



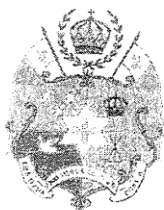
Appendices to the Final Preliminary Report

Volume 2 Appendices 5 - 13

Prepared by the Transport Accident Investigation Commission
for
The Royal Commission of Inquiry into the Sinking of the
MV Princess Ashika

15 February 2010

154



Kingdom of Tonga

**PROVISIONAL
CERTIFICATE OF REGISTRATION**

FORM NO. 15

NAME OF VESSEL	OFFICIAL NUMBER	PORT OF REGISTRY
PRINCESS ASHIKA	260	NUKU'ALOFA

IMO NUMBER	CALL SIGN	EPIRB NUMBER
385168	A3CI2	

COMPANIES	OWNERS
NAME OF COMPANY	Shipping Corporation of Polynesia Limited
RESIDENCE / NATIONALITY	P.O.Box 453 NUKU'ALOFA

VESSEL PARTICULARS			
TYPE OF VESSEL:	Passenger Ferry	CLASSED BY:	
YEAR BUILT:	1973	PLACE BUILT:	Japan
LENGTH:	50.5 m	CONSTRUCTION MATERIAL:	Steel
BREADTH:	13.2 m	GROSS TONNAGE:	677.15
MOULDED DEPTH:		NET TONNAGE:	301.32
NUMBER - TYPE OF ENGINES:	2 X Daihatsu 819.5 KW	ENGINE POWER:	2 X 819.5 KW

DATE REGISTERED:	9 th June 2009
THIS CERTIFICATE OF REGISTRY IS VALID UNTIL:	8 th September 2009

This Provisional Certificate is granted by me pursuant to section ...28... of the Shipping Act Cap 136.

William Lesly Johnson
Registrar's Signature

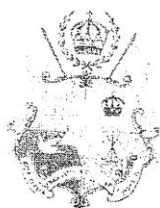
WILLIAM LESLY JOHNSON
Registrar

Name and Title

* Tonnage measured according to the International Convention on Tonnage Measurement of Ships (1969).



153



Kingdom of Tonga

PROVISIONAL MINIMUM SAFE MANNING CERTIFICATE

Issued under the provisions of regulation V/13(b) of the International Convention for the Safety of Life at Sea, 1974, as amended under the authority of the Government of the Kingdom of Tonga.

1. Ship Particulars		
1.1 Name of Ship	PRINCESS ASHIKA	
1.2 Port of Registry	NUKU'ALOFA	
1.3 IMO No.	385168	
1.4 Call Sign	A3C12	
1.5 Type of Ship	PASSENGER FERRY	
1.6 GRT / NRT*	677.15	301.32
1.7 Main Engine Power	2 x 85 Kw	
Periodically unattended machinery space: YES/ NO**		

The ship named in this document is considered to be safely manned if, when it proceeds to sea, it carries not less than the number and grades/capacities of personnel specified in the table below.

2. Manning Table		
Grade	Minimum Qualification	Number of Persons
MASTER	CLASS THREE MASTER	ONE
CHIEF OFFICER	CLASS THREE MASTER	ONE
SECOND OFFICER	CLASS FOUR WATCHKEEPER	ONE
CHIEF ENGINEER	CLASS THREE ENGINEER	ONE
2 nd ENGINEER	CLASS FOUR ENGINEER	ONE
3 rd ENGINEER	CLASS FIVE ENGINEER	ONE
4 th ENGINEER	CLASS FOUR ENGINEER	ONE
DECK RATING	RATING DECK	TWO
DECK ENGINE	RATING ENGINE	ONE
WATCHKEEPER	WATCHKEEPER RATING DECK	THREE
3. Trading Area		
ONE VOYAGE		FIJI/TONGA
4. Special Requirements or Conditions		
- FOR SEA AREAS A1 AND A1+A2: AT LEAST ONE (1) DECK OFFICER TO BE IN POSSESSION OF A VALID GENERAL OFFICER CERTIFICATE (GOC); - FOR SEA AREA A1+A2+A3: AT LEAST TWO (2) DECK OFFICERS OR ALTERNATIVELY ONE (1) RADIO OFFICER TO BE IN POSSESSION OF A VALID GOC. - IF VESSEL IS EXEMPTED FROM GMDSS REQUIREMENTS, AS PER SOLAS CH IV: VESSEL SHOULD BE ADDITIONALLY MANNED WITH ONE (1) RADIO OFFICER. ONE (1) COOK IS REQUIRED IF THE TOTAL NUMBER OF PERSONS ON BOARD EXCEEDS TEN (10).		

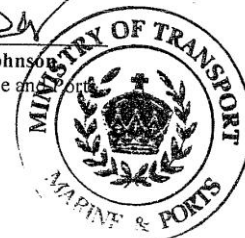
Issued at: NUKU'ALOFA

Dated: 8th June 2009

Valid until: 7th September 2009

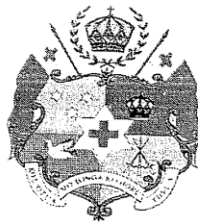
Signed: William L Johnson

William L Johnson
Director of Marine and Port



* Tonnage measured according to the International Convention on Tonnage Measurement of Ships (1969)
 ** Delete as appropriate.

Certificate No.:



#152

GOVERNMENT OF TONGA

MINISTRY OF TRANSPORT/MARINE DIVISION

June 8th, 2009

TO WHOM IT MAY CONCERN

Subject: Exemption Princess Ashika / IMO No. 385168.

Please be advised that under Solas regulation 4 (a) Part A of Chapter 1 of the convention a dispensation is granted for Princess Ashika to carry out a delivery voyage from Suva –Fiji to Nuku'alofa Tonga commencing on/or after 11th June 2009.

No passengers are to be carried.

Capt WLS Johnson

William Lesly Johnson
Director of Marine and Ports.





**PRIME MINISTER'S OFFICE
NUKU'ALOFA, TONGA**

Ref: ORG 4/2/1

156

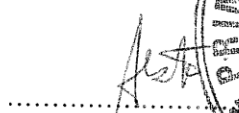
9 June 2009

To Whom it may concern:

I write to advise that the vessel MV Princess Ashika has been allocated the provisional call sign A3CI2 in order to facilitate its journey to the Kingdom of Tonga.. This call sign will be invalid or terminated once the vessel arrives here in the Kingdom of Tonga.

Formal procedures with regards to licensing the ship radio station of this vessel will be conducted before a permanent call sign and MMSI number is awarded.

Yours Sincerely,


.....
S. Be'ao Vakata

For Chief Secretary & Secretary to Cabinet



FORM SUR 3
SPECIAL SURVEYMARINE ACT
SURVEY CERTIFICATE

(No 163 of 20 09)

Of the PRINCESS ASHIKA (Class) 3B Gross Tons: 677.15 Net: 301.32 No: 385168

DIMENSIONS

Length 50.50 mBreadth: 13.20 mAssigned Freeboard: Name of Master: KELEMETE RAYAWAGrade: CLASS 3 MASTER No: M3 - 018Name & Address of Owner: PATTERSON BROTHERS SHIPPING CO. of P. O. BOX 1044, SUVAEndorsement: VESSEL TO OPERATE ONLY BETWEEN NATOVI AND BURESALA WITH
REDUCED CARGO AND AT REDUCED SPEED.

Passengers Accommodated IN/ON	Harbour & River		Short Coasting		Fiji Islands		Pacific Region	Unlimited
	Day	Night	Day	Night	Day	Night		
Approved Berth	-	-	-	-	-	-	-	-
Unberthed / Hatch	-	-	-	-	-	-	-	-
Unberthed / Other	-	-	-	-	145	145	-	-
Total Passengers	-	-	-	-	145	145	-	-
Crew berth	-	-	-	-	15	15	-	-
Total	-	-	-	-	160	160	-	-

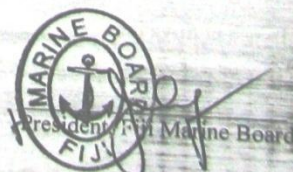
LIFE SAVING APPLIANCES

Life buoys	Life jackets	Approved Boats	Inflatable	Rigid Buoyant Apparatus
12] 2 WITH LIGHTS 4 WITH LINES 6 WITHOUT	374 COASTAL	NIL	COASTAL 160 PERS	NIL

The duplicate copy of this certificate must be exhibited in a place accessible to all persons on board, and the originals of this Certificate must be produced at the Fiji Islands Maritime Safety Administration's Office before any clearance can be obtained and unless revoked or cancelled, shall be held in

forced until the 07THday of MAY 20 09Issued at Suva this 09THday of APRIL 20 09

This vessel complies with the survey requirements of the Fiji Marine Board.



FORM SUR 3
SPECIAL SURVEYMARINE ACT
SURVEY CERTIFICATE

(No 163 of 20 09)

Of the PRINCESS ASHIKA (Class) 3B Gross Tons: 677.15 Net: 301.32 No: 385168

DIMENSIONS

PARTICULARS OF MAIN PROPULSION

Length 50.50 mMake: DAIHATSUBreadth: 13.20 mType: DIESEL ENGINEAssigned Freeboard: Power (KW) 2 X 819.5Name of Master: KELEMETE RAYAWAGrade: CLASS 3 MASTERNo: M3 - 018Name & Address of Owner: PATTERSON BROTHERS SHIPPING CO. of P. O. BOX 1044, SUVA

Passengers Accommodated IN/ON	Harbour & River		Short Coasting		Fiji Islands		Pacific Region	Unlimited
	Day	Night	Day	Night	Day	Night		
Approved Berth	-	-	-	-	-	-	-	-
Unberthed / Hatch	-	-	-	-	-	-	-	-
Unberthed / Other	-	-	-	-	145	145	-	-
Total Passengers	-	-	-	-	145	145	-	-
Crew berth	-	-	-	-	15	15	-	-
Total	-	-	-	-	160	160	-	-

LIFE SAVING APPLIANCES

Life buoys	Life jackets	Approved Boats	Inflatable	Rigid Buoyant Apparatus
12] 2 WITH LIGHTS 4 WITH LINES 6 WITHOUT	374 COASTAL	NIL	COASTAL 160 PERS	NIL

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GOVERNMENT OF TONGA
Pule'anga 'o Tonga

MINISTRY OF TRANSPORT/MARINE DIVISION
POTUNGAUE FEFONONGA 'AKI/VA'A MALINI
SHIPPING ACT CAP 136
Lao ki he Fefolau 'aki Vahe 136

PROVISIONAL CERTIFICATE OF SURVEY OF VESSELS
Section 126
Tohi Fakamo'oni 'o ha Vaka kuo'osi Savea'i
Kupu 126

This is to certify that PRINCESS ASHIKA has been surveyed
'Oku fakaha heni ko e vaka ni *kuo 'osi sivi'i*

and declare that the Tonnage for registration of the said vessel
pea 'oku ou fakaha ko e mamafa 'a ia 'oku lesisisita
'aki 'ae vaka ni ko e Toni 'e 677.15

and that the condition of the Hull, Rigging, Tackle, Boats and Machinery is such as to
comply with the provisions of the Shipping Act.
pea koe tu'unga 'oku 'iai 'ae fa'ahinga 'oe vaka, tu'unga mateuteu ki he folau, maea mo e
ngaahi naunau ki he folau laa, vaka, pea mo e misini

The above named vessel as far it could be ascertained is considered to be Seaworthy.
Ko e hingoa 'o e vaka ko ia 'oku ha atu 'i 'olunga, 'oku 'ilo mo fakamo'oni 'i ia
'oku taau mo fe'unga ke ngaue'aki 'i he fefolau'aki 'i tahi.

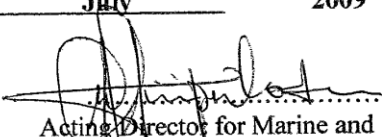
No. of Passenger to be carried
Tokolahi 'o e kau Pasese ke uta 300

No. of Crew
Tokolahi 'o e kau Kauvaka 18

Port of
Taulanga 'o NUKU'ALOFA

This certificate is valid until
'E ngata 'a e ngofua ni 1st October 2009

Dated the 2nd day of July 2009
'Aho *'Aho*


Acting Director for Marine and Ports
Talekita Le'ole'o ki he Malini mo e Ngaahi Taulanga



⑧A

B200/11



GOVERNMENT OF TONGA

Pule'anga 'o Tonga

MINISTRY OF TRANSPORT/MARINE DIVISION

POTUNGAUE FEFONONGA 'AKI/VA'A MALINI

SHIPPING ACT CAP 136

Lao ki he Fefolau 'aki Vahe 136

PROVISIONAL CERTIFICATE OF SURVEY OF VESSELS

Section 126

Tohi Fakamo'oni 'o ha Vaka kuo'osi Savea'i

Kupu 126

This is to certify that PRINCESS ASHIKA has been surveyed
'Oku fakaha heni ko e vaka ni kuo 'osi sivi'i

and declare that the Tonnage for registration of the said vessel
pea 'oku ou fakaha ko e mamafa 'a ia 'oku lesisisita
'aki 'ae vaka ni ko e Toni 'e 677.15 T

and that the condition of the Hull, Rigging, Tackle, Boats and Machinery is such as to
 comply with the provisions of the Shipping Act.
pea koe tu'unga 'oku 'iai 'ae fa'ahinga 'oe vaka, tu'unga mateuteu ki he folau, maea mo e
ngaahi naunau ki he folau laa, vaka, pea mo e misini

The above named vessel as far it could be ascertained is considered to be Seaworthy.
Ko e hingoa 'o e vaka ko ia 'oku ha atu 'i 'olunga, 'oku 'ilo mo fakamo'oni 'i ia
'oku taau mo fe'unga ke ngaue 'aki 'i he fefolau 'aki 'i tahi.

No. of Passenger to be carried
Tokolahi 'o e kau Pasese ke uta

300

No. of Crew
Tokolahi 'o e kau Kauvaka

14

Port of
Taulanga 'o

NUKU'ALOFA

This certificate is valid until
'E ngata 'a e ngofua ni

2nd October 2009

Dated the 3rd day of July 2009
'Aho *'Aho*

Acting Director of Marine and Ports
Talekita Le'ole'o 'oe Malini mo e Ngaahi Taulanga



File

MINISTRY OF TRANSPORT
Marine Department

149

Date: 2nd July 2009

Subject: Surveying the MV Princess Ashika

The Following are the list of Deficiencies found during the Survey.**1. Certificates & Documents**

The following Certificates are not available onboard:

- Safety Radio Certificate
- Safe Manning Certificate
- Permanent Registration Certificate
- Passenger Ship Safety Certificate
- Cargo Ship Safety Certificate
- Doc (ISM) Certificate
- SMS (ISM) Certificate
- ISPS Security
- Load Line Certificate
- Safety Construction Certificate
- Safety Equipment Certificate
- Tonnage Certificate
- SOPEP

2. Nautical Publications

Following Publications are not available onboard:

- Nautical Almanac
- Tide Table
- Sailing Directions
- List of Lights Volume K
- List of Radio Signals
- Mersar Manual

3. Safety in General

Following are not available onboard:

- Fire Control Plan
- General Arrangement Plan
- Muster List

4. DRILLS

- Abandon Ship Drills & Fire Drills should be conducted monthly and then record in logbook



MINISTRY OF TRANSPORT
Marine Department

5. Navigation Equipment

- Magnetic Compass last calibration 2006, Suva. There is no deviation book available onboard
- Echo Sounder & Hand Lead Line are not available onboard
- The following are not available onboard
 - i. Not under command light
 - ii. Ships bell

6. LSA

- Rescue Boat is not available onboard
- Life Rafts onboard can accommodate ONLY 315 persons
- Life Buoy – Man overboard signal is not available onboard
- Pyrotechnics – Replace the outdated hand flares
- Rescue Signal table is not available onboard
- Radio Transponders are not available onboard
- General Emergency Alarm is not available onboard
- Life Jackets – Without Whistle

7. FFA

- Fire Detection System is not available onboard
- Fireman's Outfit is not available onboard
- Only 1 air Cylinder and respirator available onboard
- International Shore Connections is not available onboard
- All Emergency Escape Hatch/Doors need to be labelled

8. Radio

- See Attached Radio Report

9. Load Line

- Load line Disc – summer draft already submerged while the ship is in ballast conditions. (to be checked for loading condition)
- Lashing Chain and tension bars are not available onboard
- Scuppers on Wagon Deck (need to be repaired), heavily corroded and without cover
- Bow/Stern Ramp are not water tight
- Guard Rails & Steps on ALL Decks are heavily corroded and wastage

10. Hull Construction

- Corroded holes observed on starboard/port forecastle horn
- Corroded holes observed on starboard chain locker
- Hydraulic Oil leaks observed on stern ramp, hydraulic jacks
- In general, the condition of all deck plating carlings, casing, deck house, air vent etc are heavily corroded/wastage

11. Machinery in Engine Room

- All Operational and in good conditions



MINISTRY OF TRANSPORT
Marine Department

12. Mooring Arrangement

- Anchor – Only 5 shackles of chain on each anchor
- Fair Leader – All forward fairlead are seized
- Anchor Chain – Bow Stoppers need to be replaced

COMPETENCY ASSESSMENT

Survey was carried out as part of competency assessment, please sign:

ASSESSOR	POSITION	Signature
Lou Pale	Senior Marine Nautical Officer	<i>[Signature]</i>
'Onesi Tu'ifua	Senior Marine Engineering Officer	<i>[Signature]</i>
Lisiate Vuni Latu	Marine Nautical Officer	<i>[Signature]</i>

Comments:

1. The Bow and Stern Ramp must be watertight to the satisfaction of the Surveyor before departure.
2. Also the Scuppers must be repaired to Surveyors satisfaction.
3. Loadline must ~~be~~ not be submerged in any case on departure.
4. Or any other item that may be advised by the Surveyor on the spot.

[Signature]

A/D 03-07-09



Kingdom of Tonga

⑨ A

B200/2

**PROVISIONAL
CERTIFICATE OF REGISTRATION**

FORM NO. 15

NAME OF VESSEL	OFFICIAL NUMBER	PORT OF REGISTRY
PRINCESS ASHIKA	260	NUKU'ALOFA

IMO NUMBER	CALL SIGN	EPIRB NUMBER
385168	A3C12	

COMPANIES	OWNERS
NAME OF COMPANY: Shipping Corporation of Polynesia Limited	Government of Tonga
RESIDENCE / NATIONALITY: TONGAN	P.O.Box 453 NUKU'ALOFA

VESSEL PARTICULARS			
TYPE OF VESSEL:	Passenger Ferry	CLASSED BY:	
YEAR BUILT:	1973	PLACE BUILT:	Japan
LENGTH:	50.5 m	CONSTRUCTION MATERIAL:	Steel
BREADTH:	13.2 m	GROSS TONNAGE:	677.15
MOULDED DEPTH:		NET TONNAGE:	301.32
NUMBER - TYPE OF ENGINES:	2 X Daihatsu 819.5 KW	ENGINE POWER:	2 X 819.5 KW

DATE REGISTERED:	3 rd July 2009
THIS CERTIFICATE OF REGISTRY IS VALID UNTIL:	2 nd October 2009

This Provisional Certificate is granted by me pursuant to section ...28... of the Shipping Act Cap 136.

Registrar's Signature

VILIAMI TU'IPULOTU
Registrar

Name and Title

* Tonnage measured according to the International Convention on Tonnage Measurement of Ships (1969).



Princess Ashika - Condition No 1: Original Lightship Condition

Floating Status

Draft FP	2.296 m	Heel	zero	GM(Solid)	2.019 m
Draft MS	2.315 m	Equil	Yes	F/S Corr.	0.000 m
Draft AP	2.334 m	Wind	Off	GM(Fluid)	2.019 m
Trim	0.038/47.000	Wave	No	KMt	6.569 m
LCG	24.340a m	VCG	4.550 m	TPcm	4.18
Displacement	669.21 MT	WaterSpgr	1.025		

Loading Summary

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
Light Ship	669.21	24.340a	0.000	4.550
Displacement	669.21	24.340a	0.000	4.550

Fixed Weight Status

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	669.21	24.340a	0.000	4.550u
Total Weight:	669.21	24.340a	0.000	4.550u

Tank Status

SALT WATER (SpGr 1.025)

Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
AFTERWBT.P	<empty>				
AFTERWBT.S	<empty>				
AFTVOID.C	<empty>				
CREWACC.C	<empty>				
ENGRM.C	<empty>				
FWDVOID.C	<empty>				
FWDWBT.P	<empty>				
FWDWBT.S	<empty>				
NO1VOID.C	<empty>				
NO2VOID.C	<empty>				
SGROOM.C	<empty>				
SUPERSTRUCT.C	<empty>				
WATERONDECK.C	<empty>				

FUEL OIL (SpGr 0.870)

Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
FUELOIL.C	<empty>				

FRESH WATER (SpGr 1.000)

Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
FRESHWATER.C	<empty>				

All Tanks

	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
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Displacer Status

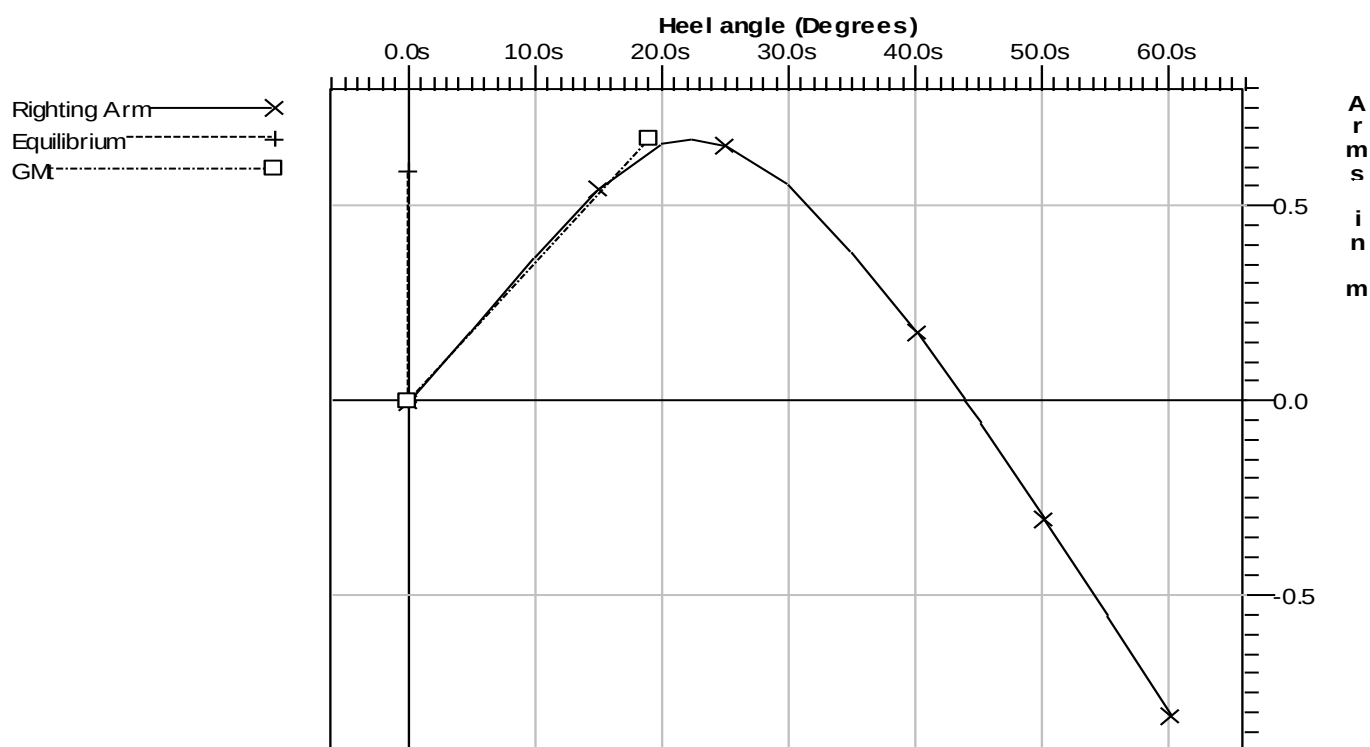
Item	Status	Spgr	Displ (MT)	LCB (m)	TCB (m)	VCB (m)	Eff /Perm
HULL.C	Intact	1.025	669.21	24.343a	0.000	1.373	1.000
SubTotals:			669.21	24.343a	0.000	1.373	

Righting Arms vs. Heel

Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Righting Arm (m)
0.00	0.05a	2.296	0.000
5.00s	0.02a	2.285	0.181
10.00s	0.04f	2.251	0.370
15.00s	0.12f	2.183	0.546
20.00s	0.20f	2.089	0.662
22.29s	0.24f	2.045	0.672
25.00s	0.27f	1.983	0.658
30.00s	0.32f	1.861	0.554
35.00s	0.38f	1.736	0.384
40.00s	0.43f	1.606	0.175
43.77s	0.47f	1.502	0.002
45.00s	0.48f	1.467	-0.057
50.00s	0.52f	1.319	-0.302
55.00s	0.56f	1.163	-0.554
60.00s	0.58f	0.999	-0.808

Righting Arms vs. Heel



Princess Ashika - Condition No 2: Original Lightship Plus Occurrence Loading

- Fresh water 50%
- Fuel oil full
- No bilge or ballast water

Floating Status

Draft FP	2.572 m	Heel	zero	GM(Solid)	2.167 m
Draft MS	2.677 m	Equil	Yes	F/S Corr.	0.015 m
Draft AP	2.782 m	Wind	Off	GM(Fluid)	2.153 m
Trim	aft 0.209/47.000	Wave	No	KMt	6.576 m
LCG	24.681a m	VCG	4.408 m	TPcm	4.69
Displacement	830.82 MT	WaterSpgr	1.025		

Loading Summary

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
Light Ship	669.21	24.340a	0.000	4.550
Deadweight	161.61	26.093a	0.000	3.822
Displacement	830.82	24.681a	0.000	4.408

Fixed Weight Status

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	669.21	24.340a	0.000	4.550u
32 CREW AT 90 KG	2.88	18.500a	0.000	7.070u
96 PASSENGERS AT 75 KG	7.20	21.960a	0.000	11.750u
CARGO 110 T	110.00	23.500a	0.000	4.150u
CREW BELONGINGS	0.50	17.250a	0.000	2.650u
DECK OIL	0.27	22.250a	0.000	2.550u
FO DAY TK	1.74	21.700a	0.000	2.300u
LUB OIL	0.72	32.900a	0.000	2.200u
NEW TKS IN ENG RM	1.96	35.400a	0.000	2.780u
PROVISIONS	0.10	8.500a	0.000	4.150u
STORES	3.00	23.400a	0.000	5.100u
TANKS IN ENG RM	6.75	28.030a	0.000	1.190u
Total Fixed:	804.33	24.232a	0.000	4.529u

Tank Status

SALT WATER (SpGr 1.025)

Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
AFTERWBT.P	<empty>				
AFTERWBT.S	<empty>				
AFTVOID.C	<empty>				
CREWACC.C	<empty>				
ENGRM.C	<empty>				
FWDVOID.C	<empty>				
FWDWBT.P	<empty>				
FWDWBT.S	<empty>				
NO1VOID.C	<empty>				
NO2VOID.C	<empty>				
SGROOM.C	<empty>				
SUPERSTRUCT.C	<empty>				
WATERONDECK.C	<empty>				

FUEL OIL (SpGr 0.870)

Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
FUELOIL.C	95.00%	15.37	35.859a	0.000	0.461
Subtotals:	95.00%	15.37	35.859a	0.000	0.461

FRESH WATER (SpGr 1.000)

Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
FRESHWATER.C	50.00%	11.12	41.688a	0.000	1.116
Subtotals:	50.00%	11.12	41.688a	0.000	1.116

All Tanks

	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
Totals:	0.79%	26.49	38.306a	0.000	0.736

Displacer Status

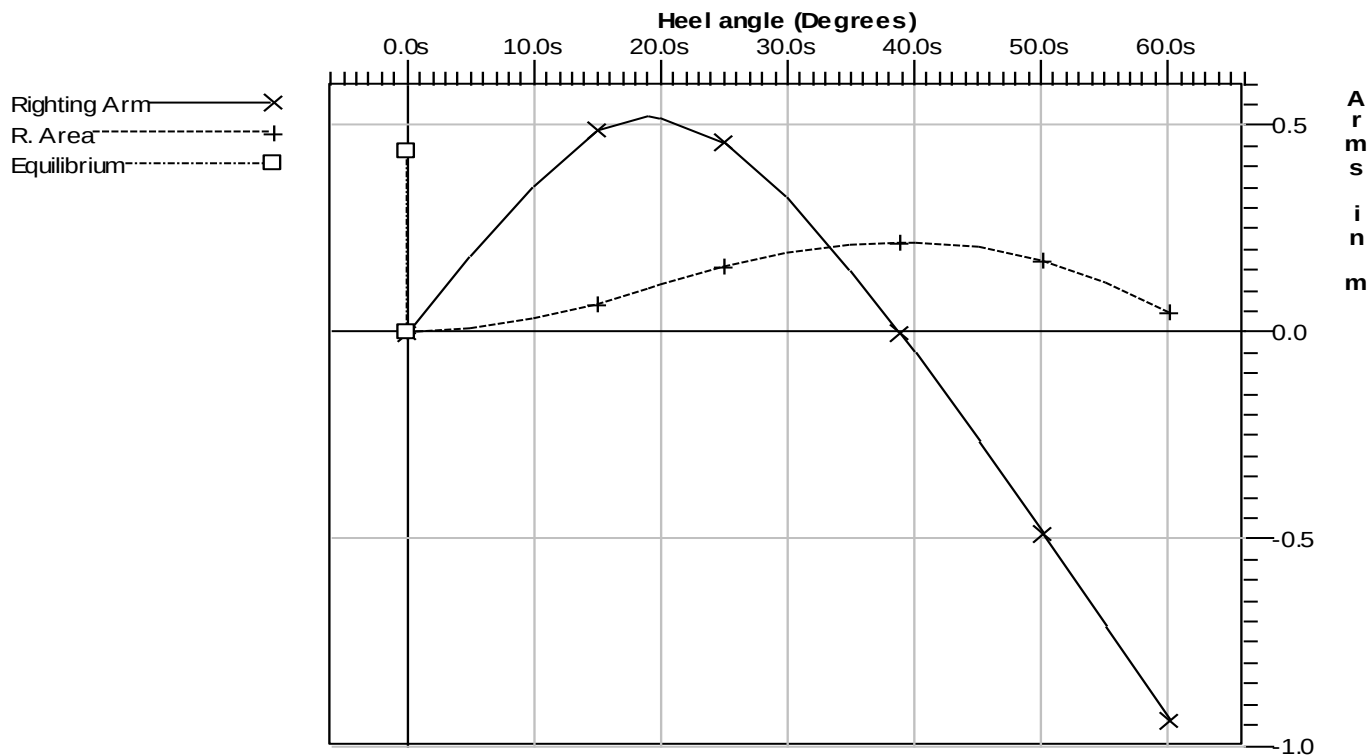
Item	Status	Spgr	Displ (MT)	LCB (m)	TCB (m)	VCB (m)	Eff /Perm
HULL.C	Intact	1.025	830.82	24.693a	0.000	1.594	1.000
SubTotals:			830.82	24.693a	0.000	1.594	

Critical point

Name	L,T,V (m)	Height (m)
(1) lower edge of bow ramp	0.000, 3.060s, 4.150	1.578

Righting Arms vs. Heel - IMO RESOLUTION A.167**Righting Arms vs Heel Angle**

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Righting Arm (m)	Area (m-Rad)
0.00	0.26a	2.572	0.000	0.000
5.00s	0.22a	2.566	0.185	0.008
10.00s	0.16a	2.529	0.353	0.032
15.00s	0.10a	2.464	0.491	0.069
18.96s	0.06a	2.416	0.522	0.104
20.00s	0.06a	2.401	0.520	0.114
25.00s	0.05a	2.328	0.460	0.157
30.00s	0.04a	2.256	0.326	0.192
35.00s	0.03a	2.180	0.151	0.213
38.76s	0.02a	2.115	0.002	0.218
40.00s	0.01a	2.092	-0.049	0.217
45.00s	0.00f	1.992	-0.264	0.204
50.00s	0.02f	1.879	-0.487	0.171
55.00s	0.03f	1.754	-0.712	0.119
60.00s	0.04f	1.618	-0.938	0.047

Righting Arms vs. Heel - IMO RESOLUTION A.167**IMO RESOLUTION A.167**

Limit	Min/Max	Actual	Margin	Pass
(1) Area from 0.00 deg to Abs 30.00 or Flood	>0.0550 m-R	0.192	0.137	Yes
(2) Area from 0.00 deg to Abs 40.00 or Flood	>0.0900 m-R	0.217	0.127	Yes
(3) Area from 30.00 deg to Abs 40.00 or Flood	>0.0300 m-R	0.026	0.004	No
(4) Righting Arm at 30.00 deg	>0.200 m	0.326	0.126	Yes
(5) Absolute Angle at MaxRA	>25.00 deg	18.96	6.04	No
(6) GM Upright	>0.150 m	2.153	2.003	Yes

Princess Ashika - Condition No 3: Estimated Lightship July 2009

Additions made to account for concrete on Promenade Deck, cement boxes, doubler plates, weight growth and liferafts

Floating Status

Draft FP	2.388 m	Heel	zero	GM(Solid)	2.062 m
Draft MS	2.390 m	Equil	Yes	F/S Corr.	0.000 m
Draft AP	2.393 m	Wind	Off	GM(Fluid)	2.062 m
Trim	0.005/47.000	Wave	No	KMt	6.513 m
LCG	24.283a m	VCG	4.450 m	TPcm	4.24
Displacement	700.61 MT	WaterSpgr	1.025		

Loading Summary

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
Light Ship	669.21	24.340a	0.000	4.550
Deadweight	31.40	23.070a	0.000	2.329
Displacement	700.61	24.283a	0.000	4.450

Fixed Weight Status

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	669.21	24.340a	0.000	4.550u
CEMENT BOXES	10.00	23.500a	0.000	0.300u
CONCRETE ON PR DK	3.00	19.750a	0.000	8.320u
DOUBLERS	4.00	23.500a	0.000	1.800u
LIFERAFTS	1.00	21.250a	0.000	11.170u
WEIGHT GROWTH	13.40	23.500a	0.000	2.000u
Total Weight:	700.61	24.283a	0.000	4.450u

Tank Status

SALT WATER (SpGr 1.025)

Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
AFTERWBT.P	<empty>				
AFTERWBT.S	<empty>				
AFTVOID.C	<empty>				
CREWACC.C	<empty>				
ENGRM.C	<empty>				
FWDVOID.C	<empty>				
FWDWBT.P	<empty>				
FWDWBT.S	<empty>				
NO1VOID.C	<empty>				
NO2VOID.C	<empty>				
SGROOM.C	<empty>				
SUPERSTRUCT.C	<empty>				
WATERONDECK.C	<empty>				

FUEL OIL (SpGr 0.870)

Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
FUELOIL.C	<empty>				

FRESH WATER (SpGr 1.000)

Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
FRESHWATER.C	<empty>				

All Tanks

	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
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Displacer Status

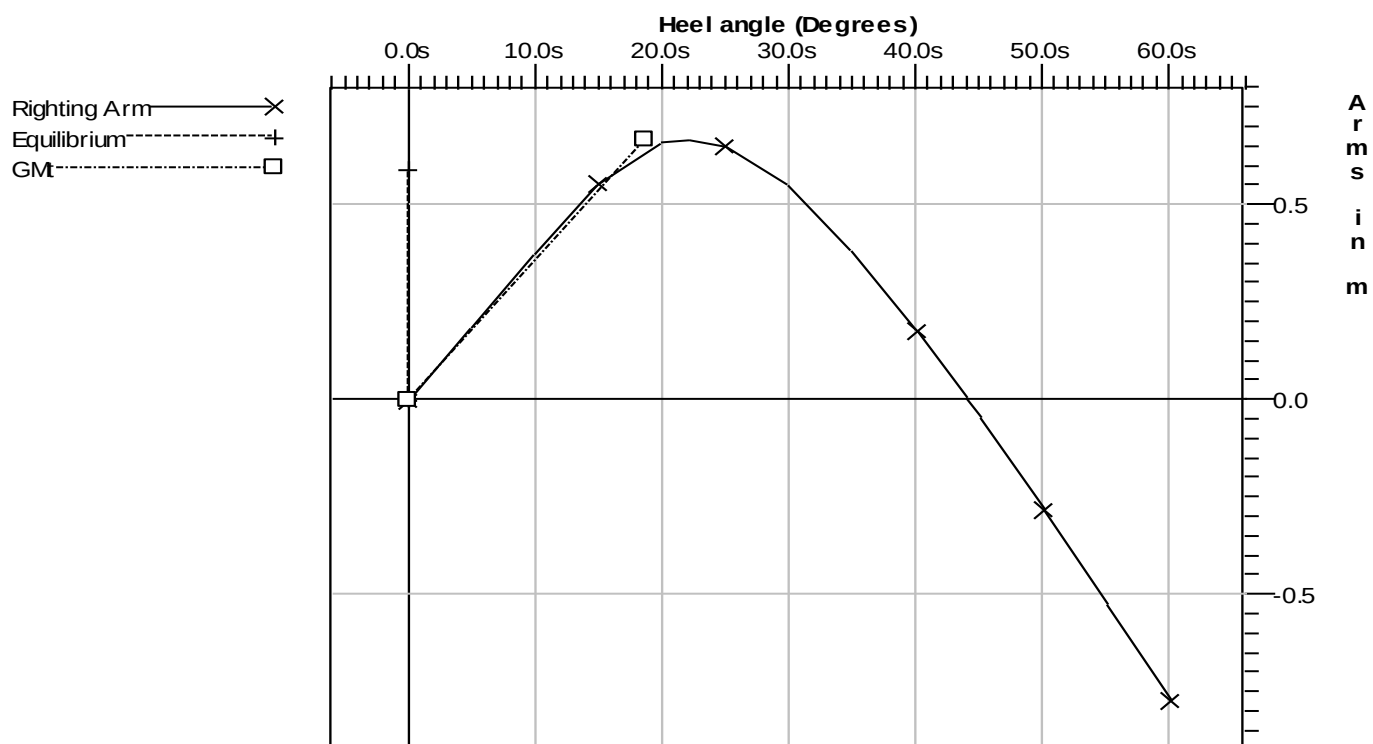
Item	Status	Spgr	Displ (MT)	LCB (m)	TCB (m)	VCB (m)	Eff /Perm
HULL.C	Intact	1.025	700.61	24.283a	0.000	1.417	1.000
SubTotals:			700.61	24.283a	0.000	1.417	

Critical point

Name	L,T,V (m)	Height (m)
(1) lower edge of bow ramp	0.000, 3.060s, 4.150	1.762

Righting Arms vs. Heel - IMO RESOLUTION A.167**Righting Arms vs Heel Angle**

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Righting Arm (m)
0.00	0.01a	2.388	0.000
5.00s	0.02f	2.377	0.185
10.00s	0.09f	2.344	0.376
15.00s	0.16f	2.275	0.555
20.00s	0.25f	2.190	0.661
22.14s	0.28f	2.151	0.669
25.00s	0.31f	2.092	0.654
30.00s	0.37f	1.985	0.548
35.00s	0.44f	1.876	0.381
40.00s	0.50f	1.760	0.177
43.94s	0.54f	1.661	0.001
45.00s	0.55f	1.634	-0.047
50.00s	0.60f	1.497	-0.284
55.00s	0.63f	1.349	-0.528
60.00s	0.66f	1.193	-0.773

Righting Arms vs. Heel - IMO RESOLUTION A.167

Princess Ashika - Condition No 4: Arrival in Tonga July 2009

Based on Estimated Lightship July 2009 with tank loads as follows:

- Freshwater 60%
- Fuel Oil 60%
- Water in aft WBT Port limited to sounding of 1.5 m at bulkhead FM 14
- Fwd Void level with waterplane
- Water ballast and bilge water in quantities sufficient to simulate condition noted in photo taken during survey 2 July 2009, that is:
- (i) stbd heel of 1 or 2 degrees at maximum; note (ii) small fwd trim; and
- (iii) loadline mark on stbd side submerged by approximately 25 mm

Floating Status

Draft FP	3.131 m	Heel	stbd 0.22 deg.	GM(Solid)	2.357 m
Draft MS	2.797 m	Equil	Yes	F/S Corr.	0.734 m
Draft AP	2.462 m	Wind	Off	GM(Fluid)	1.623 m
Trim	fwd 0.670/47.000	Wave	No	KMt	6.281 m
LCG	23.243a m	VCG	3.924 m	TPcm	4.60
Displacement	877.66 MT	WaterSpgr	1.025		

Loading Summary

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
Light Ship	669.21	24.340a	0.000	4.550
Deadweight	208.45	19.719a	0.041s	1.916
Displacement	877.66	23.243a	0.010s	3.924

Fixed Weight Status

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	669.21	24.340a	0.000	4.550u
CEMENT BOXES	10.00	23.500a	0.000	0.300u
CONCRETE ON PR DK	3.00	19.750a	0.000	8.320u
CREW	1.80	18.500a	0.000	7.070u
CREW BELONGINGS	1.80	18.500a	0.000	7.070u
DECK OIL	0.27	22.250a	0.000	2.550u
DOUBLERS	4.00	23.500a	0.000	1.800u
FO DAY TK	1.74	21.700a	0.000	2.300u
LIFERAFTS	1.00	21.250a	0.000	11.170u
LUB OIL	0.72	32.900a	0.000	2.200u
NEW TKS IN ENG RM	1.96	35.400a	0.000	2.780u
PROVISIONS	0.10	8.500a	0.000	4.150u
STORES	3.00	23.400a	0.000	5.100u
TANKS IN ENG RM	6.75	28.030a	0.000	1.190u
WEIGHT GROWTH	13.40	23.500a	0.000	2.000u
Total Fixed:	718.75	24.315a	0.000	4.423u

Tank Status**SALT WATER (SpGr 1.025)**

Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
AFTERWBT.P	5.00%	1.51	43.411a	9.751p	4.126
AFTERWBT.S	60.00%	18.12	42.417a	3.979s	3.004
AFTVOID.C	2.00%	4.40	34.712a	0.074s	0.522

CREWACC.C	<empty>				
ENGRM.C	2.00%	7.71	26.052a	0.078s	0.126
FWDVOID.C	26.97%	6.56	1.596a	0.006s	2.444
FWDWBT.P	98.00%	38.52	4.963a	1.772p	2.816
FWDWBT.S	40.00%	15.72	5.115a	1.079s	1.950
NO1VOID.C	20.00%	34.88	10.719a	0.021s	1.017
NO2VOID.C	10.00%	9.24	17.706a	0.075s	0.285
SGROOM.C	2.00%	1.01	45.255a	0.000	0.567
SUPERSTRUCT.C	<empty>				
WATERONDECK.C	<empty>				
Subtotals:	4.29%	137.65	14.911a	0.061s	1.872

FUEL OIL (SpGr 0.870)

Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
FUELOIL.C	60.00%	9.71	35.716a	0.004s	0.279
Subtotals:	60.00%	9.71	35.716a	0.004s	0.279

FRESH WATER (SpGr 1.000)

Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
FRESHWATER.C	60.00%	13.35	41.690a	0.000	1.320
Subtotals:	60.00%	13.35	41.690a	0.000	1.320

All Tanks

	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
Totals:	4.95%	160.71	18.391a	0.053s	1.730

Displacer Status

Item	Status	Spgr	Displ (MT)	LCB (m)	TCB (m)	VCB (m)	Eff /Perm
HULL.C	Intact	1.025	877.66	23.210a	0.017s	1.663	1.000
SubTotals:			877.66	23.210a	0.017s	1.663	

Critical points

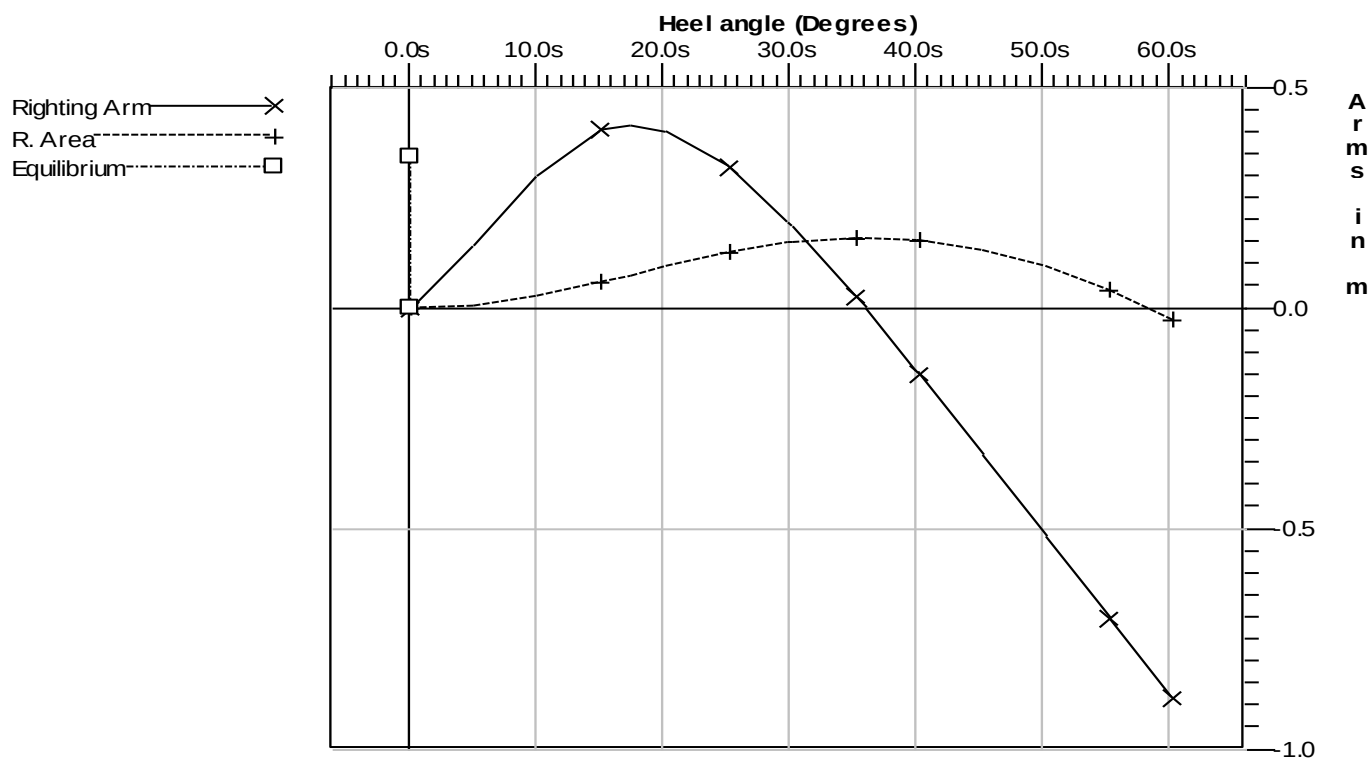
Name	L,T,V (m)	Height (m)
(1) lower edge of bow ramp	0.000, 3.060s, 4.150	1.007
(2) loadline mark stbd side	23.500a, 5.500s, 2.780	-0.037

Righting Arms vs. Heel - IMO RESOLUTION A.167

Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Righting Arm (m)	Area (m-Rad)
0.22s	0.82f	3.131	0.000	0.000
5.22s	0.85f	3.119	0.146	0.006
10.22s	0.90f	3.077	0.301	0.026
15.22s	1.00f	3.041	0.404	0.057
17.59s	1.08f	3.044	0.416	0.074
20.22s	1.19f	3.064	0.402	0.093
25.22s	1.45f	3.120	0.319	0.125
30.00s	1.69f	3.174	0.194	0.147
30.22s	1.70f	3.176	0.186	0.147
35.22s	1.94f	3.217	0.025	0.157
35.94s	1.98f	3.221	0.000	0.157
40.00s	2.16f	3.238	-0.143	0.152
40.22s	2.17f	3.238	-0.151	0.151
45.22s	2.37f	3.237	-0.332	0.130
50.22s	2.55f	3.213	-0.518	0.093
55.22s	2.71f	3.166	-0.702	0.040
60.22s	2.84f	3.092	-0.883	-0.029

Righting Arms vs. Heel - IMO RESOLUTION A.167



IMO RESOLUTION A.167

Limit	Min/Max	Actual	Margin	Pass
(1) Area from 0.00 deg to Abs 30.00 or Flood	>0.0550 m-R	0.147	0.092	Yes
(2) Area from 0.00 deg to Abs 40.00 or Flood	>0.0900 m-R	0.152	0.062	Yes
(3) Area from 30.00 deg to Abs 40.00 or Flood	>0.0300 m-R	0.005	0.025	No
(4) Righting Arm at 30.00 deg	>0.200 m	0.186	0.014	No

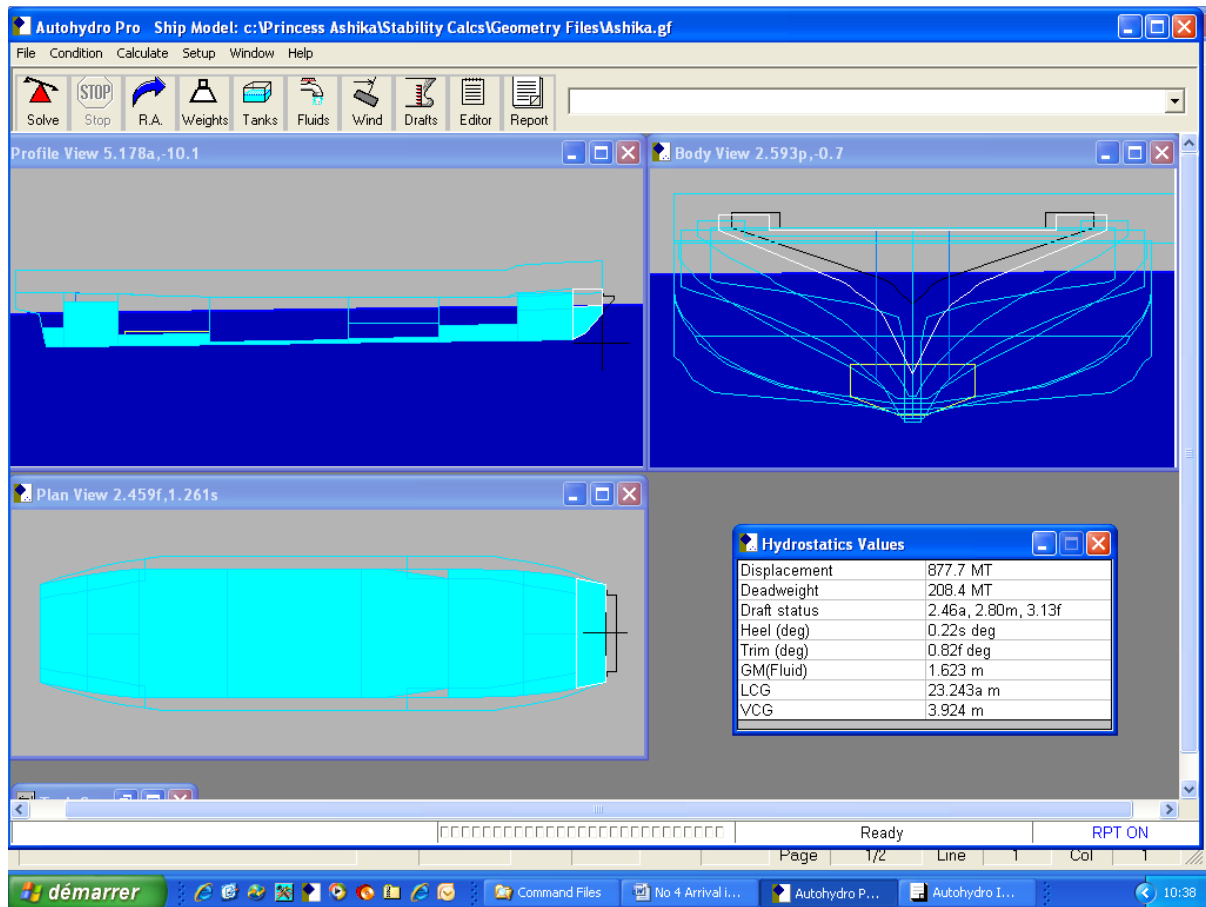
(5) Absolute Angle at MaxRA
 (6) GM Upright

>25.00 deg
 >0.150 m

17.59
 1.623

7.41
 1.473

No
 Yes



Princess Ashika - Condition No 5: Occurrence Voyage Departure

Based on Condition No 3: Estimated Lightship July 2009 with additional loads as noted:

- 110 tonnes cargo, 96 passengers and 32 crew
- Freshwater 50%
- Fuel Oil Full
- Water ballast aft port limited to sounding of 1.5 m at bulkhead FM 14 (refer Cond 4)
- Water ballast aft stbd 60% (refer Cond 4)
- Water ballast fwd (port & stbd) pumped out following departure from dock
- Fwd Void level with waterplane (refer Cond 4)
- Bilge water throughout other compartments; note level in No.1 Void assumed to have increased significantly since arrival in Tonga (July 2009)

Floating Status

Draft FP	3.879 m	Heel	stbd 2.03 deg.	GM(Solid)	2.160 m
Draft MS	3.239 m	Equil	Yes	F/S Corr.	0.550 m
Draft AP	2.599 m	Wind	Off	GM(Fluid)	1.610 m
Trim	fwd 1.279/47.000	Wave	No	KMt	6.054 m
LCG	22.380a m	VCG	3.897 m	TPcm	4.94
Displacement	1,092.29 MT	WaterSpgr	1.025		

Loading Summary

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
Light Ship	669.21	24.340a	0.000	4.550
Deadweight	423.08	19.281a	0.206s	2.863
Displacement	1,092.29	22.380a	0.080s	3.897

Fixed Weight Status

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	669.21	24.340a	0.000	4.550u
32 CREW AT 90 KG	2.88	18.500a	0.000	7.070u
96 PASSENGERS AT 75 KG	7.20	21.960a	0.000	11.750u
CARGO	110.00	23.500a	0.000	4.150u
CEMENT BOXES	10.00	23.500a	0.000	0.300u
CONCRETE ON PR DK	3.00	19.750a	0.000	8.320u
CREW BELONGINGS	0.50	17.250a	0.000	2.650u
DECK OIL	0.27	22.250a	0.000	2.550u
DOUBLERS	4.00	23.500a	0.000	1.800u
FO DAY TK	1.74	21.700a	0.000	2.300u
LIFERAFTS	1.00	21.250a	0.000	11.170u
LUB OIL	0.72	32.900a	0.000	2.200u
NEW TKS IN ENG RM	1.96	35.400a	0.000	2.780u
PROVISIONS	0.10	8.500a	0.000	4.150u
STORES	3.00	23.400a	0.000	5.100u
TANKS IN ENG RM	6.75	28.030a	0.000	1.190u
WEIGHT GROWTH	13.40	23.500a	0.000	2.000u
Total Fixed:	835.73	24.189a	0.000	4.447u

Tank Status

SALT WATER (SpGr 1.025)

Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
AFTERWBT.P	5.00%	1.51	43.483a	10.174p	4.115
AFTERWBT.S	60.00%	18.12	42.374a	3.976s	3.005
AFTVOID.C	2.00%	4.40	34.522a	0.696s	0.533
CREWACC.C	<empty>				
ENGRM.C	2.00%	7.71	25.026a	0.845s	0.160
FWDVOID.C	62.28%	15.14	1.447a	0.163s	3.014
FWDWBT.P	2.00%	0.79	5.193a	0.207p	0.586
FWDWBT.S	2.00%	0.79	5.218a	0.216s	0.585
NO1VOID.C	98.00%	170.90	10.443a	0.070s	2.374
NO2VOID.C	10.00%	9.24	17.464a	0.667s	0.302
SGROOM.C	2.00%	1.01	45.252a	0.016s	0.565
SUPERSTRUCT.C	<empty>				
WATERONDECK.C	<empty>				
Subtotals:	7.16%	229.59	13.937a	0.378s	2.265

FUEL OIL (SpGr 0.870)

Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
FUELOIL.C	98.00%	15.86	35.799a	0.010s	0.477
Subtotals:	98.00%	15.86	35.799a	0.010s	0.477

FRESH WATER (SpGr 1.000)

Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
FRESHWATER.C	50.00%	11.12	41.672a	0.004s	1.116
Subtotals:	50.00%	11.12	41.672a	0.004s	1.116

All Tanks

	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
Totals:	7.90%	256.56	16.490a	0.339s	2.104

Displacer Status

Item	Status	Spgr	Displ (MT)	LCB (m)	TCB (m)	VCB (m)	Eff /Perm
HULL.C	Intact	1.025	1,092.30	22.328a	0.148s	1.953	1.000
SubTotals:			1,092.30	22.328a	0.148s	1.953	

Critical point

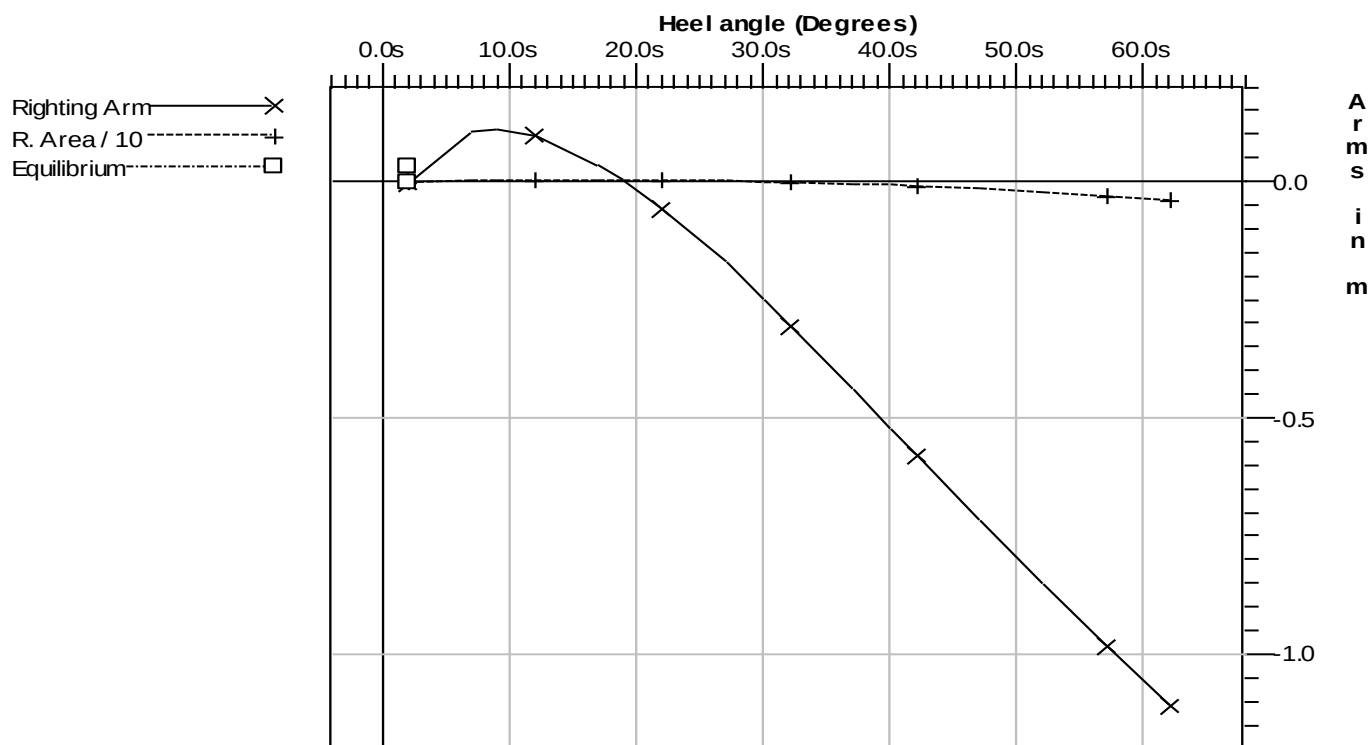
Name	L,T,V (m)	Height (m)
(1) lower edge of bow ramp	0.000, 3.060s, 4.150	0.163

Righting Arms vs. Heel - IMO RESOLUTION A.167

Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Righting Arm (m)	Area (m-Rad)
2.03s	1.56f	3.875	0.000	0.000
7.03s	1.74f	3.938	0.106	0.005
9.07s	1.91f	4.016	0.113	0.009
12.03s	2.21f	4.164	0.099	0.014
17.03s	2.81f	4.469	0.038	0.021
19.02s	3.06f	4.602	0.003	0.021
22.03s	3.46f	4.808	-0.056	0.020
27.03s	4.14f	5.158	-0.172	0.010
30.00s	4.53f	5.361	-0.248	-0.001
32.03s	4.80f	5.494	-0.303	-0.010
37.03s	5.43f	5.803	-0.439	-0.043
40.00s	5.78f	5.971	-0.523	-0.068
42.03s	6.02f	6.077	-0.579	-0.087
47.03s	6.55f	6.305	-0.715	-0.144
52.03s	7.02f	6.486	-0.850	-0.212
57.03s	7.43f	6.617	-0.981	-0.292
62.03s	7.77f	6.694	-1.107	-0.383

Righting Arms vs. Heel - IMO RESOLUTION A.167



IMO RESOLUTION A.167

Limit	Min/Max	Actual	Margin	Pass
(1) Area from 0.00 deg to Abs 30.00 or Flood	>0.0550 m-R	-0.001	0.056	No
(2) Area from 0.00 deg to Abs 40.00 or Flood	>0.0900 m-R	-0.068	0.158	No
(3) Area from 30.00 deg to Abs 40.00 or Flood	>0.0300 m-R	-0.057	0.087	No
(4) Righting Arm at 30.00 deg	>0.200 m	-0.303	0.503	No

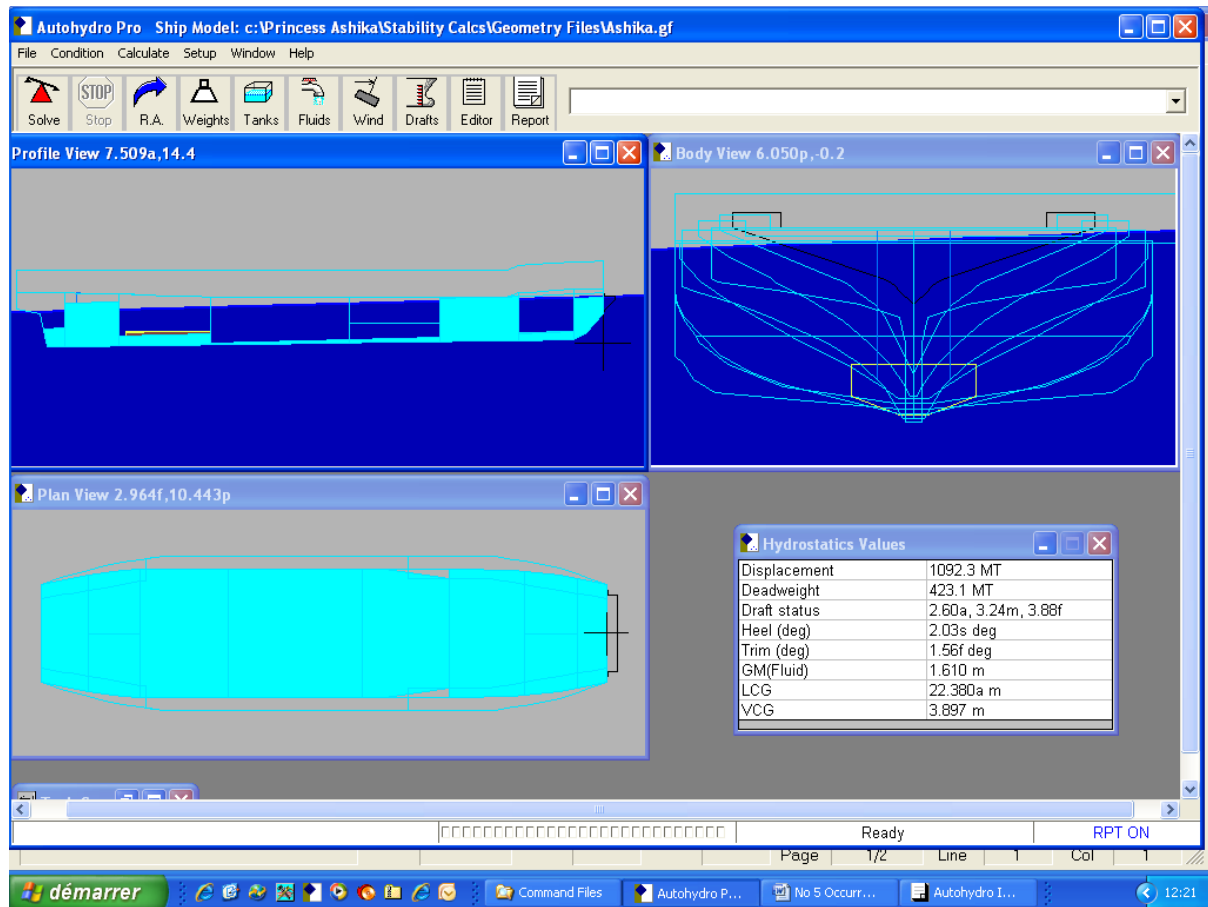
(5) Absolute Angle at MaxRA
 (6) GM Upright

>25.00 deg
 >0.150 m

9.07
 1.333

15.93
 1.183

No
 Yes



Princess Ashika - Condition No 5a: Occurrence Voyage Step 1

Based on Condition No 5: Occurrence Voyage Departure, with water ingress assumed as follows:

- in crew accommodation area sufficient to simulate approx 25 mm of water (stbd) as described in witness statement

Reference for the sounding of water in crew accommodation is at the deck, stbd side

Floating Status

Draft FP	3.879 m	Heel	stbd 2.03 deg.	GM(Solid)	2.159 m
Draft MS	3.239 m	Equil	Yes	F/S Corr.	0.550 m
Draft AP	2.598 m	Wind	Off	GM(Fluid)	1.609 m
Trim	fwd 1.280/47.000	Wave	No	KMt	6.053 m
LCG	22.380a m	VCG	3.896 m	TPcm	4.94
Displacement	1,092.38 MT	WaterSpgr	1.025		

Loading Summary

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
Light Ship	669.21	24.340a	0.000	4.550
Deadweight	423.17	19.280a	0.206s	2.863
Displacement	1,092.38	22.380a	0.080s	3.896

Fixed Weight Status

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	669.21	24.340a	0.000	4.550u
32 CREW AT 90 KG	2.88	18.500a	0.000	7.070u
96 PASSENGERS AT 75 KG	7.20	21.960a	0.000	11.750u
CARGO	110.00	23.500a	0.000	4.150u
CEMENT BOXES	10.00	23.500a	0.000	0.300u
CONCRETE ON PR DK	3.00	19.750a	0.000	8.320u
CREW BELONGINGS	0.50	17.250a	0.000	2.650u
DECK OIL	0.27	22.250a	0.000	2.550u
DOUBLERS	4.00	23.500a	0.000	1.800u
FO DAY TK	1.74	21.700a	0.000	2.300u
LIFERAFTS	1.00	21.250a	0.000	11.170u
LUB OIL	0.72	32.900a	0.000	2.200u
NEW TKS IN ENG RM	1.96	35.400a	0.000	2.780u
PROVISIONS	0.10	8.500a	0.000	4.150u
STORES	3.00	23.400a	0.000	5.100u
TANKS IN ENG RM	6.75	28.030a	0.000	1.190u
WEIGHT GROWTH	13.40	23.500a	0.000	2.000u
Total Fixed:	835.73	24.189a	0.000	4.447u

Tank Status**SALT WATER (SpGr 1.025)**

Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
AFTERWBT.P	5.00%	1.51	43.483a	10.174p	4.115
AFTERWBT.S	60.00%	18.12	42.374a	3.976s	3.005
AFTVOID.C	2.00%	4.40	34.522a	0.696s	0.533
CREWACC.C	0.05%	0.08	14.358a	4.468s	1.665

ENGRM.C	2.00%	7.71	25.025a	0.845s	0.160
FWDVOID.C	62.27%	15.14	1.447a	0.163s	3.014
FWDWBT.P	2.00%	0.79	5.193a	0.207p	0.586
FWDWBT.S	2.00%	0.79	5.218a	0.216s	0.585
NO1VOID.C	98.00%	170.90	10.443a	0.070s	2.374
NO2VOID.C	10.00%	9.24	17.463a	0.667s	0.302
SGROOM.C	2.00%	1.01	45.252a	0.016s	0.565
SUPERSTRUCT.C	<empty>				
WATERONDECK.C	<empty>				
Subtotals:	7.16%	229.67	13.937a	0.380s	2.264

FUEL OIL (SpGr 0.870)

Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
FUELOIL.C	98.00%	15.86	35.799a	0.010s	0.477
Subtotals:	98.00%	15.86	35.799a	0.010s	0.477

FRESH WATER (SpGr 1.000)

Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
FRESHWATER.C	50.00%	11.12	41.672a	0.004s	1.116
Subtotals:	50.00%	11.12	41.672a	0.004s	1.116

All Tanks

	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
Totals:	7.91%	256.65	16.490a	0.340s	2.104

Displacer Status

Item	Status	Spgr	Displ (MT)	LCB (m)	TCB (m)	VCB (m)	Eff /Perm
HULL.C	Intact	1.025	1,092.38	22.327a	0.148s	1.953	1.000
SubTotals:			1,092.38	22.327a	0.148s	1.953	

Critical point

Name	L,T,V (m)	Height (m)
(1) lower edge of bow ramp	0.000, 3.060s, 4.150	0.162

Tank Status**SALT WATER (SpGr 1.025)**

Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	Sndg (m)
AFTERWBT.P	5.00%	1.51	43.483a	10.174p	4.115	None
AFTERWBT.S	60.00%	18.12	42.374a	3.976s	3.005	None
AFTVOID.C	2.00%	4.40	34.522a	0.696s	0.533	None
CREWACC.C	0.05%	0.08	14.358a	4.468s	1.665	0.025
ENGRM.C	2.00%	7.71	25.025a	0.845s	0.160	None
FWDVOID.C	62.27%	15.14	1.447a	0.163s	3.014	None
FWDWBT.P	2.00%	0.79	5.193a	0.207p	0.586	None
FWDWBT.S	2.00%	0.79	5.218a	0.216s	0.585	None
NO1VOID.C	98.00%	170.90	10.443a	0.070s	2.374	None
NO2VOID.C	10.00%	9.24	17.463a	0.667s	0.302	None
SGROOM.C	2.00%	1.01	45.252a	0.016s	0.565	None
SUPERSTRUCT.C	<empty>					
WATERONDECK.C	<empty>					
Subtotals:	7.16%	229.67	13.937a	0.380s	2.264	

FUEL OIL (SpGr 0.870)

Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	Sndg (m)
FUELOIL.C	98.00%	15.86	35.799a	0.010s	0.477	None
Subtotals:	98.00%	15.86	35.799a	0.010s	0.477	

FRESH WATER (SpGr 1.000)

Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	Sndg (m)
FRESHWATER.C	50.00%	11.12	41.672a	0.004s	1.116	None
Subtotals:	50.00%	11.12	41.672a	0.004s	1.116	

All Tanks

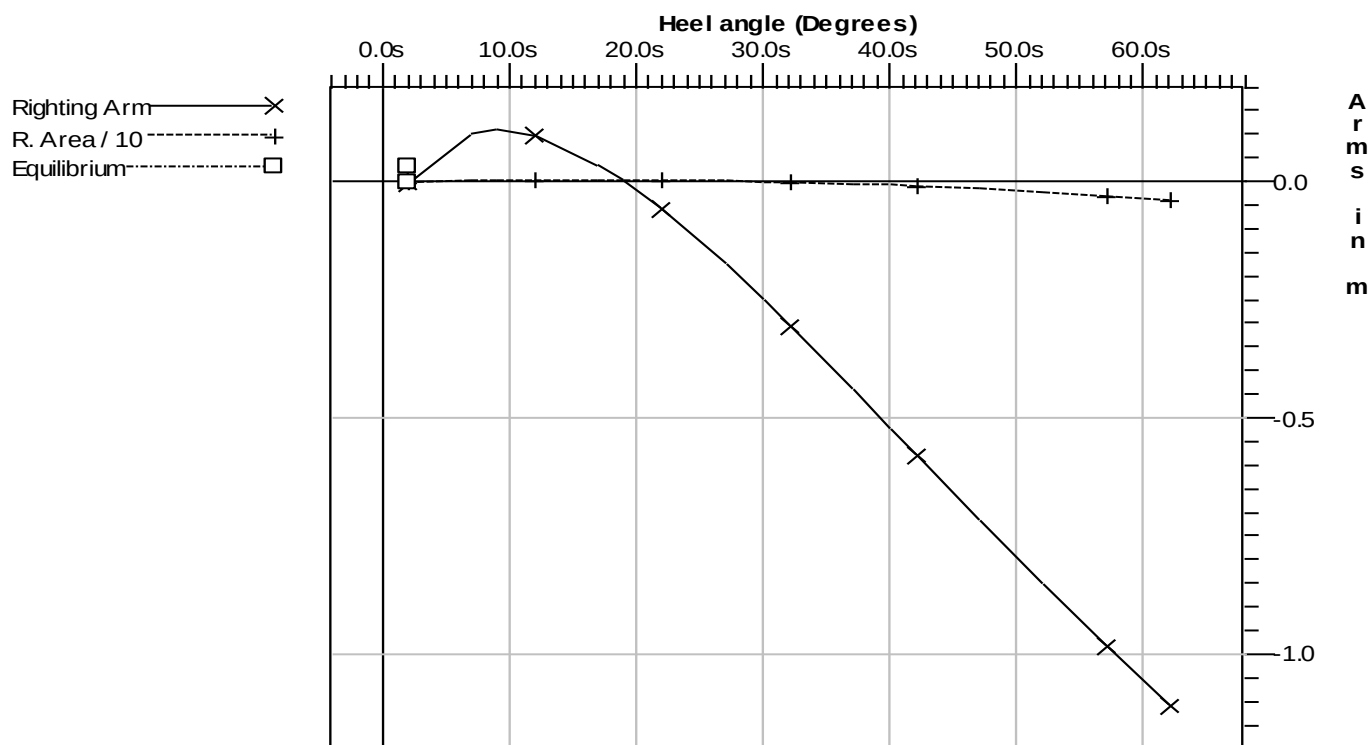
	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	Sndg (m)
Totals:	7.91%	256.65	16.490a	0.340s	2.104	

Righting Arms vs. Heel - IMO RESOLUTION A.167

Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Righting Arm (m)	Area (m-Rad)
2.03s	1.56f	3.875	0.000	0.000
7.03s	1.74f	3.939	0.105	0.005
9.07s	1.91f	4.017	0.112	0.009
12.03s	2.21f	4.165	0.098	0.014
17.03s	2.81f	4.470	0.037	0.021
19.00s	3.06f	4.601	0.003	0.021
22.03s	3.46f	4.809	-0.057	0.020
27.03s	4.14f	5.160	-0.173	0.010
30.00s	4.53f	5.362	-0.249	-0.001
32.03s	4.80f	5.496	-0.303	-0.011
37.03s	5.43f	5.805	-0.440	-0.043
40.00s	5.79f	5.973	-0.523	-0.068
42.03s	6.02f	6.079	-0.579	-0.087
47.03s	6.55f	6.307	-0.716	-0.144
52.03s	7.03f	6.488	-0.851	-0.212
57.03s	7.44f	6.620	-0.982	-0.292
62.03s	7.78f	6.697	-1.107	-0.383

Righting Arms vs. Heel - IMO RESOLUTION A.167



IMO RESOLUTION A.167

Limit	Min/Max	Actual	Margin	Pass
(1) Area from 0.00 deg to Abs 30.00 or Flood	>0.0550 m-R	-0.001	0.056	No
(2) Area from 0.00 deg to Abs 40.00 or Flood	>0.0900 m-R	-0.068	0.158	No
(3) Area from 30.00 deg to Abs 40.00 or Flood	>0.0300 m-R	-0.057	0.087	No
(4) Righting Arm at 30.00 deg	>0.200 m	-0.303	0.503	No

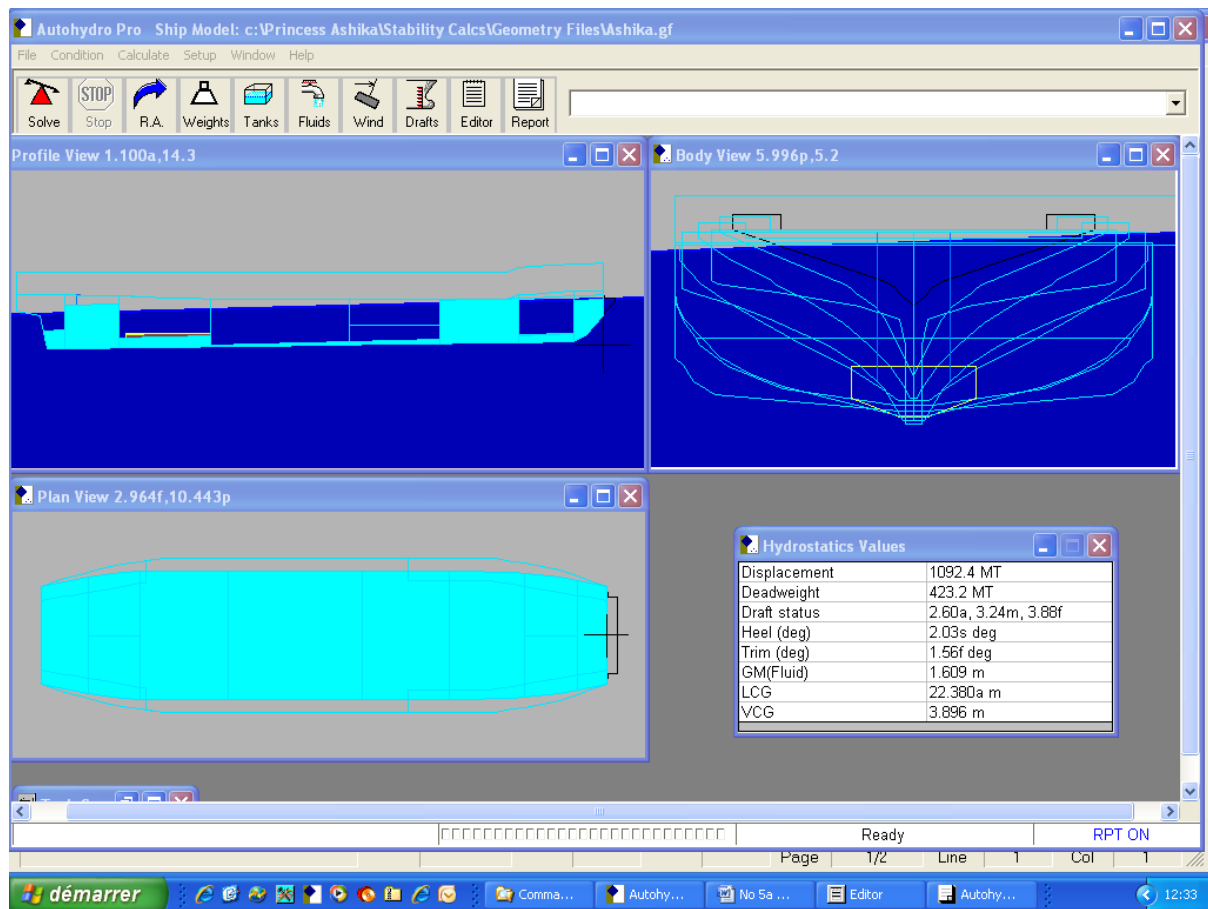
(5) Absolute Angle at MaxRA
 (6) GM Upright

>25.00 deg
 >0.150 m

9.07
 1.320

15.93
 1.170

No
 Yes



Princess Ashika - Condition No 5b: Occurrence Voyage Steps 2-5

Based on Condition No 5a: Occurrence Voyage Departure Step 1, with increased water ingress assumed as follows:

- in crew accommodation area sufficient to simulate approx 110 mm of water (stbd side) as per witness stmt
- in cargo deck sufficient to simulate approx 250 mm at bow ramp stbd and 500 mm at midships stbd as per witness statements

Reference for the sounding of water on deck is at the main deck, stbd midship
Reference for the sounding of water in crew accommodation is at the deck, stbd side

Floating Status

Draft FP	3.942 m	Heel	stbd 2.92 deg.	GM(Solid)	1.907 m
Draft MS	3.258 m	Equil	Yes	F/S Corr.	0.760 m
Draft AP	2.574 m	Wind	Off	GM(Fluid)	1.148 m
Trim	fwd 1.366/47.000	Wave	No	KMt	5.800 m
LCG	22.273a m	VCG	3.896 m	TPcm	4.74
Displacement	1,101.61 MT	WaterSpgr	1.025		

Loading Summary

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
Light Ship	669.21	24.340a	0.000	4.550
Deadweight	432.40	19.074a	0.279s	2.885
Displacement	1,101.61	22.273a	0.109s	3.896

Fixed Weight Status

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	669.21	24.340a	0.000	4.550u
32 CREW AT 90 KG	2.88	18.500a	0.000	7.070u
96 PASSENGERS AT 75 KG	7.20	21.960a	0.000	11.750u
CARGO	110.00	23.500a	0.000	4.150u
CEMENT BOXES	10.00	23.500a	0.000	0.300u
CONCRETE ON PR DK	3.00	19.750a	0.000	8.320u
CREW BELONGINGS	0.50	17.250a	0.000	2.650u
DECK OIL	0.27	22.250a	0.000	2.550u
DOUBLERS	4.00	23.500a	0.000	1.800u
FO DAY TK	1.74	21.700a	0.000	2.300u
LIFERAFTS	1.00	21.250a	0.000	11.170u
LUB OIL	0.72	32.900a	0.000	2.200u
NEW TKS IN ENG RM	1.96	35.400a	0.000	2.780u
PROVISIONS	0.10	8.500a	0.000	4.150u
STORES	3.00	23.400a	0.000	5.100u
TANKS IN ENG RM	6.75	28.030a	0.000	1.190u
WEIGHT GROWTH	13.40	23.500a	0.000	2.000u
Total Fixed:	835.73	24.189a	0.000	4.447u

Tank Status

SALT WATER (SpGr 1.025)

Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
AFTERWBT.P	5.00%	1.51	43.566a	10.359p	4.108

AFTERWBT.S	60.00%	18.12	42.360a	3.972s	3.005
AFTVOID.C	2.00%	4.40	34.490a	0.989s	0.545
CREWACC.C	0.35%	0.60	15.365a	4.357s	1.687
ENGRM.C	2.00%	7.71	24.835a	1.196s	0.179
FWDVOID.C	62.27%	15.14	1.446a	0.236s	3.017
FWDWBT.P	2.00%	0.79	5.180a	0.204p	0.587
FWDWBT.S	2.00%	0.79	5.216a	0.218s	0.585
NO1VOID.C	98.00%	170.90	10.443a	0.078s	2.375
NO2VOID.C	10.00%	9.24	17.464a	0.934s	0.314
SGROOM.C	2.00%	1.01	45.252a	0.017s	0.565
SUPERSTRUCT.C	<empty>				
WATERONDECK.C	1.50%	8.72	9.483a	2.549s	3.970
Subtotals:	7.45%	238.90	13.771a	0.504s	2.327

FUEL OIL (SpGr 0.870)

Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
FUELOIL.C	98.00%	15.86	35.801a	0.012s	0.477
Subtotals:	98.00%	15.86	35.801a	0.012s	0.477

FRESH WATER (SpGr 1.000)

Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
FRESHWATER.C	50.00%	11.12	41.671a	0.006s	1.116
Subtotals:	50.00%	11.12	41.671a	0.006s	1.116

All Tanks

	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
Totals:	8.19%	265.88	16.252a	0.454s	2.166

Displacer Status

Item	Status	Spgr	Displ (MT)	LCB (m)	TCB (m)	VCB (m)	Eff /Perm
HULL.C	Intact	1.025	1,101.61	22.217a	0.207s	1.970	1.000
SubTotals:			1,101.61	22.217a	0.207s	1.970	

Critical point

Name	L,T,V (m)	Height (m)
(1) lower edge of bow ramp	0.000, 3.060s, 4.150	0.052

Tank Status**SALT WATER (SpGr 1.025)**

Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	Sndg (m)
AFTERWBT.P	5.00%	1.51	43.566a	10.359p	4.108	None
AFTERWBT.S	60.00%	18.12	42.360a	3.972s	3.005	None
AFTVOID.C	2.00%	4.40	34.490a	0.989s	0.545	None
CREWACC.C	0.35%	0.60	15.365a	4.357s	1.687	0.110
ENGRM.C	2.00%	7.71	24.835a	1.196s	0.179	None
FWDVOID.C	62.27%	15.14	1.446a	0.236s	3.017	None
FWDWBT.P	2.00%	0.79	5.180a	0.204p	0.587	None
FWDWBT.S	2.00%	0.79	5.216a	0.218s	0.585	None
NO1VOID.C	98.00%	170.90	10.443a	0.078s	2.375	None
NO2VOID.C	10.00%	9.24	17.464a	0.934s	0.314	None
SGROOM.C	2.00%	1.01	45.252a	0.017s	0.565	None
SUPERSTRUCT.C	<empty>					

WATERONDECK.C	1.50%	8.72	9.483a	2.549s	3.970	0.069
Subtotals:	7.45%	238.90	13.771a	0.504s	2.327	

FUEL OIL (SpGr 0.870)

Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	Sndg (m)
FUELOIL.C	98.00%	15.86	35.801a	0.012s	0.477	None
Subtotals:	98.00%	15.86	35.801a	0.012s	0.477	

FRESH WATER (SpGr 1.000)

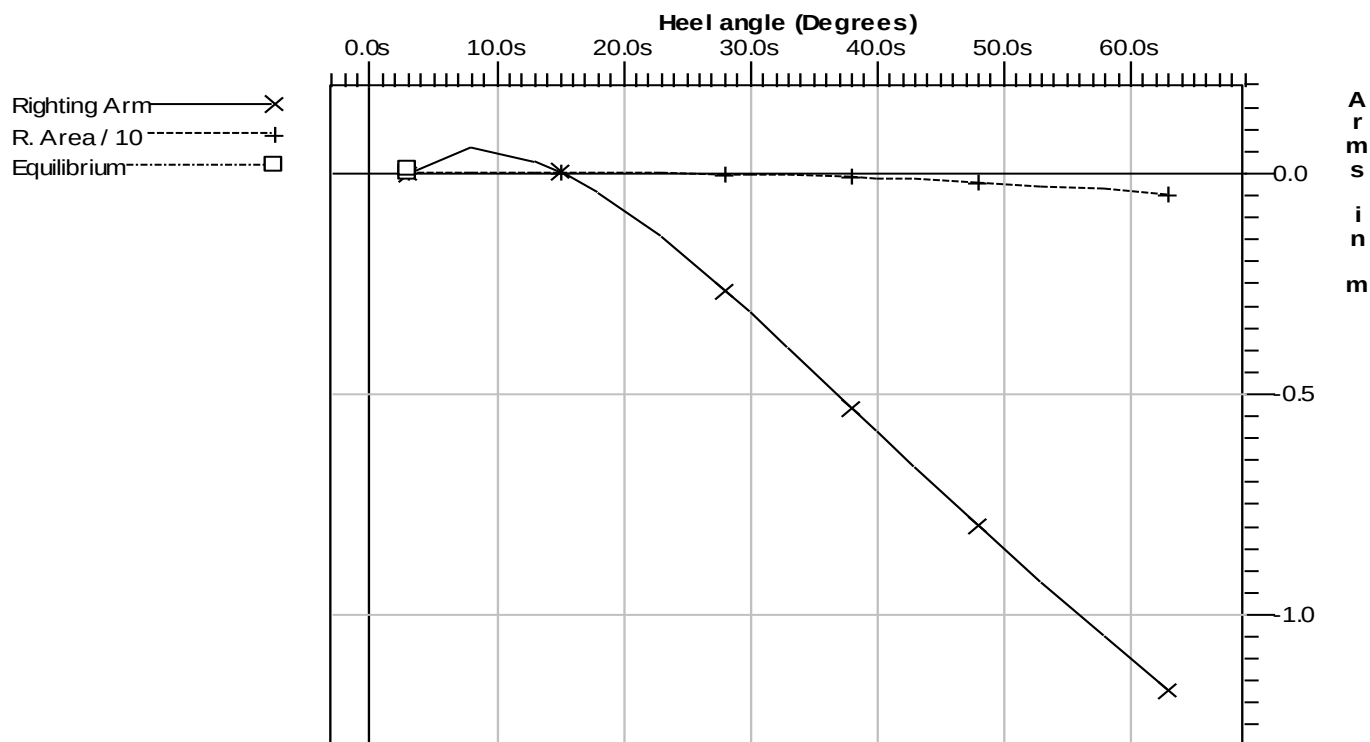
Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	Sndg (m)
FRESHWATER.C	50.00%	11.12	41.671a	0.006s	1.116	None
Subtotals:	50.00%	11.12	41.671a	0.006s	1.116	

All Tanks

	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	Sndg (m)
Totals:	8.19%	265.88	16.252a	0.454s	2.166	

Righting Arms vs. Heel - IMO RESOLUTION A.167**Righting Arms vs Heel Angle**

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Righting Arm (m)	Area (m-Rad)
2.92s	1.66f	3.935	0.000	0.000
7.92s	1.93f	4.047	0.061	0.003
12.92s	2.46f	4.315	0.031	0.007
15.00s	2.72f	4.451	0.004	0.008
17.92s	3.11f	4.654	-0.043	0.007
22.92s	3.82f	5.025	-0.144	-0.001
27.92s	4.54f	5.400	-0.262	-0.018
30.00s	4.83f	5.550	-0.316	-0.029
32.92s	5.23f	5.755	-0.393	-0.047
37.92s	5.90f	6.082	-0.529	-0.087
40.00s	6.15f	6.203	-0.585	-0.107
42.92s	6.51f	6.365	-0.663	-0.139
47.92s	7.07f	6.609	-0.795	-0.203
52.92s	7.57f	6.803	-0.925	-0.278
57.92s	8.00f	6.945	-1.050	-0.364
62.92s	8.35f	7.027	-1.168	-0.461

Righting Arms vs. Heel - IMO RESOLUTION A.167**IMO RESOLUTION A.167**

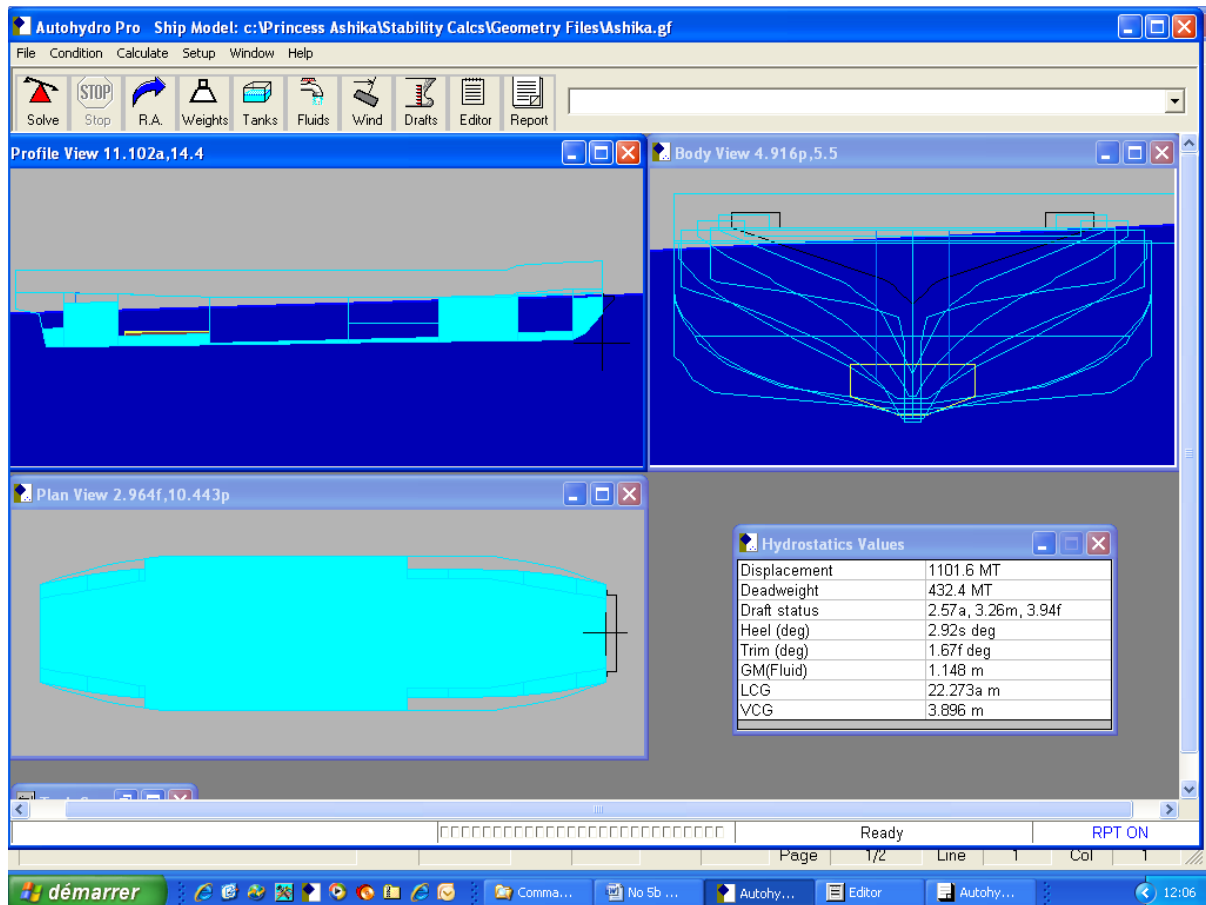
Limit	Min/Max	Actual	Margin	Pass
(1) Area from 0.00 deg to Abs 30.00 or Flood	>0.0550 m-R	-0.029	0.084	No
(2) Area from 0.00 deg to Abs 40.00 or Flood	>0.0900 m-R	-0.107	0.197	No
(3) Area from 30.00 deg to Abs 40.00 or Flood	>0.0300 m-R	-0.060	0.090	No
(4) Righting Arm at 30.00 deg	>0.200 m	-0.393	0.593	No
(5) Absolute Angle at MaxRA	>25.00 deg	7.92	17.08	No

(6) GM Upright

>0.150 m

0.803

0.653 Yes



Princess Ashika - Condition No 5c: Occurrence Voyage Steps 6-8

Based on Condition No 5b: Occurrence Voyage Departure Steps 2-5, with aft stbd water ballast pumped down so as to give port list.

Reference for the sounding of water on deck is at the main deck, port fwd
Reference for the sounding of water in crew accommodation is at the deck, port side near fwd bhd

Floating Status

Draft FP	4.011 m	Heel	port 0.20 deg.	GM(Solid)	2.158 m
Draft MS	3.222 m	Equil	Yes	F/S Corr.	1.220 m
Draft AP	2.434 m	Wind	Off	GM(Fluid)	0.938 m
Trim	fwd 1.577/47.000	Wave	No	KMt	6.069 m
LCG	21.912a m	VCG	3.912 m	TPcm	4.86
Displacement	1,085.24 MT	WaterSpgr	1.025		

Loading Summary

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
Light Ship	669.21	24.340a	0.000	4.550
Deadweight	416.03	18.006a	0.019p	2.885
Displacement	1,085.24	21.912a	0.007p	3.912

Fixed Weight Status

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	669.21	24.340a	0.000	4.550u
32 CREW AT 90 KG	2.88	18.500a	0.000	7.070u
96 PASSENGERS AT 75 KG	7.20	21.960a	0.000	11.750u
CARGO	110.00	23.500a	0.000	4.150u
CEMENT BOXES	10.00	23.500a	0.000	0.300u
CONCRETE ON PR DK	3.00	19.750a	0.000	8.320u
CREW BELONGINGS	0.50	17.250a	0.000	2.650u
DECK OIL	0.27	22.250a	0.000	2.550u
DOUBLERS	4.00	23.500a	0.000	1.800u
FO DAY TK	1.74	21.700a	0.000	2.300u
LIFERAFTS	1.00	21.250a	0.000	11.170u
LUB OIL	0.72	32.900a	0.000	2.200u
NEW TKS IN ENG RM	1.96	35.400a	0.000	2.780u
PROVISIONS	0.10	8.500a	0.000	4.150u
STORES	3.00	23.400a	0.000	5.100u
TANKS IN ENG RM	6.75	28.030a	0.000	1.190u
WEIGHT GROWTH	13.40	23.500a	0.000	2.000u
Total Fixed:	835.73	24.189a	0.000	4.447u

Tank Status

SALT WATER (SpGr 1.025)

Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
AFTERWBT.P	5.00%	1.51	43.159a	9.766p	4.110
AFTERWBT.S	3.00%	0.91	43.936a	14.423s	5.352
AFTVOID.C	2.00%	4.40	34.450a	0.068p	0.521
CREWACC.C	0.35%	0.60	14.200a	2.143p	1.668
ENGRM.C	2.00%	7.71	24.711a	0.084p	0.153

FWDVOID.C	65.74%	15.98	1.435a	0.016p	3.051
FWDWBT.P	2.00%	0.79	5.179a	0.210p	0.587
FWDWBT.S	2.00%	0.79	5.177a	0.209s	0.587
NO1VOID.C	98.00%	170.90	10.428a	0.009p	2.374
NO2VOID.C	10.00%	9.24	17.272a	0.062p	0.296
SGROOM.C	2.00%	1.01	45.251a	0.000	0.564
SUPERSTRUCT.C	<empty>				
WATERONDECK.C	1.50%	8.72	6.843a	0.181p	3.984
Subtotals:	6.94%	222.53	11.384a	0.036p	2.287

FUEL OIL (SpGr 0.870)

Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
FUELOIL.C	98.00%	15.86	35.792a	0.000	0.476
Subtotals:	98.00%	15.86	35.792a	0.000	0.476

FRESH WATER (SpGr 1.000)

Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
FRESHWATER.C	50.00%	11.12	41.668a	0.000	1.116
Subtotals:	50.00%	11.12	41.668a	0.000	1.116

All Tanks

	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
Totals:	7.69%	249.51	14.285a	0.032p	2.120

Displacer Status

Item	Status	Spgr	Displ (MT)	LCB (m)	TCB (m)	VCB (m)	Eff /Perm
HULL.C	Intact	1.025	1,085.24	21.846a	0.014p	1.956	1.000
SubTotals:			1,085.24	21.846a	0.014p	1.956	

Critical point

Name	L,T,V (m)	Height (m)
(1) lower edge of bow ramp	0.000, 3.060s, 4.150	0.150

Tank Status**SALT WATER (SpGr 1.025)**

Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	Sndg (m)
AFTERWBT.P	5.00%	1.51	43.159a	9.766p	4.110	None
AFTERWBT.S	3.00%	0.91	43.936a	14.423s	5.352	None
AFTVOID.C	2.00%	4.40	34.450a	0.068p	0.521	None
CREWACC.C	0.35%	0.60	14.200a	2.143p	1.668	0.062
ENGRM.C	2.00%	7.71	24.711a	0.084p	0.153	None
FWDVOID.C	65.74%	15.98	1.435a	0.016p	3.051	None
FWDWBT.P	2.00%	0.79	5.179a	0.210p	0.587	None
FWDWBT.S	2.00%	0.79	5.177a	0.209s	0.587	None
NO1VOID.C	98.00%	170.90	10.428a	0.009p	2.374	None
NO2VOID.C	10.00%	9.24	17.272a	0.062p	0.296	None
SGROOM.C	2.00%	1.01	45.251a	0.000	0.564	None
SUPERSTRUCT.C	<empty>					
WATERONDECK.C	1.50%	8.72	6.843a	0.181p	3.984	0.154
Subtotals:	6.94%	222.53	11.384a	0.036p	2.287	

FUEL OIL (SpGr 0.870)

Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	Sndg (m)
FUELOIL.C	98.00%	15.86	35.792a	0.000	0.476	None
Subtotals:	98.00%	15.86	35.792a	0.000	0.476	

FRESH WATER (SpGr 1.000)

Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	Sndg (m)
FRESHWATER.C	50.00%	11.12	41.668a	0.000	1.116	None
Subtotals:	50.00%	11.12	41.668a	0.000	1.116	

All Tanks

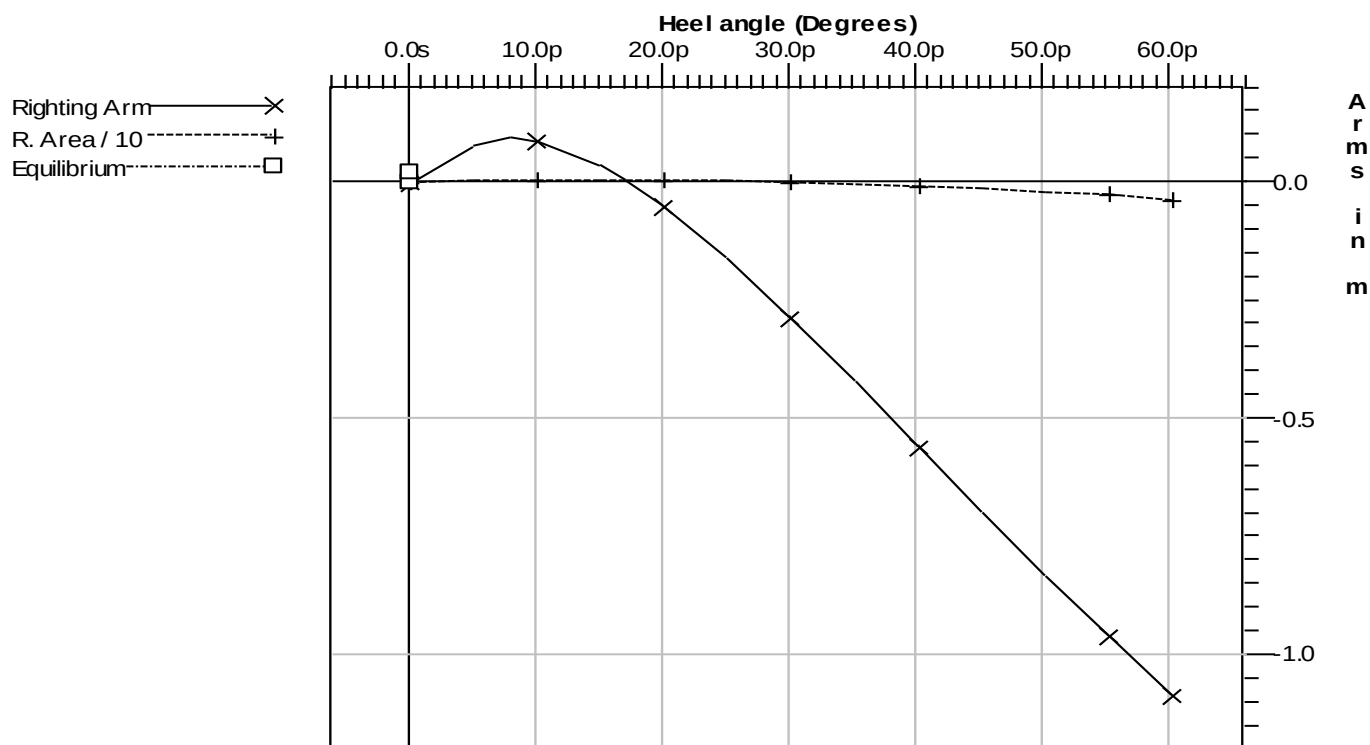
	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	Sndg (m)
Totals:	7.69%	249.51	14.285a	0.032p	2.120	

Righting Arms vs. Heel - IMO RESOLUTION A.167

Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Righting Arm (m)	Area (m-Rad)
0.20p	1.92f	4.008	0.000	0.000
5.20p	2.04f	4.054	0.080	0.003
8.15p	2.28f	4.169	0.093	0.008
10.20p	2.51f	4.280	0.086	0.011
15.20p	3.17f	4.614	0.035	0.017
17.18p	3.46f	4.764	0.004	0.018
20.20p	3.93f	5.002	-0.052	0.016
25.20p	4.71f	5.408	-0.162	0.007
30.00p	5.47f	5.790	-0.282	-0.011
30.20p	5.50f	5.804	-0.288	-0.012
35.20p	6.26f	6.178	-0.424	-0.043
40.00p	6.95f	6.506	-0.557	-0.084
40.20p	6.97f	6.516	-0.562	-0.086
45.20p	7.65f	6.822	-0.699	-0.141
50.20p	8.27f	7.081	-0.833	-0.208
55.20p	8.81f	7.281	-0.962	-0.286
60.20p	9.25f	7.421	-1.086	-0.376

Righting Arms vs. Heel - IMO RESOLUTION A.167



IMO RESOLUTION A.167

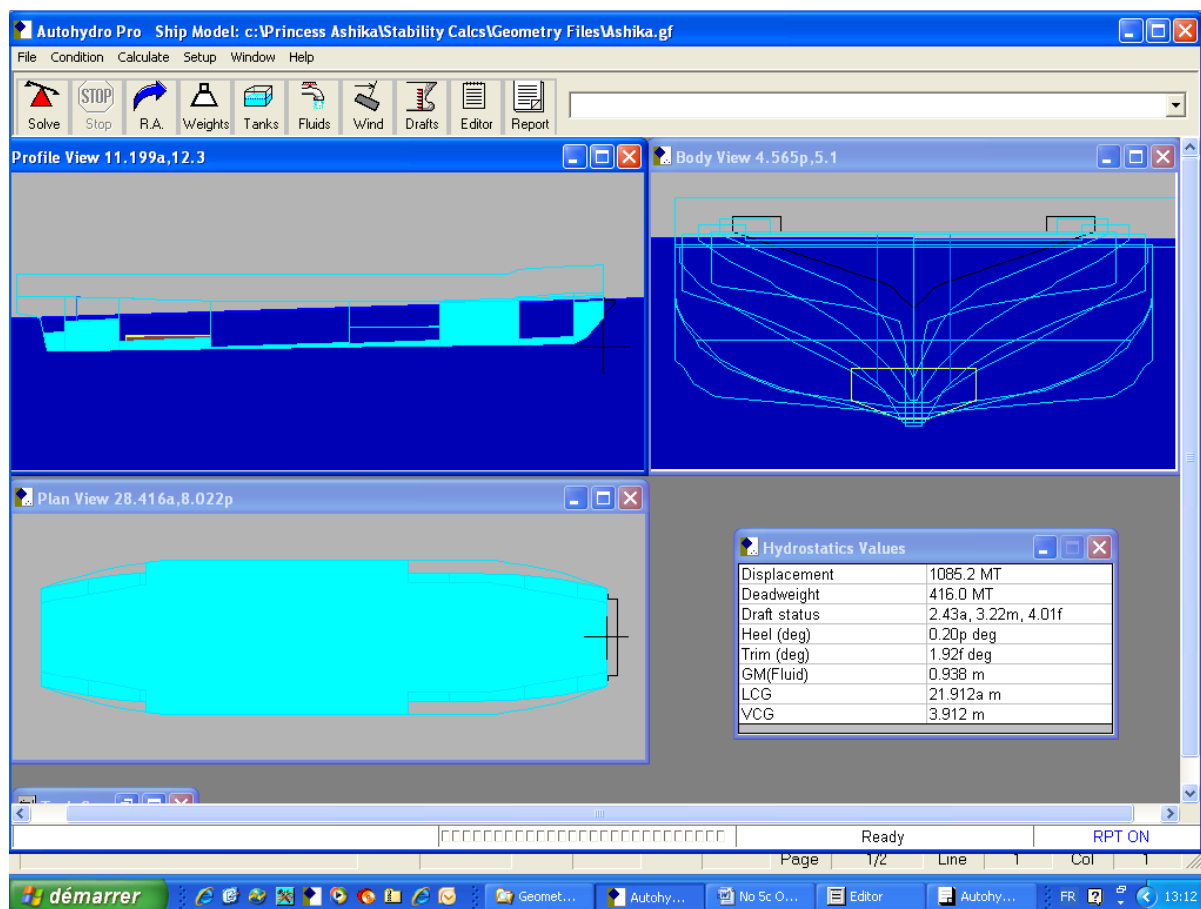
Limit	Min/Max	Actual	Margin	Pass
(1) Area from 0.00 deg to Abs 30.00 or Flood	>0.0550 m-R	-0.011	0.066	No
(2) Area from 0.00 deg to Abs 40.00 or Flood	>0.0900 m-R	-0.084	0.174	No
(3) Area from 30.00 deg to Abs 40.00 or Flood	>0.0300 m-R	-0.072	0.102	No
(4) Righting Arm at 30.00 deg	>0.200 m	-0.288	0.488	No

(5) Absolute Angle at MaxRA
 (6) GM Upright

>25.00 deg
 >0.150 m

8.15
 0.908

16.85
 0.758
 No
 Yes



Princess Ashika - Condition No 5d: Occurrence Voyage Step 9

Based on Condition No 5c: Occurrence Voyage Steps 6-8, with increasing downflooding in E /R such that port engine flywheel immersed

Reference for the sounding of water on deck is at the main deck, port fwd
 Reference for the sounding of water in crew accommodation is at the deck, port near fwd bhd
 Reference for sounding in E /R is lowest point of port flywheel

Floating Status

Draft FP	4.052 m	Heel	port 0.31 deg.	GM(Solid)	2.140 m
Draft MS	3.288 m	Equil	Yes	F/S Corr.	1.632 m
Draft AP	2.524 m	Wind	Off	GM(Fluid)	0.507 m
Trim	fwd 1.528/47.000	Wave	No	KMt	5.954 m
LCG	22.015a m	VCG	3.815 m	TPcm	4.77
Displacement	1,116.71 MT	WaterSpgr	1.025		

Loading Summary

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
Light Ship	669.21	24.340a	0.000	4.550
Deadweight	447.50	18.538a	0.030p	2.717
Displacement	1,116.71	22.015a	0.012p	3.815

Fixed Weight Status

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	669.21	24.340a	0.000	4.550u
32 CREW AT 90 KG	2.88	18.500a	0.000	7.070u
96 PASSENGERS AT 75 KG	7.20	21.960a	0.000	11.750u
CARGO	110.00	23.500a	0.000	4.150u
CEMENT BOXES	10.00	23.500a	0.000	0.300u
CONCRETE ON PR DK	3.00	19.750a	0.000	8.320u
CREW BELONGINGS	0.50	17.250a	0.000	2.650u
DECK OIL	0.27	22.250a	0.000	2.550u
DOUBLERS	4.00	23.500a	0.000	1.800u
FO DAY TK	1.74	21.700a	0.000	2.300u
LIFERAFTS	1.00	21.250a	0.000	11.170u
LUB OIL	0.72	32.900a	0.000	2.200u
NEW TKS IN ENG RM	1.96	35.400a	0.000	2.780u
PROVISIONS	0.10	8.500a	0.000	4.150u
STORES	3.00	23.400a	0.000	5.100u
TANKS IN ENG RM	6.75	28.030a	0.000	1.190u
WEIGHT GROWTH	13.40	23.500a	0.000	2.000u
Total Fixed:	835.73	24.189a	0.000	4.447u

Tank Status**SALT WATER (SpGr 1.025)**

Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
AFTERWBT.P	5.00%	1.51	43.156a	9.739p	4.110
AFTERWBT.S	3.00%	0.91	43.972a	14.454s	5.354
AFTVOID.C	2.00%	4.40	34.463a	0.107p	0.521

CREWACC.C	0.35%	0.60	14.246a	2.253p	1.669
ENGRM.C	10.00%	38.54	25.756a	0.093p	0.372
FWDVOID.C	68.37%	16.62	1.430a	0.027p	3.079
FWDWBT.P	2.00%	0.79	5.184a	0.211p	0.587
FWDWBT.S	2.00%	0.79	5.181a	0.209s	0.587
NO1VOID.C	98.00%	170.90	10.430a	0.015p	2.374
NO2VOID.C	10.00%	9.24	17.295a	0.099p	0.296
SGROOM.C	2.00%	1.01	45.251a	0.000	0.564
SUPERSTRUCT.C	<empty>				
WATERONDECK.C	1.50%	8.72	6.988a	0.280p	3.980
Subtotals:	7.92%	254.00	13.142a	0.053p	2.065

FUEL OIL (SpGr 0.870)

Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
FUELOIL.C	98.00%	15.86	35.793a	0.001p	0.476
Subtotals:	98.00%	15.86	35.793a	0.001p	0.476

FRESH WATER (SpGr 1.000)

Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
FRESHWATER.C	50.00%	11.12	41.669a	0.000	1.116
Subtotals:	50.00%	11.12	41.669a	0.000	1.116

All Tanks

	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
Totals:	8.65%	280.98	15.550a	0.048p	1.938

Displacer Status

Item	Status	Spgr	Displ (MT)	LCB (m)	TCB (m)	VCB (m)	Eff /Perm
HULL.C	Intact	1.025	1,116.71	21.956a	0.022p	1.991	1.000
SubTotals:			1,116.71	21.956a	0.022p	1.991	

Critical point

Name	L,T,V (m)	Height (m)
(1) lower edge of bow ramp	0.000, 3.060s, 4.150	0.114

Tank Status**SALT WATER (SpGr 1.025)**

Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	Sndg (m)
AFTERWBT.P	5.00%	1.51	43.156a	9.739p	4.110	None
AFTERWBT.S	3.00%	0.91	43.972a	14.454s	5.354	None
AFTVOID.C	2.00%	4.40	34.463a	0.107p	0.521	None
CREWACC.C	0.35%	0.60	14.246a	2.253p	1.669	0.070
ENGRM.C	10.00%	38.54	25.756a	0.093p	0.372	0.007
FWDVOID.C	68.37%	16.62	1.430a	0.027p	3.079	None
FWDWBT.P	2.00%	0.79	5.184a	0.211p	0.587	None
FWDWBT.S	2.00%	0.79	5.181a	0.209s	0.587	None
NO1VOID.C	98.00%	170.90	10.430a	0.015p	2.374	None
NO2VOID.C	10.00%	9.24	17.295a	0.099p	0.296	None
SGROOM.C	2.00%	1.01	45.251a	0.000	0.564	None
SUPERSTRUCT.C	<empty>					
WATERONDECK.C	1.50%	8.72	6.988a	0.280p	3.980	0.151
Subtotals:	7.92%	254.00	13.142a	0.053p	2.065	

FUEL OIL (SpGr 0.870)

Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	Sndg (m)
FUELOIL.C	98.00%	15.86	35.793a	0.001p	0.476	None
Subtotals:	98.00%	15.86	35.793a	0.001p	0.476	

FRESH WATER (SpGr 1.000)

Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	Sndg (m)
FRESHWATER.C	50.00%	11.12	41.669a	0.000	1.116	None
Subtotals:	50.00%	11.12	41.669a	0.000	1.116	

All Tanks

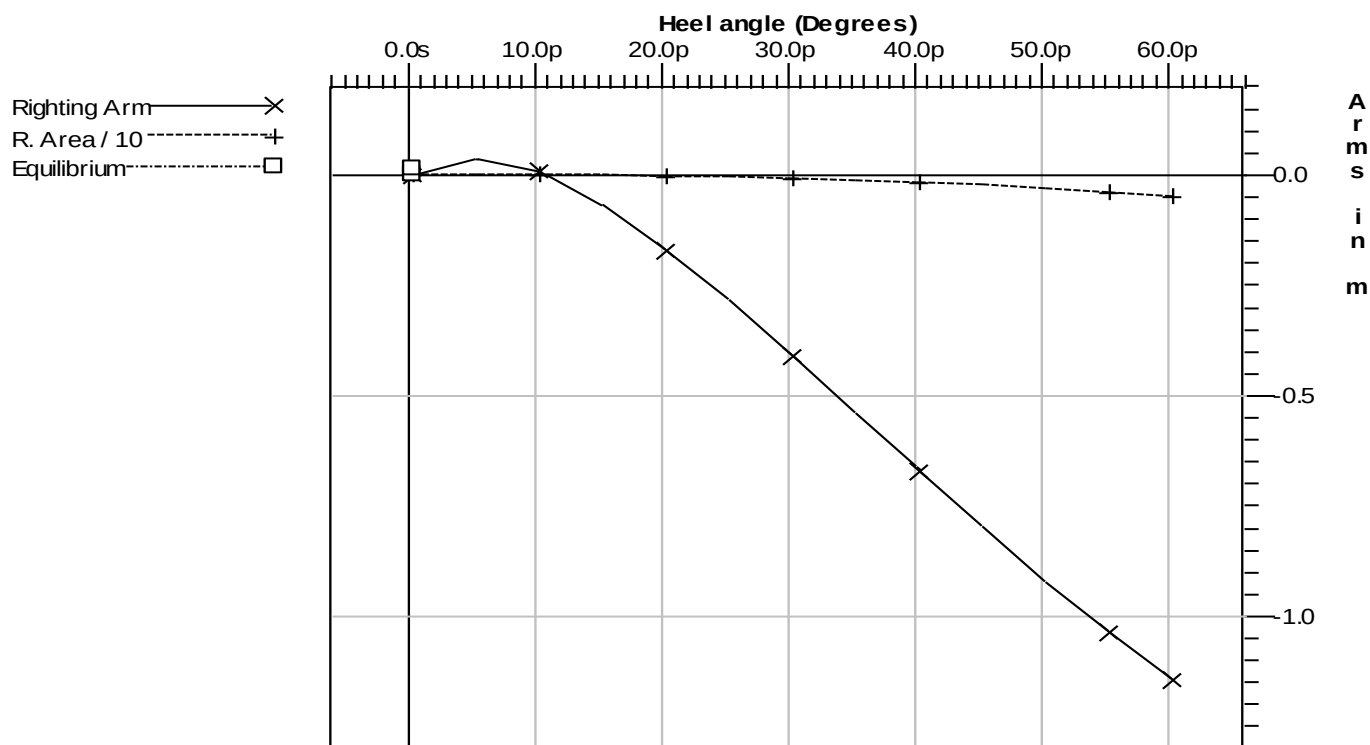
	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	Sndg (m)
Totals:	8.65%	280.98	15.550a	0.048p	1.938	

Righting Arms vs. Heel - IMO RESOLUTION A.167

Righting Arms vs Heel Angle

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Righting Arm (m)	Area (m-Rad)
0.31p	1.86f	4.050	0.000	0.000
5.31p	2.04f	4.131	0.037	0.002
5.51p	2.05f	4.139	0.038	0.002
10.31p	2.60f	4.418	0.009	0.004
10.89p	2.68f	4.460	0.002	0.004
15.31p	3.35f	4.810	-0.067	0.002
20.31p	4.17f	5.251	-0.167	-0.008
25.31p	5.01f	5.698	-0.283	-0.028
30.00p	5.79f	6.105	-0.399	-0.055
30.31p	5.84f	6.130	-0.407	-0.058
35.31p	6.66f	6.547	-0.539	-0.099
40.00p	7.41f	6.918	-0.662	-0.148
40.31p	7.45f	6.937	-0.670	-0.152
45.31p	8.21f	7.299	-0.797	-0.216
50.31p	8.91f	7.610	-0.920	-0.291
55.31p	9.51f	7.858	-1.035	-0.376
60.31p	10.01f	8.033	-1.144	-0.471

Righting Arms vs. Heel - IMO RESOLUTION A.167



IMO RESOLUTION A.167

Limit	Min/Max	Actual	Margin	Pass
(1) Area from 0.00 deg to Abs 30.00 or Flood	>0.0550 m-R	-0.055	0.110	No
(2) Area from 0.00 deg to Abs 40.00 or Flood	>0.0900 m-R	-0.148	0.238	No
(3) Area from 30.00 deg to Abs 40.00 or Flood	>0.0300 m-R	-0.090	0.120	No
(4) Righting Arm at 30.00 deg	>0.200 m	-0.407	0.607	No

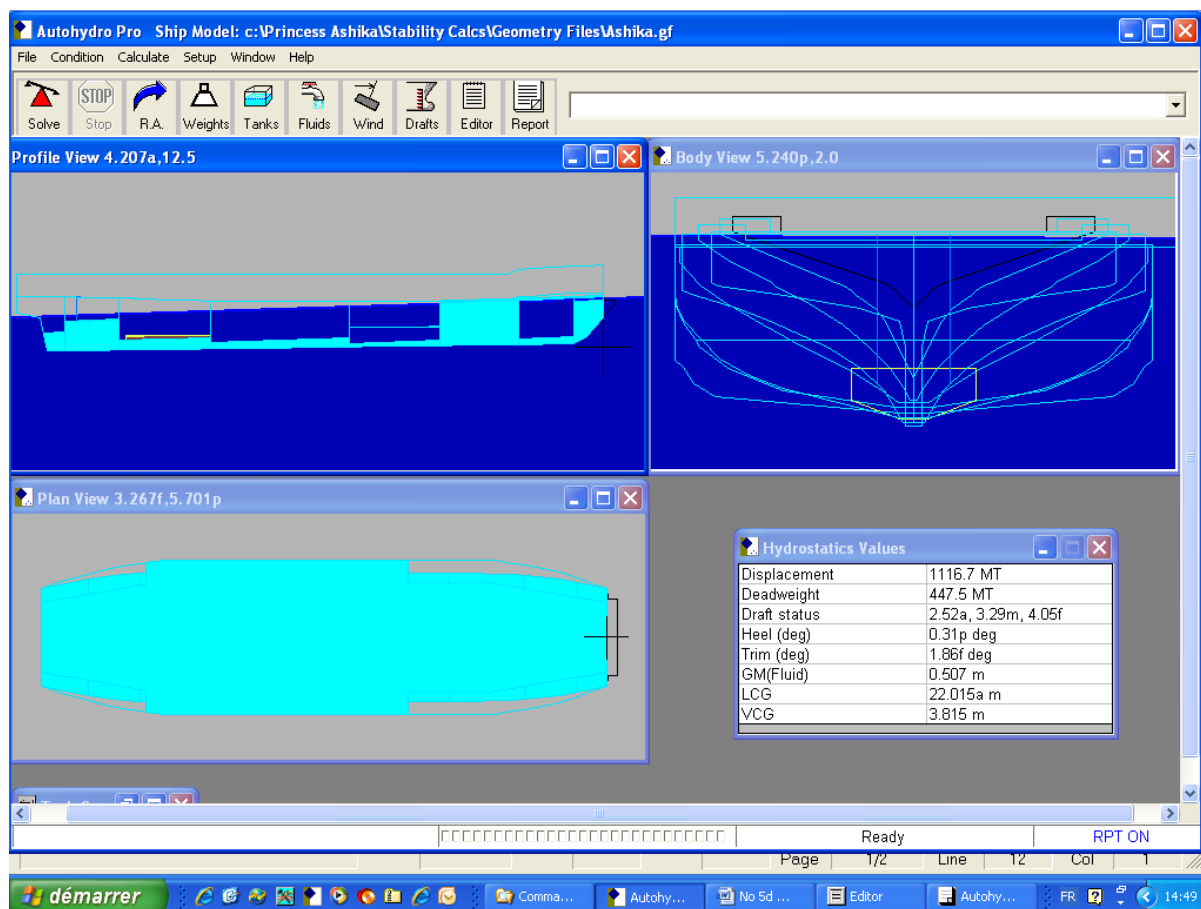
(5) Absolute Angle at MaxRA
 (6) GM Upright

>25.00 deg
 >0.150 m

5.51
 0.554

19.49
 0.404

No
 Yes



Princess Ashika - Condition No 5e: Occurrence Voyage Steps 10-14

Based on Condition No 5d: Occurrence Voyage Step 9, with additional water on cargo deck sufficient to cause total loss of stability (capsize) notwithstanding additional water which would have accumulated elsewhere, such as E /R, crew accommodations, Fwd water ballast tank port, etc.

Reference for the sounding of water on deck is at the main deck, port fwd
Reference for the sounding of water in crew accommodation is at the deck, port near fwd bhd
Reference for sounding in E /R is lowest point of port flywheel

Floating Status

Draft FP	4.116 m	Heel	port 0.59 deg.	GM(Solid)	1.976 m
Draft MS	3.308 m	Equil	Yes	F/S Corr.	1.787 m
Draft AP	2.499 m	Wind	Off	GM(Fluid)	0.189 m
Trim	fwd 1.617/47.000	Wave	No	KMt	5.792 m
LCG	21.910a m	VCG	3.817 m	TPcm	4.53
Displacement	1,125.43 MT	WaterSpgr	1.025		

Loading Summary

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
Light Ship	669.21	24.340a	0.000	4.550
Deadweight	456.22	18.347a	0.053p	2.743
Displacement	1,125.43	21.910a	0.022p	3.817

Fixed Weight Status

Item	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
LIGHT SHIP	669.21	24.340a	0.000	4.550u
32 CREW AT 90 KG	2.88	18.500a	0.000	7.070u
96 PASSENGERS AT 75 KG	7.20	21.960a	0.000	11.750u
CARGO	110.00	23.500a	0.000	4.150u
CEMENT BOXES	10.00	23.500a	0.000	0.300u
CONCRETE ON PR DK	3.00	19.750a	0.000	8.320u
CREW BELONGINGS	0.50	17.250a	0.000	2.650u
DECK OIL	0.27	22.250a	0.000	2.550u
DOUBLERS	4.00	23.500a	0.000	1.800u
FO DAY TK	1.74	21.700a	0.000	2.300u
LIFERAFTS	1.00	21.250a	0.000	11.170u
LUB OIL	0.72	32.900a	0.000	2.200u
NEW TKS IN ENG RM	1.96	35.400a	0.000	2.780u
PROVISIONS	0.10	8.500a	0.000	4.150u
STORES	3.00	23.400a	0.000	5.100u
TANKS IN ENG RM	6.75	28.030a	0.000	1.190u
WEIGHT GROWTH	13.40	23.500a	0.000	2.000u
Total Fixed:	835.73	24.189a	0.000	4.447u

Tank Status

SALT WATER (SpGr 1.025)

Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
AFTERWBT.P	5.00%	1.51	43.104a	9.692p	4.108

AFTERWBT.S	3.00%	0.91	43.992a	14.563s	5.352
AFTVOID.C	2.00%	4.40	34.439a	0.204p	0.522
CREWACC.C	0.35%	0.60	14.340a	2.737p	1.672
ENGRM.C	10.00%	38.54	25.711a	0.176p	0.374
FWDVOID.C	68.36%	16.62	1.429a	0.052p	3.080
FWDWBT.P	2.00%	0.79	5.178a	0.211p	0.587
FWDWBT.S	2.00%	0.79	5.171a	0.208s	0.588
NO1VOID.C	98.00%	170.90	10.430a	0.027p	2.374
NO2VOID.C	10.00%	9.24	17.256a	0.187p	0.298
SGROOM.C	2.00%	1.01	45.250a	0.000	0.564
SUPERSTRUCT.C	<empty>				
WATERONDECK.C	3.00%	17.43	7.878a	0.361p	4.023
Subtotals:	8.19%	262.72	12.989a	0.092p	2.132

FUEL OIL (SpGr 0.870)

Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
FUELOIL.C	98.00%	15.86	35.793a	0.002p	0.476
Subtotals:	98.00%	15.86	35.793a	0.002p	0.476

FRESH WATER (SpGr 1.000)

Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
FRESHWATER.C	50.00%	11.12	41.668a	0.001p	1.116
Subtotals:	50.00%	11.12	41.668a	0.001p	1.116

All Tanks

	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)
Totals:	8.92%	289.70	15.338a	0.084p	2.002

Displacer Status

Item	Status	Spgr	Displ (MT)	LCB (m)	TCB (m)	VCB (m)	Eff /Perm
HULL.C	Intact	1.025	1,125.43	21.849a	0.039p	2.005	1.000
SubTotals:			1,125.43	21.849a	0.039p	2.005	

Critical point

Name	L,T,V (m)	Height (m)
(1) lower edge of bow ramp	0.000, 3.060s, 4.150	0.065

Tank Status**SALT WATER (SpGr 1.025)**

Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	Sndg (m)
AFTERWBT.P	5.00%	1.51	43.104a	9.692p	4.108	None
AFTERWBT.S	3.00%	0.91	43.992a	14.563s	5.352	None
AFTVOID.C	2.00%	4.40	34.439a	0.204p	0.522	None
CREWACC.C	0.35%	0.60	14.340a	2.737p	1.672	0.088
ENGRM.C	10.00%	38.54	25.711a	0.176p	0.374	0.011
FWDVOID.C	68.36%	16.62	1.429a	0.052p	3.080	None
FWDWBT.P	2.00%	0.79	5.178a	0.211p	0.587	None
FWDWBT.S	2.00%	0.79	5.171a	0.208s	0.588	None
NO1VOID.C	98.00%	170.90	10.430a	0.027p	2.374	None
NO2VOID.C	10.00%	9.24	17.256a	0.187p	0.298	None
SGROOM.C	2.00%	1.01	45.250a	0.000	0.564	None
SUPERSTRUCT.C	<empty>					

WATERONDECK.C	3.00%	17.43	7.878a	0.361p	4.023	0.304
Subtotals:	8.19%	262.72	12.989a	0.092p	2.132	

FUEL OIL (SpGr 0.870)

Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	Sndg (m)
FUELOIL.C	98.00%	15.86	35.793a	0.002p	0.476	None
Subtotals:	98.00%	15.86	35.793a	0.002p	0.476	

FRESH WATER (SpGr 1.000)

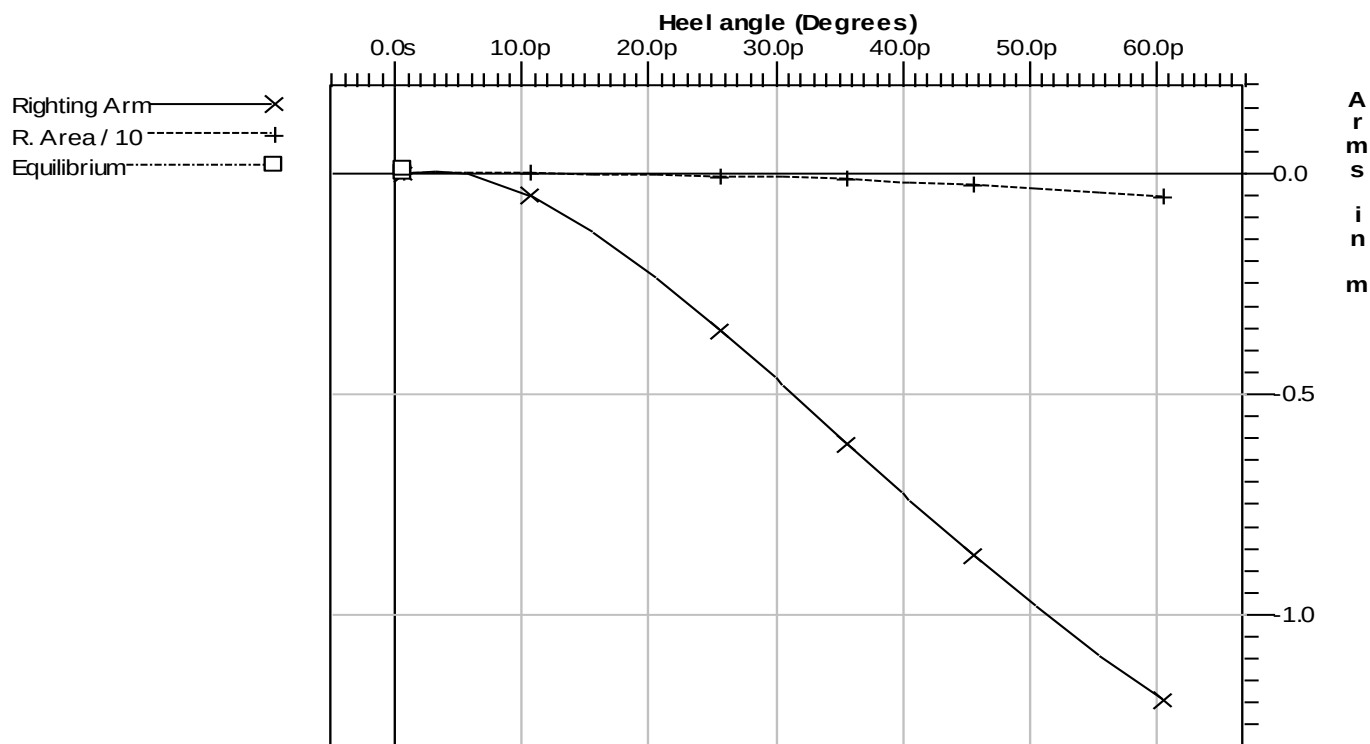
Tank Name	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	Sndg (m)
FRESHWATER.C	50.00%	11.12	41.668a	0.001p	1.116	None
Subtotals:	50.00%	11.12	41.668a	0.001p	1.116	

All Tanks

	Load (%)	Weight (MT)	LCG (m)	TCG (m)	VCG (m)	Sndg (m)
Totals:	8.92%	289.70	15.338a	0.084p	2.002	

Righting Arms vs. Heel - IMO RESOLUTION A.167**Righting Arms vs Heel Angle**

Heel Angle (deg)	Trim Angle (deg)	Origin Depth (m)	Righting Arm (m)	Area (m-Rad)
0.59p	1.97f	4.114	0.000	0.000
3.26p	2.05f	4.155	0.007	0.000
5.59p	2.23f	4.241	0.002	0.000
10.59p	2.86f	4.571	-0.046	-0.001
15.59p	3.67f	5.008	-0.131	-0.009
20.59p	4.56f	5.486	-0.236	-0.025
25.59p	5.46f	5.967	-0.354	-0.050
30.00p	6.27f	6.395	-0.464	-0.082
30.59p	6.37f	6.449	-0.479	-0.087
35.59p	7.31f	6.930	-0.610	-0.134
40.00p	8.12f	7.341	-0.725	-0.185
40.59p	8.22f	7.392	-0.740	-0.193
45.59p	9.11f	7.821	-0.864	-0.263
50.59p	9.90f	8.189	-0.982	-0.344
55.59p	10.58f	8.480	-1.092	-0.434
60.59p	11.13f	8.681	-1.194	-0.534

Righting Arms vs. Heel - IMO RESOLUTION A.167**IMO RESOLUTION A.167**

Limit	Min/Max	Actual	Margin	Pass
(1) Area from 0.00 deg to Abs 30.00 or Flood	>0.0550 m-R	-0.082	0.137	No
(2) Area from 0.00 deg to Abs 40.00 or Flood	>0.0900 m-R	-0.185	0.275	No
(3) Area from 30.00 deg to Abs 40.00 or Flood	>0.0300 m-R	-0.099	0.129	No
(4) Righting Arm at 30.00 deg	>0.200 m	-0.479	0.679	No
(5) Absolute Angle at MaxRA	>25.00 deg	3.26	21.74	No

(6) GM Upright

>0.150 m

0.352

0.202 Yes

