.59	0.00	3.069	270.82	27.37 (6)
13.609	9.08a	48.69s	501.60	0.00	2.688	273.70	27.63 (6)

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13.395	9.16a	49.69s	501.60	0.00	2.305	276.20	27.89 (6)
13.178	9.23a	50.69s	501.60	0.00	1.922	278.31	28.13 (6)
12.955	9.30a	51.69s	501.60	0.00	1.539	280.04	28.37 (6)
12.728	9.37a	52.69s	501.60	0.00	1.154	281.39	28.60 (6)
12.498	9.43a	53.69s	501.61	0.00	0.770	282.35	28.83 (6)
12.261	9.49a	54.69s	501.61	0.00	0.385	282.93	29.04 (6)
12.021	9.55a	55.69s	501.61	0.00	0.000	283.12	29.25 (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**	**8.69 P**
(4)	**Area from Equilibrium to 15 deg or Flood**	**>**	**5.26**	**Ft-deg**	**101.05 P**

Relative angles measured from 8.690s

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