



Escola Politécnica  
Superior de Ferrol

# CUADERNO 5: CONDICIONES DE CARGA Y ESTABILIDAD

FAST FERRY CATAMARÁN 950 PAX 250 COCHES

Trabajo de fin de grado 14-03

Escuela politécnica superior - Universidade da coruña.



Escola Politécnica Superior



UNIVERSIDADE DA CORUÑA

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RPA:



**DEPARTAMENTO DE INGENIERÍA NAVAL Y OCEÁNICA**

**ANTEPROYECTO Y PROYECTO FIN DE CARRERA**

*CURSO 2.013-2014*

**PROYECTO NÚMERO 14-03**

**TIPO DE BUQUE:** Fast-Ferry catamarán de 950 pax. y 250 vehículos.

**CLASIFICACIÓN, COTA Y REGLAMENTOS DE APLICACIÓN:** DNV, MARPOL, COLREG, ILO, CODIGO DE BUQUES DE ALTA VELOCIDAD.

**CARACTERÍSTICAS DE LA CARGA:** 950 pasajeros y 250 vehículos.

**VELOCIDAD Y AUTONOMÍA:** 38kn al 100% MCR y 10% Margen de mar.

**SISTEMAS Y EQUIPOS DE CARGA / DESCARGA:** 2 rampas para vehículos a popa.

**PROPULSIÓN:** 4 Waterjets, planta propulsora dual LNG-DIESEL.

**TRIPULACIÓN Y PASAJE:** 30 tripulantes, 950 pasajeros.

**OTROS EQUIPOS E INSTALACIONES:** Dos propulsores de proa (uno en cada casco).

Ferrol, Febrero de 2.014

ALUMNO: D Carlos Fernández Baldomir.

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## Presentación

En este cuaderno se va a comprobar que el buque cumpla con todos los criterios de estabilidad exigidos por la normativa aplicable tanto en estado intacto como después de averías.

Las características principales del buque proyecto son las que se presentan en la siguiente tabla:

B(m)	26,3
Lpp (m)	83,16
Loa (m)	92,4
Bcasco (m)	5,5
T (m)	4
D (m)	7,65
BHP (Kw)	32000
CB	0,6
CM	0,909
CP	0,68
$\Delta$ (t)	2082
Fn	0,66
Autonomía (millas)	1200

Para el estudio de la estabilidad se definirán las condiciones de carga con las que va a operar el buque y se harán los cálculos necesarios para estabilidad intacta y estabilidad después de averías. Esta última se evaluará tanto por el método probabilístico como por el método determinístico.

## Estabilidad en estado intacto

### Cálculo de las condiciones de carga reglamentarias

#### Peso en rosca

El peso en rosca del buque se ha calculado en el cuaderno 2 "Determinación del peso en rosca y del centro de gravedad del buque".

Los resultados que se han obtenido del cálculo del peso en rosca son:

PESO DE LOS EQUIPOS					
EQUIPO	PESO (t)	XG (m)	KG (m)	MOM. L. (t.m)	MOM. V. (t.m)
PINTURA	4,37	33,6	7,76	146,832	33,9112
PROTECCIÓN CATÓDICA	1,33	31,675	2,222	42,12775	2,95526
EQUIPO DE FONDEO	65	41,58	7,65	2702,7	497,25
EQUIPO DE NAVEGACIÓN	2	58,247	17,399	116,494	34,798
EQUIPO DE GOBIERNO	87,88	0,618	2	54,30984	175,76
SALVAMENTO	24,5	33,6	11,95	823,2	292,775
CONTRAINCENDIOS	5,46	18,505	3,43	101,0373	18,7278
INSTALACIÓN ELÉCTRICA	67	33,6	7,76	2251,2	519,92
TUBERÍAS Y BOMBAS	18,28	33,6	7,76	614,208	141,8528
HABILITACIÓN	211,6	37,91	13,185	8021,756	2789,946
RAMPAS	2	0	10,15	0	20,3
CHIMENEAS	7,44	18,5	8,7	137,64	64,728
<b>TOTAL</b>	<b>496,86</b>	<b>30,21</b>	<b>9,24</b>	<b>15011,50</b>	<b>4592,92</b>

PESO EN ROSCA					
TÉRMINO	PESO (t)	XG (m)	KG (m)	MOM. L. (t.m)	MOM. V. (t.m)
ESTRUCTURA	551,2	33,6	7,76	18520,32	4277,312
MAQUINARIA	308	18,5	3,43	5698	1056,44
EQUIPOS	496,86	30,21	9,24	15011,50	4592,92
<b>TOTAL</b>	<b>1356,06</b>	<b>28,93</b>	<b>7,32</b>	<b>39229,82</b>	<b>9926,68</b>

Se estima un peso en rosca de 1356,06 toneladas. Si se aplica un margen de un 5% el peso en rosca pasaría a ser:

$$1356,06 + 1356,06 * \frac{5}{100} = 1423,86t$$

Peso del pasaje y de la carga

El buque ha sido diseñado con capacidad para 950 pasajeros. Se estima un peso medio de 75kg por pasajero.

Al ser un ferry de viajes cortos el pasaje no suele llevar grandes cantidades de equipaje, pero aun así se va a dejar un margen de aproximadamente 15kg por persona.

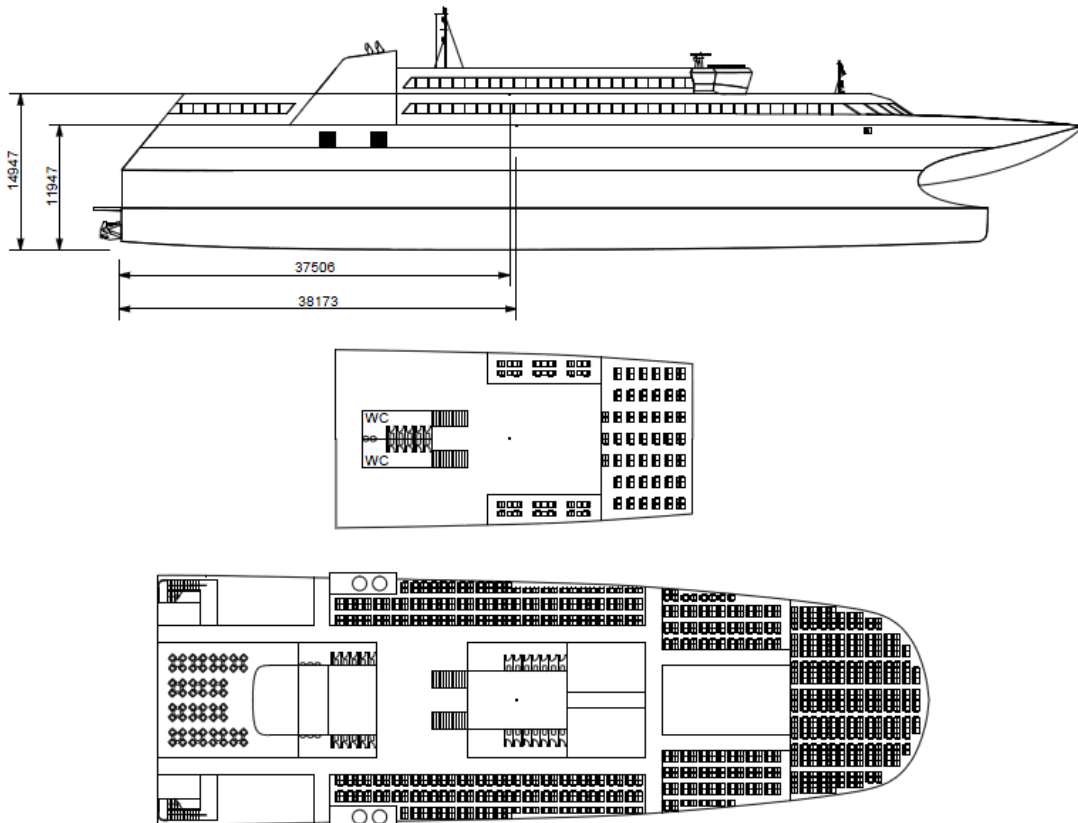
Finalmente se estima un total de 90kg por persona con equipaje a bordo.

Para los 950 pasajeros se calcula:

$$90 * 950 = 85.500kg$$

En total, el peso del pasaje se estima en 85,5 toneladas.

Para calcular la posición del centro de gravedad se calcula el centro de área de las cubiertas de pasaje del buque proyecto. La altura del centro de gravedad se sitúa un metro por encima de cada cubierta.



De forma que:

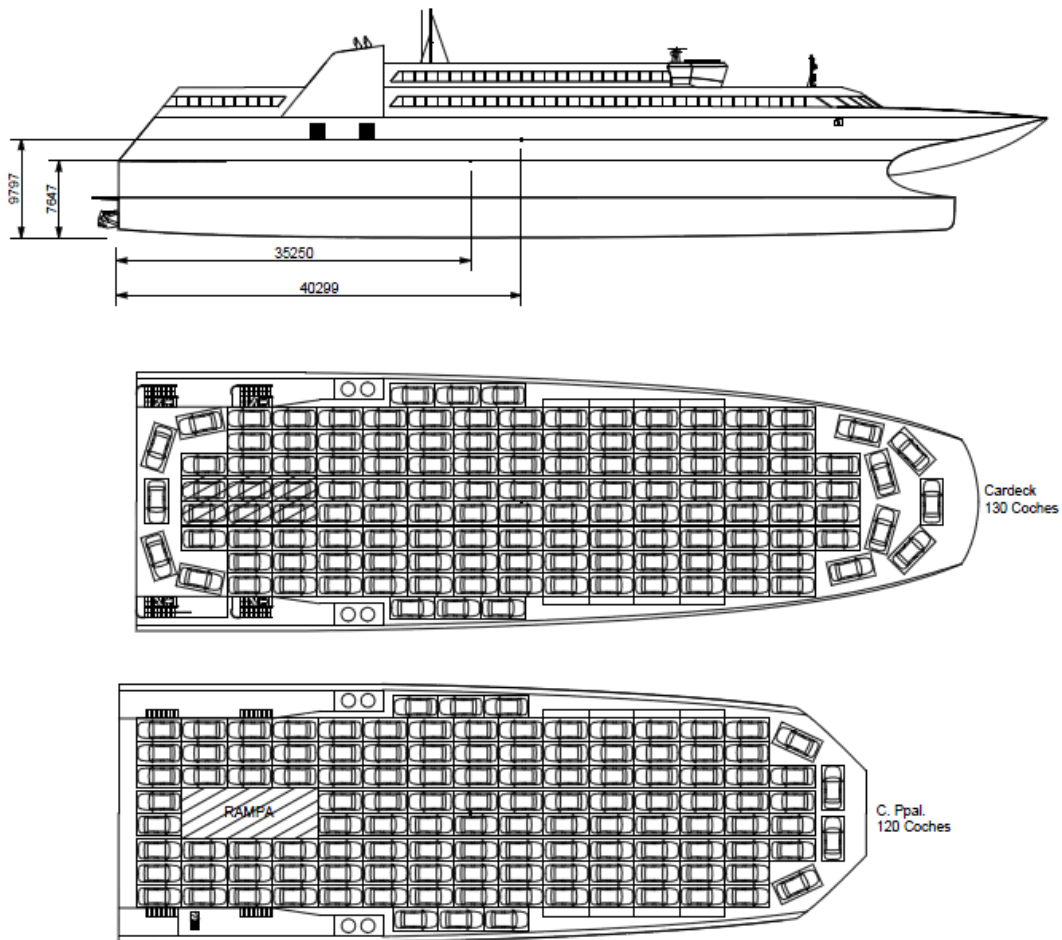
	Pasajeros	T/pasajero	Peso (t)	XG (m)	YG (m)	KG (m)	MX	MY	MZ
Cubierta P1	836	0,09	75,24	37,5	0	12,95	2821,50	0	899,12
Cubierta P2	114	0,09	10,26	38,17	0	15,95	391,62	0	153,39
<b>TOTAL</b>	<b>950</b>	<b>0,18</b>	<b>85,50</b>	<b>37,58</b>	<b>0</b>	<b>13,31</b>	<b>3213,12</b>	<b>0</b>	<b>1052,51</b>

La capacidad de carga del buque proyecto es de 250 coches. Se estima el peso promedio de cada coche en 1,5 toneladas

$$1,5 * 250 = 375t$$

El peso de la carga total es de 375 toneladas.

La posición del centro de gravedad viene determinada por el área del garaje de coches de la siguiente forma:



	Coches	T/coche	Peso (t)	XG (m)	YG (m)	KG (m)	MX	MY	MZ
C. Ppal.	120	1,5	180	35,25	0	7,65	6345,00	0	1377,00
Cardeck	130	1,5	195	40,30	0	9,78	7858,50	0	1907,10
<b>TOTAL</b>	<b>250</b>		<b>375</b>	<b>37,88</b>	<b>0</b>	<b>8,7576</b>	<b>14203,50</b>	<b>0</b>	<b>3284,10</b>

### Condiciones de carga típicas

El buque contará con 4 condiciones de carga que se definirán detalladamente más adelante en este cuaderno, en el apartado “Condiciones de carga”. Esas condiciones son:

- Salida de puerto a plena carga.
- Llegada a puerto a plena carga.
- Salida de puerto vacío de carga.
- Llegada a puerto vacío de carga.

### Criterios de estabilidad aplicables

Los criterios de estabilidad sin avería de un ferry catamarán de alta velocidad se definen por el código de naves de gran velocidad (HSC 2000), concretamente por el anexo 7 “Estabilidad de las naves multicasco”, que nos dice lo siguiente:

#### **“Anexo 7.- Estabilidad de las naves multicasco.**

*2.3.2 Las naves multicasco deberán cumplir con las prescripciones pertinentes del anexo 7 en todas las condiciones permitidas de carga:*

#### **1 CRITERIOS DE ESTABILIDAD SIN AVERIA**

*Toda nave multicasco deberá tener una estabilidad sin avería suficiente, con balance en mar encrespada, para resistir el efecto producido por la aglomeración de pasajeros o por las maniobras de giro a gran velocidad que se describen en 1.4. Se deberá considerar que la estabilidad de la nave es suficiente si ésta cumple con lo dispuesto en el presente párrafo.*

##### 1.1 Área bajo la curva GZ

*El área (A1) bajo la curva GZ hasta el ángulo  $q$  deberá ser como mínimo igual a:*

$$A1 = 0,055 \times 30^\circ / q \text{ (m. rad)}$$

*Donde  $q$  es el menor de los ángulos siguientes:*

- ángulo de inundación descendente;
- ángulo al que se da el GZ máximo;
- $30^\circ$ .

##### 1.2 GZ máximo

*El valor máximo de GZ deberá corresponder a un ángulo de  $10^\circ$  como mínimo.*

##### 1.3 Escora producida por el viento

*El brazo escorante producido por el viento deberá suponerse constante a todos los ángulos de inclinación y calcularse como se indica a continuación:*

$$HL1 = (Pi.A.Z)/(9800D) \text{ (m) (Véase la figura 1)}$$

$$HL2 = 1,5 HL1 \text{ (m) (Véase la figura 1)}$$



Donde:

- $P_i = 500$  (Pa)
- $A$  = área lateral proyectada de la porción de la nave que se encuentra por encima de la flotación mínima de servicio (m<sup>2</sup>)
- $Z$  = distancia vertical entre el centro de  $A$  y un punto situado en la mitad del calado mínimo de servicio (m)
- $\tilde{N}$  = desplazamiento (t).

#### 1.4 Escora producida por la aglomeración de pasajeros o un giro a gran velocidad:

La escora producida por la aglomeración de pasajeros en una banda de la nave o un giro a gran velocidad, tomándose de estos valores el mayor, se deberá aplicar junto con el brazo escorante producido por el viento (HL2).

- 1 Escora producida por la aglomeración de pasajeros:

Cuando se calcule la magnitud de la escora producida por la aglomeración de pasajeros, el brazo se deberá determinar utilizando las hipótesis indicadas en 2.9 del presente Código.

- 2 Escora producida por un giro a gran velocidad:

Cuando se calcule la magnitud de la escora producida por los efectos de un giro a gran velocidad, el brazo se deberá determinar utilizando la fórmula siguiente:

$$TL = V0$$

$$2(KG - d/2)/gR)$$

- $KG$  = altura del centro de gravedad por encima de la quilla (m)
- $d$  = calado medio (m)

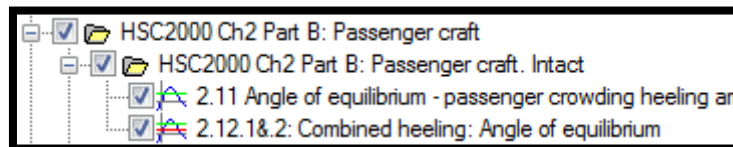
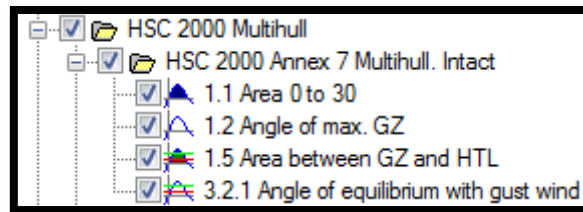
#### 1.5 Balance producido por las olas

Se deberá determinar matemáticamente el efecto sobre la seguridad de la nave del balance en mar encrespada. Al realizar los cálculos, el área residual bajo la curva GZ (A<sub>2</sub>), es decir, más allá del ángulo de escora (qh), deberá ser como mínimo de 0,028 m.rad hasta el ángulo de balance q<sub>r</sub>. A falta de pruebas con modelos u otros datos, se deberá tomar q<sub>r</sub> como 15°, o un ángulo (qd -qh), si éste es menor.

#### 2.11 Estabilidad sin avería en la modalidad con desplazamiento:

La nave deberá tener una estabilidad sin avería suficiente para que cuando esté en aguas tranquilas, la inclinación de la nave con respecto a la horizontal no exceda de 10° en ninguno de los casos permitidos de carga y de desplazamiento incontrolado de pasajeros que se pueda presentar.”

Se seleccionan los criterios aplicables en el maxsurf, en la pestaña “criteria”:



Área bajo la curva GZ

El área bajo la curva GZ hasta el ángulo  $\theta$  tiene que ser superior o igual a:

$$A1 = 0,055 \times 30^\circ/\theta(\text{m. rad})$$

Donde  $\theta$  es el menor de los siguientes:

- a. ángulo de inundación descendente;
- b. ángulo al que se da el GZ máximo; o
- c.  $30^\circ$ .

		HSC 2000 Annex 7 Multihull. Intact 1.1 Area 0 to 30	Value	Units
1	<input type="checkbox"/>	from the greater of		
2	<input checked="" type="checkbox"/>	spec. heel angle	0,0	deg
3	<input type="checkbox"/>	angle of equilibrium		deg
4	<input type="checkbox"/>	to the lesser of		
5	<input checked="" type="checkbox"/>	spec. heel angle	30,0	deg
6	<input type="checkbox"/>	spec. angle above equilibrium	0,0	deg
7	<input type="checkbox"/>	angle of first GZ peak		deg
8	<input checked="" type="checkbox"/>	angle of max. GZ		deg
9	<input checked="" type="checkbox"/>	first flooding angle of the	DownfloodingPoints	deg
10	<input type="checkbox"/>	angle of vanishing stability		deg
11	<input type="checkbox"/>	higher heel angle	30,0	deg
12	<input type="checkbox"/>	required GZ area at higher heel angle	3,1510	m.deg
13	<input type="checkbox"/>	shall be greater than (>)	3,1510	m.deg

GZ máximo

El valor del GZ máximo debe corresponder a un ángulo igual o superior a  $10^\circ$

		HSC 2000 Annex 7 Multihull. Intact 1.2 Angle of max. GZ	Value	Units
1	<input type="checkbox"/>	limited by first GZ peak angle		deg
2	<input type="checkbox"/>	first flooding angle of the	DownfloodingPoints	deg
3	<input checked="" type="checkbox"/>	shall not be less than (>=)	10,0	deg

### Escora producida por viento

El centro de área, calculado sobre el modelo en Rhinoceros, está situado a 8,2 metros de la línea de base (4,2 metros sobre la flotación) y a 42 metros de eslora. Siendo un área adicional de 382,389 m<sup>2</sup>. El área adicional es el área transversal expuesta al viento que no está introducida en el maxsurf, ya que no está modelada toda la superestructura del buque.

Se considera la presión del viento a partir de la siguiente tabla definida en el HSC 2000:

TABLA 1

Valores típicos de la presión del viento para una fuerza 7 de la escala de Beaufort a 100 millas marinas de tierra  
Tabla (ver imagen)

Z por encima de la flotación (m)	1,0	1,5	2,0	2,5	3,0	3,5	4,0	4,5	5,0
P <sub>v</sub> (Pa)	46	46	50	53	56	58	60	62	64

- Área adicional: 382,389 m<sup>2</sup>.
- K Centroide de área: 4,2 m.
- X Centroide de área: 42 m.
- Presión del viento: 61 Pa.
- Altura del centro de resistencia lateral: 2,1 m
- Radio de giro: 84m.

16	<input type="checkbox"/>	Wind arm = $a P A (h - H) / (g disp.) c$	
17	<input type="checkbox"/>	constant: a =	1
18	<input type="checkbox"/>	wind model	Pressure
19	<input type="checkbox"/>	wind pressure: P =	61,0 Pa
20	<input checked="" type="checkbox"/>	area centroid height (from zero point)	4,200 m
21	<input type="checkbox"/>	total area: A =	0,000 m <sup>2</sup>
22	<input checked="" type="checkbox"/>	additional area: A =	382,389 m <sup>2</sup>
23	<input type="checkbox"/>	height of lateral resistance: H =	0,000 m
24	<input type="checkbox"/>	H = mean draft / 2	m
25	<input type="checkbox"/>	H = vert. centre of projected lat. u'wa	m
26	<input checked="" type="checkbox"/>	H = waterline	m

## Escora producida por pasajeros a una banda

Se establecen 4 pasajeros por metro cuadrado y el buque no debe de escorar más de 10°.

- Peso por pasajero: 0,09 toneladas (estimo el caso más desfavorable).
- Distancia de crujía: 11 metros. Se selecciona esta distancia siendo la más desfavorable.
- Número de pasajeros: 950.
- Área por pasajero: 1 metro cuadrado, 4 pasajeros.

Área total ocupada por pasajeros a una banda:

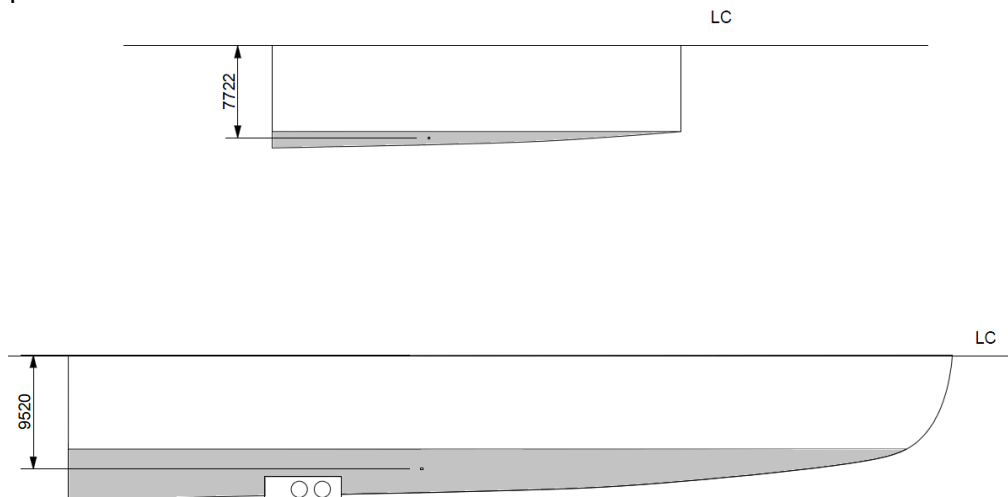
CUBIERTA 1 (836 PASAJEROS):

$$\frac{836}{4} = 209,0 \text{ m}^2$$

CUBIERTA 2 (114 PASAJEROS):

$$\frac{114}{4} = 28,5 \text{ m}^2$$

Se distribuye esa área en las dos cubiertas de pasaje y se calcula el centroide de área para ambas mediante rinoceross:



La altura del centro de gravedad del pasaje se supone un metro por encima de cada cubierta, por lo que

Se obtienen entonces los siguientes datos:

Cubiertas	PaX	Peso/pX	Peso total	YG	KG	MT	MV
Pasaje 1	836	0,09	75,24	9,52	12,95	716,28	974,35
Pasaje 2	114	0,09	10,26	7,72	15,95	79,20	163,64
TOTAL	950	-	85,5	9,30	13,31	795,49	1138,00

Entonces, el brazo transversal final es de 9,304m.

HSC2000 Ch2 Part B: Passenger craft. Intact 2.11 Angle of equilibrium - passenger crowding heeling arm			Value	Units
1	<input type="checkbox"/>	Pass. crowding arm = $nPass M / disp$		
2	<input type="checkbox"/>	number of passengers: nPass =	950	
3	<input type="checkbox"/>	passenger mass: M =	0,090	tonne
4	<input type="checkbox"/>	distance from centre line: D =	9,304	m
5	<input type="checkbox"/>	cosine power: n =	0	
6	<input type="checkbox"/>	shall be less than (<)	10,0	deg

Escora producida por un giro a gran velocidad

Se definen los datos, siendo la velocidad de 38 nudos y el radio de giro de 84 metros.

Se toma un radio de giro igual a la eslora del buque debido a que los waterjets aportan una gran maniobrabilidad a este tipo de buques y mientras mas cerrado sea el giro mayor será la escora, por lo que nos ponemos en el caso mas desfavorable para el estudio de la estabilidad, ya que si cumple en este caso cumplirá para radios de giro mayores.

6	<input type="checkbox"/>	Turn arm = $a v^2 / (R g) h \cos^n(\phi)$		
7	<input type="checkbox"/>	constant: a =	1	
8	<input type="checkbox"/>	vessel speed: v =	38,000	kn
9	<input checked="" type="checkbox"/>	turn radius: R =	84,000	m
10	<input type="checkbox"/>	turn radius, R, as percentage of Lwl	510,00	%
11	<input type="checkbox"/>	Vertical lever: h =	0,000	m
12	<input type="checkbox"/>	h = KG		m
13	<input type="checkbox"/>	h = KG - mean draft / 2		m
14	<input checked="" type="checkbox"/>	h = KG - vert. centre of projected lat.		m
15	<input type="checkbox"/>	cosine power: n =	0	

### Corrección por superficies libres

En este apartado, lo que se busca es aplicar el efecto sobre la estabilidad de la cuña que se tiene por el efecto de una superficie libre en el interior de un tanque durante el balance. Si el tanque está al 98% o más no es de aplicación y los tanques menores no hacen falta considerarlos. Un tanque menor es aquel que el momento generado a 30 grados es menor que el 1% del menor desplazamiento (peso en rosca).

Vamos a calcular si un tanque es menor o no mediante la siguiente formulación, de la que sacamos el momento por superficies libres:

$$M_{fs} = v * b * \gamma * k * \sqrt{\delta}$$

Donde:

- $M_{fs}$ : Es el momento por superficie libre a una inclinación de 30°, en tonelámetros.
- $v$ : Es la capacidad total del tanque en m<sup>3</sup>.
- $b$ : Es la anchura máxima del tanque en m.
- $\gamma$ : Peso específico del contenido del tanque en t/m<sup>3</sup>.
- $k$ : Coeficiente adimensional, se obtiene por interpolación en las tablas.
- $\delta$ : Coeficiente de bloque del tanque:  $\delta = \frac{v}{b * l * h}$ 
  - $l$ : Longitud máxima del tanque en m.
  - $h$ : Altura máxima del tanque en m.

Para comprobar el coeficiente K se pueden interpolar por los valores de la tabla siguiente:

$\theta$ b/h	5°	10°	15°	20°	30°	40°	45°	50°	60°	70°	75°	80°	90°	$\theta$ b/h
20	0,11	0,12	0,12	0,12	0,11	0,10	0,09	0,09	0,07	0,05	0,04	0,03	0,01	20
10	0,07	0,11	0,12	0,12	0,11	0,10	0,10	0,09	0,07	0,05	0,04	0,03	0,01	10
5	0,04	0,07	0,10	0,11	0,11	0,11	0,10	0,10	0,08	0,07	0,06	0,05	0,03	5
3	0,02	0,04	0,07	0,09	0,11	0,11	0,11	0,10	0,09	0,08	0,07	0,06	0,04	3
2	0,01	0,03	0,04	0,06	0,09	0,11	0,11	0,11	0,10	0,09	0,09	0,08	0,06	2
1,5	0,01	0,02	0,03	0,05	0,07	0,10	0,11	0,11	0,11	0,11	0,10	0,10	0,08	1,5
1	0,01	0,01	0,02	0,03	0,05	0,07	0,09	0,10	0,12	0,13	0,13	0,13	0,13	1
0,75	0,01	0,01	0,02	0,02	0,04	0,05	0,07	0,08	0,12	0,15	0,16	0,16	0,17	0,75
0,5	0,00	0,01	0,01	0,02	0,02	0,04	0,04	0,05	0,09	0,16	0,18	0,21	0,25	0,5
0,3	0,00	0,00	0,01	0,01	0,01	0,02	0,03	0,03	0,05	0,11	0,19	0,27	0,42	0,3
0,2	0,00	0,00	0,00	0,01	0,01	0,01	0,02	0,02	0,04	0,07	0,13	0,27	0,63	0,2
0,1	0,00	0,00	0,00	0,00	0,00	0,01	0,01	0,01	0,01	0,04	0,06	0,14	1,25	0,1

O usar las fórmulas que aparecen a continuación:

$$k = \frac{\sin \theta}{12} * \left( 1 + \frac{\tan^2 \theta}{2} \right) * \frac{b}{h}$$

Si, la cotangente del ángulo de escora es mayor que  $b/h$ , ó

$$k = \frac{\cos \theta}{8} * \left( 1 + \frac{\tan \theta}{\frac{b}{h}} \right) - \frac{\cos \theta}{12 * \left( \frac{b}{h} \right)^2} * \left( 1 + \frac{\cot^2 \theta}{2} \right)$$

Si la cotangente del ángulo de escora es menor que  $b/h$ .

Los tanques que vamos a evaluar son los siguientes:

TANQUE	NÚMERO	CAP. TANQUE (m3)	CAP. TOTAL (m3)	L (m)	B (m)	H (m)
Diésel	2	71,4	142,8	6	4,79	4
Lodos	2	2	4	1	1,8	1,462
Aceite	2	0,97	1,94	1	1,05	1,292
Agua Deshecho	2	5	10	2	2,2	1,44
Agua Dulce	2	5	10	2	2,2	1,44
LNG	2	92,31	184,62	15	2,8	2,8

Para realizar los cálculos con mayor comodidad, he elaborado un Excel con las fórmulas indicadas anteriormente para saber si los tanques deben o no deben corregir.

Se presentan los resultados:

TANQUE	Peso esp. (t/m3)	Delta	Cot(30)	B/H	¿Cot30>B/H?	Sen(30)
Diésel	0,84	0,621	1,732	1,198	SI	0,5
Lodos	0,92	0,760	1,732	1,231	SI	0,5
Aceite	0,92	0,715	1,732	0,813	SI	0,5
Agua Deshecho	1	0,789	1,732	1,528	SI	0,5
Agua Dulce	1	0,789	1,732	1,528	SI	0,5
LNG	0,45	0,785	1,732	1,000	SI	0,5

TANQUE	Tan(30)^2	k	Mfs (t*m)	Mfs * N°Tanq	1%Rosca	¿Corrige?
Diésel	0,333	0,058	13,180	26,359	14,239	SI
Lodos	0,333	0,060	0,173	0,346	14,239	NO
Aceite	0,333	0,040	0,031	0,063	14,239	NO
Agua Deshecho	0,333	0,074	0,726	1,451	14,239	NO
Agua Dulce	0,333	0,074	0,726	1,451	14,239	NO
LNG	0,333	0,049	5,009	10,019	14,239	NO

Como se puede apreciar, sólo corrige por superficies libres la pareja de tanques de Diésel.

### Condiciones de carga

En este apartado vamos a definir las condiciones de carga y vamos a estudiar su estabilidad en estado intacto. El buque tiene 4 condiciones de carga:

1. Salida de puerto a plena carga.
2. Llegada a puerto a plena carga.
3. Salida de puerto vacío de carga.
4. Llegada a puerto vacío de carga.

#### Salida de puerto a plena carga

Es la condición en la que el buque sale de puerto con toda la carga a bordo: lleva el 100% del pasaje y el 100% de los coches.

Los tanques están inicialmente llenos. Se define el llenado del 97% para que, en caso de que sea necesario, se pueda aplicar la corrección por superficies libres.

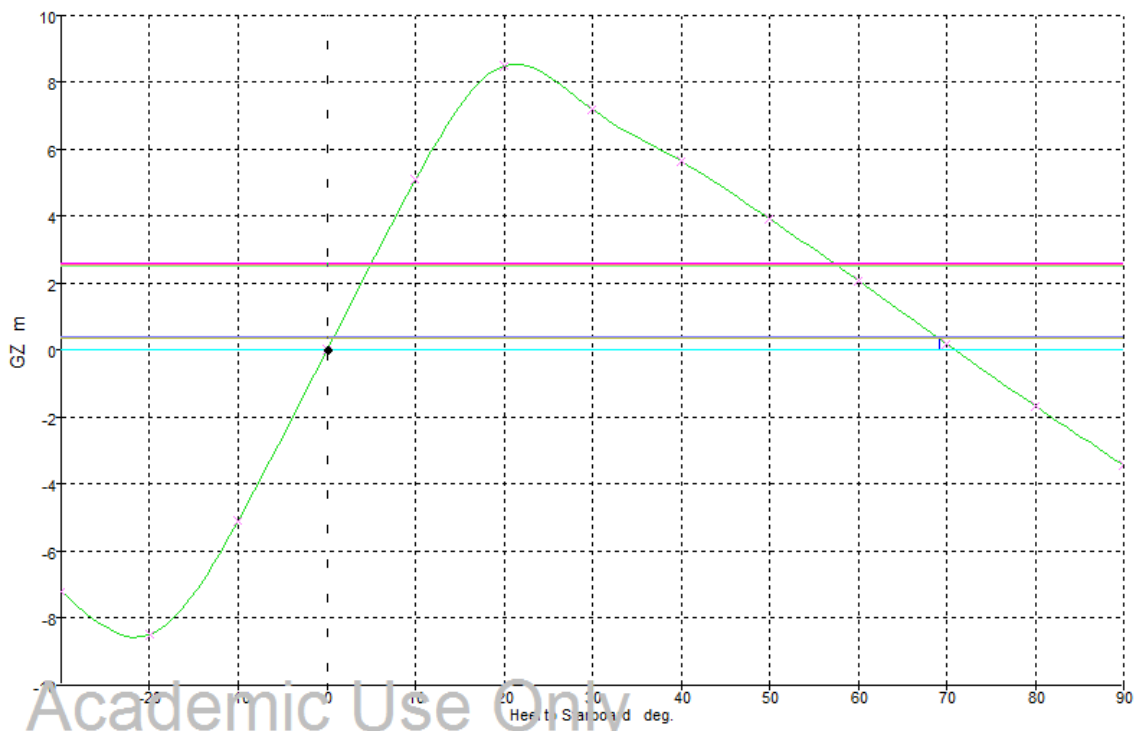
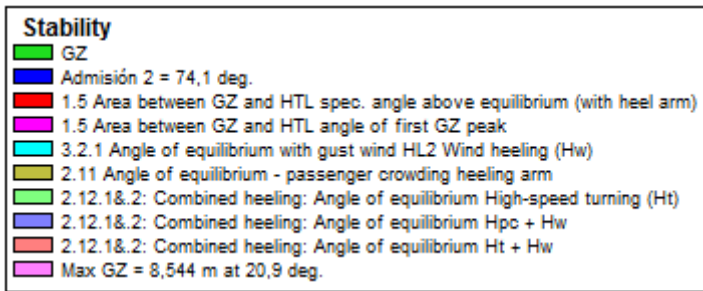
La condición de salida de puerto a plena carga es la siguiente:

PLENA CARGA SALIDA							
Partida	Llenado	Masa (t)	Vol. (m3)	XG	YG	KG	CSL
Peso en rosca	1	1423,86		28,93	0	7,32	0
Coches	1	375		37,876	0	8,757	0
Pasaje	1	85,5		37,58	0	13,31	0
A. Des ER	0%	0	0	20,976	10,801	0,073	0
A. Des BR	0%	0	0	20,976	-10,801	0,073	0
A. Dulce ER	97%	4,661	4,661	20,001	-9,041	0,876	0
Aceite ER	97%	0,825	0,896	31,497	8,575	0,966	0
Aceite BR	97%	0,825	0,896	31,497	-8,575	0,966	0
Lodos ER	0%	0	0	31,828	11	0,037	0
Lodos BR	0%	0	0	31,828	-11	0,037	0
Diésel ER	97%	55,267	65,794	39,949	10,37	1,603	32,219
Diésel BR	97%	55,267	65,794	39,949	-10,37	1,603	32,219
LNG ER	97%	38,296	85,102	46	10	4,86	0
LNG BR	97%	38,296	85,102	46	-10	4,86	0
A. Dulce BR	97%	4,661	4,661	20,001	9,041	0,876	0
<b>Total Loadcase</b>		<b>2082,458</b>	<b>312,908</b>	<b>32,071</b>	<b>0</b>	<b>7,397</b>	<b>64,439</b>
FS correction						0,031	
VCG fluid						7,428	

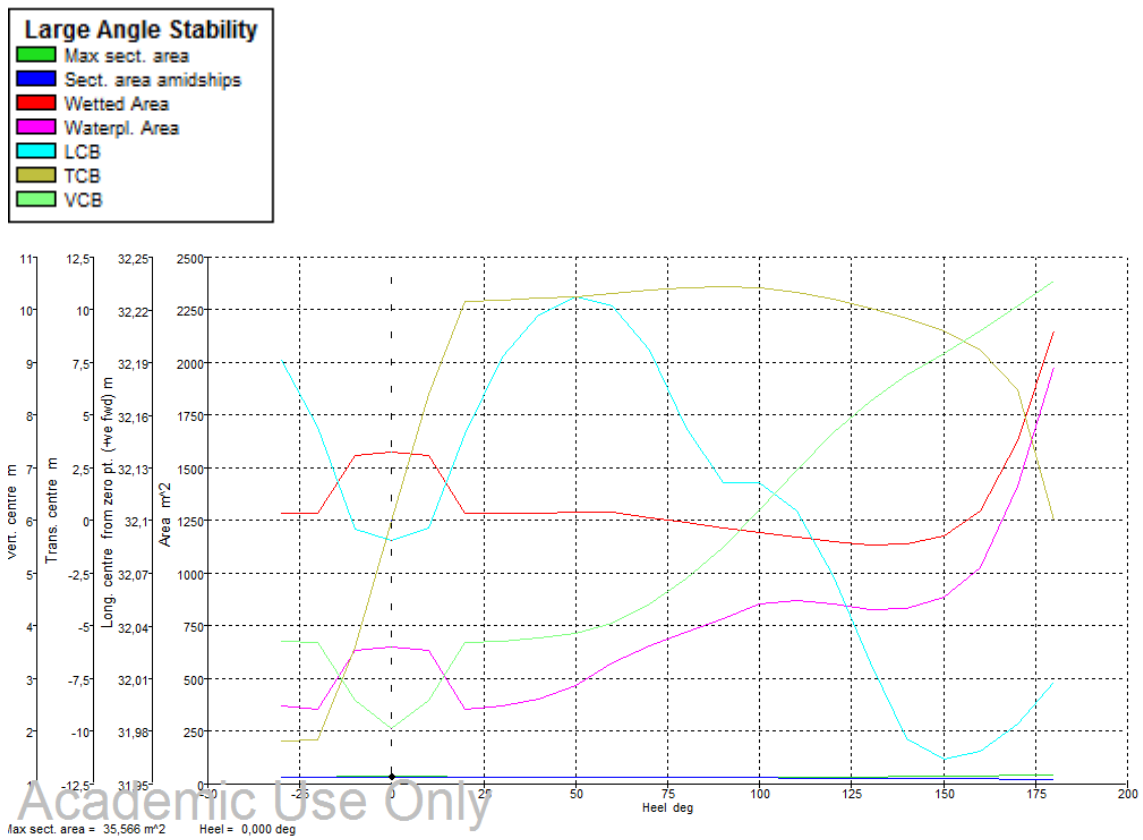


*Estabilidad a grandes ángulos*

La curva de brazos adrizantes es la que se representa a continuación, con un valor máximo de 8,544 metros a una escora de 20,9 grados.



La variación de los distintos parámetros de la estabilidad a grandes ángulos es la que se refleja a continuación.



*Equilibrio*

Los datos que se calculan del equilibrio para la condición de salida de puerto a plena carga son:

<b>EQUILIBRIO: PLENA CARGA SALIDA</b>	
Calado medio (m)	3,725
Desplazamiento (t)	2082
Escora (°)	0
Calado proa (m)	3,865
Calado popa (m)	3,585
Calado LCF (m)	3,692
Trimado (m)	-0,281
Eslora en flotación (m)	83,188
Manga en flotación (m)	26,335
Superficie mojada (m <sup>2</sup> )	1576,642
Area de flotación (m <sup>2</sup> )	649,513
Coefficiente prismático	0,687
Coefficiente de bloque	0,59
Coefficiente de la maestra	0,902
Coefficiente de flotación	0,7
XB (m)	32,089
XF (m)	31,843
KB (m)	2,063
KG (m)	7,428
BMt (m)	34,977
BMI (m)	128,381
GMt corregido (m)	29,612
GMI (m)	123,016
KMt (m)	37,04
KMI (m)	130,443
TCM (t/cm)	6,658
MTC (tm/cm)	30,805
RM a 1 grado	1076,213
Inclinación cubierta (°)	0,1934
Trimado (°)	-0,1934

## Llegada a puerto a plena carga

Es la condición en la que el buque llega a puerto con toda la carga a bordo: lleva el 100% del pasaje y el 100% de los coches.

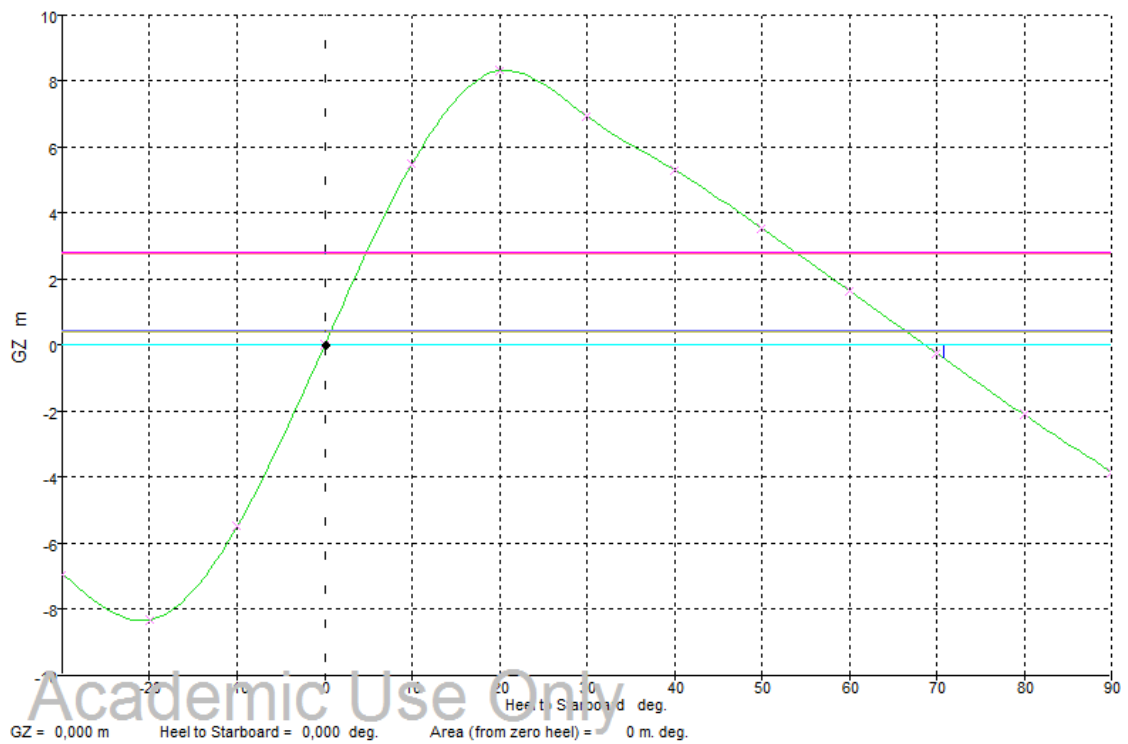
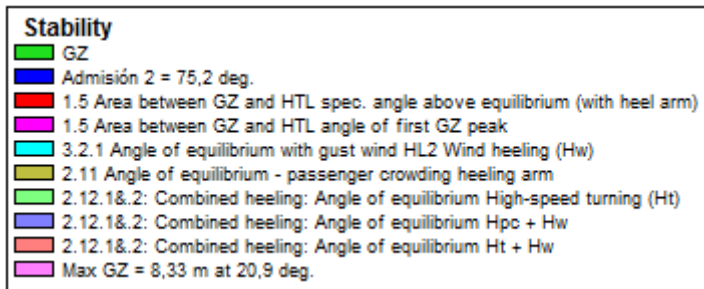
Los tanques de consumos se han vaciado hasta un 10% de su capacidad y los tanques de deshechos y lodos van llenos al 90%.

La condición de salida de puerto a plena carga es la siguiente:

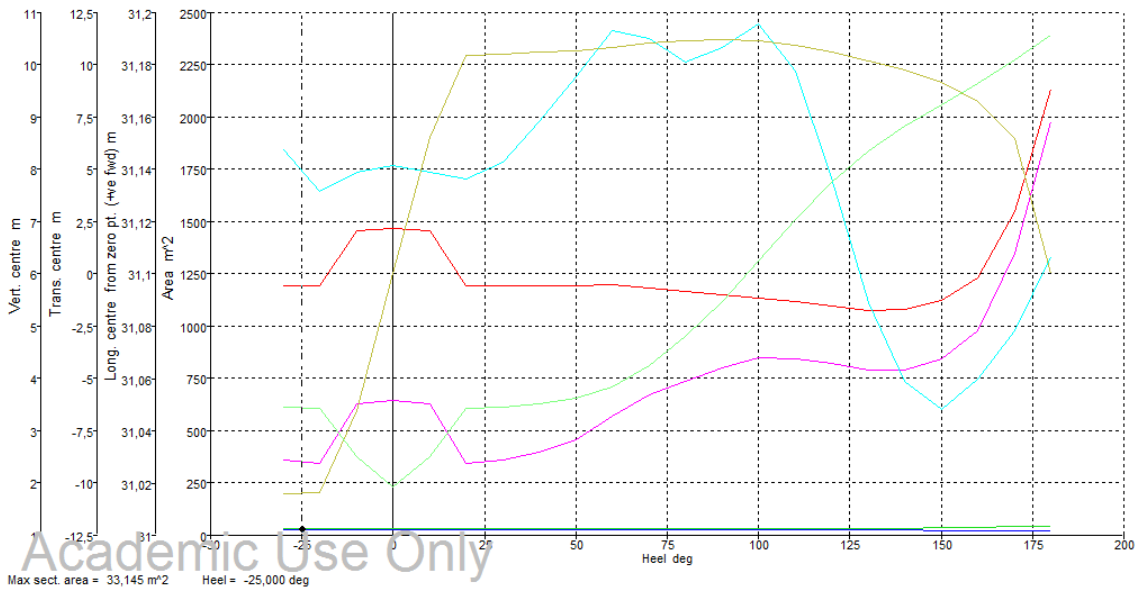
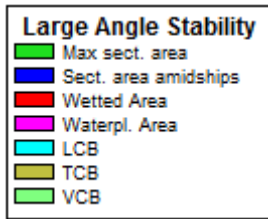
PLENA CARGA LLEGADA							
Partida	Llenado	Masa (t)	Vol. (m3)	XG	YG	KG	CSL
Peso en rosca	1	1423,86		28,93	0	7,32	0
Coches	1	375		37,876	0	8,757	0
Pasaje	1	85,5		37,58	0	13,31	0
A. Des ER	90%	4,226	4,226	20,001	11,727	0,835	0
A. Des BR	90%	4,226	4,226	20,001	11,727	0,835	0
A. Dulce ER	10%	0,481	0,481	20,017	-9,476	0,253	0
Aceite ER	10%	0,085	0,092	31,495	8,799	0,407	0
Aceite BR	10%	0,085	0,092	31,495	-8,799	0,407	0
Lodos ER	90%	1,588	1,726	31,499	11,744	0,826	0
Lodos BR	90%	1,588	1,726	31,499	11,744	0,826	0
Diésel ER	10%	5,698	6,783	39,923	10,373	0,298	32,219
Diésel BR	10%	5,698	6,783	39,923	10,373	0,298	32,219
LNG ER	10%	3,948	8,773	46	10	3,76	0
LNG BR	10%	3,948	8,773	46	-10	3,76	0
A. Dulce BR	10%	0,481	0,481	20,017	9,476	0,253	0
<b>Total Loadcase</b>		<b>1916,411</b>	<b>44,163</b>	<b>31,163</b>	<b>0</b>	<b>7,768</b>	<b>64,439</b>
FS correction						0,034	
VCG fluid						7,802	

*Estabilidad a grandes ángulos*

La curva de brazos adrizantes es la que se representa a continuación, con un valor máximo de 8,33 metros a una escora de 20,9 grados.



La variación de los distintos parámetros de la estabilidad a grandes ángulos es la que se refleja a continuación.



*Equilibrio*

Los datos que se calculan del equilibrio para la condición de llegada a puerto a plena carga son:

<b>EQUILIBRIO: PLENA CARGA LLEGADA</b>	
Calado medio (m)	3,406
Desplazamiento (t)	1916
Escora (°)	0
Calado proa (m)	3,254
Calado popa (m)	3,558
Calado LCF (m)	3,442
Trimado (m)	0,304
Eslora en flotación (m)	83,178
Manga en flotación (m)	26,329
Superficie mojada (m <sup>2</sup> )	1470,254
Area de flotación (m <sup>2</sup> )	644,958
Coefficiente prismático	0,665
Coefficiente de bloque	0,585
Coefficiente de la maestra	0,9
Coefficiente de flotación	0,696
XB (m)	31,141
XF (m)	31,702
KB (m)	1,933
KG (m)	7,802
BMt (m)	37,737
BMI (m)	137,947
GMt corregido (m)	31,868
GMI (m)	132,077
KMt (m)	39,67
KMI (m)	139,879
TCM (t/cm)	6,611
MTC (tm/cm)	30,438
RM a 1 grado	1065,888
Inclinación cubierta (°)	0,2094
Trimado (°)	0,2094

## Salida de puerto vacío de carga

Es la condición en la que el buque sale de puerto sin carga: lleva el 100% del pasaje y el 0% de los coches.

Los tanques están inicialmente llenos. Se define el llenado del 97% para que, en caso de que sea necesario, se pueda aplicar la corrección por superficies libres.

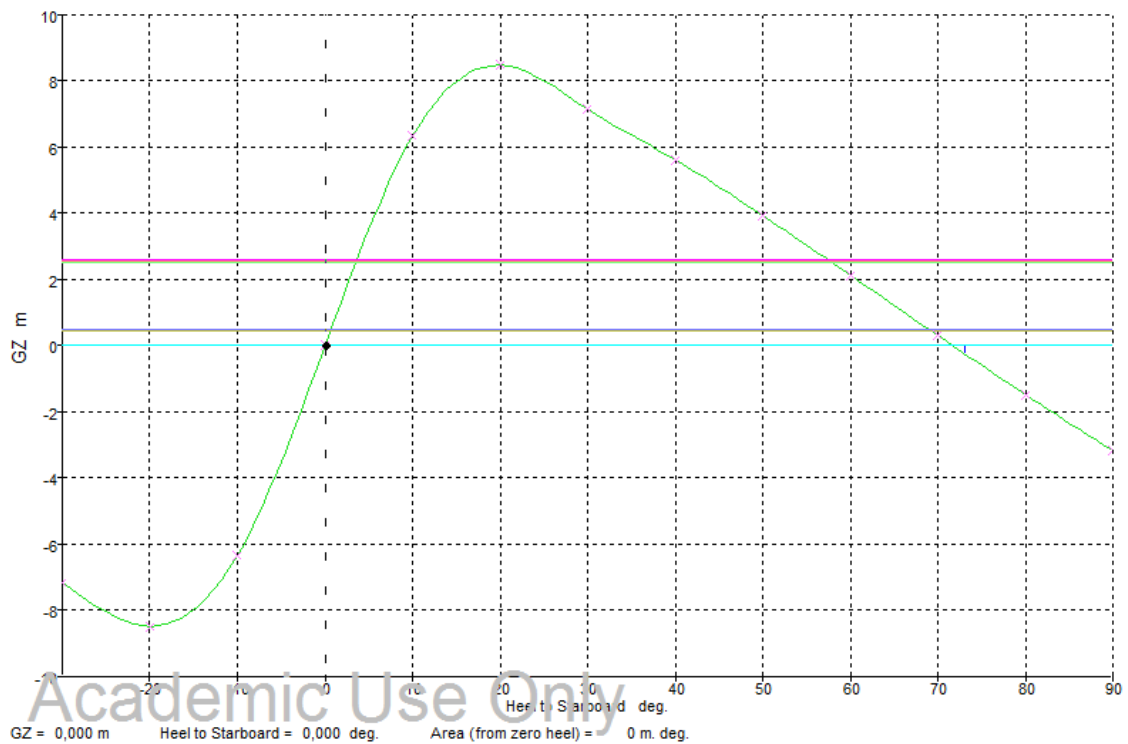
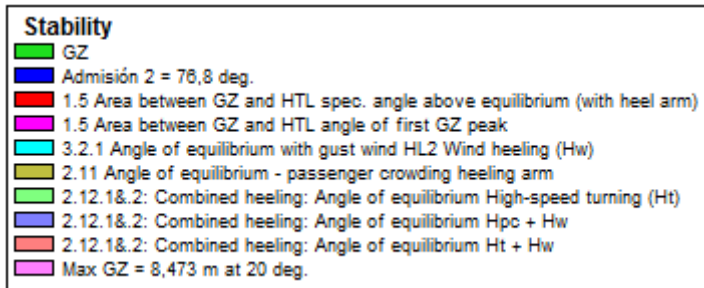
La condición de salida de puerto a plena carga es la siguiente:

VACÍO SALIDA							
Partida	Llenado	Masa (t)	Vol. (m3)	XG	YG	KG	CSL
Peso en rosca	1	1423,86		28,93	0	7,32	0
Coches	0	0		37,876	0	8,757	0
Pasaje	1	85,5		37,58	0	13,31	0
A. Des ER	0%	0	0	20,976	10,801	0,073	0
A. Des BR	0%	0	0	20,976	10,801	0,073	0
A. Dulce ER	97%	4,661	4,661	20,001	-9,041	0,876	0
Aceite ER	97%	0,825	0,896	31,497	8,575	0,966	0
Aceite BR	97%	0,825	0,896	31,497	-8,575	0,966	0
Lodos ER	0%	0	0	31,828	11	0,037	0
Lodos BR	0%	0	0	31,828	-11	0,037	0
Diésel ER	97%	55,267	65,794	39,949	10,37	1,603	32,219
Diésel BR	97%	55,267	65,794	39,949	-10,37	1,603	32,219
LNG ER	97%	38,296	85,102	46	10	4,86	0
LNG BR	97%	38,296	85,102	46	-10	4,86	0
A. Dulce BR	97%	4,661	4,661	20,001	9,041	0,876	0
<b>Total Loadcase</b>		<b>1707,458</b>	<b>312,908</b>	<b>30,796</b>	<b>0</b>	<b>7,098</b>	<b>64,439</b>
FS correction						0,038	
VCG fluid						7,136	

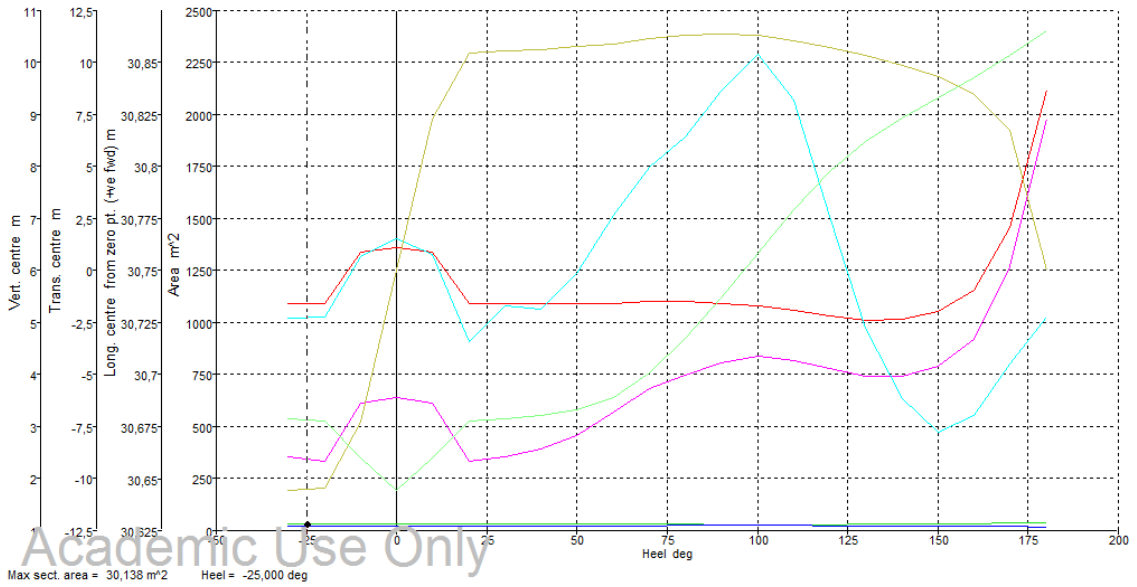
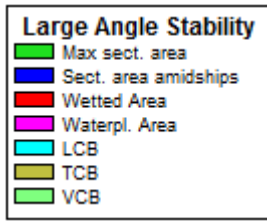


*Estabilidad a grandes ángulos*

La curva de brazos adrizantes es la que se representa a continuación, con un valor máximo de 8,473 metros a una escora de 20 grados.



La variación de los distintos parámetros de la estabilidad a grandes ángulos es la que se refleja a continuación.



*Equilibrio*

Los datos que se calculan del equilibrio para la condición de salida de puerto vacío de carga son:

<b>EQUILIBRIO: VACÍO SALIDA</b>	
Calado medio (m)	3,068
Desplazamiento (t)	1707
Escora (°)	0
Calado proa (m)	2,832
Calado popa (m)	3,305
Calado LCF (m)	3,125
Trimado (m)	0,473
Eslora en flotación (m)	83,169
Manga en flotación (m)	26,314
Superficie mojada (m <sup>2</sup> )	1357,769
Area de flotación (m <sup>2</sup> )	639,859
Coefficiente prismático	0,654
Coefficiente de bloque	0,575
Coefficiente de la maestra	0,894
Coefficiente de flotación	0,692
XB (m)	30,767
XF (m)	31,587
KB (m)	1,769
KG (m)	7,136
BMt (m)	42,017
BMI (m)	153,128
GMt corregido (m)	36,65
GMI (m)	147,761
KMt (m)	43,785
KMI (m)	154,894
TCM (t/cm)	6,559
MTC (tm/cm)	30,339
RM a 1 grado	1092,132
Inclinación cubierta (°)	0,3257
Trimado (°)	0,3257

## Llegada a puerto vacío de carga

Es la condición en la que el buque llega a puerto son carga: lleva el 100% del pasaje y el 0% de los coches.

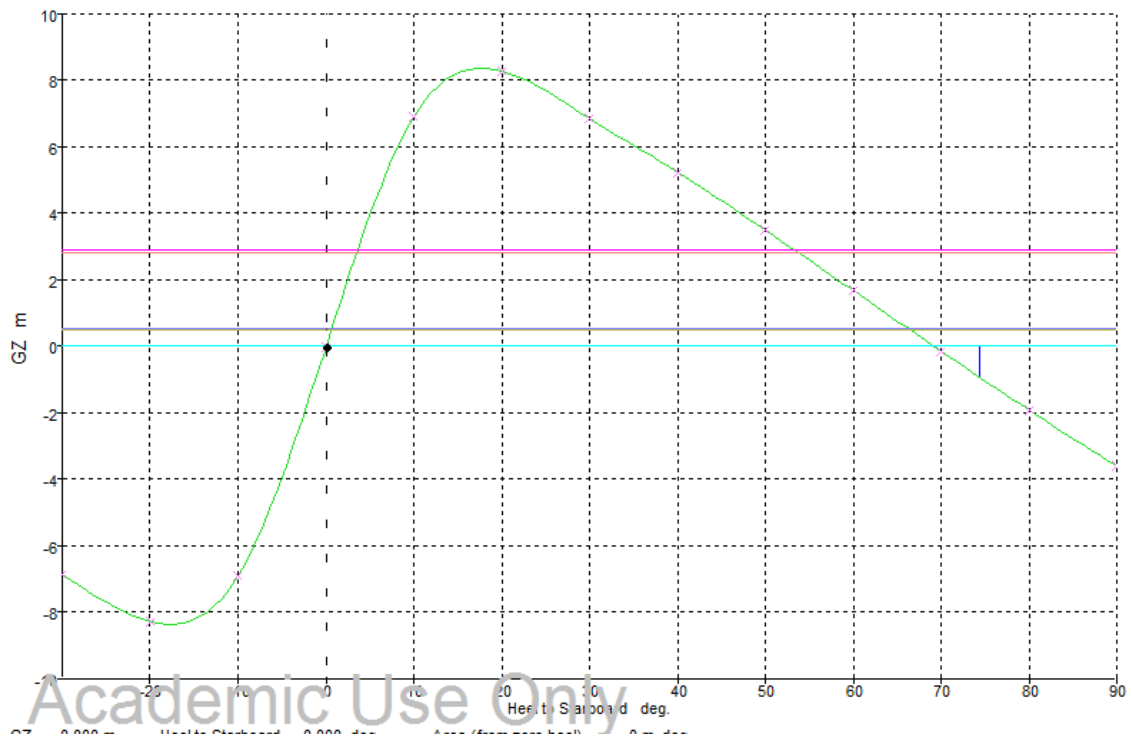
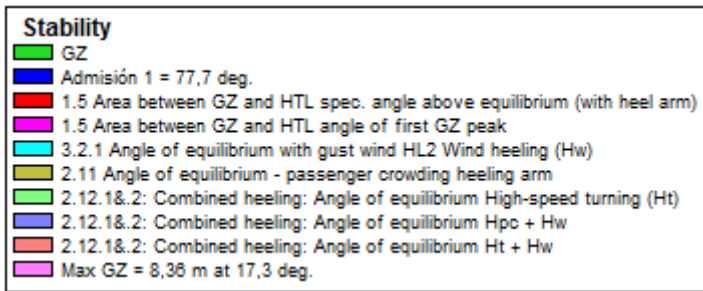
Los tanques de consumos se han vaciado hasta un 10% de su capacidad y los tanques de deshechos van llenos al 90%.

La condición de salida de puerto a plena carga es la siguiente:

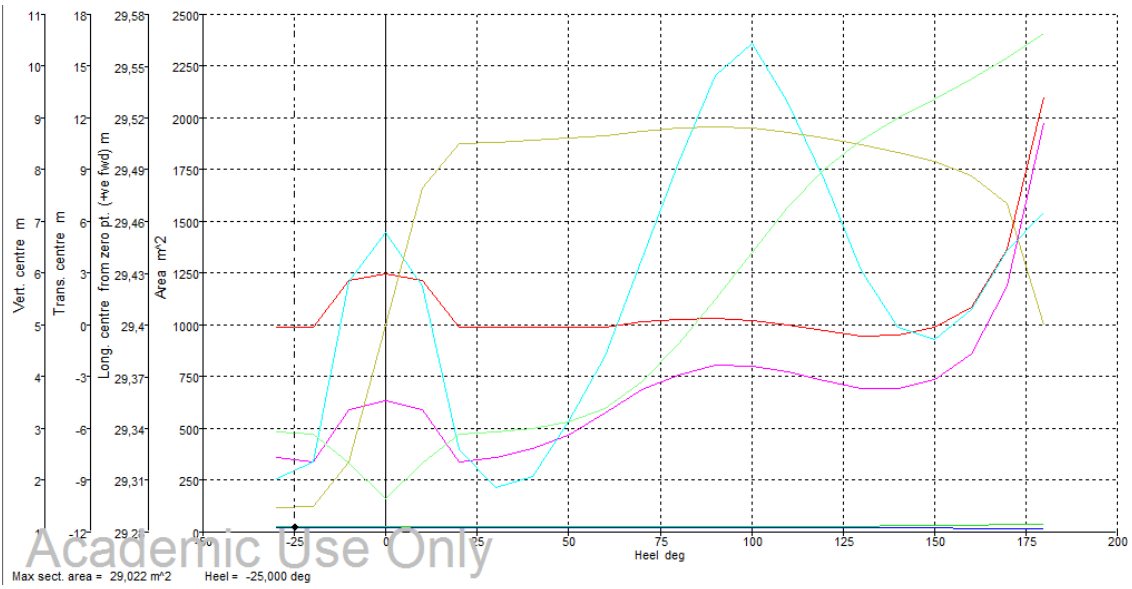
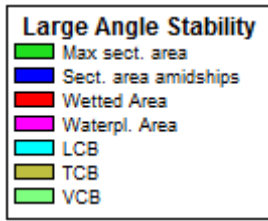
VACÍO LLEGADA							
Partida	Llenado	Masa (t)	Vol. (m3)	XG	YG	KG	CSL
Peso en rosca	1	1423,86		28,93	0	7,32	0
Coches	0	0		37,876	0	8,757	0
Pasaje	1	85,5		37,58	0	13,31	0
A. Des ER	90%	4,226	4,226	20,001	11,727	0,835	0
A. Des BR	90%	4,226	4,226	20,001	11,727	0,835	0
A. Dulce ER	10%	0,481	0,481	20,017	-9,476	0,253	0
Aceite ER	10%	0,085	0,092	31,495	8,799	0,407	0
Aceite BR	10%	0,085	0,092	31,495	-8,799	0,407	0
Lodos ER	90%	1,588	1,726	31,499	11,744	0,826	0
Lodos BR	90%	1,588	1,726	31,499	11,744	0,826	0
Diésel ER	10%	5,698	6,783	39,923	10,373	0,298	32,219
Diésel BR	10%	5,698	6,783	39,923	10,373	0,298	32,219
LNG ER	10%	3,948	8,773	46	10	3,76	0
LNG BR	10%	3,948	8,773	46	-10	3,76	0
A. Dulce BR	10%	0,481	0,481	20,017	9,476	0,253	0
<b>Total Loadcase</b>		<b>1541,411</b>	<b>44,163</b>	<b>29,53</b>	<b>0</b>	<b>7,528</b>	<b>64,439</b>
FS correction						0,042	
VCG fluid						7,57	

*Estabilidad a grandes ángulos*

La curva de brazos adrizantes es la que se representa a continuación, con un valor máximo de 8,36 metros a una escora de 17,3 grados.



La variación de los distintos parámetros de la estabilidad a grandes ángulos es la que se refleja a continuación.



*Equilibrio*

<b>EQUILIBRIO: VACÍO LLEGADA</b>	
Calado medio (m)	2,74
Desplazamiento (t)	1541
Escora (°)	0
Calado proa (m)	2,201
Calado popa (m)	3,28
Calado LCF (m)	2,873
Trimado (m)	1,08
Eslora en flotación (m)	83,15
Manga en flotación (m)	26,306
Superficie mojada (m <sup>2</sup> )	1248,577
Area de flotación (m <sup>2</sup> )	634,136
Coefficiente prismático	0,622
Coefficiente de bloque	0,552
Coefficiente de la maestra	0,893
Coefficiente de flotación	0,687
XB (m)	29,46
XF (m)	31,402
KB (m)	1,648
KG (m)	7,57
BMt (m)	46,123
BMI (m)	167,052
GMt corregido (m)	40,201
GMI (m)	161,129
KMt (m)	47,767
KMI (m)	168,685
TCM (t/cm)	6,5
MTC (tm/cm)	29,866
RM a 1 grado	1081,462
Inclinación cubierta (°)	0,7439
Trimado (°)	0,7439

## Evaluación de los criterios de estabilidad en las condiciones de carga

Una vez definidas las condiciones de carga del buque y los criterios de estabilidad en estado intacto a los que el buque debe estar sujeto, se debe comprobar que el buque cumpla con dichos criterios.

CRITERIO	PLENA CARGA SALIDA				
			ACTUAL		MARGEN %
<b>1.1 Area 0 to 30</b>				Pass	
shall be greater than (>)	4,521	m.deg	104,6364	Pass	2214,45
<b>1.2 Angle of max. GZ</b>				Pass	
shall not be less than (>=)	10	deg	20,9	Pass	109,09
<b>1.5 Area between GZ and HTL</b>				Pass	
Criteria: Area between GZ and heeling arms shall not be less than (>=)...				Pass	
Hpc + Hw	1,604	m.deg	56,4973	Pass	3422,28
Ht + Hw	1,604	m.deg	51,6201	Pass	3118,21
<b>3.2.1 Angle of equilibrium with gust wind HL2</b>				Pass	
Criteria: Angle of equilibrium due to the following shall not be greater than (<=)...				Pass	
Wind heeling (Hw)	10	deg	0	Pass	99,61
<b>2.11 Angle of equilibrium - passenger crowding heeling arm</b>				Pass	
shall be less than (<)	10	deg	0,6	Pass	93,88
<b>2.12.1&amp;.2: Combined heeling: Angle of equilibrium</b>				Pass	
Criteria: Angle of equilibrium due to the following shall not be greater than (<=)...				Pass	
High-speed turning (Ht)	10	deg	4,9	Pass	51,31
Hpc + Hw	10	deg	0,6	Pass	93,51
Ht + Hw	12	deg	4,9	Pass	59,11

La condición de salida de puerto a plena carga cumple con todos los criterios requeridos.



CRITERIO	PLENA CARGA LLEGADA				
	ACTUAL			Pass	MARGEN %
<b>1.1 Area 0 to 30</b>				Pass	
shall be greater than (>)	4,521	m.deg	108,7487	Pass	2305,41
<b>1.2 Angle of max. GZ</b>				Pass	
shall not be less than (>=)	10	deg	20,9	Pass	109,09
<b>1.5 Area between GZ and HTL</b>				Pass	
Criteria: Area between GZ and heeling arms shall not be less than (>=)...				Pass	
Hpc + Hw	1,604	m.deg	60,1117	Pass	3647,61
Ht + Hw	1,604	m.deg	50,604	Pass	3054,86
<b>3.2.1 Angle of equilibrium with gust wind HL2</b>				Pass	
Criteria: Angle of equilibrium due to the following shall not be greater than (<=)...				Pass	
Wind heeling (Hw)	10	deg	0	Pass	99,61
<b>2.11 Angle of equilibrium - passenger crowding heeling arm</b>				Pass	
shall be less than (<)	10	deg	0,7	Pass	92,99
<b>2.12.1&amp;.2: Combined heeling: Angle of equilibrium</b>				Pass	
Criteria: Angle of equilibrium due to the following shall not be greater than (<=)...				Pass	
High-speed turning (Ht)	10	deg	4,7	Pass	52,55
Hpc + Hw	10	deg	0,7	Pass	92,64
Ht + Hw	12	deg	4,8	Pass	60,14

La condición de llegada a puerto a plena carga cumple con todos los criterios requeridos.

CRITERIO	VACIO SALIDA				
			ACTUAL		MARGEN %
<b>1.1 Area 0 to 30</b>				Pass	
shall be greater than (>)	4,521	m.deg	111,7904	Pass	2265,18
<b>1.2 Angle of max. GZ</b>				Pass	
shall not be less than (>=)	10	deg	20	Pass	100
<b>1.5 Area between GZ and HTL</b>				Pass	
Criteria: Area between GZ and heeling arms shall not be less than (>=)...				Pass	
Hpc + Hw	1,604	m.deg	68,146	Pass	4148,51
Ht + Hw	1,604	m.deg	56,6303	Pass	3430,56
<b>3.2.1 Angle of equilibrium with gust wind HL2</b>				Pass	
Criteria: Angle of equilibrium due to the following shall not be greater than (<=)...				Pass	
Wind heeling (Hw)	10	deg	0	Pass	99,62
<b>2.11 Angle of equilibrium - passenger crowding heeling arm</b>				Pass	
shall be less than (<)	10	deg	0,6	Pass	93,54
<b>2.12.1&amp;.2: Combined heeling: Angle of equilibrium</b>				Pass	
Criteria: Angle of equilibrium due to the following shall not be greater than (<=)...				Pass	
High-speed turning (Ht)	10	deg	3,6	Pass	64,35
Hpc + Hw	10	deg	0,7	Pass	93,21
Ht + Hw	12	deg	3,6	Pass	70

La condición de salida de puerto vacío de carga cumple con todos los criterios requeridos.

CRITERIO	VACIO LLEGADA				
	ACTUAL			Pass	MARGEN %
<b>1.1 Area 0 to 30</b>				Pass	
shall be greater than (>)	4,521	m.deg	95,0795	Pass	1637,31
<b>1.2 Angle of max. GZ</b>				Pass	
shall not be less than (>=)	10	deg	17,3	Pass	72,73
<b>1.5 Area between GZ and HTL</b>				Pass	
Criteria: Area between GZ and heeling arms shall not be less than (>=)...				Pass	
Hpc + Hw	1,604	m.deg	73,3507	Pass	4472,99
Ht + Hw	1,604	m.deg	57,6151	Pass	3491,96
<b>3.2.1 Angle of equilibrium with gust wind HL2</b>				Pass	
Criteria: Angle of equilibrium due to the following shall not be greater than (<=)...				Pass	
Wind heeling (Hw)	10	deg	0	Pass	99,62
<b>2.11 Angle of equilibrium - passenger crowding heeling arm</b>				Pass	
shall be less than (<)	10	deg	0,6	Pass	93,7
<b>2.12.1&amp;.2: Combined heeling: Angle of equilibrium</b>				Pass	
Criteria: Angle of equilibrium due to the following shall not be greater than (<=)...				Pass	
High-speed turning (Ht)	10	deg	3,5	Pass	65,04
Hpc + Hw	10	deg	0,7	Pass	93,37
Ht + Hw	12	deg	3,5	Pass	70,58

La condición de llegada a puerto vacío de carga cumple con todos los criterios requeridos.

### Curva de KG máximos

En este apartado se va a calcular la curva de KG máximos, que define el valor máximo del KG para el que el buque pierde la estabilidad para cada desplazamiento.

Para el cálculo de la curva de KG máximos será necesario indicar varios desplazamientos intermedios. En este caso se va a establecer un rango de desplazamientos de entre el peso en rosca y el desplazamiento correspondiente a la condición de máxima carga.

Partida	Valor	Unidades
Peso en rosca	1423,86	t
Despl. Máximo	2082	t

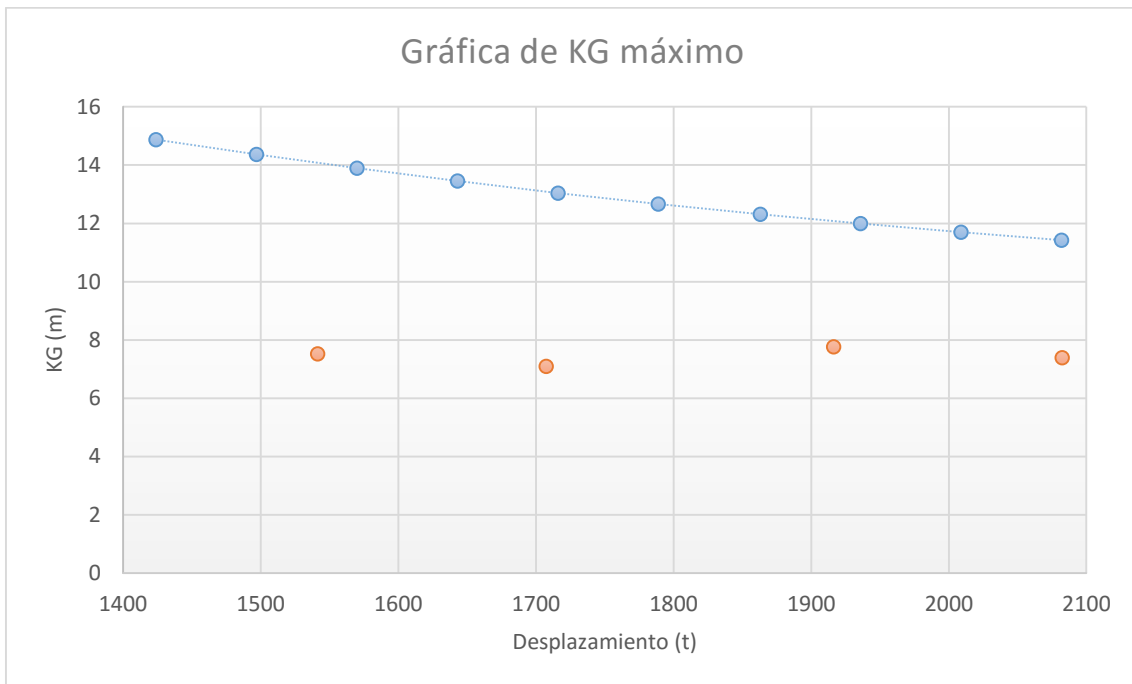
Se calculará para 10 desplazamientos intermedios y se fija el trimado en 0.

Partida	Valor	Unidades
Peso en rosca	1423,86	t
Desplazamiento 2	1496,99	t
Desplazamiento 3	1570,11	t
Desplazamiento 4	1643,24	t
Desplazamiento 5	1716,37	t
Desplazamiento 6	1789,49	t
Desplazamiento 7	1862,62	t
Desplazamiento 8	1935,75	t
Desplazamiento 9	2008,87	t
Despl. Máximo	2082,00	t

Los resultados de KG máximo obtenidos en maxsurf son los que se representan en la siguiente tabla:

Desplazamiento (t)	Calado (m)	KG máximo(m)
1424	2,691	14,869
1497	2,803	14,365
1570	2,915	13,892
1643	3,027	13,452
1716	3,139	13,044
1789	3,25	12,666
1863	3,361	12,317
1936	3,471	11,995
2009	3,581	11,698
2082	3,691	11,423

A continuación los mismos resultados se indican en una gráfica (línea azul) en la que aparecen también los KGs de cada una de las cuatro condiciones de carga, representados en la gráfica naranja.



El cálculo de la estabilidad en estado intacto se adjunta en los anexos de este documento:

***“Anexo: Libro de estabilidad en estado intacto”***

## Estabilidad después de averías

Es posible que el buque durante su vida útil sufra una avería que ponga en riesgo su estabilidad.

Hasta el momento sólo se ha calculado la estabilidad en estado intacto del buque proyecto. Es necesario, por lo tanto, calcular la estabilidad después de averías. Para ello se usarán dos métodos: el probabilístico y el determinístico.

### Método probabilístico

El método probabilístico es aplicable a buques de pasaje y buques de carga de más de 80 metros de eslora. Ya que el buque proyecto es un buque de pasaje se considera que el método probabilístico se debe aplicar a este.

Este método estudia la probabilidad que tienen los compartimentos de ser averiados y la probabilidad de que el buque sobreviva con ellos averiados.

La normativa que indica las directrices para el cálculo probabilístico de estabilidad en averías se encuentra en la MSC-216 (82).

Para el método probabilístico se debe de cumplir que:

$$A \geq R'$$

Siendo:

A: Índice de compartimentado obtenido.

R: Índice de compartimentado requerido en la normativa.

Esto se debe de cumplir tanto como para la "A" total como para las "A" parciales de cada condición de carga ( $A_s$ ,  $A_l$ ,  $A_p$ ).

Para buques de carga:

$$A \geq 0,5R$$

Para buques de pasaje:

$$A \geq 0,9R$$

El cálculo del índice "A" se hace de forma que se tienen en cuenta 3 condiciones de carga diferentes:

1. Light ( $D_l$ ): Condición con menor desplazamiento del buque. Se obtiene " $A_l$ ".
2. Deepest ( $D_s$ ): Condición de mayor desplazamiento del buque. Se obtiene " $A_s$ ".
3. Partial ( $D_p$ ): Condición con un calado al 60% de la diferencia entra las condiciones anteriores. Se obtiene " $A_p$ ".

El índice "A" total se calcula como:

$$A = 0,4A_s + 0,4A_p + 0,2A_l$$

Para cada condición, "A" se calcula como:

$$A = \sum P_i * S_i$$

Siendo:

- P: Probabilidad de que un compartimento o grupo de compartimentos se pueda inundar.
- S: Probabilidad de supervivencia del buque después de la inundación del compartimento o grupo de compartimentos.

Cálculo de la condición de carga Ds:

- Desplazamiento: Se toma el desplazamiento de salida de puerto a plena carga.
- Trimado: Para esta condición se supone trimado 0.
- XB: Se saca de hidrostáticas a asiento 0 para ese desplazamiento.
- XG: Al tener asiento 0, XG=XB.
- KG: Se saca de la curva de KG máximos, ya que se estudiará el caso más desfavorable en una primera iteración. En caso de que no cumpla los criterios se reducirá.

Cálculo de la condición de carga DI:

- Desplazamiento: Se toma el desplazamiento de llegada a puerto vacío de carga.
- Trimado: Para esta condición se supone el trimado de la condición llegada a puerto vacío de carga.
- XB: Se saca de las hidrostáticas de la condición llegada a puerto vacío de carga.
- XG: Es el de la condición llegada a puerto vacío de carga.
- KG: Se saca de la curva de KG máximos, ya que se estudiará el caso más desfavorable en una primera iteración. En caso de que no cumpla los criterios se reducirá.

## Cálculo de la condición de carga al 60% (parcial)

Las situaciones de carga 1 y 2 (D<sub>I</sub> y D<sub>S</sub>) son las mismas que las que se han definido en estado intacto, pero la situación 3 es una nueva condición de carga que se va a calcular.

Comenzamos calculando el calado:

$$D_p = D_l + 0,6 * (D_s - D_l)$$

Siendo:

$D_p$ : Calado en la condición "60% de la salida de puerto a plena carga."

$D_s$ : Calado en la condición "Salida de puerto a plena carga."

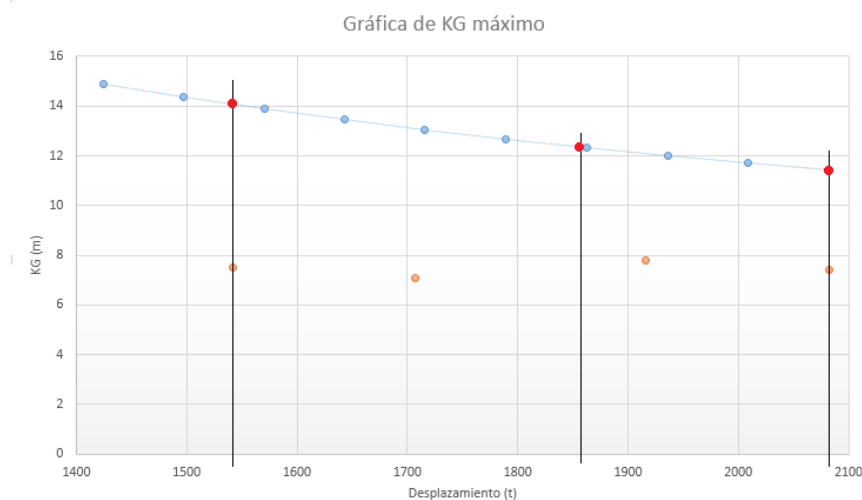
$D_l$ : Calado en la condición "Llegada a puerto en lastre"

Para el cálculo del DP:

- Desplazamiento: Se toma el 60% de la diferencia entre las condiciones de máxima carga y llegada a puerto sin carga.
- Trimado: Para esta condición se supone trimado 0.
- XB: Se saca de hidrostáticas a asiento 0 para ese desplazamiento.
- XG: Al tener asiento 0, XG=XB.
- KG: Se saca de la curva de KG máximos, ya que se estudiará el caso más desfavorable en una primera iteración. En caso de que no cumpla los criterios se reducirá.

## Selección de los KG para las tres condiciones de carga

Para las 3 condiciones de carga definidas se calcula su KG entrando en la curva de KG máximos:



	DS	DL	DP
KG (m)	14,077	11,423	12,48



## Condiciones de carga finales del método probabilístico:

Las condiciones DS y DP se definen para trimado 0, mientras que la condición DL se define para trimado de la propia condición.

Para las tres condiciones tenemos:

Condición	DS	DL	DP
Desplazamiento (t)	2082	1541	1866
Escora (°)	0	0	0
Calado proa (m)	3,692	2,201	3,365
Calado popa (m)	3,692	3,28	3,365
Calado LCF (m)	3,692	2,873	3,365
Trimado (m)	0	1,08	0
Eslora en flotación (m)	83,185	83,15	83,18
Manga en flotación (m)	26,337	26,306	26,322
Superficie mojada (m <sup>2</sup> )	1565,635	1248,577	1456,65
Area de flotación (m <sup>2</sup> )	648,958	634,136	644,498
Coefficiente prismático	0,678	0,622	0,675
Coefficiente de bloque	0,593	0,552	0,584
Coefficiente de la maestra	0,904	0,893	0,897
Coefficiente de flotación	0,699	0,687	0,696
XB (m)	31,657	29,46	31,644
XF (m)	31,809	31,402	31,723
KB (m)	2,062	1,648	1,892
KG (m)*	14,077	11,423	12,48
BMt (m)	34,948	46,123	38,737
BMI (m)	128,116	167,052	141,753
GMt corregido (m)	33,01	40,201	36,628
GMI (m)	126,178	161,129	139,644
KMt (m)	37,01	47,767	40,628
KMI (m)	130,178	168,685	143,644
TCM (t/cm)	6,652	6,5	6,606
MTC (tm/cm)	31,597	29,866	31,328
RM a 1 grado	1199,7	1081,462	1192,596
Inclinación cubierta (°)	0	0,7439	0
Trimado (°)	0	0,7439	0

\*El KG ha sido sustituido por el KG máximo calculado anteriormente.

A partir de esto se definen las condiciones en Maxsurf:

DL:

	Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
1	Lightship	1	1541,000	1541,000			29,530	0,000	11,423	0,000	User Specific
2	Total Loadgro			1541,000	0,000	0,000	29,530	0,000	11,423	0,000	
3	FS correction								0,000		
4	VCG fluid								11,423		

DS:

	Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
1	Lightship	1	2082,000	2082,000			31,657	0,000	14,077	0,000	User Specific
2	Total Loadgro			2082,000	0,000	0,000	31,657	0,000	14,077	0,000	
3	FS correction								0,000		
4	VCG fluid								14,077		

DP:

	Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
1	Lightship	1	1865,600	1865,600			31,644	0,000	12,480	0,000	User Specific
2	Total Loadgro			1865,600	0,000	0,000	31,644	0,000	12,480	0,000	
3	FS correction								0,000		
4	VCG fluid								12,480		

#### Cálculo del parámetro R

Se calcula el parámetro R (Índice de compartimentado requerido). Para buques de pasaje:

$$R = 1 - \frac{5000}{Ls + 2,5 * N + 15,225}$$

Siendo:

- N: Número de personas a bordo.

$$N = N1 + 2 * N2$$

▪ Siendo:

- N1: Número de personas en bote salvavidas.
- N2: Personal restante.
- Ls: Eslora de compartimentado.

Se calcula mediante maxsurf.

## Procedimiento del cálculo

Comenzamos definiendo los parámetros globales para el cálculo del método probabilístico, que son los siguientes:

- Buque de pasaje: ya que el buque está proyectado para llevar a más de 12 pasajeros a bordo se considera a todos los efectos buque de pasaje.
- Capacidad en botes salvavidas rígidos: 0 personas.
- Capacidad en balsas salvavidas: 980 personas (950 pax. +30 tripulantes).
- Máximo número de zonas a considerar: 3.

Una vez aplicados en maxsurf nos queda lo siguiente:

Probabilistic damage		
Resolution -- MSC.216(82) or MSC.19(58)	MSC.216(82)	
Do automatic combinations of vertical damage ?	Yes	
Loadcases		
Deepest subdivision draft (summer loadline) Loadcase	Ds	draft: 3,693 m
Partial subdivision draft Loadcase	Dp	draft: 3,366 m
Light service draft Loadcase	DI	draft: 2,736 m
Vessel parameters		
Type -- Cargo or Passenger	Passenger	
Lifeboat capacity N_1	0	
Permitted max. num. of persons in excess of N_1: N_2	980	
Subdivision length L_s	83,2	m
Aft terminal of L_s	0	m
Fwd terminal of L_s	83,2	m
Mid L_s	41,6	m
Intact displacement at subdivision draft (Dp)	1865,718	t
max. moulded breadth at or below deepest subdivision draft: B	26,334	m
max. number of adjacent zones to consider	3	
min. probability (p.r.v) of damage to consider	0,0001	
max. trim angle to consider	40	deg
Limit longitudinal extent of damage? (I_max=60,000; J_max=0,30303)	Limit	
Limit vertical extent of damage?	Limit	
max. vertical extent of damage	16,193	m
Damaged side -- Starboard or Port	Starboard	
Zone 1 located at bow or stern?	Stern	
MSC.216(82) -- Required subdivision index		
Pax ships: $R = 1 - 5000 / (L_s + 2.5 N + 15225)$	0,75258	
Reduction factor for R	1	
Required subdivision index (appying reduction factor)	0,75258	

Factor of R for required subdivision index for each loadcase	0,9	
Required subdivision index for each loadcase	0,67732	
Constants		
J_max -- MSC.216(82) formulation	0,30303	
J_kn	0,15152	
p_k	0,91667	
l_max	60	m
L_star	260	m
Vessel specific calcs (zone independent)		
J_m_star	0,30303	
J_k_star	0,15152	
J_m	0,30303	
J_k	0,15152	
Probability distribution coefficients		
b_0	11	
b_11	-65,34	
b_12	11	
b_21	-7,26	
b_22	2,2	

A continuación se definen las zonas, divididas entre sí por cada mamparo transversal estanco.

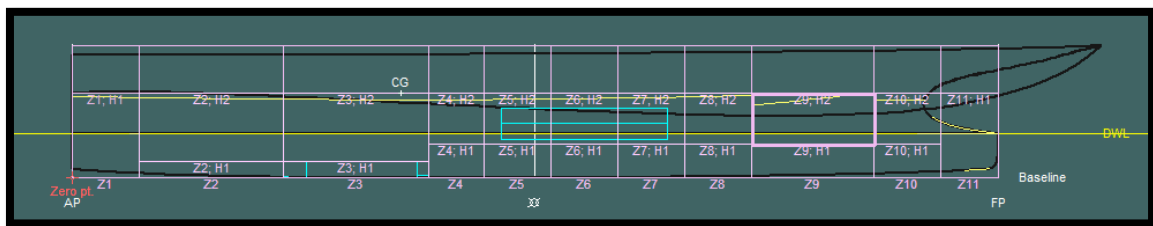
	Popa	Proa	Longitud (m)
Zone 1	0	6	6
Zone 2	6	19	13
Zone 3	19	32	13
Zone 4	32	37	5
Zone 5	37	43	6
Zone 6	43	49	6
Zone 7	49	55	6
Zone 8	55	61	6
Zone 9	61	72	11
Zone 10	72	78	6
Zone 11	78	83,2	5,2

No se divide el buque de forma longitudinal para el cálculo probabilístico porque no se disponen de mamparos longitudinales, por lo tanto no se tiene ningún parámetro B de averías.

Posteriormente se definen las cubiertas en cada una de las zonas:

ZONA	Nº DE CUBIERTAS	H
Zone 1, 1	0	7,65
Zone 2, 1	1	1,5
Zone 3, 1	1	1,5
Zone 4, 1	1	3
Zone 5, 1	1	3
Zone 6, 1	1	3
Zone 7, 1	1	3
Zone 8, 1	1	3
Zone 9, 1	1	3
Zone 10, 1	1	3
Zone 11, 1	0	7,65

Resultando una distribución como la que se puede ver en el siguiente croquis:



Se comprueba que las averías calculadas por maxsurf afecten a los compartimentos correctos.

Por último se definen las permeabilidades:

NOMBRE	TIPO	PERMEABILIDADES		
		DS (%)	DP (%)	DL (%)
C WJ ER	Compartment		85	85
C WJ BR	Compartment		85	85
CM ER	Compartment		85	85
CM BR	Compartment		85	85
DF ER	Compartment		95	95
DF BR	Compartment		95	95
CM 2 ER	Compartment		85	85
CM 2 BR	Compartment		85	85
DF 2 ER	Compartment		95	95
DF 2 BR	Compartment		95	95
A. Des ER	Tank		95	95
A. Des BR	Tank		95	95
A. Dulce ER	Tank		95	95
A. Dulce BR	Tank		95	95

Aceite ER	Tank	95	95	95
Aceite BR	Tank	95	95	95
Lodos ER	Tank	95	95	95
Lodos BR	Tank	95	95	95
VOID 1S ER	Compartment	95	95	95
VOID 1S BR	Compartment	95	95	95
VOID 1I ER	Compartment	95	95	95
VOID 1I BR	Compartment	95	95	95
Local LNG ER	Compartment	60	60	60
Local LNG BR	Compartment	60	60	60
Diesel ER	Tank	95	95	95
Diesel BR	Tank	95	95	95
VOID 3I ER	Compartment	95	95	95
VOID 3I BR	Compartment	95	95	95
VOID 4I ER	Compartment	95	95	95
VOID 4I BR	Compartment	95	95	95
VOID 5S ER	Compartment	95	95	95
VOID 5S BR	Compartment	95	95	95
VOID 5I ER	Compartment	95	95	95
VOID 5I BR	Compartment	95	95	95
VOID 6S ER	Compartment	95	95	95
VOID 6S BR	Compartment	95	95	95
Prop. Proa ER	Compartment	85	85	85
Prop. Proa BR	Compartment	85	85	85
VOID 7S ER	Compartment	95	95	95
VOID 7S BR	Compartment	95	95	95
VOID 7I ER	Compartment	95	95	95
VOID 7I BR	Compartment	95	95	95
Pique ER	Compartment	95	95	95
Pique BR	Compartment	95	95	95
LNG ER	Tank	95	95	95
LNG BR	Tank	95	95	95

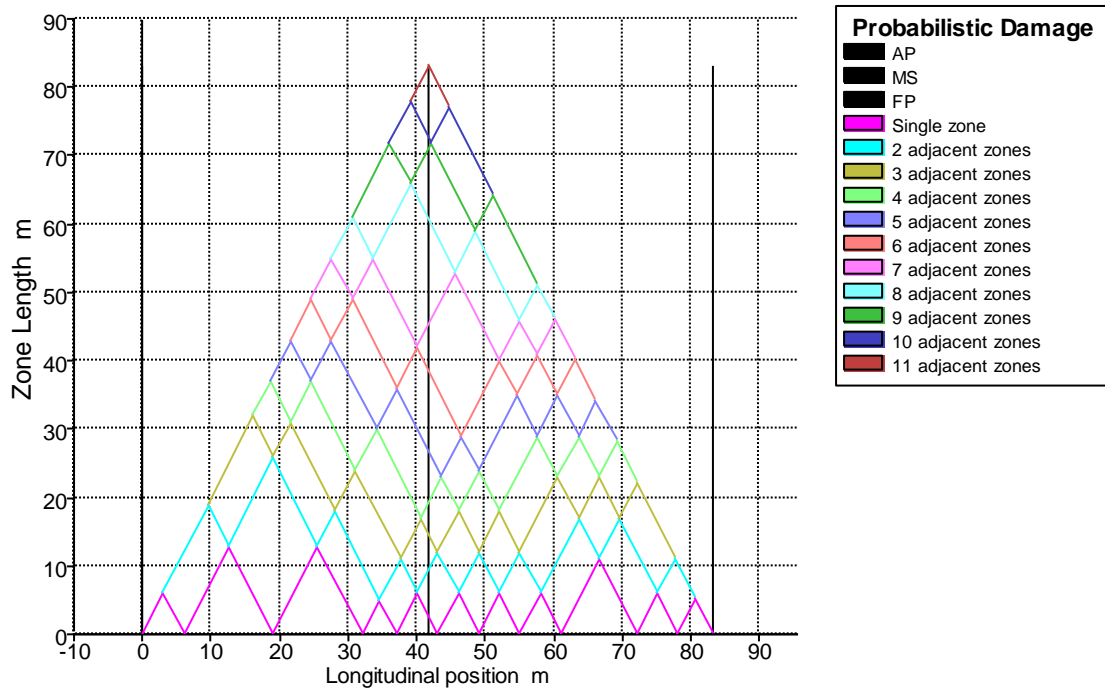
Se calcula el probabilístico, obteniéndose los siguientes resultados:

Condición	A	R	¿Cumple?
<b>Ds</b>	0,9198	0,6773	SI
<b>Dp</b>	0,9674	0,6773	SI
<b>DI</b>	0,9750	0,6773	SI
<b>Total</b>	0,9499	0,7525	SI

Los cálculos se adjuntan en los anexos:

***“Anexo: Cálculos por el método probabilístico”***

Se obtiene la gráfica de averías para las distintas zonas:



En el eje longitudinal se refleja la posición longitudinal de la avería, mientras que en el vertical se refleja la longitud de esta.

Avería supuesta en el método probabilístico

*Avería de fondo*

La resolución MSC 216 (82) para el método probabilístico, en el anexo II, regla 9, obliga a demostrar que todo buque distinto de un buque tanque soportará unas averías en el fondo definidas por la siguiente tabla:

	Para $0,3 L$ desde la perpendicular de proa del buque	Cualquier otra parte del buque
Extensión longitudinal	$1/3 L^{2/3}$ ó 14,5 m, si este segundo valor es menor.	$1/3 L^{2/3}$ ó 14,5 m, si este segundo valor es menor.
Extensión transversal	$B/6$ ó 10 m, si este segundo valor es menor.	$B/6$ ó 5 m, si este segundo valor es menor.
Extensión vertical, medida desde la línea de la quilla.	$B/20$ ó 2 m, si este segundo valor es menor.	$B/20$ ó 2 m, si este segundo valor es menor.

Vamos a comparar la avería de fondo definida por la MSC 216 (82) con la avería definida por el código HSC 2000 que se calculará en el siguiente apartado.

Método		Longitudinal	Transversal	Vertical
HSC 2000		Menor de:	Menor de:	Menor de:
		0,1L	B	0,02B
		$3+0,03L$	7 m	0,5 m
		11m		
MSC 216 (82)	0,3L desde Pp	Menor de:	Menor de:	Menor de:
		$1/3 L^{2/3}$	$B/6$	$B/20$
		14,5 m	10	2
	Cualquier otra parte del buque	Menor de:	Menor de:	Menor de:
		$1/3 L^{2/3}$	$B/6$	$B/20$
		14,5 m	5	2

Si calculamos la avería para el buque proyecto:

Método		Longitudinal	Transversal	Vertical
HSC 2000		5,5 m	7 m	0,5 m
MSC 216 (82)	0,3L desde Pp	6,35 m	4,38 m	1,315 m
	Cualquier otra parte del buque	6,35 m	4,38 m	1,315 m

Ya que el buque no tiene mamparos longitudinales en cada semicasco, a pesar de que la avería calculada por el método HSC 2000 es de mayor dimensión, el buque se verá igualmente afectado, ya que la zona inundada será la misma.

Lo mismo ocurre con la avería vertical, que tanto una avería de 0,5 metros o 1,315 metros afectan lo mismo a la totalidad de espacios situados en el fondo del buque, ya que el doble fondo en la mayoría de los espacios está situado a 3 metros sobre línea de base, a excepción de la cámara de máquinas, en la que el doble fondo se sitúa a 1,5. Ambas localizaciones son mayores que la distancia vertical de avería por ambos métodos.



Lo que si que diferencia a efectos prácticos una avería por el método determinístico del HSC 2000 y la calculada por la MSC 216 (82) es la distancia longitudinal de avería. En este último caso, la avería supuesta es de 6,35 metros.

Como la avería supuesta es mayor a la distancia mínima entre mamparos longitudinales del buque, definida en 6 metros, se va a dar el caso de zonas en las que se lleguen a inundar 3 compartimentos adyacentes, por lo que se considera que la avería definida por la MSC 216 (82) se considera más drástica y los resultados obtenidos por el determinístico calculado por este método serán mas desfavorables.

#### *Avería de costado*

Para buques de pasaje, habría que calcular la estabilidad en averías por un método determinístico definidas por la MSC 216 (82), anexo 2, regla 8, que supone una avería para buques de pasaje:

Método		Longitudinal	Transversal	Vertical
HSC 2000		Menor de:	Menor de:	Todo el puntal
		0,1L	0,2B	
		3+0,03L	0,05L	
		11m	5 m	
MSC 216 (82)	≥400 pax.	Menor de:	Menor de:	De línea de base a ds+12,5 m
		0,03Ls	0,1B	
		3 m	0,75 m	
	≤36 pax.	Menor de:	Menor de:	
		0,015Ls	0,05B	
3 m	0,75 m			

Si comparamos la avería supuesta por este método frente a la avería supuesta por el HSC 2000:

Método	Longitudinal	Transversal	Vertical
HSC 2000	5,5 m	5 m	Todo el puntal
MSC 216 (82)	2,5 m	0,75 m	16,2

La avería mayor de las definidas es la calculada por el HSC 2000. Como se va a realizar el cálculo de estabilidad en averías por el método determinístico en el apartado siguiente y este proyecto es de ámbito académico, no se va a hacer el cálculo determinístico para esta avería supuesta por la MSC 216 (82) para el método probabilístico, ya que el procedimiento a seguir es el mismo que el que se va a ver a continuación.

En un proyecto real sería necesario hacer el determinístico para la avería supuesta en la MSC 216 (82) tras hacer el probabilístico.

### Método determinístico

El método determinístico define una avería supuesta y su localización en el buque. Con ella afectando a varios compartimentos el buque debe de ser capaz de cumplir los criterios después de averías.

Para este apartado se siguen las directrices del código HSC 2000 en el capítulo 2, parte A sección 2.6

Comienza definiendo las permeabilidades:

Espacios	Permeabilidad
Apropiados para carga o provisiones	60
Destinados a alojamiento	95
Ocupados por máquinas	85
Destinados a líquidos	0 ó 95*
Apropiados para vehículos de carga	90
Espacios perdidos	95

\* Se escogerá el valor que dé lugar a las prescripciones más estrictas.

La norma indica también:

*“2.6.3 Pese a lo dispuesto en 2.6.2, se deberá utilizar la permeabilidad determinada por cálculo directo cuando dé lugar a una condición más rigurosa, la cual se podrá utilizar aunque exista una condición menos rigurosa que la obtenido de conformidad con 2.6.2.”*

Ahora calculamos las averías según lo dispuesto en la normativa HSC 2000, para avería en el costado:

*“2.6.6 Las hipótesis de avería del costado en cualquier parte de la periferia de la nave deberán ser como sigue:*

*.1 una extensión longitudinal de la avería de 0,1L o de 3 m + 0,03L o de 11 m, tomándose el menor de estos valores;*

*.2 una extensión transversal de la penetración en la nave de 0,2B o de 0,05L o de 5 m, tomándose el menor de estos valores; sin embargo, cuando la nave disponga de faldones inflados o de estructuras no flotantes en el costado, la extensión transversal de la penetración deberá ser igual como mínimo a 0,12 veces la anchura de la estructura del casco o del tanque que proporcione la flotabilidad principal;*

*.3 una extensión vertical de la avería que abarque el puntal total de la nave.”*

Para avería en el fondo:

*“2.6.7 A reserva de 2.6.8, la hipótesis de avería del fondo en cualquier parte del fondo de la nave deberá ser como sigue:*

*.1 una extensión longitudinal de la avería de 0,1L o de 3 m + 0,03L o de 11 m, tomándose el menor de estos valores;*

*.2 una extensión transversal de la avería igual a la manga total del fondo de la nave o 7 m, si este valor es menor, según se muestra en la figura 2.6.7.2; y*

*.3 una extensión vertical de la penetración en la nave de 0,02B o de 0,5 m, si este valor es menor.”*

Calculamos la extensión longitudinal de la avería, tanto para fondo como para costado (3 formas):

$$0,1 * 83,16 = 8,316 \text{ m}$$

$$0,03 * 83,16 + 3 = 5,5 \text{ m}$$

$$11 \text{ m}$$

De las tres opciones hay que escoger la menor, por lo tanto se define la avería con una **extensión de 5,5 metros**.

Ahora calculamos la extensión transversal de la avería para el costado (3 formas):

$$0,2 * 26,3 = 5,26 \text{ m}$$

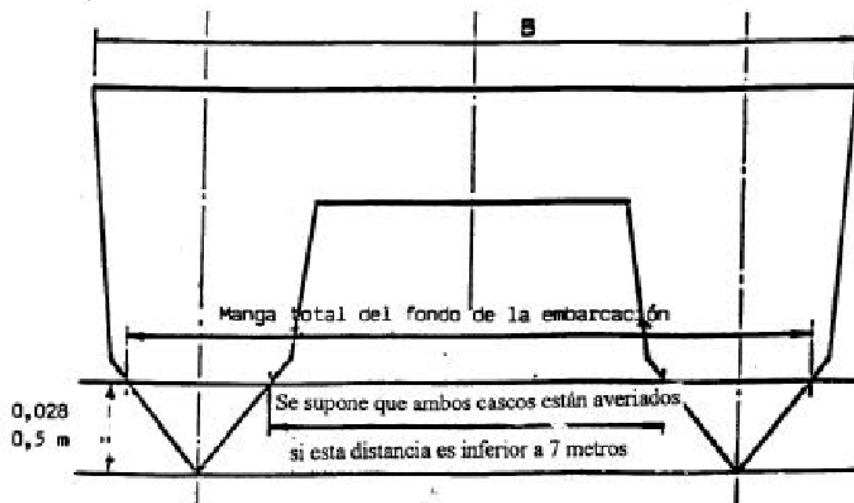
$$0,05L = 4,15 \text{ m}$$

$$5 \text{ m}$$

Se escoge el menor resultado, por lo que la avería tiene una **extensión transversal del 4,15m**. Mientras que para el fondo se coge el valor de **7 m**.

Como el buque no esta compartimentado por mamparos longitudinales ambas averías afectan a todo el doble fondo.

La extensión vertical, según el reglamento, para avería en el costado **abarca el puntal de toda la nave**. Para el doble fondo abarca todo el puntal del doble fondo, ya que este es mayor a 0,5 metros.



Como la distancia del túnel es superior a 7 metros no se supone que ambos cascos se averíen.

Por lo que se ha definido una avería con los siguientes parámetros:

Avería por método determinístico		
Extensión longitudinal	Extensión transversal	Extensión vertical
5,5	4,15	Todo el puntal

Como la distancia mínima entre mamparos estancos es de 6 metros, la avería de 5,5 metros de longitud, como mucho podrá afectar a dos compartimentos consecutivos.

Ya que la avería abarca todo el puntal no se considera que haya una subdivisión vertical que permita mantener estancas diversas zonas en la misma eslora.

Como no se han definido mamparos longitudinales estancos, la avería afecta totalmente a toda la manga del semicasco en cada caso.

Se definen las 11 averías posibles:

	Room	Intact	DCase 1	DCase 2	DCase 3	DCase 4	DCase 5	DCase 6	DCase 7	DCase 8	DCase 9	DCase 10	DCase 11
1	C WJ ER	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	C WJ BR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	CM ER	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	CM BR	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	DF ER	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	DF BR	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	CM 2 ER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	CM 2 BR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	DF 2 ER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10	DF 2 BR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11	A. Des ER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12	A. Des BR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13	A. Dulce ER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14	A. Dulce BR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15	Acelle ER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16	Acelle BR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17	Loos ER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18	Loos BR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19	VOID 1S ER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20	VOID 1S BR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21	VOID 1I ER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22	VOID 1I BR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23	Local LNG ER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24	Local LNG BR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25	Diesel ER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26	Diesel BR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27	VOID 3I ER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28	VOID 3I BR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29	VOID 4I ER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30	VOID 4I BR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31	VOID 5S ER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32	VOID 5S BR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33	VOID 5I ER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34	VOID 5I BR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35	VOID 6S ER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
36	VOID 6S BR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
37	Prop. Proa ER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
38	Prop. Proa BR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
39	VOID 7S ER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
40	VOID 7S BR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
41	VOID 7I ER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
42	VOID 7I BR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
43	Pique ER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
43	Pique BR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
44	Pique ER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
44	Pique BR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
45	LNG ER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
45	LNG BR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
46	LNG ER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
46	LNG BR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Se hacen los cálculos de estabilidad para cada avería y para cada condición de carga y se mira si cumplen con los criterios de estabilidad después de averías.

El buque cumple con todos los criterios en todas las averías supuestas.

Dichos criterios vienen definidos en el HSC2000, en el anexo 7 para naves multicasco y capítulo 2 parte B para buques de pasaje. Los criterios que se deben de cumplir tras avería son los siguientes:

Gz máximo:

Debe de ser mayor a 0,050 m:

		HSC 2000 Annex 7 Multihull. Damage 2.6 Value of max. GZ	Value	Units
1	<input type="checkbox"/>	<i>in the range from the greater of</i>		
2	<input type="checkbox"/>	spec. heel angle	0,0	deg
3	<input checked="" type="checkbox"/>	angle of equilibrium		deg
4	<input type="checkbox"/>	<i>to the lesser of</i>		
5	<input type="checkbox"/>	spec. heel angle	180,0	deg
6	<input type="checkbox"/>	spec. angle above equilibrium	0,0	deg
7	<input type="checkbox"/>	angle of first GZ peak		deg
8	<input checked="" type="checkbox"/>	angle of max. GZ		deg
9	<input checked="" type="checkbox"/>	first flooding angle of the	DownfloodingPoints	deg
10	<input type="checkbox"/>	<b>shall be greater than (&gt;)</b>	<b>0,050</b>	<b>m</b>

Rango de estabilidad positiva para buques multicasco:

Debe de ser mayor a 7 grados para naves multicasco.

		HSC 2000 Annex 7 Multihull. Damage 2.6 Range of positive stability	Value	Units
1	<input type="checkbox"/>	<i>from the greater of</i>		
2	<input checked="" type="checkbox"/>	spec. heel angle	0,0	deg
3	<input checked="" type="checkbox"/>	angle of equilibrium		deg
4	<input type="checkbox"/>	<i>to the lesser of</i>		
5	<input checked="" type="checkbox"/>	first flooding angle of the	DownfloodingPoints	deg
6	<input type="checkbox"/>	immersion angle of	Marginline	deg
7	<input checked="" type="checkbox"/>	angle of vanishing stability		deg
8	<input type="checkbox"/>	<b>shall not be less than (&gt;=)</b>	<b>7,0</b>	<b>deg</b>

Criterio meteorológico:

El ángulo de equilibrio debe de ser menor de 15 grados.

16	<input type="checkbox"/>	$Wind\ arm = a P A (h - H) / (g\ dis)$		
17	<input type="checkbox"/>	constant: a =	1,00068	
18	<input type="checkbox"/>	wind model	Pressure	
19	<input type="checkbox"/>	wind pressure: P =	61,0	Pa
20	<input checked="" type="checkbox"/>	area centroid height (from zero p	4,200	m
21	<input type="checkbox"/>	total area: A =	0,000	m <sup>2</sup>
22	<input checked="" type="checkbox"/>	additional area: A =	382,000	m <sup>2</sup>
23	<input checked="" type="checkbox"/>	height of lateral resistance: H =	2,100	m

GZ máximo para etapas intermedias:

Para etapas intermedias el GZ máximo debe de ser de como mínimo 0,05 metros.

## Área bajo la curva de GZ

Debe de ser mayor a 0,859 m.deg

		HSC2000 Ch2 Part B: Passenger craft. Damaged 2.13.2.3 Area under GZ curve	Value	Units
1	<input type="checkbox"/>	from the greater of		
2	<input checked="" type="checkbox"/>	spec. heel angle	0,0	deg
3	<input checked="" type="checkbox"/>	angle of equilibrium		deg
4	<input type="checkbox"/>	to the lesser of		
5	<input type="checkbox"/>	spec. heel angle	0,0	deg
6	<input type="checkbox"/>	spec. angle above equilibrium	0,0	deg
7	<input type="checkbox"/>	angle of first GZ peak		deg
8	<input type="checkbox"/>	angle of max. GZ		deg
9	<input checked="" type="checkbox"/>	first flooding angle of the	DownfloodingPoints	deg
10	<input type="checkbox"/>	immersion angle of	DeckEdge	deg
11	<input checked="" type="checkbox"/>	angle of vanishing stability		deg
12	<input type="checkbox"/>	shall be greater than (>)	0,8590	m.deg

## Rango de estabilidad positiva para buques de pasaje

Para buques de pasaje el rango de estabilidad positiva debe de ser mayor a 15 grados. Tanto el final como en etapas intermedias.

Este criterio es mas estricto que el criterio exigido para naves multicasco, así que este será el que se va a aplicar.

		HSC2000 Ch2 Part B: Passenger craft. Damaged 2.13.2.2 Range of positive stability	Value	Units
1	<input type="checkbox"/>	from the greater of		
2	<input checked="" type="checkbox"/>	spec. heel angle	0,0	deg
3	<input checked="" type="checkbox"/>	angle of equilibrium		deg
4	<input type="checkbox"/>	to the lesser of		
5	<input checked="" type="checkbox"/>	first flooding angle of the	DownfloodingPoints	deg
6	<input type="checkbox"/>	immersion angle of	Marginline	deg
7	<input checked="" type="checkbox"/>	angle of vanishing stability		deg
8	<input type="checkbox"/>	shall be greater than (>)	15,0	deg

El resultado del cálculo de estabilidad por el método determinístico se adjunta en los anexos:

***“Anexo: Libro de estabilidad después de averías”***

# Anexo 1

FAST FERRY CATAMARÁN 950 PAX 250 COCHES



## Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 214 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.‰: 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

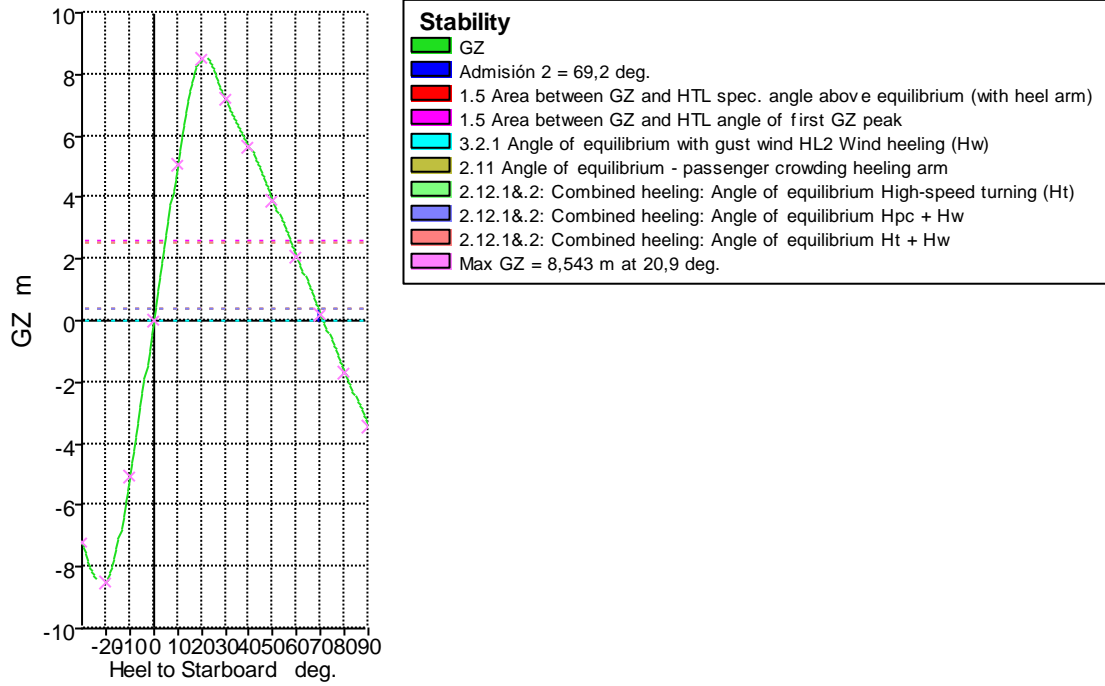
**Loadcase - Plena carga salida****Damage Case - Intact**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	0%	4,695	0,000	4,695	0,000	20,989	10,802	0,073	0,000	User Specified
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER	97%	4,805	4,661	4,805	4,661	20,001	9,041	0,876	0,000	User Specified
Aceite ER	97%	0,850	0,825	0,924	0,896	31,497	8,575	0,966	0,000	User Specified
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER	0%	1,765	0,000	1,918	0,000	31,841	11,000	0,037	0,000	User Specified
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER	97%	56,972	55,263	67,824	65,789	39,949	10,370	1,604	32,214	IMO A.749(18)
Diesel BR	97%	56,972	55,263	67,824	65,789	39,949	-10,370	1,604	32,214	IMO A.749(18)
LNG ER	97%	39,465	38,281	87,699	85,068	46,000	10,000	4,860	0,000	User Specified
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			2082,419	335,730	312,830	32,071	0,000	7,397	64,428	
FS correction								0,031		
VCG fluid								7,428		



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-7,186	-8,494	-5,083	0,000	5,083	8,494	7,186	5,643	3,926	2,093	0,205	-1,664	-3,429
Area under GZ curve from zero heel m.deg	178,0297	96,7902	25,7326	0,0000	25,7064	96,8946	177,6362	241,3764	289,4956	319,6230	331,1411	323,7763	298,2519
Displacement t	2082	2082	2082	2082	2082	2082	2083	2082	2082	2082	2082	2082	2082
Draft at FP m	1,868	3,791	3,905	3,865	3,905	3,795	1,871	-0,495	-3,691	-8,634	-17,975	-44,750	n/a
Draft at AP m	0,536	2,710	3,546	3,585	3,545	2,707	0,534	-1,995	-5,266	-10,080	-18,807	-43,187	n/a
WL Length m	76,586	76,580	83,136	83,188	83,136	76,581	76,587	76,591	76,596	76,596	76,594	76,624	76,877
Beam max extents on WL m	13,348	13,447	26,465	26,335	26,465	13,446	13,348	13,180	13,120	12,172	10,495	10,133	10,618
Wetted Area m^2	1293,389	1283,062	1561,306	1576,377	1561,323	1283,136	1293,491	1318,039	1360,772	1417,387	1452,037	1459,495	1469,802
Waterpl. Area m^2	297,464	346,606	636,389	649,494	636,390	346,582	297,424	271,708	264,649	274,218	305,361	368,337	435,496
Prismatic coeff. (Cp)	0,759	0,765	0,689	0,687	0,689	0,766	0,759	0,738	0,702	0,652	0,610	0,572	0,531
Block coeff. (Cb)	0,632	0,652	0,400	0,590	0,400	0,652	0,632	0,589	0,524	0,511	0,531	0,521	0,515
LCB from zero pt. (+ve fwd) m	32,192	32,153	32,095	32,089	32,095	32,158	32,195	32,206	32,202	32,170	32,111	32,039	31,968
LCF from zero pt. (+ve fwd) m	31,333	31,474	31,298	31,843	31,298	31,473	31,325	31,190	30,894	30,543	30,154	30,019	31,344
Max deck inclination deg	30,0095	20,0117	10,0029	0,1928	10,0029	20,0119	30,0096	40,0065	50,0036	60,0013	70,0001	80,0001	90,0000
Trim angle (+ve by stern) deg	-0,9176	-0,7447	-0,2475	-0,1928	-0,2478	-0,7495	-0,9211	-1,0333	-1,0847	-0,9965	-0,5732	1,0765	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 83,16 m)		0,4	n/a
Deck Edge (immersion pos = 83,16 m)		0,8	n/a
Admisión 1	Downflooding point	69,2	0
Admisión 2	Downflooding point	69,2	0
Admisión 3	Downflooding point	78,2	0
Admisión 4	Downflooding point	78,5	0
Guardacalor	Downflooding point	78,3	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Intact	1.1 Area 0 to 30	4,5210	m.deg	104,6384	Pass	+2214,50
HSC 2000 Annex 7 Multihull. Intact	1.2 Angle of max. GZ	10,0	deg	20,9	Pass	+109,09
HSC 2000 Annex 7 Multihull. Intact	1.5 Area between GZ and HTL				Pass	
	Hpc + Hw	1,6040	m.deg	56,4209	Pass	+3417,52
	Ht + Hw	1,6040	m.deg	51,6286	Pass	+3118,74
HSC 2000 Annex 7 Multihull. Intact	3.2.1 Angle of equilibrium with gust wind HL2				Pass	
	Wind heeling (Hw)	10,0	deg	0,0	Pass	+99,61
HSC2000 Ch2 Part B: Passenger craft. Intact	2.11 Angle of equilibrium - passenger crowding heeling arm	10,0	deg	0,7	Pass	+92,66
HSC2000 Ch2 Part B: Passenger craft. Intact	2.12.1&.2: Combined heeling: Angle of equilibrium				Pass	
	High-speed turning (Ht)	10,0	deg	4,9	Pass	+51,30
	Hpc + Hw	10,0	deg	0,8	Pass	+92,29
	Ht + Hw	12,0	deg	4,9	Pass	+59,10

## Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (Highest precision, 509 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.‰: 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

## Loadcase - Plena carga salida

## Damage Case - Intact

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	0%	4,695	0,000	4,695	0,000	20,976	10,801	0,073	0,000	User Specified
A. Des BR	0%	4,695	0,000	4,695	0,000	20,976	-10,801	0,073	0,000	User Specified
A. Dulce ER	97%	4,806	4,661	4,806	4,661	20,001	-9,041	0,876	0,000	User Specified
Aceite ER	97%	0,850	0,825	0,924	0,896	31,497	8,575	0,966	0,000	User Specified
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER	0%	1,765	0,000	1,918	0,000	31,828	11,000	0,037	0,000	User Specified
Lodos BR	0%	1,765	0,000	1,918	0,000	31,828	-11,000	0,037	0,000	User Specified
Diesel ER	97%	56,977	55,267	67,829	65,794	39,949	10,370	1,603	32,219	IMO A.749(18)
Diesel BR	97%	56,977	55,267	67,829	65,794	39,949	-10,370	1,603	32,219	IMO A.749(18)
LNG ER	97%	39,480	38,296	87,734	85,102	46,000	10,000	4,860	0,000	User Specified
LNG BR	97%	39,480	38,296	87,734	85,102	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,806	4,661	4,806	4,661	20,001	9,041	0,876	0,000	User Specified
Total Loadcase			2082,458	335,813	312,908	32,071	0,000	7,397	64,439	
FS correction								0,031		
VCG fluid								7,428		

Draft Amidships m	3,725
Displacement t	2082
Heel deg	0,0
Draft at FP m	3,865
Draft at AP m	3,585
Draft at LCF m	3,692
Trim (+ve by stern) m	-0,281
WL Length m	83,188
Beam max extents on WL m	26,335
Wetted Area m <sup>2</sup>	1576,642
Waterpl. Area m <sup>2</sup>	649,513
Prismatic coeff. (Cp)	0,687
Block coeff. (Cb)	0,590
Max Sect. area coeff. (Cm)	0,902
Waterpl. area coeff. (Cwp)	0,700
LCB from zero pt. (+ve fwd) m	32,089
LCF from zero pt. (+ve fwd) m	31,843
KB m	2,063
KG fluid m	7,428
BMt m	34,977
BML m	128,381
GMt corrected m	29,612
GML m	123,016
KMt m	37,040
KML m	130,443
Immersion (TPc) tonne/cm	6,658
MTc tonne.m	30,805
RM at 1deg = GMt.Disp.sin(1) tonne.m	1076,213
Max deck inclination deg	0,1934
Trim angle (+ve by stern) deg	-0,1934

Key point	Type	Freeboard m
Margin Line (freeboard pos = 90,745 m)		8,109
Deck Edge (freeboard pos = 90,745 m)		8,185
Admisión 1	Downflooding point	11,743
Admisión 2	Downflooding point	11,729
Admisión 3	Downflooding point	9,148
Admisión 4	Downflooding point	9,128
Guardacalor	Downflooding point	17,838

## Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 214 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.‰: 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

## Loadcase - Plena carga llegada

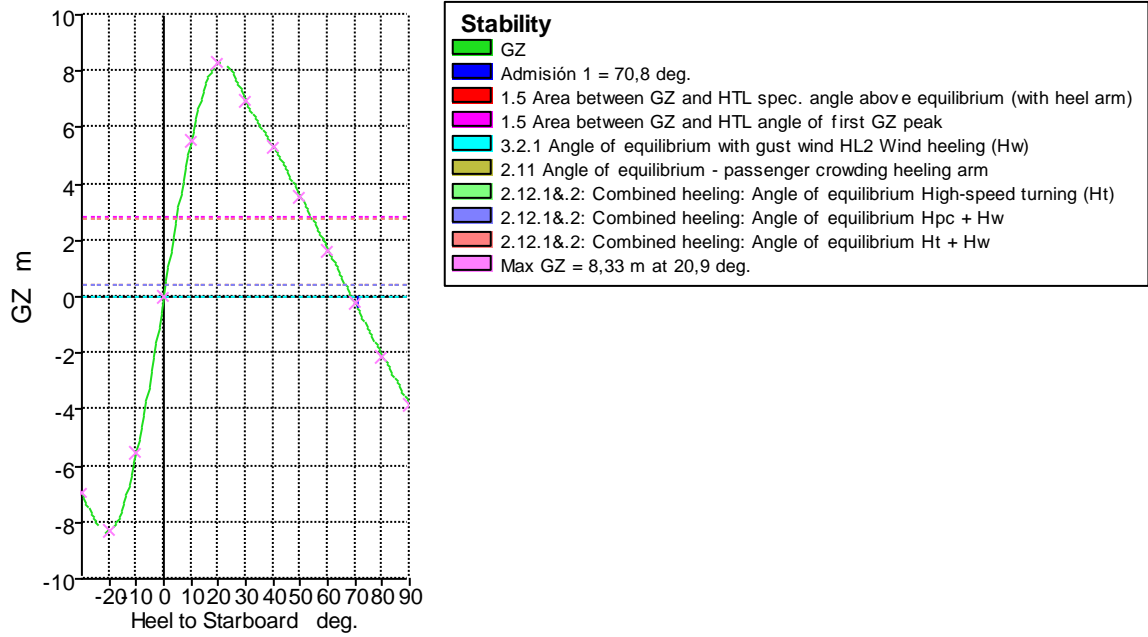
## Damage Case - Intact

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	90%	4,695	4,225	4,695	4,225	20,001	11,727	0,835	0,000	User Specified
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER	10%	4,805	0,481	4,805	0,481	20,017	9,476	0,253	0,000	User Specified
Aceite ER	10%	0,850	0,085	0,924	0,092	31,495	8,799	0,407	0,000	User Specified
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER	90%	1,765	1,588	1,918	1,726	31,499	11,744	0,826	0,000	User Specified
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER	10%	56,972	5,697	67,824	6,782	39,923	10,373	0,298	32,214	IMO A.749(18)
Diesel BR	10%	56,972	5,697	67,824	6,782	39,923	-10,373	0,298	32,214	IMO A.749(18)
LNG ER	10%	39,465	3,946	87,699	8,770	46,000	10,000	3,760	0,000	User Specified
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1916,405	335,730	44,153	31,163	0,000	7,769	64,428	
FS correction								0,034		
VCG fluid								7,802		



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-6,928	-8,318	-5,501	0,000	5,501	8,318	6,928	5,317	3,542	1,664	-0,245	-2,102	-3,837
Area under GZ curve from zero heel m.deg	179,6681	101,0972	28,5787	0,0000	28,5572	101,1792	179,3532	240,2752	284,8042	310,8563	317,9569	306,1331	276,3677
Displacement t	1916	1916	1916	1916	1916	1916	1916	1916	1916	1916	1916	1916	1916
Draft at FP m	0,310	2,409	3,223	3,254	3,223	2,414	0,307	-2,344	-5,932	-11,417	-21,627	-50,631	n/a
Draft at AP m	0,559	2,746	3,539	3,558	3,539	2,744	0,561	-1,978	-5,240	-10,036	-18,746	-43,148	n/a
WL Length m	76,727	76,684	83,040	83,178	83,040	76,681	76,729	76,821	76,965	77,125	77,275	77,328	76,898
Beam max extents on WL m	13,251	13,397	26,442	26,329	26,442	13,397	13,251	13,025	12,930	12,361	10,700	10,515	10,815
Wetted Area m <sup>2</sup>	1195,301	1193,258	1454,563	1470,067	1454,602	1193,375	1195,251	1205,189	1229,230	1270,795	1297,550	1308,156	1333,293
Waterpl. Area m <sup>2</sup>	338,664	342,532	628,247	644,916	628,249	342,540	338,610	324,485	325,095	344,131	388,507	457,793	517,227
Prismatic coeff. (Cp)	0,733	0,735	0,668	0,665	0,668	0,735	0,733	0,718	0,685	0,632	0,582	0,539	0,504
Block coeff. (Cb)	0,624	0,649	0,388	0,585	0,388	0,649	0,624	0,575	0,507	0,466	0,472	0,469	0,477
LCB from zero pt. (+ve fwd) m	31,141	31,131	31,138	31,141	31,139	31,137	31,138	31,125	31,102	31,065	31,025	30,984	30,970
LCF from zero pt. (+ve fwd) m	31,728	30,945	31,133	31,703	31,133	30,946	31,731	32,638	33,026	33,213	33,361	34,034	35,901
Max deck inclination deg	30,0003	20,0011	10,0023	0,2097	10,0023	20,0011	30,0003	40,0004	50,0007	60,0011	70,0015	80,0012	90,0000
Trim angle (+ve by stern) deg	0,1716	0,2322	0,2174	0,2097	0,2171	0,2276	0,1748	0,2523	0,4772	0,9511	1,9839	5,1422	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 60,369 m)		2,9	n/a
Deck Edge (immersion pos = 60,369 m)		3,3	n/a
Admisión 1	Downflooding point	70,8	0

Key point	Type	Immersion angle deg	Emergence angle deg
Admisión 2	Downflooding point	71,1	0
Admisión 3	Downflooding point	83,7	0
Admisión 4	Downflooding point	84,5	0
Guardacalor	Downflooding point	79,2	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Intact	1.1 Area 0 to 30	4,5210	m.deg	108,7467	Pass	+2305,37
HSC 2000 Annex 7 Multihull. Intact	1.2 Angle of max. GZ	10,0	deg	20,9	Pass	+109,09
HSC 2000 Annex 7 Multihull. Intact	1.5 Area between GZ and HTL				Pass	
	Hpc + Hw	1,6040	m.deg	60,1102	Pass	+3647,52
	Ht + Hw	1,6040	m.deg	50,6032	Pass	+3054,81
HSC 2000 Annex 7 Multihull. Intact	3.2.1 Angle of equilibrium with gust wind HL2				Pass	
	Wind heeling (Hw)	10,0	deg	0,0	Pass	+99,61
HSC2000 Ch2 Part B: Passenger craft. Intact	2.11 Angle of equilibrium - passenger crowding heeling arm	10,0	deg	0,7	Pass	+92,99
HSC2000 Ch2 Part B: Passenger craft. Intact	2.12.1&.2: Combined heeling: Angle of equilibrium				Pass	
	High-speed turning (Ht)	10,0	deg	4,7	Pass	+52,54
	Hpc + Hw	10,0	deg	0,7	Pass	+92,64
	Ht + Hw	12,0	deg	4,8	Pass	+60,14



## Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (Highest precision, 509 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.‰: 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

## Loadcase - Plena carga llegada

## Damage Case - Intact

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	90%	4,695	4,226	4,695	4,226	20,001	11,727	0,835	0,000	User Specified
A. Des BR	90%	4,695	4,226	4,695	4,226	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER	10%	4,806	0,481	4,806	0,481	20,017	-9,476	0,253	0,000	User Specified
Aceite ER	10%	0,850	0,085	0,924	0,092	31,495	8,799	0,407	0,000	User Specified
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER	90%	1,765	1,588	1,918	1,726	31,499	11,744	0,826	0,000	User Specified
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER	10%	56,977	5,698	67,829	6,783	39,923	10,373	0,298	32,219	IMO A.749(18)
Diesel BR	10%	56,977	5,698	67,829	6,783	39,923	-10,373	0,298	32,219	IMO A.749(18)
LNG ER	10%	39,480	3,948	87,734	8,773	46,000	10,000	3,760	0,000	User Specified
LNG BR	10%	39,480	3,948	87,734	8,773	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,806	0,481	4,806	0,481	20,017	9,476	0,253	0,000	User Specified
Total Loadcase			1916,411	335,813	44,163	31,163	0,000	7,768	64,439	
FS correction								0,034		
VCG fluid								7,802		

Draft Amidships m	3,406
Displacement t	1916
Heel deg	0,0
Draft at FP m	3,254
Draft at AP m	3,558
Draft at LCF m	3,442
Trim (+ve by stern) m	0,304
WL Length m	83,178
Beam max extents on WL m	26,329
Wetted Area m <sup>2</sup>	1470,254
Waterpl. Area m <sup>2</sup>	644,958
Prismatic coeff. (Cp)	0,665
Block coeff. (Cb)	0,585
Max Sect. area coeff. (Cm)	0,900
Waterpl. area coeff. (Cwp)	0,696
LCB from zero pt. (+ve fwd) m	31,141
LCF from zero pt. (+ve fwd) m	31,702
KB m	1,933
KG fluid m	7,802
BMt m	37,737
BML m	137,947
GMt corrected m	31,868
GML m	132,077
KMt m	39,670
KML m	139,879
Immersion (TPc) tonne/cm	6,611
MTc tonne.m	30,438
RM at 1deg = GMt.Disp.sin(1) tonne.m	1065,888
Max deck inclination deg	0,2094
Trim angle (+ve by stern) deg	0,2094

Key point	Type	Freeboard m
Margin Line (freeboard pos = 0 m)		8,442
Deck Edge (freeboard pos = 0 m)		8,518
Admisión 1	Downflooding point	11,920
Admisión 2	Downflooding point	11,935
Admisión 3	Downflooding point	9,607
Admisión 4	Downflooding point	9,628
Guardacalor	Downflooding point	18,026

## Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950

PAX 250 COCHES\Buque proyecto (High precision, 214 sections, Trimming on, Skin thickness not

applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp. %:

0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

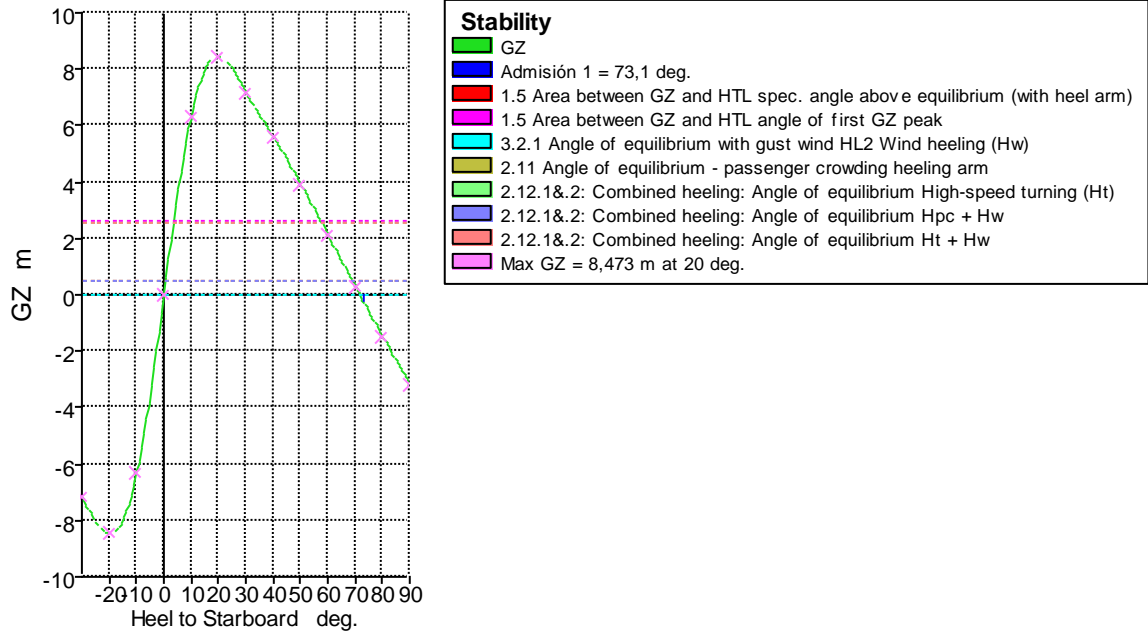
**Loadcase - Vacío salida****Damage Case - Intact**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	0%	4,695	0,000	4,695	0,000	20,989	10,802	0,073	0,000	User Specified
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER	97%	4,805	4,661	4,805	4,661	20,001	9,041	0,876	0,000	User Specified
Aceite ER	97%	0,850	0,825	0,924	0,896	31,497	8,575	0,966	0,000	User Specified
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER	0%	1,765	0,000	1,918	0,000	31,841	11,000	0,037	0,000	User Specified
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER	97%	56,972	55,263	67,824	65,789	39,949	10,370	1,604	32,214	IMO A.749(18)
Diesel BR	97%	56,972	55,263	67,824	65,789	39,949	-10,370	1,604	32,214	IMO A.749(18)
LNG ER	97%	39,465	38,281	87,699	85,068	46,000	10,000	4,860	0,000	User Specified
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			1707,419	335,730	312,830	30,796	0,000	7,098	64,428	
FS correction								0,038		
VCG fluid								7,136		



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-7,146	-8,473	-6,337	0,000	6,337	8,473	7,146	5,619	3,930	2,137	0,311	-1,477	-3,180
Area under GZ curve from zero heel m.deg	191,4306	111,7369	33,8843	0,0000	33,8706	111,7893	191,2325	254,8975	302,8403	333,2098	345,4547	339,5635	316,2290
Displacement t	1707	1707	1707	1707	1707	1707	1707	1707	1707	1707	1707	1707	1708
Draft at FP m	-0,697	1,444	2,747	2,831	2,747	1,435	-0,697	-3,353	-7,009	-	-	-	n/a
Draft at AP m	0,089	2,296	3,292	3,305	3,292	2,302	0,088	-2,585	-6,011	-	-	-	n/a
WL Length m	77,971	77,895	82,644	83,169	82,645	77,914	77,972	78,104	78,367	78,788	79,223	79,386	78,531
Beam max extents on WL m	13,011	13,246	26,350	26,314	26,350	13,247	13,011	12,643	12,363	12,500	10,795	10,826	10,971
Wetted Area m <sup>2</sup>	1091,764	1091,406	1338,379	1357,593	1338,416	1091,207	1091,712	1092,526	1101,505	1132,125	1163,459	1198,134	1238,069
Waterpl. Area m <sup>2</sup>	355,258	335,181	615,549	639,819	615,552	335,188	355,257	371,496	385,113	413,848	462,401	509,377	554,591
Prismatic coeff. (Cp)	0,709	0,709	0,660	0,654	0,660	0,709	0,709	0,705	0,684	0,634	0,571	0,522	0,488
Block coeff. (Cb)	0,598	0,630	0,375	0,575	0,375	0,630	0,598	0,550	0,486	0,407	0,412	0,435	0,455
LCB from zero pt. (+ve fwd) m	30,725	30,727	30,756	30,765	30,757	30,715	30,726	30,724	30,712	30,681	30,654	30,626	30,626
LCF from zero pt. (+ve fwd) m	30,682	30,868	31,037	31,588	31,037	30,868	30,683	31,447	32,383	33,089	33,885	35,558	37,663
Max deck inclination deg	30,0033	20,0073	10,0068	0,3267	10,0068	20,0075	30,0033	40,0017	50,0014	60,0016	70,0016	80,0011	90,0000
Trim angle (+ve by stern) deg	0,5413	0,5871	0,3756	0,3267	0,3751	0,5971	0,5412	0,5295	0,6876	1,1118	2,0596	4,7949	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 60,369 m)		4,8	n/a
Deck Edge (immersion pos = 60,369 m)		5,2	n/a
Admisión 1	Downflooding point	73,1	0
Admisión 2	Downflooding point	73,4	0
Admisión 3	Downflooding point	86,1	0
Admisión 4	Downflooding point	86,8	0
Guardacalor	Downflooding point	80,7	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Intact	1.1 Area 0 to 30	4,7265	m.deg	111,7893	Pass	+2265,16
HSC 2000 Annex 7 Multihull. Intact	1.2 Angle of max. GZ	10,0	deg	20,0	Pass	+100,00
HSC 2000 Annex 7 Multihull. Intact	1.5 Area between GZ and HTL				Pass	
	Hpc + Hw	1,6040	m.deg	68,1450	Pass	+4148,44
	Ht + Hw	1,6040	m.deg	56,6297	Pass	+3430,53
HSC 2000 Annex 7 Multihull. Intact	3.2.1 Angle of equilibrium with gust wind HL2				Pass	
	Wind heeling (Hw)	10,0	deg	0,0	Pass	+99,62
HSC2000 Ch2 Part B: Passenger craft. Intact	2.11 Angle of equilibrium - passenger crowding heeling arm	10,0	deg	0,6	Pass	+93,54
HSC2000 Ch2 Part B: Passenger craft. Intact	2.12.1&.2: Combined heeling: Angle of equilibrium				Pass	
	High-speed turning (Ht)	10,0	deg	3,6	Pass	+64,34
	Hpc + Hw	10,0	deg	0,7	Pass	+93,21
	Ht + Hw	12,0	deg	3,6	Pass	+70,00

## Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (Highest precision, 509 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.‰: 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Vacío salida****Damage Case - Intact**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	0%	4,695	0,000	4,695	0,000	20,976	10,801	0,073	0,000	User Specified
A. Des BR	0%	4,695	0,000	4,695	0,000	20,976	-10,801	0,073	0,000	User Specified
A. Dulce ER	97%	4,806	4,661	4,806	4,661	20,001	-9,041	0,876	0,000	User Specified
Aceite ER	97%	0,850	0,825	0,924	0,896	31,497	8,575	0,966	0,000	User Specified
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER	0%	1,765	0,000	1,918	0,000	31,828	11,000	0,037	0,000	User Specified
Lodos BR	0%	1,765	0,000	1,918	0,000	31,828	-11,000	0,037	0,000	User Specified
Diesel ER	97%	56,977	55,267	67,829	65,794	39,949	10,370	1,603	32,219	IMO A.749(18)
Diesel BR	97%	56,977	55,267	67,829	65,794	39,949	-10,370	1,603	32,219	IMO A.749(18)
LNG ER	97%	39,480	38,296	87,734	85,102	46,000	10,000	4,860	0,000	User Specified
LNG BR	97%	39,480	38,296	87,734	85,102	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,806	4,661	4,806	4,661	20,001	9,041	0,876	0,000	User Specified
Total Loadcase			1707,458	335,813	312,908	30,796	0,000	7,098	64,439	
FS correction								0,038		
VCG fluid								7,136		

Draft Amidships m	3,068
Displacement t	1707
Heel deg	0,0
Draft at FP m	2,832
Draft at AP m	3,305
Draft at LCF m	3,125
Trim (+ve by stern) m	0,473
WL Length m	83,169
Beam max extents on WL m	26,314
Wetted Area m <sup>2</sup>	1357,769
Waterpl. Area m <sup>2</sup>	639,859
Prismatic coeff. (Cp)	0,654
Block coeff. (Cb)	0,575
Max Sect. area coeff. (Cm)	0,894
Waterpl. area coeff. (Cwp)	0,692
LCB from zero pt. (+ve fwd) m	30,767
LCF from zero pt. (+ve fwd) m	31,587
KB m	1,769
KG fluid m	7,136
BMt m	42,017
BML m	153,128
GMt corrected m	36,650
GML m	147,761
KMt m	43,785
KML m	154,894
Immersion (TPc) tonne/cm	6,559
MTc tonne.m	30,339
RM at 1deg = GMt.Disp.sin(1) tonne.m	1092,132
Max deck inclination deg	0,3257
Trim angle (+ve by stern) deg	0,3257

Key point	Type	Freeboard m
Margin Line (freeboard pos = 0 m)		8,695
Deck Edge (freeboard pos = 0 m)		8,771
Admisión 1	Downflooding point	12,216
Admisión 2	Downflooding point	12,240
Admisión 3	Downflooding point	9,984
Admisión 4	Downflooding point	10,017
Guardacalor	Downflooding point	18,326

## Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 214 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.‰: 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Vacío llegada****Damage Case - Intact**

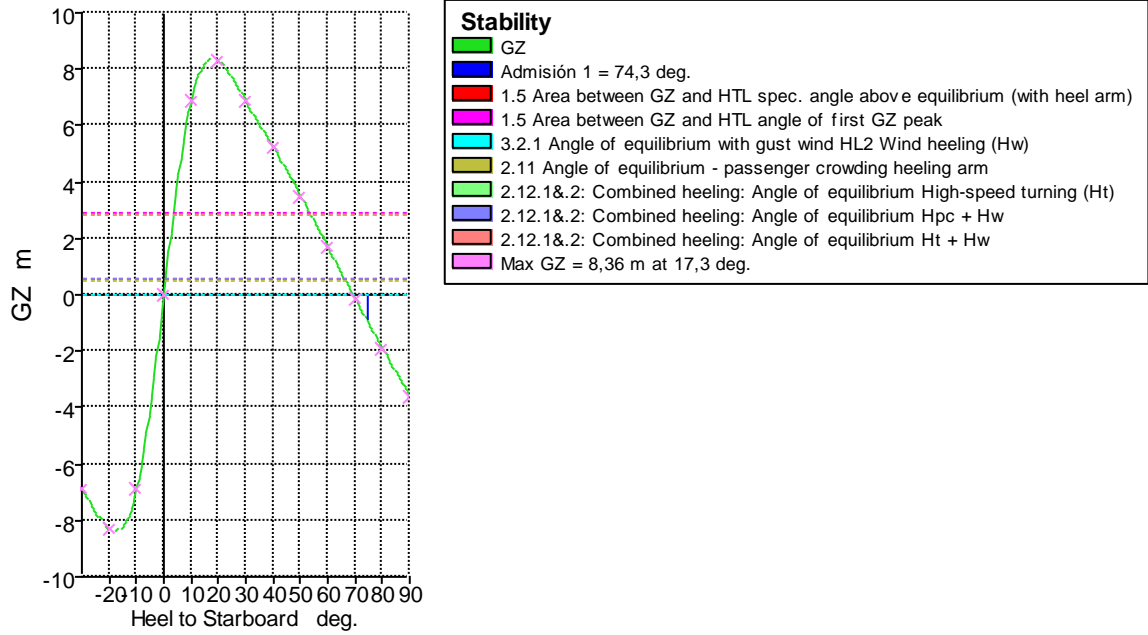
Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	90%	4,695	4,225	4,695	4,225	20,001	11,727	0,835	0,000	User Specified
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER	10%	4,805	0,481	4,805	0,481	20,017	9,476	0,253	0,000	User Specified
Aceite ER	10%	0,850	0,085	0,924	0,092	31,495	8,799	0,407	0,000	User Specified
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER	90%	1,765	1,588	1,918	1,726	31,499	11,744	0,826	0,000	User Specified
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER	10%	56,972	5,697	67,824	6,782	39,923	10,373	0,298	32,214	IMO A.749(18)
Diesel BR	10%	56,972	5,697	67,824	6,782	39,923	-10,373	0,298	32,214	IMO A.749(18)
LNG ER	10%	39,465	3,946	87,699	8,770	46,000	10,000	3,760	0,000	User Specified
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1541,405	335,730	44,153	29,530	0,000	7,528	64,428	
FS correction								0,042		
VCG fluid								7,570		





Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-6,848	-8,274	-6,908	0,000	6,908	8,273	6,848	5,239	3,499	1,682	-0,139	-1,916	-3,604
Area under GZ curve from zero heel m.deg	194,32 16	117,78 35	37,742 1	0,0000	37,734 8	117,80 47	194,22 77	254,62 57	298,44 87	324,37 19	332,07 25	321,72 75	294,07 40
Displacement t	1541	1541	1541	1541	1541	1541	1541	1541	1541	1541	1541	1542	1542
Draft at FP m	-2,164	0,034	2,002	2,199	2,001	0,038	-2,168	-4,858	-8,557	-	-	-	n/a
Draft at AP m	0,122	2,317	3,297	3,282	3,297	2,315	0,124	-2,560	-6,042	-	-	-	n/a
WL Length m	83,210	83,214	83,196	83,149	83,196	83,214	83,210	83,205	83,201	83,198	83,194	83,183	81,945
Beam max extents on WL m	12,966	13,208	26,288	26,306	26,288	13,207	12,967	12,593	12,300	12,504	11,089	10,999	11,055
Wetted Area m <sup>2</sup>	987,46 6	987,78 8	1216,9 91	1248,2 86	1216,9 37	987,92 0	987,35 8	987,15 6	991,44 4	1013,6 77	1051,2 89	1098,0 39	1150,4 39
Waterpl. Area m <sup>2</sup>	360,65 6	337,73 4	590,46 4	634,09 3	590,44 4	337,70 8	360,67 6	389,44 2	417,76 1	457,53 4	506,35 1	544,34 3	573,55 7
Prismatic coeff. (Cp)	0,623	0,623	0,621	0,622	0,621	0,623	0,622	0,621	0,609	0,571	0,516	0,474	0,446
Block coeff. (Cb)	0,520	0,553	0,350	0,552	0,350	0,553	0,520	0,478	0,426	0,360	0,356	0,385	0,412
LCB from zero pt. (+ve fwd) m	29,306	29,321	29,425	29,453	29,422	29,328	29,300	29,309	29,312	29,313	29,304	29,310	29,339
LCF from zero pt. (+ve fwd) m	31,372	31,488	30,122	31,402	30,120	31,485	31,375	31,899	33,035	34,107	35,368	37,289	38,711
Max deck inclination deg	30,028 1	20,052 3	10,038 1	0,7463	10,038 2	20,052 0	30,028 2	40,015 3	50,009 1	60,005 9	70,003 8	80,001 8	90,000 0
Trim angle (+ve by stern) deg	1,5747	1,5729	0,8922	0,7463	0,8934	1,5683	1,5785	1,5827	1,7325	2,1608	3,1880	6,1685	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 60,369 m)		7,4	n/a
Deck Edge (immersion pos = 60,369 m)		7,8	n/a
Admisión 1	Downflooding point	74,3	0
Admisión 2	Downflooding point	74,7	0
Admisión 3	Downflooding point	88,3	0
Admisión 4	Downflooding point	89,1	0
Guardacalor	Downflooding point	81,5	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Intact	1.1 Area 0 to 30	5,4728	m.deg	95,0761	Pass	+1637,25
HSC 2000 Annex 7 Multihull. Intact	1.2 Angle of max. GZ	10,0	deg	17,3	Pass	+72,73
HSC 2000 Annex 7 Multihull. Intact	1.5 Area between GZ and HTL				Pass	
	Hpc + Hw	1,6040	m.deg	73,3478	Pass	+4472,81
	Ht + Hw	1,6040	m.deg	57,6135	Pass	+3491,87
HSC 2000 Annex 7 Multihull. Intact	3.2.1 Angle of equilibrium with gust wind HL2				Pass	
	Wind heeling (Hw)	10,0	deg	0,0	Pass	+99,62
HSC2000 Ch2 Part B: Passenger craft. Intact	2.11 Angle of equilibrium - passenger crowding heeling arm	10,0	deg	0,6	Pass	+93,70
HSC2000 Ch2 Part B: Passenger craft. Intact	2.12.1&.2: Combined heeling: Angle of equilibrium				Pass	
	High-speed turning (Ht)	10,0	deg	3,5	Pass	+65,03
	Hpc + Hw	10,0	deg	0,7	Pass	+93,37
	Ht + Hw	12,0	deg	3,5	Pass	+70,58

## Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (Highest precision, 509 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.‰: 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Vacío llegada****Damage Case - Intact**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	90%	4,695	4,226	4,695	4,226	20,001	11,727	0,835	0,000	User Specified
A. Des BR	90%	4,695	4,226	4,695	4,226	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER	10%	4,806	0,481	4,806	0,481	20,017	-9,476	0,253	0,000	User Specified
Aceite ER	10%	0,850	0,085	0,924	0,092	31,495	8,799	0,407	0,000	User Specified
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER	90%	1,765	1,588	1,918	1,726	31,499	11,744	0,826	0,000	User Specified
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER	10%	56,977	5,698	67,829	6,783	39,923	10,373	0,298	32,219	IMO A.749(18)
Diesel BR	10%	56,977	5,698	67,829	6,783	39,923	-10,373	0,298	32,219	IMO A.749(18)
LNG ER	10%	39,480	3,948	87,734	8,773	46,000	10,000	3,760	0,000	User Specified
LNG BR	10%	39,480	3,948	87,734	8,773	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,806	0,481	4,806	0,481	20,017	9,476	0,253	0,000	User Specified
Total Loadcase			1541,411	335,813	44,163	29,530	0,000	7,528	64,439	
FS correction								0,042		
VCG fluid								7,570		

Draft Amidships m	2,740
Displacement t	1541
Heel deg	0,0
Draft at FP m	2,201
Draft at AP m	3,280
Draft at LCF m	2,873
Trim (+ve by stern) m	1,080
WL Length m	83,150
Beam max extents on WL m	26,306
Wetted Area m <sup>2</sup>	1248,577
Waterpl. Area m <sup>2</sup>	634,136
Prismatic coeff. (Cp)	0,622
Block coeff. (Cb)	0,552
Max Sect. area coeff. (Cm)	0,893
Waterpl. area coeff. (Cwp)	0,687
LCB from zero pt. (+ve fwd) m	29,460
LCF from zero pt. (+ve fwd) m	31,402
KB m	1,648
KG fluid m	7,570
BMt m	46,123
BML m	167,052
GMt corrected m	40,201
GML m	161,129
KMt m	47,767
KML m	168,685
Immersion (TPc) tonne/cm	6,500
MTc tonne.m	29,866
RM at 1deg = GMt.Disp.sin(1) tonne.m	1081,462
Max deck inclination deg	0,7439
Trim angle (+ve by stern) deg	0,7439

Key point	Type	Freeboard m
Margin Line (freeboard pos = 0 m)		8,719
Deck Edge (freeboard pos = 0 m)		8,795
Admisión 1	Downflooding point	12,395
Admisión 2	Downflooding point	12,449
Admisión 3	Downflooding point	10,456
Admisión 4	Downflooding point	10,532
Guardacalor	Downflooding point	18,517

## Anexo 2

FAST FERRY CATAMARÁN 950 PAX 250 COCHES

## Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

## Loadcase - Plena carga salida

## Damage Case - DCase 1

Free to Trim

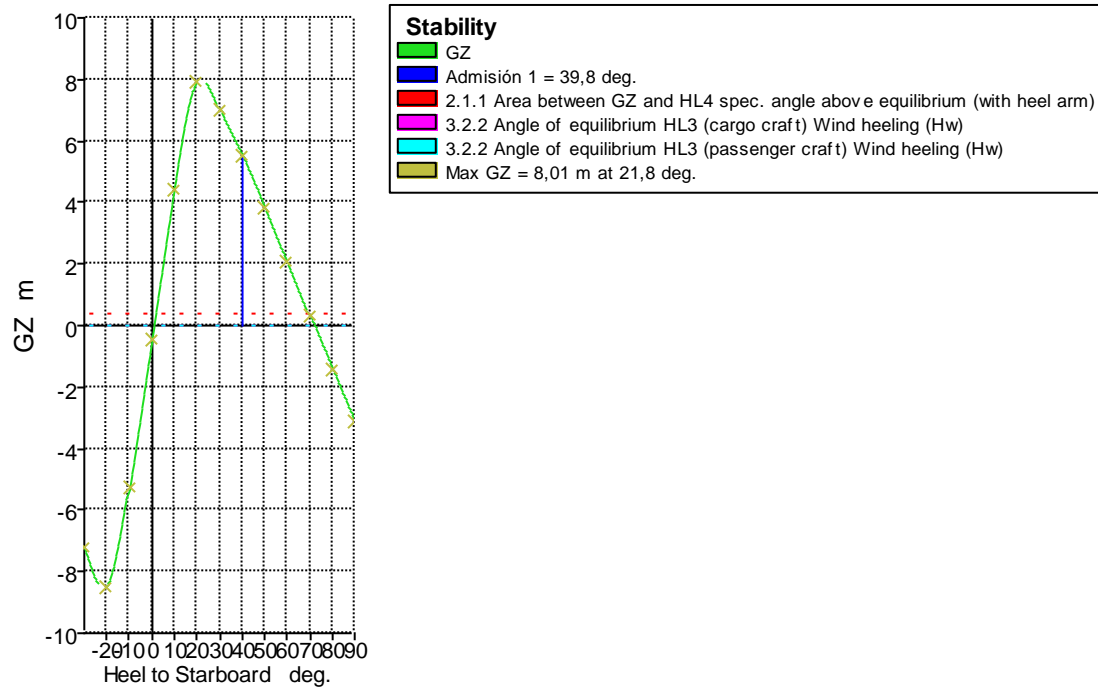
Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
C WJ ER	Fully flooded	85		

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	0%	4,695	0,000	4,695	0,000	20,989	10,802	0,073	0,000	User Specified
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER	97%	4,805	4,661	4,805	4,661	20,001	9,041	0,876	0,000	User Specified
Aceite ER	97%	0,850	0,825	0,924	0,896	31,497	8,575	0,966	0,000	User Specified
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER	0%	1,765	0,000	1,918	0,000	31,841	11,000	0,037	0,000	User Specified
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER	97%	56,972	55,262	67,823	65,789	39,949	10,370	1,604	32,213	IMO A.749(18)
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,213	IMO A.749(18)
LNG ER	97%	39,465	38,281	87,699	85,068	46,000	10,000	4,860	0,000	User Specified
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			2082,417	335,729	312,828	32,071	0,000	7,397	64,427	
FS correction								0,031		
VCG fluid								7,428		



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-7,186	-8,494	-5,233	-0,434	4,398	7,895	7,007	5,517	3,844	2,082	0,321	-1,407	-3,090
Area under GZ curve from zero heel m.deg	181,4180	100,2522	28,5865	0,0000	19,9625	84,3348	161,2481	223,7020	270,7157	300,3479	312,3501	306,8808	284,3724
Displacement t	2082	2082	2082	2082	2082	2082	2082	2082	2083	2082	2082	2083	2082
Draft at FP m	1,864	3,789	3,768	3,493	3,227	1,637	-3,013	-8,336	-15,400	-26,196	-45,719	-100,075	n/a
Draft at AP m	0,541	2,714	3,703	4,029	4,312	5,041	6,977	9,559	13,346	19,054	28,708	54,642	n/a
WL Length m	76,585	76,580	83,125	83,184	83,047	77,319	83,620	82,303	75,368	71,136	68,501	66,680	65,881
Beam max extents on WL m	13,350	13,447	26,483	26,346	26,526	26,215	21,389	16,379	13,692	12,076	11,045	10,503	11,066
Wetted Area m <sup>2</sup>	1291,504	1281,179	1564,636	1586,548	1581,154	1465,277	1553,668	1738,200	1908,118	2044,784	2142,008	2216,702	2267,966
Waterpl. Area m <sup>2</sup>	297,297	346,493	611,317	622,424	613,359	348,688	176,351	142,161	129,091	121,979	115,160	103,855	86,105
Prismatic coeff. (Cp)	0,758	0,765	0,671	0,634	0,603	0,563	0,361	0,301	0,286	0,274	0,266	0,266	0,273
Block coeff. (Cb)	0,632	0,652	0,396	0,332	0,330	0,289	0,218	0,202	0,183	0,133	0,133	0,140	0,138

Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
LCB from zero pt. (+ve fwd) m	32,190	32,153	32,075	32,036	32,000	31,806	31,225	30,571	29,908	29,317	28,944	28,812	28,951
LCF from zero pt. (+ve fwd) m	31,362	31,484	32,432	33,019	32,316	31,274	41,468	46,101	44,486	40,952	38,444	38,965	42,053
Max deck inclination deg	30,0094	20,0116	10,0001	0,3696	10,0268	20,1160	30,5286	40,9009	51,1351	61,1536	70,9107	80,4889	90,0000
Trim angle (+ve by stern) deg	-0,9115	-0,7412	-0,0446	0,3696	0,7480	2,3439	6,8505	12,1443	19,0683	28,5521	41,8281	61,7421	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 62,163 m)		1,6	n/a
Deck Edge (immersion pos = 62,163 m)		1,9	n/a
Admisión 1	Downflooding point	39,8	0
Admisión 2	Downflooding point	41,9	0
Admisión 3	Downflooding point	Not immersed in positive range	0
Admisión 4	Downflooding point	Not immersed in positive range	0
Guardacalor	Downflooding point	52,9	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	53,3956	Pass	+3228,90
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	8,010	Pass	+15920,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	38,9	Pass	+456,16
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	0,9	Pass	+95,40
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	
	Wind heeling (Hw)	15,0	deg	0,9	Pass	+93,91
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	8,010	Pass	+15920,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	222,8897	Pass	+25847,58
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	38,9	Pass	+159,54
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	38,9	Pass	+456,16

Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63



Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.‰: 0,01000(0,100); Trim‰(LCG-TCG): 0,01000(0,100); Heel‰(LCG-TCG): 0,01000(0,100)

**Loadcase - Plena carga salida****Damage Case - DCase 1**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank    Status    Perm.‰ PartFlood.‰    PartFlood.WL

C WJ ER    Fully flooded    85

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	0%	4,695	0,000	4,695	0,000	20,989	10,802	0,073	0,000	User Specified
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER	97%	4,805	4,661	4,805	4,661	20,001	9,041	0,876	0,000	User Specified
Aceite ER	97%	0,850	0,825	0,924	0,896	31,497	8,575	0,966	0,000	User Specified
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER	0%	1,765	0,000	1,918	0,000	31,841	11,000	0,037	0,000	User Specified
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER	97%	56,972	55,262	67,823	65,789	39,949	10,370	1,604	32,217	IMO A.749(18)
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,217	IMO A.749(18)
LNG ER	97%	39,465	38,281	87,699	85,068	46,000	10,000	4,860	0,000	User Specified
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			2082,417	335,729	312,828	32,071	0,000	7,397	64,435	
FS correction								0,031		
VCG fluid								7,428		

Draft Amidships m	3,763
Displacement t	2082
Heel deg	0,9
Draft at FP m	3,470
Draft at AP m	4,055
Draft at LCF m	3,823

Trim (+ve by stern) m	0,585
WL Length m	83,186
Beam max extents on WL m	26,339
Wetted Area m <sup>2</sup>	1587,131
Waterpl. Area m <sup>2</sup>	622,173
Prismatic coeff. (Cp)	0,631
Block coeff. (Cb)	0,427
Max Sect. area coeff. (Cm)	0,874
Waterpl. area coeff. (Cwp)	0,525
LCB from zero pt. (+ve fwd) m	32,033
LCF from zero pt. (+ve fwd) m	33,023
KB m	2,127
KG fluid m	7,428
BMt m	33,447
BML m	116,523
GMt corrected m	28,145
GML m	111,221
KMt m	35,569
KML m	118,633
Immersion (TPc) tonne/cm	6,377
MTc tonne.m	27,851
RM at 1deg = GMt.Disp.sin(1) tonne.m	1022,883
Max deck inclination deg	0,9841
Trim angle (+ve by stern) deg	0,4032

Key point	Type	Freeboard m
Margin Line (freeboard pos = 62,163 m)		0,123
Deck Edge (freeboard pos = 62,163 m)		0,199
Admisión 1	Downflooding point	11,297
Admisión 2	Downflooding point	11,326
Admisión 3	Downflooding point	9,154
Admisión 4	Downflooding point	9,195
Guardacalor	Downflooding point	17,416

Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Plena carga salida****Damage Case - DCase 2**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank    Status    Perm.%    PartFlood.%    PartFlood.WL

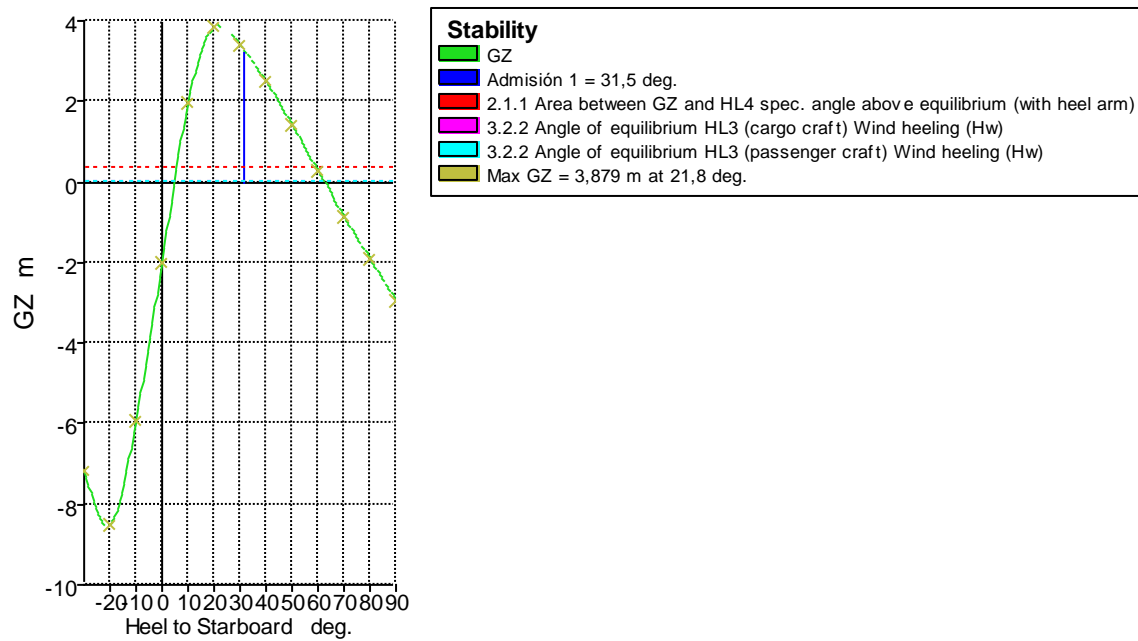
C WJ ER    Fully flooded    85

CM ER    Fully flooded    85

DF ER    Fully flooded    95

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	0%	4,695	0,000	4,695	0,000	20,989	10,802	0,073	0,000	User Specified
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER	97%	4,805	4,661	4,805	4,661	20,001	9,041	0,876	0,000	User Specified
Aceite ER	97%	0,850	0,825	0,924	0,896	31,497	8,575	0,966	0,000	User Specified
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER	0%	1,765	0,000	1,918	0,000	31,841	11,000	0,037	0,000	User Specified
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER	97%	56,972	55,262	67,823	65,789	39,949	10,370	1,604	32,213	IMO A.749(18)
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,213	IMO A.749(18)
LNG ER	97%	39,465	38,281	87,699	85,068	46,000	10,000	4,860	0,000	User Specified
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			2082,417	335,729	312,828	32,071	0,000	7,397	64,427	
FS correction								0,031		
VCG fluid								7,428		



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-7,186	-8,494	-5,915	-2,000	1,981	3,834	3,399	2,489	1,406	0,272	-0,847	-1,920	-2,938
Area under GZ curve from zero heel m.deg	195,3630	114,5957	40,0148	0,0000	0,7342	32,0597	69,3496	98,8802	118,4750	126,8621	123,9586	110,0771	85,7601
Displacement t	2082	2082	2082	2082	2082	2082	2082	2082	2082	2083	2082	2083	2082
Draft at FP m	1,856	3,789	3,401	2,684	1,827	-0,895	-5,122	-10,294	-17,331	-28,097	-48,108	-104,800	n/a
Draft at AP m	0,545	2,714	4,249	5,292	6,361	8,690	11,894	15,624	20,638	28,287	42,522	83,020	n/a
WL Length m	76,583	76,580	83,085	83,204	83,304	83,655	83,940	78,554	74,946	72,537	70,813	69,465	66,607
Beam max extents on WL m	13,351	13,447	26,524	26,260	26,543	27,354	22,033	17,076	14,243	12,555	11,521	10,941	10,978
Wetted Area m^2	1291,345	1281,179	1597,839	1662,151	1706,247	1909,567	2211,203	2367,379	2471,004	2549,725	2621,767	2685,653	2767,023
Waterpl. Area m^2	297,330	346,493	554,777	561,386	552,193	375,405	307,288	258,205	220,069	190,311	168,732	140,197	140,353
Prismatic coeff. (Cp)	0,758	0,765	0,606	0,499	0,412	0,262	0,201	0,192	0,188	0,186	0,185	0,184	0,189
Block coeff. (Cb)	0,632	0,652	0,339	0,284	0,204	0,128	0,104	0,097	0,095	0,097	0,102	0,108	0,112
LCB from zero pt. (+ve fwd) m	32,183	32,153	32,017	31,918	31,803	31,465	30,972	30,491	30,072	29,746	29,551	29,530	29,648
LCF from zero pt. (+ve fwd) m	31,382	31,484	34,466	35,148	34,345	31,276	28,438	28,080	28,010	28,430	28,564	27,226	28,907

Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
Max deck inclination deg	30,0092	20,0116	10,0164	1,7963	10,4570	20,8960	31,4892	41,8321	51,9190	61,7363	71,3080	80,6967	90,0000
Trim angle (+ve by stern) deg	-0,9033	-0,7412	0,5842	1,7963	3,1207	6,5746	11,5647	17,3105	24,5399	34,1378	47,4612	66,1180	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 62,163 m)		3,5	n/a
Deck Edge (immersion pos = 62,163 m)		3,9	n/a
Admisión 1	Downflooding point	31,5	0
Admisión 2	Downflooding point	33,8	0
Admisión 3	Downflooding point	Not immersed in positive range	0
Admisión 4	Downflooding point	Not immersed in positive range	0
Guardacalor	Downflooding point	45,5	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	33,2938	Pass	+1975,67
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	3,879	Pass	+7658,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	26,8	Pass	+282,79
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	4,8	Pass	+76,21
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	
	Wind heeling (Hw)	15,0	deg	4,8	Pass	+68,32
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	3,879	Pass	+7658,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	79,1101	Pass	+9109,56
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	26,8	Pass	+78,63
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	26,8	Pass	+282,79

Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Plena carga salida****Damage Case - DCase 2**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank    Status    Perm.%    PartFlood.%    PartFlood.WL

C WJ ER    Fully flooded    85

CM ER    Fully flooded    85

DF ER    Fully flooded    95

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	0%	4,695	0,000	4,695	0,000	20,989	10,802	0,073	0,000	User Specified
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER	97%	4,805	4,661	4,805	4,661	20,001	9,041	0,876	0,000	User Specified
Aceite ER	97%	0,850	0,825	0,924	0,896	31,497	8,575	0,966	0,000	User Specified
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER	0%	1,765	0,000	1,918	0,000	31,841	11,000	0,037	0,000	User Specified
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER	97%	56,972	55,262	67,823	65,789	39,949	10,370	1,604	32,336	IMO A.749(18)
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,336	IMO A.749(18)
LNG ER	97%	39,465	38,281	87,699	85,068	46,000	10,000	4,860	0,000	User Specified
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			2082,417	335,729	312,828	32,071	0,000	7,397	64,673	
FS correction								0,031		
VCG fluid								7,428		

Draft Amidships m	4,054
Displacement t	2082
Heel deg	5,0
Draft at FP m	2,296

Draft at AP m	5,811
Draft at LCF m	4,333
Trim (+ve by stern) m	3,515
WL Length m	83,250
Beam max extents on WL m	26,323
Wetted Area m <sup>2</sup>	1684,375
Waterpl. Area m <sup>2</sup>	561,606
Prismatic coeff. (Cp)	0,455
Block coeff. (Cb)	0,228
Max Sect. area coeff. (Cm)	0,776
Waterpl. area coeff. (Cwp)	0,382
LCB from zero pt. (+ve fwd) m	31,854
LCF from zero pt. (+ve fwd) m	34,959
KB m	2,474
KG fluid m	7,428
BMt m	29,418
BML m	102,492
GMt corrected m	24,440
GML m	97,514
KMt m	31,754
KML m	104,486
Immersion (TPc) tonne/cm	5,756
MTc tonne.m	24,419
RM at 1deg = GMt.Disp.sin(1) tonne.m	888,237
Max deck inclination deg	5,5462
Trim angle (+ve by stern) deg	2,4202

Key point	Type	Freeboard m
Margin Line (freeboard pos = 62,163 m)		-0,28
Deck Edge (freeboard pos = 62,163 m)		-0,205
Admisión 1	Downflooding point	9,351
Admisión 2	Downflooding point	9,524
Admisión 3	Downflooding point	8,783
Admisión 4	Downflooding point	9,028
Guardacalor	Downflooding point	15,539

## Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Plena carga salida****Damage Case - DCase 3**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

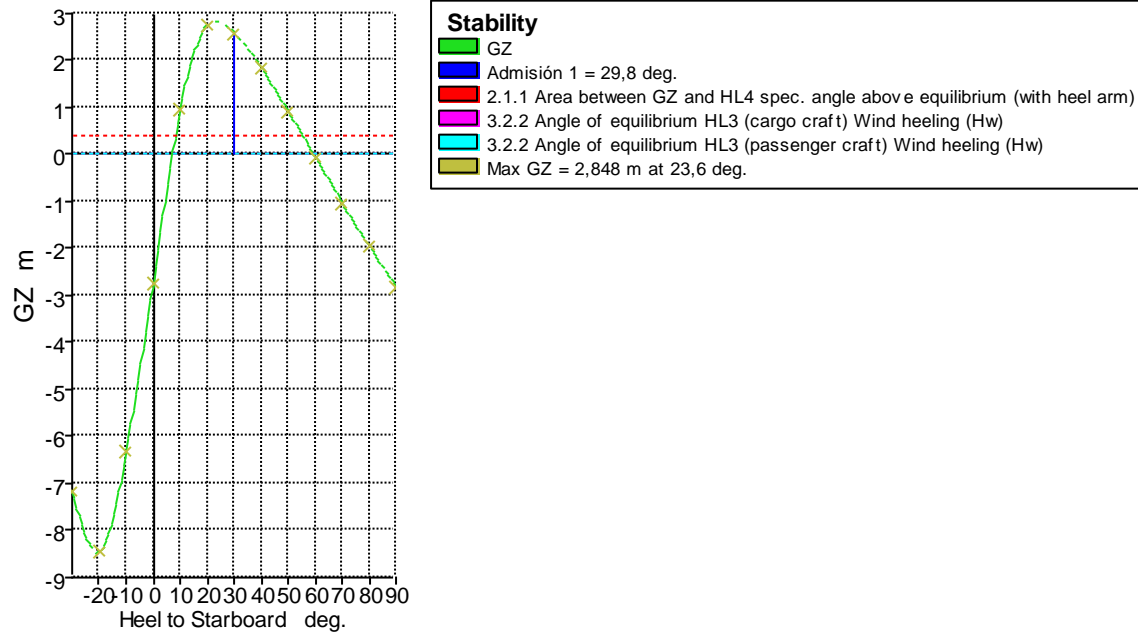
Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
CM ER	Fully flooded	85		
DF ER	Fully flooded	95		
CM 2 ER	Fully flooded	85		
DF 2 ER	Fully flooded	95		
A. Des ER	Fully flooded	95		
A. Dulce ER	Fully flooded	95		
Aceite ER	Fully flooded	95		
Lodos ER	Fully flooded	95		

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER (Damaged)	Damaged									
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER (Damaged)	Damaged									
Aceite ER (Damaged)	Damaged									
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER (Damaged)	Damaged									
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER	97%	56,972	55,262	67,823	65,789	39,949	10,370	1,604	32,213	IMO A.749(18)
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,213	IMO A.749(18)
LNG ER	97%	39,465	38,281	87,699	85,068	46,000	10,000	4,860	0,000	User Specified
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			2076,932	323,387	307,271	32,098	-0,024	7,414	64,427	
FS correction								0,031		



Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m^3	Total Volume m^3	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
VCG fluid								7,445		



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-7,155	-8,464	-6,326	-2,731	0,955	2,751	2,589	1,853	0,922	-0,056	-1,024	-1,952	-2,822
Area under GZ curve from zero heel m.deg	202,3237	122,1755	45,8399	0,0000	-8,1121	12,3500	40,0870	62,4884	76,4646	80,7997	75,3814	60,4529	36,5522
Displacement t	2077	2077	2077	2077	2077	2077	2077	2077	2077	2077	2077	2077	2077
Draft at FP m	1,865	3,797	3,625	3,245	2,845	1,141	-2,014	-6,306	-12,107	-20,749	-36,669	-81,676	n/a
Draft at AP m	0,507	2,682	4,303	5,296	6,288	8,634	11,827	15,633	20,707	28,381	42,658	83,395	n/a
WL Length m	76,585	76,582	83,115	83,203	82,869	77,888	84,048	84,831	84,286	80,923	78,539	76,730	72,848
Beam max extents on WL m	13,337	13,440	26,529	26,251	26,541	27,294	22,130	17,127	14,312	12,602	11,569	10,990	10,834
Wetted Area m^2	1288,927	1279,226	1641,738	1756,512	1854,950	2180,742	2566,121	2733,443	2827,979	2898,495	2968,393	3034,544	3118,079

Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
Waterpl. Area m <sup>2</sup>	299,604	347,710	526,204	532,740	510,816	388,686	316,549	264,588	229,885	199,650	178,487	159,132	148,235
Prismatic coeff. (Cp)	0,759	0,766	0,591	0,489	0,411	0,281	0,201	0,177	0,166	0,166	0,166	0,165	0,171
Block coeff. (Cb)	0,632	0,651	0,325	0,278	0,202	0,135	0,101	0,089	0,081	0,085	0,090	0,095	0,102
LCB from zero pt. (+ve fwd) m	32,213	32,183	32,052	31,978	31,903	31,664	31,291	30,905	30,562	30,309	30,157	30,145	30,244
LCF from zero pt. (+ve fwd) m	31,310	31,495	33,921	34,718	35,262	31,164	25,688	25,531	26,557	27,518	28,044	28,789	27,480
Max deck inclination deg	30,0099	20,0125	10,0105	1,4124	10,2662	20,5538	31,0001	41,3348	51,4602	61,3462	71,0252	80,5510	90,0000
Trim angle (+ve by stern) deg	-0,9356	-0,7680	0,4668	1,4124	2,3706	5,1483	9,4497	14,7793	21,5336	30,5744	43,6487	63,2618	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 62,163 m)		0,8	n/a
Deck Edge (immersion pos = 62,163 m)		1,2	n/a
Admisión 1	Downflooding point	29,8	0
Admisión 2	Downflooding point	31,4	0
Admisión 3	Downflooding point	71,4	0
Admisión 4	Downflooding point	85,7	0
Guardacalor	Downflooding point	43,4	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	24,8425	Pass	+1448,78
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	2,848	Pass	+5596,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	22,7	Pass	+223,86
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	7,1	Pass	+64,32
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	
	Wind heeling (Hw)	15,0	deg	7,1	Pass	+52,47
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	2,848	Pass	+5596,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	49,0134	Pass	+5605,86
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	22,7	Pass	+51,13
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	22,7	Pass	+223,86

## Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.:%: 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Plena carga salida****Damage Case - DCase 3**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
CM ER	Fully flooded	85		
DF ER	Fully flooded	95		
CM 2 ER	Fully flooded	85		
DF 2 ER	Fully flooded	95		
A. Des ER	Fully flooded	95		
A. Dulce ER	Fully flooded	95		
Aceite ER	Fully flooded	95		
Lodos ER	Fully flooded	95		

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER (Damaged)	Damaged									
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER (Damaged)	Damaged									
Aceite ER (Damaged)	Damaged									
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER (Damaged)	Damaged									
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER	97%	56,972	55,262	67,823	65,789	39,949	10,370	1,604	32,477	IMO A.749(18)
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,477	IMO A.749(18)
LNG ER	97%	39,465	38,281	87,699	85,068	46,000	10,000	4,860	0,000	User Specified
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			2076,932	323,387	307,271	32,098	-0,024	7,414	64,955	

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
FS correction								0,031		
VCG fluid								7,445		

Draft Amidships m	4,484
Displacement t	2077
Heel deg	7,3
Draft at FP m	2,990
Draft at AP m	5,978
Draft at LCF m	4,758
Trim (+ve by stern) m	2,988
WL Length m	83,148
Beam max extents on WL m	26,402
Wetted Area m <sup>2</sup>	1827,094
Waterpl. Area m <sup>2</sup>	534,906
Prismatic coeff. (Cp)	0,433
Block coeff. (Cb)	0,211
Max Sect. area coeff. (Cm)	0,716
Waterpl. area coeff. (Cwp)	0,372
LCB from zero pt. (+ve fwd) m	31,929
LCF from zero pt. (+ve fwd) m	33,951
KB m	2,716
KG fluid m	7,445
BMt m	27,252
BML m	118,702
GMt corrected m	22,480
GML m	113,930
KMt m	29,729
KML m	120,381
Immersion (TPc) tonne/cm	5,483
MTC tonne.m	28,454
RM at 1deg = GMt.Disp.sin(1) tonne.m	814,826
Max deck inclination deg	7,5764
Trim angle (+ve by stern) deg	2,0581

Key point	Type	Freeboard m
Margin Line (freeboard pos = 62,163 m)		-1,305
Deck Edge (freeboard pos = 62,163 m)		-1,231
Admisión 1	Downflooding point	8,510
Admisión 2	Downflooding point	8,655
Admisión 3	Downflooding point	7,781
Admisión 4	Downflooding point	7,990
Guardacalor	Downflooding point	14,682

### Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%, 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

### Loadcase - Plena carga salida

#### Damage Case - DCase 4

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

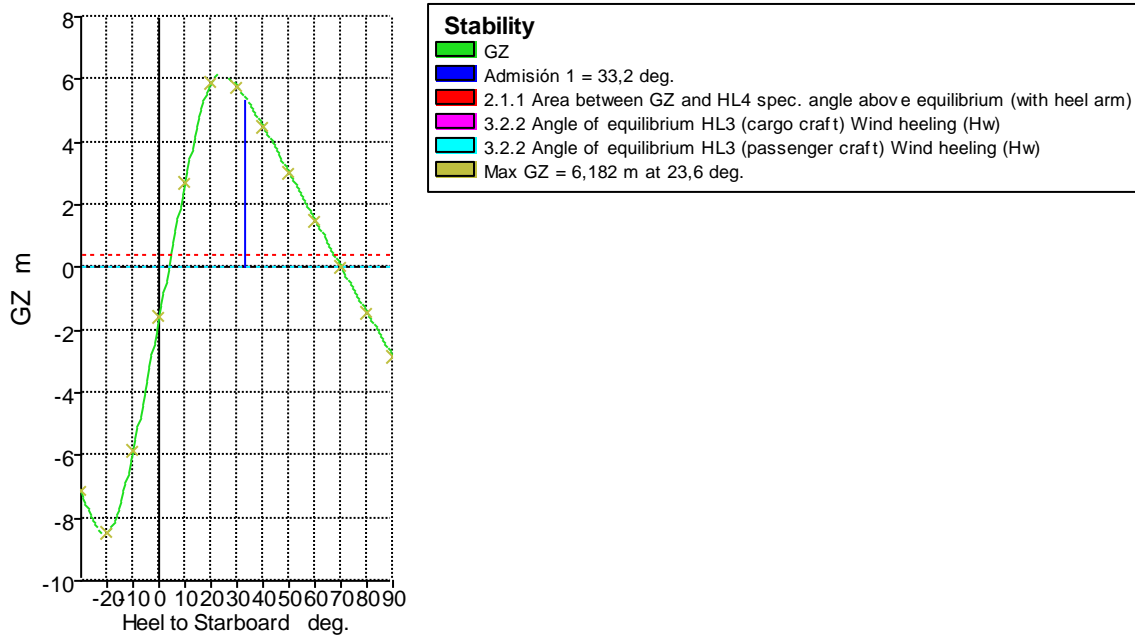
Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
CM 2 ER	Fully flooded	85		
DF 2 ER	Fully flooded	95		
A. Des ER	Fully flooded	95		
A. Dulce ER	Fully flooded	95		
Aceite ER	Fully flooded	95		
Lodos ER	Fully flooded	95		
VOID 1S ER	Fully flooded	95		
VOID 1I ER	Fully flooded	95		

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER (Damaged)	Damaged									
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER (Damaged)	Damaged									

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Aceite ER (Damaged)	Damaged									
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER (Damaged)	Damaged									
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER	97%	56,972	55,262	67,823	65,789	39,949	10,370	1,604	32,213	IMO A.749(18)
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,213	IMO A.749(18)
LNG ER	97%	39,465	38,281	87,699	85,068	46,000	10,000	4,860	0,000	User Specified
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			2076,932	323,387	307,271	32,098	-0,024	7,414	64,427	
FS correction								0,031		
VCG fluid								7,445		



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-7,155	-8,464	-5,835	-1,605	2,698	5,907	5,769	4,505	3,015	1,500	0,001	-1,467	-2,882
Area under GZ curve from zero heel m.deg	192,2795	111,8467	37,6006	0,0000	5,6546	50,8406	111,3830	163,0298	200,7191	223,2838	230,7753	223,4036	201,6283
Displacement t	2077	2077	2077	2077	2077	2077	2077	2077	2077	2077	2077	2077	2077
Draft at FP m	1,866	3,797	4,032	4,104	4,322	4,422	3,685	-1,273	-7,926	-16,541	-31,069	-71,125	n/a
Draft at AP m	0,506	2,682	3,827	4,217	4,524	5,363	7,773	11,631	16,210	22,478	33,682	65,171	n/a
WL Length m	76,585	76,582	83,143	82,193	83,157	80,237	78,856	77,263	78,600	85,287	81,879	79,082	77,287
Beam max extents on WL m	13,337	13,440	26,501	26,328	26,542	27,080	22,152	17,022	14,164	12,424	11,365	10,750	10,467
Wetted Area m <sup>2</sup>	1288,941	1279,226	1625,303	1720,215	1784,955	1917,161	2462,816	2615,079	2707,041	2754,694	2805,517	2870,692	2935,531
Waterpl. Area m <sup>2</sup>	299,602	347,710	561,461	567,598	570,583	363,233	265,507	175,663	167,018	158,483	147,123	130,787	123,841
Prismatic coeff. (Cp)	0,759	0,766	0,640	0,593	0,544	0,466	0,328	0,267	0,224	0,191	0,190	0,192	0,193
Block coeff. (Cb)	0,632	0,651	0,381	0,310	0,282	0,224	0,179	0,141	0,102	0,092	0,098	0,105	0,111
LCB from zero pt. (+ve fwd) m	32,214	32,183	32,113	32,090	32,093	32,037	31,794	31,162	30,519	30,040	29,750	29,636	29,686
LCF from zero pt. (+ve fwd) m	31,308	31,495	31,771	32,327	31,816	31,962	27,722	21,100	21,244	24,559	26,787	26,798	29,179
Max deck inclination deg	30,0099	20,0125	10,0010	0,0777	10,0009	20,0089	30,0897	40,4750	50,8106	60,8706	70,7008	80,3856	90,0000
Trim angle (+ve by stern) deg	-0,9365	-0,7680	-0,1412	0,0777	0,1389	0,6486	2,8146	8,8201	16,1847	25,1363	37,9054	58,6108	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 62,163 m)		0	n/a
Deck Edge (immersion pos = 62,163 m)		0	n/a
Admisión 1	Downflooding point	33,2	0
Admisión 2	Downflooding point	34	0
Admisión 3	Downflooding point	66,3	0
Admisión 4	Downflooding point	79,4	0
Guardacalor	Downflooding point	46,3	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	45,2309	Pass	+2719,88
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	6,182	Pass	+12264,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	29,6	Pass	+322,39
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	3,7	Pass	+81,46

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	
	Wind heeling (Hw)	15,0	deg	3,7	Pass	+75,32
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	6,182	Pass	+12264,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	132,4235	Pass	+15316,01
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	29,6	Pass	+97,11
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	29,6	Pass	+322,39

### Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

### Loadcase - Plena carga salida

#### Damage Case - DCase 4

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
CM 2 ER	Fully flooded	85		
DF 2 ER	Fully flooded	95		
A. Des ER	Fully flooded	95		
A. Dulce ER	Fully flooded	95		
Aceite ER	Fully flooded	95		
Lodos ER	Fully flooded	95		
VOID 1S ER	Fully flooded	95		
VOID 1I ER	Fully flooded	95		

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER (Damaged)	Damaged									
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified



Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
A. Dulce ER (Damaged)	Damaged									
Aceite ER (Damaged)	Damaged									
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER (Damaged)	Damaged									
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER	97%	56,972	55,262	67,823	65,789	39,949	10,370	1,604	32,282	IMO A.749(18)
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,282	IMO A.749(18)
LNG ER	97%	39,465	38,281	87,699	85,068	46,000	10,000	4,860	0,000	User Specified
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			2076,932	323,387	307,271	32,098	-0,024	7,414	64,565	
FS correction								0,031		
VCG fluid								7,445		

Draft Amidships m	4,259
Displacement t	2077
Heel deg	3,7
Draft at FP m	4,180
Draft at AP m	4,339
Draft at LCF m	4,277
Trim (+ve by stern) m	0,159
WL Length m	83,182
Beam max extents on WL m	26,335
Wetted Area m <sup>2</sup>	1748,941
Waterpl. Area m <sup>2</sup>	563,785
Prismatic coeff. (Cp)	0,569
Block coeff. (Cb)	0,304
Max Sect. area coeff. (Cm)	0,788
Waterpl. area coeff. (Cwp)	0,420
LCB from zero pt. (+ve fwd) m	32,091
LCF from zero pt. (+ve fwd) m	32,027
KB m	2,390
KG fluid m	7,445
BMt m	29,568
BML m	129,323
GMt corrected m	24,501
GML m	124,256

KMt m	31,894
KML m	131,436
Immersion (TPc) tonne/cm	5,779
MTc tonne.m	31,033
RM at 1deg = GMt.Disp.sin(1) tonne.m	888,091
Max deck inclination deg	3,7471
Trim angle (+ve by stern) deg	0,1097

Key point	Type	Freeboard m
Margin Line (freeboard pos = 62,163 m)		-1,058
Deck Edge (freeboard pos = 62,163 m)		-0,983
Admisión 1	Downflooding point	10,260
Admisión 2	Downflooding point	10,268
Admisión 3	Downflooding point	8,027
Admisión 4	Downflooding point	8,039
Guardacalor	Downflooding point	16,385

### Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

#### Loadcase - Plena carga salida

##### Damage Case - DCase 5

Free to Trim

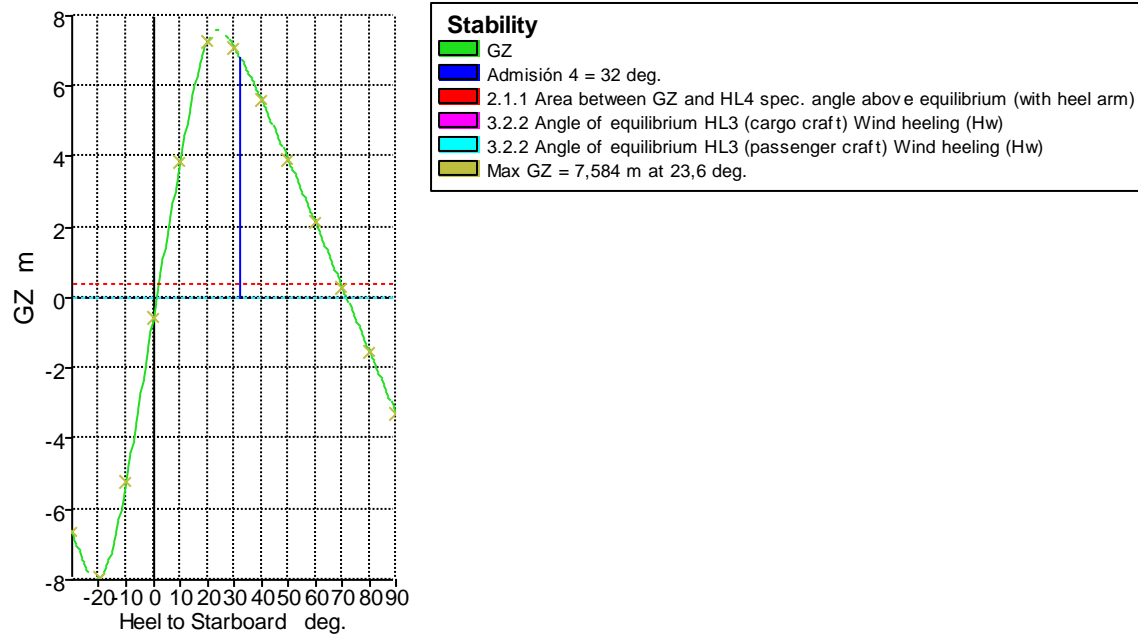
Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
VOID 1S ER	Fully flooded	95		
VOID 1I ER	Fully flooded	95		
Local LNG ER	Fully flooded	60		
Diesel ER	Fully flooded	95		
LNG ER Fully flooded	95			

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m^3	Total Volume m^3	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	0%	4,695	0,000	4,695	0,000	20,989	10,802	0,073	0,000	User Specified
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER	97%	4,805	4,661	4,805	4,661	20,001	9,041	0,876	0,000	User Specified
Aceite ER	97%	0,850	0,825	0,924	0,896	31,497	8,575	0,966	0,000	User Specified
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER	0%	1,765	0,000	1,918	0,000	31,841	11,000	0,037	0,000	User Specified
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER (Damaged)	Damaged									
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,213	IMO A.749(18)
LNG ER (Damaged)	Damaged									
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			1988,874	180,206	161,971	31,584	-0,481	7,607	32,213	
FS correction								0,016		
VCG fluid								7,623		



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-6,638	-7,950	-5,236	-0,557	3,832	7,278	7,108	5,613	3,925	2,138	0,308	-1,517	-3,293
Area under GZ curve from zero heel m.deg	173,5506	98,3009	29,3223	0,0000	16,6973	74,3817	148,7680	212,6819	260,4634	290,8374	303,0779	297,0009	272,9178
Displacement t	1989	1989	1989	1989	1989	1989	1989	1989	1989	1989	1989	1989	1989
Draft at FP m	0,973	3,031	3,745	4,107	4,914	6,414	7,787	8,620	9,652	11,156	13,593	19,648	n/a
Draft at AP m	0,548	2,727	3,596	3,693	3,662	3,069	0,992	-1,940	-5,763	-11,397	-21,485	-49,547	n/a
WL Length m	76,502	76,499	83,123	82,218	83,184	83,222	87,611	90,602	92,679	92,365	91,511	90,802	90,262
Beam max extents on WL m	13,286	13,416	26,468	26,339	26,501	25,818	22,096	14,312	13,579	12,485	10,644	10,339	10,393
Wetted Area m^2	1235,419	1231,648	1543,512	1633,104	1732,729	1904,569	2031,819	2190,187	2331,310	2440,956	2522,313	2587,204	2640,672
Waterpl. Area m^2	327,005	347,238	586,989	570,023	569,635	419,716	222,425	171,740	156,507	151,692	153,063	157,016	164,233
Prismatic coeff. (Cp)	0,748	0,751	0,658	0,636	0,594	0,552	0,457	0,400	0,367	0,351	0,341	0,333	0,325
Block coeff. (Cb)	0,633	0,656	0,385	0,544	0,340	0,188	0,166	0,196	0,192	0,154	0,147	0,157	0,171
LCB from zero pt. (+ve fwd) m	31,619	31,605	31,599	31,606	31,664	31,841	32,152	32,472	32,765	32,999	33,117	33,105	32,969
LCF from zero pt. (+ve fwd) m	31,968	31,188	30,743	30,327	30,093	39,242	42,674	36,809	33,905	31,404	29,211	27,946	27,279

Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
Max deck inclination deg	30,0010	20,0009	10,0005	0,2851	10,0356	20,1121	30,2466	40,3198	50,3368	60,2996	70,2136	80,1038	90,0000
Trim angle (+ve by stern) deg	-0,2924	-0,2098	-0,1032	-0,2851	-0,8625	-2,3040	-4,6713	-7,2374	-10,5012	-15,1741	-22,8709	-39,7628	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 83,16 m)		0	n/a
Deck Edge (immersion pos = 83,16 m)		0	n/a
Admisión 1	Downflooding point	58,1	0
Admisión 2	Downflooding point	55,2	0
Admisión 3	Downflooding point	34,1	0
Admisión 4	Downflooding point	32	0
Guardacalor	Downflooding point	70,4	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	48,2680	Pass	+2909,22
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	7,584	Pass	+15068,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	30,8	Pass	+340,36
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	1,2	Pass	+93,79
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	
	Wind heeling (Hw)	15,0	deg	1,2	Pass	+91,76
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	7,584	Pass	+15068,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	163,2796	Pass	+18908,10
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	30,8	Pass	+105,50
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	30,8	Pass	+340,36

Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Plena carga salida****Damage Case - DCase 5**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
VOID 1S ER	Fully flooded	95		
VOID 1I ER	Fully flooded	95		
Local LNG ER	Fully flooded	60		
Diesel ER	Fully flooded	95		
LNG ER Fully flooded	95			

VOID 1S ER Fully flooded 95

VOID 1I ER Fully flooded 95

Local LNG ER Fully flooded 60

Diesel ER Fully flooded 95

LNG ER Fully flooded 95

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	0%	4,695	0,000	4,695	0,000	20,989	10,802	0,073	0,000	User Specified
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER	97%	4,805	4,661	4,805	4,661	20,001	9,041	0,876	0,000	User Specified
Aceite ER	97%	0,850	0,825	0,924	0,896	31,497	8,575	0,966	0,000	User Specified
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER	0%	1,765	0,000	1,918	0,000	31,841	11,000	0,037	0,000	User Specified
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER (Damaged)	Damaged									
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,221	IMO A.749(18)
LNG ER (Damaged)	Damaged									
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			1988,874	180,206	161,971	31,584	-0,481	7,607	32,221	
FS correction								0,016		
VCG fluid								7,623		

Draft Amidships m	3,944
Displacement t	1989

Heel deg	1,2
Draft at FP m	4,192
Draft at AP m	3,695
Draft at LCF m	3,875
Trim (+ve by stern) m	-0,497
WL Length m	83,190
Beam max extents on WL m	26,341
Wetted Area m <sup>2</sup>	1647,085
Waterpl. Area m <sup>2</sup>	565,550
Prismatic coeff. (Cp)	0,624
Block coeff. (Cb)	0,503
Max Sect. area coeff. (Cm)	0,855
Waterpl. area coeff. (Cwp)	0,609
LCB from zero pt. (+ve fwd) m	31,610
LCF from zero pt. (+ve fwd) m	30,119
KB m	2,143
KG fluid m	7,623
BMt m	31,225
BML m	146,119
GMt corrected m	25,745
GML m	140,638
KMt m	33,361
KML m	148,226
Immersion (TPc) tonne/cm	5,797
MTc tonne.m	33,635
RM at 1 deg = GMt.Disp.sin(1) tonne.m	893,609
Max deck inclination deg	1,2724
Trim angle (+ve by stern) deg	-0,3424

Key point	Type	Freeboard m
Margin Line (freeboard pos = 83,16 m)		-0,483
Deck Edge (freeboard pos = 83,16 m)		-0,407
Admisión 1	Downflooding point	11,307
Admisión 2	Downflooding point	11,282
Admisión 3	Downflooding point	8,655
Admisión 4	Downflooding point	8,621
Guardacalor	Downflooding point	17,406

## Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Plena carga salida****Damage Case - DCase 6**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
Local LNG ER	Fully flooded	60		
Diesel ER	Fully flooded	95		
VOID 3I ER	Fully flooded	95		
LNG ER Fully flooded	95			

Local LNG ER Fully flooded 60

Diesel ER Fully flooded 95

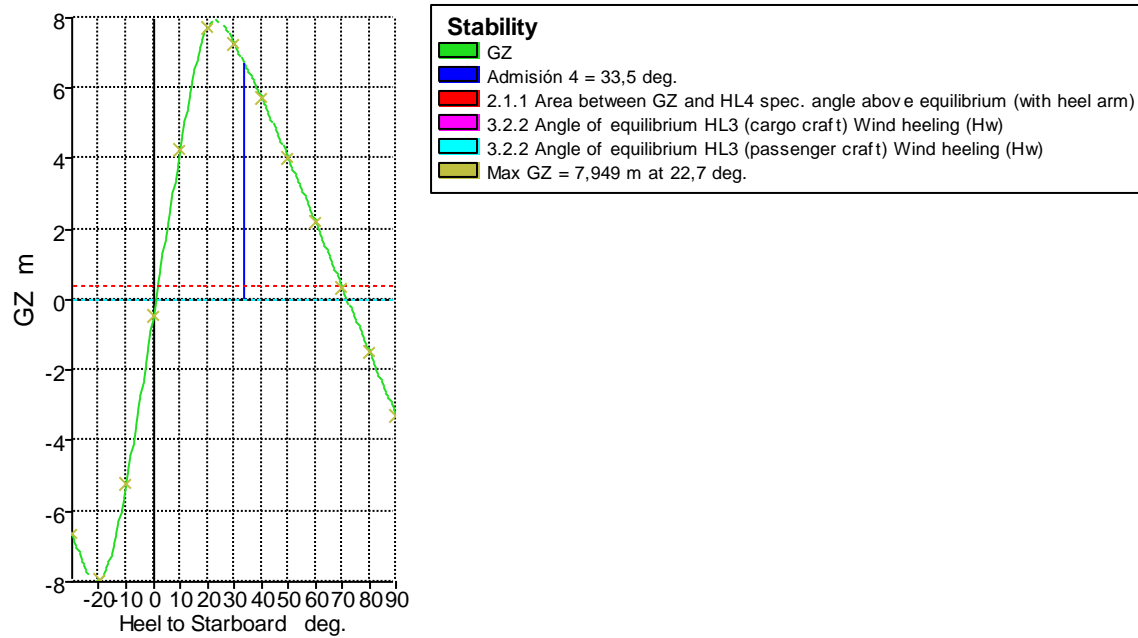
VOID 3I ER Fully flooded 95

LNG ER Fully flooded 95

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	0%	4,695	0,000	4,695	0,000	20,989	10,802	0,073	0,000	User Specified
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER	97%	4,805	4,661	4,805	4,661	20,001	9,041	0,876	0,000	User Specified
Aceite ER	97%	0,850	0,825	0,924	0,896	31,497	8,575	0,966	0,000	User Specified
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER	0%	1,765	0,000	1,918	0,000	31,841	11,000	0,037	0,000	User Specified
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER (Damaged)	Damaged									
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,213	IMO A.749(18)
LNG ER (Damaged)	Damaged									
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			1988,874	180,206	161,971	31,584	-0,481	7,607	32,213	
FS correction								0,016		
VCG fluid								7,623		





Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-6,638	-7,950	-5,237	-0,443	4,240	7,740	7,260	5,730	4,023	2,218	0,366	-1,489	-3,298
Area under GZ curve from zero heel m.deg	173,1790	97,9403	28,9267	0,0000	19,2967	81,7056	159,1674	224,2292	273,1241	304,3830	317,3273	311,6876	287,7258
Displacement t	1989	1989	1989	1989	1989	1989	1989	1989	1989	1989	1989	1989	1989
Draft at FP m	0,973	3,031	3,834	4,207	4,881	6,385	7,653	8,212	8,934	9,891	11,366	14,826	n/a
Draft at AP m	0,548	2,727	3,543	3,579	3,484	2,540	-0,017	-3,084	-7,072	-12,907	-23,456	-53,104	n/a
WL Length m	76,502	76,499	83,131	81,507	83,185	84,655	87,502	90,247	92,201	93,011	92,292	91,674	91,158
Beam max extents on WL m	13,286	13,416	26,462	26,337	26,481	25,439	22,016	14,194	13,563	12,474	10,889	10,543	10,552
Wetted Area m^2	1235,425	1231,648	1548,340	1630,806	1698,452	1741,239	1892,552	2041,388	2176,509	2284,053	2367,653	2431,649	2482,804
Waterpl. Area m^2	327,002	347,238	587,100	592,228	589,812	372,735	249,092	205,643	190,374	184,932	183,634	185,158	191,820
Prismatic coeff. (Cp)	0,748	0,751	0,662	0,653	0,617	0,585	0,499	0,432	0,393	0,369	0,357	0,346	0,337
Block coeff. (Cb)	0,633	0,656	0,385	0,548	0,345	0,228	0,175	0,201	0,199	0,155	0,150	0,163	0,179
LCB from zero pt. (+ve fwd) m	31,619	31,605	31,604	31,619	31,676	31,885	32,247	32,553	32,847	33,047	33,146	33,122	32,975
LCF from zero pt. (+ve fwd) m	31,968	31,188	30,333	30,388	30,248	34,867	37,080	32,556	30,132	28,192	26,835	26,128	25,619

Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
Max deck inclination deg	30,0010	20,0009	10,0019	0,4325	10,0444	20,1478	30,3135	40,3653	50,3628	60,3060	70,2105	80,1001	90,0000
Trim angle (+ve by stern) deg	-0,2924	-0,2098	-0,2009	-0,4325	-0,9626	-2,6467	-5,2692	-7,7354	-10,8949	-15,3307	-22,7203	-39,2443	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 83,16 m)		0	n/a
Deck Edge (immersion pos = 83,16 m)		0	n/a
Admisión 1	Downflooding point	62	0
Admisión 2	Downflooding point	59,1	0
Admisión 3	Downflooding point	36,1	0
Admisión 4	Downflooding point	33,5	0
Guardacalor	Downflooding point	72,7	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	51,5776	Pass	+3115,56
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	7,949	Pass	+15798,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	32,6	Pass	+365,23
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	0,9	Pass	+95,30
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	
	Wind heeling (Hw)	15,0	deg	0,9	Pass	+93,77
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	7,949	Pass	+15798,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	183,6857	Pass	+21283,67
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	32,6	Pass	+117,11
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	32,6	Pass	+365,23

Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Plena carga salida****Damage Case - DCase 6**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
Local LNG ER	Fully flooded	60		
Diesel ER	Fully flooded	95		
VOID 3I ER	Fully flooded	95		
LNG ER Fully flooded		95		

Local LNG ER Fully flooded 60

Diesel ER Fully flooded 95

VOID 3I ER Fully flooded 95

LNG ER Fully flooded 95

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	0%	4,695	0,000	4,695	0,000	20,989	10,802	0,073	0,000	User Specified
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER	97%	4,805	4,661	4,805	4,661	20,001	9,041	0,876	0,000	User Specified
Aceite ER	97%	0,850	0,825	0,924	0,896	31,497	8,575	0,966	0,000	User Specified
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER	0%	1,765	0,000	1,918	0,000	31,841	11,000	0,037	0,000	User Specified
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER (Damaged)	Damaged									
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,217	IMO A.749(18)
LNG ER (Damaged)	Damaged									
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			1988,874	180,206	161,971	31,584	-0,481	7,607	32,217	
FS correction								0,016		
VCG fluid								7,623		

Draft Amidships m	3,917
Displacement t	1989
Heel deg	0,9

Draft at FP m	4,258
Draft at AP m	3,575
Draft at LCF m	3,824
Trim (+ve by stern) m	-0,684
WL Length m	82,345
Beam max extents on WL m	26,339
Wetted Area m <sup>2</sup>	1637,980
Waterpl. Area m <sup>2</sup>	589,784
Prismatic coeff. (Cp)	0,645
Block coeff. (Cb)	0,517
Max Sect. area coeff. (Cm)	0,864
Waterpl. area coeff. (Cwp)	0,642
LCB from zero pt. (+ve fwd) m	31,624
LCF from zero pt. (+ve fwd) m	30,301
KB m	2,136
KG fluid m	7,623
BMt m	32,959
BML m	145,156
GMt corrected m	27,471
GML m	139,669
KMt m	35,090
KML m	147,269
Immersion (TPc) tonne/cm	6,045
MTc tonne.m	33,404
RM at 1deg = GMt.Disp.sin(1) tonne.m	953,548
Max deck inclination deg	1,0289
Trim angle (+ve by stern) deg	-0,4712

Key point	Type	Freeboard m
Margin Line (freeboard pos = 83,16 m)		-0,493
Deck Edge (freeboard pos = 83,16 m)		-0,417
Admisión 1	Downflooding point	11,448
Admisión 2	Downflooding point	11,415
Admisión 3	Downflooding point	8,694
Admisión 4	Downflooding point	8,647
Guardacalor	Downflooding point	17,542

## Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.:%: 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Plena carga salida****Damage Case - DCase 7**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
Local LNG ER	Fully flooded	60		
VOID 3I ER	Fully flooded	95		
VOID 4I ER	Fully flooded	95		
LNG ER Fully flooded	95			

Local LNG ER Fully flooded 95

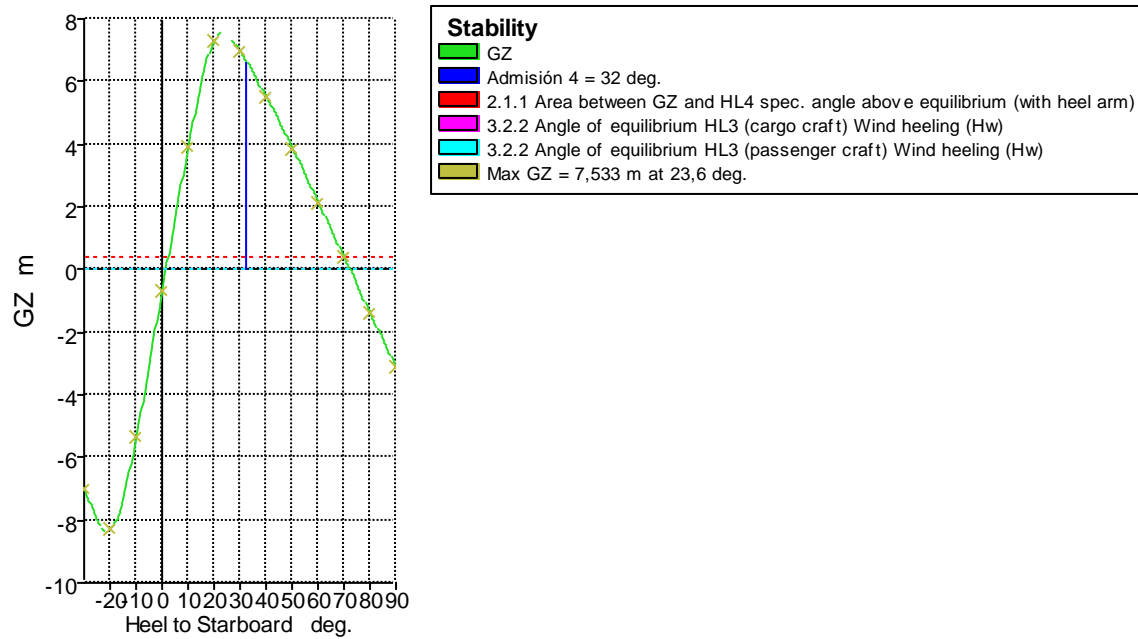
VOID 3I ER Fully flooded 95

VOID 4I ER Fully flooded 95

LNG ER Fully flooded 95

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	0%	4,695	0,000	4,695	0,000	20,989	10,802	0,073	0,000	User Specified
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER	97%	4,805	4,661	4,805	4,661	20,001	9,041	0,876	0,000	User Specified
Aceite ER	97%	0,850	0,825	0,924	0,896	31,497	8,575	0,966	0,000	User Specified
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER	0%	1,765	0,000	1,918	0,000	31,841	11,000	0,037	0,000	User Specified
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER	97%	56,972	55,262	67,823	65,789	39,949	10,370	1,604	32,213	IMO A.749(18)
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,213	IMO A.749(18)
LNG ER (Damaged)	Damaged									
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			2044,137	248,030	227,760	31,810	-0,187	7,444	64,427	
FS correction								0,032		
VCG fluid								7,476		



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-6,986	-8,292	-5,365	-0,664	3,901	7,302	6,951	5,509	3,876	2,150	0,382	-1,388	-3,117
Area under GZ curve from zero heel m.deg	180,6676	101,7832	30,4798	0,0000	16,4823	74,8824	148,5129	210,9875	258,0287	288,2072	300,8929	295,8418	273,2891
Displacement t	2044	2044	2044	2044	2044	2044	2044	2044	2044	2044	2044	2044	2044
Draft at FP m	1,414	3,420	4,109	4,496	5,177	6,646	8,047	8,937	9,988	11,482	13,880	19,996	n/a
Draft at AP m	0,588	2,756	3,507	3,513	3,416	2,498	-0,027	-3,156	-7,186	-13,098	-23,755	-53,721	n/a
WL Length m	76,498	76,500	83,149	79,970	83,198	83,261	88,299	91,254	93,204	92,240	91,462	90,791	90,274
Beam max extents on WL m	13,332	13,441	26,464	26,336	26,480	25,567	22,078	14,174	13,510	12,424	10,927	10,554	10,554
Wetted Area m^2	1266,570	1259,857	1584,321	1666,553	1732,417	1858,254	1969,154	2119,477	2258,017	2367,868	2452,003	2516,596	2568,989
Waterpl. Area m^2	311,386	351,504	595,023	588,341	594,855	437,168	254,712	203,102	187,831	181,783	180,044	181,057	186,817
Prismatic coeff. (Cp)	0,753	0,759	0,672	0,678	0,626	0,600	0,495	0,425	0,387	0,371	0,359	0,350	0,341
Block coeff. (Cb)	0,634	0,655	0,387	0,551	0,343	0,189	0,167	0,198	0,193	0,152	0,146	0,158	0,172
LCB from zero pt. (+ve fwd) m	31,888	31,860	31,854	31,865	31,922	32,122	32,475	32,799	33,099	33,325	33,425	33,406	33,265
LCF from zero pt. (+ve fwd) m	31,947	31,389	30,107	30,123	30,453	39,524	37,758	31,948	29,635	27,666	26,544	26,054	25,883

Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
Max deck inclination deg	30,0037	20,0044	10,0083	0,6771	10,0704	20,1719	30,3472	40,4179	50,4168	60,3548	70,2452	80,1176	90,0000
Trim angle (+ve by stern) deg	-0,5693	-0,4580	-0,4148	-0,6771	-1,2134	-2,8555	-5,5459	-8,2734	-11,6686	-16,4664	-24,3498	-41,5555	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 83,16 m)		0	n/a
Deck Edge (immersion pos = 83,16 m)		0	n/a
Admisión 1	Downflooding point	61,3	0
Admisión 2	Downflooding point	58,2	0
Admisión 3	Downflooding point	34,4	0
Admisión 4	Downflooding point	32	0
Guardacalor	Downflooding point	72,2	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	49,9171	Pass	+3012,04
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	7,533	Pass	+14966,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	30,6	Pass	+336,63
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	1,4	Pass	+92,81
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	
	Wind heeling (Hw)	15,0	deg	1,4	Pass	+90,45
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	7,533	Pass	+14966,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	162,3984	Pass	+18805,51
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	30,6	Pass	+103,76
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	30,6	Pass	+336,63

Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.‰: 0,01000(0,100); Trim‰(LCG-TCG): 0,01000(0,100); Heel‰(LCG-TCG): 0,01000(0,100)

**Loadcase - Plena carga salida****Damage Case - DCase 7**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.‰	PartFlood.‰	PartFlood.WL
Local LNG ER	Fully flooded	60		
VOID 3I ER	Fully flooded	95		
VOID 4I ER	Fully flooded	95		
LNG ER Fully flooded		95		

Local LNG ER Fully flooded 60

VOID 3I ER Fully flooded 95

VOID 4I ER Fully flooded 95

LNG ER Fully flooded 95

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	0%	4,695	0,000	4,695	0,000	20,989	10,802	0,073	0,000	User Specified
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER	97%	4,805	4,661	4,805	4,661	20,001	9,041	0,876	0,000	User Specified
Aceite ER	97%	0,850	0,825	0,924	0,896	31,497	8,575	0,966	0,000	User Specified
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER	0%	1,765	0,000	1,918	0,000	31,841	11,000	0,037	0,000	User Specified
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER	97%	56,972	55,262	67,823	65,789	39,949	10,370	1,604	32,223	IMO A.749(18)
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,223	IMO A.749(18)
LNG ER (Damaged)	Damaged									
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			2044,137	248,030	227,760	31,810	-0,187	7,444	64,447	
FS correction								0,032		
VCG fluid								7,476		

Draft Amidships m	4,045
Displacement t	2044
Heel deg	1,4



Draft at FP m	4,585
Draft at AP m	3,504
Draft at LCF m	3,895
Trim (+ve by stern) m	-1,081
WL Length m	80,860
Beam max extents on WL m	26,343
Wetted Area m <sup>2</sup>	1678,151
Waterpl. Area m <sup>2</sup>	585,785
Prismatic coeff. (Cp)	0,668
Block coeff. (Cb)	0,506
Max Sect. area coeff. (Cm)	0,845
Waterpl. area coeff. (Cwp)	0,649
LCB from zero pt. (+ve fwd) m	31,875
LCF from zero pt. (+ve fwd) m	30,046
KB m	2,174
KG fluid m	7,476
BMt m	31,774
BML m	136,796
GMt corrected m	26,470
GML m	131,492
KMt m	33,936
KML m	138,916
Immersion (TPc) tonne/cm	6,004
MTc tonne.m	32,322
RM at 1deg = GMt.Disp.sin(1) tonne.m	944,337
Max deck inclination deg	1,6159
Trim angle (+ve by stern) deg	-0,7446

Key point	Type	Freeboard m
Margin Line (freeboard pos = 83,16 m)		-0,913
Deck Edge (freeboard pos = 83,16 m)		-0,837
Admisión 1	Downflooding point	11,301
Admisión 2	Downflooding point	11,247
Admisión 3	Downflooding point	8,376
Admisión 4	Downflooding point	8,301
Guardacalor	Downflooding point	17,389

## Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Plena carga salida****Damage Case - DCase 8**

Free to Trim

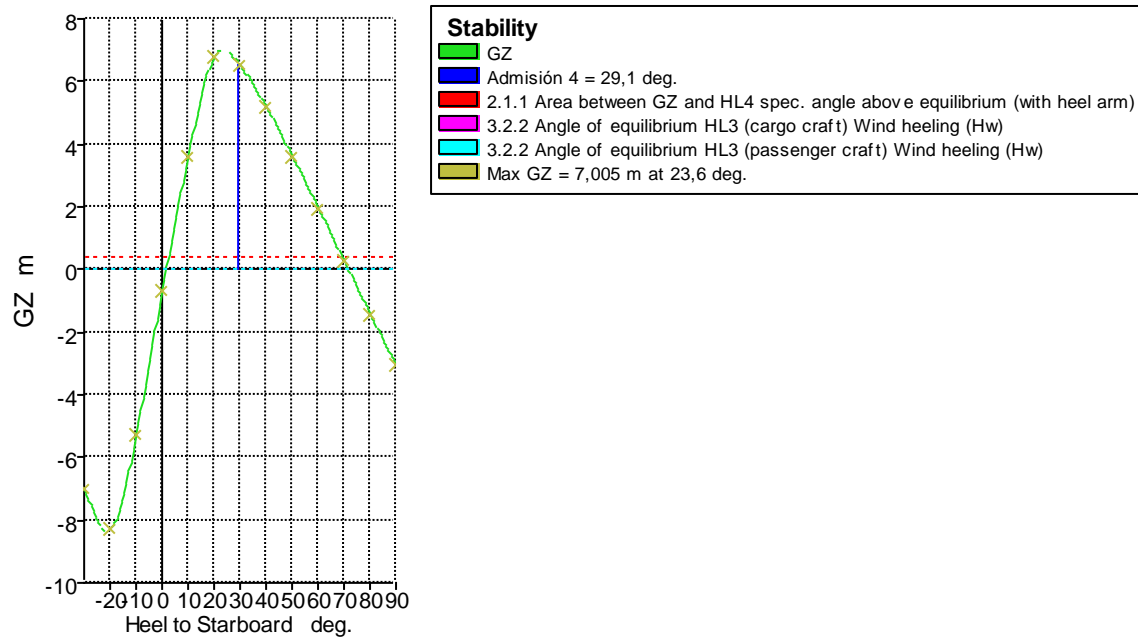
Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
Local LNG ER	Fully flooded	60		
VOID 4I ER	Fully flooded	95		
VOID 5S ER	Fully flooded	95		
VOID 5I ER	Fully flooded	95		
LNG ER Fully flooded		95		

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	0%	4,695	0,000	4,695	0,000	20,989	10,802	0,073	0,000	User Specified
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER	97%	4,805	4,661	4,805	4,661	20,001	9,041	0,876	0,000	User Specified
Aceite ER	97%	0,850	0,825	0,924	0,896	31,497	8,575	0,966	0,000	User Specified
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER	0%	1,765	0,000	1,918	0,000	31,841	11,000	0,037	0,000	User Specified
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER	97%	56,972	55,262	67,823	65,789	39,949	10,370	1,604	32,213	IMO A.749(18)
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,213	IMO A.749(18)
LNG ER (Damaged)	Damaged									
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			2044,137	248,030	227,760	31,810	-0,187	7,444	64,427	
FS correction								0,032		
VCG fluid								7,476		



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-6,986	-8,292	-5,307	-0,710	3,578	6,763	6,514	5,191	3,624	1,968	0,276	-1,415	-3,068
Area under GZ curve from zero heel m.deg	180,1640	101,2204	30,2404	0,0000	14,7109	68,5866	137,1692	195,9328	240,1492	268,1454	279,3795	273,6611	251,2236
Displacement t	2044	2044	2044	2044	2044	2044	2044	2044	2044	2044	2044	2044	2044
Draft at FP m	1,416	3,420	4,127	4,712	5,753	7,223	9,099	11,153	13,423	16,485	21,771	35,820	n/a
Draft at AP m	0,587	2,756	3,469	3,405	3,217	2,296	-0,293	-3,690	-7,962	-14,145	-25,347	-56,851	n/a
WL Length m	76,498	76,500	83,151	79,192	83,225	83,310	90,315	92,329	90,581	89,356	88,399	87,647	87,382
Beam max extents on WL m	13,331	13,441	26,459	26,334	26,472	25,762	22,179	16,990	13,514	12,383	10,977	10,635	10,593
Wetted Area m^2	1266,592	1259,857	1580,729	1682,419	1787,689	1999,071	2152,416	2345,856	2480,139	2591,248	2676,884	2739,115	2784,991
Waterpl. Area m^2	311,400	351,504	600,898	567,994	583,123	476,041	269,709	204,506	181,728	173,974	168,870	168,201	171,862
Prismatic coeff. (Cp)	0,753	0,759	0,677	0,688	0,615	0,579	0,441	0,366	0,345	0,333	0,327	0,324	0,322
Block coeff. (Cb)	0,634	0,655	0,388	0,541	0,322	0,166	0,144	0,180	0,172	0,134	0,126	0,135	0,147
LCB from zero pt. (+ve fwd) m	31,889	31,860	31,854	31,892	31,972	32,172	32,561	32,991	33,357	33,612	33,742	33,726	33,558
LCF from zero pt. (+ve fwd) m	31,944	31,389	29,956	29,088	29,923	40,972	37,669	30,489	25,826	24,187	23,550	23,564	24,019

Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
Max deck inclination deg	30,0037	20,0044	10,0099	0,9010	10,1454	20,2421	30,4679	40,6254	50,6406	60,5456	70,3804	80,1839	90,0000
Trim angle (+ve by stern) deg	-0,5711	-0,4580	-0,4536	-0,9010	-1,7467	-3,3911	-6,4431	-10,1201	-14,4209	-20,2201	-29,5356	-48,0961	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 83,16 m)		0	n/a
Deck Edge (immersion pos = 83,16 m)		0	n/a
Admisión 1	Downflooding point	60	0
Admisión 2	Downflooding point	56,2	0
Admisión 3	Downflooding point	31,1	0
Admisión 4	Downflooding point	29,1	0
Guardacalor	Downflooding point	71	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	46,5406	Pass	+2801,53
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	7,005	Pass	+13910,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	27,6	Pass	+293,71
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	1,6	Pass	+91,93
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	
	Wind heeling (Hw)	15,0	deg	1,6	Pass	+89,28
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	7,005	Pass	+13910,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	132,0786	Pass	+15275,86
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	27,6	Pass	+83,73
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	27,6	Pass	+293,71

Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.‰: 0,01000(0,100); Trim‰(LCG-TCG): 0,01000(0,100); Heel‰(LCG-TCG): 0,01000(0,100)

**Loadcase - Plena carga salida****Damage Case - DCase 8**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.‰	PartFlood.‰	PartFlood.WL
Local LNG ER	Fully flooded	60		
VOID 4I ER	Fully flooded	95		
VOID 5S ER	Fully flooded	95		
VOID 5I ER	Fully flooded	95		
LNG ER Fully flooded		95		

Local LNG ER Fully flooded 60

VOID 4I ER Fully flooded 95

VOID 5S ER Fully flooded 95

VOID 5I ER Fully flooded 95

LNG ER Fully flooded 95

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	0%	4,695	0,000	4,695	0,000	20,989	10,802	0,073	0,000	User Specified
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER	97%	4,805	4,661	4,805	4,661	20,001	9,041	0,876	0,000	User Specified
Aceite ER	97%	0,850	0,825	0,924	0,896	31,497	8,575	0,966	0,000	User Specified
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER	0%	1,765	0,000	1,918	0,000	31,841	11,000	0,037	0,000	User Specified
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER	97%	56,972	55,262	67,823	65,789	39,949	10,370	1,604	32,227	IMO A.749(18)
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,227	IMO A.749(18)
LNG ER (Damaged)	Damaged									
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			2044,137	248,030	227,760	31,810	-0,187	7,444	64,453	
FS correction									0,032	
VCG fluid								7,476		

Draft Amidships m	4,127
Displacement t	2044

Heel deg	1,6
Draft at FP m	4,873
Draft at AP m	3,381
Draft at LCF m	3,901
Trim (+ve by stern) m	-1,492
WL Length m	79,688
Beam max extents on WL m	26,342
Wetted Area m <sup>2</sup>	1702,207
Waterpl. Area m <sup>2</sup>	565,440
Prismatic coeff. (Cp)	0,678
Block coeff. (Cb)	0,489
Max Sect. area coeff. (Cm)	0,837
Waterpl. area coeff. (Cwp)	0,636
LCB from zero pt. (+ve fwd) m	31,899
LCF from zero pt. (+ve fwd) m	28,997
KB m	2,164
KG fluid m	7,476
BMt m	30,392
BML m	129,947
GMt corrected m	25,078
GML m	124,632
KMt m	32,539
KML m	132,036
Immersion (TPc) tonne/cm	5,796
MTc tonne.m	30,635
RM at 1 deg = GMt.Disp.sin(1) tonne.m	894,645
Max deck inclination deg	1,9361
Trim angle (+ve by stern) deg	-1,0279

Key point	Type	Freeboard m
Margin Line (freeboard pos = 83,16 m)		-1,238
Deck Edge (freeboard pos = 83,16 m)		-1,162
Admisión 1	Downflooding point	11,271
Admisión 2	Downflooding point	11,198
Admisión 3	Downflooding point	8,157
Admisión 4	Downflooding point	8,054
Guardacalor	Downflooding point	17,353

## Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Plena carga salida****Damage Case - DCase 9**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
VOID 5S ER	Fully flooded	95		
VOID 5I ER	Fully flooded	95		
VOID 6S ER	Fully flooded	95		
Prop. Proa ER	Fully flooded	85		

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
VOID 5S ER	Fully flooded	95		
VOID 5I ER	Fully flooded	95		
VOID 6S ER	Fully flooded	95		
Prop. Proa ER	Fully flooded	85		

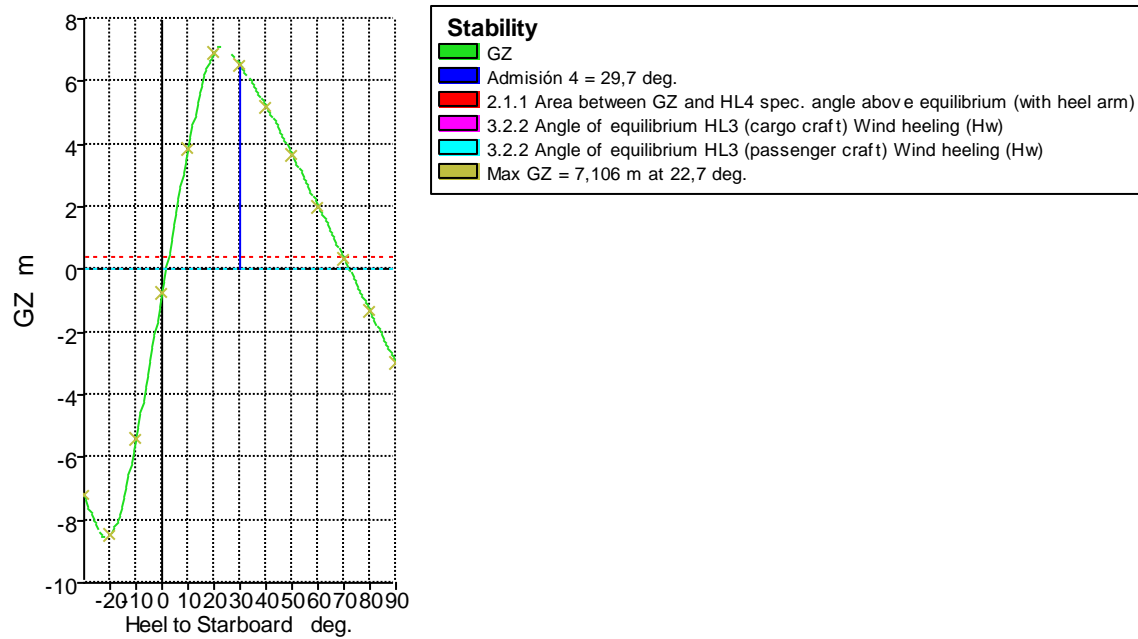
Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
VOID 5S ER	Fully flooded	95		
VOID 5I ER	Fully flooded	95		
VOID 6S ER	Fully flooded	95		
Prop. Proa ER	Fully flooded	85		

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
VOID 5S ER	Fully flooded	95		
VOID 5I ER	Fully flooded	95		
VOID 6S ER	Fully flooded	95		
Prop. Proa ER	Fully flooded	85		

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
VOID 5S ER	Fully flooded	95		
VOID 5I ER	Fully flooded	95		
VOID 6S ER	Fully flooded	95		
Prop. Proa ER	Fully flooded	85		

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	0%	4,695	0,000	4,695	0,000	20,989	10,802	0,073	0,000	User Specified
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER	97%	4,805	4,661	4,805	4,661	20,001	9,041	0,876	0,000	User Specified
Aceite ER	97%	0,850	0,825	0,924	0,896	31,497	8,575	0,966	0,000	User Specified
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER	0%	1,765	0,000	1,918	0,000	31,841	11,000	0,037	0,000	User Specified
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER	97%	56,972	55,262	67,823	65,789	39,949	10,370	1,604	32,213	IMO A.749(18)
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,213	IMO A.749(18)
LNG ER	97%	39,465	38,281	87,699	85,068	46,000	10,000	4,860	0,000	User Specified
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			2082,417	335,729	312,828	32,071	0,000	7,397	64,427	
FS correction								0,031		
VCG fluid								7,428		



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-7,186	-8,494	-5,408	-0,768	3,854	6,934	6,522	5,206	3,656	2,017	0,337	-1,349	-2,998
Area under GZ curve from zero heel m.deg	184,7006	103,6501	31,1980	0,0000	15,8561	72,2949	141,6354	200,4277	244,8920	273,2979	285,0927	280,0122	258,2560
Displacement t	2082	2082	2082	2082	2082	2082	2082	2082	2082	2083	2082	2083	2082
Draft at FP m	1,856	3,789	4,444	5,089	5,961	7,356	9,088	10,815	12,608	15,155	19,537	31,313	n/a
Draft at AP m	0,545	2,714	3,382	3,215	2,912	1,616	-1,246	-4,720	-9,078	-15,507	-27,279	-60,574	n/a
WL Length m	76,583	76,580	83,168	78,207	82,181	83,542	90,509	92,690	91,318	90,272	89,433	88,712	88,331
Beam max extents on WL m	13,351	13,447	26,455	26,329	26,433	25,475	22,156	16,935	13,440	12,351	11,136	10,757	10,703
Wetted Area m^2	1291,328	1281,179	1614,716	1707,854	1768,023	1907,959	2041,084	2209,518	2336,895	2444,367	2530,681	2596,905	2643,031
Waterpl. Area m^2	297,341	346,493	604,208	602,881	605,681	474,785	289,197	230,397	211,607	202,061	195,219	192,932	199,068
Prismatic coeff. (Cp)	0,758	0,765	0,685	0,713	0,654	0,629	0,477	0,395	0,372	0,359	0,351	0,346	0,342
Block coeff. (Cb)	0,632	0,652	0,385	0,526	0,327	0,170	0,149	0,183	0,179	0,140	0,131	0,142	0,154
LCB from zero pt. (+ve fwd) m	32,182	32,153	32,142	32,181	32,262	32,491	32,896	33,302	33,637	33,880	33,991	33,972	33,823
LCF from zero pt. (+ve fwd) m	31,382	31,484	29,675	29,240	29,967	40,641	35,120	28,572	25,226	23,912	23,631	23,901	24,338



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
Max deck inclination deg	30,0092	20,0116	10,0256	1,2908	10,2094	20,3275	30,5648	40,6838	50,6584	60,5467	70,3757	80,1809	90,0000
Trim angle (+ve by stern) deg	-0,9031	-0,7412	-0,7314	-1,2908	-2,0997	-3,9486	-7,0831	-10,5815	-14,6161	-20,2394	-29,3780	-47,8542	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 83,16 m)		0	n/a
Deck Edge (immersion pos = 83,16 m)		0	n/a
Admisión 1	Downflooding point	63,5	0
Admisión 2	Downflooding point	59,6	0
Admisión 3	Downflooding point	32,2	0
Admisión 4	Downflooding point	29,7	0
Guardacalor	Downflooding point	73,3	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	49,5814	Pass	+2991,11
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	7,106	Pass	+14112,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	28,1	Pass	+301,00
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	1,6	Pass	+91,81
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	
	Wind heeling (Hw)	15,0	deg	1,6	Pass	+89,12
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	7,106	Pass	+14112,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	140,1280	Pass	+16212,92
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	28,1	Pass	+87,13
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	28,1	Pass	+301,00

Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.‰: 0,01000(0,100); Trim‰(LCG-TCG): 0,01000(0,100); Heel‰(LCG-TCG): 0,01000(0,100)

**Loadcase - Plena carga salida****Damage Case - DCase 9**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.‰	PartFlood.‰	PartFlood.WL
VOID 5S ER	Fully flooded	95		
VOID 5I ER	Fully flooded	95		
VOID 6S ER	Fully flooded	95		
Prop. Proa ER	Fully flooded	85		

VOID 5S ER Fully flooded 95

VOID 5I ER Fully flooded 95

VOID 6S ER Fully flooded 95

Prop. Proa ER Fully flooded 85

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	0%	4,695	0,000	4,695	0,000	20,989	10,802	0,073	0,000	User Specified
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER	97%	4,805	4,661	4,805	4,661	20,001	9,041	0,876	0,000	User Specified
Aceite ER	97%	0,850	0,825	0,924	0,896	31,497	8,575	0,966	0,000	User Specified
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER	0%	1,765	0,000	1,918	0,000	31,841	11,000	0,037	0,000	User Specified
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER	97%	56,972	55,262	67,823	65,789	39,949	10,370	1,604	32,227	IMO A.749(18)
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,227	IMO A.749(18)
LNG ER	97%	39,465	38,281	87,699	85,068	46,000	10,000	4,860	0,000	User Specified
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			2082,417	335,729	312,828	32,071	0,000	7,397	64,454	
FS correction								0,031		
VCG fluid								7,428		

Draft Amidships m	4,199
Displacement t	2082
Heel deg	1,7

Draft at FP m	5,227
Draft at AP m	3,171
Draft at LCF m	3,894
Trim (+ve by stern) m	-2,056
WL Length m	78,620
Beam max extents on WL m	26,336
Wetted Area m <sup>2</sup>	1721,103
Waterpl. Area m <sup>2</sup>	602,754
Prismatic coeff. (Cp)	0,706
Block coeff. (Cb)	0,480
Max Sect. area coeff. (Cm)	0,834
Waterpl. area coeff. (Cwp)	0,688
LCB from zero pt. (+ve fwd) m	32,199
LCF from zero pt. (+ve fwd) m	29,240
KB m	2,195
KG fluid m	7,428
BMt m	32,220
BML m	106,507
GMt corrected m	26,984
GML m	101,271
KMt m	34,392
KML m	108,625
Immersion (TPc) tonne/cm	6,178
MTc tonne.m	25,359
RM at 1deg = GMt.Disp.sin(1) tonne.m	980,683
Max deck inclination deg	2,1807
Trim angle (+ve by stern) deg	-1,4163

Key point	Type	Freeboard m
Margin Line (freeboard pos = 83,16 m)		-1,594
Deck Edge (freeboard pos = 83,16 m)		-1,519
Admisión 1	Downflooding point	11,331
Admisión 2	Downflooding point	11,230
Admisión 3	Downflooding point	7,946
Admisión 4	Downflooding point	7,803
Guardacalor	Downflooding point	17,400

## Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

## Loadcase - Plena carga salida

## Damage Case - DCase 10

Free to Trim

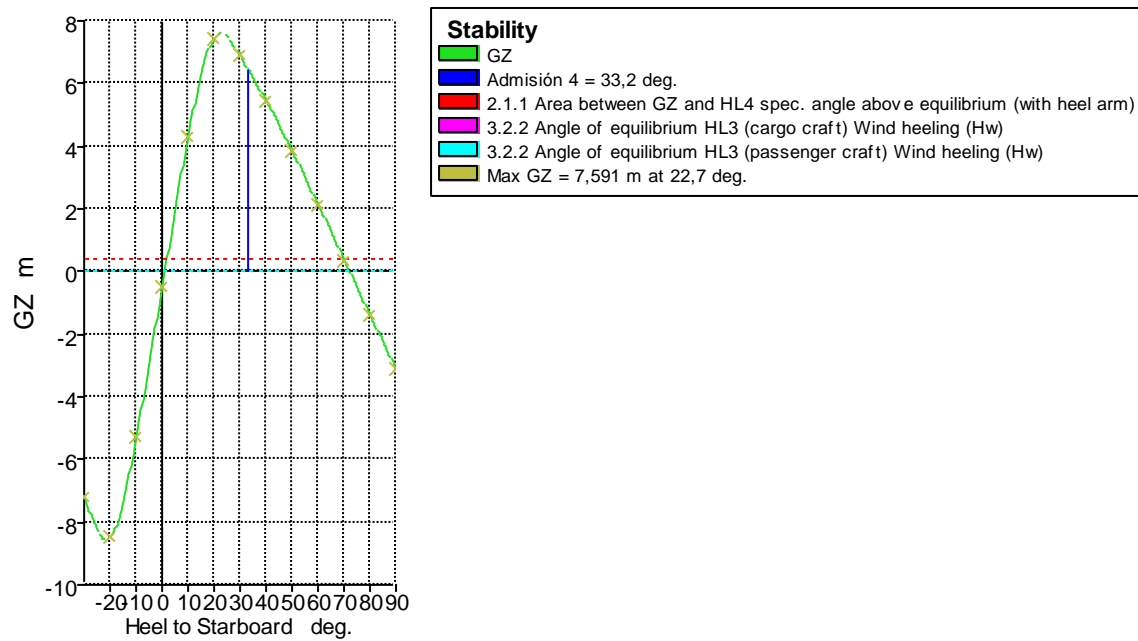
Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
VOID 6S ER	Fully flooded	95		
Prop. Proa ER	Fully flooded	85		
VOID 7S ER	Fully flooded	95		
VOID 7I ER	Fully flooded	95		

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	0%	4,695	0,000	4,695	0,000	20,989	10,802	0,073	0,000	User Specified
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER	97%	4,805	4,661	4,805	4,661	20,001	9,041	0,876	0,000	User Specified
Aceite ER	97%	0,850	0,825	0,924	0,896	31,497	8,575	0,966	0,000	User Specified
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER	0%	1,765	0,000	1,918	0,000	31,841	11,000	0,037	0,000	User Specified
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER	97%	56,972	55,262	67,823	65,789	39,949	10,370	1,604	32,213	IMO A.749(18)
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,213	IMO A.749(18)
LNG ER	97%	39,465	38,281	87,699	85,068	46,000	10,000	4,860	0,000	User Specified
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			2082,417	335,729	312,828	32,071	0,000	7,397	64,427	
FS correction								0,031		
VCG fluid								7,428		



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-7,186	-8,494	-5,289	-0,500	4,320	7,449	6,884	5,445	3,833	2,128	0,372	-1,392	-3,115
Area under GZ curve from zero heel m.deg	182,3519	101,2241	29,3037	0,0000	19,5468	81,0844	154,8894	216,6163	263,1342	292,9849	305,5127	300,3935	277,8337
Displacement t	2082	2082	2082	2082	2082	2082	2082	2082	2082	2082	2082	2082	2082
Draft at FP m	1,856	3,789	4,303	4,770	5,368	6,839	8,022	8,668	9,427	10,458	12,146	16,228	n/a
Draft at AP m	0,546	2,714	3,409	3,277	3,042	1,622	-1,218	-4,494	-8,714	-14,945	-26,367	-58,642	n/a
WL Length m	76,583	76,580	83,161	79,041	83,214	83,319	88,473	91,159	92,980	92,799	92,109	91,509	90,989
Beam max extents on WL m	13,351	13,447	26,454	26,329	26,433	25,185	22,030	14,045	13,452	12,426	11,109	10,753	10,711
Wetted Area m^2	1291,316	1281,179	1597,708	1669,843	1699,236	1752,095	1836,584	1971,730	2099,934	2205,331	2292,872	2358,201	2408,957
Waterpl. Area m^2	297,344	346,493	614,206	617,512	619,290	443,701	285,977	242,573	228,407	219,765	213,334	212,210	218,146
Prismatic coeff. (Cp)	0,758	0,765	0,688	0,718	0,672	0,668	0,549	0,467	0,422	0,399	0,384	0,372	0,362
Block coeff. (Cb)	0,632	0,652	0,390	0,551	0,348	0,195	0,175	0,204	0,202	0,159	0,151	0,165	0,182
LCB from zero pt. (+ve fwd) m	32,182	32,153	32,134	32,162	32,223	32,471	32,839	33,160	33,446	33,638	33,733	33,690	33,551
LCF from zero pt. (+ve fwd) m	31,383	31,484	29,986	29,860	30,460	39,439	34,284	29,323	26,976	25,618	25,200	25,102	25,078

Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
Max deck inclination deg	30,0092	20,0116	10,0182	1,0285	10,1225	20,2711	30,4532	40,4939	50,4642	60,3785	70,2566	80,1212	90,0000
Trim angle (+ve by stern) deg	-0,9025	-0,7412	-0,6154	-1,0285	-1,6023	-3,5899	-6,3407	-8,9938	-12,3059	-16,9866	-24,8500	-41,9971	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 83,16 m)		0	n/a
Deck Edge (immersion pos = 83,16 m)		0	n/a
Admisión 1	Downflooding point	65,6	0
Admisión 2	Downflooding point	62,3	0
Admisión 3	Downflooding point	36,2	0
Admisión 4	Downflooding point	33,2	0
Guardacalor	Downflooding point	74,9	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	52,2846	Pass	+3159,64
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	7,591	Pass	+15082,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	32,2	Pass	+359,31
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	1,0	Pass	+94,82
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	
	Wind heeling (Hw)	15,0	deg	1,0	Pass	+93,13
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	7,591	Pass	+15082,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	176,1722	Pass	+20408,99
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	32,2	Pass	+114,35
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	32,2	Pass	+359,31

Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Plena carga salida****Damage Case - DCase 10**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
VOID 6S ER	Fully flooded	95		
Prop. Proa ER	Fully flooded	85		
VOID 7S ER	Fully flooded	95		
VOID 7I ER	Fully flooded	95		

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	0%	4,695	0,000	4,695	0,000	20,989	10,802	0,073	0,000	User Specified
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER	97%	4,805	4,661	4,805	4,661	20,001	9,041	0,876	0,000	User Specified
Aceite ER	97%	0,850	0,825	0,924	0,896	31,497	8,575	0,966	0,000	User Specified
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER	0%	1,765	0,000	1,918	0,000	31,841	11,000	0,037	0,000	User Specified
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER	97%	56,972	55,262	67,823	65,789	39,949	10,370	1,604	32,219	IMO A.749(18)
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,219	IMO A.749(18)
LNG ER	97%	39,465	38,281	87,699	85,068	46,000	10,000	4,860	0,000	User Specified
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			2082,417	335,729	312,828	32,071	0,000	7,397	64,437	
FS correction								0,031		
VCG fluid								7,428		

Draft Amidships m	4,042
Displacement t	2082
Heel deg	1,0

Draft at FP m	4,827
Draft at AP m	3,257
Draft at LCF m	3,822
Trim (+ve by stern) m	-1,570
WL Length m	79,452
Beam max extents on WL m	26,332
Wetted Area m <sup>2</sup>	1675,045
Waterpl. Area m <sup>2</sup>	618,005
Prismatic coeff. (Cp)	0,713
Block coeff. (Cb)	0,520
Max Sect. area coeff. (Cm)	0,856
Waterpl. area coeff. (Cwp)	0,698
LCB from zero pt. (+ve fwd) m	32,167
LCF from zero pt. (+ve fwd) m	29,903
KB m	2,144
KG fluid m	7,428
BMt m	33,172
BML m	109,644
GMt corrected m	27,887
GML m	104,359
KMt m	35,305
KML m	111,751
Immersion (TPc) tonne/cm	6,335
MTc tonne.m	26,133
RM at 1deg = GMt.Disp.sin(1) tonne.m	1013,495
Max deck inclination deg	1,4976
Trim angle (+ve by stern) deg	-1,0817

Key point	Type	Freeboard m
Margin Line (freeboard pos = 83,16 m)		-1,083
Deck Edge (freeboard pos = 83,16 m)		-1,007
Admisión 1	Downflooding point	11,510
Admisión 2	Downflooding point	11,433
Admisión 3	Downflooding point	8,334
Admisión 4	Downflooding point	8,225
Guardacalor	Downflooding point	17,586



## Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Plena carga salida****Damage Case - DCase 11**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
VOID 7S ER	Fully flooded	95		
VOID 7I ER	Fully flooded	95		
Pique ER	Fully flooded	95		

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	0%	4,695	0,000	4,695	0,000	20,989	10,802	0,073	0,000	User Specified
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER	97%	4,805	4,661	4,805	4,661	20,001	9,041	0,876	0,000	User Specified
Aceite ER	97%	0,850	0,825	0,924	0,896	31,497	8,575	0,966	0,000	User Specified
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER	0%	1,765	0,000	1,918	0,000	31,841	11,000	0,037	0,000	User Specified
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER	97%	56,972	55,262	67,823	65,789	39,949	10,370	1,604	32,213	IMO A.749(18)
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,213	IMO A.749(18)
LNG ER	97%	39,465	38,281	87,699	85,068	46,000	10,000	4,860	0,000	User Specified
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			2082,417	335,729	312,828	32,071	0,000	7,397	64,427	
FS correction								0,031		
VCG fluid								7,428		



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-7,186	-8,494	-5,130	-0,119	4,927	8,472	7,195	5,665	3,962	2,141	0,263	-1,604	-3,383
Area under GZ curve from zero heel m.deg	179,0222	97,8072	26,5479	0,0000	24,2057	94,4730	175,2419	239,1292	287,5346	318,0800	330,1378	323,3789	298,3906
Displacement t	2082	2082	2082	2082	2082	2082	2082	2082	2082	2082	2082	2082	2082
Draft at FP m	1,853	3,789	4,015	4,112	4,262	4,610	3,074	1,150	-1,517	-5,756	-14,113	-38,380	n/a
Draft at AP m	0,547	2,714	3,505	3,493	3,410	2,392	0,092	-2,600	-6,059	-11,122	-20,190	-45,506	n/a
WL Length m	76,583	76,580	83,144	82,202	83,159	82,430	77,327	77,687	78,038	78,314	78,377	78,395	78,882
Beam max extents on WL m	13,351	13,447	26,461	26,333	26,453	23,351	13,317	13,176	13,158	12,472	10,483	10,336	10,604
Wetted Area m^2	1291,257	1281,179	1569,632	1600,349	1591,656	1342,202	1333,847	1370,599	1426,432	1493,829	1530,764	1545,818	1561,607
Waterpl. Area m^2	297,359	346,493	629,703	642,205	635,560	343,921	268,493	243,360	236,070	244,009	270,630	318,639	372,225
Prismatic coeff. (Cp)	0,758	0,765	0,690	0,697	0,691	0,714	0,750	0,724	0,684	0,635	0,597	0,565	0,531
Block coeff. (Cb)	0,632	0,652	0,398	0,583	0,392	0,571	0,579	0,537	0,485	0,441	0,477	0,508	0,521
LCB from zero pt. (+ve fwd) m	32,179	32,153	32,106	32,107	32,127	32,247	32,335	32,399	32,432	32,429	32,352	32,234	32,128
LCF from zero pt. (+ve fwd) m	31,390	31,484	30,834	31,328	31,255	32,093	27,131	26,318	25,726	25,331	25,249	25,802	27,119

Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
Max deck inclination deg	30,0092	20,0116	10,0059	0,4265	10,0165	20,0494	30,0478	40,0407	50,0296	60,0172	70,0065	80,0011	90,0000
Trim angle (+ve by stern) deg	-0,8997	-0,7412	-0,3513	-0,4265	-0,5867	-1,5278	-2,0535	-2,5818	-3,1259	-3,6926	-4,1797	-4,8976	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 83,16 m)		0	n/a
Deck Edge (immersion pos = 83,16 m)		0	n/a
Admisión 1	Downflooding point	69,3	0
Admisión 2	Downflooding point	68,7	0
Admisión 3	Downflooding point	71	0
Admisión 4	Downflooding point	69,8	0
Guardacalor	Downflooding point	78,2	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	56,0765	Pass	+3396,04
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	8,532	Pass	+16964,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	68,5	Pass	+878,71
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	0,3	Pass	+98,68
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	
	Wind heeling (Hw)	15,0	deg	0,3	Pass	+98,28
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	8,532	Pass	+16964,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	329,6719	Pass	+38278,56
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	68,5	Pass	+356,73
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	68,5	Pass	+878,71

Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Plena carga salida****Damage Case - DCase 11**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
VOID 7S ER	Fully flooded	95		
VOID 7I ER	Fully flooded	95		
Pique ER	Fully flooded	95		

VOID 7S ER Fully flooded 95

VOID 7I ER Fully flooded 95

Pique ER Fully flooded 95

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	0%	4,695	0,000	4,695	0,000	20,989	10,802	0,073	0,000	User Specified
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER	97%	4,805	4,661	4,805	4,661	20,001	9,041	0,876	0,000	User Specified
Aceite ER	97%	0,850	0,825	0,924	0,896	31,497	8,575	0,966	0,000	User Specified
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER	0%	1,765	0,000	1,918	0,000	31,841	11,000	0,037	0,000	User Specified
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER	97%	56,972	55,262	67,823	65,789	39,949	10,370	1,604	32,214	IMO A.749(18)
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,214	IMO A.749(18)
LNG ER	97%	39,465	38,281	87,699	85,068	46,000	10,000	4,860	0,000	User Specified
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			2082,417	335,729	312,828	32,071	0,000	7,397	64,427	
FS correction								0,031		
VCG fluid								7,428		

Draft Amidships m	3,803
Displacement t	2082
Heel deg	0,2
Draft at FP m	4,116

Draft at AP m	3,490
Draft at LCF m	3,726
Trim (+ve by stern) m	-0,626
WL Length m	82,506
Beam max extents on WL m	26,333
Wetted Area m <sup>2</sup>	1600,806
Waterpl. Area m <sup>2</sup>	642,385
Prismatic coeff. (Cp)	0,694
Block coeff. (Cb)	0,575
Max Sect. area coeff. (Cm)	0,890
Waterpl. area coeff. (Cwp)	0,698
LCB from zero pt. (+ve fwd) m	32,110
LCF from zero pt. (+ve fwd) m	31,342
KB m	2,081
KG fluid m	7,428
BMt m	34,598
BML m	122,885
GMt corrected m	29,251
GML m	117,538
KMt m	36,678
KML m	124,962
Immersion (TPc) tonne/cm	6,584
MTc tonne.m	29,433
RM at 1deg = GMt.Disp.sin(1) tonne.m	1063,092
Max deck inclination deg	0,4875
Trim angle (+ve by stern) deg	-0,4312

Key point	Type	Freeboard m
Margin Line (freeboard pos = 83,16 m)		-0,227
Deck Edge (freeboard pos = 83,16 m)		-0,151
Admisión 1	Downflooding point	11,699
Admisión 2	Downflooding point	11,668
Admisión 3	Downflooding point	8,946
Admisión 4	Downflooding point	8,902
Guardacalor	Downflooding point	17,788

## Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.‰: 0,01000(0,100); Trim‰(LCG-TCG): 0,01000(0,100); Heel‰(LCG-TCG): 0,01000(0,100)

**Loadcase - Plena carga llegada****Damage Case - DCase 1**

Free to Trim

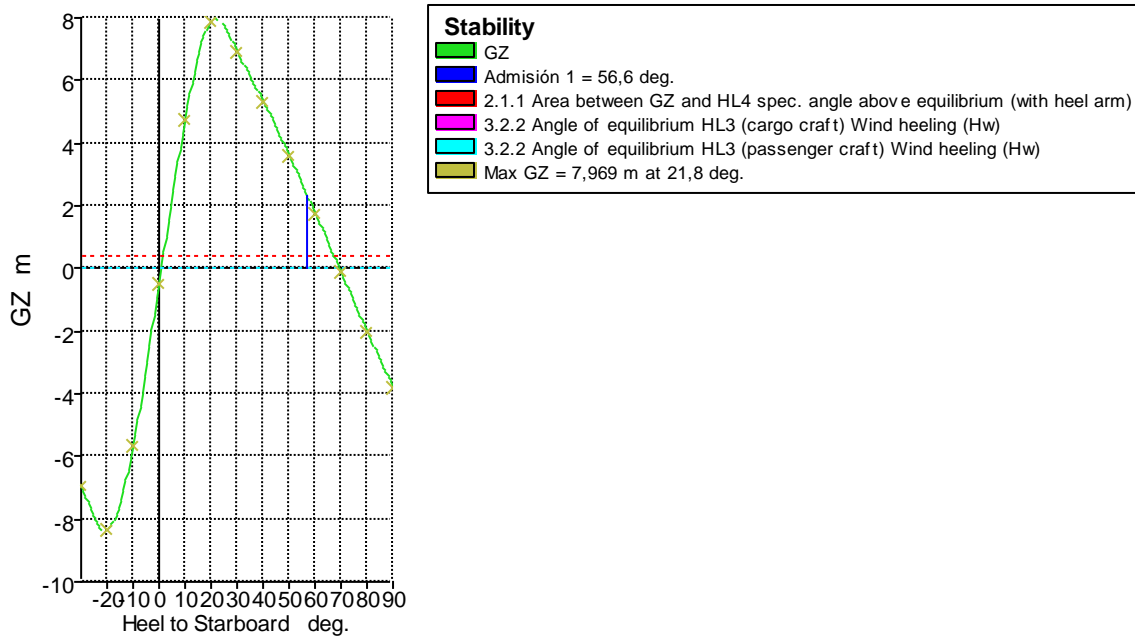
Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.‰	PartFlood.‰	PartFlood.WL
C WJ ER	Fully flooded	85		

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	90%	4,695	4,225	4,695	4,225	20,001	11,727	0,835	0,000	User Specified
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER	10%	4,805	0,481	4,805	0,481	20,017	9,476	0,253	0,000	User Specified
Aceite ER	10%	0,850	0,085	0,924	0,092	31,495	8,799	0,407	0,000	User Specified
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER	90%	1,765	1,588	1,918	1,726	31,499	11,744	0,826	0,000	User Specified
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER	10%	56,972	5,697	67,823	6,782	39,923	10,373	0,298	32,213	IMO A.749(18)
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,213	IMO A.749(18)
LNG ER	10%	39,465	3,946	87,699	8,770	46,000	10,000	3,760	0,000	User Specified
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1916,405	335,729	44,153	31,163	0,000	7,769	64,427	
FS correction								0,034		
VCG fluid								7,802		



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-6,929	-8,319	-5,658	-0,464	4,752	7,898	6,922	5,338	3,602	1,760	-0,134	-2,012	-3,786
Area under GZ curve from zero heel m.deg	183,2052	104,7134	31,5514	0,0000	22,1689	88,5257	164,8083	225,9917	270,8693	297,7236	305,8835	295,0902	266,0356
Displacement t	1916	1916	1916	1916	1916	1916	1916	1916	1917	1917	1916	1916	1916
Draft at FP m	0,310	2,408	3,088	2,883	2,539	0,217	-3,614	-7,051	-11,460	-17,767	-29,128	-61,523	n/a
Draft at AP m	0,562	2,749	3,692	3,997	4,306	5,092	5,373	4,149	2,359	-0,847	-7,366	-25,949	n/a
WL Length m	76,727	76,685	82,987	83,177	81,537	83,315	83,513	83,527	83,095	80,832	79,071	77,630	76,857
Beam max extents on WL m	13,251	13,398	26,464	26,342	26,517	26,134	14,535	14,195	13,339	12,060	10,697	10,390	11,002
Wetted Area m^2	1194,224	1192,043	1457,216	1479,533	1472,774	1326,537	1301,055	1342,629	1377,817	1403,527	1423,522	1436,985	1449,336
Waterpl. Area m^2	338,486	342,507	603,454	617,873	604,830	338,942	193,060	185,914	188,611	202,883	233,727	286,458	363,768
Prismatic coeff. (Cp)	0,733	0,735	0,649	0,608	0,584	0,490	0,395	0,377	0,370	0,379	0,389	0,397	0,396
Block coeff. (Cb)	0,624	0,649	0,382	0,550	0,317	0,249	0,292	0,298	0,297	0,304	0,298	0,300	0,327
LCB from zero pt. (+ve fwd) m	31,142	31,131	31,117	31,084	31,033	30,756	30,346	30,163	30,041	30,046	30,172	30,354	30,527
LCF from zero pt. (+ve fwd) m	31,740	30,950	32,283	32,873	32,111	31,670	45,107	46,810	48,033	48,698	48,872	48,778	47,431

Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
Max deck inclination deg	30,0003	20,0012	10,0083	0,7676	10,0708	20,2370	30,4290	40,3592	50,2714	60,1697	70,0830	80,0278	90,0000
Trim angle (+ve by stern) deg	0,1732	0,2350	0,4164	0,7676	1,2170	3,3555	6,1680	7,6708	9,4348	11,5003	14,6648	23,1603	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 62,163 m)		4,1	n/a
Deck Edge (immersion pos = 62,163 m)		4,5	n/a
Admisión 1	Downflooding point	56,6	0
Admisión 2	Downflooding point	59,2	0
Admisión 3	Downflooding point	87	0
Admisión 4	Downflooding point	89,3	0
Guardacalor	Downflooding point	72,6	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	56,2919	Pass	+3409,47
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	7,969	Pass	+15838,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	55,8	Pass	+696,43
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	0,9	Pass	+95,65
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	
	Wind heeling (Hw)	15,0	deg	0,9	Pass	+94,24
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	7,969	Pass	+15838,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	290,8298	Pass	+33756,79
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	55,8	Pass	+271,67
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	55,8	Pass	+696,43

Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63



Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.‰: 0,01000(0,100); Trim‰(LCG-TCG): 0,01000(0,100); Heel‰(LCG-TCG): 0,01000(0,100)

**Loadcase - Plena carga llegada****Damage Case - DCase 1**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank    Status    Perm.‰ PartFlood.‰    PartFlood.WL

C WJ ER    Fully flooded    85

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	90%	4,695	4,225	4,695	4,225	20,001	11,727	0,835	0,000	User Specified
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER	10%	4,805	0,481	4,805	0,481	20,017	9,476	0,253	0,000	User Specified
Aceite ER	10%	0,850	0,085	0,924	0,092	31,495	8,799	0,407	0,000	User Specified
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER	90%	1,765	1,588	1,918	1,726	31,499	11,744	0,826	0,000	User Specified
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER	10%	56,972	5,697	67,823	6,782	39,923	10,373	0,298	32,217	IMO A.749(18)
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,217	IMO A.749(18)
LNG ER	10%	39,465	3,946	87,699	8,770	46,000	10,000	3,760	0,000	User Specified
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1916,405	335,729	44,153	31,163	0,000	7,769	64,434	
FS correction								0,034		
VCG fluid								7,802		

Draft Amidships m	3,442
Displacement t	1916
Heel deg	0,9
Draft at FP m	2,861
Draft at AP m	4,022
Draft at LCF m	3,563

Trim (+ve by stern) m	1,161
WL Length m	83,181
Beam max extents on WL m	26,342
Wetted Area m <sup>2</sup>	1480,139
Waterpl. Area m <sup>2</sup>	617,813
Prismatic coeff. (Cp)	0,605
Block coeff. (Cb)	0,483
Max Sect. area coeff. (Cm)	0,870
Waterpl. area coeff. (Cwp)	0,612
LCB from zero pt. (+ve fwd) m	31,084
LCF from zero pt. (+ve fwd) m	32,871
KB m	2,000
KG fluid m	7,802
BMt m	36,094
BML m	125,163
GMt corrected m	30,290
GML m	119,360
KMt m	38,086
KML m	127,136
Immersion (TPc) tonne/cm	6,333
MTc tonne.m	27,506
RM at 1deg = GMt.Disp.sin(1) tonne.m	1013,084
Max deck inclination deg	1,1956
Trim angle (+ve by stern) deg	0,7998

Key point	Type	Freeboard m
Margin Line (freeboard pos = 62,163 m)		0,589
Deck Edge (freeboard pos = 62,163 m)		0,665
Admisión 1	Downflooding point	11,479
Admisión 2	Downflooding point	11,536
Admisión 3	Downflooding point	9,614
Admisión 4	Downflooding point	9,695
Guardacalor	Downflooding point	17,609

Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Plena carga llegada****Damage Case - DCase 2**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank    Status    Perm.%    PartFlood.%    PartFlood.WL

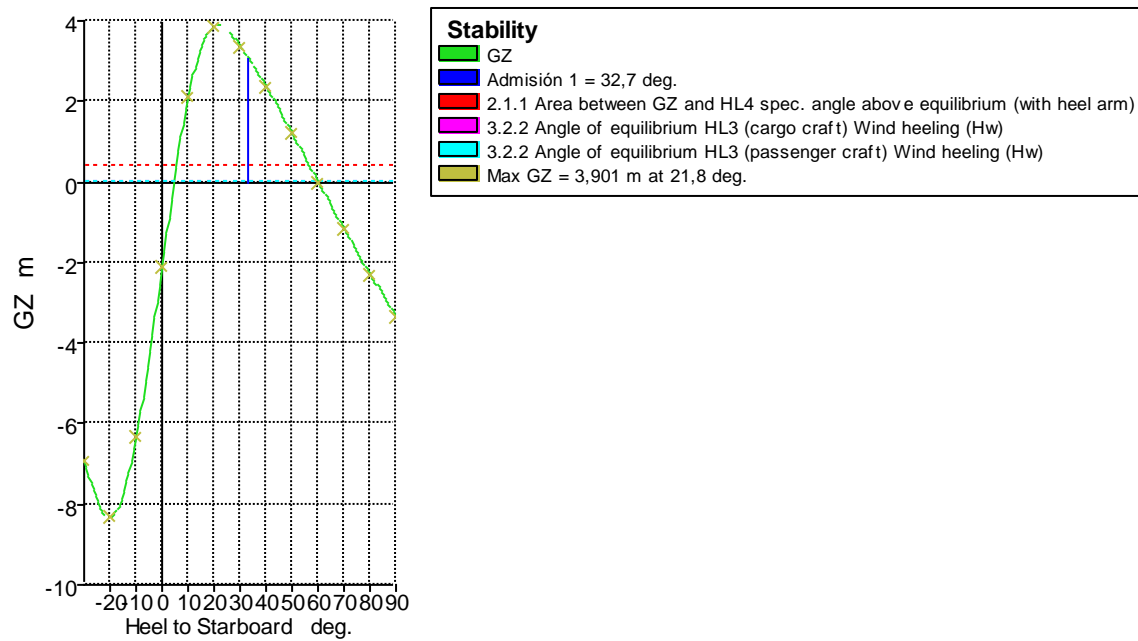
C WJ ER    Fully flooded    85

CM ER    Fully flooded    85

DF ER    Fully flooded    95

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	90%	4,695	4,225	4,695	4,225	20,001	11,727	0,835	0,000	User Specified
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER	10%	4,805	0,481	4,805	0,481	20,017	9,476	0,253	0,000	User Specified
Aceite ER	10%	0,850	0,085	0,924	0,092	31,495	8,799	0,407	0,000	User Specified
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER	90%	1,765	1,588	1,918	1,726	31,499	11,744	0,826	0,000	User Specified
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER	10%	56,972	5,697	67,823	6,782	39,923	10,373	0,298	32,213	IMO A.749(18)
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,213	IMO A.749(18)
LNG ER	10%	39,465	3,946	87,699	8,770	46,000	10,000	3,760	0,000	User Specified
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1916,405	335,729	44,153	31,163	0,000	7,769	64,427	
FS correction								0,034		
VCG fluid								7,802		



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-6,929	-8,319	-6,343	-2,110	2,105	3,874	3,365	2,367	1,198	-0,004	-1,174	-2,285	-3,335
Area under GZ curve from zero heel m.deg	197,4258	119,3308	43,2517	0,0000	1,1627	33,4154	70,7067	99,4732	117,4003	123,3541	117,4244	100,0685	71,9359
Displacement t	1916	1916	1916	1916	1916	1916	1916	1916	1916	1916	1916	1916	1916
Draft at FP m	0,311	2,408	2,743	2,089	1,112	-2,157	-6,804	-12,573	-20,496	-32,643	-55,157	-118,953	n/a
Draft at AP m	0,562	2,749	4,204	5,224	6,344	8,704	11,828	15,520	20,506	28,108	42,200	82,309	n/a
WL Length m	76,727	76,685	82,657	83,195	83,330	83,709	78,421	73,361	70,241	68,218	66,809	65,696	63,504
Beam max extents on WL m	13,251	13,398	26,513	26,275	26,545	27,417	21,981	17,031	14,226	12,526	11,496	10,920	11,089
Wetted Area m^2	1194,237	1192,043	1488,317	1551,804	1593,813	1755,568	2026,040	2182,552	2285,669	2365,973	2431,722	2496,050	2566,924
Waterpl. Area m^2	338,479	342,507	546,746	556,660	534,937	370,579	299,625	250,891	211,511	182,892	155,868	137,196	123,559
Prismatic coeff. (Cp)	0,733	0,735	0,585	0,474	0,385	0,241	0,199	0,190	0,186	0,183	0,181	0,180	0,183
Block coeff. (Cb)	0,624	0,649	0,329	0,268	0,188	0,119	0,101	0,093	0,092	0,096	0,101	0,107	0,109
LCB from zero pt. (+ve fwd) m	31,142	31,131	31,056	30,953	30,824	30,408	29,875	29,345	28,878	28,532	28,351	28,339	28,495
LCF from zero pt. (+ve fwd) m	31,741	30,950	34,310	34,998	33,547	31,246	28,798	27,982	27,594	27,504	27,717	28,297	26,876

Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
Max deck inclination deg	30,0003	20,0012	10,0486	2,1583	10,6039	21,1412	31,7700	42,1309	52,2113	61,9884	71,4874	80,7881	90,0000
Trim angle (+ve by stern) deg	0,1733	0,2350	1,0070	2,1583	3,6001	7,4411	12,6288	18,6659	26,2454	36,1495	49,4969	67,5499	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 62,163 m)		6,5	n/a
Deck Edge (immersion pos = 62,163 m)		7	n/a
Admisión 1	Downflooding point	32,7	0
Admisión 2	Downflooding point	35,3	0
Admisión 3	Downflooding point	Not immersed in positive range	0
Admisión 4	Downflooding point	Not immersed in positive range	0
Guardacalor	Downflooding point	46,9	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	33,8499	Pass	+2010,34
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	3,901	Pass	+7702,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	28,1	Pass	+301,83
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	4,6	Pass	+76,82
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	
	Wind heeling (Hw)	15,0	deg	4,6	Pass	+69,14
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	3,901	Pass	+7702,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	84,3209	Pass	+9716,17
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	28,1	Pass	+87,52
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	28,1	Pass	+301,83

Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Plena carga llegada****Damage Case - DCase 2**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank    Status    Perm.%    PartFlood.%    PartFlood.WL

C WJ ER    Fully flooded    85

CM ER    Fully flooded    85

DF ER    Fully flooded    95

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	90%	4,695	4,225	4,695	4,225	20,001	11,727	0,835	0,000	User Specified
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER	10%	4,805	0,481	4,805	0,481	20,017	9,476	0,253	0,000	User Specified
Aceite ER	10%	0,850	0,085	0,924	0,092	31,495	8,799	0,407	0,000	User Specified
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER	90%	1,765	1,588	1,918	1,726	31,499	11,744	0,826	0,000	User Specified
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER	10%	56,972	5,697	67,823	6,782	39,923	10,373	0,298	32,332	IMO A.749(18)
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,332	IMO A.749(18)
LNG ER	10%	39,465	3,946	87,699	8,770	46,000	10,000	3,760	0,000	User Specified
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1916,405	335,729	44,153	31,163	0,000	7,769	64,665	
FS correction								0,034		
VCG fluid								7,802		

Draft Amidships m	3,718
Displacement t	1916
Heel deg	4,9
Draft at FP m	1,699

Draft at AP m	5,737
Draft at LCF m	4,048
Trim (+ve by stern) m	4,037
WL Length m	83,257
Beam max extents on WL m	26,334
Wetted Area m <sup>2</sup>	1573,575
Waterpl. Area m <sup>2</sup>	555,753
Prismatic coeff. (Cp)	0,431
Block coeff. (Cb)	0,214
Max Sect. area coeff. (Cm)	0,778
Waterpl. area coeff. (Cwp)	0,376
LCB from zero pt. (+ve fwd) m	30,895
LCF from zero pt. (+ve fwd) m	34,793
KB m	2,357
KG fluid m	7,802
BMt m	31,751
BML m	109,320
GMt corrected m	26,278
GML m	103,848
KMt m	33,954
KML m	111,147
Immersion (TPc) tonne/cm	5,696
MTc tonne.m	23,931
RM at 1deg = GMt.Disp.sin(1) tonne.m	878,905
Max deck inclination deg	5,6393
Trim angle (+ve by stern) deg	2,7794

Key point	Type	Freeboard m
Margin Line (freeboard pos = 62,163 m)		0,199
Deck Edge (freeboard pos = 62,163 m)		0,275
Admisión 1	Downflooding point	9,575
Admisión 2	Downflooding point	9,773
Admisión 3	Downflooding point	9,254
Admisión 4	Downflooding point	9,536
Guardacalor	Downflooding point	15,771

## Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Plena carga llegada****Damage Case - DCase 3**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

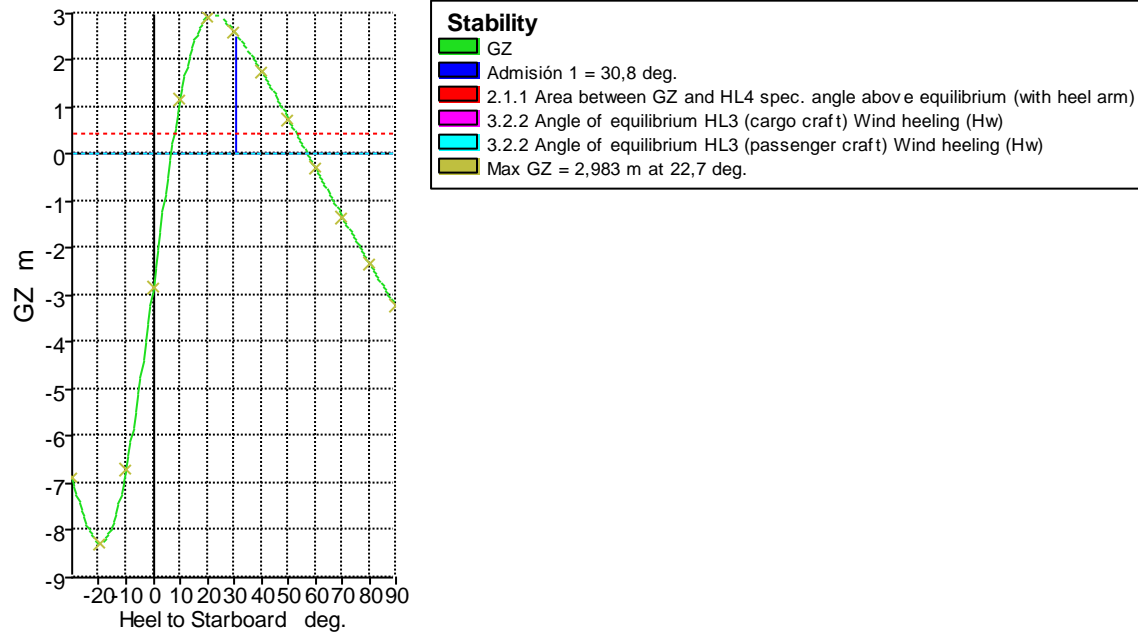
Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
CM ER	Fully flooded	85		
DF ER	Fully flooded	95		
CM 2 ER	Fully flooded	85		
DF 2 ER	Fully flooded	95		
A. Des ER	Fully flooded	95		
A. Dulce ER	Fully flooded	95		
Aceite ER	Fully flooded	95		
Lodos ER	Fully flooded	95		

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER (Damaged)	Damaged									
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER (Damaged)	Damaged									
Aceite ER (Damaged)	Damaged									
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER (Damaged)	Damaged									
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER	10%	56,972	5,697	67,823	6,782	39,923	10,373	0,298	32,213	IMO A.749(18)
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,213	IMO A.749(18)
LNG ER	10%	39,465	3,946	87,699	8,770	46,000	10,000	3,760	0,000	User Specified
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1910,026	323,387	37,629	31,190	-0,038	7,792	64,427	
FS correction								0,034		



Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m^3	Total Volume m^3	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
VCG fluid								7,826		



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-6,880	-8,272	-6,699	-2,813	1,173	2,928	2,613	1,774	0,765	-0,289	-1,325	-2,308	-3,232
Area under GZ curve from zero heel m.deg	203,4690	126,1215	48,6717	0,0000	-7,1370	15,5092	44,2449	66,3274	79,1198	81,4955	73,3963	55,1809	27,4503
Displacement t	1910	1910	1910	1910	1910	1910	1910	1910	1910	1910	1910	1910	1910
Draft at FP m	0,319	2,413	2,962	2,654	2,201	-0,167	-4,035	-8,818	-15,234	-24,973	-43,076	-94,377	n/a
Draft at AP m	0,523	2,716	4,223	5,192	6,194	8,688	11,891	15,616	20,578	28,128	42,183	82,282	n/a
WL Length m	76,723	76,683	82,913	83,201	83,059	83,599	84,259	82,270	78,381	75,787	73,884	72,411	69,582
Beam max extents on WL m	13,236	13,389	26,517	26,269	26,544	27,374	22,081	17,084	14,280	12,571	11,534	10,957	10,795
Wetted Area m^2	1191,707	1189,699	1525,555	1640,459	1736,237	2006,904	2335,176	2492,811	2595,702	2676,938	2747,023	2812,182	2895,675

Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
Waterpl. Area m <sup>2</sup>	340,424	342,220	518,339	528,233	506,895	378,123	311,778	262,160	225,217	195,349	172,240	147,814	145,908
Prismatic coeff. (Cp)	0,735	0,736	0,573	0,467	0,389	0,240	0,183	0,168	0,165	0,164	0,163	0,162	0,167
Block coeff. (Cb)	0,624	0,650	0,321	0,264	0,186	0,118	0,092	0,082	0,081	0,085	0,090	0,094	0,100
LCB from zero pt. (+ve fwd) m	31,173	31,161	31,095	31,026	30,940	30,612	30,169	29,736	29,374	29,110	28,960	28,968	29,098
LCF from zero pt. (+ve fwd) m	31,650	30,956	33,771	34,588	34,799	31,175	27,656	27,553	27,943	28,000	28,595	28,443	29,038
Max deck inclination deg	30,0002	20,0009	10,0362	1,7481	10,3564	20,7681	31,3115	41,6389	51,7209	61,5551	71,1705	80,6237	90,0000
Trim angle (+ve by stern) deg	0,1408	0,2082	0,8688	1,7481	2,7492	6,0782	10,8415	16,3739	23,2984	32,5598	45,7140	64,7918	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 62,163 m)		3,2	n/a
Deck Edge (immersion pos = 62,163 m)		3,6	n/a
Admisión 1	Downflooding point	30,8	0
Admisión 2	Downflooding point	32,9	0
Admisión 3	Downflooding point	83,2	0
Admisión 4	Downflooding point	Not immersed in positive range	0
Guardacalor	Downflooding point	44,7	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	26,2908	Pass	+1539,08
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	2,983	Pass	+5866,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	24,2	Pass	+245,63
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	6,7	Pass	+66,51
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	
	Wind heeling (Hw)	15,0	deg	6,7	Pass	+55,39
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	2,983	Pass	+5866,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	55,6034	Pass	+6373,04
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	24,2	Pass	+61,29
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	24,2	Pass	+245,63

## Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Plena carga llegada****Damage Case - DCase 3**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
CM ER	Fully flooded	85		
DF ER	Fully flooded	95		
CM 2 ER	Fully flooded	85		
DF 2 ER	Fully flooded	95		
A. Des ER	Fully flooded	95		
A. Dulce ER	Fully flooded	95		
Aceite ER	Fully flooded	95		
Lodos ER	Fully flooded	95		

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER (Damaged)	Damaged									
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER (Damaged)	Damaged									
Aceite ER (Damaged)	Damaged									
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER (Damaged)	Damaged									
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER	10%	56,972	5,697	67,823	6,782	39,923	10,373	0,298	32,454	IMO A.749(18)
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,454	IMO A.749(18)
LNG ER	10%	39,465	3,946	87,699	8,770	46,000	10,000	3,760	0,000	User Specified
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1910,026	323,387	37,629	31,190	-0,038	7,792	64,909	
FS correction								0,034		

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
VCG fluid								7,826		

Draft Amidships m	4,118
Displacement t	1910
Heel deg	7,0
Draft at FP m	2,379
Draft at AP m	5,858
Draft at LCF m	4,431
Trim (+ve by stern) m	3,479
WL Length m	83,256
Beam max extents on WL m	26,394
Wetted Area m <sup>2</sup>	1706,168
Waterpl. Area m <sup>2</sup>	530,761
Prismatic coeff. (Cp)	0,413
Block coeff. (Cb)	0,198
Max Sect. area coeff. (Cm)	0,724
Waterpl. area coeff. (Cwp)	0,364
LCB from zero pt. (+ve fwd) m	30,976
LCF from zero pt. (+ve fwd) m	34,113
KB m	2,577
KG fluid m	7,826
BMt m	29,643
BML m	130,075
GMt corrected m	24,351
GML m	124,782
KMt m	31,976
KML m	131,578
Immersion (TPc) tonne/cm	5,440
MTc tonne.m	28,660
RM at 1deg = GMt.Disp.sin(1) tonne.m	811,730
Max deck inclination deg	7,3680
Trim angle (+ve by stern) deg	2,3959

Key point	Type	Freeboard m
Margin Line (freeboard pos = 62,163 m)		-0,757

Key point	Type	Freeboard m
Deck Edge (freeboard pos = 62,163 m)		-0,682
Admisión 1	Downflooding point	8,828
Admisión 2	Downflooding point	8,998
Admisión 3	Downflooding point	8,321
Admisión 4	Downflooding point	8,564
Guardacalor	Downflooding point	15,011

### Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

### Loadcase - Plena carga llegada

#### Damage Case - DCase 4

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

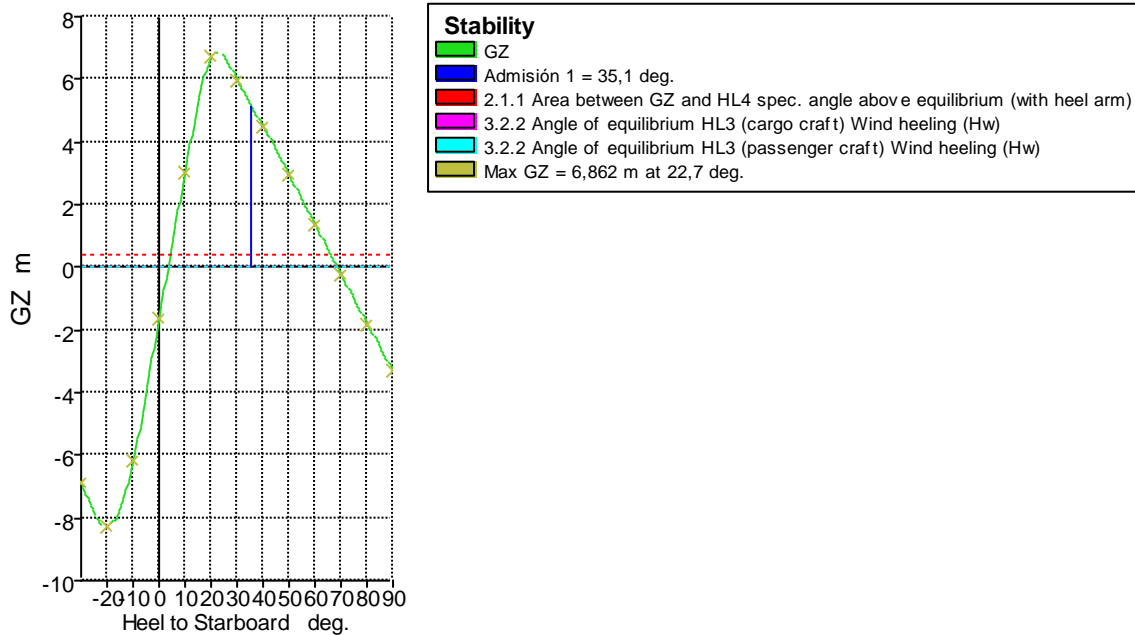
Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
CM 2 ER	Fully flooded	85		
DF 2 ER	Fully flooded	95		
A. Des ER	Fully flooded	95		
A. Dulce ER	Fully flooded	95		
Aceite ER	Fully flooded	95		
Lodos ER	Fully flooded	95		
VOID 1S ER	Fully flooded	95		
VOID 1I ER	Fully flooded	95		

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER (Damaged)	Damaged									
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER (Damaged)	Damaged									
Aceite ER (Damaged)	Damaged									

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER (Damaged)	Damaged									
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER	10%	56,972	5,697	67,823	6,782	39,923	10,373	0,298	32,213	IMO A.749(18)
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,213	IMO A.749(18)
LNG ER	10%	39,465	3,946	87,699	8,770	46,000	10,000	3,760	0,000	User Specified
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1910,026	323,387	37,629	31,190	-0,038	7,792	64,427	
FS correction								0,034		
VCG fluid								7,826		



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-6,880	-8,272	-6,189	-1,614	3,047	6,700	5,967	4,500	2,941	1,348	-0,247	-1,806	-3,310
Area under GZ curve from zero heel m.deg	192,8356	115,2059	39,8876	0,0000	7,2847	58,6960	124,5738	176,7530	214,0762	235,5165	241,0152	230,7022	205,0895
Displacement t	1910	1910	1910	1910	1910	1910	1910	1910	1910	1910	1910	1910	1910
Draft at FP m	0,318	2,413	3,332	3,477	3,635	3,196	-0,661	-5,857	-12,082	-21,029	-37,305	-83,087	n/a
Draft at AP m	0,523	2,716	3,777	4,148	4,475	5,339	8,337	11,786	15,912	21,788	32,447	62,348	n/a
WL Length m	76,723	76,683	83,068	83,184	83,117	76,521	77,381	84,258	83,431	78,949	75,975	73,827	72,562
Beam max extents on WL m	13,236	13,389	26,482	26,344	26,536	26,863	21,947	16,903	14,069	12,345	11,283	10,658	10,941
Wetted Area m <sup>2</sup>	1191,690	1189,699	1509,041	1603,597	1671,868	1717,892	2014,443	2237,387	2370,576	2462,360	2538,794	2608,588	2680,614
Waterpl. Area m <sup>2</sup>	340,422	342,220	552,562	566,549	561,976	345,169	198,531	175,429	169,697	157,636	143,546	128,650	111,344
Prismatic coeff. (Cp)	0,735	0,736	0,623	0,567	0,523	0,471	0,299	0,222	0,199	0,196	0,195	0,196	0,198
Block coeff. (Cb)	0,624	0,650	0,370	0,299	0,274	0,230	0,161	0,117	0,090	0,094	0,100	0,107	0,107
LCB from zero pt. (+ve fwd) m	31,173	31,161	31,158	31,137	31,131	31,027	30,466	29,788	29,216	28,763	28,481	28,393	28,487
LCF from zero pt. (+ve fwd) m	31,650	30,956	31,592	32,342	31,584	31,702	28,182	29,922	30,410	30,637	31,349	32,157	31,090
Max deck inclination deg	30,0002	20,0009	10,0045	0,4620	10,0160	20,0461	30,4300	40,8764	51,0791	61,0391	70,8065	80,4357	90,0000
Trim angle (+ve by stern) deg	0,1412	0,2082	0,3070	0,4620	0,5785	1,4764	6,1754	11,9782	18,6052	27,2427	39,9887	60,2391	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 62,163 m)		1,2	n/a
Deck Edge (immersion pos = 62,163 m)		1,6	n/a
Admisión 1	Downflooding point	35,1	0
Admisión 2	Downflooding point	36,6	0
Admisión 3	Downflooding point	79,4	0
Admisión 4	Downflooding point	Not immersed in positive range	0
Guardacalor	Downflooding point	48,5	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	50,4107	Pass	+3042,81
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	6,862	Pass	+13624,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	31,7	Pass	+352,24
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	3,5	Pass	+82,74
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	

Code	Criteria	Value	Units	Actual	Status	Margin %
	Wind heeling (Hw)	15,0	deg	3,4	Pass	+77,03
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	6,862	Pass	+13624,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	155,5883	Pass	+18012,72
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	31,7	Pass	+111,05
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	31,7	Pass	+352,24

### Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

### Loadcase - Plena carga llegada

#### Damage Case - DCase 4

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
CM 2 ER	Fully flooded	85		
DF 2 ER	Fully flooded	95		
A. Des ER	Fully flooded	95		
A. Dulce ER	Fully flooded	95		
Aceite ER	Fully flooded	95		
Lodos ER	Fully flooded	95		
VOID 1S ER	Fully flooded	95		
VOID 1I ER	Fully flooded	95		

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER (Damaged)	Damaged									
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER (Damaged)	Damaged									
Aceite ER (Damaged)	Damaged									



Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER (Damaged)	Damaged									
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER	10%	56,972	5,697	67,823	6,782	39,923	10,373	0,298	32,272	IMO A.749(18)
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,272	IMO A.749(18)
LNG ER	10%	39,465	3,946	87,699	8,770	46,000	10,000	3,760	0,000	User Specified
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1910,026	323,387	37,629	31,190	-0,038	7,792	64,544	
FS correction								0,034		
VCG fluid								7,826		

Draft Amidships m	3,894
Displacement t	1910
Heel deg	3,5
Draft at FP m	3,519
Draft at AP m	4,269
Draft at LCF m	3,979
Trim (+ve by stern) m	0,750
WL Length m	83,173
Beam max extents on WL m	26,335
Wetted Area m <sup>2</sup>	1630,980
Waterpl. Area m <sup>2</sup>	562,822
Prismatic coeff. (Cp)	0,550
Block coeff. (Cb)	0,312
Max Sect. area coeff. (Cm)	0,791
Waterpl. area coeff. (Cwp)	0,438
LCB from zero pt. (+ve fwd) m	31,139
LCF from zero pt. (+ve fwd) m	32,149
KB m	2,241
KG fluid m	7,826
BMt m	32,299
BML m	142,582
GMt corrected m	26,704
GML m	136,987
KMt m	34,480
KML m	144,558

Immersion (TPc) tonne/cm	5,769
MTc tonne.m	31,463
RM at 1deg = GMT.Disp.sin(1) tonne.m	890,154
Max deck inclination deg	3,4952
Trim angle (+ve by stern) deg	0,5167

Key point	Type	Freeboard m
Margin Line (freeboard pos = 62,163 m)		-0,489
Deck Edge (freeboard pos = 62,163 m)		-0,413
Admisión 1	Downflooding point	10,547
Admisión 2	Downflooding point	10,584
Admisión 3	Downflooding point	8,586
Admisión 4	Downflooding point	8,640
Guardacalor	Downflooding point	16,683

### Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.:%: 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

### Loadcase - Plena carga llegada

#### Damage Case - DCase 5

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

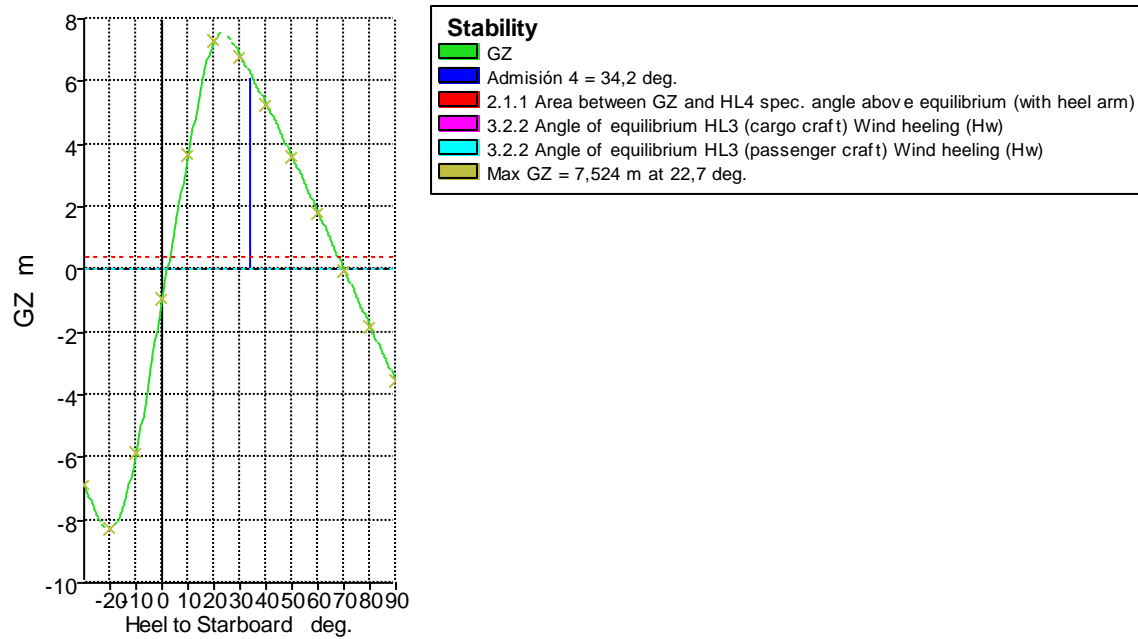
Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
VOID 1S ER	Fully flooded	95		
VOID 1I ER	Fully flooded	95		
Local LNG ER	Fully flooded	60		
Diesel ER	Fully flooded	95		
LNG ER Fully flooded	95			

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m^3	Total Volume m^3	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	90%	4,695	4,225	4,695	4,225	20,001	11,727	0,835	0,000	User Specified
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER	10%	4,805	0,481	4,805	0,481	20,017	9,476	0,253	0,000	User Specified
Aceite ER	10%	0,850	0,085	0,924	0,092	31,495	8,799	0,407	0,000	User Specified
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER	90%	1,765	1,588	1,918	1,726	31,499	11,744	0,826	0,000	User Specified
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER (Damaged)	Damaged									
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,213	IMO A.749(18)
LNG ER (Damaged)	Damaged									
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1906,761	180,206	28,601	31,106	-0,052	7,799	32,213	
FS correction								0,017		
VCG fluid								7,816		



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-6,874	-8,263	-5,849	-0,948	3,634	7,296	6,809	5,274	3,581	1,797	-0,022	-1,829	-3,577
Area under GZ curve from zero heel m.deg	186,1321	108,3815	34,5964	0,0000	13,7490	70,8094	143,9414	204,4222	248,8212	275,7538	284,6400	275,3468	248,2837
Displacement t	1907	1907	1907	1907	1907	1907	1907	1907	1907	1907	1907	1907	1907
Draft at FP m	0,221	2,326	3,378	3,748	4,524	5,923	7,327	7,709	8,233	8,939	9,928	11,929	n/a
Draft at AP m	0,566	2,752	3,590	3,679	3,656	3,002	0,614	-2,281	-6,080	-11,678	-21,753	-49,901	n/a
WL Length m	76,790	76,747	83,077	83,186	83,168	83,186	86,719	89,397	91,333	92,772	92,707	92,110	91,599
Beam max extents on WL m	13,248	13,395	26,456	26,337	26,493	25,470	21,950	14,224	13,576	12,465	10,677	10,379	10,435
Wetted Area m^2	1188,774	1186,736	1485,216	1570,798	1672,237	1696,697	1897,912	2052,660	2187,326	2293,531	2373,357	2436,135	2487,583
Waterpl. Area m^2	339,410	341,982	583,226	571,834	562,051	325,054	220,010	181,266	166,157	161,721	164,059	168,303	175,487
Prismatic coeff. (Cp)	0,731	0,733	0,649	0,620	0,588	0,557	0,469	0,411	0,376	0,353	0,339	0,329	0,320
Block coeff. (Cb)	0,622	0,647	0,379	0,540	0,341	0,277	0,176	0,200	0,200	0,158	0,152	0,164	0,180
LCB from zero pt. (+ve fwd) m	31,074	31,067	31,086	31,106	31,163	31,336	31,688	31,955	32,210	32,400	32,486	32,452	32,313
LCF from zero pt. (+ve fwd) m	31,701	30,927	30,658	30,423	29,850	32,143	39,691	35,814	33,104	30,683	28,535	27,089	25,944

Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
Max deck inclination deg	30,0006	20,0018	10,0010	0,0476	10,0171	20,0855	30,2408	40,2865	50,2909	60,2509	70,1747	80,0832	90,0000
Trim angle (+ve by stern) deg	0,2375	0,2937	0,1465	-0,0476	-0,5979	-2,0115	-4,6156	-6,8503	-9,7656	-13,9240	-20,8551	-36,6313	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 83,16 m)		0,7	n/a
Deck Edge (immersion pos = 83,16 m)		1	n/a
Admisión 1	Downflooding point	60,3	0
Admisión 2	Downflooding point	57,6	0
Admisión 3	Downflooding point	36,6	0
Admisión 4	Downflooding point	34,2	0
Guardacalor	Downflooding point	71,8	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	50,1698	Pass	+3027,79
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	7,524	Pass	+14948,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	32,3	Pass	+360,71
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	2,0	Pass	+89,97
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	
	Wind heeling (Hw)	15,0	deg	2,0	Pass	+86,66
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	7,524	Pass	+14948,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	172,2559	Pass	+19953,07
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	32,3	Pass	+115,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	32,3	Pass	+360,71

Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Plena carga llegada****Damage Case - DCase 5**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
VOID 1S ER	Fully flooded	95		
VOID 1I ER	Fully flooded	95		
Local LNG ER	Fully flooded	60		
Diesel ER	Fully flooded	95		
LNG ER Fully flooded	95			

VOID 1S ER Fully flooded 95

VOID 1I ER Fully flooded 95

Local LNG ER Fully flooded 60

Diesel ER Fully flooded 95

LNG ER Fully flooded 95

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	90%	4,695	4,225	4,695	4,225	20,001	11,727	0,835	0,000	User Specified
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER	10%	4,805	0,481	4,805	0,481	20,017	9,476	0,253	0,000	User Specified
Aceite ER	10%	0,850	0,085	0,924	0,092	31,495	8,799	0,407	0,000	User Specified
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER	90%	1,765	1,588	1,918	1,726	31,499	11,744	0,826	0,000	User Specified
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER (Damaged)	Damaged									
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,233	IMO A.749(18)
LNG ER (Damaged)	Damaged									
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1906,761	180,206	28,601	31,106	-0,052	7,799	32,233	
FS correction								0,017		
VCG fluid								7,816		

Draft Amidships m	3,781
Displacement t	1907

Heel deg	2,0
Draft at FP m	3,876
Draft at AP m	3,685
Draft at LCF m	3,754
Trim (+ve by stern) m	-0,191
WL Length m	83,182
Beam max extents on WL m	26,339
Wetted Area m <sup>2</sup>	1593,297
Waterpl. Area m <sup>2</sup>	564,339
Prismatic coeff. (Cp)	0,614
Block coeff. (Cb)	0,485
Max Sect. area coeff. (Cm)	0,822
Waterpl. area coeff. (Cwp)	0,608
LCB from zero pt. (+ve fwd) m	31,113
LCF from zero pt. (+ve fwd) m	30,119
KB m	2,084
KG fluid m	7,816
BMt m	32,571
BML m	152,783
GMt corrected m	26,835
GML m	147,048
KMt m	34,635
KML m	154,772
Immersion (TPc) tonne/cm	5,784
MTc tonne.m	33,716
RM at 1deg = GMt.Disp.sin(1) tonne.m	893,017
Max deck inclination deg	2,0218
Trim angle (+ve by stern) deg	-0,1317

Key point	Type	Freeboard m
Margin Line (freeboard pos = 62,163 m)		-0,315
Deck Edge (freeboard pos = 62,163 m)		-0,239
Admisión 1	Downflooding point	11,218
Admisión 2	Downflooding point	11,209
Admisión 3	Downflooding point	8,745
Admisión 4	Downflooding point	8,733
Guardacalor	Downflooding point	17,329

## Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.:%: 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Plena carga llegada****Damage Case - DCase 6**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
Local LNG ER	Fully flooded	60		
Diesel ER	Fully flooded	95		
VOID 3I ER	Fully flooded	95		
LNG ER Fully flooded	95			

Local LNG ER Fully flooded 60

Diesel ER Fully flooded 95

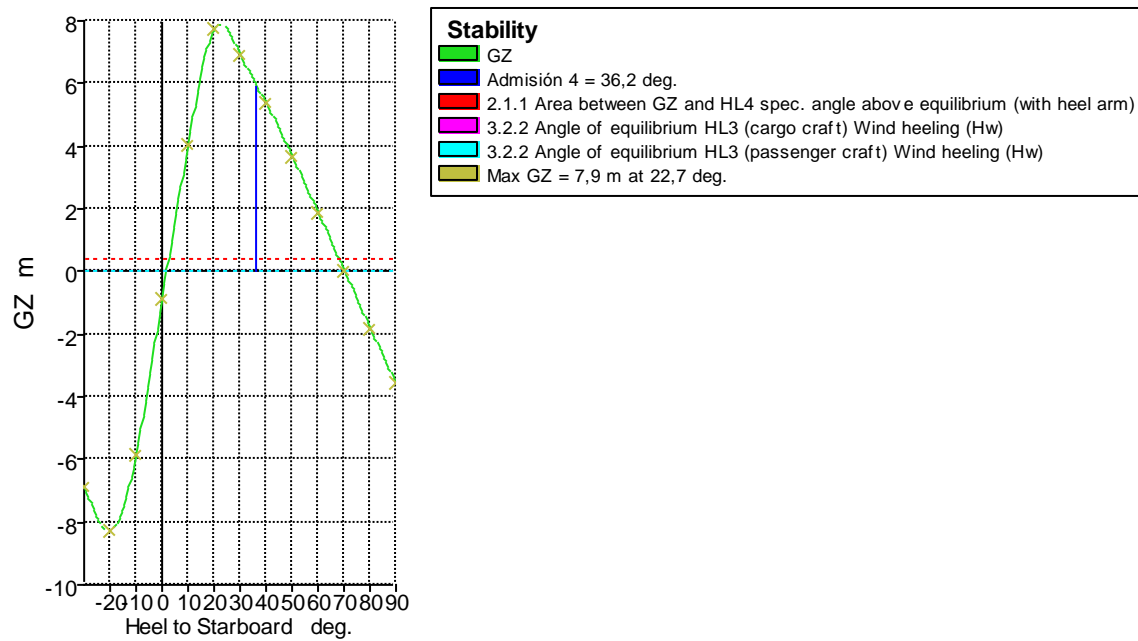
VOID 3I ER Fully flooded 95

LNG ER Fully flooded 95

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	90%	4,695	4,225	4,695	4,225	20,001	11,727	0,835	0,000	User Specified
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER	10%	4,805	0,481	4,805	0,481	20,017	9,476	0,253	0,000	User Specified
Aceite ER	10%	0,850	0,085	0,924	0,092	31,495	8,799	0,407	0,000	User Specified
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER	90%	1,765	1,588	1,918	1,726	31,499	11,744	0,826	0,000	User Specified
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER (Damaged)	Damaged									
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,213	IMO A.749(18)
LNG ER (Damaged)	Damaged									
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1906,761	180,206	28,601	31,106	-0,052	7,799	32,213	
FS correction								0,017		
VCG fluid								7,816		





Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-6,874	-8,263	-5,842	-0,851	4,037	7,754	6,931	5,375	3,669	1,871	0,031	-1,803	-3,582
Area under GZ curve from zero heel m.deg	185,7768	108,0253	34,2583	0,0000	16,2110	77,9821	154,0025	215,3843	260,7880	288,5203	298,0507	289,1586	262,2009
Displacement t	1907	1907	1907	1907	1907	1907	1907	1907	1907	1907	1907	1907	1907
Draft at FP m	0,221	2,326	3,455	3,856	4,499	5,747	7,085	7,250	7,439	7,594	7,549	6,518	n/a
Draft at AP m	0,565	2,752	3,541	3,569	3,483	2,531	-0,244	-3,288	-7,234	-13,026	-23,517	-53,006	n/a
WL Length m	76,790	76,747	83,090	83,187	83,169	83,183	86,304	88,886	90,693	91,983	92,858	92,938	92,574
Beam max extents on WL m	13,248	13,395	26,450	26,334	26,472	24,960	21,361	14,119	13,567	12,486	10,897	10,570	10,584
Wetted Area m^2	1188,774	1186,736	1489,172	1570,471	1639,965	1576,822	1763,550	1906,524	2032,504	2135,096	2214,604	2271,880	2312,305
Waterpl. Area m^2	339,411	341,982	583,318	595,474	582,885	332,675	244,915	212,507	197,002	191,171	190,041	191,262	197,876
Prismatic coeff. (Cp)	0,731	0,733	0,653	0,632	0,611	0,602	0,512	0,445	0,404	0,376	0,356	0,343	0,332
Block coeff. (Cb)	0,622	0,647	0,380	0,542	0,347	0,315	0,181	0,211	0,209	0,164	0,158	0,173	0,195
LCB from zero pt. (+ve fwd) m	31,074	31,067	31,097	31,121	31,175	31,361	31,754	32,029	32,263	32,427	32,495	32,440	32,275
LCF from zero pt. (+ve fwd) m	31,701	30,927	30,245	30,600	30,041	31,614	34,398	31,331	28,985	26,842	25,258	23,965	22,732

Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
Max deck inclination deg	30,0006	20,0018	10,0002	0,1975	10,0235	20,1036	30,2865	40,3184	50,3056	60,2510	70,1681	80,0771	90,0000
Trim angle (+ve by stern) deg	0,2375	0,2937	0,0598	-0,1975	-0,7000	-2,2145	-5,0362	-7,2220	-10,0062	-13,9256	-20,4844	-35,5941	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 83,16 m)		0,3	n/a
Deck Edge (immersion pos = 83,16 m)		0,6	n/a
Admisión 1	Downflooding point	63,8	0
Admisión 2	Downflooding point	61,1	0
Admisión 3	Downflooding point	39,1	0
Admisión 4	Downflooding point	36,2	0
Guardacalor	Downflooding point	74	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	53,5601	Pass	+3239,16
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	7,900	Pass	+15700,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	34,5	Pass	+392,93
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	1,7	Pass	+91,46
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	
	Wind heeling (Hw)	15,0	deg	1,7	Pass	+88,65
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	7,900	Pass	+15700,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	194,4475	Pass	+22536,50
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	34,5	Pass	+130,03
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	34,5	Pass	+392,93

Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Plena carga llegada****Damage Case - DCase 6**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
Local LNG ER	Fully flooded	60		
Diesel ER	Fully flooded	95		
VOID 3I ER	Fully flooded	95		
LNG ER Fully flooded		95		

Local LNG ER Fully flooded 60

Diesel ER Fully flooded 95

VOID 3I ER Fully flooded 95

LNG ER Fully flooded 95

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	90%	4,695	4,225	4,695	4,225	20,001	11,727	0,835	0,000	User Specified
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER	10%	4,805	0,481	4,805	0,481	20,017	9,476	0,253	0,000	User Specified
Aceite ER	10%	0,850	0,085	0,924	0,092	31,495	8,799	0,407	0,000	User Specified
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER	90%	1,765	1,588	1,918	1,726	31,499	11,744	0,826	0,000	User Specified
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER (Damaged)	Damaged									
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,227	IMO A.749(18)
LNG ER (Damaged)	Damaged									
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1906,761	180,206	28,601	31,106	-0,052	7,799	32,227	
FS correction								0,017		
VCG fluid								7,816		

Draft Amidships m	3,753
Displacement t	1907
Heel deg	1,7

Draft at FP m	3,942
Draft at AP m	3,564
Draft at LCF m	3,702
Trim (+ve by stern) m	-0,379
WL Length m	83,185
Beam max extents on WL m	26,342
Wetted Area m <sup>2</sup>	1584,090
Waterpl. Area m <sup>2</sup>	589,132
Prismatic coeff. (Cp)	0,628
Block coeff. (Cb)	0,496
Max Sect. area coeff. (Cm)	0,831
Waterpl. area coeff. (Cwp)	0,635
LCB from zero pt. (+ve fwd) m	31,129
LCF from zero pt. (+ve fwd) m	30,331
KB m	2,075
KG fluid m	7,816
BMt m	34,396
BML m	152,359
GMt corrected m	28,653
GML m	146,616
KMt m	36,456
KML m	154,366
Immersion (TPc) tonne/cm	6,039
MTc tonne.m	33,617
RM at 1deg = GMt.Disp.sin(1) tonne.m	953,490
Max deck inclination deg	1,7054
Trim angle (+ve by stern) deg	-0,2611

Key point	Type	Freeboard m
Margin Line (freeboard pos = 83,16 m)		-0,316
Deck Edge (freeboard pos = 83,16 m)		-0,24
Admisión 1	Downflooding point	11,366
Admisión 2	Downflooding point	11,347
Admisión 3	Downflooding point	8,789
Admisión 4	Downflooding point	8,764
Guardacalor	Downflooding point	17,471

## Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Plena carga llegada****Damage Case - DCase 7**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
Local LNG ER	Fully flooded	60		
VOID 3I ER	Fully flooded	95		
VOID 4I ER	Fully flooded	95		
LNG ER Fully flooded		95		

Local LNG ER Fully flooded 95

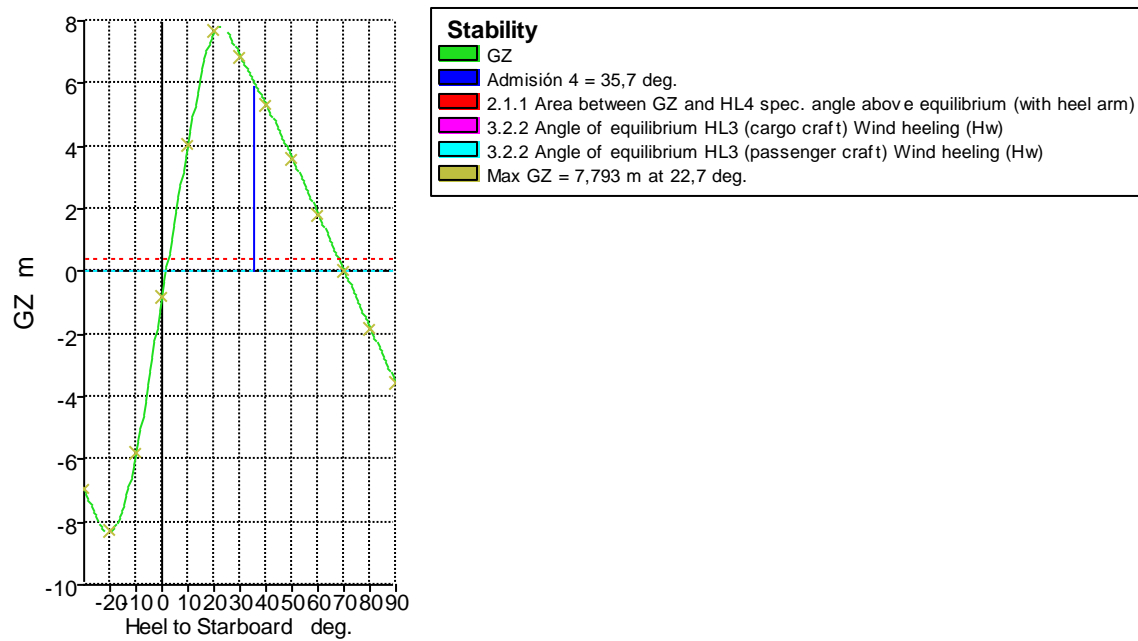
VOID 3I ER Fully flooded 95

VOID 4I ER Fully flooded 95

LNG ER Fully flooded 95

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	90%	4,695	4,225	4,695	4,225	20,001	11,727	0,835	0,000	User Specified
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER	10%	4,805	0,481	4,805	0,481	20,017	9,476	0,253	0,000	User Specified
Aceite ER	10%	0,850	0,085	0,924	0,092	31,495	8,799	0,407	0,000	User Specified
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER	90%	1,765	1,588	1,918	1,726	31,499	11,744	0,826	0,000	User Specified
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER	10%	56,972	5,697	67,823	6,782	39,923	10,373	0,298	32,213	IMO A.749(18)
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,213	IMO A.749(18)
LNG ER (Damaged)	Damaged									
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1912,459	248,030	35,383	31,132	-0,021	7,777	64,427	
FS correction								0,034		
VCG fluid								7,810		



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-6,905	-8,295	-5,806	-0,793	4,070	7,650	6,868	5,317	3,620	1,832	0,005	-1,816	-3,582
Area under GZ curve from zero heel m.deg	185,6261	107,5018	33,7463	0,0000	16,7725	78,1473	153,2452	214,0668	258,9137	286,2087	295,4181	286,3314	259,3075
Displacement t	1912	1912	1912	1912	1912	1912	1912	1913	1912	1912	1912	1912	1912
Draft at FP m	0,272	2,368	3,513	3,951	4,605	5,953	7,231	7,459	7,723	8,000	8,195	7,959	n/a
Draft at AP m	0,565	2,754	3,499	3,485	3,394	2,349	-0,432	-3,517	-7,509	-13,375	-24,017	-53,997	n/a
WL Length m	76,754	76,715	83,098	83,189	83,175	83,211	86,660	89,240	91,035	92,326	93,187	92,746	92,326
Beam max extents on WL m	13,250	13,397	26,444	26,331	26,462	25,000	21,810	14,150	13,545	12,440	10,959	10,609	10,611
Wetted Area m^2	1191,993	1189,739	1491,227	1572,347	1641,333	1585,216	1770,664	1912,634	2038,330	2141,498	2223,019	2282,255	2327,072
Waterpl. Area m^2	338,828	342,281	588,804	595,361	582,740	333,182	252,290	219,657	204,149	197,989	195,958	197,003	202,401
Prismatic coeff. (Cp)	0,732	0,734	0,659	0,642	0,618	0,609	0,514	0,445	0,404	0,376	0,356	0,344	0,333
Block coeff. (Cb)	0,623	0,648	0,382	0,543	0,346	0,309	0,178	0,206	0,206	0,161	0,154	0,170	0,190
LCB from zero pt. (+ve fwd) m	31,112	31,097	31,130	31,159	31,216	31,418	31,807	32,094	32,330	32,497	32,565	32,515	32,358
LCF from zero pt. (+ve fwd) m	31,727	30,938	29,964	30,613	30,100	31,548	34,221	30,954	28,571	26,671	25,387	24,426	23,387

Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
Max deck inclination deg	30,0005	20,0015	10,0000	0,3213	10,0334	20,1299	30,3130	40,3451	50,3290	60,2695	70,1805	80,0835	90,0000
Trim angle (+ve by stern) deg	0,2015	0,2666	-0,0097	-0,3213	-0,8343	-2,4813	-5,2644	-7,5185	-10,3797	-14,4151	-21,1742	-36,6870	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 83,16 m)		0	n/a
Deck Edge (immersion pos = 83,16 m)		0,2	n/a
Admisión 1	Downflooding point	64,2	0
Admisión 2	Downflooding point	61,4	0
Admisión 3	Downflooding point	38,7	0
Admisión 4	Downflooding point	35,7	0
Guardacalor	Downflooding point	74,2	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	52,9840	Pass	+3203,24
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	7,793	Pass	+15486,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	34,2	Pass	+388,09
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	1,6	Pass	+92,06
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	
	Wind heeling (Hw)	15,0	deg	1,6	Pass	+89,45
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	7,793	Pass	+15486,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	190,5269	Pass	+22080,08
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	34,2	Pass	+127,77
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	34,2	Pass	+388,09

Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.‰: 0,01000(0,100); Trim‰(LCG-TCG): 0,01000(0,100); Heel‰(LCG-TCG): 0,01000(0,100)

**Loadcase - Plena carga llegada****Damage Case - DCase 7**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.‰	PartFlood.‰	PartFlood.WL
Local LNG ER	Fully flooded	60		
VOID 3I ER	Fully flooded	95		
VOID 4I ER	Fully flooded	95		
LNG ER Fully flooded		95		

Local LNG ER Fully flooded 60

VOID 3I ER Fully flooded 95

VOID 4I ER Fully flooded 95

LNG ER Fully flooded 95

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	90%	4,695	4,225	4,695	4,225	20,001	11,727	0,835	0,000	User Specified
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER	10%	4,805	0,481	4,805	0,481	20,017	9,476	0,253	0,000	User Specified
Aceite ER	10%	0,850	0,085	0,924	0,092	31,495	8,799	0,407	0,000	User Specified
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER	90%	1,765	1,588	1,918	1,726	31,499	11,744	0,826	0,000	User Specified
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER	10%	56,972	5,697	67,823	6,782	39,923	10,373	0,298	32,226	IMO A.749(18)
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,226	IMO A.749(18)
LNG ER (Damaged)	Damaged									
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1912,459	248,030	35,383	31,132	-0,021	7,777	64,452	
FS correction								0,034		
VCG fluid								7,810		

Draft Amidships m	3,757
Displacement t	1912
Heel deg	1,6



Draft at FP m	4,034
Draft at AP m	3,479
Draft at LCF m	3,681
Trim (+ve by stern) m	-0,555
WL Length m	83,187
Beam max extents on WL m	26,339
Wetted Area m <sup>2</sup>	1585,023
Waterpl. Area m <sup>2</sup>	588,973
Prismatic coeff. (Cp)	0,638
Block coeff. (Cb)	0,498
Max Sect. area coeff. (Cm)	0,833
Waterpl. area coeff. (Cwp)	0,635
LCB from zero pt. (+ve fwd) m	31,165
LCF from zero pt. (+ve fwd) m	30,320
KB m	2,060
KG fluid m	7,810
BMt m	34,277
BML m	151,660
GMt corrected m	28,525
GML m	145,908
KMt m	36,323
KML m	153,659
Immersion (TPc) tonne/cm	6,037
MTc tonne.m	33,552
RM at 1deg = GMt.Disp.sin(1) tonne.m	951,973
Max deck inclination deg	1,6357
Trim angle (+ve by stern) deg	-0,3825

Key point	Type	Freeboard m
Margin Line (freeboard pos = 83,16 m)		-0,39
Deck Edge (freeboard pos = 83,16 m)		-0,314
Admisión 1	Downflooding point	11,426
Admisión 2	Downflooding point	11,399
Admisión 3	Downflooding point	8,761
Admisión 4	Downflooding point	8,723
Guardacalor	Downflooding point	17,527

## Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.‰: 0,01000(0,100); Trim‰(LCG-TCG): 0,01000(0,100); Heel‰(LCG-TCG): 0,01000(0,100)

**Loadcase - Plena carga llegada****Damage Case - DCase 8**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.‰	PartFlood.‰	PartFlood.WL
Local LNG ER	Fully flooded	60		
VOID 4I ER	Fully flooded	95		
VOID 5S ER	Fully flooded	95		
VOID 5I ER	Fully flooded	95		
LNG ER Fully flooded		95		

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	90%	4,695	4,225	4,695	4,225	20,001	11,727	0,835	0,000	User Specified
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER	10%	4,805	0,481	4,805	0,481	20,017	9,476	0,253	0,000	User Specified
Aceite ER	10%	0,850	0,085	0,924	0,092	31,495	8,799	0,407	0,000	User Specified
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER	90%	1,765	1,588	1,918	1,726	31,499	11,744	0,826	0,000	User Specified
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER	10%	56,972	5,697	67,823	6,782	39,923	10,373	0,298	32,213	IMO A.749(18)
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,213	IMO A.749(18)
LNG ER (Damaged)	Damaged									
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1912,459	248,030	35,383	31,132	-0,021	7,777	64,427	
FS correction								0,034		
VCG fluid								7,810		



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-6,905	-8,295	-5,747	-0,787	3,766	6,946	6,511	5,051	3,400	1,673	-0,086	-1,837	-3,535
Area under GZ curve from zero heel m.deg	184,8963	106,7215	33,2652	0,0000	15,5570	71,4779	141,0031	198,9752	241,3458	266,7477	274,7002	265,0552	238,1668
Displacement t	1912	1912	1912	1912	1912	1912	1912	1912	1912	1913	1912	1912	1912
Draft at FP m	0,265	2,368	3,516	4,089	5,136	6,904	8,359	9,404	10,532	12,123	14,753	21,633	n/a
Draft at AP m	0,569	2,754	3,471	3,397	3,207	2,021	-0,683	-3,938	-8,086	-14,184	-25,271	-56,598	n/a
WL Length m	76,759	76,715	83,099	82,391	83,201	83,302	89,030	92,039	92,854	91,941	91,194	90,535	90,045
Beam max extents on WL m	13,252	13,397	26,439	26,329	26,452	25,440	22,098	14,169	13,582	12,464	10,996	10,665	10,637
Wetted Area m^2	1191,858	1189,739	1487,027	1580,624	1691,286	1847,389	1958,463	2105,044	2238,852	2345,776	2431,109	2494,598	2547,696
Waterpl. Area m^2	338,691	342,281	594,721	576,573	568,394	442,797	272,141	220,286	206,399	198,478	193,563	193,316	196,967
Prismatic coeff. (Cp)	0,732	0,734	0,663	0,654	0,612	0,580	0,470	0,398	0,365	0,350	0,339	0,330	0,322
Block coeff. (Cb)	0,623	0,648	0,384	0,542	0,327	0,171	0,150	0,178	0,177	0,139	0,133	0,144	0,157
LCB from zero pt. (+ve fwd) m	31,104	31,097	31,131	31,175	31,267	31,523	31,905	32,257	32,552	32,761	32,846	32,812	32,644
LCF from zero pt. (+ve fwd) m	31,733	30,938	29,819	29,721	29,466	40,060	35,874	29,653	27,479	26,049	25,466	25,312	25,424

Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
Max deck inclination deg	30,0005	20,0015	10,0000	0,4765	10,0844	20,2378	30,4342	40,5073	50,4885	60,4054	70,2767	80,1321	90,0000
Trim angle (+ve by stern) deg	0,2098	0,2666	-0,0311	-0,4765	-1,3290	-3,3610	-6,2051	-9,1146	-12,6195	-17,5542	-25,7012	-43,2508	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 83,16 m)		0	n/a
Deck Edge (immersion pos = 83,16 m)		0	n/a
Admisión 1	Downflooding point	63	0
Admisión 2	Downflooding point	59,6	0
Admisión 3	Downflooding point	34,1	0
Admisión 4	Downflooding point	31,4	0
Guardacalor	Downflooding point	73,2	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	48,6398	Pass	+2932,41
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	7,135	Pass	+14170,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	29,8	Pass	+326,14
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	1,6	Pass	+91,83
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	
	Wind heeling (Hw)	15,0	deg	1,6	Pass	+89,14
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	7,135	Pass	+14170,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	150,7998	Pass	+17455,27
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	29,8	Pass	+98,87
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	29,8	Pass	+326,14

Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.‰: 0,01000(0,100); Trim‰(LCG-TCG): 0,01000(0,100); Heel‰(LCG-TCG): 0,01000(0,100)

**Loadcase - Plena carga llegada****Damage Case - DCase 8**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.‰	PartFlood.‰	PartFlood.WL
Local LNG ER	Fully flooded	60		
VOID 4I ER	Fully flooded	95		
VOID 5S ER	Fully flooded	95		
VOID 5I ER	Fully flooded	95		
LNG ER Fully flooded		95		

Local LNG ER Fully flooded 60

VOID 4I ER Fully flooded 95

VOID 5S ER Fully flooded 95

VOID 5I ER Fully flooded 95

LNG ER Fully flooded 95

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	90%	4,695	4,225	4,695	4,225	20,001	11,727	0,835	0,000	User Specified
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER	10%	4,805	0,481	4,805	0,481	20,017	9,476	0,253	0,000	User Specified
Aceite ER	10%	0,850	0,085	0,924	0,092	31,495	8,799	0,407	0,000	User Specified
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER	90%	1,765	1,588	1,918	1,726	31,499	11,744	0,826	0,000	User Specified
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER	10%	56,972	5,697	67,823	6,782	39,923	10,373	0,298	32,227	IMO A.749(18)
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,227	IMO A.749(18)
LNG ER (Damaged)	Damaged									
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1912,459	248,030	35,383	31,132	-0,021	7,777	64,455	
FS correction								0,034		
VCG fluid								7,810		

Draft Amidships m	3,808
Displacement t	1912

Heel deg	1,7
Draft at FP m	4,242
Draft at AP m	3,375
Draft at LCF m	3,681
Trim (+ve by stern) m	-0,868
WL Length m	83,193
Beam max extents on WL m	26,337
Wetted Area m <sup>2</sup>	1601,509
Waterpl. Area m <sup>2</sup>	569,538
Prismatic coeff. (Cp)	0,642
Block coeff. (Cb)	0,486
Max Sect. area coeff. (Cm)	0,828
Waterpl. area coeff. (Cwp)	0,614
LCB from zero pt. (+ve fwd) m	31,190
LCF from zero pt. (+ve fwd) m	29,370
KB m	2,045
KG fluid m	7,810
BMt m	32,855
BML m	145,464
GMt corrected m	27,086
GML m	139,695
KMt m	34,883
KML m	147,438
Immersion (TPc) tonne/cm	5,838
MTc tonne.m	32,126
RM at 1 deg = GMt.Disp.sin(1) tonne.m	904,053
Max deck inclination deg	1,7867
Trim angle (+ve by stern) deg	-0,5978

Key point	Type	Freeboard m
Margin Line (freeboard pos = 83,16 m)		-0,615
Deck Edge (freeboard pos = 83,16 m)		-0,539
Admisión 1	Downflooding point	11,429
Admisión 2	Downflooding point	11,387
Admisión 3	Downflooding point	8,617
Admisión 4	Downflooding point	8,557
Guardacalor	Downflooding point	17,524

## Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Plena carga llegada****Damage Case - DCase 9**

Free to Trim

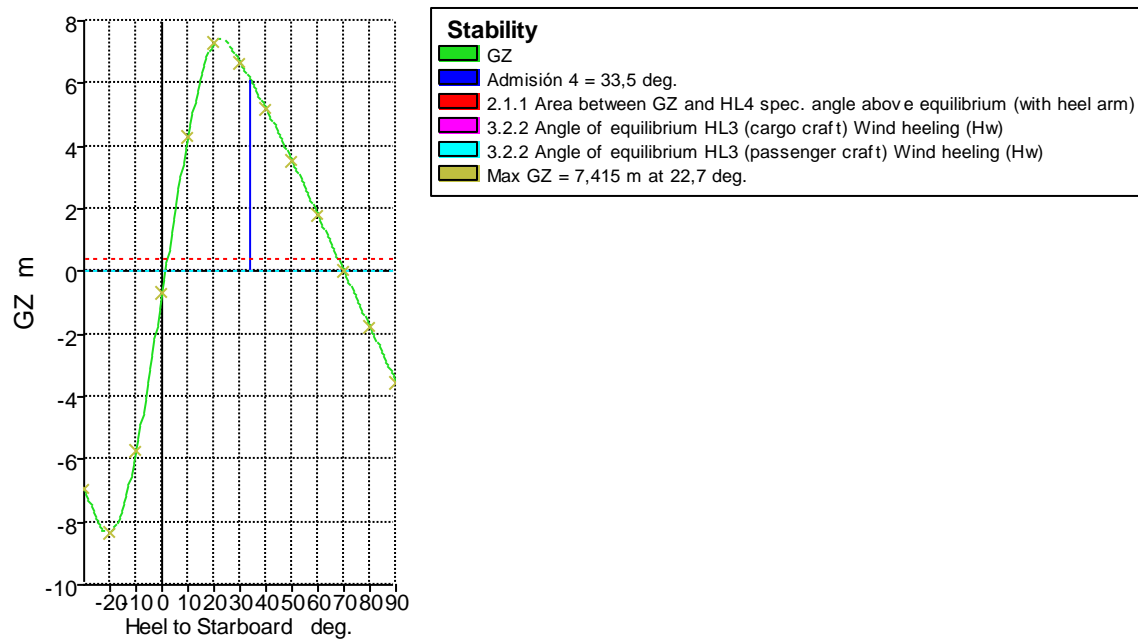
Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
VOID 5S ER	Fully flooded	95		
VOID 5I ER	Fully flooded	95		
VOID 6S ER	Fully flooded	95		
Prop. Proa ER	Fully flooded	85		

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	90%	4,695	4,225	4,695	4,225	20,001	11,727	0,835	0,000	User Specified
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER	10%	4,805	0,481	4,805	0,481	20,017	9,476	0,253	0,000	User Specified
Aceite ER	10%	0,850	0,085	0,924	0,092	31,495	8,799	0,407	0,000	User Specified
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER	90%	1,765	1,588	1,918	1,726	31,499	11,744	0,826	0,000	User Specified
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER	10%	56,972	5,697	67,823	6,782	39,923	10,373	0,298	32,213	IMO A.749(18)
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,213	IMO A.749(18)
LNG ER	10%	39,465	3,946	87,699	8,770	46,000	10,000	3,760	0,000	User Specified
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1916,405	335,729	44,153	31,163	0,000	7,769	64,427	
FS correction								0,034		
VCG fluid								7,802		



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-6,929	-8,319	-5,736	-0,696	4,307	7,299	6,677	5,182	3,525	1,780	-0,007	-1,792	-3,526
Area under GZ curve from zero heel m.deg	184,9920	106,5403	33,0606	0,0000	18,8527	79,6550	151,6042	210,9985	254,6577	281,2294	290,1133	281,0854	254,4638
Displacement t	1916	1916	1916	1916	1916	1916	1916	1916	1916	1916	1916	1916	1916
Draft at FP m	0,309	2,408	3,582	4,238	5,113	6,913	8,030	8,594	9,199	10,060	11,428	14,688	n/a
Draft at AP m	0,563	2,749	3,432	3,266	2,959	1,304	-1,589	-4,891	-9,133	-15,450	-27,064	-59,967	n/a
WL Length m	76,727	76,685	83,107	81,369	83,206	83,343	88,563	91,137	92,846	93,002	92,355	91,778	91,262
Beam max extents on WL m	13,251	13,398	26,433	26,324	26,404	25,066	22,021	14,046	13,522	12,379	11,164	10,799	10,748
Wetted Area m^2	1194,217	1192,043	1490,993	1583,794	1645,956	1719,646	1800,544	1928,941	2050,171	2153,019	2239,168	2305,655	2356,675
Waterpl. Area m^2	338,453	342,507	596,237	606,596	596,684	436,801	293,980	252,510	238,068	229,188	222,518	220,882	225,292
Prismatic coeff. (Cp)	0,733	0,735	0,668	0,675	0,645	0,633	0,518	0,440	0,397	0,374	0,359	0,348	0,338
Block coeff. (Cb)	0,624	0,649	0,385	0,543	0,334	0,179	0,161	0,187	0,188	0,148	0,140	0,154	0,170
LCB from zero pt. (+ve fwd) m	31,141	31,131	31,171	31,224	31,310	31,620	32,005	32,335	32,591	32,781	32,857	32,802	32,648
LCF from zero pt. (+ve fwd) m	31,742	30,950	29,478	29,669	29,714	39,273	33,743	28,922	26,598	25,352	24,980	24,943	24,891



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
Max deck inclination deg	30,0003	20,0012	10,0005	0,6697	10,1051	20,3129	30,4906	40,5180	50,4739	60,3817	70,2563	80,1205	90,0000
Trim angle (+ve by stern) deg	0,1748	0,2350	-0,1034	-0,6697	-1,4839	-3,8588	-6,5981	-9,2110	-12,4322	-17,0541	-24,8381	-41,9150	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 83,16 m)		0	n/a
Deck Edge (immersion pos = 83,16 m)		0	n/a
Admisión 1	Downflooding point	66,8	0
Admisión 2	Downflooding point	63,5	0
Admisión 3	Downflooding point	36,8	0
Admisión 4	Downflooding point	33,5	0
Guardacalor	Downflooding point	75,7	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	53,0593	Pass	+3207,94
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	7,415	Pass	+14730,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	32,2	Pass	+360,11
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	1,3	Pass	+93,32
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	
	Wind heeling (Hw)	15,0	deg	1,3	Pass	+91,13
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	7,415	Pass	+14730,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	174,6084	Pass	+20226,94
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	32,2	Pass	+114,72
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	32,2	Pass	+360,11

Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Plena carga llegada****Damage Case - DCase 9**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
VOID 5S ER	Fully flooded	95		
VOID 5I ER	Fully flooded	95		
VOID 6S ER	Fully flooded	95		
Prop. Proa ER	Fully flooded	85		

VOID 5S ER Fully flooded 95

VOID 5I ER Fully flooded 95

VOID 6S ER Fully flooded 95

Prop. Proa ER Fully flooded 85

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	90%	4,695	4,225	4,695	4,225	20,001	11,727	0,835	0,000	User Specified
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER	10%	4,805	0,481	4,805	0,481	20,017	9,476	0,253	0,000	User Specified
Aceite ER	10%	0,850	0,085	0,924	0,092	31,495	8,799	0,407	0,000	User Specified
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER	90%	1,765	1,588	1,918	1,726	31,499	11,744	0,826	0,000	User Specified
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER	10%	56,972	5,697	67,823	6,782	39,923	10,373	0,298	32,223	IMO A.749(18)
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,223	IMO A.749(18)
LNG ER	10%	39,465	3,946	87,699	8,770	46,000	10,000	3,760	0,000	User Specified
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1916,405	335,729	44,153	31,163	0,000	7,769	64,445	
FS correction								0,034		
VCG fluid								7,802		

Draft Amidships m	3,789
Displacement t	1916
Heel deg	1,4

Draft at FP m	4,348
Draft at AP m	3,231
Draft at LCF m	3,629
Trim (+ve by stern) m	-1,117
WL Length m	82,325
Beam max extents on WL m	26,329
Wetted Area m <sup>2</sup>	1594,951
Waterpl. Area m <sup>2</sup>	605,684
Prismatic coeff. (Cp)	0,666
Block coeff. (Cb)	0,496
Max Sect. area coeff. (Cm)	0,837
Waterpl. area coeff. (Cwp)	0,661
LCB from zero pt. (+ve fwd) m	31,239
LCF from zero pt. (+ve fwd) m	29,613
KB m	2,036
KG fluid m	7,802
BMt m	35,311
BML m	121,915
GMt corrected m	29,543
GML m	116,147
KMt m	37,334
KML m	123,905
Immersion (TPc) tonne/cm	6,208
MTc tonne.m	26,766
RM at 1deg = GMt.Disp.sin(1) tonne.m	988,085
Max deck inclination deg	1,5735
Trim angle (+ve by stern) deg	-0,7697

Key point	Type	Freeboard m
Margin Line (freeboard pos = 83,16 m)		-0,665
Deck Edge (freeboard pos = 83,16 m)		-0,589
Admisión 1	Downflooding point	11,578
Admisión 2	Downflooding point	11,523
Admisión 3	Downflooding point	8,633
Admisión 4	Downflooding point	8,556
Guardacalor	Downflooding point	17,666

## Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Plena carga llegada****Damage Case - DCase 10**

Free to Trim

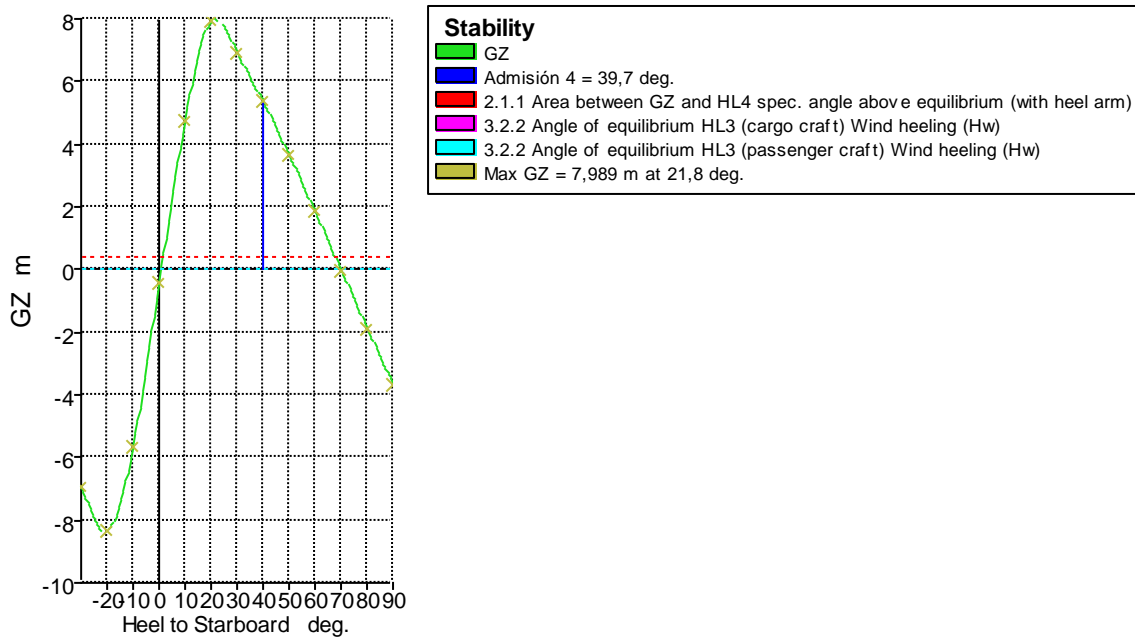
Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
VOID 6S ER	Fully flooded	95		
Prop. Proa ER	Fully flooded	85		
VOID 7S ER	Fully flooded	95		
VOID 7I ER	Fully flooded	95		

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	90%	4,695	4,225	4,695	4,225	20,001	11,727	0,835	0,000	User Specified
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER	10%	4,805	0,481	4,805	0,481	20,017	9,476	0,253	0,000	User Specified
Aceite ER	10%	0,850	0,085	0,924	0,092	31,495	8,799	0,407	0,000	User Specified
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER	90%	1,765	1,588	1,918	1,726	31,499	11,744	0,826	0,000	User Specified
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER	10%	56,972	5,697	67,823	6,782	39,923	10,373	0,298	32,213	IMO A.749(18)
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,213	IMO A.749(18)
LNG ER	10%	39,465	3,946	87,699	8,770	46,000	10,000	3,760	0,000	User Specified
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1916,405	335,729	44,153	31,163	0,000	7,769	64,427	
FS correction								0,034		
VCG fluid								7,802		



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-6,929	-8,319	-5,639	-0,447	4,758	7,920	6,924	5,360	3,649	1,844	-0,011	-1,868	-3,670
Area under GZ curve from zero heel m.deg	182,9308	104,4238	31,3542	0,0000	22,2598	88,7674	165,1736	226,4459	271,6686	299,1713	308,3632	298,9333	271,2095
Displacement t	1916	1916	1916	1916	1916	1916	1916	1916	1916	1916	1916	1916	1916
Draft at FP m	0,309	2,408	3,464	3,982	4,577	5,935	6,783	6,511	6,070	5,226	3,081	-4,678	n/a
Draft at AP m	0,563	2,749	3,459	3,312	3,075	1,478	-1,503	-4,665	-8,760	-14,822	-25,850	-56,822	n/a
WL Length m	76,728	76,685	83,091	83,191	83,179	83,247	85,768	87,939	89,394	90,379	90,877	90,862	90,296
Beam max extents on WL m	13,251	13,398	26,434	26,324	26,403	24,413	13,480	13,875	13,425	12,485	11,126	10,782	10,754
Wetted Area m^2	1194,216	1192,043	1477,016	1548,612	1583,673	1453,545	1585,937	1684,383	1788,482	1877,790	1944,876	1975,653	1974,023
Waterpl. Area m^2	338,452	342,507	606,374	620,014	610,249	354,051	272,114	241,641	231,364	226,084	222,704	226,777	242,163
Prismatic coeff. (Cp)	0,733	0,735	0,669	0,668	0,665	0,669	0,580	0,510	0,458	0,425	0,402	0,388	0,378
Block coeff. (Cb)	0,624	0,649	0,387	0,553	0,357	0,361	0,214	0,261	0,229	0,185	0,181	0,212	0,264
LCB from zero pt. (+ve fwd) m	31,141	31,131	31,157	31,207	31,270	31,537	31,906	32,163	32,364	32,490	32,490	32,362	32,111
LCF from zero pt. (+ve fwd) m	31,742	30,950	29,812	30,216	30,229	32,348	29,345	24,903	22,471	21,167	20,609	20,162	20,033

Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
Max deck inclination deg	30,0003	20,0012	10,0000	0,4611	10,0512	20,1983	30,3654	40,3577	50,3121	60,2374	70,1460	80,0594	90,0000
Trim angle (+ve by stern) deg	0,1748	0,2350	-0,0040	-0,4611	-1,0346	-3,0674	-5,6900	-7,6544	-10,1114	-13,5540	-19,1827	-32,0894	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 83,16 m)		0	n/a
Deck Edge (immersion pos = 83,16 m)		0,1	n/a
Admisión 1	Downflooding point	69	0
Admisión 2	Downflooding point	66,4	0
Admisión 3	Downflooding point	43,5	0
Admisión 4	Downflooding point	39,7	0
Guardacalor	Downflooding point	77,5	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	56,2675	Pass	+3407,95
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	7,989	Pass	+15878,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	38,9	Pass	+455,59
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	0,8	Pass	+95,79
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	
	Wind heeling (Hw)	15,0	deg	0,8	Pass	+94,42
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	7,989	Pass	+15878,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	225,0260	Pass	+26096,28
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	38,9	Pass	+159,27
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	38,9	Pass	+455,59

Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Plena carga llegada****Damage Case - DCase 10**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
VOID 6S ER	Fully flooded	95		
Prop. Proa ER	Fully flooded	85		
VOID 7S ER	Fully flooded	95		
VOID 7I ER	Fully flooded	95		

VOID 6S ER Fully flooded 95

Prop. Proa ER Fully flooded 85

VOID 7S ER Fully flooded 95

VOID 7I ER Fully flooded 95

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	90%	4,695	4,225	4,695	4,225	20,001	11,727	0,835	0,000	User Specified
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER	10%	4,805	0,481	4,805	0,481	20,017	9,476	0,253	0,000	User Specified
Aceite ER	10%	0,850	0,085	0,924	0,092	31,495	8,799	0,407	0,000	User Specified
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER	90%	1,765	1,588	1,918	1,726	31,499	11,744	0,826	0,000	User Specified
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER	10%	56,972	5,697	67,823	6,782	39,923	10,373	0,298	32,217	IMO A.749(18)
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,217	IMO A.749(18)
LNG ER	10%	39,465	3,946	87,699	8,770	46,000	10,000	3,760	0,000	User Specified
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1916,405	335,729	44,153	31,163	0,000	7,769	64,434	
FS correction								0,034		
VCG fluid								7,802		

Draft Amidships m	3,663
Displacement t	1916
Heel deg	0,8

Draft at FP m	4,030
Draft at AP m	3,295
Draft at LCF m	3,562
Trim (+ve by stern) m	-0,735
WL Length m	83,191
Beam max extents on WL m	26,326
Wetted Area m <sup>2</sup>	1553,997
Waterpl. Area m <sup>2</sup>	619,376
Prismatic coeff. (Cp)	0,668
Block coeff. (Cb)	0,528
Max Sect. area coeff. (Cm)	0,859
Waterpl. area coeff. (Cwp)	0,669
LCB from zero pt. (+ve fwd) m	31,214
LCF from zero pt. (+ve fwd) m	30,161
KB m	1,994
KG fluid m	7,802
BMt m	36,212
BML m	124,411
GMt corrected m	30,403
GML m	118,602
KMt m	38,201
KML m	126,387
Immersion (TPc) tonne/cm	6,349
MTc tonne.m	27,332
RM at 1deg = GMt.Disp.sin(1) tonne.m	1016,854
Max deck inclination deg	0,9844
Trim angle (+ve by stern) deg	-0,5066

Key point	Type	Freeboard m
Margin Line (freeboard pos = 83,16 m)		-0,252
Deck Edge (freeboard pos = 83,16 m)		-0,176
Admisión 1	Downflooding point	11,730
Admisión 2	Downflooding point	11,694
Admisión 3	Downflooding point	8,948
Admisión 4	Downflooding point	8,898
Guardacalor	Downflooding point	17,822



## Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Plena carga llegada****Damage Case - DCase 11**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

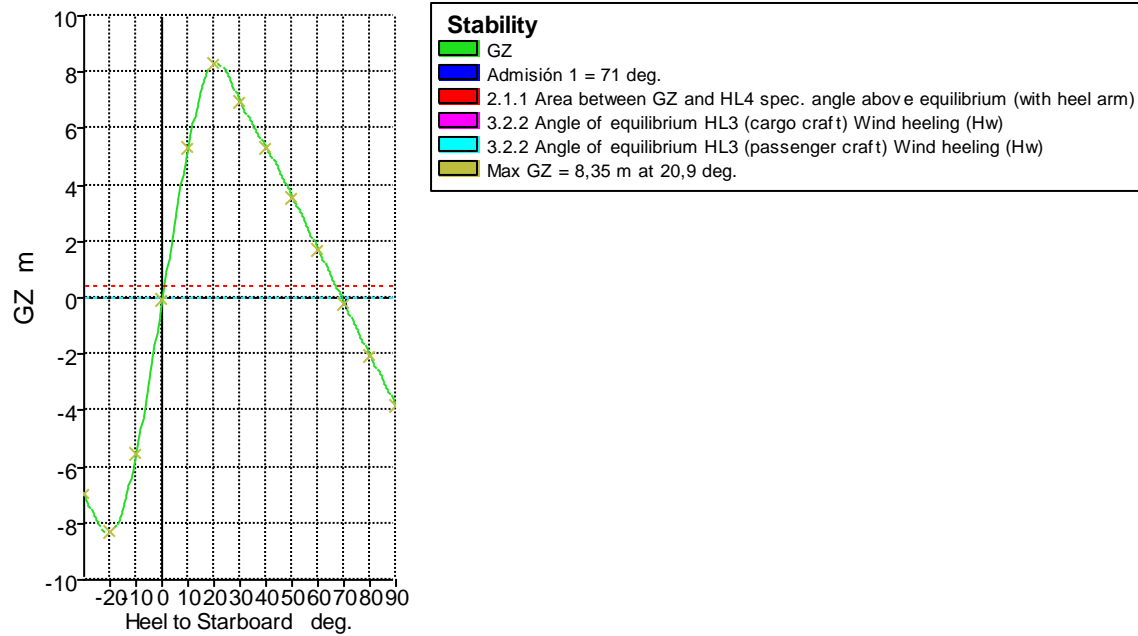
Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
VOID 7S ER	Fully flooded	95		
VOID 7I ER	Fully flooded	95		
Pique ER	Fully flooded	95		

VOID 7S ER	Fully flooded	95		
VOID 7I ER	Fully flooded	95		
Pique ER	Fully flooded	95		

VOID 7S ER	Fully flooded	95		
VOID 7I ER	Fully flooded	95		
Pique ER	Fully flooded	95		

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	90%	4,695	4,225	4,695	4,225	20,001	11,727	0,835	0,000	User Specified
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER	10%	4,805	0,481	4,805	0,481	20,017	9,476	0,253	0,000	User Specified
Aceite ER	10%	0,850	0,085	0,924	0,092	31,495	8,799	0,407	0,000	User Specified
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER	90%	1,765	1,588	1,918	1,726	31,499	11,744	0,826	0,000	User Specified
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER	10%	56,972	5,697	67,823	6,782	39,923	10,373	0,298	32,213	IMO A.749(18)
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,213	IMO A.749(18)
LNG ER	10%	39,465	3,946	87,699	8,770	46,000	10,000	3,760	0,000	User Specified
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1916,405	335,729	44,153	31,163	0,000	7,769	64,427	
FS correction								0,034		
VCG fluid								7,802		



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-6,929	-8,319	-5,528	-0,105	5,343	8,329	6,951	5,350	3,581	1,708	-0,200	-2,063	-3,812
Area under GZ curve from zero heel m.deg	180,3686	101,8048	29,1866	0,0000	27,0874	98,9454	177,4003	238,5712	283,4701	309,9394	317,4882	306,0873	276,6455
Displacement t	1916	1916	1916	1916	1916	1916	1916	1916	1916	1916	1916	1916	1916
Draft at FP m	0,307	2,408	3,280	3,454	3,568	3,225	1,189	-1,332	-4,730	-9,967	-19,763	-47,600	n/a
Draft at AP m	0,563	2,749	3,519	3,484	3,409	2,424	0,205	-2,398	-5,744	-10,644	-19,529	-44,447	n/a
WL Length m	76,729	76,685	83,055	83,181	83,105	76,495	76,498	76,500	76,502	76,504	76,507	76,506	76,507
Beam max extents on WL m	13,251	13,398	26,439	26,327	26,428	13,350	13,173	12,898	12,713	12,334	10,617	10,508	10,770
Wetted Area m^2	1194,119	1192,043	1458,233	1489,257	1484,995	1220,461	1222,487	1234,048	1261,361	1310,265	1341,196	1357,185	1384,391
Waterpl. Area m^2	338,460	342,507	621,876	638,199	626,643	343,350	340,770	318,426	314,555	329,126	367,342	425,986	479,110
Prismatic coeff. (Cp)	0,733	0,735	0,668	0,668	0,672	0,747	0,747	0,735	0,707	0,655	0,605	0,560	0,519
Block coeff. (Cb)	0,623	0,649	0,388	0,581	0,386	0,646	0,625	0,580	0,516	0,467	0,481	0,488	0,496
LCB from zero pt. (+ve fwd) m	31,139	31,131	31,143	31,155	31,172	31,231	31,253	31,256	31,250	31,207	31,150	31,089	31,049
LCF from zero pt. (+ve fwd) m	31,742	30,950	30,685	31,229	31,038	30,977	30,975	31,308	31,274	31,177	31,106	31,731	33,474

Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
Max deck inclination deg	30,0004	20,0012	10,0013	0,0207	10,0006	20,0064	30,0052	40,0033	50,0015	60,0003	70,0000	80,0002	90,0000
Trim angle (+ve by stern) deg	0,1764	0,2350	0,1646	0,0207	-0,1098	-0,5518	-0,6780	-0,7344	-0,6987	-0,4664	0,1614	2,1714	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 62,163 m)		2,2	n/a
Deck Edge (immersion pos = 62,163 m)		2,6	n/a
Admisión 1	Downflooding point	71	0
Admisión 2	Downflooding point	71	0
Admisión 3	Downflooding point	81,5	0
Admisión 4	Downflooding point	82	0
Guardacalor	Downflooding point	79,3	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	59,4749	Pass	+3607,91
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	8,350	Pass	+16600,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	68,8	Pass	+882,43
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	0,2	Pass	+98,95
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	
	Wind heeling (Hw)	15,0	deg	0,2	Pass	+98,64
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	8,350	Pass	+16600,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	317,6027	Pass	+36873,54
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	68,8	Pass	+358,47
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	68,8	Pass	+882,43

Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Plena carga llegada****Damage Case - DCase 11**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
VOID 7S ER	Fully flooded	95		
VOID 7I ER	Fully flooded	95		
Pique ER	Fully flooded	95		

VOID 7S ER Fully flooded 95

VOID 7I ER Fully flooded 95

Pique ER Fully flooded 95

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	1	375,000	375,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	90%	4,695	4,225	4,695	4,225	20,001	11,727	0,835	0,000	User Specified
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER	10%	4,805	0,481	4,805	0,481	20,017	9,476	0,253	0,000	User Specified
Aceite ER	10%	0,850	0,085	0,924	0,092	31,495	8,799	0,407	0,000	User Specified
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER	90%	1,765	1,588	1,918	1,726	31,499	11,744	0,826	0,000	User Specified
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER	10%	56,972	5,697	67,823	6,782	39,923	10,373	0,298	32,214	IMO A.749(18)
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,214	IMO A.749(18)
LNG ER	10%	39,465	3,946	87,699	8,770	46,000	10,000	3,760	0,000	User Specified
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1916,405	335,729	44,153	31,163	0,000	7,769	64,427	
FS correction								0,034		
VCG fluid								7,802		

Draft Amidships m	3,470
Displacement t	1916
Heel deg	0,2
Draft at FP m	3,457

Draft at AP m	3,483
Draft at LCF m	3,473
Trim (+ve by stern) m	0,026
WL Length m	83,182
Beam max extents on WL m	26,327
Wetted Area m <sup>2</sup>	1489,565
Waterpl. Area m <sup>2</sup>	638,206
Prismatic coeff. (Cp)	0,668
Block coeff. (Cb)	0,575
Max Sect. area coeff. (Cm)	0,889
Waterpl. area coeff. (Cwp)	0,688
LCB from zero pt. (+ve fwd) m	31,156
LCF from zero pt. (+ve fwd) m	31,229
KB m	1,946
KG fluid m	7,802
BMt m	37,350
BML m	132,684
GMt corrected m	31,494
GML m	126,828
KMt m	39,296
KML m	134,630
Immersion (TPc) tonne/cm	6,542
MTc tonne.m	29,227
RM at 1deg = GMt.Disp.sin(1) tonne.m	1053,353
Max deck inclination deg	0,1926
Trim angle (+ve by stern) deg	0,0178

Key point	Type	Freeboard m
Margin Line (freeboard pos = 62,163 m)		0,422
Deck Edge (freeboard pos = 62,163 m)		0,498
Admisión 1	Downflooding point	11,882
Admisión 2	Downflooding point	11,883
Admisión 3	Downflooding point	9,442
Admisión 4	Downflooding point	9,444
Guardacalor	Downflooding point	17,984

## Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Vacío salida****Damage Case - DCase 1**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
C WJ ER	Fully flooded	85		

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	0%	4,695	0,000	4,695	0,000	20,989	10,802	0,073	0,000	User Specified
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER	97%	4,805	4,661	4,805	4,661	20,001	9,041	0,876	0,000	User Specified
Aceite ER	97%	0,850	0,825	0,924	0,896	31,497	8,575	0,966	0,000	User Specified
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER	0%	1,765	0,000	1,918	0,000	31,841	11,000	0,037	0,000	User Specified
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER	97%	56,972	55,262	67,823	65,789	39,949	10,370	1,604	32,213	IMO A.749(18)
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,213	IMO A.749(18)
LNG ER	97%	39,465	38,281	87,699	85,068	46,000	10,000	4,860	0,000	User Specified
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			1707,417	335,729	312,828	30,796	0,000	7,098	64,427	
FS correction								0,038		
VCG fluid								7,136		



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-7,147	-8,474	-6,464	-0,471	5,525	8,458	7,222	5,694	3,999	2,193	0,342	-1,469	-3,173
Area under GZ curve from zero heel m.deg	194,5887	114,9538	36,5922	0,0000	26,7419	100,2925	180,6079	244,9331	293,6223	324,6202	337,3118	331,6011	308,3295
Displacement t	1707	1707	1707	1707	1707	1707	1707	1707	1707	1707	1707	1707	1707
Draft at FP m	-0,701	1,443	2,646	2,495	2,087	-0,548	-3,120	-6,114	-10,098	-16,084	-27,169	-58,901	n/a
Draft at AP m	0,093	2,299	3,406	3,702	4,026	4,496	2,825	0,667	-2,185	-6,503	-14,449	-36,564	n/a
WL Length m	77,979	77,898	82,405	83,165	83,210	83,312	83,327	83,320	83,298	83,248	83,059	80,504	77,817
Beam max extents on WL m	13,013	13,246	26,382	26,329	26,484	24,601	14,250	14,324	13,517	12,283	10,734	10,802	11,027
Wetted Area m^2	1090,741	1090,482	1340,490	1365,993	1354,144	1149,684	1124,100	1140,701	1167,725	1195,430	1214,418	1225,358	1259,128
Waterpl. Area m^2	355,232	335,153	591,464	612,964	589,578	316,516	270,455	271,437	283,901	312,182	365,344	438,979	491,221
Prismatic coeff. (Cp)	0,709	0,709	0,646	0,598	0,558	0,499	0,478	0,453	0,430	0,413	0,399	0,394	0,385
Block coeff. (Cb)	0,598	0,630	0,370	0,537	0,330	0,293	0,380	0,354	0,335	0,318	0,309	0,325	0,352
LCB from zero pt. (+ve fwd) m	30,722	30,727	30,742	30,717	30,662	30,396	30,268	30,202	30,161	30,168	30,216	30,273	30,341
LCF from zero pt. (+ve fwd) m	30,692	30,875	32,147	32,755	31,706	33,569	38,564	39,892	41,008	41,895	42,537	42,106	40,549

Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
Max deck inclination deg	30,0034	20,0074	10,0131	0,8312	10,0852	20,2536	30,1891	40,1326	50,0896	60,0547	70,0285	80,0110	90,0000
Trim angle (+ve by stern) deg	0,5472	0,5902	0,5234	0,8312	1,3354	3,4711	4,0894	4,6617	5,4355	6,5723	8,6964	15,0348	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 62,163 m)		6,2	n/a
Deck Edge (immersion pos = 62,163 m)		6,6	n/a
Admisión 1	Downflooding point	67,5	0
Admisión 2	Downflooding point	68,7	0
Admisión 3	Downflooding point	88	0
Admisión 4	Downflooding point	89,6	0
Guardacalor	Downflooding point	77,7	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	63,6769	Pass	+3869,88
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	8,480	Pass	+16860,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	66,8	Pass	+854,31
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	0,7	Pass	+96,31
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	
	Wind heeling (Hw)	15,0	deg	0,7	Pass	+95,12
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	8,480	Pass	+16860,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	336,0515	Pass	+39021,25
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	66,8	Pass	+345,35
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	66,8	Pass	+854,31

Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63



Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.‰: 0,01000(0,100); Trim‰(LCG-TCG): 0,01000(0,100); Heel‰(LCG-TCG): 0,01000(0,100)

**Loadcase - Vacío salida****Damage Case - DCase 1**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank    Status    Perm.‰ PartFlood.‰    PartFlood.WL

C WJ ER    Fully flooded    85

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	0%	4,695	0,000	4,695	0,000	20,989	10,802	0,073	0,000	User Specified
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER	97%	4,805	4,661	4,805	4,661	20,001	9,041	0,876	0,000	User Specified
Aceite ER	97%	0,850	0,825	0,924	0,896	31,497	8,575	0,966	0,000	User Specified
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER	0%	1,765	0,000	1,918	0,000	31,841	11,000	0,037	0,000	User Specified
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER	97%	56,972	55,262	67,823	65,789	39,949	10,370	1,604	32,216	IMO A.749(18)
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,216	IMO A.749(18)
LNG ER	97%	39,465	38,281	87,699	85,068	46,000	10,000	4,860	0,000	User Specified
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			1707,417	335,729	312,828	30,796	0,000	7,098	64,433	
FS correction								0,038		
VCG fluid								7,136		

Draft Amidships m	3,100
Displacement t	1707
Heel deg	0,8
Draft at FP m	2,475
Draft at AP m	3,725
Draft at LCF m	3,233

Trim (+ve by stern) m	1,251
WL Length m	83,170
Beam max extents on WL m	26,332
Wetted Area m <sup>2</sup>	1366,369
Waterpl. Area m <sup>2</sup>	612,924
Prismatic coeff. (Cp)	0,595
Block coeff. (Cb)	0,513
Max Sect. area coeff. (Cm)	0,865
Waterpl. area coeff. (Cwp)	0,661
LCB from zero pt. (+ve fwd) m	30,712
LCF from zero pt. (+ve fwd) m	32,750
KB m	1,831
KG fluid m	7,136
BMt m	40,185
BML m	138,937
GMt corrected m	34,879
GML m	133,630
KMt m	42,008
KML m	140,739
Immersion (TPc) tonne/cm	6,282
MTc tonne.m	27,436
RM at 1deg = GMt.Disp.sin(1) tonne.m	1039,340
Max deck inclination deg	1,1649
Trim angle (+ve by stern) deg	0,8616

Key point	Type	Freeboard m
Margin Line (freeboard pos = 62,163 m)		0,974
Deck Edge (freeboard pos = 62,163 m)		1,05
Admisión 1	Downflooding point	11,822
Admisión 2	Downflooding point	11,883
Admisión 3	Downflooding point	9,995
Admisión 4	Downflooding point	10,083
Guardacalor	Downflooding point	17,953

Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Vacío salida****Damage Case - DCase 2**

Free to Trim

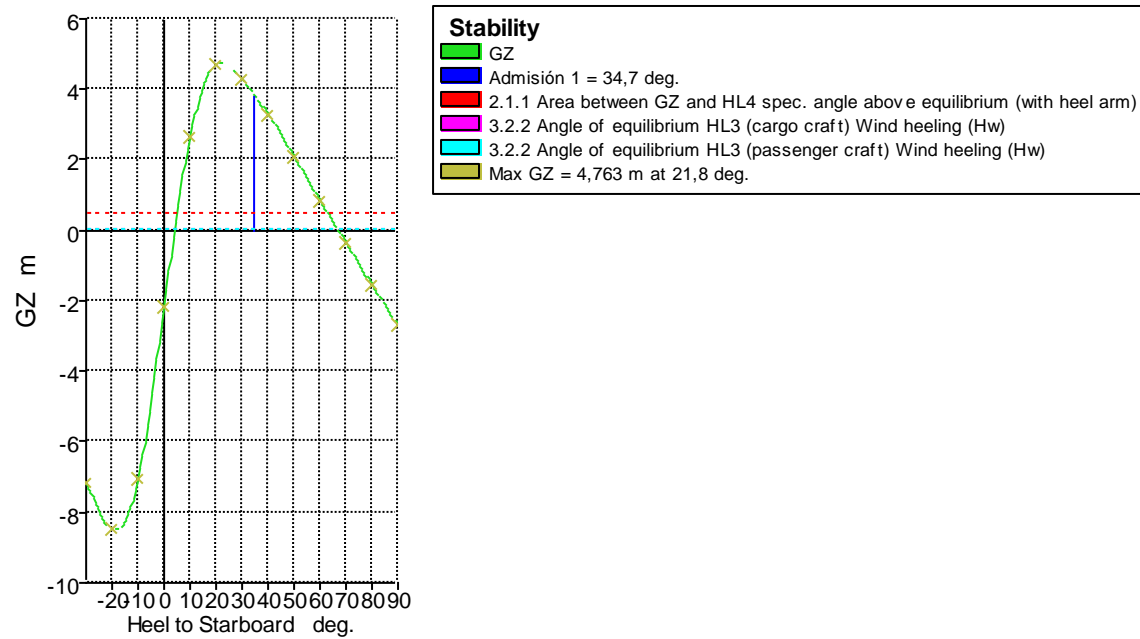
Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
C WJ ER	Fully flooded	85		
CM ER	Fully flooded	85		
DF ER	Fully flooded	95		

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	0%	4,695	0,000	4,695	0,000	20,989	10,802	0,073	0,000	User Specified
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER	97%	4,805	4,661	4,805	4,661	20,001	9,041	0,876	0,000	User Specified
Aceite ER	97%	0,850	0,825	0,924	0,896	31,497	8,575	0,966	0,000	User Specified
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER	0%	1,765	0,000	1,918	0,000	31,841	11,000	0,037	0,000	User Specified
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER	97%	56,972	55,262	67,823	65,789	39,949	10,370	1,604	32,213	IMO A.749(18)
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,213	IMO A.749(18)
LNG ER	97%	39,465	38,281	87,699	85,068	46,000	10,000	4,860	0,000	User Specified
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			1707,417	335,729	312,828	30,796	0,000	7,098	64,427	
FS correction								0,038		
VCG fluid								7,136		



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-7,147	-8,474	-7,062	-2,149	2,661	4,712	4,271	3,284	2,099	0,855	-0,374	-1,558	-2,692
Area under GZ curve from zero heel m.deg	207,9033	128,5833	47,7697	0,0000	4,1246	43,5524	89,6743	127,5774	154,6198	169,3892	171,7674	162,0606	140,7865
Displacement t	1707	1707	1707	1707	1707	1707	1707	1707	1707	1707	1708	1707	1708
Draft at FP m	-0,696	1,443	2,372	1,780	0,688	-2,918	-8,002	-14,315	-22,987	-36,362	-61,185	-131,730	n/a
Draft at AP m	0,090	2,299	3,813	4,813	5,972	8,205	11,213	14,748	19,497	26,742	40,167	78,326	n/a
WL Length m	77,968	77,898	81,462	83,164	83,320	83,252	74,244	69,339	66,411	64,514	63,193	62,108	61,379
Beam max extents on WL m	13,012	13,246	26,462	26,314	26,549	27,498	21,954	16,974	14,159	12,461	11,434	10,856	11,054
Wetted Area m^2	1090,870	1090,482	1364,510	1431,876	1468,451	1560,204	1810,326	1972,803	2079,426	2156,503	2223,514	2280,524	2353,180
Waterpl. Area m^2	355,229	335,153	533,055	551,945	519,363	361,925	281,206	235,644	202,673	173,449	146,886	131,246	119,875
Prismatic coeff. (Cp)	0,709	0,709	0,594	0,466	0,372	0,234	0,199	0,188	0,182	0,178	0,175	0,173	0,172
Block coeff. (Cb)	0,598	0,630	0,351	0,256	0,166	0,114	0,100	0,094	0,090	0,095	0,099	0,104	0,104
LCB from zero pt. (+ve fwd) m	30,729	30,727	30,694	30,613	30,479	30,068	29,489	28,910	28,389	27,972	27,719	27,647	27,756
LCF from zero pt. (+ve fwd) m	30,691	30,875	34,140	34,879	32,770	31,136	29,329	27,670	27,098	26,928	26,144	27,037	26,501

Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
Max deck inclination deg	30,0033	20,0074	10,0472	2,0893	10,6155	21,1949	31,8762	42,2700	52,3597	62,1289	71,5974	80,8498	90,0000
Trim angle (+ve by stern) deg	0,5413	0,5902	0,9924	2,0893	3,6355	7,6189	13,0103	19,2639	27,0614	37,1919	50,6307	68,4016	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 62,163 m)		9	n/a
Deck Edge (immersion pos = 62,163 m)		9,5	n/a
Admisión 1	Downflooding point	34,7	0
Admisión 2	Downflooding point	37,7	0
Admisión 3	Downflooding point	Not immersed in positive range	0
Admisión 4	Downflooding point	Not immersed in positive range	0
Guardacalor	Downflooding point	49,1	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	40,2716	Pass	+2410,70
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	4,763	Pass	+9426,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	30,7	Pass	+338,74
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	4,1	Pass	+79,70
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	
	Wind heeling (Hw)	15,0	deg	4,1	Pass	+72,98
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	4,763	Pass	+9426,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	113,0987	Pass	+13066,32
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	30,7	Pass	+104,75
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	30,7	Pass	+338,74

Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Vacío salida****Damage Case - DCase 2**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
C WJ ER	Fully flooded	85		
CM ER	Fully flooded	85		
DF ER	Fully flooded	95		

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	0%	4,695	0,000	4,695	0,000	20,989	10,802	0,073	0,000	User Specified
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER	97%	4,805	4,661	4,805	4,661	20,001	9,041	0,876	0,000	User Specified
Aceite ER	97%	0,850	0,825	0,924	0,896	31,497	8,575	0,966	0,000	User Specified
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER	0%	1,765	0,000	1,918	0,000	31,841	11,000	0,037	0,000	User Specified
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER	97%	56,972	55,262	67,823	65,789	39,949	10,370	1,604	32,306	IMO A.749(18)
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,306	IMO A.749(18)
LNG ER	97%	39,465	38,281	87,699	85,068	46,000	10,000	4,860	0,000	User Specified
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			1707,417	335,729	312,828	30,796	0,000	7,098	64,611	
FS correction								0,038		
VCG fluid								7,136		

Draft Amidships m	3,350
Displacement t	1707
Heel deg	4,3
Draft at FP m	1,433

Draft at AP m	5,266
Draft at LCF m	3,668
Trim (+ve by stern) m	3,833
WL Length m	83,231
Beam max extents on WL m	26,335
Wetted Area m <sup>2</sup>	1450,960
Waterpl. Area m <sup>2</sup>	549,648
Prismatic coeff. (Cp)	0,425
Block coeff. (Cb)	0,204
Max Sect. area coeff. (Cm)	0,787
Waterpl. area coeff. (Cwp)	0,361
LCB from zero pt. (+ve fwd) m	30,563
LCF from zero pt. (+ve fwd) m	34,673
KB m	2,154
KG fluid m	7,136
BMt m	35,347
BML m	120,424
GMt corrected m	30,345
GML m	115,423
KMt m	37,363
KML m	122,109
Immersion (TPc) tonne/cm	5,634
MTc tonne.m	23,698
RM at 1deg = GMt.Disp.sin(1) tonne.m	904,245
Max deck inclination deg	5,0628
Trim angle (+ve by stern) deg	2,6387

Key point	Type	Freeboard m
Margin Line (freeboard pos = 62,163 m)		0,636
Deck Edge (freeboard pos = 62,163 m)		0,712
Admisión 1	Downflooding point	10,129
Admisión 2	Downflooding point	10,317
Admisión 3	Downflooding point	9,687
Admisión 4	Downflooding point	9,955
Guardacalor	Downflooding point	16,322

## Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Vacío salida****Damage Case - DCase 3**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

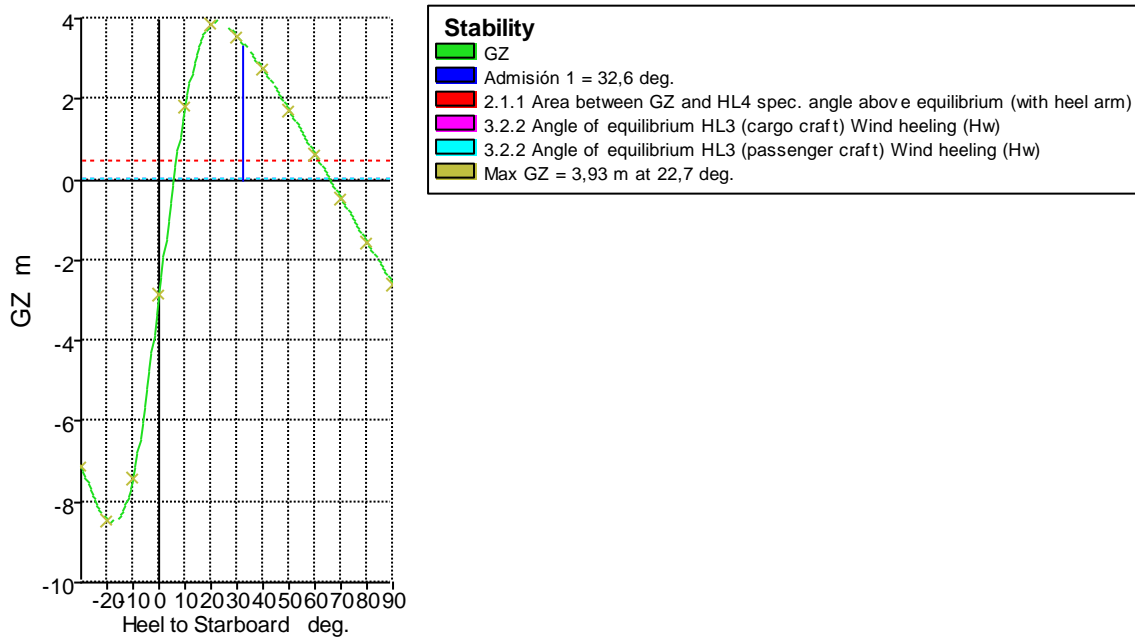
Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
CM ER	Fully flooded	85		
DF ER	Fully flooded	95		
CM 2 ER	Fully flooded	85		
DF 2 ER	Fully flooded	95		
A. Des ER	Fully flooded	95		
A. Dulce ER	Fully flooded	95		
Aceite ER	Fully flooded	95		
Lodos ER	Fully flooded	95		

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER (Damaged)	Damaged									
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER (Damaged)	Damaged									
Aceite ER (Damaged)	Damaged									
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER (Damaged)	Damaged									
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER	97%	56,972	55,262	67,823	65,789	39,949	10,370	1,604	32,213	IMO A.749(18)
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,213	IMO A.749(18)
LNG ER	97%	39,465	38,281	87,699	85,068	46,000	10,000	4,860	0,000	User Specified
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			1701,932	323,387	307,271	30,825	-0,029	7,118	64,427	
FS correction								0,038		



Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m^3	Total Volume m^3	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
VCG fluid								7,156		



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-7,108	-8,437	-7,396	-2,874	1,796	3,854	3,558	2,740	1,712	0,613	-0,489	-1,559	-2,584
Area under GZ curve from zero heel m.deg	214,0053	135,2900	53,2121	0,0000	-4,0068	26,6881	64,8846	96,5080	118,9041	130,5476	131,1582	120,8789	100,1351
Displacement t	1702	1702	1702	1702	1702	1702	1702	1702	1702	1702	1702	1702	1702
Draft at FP m	-0,692	1,450	2,543	2,296	1,819	-0,931	-5,270	-10,448	-17,448	-28,163	-48,084	-104,947	n/a
Draft at AP m	0,060	2,268	3,832	4,785	5,773	8,214	11,344	14,879	19,582	26,739	40,048	78,049	n/a
WL Length m	77,965	77,887	81,426	83,185	83,275	83,611	83,631	77,882	74,303	71,889	70,153	68,708	67,817
Beam max extents on WL m	13,000	13,238	26,470	26,309	26,549	27,483	22,035	17,030	14,219	12,506	11,468	10,889	11,056
Wetted Area m^2	1088,771	1088,484	1394,749	1513,168	1603,538	1796,290	2092,490	2260,143	2370,212	2452,264	2523,682	2584,240	2652,696

Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
Waterpl. Area m <sup>2</sup>	355,177	335,016	504,177	523,435	509,452	364,956	293,623	251,040	216,555	189,435	168,234	145,954	138,824
Prismatic coeff. (Cp)	0,710	0,710	0,585	0,459	0,378	0,232	0,174	0,165	0,161	0,159	0,157	0,156	0,155
Block coeff. (Cb)	0,598	0,631	0,347	0,253	0,166	0,112	0,087	0,081	0,080	0,083	0,087	0,092	0,092
LCB from zero pt. (+ve fwd) m	30,756	30,759	30,729	30,679	30,598	30,258	29,790	29,317	28,897	28,568	28,369	28,303	28,405
LCF from zero pt. (+ve fwd) m	30,690	30,877	33,694	34,480	33,656	31,398	28,992	28,190	27,942	28,070	27,859	27,397	27,160
Max deck inclination deg	30,0030	20,0067	10,0378	1,7140	10,3495	20,8179	31,4225	41,7540	51,8318	61,6536	71,2434	80,6649	90,0000
Trim angle (+ve by stern) deg	0,5183	0,5638	0,8884	1,7140	2,7219	6,2758	11,2982	16,9384	24,0031	33,4324	46,6627	65,5613	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 62,163 m)		5,2	n/a
Deck Edge (immersion pos = 62,163 m)		5,5	n/a
Admisión 1	Downflooding point	32,6	0
Admisión 2	Downflooding point	34,9	0
Admisión 3	Downflooding point	Not immersed in positive range	0
Admisión 4	Downflooding point	Not immersed in positive range	0
Guardacalor	Downflooding point	46,7	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	34,0630	Pass	+2023,63
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	3,930	Pass	+7760,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	26,9	Pass	+284,60
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	5,7	Pass	+71,29
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	
	Wind heeling (Hw)	15,0	deg	5,7	Pass	+61,77
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	3,930	Pass	+7760,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	81,9823	Pass	+9443,92
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	26,9	Pass	+79,48
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	26,9	Pass	+284,60

## Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Vacío salida****Damage Case - DCase 3**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
CM ER	Fully flooded	85		
DF ER	Fully flooded	95		
CM 2 ER	Fully flooded	85		
DF 2 ER	Fully flooded	95		
A. Des ER	Fully flooded	95		
A. Dulce ER	Fully flooded	95		
Aceite ER	Fully flooded	95		
Lodos ER	Fully flooded	95		

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER (Damaged)	Damaged									
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER (Damaged)	Damaged									
Aceite ER (Damaged)	Damaged									
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER (Damaged)	Damaged									
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER	97%	56,972	55,262	67,823	65,789	39,949	10,370	1,604	32,401	IMO A.749(18)
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,401	IMO A.749(18)
LNG ER	97%	39,465	38,281	87,699	85,068	46,000	10,000	4,860	0,000	User Specified
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			1701,932	323,387	307,271	30,825	-0,029	7,118	64,802	
FS correction								0,038		

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
VCG fluid								7,156		

Draft Amidships m	3,712
Displacement t	1702
Heel deg	6,2
Draft at FP m	2,041
Draft at AP m	5,383
Draft at LCF m	4,009
Trim (+ve by stern) m	3,342
WL Length m	83,242
Beam max extents on WL m	26,376
Wetted Area m <sup>2</sup>	1570,805
Waterpl. Area m <sup>2</sup>	523,775
Prismatic coeff. (Cp)	0,407
Block coeff. (Cb)	0,188
Max Sect. area coeff. (Cm)	0,739
Waterpl. area coeff. (Cwp)	0,347
LCB from zero pt. (+ve fwd) m	30,632
LCF from zero pt. (+ve fwd) m	34,192
KB m	2,353
KG fluid m	7,156
BMt m	32,985
BML m	143,708
GMt corrected m	28,149
GML m	138,872
KMt m	35,121
KML m	145,117
Immersion (TPc) tonne/cm	5,369
MTc tonne.m	28,421
RM at 1deg = GMt.Disp.sin(1) tonne.m	836,116
Max deck inclination deg	6,5680
Trim angle (+ve by stern) deg	2,3013

Key point	Type	Freeboard m
Margin Line (freeboard pos = 62,163 m)		-0,22

Key point	Type	Freeboard m
Deck Edge (freeboard pos = 62,163 m)		-0,145
Admisión 1	Downflooding point	9,460
Admisión 2	Downflooding point	9,624
Admisión 3	Downflooding point	8,855
Admisión 4	Downflooding point	9,088
Guardacalor	Downflooding point	15,643

### Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

### Loadcase - Vacío salida

#### Damage Case - DCase 4

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

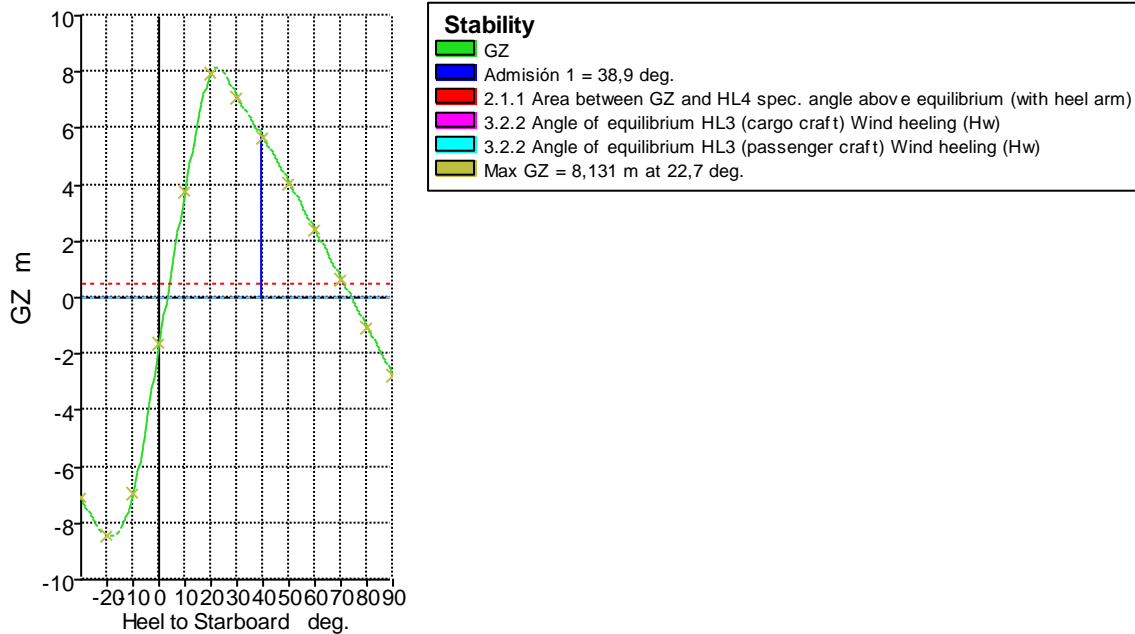
Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
CM 2 ER	Fully flooded	85		
DF 2 ER	Fully flooded	95		
A. Des ER	Fully flooded	95		
A. Dulce ER	Fully flooded	95		
Aceite ER	Fully flooded	95		
Lodos ER	Fully flooded	95		
VOID 1S ER	Fully flooded	95		
VOID 1I ER	Fully flooded	95		

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER (Damaged)	Damaged									
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER (Damaged)	Damaged									
Aceite ER (Damaged)	Damaged									

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER (Damaged)	Damaged									
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER	97%	56,972	55,262	67,823	65,789	39,949	10,370	1,604	32,213	IMO A.749(18)
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,213	IMO A.749(18)
LNG ER	97%	39,465	38,281	87,699	85,068	46,000	10,000	4,860	0,000	User Specified
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			1701,932	323,387	307,271	30,825	-0,029	7,118	64,427	
FS correction								0,038		
VCG fluid								7,156		



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-7,108	-8,437	-6,938	-1,642	3,770	7,954	7,128	5,684	4,077	2,381	0,660	-1,049	-2,752
Area under GZ curve from zero heel m.deg	203,7572	124,8217	44,5591	0,0000	10,9683	72,6751	150,8677	214,6567	263,6824	295,9908	311,2084	309,2507	290,2428
Displacement t	1702	1702	1702	1702	1702	1702	1702	1702	1702	1702	1702	1702	1702
Draft at FP m	-0,693	1,450	2,835	3,041	3,148	2,295	-2,058	-7,130	-13,562	-23,162	-40,635	-89,405	n/a
Draft at AP m	0,061	2,268	3,473	3,836	4,177	4,823	7,017	9,675	13,166	18,346	27,362	51,304	n/a
WL Length m	77,967	77,887	82,776	83,177	83,019	76,671	83,558	84,063	79,325	74,904	72,022	69,969	69,239
Beam max extents on WL m	13,001	13,238	26,411	26,338	26,516	25,961	21,480	16,459	13,683	12,015	10,963	10,290	11,049
Wetted Area m <sup>2</sup>	1088,737	1088,484	1381,620	1479,141	1546,628	1494,698	1645,847	1850,559	2003,684	2127,375	2226,502	2297,515	2315,877
Waterpl. Area m <sup>2</sup>	355,177	335,016	540,685	562,197	552,933	303,791	152,976	133,192	121,988	111,844	104,497	92,425	73,985
Prismatic coeff. (Cp)	0,710	0,710	0,621	0,557	0,511	0,476	0,292	0,239	0,225	0,220	0,216	0,218	0,231
Block coeff. (Cb)	0,598	0,631	0,358	0,500	0,291	0,253	0,176	0,157	0,147	0,130	0,106	0,114	0,113
LCB from zero pt. (+ve fwd) m	30,755	30,759	30,784	30,768	30,755	30,640	30,090	29,463	28,852	28,331	27,987	27,865	28,120
LCF from zero pt. (+ve fwd) m	30,690	30,877	31,493	32,200	31,500	31,286	40,129	44,581	45,628	44,697	43,147	44,677	51,690
Max deck inclination deg	30,0031	20,0067	10,0093	0,5481	10,0241	20,0641	30,4374	40,7972	50,9872	60,9796	70,7687	80,4095	90,0000
Trim angle (+ve by stern) deg	0,5194	0,5638	0,4399	0,5481	0,7085	1,7414	6,2280	11,4248	17,8175	26,5251	39,2715	59,4167	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 62,163 m)		3,1	n/a
Deck Edge (immersion pos = 62,163 m)		3,4	n/a
Admisión 1	Downflooding point	38,9	0
Admisión 2	Downflooding point	40,9	0
Admisión 3	Downflooding point	87,7	0
Admisión 4	Downflooding point	Not immersed in positive range	0
Guardacalor	Downflooding point	52,3	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	58,4011	Pass	+3540,97
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	8,131	Pass	+16162,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	36,0	Pass	+414,23
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	3,0	Pass	+85,14
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	

Code	Criteria	Value	Units	Actual	Status	Margin %
	Wind heeling (Hw)	15,0	deg	3,0	Pass	+80,23
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	8,131	Pass	+16162,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	210,8951	Pass	+24451,24
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	36,0	Pass	+139,97
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	36,0	Pass	+414,23

### Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

### Loadcase - Vacío salda

#### Damage Case - DCase 4

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
CM 2 ER	Fully flooded	85		
DF 2 ER	Fully flooded	95		
A. Des ER	Fully flooded	95		
A. Dulce ER	Fully flooded	95		
Aceite ER	Fully flooded	95		
Lodos ER	Fully flooded	95		
VOID 1S ER	Fully flooded	95		
VOID 1I ER	Fully flooded	95		

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER (Damaged)	Damaged									
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER (Damaged)	Damaged									
Aceite ER (Damaged)	Damaged									



Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER (Damaged)	Damaged									
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER	97%	56,972	55,262	67,823	65,789	39,949	10,370	1,604	32,258	IMO A.749(18)
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,258	IMO A.749(18)
LNG ER	97%	39,465	38,281	87,699	85,068	46,000	10,000	4,860	0,000	User Specified
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			1701,932	323,387	307,271	30,825	-0,029	7,118	64,516	
FS correction								0,038		
VCG fluid								7,156		

Draft Amidships m	3,508
Displacement t	1702
Heel deg	3,0
Draft at FP m	3,073
Draft at AP m	3,942
Draft at LCF m	3,606
Trim (+ve by stern) m	0,869
WL Length m	83,188
Beam max extents on WL m	26,339
Wetted Area m <sup>2</sup>	1502,193
Waterpl. Area m <sup>2</sup>	561,639
Prismatic coeff. (Cp)	0,542
Block coeff. (Cb)	0,425
Max Sect. area coeff. (Cm)	0,790
Waterpl. area coeff. (Cwp)	0,606
LCB from zero pt. (+ve fwd) m	30,767
LCF from zero pt. (+ve fwd) m	32,228
KB m	2,048
KG fluid m	7,156
BMt m	36,355
BML m	161,149
GMt corrected m	31,239
GML m	156,033
KMt m	38,350
KML m	162,964

Immersion (TPc) tonne/cm	5,757
MTc tonne.m	31,933
RM at 1deg = GMT.Disp.sin(1) tonne.m	927,888
Max deck inclination deg	3,0806
Trim angle (+ve by stern) deg	0,5989

Key point	Type	Freeboard m
Margin Line (freeboard pos = 62,163 m)		0,015
Deck Edge (freeboard pos = 62,163 m)		0,09
Admisión 1	Downflooding point	11,003
Admisión 2	Downflooding point	11,046
Admisión 3	Downflooding point	9,082
Admisión 4	Downflooding point	9,144
Guardacalor	Downflooding point	17,140

### Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

### Loadcase - Vacío salida

#### Damage Case - DCase 5

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

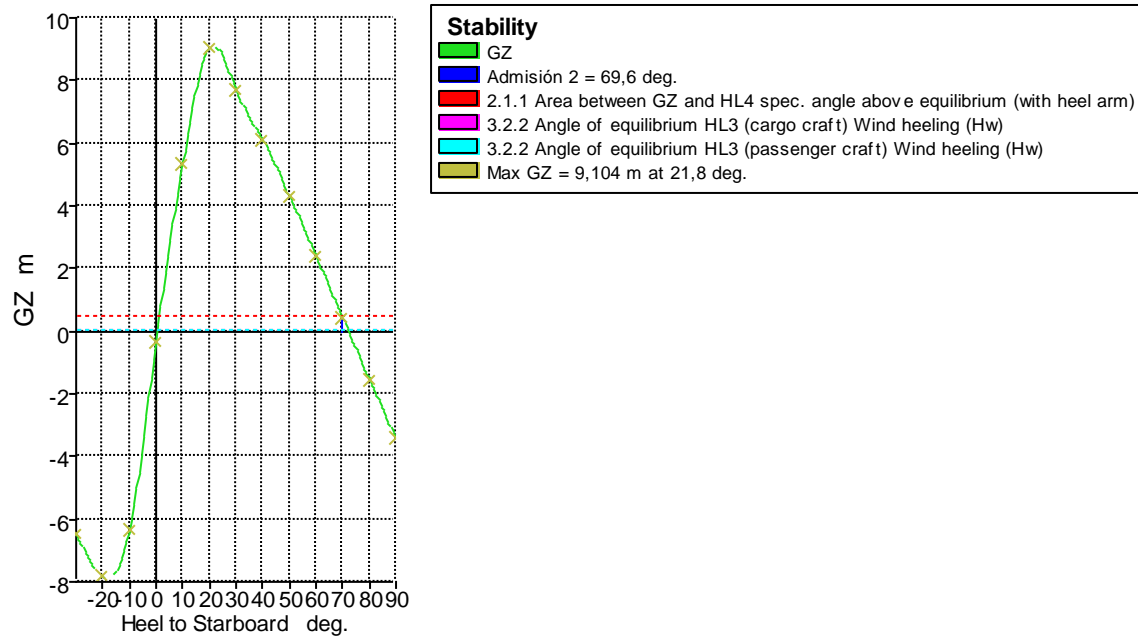
Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
VOID 1S ER	Fully flooded	95		
VOID 1I ER	Fully flooded	95		
Local LNG ER	Fully flooded	60		
Diesel ER	Fully flooded	95		
LNG ER Fully flooded	95			

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m^3	Total Volume m^3	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	0%	4,695	0,000	4,695	0,000	20,989	10,802	0,073	0,000	User Specified
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER	97%	4,805	4,661	4,805	4,661	20,001	9,041	0,876	0,000	User Specified
Aceite ER	97%	0,850	0,825	0,924	0,896	31,497	8,575	0,966	0,000	User Specified
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER	0%	1,765	0,000	1,918	0,000	31,841	11,000	0,037	0,000	User Specified
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER (Damaged)	Damaged									
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,213	IMO A.749(18)
LNG ER (Damaged)	Damaged									
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			1613,874	180,206	161,971	30,122	-0,592	7,340	32,213	
FS correction								0,020		
VCG fluid								7,359		



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-6,476	-7,812	-6,354	-0,318	5,342	9,045	7,693	6,092	4,302	2,385	0,406	-1,557	-3,432
Area under GZ curve from zero heel m.deg	182,4068	109,9354	35,2741	0,0000	26,1781	101,5613	187,7868	256,2713	308,5381	342,0082	355,9976	350,1856	325,1919
Displacement t	1614	1614	1614	1614	1614	1614	1614	1614	1614	1614	1614	1614	1614
Draft at FP m	-1,534	0,636	2,471	2,867	3,505	4,112	2,268	0,019	-3,048	-7,825	-16,901	-43,001	n/a
Draft at AP m	0,111	2,315	3,319	3,403	3,404	2,447	0,215	-2,401	-5,768	-10,712	-19,656	-44,670	n/a
WL Length m	80,432	80,396	80,931	83,170	83,097	76,709	76,746	76,795	76,846	76,876	76,888	76,930	77,256
Beam max extents on WL m	12,984	13,224	26,339	26,319	26,424	13,400	13,271	13,068	12,961	12,354	10,425	10,350	10,668
Wetted Area m^2	1034,068	1033,874	1297,563	1378,073	1474,173	1281,531	1292,012	1316,241	1358,129	1417,024	1450,951	1462,296	1473,583
Waterpl. Area m^2	356,206	335,092	564,791	572,463	543,211	270,416	240,619	219,940	215,010	223,720	248,787	286,659	321,595
Prismatic coeff. (Cp)	0,664	0,664	0,644	0,600	0,570	0,604	0,599	0,585	0,558	0,519	0,485	0,456	0,425
Block coeff. (Cb)	0,558	0,591	0,366	0,529	0,327	0,500	0,486	0,456	0,408	0,379	0,398	0,407	0,412
LCB from zero pt. (+ve fwd) m	29,976	29,977	30,065	30,083	30,127	30,252	30,318	30,353	30,358	30,326	30,258	30,166	30,086
LCF from zero pt. (+ve fwd) m	30,885	31,060	30,317	30,397	29,461	28,477	27,128	26,667	26,194	25,806	25,473	25,505	26,753

Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
Max deck inclination deg	30,0146	20,0283	10,0164	0,3693	10,0002	20,0278	30,0227	40,0170	50,0106	60,0050	70,0013	80,0001	90,0000
Trim angle (+ve by stern) deg	1,1335	1,1568	0,5841	0,3693	-0,0696	-1,1471	-1,4142	-1,6667	-1,8729	-1,9880	-1,8975	-1,1497	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 62,163 m)		3,7	n/a
Deck Edge (immersion pos = 62,163 m)		4	n/a
Admisión 1	Downflooding point	69,9	0
Admisión 2	Downflooding point	69,6	0
Admisión 3	Downflooding point	76,8	0
Admisión 4	Downflooding point	76,6	0
Guardacalor	Downflooding point	78,6	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	61,7508	Pass	+3749,80
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	9,104	Pass	+18108,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	69,1	Pass	+887,79
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	0,5	Pass	+97,33
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	
	Wind heeling (Hw)	15,0	deg	0,5	Pass	+96,48
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	9,104	Pass	+18108,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	355,9215	Pass	+41334,40
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	69,1	Pass	+360,97
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	69,1	Pass	+887,79

Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Vacío salida****Damage Case - DCase 5**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
VOID 1S ER	Fully flooded	95		
VOID 1I ER	Fully flooded	95		
Local LNG ER	Fully flooded	60		
Diesel ER	Fully flooded	95		
LNG ER Fully flooded	95			

VOID 1S ER Fully flooded 95

VOID 1I ER Fully flooded 95

Local LNG ER Fully flooded 60

Diesel ER Fully flooded 95

LNG ER Fully flooded 95

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	0%	4,695	0,000	4,695	0,000	20,989	10,802	0,073	0,000	User Specified
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER	97%	4,805	4,661	4,805	4,661	20,001	9,041	0,876	0,000	User Specified
Aceite ER	97%	0,850	0,825	0,924	0,896	31,497	8,575	0,966	0,000	User Specified
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER	0%	1,765	0,000	1,918	0,000	31,841	11,000	0,037	0,000	User Specified
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER (Damaged)	Damaged									
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,215	IMO A.749(18)
LNG ER (Damaged)	Damaged									
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			1613,874	180,206	161,971	30,122	-0,592	7,340	32,215	
FS correction								0,020		
VCG fluid								7,359		

Draft Amidships m	3,151
Displacement t	1614

Heel deg	0,6
Draft at FP m	2,899
Draft at AP m	3,403
Draft at LCF m	3,219
Trim (+ve by stern) m	0,504
WL Length m	83,174
Beam max extents on WL m	26,320
Wetted Area m <sup>2</sup>	1383,424
Waterpl. Area m <sup>2</sup>	572,467
Prismatic coeff. (Cp)	0,598
Block coeff. (Cb)	0,512
Max Sect. area coeff. (Cm)	0,869
Waterpl. area coeff. (Cwp)	0,619
LCB from zero pt. (+ve fwd) m	30,095
LCF from zero pt. (+ve fwd) m	30,402
KB m	1,817
KG fluid m	7,359
BMt m	39,252
BML m	195,405
GMt corrected m	33,709
GML m	189,862
KMt m	41,066
KML m	197,209
Immersion (TPc) tonne/cm	5,868
MTc tonne.m	36,846
RM at 1 deg = GMt.Disp.sin(1) tonne.m	949,437
Max deck inclination deg	0,6508
Trim angle (+ve by stern) deg	0,3473

Key point	Type	Freeboard m
Margin Line (freeboard pos = 62,163 m)		0,786
Deck Edge (freeboard pos = 62,163 m)		0,862
Admisión 1	Downflooding point	12,005
Admisión 2	Downflooding point	12,030
Admisión 3	Downflooding point	9,810
Admisión 4	Downflooding point	9,845
Guardacalor	Downflooding point	18,120

## Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Vacío salida****Damage Case - DCase 6**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
Local LNG ER	Fully flooded	60		
Diesel ER	Fully flooded	95		
VOID 3I ER	Fully flooded	95		
LNG ER Fully flooded	95			

Local LNG ER Fully flooded 60

Diesel ER Fully flooded 95

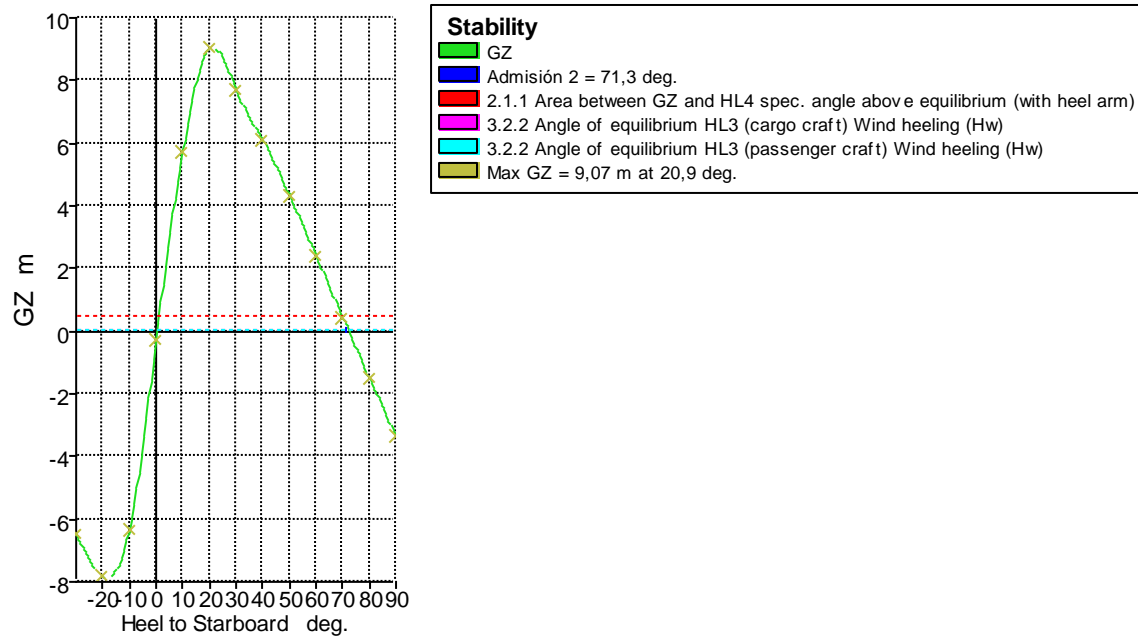
VOID 3I ER Fully flooded 95

LNG ER Fully flooded 95

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	0%	4,695	0,000	4,695	0,000	20,989	10,802	0,073	0,000	User Specified
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER	97%	4,805	4,661	4,805	4,661	20,001	9,041	0,876	0,000	User Specified
Aceite ER	97%	0,850	0,825	0,924	0,896	31,497	8,575	0,966	0,000	User Specified
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER	0%	1,765	0,000	1,918	0,000	31,841	11,000	0,037	0,000	User Specified
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER (Damaged)	Damaged									
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,213	IMO A.749(18)
LNG ER (Damaged)	Damaged									
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			1613,874	180,206	161,971	30,122	-0,592	7,340	32,213	
FS correction								0,020		
VCG fluid								7,359		





Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-6,476	-7,812	-6,333	-0,293	5,719	9,035	7,684	6,093	4,312	2,404	0,439	-1,506	-3,371
Area under GZ curve from zero heel m.deg	182,3198	109,8038	35,3296	0,0000	28,4457	105,8982	191,7075	260,2406	312,5427	346,1585	360,4019	355,0149	330,5839
Displacement t	1614	1614	1614	1614	1614	1614	1614	1614	1614	1614	1614	1614	1614
Draft at FP m	-1,534	0,636	2,503	3,007	3,513	3,888	1,936	-0,422	-3,616	-8,571	-17,926	-44,631	n/a
Draft at AP m	0,111	2,315	3,291	3,308	3,246	2,053	-0,199	-2,886	-6,340	-11,396	-20,538	-46,250	n/a
WL Length m	80,432	80,396	80,751	83,173	83,099	76,600	76,598	76,603	76,604	76,597	76,586	76,603	76,849
Beam max extents on WL m	12,984	13,224	26,330	26,315	26,386	13,295	13,096	12,794	12,567	12,505	10,532	10,588	10,786
Wetted Area m^2	1034,069	1033,874	1297,988	1385,525	1449,178	1235,251	1238,694	1252,028	1281,781	1337,024	1370,634	1390,834	1409,767
Waterpl. Area m^2	356,206	335,092	565,456	596,309	564,080	297,433	294,698	276,621	270,170	279,150	305,658	335,262	371,836
Prismatic coeff. (Cp)	0,664	0,664	0,649	0,610	0,592	0,641	0,639	0,631	0,608	0,568	0,525	0,489	0,454
Block coeff. (Cb)	0,558	0,591	0,368	0,533	0,335	0,525	0,513	0,482	0,435	0,377	0,400	0,424	0,434
LCB from zero pt. (+ve fwd) m	29,976	29,977	30,059	30,099	30,135	30,270	30,327	30,354	30,358	30,322	30,252	30,168	30,096
LCF from zero pt. (+ve fwd) m	30,885	31,060	29,943	30,594	29,723	29,241	28,289	27,727	27,368	26,982	26,766	27,280	29,227

Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
Max deck inclination deg	30,0146	20,0283	10,0142	0,2069	10,0016	20,0338	30,0245	40,0176	50,0107	60,0048	70,0012	80,0001	90,0000
Trim angle (+ve by stern) deg	1,1334	1,1568	0,5433	0,2069	-0,1840	-1,2642	-1,4707	-1,6974	-1,8765	-1,9455	-1,7988	-1,1152	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 62,163 m)		3,5	n/a
Deck Edge (immersion pos = 62,163 m)		3,8	n/a
Admisión 1	Downflooding point	71,5	0
Admisión 2	Downflooding point	71,3	0
Admisión 3	Downflooding point	79,3	0
Admisión 4	Downflooding point	79,3	0
Guardacalor	Downflooding point	79,6	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	64,9363	Pass	+3948,40
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	9,070	Pass	+18040,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	70,8	Pass	+912,04
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	0,5	Pass	+97,65
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	
	Wind heeling (Hw)	15,0	deg	0,5	Pass	+96,91
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	9,070	Pass	+18040,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	360,8675	Pass	+41910,19
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	70,8	Pass	+372,29
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	70,8	Pass	+912,04

Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Vacío salida****Damage Case - DCase 6**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
Local LNG ER	Fully flooded	60		
Diesel ER	Fully flooded	95		
VOID 3I ER	Fully flooded	95		
LNG ER Fully flooded		95		

Local LNG ER Fully flooded 60

Diesel ER Fully flooded 95

VOID 3I ER Fully flooded 95

LNG ER Fully flooded 95

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	0%	4,695	0,000	4,695	0,000	20,989	10,802	0,073	0,000	User Specified
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER	97%	4,805	4,661	4,805	4,661	20,001	9,041	0,876	0,000	User Specified
Aceite ER	97%	0,850	0,825	0,924	0,896	31,497	8,575	0,966	0,000	User Specified
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER	0%	1,765	0,000	1,918	0,000	31,841	11,000	0,037	0,000	User Specified
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER (Damaged)	Damaged									
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,214	IMO A.749(18)
LNG ER (Damaged)	Damaged									
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			1613,874	180,206	161,971	30,122	-0,592	7,340	32,214	
FS correction								0,020		
VCG fluid								7,359		

Draft Amidships m	3,167
Displacement t	1614
Heel deg	0,5

Draft at FP m	3,029
Draft at AP m	3,305
Draft at LCF m	3,203
Trim (+ve by stern) m	0,275
WL Length m	83,175
Beam max extents on WL m	26,316
Wetted Area m <sup>2</sup>	1388,766
Waterpl. Area m <sup>2</sup>	596,323
Prismatic coeff. (Cp)	0,609
Block coeff. (Cb)	0,518
Max Sect. area coeff. (Cm)	0,871
Waterpl. area coeff. (Cwp)	0,645
LCB from zero pt. (+ve fwd) m	30,110
LCF from zero pt. (+ve fwd) m	30,596
KB m	1,812
KG fluid m	7,359
BMt m	41,228
BML m	194,254
GMt corrected m	35,680
GML m	188,706
KMt m	43,038
KML m	196,057
Immersion (TPc) tonne/cm	6,112
MTc tonne.m	36,622
RM at 1deg = GMt.Disp.sin(1) tonne.m	1004,966
Max deck inclination deg	0,5140
Trim angle (+ve by stern) deg	0,1897

Key point	Type	Freeboard m
Margin Line (freeboard pos = 62,163 m)		0,728
Deck Edge (freeboard pos = 62,163 m)		0,804
Admisión 1	Downflooding point	12,061
Admisión 2	Downflooding point	12,074
Admisión 3	Downflooding point	9,752
Admisión 4	Downflooding point	9,772
Guardacalor	Downflooding point	18,171

## Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Vacío salida****Damage Case - DCase 7**

Free to Trim

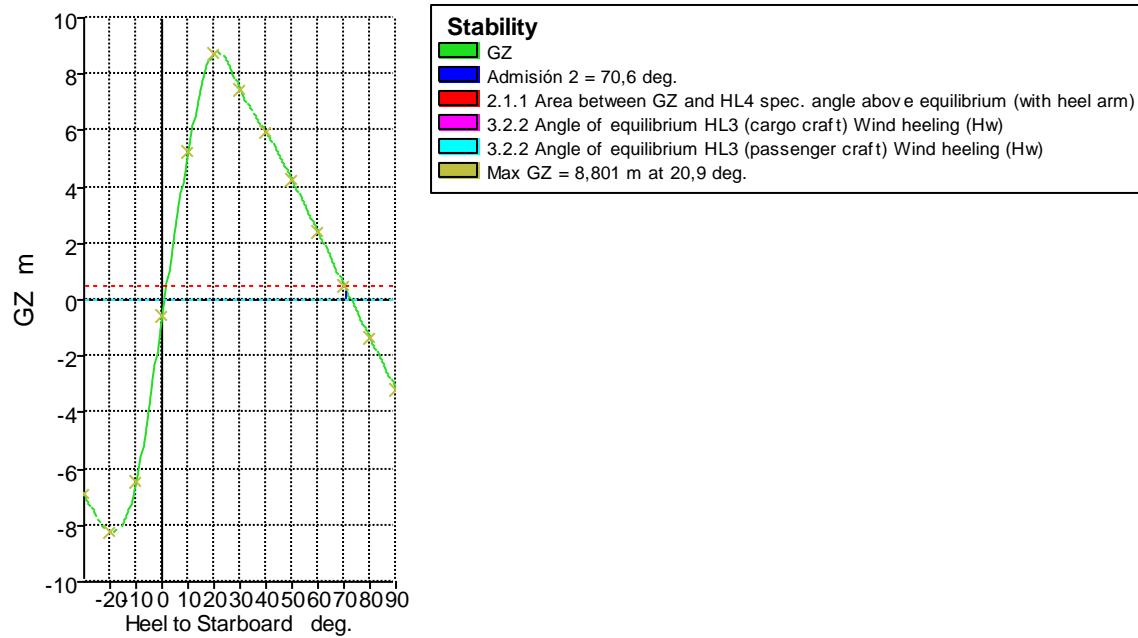
Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
Local LNG ER	Fully flooded	60		
VOID 3I ER	Fully flooded	95		
VOID 4I ER	Fully flooded	95		
LNG ER Fully flooded		95		

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	0%	4,695	0,000	4,695	0,000	20,989	10,802	0,073	0,000	User Specified
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER	97%	4,805	4,661	4,805	4,661	20,001	9,041	0,876	0,000	User Specified
Aceite ER	97%	0,850	0,825	0,924	0,896	31,497	8,575	0,966	0,000	User Specified
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER	0%	1,765	0,000	1,918	0,000	31,841	11,000	0,037	0,000	User Specified
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER	97%	56,972	55,262	67,823	65,789	39,949	10,370	1,604	32,213	IMO A.749(18)
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,213	IMO A.749(18)
LNG ER (Damaged)	Damaged									
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			1669,137	248,030	227,760	30,447	-0,229	7,150	64,427	
FS correction								0,039		
VCG fluid								7,188		



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-6,903	-8,229	-6,474	-0,557	5,246	8,751	7,459	5,931	4,223	2,392	0,503	-1,376	-3,176
Area under GZ curve from zero heel m.deg	191,1943	114,2190	37,0082	0,0000	24,5158	98,0516	181,4326	247,9857	299,0351	332,1475	346,6551	342,2381	319,4334
Displacement t	1669	1669	1669	1669	1669	1669	1669	1669	1669	1669	1669	1669	1669
Draft at FP m	-1,116	1,043	2,746	3,283	3,832	4,576	2,836	0,762	-2,063	-6,531	-15,090	-39,564	n/a
Draft at AP m	0,143	2,347	3,283	3,247	3,173	1,890	-0,409	-3,163	-6,710	-11,889	-21,235	-47,540	n/a
WL Length m	78,927	78,850	82,642	83,178	83,133	82,247	77,104	77,254	77,457	77,598	77,698	77,902	78,659
Beam max extents on WL m	13,014	13,246	26,345	26,315	26,385	22,474	13,127	12,886	12,738	12,487	10,613	10,584	10,735
Wetted Area m^2	1066,351	1066,068	1335,762	1421,265	1486,591	1277,203	1279,582	1302,955	1344,794	1409,500	1449,497	1476,591	1506,418
Waterpl. Area m^2	355,341	334,896	575,633	597,828	566,326	295,771	269,229	252,999	247,551	257,286	282,101	315,129	341,027
Prismatic coeff. (Cp)	0,688	0,689	0,646	0,627	0,606	0,609	0,644	0,629	0,601	0,558	0,520	0,490	0,457
Block coeff. (Cb)	0,580	0,613	0,367	0,540	0,339	0,472	0,484	0,453	0,415	0,362	0,389	0,427	0,443
LCB from zero pt. (+ve fwd) m	30,332	30,338	30,409	30,443	30,485	30,659	30,742	30,802	30,830	30,810	30,742	30,643	30,555
LCF from zero pt. (+ve fwd) m	30,746	30,921	29,831	30,664	29,842	29,309	25,859	24,503	24,072	23,868	23,966	24,845	25,587

Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
Max deck inclination deg	30,0085	20,0171	10,0066	0,0248	10,0099	20,0724	30,0566	40,0446	50,0310	60,0171	70,0067	80,0014	90,0000
Trim angle (+ve by stern) deg	0,8672	0,8982	0,3706	-0,0248	-0,4539	-1,8506	-2,2345	-2,7023	-3,1988	-3,6862	-4,2258	-5,4784	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 62,163 m)		2,7	n/a
Deck Edge (immersion pos = 62,163 m)		3	n/a
Admisión 1	Downflooding point	71,1	0
Admisión 2	Downflooding point	70,6	0
Admisión 3	Downflooding point	74	0
Admisión 4	Downflooding point	73	0
Guardacalor	Downflooding point	79,3	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	62,3691	Pass	+3788,35
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	8,801	Pass	+17502,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	69,7	Pass	+896,40
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	0,9	Pass	+95,49
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	
	Wind heeling (Hw)	15,0	deg	0,9	Pass	+94,02
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	8,801	Pass	+17502,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	347,1734	Pass	+40315,99
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	69,7	Pass	+364,99
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	69,7	Pass	+896,40

Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.‰: 0,01000(0,100); Trim‰(LCG-TCG): 0,01000(0,100); Heel‰(LCG-TCG): 0,01000(0,100)

**Loadcase - Vacío salida****Damage Case - DCase 7**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.‰	PartFlood.‰	PartFlood.WL
Local LNG ER	Fully flooded	60		
VOID 3I ER	Fully flooded	95		
VOID 4I ER	Fully flooded	95		
LNG ER Fully flooded		95		

Local LNG ER Fully flooded 60

VOID 3I ER Fully flooded 95

VOID 4I ER Fully flooded 95

LNG ER Fully flooded 95

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	0%	4,695	0,000	4,695	0,000	20,989	10,802	0,073	0,000	User Specified
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER	97%	4,805	4,661	4,805	4,661	20,001	9,041	0,876	0,000	User Specified
Aceite ER	97%	0,850	0,825	0,924	0,896	31,497	8,575	0,966	0,000	User Specified
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER	0%	1,765	0,000	1,918	0,000	31,841	11,000	0,037	0,000	User Specified
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER	97%	56,972	55,262	67,823	65,789	39,949	10,370	1,604	32,217	IMO A.749(18)
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,217	IMO A.749(18)
LNG ER (Damaged)	Damaged									
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			1669,137	248,030	227,760	30,447	-0,229	7,150	64,435	
FS correction								0,039		
VCG fluid								7,188		

Draft Amidships m	3,282
Displacement t	1669
Heel deg	0,9



Draft at FP m	3,320
Draft at AP m	3,244
Draft at LCF m	3,272
Trim (+ve by stern) m	-0,076
WL Length m	83,182
Beam max extents on WL m	26,317
Wetted Area m <sup>2</sup>	1427,083
Waterpl. Area m <sup>2</sup>	597,832
Prismatic coeff. (Cp)	0,626
Block coeff. (Cb)	0,512
Max Sect. area coeff. (Cm)	0,850
Waterpl. area coeff. (Cwp)	0,646
LCB from zero pt. (+ve fwd) m	30,450
LCF from zero pt. (+ve fwd) m	30,667
KB m	1,844
KG fluid m	7,188
BMt m	39,979
BML m	188,915
GMt corrected m	34,634
GML m	183,571
KMt m	41,818
KML m	190,735
Immersion (TPc) tonne/cm	6,128
MTc tonne.m	36,845
RM at 1deg = GMt.Disp.sin(1) tonne.m	1008,905
Max deck inclination deg	0,9174
Trim angle (+ve by stern) deg	-0,0526

Key point	Type	Freeboard m
Margin Line (freeboard pos = 62,163 m)		0,436
Deck Edge (freeboard pos = 62,163 m)		0,512
Admisión 1	Downflooding point	11,935
Admisión 2	Downflooding point	11,931
Admisión 3	Downflooding point	9,474
Admisión 4	Downflooding point	9,469
Guardacalor	Downflooding point	18,041

## Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Vacío salida****Damage Case - DCase 8**

Free to Trim

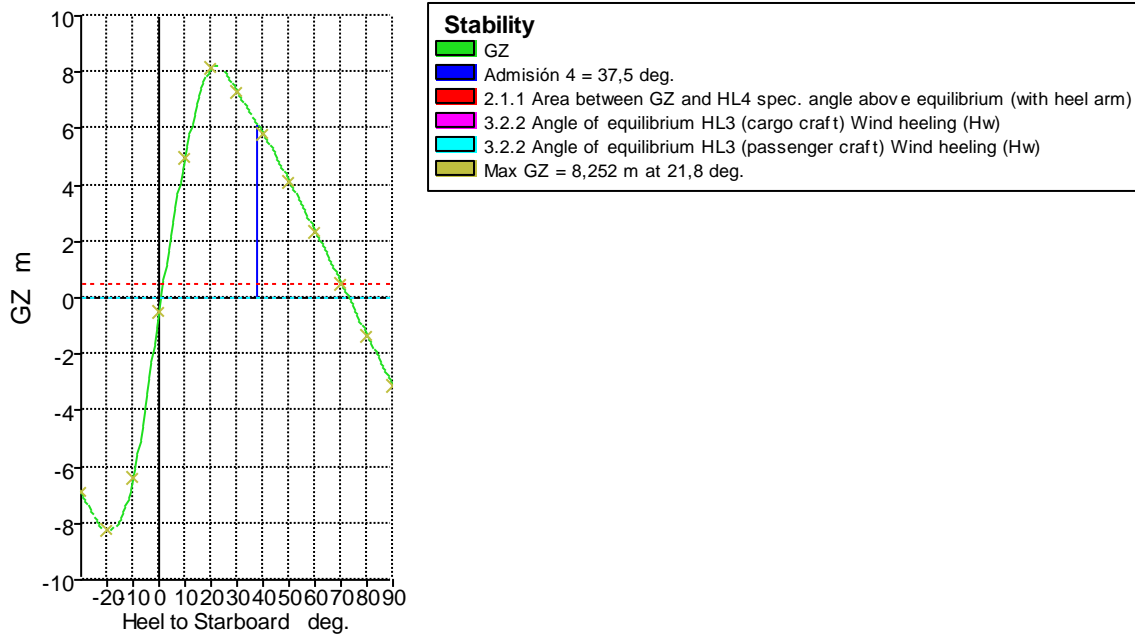
Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
Local LNG ER	Fully flooded	60		
VOID 4I ER	Fully flooded	95		
VOID 5S ER	Fully flooded	95		
VOID 5I ER	Fully flooded	95		
LNG ER Fully flooded		95		

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	0%	4,695	0,000	4,695	0,000	20,989	10,802	0,073	0,000	User Specified
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER	97%	4,805	4,661	4,805	4,661	20,001	9,041	0,876	0,000	User Specified
Aceite ER	97%	0,850	0,825	0,924	0,896	31,497	8,575	0,966	0,000	User Specified
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER	0%	1,765	0,000	1,918	0,000	31,841	11,000	0,037	0,000	User Specified
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER	97%	56,972	55,262	67,823	65,789	39,949	10,370	1,604	32,213	IMO A.749(18)
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,213	IMO A.749(18)
LNG ER (Damaged)	Damaged									
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			1669,137	248,030	227,760	30,447	-0,229	7,150	64,427	
FS correction								0,039		
VCG fluid								7,188		



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-6,903	-8,229	-6,418	-0,472	4,983	8,160	7,317	5,811	4,143	2,369	0,532	-1,320	-3,132
Area under GZ curve from zero heel m.deg	190,1074	113,1062	36,1147	0,0000	23,9365	92,6722	172,2259	237,7934	287,7365	320,3505	334,8925	330,9330	308,6471
Displacement t	1669	1669	1669	1669	1669	1669	1669	1669	1669	1669	1669	1669	1669
Draft at FP m	-1,109	1,043	2,732	3,339	4,276	6,102	7,145	7,141	7,086	6,869	6,171	3,413	n/a
Draft at AP m	0,139	2,347	3,270	3,178	3,007	1,401	-1,540	-4,728	-8,871	-15,015	-26,298	-58,232	n/a
WL Length m	78,908	78,850	82,616	83,179	83,164	83,267	86,639	88,964	90,566	91,699	92,463	92,894	93,012
Beam max extents on WL m	13,013	13,246	26,339	26,312	26,365	24,517	21,292	13,938	13,543	12,444	11,140	10,790	10,754
Wetted Area m^2	1066,500	1066,068	1331,221	1419,306	1526,127	1472,764	1646,922	1766,033	1878,257	1974,775	2055,713	2113,430	2151,159
Waterpl. Area m^2	355,332	334,896	581,451	580,259	549,138	313,988	271,912	245,362	232,571	225,644	220,328	220,853	228,567
Prismatic coeff. (Cp)	0,689	0,689	0,650	0,636	0,605	0,582	0,489	0,424	0,380	0,352	0,332	0,317	0,305
Block coeff. (Cb)	0,580	0,613	0,368	0,543	0,326	0,300	0,159	0,194	0,187	0,148	0,141	0,156	0,178
LCB from zero pt. (+ve fwd) m	30,341	30,338	30,408	30,452	30,526	30,815	31,204	31,479	31,718	31,874	31,930	31,874	31,697
LCF from zero pt. (+ve fwd) m	30,745	30,921	29,703	29,856	29,132	30,443	31,320	27,663	24,799	23,238	22,544	22,073	21,706

Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
Max deck inclination deg	30,0084	20,0171	10,0066	0,1111	10,0366	20,2205	30,4011	40,4028	50,3606	60,2823	70,1834	80,0827	90,0000
Trim angle (+ve by stern) deg	0,8596	0,8982	0,3706	-0,1111	-0,8738	-3,2357	-5,9626	-8,1228	-10,8622	-14,7434	-21,3275	-36,5490	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 83,16 m)		2,2	n/a
Deck Edge (immersion pos = 83,16 m)		2,4	n/a
Admisión 1	Downflooding point	68,2	0
Admisión 2	Downflooding point	65,3	0
Admisión 3	Downflooding point	41,2	0
Admisión 4	Downflooding point	37,5	0
Guardacalor	Downflooding point	76,8	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	58,1943	Pass	+3528,08
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	8,252	Pass	+16404,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	36,8	Pass	+425,57
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	0,8	Pass	+96,06
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	
	Wind heeling (Hw)	15,0	deg	0,8	Pass	+94,78
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	8,252	Pass	+16404,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	223,2626	Pass	+25890,99
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	36,8	Pass	+145,27
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	36,8	Pass	+425,57

Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.‰: 0,01000(0,100); Trim‰(LCG-TCG): 0,01000(0,100); Heel‰(LCG-TCG): 0,01000(0,100)

**Loadcase - Vacío salida****Damage Case - DCase 8**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.‰	PartFlood.‰	PartFlood.WL
Local LNG ER	Fully flooded	60		
VOID 4I ER	Fully flooded	95		
VOID 5S ER	Fully flooded	95		
VOID 5I ER	Fully flooded	95		
LNG ER Fully flooded		95		

Local LNG ER Fully flooded 60

VOID 4I ER Fully flooded 95

VOID 5S ER Fully flooded 95

VOID 5I ER Fully flooded 95

LNG ER Fully flooded 95

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	0%	4,695	0,000	4,695	0,000	20,989	10,802	0,073	0,000	User Specified
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER	97%	4,805	4,661	4,805	4,661	20,001	9,041	0,876	0,000	User Specified
Aceite ER	97%	0,850	0,825	0,924	0,896	31,497	8,575	0,966	0,000	User Specified
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER	0%	1,765	0,000	1,918	0,000	31,841	11,000	0,037	0,000	User Specified
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER	97%	56,972	55,262	67,823	65,789	39,949	10,370	1,604	32,217	IMO A.749(18)
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,217	IMO A.749(18)
LNG ER (Damaged)	Damaged									
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			1669,137	248,030	227,760	30,447	-0,229	7,150	64,433	
FS correction									0,039	
VCG fluid								7,188		

Draft Amidships m	3,284
Displacement t	1669

Heel deg	0,8
Draft at FP m	3,398
Draft at AP m	3,170
Draft at LCF m	3,252
Trim (+ve by stern) m	-0,227
WL Length m	83,183
Beam max extents on WL m	26,314
Wetted Area m <sup>2</sup>	1427,646
Waterpl. Area m <sup>2</sup>	580,242
Prismatic coeff. (Cp)	0,634
Block coeff. (Cb)	0,515
Max Sect. area coeff. (Cm)	0,853
Waterpl. area coeff. (Cwp)	0,628
LCB from zero pt. (+ve fwd) m	30,459
LCF from zero pt. (+ve fwd) m	29,858
KB m	1,824
KG fluid m	7,188
BMt m	38,593
BML m	184,276
GMt corrected m	33,228
GML m	178,911
KMt m	40,413
KML m	186,080
Immersion (TPc) tonne/cm	5,947
MTc tonne.m	35,910
RM at 1deg = GMt.Disp.sin(1) tonne.m	967,952
Max deck inclination deg	0,8322
Trim angle (+ve by stern) deg	-0,1567

Key point	Type	Freeboard m
Margin Line (freeboard pos = 83,16 m)		0,385
Deck Edge (freeboard pos = 83,16 m)		0,461
Admisión 1	Downflooding point	11,992
Admisión 2	Downflooding point	11,981
Admisión 3	Downflooding point	9,454
Admisión 4	Downflooding point	9,438
Guardacalor	Downflooding point	18,094

## Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Vacío salida****Damage Case - DCase 9**

Free to Trim

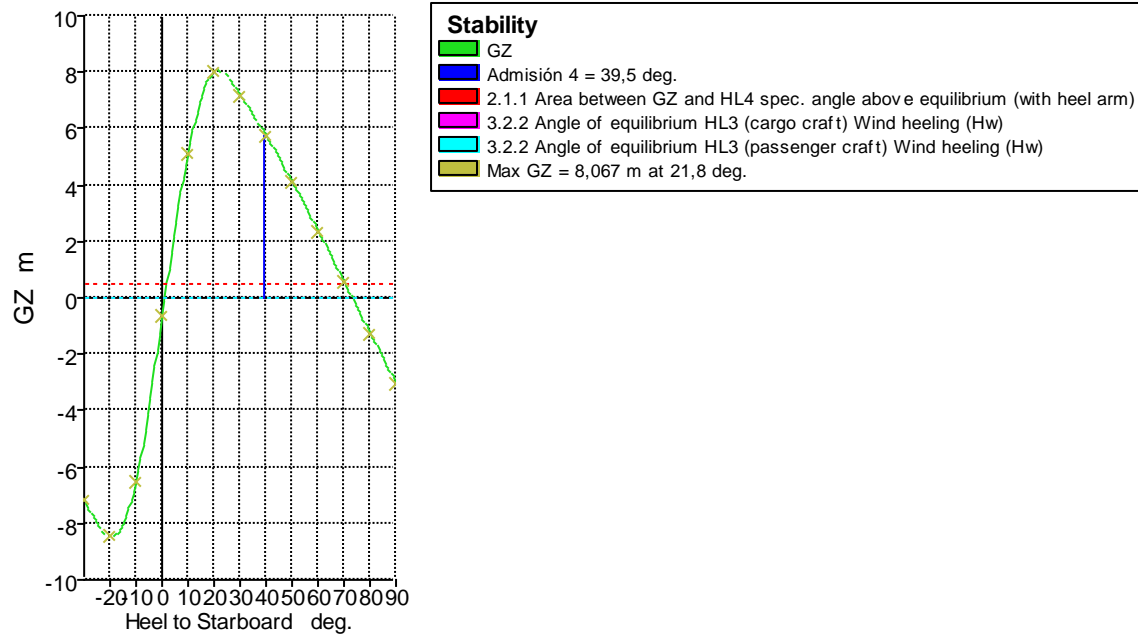
Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
VOID 5S ER	Fully flooded	95		
VOID 5I ER	Fully flooded	95		
VOID 6S ER	Fully flooded	95		
Prop. Proa ER	Fully flooded	85		

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	0%	4,695	0,000	4,695	0,000	20,989	10,802	0,073	0,000	User Specified
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER	97%	4,805	4,661	4,805	4,661	20,001	9,041	0,876	0,000	User Specified
Aceite ER	97%	0,850	0,825	0,924	0,896	31,497	8,575	0,966	0,000	User Specified
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER	0%	1,765	0,000	1,918	0,000	31,841	11,000	0,037	0,000	User Specified
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER	97%	56,972	55,262	67,823	65,789	39,949	10,370	1,604	32,213	IMO A.749(18)
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,213	IMO A.749(18)
LNG ER	97%	39,465	38,281	87,699	85,068	46,000	10,000	4,860	0,000	User Specified
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			1707,417	335,729	312,828	30,796	0,000	7,098	64,427	
FS correction								0,038		
VCG fluid								7,136		



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-7,147	-8,474	-6,498	-0,663	5,132	8,005	7,197	5,735	4,111	2,375	0,573	-1,247	-3,027
Area under GZ curve from zero heel m.deg	195,7322	116,1002	37,6432	0,0000	23,8300	92,7665	170,6487	235,3099	284,7004	317,1918	331,9675	328,5811	307,1852
Displacement t	1707	1707	1707	1707	1707	1707	1707	1707	1707	1707	1707	1708	1707
Draft at FP m	-0,699	1,443	2,963	3,670	4,490	6,354	7,043	6,763	6,263	5,386	3,446	-3,117	n/a
Draft at AP m	0,092	2,299	3,229	3,059	2,759	0,721	-2,261	-5,485	-9,674	-15,950	-27,529	-60,297	n/a
WL Length m	77,975	77,898	82,902	83,187	83,180	83,329	86,518	88,492	89,758	90,648	91,207	91,407	91,321
Beam max extents on WL m	13,013	13,246	26,341	26,309	26,300	24,360	20,659	13,747	13,449	12,403	11,263	10,884	10,829
Wetted Area m^2	1090,803	1090,482	1360,696	1454,512	1515,347	1430,164	1561,543	1648,067	1740,211	1823,638	1898,102	1944,282	1967,187
Waterpl. Area m^2	355,232	335,153	585,487	604,643	582,406	344,331	295,179	262,839	249,943	243,883	241,216	243,523	256,787
Prismatic coeff. (Cp)	0,709	0,709	0,659	0,652	0,639	0,625	0,531	0,465	0,418	0,387	0,365	0,349	0,337
Block coeff. (Cb)	0,598	0,630	0,372	0,537	0,331	0,312	0,174	0,223	0,202	0,164	0,157	0,181	0,214
LCB from zero pt. (+ve fwd) m	30,724	30,727	30,775	30,830	30,905	31,236	31,595	31,849	32,048	32,177	32,202	32,105	31,911
LCF from zero pt. (+ve fwd) m	30,691	30,875	29,467	29,780	29,752	31,706	30,561	25,621	22,844	21,448	21,006	21,012	21,222



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
Max deck inclination deg	30,0034	20,0074	10,0016	0,4205	10,0680	20,3155	30,4594	40,4286	50,3597	60,2685	70,1671	80,0712	90,0000
Trim angle (+ve by stern) deg	0,5451	0,5902	0,1835	-0,4205	-1,1926	-3,8749	-6,3837	-8,3787	-10,8488	-14,3899	-20,4294	-34,5120	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 83,16 m)		1	n/a
Deck Edge (immersion pos = 83,16 m)		1,3	n/a
Admisión 1	Downflooding point	71	0
Admisión 2	Downflooding point	68,3	0
Admisión 3	Downflooding point	43,7	0
Admisión 4	Downflooding point	39,5	0
Guardacalor	Downflooding point	78,8	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	60,6006	Pass	+3678,09
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	8,067	Pass	+16034,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	38,4	Pass	+449,26
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	1,1	Pass	+94,71
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	
	Wind heeling (Hw)	15,0	deg	1,1	Pass	+92,98
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	8,067	Pass	+16034,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	232,6231	Pass	+26980,69
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	38,4	Pass	+156,32
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	38,4	Pass	+449,26

Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Vacío salida****Damage Case - DCase 9**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
VOID 5S ER	Fully flooded	95		
VOID 5I ER	Fully flooded	95		
VOID 6S ER	Fully flooded	95		
Prop. Proa ER	Fully flooded	85		

VOID 5S ER Fully flooded 95

VOID 5I ER Fully flooded 95

VOID 6S ER Fully flooded 95

Prop. Proa ER Fully flooded 85

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	0%	4,695	0,000	4,695	0,000	20,989	10,802	0,073	0,000	User Specified
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER	97%	4,805	4,661	4,805	4,661	20,001	9,041	0,876	0,000	User Specified
Aceite ER	97%	0,850	0,825	0,924	0,896	31,497	8,575	0,966	0,000	User Specified
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER	0%	1,765	0,000	1,918	0,000	31,841	11,000	0,037	0,000	User Specified
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER	97%	56,972	55,262	67,823	65,789	39,949	10,370	1,604	32,219	IMO A.749(18)
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,219	IMO A.749(18)
LNG ER	97%	39,465	38,281	87,699	85,068	46,000	10,000	4,860	0,000	User Specified
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			1707,417	335,729	312,828	30,796	0,000	7,098	64,439	
FS correction								0,038		
VCG fluid								7,136		

Draft Amidships m	3,392
Displacement t	1707
Heel deg	1,1

Draft at FP m	3,749
Draft at AP m	3,035
Draft at LCF m	3,291
Trim (+ve by stern) m	-0,715
WL Length m	83,191
Beam max extents on WL m	26,311
Wetted Area m <sup>2</sup>	1463,719
Waterpl. Area m <sup>2</sup>	604,603
Prismatic coeff. (Cp)	0,651
Block coeff. (Cb)	0,501
Max Sect. area coeff. (Cm)	0,838
Waterpl. area coeff. (Cwp)	0,654
LCB from zero pt. (+ve fwd) m	30,839
LCF from zero pt. (+ve fwd) m	29,777
KB m	1,854
KG fluid m	7,136
BMt m	39,608
BML m	140,061
GMt corrected m	34,325
GML m	134,778
KMt m	41,453
KML m	141,883
Immersion (TPc) tonne/cm	6,197
MTc tonne.m	27,672
RM at 1deg = GMt.Disp.sin(1) tonne.m	1022,831
Max deck inclination deg	1,2171
Trim angle (+ve by stern) deg	-0,4924

Key point	Type	Freeboard m
Margin Line (freeboard pos = 83,16 m)		-0,02
Deck Edge (freeboard pos = 83,16 m)		0,056
Admisión 1	Downflooding point	11,936
Admisión 2	Downflooding point	11,901
Admisión 3	Downflooding point	9,175
Admisión 4	Downflooding point	9,126
Guardacalor	Downflooding point	18,030

## Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Vacío salida****Damage Case - DCase 10**

Free to Trim

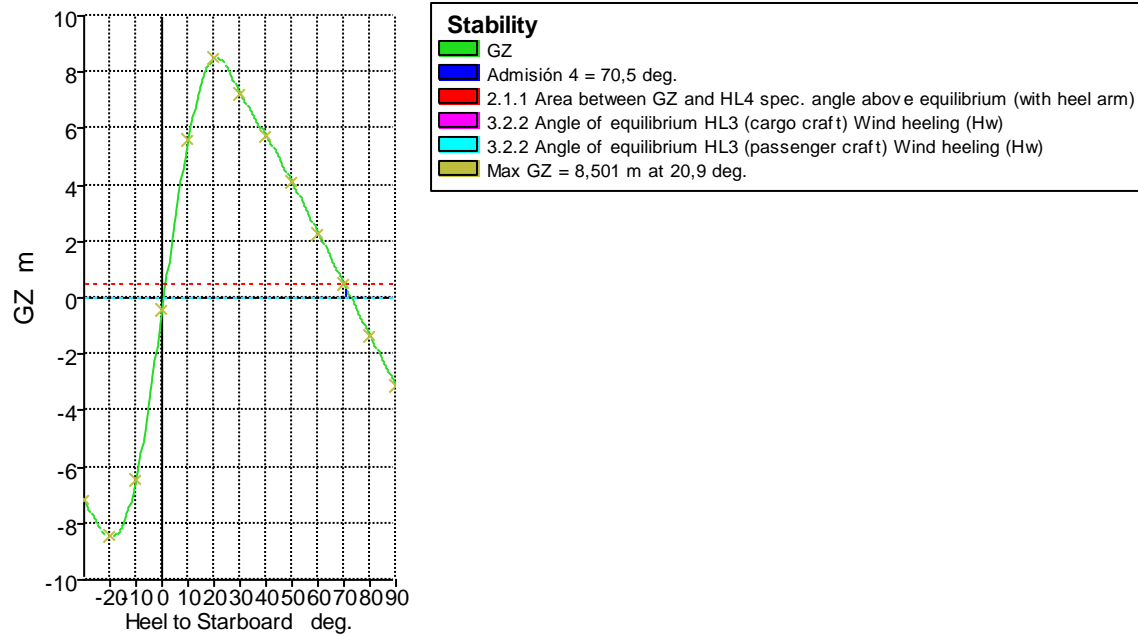
Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
VOID 6S ER	Fully flooded	95		
Prop. Proa ER	Fully flooded	85		
VOID 7S ER	Fully flooded	95		
VOID 7I ER	Fully flooded	95		

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	0%	4,695	0,000	4,695	0,000	20,989	10,802	0,073	0,000	User Specified
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER	97%	4,805	4,661	4,805	4,661	20,001	9,041	0,876	0,000	User Specified
Aceite ER	97%	0,850	0,825	0,924	0,896	31,497	8,575	0,966	0,000	User Specified
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER	0%	1,765	0,000	1,918	0,000	31,841	11,000	0,037	0,000	User Specified
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER	97%	56,972	55,262	67,823	65,789	39,949	10,370	1,604	32,213	IMO A.749(18)
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,213	IMO A.749(18)
LNG ER	97%	39,465	38,281	87,699	85,068	46,000	10,000	4,860	0,000	User Specified
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			1707,417	335,729	312,828	30,796	0,000	7,098	64,427	
FS correction								0,038		
VCG fluid								7,136		



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-7,147	-8,474	-6,422	-0,419	5,584	8,481	7,240	5,741	4,080	2,305	0,470	-1,361	-3,124
Area under GZ curve from zero heel m.deg	193,9263	114,2571	36,1048	0,0000	27,3149	101,2853	181,7703	246,4120	295,7429	327,7070	341,6156	337,1189	314,6525
Displacement t	1707	1707	1707	1707	1707	1707	1707	1707	1707	1707	1707	1707	1707
Draft at FP m	-0,699	1,443	2,875	3,443	4,007	5,039	3,421	1,369	-1,334	-5,588	-13,633	-36,319	n/a
Draft at AP m	0,092	2,299	3,251	3,101	2,861	1,016	-1,357	-4,191	-7,925	-13,407	-23,389	-51,792	n/a
WL Length m	77,975	77,898	82,820	83,182	83,149	83,074	77,661	77,870	78,155	78,385	78,630	79,143	80,324
Beam max extents on WL m	13,013	13,246	26,342	26,309	26,290	22,881	12,921	12,644	12,449	12,406	11,048	10,809	10,852
Wetted Area m^2	1090,803	1090,482	1350,694	1423,665	1459,621	1257,024	1243,577	1262,322	1298,025	1361,738	1418,940	1459,478	1505,603
Waterpl. Area m^2	355,232	335,153	595,359	615,149	596,102	334,044	305,030	302,835	305,384	313,667	330,846	355,003	385,705
Prismatic coeff. (Cp)	0,709	0,709	0,660	0,659	0,657	0,663	0,700	0,682	0,653	0,607	0,562	0,527	0,493
Block coeff. (Cb)	0,598	0,630	0,374	0,554	0,352	0,460	0,463	0,434	0,400	0,366	0,387	0,445	0,471
LCB from zero pt. (+ve fwd) m	30,724	30,727	30,762	30,815	30,872	31,117	31,217	31,289	31,334	31,316	31,253	31,160	31,078
LCF from zero pt. (+ve fwd) m	30,691	30,875	29,803	30,108	30,227	30,639	26,219	24,729	23,890	24,016	24,717	25,816	27,250

Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
Max deck inclination deg	30,0034	20,0074	10,0032	0,2358	10,0299	20,1618	30,1224	40,0893	50,0622	60,0365	70,0168	80,0053	90,0000
Trim angle (+ve by stern) deg	0,5451	0,5902	0,2592	-0,2358	-0,7892	-2,7694	-3,2880	-3,8251	-4,5316	-5,3714	-6,6912	-10,5406	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 83,16 m)		2,1	n/a
Deck Edge (immersion pos = 83,16 m)		2,4	n/a
Admisión 1	Downflooding point	73,2	0
Admisión 2	Downflooding point	72,4	0
Admisión 3	Downflooding point	72,3	0
Admisión 4	Downflooding point	70,5	0
Guardacalor	Downflooding point	80,5	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	63,8852	Pass	+3882,87
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	8,501	Pass	+16902,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	69,9	Pass	+898,57
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	0,7	Pass	+96,71
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	
	Wind heeling (Hw)	15,0	deg	0,7	Pass	+95,65
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	8,501	Pass	+16902,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	341,9702	Pass	+39710,27
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	69,9	Pass	+366,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	69,9	Pass	+898,57

Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Vacío salida****Damage Case - DCase 10**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
VOID 6S ER	Fully flooded	95		
Prop. Proa ER	Fully flooded	85		
VOID 7S ER	Fully flooded	95		
VOID 7I ER	Fully flooded	95		

VOID 6S ER Fully flooded 95

Prop. Proa ER Fully flooded 85

VOID 7S ER Fully flooded 95

VOID 7I ER Fully flooded 95

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	0%	4,695	0,000	4,695	0,000	20,989	10,802	0,073	0,000	User Specified
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER	97%	4,805	4,661	4,805	4,661	20,001	9,041	0,876	0,000	User Specified
Aceite ER	97%	0,850	0,825	0,924	0,896	31,497	8,575	0,966	0,000	User Specified
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER	0%	1,765	0,000	1,918	0,000	31,841	11,000	0,037	0,000	User Specified
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER	97%	56,972	55,262	67,823	65,789	39,949	10,370	1,604	32,216	IMO A.749(18)
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,216	IMO A.749(18)
LNG ER	97%	39,465	38,281	87,699	85,068	46,000	10,000	4,860	0,000	User Specified
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			1707,417	335,729	312,828	30,796	0,000	7,098	64,431	
FS correction								0,038		
VCG fluid								7,136		

Draft Amidships m	3,284
Displacement t	1707
Heel deg	0,7

Draft at FP m	3,480
Draft at AP m	3,088
Draft at LCF m	3,230
Trim (+ve by stern) m	-0,393
WL Length m	83,185
Beam max extents on WL m	26,310
Wetted Area m <sup>2</sup>	1427,794
Waterpl. Area m <sup>2</sup>	615,148
Prismatic coeff. (Cp)	0,659
Block coeff. (Cb)	0,531
Max Sect. area coeff. (Cm)	0,856
Waterpl. area coeff. (Cwp)	0,666
LCB from zero pt. (+ve fwd) m	30,817
LCF from zero pt. (+ve fwd) m	30,106
KB m	1,819
KG fluid m	7,136
BMt m	40,364
BML m	139,136
GMt corrected m	35,046
GML m	133,818
KMt m	42,179
KML m	140,943
Immersion (TPc) tonne/cm	6,305
MTc tonne.m	27,475
RM at 1deg = GMt.Disp.sin(1) tonne.m	1044,330
Max deck inclination deg	0,7401
Trim angle (+ve by stern) deg	-0,2704

Key point	Type	Freeboard m
Margin Line (freeboard pos = 83,16 m)		0,326
Deck Edge (freeboard pos = 83,16 m)		0,402
Admisión 1	Downflooding point	12,060
Admisión 2	Downflooding point	12,040
Admisión 3	Downflooding point	9,437
Admisión 4	Downflooding point	9,410
Guardacalor	Downflooding point	18,158



## Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Vacío salida****Damage Case - DCase 11**

Free to Trim

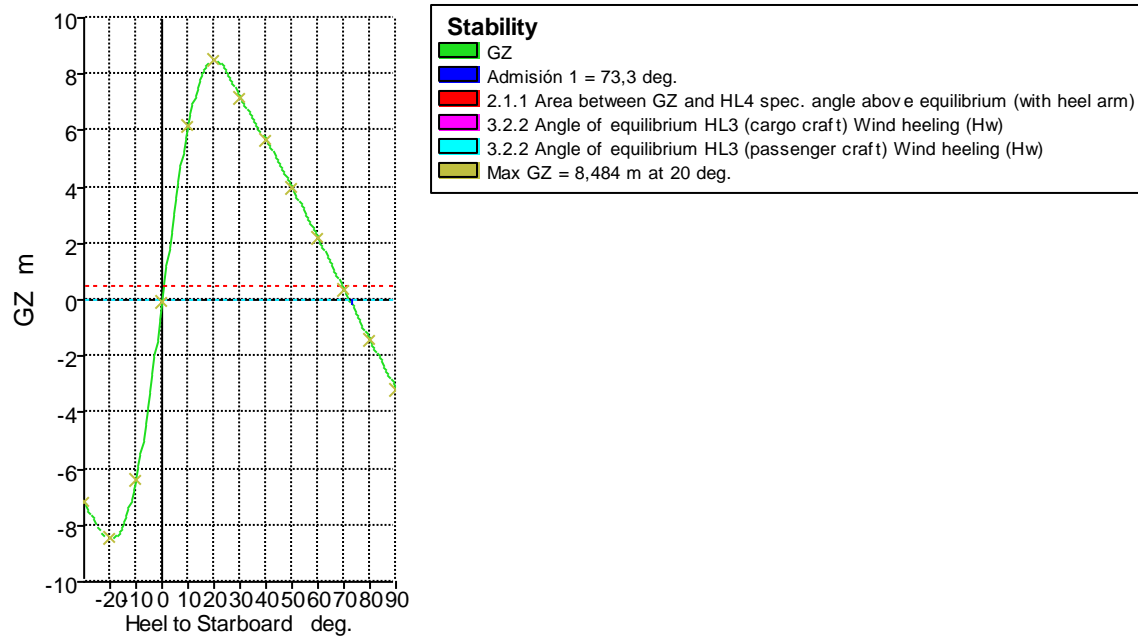
Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
VOID 7S ER	Fully flooded	95		
VOID 7I ER	Fully flooded	95		
Pique ER	Fully flooded	95		

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	0%	4,695	0,000	4,695	0,000	20,989	10,802	0,073	0,000	User Specified
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER	97%	4,805	4,661	4,805	4,661	20,001	9,041	0,876	0,000	User Specified
Aceite ER	97%	0,850	0,825	0,924	0,896	31,497	8,575	0,966	0,000	User Specified
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER	0%	1,765	0,000	1,918	0,000	31,841	11,000	0,037	0,000	User Specified
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER	97%	56,972	55,262	67,823	65,789	39,949	10,370	1,604	32,213	IMO A.749(18)
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,213	IMO A.749(18)
LNG ER	97%	39,465	38,281	87,699	85,068	46,000	10,000	4,860	0,000	User Specified
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			1707,417	335,729	312,828	30,796	0,000	7,098	64,427	
FS correction								0,038		
VCG fluid								7,136		



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-7,147	-8,474	-6,348	-0,097	6,175	8,484	7,165	5,649	3,968	2,177	0,349	-1,447	-3,161
Area under GZ curve from zero heel m.deg	191,9344	112,2337	34,3613	0,0000	32,4031	109,5310	189,2380	253,1164	301,4098	332,1697	344,8098	339,2589	316,1718
Displacement t	1707	1707	1707	1707	1707	1707	1707	1707	1707	1707	1707	1707	1707
Draft at FP m	-0,701	1,443	2,770	3,001	3,080	2,217	0,116	-2,488	-6,069	-11,556	-21,778	-50,657	n/a
Draft at AP m	0,093	2,299	3,285	3,242	3,167	1,996	-0,227	-2,932	-6,399	-11,471	-20,657	-46,709	n/a
WL Length m	77,979	77,898	82,683	83,173	82,980	76,901	76,948	77,023	77,156	77,311	77,495	77,478	76,897
Beam max extents on WL m	13,013	13,246	26,348	26,312	26,327	13,200	12,935	12,527	12,185	12,315	10,788	10,803	10,937
Wetted Area m^2	1090,741	1090,482	1339,885	1373,618	1368,348	1119,390	1119,893	1120,583	1130,601	1164,531	1201,340	1236,823	1278,007
Waterpl. Area m^2	355,232	335,153	610,069	633,162	613,665	333,422	353,281	372,378	378,756	401,527	442,773	483,189	522,916
Prismatic coeff. (Cp)	0,709	0,709	0,660	0,658	0,663	0,731	0,731	0,729	0,711	0,666	0,600	0,548	0,509
Block coeff. (Cb)	0,598	0,630	0,374	0,572	0,373	0,641	0,609	0,563	0,502	0,424	0,429	0,457	0,477
LCB from zero pt. (+ve fwd) m	30,722	30,727	30,759	30,784	30,787	30,812	30,829	30,838	30,822	30,793	30,744	30,699	30,686
LCF from zero pt. (+ve fwd) m	30,692	30,875	30,647	31,116	30,956	30,600	30,373	30,684	31,340	31,747	32,357	33,833	35,596

Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
Max deck inclination deg	30,0034	20,0074	10,0060	0,1660	10,0002	20,0005	30,0006	40,0006	50,0002	60,0000	70,0002	80,0003	90,0000
Trim angle (+ve by stern) deg	0,5472	0,5902	0,3549	0,1660	0,0602	-0,1517	-0,2368	-0,3060	-0,2268	0,0590	0,7728	2,7185	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 62,163 m)		4,1	n/a
Deck Edge (immersion pos = 62,163 m)		4,5	n/a
Admisión 1	Downflooding point	73,3	0
Admisión 2	Downflooding point	73,4	0
Admisión 3	Downflooding point	84,7	0
Admisión 4	Downflooding point	85,2	0
Guardacalor	Downflooding point	80,7	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	67,2375	Pass	+4091,86
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	8,484	Pass	+16868,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	71,8	Pass	+925,40
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	0,2	Pass	+99,18
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	
	Wind heeling (Hw)	15,0	deg	0,2	Pass	+98,93
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	8,484	Pass	+16868,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	345,1508	Pass	+40080,53
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	71,8	Pass	+378,52
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	71,8	Pass	+925,40

Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Vacío salida****Damage Case - DCase 11**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
VOID 7S ER	Fully flooded	95		
VOID 7I ER	Fully flooded	95		
Pique ER	Fully flooded	95		

VOID 7S ER Fully flooded 95

VOID 7I ER Fully flooded 95

Pique ER Fully flooded 95

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	0%	4,695	0,000	4,695	0,000	20,989	10,802	0,073	0,000	User Specified
A. Des BR	0%	4,695	0,000	4,695	0,000	20,989	-10,802	0,073	0,000	User Specified
A. Dulce ER	97%	4,805	4,661	4,805	4,661	20,001	9,041	0,876	0,000	User Specified
Aceite ER	97%	0,850	0,825	0,924	0,896	31,497	8,575	0,966	0,000	User Specified
Aceite BR	97%	0,850	0,825	0,924	0,896	31,497	-8,575	0,966	0,000	User Specified
Lodos ER	0%	1,765	0,000	1,918	0,000	31,841	11,000	0,037	0,000	User Specified
Lodos BR	0%	1,765	0,000	1,918	0,000	31,841	-11,000	0,037	0,000	User Specified
Diesel ER	97%	56,972	55,262	67,823	65,789	39,949	10,370	1,604	32,213	IMO A.749(18)
Diesel BR	97%	56,972	55,262	67,823	65,789	39,949	-10,370	1,604	32,213	IMO A.749(18)
LNG ER	97%	39,465	38,281	87,699	85,068	46,000	10,000	4,860	0,000	User Specified
LNG BR	97%	39,465	38,281	87,699	85,068	46,000	-10,000	4,860	0,000	User Specified
A. Dulce BR	97%	4,805	4,661	4,805	4,661	20,001	-9,041	0,876	0,000	User Specified
Total Loadcase			1707,417	335,729	312,828	30,796	0,000	7,098	64,427	
FS correction								0,038		
VCG fluid								7,136		

Draft Amidships m	3,122
Displacement t	1707
Heel deg	0,2
Draft at FP m	3,001

Draft at AP m	3,243
Draft at LCF m	3,152
Trim (+ve by stern) m	0,242
WL Length m	83,173
Beam max extents on WL m	26,312
Wetted Area m <sup>2</sup>	1373,684
Waterpl. Area m <sup>2</sup>	633,156
Prismatic coeff. (Cp)	0,657
Block coeff. (Cb)	0,567
Max Sect. area coeff. (Cm)	0,886
Waterpl. area coeff. (Cwp)	0,685
LCB from zero pt. (+ve fwd) m	30,777
LCF from zero pt. (+ve fwd) m	31,115
KB m	1,780
KG fluid m	7,136
BMt m	41,585
BML m	147,258
GMt corrected m	36,228
GML m	141,902
KMt m	43,364
KML m	149,037
Immersion (TPc) tonne/cm	6,490
MTc tonne.m	29,135
RM at 1deg = GMt.Disp.sin(1) tonne.m	1079,547
Max deck inclination deg	0,2282
Trim angle (+ve by stern) deg	0,1666

Key point	Type	Freeboard m
Margin Line (freeboard pos = 62,163 m)		0,831
Deck Edge (freeboard pos = 62,163 m)		0,907
Admisión 1	Downflooding point	12,185
Admisión 2	Downflooding point	12,197
Admisión 3	Downflooding point	9,848
Admisión 4	Downflooding point	9,865
Guardacalor	Downflooding point	18,291

## Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Vacío llegada****Damage Case - DCase 1**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
C WJ ER	Fully flooded	85		

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	90%	4,695	4,225	4,695	4,225	20,001	11,727	0,835	0,000	User Specified
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER	10%	4,805	0,481	4,805	0,481	20,017	9,476	0,253	0,000	User Specified
Aceite ER	10%	0,850	0,085	0,924	0,092	31,495	8,799	0,407	0,000	User Specified
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER	90%	1,765	1,588	1,918	1,726	31,499	11,744	0,826	0,000	User Specified
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER	10%	56,972	5,697	67,823	6,782	39,923	10,373	0,298	32,213	IMO A.749(18)
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,213	IMO A.749(18)
LNG ER	10%	39,465	3,946	87,699	8,770	46,000	10,000	3,760	0,000	User Specified
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1541,405	335,729	44,153	29,530	0,000	7,528	64,427	
FS correction								0,042		
VCG fluid								7,570		



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-6,849	-8,274	-7,035	-0,512	5,929	8,311	6,952	5,350	3,598	1,756	-0,103	-1,904	-3,602
Area under GZ curve from zero heel m.deg	197,5609	121,0828	40,5297	0,0000	29,3830	104,4556	182,3151	243,6307	288,5613	315,3496	323,6025	313,4839	285,8957
Displacement t	1541	1541	1541	1541	1541	1541	1541	1541	1542	1541	1541	1541	1541
Draft at FP m	-2,166	0,031	1,894	1,862	1,265	-1,801	-4,260	-7,219	-11,161	-17,155	-28,433	-61,244	n/a
Draft at AP m	0,125	2,320	3,412	3,674	4,058	4,428	2,558	0,254	-2,800	-7,368	-15,619	-38,376	n/a
WL Length m	83,210	83,214	83,199	83,137	83,220	83,332	83,308	83,247	83,084	82,452	79,623	76,486	74,104
Beam max extents on WL m	12,967	13,208	26,333	26,323	26,468	24,251	14,116	14,350	13,572	12,343	10,808	11,047	11,079
Wetted Area m^2	986,645	986,962	1218,480	1255,858	1230,107	1026,829	1012,102	1022,943	1041,923	1065,008	1088,104	1120,326	1165,651
Waterpl. Area m^2	360,567	337,659	565,006	607,144	556,421	311,533	291,020	299,329	319,636	355,819	407,398	454,409	482,146
Prismatic coeff. (Cp)	0,622	0,623	0,603	0,564	0,516	0,465	0,452	0,435	0,415	0,400	0,397	0,392	0,381
Block coeff. (Cb)	0,520	0,552	0,343	0,508	0,297	0,270	0,365	0,342	0,314	0,291	0,289	0,319	0,348
LCB from zero pt. (+ve fwd) m	29,306	29,320	29,408	29,398	29,316	28,989	28,891	28,830	28,825	28,867	28,925	28,985	29,047
LCF from zero pt. (+ve fwd) m	31,372	31,487	31,121	32,556	30,260	34,085	37,314	38,488	39,466	40,173	40,191	39,190	38,259

Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
Max deck inclination deg	30,0282	20,0525	10,0523	1,2480	10,1760	20,3850	30,2483	40,1610	50,1000	60,0571	70,0289	80,0115	90,0000
Trim angle (+ve by stern) deg	1,5782	1,5764	1,0457	1,2480	1,9233	4,2837	4,6870	5,1351	5,7410	6,7120	8,7597	15,3758	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 62,163 m)		9,4	n/a
Deck Edge (immersion pos = 62,163 m)		9,8	n/a
Admisión 1	Downflooding point	69,8	0
Admisión 2	Downflooding point	70,9	0
Admisión 3	Downflooding point	Not immersed in positive range	0
Admisión 4	Downflooding point	Not immersed in positive range	0
Guardacalor	Downflooding point	78,9	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	66,9806	Pass	+4075,85
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	8,311	Pass	+16522,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	68,8	Pass	+882,23
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	0,7	Pass	+96,42
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	
	Wind heeling (Hw)	15,0	deg	0,7	Pass	+95,27
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	8,311	Pass	+16522,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	323,8068	Pass	+37595,79
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	68,8	Pass	+358,37
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	68,8	Pass	+882,23

Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63



Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.‰: 0,01000(0,100); Trim‰(LCG-TCG): 0,01000(0,100); Heel‰(LCG-TCG): 0,01000(0,100)

**Loadcase - Vacío llegada****Damage Case - DCase 1**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank    Status    Perm.‰ PartFlood.‰    PartFlood.WL

C WJ ER    Fully flooded    85

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	90%	4,695	4,225	4,695	4,225	20,001	11,727	0,835	0,000	User Specified
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER	10%	4,805	0,481	4,805	0,481	20,017	9,476	0,253	0,000	User Specified
Aceite ER	10%	0,850	0,085	0,924	0,092	31,495	8,799	0,407	0,000	User Specified
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER	90%	1,765	1,588	1,918	1,726	31,499	11,744	0,826	0,000	User Specified
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER	10%	56,972	5,697	67,823	6,782	39,923	10,373	0,298	32,216	IMO A.749(18)
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,216	IMO A.749(18)
LNG ER	10%	39,465	3,946	87,699	8,770	46,000	10,000	3,760	0,000	User Specified
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1541,405	335,729	44,153	29,530	0,000	7,528	64,432	
FS correction								0,042		
VCG fluid								7,570		

Draft Amidships m	2,770
Displacement t	1541
Heel deg	0,8
Draft at FP m	1,843
Draft at AP m	3,696
Draft at LCF m	2,971

Trim (+ve by stern) m	1,853
WL Length m	83,148
Beam max extents on WL m	26,325
Wetted Area m <sup>2</sup>	1256,324
Waterpl. Area m <sup>2</sup>	607,079
Prismatic coeff. (Cp)	0,560
Block coeff. (Cb)	0,484
Max Sect. area coeff. (Cm)	0,864
Waterpl. area coeff. (Cwp)	0,656
LCB from zero pt. (+ve fwd) m	29,399
LCF from zero pt. (+ve fwd) m	32,550
KB m	1,714
KG fluid m	7,570
BMt m	44,085
BML m	151,317
GMt corrected m	38,227
GML m	145,460
KMt m	45,784
KML m	152,980
Immersion (TPc) tonne/cm	6,223
MTc tonne.m	26,962
RM at 1deg = GMt.Disp.sin(1) tonne.m	1028,364
Max deck inclination deg	1,4883
Trim angle (+ve by stern) deg	1,2762

Key point	Type	Freeboard m
Margin Line (freeboard pos = 62,163 m)		1,457
Deck Edge (freeboard pos = 62,163 m)		1,533
Admisión 1	Downflooding point	12,008
Admisión 2	Downflooding point	12,099
Admisión 3	Downflooding point	10,471
Admisión 4	Downflooding point	10,601
Guardacalor	Downflooding point	18,150

Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Vacío llegada****Damage Case - DCase 2**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank    Status    Perm.%    PartFlood.%    PartFlood.WL

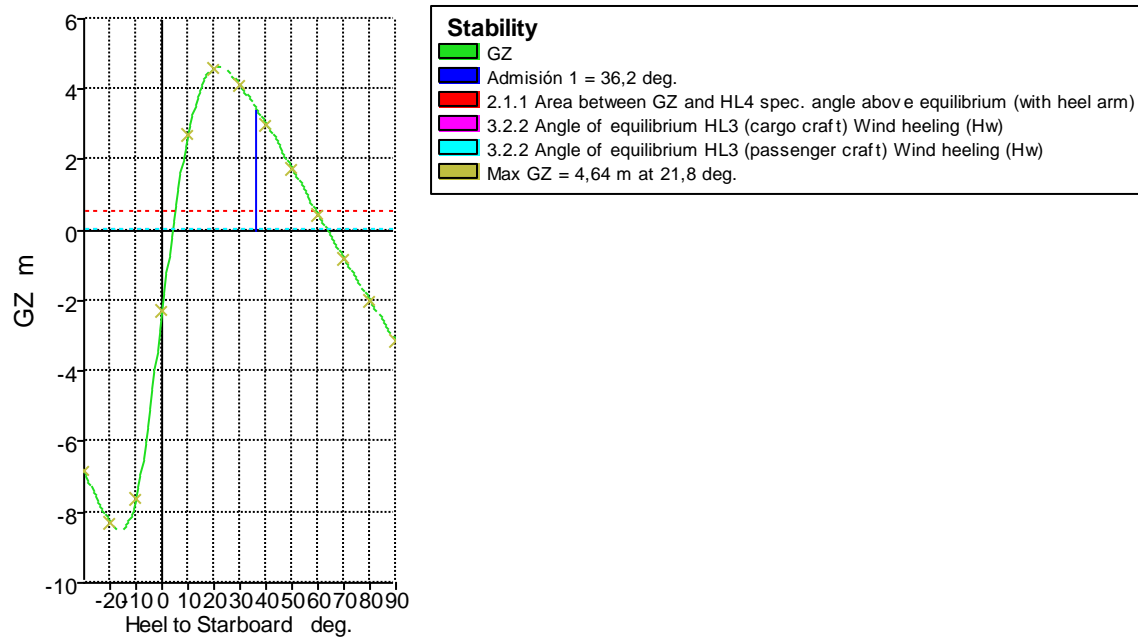
C WJ ER    Fully flooded    85

CM ER    Fully flooded    85

DF ER    Fully flooded    95

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	90%	4,695	4,225	4,695	4,225	20,001	11,727	0,835	0,000	User Specified
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER	10%	4,805	0,481	4,805	0,481	20,017	9,476	0,253	0,000	User Specified
Aceite ER	10%	0,850	0,085	0,924	0,092	31,495	8,799	0,407	0,000	User Specified
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER	90%	1,765	1,588	1,918	1,726	31,499	11,744	0,826	0,000	User Specified
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER	10%	56,972	5,697	67,823	6,782	39,923	10,373	0,298	32,213	IMO A.749(18)
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,213	IMO A.749(18)
LNG ER	10%	39,465	3,946	87,699	8,770	46,000	10,000	3,760	0,000	User Specified
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1541,405	335,729	44,153	29,530	0,000	7,528	64,427	
FS correction								0,042		
VCG fluid								7,570		



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-6,849	-8,274	-7,613	-2,302	2,712	4,609	4,104	3,017	1,752	0,453	-0,808	-2,007	-3,145
Area under GZ curve from zero heel m.deg	210,9881	134,7987	51,9225	0,0000	4,0977	43,3194	88,0347	123,7975	147,7421	158,7510	156,9290	142,7994	117,0088
Displacement t	1541	1541	1541	1541	1541	1541	1541	1541	1542	1541	1541	1542	1541
Draft at FP m	-2,166	0,031	1,624	1,164	-0,223	-4,257	-9,921	-17,107	-26,994	-42,216	-70,547	-150,325	n/a
Draft at AP m	0,125	2,320	3,789	4,748	6,016	8,223	11,181	14,739	19,520	26,803	40,308	78,395	n/a
WL Length m	83,210	83,214	83,208	83,001	83,311	77,042	68,624	64,287	61,817	60,294	59,212	58,384	57,857
Beam max extents on WL m	12,967	13,208	26,432	26,330	26,550	27,523	21,891	16,915	14,128	12,436	11,402	11,078	11,082
Wetted Area m^2	986,645	986,962	1240,383	1319,862	1350,096	1426,705	1656,680	1811,632	1911,778	1987,189	2047,916	2110,037	2174,119
Waterpl. Area m^2	360,567	337,659	504,413	545,783	493,120	353,392	268,315	223,204	188,238	158,733	137,770	115,250	114,240
Prismatic coeff. (Cp)	0,622	0,623	0,548	0,435	0,338	0,228	0,196	0,183	0,176	0,171	0,168	0,166	0,165
Block coeff. (Cb)	0,520	0,552	0,320	0,238	0,150	0,112	0,100	0,090	0,089	0,092	0,097	0,100	0,101
LCB from zero pt. (+ve fwd) m	29,306	29,320	29,367	29,293	29,115	28,639	27,995	27,344	26,780	26,345	26,090	26,061	26,204
LCF from zero pt. (+ve fwd) m	31,372	31,487	32,972	34,625	31,727	30,421	28,421	26,507	25,958	25,448	25,643	23,950	26,147

Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
Max deck inclination deg	30,0282	20,0525	10,1062	2,4678	10,8479	21,4894	32,2376	42,6870	52,7797	62,4957	71,8683	80,9849	90,0000
Trim angle (+ve by stern) deg	1,5782	1,5764	1,4911	2,4678	4,2908	8,5350	14,2380	20,9542	29,2196	39,6911	53,1239	70,0193	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 0 m)		15,5	n/a
Deck Edge (immersion pos = 0 m)		15,8	n/a
Admisión 1	Downflooding point	36,2	0
Admisión 2	Downflooding point	39,7	0
Admisión 3	Downflooding point	Not immersed in positive range	0
Admisión 4	Downflooding point	Not immersed in positive range	0
Guardacalor	Downflooding point	50,9	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	39,7655	Pass	+2379,14
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	4,640	Pass	+9180,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	32,2	Pass	+359,89
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	4,1	Pass	+79,69
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	
	Wind heeling (Hw)	15,0	deg	4,1	Pass	+72,97
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	4,640	Pass	+9180,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	116,0725	Pass	+13412,51
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	32,2	Pass	+114,61
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	32,2	Pass	+359,89

## Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Vacío llegada****Damage Case - DCase 2**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank    Status    Perm.% PartFlood.%    PartFlood.WL

C WJ ER    Fully flooded    85

CM ER    Fully flooded    85

DF ER    Fully flooded    95

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	90%	4,695	4,225	4,695	4,225	20,001	11,727	0,835	0,000	User Specified
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER	10%	4,805	0,481	4,805	0,481	20,017	9,476	0,253	0,000	User Specified
Aceite ER	10%	0,850	0,085	0,924	0,092	31,495	8,799	0,407	0,000	User Specified
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER	90%	1,765	1,588	1,918	1,726	31,499	11,744	0,826	0,000	User Specified
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER	10%	56,972	5,697	67,823	6,782	39,923	10,373	0,298	32,303	IMO A.749(18)
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,303	IMO A.749(18)
LNG ER	10%	39,465	3,946	87,699	8,770	46,000	10,000	3,760	0,000	User Specified
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1541,405	335,729	44,153	29,530	0,000	7,528	64,607	
FS correction								0,042		
VCG fluid								7,570		

Draft Amidships m	2,998
Displacement t	1541
Heel deg	4,3
Draft at FP m	0,784

Draft at AP m	5,212
Draft at LCF m	3,399
Trim (+ve by stern) m	4,429
WL Length m	83,194
Beam max extents on WL m	26,338
Wetted Area m <sup>2</sup>	1338,489
Waterpl. Area m <sup>2</sup>	538,021
Prismatic coeff. (Cp)	0,394
Block coeff. (Cb)	0,188
Max Sect. area coeff. (Cm)	0,787
Waterpl. area coeff. (Cwp)	0,353
LCB from zero pt. (+ve fwd) m	29,227
LCF from zero pt. (+ve fwd) m	34,048
KB m	2,051
KG fluid m	7,570
BMt m	38,448
BML m	125,129
GMt corrected m	32,905
GML m	119,587
KMt m	40,338
KML m	126,657
Immersion (TPc) tonne/cm	5,515
MTc tonne.m	22,166
RM at 1deg = GMt.Disp.sin(1) tonne.m	885,194
Max deck inclination deg	5,2437
Trim angle (+ve by stern) deg	3,0484

Key point	Type	Freeboard m
Margin Line (freeboard pos = 62,163 m)		1,144
Deck Edge (freeboard pos = 62,163 m)		1,219
Admisión 1	Downflooding point	10,344
Admisión 2	Downflooding point	10,561
Admisión 3	Downflooding point	10,186
Admisión 4	Downflooding point	10,494
Guardacalor	Downflooding point	16,546

## Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Vacío llegada****Damage Case - DCase 3**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

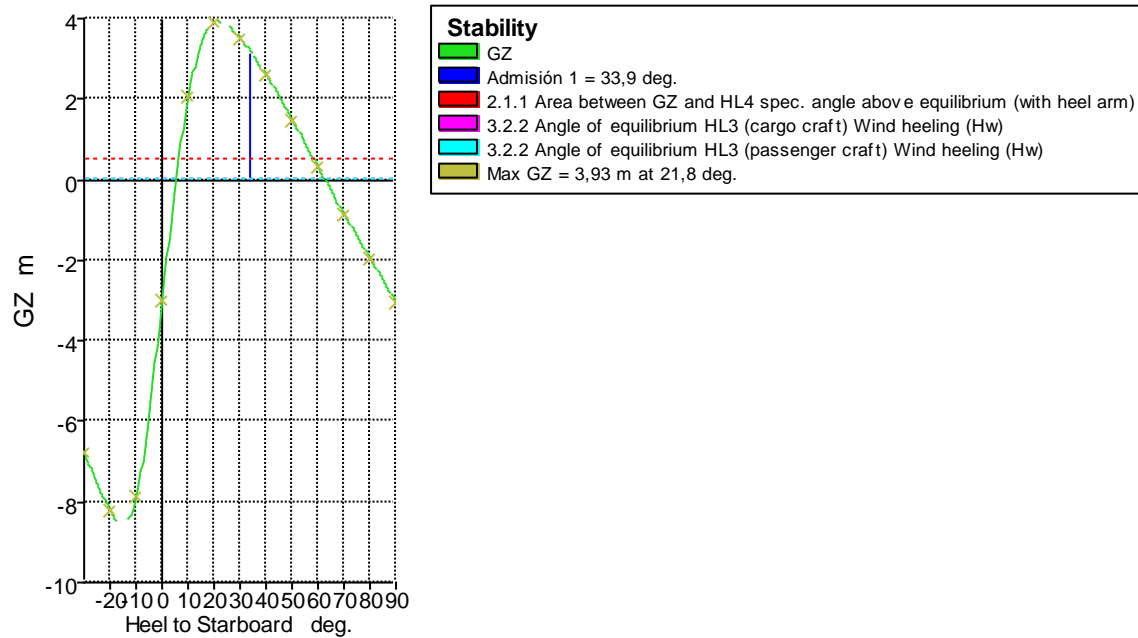
Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
CM ER	Fully flooded	85		
DF ER	Fully flooded	95		
CM 2 ER	Fully flooded	85		
DF 2 ER	Fully flooded	95		
A. Des ER	Fully flooded	95		
A. Dulce ER	Fully flooded	95		
Aceite ER	Fully flooded	95		
Lodos ER	Fully flooded	95		

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER (Damaged)	Damaged									
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER (Damaged)	Damaged									
Aceite ER (Damaged)	Damaged									
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER (Damaged)	Damaged									
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER	10%	56,972	5,697	67,823	6,782	39,923	10,373	0,298	32,213	IMO A.749(18)
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,213	IMO A.749(18)
LNG ER	10%	39,465	3,946	87,699	8,770	46,000	10,000	3,760	0,000	User Specified
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1535,026	323,387	37,629	29,557	-0,048	7,556	64,427	
FS correction								0,042		



Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m^3	Total Volume m^3	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
VCG fluid								7,598		



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-6,789	-8,216	-7,878	-2,989	2,047	3,893	3,509	2,597	1,477	0,303	-0,862	-1,982	-3,042
Area under GZ curve from zero heel m.deg	215,9897	140,5589	56,9211	0,0000	-2,8323	29,5085	67,5240	98,2286	118,7132	127,6149	124,7977	110,5296	85,3777
Displacement t	1535	1535	1535	1535	1535	1535	1535	1535	1535	1535	1535	1535	1535
Draft at FP m	-2,161	0,036	1,813	1,683	1,073	-2,185	-6,921	-12,691	-20,547	-32,573	-54,974	-118,744	n/a
Draft at AP m	0,090	2,286	3,759	4,684	5,717	8,190	11,234	14,721	19,372	26,436	39,568	77,005	n/a
WL Length m	83,209	83,213	83,206	83,151	83,295	83,649	77,766	72,658	69,565	67,553	66,098	64,904	64,261
Beam max extents on WL m	12,953	13,199	26,433	26,327	26,549	27,512	21,982	16,973	14,183	12,480	11,443	10,860	11,069
Wetted Area m^2	984,210	984,550	1265,407	1394,180	1481,341	1640,404	1907,865	2073,711	2184,447	2267,227	2334,172	2398,685	2456,112

Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
Waterpl. Area m <sup>2</sup>	360,585	337,583	479,508	518,111	491,639	351,698	285,303	241,325	207,355	180,814	153,915	142,367	119,181
Prismatic coeff. (Cp)	0,623	0,623	0,546	0,433	0,350	0,210	0,171	0,161	0,157	0,154	0,152	0,150	0,149
Block coeff. (Cb)	0,520	0,553	0,319	0,237	0,151	0,102	0,086	0,081	0,077	0,081	0,085	0,090	0,089
LCB from zero pt. (+ve fwd) m	29,336	29,350	29,408	29,363	29,258	28,856	28,309	27,783	27,316	26,979	26,781	26,738	26,867
LCF from zero pt. (+ve fwd) m	31,372	31,492	32,654	34,260	32,489	31,399	29,523	28,298	27,584	27,320	27,021	27,580	25,325
Max deck inclination deg	30,0273	20,0508	10,0859	2,0667	10,4789	21,0447	31,6850	42,0354	52,1052	61,8865	71,4114	80,7502	90,0000
Trim angle (+ve by stern) deg	1,5507	1,5497	1,3405	2,0667	3,1963	7,1114	12,3158	18,2439	25,6422	35,3591	48,6651	66,9828	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 62,163 m)		8	n/a
Deck Edge (immersion pos = 62,163 m)		8,4	n/a
Admisión 1	Downflooding point	33,9	0
Admisión 2	Downflooding point	36,6	0
Admisión 3	Downflooding point	Not immersed in positive range	0
Admisión 4	Downflooding point	Not immersed in positive range	0
Guardacalor	Downflooding point	48,2	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	34,6687	Pass	+2061,39
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	3,930	Pass	+7760,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	28,6	Pass	+308,21
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	5,4	Pass	+72,97
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	
	Wind heeling (Hw)	15,0	deg	5,4	Pass	+64,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	3,930	Pass	+7760,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	88,5400	Pass	+10207,33
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	28,6	Pass	+90,50
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	28,6	Pass	+308,21

## Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Vacío llegada****Damage Case - DCase 3**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
CM ER	Fully flooded	85		
DF ER	Fully flooded	95		
CM 2 ER	Fully flooded	85		
DF 2 ER	Fully flooded	95		
A. Des ER	Fully flooded	95		
A. Dulce ER	Fully flooded	95		
Aceite ER	Fully flooded	95		
Lodos ER	Fully flooded	95		

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER (Damaged)	Damaged									
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER (Damaged)	Damaged									
Aceite ER (Damaged)	Damaged									
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER (Damaged)	Damaged									
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER	10%	56,972	5,697	67,823	6,782	39,923	10,373	0,298	32,383	IMO A.749(18)
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,383	IMO A.749(18)
LNG ER	10%	39,465	3,946	87,699	8,770	46,000	10,000	3,760	0,000	User Specified
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1535,026	323,387	37,629	29,557	-0,048	7,556	64,766	
FS correction								0,042		

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
VCG fluid								7,598		

Draft Amidships m	3,340
Displacement t	1535
Heel deg	5,9
Draft at FP m	1,419
Draft at AP m	5,261
Draft at LCF m	3,699
Trim (+ve by stern) m	3,842
WL Length m	83,244
Beam max extents on WL m	26,372
Wetted Area m <sup>2</sup>	1449,260
Waterpl. Area m <sup>2</sup>	515,333
Prismatic coeff. (Cp)	0,383
Block coeff. (Cb)	0,175
Max Sect. area coeff. (Cm)	0,743
Waterpl. area coeff. (Cwp)	0,339
LCB from zero pt. (+ve fwd) m	29,309
LCF from zero pt. (+ve fwd) m	33,811
KB m	2,226
KG fluid m	7,598
BMt m	36,139
BML m	153,618
GMt corrected m	30,733
GML m	148,212
KMt m	38,138
KML m	154,879
Immersion (TPc) tonne/cm	5,282
MTc tonne.m	27,358
RM at 1 deg = GMt.Disp.sin(1) tonne.m	823,340
Max deck inclination deg	6,4245
Trim angle (+ve by stern) deg	2,6450

Key point	Type	Freeboard m
Margin Line (freeboard pos = 62,163 m)		0,332

Key point	Type	Freeboard m
Deck Edge (freeboard pos = 62,163 m)		0,407
Admisión 1	Downflooding point	9,776
Admisión 2	Downflooding point	9,964
Admisión 3	Downflooding point	9,399
Admisión 4	Downflooding point	9,667
Guardacalor	Downflooding point	15,968

### Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

### Loadcase - Vacío llegada

#### Damage Case - DCase 4

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

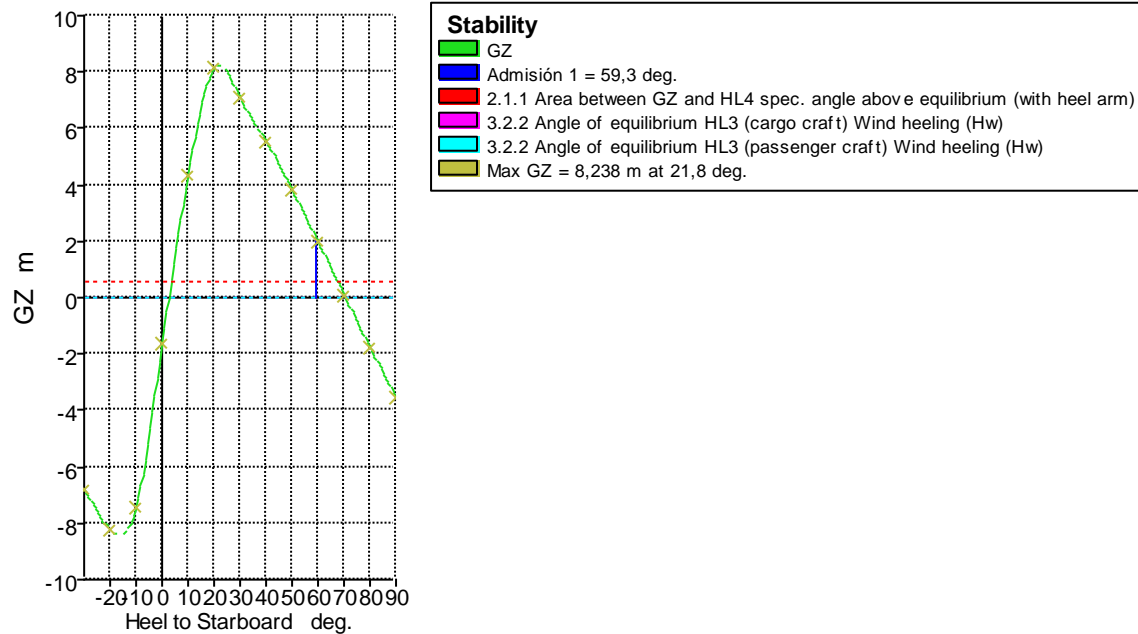
Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
CM 2 ER	Fully flooded	85		
DF 2 ER	Fully flooded	95		
A. Des ER	Fully flooded	95		
A. Dulce ER	Fully flooded	95		
Aceite ER	Fully flooded	95		
Lodos ER	Fully flooded	95		
VOID 1S ER	Fully flooded	95		
VOID 1I ER	Fully flooded	95		

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER (Damaged)	Damaged									
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER (Damaged)	Damaged									
Aceite ER (Damaged)	Damaged									

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER (Damaged)	Damaged									
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER	10%	56,972	5,697	67,823	6,782	39,923	10,373	0,298	32,213	IMO A.749(18)
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,213	IMO A.749(18)
LNG ER	10%	39,465	3,946	87,699	8,770	46,000	10,000	3,760	0,000	User Specified
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1535,026	323,387	37,629	29,557	-0,048	7,556	64,427	
FS correction								0,042		
VCG fluid								7,598		



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-6,789	-8,216	-7,419	-1,655	4,305	8,132	7,083	5,524	3,805	1,976	0,093	-1,774	-3,536
Area under GZ curve from zero heel m.deg	205,3862	129,7456	47,8927	0,0000	14,2155	79,8680	158,4863	221,2452	268,1155	297,0564	307,4353	298,9638	272,3487
Displacement t	1535	1535	1535	1535	1535	1535	1535	1535	1535	1535	1535	1535	1535
Draft at FP m	-2,161	0,036	2,076	2,398	2,431	0,804	-2,369	-5,615	-9,830	-15,996	-27,145	-58,675	n/a
Draft at AP m	0,090	2,286	3,431	3,766	4,127	4,745	4,299	2,839	0,789	-2,609	-9,379	-28,888	n/a
WL Length m	83,209	83,213	83,198	83,164	83,201	79,274	83,384	83,425	83,435	83,388	83,187	81,318	79,668
Beam max extents on WL m	12,953	13,199	26,354	26,331	26,502	25,475	14,618	14,209	13,321	12,084	10,645	10,067	10,928
Wetted Area m <sup>2</sup>	984,211	984,550	1251,608	1360,453	1426,010	1322,266	1300,910	1347,593	1391,229	1425,079	1447,311	1449,349	1441,203
Waterpl. Area m <sup>2</sup>	360,585	337,583	519,768	557,011	543,062	264,874	159,133	155,296	158,913	172,407	201,328	257,302	315,630
Prismatic coeff. (Cp)	0,623	0,623	0,591	0,531	0,481	0,438	0,354	0,330	0,317	0,310	0,308	0,313	0,313
Block coeff. (Cb)	0,520	0,553	0,337	0,479	0,276	0,241	0,259	0,263	0,260	0,258	0,256	0,254	0,270
LCB from zero pt. (+ve fwd) m	29,336	29,350	29,451	29,465	29,434	29,242	28,966	28,809	28,701	28,674	28,745	28,869	29,018
LCF from zero pt. (+ve fwd) m	31,372	31,492	30,620	32,001	31,193	31,754	46,464	48,391	49,835	50,864	51,599	52,045	51,466
Max deck inclination deg	30,0272	20,0508	10,0417	0,9428	10,0653	20,1552	30,2375	40,2057	50,1609	60,1066	70,0554	80,0195	90,0000
Trim angle (+ve by stern) deg	1,5507	1,5497	0,9332	0,9428	1,1682	2,7129	4,5842	5,8044	7,2769	9,1450	12,0592	19,7065	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 62,163 m)		5,5	n/a
Deck Edge (immersion pos = 62,163 m)		5,8	n/a
Admisión 1	Downflooding point	59,3	0
Admisión 2	Downflooding point	61,3	0
Admisión 3	Downflooding point	85,8	0
Admisión 4	Downflooding point	87,8	0
Guardacalor	Downflooding point	73,7	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	61,3348	Pass	+3723,86
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	8,238	Pass	+16376,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	56,7	Pass	+709,60
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	2,6	Pass	+86,90

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	
	Wind heeling (Hw)	15,0	deg	2,6	Pass	+82,57
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	8,238	Pass	+16376,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	297,6627	Pass	+34552,24
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	56,7	Pass	+277,81
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	56,7	Pass	+709,60

### Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

### Loadcase - Vacío llegada

#### Damage Case - DCase 4

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
CM 2 ER	Fully flooded	85		
DF 2 ER	Fully flooded	95		
A. Des ER	Fully flooded	95		
A. Dulce ER	Fully flooded	95		
Aceite ER	Fully flooded	95		
Lodos ER	Fully flooded	95		
VOID 1S ER	Fully flooded	95		
VOID 1I ER	Fully flooded	95		

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER (Damaged)	Damaged									
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER (Damaged)	Damaged									



Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Aceite ER (Damaged)	Damaged									
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER (Damaged)	Damaged									
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER	10%	56,972	5,697	67,823	6,782	39,923	10,373	0,298	32,251	IMO A.749(18)
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,251	IMO A.749(18)
LNG ER	10%	39,465	3,946	87,699	8,770	46,000	10,000	3,760	0,000	User Specified
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1535,026	323,387	37,629	29,557	-0,048	7,556	64,503	
FS correction								0,042		
VCG fluid								7,598		

Draft Amidships m	3,146
Displacement t	1535
Heel deg	2,8
Draft at FP m	2,427
Draft at AP m	3,864
Draft at LCF m	3,311
Trim (+ve by stern) m	1,437
WL Length m	83,183
Beam max extents on WL m	26,340
Wetted Area m <sup>2</sup>	1381,604
Waterpl. Area m <sup>2</sup>	556,817
Prismatic coeff. (Cp)	0,516
Block coeff. (Cb)	0,408
Max Sect. area coeff. (Cm)	0,791
Waterpl. area coeff. (Cwp)	0,601
LCB from zero pt. (+ve fwd) m	29,458
LCF from zero pt. (+ve fwd) m	32,024
KB m	1,908
KG fluid m	7,598
BMt m	39,969
BML m	176,345
GMt corrected m	34,272
GML m	170,648
KMt m	41,825

KML m	178,020
Immersion (TPc) tonne/cm	5,707
MTc tonne.m	31,499
RM at 1deg = GMT.Disp.sin(1) tonne.m	918,138
Max deck inclination deg	2,9482
Trim angle (+ve by stern) deg	0,9899

Key point	Type	Freeboard m
Margin Line (freeboard pos = 62,163 m)		0,567
Deck Edge (freeboard pos = 62,163 m)		0,642
Admisión 1	Downflooding point	11,282
Admisión 2	Downflooding point	11,353
Admisión 3	Downflooding point	9,624
Admisión 4	Downflooding point	9,725
Guardacalor	Downflooding point	17,428

### Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura nava\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

### Loadcase - Vacío llegada

#### Damage Case - DCase 5

Free to Trim

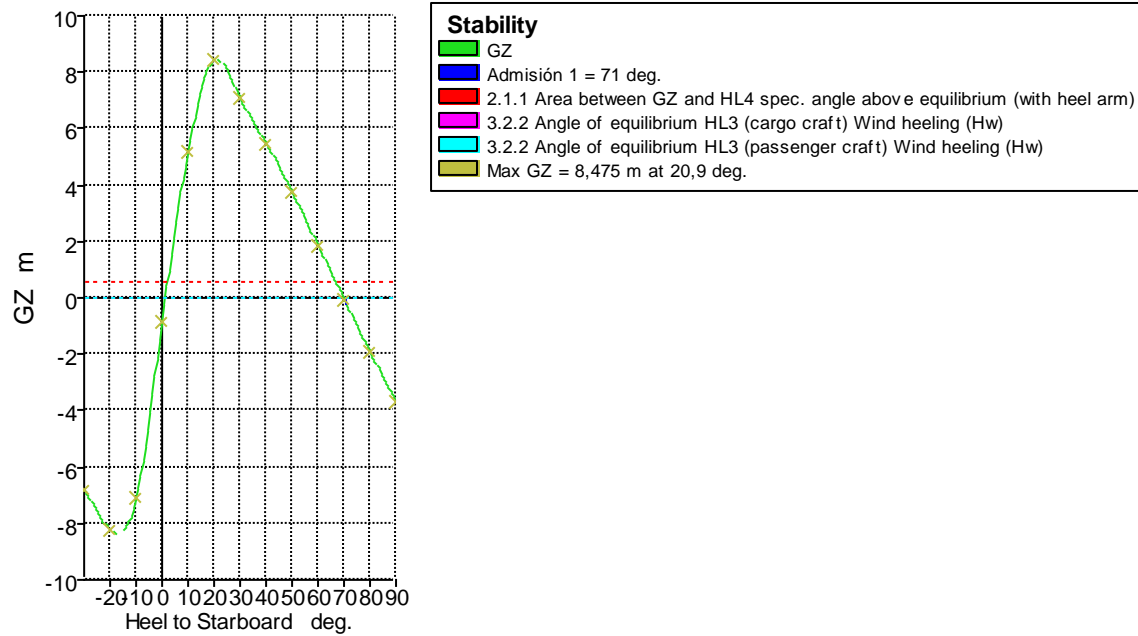
Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
VOID 1S ER	Fully flooded	95		
VOID 1I ER	Fully flooded	95		
Local LNG ER	Fully flooded	60		
Diesel ER	Fully flooded	95		
LNG ER Fully flooded	95			

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m^3	Total Volume m^3	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	90%	4,695	4,225	4,695	4,225	20,001	11,727	0,835	0,000	User Specified
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER	10%	4,805	0,481	4,805	0,481	20,017	9,476	0,253	0,000	User Specified
Aceite ER	10%	0,850	0,085	0,924	0,092	31,495	8,799	0,407	0,000	User Specified
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER	90%	1,765	1,588	1,918	1,726	31,499	11,744	0,826	0,000	User Specified
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER (Damaged)	Damaged									
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,213	IMO A.749(18)
LNG ER (Damaged)	Damaged									
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1531,761	180,206	28,601	29,448	-0,064	7,565	32,213	
FS correction								0,021		
VCG fluid								7,586		



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-6,783	-8,205	-7,123	-0,832	5,183	8,442	7,078	5,487	3,723	1,851	-0,060	-1,930	-3,690
Area under GZ curve from zero heel m.deg	198,5419	122,8583	42,2332	0,0000	23,3445	95,0991	174,8902	237,3483	283,6577	311,5552	320,5259	310,4930	282,3275
Displacement t	1532	1532	1532	1532	1532	1532	1532	1532	1532	1532	1532	1532	1532
Draft at FP m	-2,244	-0,044	2,068	2,525	3,081	3,170	1,143	-1,386	-4,815	-10,103	-19,993	-48,113	n/a
Draft at AP m	0,123	2,318	3,319	3,387	3,402	2,461	0,243	-2,355	-5,695	-10,595	-19,483	-44,419	n/a
WL Length m	83,210	83,215	83,196	83,162	82,981	76,496	76,499	76,501	76,504	76,508	76,513	76,516	76,496
Beam max extents on WL m	12,964	13,206	26,305	26,315	26,404	13,357	13,183	12,913	12,732	12,320	10,621	10,527	10,787
Wetted Area m^2	980,376	980,721	1230,929	1318,487	1408,063	1219,729	1222,584	1234,006	1260,070	1306,092	1333,440	1345,176	1370,485
Waterpl. Area m^2	361,056	338,017	551,162	588,727	538,098	268,979	265,446	245,978	242,353	253,667	282,739	330,578	379,262
Prismatic coeff. (Cp)	0,620	0,620	0,610	0,586	0,559	0,596	0,595	0,585	0,563	0,523	0,484	0,449	0,417
Block coeff. (Cb)	0,518	0,550	0,345	0,520	0,321	0,516	0,499	0,463	0,412	0,374	0,385	0,390	0,397
LCB from zero pt. (+ve fwd) m	29,217	29,232	29,358	29,391	29,421	29,504	29,533	29,538	29,530	29,486	29,430	29,365	29,325
LCF from zero pt. (+ve fwd) m	31,422	31,535	29,693	31,016	29,331	28,251	28,295	28,594	28,526	28,414	28,328	29,464	32,016

Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
Max deck inclination deg	30,0301	20,0560	10,0356	0,5937	10,0024	20,0051	30,0044	40,0027	50,0011	60,0001	70,0000	80,0003	90,0000
Trim angle (+ve by stern) deg	1,6305	1,6268	0,8615	0,5937	0,2215	-0,4886	-0,6205	-0,6677	-0,6063	-0,3395	0,3510	2,5436	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 62,163 m)		4,8	n/a
Deck Edge (immersion pos = 62,163 m)		5,1	n/a
Admisión 1	Downflooding point	71	0
Admisión 2	Downflooding point	71,1	0
Admisión 3	Downflooding point	82	0
Admisión 4	Downflooding point	82,5	0
Guardacalor	Downflooding point	79,4	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	62,7708	Pass	+3813,39
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	8,475	Pass	+16850,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	68,5	Pass	+878,16
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	1,2	Pass	+93,76
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	
	Wind heeling (Hw)	15,0	deg	1,2	Pass	+91,72
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	8,475	Pass	+16850,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	321,0384	Pass	+37273,50
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	68,5	Pass	+356,47
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	68,5	Pass	+878,16

Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Vacío llegada****Damage Case - DCase 5**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
VOID 1S ER	Fully flooded	95		
VOID 1I ER	Fully flooded	95		
Local LNG ER	Fully flooded	60		
Diesel ER	Fully flooded	95		
LNG ER Fully flooded	95			

VOID 1S ER Fully flooded 95

VOID 1I ER Fully flooded 95

Local LNG ER Fully flooded 60

Diesel ER Fully flooded 95

LNG ER Fully flooded 95

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	90%	4,695	4,225	4,695	4,225	20,001	11,727	0,835	0,000	User Specified
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER	10%	4,805	0,481	4,805	0,481	20,017	9,476	0,253	0,000	User Specified
Aceite ER	10%	0,850	0,085	0,924	0,092	31,495	8,799	0,407	0,000	User Specified
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER	90%	1,765	1,588	1,918	1,726	31,499	11,744	0,826	0,000	User Specified
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER (Damaged)	Damaged									
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,222	IMO A.749(18)
LNG ER (Damaged)	Damaged									
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1531,761	180,206	28,601	29,448	-0,064	7,565	32,222	
FS correction								0,021		
VCG fluid								7,586		

Draft Amidships m	2,984
Displacement t	1532

Heel deg	1,3
Draft at FP m	2,575
Draft at AP m	3,394
Draft at LCF m	3,096
Trim (+ve by stern) m	0,818
WL Length m	83,171
Beam max extents on WL m	26,320
Wetted Area m <sup>2</sup>	1327,928
Waterpl. Area m <sup>2</sup>	569,745
Prismatic coeff. (Cp)	0,583
Block coeff. (Cb)	0,480
Max Sect. area coeff. (Cm)	0,832
Waterpl. area coeff. (Cwp)	0,616
LCB from zero pt. (+ve fwd) m	29,396
LCF from zero pt. (+ve fwd) m	30,297
KB m	1,761
KG fluid m	7,586
BMt m	41,210
BML m	204,499
GMt corrected m	35,383
GML m	198,672
KMt m	42,957
KML m	206,195
Immersion (TPc) tonne/cm	5,840
MTc tonne.m	36,594
RM at 1deg = GMt.Disp.sin(1) tonne.m	945,886
Max deck inclination deg	1,4413
Trim angle (+ve by stern) deg	0,5638

Key point	Type	Freeboard m
Margin Line (freeboard pos = 62,163 m)		0,871
Deck Edge (freeboard pos = 62,163 m)		0,947
Admisión 1	Downflooding point	11,922
Admisión 2	Downflooding point	11,963
Admisión 3	Downflooding point	9,909
Admisión 4	Downflooding point	9,966
Guardacalor	Downflooding point	18,049

## Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.:%: 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Vacío llegada****Damage Case - DCase 6**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
Local LNG ER	Fully flooded	60		
Diesel ER	Fully flooded	95		
VOID 3I ER	Fully flooded	95		
LNG ER Fully flooded	95			

Local LNG ER Fully flooded 60

Diesel ER Fully flooded 95

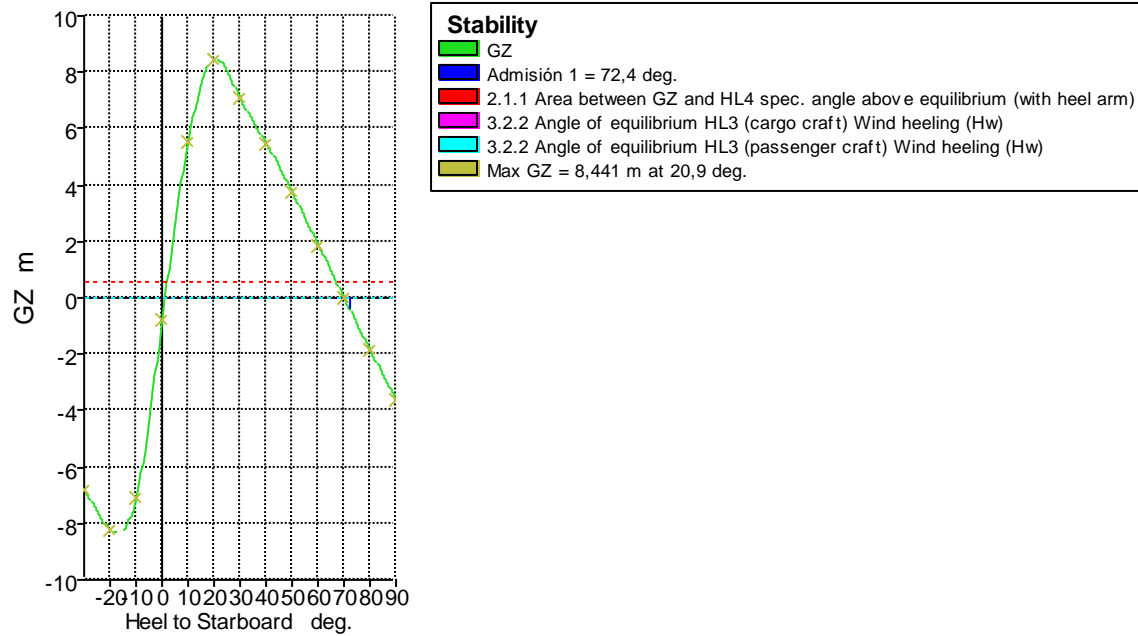
VOID 3I ER Fully flooded 95

LNG ER Fully flooded 95

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	90%	4,695	4,225	4,695	4,225	20,001	11,727	0,835	0,000	User Specified
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER	10%	4,805	0,481	4,805	0,481	20,017	9,476	0,253	0,000	User Specified
Aceite ER	10%	0,850	0,085	0,924	0,092	31,495	8,799	0,407	0,000	User Specified
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER	90%	1,765	1,588	1,918	1,726	31,499	11,744	0,826	0,000	User Specified
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER (Damaged)	Damaged									
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,213	IMO A.749(18)
LNG ER (Damaged)	Damaged									
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1531,761	180,206	28,601	29,448	-0,064	7,565	32,213	
FS correction								0,021		
VCG fluid								7,586		





Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-6,783	-8,205	-7,093	-0,814	5,547	8,432	7,062	5,484	3,734	1,878	-0,013	-1,866	-3,622
Area under GZ curve from zero heel m.deg	198,3898	122,6509	42,2682	0,0000	25,4863	99,2492	178,5912	241,0267	287,3561	315,4408	324,7742	315,3064	287,8105
Displacement t	1532	1532	1532	1532	1532	1532	1532	1532	1532	1532	1532	1532	1532
Draft at FP m	-2,243	-0,044	2,087	2,663	3,103	2,971	0,916	-1,636	-5,116	-10,450	-20,427	-48,733	n/a
Draft at AP m	0,123	2,318	3,296	3,296	3,248	2,094	-0,139	-2,822	-6,252	-11,279	-20,381	-46,081	n/a
WL Length m	83,210	83,215	83,196	83,165	82,992	76,508	76,511	76,515	76,523	76,588	76,670	76,684	76,508
Beam max extents on WL m	12,964	13,206	26,295	26,311	26,359	13,258	13,026	12,665	12,377	12,505	10,671	10,696	10,874
Wetted Area m^2	980,393	980,721	1229,943	1326,325	1385,661	1177,321	1178,189	1182,298	1199,510	1242,413	1273,354	1296,697	1325,060
Waterpl. Area m^2	361,053	338,017	552,173	591,536	558,861	284,261	298,874	291,961	291,316	306,661	337,086	373,088	416,158
Prismatic coeff. (Cp)	0,620	0,620	0,614	0,596	0,581	0,630	0,631	0,627	0,609	0,568	0,519	0,478	0,443
Block coeff. (Cb)	0,518	0,550	0,347	0,525	0,329	0,544	0,523	0,486	0,435	0,370	0,385	0,406	0,418
LCB from zero pt. (+ve fwd) m	29,218	29,232	29,354	29,407	29,436	29,518	29,548	29,561	29,546	29,509	29,450	29,392	29,346
LCF from zero pt. (+ve fwd) m	31,422	31,535	29,326	30,628	29,607	28,300	27,940	28,195	28,468	28,609	28,819	30,298	32,823

Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
Max deck inclination deg	30,0301	20,0560	10,0333	0,4364	10,0005	20,0077	30,0060	40,0041	50,0019	60,0004	70,0000	80,0002	90,0000
Trim angle (+ve by stern) deg	1,6299	1,6268	0,8332	0,4364	0,0995	-0,6044	-0,7269	-0,8165	-0,7831	-0,5708	0,0316	1,8263	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 62,163 m)		4,7	n/a
Deck Edge (immersion pos = 62,163 m)		5	n/a
Admisión 1	Downflooding point	72,4	0
Admisión 2	Downflooding point	72,4	0
Admisión 3	Downflooding point	83,1	0
Admisión 4	Downflooding point	83,5	0
Guardacalor	Downflooding point	80,1	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	65,7090	Pass	+3996,57
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	8,441	Pass	+16782,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	68,8	Pass	+882,81
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	1,2	Pass	+94,18
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	
	Wind heeling (Hw)	15,0	deg	1,2	Pass	+92,27
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	8,441	Pass	+16782,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	325,2349	Pass	+37762,03
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	68,8	Pass	+358,65
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	68,8	Pass	+882,81

Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Vacío llegada****Damage Case - DCase 6**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
Local LNG ER	Fully flooded	60		
Diesel ER	Fully flooded	95		
VOID 3I ER	Fully flooded	95		
LNG ER Fully flooded		95		

Local LNG ER Fully flooded 60

Diesel ER Fully flooded 95

VOID 3I ER Fully flooded 95

LNG ER Fully flooded 95

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	90%	4,695	4,225	4,695	4,225	20,001	11,727	0,835	0,000	User Specified
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER	10%	4,805	0,481	4,805	0,481	20,017	9,476	0,253	0,000	User Specified
Aceite ER	10%	0,850	0,085	0,924	0,092	31,495	8,799	0,407	0,000	User Specified
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER	90%	1,765	1,588	1,918	1,726	31,499	11,744	0,826	0,000	User Specified
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER (Damaged)	Damaged									
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,221	IMO A.749(18)
LNG ER (Damaged)	Damaged									
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1531,761	180,206	28,601	29,448	-0,064	7,565	32,221	
FS correction								0,021		
VCG fluid								7,586		

Draft Amidships m	3,000
Displacement t	1532
Heel deg	1,2

Draft at FP m	2,704
Draft at AP m	3,296
Draft at LCF m	3,079
Trim (+ve by stern) m	0,592
WL Length m	83,172
Beam max extents on WL m	26,316
Wetted Area m <sup>2</sup>	1333,188
Waterpl. Area m <sup>2</sup>	593,627
Prismatic coeff. (Cp)	0,594
Block coeff. (Cb)	0,487
Max Sect. area coeff. (Cm)	0,832
Waterpl. area coeff. (Cwp)	0,642
LCB from zero pt. (+ve fwd) m	29,405
LCF from zero pt. (+ve fwd) m	30,499
KB m	1,753
KG fluid m	7,586
BMt m	43,278
BML m	203,323
GMt corrected m	37,445
GML m	197,489
KMt m	45,020
KML m	205,023
Immersion (TPc) tonne/cm	6,085
MTc tonne.m	36,376
RM at 1deg = GMt.Disp.sin(1) tonne.m	1001,001
Max deck inclination deg	1,3086
Trim angle (+ve by stern) deg	0,4077

Key point	Type	Freeboard m
Margin Line (freeboard pos = 62,163 m)		0,817
Deck Edge (freeboard pos = 62,163 m)		0,892
Admisión 1	Downflooding point	11,981
Admisión 2	Downflooding point	12,010
Admisión 3	Downflooding point	9,855
Admisión 4	Downflooding point	9,896
Guardacalor	Downflooding point	18,102

## Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Vacío llegada****Damage Case - DCase 7**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
Local LNG ER	Fully flooded	60		
VOID 3I ER	Fully flooded	95		
VOID 4I ER	Fully flooded	95		
LNG ER Fully flooded		95		

Local LNG ER Fully flooded 95

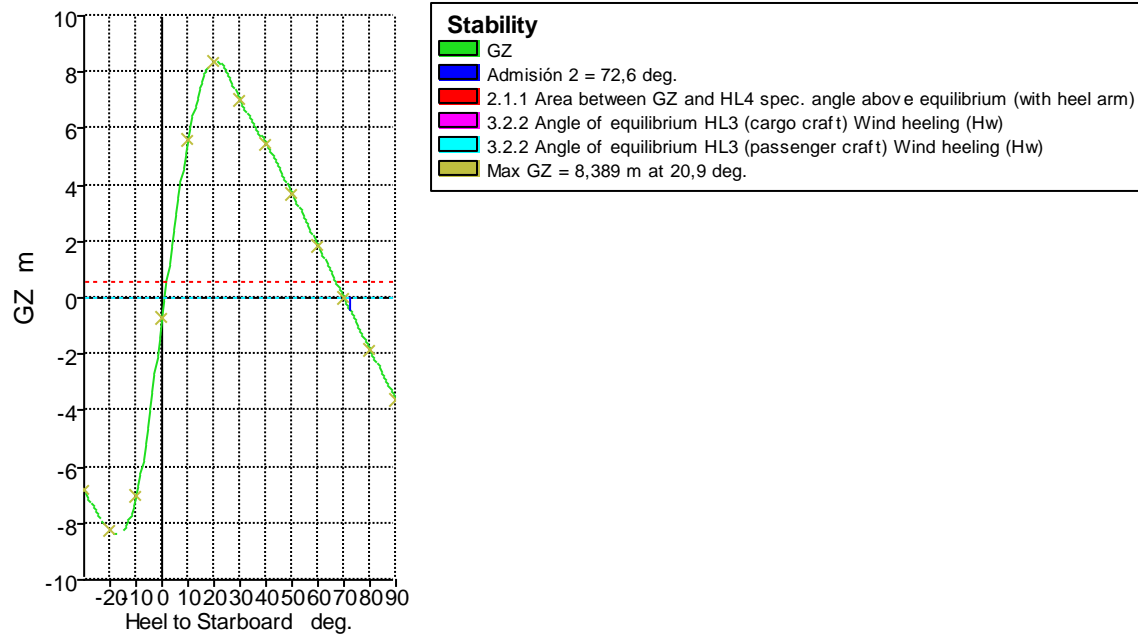
VOID 3I ER Fully flooded 95

VOID 4I ER Fully flooded 95

LNG ER Fully flooded 95

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	90%	4,695	4,225	4,695	4,225	20,001	11,727	0,835	0,000	User Specified
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER	10%	4,805	0,481	4,805	0,481	20,017	9,476	0,253	0,000	User Specified
Aceite ER	10%	0,850	0,085	0,924	0,092	31,495	8,799	0,407	0,000	User Specified
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER	90%	1,765	1,588	1,918	1,726	31,499	11,744	0,826	0,000	User Specified
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER	10%	56,972	5,697	67,823	6,782	39,923	10,373	0,298	32,213	IMO A.749(18)
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,213	IMO A.749(18)
LNG ER (Damaged)	Damaged									
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1537,459	248,030	35,383	29,487	-0,026	7,538	64,427	
FS correction								0,042		
VCG fluid								7,580		



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-6,820	-8,245	-7,053	-0,728	5,582	8,383	7,010	5,435	3,693	1,847	-0,031	-1,871	-3,621
Area under GZ curve from zero heel m.deg	198,1623	121,9801	41,5676	0,0000	26,1619	99,8238	178,6177	240,5556	286,4291	314,1526	323,2375	313,6618	286,1540
Displacement t	1537	1537	1538	1537	1537	1537	1537	1537	1537	1537	1537	1537	1537
Draft at FP m	-2,203	-0,006	2,103	2,749	3,213	3,218	1,180	-1,346	-4,771	-10,028	-19,843	-47,661	n/a
Draft at AP m	0,127	2,323	3,282	3,214	3,156	1,905	-0,336	-3,041	-6,515	-11,602	-20,812	-46,831	n/a
WL Length m	83,210	83,214	83,196	83,167	83,036	76,502	76,505	76,509	76,510	76,512	76,513	76,510	76,491
Beam max extents on WL m	12,967	13,208	26,290	26,308	26,335	13,224	12,977	12,598	12,279	12,387	10,668	10,717	10,874
Wetted Area m^2	983,926	984,206	1230,307	1326,923	1387,277	1178,671	1179,618	1183,162	1200,028	1243,129	1279,846	1308,544	1336,547
Waterpl. Area m^2	360,819	337,838	558,733	590,379	557,837	286,003	300,401	297,884	295,756	310,075	343,098	372,780	408,165
Prismatic coeff. (Cp)	0,621	0,621	0,618	0,609	0,592	0,642	0,642	0,639	0,622	0,584	0,534	0,490	0,452
Block coeff. (Cb)	0,519	0,551	0,349	0,533	0,333	0,542	0,524	0,490	0,441	0,376	0,389	0,415	0,427
LCB from zero pt. (+ve fwd) m	29,261	29,274	29,395	29,458	29,490	29,593	29,632	29,647	29,637	29,601	29,538	29,470	29,420
LCF from zero pt. (+ve fwd) m	31,399	31,510	29,142	30,239	29,682	28,507	28,079	27,879	28,014	28,086	28,476	29,589	31,626

Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
Max deck inclination deg	30,0292	20,0544	10,0316	0,3200	10,0001	20,0173	30,0124	40,0083	50,0044	60,0015	70,0002	80,0000	90,0000
Trim angle (+ve by stern) deg	1,6053	1,6041	0,8125	0,3200	-0,0392	-0,9046	-1,0445	-1,1675	-1,2014	-1,0841	-0,6677	0,5718	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 62,163 m)		4,5	n/a
Deck Edge (immersion pos = 62,163 m)		4,8	n/a
Admisión 1	Downflooding point	72,6	0
Admisión 2	Downflooding point	72,6	0
Admisión 3	Downflooding point	82,4	0
Admisión 4	Downflooding point	82,7	0
Guardacalor	Downflooding point	80,3	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	65,3732	Pass	+3975,64
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	8,389	Pass	+16678,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	68,8	Pass	+883,14
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	1,0	Pass	+94,77
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	
	Wind heeling (Hw)	15,0	deg	1,0	Pass	+93,07
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	8,389	Pass	+16678,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	323,6089	Pass	+37572,75
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	68,8	Pass	+358,80
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	68,8	Pass	+883,14

Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Vacío llegada****Damage Case - DCase 7**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
Local LNG ER	Fully flooded	60		
VOID 3I ER	Fully flooded	95		
VOID 4I ER	Fully flooded	95		
LNG ER Fully flooded		95		

Local LNG ER Fully flooded 95

VOID 3I ER Fully flooded 95

VOID 4I ER Fully flooded 95

LNG ER Fully flooded 95

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	90%	4,695	4,225	4,695	4,225	20,001	11,727	0,835	0,000	User Specified
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER	10%	4,805	0,481	4,805	0,481	20,017	9,476	0,253	0,000	User Specified
Aceite ER	10%	0,850	0,085	0,924	0,092	31,495	8,799	0,407	0,000	User Specified
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER	90%	1,765	1,588	1,918	1,726	31,499	11,744	0,826	0,000	User Specified
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER	10%	56,972	5,697	67,823	6,782	39,923	10,373	0,298	32,220	IMO A.749(18)
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,220	IMO A.749(18)
LNG ER (Damaged)	Damaged									
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1537,459	248,030	35,383	29,487	-0,026	7,538	64,439	
FS correction								0,042		
VCG fluid								7,580		

Draft Amidships m	3,004
Displacement t	1538
Heel deg	1,1



Draft at FP m	2,796
Draft at AP m	3,213
Draft at LCF m	3,060
Trim (+ve by stern) m	0,417
WL Length m	83,173
Beam max extents on WL m	26,311
Wetted Area m <sup>2</sup>	1334,513
Waterpl. Area m <sup>2</sup>	593,753
Prismatic coeff. (Cp)	0,607
Block coeff. (Cb)	0,497
Max Sect. area coeff. (Cm)	0,835
Waterpl. area coeff. (Cwp)	0,643
LCB from zero pt. (+ve fwd) m	29,452
LCF from zero pt. (+ve fwd) m	30,525
KB m	1,738
KG fluid m	7,580
BMt m	43,116
BML m	202,748
GMt corrected m	37,273
GML m	196,904
KMt m	44,845
KML m	204,443
Immersion (TPc) tonne/cm	6,086
MTc tonne.m	36,407
RM at 1deg = GMt.Disp.sin(1) tonne.m	1000,212
Max deck inclination deg	1,1691
Trim angle (+ve by stern) deg	0,2870

Key point	Type	Freeboard m
Margin Line (freeboard pos = 62,163 m)		0,792
Deck Edge (freeboard pos = 62,163 m)		0,868
Admisión 1	Downflooding point	12,044
Admisión 2	Downflooding point	12,065
Admisión 3	Downflooding point	9,829
Admisión 4	Downflooding point	9,859
Guardacalor	Downflooding point	18,161

## Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Vacío llegada****Damage Case - DCase 8**

Free to Trim

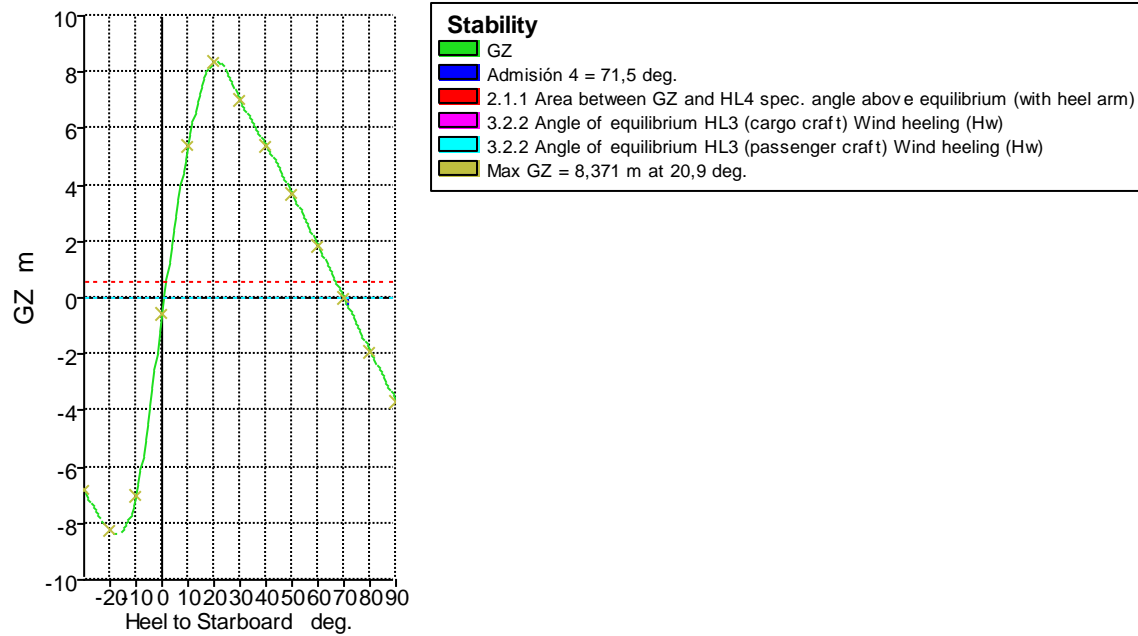
Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
Local LNG ER	Fully flooded	60		
VOID 4I ER	Fully flooded	95		
VOID 5S ER	Fully flooded	95		
VOID 5I ER	Fully flooded	95		
LNG ER Fully flooded		95		

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	90%	4,695	4,225	4,695	4,225	20,001	11,727	0,835	0,000	User Specified
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER	10%	4,805	0,481	4,805	0,481	20,017	9,476	0,253	0,000	User Specified
Aceite ER	10%	0,850	0,085	0,924	0,092	31,495	8,799	0,407	0,000	User Specified
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER	90%	1,765	1,588	1,918	1,726	31,499	11,744	0,826	0,000	User Specified
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER	10%	56,972	5,697	67,823	6,782	39,923	10,373	0,298	32,213	IMO A.749(18)
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,213	IMO A.749(18)
LNG ER (Damaged)	Damaged									
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1537,459	248,030	35,383	29,487	-0,026	7,538	64,427	
FS correction								0,042		
VCG fluid								7,580		



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-6,820	-8,245	-6,994	-0,591	5,373	8,350	7,003	5,424	3,688	1,848	-0,034	-1,892	-3,663
Area under GZ curve from zero heel m.deg	196,7253	120,5353	40,2921	0,0000	25,7305	97,9187	176,6932	238,5030	284,2981	312,0066	321,0965	311,4048	283,5774
Displacement t	1537	1537	1538	1537	1537	1537	1537	1537	1537	1537	1537	1538	1537
Draft at FP m	-2,205	-0,006	2,073	2,758	3,588	4,822	3,169	1,124	-1,597	-5,947	-14,236	-37,563	n/a
Draft at AP m	0,129	2,323	3,279	3,159	3,007	1,390	-0,952	-3,761	-7,430	-12,779	-22,473	-49,993	n/a
WL Length m	83,210	83,214	83,196	83,167	83,110	82,877	77,379	77,595	77,890	78,067	78,209	78,641	79,960
Beam max extents on WL m	12,968	13,208	26,285	26,305	26,307	22,699	13,003	12,737	12,562	12,429	10,905	10,725	10,805
Wetted Area m^2	983,863	984,206	1224,760	1319,151	1420,384	1263,961	1258,438	1279,779	1318,971	1382,995	1431,666	1468,968	1519,848
Waterpl. Area m^2	360,829	337,838	564,401	600,130	539,974	280,752	260,300	256,575	255,256	264,571	283,002	305,724	331,470
Prismatic coeff. (Cp)	0,621	0,621	0,620	0,618	0,595	0,581	0,615	0,600	0,573	0,533	0,496	0,465	0,431
Block coeff. (Cb)	0,519	0,551	0,350	0,539	0,328	0,425	0,431	0,402	0,370	0,333	0,353	0,398	0,415
LCB from zero pt. (+ve fwd) m	29,258	29,274	29,393	29,462	29,527	29,777	29,876	29,943	29,981	29,956	29,882	29,785	29,715
LCF from zero pt. (+ve fwd) m	31,400	31,510	29,032	30,112	28,922	28,016	23,564	22,158	21,561	21,622	22,142	23,114	24,214

Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
Max deck inclination deg	30,0293	20,0544	10,0331	0,2761	10,0077	20,1179	30,0912	40,0690	50,0488	60,0279	70,0120	80,0034	90,0000
Trim angle (+ve by stern) deg	1,6076	1,6041	0,8309	0,2761	-0,4001	-2,3635	-2,8374	-3,3618	-4,0122	-4,6967	-5,6567	-8,5010	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 62,163 m)		4,1	n/a
Deck Edge (immersion pos = 62,163 m)		4,4	n/a
Admisión 1	Downflooding point	72,3	0
Admisión 2	Downflooding point	71,7	0
Admisión 3	Downflooding point	72,9	0
Admisión 4	Downflooding point	71,5	0
Guardacalor	Downflooding point	80	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	62,5643	Pass	+3800,52
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	8,371	Pass	+16642,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	69,0	Pass	+885,26
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	0,9	Pass	+95,58
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	
	Wind heeling (Hw)	15,0	deg	0,9	Pass	+94,15
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	8,371	Pass	+16642,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	321,3513	Pass	+37309,93
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	69,0	Pass	+359,79
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	69,0	Pass	+885,26

Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.‰: 0,01000(0,100); Trim‰(LCG-TCG): 0,01000(0,100); Heel‰(LCG-TCG): 0,01000(0,100)

**Loadcase - Vacío llegada****Damage Case - DCase 8**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.‰	PartFlood.‰	PartFlood.WL
Local LNG ER	Fully flooded	60		
VOID 4I ER	Fully flooded	95		
VOID 5S ER	Fully flooded	95		
VOID 5I ER	Fully flooded	95		
LNG ER Fully flooded		95		

Local LNG ER Fully flooded 60

VOID 4I ER Fully flooded 95

VOID 5S ER Fully flooded 95

VOID 5I ER Fully flooded 95

LNG ER Fully flooded 95

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	90%	4,695	4,225	4,695	4,225	20,001	11,727	0,835	0,000	User Specified
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER	10%	4,805	0,481	4,805	0,481	20,017	9,476	0,253	0,000	User Specified
Aceite ER	10%	0,850	0,085	0,924	0,092	31,495	8,799	0,407	0,000	User Specified
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER	90%	1,765	1,588	1,918	1,726	31,499	11,744	0,826	0,000	User Specified
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER	10%	56,972	5,697	67,823	6,782	39,923	10,373	0,298	32,218	IMO A.749(18)
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,218	IMO A.749(18)
LNG ER (Damaged)	Damaged									
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1537,459	248,030	35,383	29,487	-0,026	7,538	64,436	
FS correction									0,042	
VCG fluid								7,580		

Draft Amidships m	2,986
Displacement t	1538

Heel deg	1,0
Draft at FP m	2,824
Draft at AP m	3,148
Draft at LCF m	3,032
Trim (+ve by stern) m	0,324
WL Length m	83,173
Beam max extents on WL m	26,307
Wetted Area m <sup>2</sup>	1328,429
Waterpl. Area m <sup>2</sup>	576,207
Prismatic coeff. (Cp)	0,617
Block coeff. (Cb)	0,508
Max Sect. area coeff. (Cm)	0,842
Waterpl. area coeff. (Cwp)	0,624
LCB from zero pt. (+ve fwd) m	29,473
LCF from zero pt. (+ve fwd) m	29,710
KB m	1,716
KG fluid m	7,580
BMt m	41,619
BML m	197,510
GMt corrected m	35,754
GML m	191,645
KMt m	43,329
KML m	199,197
Immersion (TPc) tonne/cm	5,906
MTc tonne.m	35,435
RM at 1deg = GMt.Disp.sin(1) tonne.m	959,464
Max deck inclination deg	0,9770
Trim angle (+ve by stern) deg	0,2234

Key point	Type	Freeboard m
Margin Line (freeboard pos = 62,163 m)		0,824
Deck Edge (freeboard pos = 62,163 m)		0,9
Admisión 1	Downflooding point	12,125
Admisión 2	Downflooding point	12,141
Admisión 3	Downflooding point	9,859
Admisión 4	Downflooding point	9,882
Guardacalor	Downflooding point	18,240

## Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Vacío llegada****Damage Case - DCase 9**

Free to Trim

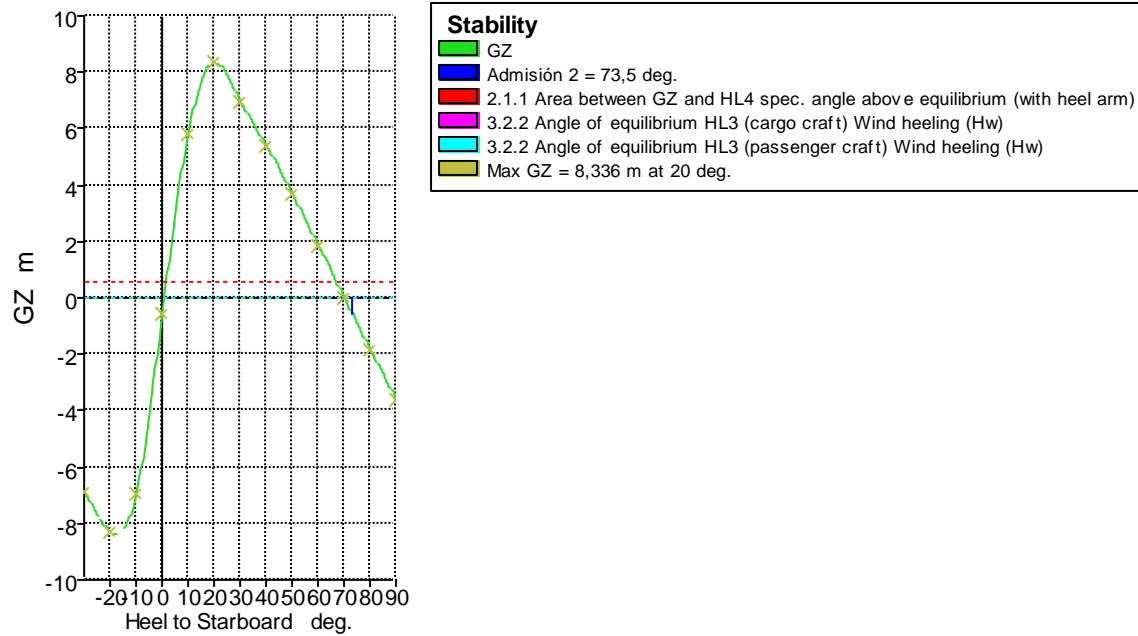
Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
VOID 5S ER	Fully flooded	95		
VOID 5I ER	Fully flooded	95		
VOID 6S ER	Fully flooded	95		
Prop. Proa ER	Fully flooded	85		

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	90%	4,695	4,225	4,695	4,225	20,001	11,727	0,835	0,000	User Specified
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER	10%	4,805	0,481	4,805	0,481	20,017	9,476	0,253	0,000	User Specified
Aceite ER	10%	0,850	0,085	0,924	0,092	31,495	8,799	0,407	0,000	User Specified
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER	90%	1,765	1,588	1,918	1,726	31,499	11,744	0,826	0,000	User Specified
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER	10%	56,972	5,697	67,823	6,782	39,923	10,373	0,298	32,213	IMO A.749(18)
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,213	IMO A.749(18)
LNG ER	10%	39,465	3,946	87,699	8,770	46,000	10,000	3,760	0,000	User Specified
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1541,405	335,729	44,153	29,530	0,000	7,528	64,427	
FS correction								0,042		
VCG fluid								7,570		



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-6,849	-8,274	-6,959	-0,575	5,832	8,336	6,976	5,405	3,689	1,875	0,016	-1,824	-3,587
Area under GZ curve from zero heel m.deg	197,0291	120,4598	40,3713	0,0000	28,3925	103,1181	181,2923	242,9627	288,6340	316,4866	325,9653	316,8717	289,7694
Displacement t	1541	1541	1541	1541	1541	1541	1541	1541	1541	1541	1541	1541	1541
Draft at FP m	-2,167	0,031	2,059	2,868	3,590	4,829	2,965	0,694	-2,266	-6,750	-15,110	-38,391	n/a
Draft at AP m	0,125	2,320	3,282	3,086	2,814	0,778	-1,527	-4,323	-8,032	-13,539	-23,610	-52,420	n/a
WL Length m	83,210	83,214	83,196	83,169	83,111	82,906	77,173	77,177	77,237	77,367	77,599	78,244	79,768
Beam max extents on WL m	12,968	13,208	26,285	26,302	26,211	22,110	12,805	12,446	12,133	12,166	11,114	10,867	10,893
Wetted Area m^2	986,624	986,962	1222,982	1325,500	1386,486	1206,679	1200,040	1209,453	1233,657	1290,222	1356,819	1406,162	1463,444
Waterpl. Area m^2	360,572	337,659	569,748	601,876	572,621	307,643	305,527	311,557	318,460	327,236	342,495	362,868	387,138
Prismatic coeff. (Cp)	0,622	0,623	0,621	0,628	0,627	0,624	0,666	0,657	0,636	0,597	0,549	0,509	0,468
Block coeff. (Cb)	0,520	0,552	0,350	0,543	0,339	0,427	0,443	0,426	0,402	0,368	0,375	0,426	0,445
LCB from zero pt. (+ve fwd) m	29,304	29,320	29,434	29,514	29,582	29,875	29,958	30,004	30,017	30,000	29,939	29,869	29,804
LCF from zero pt. (+ve fwd) m	31,373	31,487	29,002	29,748	29,517	28,102	25,766	24,468	23,617	23,815	24,610	25,754	26,975



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
Max deck inclination deg	30,0283	20,0525	10,0340	0,1503	10,0137	20,1641	30,1082	40,0727	50,0477	60,0275	70,0127	80,0043	90,0000
Trim angle (+ve by stern) deg	1,5790	1,5764	0,8427	0,1503	-0,5344	-2,7894	-3,0919	-3,4524	-3,9670	-4,6676	-5,8365	-9,5754	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 62,163 m)		4	n/a
Deck Edge (immersion pos = 62,163 m)		4,3	n/a
Admisión 1	Downflooding point	74,1	0
Admisión 2	Downflooding point	73,5	0
Admisión 3	Downflooding point	75,2	0
Admisión 4	Downflooding point	73,9	0
Guardacalor	Downflooding point	81,1	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	66,5564	Pass	+4049,40
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	8,336	Pass	+16572,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	69,3	Pass	+890,04
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	0,8	Pass	+95,93
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	
	Wind heeling (Hw)	15,0	deg	0,8	Pass	+94,61
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	8,336	Pass	+16572,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	326,1916	Pass	+37873,41
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	69,3	Pass	+362,02
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	69,3	Pass	+890,04

Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Vacío llegada****Damage Case - DCase 9**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
VOID 5S ER	Fully flooded	95		
VOID 5I ER	Fully flooded	95		
VOID 6S ER	Fully flooded	95		
Prop. Proa ER	Fully flooded	85		

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	90%	4,695	4,225	4,695	4,225	20,001	11,727	0,835	0,000	User Specified
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER	10%	4,805	0,481	4,805	0,481	20,017	9,476	0,253	0,000	User Specified
Aceite ER	10%	0,850	0,085	0,924	0,092	31,495	8,799	0,407	0,000	User Specified
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER	90%	1,765	1,588	1,918	1,726	31,499	11,744	0,826	0,000	User Specified
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER	10%	56,972	5,697	67,823	6,782	39,923	10,373	0,298	32,217	IMO A.749(18)
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,217	IMO A.749(18)
LNG ER	10%	39,465	3,946	87,699	8,770	46,000	10,000	3,760	0,000	User Specified
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1541,405	335,729	44,153	29,530	0,000	7,528	64,434	
FS correction								0,042		
VCG fluid								7,570		

Draft Amidships m	2,998
Displacement t	1541
Heel deg	0,9

Draft at FP m	2,928
Draft at AP m	3,068
Draft at LCF m	3,018
Trim (+ve by stern) m	0,140
WL Length m	83,174
Beam max extents on WL m	26,303
Wetted Area m <sup>2</sup>	1332,495
Waterpl. Area m <sup>2</sup>	599,544
Prismatic coeff. (Cp)	0,628
Block coeff. (Cb)	0,514
Max Sect. area coeff. (Cm)	0,843
Waterpl. area coeff. (Cwp)	0,650
LCB from zero pt. (+ve fwd) m	29,521
LCF from zero pt. (+ve fwd) m	29,609
KB m	1,709
KG fluid m	7,570
BMt m	43,505
BML m	152,662
GMt corrected m	37,643
GML m	146,800
KMt m	45,209
KML m	154,352
Immersion (TPc) tonne/cm	6,145
MTc tonne.m	27,210
RM at 1deg = GMt.Disp.sin(1) tonne.m	1012,652
Max deck inclination deg	0,8886
Trim angle (+ve by stern) deg	0,0961

Key point	Type	Freeboard m
Margin Line (freeboard pos = 62,163 m)		0,78
Deck Edge (freeboard pos = 62,163 m)		0,856
Admisión 1	Downflooding point	12,173
Admisión 2	Downflooding point	12,180
Admisión 3	Downflooding point	9,815
Admisión 4	Downflooding point	9,825
Guardacalor	Downflooding point	18,283

## Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Vacío llegada****Damage Case - DCase 10**

Free to Trim

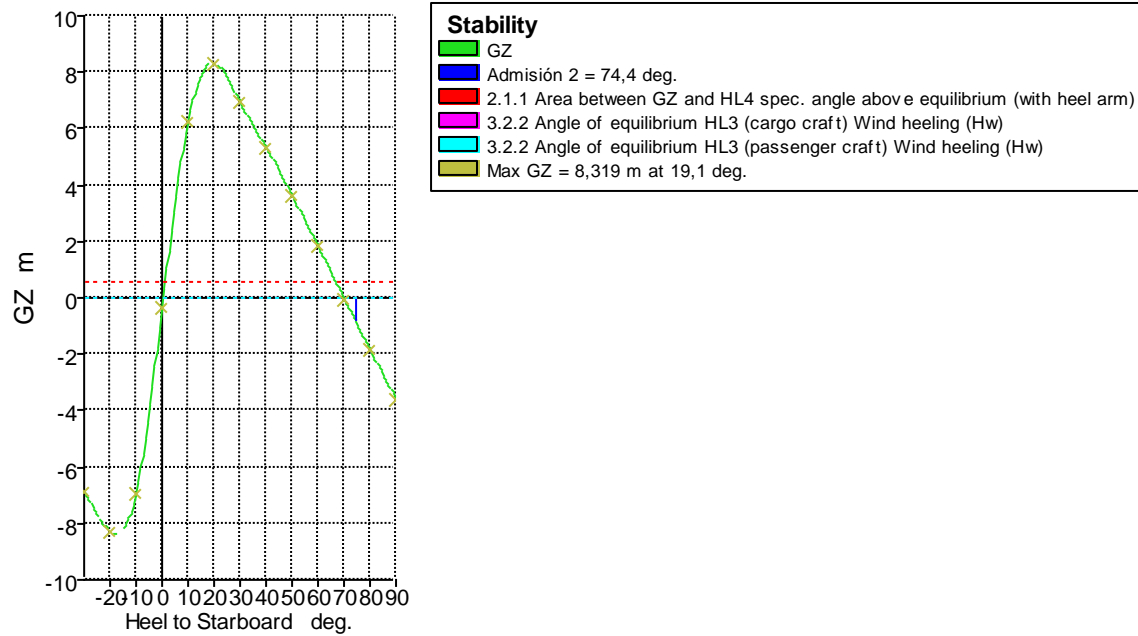
Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
VOID 6S ER	Fully flooded	95		
Prop. Proa ER	Fully flooded	85		
VOID 7S ER	Fully flooded	95		
VOID 7I ER	Fully flooded	95		

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	90%	4,695	4,225	4,695	4,225	20,001	11,727	0,835	0,000	User Specified
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER	10%	4,805	0,481	4,805	0,481	20,017	9,476	0,253	0,000	User Specified
Aceite ER	10%	0,850	0,085	0,924	0,092	31,495	8,799	0,407	0,000	User Specified
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER	90%	1,765	1,588	1,918	1,726	31,499	11,744	0,826	0,000	User Specified
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER	10%	56,972	5,697	67,823	6,782	39,923	10,373	0,298	32,213	IMO A.749(18)
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,213	IMO A.749(18)
LNG ER	10%	39,465	3,946	87,699	8,770	46,000	10,000	3,760	0,000	User Specified
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1541,405	335,729	44,153	29,530	0,000	7,528	64,427	
FS correction								0,042		
VCG fluid								7,570		



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-6,849	-8,274	-6,920	-0,350	6,256	8,316	6,919	5,339	3,624	1,810	-0,036	-1,854	-3,589
Area under GZ curve from zero heel m.deg	195,7806	119,2021	39,2383	0,0000	32,0483	108,9155	186,3850	247,5034	292,5011	319,7065	328,5867	319,0814	291,8174
Displacement t	1541	1541	1541	1541	1541	1541	1541	1541	1541	1541	1541	1541	1541
Draft at FP m	-2,166	0,031	2,020	2,671	3,164	3,039	0,965	-1,631	-5,090	-10,356	-20,057	-47,125	n/a
Draft at AP m	0,125	2,320	3,292	3,124	2,902	1,257	-0,983	-3,706	-7,310	-12,595	-22,254	-49,934	n/a
WL Length m	83,210	83,214	83,196	83,164	83,019	76,520	76,523	76,527	76,560	76,601	76,588	76,506	76,606
Beam max extents on WL m	12,967	13,208	26,287	26,302	26,195	13,062	12,731	12,264	11,807	11,727	11,061	10,890	10,946
Wetted Area m^2	986,646	986,962	1218,370	1298,988	1335,291	1114,882	1114,722	1113,602	1120,403	1153,631	1213,864	1263,780	1317,712
Waterpl. Area m^2	360,567	337,659	581,645	612,147	584,149	312,115	332,033	364,989	370,204	384,327	407,283	430,400	454,040
Prismatic coeff. (Cp)	0,622	0,623	0,621	0,631	0,639	0,709	0,709	0,708	0,699	0,667	0,605	0,552	0,506
Block coeff. (Cb)	0,520	0,552	0,350	0,551	0,351	0,574	0,557	0,526	0,478	0,415	0,411	0,453	0,477
LCB from zero pt. (+ve fwd) m	29,306	29,320	29,435	29,505	29,551	29,683	29,719	29,726	29,724	29,689	29,636	29,600	29,573
LCF from zero pt. (+ve fwd) m	31,372	31,487	29,603	30,070	29,930	28,278	28,056	27,806	27,621	27,765	28,516	29,804	31,053

Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
Max deck inclination deg	30,0282	20,0525	10,0368	0,3121	10,0016	20,0319	30,0204	40,0125	50,0071	60,0030	70,0009	80,0002	90,0000
Trim angle (+ve by stern) deg	1,5782	1,5764	0,8764	0,3121	-0,1803	-1,2278	-1,3419	-1,4292	-1,5292	-1,5422	-1,5138	-1,9350	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 62,163 m)		4,8	n/a
Deck Edge (immersion pos = 62,163 m)		5,2	n/a
Admisión 1	Downflooding point	74,5	0
Admisión 2	Downflooding point	74,4	0
Admisión 3	Downflooding point	82,7	0
Admisión 4	Downflooding point	82,6	0
Guardacalor	Downflooding point	81,5	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	69,0860	Pass	+4207,10
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	8,319	Pass	+16538,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	69,3	Pass	+890,71
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	0,5	Pass	+97,57
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	
	Wind heeling (Hw)	15,0	deg	0,5	Pass	+96,80
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	8,319	Pass	+16538,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	328,6701	Pass	+38161,94
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	69,3	Pass	+362,33
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	69,3	Pass	+890,71

Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Vacío llegada****Damage Case - DCase 10**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
VOID 6S ER	Fully flooded	95		
Prop. Proa ER	Fully flooded	85		
VOID 7S ER	Fully flooded	95		
VOID 7I ER	Fully flooded	95		

VOID 6S ER Fully flooded 95

Prop. Proa ER Fully flooded 85

VOID 7S ER Fully flooded 95

VOID 7I ER Fully flooded 95

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	90%	4,695	4,225	4,695	4,225	20,001	11,727	0,835	0,000	User Specified
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER	10%	4,805	0,481	4,805	0,481	20,017	9,476	0,253	0,000	User Specified
Aceite ER	10%	0,850	0,085	0,924	0,092	31,495	8,799	0,407	0,000	User Specified
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER	90%	1,765	1,588	1,918	1,726	31,499	11,744	0,826	0,000	User Specified
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER	10%	56,972	5,697	67,823	6,782	39,923	10,373	0,298	32,215	IMO A.749(18)
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,215	IMO A.749(18)
LNG ER	10%	39,465	3,946	87,699	8,770	46,000	10,000	3,760	0,000	User Specified
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1541,405	335,729	44,153	29,530	0,000	7,528	64,429	
FS correction								0,042		
VCG fluid								7,570		

Draft Amidships m	2,906
Displacement t	1541
Heel deg	0,5

Draft at FP m	2,695
Draft at AP m	3,117
Draft at LCF m	2,964
Trim (+ve by stern) m	0,422
WL Length m	83,168
Beam max extents on WL m	26,302
Wetted Area m <sup>2</sup>	1301,667
Waterpl. Area m <sup>2</sup>	612,108
Prismatic coeff. (Cp)	0,631
Block coeff. (Cb)	0,533
Max Sect. area coeff. (Cm)	0,861
Waterpl. area coeff. (Cwp)	0,664
LCB from zero pt. (+ve fwd) m	29,500
LCF from zero pt. (+ve fwd) m	30,067
KB m	1,681
KG fluid m	7,570
BMt m	44,498
BML m	162,993
GMt corrected m	38,609
GML m	157,104
KMt m	46,177
KML m	164,665
Immersion (TPc) tonne/cm	6,274
MTc tonne.m	29,120
RM at 1deg = GMt.Disp.sin(1) tonne.m	1038,623
Max deck inclination deg	0,6072
Trim angle (+ve by stern) deg	0,2906

Key point	Type	Freeboard m
Margin Line (freeboard pos = 62,163 m)		1,014
Deck Edge (freeboard pos = 62,163 m)		1,09
Admisión 1	Downflooding point	12,274
Admisión 2	Downflooding point	12,295
Admisión 3	Downflooding point	10,038
Admisión 4	Downflooding point	10,068
Guardacalor	Downflooding point	18,387



## Stability calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Vacío llegada****Damage Case - DCase 11**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
VOID 7S ER	Fully flooded	95		
VOID 7I ER	Fully flooded	95		
Pique ER	Fully flooded	95		

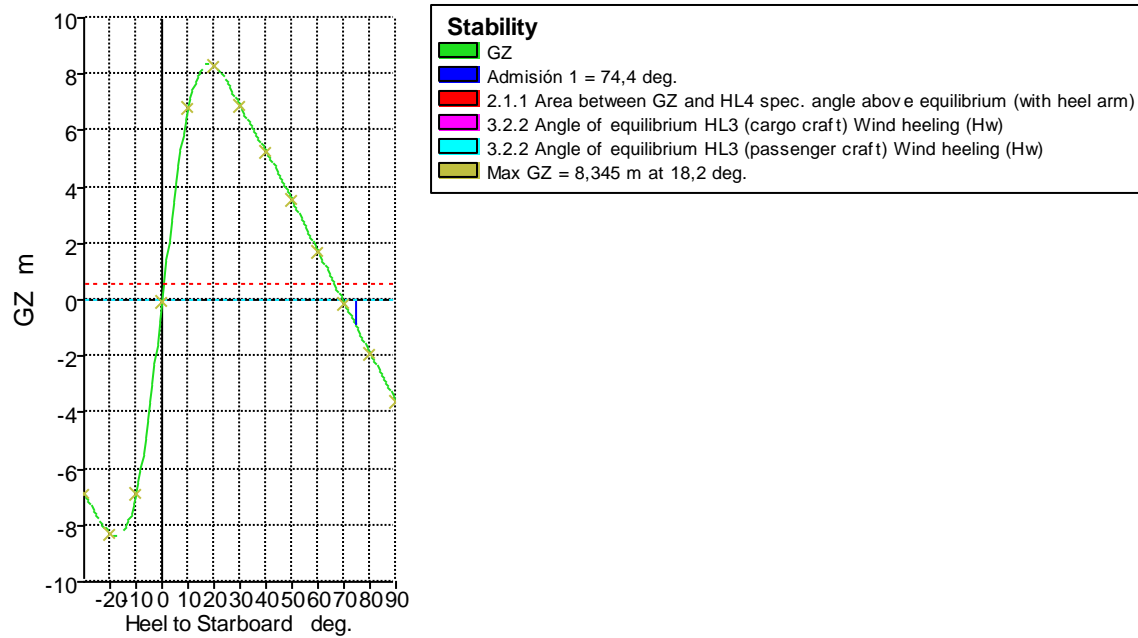
VOID 7S ER	Fully flooded	95		
VOID 7I ER	Fully flooded	95		
Pique ER	Fully flooded	95		

VOID 7S ER	Fully flooded	95		
VOID 7I ER	Fully flooded	95		
Pique ER	Fully flooded	95		

VOID 7S ER	Fully flooded	95		
VOID 7I ER	Fully flooded	95		
Pique ER	Fully flooded	95		

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	90%	4,695	4,225	4,695	4,225	20,001	11,727	0,835	0,000	User Specified
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER	10%	4,805	0,481	4,805	0,481	20,017	9,476	0,253	0,000	User Specified
Aceite ER	10%	0,850	0,085	0,924	0,092	31,495	8,799	0,407	0,000	User Specified
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER	90%	1,765	1,588	1,918	1,726	31,499	11,744	0,826	0,000	User Specified
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER	10%	56,972	5,697	67,823	6,782	39,923	10,373	0,298	32,213	IMO A.749(18)
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,213	IMO A.749(18)
LNG ER	10%	39,465	3,946	87,699	8,770	46,000	10,000	3,760	0,000	User Specified
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1541,405	335,729	44,153	29,530	0,000	7,528	64,427	
FS correction								0,042		
VCG fluid								7,570		



Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
GZ m	-6,849	-8,274	-6,906	-0,077	6,785	8,281	6,860	5,257	3,524	1,710	-0,114	-1,897	-3,594
Area under GZ curve from zero heel m.deg	194,6147	118,0584	38,0632	0,0000	36,5947	116,0686	192,6758	253,1947	297,2411	323,4302	331,3965	321,2763	293,7755
Displacement t	1541	1541	1541	1541	1541	1541	1541	1541	1541	1541	1541	1541	1541
Draft at FP m	-2,166	0,031	2,000	2,321	2,326	0,661	-1,518	-4,184	-7,863	-13,557	-24,179	-54,409	n/a
Draft at AP m	0,125	2,320	3,299	3,237	3,177	2,074	-0,129	-2,829	-6,332	-11,454	-20,757	-47,211	n/a
WL Length m	83,210	83,214	83,196	83,154	81,856	80,303	80,390	80,447	80,844	81,555	82,432	82,936	82,322
Beam max extents on WL m	12,967	13,208	26,288	26,305	26,252	13,162	12,886	12,467	12,110	12,315	11,062	10,968	11,042
Wetted Area m^2	986,645	986,962	1216,296	1259,454	1249,183	1016,327	1015,956	1015,078	1018,325	1040,287	1080,338	1124,333	1168,370
Waterpl. Area m^2	360,567	337,659	590,497	627,552	593,044	329,508	351,348	384,276	409,062	443,298	485,502	515,596	535,648
Prismatic coeff. (Cp)	0,622	0,623	0,621	0,626	0,640	0,659	0,659	0,658	0,643	0,600	0,534	0,483	0,449
Block coeff. (Cb)	0,520	0,552	0,350	0,553	0,359	0,585	0,549	0,505	0,448	0,376	0,366	0,393	0,415
LCB from zero pt. (+ve fwd) m	29,306	29,320	29,425	29,467	29,462	29,406	29,397	29,403	29,393	29,376	29,367	29,351	29,364
LCF from zero pt. (+ve fwd) m	31,372	31,487	30,133	30,936	30,217	30,432	30,261	30,512	31,640	32,580	33,668	35,190	36,069

Heel to Starboard deg	-30,0	-20,0	-10,0	0,0	10,0	20,0	30,0	40,0	50,0	60,0	70,0	80,0	90,0
Max deck inclination deg	30,0282	20,0525	10,0383	0,6312	10,0165	20,0200	30,0104	40,0053	50,0034	60,0026	70,0021	80,0011	90,0000
Trim angle (+ve by stern) deg	1,5782	1,5764	0,8945	0,6312	0,5860	0,9731	0,9572	0,9334	1,0548	1,4484	2,3564	4,9467	n/a

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 62,163 m)		6,7	n/a
Deck Edge (immersion pos = 62,163 m)		7,1	n/a
Admisión 1	Downflooding point	74,4	0
Admisión 2	Downflooding point	74,7	0
Admisión 3	Downflooding point	87,7	0
Admisión 4	Downflooding point	88,4	0
Guardacalor	Downflooding point	81,5	0

Code	Criteria	Value	Units	Actual	Status	Margin %
HSC 2000 Annex 7 Multihull. Damage	2.1.1 Area between GZ and HL4				Pass	
	Hpc + Hw	1,6040	m.deg	72,5964	Pass	+4425,96
HSC 2000 Annex 7 Multihull. Damage	2.6 Value of max. GZ	0,050	m	8,345	Pass	+16590,00
HSC 2000 Annex 7 Multihull. Damage	2.6 Range of positive stability	7,0	deg	69,3	Pass	+889,64
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (cargo craft)				Pass	
	Wind heeling (Hw)	20,0	deg	0,1	Pass	+99,39
HSC 2000 Annex 7 Multihull. Damage	3.2.2 Angle of equilibrium HL3 (passenger craft)				Pass	
	Wind heeling (Hw)	15,0	deg	0,1	Pass	+99,22
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Value of max. GZ in intermediate stages	0,050	m	8,345	Pass	+16590,00
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.3 Area under GZ curve	0,8590	m.deg	331,4362	Pass	+38483,96
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.2 Range of positive stability	15,0	deg	69,3	Pass	+361,83
HSC2000 Ch2 Part B: Passenger craft. Damaged	2.13.2.5 Range of positive stability in intermediate stages	7,0	deg	69,3	Pass	+889,64

Equilibrium calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%; 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Loadcase - Vacío llegada****Damage Case - DCase 11**

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Compartments Damaged -

Compartment or Tank	Status	Perm.%	PartFlood.%	PartFlood.WL
VOID 7S ER	Fully flooded	95		
VOID 7I ER	Fully flooded	95		
Pique ER	Fully flooded	95		

Fluid analysis method: Use corrected VCG

Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m <sup>3</sup>	Total Volume m <sup>3</sup>	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
Peso en rosca	1	1423,860	1423,860			28,930	0,000	7,320	0,000	
Coches	0	375,000	0,000			37,876	0,000	8,757	0,000	User Specified
Pasaje	1	85,500	85,500			37,580	0,000	13,310	0,000	User Specified
A. Des ER	90%	4,695	4,225	4,695	4,225	20,001	11,727	0,835	0,000	User Specified
A. Des BR	90%	4,695	4,225	4,695	4,225	20,001	-11,727	0,835	0,000	User Specified
A. Dulce ER	10%	4,805	0,481	4,805	0,481	20,017	9,476	0,253	0,000	User Specified
Aceite ER	10%	0,850	0,085	0,924	0,092	31,495	8,799	0,407	0,000	User Specified
Aceite BR	10%	0,850	0,085	0,924	0,092	31,495	-8,799	0,407	0,000	User Specified
Lodos ER	90%	1,765	1,588	1,918	1,726	31,499	11,744	0,826	0,000	User Specified
Lodos BR	90%	1,765	1,588	1,918	1,726	31,499	-11,744	0,826	0,000	User Specified
Diesel ER	10%	56,972	5,697	67,823	6,782	39,923	10,373	0,298	32,213	IMO A.749(18)
Diesel BR	10%	56,972	5,697	67,823	6,782	39,923	-10,373	0,298	32,213	IMO A.749(18)
LNG ER	10%	39,465	3,946	87,699	8,770	46,000	10,000	3,760	0,000	User Specified
LNG BR	10%	39,465	3,946	87,699	8,770	46,000	-10,000	3,760	0,000	User Specified
A. Dulce BR	10%	4,805	0,481	4,805	0,481	20,017	-9,476	0,253	0,000	User Specified
Total Loadcase			1541,405	335,729	44,153	29,530	0,000	7,528	64,427	
FS correction								0,042		
VCG fluid								7,570		

Draft Amidships m	2,779
Displacement t	1541
Heel deg	0,1
Draft at FP m	2,322

Draft at AP m	3,237
Draft at LCF m	2,896
Trim (+ve by stern) m	0,915
WL Length m	83,155
Beam max extents on WL m	26,305
Wetted Area m <sup>2</sup>	1259,585
Waterpl. Area m <sup>2</sup>	627,548
Prismatic coeff. (Cp)	0,626
Block coeff. (Cb)	0,549
Max Sect. area coeff. (Cm)	0,885
Waterpl. area coeff. (Cwp)	0,680
LCB from zero pt. (+ve fwd) m	29,464
LCF from zero pt. (+ve fwd) m	30,935
KB m	1,654
KG fluid m	7,570
BMt m	45,652
BML m	160,657
GMt corrected m	39,736
GML m	154,742
KMt m	47,303
KML m	162,302
Immersion (TPc) tonne/cm	6,432
MTc tonne.m	28,682
RM at 1deg = GMt.Disp.sin(1) tonne.m	1068,952
Max deck inclination deg	0,6409
Trim angle (+ve by stern) deg	0,6304

Key point	Type	Freeboard m
Margin Line (freeboard pos = 62,163 m)		1,348
Deck Edge (freeboard pos = 62,163 m)		1,424
Admisión 1	Downflooding point	12,372
Admisión 2	Downflooding point	12,417
Admisión 3	Downflooding point	10,358
Admisión 4	Downflooding point	10,421
Guardacalor	Downflooding point	18,491



# Anexo 3

FAST FERRY CATAMARÁN 950 PAX 250 COCHES

Limiting KG - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (Highest precision, 509 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp. %: 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

Damage Case - Intact

Fixed Trim = 0 m (+ve by stern)

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Heel to starboard; heel range: from -30 deg to 90 deg in steps of 10 deg.

Criteria tested:

HSC 2000 Annex 7 Multihull. Intact 1.1 Area 0 to 30

HSC 2000 Annex 7 Multihull. Intact 1.2 Angle of max. GZ

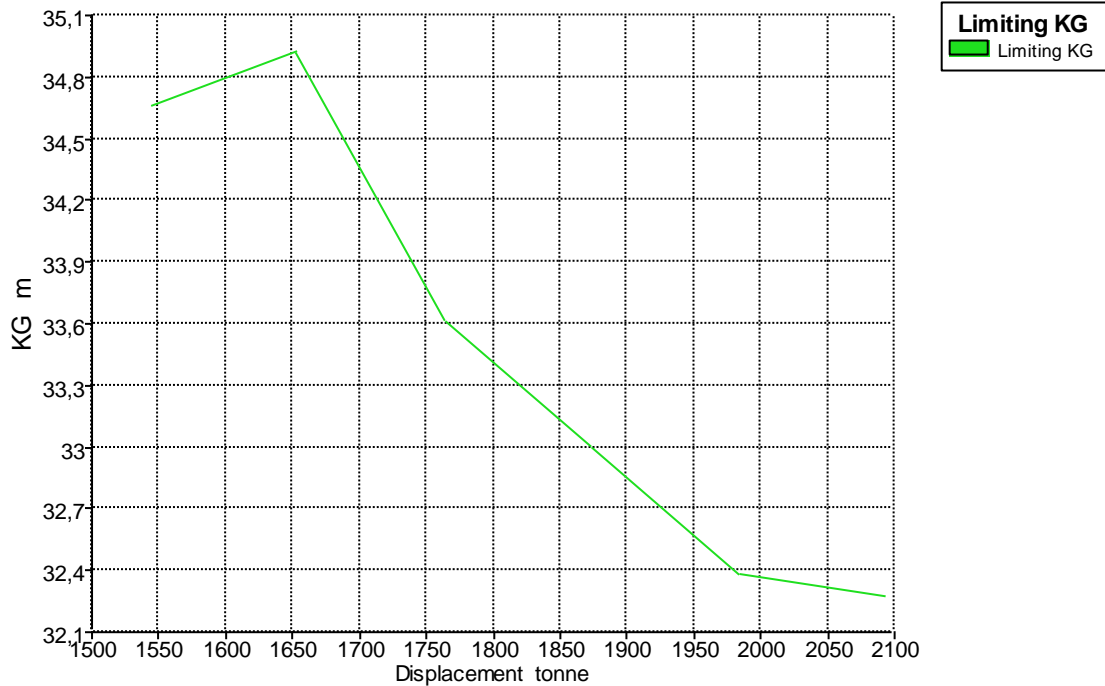
HSC 2000 Annex 7 Multihull. Intact 1.5 Area between GZ and HTL

HSC 2000 Annex 7 Multihull. Intact 3.2.1 Angle of equilibrium with gust wind HL2

HSC2000 Ch2 Part B: Passenger craft. Intact 2.11 Angle of equilibrium - passenger crowding heeling arm

HSC2000 Ch2 Part B: Passenger craft. Intact 2.12.1&.2: Combined heeling: Angle of equilibrium

Displacement (intact) tonne	Draft Amidships m	Trim (+ve by stern) m	LCG m	TCG m	VCG m	Limit KG m	min. GM m	Criterion	Name
2093	3,708	0,000 (fixed)	31,657	0,000	32,274	32,274	4,578	HSC 2000 Annex 7 Multihull. Intact	1.1 Area 0 to 30
1983	3,542	0,000 (fixed)	31,650	0,000	32,383	32,383	6,187	HSC 2000 Annex 7 Multihull. Intact	1.1 Area 0 to 30
1873	3,376	0,000 (fixed)	31,644	0,000	33,007	33,007	7,483	HSC 2000 Annex 7 Multihull. Intact	1.1 Area 0 to 30
1763	3,210	0,000 (fixed)	31,640	0,000	33,623	33,623	9,027	HSC 2000 Annex 7 Multihull. Intact	1.1 Area 0 to 30
1653	3,042	0,000 (fixed)	31,639	0,000	34,927	34,927	10,169	HSC 2000 Annex 7 Multihull. Intact	1.1 Area 0 to 30
1543	2,874	0,000 (fixed)	31,641	0,000	34,657	34,657	13,229	HSC 2000 Annex 7 Multihull. Intact	1.2 Angle of max. GZ





## Limiting KG - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950

PAX 250 COCHES\Buque proyecto (Highest precision, 509 sections, Trimming on, Skin thickness not

applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp. %:

0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

**Damage Case - Intact**

Fixed Trim = 1,078 m (+ve by stern)

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Heel to starboard; heel range: from -30 deg to 90 deg in steps of 10 deg.

**Criteria tested:**

HSC 2000 Annex 7 Multihull. Intact 1.1 Area 0 to 30

HSC 2000 Annex 7 Multihull. Intact 1.2 Angle of max. GZ

HSC 2000 Annex 7 Multihull. Intact 1.5 Area between GZ and HTL

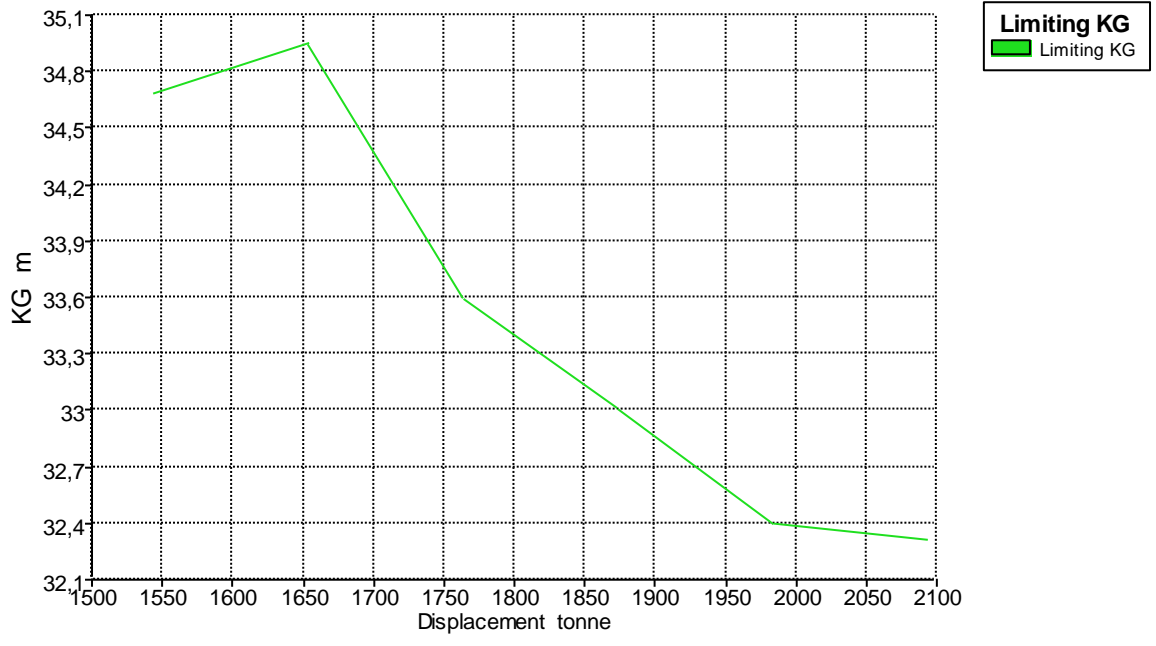
HSC 2000 Annex 7 Multihull. Intact 3.2.1 Angle of equilibrium with gust wind HL2

HSC2000 Ch2 Part B: Passenger craft. Intact 2.11 Angle of equilibrium - passenger crowding

heeling arm

HSC2000 Ch2 Part B: Passenger craft. Intact 2.12.1&amp;.2: Combined heeling: Angle of equilibrium

Displacement (intact) tonne	Draft Amidships m	Trim (+ve by stern) m	LCG m	TCG m	VCG m	Limit KG m	min. GM m	Criterion	Name
2093	3,581	1,078 (fixed)	29,972	0,000	32,318	32,318	4,415	HSC 2000 Annex 7 Multihull. Intact	1.1 Area 0 to 30
1983	3,414	1,078 (fixed)	30,314	0,000	32,399	32,399	6,047	HSC 2000 Annex 7 Multihull. Intact	1.1 Area 0 to 30
1873	3,248	1,078 (fixed)	30,218	0,000	33,017	33,017	7,342	HSC 2000 Annex 7 Multihull. Intact	1.1 Area 0 to 30
1763	3,080	1,078 (fixed)	30,127	0,000	33,598	33,598	8,911	HSC 2000 Annex 7 Multihull. Intact	1.1 Area 0 to 30
1653	2,912	1,078 (fixed)	30,017	0,000	34,951	34,951	9,993	HSC 2000 Annex 7 Multihull. Intact	1.1 Area 0 to 30
1543	2,743	1,078 (fixed)	29,914	0,000	34,683	34,683	13,038	HSC 2000 Annex 7 Multihull. Intact	1.2 Angle of max. GZ



# Anexo 4

CÁLCULO DE AVERÍAS POR EL MÉTODO  
PROBABILÍSTICO

## Probabilistic Damage calculation - Buque proyecto

Stability 21.00.02.63, build: 63

Model file: C:\Users\Carlos\Dropbox\Arquitectura naval\PROYECTO\FAST FERRY CATAMARÁN 950 PAX 250 COCHES\Buque proyecto (High precision, 64 sections, Trimming on, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.‰: 0,01000(0,100); Trim‰(LCG-TCG): 0,01000(0,100); Heel‰(LCG-TCG): 0,01000(0,100)

**Loadcases -**

Deepest subdivision draft (summer loadline) Loadcase: Ds

Partial subdivision draft Loadcase: Dp

Light service draft Loadcase: DI

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)

Fluid analysis method: Use corrected VCG

Heel to starboard; heel range: from -30 deg to 90 deg in steps of 10 deg.

Description	Status	Case type	Damage (room indices)	p factor	r factor	v factor	p.r.v	stab. range deg	GZ max. m	Equi. angle deg	Immersion angle deg	Angle of vanishing stab. deg	DF angle deg	GZmax. angle deg	K	s intermed.	s final	s moment	s factor	A factor (p.r.v.s)	R (required value)	Pass/Fail
Deepest subdivision draft (summer loadline) Loadcase																						
Ds: Z1 (stbd)	GZ curve completed successfully	Final stage*	1	0,048320	1,000000	1,000000	0,048320	36,6	5,341	1,2	37,8 (Pass)	43,2	37,8	20,0	1,000	1,000000	1,000000	1,000000	1,000000	0,048320		
Ds: Z2; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	3,5	0,092736	1,000000	1,000000	0,092736	30,1	3,392	3,6	33,7 (Pass)	36,6	33,7	19,1	1,000	1,000000	1,000000	1,000000	1,000000	0,092736		
Ds: Z2; Hx; Alt.2/2 (stbd)	GZ curve completed	Final stage	3					32,2	4,005	2,5	34,6 (Pass)	38,6	34,6	19,1	1,000	1,000000	1,000000	1,000000	1,000000			

Descript ion	Status	Cas e type	Damage (room indices)	p factor	r factor	v factor	p.r.v	sta b. range deg	GZ max. angle deg	Equi. angle deg	Immer sion angle deg	Angle of vanishing stab. deg	DF angle deg	GZmax. angle deg	K	s intermed.	s final	s moment	s factor	A factor (p.r.v.s)	R (required value)	Pass/ Fail
	success fully																					
Ds: Z3; Hx; Alt.1/2 (stbd)	GZ curve completed success fully	Final stage*	7,9,11,14,15,17	0,092736	1,000000	1,000000	0,092736	31,7	4,746	3,3	35,0 (Pass)	41,5	35,0	20,0	1,000	1,000000	1,000000	1,000000	1,000000	0,092736		
Ds: Z3; Hx; Alt.2/2 (stbd)	GZ curve completed success fully	Final stage	7					33,9	5,185	2,2	36,1 (Pass)	42,5	36,1	20,0	1,000	1,000000	1,000000	1,000000	1,000000			
Ds: Z4; Hx; Alt.1/2 (stbd)	GZ curve completed success fully	Final stage*	19,21	0,017500	1,000000	1,000000	0,017500	44,6	6,175	1,1	65,4 (Pass)	45,8	65,4	20,0	1,000	1,000000	1,000000	1,000000	1,000000	0,017500		
Ds: Z4; Hx; Alt.2/2 (stbd)	GZ curve completed success fully	Final stage	19					45,2	6,220	0,2	66,9 (Pass)	45,5	66,9	20,0	1,000	1,000000	1,000000	1,000000	1,000000			
Ds: Z5; Hx; Alt.1/2 (stbd)	GZ curve completed success fully	Final stage*	23,25,45	0,024519	1,000000	1,000000	0,024519	29,3	4,755	1,9	31,2 (Pass)	44,3	31,2	20,9	1,000	1,000000	1,000000	1,000000	1,000000	0,024519		
Ds: Z5; Hx; Alt.2/2 (stbd)	GZ curve completed success fully	Final stage	23,45					32,0	5,021	0,6	32,6 (Pass)	44,4	32,6	20,9	1,000	1,000000	1,000000	1,000000	1,000000			

Descript ion	Status	Cas e type	Damage (room indices)	p factor	r factor	v factor	p.r.v	sta b. range deg	GZ max. m deg	Equi. angle deg	Immer sion angle deg	Angle of vanishing stab. deg	DF angle deg	GZmax. angle deg	K	s intermed.	s final	s moment	s factor	A factor (p.r.v.s)	R (required value)	Pass/ Fail
Ds: Z6; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	23,27,45	0,024519	1,000000	1,000000	0,024519	29,2	4,749	1,8	31,0 (Pass)	44,2	31,0	20,9	1,000000	1,000000	1,000000	1,000000	1,000000	0,024519		
Ds: Z6; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	23,45					32,0	5,021	0,6	32,6 (Pass)	44,4	32,6	20,9	1,000000	1,000000	1,000000	1,000000	1,000000			
Ds: Z7; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	23,29,45	0,024519	1,000000	1,000000	0,024519	29,3	4,756	1,6	30,9 (Pass)	44,1	30,9	20,9	1,000000	1,000000	1,000000	1,000000	1,000000	0,024519		
Ds: Z7; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	23,45					32,0	5,021	0,6	32,6 (Pass)	44,4	32,6	20,9	1,000000	1,000000	1,000000	1,000000	1,000000			
Ds: Z8; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	31,33	0,024519	1,000000	1,000000	0,024519	36,7	5,826	0,8	37,5 (Pass)	45,4	37,5	20,0	1,000000	1,000000	1,000000	1,000000	1,000000	0,024519		
Ds: Z8; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	31					45,3	6,096	0,2	45,8 (Pass)	45,5	45,8	20,0	1,000000	1,000000	1,000000	1,000000	1,000000			
Ds: Z9; Hx;	GZ curve complet	Final	35,37	0,070972	1,000000	1,000000	0,070972	33,9	5,422	0,9	34,8 (Pass)	45,0	34,8	20,0	1,000000	1,000000	1,000000	1,000000	1,000000	0,070972		

Description	Status	Case type	Damage (room indices)	p factor	r factor	v factor	p.r.v	stab. range deg	GZ max. m	Equi. angle deg	Immersion angle deg	Angle of vanishing stab. deg	DF angle deg	GZmax. angle deg	K	s intermed.	s final	s moment	s factor	A factor (p.r.v.s)	R (required value)	Pass/Fail
Alt.1/2 (stbd)	ed successfully	stage*																				
Ds: Z9; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	35					37,9	5,828	0,2	38,1 (Pass)	45,3	38,1	20,0	1,000	1,000000	1,000000	1,000000	1,000000			
Ds: Z10; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	39,41	0,024519	1,000000	1,000000	0,024519	45,4	6,229	0,2	68,7 (Pass)	45,6	68,7	20,0	1,000	1,000000	1,000000	1,000000	1,000000	0,024519		
Ds: Z10; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	39					45,5	6,225	0,1	68,8 (Pass)	45,5	68,8	20,0	1,000	1,000000	1,000000	1,000000	1,000000			
Ds: Z11 (stbd)	GZ curve completed successfully	Final stage*	43	0,040663	1,000000	1,000000	0,040663	45,5	6,225	0,1	68,8 (Pass)	45,5	68,8	20,0	1,000	1,000000	1,000000	1,000000	1,000000	0,040663		
Ds: Z1,2; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	1,3,5	0,053894	1,000000	1,000000	0,053894	20,5	1,237	7,0	31,1 (Pass)	27,5	31,1	16,4	1,000	1,000000	1,000000	1,000000	1,000000	0,053894		
Ds: Z1,2; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	1,3					24,9	1,834	5,2	31,8 (Pass)	30,1	31,8	16,4	1,000	1,000000	1,000000	1,000000	1,000000			

Description	Status	Case type	Damage (room indices)	p factor	r factor	v factor	p.r.v	stab. range deg	GZ max. m	Equi. angle deg	Immersion angle deg	Angle of vanishing stab. deg	DF angle deg	GZmax. angle deg	K	s intermed.	s final	s moment	s factor	A factor (p.r.v.s)	R (required value)	Pass/Fail
Ds: Z2,2; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	3,5,7,9,11,14,15,17	0,059687	1,000000	1,000000	0,059687	8,8	0,207	12,5	29,4 (Pass)	21,3	29,4	17,3	0,554	1,000000	0,477217	0,507641	0,242300	0,014462		
Ds: Z2,2; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	3,7					21,4	1,341	6,9	30,7 (Pass)	28,4	30,7	17,3	1,000000	1,000000	1,000000	1,000000				
Ds: Z3,2; Hx; Alt.1/3 (stbd)	GZ curve completed successfully	Final stage*	7,9,11,14,15,17,19,21	0,039558	1,000000	1,000000	0,039558	27,9	3,547	5,0	32,9 (Pass)	39,0	32,9	20,9	1,000000	1,000000	1,000000	1,000000	0,039558			
Ds: Z3,2; Hx; Alt.2/3 (stbd)	GZ curve completed successfully	Final stage	7,19,21					29,9	4,087	3,9	33,8 (Pass)	40,1	33,8	20,9	1,000000	1,000000	1,000000	1,000000				
Ds: Z3,2; Hx; Alt.3/3 (stbd)	GZ curve completed successfully	Final stage	7,19					31,8	4,493	2,8	34,6 (Pass)	40,7	34,6	20,0	1,000000	1,000000	1,000000	1,000000				
Ds: Z4,2; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	19,21,23,25,45	0,028953	1,000000	1,000000	0,028953	25,6	3,979	3,9	29,5 (Pass)	43,4	29,5	21,8	1,000000	1,000000	1,000000	1,000000	0,028953			
Ds: Z4,2; Hx;	GZ curve completed	Final stage	19,23,45					29,8	4,543	1,0	30,8 (Pass)	43,7	30,8	20,9	1,000000	1,000000	1,000000	1,000000				



Descript ion	Status	Cas e type	Damage (room indices)	p factor	r factor	v factor	p.r.v	sta b. range deg	GZ max. m	Equi. angle deg	Immer sion angle deg	Angle of vanishing stab. deg	DF angle deg	GZmax. angle deg	K	s intermed.	s final	s moment	s factor	A factor (p.r.v.s)	R (required value)	Pass/ Fail
Alt.2/2 (stbd)	ed successfully	stage																				
Ds: Z5,2; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	23,25,27,45	0,032701	1,000000	1,000000	0,032701	26,8	4,479	3,1	29,9 (Pass)	44,0	29,9	20,9	1,000	1,000000	1,000000	1,000000	1,000000	0,032701		
Ds: Z5,2; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	23,45					32,0	5,021	0,6	32,6 (Pass)	44,4	32,6	20,9	1,000	1,000000	1,000000	1,000000	1,000000			
Ds: Z6,2; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	23,27,29,45	0,032701	1,000000	1,000000	0,032701	26,9	4,490	2,9	29,7 (Pass)	43,9	29,7	20,9	1,000	1,000000	1,000000	1,000000	1,000000	0,032701		
Ds: Z6,2; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	23,45					32,0	5,021	0,6	32,6 (Pass)	44,4	32,6	20,9	1,000	1,000000	1,000000	1,000000	1,000000			
Ds: Z7,2; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	23,29,31,33,45	0,032701	1,000000	1,000000	0,032701	24,2	3,940	3,4	27,6 (Pass)	42,0	27,6	20,9	1,000	1,000000	1,000000	1,000000	1,000000	0,032701		
Ds: Z7,2; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	23,31,45					28,5	4,439	1,0	29,5 (Pass)	43,2	29,5	20,9	1,000	1,000000	1,000000	1,000000	1,000000			

Description	Status	Case type	Damage (room indices)	p factor	r factor	v factor	p.r.v	stab. range deg	GZ max. m	Equi. angle deg	Immersion angle deg	Angle of vanishing stab. deg	DF angle deg	GZmax. angle deg	K	s intermed.	s final	s moment	s factor	A factor (p.r.v.s)	R (required value)	Pass/Fail
Ds: Z8,2; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	31,33,35,37	0,042659	1,000000	1,000000	0,042659	27,3	4,663	2,1	29,4 (Pass)	43,8	29,4	20,0	1,000000	1,000000	1,000000	1,000000	1,000000	0,042659		
Ds: Z8,2; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	31,35					32,2	5,144	0,5	32,7 (Pass)	44,4	32,7	20,0	1,000000	1,000000	1,000000	1,000000	1,000000			
Ds: Z9,2; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	35,37,39,41	0,042659	1,000000	1,000000	0,042659	31,5	5,188	1,3	32,8 (Pass)	44,8	32,8	20,0	1,000000	1,000000	1,000000	1,000000	1,000000	0,042659		
Ds: Z9,2; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	35,39					36,2	5,653	0,3	36,5 (Pass)	45,1	36,5	20,0	1,000000	1,000000	1,000000	1,000000	1,000000			
Ds: Z10,2; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	39,41,43	0,038677	1,000000	1,000000	0,038677	45,3	6,229	0,3	68,7 (Pass)	45,6	68,7	20,0	1,000000	1,000000	1,000000	1,000000	1,000000	0,038677		
Ds: Z10,2; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	39,43					45,4	6,226	0,1	68,8 (Pass)	45,5	68,8	20,0	1,000000	1,000000	1,000000	1,000000	1,000000			
Ds: Z1,3; Hx;	GZ curve completed	Final	1,3,5,7,9,11,14,15,17	0,003575	1,000000	1,000000	0,003575	0,0	0,000	n/a	27,1 (Invalid)	n/a	27,1	n/a	0,000000	0,000000	0,000000	0,000000	0,000000	0,000000		

Descript ion	Status	Cas e type	Damage (room indices)	p factor	r factor	v factor	p.r.v	sta b. range deg	GZ max. m	Equi. angle deg	Immer sion angle deg	Angle of vanishing stab. deg	DF angle deg	GZmax. angle deg	K	s intermed.	s final	s moment	s factor	A factor (p.r.v.s)	R (required value)	Pass/ Fail
Alt.1/2 (stbd)	ed successfully	stage*									parameter)											
Ds: Z1,3; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	1,3,7					0,0	0,000	n/a	28,5 (Invalid parameter)	n/a	28,5	n/a	0,000	0,000000	0,000000	0,000000	0,000000			
Ds: Z2,3; Hx; Alt.1/3 (stbd)	GZ curve completed successfully	Final stage*	3,5,7,9,11,14,15,17,19,21	0,003038	1,000000	1,000000	0,003038	0,0	0,000	n/a	28,2 (Invalid parameter)	n/a	28,2	n/a	0,000	0,000000	0,000000	0,000000	0,000000	0,000000		
Ds: Z2,3; Hx; Alt.2/3 (stbd)	GZ curve completed successfully	Final stage	3,7,19,21					9,7	0,241	12,1	29,4 (Pass)	21,9	29,4	17,3	0,601	1,000000	0,530539	0,613327	0,325400			
Ds: Z2,3; Hx; Alt.3/3 (stbd)	GZ curve completed successfully	Final stage	3,7,19					15,4	0,623	9,2	29,8 (Pass)	24,6	29,8	16,4	0,852	1,000000	0,843817	1,000000	0,843800			
Ds: Z3,3; Hx; Alt.1/3 (stbd)	GZ curve completed successfully	Final stage*	7,9,11,14,15,17,19,21,23,25,45	0,017859	1,000000	1,000000	0,017859	17,8	0,724	12,2	30,8 (Pass)	30,1	30,8	20,9	0,588	1,000000	0,587604	1,000000	0,587600	0,010494		
Ds: Z3,3; Hx; Alt.2/3 (stbd)	GZ curve completed successfully	Final stage	7,19,21,23,25,45					21,1	1,262	9,9	31,0 (Pass)	33,7	31,0	20,9	0,799	1,000000	0,798925	1,000000	0,798900			

Descript ion	Status	Cas e type	Damage (room indices)	p factor	r factor	v factor	p.r.v	sta b. range deg	GZ max. m	Eq ui. angle deg	Immer sion angle deg	Angle of vanishing stab. deg	DF angle deg	GZm ax. angle deg	K	s intermed.	s final	s moment	s factor	A factor (p.r.v.s)	R (required value)	Pass/ Fail
Ds: Z3,3; Hx; Alt.3/3 (stbd)	GZ curve completed successfully	Final stage	7,19,23,45					26,8	2,141	5,6	32,5 (Pass)	37,7	32,5	20,9	1,000	1,000000	1,000000	1,000000	1,000000			
Ds: Z4,3; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	19,21,23,25,27,45	0,009958	1,000000	1,000000	0,009958	23,5	3,667	5,3	28,8 (Pass)	42,9	28,8	21,8	1,000	1,000000	1,000000	1,000000	1,000000	0,009958		
Ds: Z4,3; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	19,23,45					29,8	4,543	1,0	30,8 (Pass)	43,7	30,8	20,9	1,000	1,000000	1,000000	1,000000	1,000000			
Ds: Z5,3; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	23,25,27,29,45	0,010834	1,000000	1,000000	0,010834	24,8	4,213	4,2	28,9 (Pass)	43,6	28,9	21,8	1,000	1,000000	1,000000	1,000000	1,000000	0,010834		
Ds: Z5,3; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	23,45					32,0	5,021	0,6	32,6 (Pass)	44,4	32,6	20,9	1,000	1,000000	1,000000	1,000000	1,000000			
Ds: Z6,3; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	23,27,29,31,33,45	0,010834	1,000000	1,000000	0,010834	22,0	3,653	4,8	26,8 (Pass)	41,2	26,8	20,9	1,000	1,000000	1,000000	1,000000	1,000000	0,010834		
Ds: Z6,3; Hx;	GZ curve completed	Final	23,31,45					28,5	4,439	1,0	29,5 (Pass)	43,2	29,5	20,9	1,000	1,000000	1,000000	1,000000	1,000000			

Descript ion	Status	Cas e type	Damage (room indices)	p factor	r factor	v factor	p.r.v	sta b. range deg	GZ max. m	Equi. angle deg	Immer sion angle deg	Angle of vanishing stab. deg	DF angle deg	GZmax. angle deg	K	s intermed.	s final	s moment	s factor	A factor (p.r.v.s)	R (required value)	Pass/ Fail
Alt.2/2 (stbd)	ed successfully	stage																				
Ds: Z7,3; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	23,29,31,33,35,37,45	0,013754	1,000000	1,000000	0,013754	17,5	2,773	6,7	24,2 (Pass)	37,0	24,2	20,9	1,000	1,000000	1,000000	1,000000	1,000000	0,013754		
Ds: Z7,3; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	23,31,35,45					24,7	3,679	2,0	26,7 (Pass)	40,5	26,7	20,9	1,000	1,000000	1,000000	1,000000	1,000000			
Ds: Z8,3; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	31,33,35,37,39,41	0,003796	1,000000	1,000000	0,003796	25,8	4,450	2,6	28,4 (Pass)	43,2	28,4	20,0	1,000	1,000000	1,000000	1,000000	1,000000	0,003796		
Ds: Z8,3; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	31,35,39					31,1	5,022	0,6	31,7 (Pass)	44,2	31,7	20,0	1,000	1,000000	1,000000	1,000000	1,000000			
Ds: Z9,3; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	35,37,39,41,43	0,015696	1,000000	1,000000	0,015696	31,1	5,147	1,4	32,4 (Pass)	44,7	32,4	20,0	1,000	1,000000	1,000000	1,000000	1,000000	0,015696		
Ds: Z9,3; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	35,39,43					35,6	5,590	0,4	36,0 (Pass)	45,1	36,0	20,0	1,000	1,000000	1,000000	1,000000	1,000000			

Description	Status	Cas e type	Damage (room indices)	p factor	r factor	v factor	p.r.v	sta b. range deg	GZ max. m	Eq ui. angle deg	Immer sion angle deg	Angle of vanishing stab. deg	DF angle deg	GZmax. angle deg	K	s intermed.	s final	s moment	s factor	A factor (p.r.v.s)	R (required value)	Pass/ Fail
Attained partial index As							0,979054													0,919851	0,677318	Pass
Partial subdivision draft Loadcase																						
Dp: Z1 (stbd)	GZ curve completed successfully	Final stage*	1	0,048320	1,000000	1,000000	0,048320	49,0	6,496	0,9	63,0 (Pass)	49,9	63,0	20,0	1,000000	1,000000	1,000000	1,000000	1,000000	0,048320		
Dp: Z2; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	3,5	0,092736	1,000000	1,000000	0,092736	33,4	4,806	2,8	36,2 (Pass)	45,3	36,2	20,0	1,000000	1,000000	1,000000	1,000000	1,000000	0,092736		
Dp: Z2; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	3					35,7	5,402	1,8	37,5 (Pass)	46,9	37,5	20,0	1,000000	1,000000	1,000000	1,000000	1,000000			
Dp: Z3; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	7,9,11,14,15,17	0,092736	1,000000	1,000000	0,092736	36,7	6,356	2,6	39,3 (Pass)	49,9	39,3	20,9	1,000000	1,000000	1,000000	1,000000	1,000000	0,092736		
Dp: Z3; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	7					48,4	6,602	1,6	61,7 (Pass)	50,0	61,7	20,9	1,000000	1,000000	1,000000	1,000000	1,000000			

Description	Status	Case type	Damage (room indices)	p factor	r factor	v factor	p.r.v	stab. range deg	GZ max. m	Equi. angle deg	Immersion angle deg	Angle of vanishing stab. deg	DF angle deg	GZmax. angle deg	K	s intermed.	s final	s moment	s factor	A factor (p.r.v.s)	R (required value)	Pass/Fail
Dp: Z4; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	19,21	0,017500	1,000000	1,000000	0,017500	49,3	6,748	0,8	70,0 (Pass)	50,1	70,0	20,0	1,000000	1,000000	1,000000	1,000000	1,000000	0,017500		
Dp: Z4; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	19					49,6	6,703	0,1	70,9 (Pass)	49,7	70,9	20,0	1,000000	1,000000	1,000000	1,000000	1,000000			
Dp: Z5; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	23,25,45	0,024519	1,000000	1,000000	0,024519	33,9	5,971	1,2	35,1 (Pass)	49,8	35,1	20,9	1,000000	1,000000	1,000000	1,000000	1,000000	0,024519		
Dp: Z5; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	23,45					37,3	6,275	0,2	37,5 (Pass)	49,7	37,5	20,0	1,000000	1,000000	1,000000	1,000000	1,000000			
Dp: Z6; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	23,27,45	0,024519	1,000000	1,000000	0,024519	33,8	5,922	1,1	34,9 (Pass)	49,7	34,9	20,9	1,000000	1,000000	1,000000	1,000000	1,000000	0,024519		
Dp: Z6; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	23,45					37,3	6,275	0,2	37,5 (Pass)	49,7	37,5	20,0	1,000000	1,000000	1,000000	1,000000	1,000000			
Dp: Z7; Hx;	GZ curve completed	Final	23,29,45	0,024519	1,000000	1,000000	0,024519	33,8	5,903	1,0	34,8 (Pass)	49,6	34,8	20,9	1,000000	1,000000	1,000000	1,000000	1,000000	0,024519		

Descript ion	Status	Cas e type	Damage (room indices)	p factor	r factor	v factor	p.r.v	sta b. range deg	GZ max. m	Equi. angle deg	Immer sion angle deg	Angle of vanishing stab. deg	DF angle deg	GZmax. angle deg	K	s intermed.	s final	s moment	s factor	A factor (p.r.v.s)	R (required value)	Pass/ Fail
Alt.1/2 (stbd)	ed successfully	stage*																				
Dp: Z7; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	23,45					37,3	6,275	0,2	37,5 (Pass)	49,7	37,5	20,0	1,000	1,000000	1,000000	1,000000	1,000000			
Dp: Z8; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	31,33	0,024519	1,000000	1,000000	0,024519	49,5	6,708	0,6	70,9 (Pass)	50,1	70,9	20,0	1,000	1,000000	1,000000	1,000000	1,000000	0,024519		
Dp: Z8; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	31					49,8	6,708	0,1	71,5 (Pass)	49,8	71,5	19,1	1,000	1,000000	1,000000	1,000000	1,000000			
Dp: Z9; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	35,37	0,070972	1,000000	1,000000	0,070972	43,6	6,440	0,7	44,3 (Pass)	50,2	44,3	20,0	1,000	1,000000	1,000000	1,000000	1,000000	0,070972		
Dp: Z9; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	35					49,8	6,680	0,1	71,2 (Pass)	49,9	71,2	20,0	1,000	1,000000	1,000000	1,000000	1,000000			
Dp: Z10; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	39,41	0,024519	1,000000	1,000000	0,024519	49,7	6,720	0,2	71,9 (Pass)	49,9	71,9	19,1	1,000	1,000000	1,000000	1,000000	1,000000	0,024519		



Descript ion	Status	Cas e type	Damage (room indices)	p factor	r factor	v factor	p.r.v	sta b. range deg	GZ max. m deg	Equi. angle deg	Immer sion angle deg	Angle of vanishing stab. deg	DF angle deg	GZmax. angle deg	K	s intermed.	s final	s moment	s factor	A factor (p.r.v.s)	R (required value)	Pass/ Fail
Dp: Z10; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	39					49,8	6,718	0,0	71,9 (Pass)	49,8	71,9	19,1	1,000	1,000000	1,000000	1,000000	1,000000			
Dp: Z11 (stbd)	GZ curve completed successfully	Final stage*	43	0,040663	1,000000	1,000000	0,040663	49,7	6,721	0,0	71,9 (Pass)	49,8	71,9	19,1	1,000	1,000000	1,000000	1,000000	1,000000	0,040663		
Dp: Z1,2; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	1,3,5	0,053894	1,000000	1,000000	0,053894	27,8	2,466	5,3	33,1 (Pass)	36,2	33,1	18,2	1,000	1,000000	1,000000	1,000000	1,000000	0,053894		
Dp: Z1,2; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	1,3					30,1	3,116	3,9	34,0 (Pass)	38,7	34,0	18,2	1,000	1,000000	1,000000	1,000000	1,000000			
Dp: Z2,2; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	3,5,7,9,11,14,15,17	0,059687	1,000000	1,000000	0,059687	23,1	1,527	8,1	31,1 (Pass)	32,3	31,1	19,1	0,929	1,000000	0,929332	1,000000	0,929300	0,055467		
Dp: Z2,2; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	3,7					27,7	2,744	4,9	32,6 (Pass)	37,2	32,6	19,1	1,000	1,000000	1,000000	1,000000	1,000000			
Dp: Z3,2; Hx;	GZ curve completed	Final stage	7,9,11,14,15,17,19,21	0,039558	1,000000	1,000000	0,039558	31,7	5,501	4,1	35,7 (Pass)	47,5	35,7	20,9	1,000	1,000000	1,000000	1,000000	1,000000	0,039558		

Descript ion	Status	Cas e type	Damage (room indices)	p factor	r factor	v factor	p.r.v	sta b. range deg	GZ max. m	Equi. angle deg	Immer sion angle deg	Angle of vanishing stab. deg	DF angle deg	GZmax. angle deg	K	s intermed.	s final	s moment	s factor	A factor (p.r.v.s)	R (required value)	Pass/ Fail
Alt.1/3 (stbd)	ed successfully	stage*																				
Dp: Z3,2; Hx; Alt.2/3 (stbd)	GZ curve completed successfully	Final stage	7,19,21					34,1	5,965	3,0	37,1 (Pass)	48,4	37,1	20,9	1,000	1,000000	1,000000	1,000000	1,000000			
Dp: Z3,2; Hx; Alt.3/3 (stbd)	GZ curve completed successfully	Final stage	7,19					36,5	6,238	1,9	38,4 (Pass)	48,9	38,4	20,9	1,000	1,000000	1,000000	1,000000	1,000000			
Dp: Z4,2; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	19,21,23,25,45	0,028953	1,000000	1,000000	0,028953	28,9	5,305	2,7	31,6 (Pass)	49,2	31,6	21,8	1,000	1,000000	1,000000	1,000000	1,000000	0,028953		
Dp: Z4,2; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	19,23,45					34,0	5,828	0,4	34,4 (Pass)	49,2	34,4	20,9	1,000	1,000000	1,000000	1,000000	1,000000			
Dp: Z5,2; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	23,25,27,45	0,032701	1,000000	1,000000	0,032701	30,8	5,643	2,2	33,0 (Pass)	49,7	33,0	20,9	1,000	1,000000	1,000000	1,000000	1,000000	0,032701		
Dp: Z5,2; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	23,45					37,3	6,275	0,2	37,5 (Pass)	49,7	37,5	20,0	1,000	1,000000	1,000000	1,000000	1,000000			

Descript ion	Status	Cas e type	Damage (room indices)	p factor	r factor	v factor	p.r.v	sta b. range deg	GZ max. m	Equi. angle deg	Immer sion angle deg	Angle of vanishing stab. deg	DF angle deg	GZmax. angle deg	K	s intermed.	s final	s moment	s factor	A factor (p.r.v.s)	R (required value)	Pass/ Fail
Dp: Z6,2; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	23,27,29,45	0,032701	1,000000	1,000000	0,032701	30,7	5,617	2,0	32,7 (Pass)	49,6	32,7	20,9	1,000	1,000000	1,000000	1,000000	1,000000	0,032701		
Dp: Z6,2; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	23,45					37,3	6,275	0,2	37,5 (Pass)	49,7	37,5	20,0	1,000	1,000000	1,000000	1,000000	1,000000			
Dp: Z7,2; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	23,29,31,33,45	0,032701	1,000000	1,000000	0,032701	27,3	5,031	2,2	29,4 (Pass)	48,4	29,4	20,9	1,000	1,000000	1,000000	1,000000	1,000000	0,032701		
Dp: Z7,2; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	23,31,45					32,0	5,517	0,4	32,3 (Pass)	48,8	32,3	20,9	1,000	1,000000	1,000000	1,000000	1,000000			
Dp: Z8,2; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	31,33,35,37	0,042659	1,000000	1,000000	0,042659	30,9	5,602	1,5	32,5 (Pass)	49,5	32,5	20,0	1,000	1,000000	1,000000	1,000000	1,000000	0,042659		
Dp: Z8,2; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	31,35					37,6	6,157	0,2	37,8 (Pass)	49,8	37,8	20,0	1,000	1,000000	1,000000	1,000000	1,000000			
Dp: Z9,2; Hx;	GZ curve completed	Final	35,37,39,41	0,042659	1,000000	1,000000	0,042659	37,0	6,164	1,0	37,9 (Pass)	50,2	37,9	20,0	1,000	1,000000	1,000000	1,000000	1,000000	0,042659		

Descript ion	Status	Cas e type	Damage (room indices)	p factor	r factor	v factor	p.r.v	sta b. range deg	GZ max. m	Equi. angle deg	Immer sion angle deg	Angle of vanishing stab. deg	DF angle deg	GZmax. angle deg	K	s intermed.	s final	s moment	s factor	A factor (p.r.v.s)	R (required value)	Pass/ Fail
Alt.1/2 (stbd)	ed successfully	stage*																				
Dp: Z9,2; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	35,39					49,8	6,584	0,1	63,9 (Pass)	50,0	63,9	20,0	1,000	1,000000	1,000000	1,000000	1,000000			
Dp: Z10,2; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	39,41,43	0,038677	1,000000	1,000000	0,038677	49,7	6,720	0,2	71,9 (Pass)	49,9	71,9	19,1	1,000	1,000000	1,000000	1,000000	1,000000	0,038677		
Dp: Z10,2; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	39,43					49,8	6,718	0,1	71,9 (Pass)	49,8	71,9	19,1	1,000	1,000000	1,000000	1,000000	1,000000			
Dp: Z1,3; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	1,3,5,7,9,11,14,15,17	0,003575	1,000000	1,000000	0,003575	0,0	0,000	n/a	28,8 (Invalid parameter)	n/a	28,8	n/a	0,000	0,000000	0,000000	0,000000	0,000000	0,000000		
Dp: Z1,3; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	1,3,7					10,8	0,278	12,4	30,2 (Pass)	23,2	30,2	17,3	0,571	1,000000	0,517571	0,648575	0,335700			
Dp: Z2,3; Hx; Alt.1/3 (stbd)	GZ curve completed successfully	Final stage*	3,5,7,9,11,14,15,17,19,21	0,003038	1,000000	1,000000	0,003038	12,3	0,377	13,1	29,8 (Pass)	25,5	29,8	19,1	0,484	1,000000	0,453099	0,919016	0,416400	0,001265		

Description	Status	Case type	Damage (room indices)	p factor	r factor	v factor	p.r.v	stab. range deg	GZ max. m	Equi. angle deg	Immersion angle deg	Angle of vanishing stab. deg	DF angle deg	GZmax. angle deg	K	s intermed.	s final	s moment	s factor	A factor (p.r.v.s)	R (required value)	Pass/Fail
Dp: Z2,3; Hx; Alt.2/3 (stbd)	GZ curve completed successfully	Final stage	3,7,19,21					23,5	1,656	7,6	31,1 (Pass)	32,6	31,1	19,1	0,960	1,0000	0,959678	1,0000	0,959700			
Dp: Z2,3; Hx; Alt.3/3 (stbd)	GZ curve completed successfully	Final stage	3,7,19					25,6	2,029	6,0	31,6 (Pass)	34,0	31,6	19,1	1,000	1,0000	1,0000	1,0000	1,0000			
Dp: Z3,3; Hx; Alt.1/3 (stbd)	GZ curve completed successfully	Final stage*	7,9,11,14,15,17,19,21,23,25,45	0,017859	1,0000	1,0000	0,017859	23,6	2,561	8,7	32,3 (Pass)	43,8	32,3	23,6	0,886	1,0000	0,886044	1,0000	0,886000	0,015823		
Dp: Z3,3; Hx; Alt.2/3 (stbd)	GZ curve completed successfully	Final stage	7,19,21,23,25,45					25,7	3,141	7,0	32,7 (Pass)	45,7	32,7	23,6	1,000	1,0000	1,0000	1,0000	1,0000			
Dp: Z3,3; Hx; Alt.3/3 (stbd)	GZ curve completed successfully	Final stage	7,19,23,45					31,5	4,092	3,1	34,7 (Pass)	47,5	34,7	23,6	1,000	1,0000	1,0000	1,0000	1,0000			
Dp: Z4,3; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	19,21,23,25,27,45	0,009958	1,0000	1,0000	0,009958	26,3	5,020	3,9	30,2 (Pass)	49,1	30,2	21,8	1,000	1,0000	1,0000	1,0000	1,0000	0,009958		
Dp: Z4,3; Hx;	GZ curve completed	Final stage	19,23,45					34,0	5,828	0,4	34,4 (Pass)	49,2	34,4	20,9	1,000	1,0000	1,0000	1,0000	1,0000			

Descript ion	Status	Cas e type	Damage (room indices)	p factor	r factor	v factor	p.r.v	sta b. range deg	GZ max. m	Equi. angle deg	Immer sion angle deg	Angle of vanishing stab. deg	DF angle deg	GZmax. angle deg	K	s intermed.	s final	s moment	s factor	A factor (p.r.v.s)	R (required value)	Pass/ Fail
Alt.2/2 (stbd)	ed successfully	stage																				
Dp: Z5,3; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	23,25,27,29,45	0,010834	1,000000	1,000000	0,010834	28,0	5,384	3,2	31,2 (Pass)	49,6	31,2	21,8	1,000	1,000000	1,000000	1,000000	1,000000	0,010834		
Dp: Z5,3; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	23,45					37,3	6,275	0,2	37,5 (Pass)	49,7	37,5	20,0	1,000	1,000000	1,000000	1,000000	1,000000			
Dp: Z6,3; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	23,27,29,31,33,45	0,010834	1,000000	1,000000	0,010834	25,0	4,770	3,4	28,4 (Pass)	48,1	28,4	21,8	1,000	1,000000	1,000000	1,000000	1,000000	0,010834		
Dp: Z6,3; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	23,31,45					32,0	5,517	0,4	32,3 (Pass)	48,8	32,3	20,9	1,000	1,000000	1,000000	1,000000	1,000000			
Dp: Z7,3; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	23,29,31,33,35,37,45	0,013754	1,000000	1,000000	0,013754	20,7	3,834	4,8	25,5 (Pass)	44,5	25,5	20,9	1,000	1,000000	1,000000	1,000000	1,000000	0,013754		
Dp: Z7,3; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	23,31,35,45					27,7	4,732	0,7	28,3 (Pass)	47,1	28,3	20,9	1,000	1,000000	1,000000	1,000000	1,000000			

Description	Status	Case type	Damage (room indices)	p factor	r factor	v factor	p.r.v	stab. range deg	GZ max. m	Equi. angle deg	Immersion angle deg	Angle of vanishing stab. deg	DF angle deg	GZmax. angle deg	K	s intermed.	s final	s moment	s factor	A factor (p.r.v.s)	R (required value)	Pass/Fail
Dp: Z8,3; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	31,33,35,37,39,41	0,003796	1,000000	1,000000	0,003796	28,9	5,382	1,9	30,8 (Pass)	49,2	30,8	20,0	1,000000	1,000000	1,000000	1,000000	1,000000	0,003796		
Dp: Z8,3; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	31,35,39					36,0	5,974	0,3	36,2 (Pass)	49,6	36,2	20,0	1,000000	1,000000	1,000000	1,000000	1,000000			
Dp: Z9,3; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	35,37,39,41,43	0,015696	1,000000	1,000000	0,015696	36,3	6,105	1,0	37,4 (Pass)	50,1	37,4	20,0	1,000000	1,000000	1,000000	1,000000	1,000000	0,015696		
Dp: Z9,3; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	35,39,43					49,8	6,545	0,2	59,8 (Pass)	50,0	59,8	20,0	1,000000	1,000000	1,000000	1,000000	1,000000			
Attained partial index Ap							0,979054													0,967451	0,677318	Pass
Light service draft Loadcase																						
DI: Z1 (stbd)	GZ curve completed successfully	Final stage*	1	0,048320	1,000000	1,000000	0,048320	52,1	6,998	0,8	69,7 (Pass)	52,9	69,7	19,1	1,000000	1,000000	1,000000	1,000000	1,000000	0,048320		

Description	Status	Case type	Damage (room indices)	p factor	r factor	v factor	p.r.v	stab. range deg	GZ max. m	Equi. angle deg	Immersion angle deg	Angle of vanishing stab. deg	DF angle deg	GZmax. angle deg	K	s intermed.	s final	s moment	s factor	A factor (p.r.v.s)	R (required value)	Pass/Fail
DI: Z2; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	3,5	0,092736	1,000000	1,000000	0,092736	37,6	5,602	2,3	39,9 (Pass)	50,9	39,9	20,0	1,000000	1,000000	1,000000	1,000000	1,000000	0,092736		
DI: Z2; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	3					41,0	6,168	1,3	42,3 (Pass)	52,4	42,3	20,0	1,000000	1,000000	1,000000	1,000000	1,000000			
DI: Z3; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	7,9,11,14,15,17	0,092736	1,000000	1,000000	0,092736	51,5	7,031	1,9	67,5 (Pass)	53,3	67,5	20,0	1,000000	1,000000	1,000000	1,000000	1,000000	0,092736		
DI: Z3; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	7					51,7	7,028	1,0	69,9 (Pass)	52,7	69,9	19,1	1,000000	1,000000	1,000000	1,000000	1,000000			
DI: Z4; H1 (stbd)	GZ curve completed successfully	Final stage*	21	0,017500	1,000000	0,027036	0,000473	52,3	7,172	0,6	73,8 (Pass)	52,9	73,8	17,3	1,000000	1,000000	1,000000	1,000000	1,000000	0,000473		
DI: Z4; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	19,21	0,017500	1,000000	0,972964	0,017027	52,2	7,097	0,6	73,1 (Pass)	52,8	73,1	18,2	1,000000	1,000000	1,000000	1,000000	1,000000	0,017027		
DI: Z4; Hx;	GZ curve completed	Final stage	19					52,3	7,144	0,0	73,7 (Pass)	52,3	73,7	16,4	1,000000	1,000000	1,000000	1,000000	1,000000			



Descript ion	Status	Cas e type	Damage (room indices)	p factor	r factor	v factor	p.r.v	sta b. range deg	GZ max. m	Equi. angle deg	Immer sion angle deg	Angle of vanishing stab. deg	DF angle deg	GZmax. angle deg	K	s intermed.	s final	s moment	s factor	A factor (p.r.v.s)	R (required value)	Pass/ Fail
Alt.2/2 (stbd)	ed successfully	stage																				
DI: Z5; H1 (stbd)	GZ curve completed successfully	Final stage*	25	0,024519	1,000000	0,027036	0,000663	52,3	7,166	0,6	73,8 (Pass)	52,9	73,8	17,3	1,000000	1,000000	1,000000	1,000000	0,000663			
DI: Z5; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	23,25,45	0,024519	1,000000	0,972964	0,023856	52,3	7,043	0,7	72,4 (Pass)	52,9	72,4	19,1	1,000000	1,000000	1,000000	1,000000	0,023856			
DI: Z5; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	23,45					52,4	7,043	0,0	73,1 (Pass)	52,4	73,1	18,2	1,000000	1,000000	1,000000	1,000000				
DI: Z6; H1 (stbd)	GZ curve completed successfully	Final stage*	27	0,024519	1,000000	0,027036	0,000663	52,3	7,172	0,5	74,0 (Pass)	52,9	74,0	17,3	1,000000	1,000000	1,000000	1,000000	0,000663			
DI: Z6; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	23,27,45	0,024519	1,000000	0,972964	0,023856	52,3	7,038	0,6	72,6 (Pass)	52,9	72,6	19,1	1,000000	1,000000	1,000000	1,000000	0,023856			
DI: Z6; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	23,45					52,4	7,043	0,0	73,1 (Pass)	52,4	73,1	18,2	1,000000	1,000000	1,000000	1,000000				

Descript ion	Status	Cas e type	Damage (room indices)	p factor	r factor	v factor	p.r.v	sta b. range deg	GZ max. m deg	Equi. angle deg	Immer sion angle deg	Angle of vanishing stab. deg	DF angle deg	GZmax. angle deg	K	s intermed.	s final	s moment	s factor	A factor (p.r.v.s)	R (required value)	Pass/ Fail
DI: Z7; H1 (stbd)	GZ curve completed successfully	Final stage*	29	0,024519	1,000000	0,027036	0,000663	52,4	7,179	0,4	74,1 (Pass)	52,8	74,1	17,3	1,000000	1,000000	1,000000	1,000000	1,000000	0,000663		
DI: Z7; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	23,29,45	0,024519	1,000000	0,972964	0,023856	52,4	7,034	0,5	72,7 (Pass)	52,8	72,7	19,1	1,000000	1,000000	1,000000	1,000000	1,000000	0,023856		
DI: Z7; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	23,45					52,4	7,043	0,0	73,1 (Pass)	52,4	73,1	18,2	1,000000	1,000000	1,000000	1,000000				
DI: Z8; H1 (stbd)	GZ curve completed successfully	Final stage*	33	0,024519	1,000000	0,027036	0,000663	52,4	7,192	0,3	74,2 (Pass)	52,7	74,2	16,4	1,000000	1,000000	1,000000	1,000000	1,000000	0,000663		
DI: Z8; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	31,33	0,024519	1,000000	0,972964	0,023856	52,4	7,135	0,3	74,2 (Pass)	52,8	74,2	17,3	1,000000	1,000000	1,000000	1,000000	1,000000	0,023856		
DI: Z8; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	31					52,5	7,192	0,0	74,2 (Pass)	52,5	74,2	16,4	1,000000	1,000000	1,000000	1,000000	1,000000			
DI: Z9; H1 (stbd)	GZ curve completed	Final	37	0,070972	1,000000	0,027036	0,001919	52,4	7,188	0,4	74,3 (Pass)	52,8	74,3	16,4	1,000000	1,000000	1,000000	1,000000	1,000000	0,001919		

Descript ion	Status	Cas e type	Damage (room indices)	p factor	r factor	v factor	p.r.v	sta b. range deg	GZ max. m deg	Equi. angle deg	Immer sion angle deg	Angle of vanishing stab. deg	DF angle deg	GZmax. angle deg	K	s intermed.	s final	s moment	s factor	A factor (p.r.v.s)	R (required value)	Pass/ Fail
	ed successfully	stage*																				
DI: Z9; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	35,37	0,070972	1,000000	0,972964	0,069053	52,5	7,117	0,4	74,4 (Pass)	52,9	74,4	17,3	1,000	1,000000	1,000000	1,000000	1,000000	0,069053		
DI: Z9; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	35					52,5	7,183	0,0	74,3 (Pass)	52,5	74,3	16,4	1,000	1,000000	1,000000	1,000000	1,000000			
DI: Z10; H1 (stbd)	GZ curve completed successfully	Final stage*	41	0,024519	1,000000	0,027036	0,000663	52,5	7,232	0,1	74,4 (Pass)	52,5	74,4	16,4	1,000	1,000000	1,000000	1,000000	1,000000	0,000663		
DI: Z10; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	39,41	0,024519	1,000000	0,972964	0,023856	52,5	7,217	0,1	74,4 (Pass)	52,6	74,4	16,4	1,000	1,000000	1,000000	1,000000	1,000000	0,023856		
DI: Z10; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	39					52,5	7,235	0,0	74,3 (Pass)	52,5	74,3	16,4	1,000	1,000000	1,000000	1,000000	1,000000			
DI: Z11 (stbd)	GZ curve completed successfully	Final stage*	43	0,040663	1,000000	1,000000	0,040663	52,5	7,240	0,0	74,3 (Pass)	52,5	74,3	16,4	1,000	1,000000	1,000000	1,000000	1,000000	0,040663		

Description	Status	Case type	Damage (room indices)	p factor	r factor	v factor	p.r.v	stab. range deg	GZ max. m	Equi. angle deg	Immersion angle deg	Angle of vanishing stab. deg	DF angle deg	GZmax. angle deg	K	s intermed.	s final	s moment	s factor	A factor (p.r.v.s)	R (required value)	Pass/Fail
DI: Z1,2; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	1,3,5	0,053894	1,000000	1,000000	0,053894	31,3	3,085	4,7	36,0 (Pass)	41,3	36,0	18,2	1,000	1,000000	1,000000	1,000000	1,000000	0,053894		
DI: Z1,2; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	1,3					33,8	3,794	3,2	37,0 (Pass)	43,7	37,0	18,2	1,000	1,000000	1,000000	1,000000	1,000000			
DI: Z2,2; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	3,5,7,9,11,14,15,17	0,059687	1,000000	1,000000	0,059687	27,4	2,382	6,3	33,7 (Pass)	39,1	33,7	18,2	1,000	1,000000	1,000000	1,000000	1,000000	0,059687		
DI: Z2,2; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	3,7					32,0	3,687	3,5	35,5 (Pass)	43,6	35,5	18,2	1,000	1,000000	1,000000	1,000000	1,000000			
DI: Z3,2; H2; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	7,9,11,14,15,17,21	0,039558	1,000000	0,027036	0,001069	51,1	6,970	2,7	65,3 (Pass)	53,8	65,3	20,0	1,000	1,000000	1,000000	1,000000	1,000000	0,001069		
DI: Z3,2; H2; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	7,21					51,3	7,062	1,8	68,5 (Pass)	53,1	68,5	20,0	1,000	1,000000	1,000000	1,000000	1,000000			
DI: Z3,2; Hx; Alt.1/2 (stbd)	GZ curve completed	Final stage	7,9,11,14,15,17,19,21	0,039558	1,000000	0,972964	0,038488	50,9	6,744	2,9	56,6 (Pass)	53,8	56,6	20,9	1,000	1,000000	1,000000	1,000000	1,000000	0,038488		

Descript ion	Status	Cas e type	Damage (room indices)	p factor	r factor	v factor	p.r.v	sta b. range deg	GZ max. m deg	Equi. angle deg	Immer sion angle deg	Angle of vanishing stab. deg	DF angle deg	GZmax. angle deg	K	s intermed.	s final	s moment	s factor	A factor (p.r.v.s)	R (required value)	Pass/ Fail
Alt.1/3 (stbd)	ed successfully	stage*																				
DI: Z3,2; Hx; Alt.2/3 (stbd)	GZ curve completed successfully	Final stage	7,19,21					51,1	6,955	1,9	65,5 (Pass)	53,1	65,5	20,0	1,000	1,000000	1,000000	1,000000	1,000000			
DI: Z3,2; Hx; Alt.3/3 (stbd)	GZ curve completed successfully	Final stage	7,19					51,5	7,003	1,1	67,9 (Pass)	52,6	67,9	20,0	1,000	1,000000	1,000000	1,000000	1,000000			
DI: Z4,2; H1 (stbd)	GZ curve completed successfully	Final stage*	21,25	0,028953	1,000000	0,027036	0,000783	52,1	7,133	1,2	73,3 (Pass)	53,4	73,3	18,2	1,000	1,000000	1,000000	1,000000	1,000000	0,000783		
DI: Z4,2; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	19,21,23,25,45	0,028953	1,000000	0,972964	0,028170	51,9	7,090	1,5	70,0 (Pass)	53,4	70,0	20,0	1,000	1,000000	1,000000	1,000000	1,000000	0,028170		
DI: Z4,2; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	19,23,45					52,3	7,001	0,0	72,2 (Pass)	52,3	72,2	19,1	1,000	1,000000	1,000000	1,000000	1,000000			
DI: Z5,2; H1 (stbd)	GZ curve completed successfully	Final stage*	25,27	0,032701	1,000000	0,027036	0,000884	52,1	7,131	1,2	73,5 (Pass)	53,4	73,5	18,2	1,000	1,000000	1,000000	1,000000	1,000000	0,000884		

Descript ion	Status	Cas e type	Damage (room indices)	p factor	r factor	v factor	p.r.v	sta b. range deg	GZ max. m	Equi. angle deg	Immer sion angle deg	Angle of vanishing stab. deg	DF angle deg	GZmax. angle deg	K	s intermed.	s final	s moment	s factor	A factor (p.r.v.s)	R (required value)	Pass/ Fail
DI: Z5,2; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	23,25,27,45	0,032701	1,000000	0,972964	0,031817	52,1	7,080	1,4	71,6 (Pass)	53,5	71,6	20,0	1,000	1,000000	1,000000	1,000000	1,000000	0,031817		
DI: Z5,2; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	23,45					52,4	7,043	0,0	73,1 (Pass)	52,4	73,1	18,2	1,000	1,000000	1,000000	1,000000	1,000000			
DI: Z6,2; H1 (stbd)	GZ curve completed successfully	Final stage*	27,29	0,032701	1,000000	0,027036	0,000884	52,2	7,132	1,1	73,8 (Pass)	53,3	73,8	18,2	1,000	1,000000	1,000000	1,000000	1,000000	0,000884		
DI: Z6,2; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	23,27,29,45	0,032701	1,000000	0,972964	0,031817	52,2	7,063	1,2	71,9 (Pass)	53,4	71,9	20,0	1,000	1,000000	1,000000	1,000000	1,000000	0,031817		
DI: Z6,2; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	23,45					52,4	7,043	0,0	73,1 (Pass)	52,4	73,1	18,2	1,000	1,000000	1,000000	1,000000	1,000000			
DI: Z7,2; H1 (stbd)	GZ curve completed successfully	Final stage*	29,33	0,032701	1,000000	0,027036	0,000884	52,3	7,144	0,9	74,1 (Pass)	53,1	74,1	17,3	1,000	1,000000	1,000000	1,000000	1,000000	0,000884		
DI: Z7,2; Hx;	GZ curve completed	Final	23,29,31,33,45	0,032701	1,000000	0,972964	0,031817	39,3	6,705	1,0	40,3 (Pass)	53,3	40,3	20,0	1,000	1,000000	1,000000	1,000000	1,000000	0,031817		

Descript ion	Status	Cas e type	Damage (room indices)	p factor	r factor	v factor	p.r.v	sta b. range deg	GZ max. m deg	Equi. angle deg	Immer sion angle deg	Angle of vanishing stab. deg	DF angle deg	GZmax. angle deg	K	s intermed.	s final	s moment	s factor	A factor (p.r.v.s)	R (required value)	Pass/ Fail
Alt.1/2 (stbd)	ed successfully	stage*																				
DI: Z7,2; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	23,31,45					52,5	7,009	0,0	72,5 (Pass)	52,5	72,5	19,1	1,000	1,000000	1,000000	1,000000	1,000000			
DI: Z8,2; H1 (stbd)	GZ curve completed successfully	Final stage*	33,37	0,042659	1,000000	0,027036	0,001153	52,3	7,149	0,8	74,3 (Pass)	53,1	74,3	17,3	1,000000	1,000000	1,000000	1,000000	0,001153			
DI: Z8,2; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	31,33,35,37	0,042659	1,000000	0,972964	0,041506	52,5	7,025	0,9	73,5 (Pass)	53,3	73,5	19,1	1,000000	1,000000	1,000000	1,000000	0,041506			
DI: Z8,2; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	31,35					52,5	7,115	0,0	74,3 (Pass)	52,5	74,3	17,3	1,000000	1,000000	1,000000	1,000000				
DI: Z9,2; H1 (stbd)	GZ curve completed successfully	Final stage*	37,41	0,042659	1,000000	0,027036	0,001153	52,4	7,172	0,5	74,4 (Pass)	52,9	74,4	17,3	1,000000	1,000000	1,000000	1,000000	0,001153			
DI: Z9,2; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	35,37,39,41	0,042659	1,000000	0,972964	0,041506	52,5	7,086	0,5	74,4 (Pass)	53,0	74,4	18,2	1,000000	1,000000	1,000000	1,000000	0,041506			

Descript ion	Status	Cas e type	Damage (room indices)	p factor	r factor	v factor	p.r.v	sta b. range deg	GZ max. m	Equi. angle deg	Immer sion angle deg	Angle of vanishing stab. deg	DF angle deg	GZmax. angle deg	K	s intermed.	s final	s moment	s factor	A factor (p.r.v.s)	R (required value)	Pass/Fail
DI: Z9,2; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	35,39					52,5	7,161	0,0	74,4 (Pass)	52,5	74,4	16,4	1,000	1,000000	1,000000	1,000000	1,000000			
DI: Z10,2; H1 (stbd)	GZ curve completed successfully	Final stage*	41,43	0,038677	1,000000	0,027036	0,001046	52,5	7,224	0,1	74,4 (Pass)	52,6	74,4	16,4	1,000	1,000000	1,000000	1,000000	1,000000	0,001046		
DI: Z10,2; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	39,41,43	0,038677	1,000000	0,972964	0,037631	52,5	7,208	0,1	74,4 (Pass)	52,6	74,4	16,4	1,000	1,000000	1,000000	1,000000	1,000000	0,037631		
DI: Z10,2; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	39,43					52,5	7,227	0,0	74,4 (Pass)	52,5	74,4	16,4	1,000	1,000000	1,000000	1,000000	1,000000			
DI: Z1,3; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	1,3,5,7,9,11,14,15,17	0,003575	1,000000	1,000000	0,003575	0,0	0,000	n/a	31,0 (Invalid parameter)	n/a	31,0	n/a	0,000	0,000000	0,000000	0,000000	0,000000	0,000000		
DI: Z1,3; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	1,3,7					20,1	0,840	8,9	32,6 (Pass)	29,0	32,6	17,3	0,875	1,000000	0,874683	1,000000	0,874700			
DI: Z2,3; Hx;	GZ curve completed	Final stage	3,5,7,9,11,14,15,17,19,21	0,003038	1,000000	0,972964	0,002956	23,1	1,274	9,0	32,1 (Pass)	33,3	32,1	18,2	0,868	1,000000	0,868274	1,000000	0,868300	0,002567		



Descript ion	Status	Cas e type	Damage (room indices)	p factor	r factor	v factor	p.r.v	sta b. range deg	GZ max. m	Equi. angle deg	Immer sion angle deg	Angle of vanishing stab. deg	DF angle deg	GZmax. angle deg	K	s intermed.	s final	s moment	s factor	A factor (p.r.v.s)	R (required value)	Pass/ Fail
Alt.1/3 (stbd)	ed successfully	stage*																				
Di: Z2,3; Hx; Alt.2/3 (stbd)	GZ curve completed successfully	Final stage	3,7,19,21					28,4	2,682	5,3	33,7 (Pass)	39,6	33,7	18,2	1,000	1,000000	1,000000	1,000000	1,000000			
Di: Z2,3; Hx; Alt.3/3 (stbd)	GZ curve completed successfully	Final stage	3,7,19					30,4	3,054	3,9	34,3 (Pass)	40,7	34,3	18,2	1,000	1,000000	1,000000	1,000000	1,000000			
Di: Z3,3; H2; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	7,9,11,14,15,17,21,25	0,017859	1,000000	0,027036	0,000483	50,7	6,946	3,6	62,5 (Pass)	54,4	62,5	20,9	1,000	1,000000	1,000000	1,000000	1,000000	0,000483		
Di: Z3,3; H2; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	7,21,25					50,9	7,081	2,7	66,9 (Pass)	53,7	66,9	20,0	1,000	1,000000	1,000000	1,000000	1,000000			
Di: Z3,3; Hx; Alt.1/3 (stbd)	GZ curve completed successfully	Final stage*	7,9,11,14,15,17,19,21,23,25,45	0,017859	1,000000	0,972964	0,017376	29,5	5,359	5,7	35,2 (Pass)	51,2	35,2	22,7	1,000	1,000000	1,000000	1,000000	1,000000	0,017376		
Di: Z3,3; Hx; Alt.2/3 (stbd)	GZ curve completed successfully	Final stage	7,19,21,23,25,45					32,8	5,960	4,0	36,9 (Pass)	52,2	36,9	22,7	1,000	1,000000	1,000000	1,000000	1,000000			

Description	Status	Case type	Damage (room indices)	p factor	r factor	v factor	p.r.v	stab. range deg	GZ max. m	Equi. angle deg	Immersion angle deg	Angle of vanishing stab. deg	DF angle deg	GZmax. angle deg	K	s intermed.	s final	s moment	s factor	A factor (p.r.v.s)	R (required value)	Pass/Fail
DI: Z3,3; Hx; Alt.3/3 (stbd)	GZ curve completed successfully	Final stage	7,19,23,45					51,4	6,731	1,3	59,5 (Pass)	52,7	59,5	20,9	1,000	1,00000	1,00000	1,00000	1,00000			
DI: Z4,3; H1 (stbd)	GZ curve completed successfully	Final stage*	21,25,27	0,009958	1,00000	0,027036	0,000269	52,0	7,128	1,9	72,9 (Pass)	53,8	72,9	19,1	1,000	1,00000	1,00000	1,00000	1,00000	0,000269		
DI: Z4,3; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	19,21,23,25,27,45	0,009958	1,00000	0,972964	0,009688	51,5	7,037	2,5	58,8 (Pass)	54,0	58,8	20,9	1,000	1,00000	1,00000	1,00000	1,00000	0,009688		
DI: Z4,3; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	19,23,45					52,3	7,001	0,0	72,2 (Pass)	52,3	72,2	19,1	1,000	1,00000	1,00000	1,00000	1,00000			
DI: Z5,3; H1 (stbd)	GZ curve completed successfully	Final stage*	25,27,29	0,010834	1,00000	0,027036	0,000293	52,0	7,120	1,8	73,3 (Pass)	53,8	73,3	19,1	1,000	1,00000	1,00000	1,00000	1,00000	0,000293		
DI: Z5,3; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	23,25,27,29,45	0,010834	1,00000	0,972964	0,010541	51,8	7,097	2,2	70,6 (Pass)	54,0	70,6	20,0	1,000	1,00000	1,00000	1,00000	1,00000	0,010541		
DI: Z5,3; Hx;	GZ curve completed	Final	23,45					52,4	7,043	0,0	73,1 (Pass)	52,4	73,1	18,2	1,000	1,00000	1,00000	1,00000	1,00000			

Descript ion	Status	Cas e type	Damage (room indices)	p factor	r factor	v factor	p.r.v	sta b. range deg	GZ max. m	Equi. angle deg	Immer sion angle deg	Angle of vanishing stab. deg	DF angle deg	GZmax. angle deg	K	s intermed.	s final	s moment	s factor	A factor (p.r.v.s)	R (required value)	Pass/ Fail
Alt.2/2 (stbd)	ed successfully	stage																				
DI: Z6,3; H1 (stbd)	GZ curve completed successfully	Final stage*	27,29,33	0,010834	1,000000	0,027036	0,000293	52,1	7,120	1,5	73,7 (Pass)	53,6	73,7	18,2	1,000	1,000000	1,000000	1,000000	1,000000	0,000293		
DI: Z6,3; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	23,27,29,31,33,45	0,010834	1,000000	0,972964	0,010541	34,6	6,333	2,0	36,5 (Pass)	53,6	36,5	20,9	1,000	1,000000	1,000000	1,000000	1,000000	0,010541		
DI: Z6,3; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	23,31,45					52,5	7,009	0,0	72,5 (Pass)	52,5	72,5	19,1	1,000	1,000000	1,000000	1,000000	1,000000			
DI: Z7,3; H1 (stbd)	GZ curve completed successfully	Final stage*	29,33,37	0,013754	1,000000	0,027036	0,000372	52,2	7,121	1,3	74,1 (Pass)	53,5	74,1	18,2	1,000	1,000000	1,000000	1,000000	1,000000	0,000372		
DI: Z7,3; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	23,29,31,33,35,37,45	0,013754	1,000000	0,972964	0,013382	27,9	5,310	2,1	30,0 (Pass)	52,0	30,0	20,9	1,000	1,000000	1,000000	1,000000	1,000000	0,013382		
DI: Z7,3; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	23,31,35,45					36,5	6,201	0,0	36,5 (Pass)	52,4	36,5	19,1	1,000	1,000000	1,000000	1,000000	1,000000			

Descript ion	Status	Cas e type	Damage (room indices)	p factor	r factor	v factor	p.r.v	sta b. range deg	GZ max. m	Equi. angle deg	Immer sion angle deg	Angle of vanishing stab. deg	DF angle deg	GZmax. angle deg	K	s intermed.	s final	s moment	s factor	A factor (p.r.v.s)	R (required value)	Pass/ Fail
DI: Z8,3; H1 (stbd)	GZ curve completed successfully	Final stage*	33,37,41	0,003796	1,000000	0,027036	0,000103	52,2	7,138	1,0	74,3 (Pass)	53,2	74,3	17,3	1,000000	1,000000	1,000000	1,000000	1,000000	0,000103		
DI: Z8,3; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	31,33,35,37,39,41	0,003796	1,000000	0,972964	0,003694	52,5	6,806	1,1	60,1 (Pass)	53,6	60,1	19,1	1,000000	1,000000	1,000000	1,000000	1,000000	0,003694		
DI: Z8,3; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	31,35,39					52,6	7,094	0,0	74,3 (Pass)	52,6	74,3	17,3	1,000000	1,000000	1,000000	1,000000				
DI: Z9,3; H1 (stbd)	GZ curve completed successfully	Final stage*	37,41,43	0,015696	1,000000	0,027036	0,000424	52,4	7,166	0,5	74,4 (Pass)	52,9	74,4	17,3	1,000000	1,000000	1,000000	1,000000	1,000000	0,000424		
DI: Z9,3; Hx; Alt.1/2 (stbd)	GZ curve completed successfully	Final stage*	35,37,39,41,43	0,015696	1,000000	0,972964	0,015271	52,5	7,081	0,5	74,4 (Pass)	53,1	74,4	18,2	1,000000	1,000000	1,000000	1,000000	1,000000	0,015271		
DI: Z9,3; Hx; Alt.2/2 (stbd)	GZ curve completed successfully	Final stage	35,39,43					52,5	7,148	0,0	74,4 (Pass)	52,6	74,4	16,4	1,000000	1,000000	1,000000	1,000000				
Attained partial index AI							0,978972													0,975008	0,677318	Pass

Description	Status	Case type	Damage (room indices)	p factor	r factor	v factor	p.r.v	stab. range deg	GZ max. m	Equi. angle deg	Immersion angle deg	Angle of vanishing stab. deg	DF angle deg	GZmax. angle deg	K	s intermed.	s final	s moment	s factor	A factor (p.r.v.s)	R (required value)	Pass/Fail
Attained subdivision index																				0,949 922	0,752 576	Pass
MSC.216(82)																						Pass

