



UNIVERSIDADE DA CORUÑA



Escuela Politécnica Superior

Trabajo Fin de Grado

CURSO 2019/20

*BULKARRIER PORTACONTENEDORES
40 000 TPM*

Grado en Ingeniería Naval y Oceánica

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TÍTULO Y RESUMEN

1.1 Título y Resumen

En este trabajo, se va a desarrollar el anteproyecto de un buque bulkcarrier portacontenedores de 40 000 t. Primeramente vamos a realizar un dimensionamiento preliminar, así como una predicción de potencia. Cabe destacar que la elección de las dimensiones del buque se ha hecho teniendo en cuenta varias combinaciones posibles, tomando como cifra de mérito el coste del buque.

Posteriormente, se procederá a un cálculo más detallado de los pesos del buque, así como a una definición de las formas del casco.

También detallaremos el compartimentado del buque, el cálculo de estabilidad en las diferentes situaciones de carga, una predicción de potencia más detallada, así como el diseño del timón y el cálculo del servomotor.

Llevaremos a cabo el cálculo estructural básico del buque, según el Bureau Veritas.

Con los datos obtenidos a lo largo del proyecto, elaboraremos los planos de disposición general del buque.

También se hará el cálculo del balance eléctrico del buque en las diferentes situaciones de demanda eléctrica.

Por último, haremos el cálculo del coste del buque, detallando cada partida.

1.2 Título e Resumo

Neste traballo, vaíse desenrolar o anteprojecto dun buque bulkcarrier portacontenedores de 40 000 t. Primeiramente imos face-lo dimensionamento preliminar, así coma unha predición de potencia. É preciso destacar que a elección das dimensións do buque fíxose tendo en conta varias combinacións posibles, tomando como cifra de mérito o coste do buque.

Posteriormente, procederáse a un cálculo máis detallado dos pesos do buque, así coma a unha definición das formas do casco.

Tamén detallaremos o compartimentado do buque, o cálculo da estabilidade nas diferentes situacións de carga, unha predición de potencia máis detallada, así coma o deseño do timón e o cálculo do servomotor.

Levaremos a cabo o cálculo estrutural básico do buque, según o Bureau Veritas.

Cos datos obtidos ó longo do proxecto, elaboraremos os planos de disposición xeral do buque.

Tamén se fará o cálculo do balance eléctrico do buque nas diferentes situacións de demanda eléctrica.

Por último, faremos o cálculo do coste do buque, detallando cada partida.

1.3 Tittle and Abstract

In this project will be developed the pre-project of a containership bulkcarrier of 40 000 tn. In the first place, it makes a preliminary sizing and power prediction. Its necessary to be noticed that the dimensions were choosen by making several posible combinations taking the minimun building cost as the criteria to minimize.

After that, it makes a more detailed calculation of the ship weights as well as a definition of the hull shapes.

It is also detailed the behaviour of the ship, the stability calculation in all the diferent cargo situations, a more detailed power prediction as well as the rudder design and the servo calculation.

In addition to that, it develops a basic stuctural calculation of the ship according to the Bureau Veritas.

With all the obtained data in the project, it will obtain the drawing of the ship general arrangement.

It also elaborates the electric balance for all the diferent situations of electric demanding.

Finally, it makes the calculation of the cost of the ship, detailing each item.



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**TRABAJO FIN DE GRADO
CURSO 2019/20**

*BULKCARRIER PORTACONTENEDORES
40 000 TPM*

Grado en Ingeniería Naval y Oceánica

Cuaderno 5

SITUACIONES DE CARGA

GRADO EN INGENIERÍA NAVAL Y OCEÁNICA
TRABAJO FIN DE GRADO

CURSO 2 019-2 020

PROYECTO NÚMERO: 18-14

TIPO DE BUQUE: *Bulkcarrier y Portacontenedores*

CLASIFICACIÓN, COTA Y REGLAMENTOS DE APLICACIÓN: *Bureau Veritas, MARPOL, SOLAS.*

CARACTERÍSTICAS DE LA CARGA: *40 000 TPM. Grano, mineral, carbón. 2 Pilas de contenedores / madera sobre las tapas de escotillas. Madera.*

VELOCIDAD Y AUTONOMÍA: *15 nudos en condiciones de servicio al 85% MCR y 15% de margen de mar. 12 000 millas a la velocidad de servicio.*

SISTEMAS Y EQUIPOS DE CARGA / DESCARGA: *Escotillas de accionamiento hidráulico. Con grúas carga-descarga.*

PROPULSIÓN: *Motor diésel acoplado a una hélice de paso fijo. LNG para operaciones en puerto.*

TRIPULACIÓN Y PASAJE: *20 personas.*

OTROS EQUIPOS E INSTALACIONES: *Los habituales en este tipo de buques.*

Ferrol, 11 de marzo de 2019

ALUMNA: **D^a Marta González García**

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1. INTRODUCCIÓN

1.1. Contenido a desarrollar en el presente cuaderno

- Presentación. Introducción al cuaderno. Descripción de características del buque proyecto.
- Criterios de estabilidad y condiciones de carga aplicables. Descripción de la normativa aplicable al buque proyecto, incluyendo tanto los criterios de estabilidad como las condiciones de carga mínimas a evaluar. Los reglamentos/criterios mínimos a utilizar son los siguientes:
 - Código Internacional de estabilidad sin averías (Código IS Code 2008). Incluyendo recomendaciones.
 - Criterio meteorológico aplicable a todos los buques en, al menos, la peor condición de carga.
- Peso muerto. Descripción de las partidas del peso muerto del buque proyecto a considerar en los cálculos de estabilidad. Debe incluirse la distribución del peso muerto para las distintas condiciones de carga (distintos niveles de consumos, lastre y carga), incluyendo al menos las siguientes partidas:
 - Consumos al 100%.
 - Consumos al 10%.
 - Tripulación y posible personal auxiliar o pasaje.
 - Pertrechos.
 - Víveres.
 - Carga y equipos específicos del buque proyecto.
- Corrección por superficies libres. Realización de los cálculos de superficies libres de los tanques de carga líquida del buque, indicando qué tanques deberán corregir por superficies y en qué condiciones de carga.
- Condiciones de carga. Descripción de las condiciones de carga analizadas, describiendo cada una de ellas.
- Tabla resumen de condiciones de carga. Resumen de la condición de equilibrio, curva de brazos adrizantes y cumplimiento de los criterios de estabilidad para todas las condiciones de carga analizadas.
- Comentarios finales a condiciones de carga y estabilidad. Resumen y posibles conclusiones del cuaderno.
- Anexo. Salidas e informes de todas las condiciones del software de arquitectura naval utilizado para la realización de los cálculos (Descripción de pesos de las condiciones analizadas, hidrostáticas del equilibrio, curva de GZs, cumplimiento con criterios de estabilidad).

1.2. Presentación

El objetivo de este cuaderno será hacer la comprobación de los criterios de estabilidad para todas las condiciones de carga en las que se puede encontrar el buque. Éste cuenta con las siguientes características:

CARACTERÍSTICAS PRINCIPALES		
Eslora total	176,50	m
Eslora entre perpendiculares	170,40	m
Manga	30,17	m

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Calado	11,56	m
Puntal	17,14	m
Peso muerto	40 000,00	t
Desplazamiento	50 138,00	t

2. CRITERIOS DE ESTABILIDAD Y CONDICIONES DE CARGA APLICABLES

2.1. Criterios generales de estabilidad sin avería para todos los buques

Siguiendo la *Resolución A. 749 (18) de la IMO*, nuestro buque ha de seguir los siguientes criterios:

- Mínimo valor de GZ a un ángulo de 30°: 0,20 m.
- Mínimo ángulo para el valor de GZ máximo: 25°.
- GM0 mínimo: 0,15 m.
- Área mínimo bajo curva GZ hasta 30°: 0,055 m · rad.
- Área mínimo bajo curva GZ hasta 40°: 0,090 m · rad.
- Área mínima bajo curva GZ entre 30° y 40°: 0,030 m · rad.

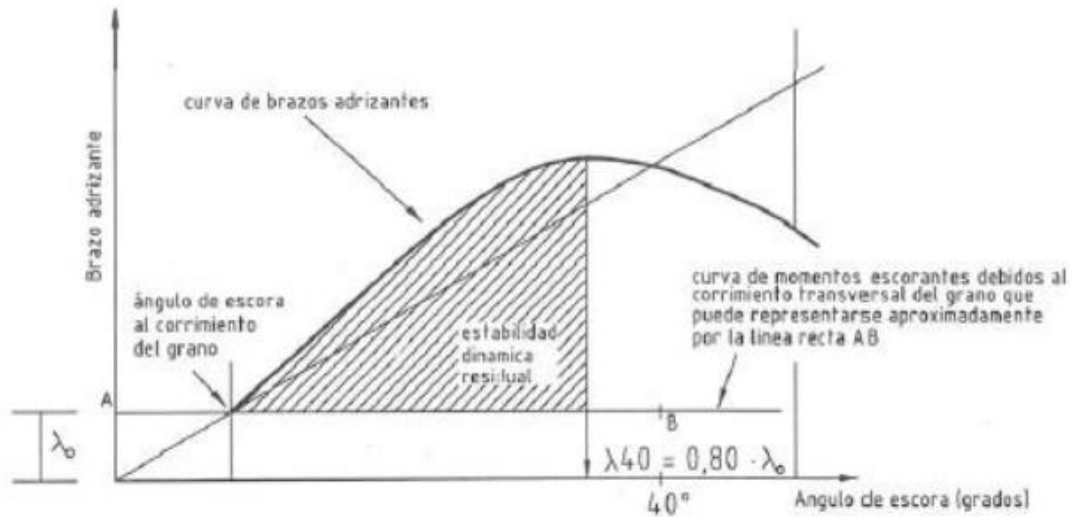
2.2. Criterio de viento y balance intensos

A su vez, siguiendo de nuevo la citada *Resolución en el apartado A. 562 (14)*, se recomienda un criterio de viento y balance intensos (criterio meteorológico) aplicable a la estabilidad sin avería de buque de carga de eslora igual o superior a 24 metros.

2.3. Criterios de estabilidad intacta para bulkcarriers

La estabilidad sin avería de los buques dedicados al transporte de grano debe ajustarse a las prescripciones del *Código Internacional para el Transporte de Grano a Granel*, adoptado mediante la *Resolución MSC23 (59)*, tras haber tenido en cuenta los momentos escorantes debidos al corrimiento de grano, tal y como se indica a continuación.

- El ángulo de escora debido a un corrimiento de carga será inferior a 12°.
- El área residual comprendida entre el ángulo de escora por corrimiento de carga y un ángulo de 40° o el de inundación si éste fuese menor, no será inferior a 0,075 m · rad.
- La altura metacéntrica inicial, después de tener en cuenta los efectos de superficie libre de los líquidos contenidos en los tanques, no será inferior a 0,30 m.



El ángulo de escora se calcula como la intersección de la curva de brazos adrizantes, corregida por el corrimiento de la carga; con la curva de brazos escorantes debida al corrimiento de la carga; la cual viene definida en el SOLAS como una recta que pasa por los siguientes puntos:

- Abscisa: 0° ordenada: λ_0
- Abscisa: 40° ordenada: λ_{40}

$$\lambda_0 = \frac{\text{momento escorante}}{\text{factor de estiba} \cdot \text{desplazamiento}}$$

Donde:

- $\lambda_{40} = 0,8 \cdot \lambda_0$

El factor de estiba se define como el volumen por unidad de peso de la carga de grano.

La curva de brazos adrizantes se deducirá de un número de curvas transversales de estabilidad suficiente para definirla con precisión.

3. CONSIDERACIONES PREVIAS AL ESTUDIO DE LAS CONDICIONES DE CARGA

3.1. Peso en rosca

El peso en rosca se estudia de forma desglosada en las siguientes partidas:

- Acero.
- Equipo.
- Maquinaria.

También se hace la estimación y cálculo del centro de gravedad del mismo, así como de los márgenes considerados de peso y coordenadas del buque en rosca.

Todo este estudio ya lo hemos realizado en el *Cuaderno 2*, por tanto, adjuntaremos a continuación las tablas resumen de los resultados obtenidos.

	PESO (t)	KG (m)	XG (m)	MOM. KG	MOM. XG
Acero	6 780,67	8,87	82,33	60 123,14	558 228,99
Maquinaria	1 060,10	8,14	20,00	8 624,55	162,71
Equipo y habilitación	1 166,03	22,52	57,43	26 259,97	66 963,14
Varios	670,21	21,41	43,73	14 350,85	29 309,03
	9 677,01	11,30	67,65	109 358,50	654 663,88

	Peso Rosca (t)	KG (m)	XG (m)
Sin margen	9 677,01	11,30	67,65
Con margen	10 064,10	11,80	68,65

3.2. Peso muerto

En nuestro buque proyecto el peso muerto es un dato dado, por tanto debe permanecer invariable. Las distintas partidas que integran este peso se descomponen en:

- Carga útil.
- Tripulación y pasaje.
- Pertrechos.
- Consumos.

A continuación, mostramos la tabla resumen de estos pesos calculados también el *Cuaderno 2* del presente proyecto.

	Peso (t)
Carga útil	37 690,50
Tripulación	2,50
Pertrechos	40,00
Consumos	2 267,00
Peso muerto	40 000,00

3.3. Capacidades de tanques

La capacidad de los diferentes tanques de nuestro buque se ha calculado anteriormente en el *Cuaderno 4*, adjuntaremos por tanto una tabla resumen de dichas capacidades.

TANQUE		CAPACIDAD		
		m ³	ton	
HFO	Sedimentación		89,02	87,24
	Uso diario		133,53	130,86
	Almacenamiento		1 651,11	1 618,09
Diésel	Reserva	Uso diario	66,77	56,08
		Almacenamiento	111,28	93,47
	Emergencia		4,50	4,00
LNG		144,00	59,00	
Aceite	Almacenamiento		32,79	30,16
	Cilindros	Almacenamiento	35,26	32,44
		Servicio	5,90	5,43
Agua	Dulce		195,85	195,85
	Técnica		47,48	47,48
Misceláneos	Refrigeración eje		67,00	67,00
	Reboses aceite		24,40	22,44
	Reboses HFO		16,23	15,91
	Lodos		22,54	22,54
	Aguas aceitosas		16,17	14,76
	Sentinas		8,73	7,97
	Aguas residuales		152,06	152,06
Lastre		12 689,35	13 006,59	

3.4. Carga a transportar

Nuestro buque es un *bulkcarrier*, por tanto, se deberán realizar estudios de las condiciones de carga para las distintas densidades de los distintos materiales a transportar.

- Grano: 0,788 t/m³.
- Carbón: 1,767 t/m³.
- Mineral: 3,125 t/m³.

Tendremos que tener cuenta también que nuestro buque transportará contenedores en determinadas condiciones y por eso se establecerá un peso por unidad:

- Contenedor vacío: 2,3 t/unidad.
- Contenedor lleno: 22 t/unidad.

Además, nuestro buque también presenta la posibilidad de transportar madera sobre las escotillas, por lo que habrá que tener en cuenta también el peso de ésta.

Como únicamente podemos establecer la altura que alcanzará la madera condicionada por la altura de los posteleros instalados a los costados de las escotillas, pero no tenemos conocimiento del espacio ocupado realmente por ésta, estipularemos que será semejante al ocupado por los contenedores, por tanto:

$$\text{Peso madera en el espacio de un contenedor} = \text{Capacidad} \cdot \rho = 32,6 \text{ m}^3 \cdot 0,6 \text{ t/m}^3 \\ \simeq 20 \text{ t}$$

- Capacidad útil contenedor: $32,6 \text{ m}^3$.
- Densidad madera: $0,6 \text{ t/m}^3$.

4. CORRECCIÓN POR SUPERFICIES LIBRES

En este apartado se realizará la corrección por superficies libres para cada una de las condiciones de carga analizadas.

En primer lugar debemos determinar qué tanques deben ser corregidos, que serán los que cumplan la siguiente expresión:

$$MSL_{fs} > 0,01 \cdot \Delta_{min}$$

Donde:

- MSL_{fs} : momento escorante por superficies libres para una inclinación de 30°.

$$MSL_{fs} = v \cdot b \cdot \gamma \cdot k \cdot \delta^{1/2}$$

Donde a su vez:

- v : capacidad total del tanque (m^3).
- b : manga máxima del tanque (m).
- γ : densidad del fluido contenido en el tanque (t/m^3).
- k : coeficiente adimensional según la relación entre b/h .

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

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

- δ : coeficiente de bloque del tanque.

Por tanto, se determina que todos los tanques que consumen simultáneamente, con un llenado inferior al 98% con un MSL (o la suma de este si son pareja de tanques) a 30° de escora sea superior al 10% del peso en rosca del buque, deberán corregir por superficies libres.

Se adjuntará como *Anexo I* la tabla correspondiente a los cálculos de Corrección por Superficies Libres.

5. ESTABILIDAD INTACTA

5.1. Condiciones de carga generales

En este cuaderno estudiaremos 20 condiciones de carga teniendo en cuenta todas las variantes posibles:

- Carga en bodegas con madera en cubierta.
- Carga en bodegas con contenedores en cubierta.
- Carga en bodegas.
- Lastre.

5.1.1. Requisitos generales

En las distintas condiciones de carga se tendrá que verificar el cumplimiento de los siguientes requisitos de carácter general:

5.1.1.1. Calado de proa

Las Sociedades de Clasificación exigen un calado mínimo de proa de $0,045 \cdot L$ para cualquier situación de navegación, si no se desea incorporar un reforzado adicional en la zona de los fondos de proa:

$$T_{PR} = 0,045 \cdot L = 0,045 \cdot 170,40 = 7,70 \text{ m}$$

5.1.1.2. Calado de popa

El calado en popa ha de ser tal que permita lograr una inmersión adecuada de las palas del propulsor con un asiento razonable.

Se debería tener en cuenta el calado dinámico a popa, al considerar el efecto de inmersión adicional que provoca la ola de popa en navegación. El aumento de calado sobre la punta de las palas de la hélice, producida por la ola, es del orden de un metro en un buque de 200 m de eslora navegando a 15 nudos.

Se considera satisfactorio una navegación en lastre con alrededor del 90% del diámetro del propulsor sumergido en condiciones estáticas.

$$T_{PP} = h_{eje} + \frac{D_{propulsor}}{2} = 3,75 + \frac{6,5}{2} = 7 \text{ m}$$

Por lo que el calado mínimo requerido a popa para lograr una inmersión apropiada de la hélice será de 7 metros calculado sin margen ya que se considerarán los efectos dinámicos anteriormente mencionados como margen suficiente.

5.1.1.3. Trimado

Según las recomendaciones de la IMO, el asiento a proa se evitará en la medida de lo posible, considerando que este asiento será inferior al 1,5% de la eslora entre perpendiculares, por lo que en nuestro caso:

$$Trimado_{PR} = 0,015 \cdot L = 0,015 \cdot 170,40 = 2,556 \text{ m}$$

En el caso de asiento a popa, se tomará como un valor aceptable hasta, aproximadamente un 2% de la eslora entre perpendiculares, lo que en nuestro caso se dará, sobre todo, en aquellos casos en los que se transporte grano ligero.

$$\text{Trimado}_{PP} = 0,02 \cdot L = 0,02 \cdot 170,40 = 3,408 \text{ m}$$

5.1.2. Parámetros comunes

Tenemos los siguientes parámetros comunes para las situaciones de carga estudiadas:

5.1.2.1. Consideraciones referentes a las salidas de puerto:

- El buque parte con el 100% de la carga y sin ningún tipo de lastre (salvo condiciones de navegación en lastre).
- Los tanques de reboses se consideran totalmente vacíos.

5.1.2.2. Consideraciones referentes a las llegadas a puerto:

- El buque llega con el 100% de la carga y con los tanques de lastre que sean necesarios llenos para garantizar la estabilidad (salvo condiciones de navegación en lastre).
- A la llegada a puerto se habrá consumido un porcentaje de los víveres.
- Tendremos en este punto corrección por superficies libres.

5.2. Desglose de cada condición de carga

Una vez llegados a este punto, procederemos al estudio de cada una de las condiciones de carga de nuestro buque las cuales se citan a continuación y se adjuntarán desarrolladas como *Anexo II*.

5.2.1. Condición I: Salida de puerto a plena carga (grano)

El buque sale de puerto con las bodegas llenas de grano y con el 100% de provisiones y combustibles.

5.2.2. Condición II: Llegada a puerto a plena carga (grano)

El buque llega a puerto con las bodegas llenas de grano y con el 10% de provisiones y combustibles.

5.2.3. Condición III: Salida de puerto a plena carga (grano) + contenedores sobre las escotillas

El buque sale de puerto con las bodegas llenas de grano y con contenedores sobre las escotillas además de con el 100% de provisiones y combustibles.

5.2.4. Condición IV: Llegada a puerto a plena carga (grano) + contenedores sobre las escotillas

El buque llega a puerto con las bodegas llenas de grano y con contenedores sobre las escotillas además de con el 10% de provisiones y combustibles.

5.2.5. Condición V: Salida de puerto a plena carga (grano) + madera sobre las escotillas

El buque sale de puerto con las bodegas llenas de grano y con madera sobre las escotillas además de con el 100% de provisiones y combustibles.

5.2.6. Condición VI: Llegada a puerto a plena carga (grano) + madera sobre las escotillas

El buque llega a puerto con las bodegas llenas de grano y con madera sobre las escotillas además de con el 10% de provisiones y combustibles.

5.2.7. Condición VII: Salida de puerto a plena carga (carbón)

El buque sale de puerto con las bodegas llenas de carbón y con el 100% de provisiones y combustibles.

5.2.8. Condición VIII: Llegada a puerto a plena carga (carbón)

El buque llega a puerto con las bodegas llenas de carbón y con el 10% de provisiones y combustibles.

5.2.9. Condición IX: Salida de puerto a plena carga (carbón) + contenedores sobre las escotillas

El buque sale de puerto con las bodegas llenas de carbón y con contenedores sobre las escotillas además de con el 100% de provisiones y combustibles.

5.2.10. Condición X: Llegada a puerto a plena carga (carbón) + contenedores sobre las escotillas

El buque llega a puerto con las bodegas llenas de carbón y con contenedores sobre las escotillas además de con el 10% de provisiones y combustibles.

5.2.11. Condición XI: Salida de puerto a plena carga (carbón) + madera sobre las escotillas

El buque sale de puerto con las bodegas llenas de carbón y con madera sobre las escotillas además de con el 100% de provisiones y combustibles.

5.2.12. Condición XII: Llegada a puerto a plena carga (carbón) + madera sobre las escotillas

El buque llega a puerto con las bodegas llenas de carbón y con madera sobre las escotillas además de con el 10% de provisiones y combustibles.

5.2.13. Condición XIII: Salida de puerto a plena carga (mineral)

El buque sale de puerto con las bodegas llenas de mineral y con el 100% de provisiones y combustibles.

5.2.14. Condición XIV: Llegada a puerto a plena carga (mineral)

El buque llega a puerto con las bodegas llenas de mineral y con el 10% de provisiones y combustibles.

5.2.15. Condición XV: Salida de puerto a plena carga (mineral) + contenedores sobre las escotillas

El buque sale de puerto con las bodegas llenas de mineral y con contenedores sobre las escotillas además de con el 100% de provisiones y combustibles.

5.2.16. Condición XVI: Llegada a puerto a plena carga (mineral) + contenedores sobre las escotillas

El buque llega a puerto con las bodegas llenas de mineral y con contenedores sobre las escotillas además de con el 10% de provisiones y combustibles.

5.2.17. Condición XVII: Salida de puerto a plena carga (mineral) + madera sobre las escotillas

El buque sale de puerto con las bodegas llenas de mineral y con madera sobre las escotillas además de con el 100% de provisiones y combustibles.

5.2.18. Condición XVIII: Llegada a puerto a plena carga (mineral) + madera sobre las escotillas

El buque llega a puerto con las bodegas llenas de mineral y con madera sobre las escotillas además de con el 10% de provisiones y combustibles.

5.2.19. Condición XIX: Salida de puerto en lastre

El buque sale de puerto con los tanques de lastre llenos y con las bodegas necesarias llenas de agua de lastre para una buena navegación además del 100% de provisiones y combustibles.

5.2.20. Condición XX: Llegada a puerto en lastre

El buque llega a puerto con los tanques de lastre llenos y con las bodegas necesarias llenas de agua de lastre para una buena navegación además del 10% de provisiones y combustibles.

5.3. Cálculo manual

Realizaremos el cálculo manual de una de las condiciones de carga estudiadas anteriormente para corroborar que sí se cumplen los criterios de estabilidad en la Condición I en cual se presenta la salida de puerto al 100% de carga de grano y al 100% de provisiones y combustibles.

Para tal condición, el buque presenta un desplazamiento de 53 299 *t* y un KG de 10,150 *m*. Con estos datos procedemos a calcular los datos requeridos ayudados por una tabla Excel proporcionada en la asignatura de Proyectos del buque.

En cuanto al valor de los KN, empleamos el programa Maxsurf:

KN's (m)								
5°	10°	15°	20°	25°	30°	40°	50°	60°
1,077	2,158	3,247	4,338	5,315	6,193	7,791	9,033	9,767

Para la corrección de superficies libres, introducimos los tanques que corrigen y obtenemos lo que sigue:

DESPLAZ. (Tons)	CORR. GM (m.)	Corrección GZ's (m.)								
		5°	10°	15°	20°	25°	30°	40°	50°	60°
53299	0,075	0,001	0,002	0,004	0,005	0,006	0,007	0,009	0,009	0,009

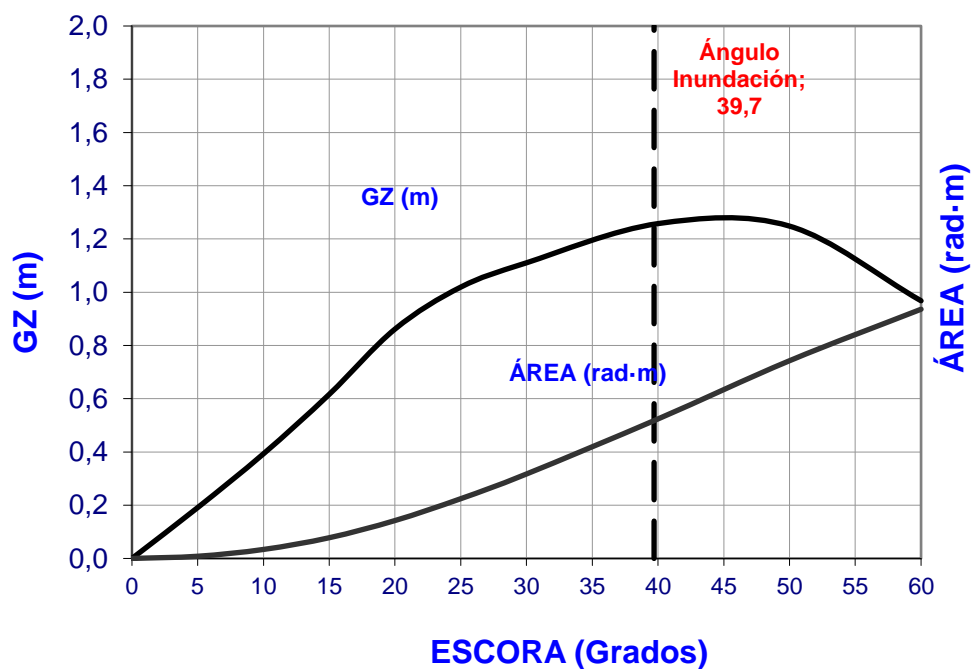
Por tanto, partiendo de un GM de 2,197 m y aplicando una corrección de 0,075 m obtenemos el GM final:

CORRECCIÓN GM	
GM sin corr.	2,197
corr. (m.)	0,075
GM corr. (m)	2,122

A continuación, se presenta la curva de GZ's para la condición de carga estudiada:

Escora (θ)	KN	KG*sen(θ)	GZ	Corr. SL	GZ corr.	Área
0	0,000	0,000	0,000	0,000	0,000	0,000
5	1,077	0,885	0,192	0,001	0,191	0,008
10	2,158	1,763	0,395	0,002	0,393	0,034
15	3,247	2,627	0,620	0,004	0,616	0,078
20	4,338	3,472	0,866	0,005	0,862	0,142
25	5,315	4,290	1,025	0,006	1,019	0,224
30	6,193	5,075	1,118	0,007	1,111	0,317
40	7,791	6,524	1,267	0,009	1,258	0,524
50	9,033	7,775	1,258	0,009	1,248	0,743
60	9,767	8,790	0,977	0,009	0,968	0,936

CURVA DE GZ'S



Gracias a este estudio previo, obtenemos la tabla que se adjunta a continuación y que demuestra que la condición de carga cumple todos los criterios e estabilidad:

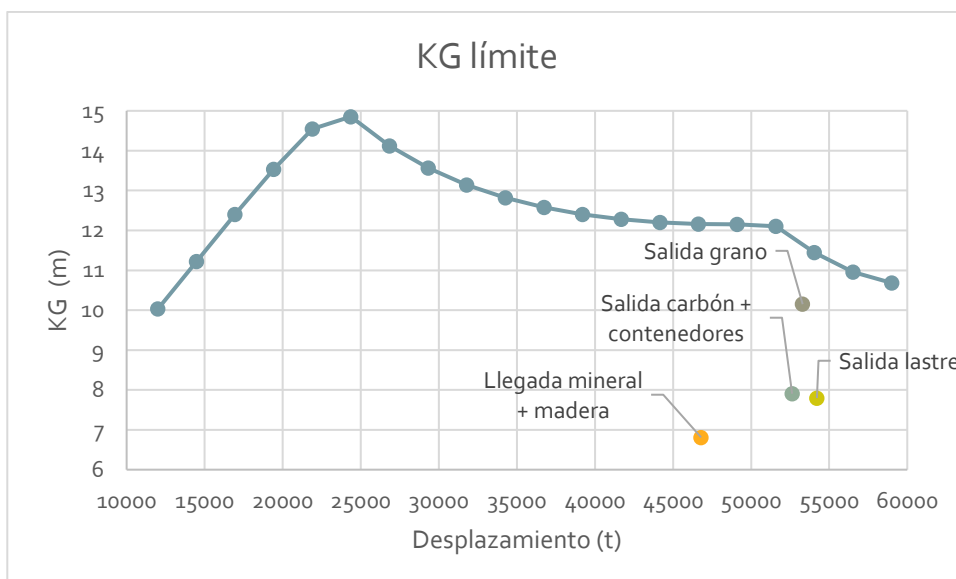
CRITERIOS			
	VALOR	MÍNIMO.	¿CUMPLE?
GM (m.)	2,122	0,150	O.K.
ANGULO ESC. LÍMITE	39,70		
GZ MAX (m.)	1,258	0,200	O.K.
ANGULO GZ MÁX (º)	40,0	25,0	O.K.
ANG [GZ =0,2] >30º	SI		O.K.
BRAZO DINAM. A 30º (m·rad)	0,317	0,055	O.K.
BRAZO. DINAM A 40º (m·rad)	0,524	0,090	O.K.
BRAZO DINAM. 40-30º (m·rad)	0,207	0,030	O.K.

6. CURVA DE KG MÁXIMOS

El objetivo de este apartado es determinar la altura máxima que puede tener el centro de gravedad del buque cumpliendo con unos criterios de estabilidad determinados.

Para ello se calculará el valor del $KG_{m\acute{a}x}$ al cual se enfrentará el buque, esto ocurre no en la condición de plena carga, sino, dada la particularidad de nuestro buque, cuando éste se enfrenta a su situación más desfavorable, es decir, cuando transporta en bodegas el material con menos densidad (grano) y lleva sobre las escotillas el bulto con más peso (contenedores).

Además, integraremos en la gráfica del $KG_{m\acute{a}x}$ los valores de KG obtenidos de otras de las peores situaciones de navegación a las que se enfrentará el buque (no se presentarán todas por ser demasiadas) y observaremos que todas cumplen ya que se encuentran por debajo de la curva de KG máximos.



ANEXO I

Corrección por superficies libres

TANQUE	Peso	V (m³)	Anchura	Longitud	Altura	Densidad	C. bloque	b/h	k	Msl	0,01* P rosca	SIMETR.	Corrige	It (m4)	Mso (t*m)
P1-PIQUE PROA 1	690,827	673,978	20,000	13,000	17,000	1,025	0,088	1,176	0,057	234,787	100,641	1	SI	8666,667	8883,333
P2B-PIQUE PROA 2 BR	445,266	434,406	10,000	7,000	10,000	1,025	0,139	1,000	0,049	80,806	100,641	2	SI	583,333	597,917
P2E-PIQUE PROA 2 ER	445,266	434,406	10,000	7,000	10,000	1,025	0,139	1,000	0,049	80,806	100,641	2	SI	583,333	597,917
S1B-TOLVA SUPERIOR B1 BAVOR	434,402	423,807	7,250	21,600	4,440	1,025	0,074	1,633	0,079	67,891	100,641	2	SI	685,941	703,089
S1E-TOLVA SUPERIOR B1 ESTRIBOR	434,402	423,807	7,250	21,600	4,440	1,025	0,074	1,633	0,079	67,891	100,641	2	SI	685,941	703,089
I1B-TOLVA INFERIOR B1 BAVOR	460,629	449,394	14,000	21,600	3,000	1,025	0,211	4,667	0,113	335,628	100,641	2	SI	4939,200	5062,680
I1E-TOLVA INFERIOR B1 ESTRIBOR	460,629	449,394	14,000	21,600	3,000	1,025	0,211	4,667	0,113	335,628	100,641	2	SI	4939,200	5062,680
S2B-TOLVA SUPERIOR B2 BAVOR	608,512	593,670	7,250	26,400	4,440	1,025	0,060	1,633	0,079	86,022	100,641	2	SI	838,372	859,331
S2E-TOLVA SUPERIOR B2 ESTRIBOR	608,512	593,670	7,250	26,400	4,440	1,025	0,060	1,633	0,079	86,022	100,641	2	SI	838,372	859,331
I2B-TOLVA INFERIOR B2 BAVOR	831,818	811,530	14,000	26,400	3,000	1,025	0,172	4,667	0,113	548,228	100,641	2	SI	6036,800	6187,720
I2E-TOLVA INFERIOR B2 ESTRIBOR	831,818	811,530	14,000	26,400	3,000	1,025	0,172	4,667	0,113	548,228	100,641	2	SI	6036,800	6187,720
S3B-TOLVA SUPERIOR B3 BAVOR	608,594	593,750	7,250	26,400	4,440	1,025	0,060	1,633	0,079	86,034	100,641	2	SI	838,372	859,331
S3E-TOLVA SUPERIOR B3 ESTRIBOR	608,594	593,750	7,250	26,400	4,440	1,025	0,060	1,633	0,079	86,034	100,641	2	SI	838,372	859,331
I3B-TOLVA INFERIOR B3 BAVOR	866,904	845,760	14,000	26,400	3,000	1,025	0,172	4,667	0,113	571,352	100,641	2	SI	6036,800	6187,720
I3E-TOLVA INFERIOR B3 ESTRIBOR	866,904	845,760	14,000	26,400	3,000	1,025	0,172	4,667	0,113	571,352	100,641	2	SI	6036,800	6187,720
I4B-TOLVA INFERIOR B4 BAVOR	860,892	839,895	14,000	26,400	3,000	1,025	0,172	4,667	0,113	567,390	100,641	2	SI	6036,800	6187,720
I4E-TOLVA INFERIOR B4 ESTRIBOR	860,892	839,895	14,000	26,400	3,000	1,025	0,172	4,667	0,113	567,390	100,641	2	SI	6036,800	6187,720
I5B-TOLVA INFERIOR B5 BAVOR	769,640	750,868	14,000	27,200	3,000	1,025	0,167	4,667	0,113	499,732	100,641	2	SI	6219,733	6375,227
I5E-TOLVA INFERIOR B5 ESTRIBOR	769,640	750,868	14,000	27,200	3,000	1,025	0,167	4,667	0,113	499,732	100,641	2	SI	6219,733	6375,227
PIQUE POPA BAVOR	271,223	264,608	6,500	10,900	8,000	1,025	0,073	0,813	0,039	18,777	100,641	2	NO	249,451	255,687
PIQUE POPA ESTRIBOR	271,223	264,608	6,500	10,900	8,000	1,025	0,073	0,813	0,039	18,777	100,641	2	NO	249,451	255,687
SEDIMENTACIÓN HFO 1	43,622	44,512	2,000	1,500	15,140	0,980	0,090	0,132	0,006	0,168	100,641	2	NO	1,000	0,980
USO DIARIO HFO 1	65,432	66,767	3,000	1,500	15,140	0,980	0,135	0,198	0,010	0,694	100,641	2	NO	3,375	3,308
USO DIARIO HFO 2	65,432	66,767	3,000	1,500	15,140	0,980	0,135	0,198	0,010	0,694	100,641	2	NO	3,375	3,308
SEDIMENTACIÓN HFO 2	43,622	44,512	2,000	1,500	15,140	0,980	0,090	0,132	0,006	0,168	100,641	2	NO	1,000	0,980
S4B-TOLVA SUPERIOR B4 BAVOR	405,778	414,059	7,250	26,400	4,440	0,980	0,063	1,633	0,079	58,665	100,641	2	SI	838,372	821,604
S4E-TOLVA SUPERIOR B4 ESTRIBOR	405,778	414,059	7,250	26,400	4,440	0,980	0,063	1,633	0,079	58,665	100,641	2	SI	838,372	821,604
S5B-TOLVA SUPERIOR B5 BAVOR	403,267	411,497	7,250	27,200	4,440	0,980	0,061	1,633	0,079	57,438	100,641	2	SI	863,777	846,502
S5E-TOLVA SUPERIOR B5 ESTRIBOR	403,267	411,497	7,250	27,200	4,440	0,980	0,061	1,633	0,079	57,438	100,641	2	SI	863,777	846,502
SERVICIO ACEITE CILINDROS	5,428	5,900	3,500	2,000	0,860	0,920	2,212	4,070	0,113	3,185	100,641	1	NO	7,146	6,574
ALMACÉN ACEITE CILINDROS	32,439	35,260	3,500	2,000	5,140	0,920	0,370	0,681	0,033	2,286	100,641	1	NO	7,146	6,574
ALMACÉN ACEITE 1	17,009	18,488	2,000	2,000	5,000	0,920	0,217	0,400	0,019	0,308	100,641	1	NO	1,333	1,227
ALMACÉN ACEITE 2	13,153	14,297	5,500	2,000	5,000	0,920	0,598	1,100	0,053	2,991	100,641	1	NO	27,729	25,511
ADB-AGUA DULCE BAVOR	121,659	121,659	10,000	4,750	4,000	1,000	0,526	2,500	0,104	92,132	100,641	2	SI	395,833	395,833
ADE-AGUA DULCE ESTRIBOR	74,189	74,189	10,000	3,000	4,000	1,000	0,833	2,500	0,104	70,695	100,641	2	SI	250,000	250,000
ATE-AGUA TÉCNICA ESTRIBOR	47,476	47,476	10,000	1,750	4,000	1,000	1,429	2,500	0,104	59,233	100,641	1	NO	145,833	145,833
REFRIGERACIÓN EJE	67,172	67,172	12,200	9,750	6,500	1,000	0,193	1,877	0,090	32,482	100,641	1	NO	1475,377	1475,377
LODOS	22,540	22,540	8,000	3,000	1,000	1,000	2,667	8,000	0,113	33,347	100,641	1	NO	128,000	128,000
REBOSES HFO BR	15,908	16,233	5,400	3,000	2,000	0,980	0,918	2,700	0,107	8,780	100,641	1	NO	39,366	38,579
REBOSES ACEITE ER	22,443	24,395	5,600	4,500	2,000	0,920	0,676	2,800	0,108	11,118	100,641	1	NO	65,856	60,588
AGUAS ACEITOSAS	14,763	16,170	2,000	8,250	1,000	0,913	0,266	2,000	0,094	1,436	100,641	1	NO	5,500	5,022
SENTINAS	7,974	8,734	2,000	2,250	2,000	0,913	0,487	1,000	0,049	0,541	100,641	1	NO	1,500	1,370
AGUAS RESIDUALES	152,063	152,063	4,500	5,000	8,000	1,000	0,113	0,563	0,027	6,276	100,641	1	NO	37,969	37,969
USO DIARIO DIÉSEL 1	28,043	33,384	1,500	1,500	15,140	0,840	0,079	0,099	0,005	0,057	100,641	1	NO	0,422	0,354
USO DIARIO DIÉSEL 2	28,043	33,384	1,500	1,500	15,140	0,840	0,079	0,099	0,005	0,057	100,641	1	NO	0,422	0,354
ALMACÉN DIÉSEL	93,474	111,279	5,000	1,500	15,140	0,840	0,262	0,330	0,016	3,841	100,641	1	NO	15,625	13,125
DIÉSEL EMERGENCIA	3,780	4,500	4,000	2,000	4,860	0,840	0,490	0,823	0,040	0,423	100,641	1	NO	10,667	8,960

ANEXO II

Desglose condiciones de carga

CONDICIÓN I

Salida de puerto a plena carga
(grano)

Equilibrium calculation - D

Stability 22.01.00.131, build: 131

Model file: C:\Users\MARTA\Google Drive\TFG\Marta González\PROGRAMAS\MaxSURF\NUEVO (TFG)\D (Highest precision, 65 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 - Condición I

Damage Case - Intact

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m³)

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	10064,100	10064,100			68,650	0,000	11,800	0,000	User Specified
Total peso en rosca			10064,100			68,650	0,000	11,800	0,000	
Tripulación	20	0,125	2,500			15,000	0,000	22,000	0,000	User Specified
Pertrechos	1	40,000	40,000			90,000	0,000	15,000	0,000	User Specified
Total pesos fijos			42,500			85,588	0,000	15,412	0,000	
Viveres	1	3,700	3,700			17,000	0,000	20,000	0,000	User Specified
Total pesos variables			3,700			17,000	0,000	20,000	0,000	
P1-PIQUE PROA 1	0%	690,827	0,000	673,978	0,000	165,684	0,000	0,047	0,000	IMO A.749(18)
P2B-PIQUE PROA 2 BR	0%	445,266	0,000	434,406	0,000	158,040	-0,001	0,009	0,000	IMO A.749(18)
P2E-PIQUE PROA 2 ER	0%	445,266	0,000	434,406	0,000	158,040	0,001	0,009	0,000	IMO A.749(18)
S1B-TOLVA SUPERIOR B1 BAVOR	0%	436,049	0,000	425,414	0,000	139,794	-12,904	12,700	0,000	IMO A.749(18)
S1E-TOLVA SUPERIOR B1 ESTRIBOR	0%	436,049	0,000	425,414	0,000	139,794	12,904	12,700	0,000	IMO A.749(18)
I1B-TOLVA INFERIOR B1 BAVOR	0%	460,629	0,000	449,394	0,000	136,523	-0,671	0,005	0,000	IMO A.749(18)
I1E-TOLVA INFERIOR B1 ESTRIBOR	0%	460,629	0,000	449,394	0,000	136,523	0,671	0,005	0,000	IMO A.749(18)
S2B-TOLVA SUPERIOR B2 BAVOR	0%	608,511	0,000	593,669	0,000	123,728	-14,225	12,700	0,000	IMO A.749(18)
S2E-TOLVA SUPERIOR B2 ESTRIBOR	0%	608,511	0,000	593,669	0,000	123,728	14,225	12,700	0,000	IMO A.749(18)
I2B-TOLVA INFERIOR B2 BAVOR	0%	831,819	0,000	811,530	0,000	111,611	-1,566	0,000	0,000	IMO A.749(18)
I2E-TOLVA INFERIOR B2 ESTRIBOR	0%	831,819	0,000	811,530	0,000	111,611	1,566	0,000	0,000	IMO A.749(18)
S3B-TOLVA SUPERIOR B3 BAVOR	0%	608,593	0,000	593,750	0,000	96,777	-14,339	12,700	0,000	IMO A.749(18)
S3E-TOLVA SUPERIOR B3 ESTRIBOR	0%	608,593	0,000	593,750	0,000	96,777	14,339	12,700	0,000	IMO A.749(18)
I3B-TOLVA INFERIOR B3 BAVOR	0%	866,904	0,000	845,760	0,000	95,275	-2,938	0,000	0,000	IMO A.749(18)
I3E-TOLVA INFERIOR B3 ESTRIBOR	0%	866,904	0,000	845,760	0,000	95,275	2,938	0,000	0,000	IMO A.749(18)
I4B-TOLVA INFERIOR B4 BAVOR	0%	860,892	0,000	839,895	0,000	77,837	-2,284	0,000	0,000	IMO A.749(18)
I4E-TOLVA INFERIOR B4 ESTRIBOR	0%	860,892	0,000	839,895	0,000	77,837	2,284	0,000	0,000	IMO A.749(18)

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
I5B-TOLVA INFERIOR B5 BABOR	0%	769,640	0,000	750,868	0,000	54,943	-1,029	0,000	0,000	IMO A.749(18)
I5E-TOLVA INFERIOR B5 ESTRIBOR	0%	769,640	0,000	750,868	0,000	54,943	1,029	0,000	0,000	IMO A.749(18)
PIQUE POPA BABOR	0%	271,223	0,000	264,608	0,000	8,299	-4,606	9,140	0,000	User Specified
PIQUE POPA ESTRIBOR	0%	271,223	0,000	264,608	0,000	8,299	4,606	9,140	0,000	User Specified
Total lastre	0%	13009,878	0,000	12692,564	0,000	0,000	0,000	0,000	0,000	
ADB-AGUA DULCE BABOR	97,9%	121,659	119,104	121,659	119,104	7,451	-8,283	15,165	131,283	IMO A.749(18)
ADE-AGUA DULCE ESTRIBOR	97,9%	74,189	72,631	74,189	72,631	6,534	8,168	15,176	0,000	IMO A.749(18)
ATE-AGUA TÉCNICA ESTRIBOR	100%	47,476	47,476	47,476	47,476	8,883	8,468	15,189	0,000	User Specified
Total agua	98,31%	243,325	239,212	243,325	239,212	7,457	0,036	15,173	131,283	
REFRIGERACIÓN EJE	100%	67,303	67,303	67,303	67,303	8,597	0,000	3,839	0,000	User Specified
LODOS	0%	22,540	0,000	22,540	0,000	11,401	0,000	1,000	0,000	User Specified
REBOSES HFO BR	0%	15,908	0,000	16,233	0,000	20,233	-2,001	0,313	0,000	User Specified
REBOSES ACEITE ER	0%	22,443	0,000	24,395	0,000	20,974	2,001	0,291	0,000	User Specified
AGUAS ACEITOSAS	0%	14,763	0,000	16,170	0,000	23,625	0,000	1,000	0,000	User Specified
SENTINAS	0%	7,974	0,000	8,734	0,000	28,919	0,000	0,000	0,000	User Specified
AGUAS RESIDUALES	0%	152,063	0,000	152,063	0,000	13,523	8,989	9,140	0,000	User Specified
Total misceláneos	22,21%	302,994	67,303	307,437	67,303	8,597	0,000	3,839	0,000	
SERVICIO ACEITE CILINDROS	100%	5,428	5,428	5,900	5,900	11,000	-5,750	9,570	0,000	User Specified
ALMACÉN ACEITE CILINDROS	100%	32,440	32,440	35,260	35,260	11,000	-5,750	12,570	0,000	User Specified
ALMACÉN ACEITE 1	100%	17,009	17,009	18,488	18,488	11,021	-8,471	11,771	0,000	User Specified
ALMACÉN ACEITE 2	100%	13,153	13,153	14,297	14,297	11,071	-10,529	12,530	0,000	User Specified
Total aceite	100%	68,030	68,030	73,945	73,945	11,019	-7,354	12,123	0,000	
SEDIMENTACIÓN HFO 1	100%	43,621	43,621	44,512	44,512	29,250	-1,000	9,570	0,000	User Specified
USO DIARIO HFO 1	100%	65,432	65,432	66,767	66,767	29,250	1,500	9,570	0,000	User Specified
USO DIARIO HFO 2	100%	65,432	65,432	66,767	66,767	29,250	4,500	9,570	0,000	User Specified
SEDIMENTACIÓN HFO 2	100%	43,621	43,621	44,512	44,512	29,250	7,000	9,570	0,000	User Specified
S4B-TOLVA SUPERIOR B4 BABOR	97,9%	405,778	397,256	414,059	405,363	70,405	-11,318	15,562	203,826	IMO A.749(18)
S4E-TOLVA SUPERIOR B4 ESTRIBOR	97,9%	405,778	397,256	414,059	405,363	70,405	11,318	15,562	203,826	IMO A.749(18)
S5B-TOLVA SUPERIOR B5 BABOR	97,9%	9,973	9,764	10,177	9,963	43,690	-11,263	14,110	0,000	IMO A.749(18)
S5E-TOLVA SUPERIOR B5 ESTRIBOR	97,9%	9,973	9,764	10,177	9,963	43,690	11,263	14,110	0,000	IMO A.749(18)
Total HFO	98,34%	1049,608	1032,147	1071,029	1053,211	61,203	0,634	14,269	407,652	
USO DIARIO DIÉSEL 1	97,9%	28,042	27,453	33,384	32,683	29,250	-2,750	9,411	0,000	IMO A.749(18)
USO DIARIO DIÉSEL 2	97,9%	28,042	27,453	33,384	32,683	29,250	-4,250	9,411	0,000	IMO A.749(18)
ALMACÉN DIÉSEL	97,9%	93,474	91,511	111,279	108,942	29,250	-7,500	9,411	0,000	IMO A.749(18)

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
Total diésel	97,9%	149,559	146,418	178,046	174,307	29,250	-6,000	9,411	0,000	
DIÉSEL EMERGENCIA	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	IMO A.749(18)
Total diésel emergencia	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	
LNG 1	97,9%	47,695	46,694	105,989	103,763	4,571	1,270	22,363	0,000	IMO A.749(18)
LNG 2	97,9%	47,878	46,873	106,396	104,161	-0,102	1,260	22,297	122,130	IMO A.749(18)
Total LNG	97,9%	95,573	93,566	212,385	207,925	2,230	1,265	22,330	122,130	
BODEGA 1	100%	6307,524	6307,524	8004,472	8004,472	146,651	0,000	9,617	0,000	User Specified
BODEGA 2	100%	8762,080	8762,080	11119,391	11119,391	123,166	0,000	9,562	0,000	User Specified
BODEGA 3	100%	8826,230	8826,230	11200,800	11200,800	96,808	0,000	9,550	0,000	User Specified
BODEGA 4	100%	8826,427	8826,427	11201,049	11201,049	70,408	0,000	9,550	0,000	User Specified
BODEGA 5	100%	8816,728	8816,728	11188,741	11188,741	43,813	0,000	9,625	0,000	User Specified
Total bodegas	100%	41538,989	41538,989	52714,453	52714,453	93,078	0,000	9,578	0,000	
Contenedor 1	0	440,000	0,000			147,000	0,000	22,800	0,000	User Specified
Contenedor 2	0	792,000	0,000			123,500	0,000	22,800	0,000	User Specified
Contenedor 3	0	792,000	0,000			97,000	0,000	22,800	0,000	User Specified
Contenedor 4	0	792,000	0,000			70,500	0,000	22,800	0,000	User Specified
Contenedor 5	0	792,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total contenedores			0,000			0,000	0,000	0,000	0,000	
Madera 1	0	400,000	0,000			147,000	0,000	22,800	0,000	User Specified
Madera 2	0	720,000	0,000			123,500	0,000	22,800	0,000	User Specified
Madera 3	0	720,000	0,000			97,000	0,000	22,800	0,000	User Specified
Madera 4	0	720,000	0,000			70,500	0,000	22,800	0,000	User Specified
Madera 5	0	720,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total madera			0,000			0,000	0,000	0,000	0,000	
Total Loadcase			53298,574	67496,358	54533,463	86,903	-0,012	10,138	661,066	
FS correction								0,012		
VCG fluid								10,150		

Draft Amidships m	12,229
Displacement t	53299
Heel deg	0,0
Draft at FP m	12,027
Draft at AP m	12,431

Draft at LCF m	12,234
Trim (+ve by stern) m	0,404
WL Length m	173,956
Beam max extents on WL m	30,165
Wetted Area m ²	8094,575
Waterpl. Area m ²	4640,841
Prismatic coeff. (Cp)	0,813
Block coeff. (Cb)	0,799
Max Sect. area coeff. (Cm)	0,995
Waterpl. area coeff. (Cwp)	0,884
LCB from zero pt. (+ve fwd) m	86,894
LCF from zero pt. (+ve fwd) m	83,119
KB m	6,322
KG fluid m	10,150
BMt m	6,025
BML m	184,618
GMt corrected m	2,197
GML m	180,790
KMt m	12,347
KML m	190,939
Immersion (TPc) tonne/cm	47,569
MTc tonne.m	565,483
RM at 1deg = GMt.Disp.sin(1) tonne.m	2043,832
Max deck inclination deg	0,1360
Trim angle (+ve by stern) deg	0,1360

Key point	Type	Freeboard m
Margin Line (freeboard pos = 30,275 m)		4,704
Deck Edge (freeboard pos = 30,275 m)		4,78
Entrada habilitación cta ppal 1	Downflooding point	6,280
Aseo público cubierta	Downflooding point	6,280
Local CO2	Downflooding point	6,280
Entrada habilitación cta ppal 2	Downflooding point	6,280
Local ropa de agua	Downflooding point	6,280
Entrada habilitación cta toldil	Downflooding point	9,056
Entrada habilitación cta toldil	Downflooding point	9,056
Local grupo emergencia	Downflooding point	9,029
Entrada a cta ppal desde cta to	Downflooding point	9,020

Stability calculation - D

Stability 22.01.00.131, build: 131

Model file: C:\Users\MARTA\Google Drive\TFG\Marta González\PROGRAMAS\MaxSURF\NUEVO (TFG)\D (Highest precision, 65 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 - Condición I

Damage Case - Intact

Free to Trim

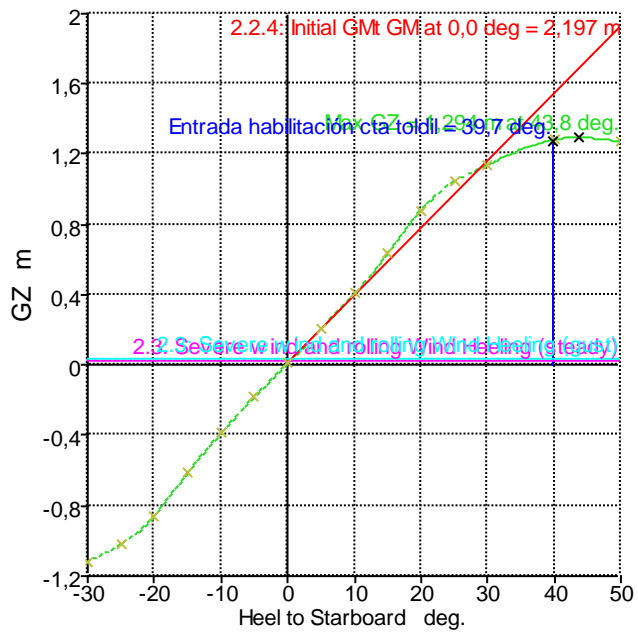
Specific gravity = 1,025; (Density = 1,025 tonne/m³)

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	10064,100	10064,100			68,650	0,000	11,800	0,000	User Specified
Total peso en rosca			10064,100			68,650	0,000	11,800	0,000	
Tripulación	20	0,125	2,500			15,000	0,000	22,000	0,000	User Specified
Pertrechos	1	40,000	40,000			90,000	0,000	15,000	0,000	User Specified
Total pesos fijos			42,500			85,588	0,000	15,412	0,000	
Viveres	1	3,700	3,700			17,000	0,000	20,000	0,000	User Specified
Total pesos variables			3,700			17,000	0,000	20,000	0,000	
P1-PIQUE PROA 1	0%	690,827	0,000	673,978	0,000	165,684	0,000	0,047	0,000	IMO A.749(18)
P2B-PIQUE PROA 2 BR	0%	445,266	0,000	434,406	0,000	158,040	-0,001	0,009	0,000	IMO A.749(18)
P2E-PIQUE PROA 2 ER	0%	445,266	0,000	434,406	0,000	158,040	0,001	0,009	0,000	IMO A.749(18)
S1B-TOLVA SUPERIOR B1 BAVOR	0%	436,049	0,000	425,414	0,000	139,794	-12,904	12,700	0,000	IMO A.749(18)
S1E-TOLVA SUPERIOR B1 ESTRIBOR	0%	436,049	0,000	425,414	0,000	139,794	12,904	12,700	0,000	IMO A.749(18)
I1B-TOLVA INFERIOR B1 BAVOR	0%	460,629	0,000	449,394	0,000	136,523	-0,671	0,005	0,000	IMO A.749(18)
I1E-TOLVA INFERIOR B1 ESTRIBOR	0%	460,629	0,000	449,394	0,000	136,523	0,671	0,005	0,000	IMO A.749(18)
S2B-TOLVA SUPERIOR B2 BAVOR	0%	608,511	0,000	593,669	0,000	123,728	-14,225	12,700	0,000	IMO A.749(18)
S2E-TOLVA SUPERIOR B2 ESTRIBOR	0%	608,511	0,000	593,669	0,000	123,728	14,225	12,700	0,000	IMO A.749(18)
I2B-TOLVA INFERIOR B2 BAVOR	0%	831,819	0,000	811,530	0,000	111,611	-1,566	0,000	0,000	IMO A.749(18)
I2E-TOLVA INFERIOR B2 ESTRIBOR	0%	831,819	0,000	811,530	0,000	111,611	1,566	0,000	0,000	IMO A.749(18)
S3B-TOLVA SUPERIOR B3 BAVOR	0%	608,593	0,000	593,750	0,000	96,777	-14,339	12,700	0,000	IMO A.749(18)
S3E-TOLVA SUPERIOR B3 ESTRIBOR	0%	608,593	0,000	593,750	0,000	96,777	14,339	12,700	0,000	IMO A.749(18)
I3B-TOLVA INFERIOR B3 BAVOR	0%	866,904	0,000	845,760	0,000	95,275	-2,938	0,000	0,000	IMO A.749(18)
I3E-TOLVA INFERIOR B3 ESTRIBOR	0%	866,904	0,000	845,760	0,000	95,275	2,938	0,000	0,000	IMO A.749(18)
I4B-TOLVA INFERIOR B4 BAVOR	0%	860,892	0,000	839,895	0,000	77,837	-2,284	0,000	0,000	IMO A.749(18)
I4E-TOLVA INFERIOR B4 ESTRIBOR	0%	860,892	0,000	839,895	0,000	77,837	2,284	0,000	0,000	IMO A.749(18)

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
I5B-TOLVA INFERIOR B5 BABOR	0%	769,640	0,000	750,868	0,000	54,943	-1,029	0,000	0,000	IMO A.749(18)
I5E-TOLVA INFERIOR B5 ESTRIBOR	0%	769,640	0,000	750,868	0,000	54,943	1,029	0,000	0,000	IMO A.749(18)
PIQUE POPA BABOR	0%	271,223	0,000	264,608	0,000	8,299	-4,606	9,140	0,000	User Specified
PIQUE POPA ESTRIBOR	0%	271,223	0,000	264,608	0,000	8,299	4,606	9,140	0,000	User Specified
Total lastre	0%	13009,878	0,000	12692,564	0,000	0,000	0,000	0,000	0,000	
ADB-AGUA DULCE BABOR	97,9%	121,659	119,104	121,659	119,104	7,451	-8,283	15,165	131,283	IMO A.749(18)
ADE-AGUA DULCE ESTRIBOR	97,9%	74,189	72,631	74,189	72,631	6,534	8,168	15,176	0,000	IMO A.749(18)
ATE-AGUA TÉCNICA ESTRIBOR	100%	47,476	47,476	47,476	47,476	8,883	8,468	15,189	0,000	User Specified
Total agua	98,31%	243,325	239,212	243,325	239,212	7,457	0,036	15,173	131,283	
REFRIGERACIÓN EJE	100%	67,303	67,303	67,303	67,303	8,597	0,000	3,839	0,000	User Specified
LODOS	0%	22,540	0,000	22,540	0,000	11,401	0,000	1,000	0,000	User Specified
REBOSES HFO BR	0%	15,908	0,000	16,233	0,000	20,233	-2,001	0,313	0,000	User Specified
REBOSES ACEITE ER	0%	22,443	0,000	24,395	0,000	20,974	2,001	0,291	0,000	User Specified
AGUAS ACEITOSAS	0%	14,763	0,000	16,170	0,000	23,625	0,000	1,000	0,000	User Specified
SENTINAS	0%	7,974	0,000	8,734	0,000	28,919	0,000	0,000	0,000	User Specified
AGUAS RESIDUALES	0%	152,063	0,000	152,063	0,000	13,523	8,989	9,140	0,000	User Specified
Total misceláneos	22,21%	302,994	67,303	307,437	67,303	8,597	0,000	3,839	0,000	
SERVICIO ACEITE CILINDROS	100%	5,428	5,428	5,900	5,900	11,000	-5,750	9,570	0,000	User Specified
ALMACÉN ACEITE CILINDROS	100%	32,440	32,440	35,260	35,260	11,000	-5,750	12,570	0,000	User Specified
ALMACÉN ACEITE 1	100%	17,009	17,009	18,488	18,488	11,021	-8,471	11,771	0,000	User Specified
ALMACÉN ACEITE 2	100%	13,153	13,153	14,297	14,297	11,071	-10,529	12,530	0,000	User Specified
Total aceite	100%	68,030	68,030	73,945	73,945	11,019	-7,354	12,123	0,000	
SEDIMENTACIÓN HFO 1	100%	43,621	43,621	44,512	44,512	29,250	-1,000	9,570	0,000	User Specified
USO DIARIO HFO 1	100%	65,432	65,432	66,767	66,767	29,250	1,500	9,570	0,000	User Specified
USO DIARIO HFO 2	100%	65,432	65,432	66,767	66,767	29,250	4,500	9,570	0,000	User Specified
SEDIMENTACIÓN HFO 2	100%	43,621	43,621	44,512	44,512	29,250	7,000	9,570	0,000	User Specified
S4B-TOLVA SUPERIOR B4 BABOR	97,9%	405,778	397,256	414,059	405,363	70,405	-11,318	15,562	203,826	IMO A.749(18)
S4E-TOLVA SUPERIOR B4 ESTRIBOR	97,9%	405,778	397,256	414,059	405,363	70,405	11,318	15,562	203,826	IMO A.749(18)
S5B-TOLVA SUPERIOR B5 BABOR	97,9%	9,973	9,764	10,177	9,963	43,690	-11,263	14,110	0,000	IMO A.749(18)
S5E-TOLVA SUPERIOR B5 ESTRIBOR	97,9%	9,973	9,764	10,177	9,963	43,690	11,263	14,110	0,000	IMO A.749(18)
Total HFO	98,34%	1049,608	1032,147	1071,029	1053,211	61,203	0,634	14,269	407,652	
USO DIARIO DIÉSEL 1	97,9%	28,042	27,453	33,384	32,683	29,250	-2,750	9,411	0,000	IMO A.749(18)
USO DIARIO DIÉSEL 2	97,9%	28,042	27,453	33,384	32,683	29,250	-4,250	9,411	0,000	IMO A.749(18)
ALMACÉN DIÉSEL	97,9%	93,474	91,511	111,279	108,942	29,250	-7,500	9,411	0,000	IMO A.749(18)

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
Total diésel	97,9%	149,559	146,418	178,046	174,307	29,250	-6,000	9,411	0,000	
DIÉSEL EMERGENCIA	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	IMO A.749(18)
Total diésel emergencia	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	
LNG 1	97,9%	47,695	46,693	105,989	103,763	4,571	1,270	22,363	0,000	IMO A.749(18)
LNG 2	97,9%	47,878	46,873	106,396	104,161	-0,102	1,260	22,297	122,130	IMO A.749(18)
Total LNG	97,9%	95,573	93,566	212,385	207,925	2,230	1,265	22,330	122,130	
BODEGA 1	100%	6307,524	6307,524	8004,472	8004,472	146,651	0,000	9,617	0,000	User Specified
BODEGA 2	100%	8762,080	8762,080	11119,391	11119,391	123,166	0,000	9,562	0,000	User Specified
BODEGA 3	100%	8826,230	8826,230	11200,800	11200,800	96,808	0,000	9,550	0,000	User Specified
BODEGA 4	100%	8826,427	8826,427	11201,049	11201,049	70,408	0,000	9,550	0,000	User Specified
BODEGA 5	100%	8816,728	8816,728	11188,741	11188,741	43,813	0,000	9,625	0,000	User Specified
Total bodegas	100%	41538,989	41538,989	52714,453	52714,453	93,078	0,000	9,578	0,000	
Contenedor 1	0	440,000	0,000			147,000	0,000	22,800	0,000	User Specified
Contenedor 2	0	792,000	0,000			123,500	0,000	22,800	0,000	User Specified
Contenedor 3	0	792,000	0,000			97,000	0,000	22,800	0,000	User Specified
Contenedor 4	0	792,000	0,000			70,500	0,000	22,800	0,000	User Specified
Contenedor 5	0	792,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total contenedores			0,000			0,000	0,000	0,000	0,000	
Madera 1	0	400,000	0,000			147,000	0,000	22,800	0,000	User Specified
Madera 2	0	720,000	0,000			123,500	0,000	22,800	0,000	User Specified
Madera 3	0	720,000	0,000			97,000	0,000	22,800	0,000	User Specified
Madera 4	0	720,000	0,000			70,500	0,000	22,800	0,000	User Specified
Madera 5	0	720,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total madera			0,000			0,000	0,000	0,000	0,000	
Total Loadcase			53298,574	67496,358	54533,463	86,903	-0,012	10,138	661,066	
FS correction								0,012		
VCG fluid								10,150		



Stability	
Green	GZ
Blue	Entrada habilitación cta toldil = 39,7 deg.
Red	2.2.4: Initial GMt GM at 0,0 deg = 2,197 m
Pink	2.3: Severe wind and rolling Wind Heeling (steady)
Cyan	2.3: Severe wind and rolling Wind Heeling (gust)
Olive	Max GZ = 1,294 m at 43,8 deg.

Heel to Starboard deg	-30,0	-25,0	-20,0	-15,0	-10,0	-5,0	0,0	5,0	10,0	15,0	20,0	25,0
GZ m	-1,117	-1,021	-0,859	-0,611	-0,386	-0,182	0,012	0,205	0,409	0,633	0,881	1,042
Area under GZ curve from zero heel m.deg	18,1009	12,7427	8,0021	4,3132	1,8372	0,4233	0,0105	0,5389	2,0677	4,6559	8,4580	13,3019
Displacement t	53298	53299	53299	53303	53302	53301	53299	53299	53296	53295	53294	53299
Draft at FP m	12,597	12,241	12,069	12,047	12,036	12,029	12,033	12,029	12,035	12,045	12,068	12,242
Draft at AP m	12,298	12,268	12,282	12,347	12,395	12,423	12,425	12,423	12,394	12,345	12,281	12,268
WL Length m	174,084	174,004	173,965	173,960	173,958	173,956	173,957	173,956	173,958	173,960	173,965	174,004
Beam max extents on WL m	29,781	29,783	30,594	31,223	30,628	30,279	30,165	30,279	30,628	31,223	30,597	29,783
Wetted Area m^2	8651,481	8477,013	8221,276	8108,004	8100,954	8096,336	8094,457	8096,164	8100,507	8107,373	8220,690	8476,992
Waterpl. Area m^2	4296,663	4458,955	4745,393	4792,418	4707,963	4657,630	4640,627	4657,602	4707,893	4792,320	4745,699	4458,948
Prismatic coeff. (Cp)	0,829	0,823	0,818	0,815	0,814	0,813	0,813	0,813	0,814	0,815	0,818	0,823
Block coeff. (Cb)	0,562	0,589	0,602	0,623	0,677	0,739	0,799	0,739	0,677	0,623	0,602	0,589
LCB from zero pt. (+ve fwd) m	86,898	86,901	86,898	86,896	86,894	86,894	86,907	86,894	86,895	86,896	86,898	86,901
LCF from zero pt. (+ve fwd) m	82,156	82,710	83,437	83,331	83,200	83,137	83,125	83,137	83,201	83,332	83,438	82,710
Max deck inclination deg	30,0001	25,0000	20,0001	15,0003	10,0007	5,0017	0,1319	5,0017	10,0007	15,0003	20,0001	25,0000
Trim angle (+ve by stern) deg	-0,1005	0,0091	0,0717	0,1009	0,1208	0,1324	0,1319	0,1324	0,1208	0,1009	0,0718	0,0090

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 55,229 m)		17,8	n/a
Deck Edge (immersion pos = 55,229 m)		18,1	n/a
Entrada habilitación cta ppal 1	Downflooding point	Not immersed in positive range	0
Aseo público cubierta	Downflooding point	Not immersed in positive range	0
Local CO2	Downflooding point	Not immersed in positive range	0
Entrada habilitación cta ppal 2	Downflooding point	Not immersed in positive range	0
Local ropa de agua	Downflooding point	Not immersed in positive range	0
Entrada habilitación cta toldil	Downflooding point	39,7	0
Entrada habilitación cta toldil	Downflooding point	Not immersed in positive range	0
Local grupo emergencia	Downflooding point	47,1	0
Entrada a cta ppal desde cta to	Downflooding point	Not immersed in positive range	0

Code	Criteria	Value	Units	Actual	Status	Margin %
267(85) Ch2 - General Criteria	2.3: IMO roll back angle	19,2	deg			
267(85) Ch2 - General Criteria	2.2.1: Area 0 to 30	3,1513	m.deg	18,7601	Pass	+495,32
267(85) Ch2 - General Criteria	2.2.1: Area 0 to 40	5,1566	m.deg	30,5917	Pass	+493,25
267(85) Ch2 - General Criteria	2.2.1: Area 30 to 40	1,7189	m.deg	11,8316	Pass	+588,33
267(85) Ch2 - General Criteria	2.2.2: Max GZ at 30 or greater	0,200	m	1,294	Pass	+547,00
267(85) Ch2 - General Criteria	2.2.3: Angle of maximum GZ	25,0	deg	43,8	Pass	+75,09
267(85) Ch2 - General Criteria	2.2.4: Initial GMt	0,150	m	2,197	Pass	+1364,67
267(85) Ch2 - General Criteria	2.3: Severe wind and rolling				Pass	
	Angle of steady heel shall not be greater than (\leq)	16,0	deg	0,4	Pass	+97,51

KN calculation - D

Stability 22.01.00.131, build: 131

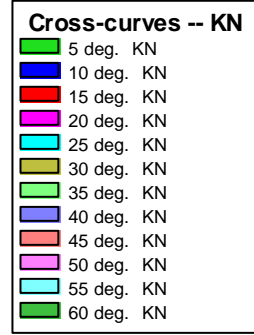
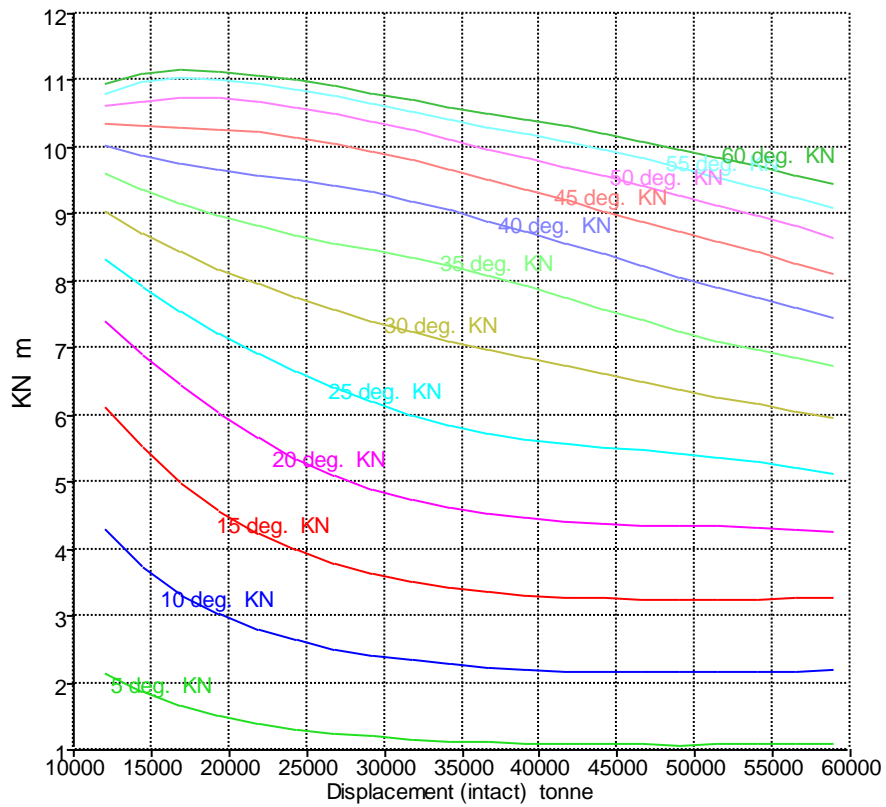
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Damage Case - Intact

Initial Trim = 0 m (+ve by stern)

Specific gravity = 1,025; (Density = 1,025 tonne/m³)

VCG = 0 m; TCG = 0 m



Displacement (intact) tonne	Draft Amidships m	Trim (+ve by stern) m	LCG m	TCG m	Assumed VCG m	KN 5,0 deg. Starb.	KN 10,0 deg. Starb.	KN 15,0 deg. Starb.	KN 20,0 deg. Starb.	KN 25,0 deg. Starb.	KN 30,0 deg. Starb.
12000	3,021	0,000	89,310	0,000	0,000	2,147	4,274	6,119	7,396	8,327	9,000
14474	3,593	0,000	89,278	0,000	0,000	1,856	3,714	5,501	6,883	7,912	8,500
16947	4,161	0,000	89,248	0,000	0,000	1,652	3,314	4,972	6,430	7,548	8,000
19421	4,727	0,000	89,209	0,000	0,000	1,504	3,020	4,552	6,024	7,221	7,750
21895	5,291	0,000	89,150	0,000	0,000	1,394	2,800	4,228	5,660	6,925	7,400
24368	5,854	0,000	89,073	0,000	0,000	1,310	2,633	3,978	5,349	6,655	7,100
26842	6,416	0,000	88,973	0,000	0,000	1,247	2,504	3,785	5,097	6,409	6,850
29316	6,978	0,000	88,845	0,000	0,000	1,198	2,406	3,635	4,898	6,189	6,600

Displacement (intact) tonne	Draft Amidships m	Trim (+ve by stern) m	LCG m	TCG m	Assumed VCG m	KN 5,0 deg. Starb.	KN 10,0 deg. Starb.	KN 15,0 deg. Starb.	KN 20,0 deg. Starb.	KN 25,0 deg. Starb.	KN 30,0 deg. Starb.
31789	7,537	0,000	88,708	0,000	0,000	1,160	2,330	3,520	4,742	6,003	7,254
34263	8,093	0,000	88,571	0,000	0,000	1,132	2,273	3,432	4,621	5,852	7,083
36737	8,646	0,000	88,435	0,000	0,000	1,111	2,230	3,365	4,529	5,734	6,965
39211	9,195	0,000	88,295	0,000	0,000	1,096	2,199	3,316	4,461	5,643	6,856
41684	9,739	0,000	88,144	0,000	0,000	1,085	2,177	3,282	4,411	5,575	6,787
44158	10,279	0,000	87,986	0,000	0,000	1,079	2,163	3,259	4,377	5,527	6,739
46632	10,814	0,000	87,819	0,000	0,000	1,075	2,155	3,246	4,356	5,482	6,694
49105	11,345	0,000	87,643	0,000	0,000	1,074	2,153	3,241	4,346	5,427	6,649
51579	11,871	0,000	87,460	0,000	0,000	1,075	2,155	3,243	4,345	5,364	6,594
54053	12,393	0,000	87,274	0,000	0,000	1,079	2,160	3,250	4,333	5,292	6,539
56526	12,911	0,000	87,090	0,000	0,000	1,083	2,169	3,262	4,302	5,214	6,474
59000	13,426	0,000	86,911	0,000	0,000	1,089	2,181	3,274	4,255	5,132	6,392

KN calculation - D

Stability 22.01.00.131, build: 131

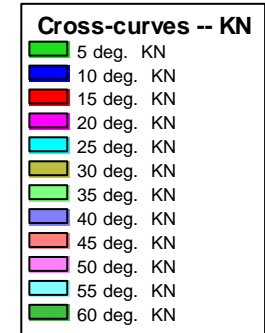
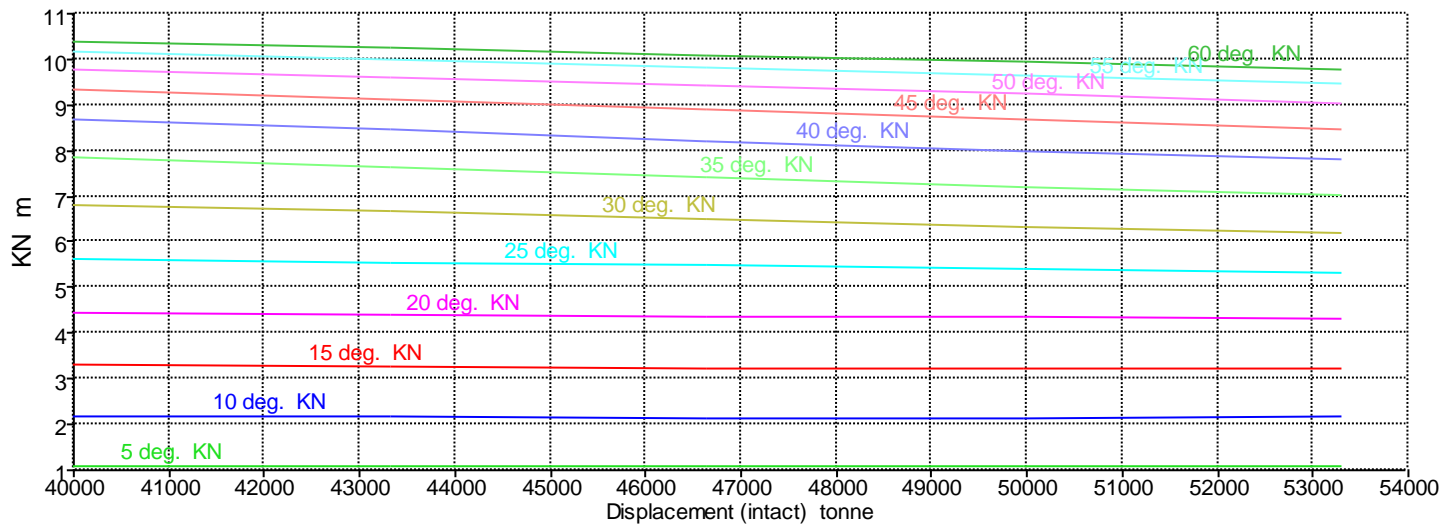
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Damage Case - Intact

Initial Trim = 0 m (+ve by stern)

Specific gravity = 1,025; (Density = 1,025 tonne/m³)

VCG = 0 m; TCG = 0 m



Displacement (intact) tonne	Draft Amidships m	Trim (+ve by stern) m	LCG m	TCG m	Assumed VCG m	KN 5,0 deg. Starb.	KN 10,0 deg. Starb.	KN 15,0 deg. Starb.	KN 20,0 deg. Starb.	KN 25,0 deg. Starb.	KN 30,0 deg. Starb.
40000	9,369	0,000	88,248	0,000	0,000	1,092	2,191	3,305	4,443	5,619	6,819
43325	10,098	0,000	88,040	0,000	0,000	1,081	2,167	3,266	4,386	5,542	6,742
46650	10,818	0,000	87,817	0,000	0,000	1,075	2,155	3,246	4,356	5,482	6,682
49974	11,530	0,000	87,579	0,000	0,000	1,074	2,153	3,241	4,345	5,406	6,606
53299	12,234	0,000	87,331	0,000	0,000	1,077	2,158	3,247	4,338	5,315	6,515

CONDICIÓN II

Llegada a puerto a plena carga
(grano)

Equilibrium calculation - D

Stability 22.01.00.131, build: 131

Model file: C:\Users\MARTA\Google Drive\TFG\Marta González\PROGRAMAS\MaxSURF\NUEVO (TFG)\D (Highest precision, 65 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 - Condición I

Damage Case - Intact

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m³)

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	10064,100	10064,100			68,650	0,000	11,800	0,000	User Specified
Total peso en rosca			10064,100			68,650	0,000	11,800	0,000	
Tripulación	20	0,125	2,500			15,000	0,000	22,000	0,000	User Specified
Pertrechos	1	40,000	40,000			90,000	0,000	15,000	0,000	User Specified
Total pesos fijos			42,500			85,588	0,000	15,412	0,000	
Viveres	0,1	3,700	0,370			17,000	0,000	20,000	0,000	User Specified
Total pesos variables			0,370			17,000	0,000	20,000	0,000	
P1-PIQUE PROA 1	0%	690,827	0,000	673,978	0,000	165,684	0,000	0,047	0,000	IMO A.749(18)
P2B-PIQUE PROA 2 BR	0%	445,266	0,000	434,406	0,000	158,040	-0,001	0,009	0,000	IMO A.749(18)
P2E-PIQUE PROA 2 ER	0%	445,266	0,000	434,406	0,000	158,040	0,001	0,009	0,000	IMO A.749(18)
S1B-TOLVA SUPERIOR B1 BAVOR	0%	436,049	0,000	425,414	0,000	139,794	-12,904	12,700	0,000	IMO A.749(18)
S1E-TOLVA SUPERIOR B1 ESTRIBOR	0%	436,049	0,000	425,414	0,000	139,794	12,904	12,700	0,000	IMO A.749(18)
I1B-TOLVA INFERIOR B1 BAVOR	0%	460,629	0,000	449,394	0,000	136,523	-0,671	0,005	0,000	IMO A.749(18)
I1E-TOLVA INFERIOR B1 ESTRIBOR	0%	460,629	0,000	449,394	0,000	136,523	0,671	0,005	0,000	IMO A.749(18)
S2B-TOLVA SUPERIOR B2 BAVOR	0%	608,511	0,000	593,669	0,000	123,728	-14,225	12,700	0,000	IMO A.749(18)
S2E-TOLVA SUPERIOR B2 ESTRIBOR	0%	608,511	0,000	593,669	0,000	123,728	14,225	12,700	0,000	IMO A.749(18)
I2B-TOLVA INFERIOR B2 BAVOR	0%	831,819	0,000	811,530	0,000	111,611	-1,566	0,000	0,000	IMO A.749(18)
I2E-TOLVA INFERIOR B2 ESTRIBOR	0%	831,819	0,000	811,530	0,000	111,611	1,566	0,000	0,000	IMO A.749(18)
S3B-TOLVA SUPERIOR B3 BAVOR	0%	608,593	0,000	593,750	0,000	96,777	-14,339	12,700	0,000	IMO A.749(18)
S3E-TOLVA SUPERIOR B3 ESTRIBOR	0%	608,593	0,000	593,750	0,000	96,777	14,339	12,700	0,000	IMO A.749(18)
I3B-TOLVA INFERIOR B3 BAVOR	0%	866,904	0,000	845,760	0,000	95,275	-2,938	0,000	0,000	IMO A.749(18)
I3E-TOLVA INFERIOR B3 ESTRIBOR	0%	866,904	0,000	845,760	0,000	95,275	2,938	0,000	0,000	IMO A.749(18)
I4B-TOLVA INFERIOR B4 BAVOR	0%	860,892	0,000	839,895	0,000	77,837	-2,284	0,000	0,000	IMO A.749(18)
I4E-TOLVA INFERIOR B4 ESTRIBOR	0%	860,892	0,000	839,895	0,000	77,837	2,284	0,000	0,000	IMO A.749(18)

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
I5B-TOLVA INFERIOR B5 BABOR	0%	769,640	0,000	750,868	0,000	54,943	-1,029	0,000	0,000	IMO A.749(18)
I5E-TOLVA INFERIOR B5 ESTRIBOR	0%	769,640	0,000	750,868	0,000	54,943	1,029	0,000	0,000	IMO A.749(18)
PIQUE POPA BABOR	0%	271,223	0,000	264,608	0,000	8,299	-4,606	9,140	0,000	User Specified
PIQUE POPA ESTRIBOR	0%	271,223	0,000	264,608	0,000	8,299	4,606	9,140	0,000	User Specified
Total lastre	0%	13009,878	0,000	12692,564	0,000	0,000	0,000	0,000	0,000	
ADB-AGUA DULCE BABOR	10%	121,659	12,166	121,659	12,166	7,492	-7,942	13,365	131,298	IMO A.749(18)
ADE-AGUA DULCE ESTRIBOR	10%	74,189	7,419	74,189	7,419	6,554	7,777	13,370	0,000	IMO A.749(18)
ATE-AGUA TÉCNICA ESTRIBOR	10%	47,476	4,748	47,476	4,748	8,887	8,188	13,358	0,000	User Specified
Total agua	10%	243,325	24,332	243,325	24,332	7,478	-0,002	13,366	131,298	
REFRIGERACIÓN EJE	100%	67,303	67,303	67,303	67,303	8,597	0,000	3,839	0,000	User Specified
LODOS	100%	22,540	22,540	22,540	22,540	11,375	0,000	1,532	0,000	User Specified
REBOSES HFO BR	100%	15,908	15,908	16,233	16,233	18,841	-5,025	1,382	0,000	User Specified
REBOSES ACEITE ER	100%	22,443	22,443	24,395	24,395	18,954	5,046	1,380	0,000	User Specified
AGUAS ACEITOSAS	100%	14,763	14,763	16,170	16,170	23,625	0,000	1,500	0,000	User Specified
SENTINAS	100%	7,974	7,974	8,734	8,734	28,875	0,000	1,010	0,000	User Specified
AGUAS RESIDUALES	100%	152,063	152,063	152,063	152,063	12,650	10,081	13,659	0,000	User Specified
Total misceláneos	100%	302,994	302,994	307,437	307,437	13,409	5,169	8,096	0,000	
SERVICIO ACEITE CILINDROS	10%	5,428	0,543	5,900	0,590	11,000	-5,750	9,183	0,000	User Specified
ALMACÉN ACEITE CILINDROS	10%	32,440	3,244	35,260	3,526	11,000	-5,750	10,257	0,000	User Specified
ALMACÉN ACEITE 1	10%	17,009	1,701	18,488	1,849	11,178	-8,241	9,558	0,000	User Specified
ALMACÉN ACEITE 2	10%	13,153	1,315	14,297	1,430	11,268	-9,962	10,577	0,000	User Specified
Total aceite	10%	68,030	6,803	73,945	7,395	11,096	-7,187	10,058	0,000	
SEDIMENTACIÓN HFO 1	0%	43,621	0,000	44,512	0,000	29,250	-1,000	2,000	0,000	User Specified
USO DIARIO HFO 1	80,24%	65,432	52,500	66,767	53,571	29,250	1,500	8,074	0,000	User Specified
USO DIARIO HFO 2	80,24%	65,432	52,500	66,767	53,571	29,250	4,500	8,074	0,000	User Specified
SEDIMENTACIÓN HFO 2	0%	43,621	0,000	44,512	0,000	29,250	7,000	2,000	0,000	User Specified
S4B-TOLVA SUPERIOR B4 BABOR	0%	405,778	0,000	414,059	0,000	71,250	-13,611	12,700	0,000	IMO A.749(18)
S4E-TOLVA SUPERIOR B4 ESTRIBOR	0%	405,778	0,000	414,059	0,000	71,250	13,611	12,700	0,000	IMO A.749(18)
S5B-TOLVA SUPERIOR B5 BABOR	0%	9,973	0,000	10,177	0,000	44,162	-14,104	12,700	0,000	IMO A.749(18)
S5E-TOLVA SUPERIOR B5 ESTRIBOR	0%	9,973	0,000	10,177	0,000	44,162	14,104	12,700	0,000	IMO A.749(18)
Total HFO	10%	1049,608	105,000	1071,029	107,143	29,250	3,000	8,074	0,000	
USO DIARIO DIÉSEL 1	26,75%	28,042	7,500	33,384	8,929	29,250	-2,750	4,025	0,000	IMO A.749(18)
USO DIARIO DIÉSEL 2	26,75%	28,042	7,500	33,384	8,929	29,250	-4,250	4,025	0,000	IMO A.749(18)
ALMACÉN DIÉSEL	0%	93,474	0,000	111,279	0,000	29,250	-7,500	2,000	0,000	IMO A.749(18)

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
Total diésel	10,03%	149,559	15,000	178,046	17,857	29,250	-3,500	4,025	0,000	
DIÉSEL EMERGENCIA	10%	2,666	0,267	3,174	0,317	8,267	-7,570	20,260	0,000	IMO A.749(18)
Total diésel emergencia	10%	2,666	0,267	3,174	0,317	8,267	-7,570	20,260	0,000	
LNG 1	10%	47,695	4,770	105,989	10,599	4,549	1,266	20,938	0,000	IMO A.749(18)
LNG 2	10%	47,878	4,788	106,396	10,640	-0,067	1,235	20,762	122,144	IMO A.749(18)
Total LNG	10%	95,573	9,557	212,385	21,238	2,237	1,251	20,850	122,144	
BODEGA 1	100%	6307,524	6307,524	8004,472	8004,472	146,651	0,000	9,617	0,000	User Specified
BODEGA 2	100%	8762,080	8762,080	11119,391	11119,391	123,166	0,000	9,562	0,000	User Specified
BODEGA 3	100%	8826,230	8826,230	11200,800	11200,800	96,808	0,000	9,550	0,000	User Specified
BODEGA 4	100%	8826,427	8826,427	11201,049	11201,049	70,408	0,000	9,550	0,000	User Specified
BODEGA 5	100%	8816,728	8816,728	11188,741	11188,741	43,813	0,000	9,625	0,000	User Specified
Total bodegas	100%	41538,989	41538,989	52714,453	52714,453	93,078	0,000	9,578	0,000	
Contenedor 1	0	440,000	0,000			147,000	0,000	22,800	0,000	User Specified
Contenedor 2	0	792,000	0,000			123,500	0,000	22,800	0,000	User Specified
Contenedor 3	0	792,000	0,000			97,000	0,000	22,800	0,000	User Specified
Contenedor 4	0	792,000	0,000			70,500	0,000	22,800	0,000	User Specified
Contenedor 5	0	792,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total contenedores			0,000			0,000	0,000	0,000	0,000	
Madera 1	0	400,000	0,000			147,000	0,000	22,800	0,000	User Specified
Madera 2	0	720,000	0,000			123,500	0,000	22,800	0,000	User Specified
Madera 3	0	720,000	0,000			97,000	0,000	22,800	0,000	User Specified
Madera 4	0	720,000	0,000			70,500	0,000	22,800	0,000	User Specified
Madera 5	0	720,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total madera			0,000			0,000	0,000	0,000	0,000	
Total Loadcase			52109,913	67496,358	53200,173	87,676	0,034	10,003	253,442	
FS correction								0,005		
VCG fluid								10,008		

Draft Amidships m	11,985
Displacement t	52110
Heel deg	0,9
Draft at FP m	12,105
Draft at AP m	11,865

Draft at LCF m	11,983
Trim (+ve by stern) m	-0,240
WL Length m	173,975
Beam max extents on WL m	30,167
Wetted Area m ²	7992,325
Waterpl. Area m ²	4612,100
Prismatic coeff. (Cp)	0,811
Block coeff. (Cb)	0,795
Max Sect. area coeff. (Cm)	0,981
Waterpl. area coeff. (Cwp)	0,879
LCB from zero pt. (+ve fwd) m	87,681
LCF from zero pt. (+ve fwd) m	83,633
KB m	6,190
KG fluid m	10,008
BMt m	6,130
BML m	185,198
GMt corrected m	2,312
GML m	181,380
KMt m	12,320
KML m	191,368
Immersion (TPc) tonne/cm	47,274
MTc tonne.m	554,677
RM at 1deg = GMt.Disp.sin(1) tonne.m	2102,915
Max deck inclination deg	0,8539
Trim angle (+ve by stern) deg	-0,0807

Key point	Type	Freeboard m
Margin Line (freeboard pos = 146,536 m)		4,777
Deck Edge (freeboard pos = 146,536 m)		4,853
Entrada habilitación cta ppal 1	Downflooding point	6,702
Aseo público cubierta	Downflooding point	6,743
Local CO2	Downflooding point	6,766
Entrada habilitación cta ppal 2	Downflooding point	6,791
Local ropa de agua	Downflooding point	6,825
Entrada habilitación cta toldil	Downflooding point	9,374
Entrada habilitación cta toldil	Downflooding point	9,685
Local grupo emergencia	Downflooding point	9,431
Entrada a cta ppal desde cta to	Downflooding point	9,636

Stability calculation - D

Stability 22.01.00.131, build: 131

Model file: C:\Users\MARTA\Google Drive\TFG\Marta González\PROGRAMAS\MaxSURF\NUEVO (TFG)\D (Highest precision, 65 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 - Condición I

Damage Case - Intact

Free to Trim

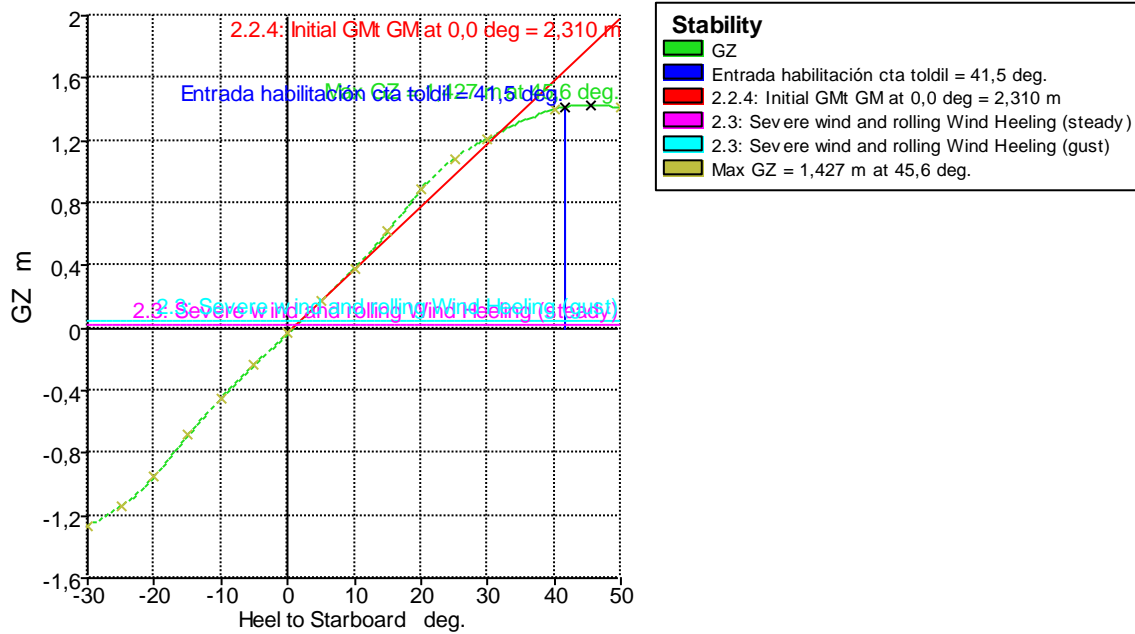
Specific gravity = 1,025; (Density = 1,025 tonne/m³)

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	10064,100	10064,100			68,650	0,000	11,800	0,000	User Specified
Total peso en rosca			10064,100			68,650	0,000	11,800	0,000	
Tripulación	20	0,125	2,500			15,000	0,000	22,000	0,000	User Specified
Pertrechos	1	40,000	40,000			90,000	0,000	15,000	0,000	User Specified
Total pesos fijos			42,500			85,588	0,000	15,412	0,000	
Viveres	0,1	3,700	0,370			17,000	0,000	20,000	0,000	User Specified
Total pesos variables			0,370			17,000	0,000	20,000	0,000	
P1-PIQUE PROA 1	0%	690,827	0,000	673,978	0,000	165,684	0,000	0,047	0,000	IMO A.749(18)
P2B-PIQUE PROA 2 BR	0%	445,266	0,000	434,406	0,000	158,040	-0,001	0,009	0,000	IMO A.749(18)
P2E-PIQUE PROA 2 ER	0%	445,266	0,000	434,406	0,000	158,040	0,001	0,009	0,000	IMO A.749(18)
S1B-TOLVA SUPERIOR B1 BAVOR	0%	436,049	0,000	425,414	0,000	139,794	-12,904	12,700	0,000	IMO A.749(18)
S1E-TOLVA SUPERIOR B1 ESTRIBOR	0%	436,049	0,000	425,414	0,000	139,794	12,904	12,700	0,000	IMO A.749(18)
I1B-TOLVA INFERIOR B1 BAVOR	0%	460,629	0,000	449,394	0,000	136,523	-0,671	0,005	0,000	IMO A.749(18)
I1E-TOLVA INFERIOR B1 ESTRIBOR	0%	460,629	0,000	449,394	0,000	136,523	0,671	0,005	0,000	IMO A.749(18)
S2B-TOLVA SUPERIOR B2 BAVOR	0%	608,511	0,000	593,669	0,000	123,728	-14,225	12,700	0,000	IMO A.749(18)
S2E-TOLVA SUPERIOR B2 ESTRIBOR	0%	608,511	0,000	593,669	0,000	123,728	14,225	12,700	0,000	IMO A.749(18)
I2B-TOLVA INFERIOR B2 BAVOR	0%	831,819	0,000	811,530	0,000	111,611	-1,566	0,000	0,000	IMO A.749(18)
I2E-TOLVA INFERIOR B2 ESTRIBOR	0%	831,819	0,000	811,530	0,000	111,611	1,566	0,000	0,000	IMO A.749(18)
S3B-TOLVA SUPERIOR B3 BAVOR	0%	608,593	0,000	593,750	0,000	96,777	-14,339	12,700	0,000	IMO A.749(18)
S3E-TOLVA SUPERIOR B3 ESTRIBOR	0%	608,593	0,000	593,750	0,000	96,777	14,339	12,700	0,000	IMO A.749(18)
I3B-TOLVA INFERIOR B3 BAVOR	0%	866,904	0,000	845,760	0,000	95,275	-2,938	0,000	0,000	IMO A.749(18)
I3E-TOLVA INFERIOR B3 ESTRIBOR	0%	866,904	0,000	845,760	0,000	95,275	2,938	0,000	0,000	IMO A.749(18)
I4B-TOLVA INFERIOR B4 BAVOR	0%	860,892	0,000	839,895	0,000	77,837	-2,284	0,000	0,000	IMO A.749(18)
I4E-TOLVA INFERIOR B4 ESTRIBOR	0%	860,892	0,000	839,895	0,000	77,837	2,284	0,000	0,000	IMO A.749(18)

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
I5B-TOLVA INFERIOR B5 BABOR	0%	769,640	0,000	750,868	0,000	54,943	-1,029	0,000	0,000	IMO A.749(18)
I5E-TOLVA INFERIOR B5 ESTRIBOR	0%	769,640	0,000	750,868	0,000	54,943	1,029	0,000	0,000	IMO A.749(18)
PIQUE POPA BABOR	0%	271,223	0,000	264,608	0,000	8,299	-4,606	9,140	0,000	User Specified
PIQUE POPA ESTRIBOR	0%	271,223	0,000	264,608	0,000	8,299	4,606	9,140	0,000	User Specified
Total lastre	0%	13009,878	0,000	12692,564	0,000	0,000	0,000	0,000	0,000	
ADB-AGUA DULCE BABOR	10%	121,659	12,166	121,659	12,166	7,492	-7,942	13,365	131,283	IMO A.749(18)
ADE-AGUA DULCE ESTRIBOR	10%	74,189	7,419	74,189	7,419	6,554	7,777	13,370	0,000	IMO A.749(18)
ATE-AGUA TÉCNICA ESTRIBOR	10%	47,476	4,748	47,476	4,748	8,887	8,188	13,358	0,000	User Specified
Total agua	10%	243,325	24,332	243,325	24,332	7,478	-0,002	13,366	131,283	
REFRIGERACIÓN EJE	100%	67,303	67,303	67,303	67,303	8,597	0,000	3,839	0,000	User Specified
LODOS	100%	22,540	22,540	22,540	22,540	11,375	0,000	1,532	0,000	User Specified
REBOSES HFO BR	100%	15,908	15,908	16,233	16,233	18,841	-5,025	1,382	0,000	User Specified
REBOSES ACEITE ER	100%	22,443	22,443	24,395	24,395	18,954	5,046	1,380	0,000	User Specified
AGUAS ACEITOSAS	100%	14,763	14,763	16,170	16,170	23,625	0,000	1,500	0,000	User Specified
SENTINAS	100%	7,974	7,974	8,734	8,734	28,875	0,000	1,010	0,000	User Specified
AGUAS RESIDUALES	100%	152,063	152,063	152,063	152,063	12,650	10,081	13,659	0,000	User Specified
Total misceláneos	100%	302,994	302,994	307,437	307,437	13,409	5,169	8,096	0,000	
SERVICIO ACEITE CILINDROS	10%	5,428	0,543	5,900	0,590	11,000	-5,750	9,183	0,000	User Specified
ALMACÉN ACEITE CILINDROS	10%	32,440	3,244	35,260	3,526	11,000	-5,750	10,257	0,000	User Specified
ALMACÉN ACEITE 1	10%	17,009	1,701	18,488	1,849	11,178	-8,241	9,558	0,000	User Specified
ALMACÉN ACEITE 2	10%	13,153	1,315	14,297	1,430	11,268	-9,962	10,577	0,000	User Specified
Total aceite	10%	68,030	6,803	73,945	7,395	11,096	-7,187	10,058	0,000	
SEDIMENTACIÓN HFO 1	0%	43,621	0,000	44,512	0,000	29,250	-1,000	2,000	0,000	User Specified
USO DIARIO HFO 1	80,24%	65,432	52,500	66,767	53,571	29,250	1,500	8,074	0,000	User Specified
USO DIARIO HFO 2	80,24%	65,432	52,500	66,767	53,571	29,250	4,500	8,074	0,000	User Specified
SEDIMENTACIÓN HFO 2	0%	43,621	0,000	44,512	0,000	29,250	7,000	2,000	0,000	User Specified
S4B-TOLVA SUPERIOR B4 BABOR	0%	405,778	0,000	414,059	0,000	71,250	-13,611	12,700	0,000	IMO A.749(18)
S4E-TOLVA SUPERIOR B4 ESTRIBOR	0%	405,778	0,000	414,059	0,000	71,250	13,611	12,700	0,000	IMO A.749(18)
S5B-TOLVA SUPERIOR B5 BABOR	0%	9,973	0,000	10,177	0,000	44,162	-14,104	12,700	0,000	IMO A.749(18)
S5E-TOLVA SUPERIOR B5 ESTRIBOR	0%	9,973	0,000	10,177	0,000	44,162	14,104	12,700	0,000	IMO A.749(18)
Total HFO	10%	1049,608	105,000	1071,029	107,143	29,250	3,000	8,074	0,000	
USO DIARIO DIÉSEL 1	26,75%	28,042	7,500	33,384	8,929	29,250	-2,750	4,025	0,000	IMO A.749(18)
USO DIARIO DIÉSEL 2	26,75%	28,042	7,500	33,384	8,929	29,250	-4,250	4,025	0,000	IMO A.749(18)
ALMACÉN DIÉSEL	0%	93,474	0,000	111,279	0,000	29,250	-7,500	2,000	0,000	IMO A.749(18)

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
Total diésel	10,03%	149,559	15,000	178,046	17,857	29,250	-3,500	4,025	0,000	
DIÉSEL EMERGENCIA	10%	2,666	0,267	3,174	0,317	8,267	-7,570	20,260	0,000	IMO A.749(18)
Total diésel emergencia	10%	2,666	0,267	3,174	0,317	8,267	-7,570	20,260	0,000	
LNG 1	10%	47,695	4,770	105,989	10,599	4,549	1,266	20,938	0,000	IMO A.749(18)
LNG 2	10%	47,878	4,788	106,396	10,640	-0,067	1,235	20,762	122,130	IMO A.749(18)
Total LNG	10%	95,573	9,557	212,385	21,238	2,237	1,251	20,850	122,130	
BODEGA 1	100%	6307,524	6307,524	8004,472	8004,472	146,651	0,000	9,617	0,000	User Specified
BODEGA 2	100%	8762,080	8762,080	11119,391	11119,391	123,166	0,000	9,562	0,000	User Specified
BODEGA 3	100%	8826,230	8826,230	11200,800	11200,800	96,808	0,000	9,550	0,000	User Specified
BODEGA 4	100%	8826,427	8826,427	11201,049	11201,049	70,408	0,000	9,550	0,000	User Specified
BODEGA 5	100%	8816,728	8816,728	11188,741	11188,741	43,813	0,000	9,625	0,000	User Specified
Total bodegas	100%	41538,989	41538,989	52714,453	52714,453	93,078	0,000	9,578	0,000	
Contenedor 1	0	440,000	0,000			147,000	0,000	22,800	0,000	User Specified
Contenedor 2	0	792,000	0,000			123,500	0,000	22,800	0,000	User Specified
Contenedor 3	0	792,000	0,000			97,000	0,000	22,800	0,000	User Specified
Contenedor 4	0	792,000	0,000			70,500	0,000	22,800	0,000	User Specified
Contenedor 5	0	792,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total contenedores			0,000			0,000	0,000	0,000	0,000	
Madera 1	0	400,000	0,000			147,000	0,000	22,800	0,000	User Specified
Madera 2	0	720,000	0,000			123,500	0,000	22,800	0,000	User Specified
Madera 3	0	720,000	0,000			97,000	0,000	22,800	0,000	User Specified
Madera 4	0	720,000	0,000			70,500	0,000	22,800	0,000	User Specified
Madera 5	0	720,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total madera			0,000			0,000	0,000	0,000	0,000	
Total Loadcase			52109,913	67496,358	53200,173	87,676	0,034	10,003	253,414	
FS correction								0,005		
VCG fluid								10,008		



Heel to Starboard deg	-30,0	-25,0	-20,0	-15,0	-10,0	-5,0	0,0	5,0	10,0	15,0	20,0	25,0
GZ m	-1,266	-1,146	-0,951	-0,685	-0,451	-0,238	-0,034	0,169	0,383	0,619	0,886	1,084
Area under GZ curve from zero heel m.deg	20,6446	14,5957	9,3142	5,2168	2,3929	0,6771	-0,0312	0,3341	1,7096	4,1976	7,9703	12,9301
Displacement t	52110	52110	52110	52113	52112	52111	52110	52110	52109	52108	52106	52110
Draft at FP m	12,657	12,312	12,147	12,127	12,115	12,108	12,111	12,108	12,114	12,125	12,146	12,312
Draft at AP m	11,644	11,647	11,700	11,776	11,827	11,856	11,860	11,856	11,826	11,775	11,699	11,647
WL Length m	174,100	174,021	173,983	173,978	173,976	173,974	173,975	173,974	173,975	173,978	173,983	174,021
Beam max extents on WL m	30,318	29,521	31,435	31,223	30,627	30,279	30,164	30,279	30,627	31,222	31,437	29,521
Wetted Area m^2	8518,430	8339,424	8075,623	8009,368	7999,625	7994,149	7992,106	7994,036	7999,329	8008,930	8075,138	8339,400
Waterpl. Area m^2	4349,080	4511,647	4803,545	4765,439	4678,994	4628,249	4611,369	4628,228	4678,940	4765,361	4803,769	4511,653
Prismatic coeff. (Cp)	0,821	0,817	0,814	0,813	0,812	0,812	0,811	0,812	0,812	0,813	0,814	0,817
Block coeff. (Cb)	0,546	0,588	0,581	0,618	0,672	0,735	0,802	0,735	0,672	0,618	0,581	0,588
LCB from zero pt. (+ve fwd) m	87,683	87,690	87,685	87,683	87,682	87,681	87,693	87,682	87,682	87,684	87,686	87,690
LCF from zero pt. (+ve fwd) m	82,265	82,871	83,599	83,784	83,700	83,651	83,639	83,652	83,701	83,785	83,600	82,871
Max deck inclination deg	30,0013	25,0008	20,0005	15,0004	10,0004	5,0007	0,0843	5,0007	10,0004	15,0004	20,0005	25,0008
Trim angle (+ve by stern) deg	-0,3405	-0,2235	-0,1502	-0,1178	-0,0967	-0,0847	-0,0843	-0,0847	-0,0967	-0,1177	-0,1503	-0,2234

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 127,716 m)		18,5	n/a
Deck Edge (immersion pos = 127,716 m)		18,7	n/a
Entrada habilitación cta ppal 1	Downflooding point	Not immersed in positive range	0
Aseo público cubierta	Downflooding point	Not immersed in positive range	0
Local CO2	Downflooding point	Not immersed in positive range	0
Entrada habilitación cta ppal 2	Downflooding point	Not immersed in positive range	0
Local ropa de agua	Downflooding point	Not immersed in positive range	0
Entrada habilitación cta toldil	Downflooding point	41,5	0
Entrada habilitación cta toldil	Downflooding point	Not immersed in positive range	0
Local grupo emergencia	Downflooding point	49,5	0
Entrada a cta ppal desde cta to	Downflooding point	Not immersed in positive range	0

Code	Criteria	Value	Units	Actual	Status	Margin %
267(85) Ch2 - General Criteria	2.3: IMO roll back angle	19,3	deg			
267(85) Ch2 - General Criteria	2.2.1: Area 0 to 30	3,1513	m.deg	18,6719	Pass	+492,52
267(85) Ch2 - General Criteria	2.2.1: Area 0 to 40	5,1566	m.deg	31,7860	Pass	+516,41
267(85) Ch2 - General Criteria	2.2.1: Area 30 to 40	1,7189	m.deg	13,1141	Pass	+662,95
267(85) Ch2 - General Criteria	2.2.2: Max GZ at 30 or greater	0,200	m	1,427	Pass	+613,50
267(85) Ch2 - General Criteria	2.2.3: Angle of maximum GZ	25,0	deg	45,6	Pass	+82,34
267(85) Ch2 - General Criteria	2.2.4: Initial GMt	0,150	m	2,310	Pass	+1440,00
267(85) Ch2 - General Criteria	2.3: Severe wind and rolling				Pass	
	Angle of steady heel shall not be greater than (\leq)	16,0	deg	1,5	Pass	+90,40

CONDICIÓN III

Salida de puerto a plena carga
(grano) + contenedores sobre
escotillas

Equilibrium calculation - D

Stability 22.01.00.131, build: 131

Model file: C:\Users\MARTA\Google Drive\TFG\Marta González\PROGRAMAS\MaxSURFNUEVO (TFG)\D (Highest precision, 65 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 - Condición I

Damage Case - Intact

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m³)

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	10064,100	10064,100			68,650	0,000	11,800	0,000	User Specified
Total peso en rosca			10064,100			68,650	0,000	11,800	0,000	
Tripulación	20	0,125	2,500			15,000	0,000	22,000	0,000	User Specified
Pertrechos	1	40,000	40,000			90,000	0,000	15,000	0,000	User Specified
Total pesos fijos			42,500			85,588	0,000	15,412	0,000	
Víveres	1	3,700	3,700			17,000	0,000	20,000	0,000	User Specified
Total pesos variables			3,700			17,000	0,000	20,000	0,000	
P1-PIQUE PROA 1	0%	690,827	0,000	673,978	0,000	165,684	0,000	0,047	0,000	IMO A.749(18)
P2B-PIQUE PROA 2 BR	0%	445,266	0,000	434,406	0,000	158,040	-0,001	0,009	0,000	IMO A.749(18)
P2E-PIQUE PROA 2 ER	0%	445,266	0,000	434,406	0,000	158,040	0,001	0,009	0,000	IMO A.749(18)
S1B-TOLVA SUPERIOR B1 BABOR	0%	436,049	0,000	425,414	0,000	139,794	-12,904	12,700	0,000	IMO A.749(18)
S1E-TOLVA SUPERIOR B1 ESTRIBOR	0%	436,049	0,000	425,414	0,000	139,794	12,904	12,700	0,000	IMO A.749(18)
I1B-TOLVA INFERIOR B1 BABOR	0%	460,629	0,000	449,394	0,000	136,523	-0,671	0,005	0,000	IMO A.749(18)
I1E-TOLVA INFERIOR B1 ESTRIBOR	0%	460,629	0,000	449,394	0,000	136,523	0,671	0,005	0,000	IMO A.749(18)
S2B-TOLVA SUPERIOR B2 BABOR	0%	608,511	0,000	593,669	0,000	123,728	-14,225	12,700	0,000	IMO A.749(18)
S2E-TOLVA SUPERIOR B2 ESTRIBOR	0%	608,511	0,000	593,669	0,000	123,728	14,225	12,700	0,000	IMO A.749(18)
I2B-TOLVA INFERIOR B2 BABOR	0%	831,819	0,000	811,530	0,000	111,611	-1,566	0,000	0,000	IMO A.749(18)
I2E-TOLVA INFERIOR B2 ESTRIBOR	0%	831,819	0,000	811,530	0,000	111,611	1,566	0,000	0,000	IMO A.749(18)
S3B-TOLVA SUPERIOR B3 BABOR	0%	608,593	0,000	593,750	0,000	96,777	-14,339	12,700	0,000	IMO A.749(18)
S3E-TOLVA SUPERIOR B3 ESTRIBOR	0%	608,593	0,000	593,750	0,000	96,777	14,339	12,700	0,000	IMO A.749(18)
I3B-TOLVA INFERIOR B3 BABOR	0%	866,904	0,000	845,760	0,000	95,275	-2,938	0,000	0,000	IMO A.749(18)
I3E-TOLVA INFERIOR B3 ESTRIBOR	0%	866,904	0,000	845,760	0,000	95,275	2,938	0,000	0,000	IMO A.749(18)

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
I4B-TOLVA INFERIOR B4 BABOR	0%	860,892	0,000	839,895	0,000	77,837	-2,284	0,000	0,000	IMO A.749(18)
I4E-TOLVA INFERIOR B4 ESTRIBOR	0%	860,892	0,000	839,895	0,000	77,837	2,284	0,000	0,000	IMO A.749(18)
I5B-TOLVA INFERIOR B5 BABOR	0%	769,640	0,000	750,868	0,000	54,943	-1,029	0,000	0,000	IMO A.749(18)
I5E-TOLVA INFERIOR B5 ESTRIBOR	0%	769,640	0,000	750,868	0,000	54,943	1,029	0,000	0,000	IMO A.749(18)
PIQUE POPA BABOR	0%	271,223	0,000	264,608	0,000	8,299	-4,606	9,140	0,000	User Specified
PIQUE POPA ESTRIBOR	0%	271,223	0,000	264,608	0,000	8,299	4,606	9,140	0,000	User Specified
Total lastre	0%	13009,878	0,000	12692,564	0,000	0,000	0,000	0,000	0,000	
ADB-AGUA DULCE BABOR	97,9%	121,659	119,104	121,659	119,104	7,451	-8,283	15,165	131,283	IMO A.749(18)
ADE-AGUA DULCE ESTRIBOR	97,9%	74,189	72,631	74,189	72,631	6,534	8,168	15,176	0,000	IMO A.749(18)
ATE-AGUA TÉCNICA ESTRIBOR	100%	47,476	47,476	47,476	47,476	8,883	8,468	15,189	0,000	User Specified
Total agua	98,31%	243,325	239,212	243,325	239,212	7,457	0,036	15,173	131,283	
REFRIGERACIÓN EJE	100%	67,303	67,303	67,303	67,303	8,597	0,000	3,839	0,000	User Specified
LODOS	0%	22,540	0,000	22,540	0,000	11,401	0,000	1,000	0,000	User Specified
REBOSOS HFO BR	0%	15,908	0,000	16,233	0,000	20,233	-2,001	0,313	0,000	User Specified
REBOSOS ACEITE ER	0%	22,443	0,000	24,395	0,000	20,974	2,001	0,291	0,000	User Specified
AGUAS ACEITOSAS	0%	14,763	0,000	16,170	0,000	23,625	0,000	1,000	0,000	User Specified
SENTINAS	0%	7,974	0,000	8,734	0,000	28,919	0,000	0,000	0,000	User Specified
AGUAS RESIDUALES	0%	152,063	0,000	152,063	0,000	13,523	8,989	9,140	0,000	User Specified
Total misceláneos	22,21%	302,994	67,303	307,437	67,303	8,597	0,000	3,839	0,000	
SERVICIO ACEITE CILINDROS	100%	5,428	5,428	5,900	5,900	11,000	-5,750	9,570	0,000	User Specified
ALMACÉN ACEITE CILINDROS	100%	32,440	32,440	35,260	35,260	11,000	-5,750	12,570	0,000	User Specified
ALMACÉN ACEITE 1	100%	17,009	17,009	18,488	18,488	11,021	-8,471	11,771	0,000	User Specified
ALMACÉN ACEITE 2	100%	13,153	13,153	14,297	14,297	11,071	-10,529	12,530	0,000	User Specified
Total aceite	100%	68,030	68,030	73,945	73,945	11,019	-7,354	12,123	0,000	
SEDIMENTACIÓN HFO 1	100%	43,621	43,621	44,512	44,512	29,250	-1,000	9,570	0,000	User Specified
USO DIARIO HFO 1	100%	65,432	65,432	66,767	66,767	29,250	1,500	9,570	0,000	User Specified
USO DIARIO HFO 2	100%	65,432	65,432	66,767	66,767	29,250	4,500	9,570	0,000	User Specified
SEDIMENTACIÓN HFO 2	100%	43,621	43,621	44,512	44,512	29,250	7,000	9,570	0,000	User Specified
S4B-TOLVA SUPERIOR B4 BABOR	97,9%	405,778	397,256	414,059	405,363	70,405	-11,318	15,562	203,826	IMO A.749(18)
S4E-TOLVA SUPERIOR B4 ESTRIBOR	97,9%	405,778	397,256	414,059	405,363	70,405	11,318	15,562	203,826	IMO A.749(18)
S5B-TOLVA SUPERIOR B5 BABOR	97,9%	9,973	9,764	10,177	9,963	43,690	-11,263	14,110	0,000	IMO A.749(18)
S5E-TOLVA SUPERIOR B5 ESTRIBOR	97,9%	9,973	9,764	10,177	9,963	43,690	11,263	14,110	0,000	IMO A.749(18)
Total HFO	98,34%	1049,608	1032,147	1071,029	1053,211	61,203	0,634	14,269	407,652	
USO DIARIO DIÉSEL 1	97,9%	28,042	27,453	33,384	32,683	29,250	-2,750	9,411	0,000	IMO A.749(18)

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
USO DIARIO DIÉSEL 2	97,9%	28,042	27,453	33,384	32,683	29,250	-4,250	9,411	0,000	IMO A.749(18)
ALMACÉN DIÉSEL	97,9%	93,474	91,511	111,279	108,942	29,250	-7,500	9,411	0,000	IMO A.749(18)
Total diésel	97,9%	149,559	146,418	178,046	174,307	29,250	-6,000	9,411	0,000	
DIÉSEL EMERGENCIA	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	IMO A.749(18)
Total diésel emergencia	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	
LNG 1	97,9%	47,695	46,693	105,989	103,763	4,571	1,270	22,363	0,000	IMO A.749(18)
LNG 2	97,9%	47,878	46,873	106,396	104,161	-0,102	1,260	22,297	122,130	IMO A.749(18)
Total LNG	97,9%	95,573	93,566	212,385	207,925	2,230	1,265	22,330	122,130	
BODEGA 1	90%	6307,524	5676,772	8004,472	7204,026	146,597	0,000	8,780	0,000	User Specified
BODEGA 2	90%	8762,080	7885,872	11119,391	10007,452	123,145	0,000	8,694	0,000	User Specified
BODEGA 3	90%	8826,230	7943,607	11200,800	10080,720	96,797	0,000	8,682	0,000	User Specified
BODEGA 4	90%	8826,427	7943,784	11201,049	10080,944	70,403	0,000	8,682	0,000	User Specified
BODEGA 5	90%	8816,728	7935,055	11188,741	10069,867	43,813	0,000	8,765	0,000	User Specified
Total bodegas	90%	41538,989	37385,091	52714,453	47443,009	93,063	0,000	8,717	0,000	
Contenedor 1	1	440,000	440,000			147,000	0,000	22,800	0,000	User Specified
Contenedor 2	1	792,000	792,000			123,500	0,000	22,800	0,000	User Specified
Contenedor 3	1	792,000	792,000			97,000	0,000	22,800	0,000	User Specified
Contenedor 4	1	792,000	792,000			70,500	0,000	22,800	0,000	User Specified
Contenedor 5	1	792,000	792,000			44,000	0,000	22,800	0,000	User Specified
Total contenedores			3608,000			91,463	0,000	22,800	0,000	
Madera 1	0	400,000	0,000			147,000	0,000	22,800	0,000	User Specified
Madera 2	0	720,000	0,000			123,500	0,000	22,800	0,000	User Specified
Madera 3	0	720,000	0,000			97,000	0,000	22,800	0,000	User Specified
Madera 4	0	720,000	0,000			70,500	0,000	22,800	0,000	User Specified
Madera 5	0	720,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total madera			0,000			0,000	0,000	0,000	0,000	
Total Loadcase			52752,676	67496,358	49262,019	86,717	-0,012	10,437	661,066	
FS correction								0,013		
VCG fluid								10,450		

Draft Amidships m	12,112
Displacement t	52753
Heel deg	0,0

Draft at FP m	11,803
Draft at AP m	12,421
Draft at LCF m	12,119
Trim (+ve by stern) m	0,617
WL Length m	173,906
Beam max extents on WL m	30,165
Wetted Area m ²	8053,899
Waterpl. Area m ²	4637,574
Prismatic coeff. (Cp)	0,811
Block coeff. (Cb)	0,792
Max Sect. area coeff. (Cm)	0,994
Waterpl. area coeff. (Cwp)	0,884
LCB from zero pt. (+ve fwd) m	86,700
LCF from zero pt. (+ve fwd) m	83,092
KB m	6,262
KG fluid m	10,450
BMt m	6,082
BML m	186,171
GMt corrected m	1,894
GML m	181,983
KMt m	12,344
KML m	192,432
Immersion (TPc) tonne/cm	47,535
MTc tonne.m	563,385
RM at 1deg = GMt.Disp.sin(1) tonne.m	1743,737
Max deck inclination deg	0,2076
Trim angle (+ve by stern) deg	0,2076

Key point	Type	Freeboard m
Margin Line (freeboard pos = 30,275 m)		4,753
Deck Edge (freeboard pos = 30,275 m)		4,829
Entrada habilitación cta ppal 1	Downflooding point	6,328
Aseo público cubierta	Downflooding point	6,328
Local CO2	Downflooding point	6,328
Entrada habilitación cta ppal 2	Downflooding point	6,328
Local ropa de agua	Downflooding point	6,328
Entrada habilitación cta toldil	Downflooding point	9,097
Entrada habilitación cta toldil	Downflooding point	9,097
Local grupo emergencia	Downflooding point	9,056
Entrada a cta ppal desde cta to	Downflooding point	9,042

Stability calculation - D

Stability 22.01.00.131, build: 131

Model file: C:\Users\MARTA\Google Drive\TFG\Marta González\PROGRAMAS\MaxSURF\NUEVO (TFG)\D (Highest precision, 65 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 - Condición I

Damage Case - Intact

Free to Trim

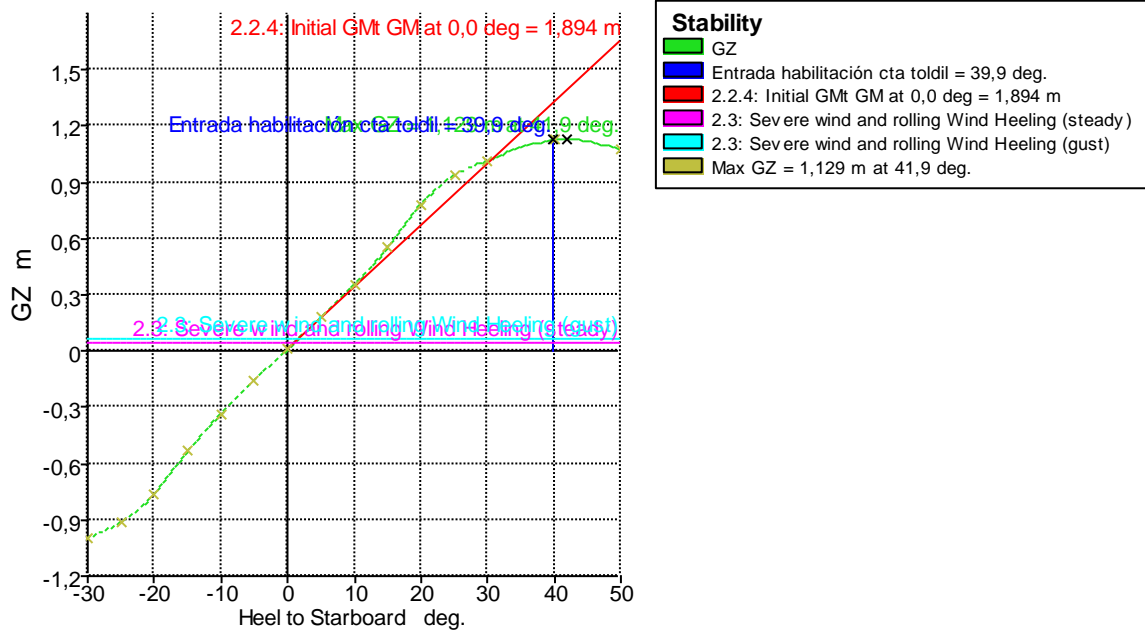
Specific gravity = 1,025; (Density = 1,025 tonne/m³)

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	10064,100	10064,100			68,650	0,000	11,800	0,000	User Specified
Total peso en rosca			10064,100			68,650	0,000	11,800	0,000	
Tripulación	20	0,125	2,500			15,000	0,000	22,000	0,000	User Specified
Pertrechos	1	40,000	40,000			90,000	0,000	15,000	0,000	User Specified
Total pesos fijos			42,500			85,588	0,000	15,412	0,000	
Viveres	1	3,700	3,700			17,000	0,000	20,000	0,000	User Specified
Total pesos variables			3,700			17,000	0,000	20,000	0,000	
P1-PIQUE PROA 1	0%	690,827	0,000	673,978	0,000	165,684	0,000	0,047	0,000	IMO A.749(18)
P2B-PIQUE PROA 2 BR	0%	445,266	0,000	434,406	0,000	158,040	-0,001	0,009	0,000	IMO A.749(18)
P2E-PIQUE PROA 2 ER	0%	445,266	0,000	434,406	0,000	158,040	0,001	0,009	0,000	IMO A.749(18)
S1B-TOLVA SUPERIOR B1 BAVOR	0%	436,049	0,000	425,414	0,000	139,794	-12,904	12,700	0,000	IMO A.749(18)
S1E-TOLVA SUPERIOR B1 ESTRIBOR	0%	436,049	0,000	425,414	0,000	139,794	12,904	12,700	0,000	IMO A.749(18)
I1B-TOLVA INFERIOR B1 BAVOR	0%	460,629	0,000	449,394	0,000	136,523	-0,671	0,005	0,000	IMO A.749(18)
I1E-TOLVA INFERIOR B1 ESTRIBOR	0%	460,629	0,000	449,394	0,000	136,523	0,671	0,005	0,000	IMO A.749(18)
S2B-TOLVA SUPERIOR B2 BAVOR	0%	608,511	0,000	593,669	0,000	123,728	-14,225	12,700	0,000	IMO A.749(18)
S2E-TOLVA SUPERIOR B2 ESTRIBOR	0%	608,511	0,000	593,669	0,000	123,728	14,225	12,700	0,000	IMO A.749(18)
I2B-TOLVA INFERIOR B2 BAVOR	0%	831,819	0,000	811,530	0,000	111,611	-1,566	0,000	0,000	IMO A.749(18)
I2E-TOLVA INFERIOR B2 ESTRIBOR	0%	831,819	0,000	811,530	0,000	111,611	1,566	0,000	0,000	IMO A.749(18)
S3B-TOLVA SUPERIOR B3 BAVOR	0%	608,593	0,000	593,750	0,000	96,777	-14,339	12,700	0,000	IMO A.749(18)
S3E-TOLVA SUPERIOR B3 ESTRIBOR	0%	608,593	0,000	593,750	0,000	96,777	14,339	12,700	0,000	IMO A.749(18)
I3B-TOLVA INFERIOR B3 BAVOR	0%	866,904	0,000	845,760	0,000	95,275	-2,938	0,000	0,000	IMO A.749(18)
I3E-TOLVA INFERIOR B3 ESTRIBOR	0%	866,904	0,000	845,760	0,000	95,275	2,938	0,000	0,000	IMO A.749(18)

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
I4B-TOLVA INFERIOR B4 BABOR	0%	860,892	0,000	839,895	0,000	77,837	-2,284	0,000	0,000	IMO A.749(18)
I4E-TOLVA INFERIOR B4 ESTRIBOR	0%	860,892	0,000	839,895	0,000	77,837	2,284	0,000	0,000	IMO A.749(18)
I5B-TOLVA INFERIOR B5 BABOR	0%	769,640	0,000	750,868	0,000	54,943	-1,029	0,000	0,000	IMO A.749(18)
I5E-TOLVA INFERIOR B5 ESTRIBOR	0%	769,640	0,000	750,868	0,000	54,943	1,029	0,000	0,000	IMO A.749(18)
PIQUE POPA BABOR	0%	271,223	0,000	264,608	0,000	8,299	-4,606	9,140	0,000	User Specified
PIQUE POPA ESTRIBOR	0%	271,223	0,000	264,608	0,000	8,299	4,606	9,140	0,000	User Specified
Total lastre	0%	13009,878	0,000	12692,564	0,000	0,000	0,000	0,000	0,000	
ADB-AGUA DULCE BABOR	97,9%	121,659	119,104	121,659	119,104	7,451	-8,283	15,165	131,283	IMO A.749(18)
ADE-AGUA DULCE ESTRIBOR	97,9%	74,189	72,631	74,189	72,631	6,534	8,168	15,176	0,000	IMO A.749(18)
ATE-AGUA TÉCNICA ESTRIBOR	100%	47,476	47,476	47,476	47,476	8,883	8,468	15,189	0,000	User Specified
Total agua	98,31%	243,325	239,212	243,325	239,212	7,457	0,036	15,173	131,283	
REFRIGERACIÓN EJE	100%	67,303	67,303	67,303	67,303	8,597	0,000	3,839	0,000	User Specified
LODOS	0%	22,540	0,000	22,540	0,000	11,401	0,000	1,000	0,000	User Specified
REBOSOS HFO BR	0%	15,908	0,000	16,233	0,000	20,233	-2,001	0,313	0,000	User Specified
REBOSOS ACEITE ER	0%	22,443	0,000	24,395	0,000	20,974	2,001	0,291	0,000	User Specified
AGUAS ACEITOSAS	0%	14,763	0,000	16,170	0,000	23,625	0,000	1,000	0,000	User Specified
SENTINAS	0%	7,974	0,000	8,734	0,000	28,919	0,000	0,000	0,000	User Specified
AGUAS RESIDUALES	0%	152,063	0,000	152,063	0,000	13,523	8,989	9,140	0,000	User Specified
Total misceláneos	22,21%	302,994	67,303	307,437	67,303	8,597	0,000	3,839	0,000	
SERVICIO ACEITE CILINDROS	100%	5,428	5,428	5,900	5,900	11,000	-5,750	9,570	0,000	User Specified
ALMACÉN ACEITE CILINDROS	100%	32,440	32,440	35,260	35,260	11,000	-5,750	12,570	0,000	User Specified
ALMACÉN ACEITE 1	100%	17,009	17,009	18,488	18,488	11,021	-8,471	11,771	0,000	User Specified
ALMACÉN ACEITE 2	100%	13,153	13,153	14,297	14,297	11,071	-10,529	12,530	0,000	User Specified
Total aceite	100%	68,030	68,030	73,945	73,945	11,019	-7,354	12,123	0,000	
SEDIMENTACIÓN HFO 1	100%	43,621	43,621	44,512	44,512	29,250	-1,000	9,570	0,000	User Specified
USO DIARIO HFO 1	100%	65,432	65,432	66,767	66,767	29,250	1,500	9,570	0,000	User Specified
USO DIARIO HFO 2	100%	65,432	65,432	66,767	66,767	29,250	4,500	9,570	0,000	User Specified
SEDIMENTACIÓN HFO 2	100%	43,621	43,621	44,512	44,512	29,250	7,000	9,570	0,000	User Specified
S4B-TOLVA SUPERIOR B4 BABOR	97,9%	405,778	397,256	414,059	405,363	70,405	-11,318	15,562	203,826	IMO A.749(18)
S4E-TOLVA SUPERIOR B4 ESTRIBOR	97,9%	405,778	397,256	414,059	405,363	70,405	11,318	15,562	203,826	IMO A.749(18)
S5B-TOLVA SUPERIOR B5 BABOR	97,9%	9,973	9,764	10,177	9,963	43,690	-11,263	14,110	0,000	IMO A.749(18)
S5E-TOLVA SUPERIOR B5 ESTRIBOR	97,9%	9,973	9,764	10,177	9,963	43,690	11,263	14,110	0,000	IMO A.749(18)
Total HFO	98,34%	1049,608	1032,147	1071,029	1053,211	61,203	0,634	14,269	407,652	
USO DIARIO DIÉSEL 1	97,9%	28,042	27,453	33,384	32,683	29,250	-2,750	9,411	0,000	IMO A.749(18)

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
USO DIARIO DIÉSEL 2	97,9%	28,042	27,453	33,384	32,683	29,250	-4,250	9,411	0,000	IMO A.749(18)
ALMACÉN DIÉSEL	97,9%	93,474	91,511	111,279	108,942	29,250	-7,500	9,411	0,000	IMO A.749(18)
Total diésel	97,9%	149,559	146,418	178,046	174,307	29,250	-6,000	9,411	0,000	
DIÉSEL EMERGENCIA	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	IMO A.749(18)
Total diésel emergencia	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	
LNG 1	97,9%	47,695	46,693	105,989	103,763	4,571	1,270	22,363	0,000	IMO A.749(18)
LNG 2	97,9%	47,878	46,873	106,396	104,161	-0,102	1,260	22,297	122,130	IMO A.749(18)
Total LNG	97,9%	95,573	93,566	212,385	207,925	2,230	1,265	22,330	122,130	
BODEGA 1	90%	6307,524	5676,771	8004,472	7204,025	146,597	0,000	8,780	0,000	User Specified
BODEGA 2	90%	8762,080	7885,873	11119,391	10007,453	123,145	0,000	8,694	0,000	User Specified
BODEGA 3	90%	8826,230	7943,608	11200,800	10080,720	96,797	0,000	8,682	0,000	User Specified
BODEGA 4	90%	8826,427	7943,784	11201,049	10080,945	70,403	0,000	8,682	0,000	User Specified
BODEGA 5	90%	8816,728	7935,055	11188,741	10069,867	43,813	0,000	8,765	0,000	User Specified
Total bodegas	90%	41538,989	37385,091	52714,453	47443,009	93,063	0,000	8,717	0,000	
Contenedor 1	1	440,000	440,000			147,000	0,000	22,800	0,000	User Specified
Contenedor 2	1	792,000	792,000			123,500	0,000	22,800	0,000	User Specified
Contenedor 3	1	792,000	792,000			97,000	0,000	22,800	0,000	User Specified
Contenedor 4	1	792,000	792,000			70,500	0,000	22,800	0,000	User Specified
Contenedor 5	1	792,000	792,000			44,000	0,000	22,800	0,000	User Specified
Total contenedores			3608,000			91,463	0,000	22,800	0,000	
Madera 1	0	400,000	0,000			147,000	0,000	22,800	0,000	User Specified
Madera 2	0	720,000	0,000			123,500	0,000	22,800	0,000	User Specified
Madera 3	0	720,000	0,000			97,000	0,000	22,800	0,000	User Specified
Madera 4	0	720,000	0,000			70,500	0,000	22,800	0,000	User Specified
Madera 5	0	720,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total madera			0,000			0,000	0,000	0,000	0,000	
Total Loadcase			52752,676	67496,358	49262,019	86,717	-0,012	10,437	661,066	
FS correction								0,013		
VCG fluid								10,450		



Heel to Starboard deg	-30,0	-25,0	-20,0	-15,0	-10,0	-5,0	0,0	5,0	10,0	15,0	20,0	25,0
GZ m	-0,996	-0,913	-0,761	-0,533	-0,333	-0,155	0,012	0,179	0,356	0,555	0,783	0,935
Area under GZ curve from zero heel m.deg	15,9789	11,1896	6,9644	3,7206	1,5724	0,3565	0,0106	0,4733	1,8053	4,0669	7,4251	11,7538
Displacement t	52752	52753	52753	52758	52757	52755	52753	52753	52750	52749	52748	52753
Draft at FP m	12,324	11,990	11,842	11,824	11,813	11,806	11,811	11,806	11,812	11,823	11,841	11,990
Draft at AP m	12,278	12,251	12,267	12,334	12,383	12,411	12,413	12,411	12,382	12,332	12,266	12,251
WL Length m	174,022	173,947	173,914	173,911	173,908	173,907	173,908	173,907	173,908	173,910	173,914	173,947
Beam max extents on WL m	29,871	29,758	31,051	31,223	30,627	30,279	30,165	30,279	30,627	31,223	31,054	29,758
Wetted Area m^2	8585,529	8409,428	8152,990	8067,280	8060,260	8055,653	8053,756	8055,466	8059,773	8066,604	8152,432	8409,406
Waterpl. Area m^2	4332,906	4498,408	4785,631	4788,800	4704,534	4654,299	4637,310	4654,268	4704,457	4788,696	4785,913	4498,401
Prismatic coeff. (Cp)	0,829	0,822	0,816	0,814	0,812	0,811	0,811	0,811	0,812	0,814	0,816	0,822
Block coeff. (Cb)	0,559	0,587	0,592	0,621	0,675	0,737	0,793	0,737	0,675	0,621	0,591	0,587
LCB from zero pt. (+ve fwd) m	86,708	86,710	86,707	86,704	86,703	86,702	86,717	86,702	86,703	86,705	86,707	86,710
LCF from zero pt. (+ve fwd) m	82,300	82,893	83,564	83,303	83,173	83,110	83,099	83,110	83,174	83,304	83,565	82,893
Max deck inclination deg	30,0000	25,0001	20,0004	15,0009	10,0018	5,0041	0,2026	5,0041	10,0018	15,0009	20,0004	25,0001
Trim angle (+ve by stern) deg	-0,0155	0,0878	0,1429	0,1714	0,1916	0,2033	0,2026	0,2033	0,1917	0,1715	0,1430	0,0877

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 55,229 m)		18,1	n/a
Deck Edge (immersion pos = 55,229 m)		18,4	n/a
Entrada habilitación cta ppal 1	Downflooding point	Not immersed in positive range	0
Aseo público cubierta	Downflooding point	Not immersed in positive range	0
Local CO2	Downflooding point	Not immersed in positive range	0
Entrada habilitación cta ppal 2	Downflooding point	Not immersed in positive range	0
Local ropa de agua	Downflooding point	Not immersed in positive range	0
Entrada habilitación cta toldil	Downflooding point	39,9	0
Entrada habilitación cta toldil	Downflooding point	Not immersed in positive range	0
Local grupo emergencia	Downflooding point	47,3	0
Entrada a cta ppal desde cta to	Downflooding point	Not immersed in positive range	0

Code	Criteria	Value	Units	Actual	Status	Margin %
267(85) Ch2 - General Criteria	2.3: IMO roll back angle	18,4	deg			
267(85) Ch2 - General Criteria	2.2.1: Area 0 to 30	3,1513	m.deg	16,6458	Pass	+428,23
267(85) Ch2 - General Criteria	2.2.1: Area 0 to 40	5,1566	m.deg	27,3454	Pass	+430,30
267(85) Ch2 - General Criteria	2.2.1: Area 30 to 40	1,7189	m.deg	10,6996	Pass	+522,48
267(85) Ch2 - General Criteria	2.2.2: Max GZ at 30 or greater	0,200	m	1,129	Pass	+464,50
267(85) Ch2 - General Criteria	2.2.3: Angle of maximum GZ	25,0	deg	41,9	Pass	+67,66
267(85) Ch2 - General Criteria	2.2.4: Initial GMt	0,150	m	1,894	Pass	+1162,67
267(85) Ch2 - General Criteria	2.3: Severe wind and rolling				Pass	
	Angle of steady heel shall not be greater than (\leq)	16,0	deg	0,9	Pass	+94,42

CONDICIÓN IV

Llegada a puerto a plena carga
(grano) + madera sobre las escotillas

Equilibrium calculation - D

Stability 22.01.00.131, build: 131

Model file: C:\Users\MARTA\Google Drive\TFG\Marta González\PROGRAMAS\MaxSURF\NUEVO (TFG)\D (Highest precision, 65 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 - Condición I

Damage Case - Intact

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m³)

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	10064,100	10064,100			68,650	0,000	11,800	0,000	User Specified
Total peso en rosca			10064,100			68,650	0,000	11,800	0,000	
Tripulación	20	0,125	2,500			15,000	0,000	22,000	0,000	User Specified
Pertrechos	1	40,000	40,000			90,000	0,000	15,000	0,000	User Specified
Total pesos fijos			42,500			85,588	0,000	15,412	0,000	
Viveres	0,1	3,700	0,370			17,000	0,000	20,000	0,000	User Specified
Total pesos variables			0,370			17,000	0,000	20,000	0,000	
P1-PIQUE PROA 1	0%	690,827	0,000	673,978	0,000	165,684	0,000	0,047	0,000	IMO A.749(18)
P2B-PIQUE PROA 2 BR	0%	445,266	0,000	434,406	0,000	158,040	-0,001	0,009	0,000	IMO A.749(18)
P2E-PIQUE PROA 2 ER	0%	445,266	0,000	434,406	0,000	158,040	0,001	0,009	0,000	IMO A.749(18)
S1B-TOLVA SUPERIOR B1 BABOR	0%	436,049	0,000	425,414	0,000	139,794	-12,904	12,700	0,000	IMO A.749(18)
S1E-TOLVA SUPERIOR B1 ESTRIBOR	0%	436,049	0,000	425,414	0,000	139,794	12,904	12,700	0,000	IMO A.749(18)
I1B-TOLVA INFERIOR B1 BABOR	0%	460,629	0,000	449,394	0,000	136,523	-0,671	0,005	0,000	IMO A.749(18)
I1E-TOLVA INFERIOR B1 ESTRIBOR	0%	460,629	0,000	449,394	0,000	136,523	0,671	0,005	0,000	IMO A.749(18)
S2B-TOLVA SUPERIOR B2 BABOR	0%	608,511	0,000	593,669	0,000	123,728	-14,225	12,700	0,000	IMO A.749(18)
S2E-TOLVA SUPERIOR B2 ESTRIBOR	0%	608,511	0,000	593,669	0,000	123,728	14,225	12,700	0,000	IMO A.749(18)
I2B-TOLVA INFERIOR B2 BABOR	0%	831,819	0,000	811,530	0,000	111,611	-1,566	0,000	0,000	IMO A.749(18)
I2E-TOLVA INFERIOR B2 ESTRIBOR	0%	831,819	0,000	811,530	0,000	111,611	1,566	0,000	0,000	IMO A.749(18)
S3B-TOLVA SUPERIOR B3 BABOR	0%	608,593	0,000	593,750	0,000	96,777	-14,339	12,700	0,000	IMO A.749(18)
S3E-TOLVA SUPERIOR B3 ESTRIBOR	0%	608,593	0,000	593,750	0,000	96,777	14,339	12,700	0,000	IMO A.749(18)
I3B-TOLVA INFERIOR B3 BABOR	0%	866,904	0,000	845,760	0,000	95,275	-2,938	0,000	0,000	IMO A.749(18)
I3E-TOLVA INFERIOR B3 ESTRIBOR	0%	866,904	0,000	845,760	0,000	95,275	2,938	0,000	0,000	IMO A.749(18)
I4B-TOLVA INFERIOR B4 BABOR	0%	860,892	0,000	839,895	0,000	77,837	-2,284	0,000	0,000	IMO A.749(18)
I4E-TOLVA INFERIOR B4 ESTRIBOR	0%	860,892	0,000	839,895	0,000	77,837	2,284	0,000	0,000	IMO A.749(18)

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
I5B-TOLVA INFERIOR B5 BABOR	0%	769,640	0,000	750,868	0,000	54,943	-1,029	0,000	0,000	IMO A.749(18)
I5E-TOLVA INFERIOR B5 ESTRIBOR	0%	769,640	0,000	750,868	0,000	54,943	1,029	0,000	0,000	IMO A.749(18)
PIQUE POPA BABOR	0%	271,223	0,000	264,608	0,000	8,299	-4,606	9,140	0,000	User Specified
PIQUE POPA ESTRIBOR	0%	271,223	0,000	264,608	0,000	8,299	4,606	9,140	0,000	User Specified
Total lastre	0%	13009,878	0,000	12692,564	0,000	0,000	0,000	0,000	0,000	
ADB-AGUA DULCE BABOR	10%	121,659	12,166	121,659	12,166	7,492	-7,942	13,365	131,303	IMO A.749(18)
ADE-AGUA DULCE ESTRIBOR	10%	74,189	7,419	74,189	7,419	6,554	7,777	13,370	0,000	IMO A.749(18)
ATE-AGUA TÉCNICA ESTRIBOR	10%	47,476	4,748	47,476	4,748	8,887	8,188	13,358	0,000	User Specified
Total agua	10%	243,325	24,332	243,325	24,332	7,478	-0,002	13,366	131,303	
REFRIGERACIÓN EJE	100%	67,303	67,303	67,303	67,303	8,597	0,000	3,839	0,000	User Specified
LODOS	100%	22,540	22,540	22,540	22,540	11,375	0,000	1,532	0,000	User Specified
REBOSES HFO BR	100%	15,908	15,908	16,233	16,233	18,841	-5,025	1,382	0,000	User Specified
REBOSES ACEITE ER	100%	22,443	22,443	24,395	24,395	18,954	5,046	1,380	0,000	User Specified
AGUAS ACEITOSAS	100%	14,763	14,763	16,170	16,170	23,625	0,000	1,500	0,000	User Specified
SENTINAS	100%	7,974	7,974	8,734	8,734	28,875	0,000	1,010	0,000	User Specified
AGUAS RESIDUALES	100%	152,063	152,063	152,063	152,063	12,650	10,081	13,659	0,000	User Specified
Total misceláneos	100%	302,994	302,994	307,437	307,437	13,409	5,169	8,096	0,000	
SERVICIO ACEITE CILINDROS	10%	5,428	0,543	5,900	0,590	11,000	-5,750	9,183	0,000	User Specified
ALMACÉN ACEITE CILINDROS	10%	32,440	3,244	35,260	3,526	11,000	-5,750	10,257	0,000	User Specified
ALMACÉN ACEITE 1	10%	17,009	1,701	18,488	1,849	11,178	-8,241	9,558	0,000	User Specified
ALMACÉN ACEITE 2	10%	13,153	1,315	14,297	1,430	11,268	-9,962	10,577	0,000	User Specified
Total aceite	10%	68,030	6,803	73,945	7,395	11,096	-7,187	10,058	0,000	
SEDIMENTACIÓN HFO 1	0%	43,621	0,000	44,512	0,000	29,250	-1,000	2,000	0,000	User Specified
USO DIARIO HFO 1	80,24%	65,432	52,500	66,767	53,571	29,250	1,500	8,074	0,000	User Specified
USO DIARIO HFO 2	80,24%	65,432	52,500	66,767	53,571	29,250	4,500	8,074	0,000	User Specified
SEDIMENTACIÓN HFO 2	0%	43,621	0,000	44,512	0,000	29,250	7,000	2,000	0,000	User Specified
S4B-TOLVA SUPERIOR B4 BABOR	0%	405,778	0,000	414,059	0,000	71,250	-13,611	12,700	0,000	IMO A.749(18)
S4E-TOLVA SUPERIOR B4 ESTRIBOR	0%	405,778	0,000	414,059	0,000	71,250	13,611	12,700	0,000	IMO A.749(18)
S5B-TOLVA SUPERIOR B5 BABOR	0%	9,973	0,000	10,177	0,000	44,162	-14,104	12,700	0,000	IMO A.749(18)
S5E-TOLVA SUPERIOR B5 ESTRIBOR	0%	9,973	0,000	10,177	0,000	44,162	14,104	12,700	0,000	IMO A.749(18)
Total HFO	10%	1049,608	105,000	1071,029	107,143	29,250	3,000	8,074	0,000	
USO DIARIO DIÉSEL 1	26,75%	28,042	7,500	33,384	8,929	29,250	-2,750	4,025	0,000	IMO A.749(18)
USO DIARIO DIÉSEL 2	26,75%	28,042	7,500	33,384	8,929	29,250	-4,250	4,025	0,000	IMO A.749(18)
ALMACÉN DIÉSEL	0%	93,474	0,000	111,279	0,000	29,250	-7,500	2,000	0,000	IMO A.749(18)

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
Total diésel	10,03%	149,559	15,000	178,046	17,857	29,250	-3,500	4,025	0,000	
DIÉSEL EMERGENCIA	10%	2,666	0,267	3,174	0,317	8,267	-7,570	20,260	0,000	IMO A.749(18)
Total diésel emergencia	10%	2,666	0,267	3,174	0,317	8,267	-7,570	20,260	0,000	
LNG 1	10%	47,695	4,770	105,989	10,599	4,549	1,266	20,938	0,000	IMO A.749(18)
LNG 2	10%	47,878	4,788	106,396	10,640	-0,067	1,235	20,762	122,149	IMO A.749(18)
Total LNG	10%	95,573	9,557	212,385	21,238	2,237	1,251	20,850	122,149	
BODEGA 1	90%	6307,524	5676,771	8004,472	7204,025	146,597	0,000	8,780	0,000	User Specified
BODEGA 2	90%	8762,080	7885,871	11119,391	10007,451	123,145	0,000	8,694	0,000	User Specified
BODEGA 3	90%	8826,230	7943,607	11200,800	10080,720	96,797	0,000	8,682	0,000	User Specified
BODEGA 4	90%	8826,427	7943,784	11201,049	10080,944	70,403	0,000	8,682	0,000	User Specified
BODEGA 5	90%	8816,728	7935,056	11188,741	10069,868	43,813	0,000	8,765	0,000	User Specified
Total bodegas	90%	41538,989	37385,089	52714,453	47443,007	93,063	0,000	8,717	0,000	
Contenedor 1	1	440,000	440,000			147,000	0,000	22,800	0,000	User Specified
Contenedor 2	1	792,000	792,000			123,500	0,000	22,800	0,000	User Specified
Contenedor 3	1	792,000	792,000			97,000	0,000	22,800	0,000	User Specified
Contenedor 4	1	792,000	792,000			70,500	0,000	22,800	0,000	User Specified
Contenedor 5	1	792,000	792,000			44,000	0,000	22,800	0,000	User Specified
Total contenedores			3608,000			91,463	0,000	22,800	0,000	
Madera 1	0	400,000	0,000			147,000	0,000	22,800	0,000	User Specified
Madera 2	0	720,000	0,000			123,500	0,000	22,800	0,000	User Specified
Madera 3	0	720,000	0,000			97,000	0,000	22,800	0,000	User Specified
Madera 4	0	720,000	0,000			70,500	0,000	22,800	0,000	User Specified
Madera 5	0	720,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total madera			0,000			0,000	0,000	0,000	0,000	
Total Loadcase			51564,013	67496,358	47928,727	87,494	0,035	10,308	253,452	
FS correction								0,005		
VCG fluid								10,313		

Draft Amidships m	11,868
Displacement t	51564
Heel deg	1,0
Draft at FP m	11,883
Draft at AP m	11,852

Draft at LCF m	11,868
Trim (+ve by stern) m	-0,031
WL Length m	173,923
Beam max extents on WL m	30,168
Wetted Area m ²	7951,429
Waterpl. Area m ²	4608,707
Prismatic coeff. (Cp)	0,811
Block coeff. (Cb)	0,793
Max Sect. area coeff. (Cm)	0,978
Waterpl. area coeff. (Cwp)	0,878
LCB from zero pt. (+ve fwd) m	87,495
LCF from zero pt. (+ve fwd) m	83,611
KB m	6,130
KG fluid m	10,313
BMt m	6,190
BML m	186,768
GMt corrected m	2,006
GML m	182,583
KMt m	12,318
KML m	192,869
Immersion (TPc) tonne/cm	47,239
MTc tonne.m	552,503
RM at 1deg = GMt.Disp.sin(1) tonne.m	1804,883
Max deck inclination deg	0,9926
Trim angle (+ve by stern) deg	-0,0105

Key point	Type	Freeboard m
Margin Line (freeboard pos = 132,727 m)		4,927
Deck Edge (freeboard pos = 132,727 m)		5,003
Entrada habilitación cta ppal 1	Downflooding point	6,747
Aseo público cubierta	Downflooding point	6,795
Local CO2	Downflooding point	6,821
Entrada habilitación cta ppal 2	Downflooding point	6,851
Local ropa de agua	Downflooding point	6,890
Entrada habilitación cta toldil	Downflooding point	9,390
Entrada habilitación cta toldil	Downflooding point	9,754
Local grupo emergencia	Downflooding point	9,441
Entrada a cta ppal desde cta to	Downflooding point	9,674

Stability calculation - D

Stability 22.01.00.131, build: 131

Model file: C:\Users\MARTA\Google Drive\TFG\Marta González\PROGRAMAS\MaxSURF\NUEVO (TFG)\D (Highest precision, 65 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 - Condición I

Damage Case - Intact

Free to Trim

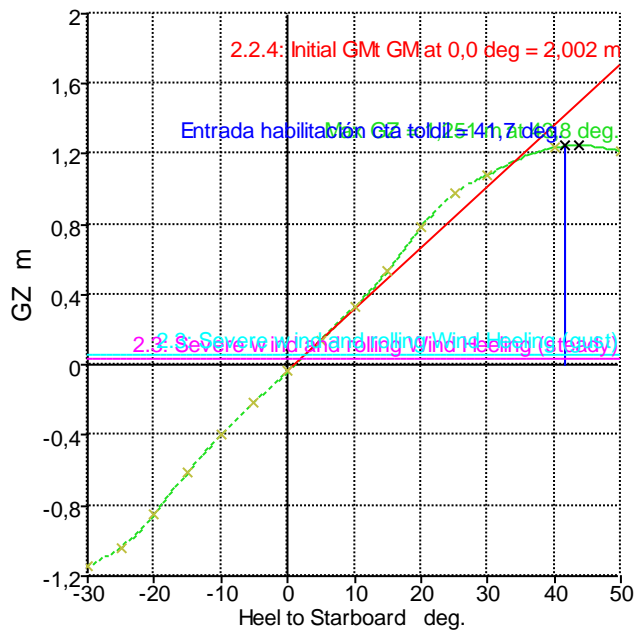
Specific gravity = 1,025; (Density = 1,025 tonne/m³)

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	10064,100	10064,100			68,650	0,000	11,800	0,000	User Specified
Total peso en rosca			10064,100			68,650	0,000	11,800	0,000	
Tripulación	20	0,125	2,500			15,000	0,000	22,000	0,000	User Specified
Pertrechos	1	40,000	40,000			90,000	0,000	15,000	0,000	User Specified
Total pesos fijos			42,500			85,588	0,000	15,412	0,000	
Viveres	0,1	3,700	0,370			17,000	0,000	20,000	0,000	User Specified
Total pesos variables			0,370			17,000	0,000	20,000	0,000	
P1-PIQUE PROA 1	0%	690,827	0,000	673,978	0,000	165,684	0,000	0,047	0,000	IMO A.749(18)
P2B-PIQUE PROA 2 BR	0%	445,266	0,000	434,406	0,000	158,040	-0,001	0,009	0,000	IMO A.749(18)
P2E-PIQUE PROA 2 ER	0%	445,266	0,000	434,406	0,000	158,040	0,001	0,009	0,000	IMO A.749(18)
S1B-TOLVA SUPERIOR B1 BABOR	0%	436,049	0,000	425,414	0,000	139,794	-12,904	12,700	0,000	IMO A.749(18)
S1E-TOLVA SUPERIOR B1 ESTRIBOR	0%	436,049	0,000	425,414	0,000	139,794	12,904	12,700	0,000	IMO A.749(18)
I1B-TOLVA INFERIOR B1 BABOR	0%	460,629	0,000	449,394	0,000	136,523	-0,671	0,005	0,000	IMO A.749(18)
I1E-TOLVA INFERIOR B1 ESTRIBOR	0%	460,629	0,000	449,394	0,000	136,523	0,671	0,005	0,000	IMO A.749(18)
S2B-TOLVA SUPERIOR B2 BABOR	0%	608,511	0,000	593,669	0,000	123,728	-14,225	12,700	0,000	IMO A.749(18)
S2E-TOLVA SUPERIOR B2 ESTRIBOR	0%	608,511	0,000	593,669	0,000	123,728	14,225	12,700	0,000	IMO A.749(18)
I2B-TOLVA INFERIOR B2 BABOR	0%	831,819	0,000	811,530	0,000	111,611	-1,566	0,000	0,000	IMO A.749(18)
I2E-TOLVA INFERIOR B2 ESTRIBOR	0%	831,819	0,000	811,530	0,000	111,611	1,566	0,000	0,000	IMO A.749(18)
S3B-TOLVA SUPERIOR B3 BABOR	0%	608,593	0,000	593,750	0,000	96,777	-14,339	12,700	0,000	IMO A.749(18)
S3E-TOLVA SUPERIOR B3 ESTRIBOR	0%	608,593	0,000	593,750	0,000	96,777	14,339	12,700	0,000	IMO A.749(18)
I3B-TOLVA INFERIOR B3 BABOR	0%	866,904	0,000	845,760	0,000	95,275	-2,938	0,000	0,000	IMO A.749(18)
I3E-TOLVA INFERIOR B3 ESTRIBOR	0%	866,904	0,000	845,760	0,000	95,275	2,938	0,000	0,000	IMO A.749(18)
I4B-TOLVA INFERIOR B4 BABOR	0%	860,892	0,000	839,895	0,000	77,837	-2,284	0,000	0,000	IMO A.749(18)
I4E-TOLVA INFERIOR B4 ESTRIBOR	0%	860,892	0,000	839,895	0,000	77,837	2,284	0,000	0,000	IMO A.749(18)

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
I5B-TOLVA INFERIOR B5 BABOR	0%	769,640	0,000	750,868	0,000	54,943	-1,029	0,000	0,000	IMO A.749(18)
I5E-TOLVA INFERIOR B5 ESTRIBOR	0%	769,640	0,000	750,868	0,000	54,943	1,029	0,000	0,000	IMO A.749(18)
PIQUE POPA BABOR	0%	271,223	0,000	264,608	0,000	8,299	-4,606	9,140	0,000	User Specified
PIQUE POPA ESTRIBOR	0%	271,223	0,000	264,608	0,000	8,299	4,606	9,140	0,000	User Specified
Total lastre	0%	13009,878	0,000	12692,564	0,000	0,000	0,000	0,000	0,000	
ADB-AGUA DULCE BABOR	10%	121,659	12,166	121,659	12,166	7,492	-7,942	13,365	131,283	IMO A.749(18)
ADE-AGUA DULCE ESTRIBOR	10%	74,189	7,419	74,189	7,419	6,554	7,777	13,370	0,000	IMO A.749(18)
ATE-AGUA TÉCNICA ESTRIBOR	10%	47,476	4,748	47,476	4,748	8,887	8,188	13,358	0,000	User Specified
Total agua	10%	243,325	24,332	243,325	24,332	7,478	-0,002	13,366	131,283	
REFRIGERACIÓN EJE	100%	67,303	67,303	67,303	67,303	8,597	0,000	3,839	0,000	User Specified
LODOS	100%	22,540	22,540	22,540	22,540	11,375	0,000	1,532	0,000	User Specified
REBOSES HFO BR	100%	15,908	15,908	16,233	16,233	18,841	-5,025	1,382	0,000	User Specified
REBOSES ACEITE ER	100%	22,443	22,443	24,395	24,395	18,954	5,046	1,380	0,000	User Specified
AGUAS ACEITOSAS	100%	14,763	14,763	16,170	16,170	23,625	0,000	1,500	0,000	User Specified
SENTINAS	100%	7,974	7,974	8,734	8,734	28,875	0,000	1,010	0,000	User Specified
AGUAS RESIDUALES	100%	152,063	152,063	152,063	152,063	12,650	10,081	13,659	0,000	User Specified
Total misceláneos	100%	302,994	302,994	307,437	307,437	13,409	5,169	8,096	0,000	
SERVICIO ACEITE CILINDROS	10%	5,428	0,543	5,900	0,590	11,000	-5,750	9,183	0,000	User Specified
ALMACÉN ACEITE CILINDROS	10%	32,440	3,244	35,260	3,526	11,000	-5,750	10,257	0,000	User Specified
ALMACÉN ACEITE 1	10%	17,009	1,701	18,488	1,849	11,178	-8,241	9,558	0,000	User Specified
ALMACÉN ACEITE 2	10%	13,153	1,315	14,297	1,430	11,268	-9,962	10,577	0,000	User Specified
Total aceite	10%	68,030	6,803	73,945	7,395	11,096	-7,187	10,058	0,000	
SEDIMENTACIÓN HFO 1	0%	43,621	0,000	44,512	0,000	29,250	-1,000	2,000	0,000	User Specified
USO DIARIO HFO 1	80,24%	65,432	52,500	66,767	53,571	29,250	1,500	8,074	0,000	User Specified
USO DIARIO HFO 2	80,24%	65,432	52,500	66,767	53,571	29,250	4,500	8,074	0,000	User Specified
SEDIMENTACIÓN HFO 2	0%	43,621	0,000	44,512	0,000	29,250	7,000	2,000	0,000	User Specified
S4B-TOLVA SUPERIOR B4 BABOR	0%	405,778	0,000	414,059	0,000	71,250	-13,611	12,700	0,000	IMO A.749(18)
S4E-TOLVA SUPERIOR B4 ESTRIBOR	0%	405,778	0,000	414,059	0,000	71,250	13,611	12,700	0,000	IMO A.749(18)
S5B-TOLVA SUPERIOR B5 BABOR	0%	9,973	0,000	10,177	0,000	44,162	-14,104	12,700	0,000	IMO A.749(18)
S5E-TOLVA SUPERIOR B5 ESTRIBOR	0%	9,973	0,000	10,177	0,000	44,162	14,104	12,700	0,000	IMO A.749(18)
Total HFO	10%	1049,608	105,000	1071,029	107,143	29,250	3,000	8,074	0,000	
USO DIARIO DIÉSEL 1	26,75%	28,042	7,500	33,384	8,929	29,250	-2,750	4,025	0,000	IMO A.749(18)
USO DIARIO DIÉSEL 2	26,75%	28,042	7,500	33,384	8,929	29,250	-4,250	4,025	0,000	IMO A.749(18)
ALMACÉN DIÉSEL	0%	93,474	0,000	111,279	0,000	29,250	-7,500	2,000	0,000	IMO A.749(18)

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
Total diésel	10,03%	149,559	15,000	178,046	17,857	29,250	-3,500	4,025	0,000	
DIÉSEL EMERGENCIA	10%	2,666	0,267	3,174	0,317	8,267	-7,570	20,260	0,000	IMO A.749(18)
Total diésel emergencia	10%	2,666	0,267	3,174	0,317	8,267	-7,570	20,260	0,000	
LNG 1	10%	47,695	4,770	105,989	10,599	4,549	1,266	20,938	0,000	IMO A.749(18)
LNG 2	10%	47,878	4,788	106,396	10,640	-0,067	1,235	20,762	122,130	IMO A.749(18)
Total LNG	10%	95,573	9,557	212,385	21,238	2,237	1,251	20,850	122,130	
BODEGA 1	90%	6307,524	5676,772	8004,472	7204,025	146,597	0,000	8,780	0,000	User Specified
BODEGA 2	90%	8762,080	7885,872	11119,391	10007,452	123,145	0,000	8,694	0,000	User Specified
BODEGA 3	90%	8826,230	7943,607	11200,800	10080,719	96,797	0,000	8,682	0,000	User Specified
BODEGA 4	90%	8826,427	7943,784	11201,049	10080,944	70,403	0,000	8,682	0,000	User Specified
BODEGA 5	90%	8816,728	7935,055	11188,741	10069,866	43,813	0,000	8,765	0,000	User Specified
Total bodegas	90%	41538,989	37385,089	52714,453	47443,007	93,063	0,000	8,717	0,000	
Contenedor 1	1	440,000	440,000			147,000	0,000	22,800	0,000	User Specified
Contenedor 2	1	792,000	792,000			123,500	0,000	22,800	0,000	User Specified
Contenedor 3	1	792,000	792,000			97,000	0,000	22,800	0,000	User Specified
Contenedor 4	1	792,000	792,000			70,500	0,000	22,800	0,000	User Specified
Contenedor 5	1	792,000	792,000			44,000	0,000	22,800	0,000	User Specified
Total contenedores			3608,000			91,463	0,000	22,800	0,000	
Madera 1	0	400,000	0,000			147,000	0,000	22,800	0,000	User Specified
Madera 2	0	720,000	0,000			123,500	0,000	22,800	0,000	User Specified
Madera 3	0	720,000	0,000			97,000	0,000	22,800	0,000	User Specified
Madera 4	0	720,000	0,000			70,500	0,000	22,800	0,000	User Specified
Madera 5	0	720,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total madera			0,000			0,000	0,000	0,000	0,000	
Total Loadcase			51564,013	67496,358	47928,727	87,494	0,035	10,308	253,414	
FS correction								0,005		
VCG fluid								10,313		



Stability

- █ GZ
- █ Entrada habilitación cta toldil = 41,7 deg.
- █ 2.2.4: Initial GMt GM at 0,0 deg = 2,002 m
- █ 2.3: Severe wind and rolling Wind Heeling (steady)
- █ 2.3: Severe wind and rolling Wind Heeling (gust)
- █ Max GZ = 1,251 m at 43,8 deg.

Heel to Starboard deg	-30,0	-25,0	-20,0	-15,0	-10,0	-5,0	0,0	5,0	10,0	15,0	20,0	25,0
GZ m	-1,143	-1,036	-0,850	-0,607	-0,398	-0,211	-0,035	0,142	0,330	0,540	0,785	0,973
Area under GZ curve from zero heel m.deg	18,4873	13,0184	8,2668	4,6238	2,1292	0,6120	-0,0316	0,2653	1,4386	3,5939	6,9086	11,3342
Displacement t	51564	51564	51564	51567	51567	51566	51564	51564	51562	51562	51560	51564
Draft at FP m	12,389	12,063	11,923	11,905	11,893	11,886	11,889	11,886	11,892	11,904	11,922	12,063
Draft at AP m	11,622	11,630	11,686	11,763	11,814	11,843	11,847	11,843	11,813	11,762	11,685	11,631
WL Length m	174,038	173,964	173,932	173,928	173,925	173,924	173,925	173,924	173,925	173,928	173,932	173,964
Beam max extents on WL m	30,291	29,493	31,695	31,222	30,626	30,278	30,164	30,278	30,626	31,222	31,697	29,493
Wetted Area m^2	8453,723	8272,687	8009,272	7968,471	7958,715	7953,254	7951,219	7953,129	7958,388	7967,999	8008,825	8272,663
Waterpl. Area m^2	4383,323	4550,502	4841,330	4761,592	4675,288	4624,654	4607,783	4624,631	4675,227	4761,508	4841,521	4550,506
Prismatic coeff. (Cp)	0,823	0,819	0,815	0,814	0,812	0,812	0,811	0,812	0,812	0,814	0,815	0,819
Block coeff. (Cb)	0,546	0,587	0,575	0,616	0,672	0,735	0,807	0,735	0,672	0,616	0,575	0,587
LCB from zero pt. (+ve fwd) m	87,503	87,504	87,500	87,497	87,496	87,495	87,508	87,495	87,496	87,498	87,500	87,504
LCF from zero pt. (+ve fwd) m	82,423	83,049	83,742	83,760	83,677	83,629	83,617	83,629	83,678	83,761	83,743	83,049
Max deck inclination deg	30,0008	25,0003	20,0001	15,0001	10,0000	5,0000	0,0143	5,0000	10,0000	15,0001	20,0001	25,0003
Trim angle (+ve by stern) deg	-0,2577	-0,1454	-0,0795	-0,0479	-0,0266	-0,0144	-0,0143	-0,0144	-0,0266	-0,0479	-0,0795	-0,1453

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 122,534 m)		19,1	n/a
Deck Edge (immersion pos = 122,534 m)		19,3	n/a
Entrada habilitación cta ppal 1	Downflooding point	Not immersed in positive range	0
Aseo público cubierta	Downflooding point	Not immersed in positive range	0
Local CO2	Downflooding point	Not immersed in positive range	0
Entrada habilitación cta ppal 2	Downflooding point	Not immersed in positive range	0
Local ropa de agua	Downflooding point	Not immersed in positive range	0
Entrada habilitación cta toldil	Downflooding point	41,7	0
Entrada habilitación cta toldil	Downflooding point	Not immersed in positive range	0
Local grupo emergencia	Downflooding point	49,7	0
Entrada a cta ppal desde cta to	Downflooding point	Not immersed in positive range	0

Code	Criteria	Value	Units	Actual	Status	Margin %
267(85) Ch2 - General Criteria	2.3: IMO roll back angle	18,6	deg			
267(85) Ch2 - General Criteria	2.2.1: Area 0 to 30	3,1513	m.deg	16,4947	Pass	+423,43
267(85) Ch2 - General Criteria	2.2.1: Area 0 to 40	5,1566	m.deg	28,1993	Pass	+446,86
267(85) Ch2 - General Criteria	2.2.1: Area 30 to 40	1,7189	m.deg	11,7046	Pass	+580,94
267(85) Ch2 - General Criteria	2.2.2: Max GZ at 30 or greater	0,200	m	1,251	Pass	+525,50
267(85) Ch2 - General Criteria	2.2.3: Angle of maximum GZ	25,0	deg	43,8	Pass	+75,09
267(85) Ch2 - General Criteria	2.2.4: Initial GMt	0,150	m	2,002	Pass	+1234,67
267(85) Ch2 - General Criteria	2.3: Severe wind and rolling				Pass	
	Angle of steady heel shall not be greater than (\leq)	16,0	deg	2,2	Pass	+86,25

CONDICIÓN V

Salida de puerto a plena carga
(grano) + madera sobre las escotillas

Equilibrium calculation - D

Stability 22.01.00.131, build: 131

Model file: C:\Users\MARTA\Google Drive\TFG\Marta González\PROGRAMAS\MaxSURF\NUEVO (TFG)\D (Highest precision, 65 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 - Condición I

Damage Case - Intact

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m³)

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	10064,100	10064,100			68,650	0,000	11,800	0,000	User Specified
Total peso en rosca			10064,100			68,650	0,000	11,800	0,000	
Tripulación	20	0,125	2,500			15,000	0,000	22,000	0,000	User Specified
Pertrechos	1	40,000	40,000			90,000	0,000	15,000	0,000	User Specified
Total pesos fijos			42,500			85,588	0,000	15,412	0,000	
Viveres	1	3,700	3,700			17,000	0,000	20,000	0,000	User Specified
Total pesos variables			3,700			17,000	0,000	20,000	0,000	
P1-PIQUE PROA 1	0%	690,827	0,000	673,978	0,000	165,684	0,000	0,047	0,000	IMO A.749(18)
P2B-PIQUE PROA 2 BR	0%	445,266	0,000	434,406	0,000	158,040	-0,001	0,009	0,000	IMO A.749(18)
P2E-PIQUE PROA 2 ER	0%	445,266	0,000	434,406	0,000	158,040	0,001	0,009	0,000	IMO A.749(18)
S1B-TOLVA SUPERIOR B1 BAVOR	0%	436,049	0,000	425,414	0,000	139,794	-12,904	12,700	0,000	IMO A.749(18)
S1E-TOLVA SUPERIOR B1 ESTRIBOR	0%	436,049	0,000	425,414	0,000	139,794	12,904	12,700	0,000	IMO A.749(18)
I1B-TOLVA INFERIOR B1 BAVOR	0%	460,629	0,000	449,394	0,000	136,523	-0,671	0,005	0,000	IMO A.749(18)
I1E-TOLVA INFERIOR B1 ESTRIBOR	0%	460,629	0,000	449,394	0,000	136,523	0,671	0,005	0,000	IMO A.749(18)
S2B-TOLVA SUPERIOR B2 BAVOR	0%	608,511	0,000	593,669	0,000	123,728	-14,225	12,700	0,000	IMO A.749(18)
S2E-TOLVA SUPERIOR B2 ESTRIBOR	0%	608,511	0,000	593,669	0,000	123,728	14,225	12,700	0,000	IMO A.749(18)
I2B-TOLVA INFERIOR B2 BAVOR	0%	831,819	0,000	811,530	0,000	111,611	-1,566	0,000	0,000	IMO A.749(18)
I2E-TOLVA INFERIOR B2 ESTRIBOR	0%	831,819	0,000	811,530	0,000	111,611	1,566	0,000	0,000	IMO A.749(18)
S3B-TOLVA SUPERIOR B3 BAVOR	0%	608,593	0,000	593,750	0,000	96,777	-14,339	12,700	0,000	IMO A.749(18)
S3E-TOLVA SUPERIOR B3 ESTRIBOR	0%	608,593	0,000	593,750	0,000	96,777	14,339	12,700	0,000	IMO A.749(18)
I3B-TOLVA INFERIOR B3 BAVOR	0%	866,904	0,000	845,760	0,000	95,275	-2,938	0,000	0,000	IMO A.749(18)
I3E-TOLVA INFERIOR B3 ESTRIBOR	0%	866,904	0,000	845,760	0,000	95,275	2,938	0,000	0,000	IMO A.749(18)
I4B-TOLVA INFERIOR B4 BAVOR	0%	860,892	0,000	839,895	0,000	77,837	-2,284	0,000	0,000	IMO A.749(18)
I4E-TOLVA INFERIOR B4 ESTRIBOR	0%	860,892	0,000	839,895	0,000	77,837	2,284	0,000	0,000	IMO A.749(18)

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
I5B-TOLVA INFERIOR B5 BABOR	0%	769,640	0,000	750,868	0,000	54,943	-1,029	0,000	0,000	IMO A.749(18)
I5E-TOLVA INFERIOR B5 ESTRIBOR	0%	769,640	0,000	750,868	0,000	54,943	1,029	0,000	0,000	IMO A.749(18)
PIQUE POPA BABOR	0%	271,223	0,000	264,608	0,000	8,299	-4,606	9,140	0,000	User Specified
PIQUE POPA ESTRIBOR	0%	271,223	0,000	264,608	0,000	8,299	4,606	9,140	0,000	User Specified
Total lastre	0%	13009,878	0,000	12692,564	0,000	0,000	0,000	0,000	0,000	
ADB-AGUA DULCE BABOR	97,9%	121,659	119,104	121,659	119,104	7,451	-8,283	15,165	131,283	IMO A.749(18)
ADE-AGUA DULCE ESTRIBOR	97,9%	74,189	72,631	74,189	72,631	6,534	8,168	15,176	0,000	IMO A.749(18)
ATE-AGUA TÉCNICA ESTRIBOR	100%	47,476	47,476	47,476	47,476	8,883	8,468	15,189	0,000	User Specified
Total agua	98,31%	243,325	239,212	243,325	239,212	7,457	0,036	15,173	131,283	
REFRIGERACIÓN EJE	100%	67,303	67,303	67,303	67,303	8,597	0,000	3,839	0,000	User Specified
LODOS	0%	22,540	0,000	22,540	0,000	11,401	0,000	1,000	0,000	User Specified
REBOSES HFO BR	0%	15,908	0,000	16,233	0,000	20,233	-2,001	0,313	0,000	User Specified
REBOSES ACEITE ER	0%	22,443	0,000	24,395	0,000	20,974	2,001	0,291	0,000	User Specified
AGUAS ACEITOSAS	0%	14,763	0,000	16,170	0,000	23,625	0,000	1,000	0,000	User Specified
SENTINAS	0%	7,974	0,000	8,734	0,000	28,919	0,000	0,000	0,000	User Specified
AGUAS RESIDUALES	0%	152,063	0,000	152,063	0,000	13,523	8,989	9,140	0,000	User Specified
Total misceláneos	22,21%	302,994	67,303	307,437	67,303	8,597	0,000	3,839	0,000	
SERVICIO ACEITE CILINDROS	100%	5,428	5,428	5,900	5,900	11,000	-5,750	9,570	0,000	User Specified
ALMACÉN ACEITE CILINDROS	100%	32,440	32,440	35,260	35,260	11,000	-5,750	12,570	0,000	User Specified
ALMACÉN ACEITE 1	100%	17,009	17,009	18,488	18,488	11,021	-8,471	11,771	0,000	User Specified
ALMACÉN ACEITE 2	100%	13,153	13,153	14,297	14,297	11,071	-10,529	12,530	0,000	User Specified
Total aceite	100%	68,030	68,030	73,945	73,945	11,019	-7,354	12,123	0,000	
SEDIMENTACIÓN HFO 1	100%	43,621	43,621	44,512	44,512	29,250	-1,000	9,570	0,000	User Specified
USO DIARIO HFO 1	100%	65,432	65,432	66,767	66,767	29,250	1,500	9,570	0,000	User Specified
USO DIARIO HFO 2	100%	65,432	65,432	66,767	66,767	29,250	4,500	9,570	0,000	User Specified
SEDIMENTACIÓN HFO 2	100%	43,621	43,621	44,512	44,512	29,250	7,000	9,570	0,000	User Specified
S4B-TOLVA SUPERIOR B4 BABOR	97,9%	405,778	397,256	414,059	405,363	70,405	-11,318	15,562	203,826	IMO A.749(18)
S4E-TOLVA SUPERIOR B4 ESTRIBOR	97,9%	405,778	397,256	414,059	405,363	70,405	11,318	15,562	203,826	IMO A.749(18)
S5B-TOLVA SUPERIOR B5 BABOR	97,9%	9,973	9,764	10,177	9,963	43,690	-11,263	14,110	0,000	IMO A.749(18)
S5E-TOLVA SUPERIOR B5 ESTRIBOR	97,9%	9,973	9,764	10,177	9,963	43,690	11,263	14,110	0,000	IMO A.749(18)
Total HFO	98,34%	1049,608	1032,147	1071,029	1053,211	61,203	0,634	14,269	407,652	
USO DIARIO DIÉSEL 1	97,9%	28,042	27,453	33,384	32,683	29,250	-2,750	9,411	0,000	IMO A.749(18)
USO DIARIO DIÉSEL 2	97,9%	28,042	27,453	33,384	32,683	29,250	-4,250	9,411	0,000	IMO A.749(18)
ALMACÉN DIÉSEL	97,9%	93,474	91,511	111,279	108,942	29,250	-7,500	9,411	0,000	IMO A.749(18)

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
Total diésel	97,9%	149,559	146,418	178,046	174,307	29,250	-6,000	9,411	0,000	
DIÉSEL EMERGENCIA	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	IMO A.749(18)
Total diésel emergencia	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	
LNG 1	97,9%	47,695	46,694	105,989	103,763	4,571	1,270	22,363	0,000	IMO A.749(18)
LNG 2	97,9%	47,878	46,873	106,396	104,161	-0,102	1,260	22,297	122,130	IMO A.749(18)
Total LNG	97,9%	95,573	93,566	212,385	207,925	2,230	1,265	22,330	122,130	
BODEGA 1	90%	6307,524	5676,771	8004,472	7204,024	146,597	0,000	8,780	0,000	User Specified
BODEGA 2	90%	8762,080	7885,873	11119,391	10007,453	123,145	0,000	8,694	0,000	User Specified
BODEGA 3	90%	8826,230	7943,608	11200,800	10080,720	96,797	0,000	8,682	0,000	User Specified
BODEGA 4	90%	8826,427	7943,784	11201,049	10080,945	70,403	0,000	8,682	0,000	User Specified
BODEGA 5	90%	8816,728	7935,055	11188,741	10069,867	43,813	0,000	8,765	0,000	User Specified
Total bodegas	90%	41538,989	37385,091	52714,453	47443,009	93,063	0,000	8,717	0,000	
Contenedor 1	0	440,000	0,000			147,000	0,000	22,800	0,000	User Specified
Contenedor 2	0	792,000	0,000			123,500	0,000	22,800	0,000	User Specified
Contenedor 3	0	792,000	0,000			97,000	0,000	22,800	0,000	User Specified
Contenedor 4	0	792,000	0,000			70,500	0,000	22,800	0,000	User Specified
Contenedor 5	0	792,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total contenedores			0,000			0,000	0,000	0,000	0,000	
Madera 1	1	400,000	400,000			147,000	0,000	22,800	0,000	User Specified
Madera 2	1	720,000	720,000			123,500	0,000	22,800	0,000	User Specified
Madera 3	1	720,000	720,000			97,000	0,000	22,800	0,000	User Specified
Madera 4	1	720,000	720,000			70,500	0,000	22,800	0,000	User Specified
Madera 5	1	720,000	720,000			44,000	0,000	22,800	0,000	User Specified
Total madera			3280,000			91,463	0,000	22,800	0,000	
Total Loadcase			52424,677	67496,358	49262,019	86,687	-0,012	10,360	661,066	
FS correction								0,013		
VCG fluid								10,373		

Draft Amidships m	12,042
Displacement t	52425
Heel deg	0,0
Draft at FP m	11,709
Draft at AP m	12,375

Draft at LCF m	12,050
Trim (+ve by stern) m	0,667
WL Length m	173,885
Beam max extents on WL m	30,164
Wetted Area m ²	8028,650
Waterpl. Area m ²	4634,219
Prismatic coeff. (Cp)	0,810
Block coeff. (Cb)	0,791
Max Sect. area coeff. (Cm)	0,993
Waterpl. area coeff. (Cwp)	0,884
LCB from zero pt. (+ve fwd) m	86,669
LCF from zero pt. (+ve fwd) m	83,114
KB m	6,226
KG fluid m	10,373
BMt m	6,115
BML m	186,942
GMt corrected m	1,968
GML m	182,795
KMt m	12,341
KML m	193,167
Immersion (TPc) tonne/cm	47,501
MTc tonne.m	562,381
RM at 1deg = GMt.Disp.sin(1) tonne.m	1800,588
Max deck inclination deg	0,2241
Trim angle (+ve by stern) deg	0,2241

Key point	Type	Freeboard m
Margin Line (freeboard pos = 30,275 m)		4,807
Deck Edge (freeboard pos = 30,275 m)		4,883
Entrada habilitación cta ppal 1	Downflooding point	6,382
Aseo público cubierta	Downflooding point	6,382
Local CO2	Downflooding point	6,382
Entrada habilitación cta ppal 2	Downflooding point	6,382
Local ropa de agua	Downflooding point	6,382
Entrada habilitación cta toldil	Downflooding point	9,149
Entrada habilitación cta toldil	Downflooding point	9,149
Local grupo emergencia	Downflooding point	9,105
Entrada a cta ppal desde cta to	Downflooding point	9,090

Stability calculation - D

Stability 22.01.00.131, build: 131

Model file: C:\Users\MARTA\Google Drive\TFG\Marta González\PROGRAMAS\MaxSURF\NUEVO (TFG)\D (Highest precision, 65 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 - Condición I

Damage Case - Intact

Free to Trim

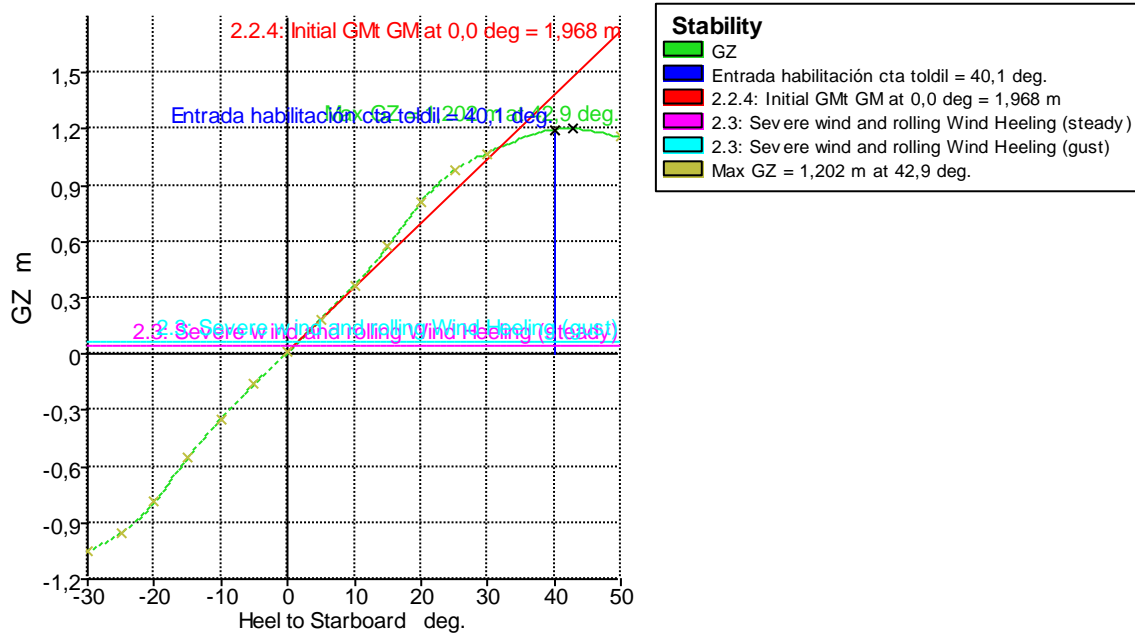
Specific gravity = 1,025; (Density = 1,025 tonne/m³)

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	10064,100	10064,100			68,650	0,000	11,800	0,000	User Specified
Total peso en rosca			10064,100			68,650	0,000	11,800	0,000	
Tripulación	20	0,125	2,500			15,000	0,000	22,000	0,000	User Specified
Pertrechos	1	40,000	40,000			90,000	0,000	15,000	0,000	User Specified
Total pesos fijos			42,500			85,588	0,000	15,412	0,000	
Viveres	1	3,700	3,700			17,000	0,000	20,000	0,000	User Specified
Total pesos variables			3,700			17,000	0,000	20,000	0,000	
P1-PIQUE PROA 1	0%	690,827	0,000	673,978	0,000	165,684	0,000	0,047	0,000	IMO A.749(18)
P2B-PIQUE PROA 2 BR	0%	445,266	0,000	434,406	0,000	158,040	-0,001	0,009	0,000	IMO A.749(18)
P2E-PIQUE PROA 2 ER	0%	445,266	0,000	434,406	0,000	158,040	0,001	0,009	0,000	IMO A.749(18)
S1B-TOLVA SUPERIOR B1 BAVOR	0%	436,049	0,000	425,414	0,000	139,794	-12,904	12,700	0,000	IMO A.749(18)
S1E-TOLVA SUPERIOR B1 ESTRIBOR	0%	436,049	0,000	425,414	0,000	139,794	12,904	12,700	0,000	IMO A.749(18)
I1B-TOLVA INFERIOR B1 BAVOR	0%	460,629	0,000	449,394	0,000	136,523	-0,671	0,005	0,000	IMO A.749(18)
I1E-TOLVA INFERIOR B1 ESTRIBOR	0%	460,629	0,000	449,394	0,000	136,523	0,671	0,005	0,000	IMO A.749(18)
S2B-TOLVA SUPERIOR B2 BAVOR	0%	608,511	0,000	593,669	0,000	123,728	-14,225	12,700	0,000	IMO A.749(18)
S2E-TOLVA SUPERIOR B2 ESTRIBOR	0%	608,511	0,000	593,669	0,000	123,728	14,225	12,700	0,000	IMO A.749(18)
I2B-TOLVA INFERIOR B2 BAVOR	0%	831,819	0,000	811,530	0,000	111,611	-1,566	0,000	0,000	IMO A.749(18)
I2E-TOLVA INFERIOR B2 ESTRIBOR	0%	831,819	0,000	811,530	0,000	111,611	1,566	0,000	0,000	IMO A.749(18)
S3B-TOLVA SUPERIOR B3 BAVOR	0%	608,593	0,000	593,750	0,000	96,777	-14,339	12,700	0,000	IMO A.749(18)
S3E-TOLVA SUPERIOR B3 ESTRIBOR	0%	608,593	0,000	593,750	0,000	96,777	14,339	12,700	0,000	IMO A.749(18)
I3B-TOLVA INFERIOR B3 BAVOR	0%	866,904	0,000	845,760	0,000	95,275	-2,938	0,000	0,000	IMO A.749(18)
I3E-TOLVA INFERIOR B3 ESTRIBOR	0%	866,904	0,000	845,760	0,000	95,275	2,938	0,000	0,000	IMO A.749(18)
I4B-TOLVA INFERIOR B4 BAVOR	0%	860,892	0,000	839,895	0,000	77,837	-2,284	0,000	0,000	IMO A.749(18)
I4E-TOLVA INFERIOR B4 ESTRIBOR	0%	860,892	0,000	839,895	0,000	77,837	2,284	0,000	0,000	IMO A.749(18)

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
I5B-TOLVA INFERIOR B5 BABOR	0%	769,640	0,000	750,868	0,000	54,943	-1,029	0,000	0,000	IMO A.749(18)
I5E-TOLVA INFERIOR B5 ESTRIBOR	0%	769,640	0,000	750,868	0,000	54,943	1,029	0,000	0,000	IMO A.749(18)
PIQUE POPA BABOR	0%	271,223	0,000	264,608	0,000	8,299	-4,606	9,140	0,000	User Specified
PIQUE POPA ESTRIBOR	0%	271,223	0,000	264,608	0,000	8,299	4,606	9,140	0,000	User Specified
Total lastre	0%	13009,878	0,000	12692,564	0,000	0,000	0,000	0,000	0,000	
ADB-AGUA DULCE BABOR	97,9%	121,659	119,104	121,659	119,104	7,451	-8,283	15,165	131,283	IMO A.749(18)
ADE-AGUA DULCE ESTRIBOR	97,9%	74,189	72,631	74,189	72,631	6,534	8,168	15,176	0,000	IMO A.749(18)
ATE-AGUA TÉCNICA ESTRIBOR	100%	47,476	47,476	47,476	47,476	8,883	8,468	15,189	0,000	User Specified
Total agua	98,31%	243,325	239,212	243,325	239,212	7,457	0,036	15,173	131,283	
REFRIGERACIÓN EJE	100%	67,303	67,303	67,303	67,303	8,597	0,000	3,839	0,000	User Specified
LODOS	0%	22,540	0,000	22,540	0,000	11,401	0,000	1,000	0,000	User Specified
REBOSES HFO BR	0%	15,908	0,000	16,233	0,000	20,233	-2,001	0,313	0,000	User Specified
REBOSES ACEITE ER	0%	22,443	0,000	24,395	0,000	20,974	2,001	0,291	0,000	User Specified
AGUAS ACEITOSAS	0%	14,763	0,000	16,170	0,000	23,625	0,000	1,000	0,000	User Specified
SENTINAS	0%	7,974	0,000	8,734	0,000	28,919	0,000	0,000	0,000	User Specified
AGUAS RESIDUALES	0%	152,063	0,000	152,063	0,000	13,523	8,989	9,140	0,000	User Specified
Total misceláneos	22,21%	302,994	67,303	307,437	67,303	8,597	0,000	3,839	0,000	
SERVICIO ACEITE CILINDROS	100%	5,428	5,428	5,900	5,900	11,000	-5,750	9,570	0,000	User Specified
ALMACÉN ACEITE CILINDROS	100%	32,440	32,440	35,260	35,260	11,000	-5,750	12,570	0,000	User Specified
ALMACÉN ACEITE 1	100%	17,009	17,009	18,488	18,488	11,021	-8,471	11,771	0,000	User Specified
ALMACÉN ACEITE 2	100%	13,153	13,153	14,297	14,297	11,071	-10,529	12,530	0,000	User Specified
Total aceite	100%	68,030	68,030	73,945	73,945	11,019	-7,354	12,123	0,000	
SEDIMENTACIÓN HFO 1	100%	43,621	43,621	44,512	44,512	29,250	-1,000	9,570	0,000	User Specified
USO DIARIO HFO 1	100%	65,432	65,432	66,767	66,767	29,250	1,500	9,570	0,000	User Specified
USO DIARIO HFO 2	100%	65,432	65,432	66,767	66,767	29,250	4,500	9,570	0,000	User Specified
SEDIMENTACIÓN HFO 2	100%	43,621	43,621	44,512	44,512	29,250	7,000	9,570	0,000	User Specified
S4B-TOLVA SUPERIOR B4 BABOR	97,9%	405,778	397,256	414,059	405,363	70,405	-11,318	15,562	203,826	IMO A.749(18)
S4E-TOLVA SUPERIOR B4 ESTRIBOR	97,9%	405,778	397,256	414,059	405,363	70,405	11,318	15,562	203,826	IMO A.749(18)
S5B-TOLVA SUPERIOR B5 BABOR	97,9%	9,973	9,764	10,177	9,963	43,690	-11,263	14,110	0,000	IMO A.749(18)
S5E-TOLVA SUPERIOR B5 ESTRIBOR	97,9%	9,973	9,764	10,177	9,963	43,690	11,263	14,110	0,000	IMO A.749(18)
Total HFO	98,34%	1049,608	1032,147	1071,029	1053,211	61,203	0,634	14,269	407,652	
USO DIARIO DIÉSEL 1	97,9%	28,042	27,453	33,384	32,683	29,250	-2,750	9,411	0,000	IMO A.749(18)
USO DIARIO DIÉSEL 2	97,9%	28,042	27,453	33,384	32,683	29,250	-4,250	9,411	0,000	IMO A.749(18)
ALMACÉN DIÉSEL	97,9%	93,474	91,511	111,279	108,942	29,250	-7,500	9,411	0,000	IMO A.749(18)

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
Total diésel	97,9%	149,559	146,418	178,046	174,307	29,250	-6,000	9,411	0,000	
DIÉSEL EMERGENCIA	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	IMO A.749(18)
Total diésel emergencia	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	
LNG 1	97,9%	47,695	46,693	105,989	103,763	4,571	1,270	22,363	0,000	IMO A.749(18)
LNG 2	97,9%	47,878	46,873	106,396	104,161	-0,102	1,260	22,297	122,130	IMO A.749(18)
Total LNG	97,9%	95,573	93,566	212,385	207,925	2,230	1,265	22,330	122,130	
BODEGA 1	90%	6307,524	5676,772	8004,472	7204,025	146,597	0,000	8,780	0,000	User Specified
BODEGA 2	90%	8762,080	7885,872	11119,391	10007,452	123,145	0,000	8,694	0,000	User Specified
BODEGA 3	90%	8826,230	7943,607	11200,800	10080,720	96,797	0,000	8,682	0,000	User Specified
BODEGA 4	90%	8826,427	7943,784	11201,049	10080,944	70,403	0,000	8,682	0,000	User Specified
BODEGA 5	90%	8816,728	7935,055	11188,741	10069,867	43,813	0,000	8,765	0,000	User Specified
Total bodegas	90%	41538,989	37385,090	52714,453	47443,008	93,063	0,000	8,717	0,000	
Contenedor 1	0	440,000	0,000			147,000	0,000	22,800	0,000	User Specified
Contenedor 2	0	792,000	0,000			123,500	0,000	22,800	0,000	User Specified
Contenedor 3	0	792,000	0,000			97,000	0,000	22,800	0,000	User Specified
Contenedor 4	0	792,000	0,000			70,500	0,000	22,800	0,000	User Specified
Contenedor 5	0	792,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total contenedores			0,000			0,000	0,000	0,000	0,000	
Madera 1	1	400,000	400,000			147,000	0,000	22,800	0,000	User Specified
Madera 2	1	720,000	720,000			123,500	0,000	22,800	0,000	User Specified
Madera 3	1	720,000	720,000			97,000	0,000	22,800	0,000	User Specified
Madera 4	1	720,000	720,000			70,500	0,000	22,800	0,000	User Specified
Madera 5	1	720,000	720,000			44,000	0,000	22,800	0,000	User Specified
Total madera			3280,000			91,463	0,000	22,800	0,000	
Total Loadcase			52424,675	67496,358	49262,018	86,687	-0,012	10,360	661,066	
FS correction								0,013		
VCG fluid								10,373		



Heel to Starboard deg	-30,0	-25,0	-20,0	-15,0	-10,0	-5,0	0,0	5,0	10,0	15,0	20,0	25,0
GZ m	-1,050	-0,956	-0,789	-0,552	-0,346	-0,162	0,012	0,185	0,369	0,575	0,811	0,977
Area under GZ curve from zero heel m.deg	16,6588	11,6257	7,2247	3,8648	1,6363	0,3723	0,0107	0,4898	1,8706	4,2133	7,6883	12,1929
Displacement t	52424	52425	52425	52430	52429	52427	52425	52425	52422	52421	52420	52425
Draft at FP m	12,208	11,884	11,747	11,731	11,720	11,713	11,717	11,712	11,718	11,729	11,746	11,884
Draft at AP m	12,221	12,199	12,219	12,288	12,338	12,366	12,368	12,365	12,336	12,286	12,218	12,199
WL Length m	173,996	173,924	173,893	173,890	173,887	173,886	173,887	173,886	173,887	173,889	173,893	173,924
Beam max extents on WL m	29,972	29,728	31,284	31,223	30,627	30,279	30,164	30,279	30,627	31,223	31,287	29,728
Wetted Area m^2	8546,938	8369,848	8112,950	8042,274	8035,108	8030,424	8028,491	8030,234	8034,615	8041,589	8112,404	8369,827
Waterpl. Area m^2	4352,939	4519,711	4806,970	4785,474	4701,178	4650,930	4633,931	4650,899	4701,099	4785,367	4807,239	4519,705
Prismatic coeff. (Cp)	0,829	0,821	0,816	0,813	0,812	0,811	0,811	0,811	0,812	0,813	0,816	0,821
Block coeff. (Cb)	0,556	0,587	0,586	0,620	0,674	0,737	0,791	0,737	0,674	0,620	0,586	0,587
LCB from zero pt. (+ve fwd) m	86,680	86,679	86,676	86,674	86,672	86,671	86,686	86,671	86,672	86,674	86,676	86,679
LCF from zero pt. (+ve fwd) m	82,366	82,982	83,615	83,319	83,193	83,132	83,121	83,132	83,194	83,320	83,616	82,982
Max deck inclination deg	30,0000	25,0002	20,0005	15,0011	10,0021	5,0048	0,2188	5,0048	10,0021	15,0011	20,0005	25,0002
Trim angle (+ve by stern) deg	0,0042	0,1059	0,1586	0,1874	0,2078	0,2196	0,2188	0,2196	0,2078	0,1874	0,1586	0,1059

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 49,898 m)		18,3	n/a
Deck Edge (immersion pos = 49,898 m)		18,6	n/a
Entrada habilitación cta ppal 1	Downflooding point	Not immersed in positive range	0
Aseo público cubierta	Downflooding point	Not immersed in positive range	0
Local CO2	Downflooding point	Not immersed in positive range	0
Entrada habilitación cta ppal 2	Downflooding point	Not immersed in positive range	0
Local ropa de agua	Downflooding point	Not immersed in positive range	0
Entrada habilitación cta toldil	Downflooding point	40,1	0
Entrada habilitación cta toldil	Downflooding point	Not immersed in positive range	0
Local grupo emergencia	Downflooding point	47,5	0
Entrada a cta ppal desde cta to	Downflooding point	Not immersed in positive range	0

Code	Criteria	Value	Units	Actual	Status	Margin %
267(85) Ch2 - General Criteria	2.3: IMO roll back angle	18,5	deg			
267(85) Ch2 - General Criteria	2.2.1: Area 0 to 30	3,1513	m.deg	17,3307	Pass	+449,96
267(85) Ch2 - General Criteria	2.2.1: Area 0 to 40	5,1566	m.deg	28,7531	Pass	+457,60
267(85) Ch2 - General Criteria	2.2.1: Area 30 to 40	1,7189	m.deg	11,4223	Pass	+564,52
267(85) Ch2 - General Criteria	2.2.2: Max GZ at 30 or greater	0,200	m	1,202	Pass	+501,00
267(85) Ch2 - General Criteria	2.2.3: Angle of maximum GZ	25,0	deg	42,9	Pass	+71,40
267(85) Ch2 - General Criteria	2.2.4: Initial GMt	0,150	m	1,968	Pass	+1212,00
267(85) Ch2 - General Criteria	2.3: Severe wind and rolling				Pass	
	Angle of steady heel shall not be greater than (\leq)	16,0	deg	0,9	Pass	+94,56

CONDICIÓN VI

Llegada a puerto a plena carga
(grano) + madera sobre las escotillas

Equilibrium calculation - D

Stability 22.01.00.131, build: 131

Model file: C:\Users\MARTA\Google Drive\TFG\Marta González\PROGRAMAS\MaxSURF\NUEVO (TFG)\D (Highest precision, 65 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 - Condición I

Damage Case - Intact

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m³)

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	10064,100	10064,100			68,650	0,000	11,800	0,000	User Specified
Total peso en rosca			10064,100			68,650	0,000	11,800	0,000	
Tripulación	20	0,125	2,500			15,000	0,000	22,000	0,000	User Specified
Pertrechos	1	40,000	40,000			90,000	0,000	15,000	0,000	User Specified
Total pesos fijos			42,500			85,588	0,000	15,412	0,000	
Viveres	0,1	3,700	0,370			17,000	0,000	20,000	0,000	User Specified
Total pesos variables			0,370			17,000	0,000	20,000	0,000	
P1-PIQUE PROA 1	0%	690,827	0,000	673,978	0,000	165,684	0,000	0,047	0,000	IMO A.749(18)
P2B-PIQUE PROA 2 BR	0%	445,266	0,000	434,406	0,000	158,040	-0,001	0,009	0,000	IMO A.749(18)
P2E-PIQUE PROA 2 ER	0%	445,266	0,000	434,406	0,000	158,040	0,001	0,009	0,000	IMO A.749(18)
S1B-TOLVA SUPERIOR B1 BAVOR	0%	436,049	0,000	425,414	0,000	139,794	-12,904	12,700	0,000	IMO A.749(18)
S1E-TOLVA SUPERIOR B1 ESTRIBOR	0%	436,049	0,000	425,414	0,000	139,794	12,904	12,700	0,000	IMO A.749(18)
I1B-TOLVA INFERIOR B1 BAVOR	0%	460,629	0,000	449,394	0,000	136,523	-0,671	0,005	0,000	IMO A.749(18)
I1E-TOLVA INFERIOR B1 ESTRIBOR	0%	460,629	0,000	449,394	0,000	136,523	0,671	0,005	0,000	IMO A.749(18)
S2B-TOLVA SUPERIOR B2 BAVOR	0%	608,511	0,000	593,669	0,000	123,728	-14,225	12,700	0,000	IMO A.749(18)
S2E-TOLVA SUPERIOR B2 ESTRIBOR	0%	608,511	0,000	593,669	0,000	123,728	14,225	12,700	0,000	IMO A.749(18)
I2B-TOLVA INFERIOR B2 BAVOR	0%	831,819	0,000	811,530	0,000	111,611	-1,566	0,000	0,000	IMO A.749(18)
I2E-TOLVA INFERIOR B2 ESTRIBOR	0%	831,819	0,000	811,530	0,000	111,611	1,566	0,000	0,000	IMO A.749(18)
S3B-TOLVA SUPERIOR B3 BAVOR	0%	608,593	0,000	593,750	0,000	96,777	-14,339	12,700	0,000	IMO A.749(18)
S3E-TOLVA SUPERIOR B3 ESTRIBOR	0%	608,593	0,000	593,750	0,000	96,777	14,339	12,700	0,000	IMO A.749(18)
I3B-TOLVA INFERIOR B3 BAVOR	0%	866,904	0,000	845,760	0,000	95,275	-2,938	0,000	0,000	IMO A.749(18)
I3E-TOLVA INFERIOR B3 ESTRIBOR	0%	866,904	0,000	845,760	0,000	95,275	2,938	0,000	0,000	IMO A.749(18)
I4B-TOLVA INFERIOR B4 BAVOR	0%	860,892	0,000	839,895	0,000	77,837	-2,284	0,000	0,000	IMO A.749(18)
I4E-TOLVA INFERIOR B4 ESTRIBOR	0%	860,892	0,000	839,895	0,000	77,837	2,284	0,000	0,000	IMO A.749(18)

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
I5B-TOLVA INFERIOR B5 BABOR	0%	769,640	0,000	750,868	0,000	54,943	-1,029	0,000	0,000	IMO A.749(18)
I5E-TOLVA INFERIOR B5 ESTRIBOR	0%	769,640	0,000	750,868	0,000	54,943	1,029	0,000	0,000	IMO A.749(18)
PIQUE POPA BABOR	0%	271,223	0,000	264,608	0,000	8,299	-4,606	9,140	0,000	User Specified
PIQUE POPA ESTRIBOR	0%	271,223	0,000	264,608	0,000	8,299	4,606	9,140	0,000	User Specified
Total lastre	0%	13009,878	0,000	12692,564	0,000	0,000	0,000	0,000	0,000	
ADB-AGUA DULCE BABOR	10%	121,659	12,166	121,659	12,166	7,492	-7,942	13,365	131,302	IMO A.749(18)
ADE-AGUA DULCE ESTRIBOR	10%	74,189	7,419	74,189	7,419	6,554	7,777	13,370	0,000	IMO A.749(18)
ATE-AGUA TÉCNICA ESTRIBOR	10%	47,476	4,748	47,476	4,748	8,887	8,188	13,358	0,000	User Specified
Total agua	10%	243,325	24,332	243,325	24,332	7,478	-0,002	13,366	131,302	
REFRIGERACIÓN EJE	100%	67,303	67,303	67,303	67,303	8,597	0,000	3,839	0,000	User Specified
LODOS	100%	22,540	22,540	22,540	22,540	11,375	0,000	1,532	0,000	User Specified
REBOSES HFO BR	100%	15,908	15,908	16,233	16,233	18,841	-5,025	1,382	0,000	User Specified
REBOSES ACEITE ER	100%	22,443	22,443	24,395	24,395	18,954	5,046	1,380	0,000	User Specified
AGUAS ACEITOSAS	100%	14,763	14,763	16,170	16,170	23,625	0,000	1,500	0,000	User Specified
SENTINAS	100%	7,974	7,974	8,734	8,734	28,875	0,000	1,010	0,000	User Specified
AGUAS RESIDUALES	100%	152,063	152,063	152,063	152,063	12,650	10,081	13,659	0,000	User Specified
Total misceláneos	100%	302,994	302,994	307,437	307,437	13,409	5,169	8,096	0,000	
SERVICIO ACEITE CILINDROS	10%	5,428	0,543	5,900	0,590	11,000	-5,750	9,183	0,000	User Specified
ALMACÉN ACEITE CILINDROS	10%	32,440	3,244	35,260	3,526	11,000	-5,750	10,257	0,000	User Specified
ALMACÉN ACEITE 1	10%	17,009	1,701	18,488	1,849	11,178	-8,241	9,558	0,000	User Specified
ALMACÉN ACEITE 2	10%	13,153	1,315	14,297	1,430	11,268	-9,962	10,577	0,000	User Specified
Total aceite	10%	68,030	6,803	73,945	7,395	11,096	-7,187	10,058	0,000	
SEDIMENTACIÓN HFO 1	0%	43,621	0,000	44,512	0,000	29,250	-1,000	2,000	0,000	User Specified
USO DIARIO HFO 1	80,24%	65,432	52,500	66,767	53,571	29,250	1,500	8,074	0,000	User Specified
USO DIARIO HFO 2	80,24%	65,432	52,500	66,767	53,571	29,250	4,500	8,074	0,000	User Specified
SEDIMENTACIÓN HFO 2	0%	43,621	0,000	44,512	0,000	29,250	7,000	2,000	0,000	User Specified
S4B-TOLVA SUPERIOR B4 BABOR	0%	405,778	0,000	414,059	0,000	71,250	-13,611	12,700	0,000	IMO A.749(18)
S4E-TOLVA SUPERIOR B4 ESTRIBOR	0%	405,778	0,000	414,059	0,000	71,250	13,611	12,700	0,000	IMO A.749(18)
S5B-TOLVA SUPERIOR B5 BABOR	0%	9,973	0,000	10,177	0,000	44,162	-14,104	12,700	0,000	IMO A.749(18)
S5E-TOLVA SUPERIOR B5 ESTRIBOR	0%	9,973	0,000	10,177	0,000	44,162	14,104	12,700	0,000	IMO A.749(18)
Total HFO	10%	1049,608	105,000	1071,029	107,143	29,250	3,000	8,074	0,000	
USO DIARIO DIÉSEL 1	26,75%	28,042	7,500	33,384	8,929	29,250	-2,750	4,025	0,000	IMO A.749(18)
USO DIARIO DIÉSEL 2	26,75%	28,042	7,500	33,384	8,929	29,250	-4,250	4,025	0,000	IMO A.749(18)
ALMACÉN DIÉSEL	0%	93,474	0,000	111,279	0,000	29,250	-7,500	2,000	0,000	IMO A.749(18)

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
Total diésel	10,03%	149,559	15,000	178,046	17,857	29,250	-3,500	4,025	0,000	
DIÉSEL EMERGENCIA	10%	2,666	0,267	3,174	0,317	8,267	-7,570	20,260	0,000	IMO A.749(18)
Total diésel emergencia	10%	2,666	0,267	3,174	0,317	8,267	-7,570	20,260	0,000	
LNG 1	10%	47,695	4,770	105,989	10,599	4,549	1,266	20,938	0,000	IMO A.749(18)
LNG 2	10%	47,878	4,788	106,396	10,640	-0,067	1,235	20,762	122,148	IMO A.749(18)
Total LNG	10%	95,573	9,557	212,385	21,238	2,237	1,251	20,850	122,148	
BODEGA 1	90%	6307,524	5676,771	8004,472	7204,025	146,597	0,000	8,780	0,000	User Specified
BODEGA 2	90%	8762,080	7885,872	11119,391	10007,452	123,145	0,000	8,694	0,000	User Specified
BODEGA 3	90%	8826,230	7943,607	11200,800	10080,720	96,797	0,000	8,682	0,000	User Specified
BODEGA 4	90%	8826,427	7943,784	11201,049	10080,944	70,403	0,000	8,682	0,000	User Specified
BODEGA 5	90%	8816,728	7935,054	11188,741	10069,866	43,813	0,000	8,765	0,000	User Specified
Total bodegas	90%	41538,989	37385,089	52714,453	47443,006	93,063	0,000	8,717	0,000	
Contenedor 1	0	440,000	0,000			147,000	0,000	22,800	0,000	User Specified
Contenedor 2	0	792,000	0,000			123,500	0,000	22,800	0,000	User Specified
Contenedor 3	0	792,000	0,000			97,000	0,000	22,800	0,000	User Specified
Contenedor 4	0	792,000	0,000			70,500	0,000	22,800	0,000	User Specified
Contenedor 5	0	792,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total contenedores			0,000			0,000	0,000	0,000	0,000	
Madera 1	1	400,000	400,000			147,000	0,000	22,800	0,000	User Specified
Madera 2	1	720,000	720,000			123,500	0,000	22,800	0,000	User Specified
Madera 3	1	720,000	720,000			97,000	0,000	22,800	0,000	User Specified
Madera 4	1	720,000	720,000			70,500	0,000	22,800	0,000	User Specified
Madera 5	1	720,000	720,000			44,000	0,000	22,800	0,000	User Specified
Total madera			3280,000			91,463	0,000	22,800	0,000	
Total Loadcase			51236,012	67496,358	47928,726	87,469	0,035	10,228	253,449	
FS correction								0,005		
VCG fluid								10,233		

Draft Amidships m	11,798
Displacement t	51237
Heel deg	1,0
Draft at FP m	11,798
Draft at AP m	11,798

Draft at LCF m	11,798
Trim (+ve by stern) m	0,000
WL Length m	173,906
Beam max extents on WL m	30,168
Wetted Area m ²	7925,301
Waterpl. Area m ²	4604,321
Prismatic coeff. (Cp)	0,811
Block coeff. (Cb)	0,794
Max Sect. area coeff. (Cm)	0,978
Waterpl. area coeff. (Cwp)	0,878
LCB from zero pt. (+ve fwd) m	87,485
LCF from zero pt. (+ve fwd) m	83,654
KB m	6,093
KG fluid m	10,233
BMt m	6,223
BML m	187,421
GMt corrected m	2,083
GML m	183,280
KMt m	12,316
KML m	193,488
Immersion (TPc) tonne/cm	47,194
MTc tonne.m	551,098
RM at 1deg = GMt.Disp.sin(1) tonne.m	1862,475
Max deck inclination deg	0,9621
Trim angle (+ve by stern) deg	0,0000

Key point	Type	Freeboard m
Margin Line (freeboard pos = 83,34 m)		5,012
Deck Edge (freeboard pos = 83,34 m)		5,088
Entrada habilitación cta ppal 1	Downflooding point	6,807
Aseo público cubierta	Downflooding point	6,854
Local CO2	Downflooding point	6,879
Entrada habilitación cta ppal 2	Downflooding point	6,908
Local ropa de agua	Downflooding point	6,947
Entrada habilitación cta toldil	Downflooding point	9,454
Entrada habilitación cta toldil	Downflooding point	9,807
Local grupo emergencia	Downflooding point	9,501
Entrada a cta ppal desde cta to	Downflooding point	9,727

Stability calculation - D

Stability 22.01.00.131, build: 131

Model file: C:\Users\MARTA\Google Drive\TFG\Marta González\PROGRAMAS\MaxSURF\NUEVO (TFG)\D (Highest precision, 65 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 - Condición I

Damage Case - Intact

Free to Trim

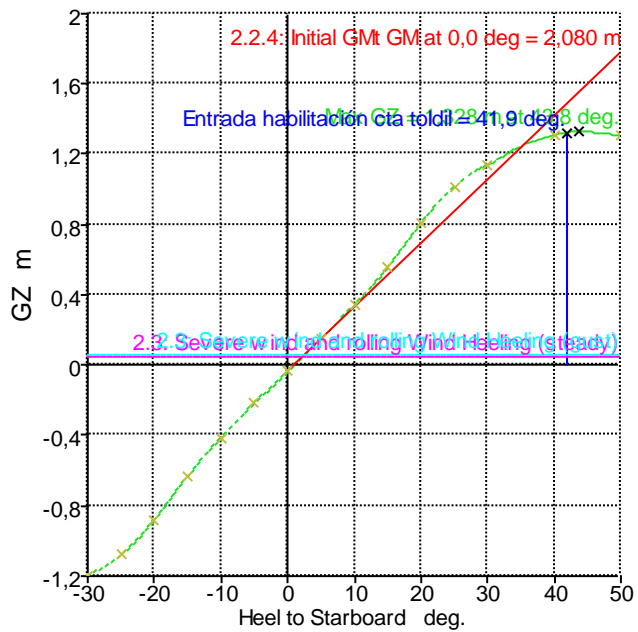
Specific gravity = 1,025; (Density = 1,025 tonne/m³)

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	10064,100	10064,100			68,650	0,000	11,800	0,000	User Specified
Total peso en rosca			10064,100			68,650	0,000	11,800	0,000	
Tripulación	20	0,125	2,500			15,000	0,000	22,000	0,000	User Specified
Pertrechos	1	40,000	40,000			90,000	0,000	15,000	0,000	User Specified
Total pesos fijos			42,500			85,588	0,000	15,412	0,000	
Viveres	0,1	3,700	0,370			17,000	0,000	20,000	0,000	User Specified
Total pesos variables			0,370			17,000	0,000	20,000	0,000	
P1-PIQUE PROA 1	0%	690,827	0,000	673,978	0,000	165,684	0,000	0,047	0,000	IMO A.749(18)
P2B-PIQUE PROA 2 BR	0%	445,266	0,000	434,406	0,000	158,040	-0,001	0,009	0,000	IMO A.749(18)
P2E-PIQUE PROA 2 ER	0%	445,266	0,000	434,406	0,000	158,040	0,001	0,009	0,000	IMO A.749(18)
S1B-TOLVA SUPERIOR B1 BAVOR	0%	436,049	0,000	425,414	0,000	139,794	-12,904	12,700	0,000	IMO A.749(18)
S1E-TOLVA SUPERIOR B1 ESTRIBOR	0%	436,049	0,000	425,414	0,000	139,794	12,904	12,700	0,000	IMO A.749(18)
I1B-TOLVA INFERIOR B1 BAVOR	0%	460,629	0,000	449,394	0,000	136,523	-0,671	0,005	0,000	IMO A.749(18)
I1E-TOLVA INFERIOR B1 ESTRIBOR	0%	460,629	0,000	449,394	0,000	136,523	0,671	0,005	0,000	IMO A.749(18)
S2B-TOLVA SUPERIOR B2 BAVOR	0%	608,511	0,000	593,669	0,000	123,728	-14,225	12,700	0,000	IMO A.749(18)
S2E-TOLVA SUPERIOR B2 ESTRIBOR	0%	608,511	0,000	593,669	0,000	123,728	14,225	12,700	0,000	IMO A.749(18)
I2B-TOLVA INFERIOR B2 BAVOR	0%	831,819	0,000	811,530	0,000	111,611	-1,566	0,000	0,000	IMO A.749(18)
I2E-TOLVA INFERIOR B2 ESTRIBOR	0%	831,819	0,000	811,530	0,000	111,611	1,566	0,000	0,000	IMO A.749(18)
S3B-TOLVA SUPERIOR B3 BAVOR	0%	608,593	0,000	593,750	0,000	96,777	-14,339	12,700	0,000	IMO A.749(18)
S3E-TOLVA SUPERIOR B3 ESTRIBOR	0%	608,593	0,000	593,750	0,000	96,777	14,339	12,700	0,000	IMO A.749(18)
I3B-TOLVA INFERIOR B3 BAVOR	0%	866,904	0,000	845,760	0,000	95,275	-2,938	0,000	0,000	IMO A.749(18)
I3E-TOLVA INFERIOR B3 ESTRIBOR	0%	866,904	0,000	845,760	0,000	95,275	2,938	0,000	0,000	IMO A.749(18)
I4B-TOLVA INFERIOR B4 BAVOR	0%	860,892	0,000	839,895	0,000	77,837	-2,284	0,000	0,000	IMO A.749(18)
I4E-TOLVA INFERIOR B4 ESTRIBOR	0%	860,892	0,000	839,895	0,000	77,837	2,284	0,000	0,000	IMO A.749(18)

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
I5B-TOLVA INFERIOR B5 BABOR	0%	769,640	0,000	750,868	0,000	54,943	-1,029	0,000	0,000	IMO A.749(18)
I5E-TOLVA INFERIOR B5 ESTRIBOR	0%	769,640	0,000	750,868	0,000	54,943	1,029	0,000	0,000	IMO A.749(18)
PIQUE POPA BABOR	0%	271,223	0,000	264,608	0,000	8,299	-4,606	9,140	0,000	User Specified
PIQUE POPA ESTRIBOR	0%	271,223	0,000	264,608	0,000	8,299	4,606	9,140	0,000	User Specified
Total lastre	0%	13009,878	0,000	12692,564	0,000	0,000	0,000	0,000	0,000	
ADB-AGUA DULCE BABOR	10%	121,659	12,166	121,659	12,166	7,492	-7,942	13,365	131,283	IMO A.749(18)
ADE-AGUA DULCE ESTRIBOR	10%	74,189	7,419	74,189	7,419	6,554	7,777	13,370	0,000	IMO A.749(18)
ATE-AGUA TÉCNICA ESTRIBOR	10%	47,476	4,748	47,476	4,748	8,887	8,188	13,358	0,000	User Specified
Total agua	10%	243,325	24,332	243,325	24,332	7,478	-0,002	13,366	131,283	
REFRIGERACIÓN EJE	100%	67,303	67,303	67,303	67,303	8,597	0,000	3,839	0,000	User Specified
LODOS	100%	22,540	22,540	22,540	22,540	11,375	0,000	1,532	0,000	User Specified
REBOSES HFO BR	100%	15,908	15,908	16,233	16,233	18,841	-5,025	1,382	0,000	User Specified
REBOSES ACEITE ER	100%	22,443	22,443	24,395	24,395	18,954	5,046	1,380	0,000	User Specified
AGUAS ACEITOSAS	100%	14,763	14,763	16,170	16,170	23,625	0,000	1,500	0,000	User Specified
SENTINAS	100%	7,974	7,974	8,734	8,734	28,875	0,000	1,010	0,000	User Specified
AGUAS RESIDUALES	100%	152,063	152,063	152,063	152,063	12,650	10,081	13,659	0,000	User Specified
Total misceláneos	100%	302,994	302,994	307,437	307,437	13,409	5,169	8,096	0,000	
SERVICIO ACEITE CILINDROS	10%	5,428	0,543	5,900	0,590	11,000	-5,750	9,183	0,000	User Specified
ALMACÉN ACEITE CILINDROS	10%	32,440	3,244	35,260	3,526	11,000	-5,750	10,257	0,000	User Specified
ALMACÉN ACEITE 1	10%	17,009	1,701	18,488	1,849	11,178	-8,241	9,558	0,000	User Specified
ALMACÉN ACEITE 2	10%	13,153	1,315	14,297	1,430	11,268	-9,962	10,577	0,000	User Specified
Total aceite	10%	68,030	6,803	73,945	7,395	11,096	-7,187	10,058	0,000	
SEDIMENTACIÓN HFO 1	0%	43,621	0,000	44,512	0,000	29,250	-1,000	2,000	0,000	User Specified
USO DIARIO HFO 1	80,24%	65,432	52,500	66,767	53,571	29,250	1,500	8,074	0,000	User Specified
USO DIARIO HFO 2	80,24%	65,432	52,500	66,767	53,571	29,250	4,500	8,074	0,000	User Specified
SEDIMENTACIÓN HFO 2	0%	43,621	0,000	44,512	0,000	29,250	7,000	2,000	0,000	User Specified
S4B-TOLVA SUPERIOR B4 BABOR	0%	405,778	0,000	414,059	0,000	71,250	-13,611	12,700	0,000	IMO A.749(18)
S4E-TOLVA SUPERIOR B4 ESTRIBOR	0%	405,778	0,000	414,059	0,000	71,250	13,611	12,700	0,000	IMO A.749(18)
S5B-TOLVA SUPERIOR B5 BABOR	0%	9,973	0,000	10,177	0,000	44,162	-14,104	12,700	0,000	IMO A.749(18)
S5E-TOLVA SUPERIOR B5 ESTRIBOR	0%	9,973	0,000	10,177	0,000	44,162	14,104	12,700	0,000	IMO A.749(18)
Total HFO	10%	1049,608	105,000	1071,029	107,143	29,250	3,000	8,074	0,000	
USO DIARIO DIÉSEL 1	26,75%	28,042	7,500	33,384	8,929	29,250	-2,750	4,025	0,000	IMO A.749(18)
USO DIARIO DIÉSEL 2	26,75%	28,042	7,500	33,384	8,929	29,250	-4,250	4,025	0,000	IMO A.749(18)
ALMACÉN DIÉSEL	0%	93,474	0,000	111,279	0,000	29,250	-7,500	2,000	0,000	IMO A.749(18)

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
Total diésel	10,03%	149,559	15,000	178,046	17,857	29,250	-3,500	4,025	0,000	
DIÉSEL EMERGENCIA	10%	2,666	0,267	3,174	0,317	8,267	-7,570	20,260	0,000	IMO A.749(18)
Total diésel emergencia	10%	2,666	0,267	3,174	0,317	8,267	-7,570	20,260	0,000	
LNG 1	10%	47,695	4,770	105,989	10,599	4,549	1,266	20,938	0,000	IMO A.749(18)
LNG 2	10%	47,878	4,788	106,396	10,640	-0,067	1,235	20,762	122,130	IMO A.749(18)
Total LNG	10%	95,573	9,557	212,385	21,238	2,237	1,251	20,850	122,130	
BODEGA 1	90%	6307,524	5676,771	8004,472	7204,025	146,597	0,000	8,780	0,000	User Specified
BODEGA 2	90%	8762,080	7885,872	11119,391	10007,451	123,145	0,000	8,694	0,000	User Specified
BODEGA 3	90%	8826,230	7943,607	11200,800	10080,719	96,797	0,000	8,682	0,000	User Specified
BODEGA 4	90%	8826,427	7943,784	11201,049	10080,944	70,403	0,000	8,682	0,000	User Specified
BODEGA 5	90%	8816,728	7935,056	11188,741	10069,868	43,813	0,000	8,765	0,000	User Specified
Total bodegas	90%	41538,989	37385,089	52714,453	47443,006	93,063	0,000	8,717	0,000	
Contenedor 1	0	440,000	0,000			147,000	0,000	22,800	0,000	User Specified
Contenedor 2	0	792,000	0,000			123,500	0,000	22,800	0,000	User Specified
Contenedor 3	0	792,000	0,000			97,000	0,000	22,800	0,000	User Specified
Contenedor 4	0	792,000	0,000			70,500	0,000	22,800	0,000	User Specified
Contenedor 5	0	792,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total contenedores			0,000			0,000	0,000	0,000	0,000	
Madera 1	1	400,000	400,000			147,000	0,000	22,800	0,000	User Specified
Madera 2	1	720,000	720,000			123,500	0,000	22,800	0,000	User Specified
Madera 3	1	720,000	720,000			97,000	0,000	22,800	0,000	User Specified
Madera 4	1	720,000	720,000			70,500	0,000	22,800	0,000	User Specified
Madera 5	1	720,000	720,000			44,000	0,000	22,800	0,000	User Specified
Total madera			3280,000			91,463	0,000	22,800	0,000	
Total Loadcase			51236,012	67496,358	47928,726	87,469	0,035	10,228	253,414	
FS correction								0,005		
VCG fluid								10,233		



Stability	
Green line	GZ
Blue vertical line	Entrada habilitación cta toldil = 41,9 deg.
Red line	2.2.4: Initial GMT GM at 0,0 deg = 2,080 m
Magenta horizontal line	2.3: Severe wind and rolling Wind Heeling (steady)
Cyan horizontal line	2.3: Severe wind and rolling Wind Heeling (gust)
Yellow horizontal line	Max GZ = 1,328 m at 43,8 deg.

Heel to Starboard deg	-30,0	-25,0	-20,0	-15,0	-10,0	-5,0	0,0	5,0	10,0	15,0	20,0	25,0
GZ m	-1,199	-1,080	-0,878	-0,627	-0,412	-0,218	-0,035	0,148	0,343	0,560	0,812	1,017
Area under GZ curve from zero heel m.deg	19,1922	13,4720	8,5423	4,7799	2,1991	0,6300	-0,0318	0,2812	1,5041	3,7435	7,1754	11,7765
Displacement t	51236	51236	51236	51239	51239	51238	51236	51236	51234	51234	51233	51236
Draft at FP m	12,273	11,958	11,829	11,812	11,800	11,793	11,796	11,793	11,799	11,811	11,828	11,958
Draft at AP m	11,568	11,579	11,638	11,716	11,767	11,797	11,800	11,796	11,766	11,714	11,638	11,579
WL Length m	174,012	173,943	173,911	173,907	173,904	173,903	173,904	173,903	173,904	173,907	173,911	173,940
Beam max extents on WL m	30,262	29,461	31,885	31,222	30,626	30,278	30,163	30,278	30,626	31,222	31,887	29,461
Wetted Area m^2	8415,851	8233,409	7971,121	7942,876	7932,884	7927,358	7925,274	7927,233	7932,555	7942,404	7970,704	8233,385
Waterpl. Area m^2	4401,787	4571,337	4859,230	4757,696	4671,282	4620,706	4603,818	4620,682	4671,220	4757,609	4859,394	4571,337
Prismatic coeff. (Cp)	0,823	0,819	0,815	0,813	0,812	0,811	0,811	0,811	0,812	0,813	0,815	0,819
Block coeff. (Cb)	0,545	0,587	0,570	0,615	0,671	0,734	0,808	0,734	0,671	0,615	0,570	0,587
LCB from zero pt. (+ve fwd) m	87,477	87,477	87,473	87,471	87,469	87,469	87,481	87,469	87,470	87,471	87,473	87,477
LCF from zero pt. (+ve fwd) m	82,506	83,138	83,821	83,786	83,709	83,661	83,650	83,661	83,709	83,787	83,822	83,138
Max deck inclination deg	30,0006	25,0002	20,0001	15,0000	10,0000	5,0000	0,0013	5,0000	10,0000	15,0000	20,0001	25,0002
Trim angle (+ve by stern) deg	-0,2373	-0,1273	-0,0641	-0,0325	-0,0110	0,0013	0,0013	0,0013	-0,0110	-0,0325	-0,0641	-0,1273

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 122,534 m)		19,3	n/a
Deck Edge (immersion pos = 122,534 m)		19,6	n/a
Entrada habilitación cta ppal 1	Downflooding point	Not immersed in positive range	0
Aseo público cubierta	Downflooding point	Not immersed in positive range	0
Local CO2	Downflooding point	Not immersed in positive range	0
Entrada habilitación cta ppal 2	Downflooding point	Not immersed in positive range	0
Local ropa de agua	Downflooding point	Not immersed in positive range	0
Entrada habilitación cta toldil	Downflooding point	41,9	0
Entrada habilitación cta toldil	Downflooding point	Not immersed in positive range	0
Local grupo emergencia	Downflooding point	49,9	0
Entrada a cta ppal desde cta to	Downflooding point	Not immersed in positive range	0

Code	Criteria	Value	Units	Actual	Status	Margin %
267(85) Ch2 - General Criteria	2.3: IMO roll back angle	18,7	deg			
267(85) Ch2 - General Criteria	2.2.1: Area 0 to 30	3,1513	m.deg	17,1875	Pass	+445,42
267(85) Ch2 - General Criteria	2.2.1: Area 0 to 40	5,1566	m.deg	29,5380	Pass	+472,82
267(85) Ch2 - General Criteria	2.2.1: Area 30 to 40	1,7189	m.deg	12,3504	Pass	+618,52
267(85) Ch2 - General Criteria	2.2.2: Max GZ at 30 or greater	0,200	m	1,328	Pass	+564,00
267(85) Ch2 - General Criteria	2.2.3: Angle of maximum GZ	25,0	deg	43,8	Pass	+75,09
267(85) Ch2 - General Criteria	2.2.4: Initial GMt	0,150	m	2,080	Pass	+1286,67
267(85) Ch2 - General Criteria	2.3: Severe wind and rolling				Pass	
	Angle of steady heel shall not be greater than (\leq)	16,0	deg	2,1	Pass	+86,64

CONDICIÓN VII

Salida de puerto a plena carga
(carbón)

Equilibrium calculation - D

Stability 22.01.00.131, build: 131

Model file: C:\Users\MARTA\Google Drive\TFG\Marta González\PROGRAMAS\MaxSURF\NUEVO (TFG)\D (Highest precision, 65 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 - Condición I

Damage Case - Intact

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m³)

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	10064,100	10064,100			68,650	0,000	11,800	0,000	User Specified
Total peso en rosca			10064,100			68,650	0,000	11,800	0,000	
Tripulación	20	0,125	2,500			15,000	0,000	22,000	0,000	User Specified
Pertrechos	1	40,000	40,000			90,000	0,000	15,000	0,000	User Specified
Total pesos fijos			42,500			85,588	0,000	15,412	0,000	
Viveres	1	3,700	3,700			17,000	0,000	20,000	0,000	User Specified
Total pesos variables			3,700			17,000	0,000	20,000	0,000	
P1-PIQUE PROA 1	0%	690,827	0,000	673,978	0,000	165,684	0,000	0,047	0,000	IMO A.749(18)
P2B-PIQUE PROA 2 BR	0%	445,266	0,000	434,406	0,000	158,040	-0,001	0,009	0,000	IMO A.749(18)
P2E-PIQUE PROA 2 ER	0%	445,266	0,000	434,406	0,000	158,040	0,001	0,009	0,000	IMO A.749(18)
S1B-TOLVA SUPERIOR B1 BAVOR	0%	436,049	0,000	425,414	0,000	139,794	-12,904	12,700	0,000	IMO A.749(18)
S1E-TOLVA SUPERIOR B1 ESTRIBOR	0%	436,049	0,000	425,414	0,000	139,794	12,904	12,700	0,000	IMO A.749(18)
I1B-TOLVA INFERIOR B1 BAVOR	0%	460,629	0,000	449,394	0,000	136,523	-0,671	0,005	0,000	IMO A.749(18)
I1E-TOLVA INFERIOR B1 ESTRIBOR	0%	460,629	0,000	449,394	0,000	136,523	0,671	0,005	0,000	IMO A.749(18)
S2B-TOLVA SUPERIOR B2 BAVOR	0%	608,511	0,000	593,669	0,000	123,728	-14,225	12,700	0,000	IMO A.749(18)
S2E-TOLVA SUPERIOR B2 ESTRIBOR	0%	608,511	0,000	593,669	0,000	123,728	14,225	12,700	0,000	IMO A.749(18)
I2B-TOLVA INFERIOR B2 BAVOR	0%	831,819	0,000	811,530	0,000	111,611	-1,566	0,000	0,000	IMO A.749(18)
I2E-TOLVA INFERIOR B2 ESTRIBOR	0%	831,819	0,000	811,530	0,000	111,611	1,566	0,000	0,000	IMO A.749(18)
S3B-TOLVA SUPERIOR B3 BAVOR	0%	608,593	0,000	593,750	0,000	96,777	-14,339	12,700	0,000	IMO A.749(18)
S3E-TOLVA SUPERIOR B3 ESTRIBOR	0%	608,593	0,000	593,750	0,000	96,777	14,339	12,700	0,000	IMO A.749(18)
I3B-TOLVA INFERIOR B3 BAVOR	0%	866,904	0,000	845,760	0,000	95,275	-2,938	0,000	0,000	IMO A.749(18)
I3E-TOLVA INFERIOR B3 ESTRIBOR	0%	866,904	0,000	845,760	0,000	95,275	2,938	0,000	0,000	IMO A.749(18)
I4B-TOLVA INFERIOR B4 BAVOR	0%	860,892	0,000	839,895	0,000	77,837	-2,284	0,000	0,000	IMO A.749(18)
I4E-TOLVA INFERIOR B4 ESTRIBOR	0%	860,892	0,000	839,895	0,000	77,837	2,284	0,000	0,000	IMO A.749(18)

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
I5B-TOLVA INFERIOR B5 BABOR	0%	769,640	0,000	750,868	0,000	54,943	-1,029	0,000	0,000	IMO A.749(18)
I5E-TOLVA INFERIOR B5 ESTRIBOR	0%	769,640	0,000	750,868	0,000	54,943	1,029	0,000	0,000	IMO A.749(18)
PIQUE POPA BABOR	0%	271,223	0,000	264,608	0,000	8,299	-4,606	9,140	0,000	User Specified
PIQUE POPA ESTRIBOR	0%	271,223	0,000	264,608	0,000	8,299	4,606	9,140	0,000	User Specified
Total lastre	0%	13009,878	0,000	12692,564	0,000	0,000	0,000	0,000	0,000	
ADB-AGUA DULCE BABOR	97,9%	121,659	119,104	121,659	119,104	7,451	-8,283	15,165	131,283	IMO A.749(18)
ADE-AGUA DULCE ESTRIBOR	97,9%	74,189	72,631	74,189	72,631	6,534	8,168	15,176	0,000	IMO A.749(18)
ATE-AGUA TÉCNICA ESTRIBOR	100%	47,476	47,476	47,476	47,476	8,883	8,468	15,189	0,000	User Specified
Total agua	98,31%	243,325	239,212	243,325	239,212	7,457	0,036	15,173	131,283	
REFRIGERACIÓN EJE	100%	67,303	67,303	67,303	67,303	8,597	0,000	3,839	0,000	User Specified
LODOS	0%	22,540	0,000	22,540	0,000	11,401	0,000	1,000	0,000	User Specified
REBOSES HFO BR	0%	15,908	0,000	16,233	0,000	20,233	-2,001	0,313	0,000	User Specified
REBOSES ACEITE ER	0%	22,443	0,000	24,395	0,000	20,974	2,001	0,291	0,000	User Specified
AGUAS ACEITOSAS	0%	14,763	0,000	16,170	0,000	23,625	0,000	1,000	0,000	User Specified
SENTINAS	0%	7,974	0,000	8,734	0,000	28,919	0,000	0,000	0,000	User Specified
AGUAS RESIDUALES	0%	152,063	0,000	152,063	0,000	13,523	8,989	9,140	0,000	User Specified
Total misceláneos	22,21%	302,994	67,303	307,437	67,303	8,597	0,000	3,839	0,000	
SERVICIO ACEITE CILINDROS	100%	5,428	5,428	5,900	5,900	11,000	-5,750	9,570	0,000	User Specified
ALMACÉN ACEITE CILINDROS	100%	32,440	32,440	35,260	35,260	11,000	-5,750	12,570	0,000	User Specified
ALMACÉN ACEITE 1	100%	17,009	17,009	18,488	18,488	11,021	-8,471	11,771	0,000	User Specified
ALMACÉN ACEITE 2	100%	13,153	13,153	14,297	14,297	11,071	-10,529	12,530	0,000	User Specified
Total aceite	100%	68,030	68,030	73,945	73,945	11,019	-7,354	12,123	0,000	
SEDIMENTACIÓN HFO 1	100%	43,621	43,621	44,512	44,512	29,250	-1,000	9,570	0,000	User Specified
USO DIARIO HFO 1	100%	65,432	65,432	66,767	66,767	29,250	1,500	9,570	0,000	User Specified
USO DIARIO HFO 2	100%	65,432	65,432	66,767	66,767	29,250	4,500	9,570	0,000	User Specified
SEDIMENTACIÓN HFO 2	100%	43,621	43,621	44,512	44,512	29,250	7,000	9,570	0,000	User Specified
S4B-TOLVA SUPERIOR B4 BABOR	97,9%	405,778	397,256	414,059	405,363	70,405	-11,318	15,562	203,826	IMO A.749(18)
S4E-TOLVA SUPERIOR B4 ESTRIBOR	97,9%	405,778	397,256	414,059	405,363	70,405	11,318	15,562	203,826	IMO A.749(18)
S5B-TOLVA SUPERIOR B5 BABOR	97,9%	9,973	9,764	10,177	9,963	43,690	-11,263	14,110	0,000	IMO A.749(18)
S5E-TOLVA SUPERIOR B5 ESTRIBOR	97,9%	9,973	9,764	10,177	9,963	43,690	11,263	14,110	0,000	IMO A.749(18)
Total HFO	98,34%	1049,608	1032,147	1071,029	1053,211	61,203	0,634	14,269	407,652	
USO DIARIO DIÉSEL 1	97,9%	28,042	27,453	33,384	32,683	29,250	-2,750	9,411	0,000	IMO A.749(18)
USO DIARIO DIÉSEL 2	97,9%	28,042	27,453	33,384	32,683	29,250	-4,250	9,411	0,000	IMO A.749(18)
ALMACÉN DIÉSEL	97,9%	93,474	91,511	111,279	108,942	29,250	-7,500	9,411	0,000	IMO A.749(18)

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
Total diésel	97,9%	149,559	146,418	178,046	174,307	29,250	-6,000	9,411	0,000	
DIÉSEL EMERGENCIA	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	IMO A.749(18)
Total diésel emergencia	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	
LNG 1	97,9%	47,695	46,693	105,989	103,763	4,571	1,270	22,363	0,000	IMO A.749(18)
LNG 2	97,9%	47,878	46,873	106,396	104,161	-0,102	1,260	22,297	122,130	IMO A.749(18)
Total LNG	97,9%	95,573	93,566	212,385	207,925	2,230	1,265	22,330	122,130	
BODEGA 1	40%	14143,902	5657,560	8004,472	3201,789	146,444	0,000	5,184	0,000	User Specified
BODEGA 2	40%	19647,964	7859,187	11119,391	4447,757	123,130	0,000	5,088	0,000	User Specified
BODEGA 3	40%	19791,814	7916,727	11200,800	4480,321	96,797	0,000	5,080	0,000	User Specified
BODEGA 4	40%	19792,254	7916,901	11201,049	4480,420	70,404	0,000	5,080	0,000	User Specified
BODEGA 5	40%	19770,505	7908,201	11188,741	4475,496	43,930	0,000	5,164	0,000	User Specified
Total bodegas	40%	93146,439	37258,577	52714,453	21085,782	93,061	0,000	5,115	0,000	
Contenedor 1	0	440,000	0,000			147,000	0,000	22,800	0,000	User Specified
Contenedor 2	0	792,000	0,000			123,500	0,000	22,800	0,000	User Specified
Contenedor 3	0	792,000	0,000			97,000	0,000	22,800	0,000	User Specified
Contenedor 4	0	792,000	0,000			70,500	0,000	22,800	0,000	User Specified
Contenedor 5	0	792,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total contenedores			0,000			0,000	0,000	0,000	0,000	
Madera 1	0	400,000	0,000			147,000	0,000	22,800	0,000	User Specified
Madera 2	0	720,000	0,000			123,500	0,000	22,800	0,000	User Specified
Madera 3	0	720,000	0,000			97,000	0,000	22,800	0,000	User Specified
Madera 4	0	720,000	0,000			70,500	0,000	22,800	0,000	User Specified
Madera 5	0	720,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total madera			0,000			0,000	0,000	0,000	0,000	
Total Loadcase			49018,162	67496,358	22904,792	86,350	-0,013	6,794	661,066	
FS correction								0,013		
VCG fluid								6,808		

Draft Amidships m	11,316
Displacement t	49018
Heel deg	0,0
Draft at FP m	10,735
Draft at AP m	11,898

Draft at LCF m	11,329
Trim (+ve by stern) m	1,164
WL Length m	173,669
Beam max extents on WL m	30,162
Wetted Area m ²	7764,003
Waterpl. Area m ²	4597,203
Prismatic coeff. (Cp)	0,803
Block coeff. (Cb)	0,772
Max Sect. area coeff. (Cm)	0,991
Waterpl. area coeff. (Cwp)	0,878
LCB from zero pt. (+ve fwd) m	86,330
LCF from zero pt. (+ve fwd) m	83,399
KB m	5,849
KG fluid m	6,808
BMt m	6,482
BML m	195,281
GMt corrected m	5,524
GML m	194,323
KMt m	12,331
KML m	201,126
Immersion (TPc) tonne/cm	47,121
MTc tonne.m	558,998
RM at 1deg = GMt.Disp.sin(1) tonne.m	4725,412
Max deck inclination deg	0,3913
Trim angle (+ve by stern) deg	0,3913

Key point	Type	Freeboard m
Margin Line (freeboard pos = 30,275 m)		5,372
Deck Edge (freeboard pos = 30,275 m)		5,448
Entrada habilitación cta ppal 1	Downflooding point	6,946
Aseo público cubierta	Downflooding point	6,946
Local CO2	Downflooding point	6,946
Entrada habilitación cta ppal 2	Downflooding point	6,946
Local ropa de agua	Downflooding point	6,946
Entrada habilitación cta toldil	Downflooding point	9,697
Entrada habilitación cta toldil	Downflooding point	9,697
Local grupo emergencia	Downflooding point	9,620
Entrada a cta ppal desde cta to	Downflooding point	9,593

Stability calculation - D

Stability 22.01.00.131, build: 131

Model file: C:\Users\MARTA\Google Drive\TFG\Marta González\PROGRAMAS\MaxSURF\NUEVO (TFG)\D (Highest precision, 65 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 - Condición I

Damage Case - Intact

Free to Trim

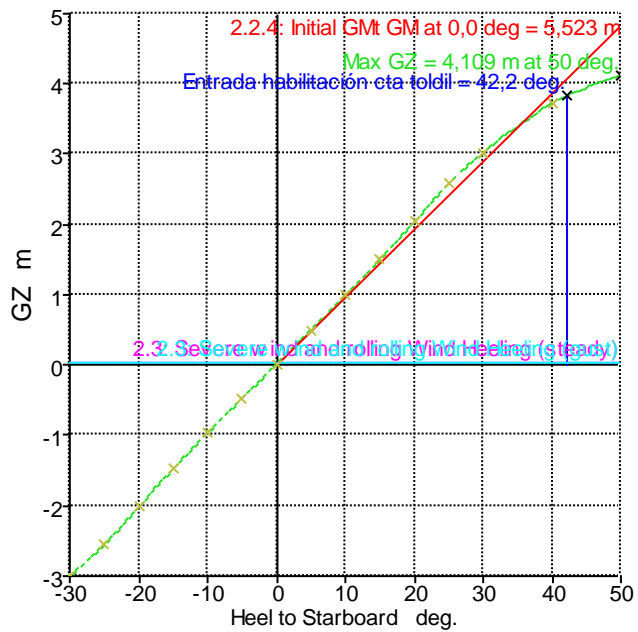
Specific gravity = 1,025; (Density = 1,025 tonne/m³)

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	10064,100	10064,100			68,650	0,000	11,800	0,000	User Specified
Total peso en rosca			10064,100			68,650	0,000	11,800	0,000	
Tripulación	20	0,125	2,500			15,000	0,000	22,000	0,000	User Specified
Pertrechos	1	40,000	40,000			90,000	0,000	15,000	0,000	User Specified
Total pesos fijos			42,500			85,588	0,000	15,412	0,000	
Viveres	1	3,700	3,700			17,000	0,000	20,000	0,000	User Specified
Total pesos variables			3,700			17,000	0,000	20,000	0,000	
P1-PIQUE PROA 1	0%	690,827	0,000	673,978	0,000	165,684	0,000	0,047	0,000	IMO A.749(18)
P2B-PIQUE PROA 2 BR	0%	445,266	0,000	434,406	0,000	158,040	-0,001	0,009	0,000	IMO A.749(18)
P2E-PIQUE PROA 2 ER	0%	445,266	0,000	434,406	0,000	158,040	0,001	0,009	0,000	IMO A.749(18)
S1B-TOLVA SUPERIOR B1 BAVOR	0%	436,049	0,000	425,414	0,000	139,794	-12,904	12,700	0,000	IMO A.749(18)
S1E-TOLVA SUPERIOR B1 ESTRIBOR	0%	436,049	0,000	425,414	0,000	139,794	12,904	12,700	0,000	IMO A.749(18)
I1B-TOLVA INFERIOR B1 BAVOR	0%	460,629	0,000	449,394	0,000	136,523	-0,671	0,005	0,000	IMO A.749(18)
I1E-TOLVA INFERIOR B1 ESTRIBOR	0%	460,629	0,000	449,394	0,000	136,523	0,671	0,005	0,000	IMO A.749(18)
S2B-TOLVA SUPERIOR B2 BAVOR	0%	608,511	0,000	593,669	0,000	123,728	-14,225	12,700	0,000	IMO A.749(18)
S2E-TOLVA SUPERIOR B2 ESTRIBOR	0%	608,511	0,000	593,669	0,000	123,728	14,225	12,700	0,000	IMO A.749(18)
I2B-TOLVA INFERIOR B2 BAVOR	0%	831,819	0,000	811,530	0,000	111,611	-1,566	0,000	0,000	IMO A.749(18)
I2E-TOLVA INFERIOR B2 ESTRIBOR	0%	831,819	0,000	811,530	0,000	111,611	1,566	0,000	0,000	IMO A.749(18)
S3B-TOLVA SUPERIOR B3 BAVOR	0%	608,593	0,000	593,750	0,000	96,777	-14,339	12,700	0,000	IMO A.749(18)
S3E-TOLVA SUPERIOR B3 ESTRIBOR	0%	608,593	0,000	593,750	0,000	96,777	14,339	12,700	0,000	IMO A.749(18)
I3B-TOLVA INFERIOR B3 BAVOR	0%	866,904	0,000	845,760	0,000	95,275	-2,938	0,000	0,000	IMO A.749(18)
I3E-TOLVA INFERIOR B3 ESTRIBOR	0%	866,904	0,000	845,760	0,000	95,275	2,938	0,000	0,000	IMO A.749(18)
I4B-TOLVA INFERIOR B4 BAVOR	0%	860,892	0,000	839,895	0,000	77,837	-2,284	0,000	0,000	IMO A.749(18)
I4E-TOLVA INFERIOR B4 ESTRIBOR	0%	860,892	0,000	839,895	0,000	77,837	2,284	0,000	0,000	IMO A.749(18)

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
I5B-TOLVA INFERIOR B5 BABOR	0%	769,640	0,000	750,868	0,000	54,943	-1,029	0,000	0,000	IMO A.749(18)
I5E-TOLVA INFERIOR B5 ESTRIBOR	0%	769,640	0,000	750,868	0,000	54,943	1,029	0,000	0,000	IMO A.749(18)
PIQUE POPA BABOR	0%	271,223	0,000	264,608	0,000	8,299	-4,606	9,140	0,000	User Specified
PIQUE POPA ESTRIBOR	0%	271,223	0,000	264,608	0,000	8,299	4,606	9,140	0,000	User Specified
Total lastre	0%	13009,878	0,000	12692,564	0,000	0,000	0,000	0,000	0,000	
ADB-AGUA DULCE BABOR	97,9%	121,659	119,104	121,659	119,104	7,451	-8,283	15,165	131,283	IMO A.749(18)
ADE-AGUA DULCE ESTRIBOR	97,9%	74,189	72,631	74,189	72,631	6,534	8,168	15,176	0,000	IMO A.749(18)
ATE-AGUA TÉCNICA ESTRIBOR	100%	47,476	47,476	47,476	47,476	8,883	8,468	15,189	0,000	User Specified
Total agua	98,31%	243,325	239,212	243,325	239,212	7,457	0,036	15,173	131,283	
REFRIGERACIÓN EJE	100%	67,303	67,303	67,303	67,303	8,597	0,000	3,839	0,000	User Specified
LODOS	0%	22,540	0,000	22,540	0,000	11,401	0,000	1,000	0,000	User Specified
REBOSES HFO BR	0%	15,908	0,000	16,233	0,000	20,233	-2,001	0,313	0,000	User Specified
REBOSES ACEITE ER	0%	22,443	0,000	24,395	0,000	20,974	2,001	0,291	0,000	User Specified
AGUAS ACEITOSAS	0%	14,763	0,000	16,170	0,000	23,625	0,000	1,000	0,000	User Specified
SENTINAS	0%	7,974	0,000	8,734	0,000	28,919	0,000	0,000	0,000	User Specified
AGUAS RESIDUALES	0%	152,063	0,000	152,063	0,000	13,523	8,989	9,140	0,000	User Specified
Total misceláneos	22,21%	302,994	67,303	307,437	67,303	8,597	0,000	3,839	0,000	
SERVICIO ACEITE CILINDROS	100%	5,428	5,428	5,900	5,900	11,000	-5,750	9,570	0,000	User Specified
ALMACÉN ACEITE CILINDROS	100%	32,440	32,440	35,260	35,260	11,000	-5,750	12,570	0,000	User Specified
ALMACÉN ACEITE 1	100%	17,009	17,009	18,488	18,488	11,021	-8,471	11,771	0,000	User Specified
ALMACÉN ACEITE 2	100%	13,153	13,153	14,297	14,297	11,071	-10,529	12,530	0,000	User Specified
Total aceite	100%	68,030	68,030	73,945	73,945	11,019	-7,354	12,123	0,000	
SEDIMENTACIÓN HFO 1	100%	43,621	43,621	44,512	44,512	29,250	-1,000	9,570	0,000	User Specified
USO DIARIO HFO 1	100%	65,432	65,432	66,767	66,767	29,250	1,500	9,570	0,000	User Specified
USO DIARIO HFO 2	100%	65,432	65,432	66,767	66,767	29,250	4,500	9,570	0,000	User Specified
SEDIMENTACIÓN HFO 2	100%	43,621	43,621	44,512	44,512	29,250	7,000	9,570	0,000	User Specified
S4B-TOLVA SUPERIOR B4 BABOR	97,9%	405,778	397,256	414,059	405,363	70,405	-11,318	15,562	203,826	IMO A.749(18)
S4E-TOLVA SUPERIOR B4 ESTRIBOR	97,9%	405,778	397,256	414,059	405,363	70,405	11,318	15,562	203,826	IMO A.749(18)
S5B-TOLVA SUPERIOR B5 BABOR	97,9%	9,973	9,764	10,177	9,963	43,690	-11,263	14,110	0,000	IMO A.749(18)
S5E-TOLVA SUPERIOR B5 ESTRIBOR	97,9%	9,973	9,764	10,177	9,963	43,690	11,263	14,110	0,000	IMO A.749(18)
Total HFO	98,34%	1049,608	1032,147	1071,029	1053,211	61,203	0,634	14,269	407,652	
USO DIARIO DIÉSEL 1	97,9%	28,042	27,453	33,384	32,683	29,250	-2,750	9,411	0,000	IMO A.749(18)
USO DIARIO DIÉSEL 2	97,9%	28,042	27,453	33,384	32,683	29,250	-4,250	9,411	0,000	IMO A.749(18)
ALMACÉN DIÉSEL	97,9%	93,474	91,511	111,279	108,942	29,250	-7,500	9,411	0,000	IMO A.749(18)

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
Total diésel	97,9%	149,559	146,418	178,046	174,307	29,250	-6,000	9,411	0,000	
DIÉSEL EMERGENCIA	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	IMO A.749(18)
Total diésel emergencia	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	
LNG 1	97,9%	47,695	46,693	105,989	103,763	4,571	1,270	22,363	0,000	IMO A.749(18)
LNG 2	97,9%	47,878	46,873	106,396	104,161	-0,102	1,260	22,297	122,130	IMO A.749(18)
Total LNG	97,9%	95,573	93,566	212,385	207,925	2,230	1,265	22,330	122,130	
BODEGA 1	40%	14143,902	5657,561	8004,472	3201,789	146,444	0,000	5,184	0,000	User Specified
BODEGA 2	40%	19647,964	7859,187	11119,391	4447,757	123,130	0,000	5,088	0,000	User Specified
BODEGA 3	40%	19791,814	7916,724	11200,800	4480,319	96,797	0,000	5,080	0,000	User Specified
BODEGA 4	40%	19792,254	7916,901	11201,049	4480,419	70,404	0,000	5,080	0,000	User Specified
BODEGA 5	40%	19770,505	7908,202	11188,741	4475,496	43,930	0,000	5,164	0,000	User Specified
Total bodegas	40%	93146,439	37258,575	52714,453	21085,781	93,061	0,000	5,115	0,000	
Contenedor 1	0	440,000	0,000			147,000	0,000	22,800	0,000	User Specified
Contenedor 2	0	792,000	0,000			123,500	0,000	22,800	0,000	User Specified
Contenedor 3	0	792,000	0,000			97,000	0,000	22,800	0,000	User Specified
Contenedor 4	0	792,000	0,000			70,500	0,000	22,800	0,000	User Specified
Contenedor 5	0	792,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total contenedores			0,000			0,000	0,000	0,000	0,000	
Madera 1	0	400,000	0,000			147,000	0,000	22,800	0,000	User Specified
Madera 2	0	720,000	0,000			123,500	0,000	22,800	0,000	User Specified
Madera 3	0	720,000	0,000			97,000	0,000	22,800	0,000	User Specified
Madera 4	0	720,000	0,000			70,500	0,000	22,800	0,000	User Specified
Madera 5	0	720,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total madera			0,000			0,000	0,000	0,000	0,000	
Total Loadcase			49018,160	67496,358	22904,791	86,350	-0,013	6,794	661,066	
FS correction								0,013		
VCG fluid								6,808		



Stability	
Green line	GZ
Blue vertical line	Entrada habilitación cta toldil = 42,2 deg.
Red text	2.2.4: Initial GMT GM at 0,0 deg = 5,523 m
Magenta text	2.3: Severe wind and rolling Wind Heeling (steady)
Cyan text	2.3: Severe wind and rolling Wind Heeling (gust)
Olive text	Max GZ = 4,109 m at 50 deg.

Heel to Starboard deg	-30,0	-25,0	-20,0	-15,0	-10,0	-5,0	0,0	5,0	10,0	15,0	20,0	25,0
GZ m	-2,997	-2,556	-2,016	-1,474	-0,963	-0,471	0,013	0,496	0,988	1,499	2,040	2,579
Area under GZ curve from zero heel m.deg	44,8914	30,9760	19,5203	10,8076	4,7240	1,1439	0,0114	1,2696	4,9747	11,1804	20,0166	31,5760
Displacement t	49020	49018	49018	49018	49022	49021	49019	49017	49016	49014	49018	49018
Draft at FP m	11,043	10,828	10,780	10,763	10,751	10,743	10,741	10,743	10,750	10,762	10,780	10,828
Draft at AP m	11,646	11,659	11,724	11,801	11,854	11,883	11,893	11,883	11,853	11,800	11,724	11,659
WL Length m	173,735	173,688	173,677	173,674	173,672	173,671	173,670	173,670	173,672	173,674	173,677	173,688
Beam max extents on WL m	30,209	30,809	32,086	31,220	30,625	30,276	30,162	30,276	30,625	31,220	32,086	30,809
Wetted Area m^2	8160,205	7970,912	7793,328	7779,903	7771,052	7765,742	7763,899	7765,483	7770,537	7779,590	7793,327	7970,888
Waterpl. Area m^2	4544,667	4731,208	4871,382	4748,358	4663,320	4613,513	4596,945	4613,466	4663,226	4748,304	4871,376	4731,204
Prismatic coeff. (Cp)	0,823	0,815	0,810	0,807	0,805	0,804	0,803	0,804	0,805	0,807	0,810	0,815
Block coeff. (Cb)	0,539	0,553	0,558	0,607	0,663	0,727	0,773	0,727	0,663	0,607	0,558	0,553
LCB from zero pt. (+ve fwd) m	86,346	86,343	86,343	86,343	86,343	86,343	86,344	86,344	86,343	86,343	86,343	86,343
LCF from zero pt. (+ve fwd) m	83,157	83,846	83,683	83,553	83,470	83,419	83,405	83,420	83,471	83,553	83,683	83,845
Max deck inclination deg	30,0005	25,0012	20,0021	15,0037	10,0066	5,0145	0,3873	5,0145	10,0066	15,0037	20,0021	25,0012
Trim angle (+ve by stern) deg	0,2025	0,2792	0,3172	0,3491	0,3708	0,3833	0,3873	0,3833	0,3709	0,3491	0,3173	0,2792

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 49,898 m)		20,5	n/a
Deck Edge (immersion pos = 49,898 m)		20,8	n/a
Entrada habilitación cta ppal 1	Downflooding point	Not immersed in positive range	0
Aseo público cubierta	Downflooding point	Not immersed in positive range	0
Local CO2	Downflooding point	Not immersed in positive range	0
Entrada habilitación cta ppal 2	Downflooding point	Not immersed in positive range	0
Local ropa de agua	Downflooding point	Not immersed in positive range	0
Entrada habilitación cta toldil	Downflooding point	42,2	0
Entrada habilitación cta toldil	Downflooding point	Not immersed in positive range	0
Local grupo emergencia	Downflooding point	Not immersed in positive range	0
Entrada a cta ppal desde cta to	Downflooding point	Not immersed in positive range	0

Code	Criteria	Value	Units	Actual	Status	Margin %
267(85) Ch2 - General Criteria	2.3: IMO roll back angle	21,1	deg			
267(85) Ch2 - General Criteria	2.2.1: Area 0 to 30	3,1513	m.deg	45,6229	Pass	+1347,76
267(85) Ch2 - General Criteria	2.2.1: Area 0 to 40	5,1566	m.deg	79,4930	Pass	+1441,57
267(85) Ch2 - General Criteria	2.2.1: Area 30 to 40	1,7189	m.deg	33,8700	Pass	+1870,48
267(85) Ch2 - General Criteria	2.2.2: Max GZ at 30 or greater	0,200	m	4,109	Pass	+1954,50
267(85) Ch2 - General Criteria	2.2.3: Angle of maximum GZ	25,0	deg	50,0	Pass	+100,00
267(85) Ch2 - General Criteria	2.2.4: Initial GMt	0,150	m	5,523	Pass	+3582,00
267(85) Ch2 - General Criteria	2.3: Severe wind and rolling				Pass	
	Angle of steady heel shall not be greater than (<=)	16,0	deg	0,2	Pass	+98,76

CONDICIÓN VIII

Llegada a puerto a plena carga
(carbón)

Equilibrium calculation - D

Stability 22.01.00.131, build: 131

Model file: C:\Users\MARTA\Google Drive\TFG\Marta González\PROGRAMAS\MaxSURF\NUEVO (TFG)\D (Highest precision, 65 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 - Condición I

Damage Case - Intact

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m³)

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	10064,100	10064,100			68,650	0,000	11,800	0,000	User Specified
Total peso en rosca			10064,100			68,650	0,000	11,800	0,000	
Tripulación	20	0,125	2,500			15,000	0,000	22,000	0,000	User Specified
Pertrechos	1	40,000	40,000			90,000	0,000	15,000	0,000	User Specified
Total pesos fijos			42,500			85,588	0,000	15,412	0,000	
Viveres	0,1	3,700	0,370			17,000	0,000	20,000	0,000	User Specified
Total pesos variables			0,370			17,000	0,000	20,000	0,000	
P1-PIQUE PROA 1	0%	690,827	0,000	673,978	0,000	165,684	0,000	0,047	0,000	IMO A.749(18)
P2B-PIQUE PROA 2 BR	0%	445,266	0,000	434,406	0,000	158,040	-0,001	0,009	0,000	IMO A.749(18)
P2E-PIQUE PROA 2 ER	0%	445,266	0,000	434,406	0,000	158,040	0,001	0,009	0,000	IMO A.749(18)
S1B-TOLVA SUPERIOR B1 BAVOR	0%	436,049	0,000	425,414	0,000	139,794	-12,904	12,700	0,000	IMO A.749(18)
S1E-TOLVA SUPERIOR B1 ESTRIBOR	0%	436,049	0,000	425,414	0,000	139,794	12,904	12,700	0,000	IMO A.749(18)
I1B-TOLVA INFERIOR B1 BAVOR	0%	460,629	0,000	449,394	0,000	136,523	-0,671	0,005	0,000	IMO A.749(18)
I1E-TOLVA INFERIOR B1 ESTRIBOR	0%	460,629	0,000	449,394	0,000	136,523	0,671	0,005	0,000	IMO A.749(18)
S2B-TOLVA SUPERIOR B2 BAVOR	0%	608,511	0,000	593,669	0,000	123,728	-14,225	12,700	0,000	IMO A.749(18)
S2E-TOLVA SUPERIOR B2 ESTRIBOR	0%	608,511	0,000	593,669	0,000	123,728	14,225	12,700	0,000	IMO A.749(18)
I2B-TOLVA INFERIOR B2 BAVOR	0%	831,819	0,000	811,530	0,000	111,611	-1,566	0,000	0,000	IMO A.749(18)
I2E-TOLVA INFERIOR B2 ESTRIBOR	0%	831,819	0,000	811,530	0,000	111,611	1,566	0,000	0,000	IMO A.749(18)
S3B-TOLVA SUPERIOR B3 BAVOR	0%	608,593	0,000	593,750	0,000	96,777	-14,339	12,700	0,000	IMO A.749(18)
S3E-TOLVA SUPERIOR B3 ESTRIBOR	0%	608,593	0,000	593,750	0,000	96,777	14,339	12,700	0,000	IMO A.749(18)
I3B-TOLVA INFERIOR B3 BAVOR	0%	866,904	0,000	845,760	0,000	95,275	-2,938	0,000	0,000	IMO A.749(18)
I3E-TOLVA INFERIOR B3 ESTRIBOR	0%	866,904	0,000	845,760	0,000	95,275	2,938	0,000	0,000	IMO A.749(18)
I4B-TOLVA INFERIOR B4 BAVOR	0%	860,892	0,000	839,895	0,000	77,837	-2,284	0,000	0,000	IMO A.749(18)
I4E-TOLVA INFERIOR B4 ESTRIBOR	0%	860,892	0,000	839,895	0,000	77,837	2,284	0,000	0,000	IMO A.749(18)

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
I5B-TOLVA INFERIOR B5 BABOR	0%	769,640	0,000	750,868	0,000	54,943	-1,029	0,000	0,000	IMO A.749(18)
I5E-TOLVA INFERIOR B5 ESTRIBOR	0%	769,640	0,000	750,868	0,000	54,943	1,029	0,000	0,000	IMO A.749(18)
PIQUE POPA BABOR	0%	271,223	0,000	264,608	0,000	8,299	-4,606	9,140	0,000	User Specified
PIQUE POPA ESTRIBOR	0%	271,223	0,000	264,608	0,000	8,299	4,606	9,140	0,000	User Specified
Total lastre	0%	13009,878	0,000	12692,564	0,000	0,000	0,000	0,000	0,000	
ADB-AGUA DULCE BABOR	10%	121,659	12,166	121,659	12,166	7,492	-7,942	13,365	131,286	IMO A.749(18)
ADE-AGUA DULCE ESTRIBOR	10%	74,189	7,419	74,189	7,419	6,554	7,777	13,370	0,000	IMO A.749(18)
ATE-AGUA TÉCNICA ESTRIBOR	10%	47,476	4,748	47,476	4,748	8,887	8,188	13,358	0,000	User Specified
Total agua	10%	243,325	24,332	243,325	24,332	7,478	-0,002	13,366	131,286	
REFRIGERACIÓN EJE	100%	67,303	67,303	67,303	67,303	8,597	0,000	3,839	0,000	User Specified
LODOS	100%	22,540	22,540	22,540	22,540	11,375	0,000	1,532	0,000	User Specified
REBOSES HFO BR	100%	15,908	15,908	16,233	16,233	18,841	-5,025	1,382	0,000	User Specified
REBOSES ACEITE ER	100%	22,443	22,443	24,395	24,395	18,954	5,046	1,380	0,000	User Specified
AGUAS ACEITOSAS	100%	14,763	14,763	16,170	16,170	23,625	0,000	1,500	0,000	User Specified
SENTINAS	100%	7,974	7,974	8,734	8,734	28,875	0,000	1,010	0,000	User Specified
AGUAS RESIDUALES	100%	152,063	152,063	152,063	152,063	12,650	10,081	13,659	0,000	User Specified
Total misceláneos	100%	302,994	302,994	307,437	307,437	13,409	5,169	8,096	0,000	
SERVICIO ACEITE CILINDROS	10%	5,428	0,543	5,900	0,590	11,000	-5,750	9,183	0,000	User Specified
ALMACÉN ACEITE CILINDROS	10%	32,440	3,244	35,260	3,526	11,000	-5,750	10,257	0,000	User Specified
ALMACÉN ACEITE 1	10%	17,009	1,701	18,488	1,849	11,178	-8,241	9,558	0,000	User Specified
ALMACÉN ACEITE 2	10%	13,153	1,315	14,297	1,430	11,268	-9,962	10,577	0,000	User Specified
Total aceite	10%	68,030	6,803	73,945	7,395	11,096	-7,187	10,058	0,000	
SEDIMENTACIÓN HFO 1	0%	43,621	0,000	44,512	0,000	29,250	-1,000	2,000	0,000	User Specified
USO DIARIO HFO 1	80,24%	65,432	52,500	66,767	53,571	29,250	1,500	8,074	0,000	User Specified
USO DIARIO HFO 2	80,24%	65,432	52,500	66,767	53,571	29,250	4,500	8,074	0,000	User Specified
SEDIMENTACIÓN HFO 2	0%	43,621	0,000	44,512	0,000	29,250	7,000	2,000	0,000	User Specified
S4B-TOLVA SUPERIOR B4 BABOR	0%	405,778	0,000	414,059	0,000	71,250	-13,611	12,700	0,000	IMO A.749(18)
S4E-TOLVA SUPERIOR B4 ESTRIBOR	0%	405,778	0,000	414,059	0,000	71,250	13,611	12,700	0,000	IMO A.749(18)
S5B-TOLVA SUPERIOR B5 BABOR	0%	9,973	0,000	10,177	0,000	44,162	-14,104	12,700	0,000	IMO A.749(18)
S5E-TOLVA SUPERIOR B5 ESTRIBOR	0%	9,973	0,000	10,177	0,000	44,162	14,104	12,700	0,000	IMO A.749(18)
Total HFO	10%	1049,608	105,000	1071,029	107,143	29,250	3,000	8,074	0,000	
USO DIARIO DIÉSEL 1	26,75%	28,042	7,500	33,384	8,929	29,250	-2,750	4,025	0,000	IMO A.749(18)
USO DIARIO DIÉSEL 2	26,75%	28,042	7,500	33,384	8,929	29,250	-4,250	4,025	0,000	IMO A.749(18)
ALMACÉN DIÉSEL	0%	93,474	0,000	111,279	0,000	29,250	-7,500	2,000	0,000	IMO A.749(18)

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
Total diésel	10,03%	149,559	15,000	178,046	17,857	29,250	-3,500	4,025	0,000	
DIÉSEL EMERGENCIA	10%	2,666	0,267	3,174	0,317	8,267	-7,570	20,260	0,000	IMO A.749(18)
Total diésel emergencia	10%	2,666	0,267	3,174	0,317	8,267	-7,570	20,260	0,000	
LNG 1	10%	47,695	4,770	105,989	10,599	4,549	1,266	20,938	0,000	IMO A.749(18)
LNG 2	10%	47,878	4,788	106,396	10,640	-0,067	1,235	20,762	122,133	IMO A.749(18)
Total LNG	10%	95,573	9,557	212,385	21,238	2,237	1,251	20,850	122,133	
BODEGA 1	40%	14143,902	5657,560	8004,472	3201,788	146,444	0,000	5,184	0,000	User Specified
BODEGA 2	40%	19647,964	7859,186	11119,391	4447,757	123,130	0,000	5,088	0,000	User Specified
BODEGA 3	40%	19791,814	7916,725	11200,800	4480,320	96,797	0,000	5,080	0,000	User Specified
BODEGA 4	40%	19792,254	7916,901	11201,049	4480,419	70,404	0,000	5,080	0,000	User Specified
BODEGA 5	40%	19770,505	7908,204	11188,741	4475,497	43,930	0,000	5,164	0,000	User Specified
Total bodegas	40%	93146,439	37258,576	52714,453	21085,781	93,061	0,000	5,115	0,000	
Contenedor 1	0	440,000	0,000			147,000	0,000	22,800	0,000	User Specified
Contenedor 2	0	792,000	0,000			123,500	0,000	22,800	0,000	User Specified
Contenedor 3	0	792,000	0,000			97,000	0,000	22,800	0,000	User Specified
Contenedor 4	0	792,000	0,000			70,500	0,000	22,800	0,000	User Specified
Contenedor 5	0	792,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total contenedores			0,000			0,000	0,000	0,000	0,000	
Madera 1	0	400,000	0,000			147,000	0,000	22,800	0,000	User Specified
Madera 2	0	720,000	0,000			123,500	0,000	22,800	0,000	User Specified
Madera 3	0	720,000	0,000			97,000	0,000	22,800	0,000	User Specified
Madera 4	0	720,000	0,000			70,500	0,000	22,800	0,000	User Specified
Madera 5	0	720,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total madera			0,000			0,000	0,000	0,000	0,000	
Total Loadcase			47829,499	67496,358	21571,501	87,179	0,037	6,564	253,419	
FS correction								0,005		
VCG fluid								6,570		

Draft Amidships m	11,069
Displacement t	47830
Heel deg	0,4
Draft at FP m	10,823
Draft at AP m	11,315

Draft at LCF m	11,072
Trim (+ve by stern) m	0,491
WL Length m	172,288
Beam max extents on WL m	30,162
Wetted Area m ²	7654,554
Waterpl. Area m ²	4560,706
Prismatic coeff. (Cp)	0,813
Block coeff. (Cb)	0,796
Max Sect. area coeff. (Cm)	0,988
Waterpl. area coeff. (Cwp)	0,878
LCB from zero pt. (+ve fwd) m	87,175
LCF from zero pt. (+ve fwd) m	84,047
KB m	5,712
KG fluid m	6,570
BMt m	6,604
BML m	195,122
GMt corrected m	5,747
GML m	194,265
KMt m	12,316
KML m	200,829
Immersion (TPc) tonne/cm	46,747
MTc tonne.m	545,281
RM at 1deg = GMt.Disp.sin(1) tonne.m	4797,219
Max deck inclination deg	0,4087
Trim angle (+ve by stern) deg	0,1652

Key point	Type	Freeboard m
Margin Line (freeboard pos = 30,275 m)		5,743
Deck Edge (freeboard pos = 30,275 m)		5,819
Entrada habilitación cta ppal 1	Downflooding point	7,399
Aseo público cubierta	Downflooding point	7,417
Local CO2	Downflooding point	7,427
Entrada habilitación cta ppal 2	Downflooding point	7,438
Local ropa de agua	Downflooding point	7,453
Entrada habilitación cta toldil	Downflooding point	10,117
Entrada habilitación cta toldil	Downflooding point	10,254
Local grupo emergencia	Downflooding point	10,102
Entrada a cta ppal desde cta to	Downflooding point	10,179

Stability calculation - D

Stability 22.01.00.131, build: 131

Model file: C:\Users\MARTA\Google Drive\TFG\Marta González\PROGRAMAS\MaxSURF\NUEVO (TFG)\D (Highest precision, 65 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 - Condición I

Damage Case - Intact

Free to Trim

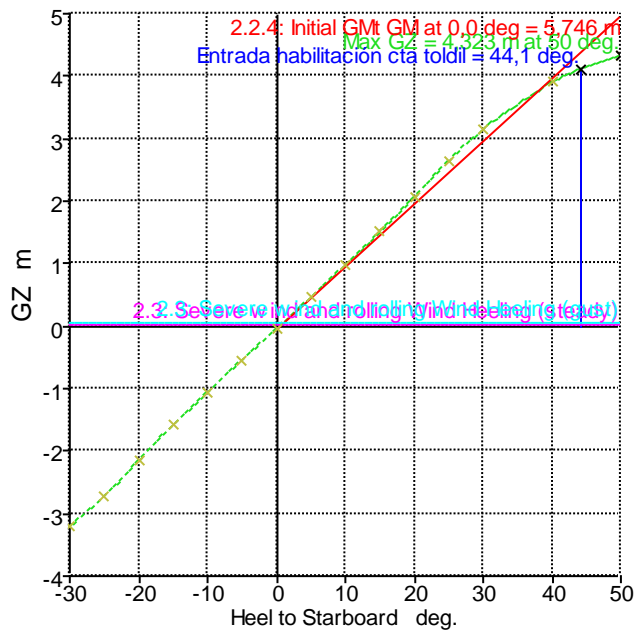
Specific gravity = 1,025; (Density = 1,025 tonne/m³)

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	10064,100	10064,100			68,650	0,000	11,800	0,000	User Specified
Total peso en rosca			10064,100			68,650	0,000	11,800	0,000	
Tripulación	20	0,125	2,500			15,000	0,000	22,000	0,000	User Specified
Pertrechos	1	40,000	40,000			90,000	0,000	15,000	0,000	User Specified
Total pesos fijos			42,500			85,588	0,000	15,412	0,000	
Viveres	0,1	3,700	0,370			17,000	0,000	20,000	0,000	User Specified
Total pesos variables			0,370			17,000	0,000	20,000	0,000	
P1-PIQUE PROA 1	0%	690,827	0,000	673,978	0,000	165,684	0,000	0,047	0,000	IMO A.749(18)
P2B-PIQUE PROA 2 BR	0%	445,266	0,000	434,406	0,000	158,040	-0,001	0,009	0,000	IMO A.749(18)
P2E-PIQUE PROA 2 ER	0%	445,266	0,000	434,406	0,000	158,040	0,001	0,009	0,000	IMO A.749(18)
S1B-TOLVA SUPERIOR B1 BAVOR	0%	436,049	0,000	425,414	0,000	139,794	-12,904	12,700	0,000	IMO A.749(18)
S1E-TOLVA SUPERIOR B1 ESTRIBOR	0%	436,049	0,000	425,414	0,000	139,794	12,904	12,700	0,000	IMO A.749(18)
I1B-TOLVA INFERIOR B1 BAVOR	0%	460,629	0,000	449,394	0,000	136,523	-0,671	0,005	0,000	IMO A.749(18)
I1E-TOLVA INFERIOR B1 ESTRIBOR	0%	460,629	0,000	449,394	0,000	136,523	0,671	0,005	0,000	IMO A.749(18)
S2B-TOLVA SUPERIOR B2 BAVOR	0%	608,511	0,000	593,669	0,000	123,728	-14,225	12,700	0,000	IMO A.749(18)
S2E-TOLVA SUPERIOR B2 ESTRIBOR	0%	608,511	0,000	593,669	0,000	123,728	14,225	12,700	0,000	IMO A.749(18)
I2B-TOLVA INFERIOR B2 BAVOR	0%	831,819	0,000	811,530	0,000	111,611	-1,566	0,000	0,000	IMO A.749(18)
I2E-TOLVA INFERIOR B2 ESTRIBOR	0%	831,819	0,000	811,530	0,000	111,611	1,566	0,000	0,000	IMO A.749(18)
S3B-TOLVA SUPERIOR B3 BAVOR	0%	608,593	0,000	593,750	0,000	96,777	-14,339	12,700	0,000	IMO A.749(18)
S3E-TOLVA SUPERIOR B3 ESTRIBOR	0%	608,593	0,000	593,750	0,000	96,777	14,339	12,700	0,000	IMO A.749(18)
I3B-TOLVA INFERIOR B3 BAVOR	0%	866,904	0,000	845,760	0,000	95,275	-2,938	0,000	0,000	IMO A.749(18)
I3E-TOLVA INFERIOR B3 ESTRIBOR	0%	866,904	0,000	845,760	0,000	95,275	2,938	0,000	0,000	IMO A.749(18)
I4B-TOLVA INFERIOR B4 BAVOR	0%	860,892	0,000	839,895	0,000	77,837	-2,284	0,000	0,000	IMO A.749(18)
I4E-TOLVA INFERIOR B4 ESTRIBOR	0%	860,892	0,000	839,895	0,000	77,837	2,284	0,000	0,000	IMO A.749(18)

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I5E-TOLVA INFERIOR B5 ESTRIBOR	0%	769,640	0,000	750,868	0,000	54,943	1,029	0,000	0,000	IMO A.749(18)
PIQUE POPA BABOR	0%	271,223	0,000	264,608	0,000	8,299	-4,606	9,140	0,000	User Specified
PIQUE POPA ESTRIBOR	0%	271,223	0,000	264,608	0,000	8,299	4,606	9,140	0,000	User Specified
Total lastre	0%	13009,878	0,000	12692,564	0,000	0,000	0,000	0,000	0,000	
ADB-AGUA DULCE BABOR	10%	121,659	12,166	121,659	12,166	7,492	-7,942	13,365	131,283	IMO A.749(18)
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Total agua	10%	243,325	24,332	243,325	24,332	7,478	-0,002	13,366	131,283	
REFRIGERACIÓN EJE	100%	67,303	67,303	67,303	67,303	8,597	0,000	3,839	0,000	User Specified
LODOS	100%	22,540	22,540	22,540	22,540	11,375	0,000	1,532	0,000	User Specified
REBOSES HFO BR	100%	15,908	15,908	16,233	16,233	18,841	-5,025	1,382	0,000	User Specified
REBOSES ACEITE ER	100%	22,443	22,443	24,395	24,395	18,954	5,046	1,380	0,000	User Specified
AGUAS ACEITOSAS	100%	14,763	14,763	16,170	16,170	23,625	0,000	1,500	0,000	User Specified
SENTINAS	100%	7,974	7,974	8,734	8,734	28,875	0,000	1,010	0,000	User Specified
AGUAS RESIDUALES	100%	152,063	152,063	152,063	152,063	12,650	10,081	13,659	0,000	User Specified
Total misceláneos	100%	302,994	302,994	307,437	307,437	13,409	5,169	8,096	0,000	
SERVICIO ACEITE CILINDROS	10%	5,428	0,543	5,900	0,590	11,000	-5,750	9,183	0,000	User Specified
ALMACÉN ACEITE CILINDROS	10%	32,440	3,244	35,260	3,526	11,000	-5,750	10,257	0,000	User Specified
ALMACÉN ACEITE 1	10%	17,009	1,701	18,488	1,849	11,178	-8,241	9,558	0,000	User Specified
ALMACÉN ACEITE 2	10%	13,153	1,315	14,297	1,430	11,268	-9,962	10,577	0,000	User Specified
Total aceite	10%	68,030	6,803	73,945	7,395	11,096	-7,187	10,058	0,000	
SEDIMENTACIÓN HFO 1	0%	43,621	0,000	44,512	0,000	29,250	-1,000	2,000	0,000	User Specified
USO DIARIO HFO 1	80,24%	65,432	52,500	66,767	53,571	29,250	1,500	8,074	0,000	User Specified
USO DIARIO HFO 2	80,24%	65,432	52,500	66,767	53,571	29,250	4,500	8,074	0,000	User Specified
SEDIMENTACIÓN HFO 2	0%	43,621	0,000	44,512	0,000	29,250	7,000	2,000	0,000	User Specified
S4B-TOLVA SUPERIOR B4 BABOR	0%	405,778	0,000	414,059	0,000	71,250	-13,611	12,700	0,000	IMO A.749(18)
S4E-TOLVA SUPERIOR B4 ESTRIBOR	0%	405,778	0,000	414,059	0,000	71,250	13,611	12,700	0,000	IMO A.749(18)
S5B-TOLVA SUPERIOR B5 BABOR	0%	9,973	0,000	10,177	0,000	44,162	-14,104	12,700	0,000	IMO A.749(18)
S5E-TOLVA SUPERIOR B5 ESTRIBOR	0%	9,973	0,000	10,177	0,000	44,162	14,104	12,700	0,000	IMO A.749(18)
Total HFO	10%	1049,608	105,000	1071,029	107,143	29,250	3,000	8,074	0,000	
USO DIARIO DIÉSEL 1	26,75%	28,042	7,500	33,384	8,929	29,250	-2,750	4,025	0,000	IMO A.749(18)
USO DIARIO DIÉSEL 2	26,75%	28,042	7,500	33,384	8,929	29,250	-4,250	4,025	0,000	IMO A.749(18)
ALMACÉN DIÉSEL	0%	93,474	0,000	111,279	0,000	29,250	-7,500	2,000	0,000	IMO A.749(18)

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
Total diésel	10,03%	149,559	15,000	178,046	17,857	29,250	-3,500	4,025	0,000	
DIÉSEL EMERGENCIA	10%	2,666	0,267	3,174	0,317	8,267	-7,570	20,260	0,000	IMO A.749(18)
Total diésel emergencia	10%	2,666	0,267	3,174	0,317	8,267	-7,570	20,260	0,000	
LNG 1	10%	47,695	4,770	105,989	10,599	4,549	1,266	20,938	0,000	IMO A.749(18)
LNG 2	10%	47,878	4,788	106,396	10,640	-0,067	1,235	20,762	122,130	IMO A.749(18)
Total LNG	10%	95,573	9,557	212,385	21,238	2,237	1,251	20,850	122,130	
BODEGA 1	40%	14143,902	5657,560	8004,472	3201,789	146,444	0,000	5,184	0,000	User Specified
BODEGA 2	40%	19647,964	7859,184	11119,391	4447,756	123,130	0,000	5,088	0,000	User Specified
BODEGA 3	40%	19791,814	7916,724	11200,800	4480,319	96,797	0,000	5,080	0,000	User Specified
BODEGA 4	40%	19792,254	7916,900	11201,049	4480,419	70,404	0,000	5,080	0,000	User Specified
BODEGA 5	40%	19770,505	7908,201	11188,741	4475,496	43,930	0,000	5,164	0,000	User Specified
Total bodegas	40%	93146,439	37258,569	52714,453	21085,778	93,061	0,000	5,115	0,000	
Contenedor 1	0	440,000	0,000			147,000	0,000	22,800	0,000	User Specified
Contenedor 2	0	792,000	0,000			123,500	0,000	22,800	0,000	User Specified
Contenedor 3	0	792,000	0,000			97,000	0,000	22,800	0,000	User Specified
Contenedor 4	0	792,000	0,000			70,500	0,000	22,800	0,000	User Specified
Contenedor 5	0	792,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total contenedores			0,000			0,000	0,000	0,000	0,000	
Madera 1	0	400,000	0,000			147,000	0,000	22,800	0,000	User Specified
Madera 2	0	720,000	0,000			123,500	0,000	22,800	0,000	User Specified
Madera 3	0	720,000	0,000			97,000	0,000	22,800	0,000	User Specified
Madera 4	0	720,000	0,000			70,500	0,000	22,800	0,000	User Specified
Madera 5	0	720,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total madera			0,000			0,000	0,000	0,000	0,000	
Total Loadcase			47829,493	67496,358	21571,498	87,179	0,037	6,564	253,414	
FS correction								0,005		
VCG fluid								6,570		



Stability	
█	GZ
█	Entrada habilitación cta toldil = 44,1 deg.
█	2.2.4: Initial GMT GM at 0,0 deg = 5,746 m
█	2.3: Severe wind and rolling Wind Heeling (steady)
█	2.3: Severe wind and rolling Wind Heeling (gust)
█	Max GZ = 4,323 m at 50 deg.

Heel to Starboard deg	-30,0	-25,0	-20,0	-15,0	-10,0	-5,0	0,0	5,0	10,0	15,0	20,0	25,0
GZ m	-3,201	-2,720	-2,142	-1,581	-1,051	-0,540	-0,037	0,466	0,978	1,509	2,072	2,653
Area under GZ curve from zero heel m.deg	48,2913	33,4543	21,2784	11,9885	5,4157	1,4423	-0,0340	1,0686	4,6713	10,8782	19,8147	31,6320
Displacement t	47829	47829	47833	47832	47832	47831	47829	47829	47828	47827	47826	47825
Draft at FP m	11,112	10,909	10,866	10,848	10,835	10,827	10,832	10,827	10,834	10,847	10,864	10,908
Draft at AP m	11,005	11,050	11,141	11,220	11,274	11,304	11,307	11,304	11,273	11,219	11,140	11,049
WL Length m	173,750	173,704	172,859	172,508	172,355	172,278	172,261	172,277	172,353	172,505	172,854	173,704
Beam max extents on WL m	29,988	31,193	32,084	31,219	30,623	30,275	30,161	30,275	30,623	31,219	32,084	31,196
Wetted Area m^2	8035,330	7835,109	7690,822	7672,777	7661,921	7656,303	7654,226	7656,192	7661,633	7672,356	7690,271	7834,575
Waterpl. Area m^2	4586,302	4776,811	4840,125	4712,898	4626,740	4576,901	4560,169	4576,878	4626,681	4712,809	4840,005	4777,024
Prismatic coeff. (Cp)	0,823	0,817	0,816	0,815	0,814	0,813	0,813	0,814	0,814	0,815	0,816	0,817
Block coeff. (Cb)	0,538	0,542	0,556	0,608	0,666	0,733	0,796	0,733	0,666	0,608	0,556	0,542
LCB from zero pt. (+ve fwd) m	87,173	87,177	87,177	87,176	87,176	87,176	87,193	87,176	87,177	87,177	87,177	87,178
LCF from zero pt. (+ve fwd) m	83,344	84,046	84,199	84,157	84,105	84,063	84,057	84,063	84,105	84,158	84,200	84,047
Max deck inclination deg	30,0000	25,0000	20,0002	15,0005	10,0010	5,0025	0,1598	5,0025	10,0010	15,0005	20,0002	25,0000
Trim angle (+ve by stern) deg	-0,0360	0,0473	0,0926	0,1252	0,1475	0,1605	0,1598	0,1605	0,1475	0,1252	0,0926	0,0472

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 60,688 m)		21,8	n/a
Deck Edge (immersion pos = 60,688 m)		22,1	n/a
Entrada habilitación cta ppal 1	Downflooding point	Not immersed in positive range	0
Aseo público cubierta	Downflooding point	Not immersed in positive range	0
Local CO2	Downflooding point	Not immersed in positive range	0
Entrada habilitación cta ppal 2	Downflooding point	Not immersed in positive range	0
Local ropa de agua	Downflooding point	Not immersed in positive range	0
Entrada habilitación cta toldil	Downflooding point	44,1	0
Entrada habilitación cta toldil	Downflooding point	Not immersed in positive range	0
Local grupo emergencia	Downflooding point	Not immersed in positive range	0
Entrada a cta ppal desde cta to	Downflooding point	Not immersed in positive range	0

Code	Criteria	Value	Units	Actual	Status	Margin %
267(85) Ch2 - General Criteria	2.3: IMO roll back angle	20,9	deg			
267(85) Ch2 - General Criteria	2.2.1: Area 0 to 30	3,1513	m.deg	46,1597	Pass	+1364,80
267(85) Ch2 - General Criteria	2.2.1: Area 0 to 40	5,1566	m.deg	81,5479	Pass	+1481,42
267(85) Ch2 - General Criteria	2.2.1: Area 30 to 40	1,7189	m.deg	35,3882	Pass	+1958,80
267(85) Ch2 - General Criteria	2.2.2: Max GZ at 30 or greater	0,200	m	4,323	Pass	+2061,50
267(85) Ch2 - General Criteria	2.2.3: Angle of maximum GZ	25,0	deg	50,0	Pass	+100,00
267(85) Ch2 - General Criteria	2.2.4: Initial GMt	0,150	m	5,746	Pass	+3730,67
267(85) Ch2 - General Criteria	2.3: Severe wind and rolling				Pass	
	Angle of steady heel shall not be greater than (\leq)	16,0	deg	0,7	Pass	+95,64

CONDICIÓN IX

Salida de puerto a plena carga
(carbón) + contenedores sobre las
escotillas

Equilibrium calculation - D

Stability 22.01.00.131, build: 131

Model file: C:\Users\MARTA\Google Drive\TFG\Marta González\PROGRAMAS\MaxSURF\NUEVO (TFG)\D (Highest precision, 65 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 - Condición I

Damage Case - Intact

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m³)

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	10064,100	10064,100			68,650	0,000	11,800	0,000	User Specified
Total peso en rosca			10064,100			68,650	0,000	11,800	0,000	
Tripulación	20	0,125	2,500			15,000	0,000	22,000	0,000	User Specified
Pertrechos	1	40,000	40,000			90,000	0,000	15,000	0,000	User Specified
Total pesos fijos			42,500			85,588	0,000	15,412	0,000	
Viveres	1	3,700	3,700			17,000	0,000	20,000	0,000	User Specified
Total pesos variables			3,700			17,000	0,000	20,000	0,000	
P1-PIQUE PROA 1	0%	690,827	0,000	673,978	0,000	165,684	0,000	0,047	0,000	IMO A.749(18)
P2B-PIQUE PROA 2 BR	0%	445,266	0,000	434,406	0,000	158,040	-0,001	0,009	0,000	IMO A.749(18)
P2E-PIQUE PROA 2 ER	0%	445,266	0,000	434,406	0,000	158,040	0,001	0,009	0,000	IMO A.749(18)
S1B-TOLVA SUPERIOR B1 BAVOR	0%	436,049	0,000	425,414	0,000	139,794	-12,904	12,700	0,000	IMO A.749(18)
S1E-TOLVA SUPERIOR B1 ESTRIBOR	0%	436,049	0,000	425,414	0,000	139,794	12,904	12,700	0,000	IMO A.749(18)
I1B-TOLVA INFERIOR B1 BAVOR	0%	460,629	0,000	449,394	0,000	136,523	-0,671	0,005	0,000	IMO A.749(18)
I1E-TOLVA INFERIOR B1 ESTRIBOR	0%	460,629	0,000	449,394	0,000	136,523	0,671	0,005	0,000	IMO A.749(18)
S2B-TOLVA SUPERIOR B2 BAVOR	0%	608,511	0,000	593,669	0,000	123,728	-14,225	12,700	0,000	IMO A.749(18)
S2E-TOLVA SUPERIOR B2 ESTRIBOR	0%	608,511	0,000	593,669	0,000	123,728	14,225	12,700	0,000	IMO A.749(18)
I2B-TOLVA INFERIOR B2 BAVOR	0%	831,819	0,000	811,530	0,000	111,611	-1,566	0,000	0,000	IMO A.749(18)
I2E-TOLVA INFERIOR B2 ESTRIBOR	0%	831,819	0,000	811,530	0,000	111,611	1,566	0,000	0,000	IMO A.749(18)
S3B-TOLVA SUPERIOR B3 BAVOR	0%	608,593	0,000	593,750	0,000	96,777	-14,339	12,700	0,000	IMO A.749(18)
S3E-TOLVA SUPERIOR B3 ESTRIBOR	0%	608,593	0,000	593,750	0,000	96,777	14,339	12,700	0,000	IMO A.749(18)
I3B-TOLVA INFERIOR B3 BAVOR	0%	866,904	0,000	845,760	0,000	95,275	-2,938	0,000	0,000	IMO A.749(18)
I3E-TOLVA INFERIOR B3 ESTRIBOR	0%	866,904	0,000	845,760	0,000	95,275	2,938	0,000	0,000	IMO A.749(18)
I4B-TOLVA INFERIOR B4 BAVOR	0%	860,892	0,000	839,895	0,000	77,837	-2,284	0,000	0,000	IMO A.749(18)
I4E-TOLVA INFERIOR B4 ESTRIBOR	0%	860,892	0,000	839,895	0,000	77,837	2,284	0,000	0,000	IMO A.749(18)

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
I5B-TOLVA INFERIOR B5 BABOR	0%	769,640	0,000	750,868	0,000	54,943	-1,029	0,000	0,000	IMO A.749(18)
I5E-TOLVA INFERIOR B5 ESTRIBOR	0%	769,640	0,000	750,868	0,000	54,943	1,029	0,000	0,000	IMO A.749(18)
PIQUE POPA BABOR	0%	271,223	0,000	264,608	0,000	8,299	-4,606	9,140	0,000	User Specified
PIQUE POPA ESTRIBOR	0%	271,223	0,000	264,608	0,000	8,299	4,606	9,140	0,000	User Specified
Total lastre	0%	13009,878	0,000	12692,564	0,000	0,000	0,000	0,000	0,000	
ADB-AGUA DULCE BABOR	97,9%	121,659	119,104	121,659	119,104	7,451	-8,283	15,165	131,283	IMO A.749(18)
ADE-AGUA DULCE ESTRIBOR	97,9%	74,189	72,631	74,189	72,631	6,534	8,168	15,176	0,000	IMO A.749(18)
ATE-AGUA TÉCNICA ESTRIBOR	100%	47,476	47,476	47,476	47,476	8,883	8,468	15,189	0,000	User Specified
Total agua	98,31%	243,325	239,212	243,325	239,212	7,457	0,036	15,173	131,283	
REFRIGERACIÓN EJE	100%	67,303	67,303	67,303	67,303	8,597	0,000	3,839	0,000	User Specified
LODOS	0%	22,540	0,000	22,540	0,000	11,401	0,000	1,000	0,000	User Specified
REBOSES HFO BR	0%	15,908	0,000	16,233	0,000	20,233	-2,001	0,313	0,000	User Specified
REBOSES ACEITE ER	0%	22,443	0,000	24,395	0,000	20,974	2,001	0,291	0,000	User Specified
AGUAS ACEITOSAS	0%	14,763	0,000	16,170	0,000	23,625	0,000	1,000	0,000	User Specified
SENTINAS	0%	7,974	0,000	8,734	0,000	28,919	0,000	0,000	0,000	User Specified
AGUAS RESIDUALES	0%	152,063	0,000	152,063	0,000	13,523	8,989	9,140	0,000	User Specified
Total misceláneos	22,21%	302,994	67,303	307,437	67,303	8,597	0,000	3,839	0,000	
SERVICIO ACEITE CILINDROS	100%	5,428	5,428	5,900	5,900	11,000	-5,750	9,570	0,000	User Specified
ALMACÉN ACEITE CILINDROS	100%	32,440	32,440	35,260	35,260	11,000	-5,750	12,570	0,000	User Specified
ALMACÉN ACEITE 1	100%	17,009	17,009	18,488	18,488	11,021	-8,471	11,771	0,000	User Specified
ALMACÉN ACEITE 2	100%	13,153	13,153	14,297	14,297	11,071	-10,529	12,530	0,000	User Specified
Total aceite	100%	68,030	68,030	73,945	73,945	11,019	-7,354	12,123	0,000	
SEDIMENTACIÓN HFO 1	100%	43,621	43,621	44,512	44,512	29,250	-1,000	9,570	0,000	User Specified
USO DIARIO HFO 1	100%	65,432	65,432	66,767	66,767	29,250	1,500	9,570	0,000	User Specified
USO DIARIO HFO 2	100%	65,432	65,432	66,767	66,767	29,250	4,500	9,570	0,000	User Specified
SEDIMENTACIÓN HFO 2	100%	43,621	43,621	44,512	44,512	29,250	7,000	9,570	0,000	User Specified
S4B-TOLVA SUPERIOR B4 BABOR	97,9%	405,778	397,256	414,059	405,363	70,405	-11,318	15,562	203,826	IMO A.749(18)
S4E-TOLVA SUPERIOR B4 ESTRIBOR	97,9%	405,778	397,256	414,059	405,363	70,405	11,318	15,562	203,826	IMO A.749(18)
S5B-TOLVA SUPERIOR B5 BABOR	97,9%	9,973	9,764	10,177	9,963	43,690	-11,263	14,110	0,000	IMO A.749(18)
S5E-TOLVA SUPERIOR B5 ESTRIBOR	97,9%	9,973	9,764	10,177	9,963	43,690	11,263	14,110	0,000	IMO A.749(18)
Total HFO	98,34%	1049,608	1032,147	1071,029	1053,211	61,203	0,634	14,269	407,652	
USO DIARIO DIÉSEL 1	97,9%	28,042	27,453	33,384	32,683	29,250	-2,750	9,411	0,000	IMO A.749(18)
USO DIARIO DIÉSEL 2	97,9%	28,042	27,453	33,384	32,683	29,250	-4,250	9,411	0,000	IMO A.749(18)
ALMACÉN DIÉSEL	97,9%	93,474	91,511	111,279	108,942	29,250	-7,500	9,411	0,000	IMO A.749(18)

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
Total diésel	97,9%	149,559	146,418	178,046	174,307	29,250	-6,000	9,411	0,000	
DIÉSEL EMERGENCIA	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	IMO A.749(18)
Total diésel emergencia	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	
LNG 1	97,9%	47,695	46,693	105,989	103,763	4,571	1,270	22,363	0,000	IMO A.749(18)
LNG 2	97,9%	47,878	46,873	106,396	104,161	-0,102	1,260	22,297	122,130	IMO A.749(18)
Total LNG	97,9%	95,573	93,566	212,385	207,925	2,230	1,265	22,330	122,130	
BODEGA 1	40%	14143,902	5657,561	8004,472	3201,789	146,444	0,000	5,184	0,000	User Specified
BODEGA 2	40%	19647,964	7859,187	11119,391	4447,757	123,130	0,000	5,088	0,000	User Specified
BODEGA 3	40%	19791,814	7916,724	11200,800	4480,319	96,797	0,000	5,080	0,000	User Specified
BODEGA 4	40%	19792,254	7916,902	11201,049	4480,420	70,404	0,000	5,080	0,000	User Specified
BODEGA 5	40%	19770,505	7908,202	11188,741	4475,496	43,930	0,000	5,164	0,000	User Specified
Total bodegas	40%	93146,439	37258,576	52714,453	21085,781	93,061	0,000	5,115	0,000	
Contenedor 1	1	440,000	440,000			147,000	0,000	22,800	0,000	User Specified
Contenedor 2	1	792,000	792,000			123,500	0,000	22,800	0,000	User Specified
Contenedor 3	1	792,000	792,000			97,000	0,000	22,800	0,000	User Specified
Contenedor 4	1	792,000	792,000			70,500	0,000	22,800	0,000	User Specified
Contenedor 5	1	792,000	792,000			44,000	0,000	22,800	0,000	User Specified
Total contenedores			3608,000			91,463	0,000	22,800	0,000	
Madera 1	0	400,000	0,000			147,000	0,000	22,800	0,000	User Specified
Madera 2	0	720,000	0,000			123,500	0,000	22,800	0,000	User Specified
Madera 3	0	720,000	0,000			97,000	0,000	22,800	0,000	User Specified
Madera 4	0	720,000	0,000			70,500	0,000	22,800	0,000	User Specified
Madera 5	0	720,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total madera			0,000			0,000	0,000	0,000	0,000	
Total Loadcase			52626,161	67496,358	22904,791	86,701	-0,012	7,891	661,066	
FS correction								0,013		
VCG fluid								7,904		

Draft Amidships m	12,085
Displacement t	52626
Heel deg	0,0
Draft at FP m	11,769
Draft at AP m	12,401

Draft at LCF m	12,093
Trim (+ve by stern) m	0,632
WL Length m	173,899
Beam max extents on WL m	30,164
Wetted Area m ²	8044,119
Waterpl. Area m ²	4636,208
Prismatic coeff. (Cp)	0,811
Block coeff. (Cb)	0,792
Max Sect. area coeff. (Cm)	0,994
Waterpl. area coeff. (Cwp)	0,884
LCB from zero pt. (+ve fwd) m	86,693
LCF from zero pt. (+ve fwd) m	83,102
KB m	6,248
KG fluid m	7,904
BMt m	6,094
BML m	186,458
GMt corrected m	4,438
GML m	184,802
KMt m	12,342
KML m	192,705
Immersion (TPc) tonne/cm	47,521
MTc tonne.m	570,740
RM at 1deg = GMt.Disp.sin(1) tonne.m	4076,421
Max deck inclination deg	0,2126
Trim angle (+ve by stern) deg	0,2126

Key point	Type	Freeboard m
Margin Line (freeboard pos = 30,275 m)		4,775
Deck Edge (freeboard pos = 30,275 m)		4,851
Entrada habilitación cta ppal 1	Downflooding point	6,350
Aseo público cubierta	Downflooding point	6,350
Local CO2	Downflooding point	6,350
Entrada habilitación cta ppal 2	Downflooding point	6,350
Local ropa de agua	Downflooding point	6,350
Entrada habilitación cta toldil	Downflooding point	9,119
Entrada habilitación cta toldil	Downflooding point	9,119
Local grupo emergencia	Downflooding point	9,077
Entrada a cta ppal desde cta to	Downflooding point	9,062

Stability calculation - D

Stability 22.01.00.131, build: 131

Model file: C:\Users\MARTA\Google Drive\TFG\Marta González\PROGRAMAS\MaxSURF\NUEVO (TFG)\D (Highest precision, 65 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 - Condición I

Damage Case - Intact

Free to Trim

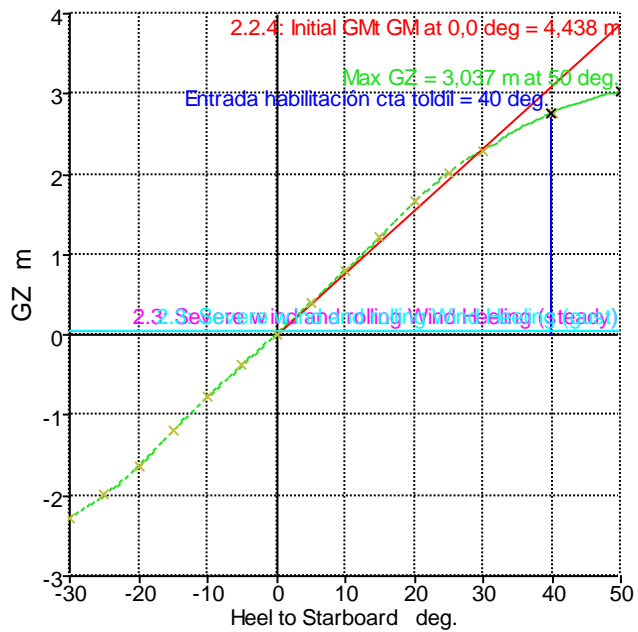
Specific gravity = 1,025; (Density = 1,025 tonne/m³)

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	10064,100	10064,100			68,650	0,000	11,800	0,000	User Specified
Total peso en rosca			10064,100			68,650	0,000	11,800	0,000	
Tripulación	20	0,125	2,500			15,000	0,000	22,000	0,000	User Specified
Pertrechos	1	40,000	40,000			90,000	0,000	15,000	0,000	User Specified
Total pesos fijos			42,500			85,588	0,000	15,412	0,000	
Viveres	1	3,700	3,700			17,000	0,000	20,000	0,000	User Specified
Total pesos variables			3,700			17,000	0,000	20,000	0,000	
P1-PIQUE PROA 1	0%	690,827	0,000	673,978	0,000	165,684	0,000	0,047	0,000	IMO A.749(18)
P2B-PIQUE PROA 2 BR	0%	445,266	0,000	434,406	0,000	158,040	-0,001	0,009	0,000	IMO A.749(18)
P2E-PIQUE PROA 2 ER	0%	445,266	0,000	434,406	0,000	158,040	0,001	0,009	0,000	IMO A.749(18)
S1B-TOLVA SUPERIOR B1 BABOR	0%	436,049	0,000	425,414	0,000	139,794	-12,904	12,700	0,000	IMO A.749(18)
S1E-TOLVA SUPERIOR B1 ESTRIBOR	0%	436,049	0,000	425,414	0,000	139,794	12,904	12,700	0,000	IMO A.749(18)
I1B-TOLVA INFERIOR B1 BABOR	0%	460,629	0,000	449,394	0,000	136,523	-0,671	0,005	0,000	IMO A.749(18)
I1E-TOLVA INFERIOR B1 ESTRIBOR	0%	460,629	0,000	449,394	0,000	136,523	0,671	0,005	0,000	IMO A.749(18)
S2B-TOLVA SUPERIOR B2 BABOR	0%	608,511	0,000	593,669	0,000	123,728	-14,225	12,700	0,000	IMO A.749(18)
S2E-TOLVA SUPERIOR B2 ESTRIBOR	0%	608,511	0,000	593,669	0,000	123,728	14,225	12,700	0,000	IMO A.749(18)
I2B-TOLVA INFERIOR B2 BABOR	0%	831,819	0,000	811,530	0,000	111,611	-1,566	0,000	0,000	IMO A.749(18)
I2E-TOLVA INFERIOR B2 ESTRIBOR	0%	831,819	0,000	811,530	0,000	111,611	1,566	0,000	0,000	IMO A.749(18)
S3B-TOLVA SUPERIOR B3 BABOR	0%	608,593	0,000	593,750	0,000	96,777	-14,339	12,700	0,000	IMO A.749(18)
S3E-TOLVA SUPERIOR B3 ESTRIBOR	0%	608,593	0,000	593,750	0,000	96,777	14,339	12,700	0,000	IMO A.749(18)
I3B-TOLVA INFERIOR B3 BABOR	0%	866,904	0,000	845,760	0,000	95,275	-2,938	0,000	0,000	IMO A.749(18)
I3E-TOLVA INFERIOR B3 ESTRIBOR	0%	866,904	0,000	845,760	0,000	95,275	2,938	0,000	0,000	IMO A.749(18)
I4B-TOLVA INFERIOR B4 BABOR	0%	860,892	0,000	839,895	0,000	77,837	-2,284	0,000	0,000	IMO A.749(18)
I4E-TOLVA INFERIOR B4 ESTRIBOR	0%	860,892	0,000	839,895	0,000	77,837	2,284	0,000	0,000	IMO A.749(18)

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
I5B-TOLVA INFERIOR B5 BABOR	0%	769,640	0,000	750,868	0,000	54,943	-1,029	0,000	0,000	IMO A.749(18)
I5E-TOLVA INFERIOR B5 ESTRIBOR	0%	769,640	0,000	750,868	0,000	54,943	1,029	0,000	0,000	IMO A.749(18)
PIQUE POPA BABOR	0%	271,223	0,000	264,608	0,000	8,299	-4,606	9,140	0,000	User Specified
PIQUE POPA ESTRIBOR	0%	271,223	0,000	264,608	0,000	8,299	4,606	9,140	0,000	User Specified
Total lastre	0%	13009,878	0,000	12692,564	0,000	0,000	0,000	0,000	0,000	
ADB-AGUA DULCE BABOR	97,9%	121,659	119,104	121,659	119,104	7,451	-8,283	15,165	131,283	IMO A.749(18)
ADE-AGUA DULCE ESTRIBOR	97,9%	74,189	72,631	74,189	72,631	6,534	8,168	15,176	0,000	IMO A.749(18)
ATE-AGUA TÉCNICA ESTRIBOR	100%	47,476	47,476	47,476	47,476	8,883	8,468	15,189	0,000	User Specified
Total agua	98,31%	243,325	239,212	243,325	239,212	7,457	0,036	15,173	131,283	
REFRIGERACIÓN EJE	100%	67,303	67,303	67,303	67,303	8,597	0,000	3,839	0,000	User Specified
LODOS	0%	22,540	0,000	22,540	0,000	11,401	0,000	1,000	0,000	User Specified
REBOSES HFO BR	0%	15,908	0,000	16,233	0,000	20,233	-2,001	0,313	0,000	User Specified
REBOSES ACEITE ER	0%	22,443	0,000	24,395	0,000	20,974	2,001	0,291	0,000	User Specified
AGUAS ACEITOSAS	0%	14,763	0,000	16,170	0,000	23,625	0,000	1,000	0,000	User Specified
SENTINAS	0%	7,974	0,000	8,734	0,000	28,919	0,000	0,000	0,000	User Specified
AGUAS RESIDUALES	0%	152,063	0,000	152,063	0,000	13,523	8,989	9,140	0,000	User Specified
Total misceláneos	22,21%	302,994	67,303	307,437	67,303	8,597	0,000	3,839	0,000	
SERVICIO ACEITE CILINDROS	100%	5,428	5,428	5,900	5,900	11,000	-5,750	9,570	0,000	User Specified
ALMACÉN ACEITE CILINDROS	100%	32,440	32,440	35,260	35,260	11,000	-5,750	12,570	0,000	User Specified
ALMACÉN ACEITE 1	100%	17,009	17,009	18,488	18,488	11,021	-8,471	11,771	0,000	User Specified
ALMACÉN ACEITE 2	100%	13,153	13,153	14,297	14,297	11,071	-10,529	12,530	0,000	User Specified
Total aceite	100%	68,030	68,030	73,945	73,945	11,019	-7,354	12,123	0,000	
SEDIMENTACIÓN HFO 1	100%	43,621	43,621	44,512	44,512	29,250	-1,000	9,570	0,000	User Specified
USO DIARIO HFO 1	100%	65,432	65,432	66,767	66,767	29,250	1,500	9,570	0,000	User Specified
USO DIARIO HFO 2	100%	65,432	65,432	66,767	66,767	29,250	4,500	9,570	0,000	User Specified
SEDIMENTACIÓN HFO 2	100%	43,621	43,621	44,512	44,512	29,250	7,000	9,570	0,000	User Specified
S4B-TOLVA SUPERIOR B4 BABOR	97,9%	405,778	397,256	414,059	405,363	70,405	-11,318	15,562	203,826	IMO A.749(18)
S4E-TOLVA SUPERIOR B4 ESTRIBOR	97,9%	405,778	397,256	414,059	405,363	70,405	11,318	15,562	203,826	IMO A.749(18)
S5B-TOLVA SUPERIOR B5 BABOR	97,9%	9,973	9,764	10,177	9,963	43,690	-11,263	14,110	0,000	IMO A.749(18)
S5E-TOLVA SUPERIOR B5 ESTRIBOR	97,9%	9,973	9,764	10,177	9,963	43,690	11,263	14,110	0,000	IMO A.749(18)
Total HFO	98,34%	1049,608	1032,147	1071,029	1053,211	61,203	0,634	14,269	407,652	
USO DIARIO DIÉSEL 1	97,9%	28,042	27,453	33,384	32,683	29,250	-2,750	9,411	0,000	IMO A.749(18)
USO DIARIO DIÉSEL 2	97,9%	28,042	27,453	33,384	32,683	29,250	-4,250	9,411	0,000	IMO A.749(18)
ALMACÉN DIÉSEL	97,9%	93,474	91,511	111,279	108,942	29,250	-7,500	9,411	0,000	IMO A.749(18)

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
Total diésel	97,9%	149,559	146,418	178,046	174,307	29,250	-6,000	9,411	0,000	
DIÉSEL EMERGENCIA	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	IMO A.749(18)
Total diésel emergencia	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	
LNG 1	97,9%	47,695	46,693	105,989	103,763	4,571	1,270	22,363	0,000	IMO A.749(18)
LNG 2	97,9%	47,878	46,873	106,396	104,161	-0,102	1,260	22,297	122,130	IMO A.749(18)
Total LNG	97,9%	95,573	93,566	212,385	207,925	2,230	1,265	22,330	122,130	
BODEGA 1	40%	14143,902	5657,561	8004,472	3201,789	146,444	0,000	5,184	0,000	User Specified
BODEGA 2	40%	19647,964	7859,186	11119,391	4447,757	123,130	0,000	5,088	0,000	User Specified
BODEGA 3	40%	19791,814	7916,726	11200,800	4480,320	96,797	0,000	5,080	0,000	User Specified
BODEGA 4	40%	19792,254	7916,904	11201,049	4480,421	70,404	0,000	5,080	0,000	User Specified
BODEGA 5	40%	19770,505	7908,202	11188,741	4475,496	43,930	0,000	5,164	0,000	User Specified
Total bodegas	40%	93146,439	37258,578	52714,453	21085,783	93,061	0,000	5,115	0,000	
Contenedor 1	1	440,000	440,000			147,000	0,000	22,800	0,000	User Specified
Contenedor 2	1	792,000	792,000			123,500	0,000	22,800	0,000	User Specified
Contenedor 3	1	792,000	792,000			97,000	0,000	22,800	0,000	User Specified
Contenedor 4	1	792,000	792,000			70,500	0,000	22,800	0,000	User Specified
Contenedor 5	1	792,000	792,000			44,000	0,000	22,800	0,000	User Specified
Total contenedores			3608,000			91,463	0,000	22,800	0,000	
Madera 1	0	400,000	0,000			147,000	0,000	22,800	0,000	User Specified
Madera 2	0	720,000	0,000			123,500	0,000	22,800	0,000	User Specified
Madera 3	0	720,000	0,000			97,000	0,000	22,800	0,000	User Specified
Madera 4	0	720,000	0,000			70,500	0,000	22,800	0,000	User Specified
Madera 5	0	720,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total madera			0,000			0,000	0,000	0,000	0,000	
Total Loadcase			52626,163	67496,358	22904,792	86,701	-0,012	7,891	661,066	
FS correction								0,013		
VCG fluid								7,904		



Stability	
Green	GZ
Blue	Entrada habilitación cta toldil = 40 deg.
Red	2.2.4: Initial GMt GM at 0,0 deg = 4,438 m
Magenta	2.3: Severe wind and rolling Wind Heeling (steady)
Cyan	2.3: Severe wind and rolling Wind Heeling (gust)
Olive	Max GZ = 3,037 m at 50 deg.

Heel to Starboard deg	-30,0	-25,0	-20,0	-15,0	-10,0	-5,0	0,0	5,0	10,0	15,0	20,0	25,0
GZ m	-2,275	-1,993	-1,632	-1,191	-0,775	-0,377	0,012	0,400	0,798	1,214	1,654	2,014
Area under GZ curve from zero heel m.deg	35,5530	24,8640	15,7579	8,6879	3,7869	0,9111	0,0107	1,0282	4,0204	9,0349	16,2202	25,4282
Displacement t	52626	52626	52626	52631	52630	52629	52626	52626	52624	52622	52622	52626
Draft at FP m	12,276	11,948	11,806	11,790	11,779	11,772	11,777	11,772	11,777	11,788	11,805	11,948
Draft at AP m	12,258	12,232	12,248	12,315	12,364	12,392	12,394	12,391	12,363	12,314	12,247	12,231
WL Length m	174,012	173,938	173,906	173,903	173,901	173,899	173,900	173,899	173,900	173,902	173,906	173,938
Beam max extents on WL m	29,907	29,747	31,140	31,223	30,627	30,279	30,164	30,279	30,627	31,223	31,143	29,747
Wetted Area m^2	8570,567	8394,126	8137,444	8057,614	8050,526	8045,881	8043,972	8045,696	8050,044	8056,945	8136,903	8394,104
Waterpl. Area m^2	4340,784	4506,675	4793,996	4787,484	4703,187	4652,932	4635,941	4652,902	4703,110	4787,380	4794,261	4506,669
Prismatic coeff. (Cp)	0,829	0,822	0,816	0,814	0,812	0,811	0,811	0,811	0,812	0,814	0,816	0,822
Block coeff. (Cb)	0,558	0,587	0,589	0,620	0,675	0,737	0,792	0,737	0,675	0,620	0,589	0,587
LCB from zero pt. (+ve fwd) m	86,692	86,697	86,696	86,695	86,695	86,694	86,709	86,695	86,695	86,695	86,696	86,697
LCF from zero pt. (+ve fwd) m	82,326	82,928	83,586	83,310	83,182	83,120	83,109	83,120	83,183	83,311	83,586	82,928
Max deck inclination deg	30,0000	25,0001	20,0005	15,0009	10,0019	5,0043	0,2075	5,0043	10,0019	15,0010	20,0005	25,0001
Trim angle (+ve by stern) deg	-0,0060	0,0953	0,1487	0,1768	0,1967	0,2083	0,2075	0,2083	0,1968	0,1769	0,1487	0,0952

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 55,229 m)		18,2	n/a
Deck Edge (immersion pos = 55,229 m)		18,5	n/a
Entrada habilitación cta ppal 1	Downflooding point	Not immersed in positive range	0
Aseo público cubierta	Downflooding point	Not immersed in positive range	0
Local CO2	Downflooding point	Not immersed in positive range	0
Entrada habilitación cta ppal 2	Downflooding point	Not immersed in positive range	0
Local ropa de agua	Downflooding point	Not immersed in positive range	0
Entrada habilitación cta toldil	Downflooding point	40	0
Entrada habilitación cta toldil	Downflooding point	Not immersed in positive range	0
Local grupo emergencia	Downflooding point	47,3	0
Entrada a cta ppal desde cta to	Downflooding point	Not immersed in positive range	0

Code	Criteria	Value	Units	Actual	Status	Margin %
267(85) Ch2 - General Criteria	2.3: IMO roll back angle	21,4	deg			
267(85) Ch2 - General Criteria	2.2.1: Area 0 to 30	3,1513	m.deg	36,2247	Pass	+1049,53
267(85) Ch2 - General Criteria	2.2.1: Area 0 to 40	5,1566	m.deg	61,6276	Pass	+1095,12
267(85) Ch2 - General Criteria	2.2.1: Area 30 to 40	1,7189	m.deg	25,4028	Pass	+1377,88
267(85) Ch2 - General Criteria	2.2.2: Max GZ at 30 or greater	0,200	m	3,037	Pass	+1418,50
267(85) Ch2 - General Criteria	2.2.3: Angle of maximum GZ	25,0	deg	50,0	Pass	+100,00
267(85) Ch2 - General Criteria	2.2.4: Initial GMt	0,150	m	4,438	Pass	+2858,67
267(85) Ch2 - General Criteria	2.3: Severe wind and rolling				Pass	
	Angle of steady heel shall not be greater than (\leq)	16,0	deg	0,4	Pass	+97,61

CONDICIÓN X

Llegada a puerto a plena carga
(carbón) + contenedores sobre las
escotillas

Equilibrium calculation - D

Stability 22.01.00.131, build: 131

Model file: C:\Users\MARTA\Google Drive\TFG\Marta González\PROGRAMAS\MaxSURF\NUEVO (TFG)\D (Highest precision, 65 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 - Condición I

Damage Case - Intact

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m³)

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	10064,100	10064,100			68,650	0,000	11,800	0,000	User Specified
Total peso en rosca			10064,100			68,650	0,000	11,800	0,000	
Tripulación	20	0,125	2,500			15,000	0,000	22,000	0,000	User Specified
Pertrechos	1	40,000	40,000			90,000	0,000	15,000	0,000	User Specified
Total pesos fijos			42,500			85,588	0,000	15,412	0,000	
Viveres	0,1	3,700	0,370			17,000	0,000	20,000	0,000	User Specified
Total pesos variables			0,370			17,000	0,000	20,000	0,000	
P1-PIQUE PROA 1	0%	690,827	0,000	673,978	0,000	165,684	0,000	0,047	0,000	IMO A.749(18)
P2B-PIQUE PROA 2 BR	0%	445,266	0,000	434,406	0,000	158,040	-0,001	0,009	0,000	IMO A.749(18)
P2E-PIQUE PROA 2 ER	0%	445,266	0,000	434,406	0,000	158,040	0,001	0,009	0,000	IMO A.749(18)
S1B-TOLVA SUPERIOR B1 BAVOR	0%	436,049	0,000	425,414	0,000	139,794	-12,904	12,700	0,000	IMO A.749(18)
S1E-TOLVA SUPERIOR B1 ESTRIBOR	0%	436,049	0,000	425,414	0,000	139,794	12,904	12,700	0,000	IMO A.749(18)
I1B-TOLVA INFERIOR B1 BAVOR	0%	460,629	0,000	449,394	0,000	136,523	-0,671	0,005	0,000	IMO A.749(18)
I1E-TOLVA INFERIOR B1 ESTRIBOR	0%	460,629	0,000	449,394	0,000	136,523	0,671	0,005	0,000	IMO A.749(18)
S2B-TOLVA SUPERIOR B2 BAVOR	0%	608,511	0,000	593,669	0,000	123,728	-14,225	12,700	0,000	IMO A.749(18)
S2E-TOLVA SUPERIOR B2 ESTRIBOR	0%	608,511	0,000	593,669	0,000	123,728	14,225	12,700	0,000	IMO A.749(18)
I2B-TOLVA INFERIOR B2 BAVOR	0%	831,819	0,000	811,530	0,000	111,611	-1,566	0,000	0,000	IMO A.749(18)
I2E-TOLVA INFERIOR B2 ESTRIBOR	0%	831,819	0,000	811,530	0,000	111,611	1,566	0,000	0,000	IMO A.749(18)
S3B-TOLVA SUPERIOR B3 BAVOR	0%	608,593	0,000	593,750	0,000	96,777	-14,339	12,700	0,000	IMO A.749(18)
S3E-TOLVA SUPERIOR B3 ESTRIBOR	0%	608,593	0,000	593,750	0,000	96,777	14,339	12,700	0,000	IMO A.749(18)
I3B-TOLVA INFERIOR B3 BAVOR	0%	866,904	0,000	845,760	0,000	95,275	-2,938	0,000	0,000	IMO A.749(18)
I3E-TOLVA INFERIOR B3 ESTRIBOR	0%	866,904	0,000	845,760	0,000	95,275	2,938	0,000	0,000	IMO A.749(18)
I4B-TOLVA INFERIOR B4 BAVOR	0%	860,892	0,000	839,895	0,000	77,837	-2,284	0,000	0,000	IMO A.749(18)
I4E-TOLVA INFERIOR B4 ESTRIBOR	0%	860,892	0,000	839,895	0,000	77,837	2,284	0,000	0,000	IMO A.749(18)

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
I5B-TOLVA INFERIOR B5 BABOR	0%	769,640	0,000	750,868	0,000	54,943	-1,029	0,000	0,000	IMO A.749(18)
I5E-TOLVA INFERIOR B5 ESTRIBOR	0%	769,640	0,000	750,868	0,000	54,943	1,029	0,000	0,000	IMO A.749(18)
PIQUE POPA BABOR	0%	271,223	0,000	264,608	0,000	8,299	-4,606	9,140	0,000	User Specified
PIQUE POPA ESTRIBOR	0%	271,223	0,000	264,608	0,000	8,299	4,606	9,140	0,000	User Specified
Total lastre	0%	13009,878	0,000	12692,564	0,000	0,000	0,000	0,000	0,000	
ADB-AGUA DULCE BABOR	10%	121,659	12,166	121,659	12,166	7,492	-7,942	13,365	131,287	IMO A.749(18)
ADE-AGUA DULCE ESTRIBOR	10%	74,189	7,419	74,189	7,419	6,554	7,777	13,370	0,000	IMO A.749(18)
ATE-AGUA TÉCNICA ESTRIBOR	10%	47,476	4,748	47,476	4,748	8,887	8,188	13,358	0,000	User Specified
Total agua	10%	243,325	24,332	243,325	24,332	7,478	-0,002	13,366	131,287	
REFRIGERACIÓN EJE	100%	67,303	67,303	67,303	67,303	8,597	0,000	3,839	0,000	User Specified
LODOS	100%	22,540	22,540	22,540	22,540	11,375	0,000	1,532	0,000	User Specified
REBOSES HFO BR	100%	15,908	15,908	16,233	16,233	18,841	-5,025	1,382	0,000	User Specified
REBOSES ACEITE ER	100%	22,443	22,443	24,395	24,395	18,954	5,046	1,380	0,000	User Specified
AGUAS ACEITOSAS	100%	14,763	14,763	16,170	16,170	23,625	0,000	1,500	0,000	User Specified
SENTINAS	100%	7,974	7,974	8,734	8,734	28,875	0,000	1,010	0,000	User Specified
AGUAS RESIDUALES	100%	152,063	152,063	152,063	152,063	12,650	10,081	13,659	0,000	User Specified
Total misceláneos	100%	302,994	302,994	307,437	307,437	13,409	5,169	8,096	0,000	
SERVICIO ACEITE CILINDROS	10%	5,428	0,543	5,900	0,590	11,000	-5,750	9,183	0,000	User Specified
ALMACÉN ACEITE CILINDROS	10%	32,440	3,244	35,260	3,526	11,000	-5,750	10,257	0,000	User Specified
ALMACÉN ACEITE 1	10%	17,009	1,701	18,488	1,849	11,178	-8,241	9,558	0,000	User Specified
ALMACÉN ACEITE 2	10%	13,153	1,315	14,297	1,430	11,268	-9,962	10,577	0,000	User Specified
Total aceite	10%	68,030	6,803	73,945	7,395	11,096	-7,187	10,058	0,000	
SEDIMENTACIÓN HFO 1	0%	43,621	0,000	44,512	0,000	29,250	-1,000	2,000	0,000	User Specified
USO DIARIO HFO 1	80,24%	65,432	52,500	66,767	53,571	29,250	1,500	8,074	0,000	User Specified
USO DIARIO HFO 2	80,24%	65,432	52,500	66,767	53,571	29,250	4,500	8,074	0,000	User Specified
SEDIMENTACIÓN HFO 2	0%	43,621	0,000	44,512	0,000	29,250	7,000	2,000	0,000	User Specified
S4B-TOLVA SUPERIOR B4 BABOR	0%	405,778	0,000	414,059	0,000	71,250	-13,611	12,700	0,000	IMO A.749(18)
S4E-TOLVA SUPERIOR B4 ESTRIBOR	0%	405,778	0,000	414,059	0,000	71,250	13,611	12,700	0,000	IMO A.749(18)
S5B-TOLVA SUPERIOR B5 BABOR	0%	9,973	0,000	10,177	0,000	44,162	-14,104	12,700	0,000	IMO A.749(18)
S5E-TOLVA SUPERIOR B5 ESTRIBOR	0%	9,973	0,000	10,177	0,000	44,162	14,104	12,700	0,000	IMO A.749(18)
Total HFO	10%	1049,608	105,000	1071,029	107,143	29,250	3,000	8,074	0,000	
USO DIARIO DIÉSEL 1	26,75%	28,042	7,500	33,384	8,929	29,250	-2,750	4,025	0,000	IMO A.749(18)
USO DIARIO DIÉSEL 2	26,75%	28,042	7,500	33,384	8,929	29,250	-4,250	4,025	0,000	IMO A.749(18)
ALMACÉN DIÉSEL	0%	93,474	0,000	111,279	0,000	29,250	-7,500	2,000	0,000	IMO A.749(18)

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
Total diésel	10,03%	149,559	15,000	178,046	17,857	29,250	-3,500	4,025	0,000	
DIÉSEL EMERGENCIA	10%	2,666	0,267	3,174	0,317	8,267	-7,570	20,260	0,000	IMO A.749(18)
Total diésel emergencia	10%	2,666	0,267	3,174	0,317	8,267	-7,570	20,260	0,000	
LNG 1	10%	47,695	4,770	105,989	10,599	4,549	1,266	20,938	0,000	IMO A.749(18)
LNG 2	10%	47,878	4,788	106,396	10,640	-0,067	1,235	20,762	122,134	IMO A.749(18)
Total LNG	10%	95,573	9,557	212,385	21,238	2,237	1,251	20,850	122,134	
BODEGA 1	40%	14143,902	5657,559	8004,472	3201,788	146,444	0,000	5,184	0,000	User Specified
BODEGA 2	40%	19647,964	7859,187	11119,391	4447,757	123,130	0,000	5,088	0,000	User Specified
BODEGA 3	40%	19791,814	7916,726	11200,800	4480,320	96,797	0,000	5,080	0,000	User Specified
BODEGA 4	40%	19792,254	7916,903	11201,049	4480,421	70,404	0,000	5,080	0,000	User Specified
BODEGA 5	40%	19770,505	7908,201	11188,741	4475,496	43,930	0,000	5,164	0,000	User Specified
Total bodegas	40%	93146,439	37258,576	52714,453	21085,782	93,061	0,000	5,115	0,000	
Contenedor 1	1	440,000	440,000			147,000	0,000	22,800	0,000	User Specified
Contenedor 2	1	792,000	792,000			123,500	0,000	22,800	0,000	User Specified
Contenedor 3	1	792,000	792,000			97,000	0,000	22,800	0,000	User Specified
Contenedor 4	1	792,000	792,000			70,500	0,000	22,800	0,000	User Specified
Contenedor 5	1	792,000	792,000			44,000	0,000	22,800	0,000	User Specified
Total contenedores			3608,000			91,463	0,000	22,800	0,000	
Madera 1	0	400,000	0,000			147,000	0,000	22,800	0,000	User Specified
Madera 2	0	720,000	0,000			123,500	0,000	22,800	0,000	User Specified
Madera 3	0	720,000	0,000			97,000	0,000	22,800	0,000	User Specified
Madera 4	0	720,000	0,000			70,500	0,000	22,800	0,000	User Specified
Madera 5	0	720,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total madera			0,000			0,000	0,000	0,000	0,000	
Total Loadcase			51437,500	67496,358	21571,502	87,479	0,035	7,703	253,421	
FS correction								0,005		
VCG fluid								7,708		

Draft Amidships m	11,841
Displacement t	51438
Heel deg	0,4
Draft at FP m	11,841
Draft at AP m	11,841

Draft at LCF m	11,841
Trim (+ve by stern) m	0,000
WL Length m	173,914
Beam max extents on WL m	30,164
Wetted Area m ²	7941,680
Waterpl. Area m ²	4606,961
Prismatic coeff. (Cp)	0,811
Block coeff. (Cb)	0,802
Max Sect. area coeff. (Cm)	0,988
Waterpl. area coeff. (Cwp)	0,878
LCB from zero pt. (+ve fwd) m	87,470
LCF from zero pt. (+ve fwd) m	83,616
KB m	6,115
KG fluid m	7,708
BMt m	6,201
BML m	187,058
GMt corrected m	4,608
GML m	185,465
KMt m	12,315
KML m	193,168
Immersion (TPc) tonne/cm	47,221
MTc tonne.m	559,853
RM at 1deg = GMt.Disp.sin(1) tonne.m	4136,212
Max deck inclination deg	0,4327
Trim angle (+ve by stern) deg	0,0000

Key point	Type	Freeboard m
Margin Line (freeboard pos = 83,34 m)		5,109
Deck Edge (freeboard pos = 83,34 m)		5,185
Entrada habilitación cta ppal 1	Downflooding point	6,784
Aseo público cubierta	Downflooding point	6,805
Local CO2	Downflooding point	6,816
Entrada habilitación cta ppal 2	Downflooding point	6,829
Local ropa de agua	Downflooding point	6,846
Entrada habilitación cta toldil	Downflooding point	9,509
Entrada habilitación cta toldil	Downflooding point	9,668
Local grupo emergencia	Downflooding point	9,531
Entrada a cta ppal desde cta to	Downflooding point	9,632

Stability calculation - D

Stability 22.01.00.131, build: 131

Model file: C:\Users\MARTA\Google Drive\TFG\Marta González\PROGRAMAS\MaxSURF\NUEVO (TFG)\D (Highest precision, 65 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 - Condición I

Damage Case - Intact

Free to Trim

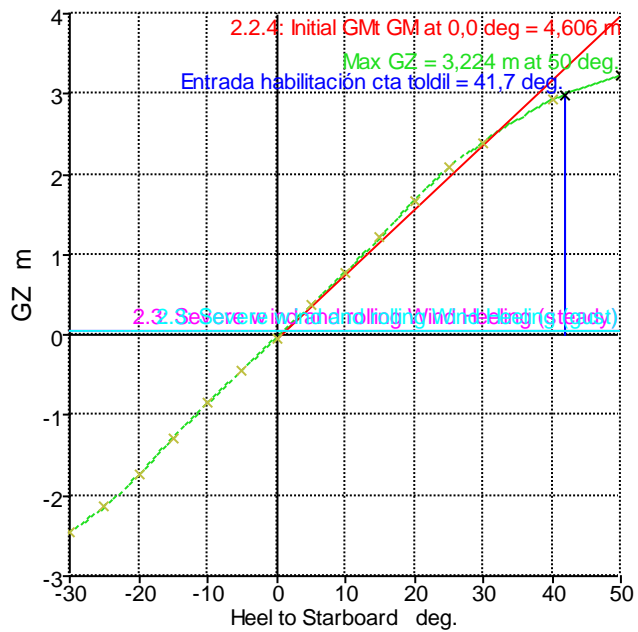
Specific gravity = 1,025; (Density = 1,025 tonne/m³)

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	10064,100	10064,100			68,650	0,000	11,800	0,000	User Specified
Total peso en rosca			10064,100			68,650	0,000	11,800	0,000	
Tripulación	20	0,125	2,500			15,000	0,000	22,000	0,000	User Specified
Pertrechos	1	40,000	40,000			90,000	0,000	15,000	0,000	User Specified
Total pesos fijos			42,500			85,588	0,000	15,412	0,000	
Viveres	0,1	3,700	0,370			17,000	0,000	20,000	0,000	User Specified
Total pesos variables			0,370			17,000	0,000	20,000	0,000	
P1-PIQUE PROA 1	0%	690,827	0,000	673,978	0,000	165,684	0,000	0,047	0,000	IMO A.749(18)
P2B-PIQUE PROA 2 BR	0%	445,266	0,000	434,406	0,000	158,040	-0,001	0,009	0,000	IMO A.749(18)
P2E-PIQUE PROA 2 ER	0%	445,266	0,000	434,406	0,000	158,040	0,001	0,009	0,000	IMO A.749(18)
S1B-TOLVA SUPERIOR B1 BAVOR	0%	436,049	0,000	425,414	0,000	139,794	-12,904	12,700	0,000	IMO A.749(18)
S1E-TOLVA SUPERIOR B1 ESTRIBOR	0%	436,049	0,000	425,414	0,000	139,794	12,904	12,700	0,000	IMO A.749(18)
I1B-TOLVA INFERIOR B1 BAVOR	0%	460,629	0,000	449,394	0,000	136,523	-0,671	0,005	0,000	IMO A.749(18)
I1E-TOLVA INFERIOR B1 ESTRIBOR	0%	460,629	0,000	449,394	0,000	136,523	0,671	0,005	0,000	IMO A.749(18)
S2B-TOLVA SUPERIOR B2 BAVOR	0%	608,511	0,000	593,669	0,000	123,728	-14,225	12,700	0,000	IMO A.749(18)
S2E-TOLVA SUPERIOR B2 ESTRIBOR	0%	608,511	0,000	593,669	0,000	123,728	14,225	12,700	0,000	IMO A.749(18)
I2B-TOLVA INFERIOR B2 BAVOR	0%	831,819	0,000	811,530	0,000	111,611	-1,566	0,000	0,000	IMO A.749(18)
I2E-TOLVA INFERIOR B2 ESTRIBOR	0%	831,819	0,000	811,530	0,000	111,611	1,566	0,000	0,000	IMO A.749(18)
S3B-TOLVA SUPERIOR B3 BAVOR	0%	608,593	0,000	593,750	0,000	96,777	-14,339	12,700	0,000	IMO A.749(18)
S3E-TOLVA SUPERIOR B3 ESTRIBOR	0%	608,593	0,000	593,750	0,000	96,777	14,339	12,700	0,000	IMO A.749(18)
I3B-TOLVA INFERIOR B3 BAVOR	0%	866,904	0,000	845,760	0,000	95,275	-2,938	0,000	0,000	IMO A.749(18)
I3E-TOLVA INFERIOR B3 ESTRIBOR	0%	866,904	0,000	845,760	0,000	95,275	2,938	0,000	0,000	IMO A.749(18)
I4B-TOLVA INFERIOR B4 BAVOR	0%	860,892	0,000	839,895	0,000	77,837	-2,284	0,000	0,000	IMO A.749(18)
I4E-TOLVA INFERIOR B4 ESTRIBOR	0%	860,892	0,000	839,895	0,000	77,837	2,284	0,000	0,000	IMO A.749(18)

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
I5B-TOLVA INFERIOR B5 BABOR	0%	769,640	0,000	750,868	0,000	54,943	-1,029	0,000	0,000	IMO A.749(18)
I5E-TOLVA INFERIOR B5 ESTRIBOR	0%	769,640	0,000	750,868	0,000	54,943	1,029	0,000	0,000	IMO A.749(18)
PIQUE POPA BABOR	0%	271,223	0,000	264,608	0,000	8,299	-4,606	9,140	0,000	User Specified
PIQUE POPA ESTRIBOR	0%	271,223	0,000	264,608	0,000	8,299	4,606	9,140	0,000	User Specified
Total lastre	0%	13009,878	0,000	12692,564	0,000	0,000	0,000	0,000	0,000	
ADB-AGUA DULCE BABOR	10%	121,659	12,166	121,659	12,166	7,492	-7,942	13,365	131,283	IMO A.749(18)
ADE-AGUA DULCE ESTRIBOR	10%	74,189	7,419	74,189	7,419	6,554	7,777	13,370	0,000	IMO A.749(18)
ATE-AGUA TÉCNICA ESTRIBOR	10%	47,476	4,748	47,476	4,748	8,887	8,188	13,358	0,000	User Specified
Total agua	10%	243,325	24,332	243,325	24,332	7,478	-0,002	13,366	131,283	
REFRIGERACIÓN EJE	100%	67,303	67,303	67,303	67,303	8,597	0,000	3,839	0,000	User Specified
LODOS	100%	22,540	22,540	22,540	22,540	11,375	0,000	1,532	0,000	User Specified
REBOSES HFO BR	100%	15,908	15,908	16,233	16,233	18,841	-5,025	1,382	0,000	User Specified
REBOSES ACEITE ER	100%	22,443	22,443	24,395	24,395	18,954	5,046	1,380	0,000	User Specified
AGUAS ACEITOSAS	100%	14,763	14,763	16,170	16,170	23,625	0,000	1,500	0,000	User Specified
SENTINAS	100%	7,974	7,974	8,734	8,734	28,875	0,000	1,010	0,000	User Specified
AGUAS RESIDUALES	100%	152,063	152,063	152,063	152,063	12,650	10,081	13,659	0,000	User Specified
Total misceláneos	100%	302,994	302,994	307,437	307,437	13,409	5,169	8,096	0,000	
SERVICIO ACEITE CILINDROS	10%	5,428	0,543	5,900	0,590	11,000	-5,750	9,183	0,000	User Specified
ALMACÉN ACEITE CILINDROS	10%	32,440	3,244	35,260	3,526	11,000	-5,750	10,257	0,000	User Specified
ALMACÉN ACEITE 1	10%	17,009	1,701	18,488	1,849	11,178	-8,241	9,558	0,000	User Specified
ALMACÉN ACEITE 2	10%	13,153	1,315	14,297	1,430	11,268	-9,962	10,577	0,000	User Specified
Total aceite	10%	68,030	6,803	73,945	7,395	11,096	-7,187	10,058	0,000	
SEDIMENTACIÓN HFO 1	0%	43,621	0,000	44,512	0,000	29,250	-1,000	2,000	0,000	User Specified
USO DIARIO HFO 1	80,24%	65,432	52,500	66,767	53,571	29,250	1,500	8,074	0,000	User Specified
USO DIARIO HFO 2	80,24%	65,432	52,500	66,767	53,571	29,250	4,500	8,074	0,000	User Specified
SEDIMENTACIÓN HFO 2	0%	43,621	0,000	44,512	0,000	29,250	7,000	2,000	0,000	User Specified
S4B-TOLVA SUPERIOR B4 BABOR	0%	405,778	0,000	414,059	0,000	71,250	-13,611	12,700	0,000	IMO A.749(18)
S4E-TOLVA SUPERIOR B4 ESTRIBOR	0%	405,778	0,000	414,059	0,000	71,250	13,611	12,700	0,000	IMO A.749(18)
S5B-TOLVA SUPERIOR B5 BABOR	0%	9,973	0,000	10,177	0,000	44,162	-14,104	12,700	0,000	IMO A.749(18)
S5E-TOLVA SUPERIOR B5 ESTRIBOR	0%	9,973	0,000	10,177	0,000	44,162	14,104	12,700	0,000	IMO A.749(18)
Total HFO	10%	1049,608	105,000	1071,029	107,143	29,250	3,000	8,074	0,000	
USO DIARIO DIÉSEL 1	26,75%	28,042	7,500	33,384	8,929	29,250	-2,750	4,025	0,000	IMO A.749(18)
USO DIARIO DIÉSEL 2	26,75%	28,042	7,500	33,384	8,929	29,250	-4,250	4,025	0,000	IMO A.749(18)
ALMACÉN DIÉSEL	0%	93,474	0,000	111,279	0,000	29,250	-7,500	2,000	0,000	IMO A.749(18)

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
Total diésel	10,03%	149,559	15,000	178,046	17,857	29,250	-3,500	4,025	0,000	
DIÉSEL EMERGENCIA	10%	2,666	0,267	3,174	0,317	8,267	-7,570	20,260	0,000	IMO A.749(18)
Total diésel emergencia	10%	2,666	0,267	3,174	0,317	8,267	-7,570	20,260	0,000	
LNG 1	10%	47,695	4,770	105,989	10,599	4,549	1,266	20,938	0,000	IMO A.749(18)
LNG 2	10%	47,878	4,788	106,396	10,640	-0,067	1,235	20,762	122,130	IMO A.749(18)
Total LNG	10%	95,573	9,557	212,385	21,238	2,237	1,251	20,850	122,130	
BODEGA 1	40%	14143,902	5657,561	8004,472	3201,789	146,444	0,000	5,184	0,000	User Specified
BODEGA 2	40%	19647,964	7859,186	11119,391	4447,756	123,130	0,000	5,088	0,000	User Specified
BODEGA 3	40%	19791,814	7916,727	11200,800	4480,321	96,797	0,000	5,080	0,000	User Specified
BODEGA 4	40%	19792,254	7916,901	11201,049	4480,420	70,404	0,000	5,080	0,000	User Specified
BODEGA 5	40%	19770,505	7908,202	11188,741	4475,496	43,930	0,000	5,164	0,000	User Specified
Total bodegas	40%	93146,439	37258,577	52714,453	21085,782	93,061	0,000	5,115	0,000	
Contenedor 1	1	440,000	440,000			147,000	0,000	22,800	0,000	User Specified
Contenedor 2	1	792,000	792,000			123,500	0,000	22,800	0,000	User Specified
Contenedor 3	1	792,000	792,000			97,000	0,000	22,800	0,000	User Specified
Contenedor 4	1	792,000	792,000			70,500	0,000	22,800	0,000	User Specified
Contenedor 5	1	792,000	792,000			44,000	0,000	22,800	0,000	User Specified
Total contenedores			3608,000			91,463	0,000	22,800	0,000	
Madera 1	0	400,000	0,000			147,000	0,000	22,800	0,000	User Specified
Madera 2	0	720,000	0,000			123,500	0,000	22,800	0,000	User Specified
Madera 3	0	720,000	0,000			97,000	0,000	22,800	0,000	User Specified
Madera 4	0	720,000	0,000			70,500	0,000	22,800	0,000	User Specified
Madera 5	0	720,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total madera			0,000			0,000	0,000	0,000	0,000	
Total Loadcase			51437,501	67496,358	21571,502	87,479	0,035	7,703	253,414	
FS correction								0,005		
VCG fluid								7,708		



Stability	
■	GZ
■	Entrada habilitación cta toldil = 41,7 deg.
■	2.2.4: Initial GMT GM at 0,0 deg = 4,606 m
■	2.3: Severe wind and rolling Wind Heeling (steady)
■	2.3: Severe wind and rolling Wind Heeling (gust)
■	Max GZ = 3,224 m at 50 deg.

Heel to Starboard deg	-30,0	-25,0	-20,0	-15,0	-10,0	-5,0	0,0	5,0	10,0	15,0	20,0	25,0
GZ m	-2,452	-2,141	-1,741	-1,281	-0,850	-0,438	-0,035	0,369	0,782	1,214	1,676	2,078
Area under GZ curve from zero heel m.deg	38,5192	27,0127	17,2677	9,7095	4,3968	1,1802	-0,0316	0,8326	3,7045	8,6769	15,9066	25,3229
Displacement t	51437	51437	51437	51441	51440	51439	51438	51438	51436	51435	51434	51437
Draft at FP m	12,336	12,017	11,883	11,866	11,855	11,848	11,851	11,847	11,854	11,865	11,882	12,017
Draft at AP m	11,609	11,616	11,671	11,748	11,799	11,828	11,831	11,827	11,798	11,746	11,670	11,616
WL Length m	174,027	173,954	173,923	173,919	173,917	173,915	173,916	173,915	173,916	173,919	173,923	173,954
Beam max extents on WL m	30,282	29,483	31,766	31,222	30,626	30,278	30,164	30,278	30,626	31,222	31,768	29,483
Wetted Area m^2	8438,979	8257,459	7994,425	7958,683	7948,841	7943,352	7941,351	7943,229	7948,517	7958,216	7993,994	8257,435
Waterpl. Area m^2	4390,806	4558,828	4848,655	4760,221	4673,872	4623,249	4606,375	4623,226	4673,811	4760,137	4848,832	4558,831
Prismatic coeff. (Cp)	0,823	0,819	0,815	0,814	0,812	0,812	0,811	0,812	0,812	0,814	0,815	0,819
Block coeff. (Cb)	0,545	0,587	0,573	0,616	0,671	0,735	0,807	0,735	0,671	0,616	0,573	0,587
LCB from zero pt. (+ve fwd) m	87,478	87,484	87,481	87,480	87,480	87,480	87,492	87,480	87,480	87,481	87,482	87,483
LCF from zero pt. (+ve fwd) m	82,457	83,085	83,772	83,767	83,686	83,638	83,627	83,638	83,687	83,767	83,772	83,085
Max deck inclination deg	30,0007	25,0003	20,0001	15,0000	10,0000	5,0000	0,0067	5,0000	10,0000	15,0000	20,0001	25,0003
Trim angle (+ve by stern) deg	-0,2447	-0,1351	-0,0711	-0,0399	-0,0188	-0,0067	-0,0067	-0,0067	-0,0188	-0,0399	-0,0711	-0,1350

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 122,534 m)		19,2	n/a
Deck Edge (immersion pos = 122,534 m)		19,4	n/a
Entrada habilitación cta ppal 1	Downflooding point	Not immersed in positive range	0
Aseo público cubierta	Downflooding point	Not immersed in positive range	0
Local CO2	Downflooding point	Not immersed in positive range	0
Entrada habilitación cta ppal 2	Downflooding point	Not immersed in positive range	0
Local ropa de agua	Downflooding point	Not immersed in positive range	0
Entrada habilitación cta toldil	Downflooding point	41,7	0
Entrada habilitación cta toldil	Downflooding point	Not immersed in positive range	0
Local grupo emergencia	Downflooding point	49,7	0
Entrada a cta ppal desde cta to	Downflooding point	Not immersed in positive range	0

Code	Criteria	Value	Units	Actual	Status	Margin %
267(85) Ch2 - General Criteria	2.3: IMO roll back angle	21,3	deg			
267(85) Ch2 - General Criteria	2.2.1: Area 0 to 30	3,1513	m.deg	36,5249	Pass	+1059,05
267(85) Ch2 - General Criteria	2.2.1: Area 0 to 40	5,1566	m.deg	63,2226	Pass	+1126,05
267(85) Ch2 - General Criteria	2.2.1: Area 30 to 40	1,7189	m.deg	26,6977	Pass	+1453,21
267(85) Ch2 - General Criteria	2.2.2: Max GZ at 30 or greater	0,200	m	3,224	Pass	+1512,00
267(85) Ch2 - General Criteria	2.2.3: Angle of maximum GZ	25,0	deg	50,0	Pass	+100,00
267(85) Ch2 - General Criteria	2.2.4: Initial GMT	0,150	m	4,606	Pass	+2970,67
267(85) Ch2 - General Criteria	2.3: Severe wind and rolling				Pass	
	Angle of steady heel shall not be greater than (\leq)	16,0	deg	1,0	Pass	+93,99

CONDICIÓN XI

Salida de puerto a plena carga
(carbón) + madera sobre las
escotillas

Equilibrium calculation - D

Stability 22.01.00.131, build: 131

Model file: C:\Users\MARTA\Google Drive\TFG\Marta González\PROGRAMAS\MaxSURF\NUEVO (TFG)\D (Highest precision, 65 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 - Condición I

Damage Case - Intact

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m³)

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	10064,100	10064,100			68,650	0,000	11,800	0,000	User Specified
Total peso en rosca			10064,100			68,650	0,000	11,800	0,000	
Tripulación	20	0,125	2,500			15,000	0,000	22,000	0,000	User Specified
Pertrechos	1	40,000	40,000			90,000	0,000	15,000	0,000	User Specified
Total pesos fijos			42,500			85,588	0,000	15,412	0,000	
Viveres	1	3,700	3,700			17,000	0,000	20,000	0,000	User Specified
Total pesos variables			3,700			17,000	0,000	20,000	0,000	
P1-PIQUE PROA 1	0%	690,827	0,000	673,978	0,000	165,684	0,000	0,047	0,000	IMO A.749(18)
P2B-PIQUE PROA 2 BR	0%	445,266	0,000	434,406	0,000	158,040	-0,001	0,009	0,000	IMO A.749(18)
P2E-PIQUE PROA 2 ER	0%	445,266	0,000	434,406	0,000	158,040	0,001	0,009	0,000	IMO A.749(18)
S1B-TOLVA SUPERIOR B1 BAVOR	0%	436,049	0,000	425,414	0,000	139,794	-12,904	12,700	0,000	IMO A.749(18)
S1E-TOLVA SUPERIOR B1 ESTRIBOR	0%	436,049	0,000	425,414	0,000	139,794	12,904	12,700	0,000	IMO A.749(18)
I1B-TOLVA INFERIOR B1 BAVOR	0%	460,629	0,000	449,394	0,000	136,523	-0,671	0,005	0,000	IMO A.749(18)
I1E-TOLVA INFERIOR B1 ESTRIBOR	0%	460,629	0,000	449,394	0,000	136,523	0,671	0,005	0,000	IMO A.749(18)
S2B-TOLVA SUPERIOR B2 BAVOR	0%	608,511	0,000	593,669	0,000	123,728	-14,225	12,700	0,000	IMO A.749(18)
S2E-TOLVA SUPERIOR B2 ESTRIBOR	0%	608,511	0,000	593,669	0,000	123,728	14,225	12,700	0,000	IMO A.749(18)
I2B-TOLVA INFERIOR B2 BAVOR	0%	831,819	0,000	811,530	0,000	111,611	-1,566	0,000	0,000	IMO A.749(18)
I2E-TOLVA INFERIOR B2 ESTRIBOR	0%	831,819	0,000	811,530	0,000	111,611	1,566	0,000	0,000	IMO A.749(18)
S3B-TOLVA SUPERIOR B3 BAVOR	0%	608,593	0,000	593,750	0,000	96,777	-14,339	12,700	0,000	IMO A.749(18)
S3E-TOLVA SUPERIOR B3 ESTRIBOR	0%	608,593	0,000	593,750	0,000	96,777	14,339	12,700	0,000	IMO A.749(18)
I3B-TOLVA INFERIOR B3 BAVOR	0%	866,904	0,000	845,760	0,000	95,275	-2,938	0,000	0,000	IMO A.749(18)
I3E-TOLVA INFERIOR B3 ESTRIBOR	0%	866,904	0,000	845,760	0,000	95,275	2,938	0,000	0,000	IMO A.749(18)
I4B-TOLVA INFERIOR B4 BAVOR	0%	860,892	0,000	839,895	0,000	77,837	-2,284	0,000	0,000	IMO A.749(18)
I4E-TOLVA INFERIOR B4 ESTRIBOR	0%	860,892	0,000	839,895	0,000	77,837	2,284	0,000	0,000	IMO A.749(18)

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
I5B-TOLVA INFERIOR B5 BABOR	0%	769,640	0,000	750,868	0,000	54,943	-1,029	0,000	0,000	IMO A.749(18)
I5E-TOLVA INFERIOR B5 ESTRIBOR	0%	769,640	0,000	750,868	0,000	54,943	1,029	0,000	0,000	IMO A.749(18)
PIQUE POPA BABOR	0%	271,223	0,000	264,608	0,000	8,299	-4,606	9,140	0,000	User Specified
PIQUE POPA ESTRIBOR	0%	271,223	0,000	264,608	0,000	8,299	4,606	9,140	0,000	User Specified
Total lastre	0%	13009,878	0,000	12692,564	0,000	0,000	0,000	0,000	0,000	
ADB-AGUA DULCE BABOR	97,9%	121,659	119,104	121,659	119,104	7,451	-8,283	15,165	131,283	IMO A.749(18)
ADE-AGUA DULCE ESTRIBOR	97,9%	74,189	72,631	74,189	72,631	6,534	8,168	15,176	0,000	IMO A.749(18)
ATE-AGUA TÉCNICA ESTRIBOR	100%	47,476	47,476	47,476	47,476	8,883	8,468	15,189	0,000	User Specified
Total agua	98,31%	243,325	239,212	243,325	239,212	7,457	0,036	15,173	131,283	
REFRIGERACIÓN EJE	100%	67,303	67,303	67,303	67,303	8,597	0,000	3,839	0,000	User Specified
LODOS	0%	22,540	0,000	22,540	0,000	11,401	0,000	1,000	0,000	User Specified
REBOSES HFO BR	0%	15,908	0,000	16,233	0,000	20,233	-2,001	0,313	0,000	User Specified
REBOSES ACEITE ER	0%	22,443	0,000	24,395	0,000	20,974	2,001	0,291	0,000	User Specified
AGUAS ACEITOSAS	0%	14,763	0,000	16,170	0,000	23,625	0,000	1,000	0,000	User Specified
SENTINAS	0%	7,974	0,000	8,734	0,000	28,919	0,000	0,000	0,000	User Specified
AGUAS RESIDUALES	0%	152,063	0,000	152,063	0,000	13,523	8,989	9,140	0,000	User Specified
Total misceláneos	22,21%	302,994	67,303	307,437	67,303	8,597	0,000	3,839	0,000	
SERVICIO ACEITE CILINDROS	100%	5,428	5,428	5,900	5,900	11,000	-5,750	9,570	0,000	User Specified
ALMACÉN ACEITE CILINDROS	100%	32,440	32,440	35,260	35,260	11,000	-5,750	12,570	0,000	User Specified
ALMACÉN ACEITE 1	100%	17,009	17,009	18,488	18,488	11,021	-8,471	11,771	0,000	User Specified
ALMACÉN ACEITE 2	100%	13,153	13,153	14,297	14,297	11,071	-10,529	12,530	0,000	User Specified
Total aceite	100%	68,030	68,030	73,945	73,945	11,019	-7,354	12,123	0,000	
SEDIMENTACIÓN HFO 1	100%	43,621	43,621	44,512	44,512	29,250	-1,000	9,570	0,000	User Specified
USO DIARIO HFO 1	100%	65,432	65,432	66,767	66,767	29,250	1,500	9,570	0,000	User Specified
USO DIARIO HFO 2	100%	65,432	65,432	66,767	66,767	29,250	4,500	9,570	0,000	User Specified
SEDIMENTACIÓN HFO 2	100%	43,621	43,621	44,512	44,512	29,250	7,000	9,570	0,000	User Specified
S4B-TOLVA SUPERIOR B4 BABOR	97,9%	405,778	397,256	414,059	405,363	70,405	-11,318	15,562	203,826	IMO A.749(18)
S4E-TOLVA SUPERIOR B4 ESTRIBOR	97,9%	405,778	397,256	414,059	405,363	70,405	11,318	15,562	203,826	IMO A.749(18)
S5B-TOLVA SUPERIOR B5 BABOR	97,9%	9,973	9,764	10,177	9,963	43,690	-11,263	14,110	0,000	IMO A.749(18)
S5E-TOLVA SUPERIOR B5 ESTRIBOR	97,9%	9,973	9,764	10,177	9,963	43,690	11,263	14,110	0,000	IMO A.749(18)
Total HFO	98,34%	1049,608	1032,147	1071,029	1053,211	61,203	0,634	14,269	407,652	
USO DIARIO DIÉSEL 1	97,9%	28,042	27,453	33,384	32,683	29,250	-2,750	9,411	0,000	IMO A.749(18)
USO DIARIO DIÉSEL 2	97,9%	28,042	27,453	33,384	32,683	29,250	-4,250	9,411	0,000	IMO A.749(18)
ALMACÉN DIÉSEL	97,9%	93,474	91,511	111,279	108,942	29,250	-7,500	9,411	0,000	IMO A.749(18)

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
Total diésel	97,9%	149,559	146,418	178,046	174,307	29,250	-6,000	9,411	0,000	
DIÉSEL EMERGENCIA	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	IMO A.749(18)
Total diésel emergencia	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	
LNG 1	97,9%	47,695	46,694	105,989	103,763	4,571	1,270	22,363	0,000	IMO A.749(18)
LNG 2	97,9%	47,878	46,873	106,396	104,161	-0,102	1,260	22,297	122,130	IMO A.749(18)
Total LNG	97,9%	95,573	93,566	212,385	207,925	2,230	1,265	22,330	122,130	
BODEGA 1	40%	14143,902	5657,561	8004,472	3201,789	146,444	0,000	5,184	0,000	User Specified
BODEGA 2	40%	19647,964	7859,186	11119,391	4447,757	123,130	0,000	5,088	0,000	User Specified
BODEGA 3	40%	19791,814	7916,725	11200,800	4480,320	96,797	0,000	5,080	0,000	User Specified
BODEGA 4	40%	19792,254	7916,900	11201,049	4480,419	70,404	0,000	5,080	0,000	User Specified
BODEGA 5	40%	19770,505	7908,201	11188,741	4475,496	43,930	0,000	5,164	0,000	User Specified
Total bodegas	40%	93146,439	37258,573	52714,453	21085,780	93,061	0,000	5,115	0,000	
Contenedor 1	0	440,000	0,000			147,000	0,000	22,800	0,000	User Specified
Contenedor 2	0	792,000	0,000			123,500	0,000	22,800	0,000	User Specified
Contenedor 3	0	792,000	0,000			97,000	0,000	22,800	0,000	User Specified
Contenedor 4	0	792,000	0,000			70,500	0,000	22,800	0,000	User Specified
Contenedor 5	0	792,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total contenedores			0,000			0,000	0,000	0,000	0,000	
Madera 1	1	400,000	400,000			147,000	0,000	22,800	0,000	User Specified
Madera 2	1	720,000	720,000			123,500	0,000	22,800	0,000	User Specified
Madera 3	1	720,000	720,000			97,000	0,000	22,800	0,000	User Specified
Madera 4	1	720,000	720,000			70,500	0,000	22,800	0,000	User Specified
Madera 5	1	720,000	720,000			44,000	0,000	22,800	0,000	User Specified
Total madera			3280,000			91,463	0,000	22,800	0,000	
Total Loadcase			52298,158	67496,358	22904,790	86,671	-0,012	7,798	661,066	
FS correction								0,013		
VCG fluid								7,811		

Draft Amidships m	12,015
Displacement t	52298
Heel deg	0,0
Draft at FP m	11,675
Draft at AP m	12,356

Draft at LCF m	12,024
Trim (+ve by stern) m	0,681
WL Length m	173,878
Beam max extents on WL m	30,164
Wetted Area m ²	8018,848
Waterpl. Area m ²	4632,825
Prismatic coeff. (Cp)	0,810
Block coeff. (Cb)	0,790
Max Sect. area coeff. (Cm)	0,993
Waterpl. area coeff. (Cwp)	0,883
LCB from zero pt. (+ve fwd) m	86,662
LCF from zero pt. (+ve fwd) m	83,125
KB m	6,212
KG fluid m	7,811
BMt m	6,127
BML m	187,229
GMt corrected m	4,529
GML m	185,631
KMt m	12,339
KML m	193,440
Immersion (TPc) tonne/cm	47,486
MTc tonne.m	569,725
RM at 1deg = GMt.Disp.sin(1) tonne.m	4133,412
Max deck inclination deg	0,2288
Trim angle (+ve by stern) deg	0,2288

Key point	Type	Freeboard m
Margin Line (freeboard pos = 30,275 m)		4,829
Deck Edge (freeboard pos = 30,275 m)		4,905
Entrada habilitación cta ppal 1	Downflooding point	6,404
Aseo público cubierta	Downflooding point	6,404
Local CO2	Downflooding point	6,404
Entrada habilitación cta ppal 2	Downflooding point	6,404
Local ropa de agua	Downflooding point	6,404
Entrada habilitación cta toldil	Downflooding point	9,171
Entrada habilitación cta toldil	Downflooding point	9,171
Local grupo emergencia	Downflooding point	9,126
Entrada a cta ppal desde cta to	Downflooding point	9,110

Stability calculation - D

Stability 22.01.00.131, build: 131

Model file: C:\Users\MARTA\Google Drive\TFG\Marta González\PROGRAMAS\MaxSURF\NUEVO (TFG)\D (Highest precision, 65 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 - Condición I

Damage Case - Intact

Free to Trim

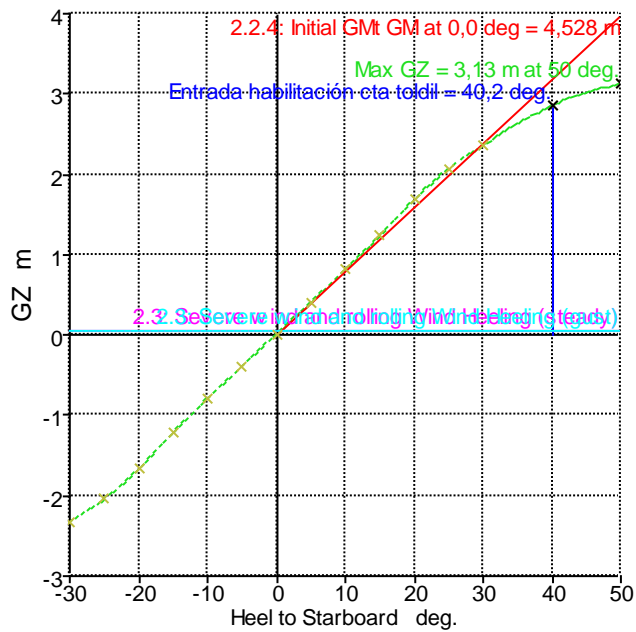
Specific gravity = 1,025; (Density = 1,025 tonne/m³)

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	10064,100	10064,100			68,650	0,000	11,800	0,000	User Specified
Total peso en rosca			10064,100			68,650	0,000	11,800	0,000	
Tripulación	20	0,125	2,500			15,000	0,000	22,000	0,000	User Specified
Pertrechos	1	40,000	40,000			90,000	0,000	15,000	0,000	User Specified
Total pesos fijos			42,500			85,588	0,000	15,412	0,000	
Viveres	1	3,700	3,700			17,000	0,000	20,000	0,000	User Specified
Total pesos variables			3,700			17,000	0,000	20,000	0,000	
P1-PIQUE PROA 1	0%	690,827	0,000	673,978	0,000	165,684	0,000	0,047	0,000	IMO A.749(18)
P2B-PIQUE PROA 2 BR	0%	445,266	0,000	434,406	0,000	158,040	-0,001	0,009	0,000	IMO A.749(18)
P2E-PIQUE PROA 2 ER	0%	445,266	0,000	434,406	0,000	158,040	0,001	0,009	0,000	IMO A.749(18)
S1B-TOLVA SUPERIOR B1 BAVOR	0%	436,049	0,000	425,414	0,000	139,794	-12,904	12,700	0,000	IMO A.749(18)
S1E-TOLVA SUPERIOR B1 ESTRIBOR	0%	436,049	0,000	425,414	0,000	139,794	12,904	12,700	0,000	IMO A.749(18)
I1B-TOLVA INFERIOR B1 BAVOR	0%	460,629	0,000	449,394	0,000	136,523	-0,671	0,005	0,000	IMO A.749(18)
I1E-TOLVA INFERIOR B1 ESTRIBOR	0%	460,629	0,000	449,394	0,000	136,523	0,671	0,005	0,000	IMO A.749(18)
S2B-TOLVA SUPERIOR B2 BAVOR	0%	608,511	0,000	593,669	0,000	123,728	-14,225	12,700	0,000	IMO A.749(18)
S2E-TOLVA SUPERIOR B2 ESTRIBOR	0%	608,511	0,000	593,669	0,000	123,728	14,225	12,700	0,000	IMO A.749(18)
I2B-TOLVA INFERIOR B2 BAVOR	0%	831,819	0,000	811,530	0,000	111,611	-1,566	0,000	0,000	IMO A.749(18)
I2E-TOLVA INFERIOR B2 ESTRIBOR	0%	831,819	0,000	811,530	0,000	111,611	1,566	0,000	0,000	IMO A.749(18)
S3B-TOLVA SUPERIOR B3 BAVOR	0%	608,593	0,000	593,750	0,000	96,777	-14,339	12,700	0,000	IMO A.749(18)
S3E-TOLVA SUPERIOR B3 ESTRIBOR	0%	608,593	0,000	593,750	0,000	96,777	14,339	12,700	0,000	IMO A.749(18)
I3B-TOLVA INFERIOR B3 BAVOR	0%	866,904	0,000	845,760	0,000	95,275	-2,938	0,000	0,000	IMO A.749(18)
I3E-TOLVA INFERIOR B3 ESTRIBOR	0%	866,904	0,000	845,760	0,000	95,275	2,938	0,000	0,000	IMO A.749(18)
I4B-TOLVA INFERIOR B4 BAVOR	0%	860,892	0,000	839,895	0,000	77,837	-2,284	0,000	0,000	IMO A.749(18)
I4E-TOLVA INFERIOR B4 ESTRIBOR	0%	860,892	0,000	839,895	0,000	77,837	2,284	0,000	0,000	IMO A.749(18)

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
I5B-TOLVA INFERIOR B5 BABOR	0%	769,640	0,000	750,868	0,000	54,943	-1,029	0,000	0,000	IMO A.749(18)
I5E-TOLVA INFERIOR B5 ESTRIBOR	0%	769,640	0,000	750,868	0,000	54,943	1,029	0,000	0,000	IMO A.749(18)
PIQUE POPA BABOR	0%	271,223	0,000	264,608	0,000	8,299	-4,606	9,140	0,000	User Specified
PIQUE POPA ESTRIBOR	0%	271,223	0,000	264,608	0,000	8,299	4,606	9,140	0,000	User Specified
Total lastre	0%	13009,878	0,000	12692,564	0,000	0,000	0,000	0,000	0,000	
ADB-AGUA DULCE BABOR	97,9%	121,659	119,104	121,659	119,104	7,451	-8,283	15,165	131,283	IMO A.749(18)
ADE-AGUA DULCE ESTRIBOR	97,9%	74,189	72,631	74,189	72,631	6,534	8,168	15,176	0,000	IMO A.749(18)
ATE-AGUA TÉCNICA ESTRIBOR	100%	47,476	47,476	47,476	47,476	8,883	8,468	15,189	0,000	User Specified
Total agua	98,31%	243,325	239,212	243,325	239,212	7,457	0,036	15,173	131,283	
REFRIGERACIÓN EJE	100%	67,303	67,303	67,303	67,303	8,597	0,000	3,839	0,000	User Specified
LODOS	0%	22,540	0,000	22,540	0,000	11,401	0,000	1,000	0,000	User Specified
REBOSES HFO BR	0%	15,908	0,000	16,233	0,000	20,233	-2,001	0,313	0,000	User Specified
REBOSES ACEITE ER	0%	22,443	0,000	24,395	0,000	20,974	2,001	0,291	0,000	User Specified
AGUAS ACEITOSAS	0%	14,763	0,000	16,170	0,000	23,625	0,000	1,000	0,000	User Specified
SENTINAS	0%	7,974	0,000	8,734	0,000	28,919	0,000	0,000	0,000	User Specified
AGUAS RESIDUALES	0%	152,063	0,000	152,063	0,000	13,523	8,989	9,140	0,000	User Specified
Total misceláneos	22,21%	302,994	67,303	307,437	67,303	8,597	0,000	3,839	0,000	
SERVICIO ACEITE CILINDROS	100%	5,428	5,428	5,900	5,900	11,000	-5,750	9,570	0,000	User Specified
ALMACÉN ACEITE CILINDROS	100%	32,440	32,440	35,260	35,260	11,000	-5,750	12,570	0,000	User Specified
ALMACÉN ACEITE 1	100%	17,009	17,009	18,488	18,488	11,021	-8,471	11,771	0,000	User Specified
ALMACÉN ACEITE 2	100%	13,153	13,153	14,297	14,297	11,071	-10,529	12,530	0,000	User Specified
Total aceite	100%	68,030	68,030	73,945	73,945	11,019	-7,354	12,123	0,000	
SEDIMENTACIÓN HFO 1	100%	43,621	43,621	44,512	44,512	29,250	-1,000	9,570	0,000	User Specified
USO DIARIO HFO 1	100%	65,432	65,432	66,767	66,767	29,250	1,500	9,570	0,000	User Specified
USO DIARIO HFO 2	100%	65,432	65,432	66,767	66,767	29,250	4,500	9,570	0,000	User Specified
SEDIMENTACIÓN HFO 2	100%	43,621	43,621	44,512	44,512	29,250	7,000	9,570	0,000	User Specified
S4B-TOLVA SUPERIOR B4 BABOR	97,9%	405,778	397,256	414,059	405,363	70,405	-11,318	15,562	203,826	IMO A.749(18)
S4E-TOLVA SUPERIOR B4 ESTRIBOR	97,9%	405,778	397,256	414,059	405,363	70,405	11,318	15,562	203,826	IMO A.749(18)
S5B-TOLVA SUPERIOR B5 BABOR	97,9%	9,973	9,764	10,177	9,963	43,690	-11,263	14,110	0,000	IMO A.749(18)
S5E-TOLVA SUPERIOR B5 ESTRIBOR	97,9%	9,973	9,764	10,177	9,963	43,690	11,263	14,110	0,000	IMO A.749(18)
Total HFO	98,34%	1049,608	1032,147	1071,029	1053,211	61,203	0,634	14,269	407,652	
USO DIARIO DIÉSEL 1	97,9%	28,042	27,453	33,384	32,683	29,250	-2,750	9,411	0,000	IMO A.749(18)
USO DIARIO DIÉSEL 2	97,9%	28,042	27,453	33,384	32,683	29,250	-4,250	9,411	0,000	IMO A.749(18)
ALMACÉN DIÉSEL	97,9%	93,474	91,511	111,279	108,942	29,250	-7,500	9,411	0,000	IMO A.749(18)

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
Total diésel	97,9%	149,559	146,418	178,046	174,307	29,250	-6,000	9,411	0,000	
DIÉSEL EMERGENCIA	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	IMO A.749(18)
Total diésel emergencia	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	
LNG 1	97,9%	47,695	46,693	105,989	103,763	4,571	1,270	22,363	0,000	IMO A.749(18)
LNG 2	97,9%	47,878	46,873	106,396	104,161	-0,102	1,260	22,297	122,130	IMO A.749(18)
Total LNG	97,9%	95,573	93,566	212,385	207,925	2,230	1,265	22,330	122,130	
BODEGA 1	40%	14143,902	5657,560	8004,472	3201,789	146,444	0,000	5,184	0,000	User Specified
BODEGA 2	40%	19647,964	7859,187	11119,391	4447,757	123,130	0,000	5,088	0,000	User Specified
BODEGA 3	40%	19791,814	7916,725	11200,800	4480,320	96,797	0,000	5,080	0,000	User Specified
BODEGA 4	40%	19792,254	7916,901	11201,049	4480,419	70,404	0,000	5,080	0,000	User Specified
BODEGA 5	40%	19770,505	7908,200	11188,741	4475,495	43,930	0,000	5,164	0,000	User Specified
Total bodegas	40%	93146,439	37258,574	52714,453	21085,780	93,061	0,000	5,115	0,000	
Contenedor 1	0	440,000	0,000			147,000	0,000	22,800	0,000	User Specified
Contenedor 2	0	792,000	0,000			123,500	0,000	22,800	0,000	User Specified
Contenedor 3	0	792,000	0,000			97,000	0,000	22,800	0,000	User Specified
Contenedor 4	0	792,000	0,000			70,500	0,000	22,800	0,000	User Specified
Contenedor 5	0	792,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total contenedores			0,000			0,000	0,000	0,000	0,000	
Madera 1	1	400,000	400,000			147,000	0,000	22,800	0,000	User Specified
Madera 2	1	720,000	720,000			123,500	0,000	22,800	0,000	User Specified
Madera 3	1	720,000	720,000			97,000	0,000	22,800	0,000	User Specified
Madera 4	1	720,000	720,000			70,500	0,000	22,800	0,000	User Specified
Madera 5	1	720,000	720,000			44,000	0,000	22,800	0,000	User Specified
Total madera			3280,000			91,463	0,000	22,800	0,000	
Total Loadcase			52298,159	67496,358	22904,790	86,671	-0,012	7,798	661,066	
FS correction								0,013		
VCG fluid								7,811		



Stability	
█	GZ
█	Entrada habilitación cta toldil = 40,2 deg.
█	2.2.4: Initial GMt GM at 0,0 deg = 4,528 m
█	2.3: Severe wind and rolling Wind Heeling (steady)
█	2.3: Severe wind and rolling Wind Heeling (gust)
█	Max GZ = 3,13 m at 50 deg.

Heel to Starboard deg	-30,0	-25,0	-20,0	-15,0	-10,0	-5,0	0,0	5,0	10,0	15,0	20,0	25,0
GZ m	-2,337	-2,043	-1,666	-1,215	-0,791	-0,385	0,012	0,408	0,814	1,238	1,688	2,064
Area under GZ curve from zero heel m.deg	36,3562	25,3863	16,0741	8,8639	3,8649	0,9304	0,0107	1,0483	4,0999	9,2131	16,5392	25,9534
Displacement t	52298	52298	52298	52303	52302	52301	52298	52298	52296	52294	52294	52298
Draft at FP m	12,162	11,843	11,712	11,696	11,685	11,679	11,683	11,678	11,684	11,694	11,711	11,843
Draft at AP m	12,201	12,179	12,200	12,269	12,318	12,346	12,348	12,345	12,317	12,267	12,199	12,179
WL Length m	173,986	173,914	173,885	173,882	173,880	173,878	173,879	173,878	173,879	173,881	173,885	173,914
Beam max extents on WL m	30,008	29,717	31,373	31,223	30,627	30,279	30,164	30,279	30,627	31,223	31,376	29,717
Wetted Area m^2	8532,084	8354,631	8097,605	8032,597	8025,357	8020,633	8018,687	8020,446	8024,869	8031,918	8097,068	8354,609
Waterpl. Area m^2	4360,681	4527,913	4815,062	4784,140	4699,805	4649,541	4632,534	4649,510	4699,727	4784,033	4815,327	4527,907
Prismatic coeff. (Cp)	0,829	0,821	0,816	0,813	0,812	0,811	0,810	0,811	0,812	0,813	0,816	0,821
Block coeff. (Cb)	0,555	0,587	0,584	0,619	0,674	0,736	0,791	0,736	0,674	0,619	0,584	0,587
LCB from zero pt. (+ve fwd) m	86,664	86,667	86,666	86,665	86,664	86,664	86,680	86,664	86,665	86,665	86,666	86,667
LCF from zero pt. (+ve fwd) m	82,393	83,016	83,634	83,327	83,203	83,142	83,132	83,143	83,204	83,328	83,634	83,016
Max deck inclination deg	30,0000	25,0002	20,0006	15,0011	10,0022	5,0050	0,2235	5,0050	10,0022	15,0011	20,0006	25,0002
Trim angle (+ve by stern) deg	0,0134	0,1131	0,1641	0,1926	0,2127	0,2243	0,2235	0,2243	0,2127	0,1926	0,1642	0,1131

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 49,898 m)		18,4	n/a
Deck Edge (immersion pos = 49,898 m)		18,7	n/a
Entrada habilitación cta ppal 1	Downflooding point	Not immersed in positive range	0
Aseo público cubierta	Downflooding point	Not immersed in positive range	0
Local CO2	Downflooding point	Not immersed in positive range	0
Entrada habilitación cta ppal 2	Downflooding point	Not immersed in positive range	0
Local ropa de agua	Downflooding point	Not immersed in positive range	0
Entrada habilitación cta toldil	Downflooding point	40,2	0
Entrada habilitación cta toldil	Downflooding point	Not immersed in positive range	0
Local grupo emergencia	Downflooding point	47,6	0
Entrada a cta ppal desde cta to	Downflooding point	Not immersed in positive range	0

Code	Criteria	Value	Units	Actual	Status	Margin %
267(85) Ch2 - General Criteria	2.3: IMO roll back angle	21,4	deg			
267(85) Ch2 - General Criteria	2.2.1: Area 0 to 30	3,1513	m.deg	37,0330	Pass	+1075,18
267(85) Ch2 - General Criteria	2.2.1: Area 0 to 40	5,1566	m.deg	63,2004	Pass	+1125,62
267(85) Ch2 - General Criteria	2.2.1: Area 30 to 40	1,7189	m.deg	26,1674	Pass	+1422,36
267(85) Ch2 - General Criteria	2.2.2: Max GZ at 30 or greater	0,200	m	3,130	Pass	+1465,00
267(85) Ch2 - General Criteria	2.2.3: Angle of maximum GZ	25,0	deg	50,0	Pass	+100,00
267(85) Ch2 - General Criteria	2.2.4: Initial GMt	0,150	m	4,528	Pass	+2918,67
267(85) Ch2 - General Criteria	2.3: Severe wind and rolling				Pass	
	Angle of steady heel shall not be greater than (\leq)	16,0	deg	0,4	Pass	+97,63

CONDICIÓN XII

Llegada a puerto a plena carga
(carbón) + madera sobre las
escotillas

Equilibrium calculation - D

Stability 22.01.00.131, build: 131

Model file: C:\Users\MARTA\Google Drive\TFG\Marta González\PROGRAMAS\MaxSURF\NUEVO (TFG)\D (Highest precision, 65 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 - Condición I

Damage Case - Intact

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m³)

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	10064,100	10064,100			68,650	0,000	11,800	0,000	User Specified
Total peso en rosca			10064,100			68,650	0,000	11,800	0,000	
Tripulación	20	0,125	2,500			15,000	0,000	22,000	0,000	User Specified
Pertrechos	1	40,000	40,000			90,000	0,000	15,000	0,000	User Specified
Total pesos fijos			42,500			85,588	0,000	15,412	0,000	
Viveres	0,1	3,700	0,370			17,000	0,000	20,000	0,000	User Specified
Total pesos variables			0,370			17,000	0,000	20,000	0,000	
P1-PIQUE PROA 1	0%	690,827	0,000	673,978	0,000	165,684	0,000	0,047	0,000	IMO A.749(18)
P2B-PIQUE PROA 2 BR	0%	445,266	0,000	434,406	0,000	158,040	-0,001	0,009	0,000	IMO A.749(18)
P2E-PIQUE PROA 2 ER	0%	445,266	0,000	434,406	0,000	158,040	0,001	0,009	0,000	IMO A.749(18)
S1B-TOLVA SUPERIOR B1 BAVOR	0%	436,049	0,000	425,414	0,000	139,794	-12,904	12,700	0,000	IMO A.749(18)
S1E-TOLVA SUPERIOR B1 ESTRIBOR	0%	436,049	0,000	425,414	0,000	139,794	12,904	12,700	0,000	IMO A.749(18)
I1B-TOLVA INFERIOR B1 BAVOR	0%	460,629	0,000	449,394	0,000	136,523	-0,671	0,005	0,000	IMO A.749(18)
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S2B-TOLVA SUPERIOR B2 BAVOR	0%	608,511	0,000	593,669	0,000	123,728	-14,225	12,700	0,000	IMO A.749(18)
S2E-TOLVA SUPERIOR B2 ESTRIBOR	0%	608,511	0,000	593,669	0,000	123,728	14,225	12,700	0,000	IMO A.749(18)
I2B-TOLVA INFERIOR B2 BAVOR	0%	831,819	0,000	811,530	0,000	111,611	-1,566	0,000	0,000	IMO A.749(18)
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S3B-TOLVA SUPERIOR B3 BAVOR	0%	608,593	0,000	593,750	0,000	96,777	-14,339	12,700	0,000	IMO A.749(18)
S3E-TOLVA SUPERIOR B3 ESTRIBOR	0%	608,593	0,000	593,750	0,000	96,777	14,339	12,700	0,000	IMO A.749(18)
I3B-TOLVA INFERIOR B3 BAVOR	0%	866,904	0,000	845,760	0,000	95,275	-2,938	0,000	0,000	IMO A.749(18)
I3E-TOLVA INFERIOR B3 ESTRIBOR	0%	866,904	0,000	845,760	0,000	95,275	2,938	0,000	0,000	IMO A.749(18)
I4B-TOLVA INFERIOR B4 BAVOR	0%	860,892	0,000	839,895	0,000	77,837	-2,284	0,000	0,000	IMO A.749(18)
I4E-TOLVA INFERIOR B4 ESTRIBOR	0%	860,892	0,000	839,895	0,000	77,837	2,284	0,000	0,000	IMO A.749(18)

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
I5B-TOLVA INFERIOR B5 BABOR	0%	769,640	0,000	750,868	0,000	54,943	-1,029	0,000	0,000	IMO A.749(18)
I5E-TOLVA INFERIOR B5 ESTRIBOR	0%	769,640	0,000	750,868	0,000	54,943	1,029	0,000	0,000	IMO A.749(18)
PIQUE POPA BABOR	0%	271,223	0,000	264,608	0,000	8,299	-4,606	9,140	0,000	User Specified
PIQUE POPA ESTRIBOR	0%	271,223	0,000	264,608	0,000	8,299	4,606	9,140	0,000	User Specified
Total lastre	0%	13009,878	0,000	12692,564	0,000	0,000	0,000	0,000	0,000	
ADB-AGUA DULCE BABOR	10%	121,659	12,166	121,659	12,166	7,492	-7,942	13,365	131,287	IMO A.749(18)
ADE-AGUA DULCE ESTRIBOR	10%	74,189	7,419	74,189	7,419	6,554	7,777	13,370	0,000	IMO A.749(18)
ATE-AGUA TÉCNICA ESTRIBOR	10%	47,476	4,748	47,476	4,748	8,887	8,188	13,358	0,000	User Specified
Total agua	10%	243,325	24,332	243,325	24,332	7,478	-0,002	13,366	131,287	
REFRIGERACIÓN EJE	100%	67,303	67,303	67,303	67,303	8,597	0,000	3,839	0,000	User Specified
LODOS	100%	22,540	22,540	22,540	22,540	11,375	0,000	1,532	0,000	User Specified
REBOSES HFO BR	100%	15,908	15,908	16,233	16,233	18,841	-5,025	1,382	0,000	User Specified
REBOSES ACEITE ER	100%	22,443	22,443	24,395	24,395	18,954	5,046	1,380	0,000	User Specified
AGUAS ACEITOSAS	100%	14,763	14,763	16,170	16,170	23,625	0,000	1,500	0,000	User Specified
SENTINAS	100%	7,974	7,974	8,734	8,734	28,875	0,000	1,010	0,000	User Specified
AGUAS RESIDUALES	100%	152,063	152,063	152,063	152,063	12,650	10,081	13,659	0,000	User Specified
Total misceláneos	100%	302,994	302,994	307,437	307,437	13,409	5,169	8,096	0,000	
SERVICIO ACEITE CILINDROS	10%	5,428	0,543	5,900	0,590	11,000	-5,750	9,183	0,000	User Specified
ALMACÉN ACEITE CILINDROS	10%	32,440	3,244	35,260	3,526	11,000	-5,750	10,257	0,000	User Specified
ALMACÉN ACEITE 1	10%	17,009	1,701	18,488	1,849	11,178	-8,241	9,558	0,000	User Specified
ALMACÉN ACEITE 2	10%	13,153	1,315	14,297	1,430	11,268	-9,962	10,577	0,000	User Specified
Total aceite	10%	68,030	6,803	73,945	7,395	11,096	-7,187	10,058	0,000	
SEDIMENTACIÓN HFO 1	0%	43,621	0,000	44,512	0,000	29,250	-1,000	2,000	0,000	User Specified
USO DIARIO HFO 1	80,24%	65,432	52,500	66,767	53,571	29,250	1,500	8,074	0,000	User Specified
USO DIARIO HFO 2	80,24%	65,432	52,500	66,767	53,571	29,250	4,500	8,074	0,000	User Specified
SEDIMENTACIÓN HFO 2	0%	43,621	0,000	44,512	0,000	29,250	7,000	2,000	0,000	User Specified
S4B-TOLVA SUPERIOR B4 BABOR	0%	405,778	0,000	414,059	0,000	71,250	-13,611	12,700	0,000	IMO A.749(18)
S4E-TOLVA SUPERIOR B4 ESTRIBOR	0%	405,778	0,000	414,059	0,000	71,250	13,611	12,700	0,000	IMO A.749(18)
S5B-TOLVA SUPERIOR B5 BABOR	0%	9,973	0,000	10,177	0,000	44,162	-14,104	12,700	0,000	IMO A.749(18)
S5E-TOLVA SUPERIOR B5 ESTRIBOR	0%	9,973	0,000	10,177	0,000	44,162	14,104	12,700	0,000	IMO A.749(18)
Total HFO	10%	1049,608	105,000	1071,029	107,143	29,250	3,000	8,074	0,000	
USO DIARIO DIÉSEL 1	26,75%	28,042	7,500	33,384	8,929	29,250	-2,750	4,025	0,000	IMO A.749(18)
USO DIARIO DIÉSEL 2	26,75%	28,042	7,500	33,384	8,929	29,250	-4,250	4,025	0,000	IMO A.749(18)
ALMACÉN DIÉSEL	0%	93,474	0,000	111,279	0,000	29,250	-7,500	2,000	0,000	IMO A.749(18)

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
Total diésel	10,03%	149,559	15,000	178,046	17,857	29,250	-3,500	4,025	0,000	
DIÉSEL EMERGENCIA	10%	2,666	0,267	3,174	0,317	8,267	-7,570	20,260	0,000	IMO A.749(18)
Total diésel emergencia	10%	2,666	0,267	3,174	0,317	8,267	-7,570	20,260	0,000	
LNG 1	10%	47,695	4,770	105,989	10,599	4,549	1,266	20,938	0,000	IMO A.749(18)
LNG 2	10%	47,878	4,788	106,396	10,640	-0,067	1,235	20,762	122,134	IMO A.749(18)
Total LNG	10%	95,573	9,557	212,385	21,238	2,237	1,251	20,850	122,134	
BODEGA 1	40%	14143,902	5657,562	8004,472	3201,789	146,444	0,000	5,184	0,000	User Specified
BODEGA 2	40%	19647,964	7859,185	11119,391	4447,756	123,130	0,000	5,088	0,000	User Specified
BODEGA 3	40%	19791,814	7916,726	11200,800	4480,320	96,797	0,000	5,080	0,000	User Specified
BODEGA 4	40%	19792,254	7916,902	11201,049	4480,420	70,404	0,000	5,080	0,000	User Specified
BODEGA 5	40%	19770,505	7908,201	11188,741	4475,496	43,930	0,000	5,164	0,000	User Specified
Total bodegas	40%	93146,439	37258,575	52714,453	21085,781	93,061	0,000	5,115	0,000	
Contenedor 1	0	440,000	0,000			147,000	0,000	22,800	0,000	User Specified
Contenedor 2	0	792,000	0,000			123,500	0,000	22,800	0,000	User Specified
Contenedor 3	0	792,000	0,000			97,000	0,000	22,800	0,000	User Specified
Contenedor 4	0	792,000	0,000			70,500	0,000	22,800	0,000	User Specified
Contenedor 5	0	792,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total contenedores			0,000			0,000	0,000	0,000	0,000	
Madera 1	1	400,000	400,000			147,000	0,000	22,800	0,000	User Specified
Madera 2	1	720,000	720,000			123,500	0,000	22,800	0,000	User Specified
Madera 3	1	720,000	720,000			97,000	0,000	22,800	0,000	User Specified
Madera 4	1	720,000	720,000			70,500	0,000	22,800	0,000	User Specified
Madera 5	1	720,000	720,000			44,000	0,000	22,800	0,000	User Specified
Total madera			3280,000			91,463	0,000	22,800	0,000	
Total Loadcase			51109,499	67496,358	21571,501	87,454	0,035	7,606	253,421	
FS correction								0,005		
VCG fluid								7,611		

Draft Amidships m	11,771
Displacement t	51111
Heel deg	0,4
Draft at FP m	11,753
Draft at AP m	11,790

Draft at LCF m	11,772
Trim (+ve by stern) m	0,038
WL Length m	173,894
Beam max extents on WL m	30,164
Wetted Area m ²	7915,732
Waterpl. Area m ²	4602,800
Prismatic coeff. (Cp)	0,811
Block coeff. (Cb)	0,802
Max Sect. area coeff. (Cm)	0,988
Waterpl. area coeff. (Cwp)	0,877
LCB from zero pt. (+ve fwd) m	87,453
LCF from zero pt. (+ve fwd) m	83,654
KB m	6,078
KG fluid m	7,611
BMt m	6,235
BML m	187,742
GMt corrected m	4,702
GML m	186,209
KMt m	12,313
KML m	193,815
Immersion (TPc) tonne/cm	47,179
MTc tonne.m	558,532
RM at 1deg = GMt.Disp.sin(1) tonne.m	4194,299
Max deck inclination deg	0,4270
Trim angle (+ve by stern) deg	0,0126

Key point	Type	Freeboard m
Margin Line (freeboard pos = 44,716 m)		5,172
Deck Edge (freeboard pos = 44,716 m)		5,248
Entrada habilitación cta ppal 1	Downflooding point	6,841
Aseo público cubierta	Downflooding point	6,862
Local CO2	Downflooding point	6,873
Entrada habilitación cta ppal 2	Downflooding point	6,886
Local ropa de agua	Downflooding point	6,903
Entrada habilitación cta toldil	Downflooding point	9,567
Entrada habilitación cta toldil	Downflooding point	9,723
Local grupo emergencia	Downflooding point	9,585
Entrada a cta ppal desde cta to	Downflooding point	9,684

Stability calculation - D

Stability 22.01.00.131, build: 131

Model file: C:\Users\MARTA\Google Drive\TFG\Marta González\PROGRAMAS\MaxSURF\NUEVO (TFG)\D (Highest precision, 65 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 - Condición I

Damage Case - Intact

Free to Trim

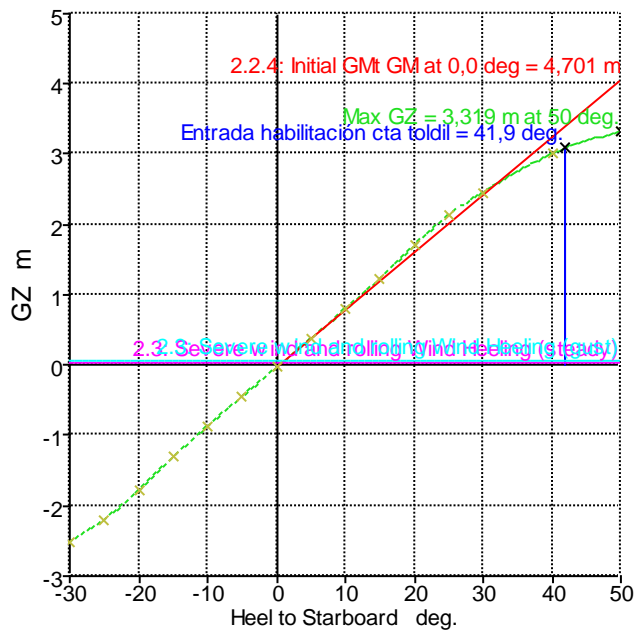
Specific gravity = 1,025; (Density = 1,025 tonne/m³)

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	10064,100	10064,100			68,650	0,000	11,800	0,000	User Specified
Total peso en rosca			10064,100			68,650	0,000	11,800	0,000	
Tripulación	20	0,125	2,500			15,000	0,000	22,000	0,000	User Specified
Pertrechos	1	40,000	40,000			90,000	0,000	15,000	0,000	User Specified
Total pesos fijos			42,500			85,588	0,000	15,412	0,000	
Viveres	0,1	3,700	0,370			17,000	0,000	20,000	0,000	User Specified
Total pesos variables			0,370			17,000	0,000	20,000	0,000	
P1-PIQUE PROA 1	0%	690,827	0,000	673,978	0,000	165,684	0,000	0,047	0,000	IMO A.749(18)
P2B-PIQUE PROA 2 BR	0%	445,266	0,000	434,406	0,000	158,040	-0,001	0,009	0,000	IMO A.749(18)
P2E-PIQUE PROA 2 ER	0%	445,266	0,000	434,406	0,000	158,040	0,001	0,009	0,000	IMO A.749(18)
S1B-TOLVA SUPERIOR B1 BAVOR	0%	436,049	0,000	425,414	0,000	139,794	-12,904	12,700	0,000	IMO A.749(18)
S1E-TOLVA SUPERIOR B1 ESTRIBOR	0%	436,049	0,000	425,414	0,000	139,794	12,904	12,700	0,000	IMO A.749(18)
I1B-TOLVA INFERIOR B1 BAVOR	0%	460,629	0,000	449,394	0,000	136,523	-0,671	0,005	0,000	IMO A.749(18)
I1E-TOLVA INFERIOR B1 ESTRIBOR	0%	460,629	0,000	449,394	0,000	136,523	0,671	0,005	0,000	IMO A.749(18)
S2B-TOLVA SUPERIOR B2 BAVOR	0%	608,511	0,000	593,669	0,000	123,728	-14,225	12,700	0,000	IMO A.749(18)
S2E-TOLVA SUPERIOR B2 ESTRIBOR	0%	608,511	0,000	593,669	0,000	123,728	14,225	12,700	0,000	IMO A.749(18)
I2B-TOLVA INFERIOR B2 BAVOR	0%	831,819	0,000	811,530	0,000	111,611	-1,566	0,000	0,000	IMO A.749(18)
I2E-TOLVA INFERIOR B2 ESTRIBOR	0%	831,819	0,000	811,530	0,000	111,611	1,566	0,000	0,000	IMO A.749(18)
S3B-TOLVA SUPERIOR B3 BAVOR	0%	608,593	0,000	593,750	0,000	96,777	-14,339	12,700	0,000	IMO A.749(18)
S3E-TOLVA SUPERIOR B3 ESTRIBOR	0%	608,593	0,000	593,750	0,000	96,777	14,339	12,700	0,000	IMO A.749(18)
I3B-TOLVA INFERIOR B3 BAVOR	0%	866,904	0,000	845,760	0,000	95,275	-2,938	0,000	0,000	IMO A.749(18)
I3E-TOLVA INFERIOR B3 ESTRIBOR	0%	866,904	0,000	845,760	0,000	95,275	2,938	0,000	0,000	IMO A.749(18)
I4B-TOLVA INFERIOR B4 BAVOR	0%	860,892	0,000	839,895	0,000	77,837	-2,284	0,000	0,000	IMO A.749(18)
I4E-TOLVA INFERIOR B4 ESTRIBOR	0%	860,892	0,000	839,895	0,000	77,837	2,284	0,000	0,000	IMO A.749(18)

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
I5B-TOLVA INFERIOR B5 BABOR	0%	769,640	0,000	750,868	0,000	54,943	-1,029	0,000	0,000	IMO A.749(18)
I5E-TOLVA INFERIOR B5 ESTRIBOR	0%	769,640	0,000	750,868	0,000	54,943	1,029	0,000	0,000	IMO A.749(18)
PIQUE POPA BABOR	0%	271,223	0,000	264,608	0,000	8,299	-4,606	9,140	0,000	User Specified
PIQUE POPA ESTRIBOR	0%	271,223	0,000	264,608	0,000	8,299	4,606	9,140	0,000	User Specified
Total lastre	0%	13009,878	0,000	12692,564	0,000	0,000	0,000	0,000	0,000	
ADB-AGUA DULCE BABOR	10%	121,659	12,166	121,659	12,166	7,492	-7,942	13,365	131,283	IMO A.749(18)
ADE-AGUA DULCE ESTRIBOR	10%	74,189	7,419	74,189	7,419	6,554	7,777	13,370	0,000	IMO A.749(18)
ATE-AGUA TÉCNICA ESTRIBOR	10%	47,476	4,748	47,476	4,748	8,887	8,188	13,358	0,000	User Specified
Total agua	10%	243,325	24,332	243,325	24,332	7,478	-0,002	13,366	131,283	
REFRIGERACIÓN EJE	100%	67,303	67,303	67,303	67,303	8,597	0,000	3,839	0,000	User Specified
LODOS	100%	22,540	22,540	22,540	22,540	11,375	0,000	1,532	0,000	User Specified
REBOSES HFO BR	100%	15,908	15,908	16,233	16,233	18,841	-5,025	1,382	0,000	User Specified
REBOSES ACEITE ER	100%	22,443	22,443	24,395	24,395	18,954	5,046	1,380	0,000	User Specified
AGUAS ACEITOSAS	100%	14,763	14,763	16,170	16,170	23,625	0,000	1,500	0,000	User Specified
SENTINAS	100%	7,974	7,974	8,734	8,734	28,875	0,000	1,010	0,000	User Specified
AGUAS RESIDUALES	100%	152,063	152,063	152,063	152,063	12,650	10,081	13,659	0,000	User Specified
Total misceláneos	100%	302,994	302,994	307,437	307,437	13,409	5,169	8,096	0,000	
SERVICIO ACEITE CILINDROS	10%	5,428	0,543	5,900	0,590	11,000	-5,750	9,183	0,000	User Specified
ALMACÉN ACEITE CILINDROS	10%	32,440	3,244	35,260	3,526	11,000	-5,750	10,257	0,000	User Specified
ALMACÉN ACEITE 1	10%	17,009	1,701	18,488	1,849	11,178	-8,241	9,558	0,000	User Specified
ALMACÉN ACEITE 2	10%	13,153	1,315	14,297	1,430	11,268	-9,962	10,577	0,000	User Specified
Total aceite	10%	68,030	6,803	73,945	7,395	11,096	-7,187	10,058	0,000	
SEDIMENTACIÓN HFO 1	0%	43,621	0,000	44,512	0,000	29,250	-1,000	2,000	0,000	User Specified
USO DIARIO HFO 1	80,24%	65,432	52,500	66,767	53,571	29,250	1,500	8,074	0,000	User Specified
USO DIARIO HFO 2	80,24%	65,432	52,500	66,767	53,571	29,250	4,500	8,074	0,000	User Specified
SEDIMENTACIÓN HFO 2	0%	43,621	0,000	44,512	0,000	29,250	7,000	2,000	0,000	User Specified
S4B-TOLVA SUPERIOR B4 BABOR	0%	405,778	0,000	414,059	0,000	71,250	-13,611	12,700	0,000	IMO A.749(18)
S4E-TOLVA SUPERIOR B4 ESTRIBOR	0%	405,778	0,000	414,059	0,000	71,250	13,611	12,700	0,000	IMO A.749(18)
S5B-TOLVA SUPERIOR B5 BABOR	0%	9,973	0,000	10,177	0,000	44,162	-14,104	12,700	0,000	IMO A.749(18)
S5E-TOLVA SUPERIOR B5 ESTRIBOR	0%	9,973	0,000	10,177	0,000	44,162	14,104	12,700	0,000	IMO A.749(18)
Total HFO	10%	1049,608	105,000	1071,029	107,143	29,250	3,000	8,074	0,000	
USO DIARIO DIÉSEL 1	26,75%	28,042	7,500	33,384	8,929	29,250	-2,750	4,025	0,000	IMO A.749(18)
USO DIARIO DIÉSEL 2	26,75%	28,042	7,500	33,384	8,929	29,250	-4,250	4,025	0,000	IMO A.749(18)
ALMACÉN DIÉSEL	0%	93,474	0,000	111,279	0,000	29,250	-7,500	2,000	0,000	IMO A.749(18)

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
Total diésel	10,03%	149,559	15,000	178,046	17,857	29,250	-3,500	4,025	0,000	
DIÉSEL EMERGENCIA	10%	2,666	0,267	3,174	0,317	8,267	-7,570	20,260	0,000	IMO A.749(18)
Total diésel emergencia	10%	2,666	0,267	3,174	0,317	8,267	-7,570	20,260	0,000	
LNG 1	10%	47,695	4,770	105,989	10,599	4,549	1,266	20,938	0,000	IMO A.749(18)
LNG 2	10%	47,878	4,788	106,396	10,640	-0,067	1,235	20,762	122,130	IMO A.749(18)
Total LNG	10%	95,573	9,557	212,385	21,238	2,237	1,251	20,850	122,130	
BODEGA 1	40%	14143,902	5657,560	8004,472	3201,788	146,444	0,000	5,184	0,000	User Specified
BODEGA 2	40%	19647,964	7859,187	11119,391	4447,757	123,130	0,000	5,088	0,000	User Specified
BODEGA 3	40%	19791,814	7916,726	11200,800	4480,320	96,797	0,000	5,080	0,000	User Specified
BODEGA 4	40%	19792,254	7916,902	11201,049	4480,420	70,404	0,000	5,080	0,000	User Specified
BODEGA 5	40%	19770,505	7908,201	11188,741	4475,496	43,930	0,000	5,164	0,000	User Specified
Total bodegas	40%	93146,439	37258,576	52714,453	21085,781	93,061	0,000	5,115	0,000	
Contenedor 1	0	440,000	0,000			147,000	0,000	22,800	0,000	User Specified
Contenedor 2	0	792,000	0,000			123,500	0,000	22,800	0,000	User Specified
Contenedor 3	0	792,000	0,000			97,000	0,000	22,800	0,000	User Specified
Contenedor 4	0	792,000	0,000			70,500	0,000	22,800	0,000	User Specified
Contenedor 5	0	792,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total contenedores			0,000			0,000	0,000	0,000	0,000	
Madera 1	1	400,000	400,000			147,000	0,000	22,800	0,000	User Specified
Madera 2	1	720,000	720,000			123,500	0,000	22,800	0,000	User Specified
Madera 3	1	720,000	720,000			97,000	0,000	22,800	0,000	User Specified
Madera 4	1	720,000	720,000			70,500	0,000	22,800	0,000	User Specified
Madera 5	1	720,000	720,000			44,000	0,000	22,800	0,000	User Specified
Total madera			3280,000			91,463	0,000	22,800	0,000	
Total Loadcase			51109,499	67496,358	21571,501	87,454	0,035	7,606	253,414	
FS correction								0,005		
VCG fluid								7,611		



Stability	
Green line	GZ
Blue vertical line	Entrada habilitación cta toldil = 41,9 deg.
Red horizontal line	2.2.4: Initial GMT GM at 0,0 deg = 4,701 m
Magenta horizontal line	2.3: Severe wind and rolling Wind Heeling (steady)
Cyan horizontal line	2.3: Severe wind and rolling Wind Heeling (gust)
Yellow point	Max GZ = 3,319 m at 50 deg.

Heel to Starboard deg	-30,0	-25,0	-20,0	-15,0	-10,0	-5,0	0,0	5,0	10,0	15,0	20,0	25,0
GZ m	-2,517	-2,192	-1,775	-1,306	-0,867	-0,447	-0,035	0,377	0,798	1,238	1,709	2,128
Area under GZ curve from zero heel m.deg	39,3532	27,5568	17,6017	9,8990	4,4815	1,2020	-0,0318	0,8522	3,7848	8,8599	16,2319	25,8556
Displacement t	51109	51109	51109	51113	51112	51111	51110	51110	51108	51107	51106	51109
Draft at FP m	12,223	11,913	11,790	11,774	11,762	11,755	11,758	11,754	11,761	11,772	11,789	11,913
Draft at AP m	11,552	11,564	11,623	11,700	11,752	11,781	11,784	11,780	11,751	11,699	11,623	11,564
WL Length m	174,001	173,930	173,902	173,898	173,896	173,894	173,895	173,894	173,896	173,898	173,902	173,930
Beam max extents on WL m	30,253	29,462	31,957	31,222	30,626	30,278	30,163	30,278	30,626	31,222	31,959	29,462
Wetted Area m^2	8401,215	8218,257	7956,643	7933,052	7922,978	7917,426	7915,364	7917,302	7922,653	7932,584	7956,251	8218,234
Waterpl. Area m^2	4409,131	4579,594	4865,944	4756,287	4669,830	4619,267	4602,351	4619,243	4669,768	4756,200	4866,078	4579,593
Prismatic coeff. (Cp)	0,823	0,819	0,815	0,813	0,812	0,811	0,811	0,811	0,812	0,813	0,815	0,819
Block coeff. (Cb)	0,545	0,587	0,568	0,615	0,670	0,734	0,807	0,734	0,670	0,615	0,568	0,587
LCB from zero pt. (+ve fwd) m	87,456	87,457	87,455	87,454	87,454	87,454	87,467	87,454	87,454	87,455	87,456	87,457
LCF from zero pt. (+ve fwd) m	82,539	83,174	83,851	83,794	83,718	83,671	83,661	83,671	83,719	83,795	83,852	83,174
Max deck inclination deg	30,0006	25,0002	20,0001	15,0000	10,0000	5,0000	0,0087	5,0000	10,0000	15,0000	20,0001	25,0002
Trim angle (+ve by stern) deg	-0,2258	-0,1173	-0,0559	-0,0247	-0,0035	0,0087	0,0087	0,0087	-0,0034	-0,0247	-0,0559	-0,1173

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 122,534 m)		19,5	n/a
Deck Edge (immersion pos = 122,534 m)		19,7	n/a
Entrada habilitación cta ppal 1	Downflooding point	Not immersed in positive range	0
Aseo público cubierta	Downflooding point	Not immersed in positive range	0
Local CO2	Downflooding point	Not immersed in positive range	0
Entrada habilitación cta ppal 2	Downflooding point	Not immersed in positive range	0
Local ropa de agua	Downflooding point	Not immersed in positive range	0
Entrada habilitación cta toldil	Downflooding point	41,9	0
Entrada habilitación cta toldil	Downflooding point	Not immersed in positive range	0
Local grupo emergencia	Downflooding point	50	0
Entrada a cta ppal desde cta to	Downflooding point	Not immersed in positive range	0

Code	Criteria	Value	Units	Actual	Status	Margin %
267(85) Ch2 - General Criteria	2.3: IMO roll back angle	21,3	deg			
267(85) Ch2 - General Criteria	2.2.1: Area 0 to 30	3,1513	m.deg	37,3469	Pass	+1085,14
267(85) Ch2 - General Criteria	2.2.1: Area 0 to 40	5,1566	m.deg	64,7878	Pass	+1156,40
267(85) Ch2 - General Criteria	2.2.1: Area 30 to 40	1,7189	m.deg	27,4409	Pass	+1496,44
267(85) Ch2 - General Criteria	2.2.2: Max GZ at 30 or greater	0,200	m	3,319	Pass	+1559,50
267(85) Ch2 - General Criteria	2.2.3: Angle of maximum GZ	25,0	deg	50,0	Pass	+100,00
267(85) Ch2 - General Criteria	2.2.4: Initial GMt	0,150	m	4,701	Pass	+3034,00
267(85) Ch2 - General Criteria	2.3: Severe wind and rolling				Pass	
	Angle of steady heel shall not be greater than (\leq)	16,0	deg	0,9	Pass	+94,06

CONDICIÓN XIII

Salida de puerto a plena carga
(mineral)

Equilibrium calculation - D

Stability 22.01.00.131, build: 131

Model file: C:\Users\MARTA\Google Drive\TFG\Marta González\PROGRAMAS\MaxSURFNUEVO (TFG)\D (Highest precision, 65 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 - Condición I

Damage Case - Intact

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m³)

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	10064,100	10064,100			68,650	0,000	11,800	0,000	User Specified
Total peso en rosca			10064,100			68,650	0,000	11,800	0,000	
Tripulación	20	0,125	2,500			15,000	0,000	22,000	0,000	User Specified
Pertrechos	1	40,000	40,000			90,000	0,000	15,000	0,000	User Specified
Total pesos fijos			42,500			85,588	0,000	15,412	0,000	
Viveres	1	3,700	3,700			17,000	0,000	20,000	0,000	User Specified
Total pesos variables			3,700			17,000	0,000	20,000	0,000	
P1-PIQUE PROA 1	0%	690,827	0,000	673,978	0,000	165,684	0,000	0,047	0,000	IMO A.749(18)
P2B-PIQUE PROA 2 BR	0%	445,266	0,000	434,406	0,000	158,040	-0,001	0,009	0,000	IMO A.749(18)
P2E-PIQUE PROA 2 ER	0%	445,266	0,000	434,406	0,000	158,040	0,001	0,009	0,000	IMO A.749(18)
S1B-TOLVA SUPERIOR B1 BABOR	0%	436,049	0,000	425,414	0,000	139,794	-12,904	12,700	0,000	IMO A.749(18)
S1E-TOLVA SUPERIOR B1 ESTRIBOR	0%	436,049	0,000	425,414	0,000	139,794	12,904	12,700	0,000	IMO A.749(18)
I1B-TOLVA INFERIOR B1 BABOR	0%	460,629	0,000	449,394	0,000	136,523	-0,671	0,005	0,000	IMO A.749(18)
I1E-TOLVA INFERIOR B1 ESTRIBOR	0%	460,629	0,000	449,394	0,000	136,523	0,671	0,005	0,000	IMO A.749(18)
S2B-TOLVA SUPERIOR B2 BABOR	0%	608,511	0,000	593,669	0,000	123,728	-14,225	12,700	0,000	IMO A.749(18)
S2E-TOLVA SUPERIOR B2 ESTRIBOR	0%	608,511	0,000	593,669	0,000	123,728	14,225	12,700	0,000	IMO A.749(18)
I2B-TOLVA INFERIOR B2 BABOR	0%	831,819	0,000	811,530	0,000	111,611	-1,566	0,000	0,000	IMO A.749(18)
I2E-TOLVA INFERIOR B2 ESTRIBOR	0%	831,819	0,000	811,530	0,000	111,611	1,566	0,000	0,000	IMO A.749(18)
S3B-TOLVA SUPERIOR B3 BABOR	0%	608,593	0,000	593,750	0,000	96,777	-14,339	12,700	0,000	IMO A.749(18)
S3E-TOLVA SUPERIOR B3 ESTRIBOR	0%	608,593	0,000	593,750	0,000	96,777	14,339	12,700	0,000	IMO A.749(18)
I3B-TOLVA INFERIOR B3 BABOR	0%	866,904	0,000	845,760	0,000	95,275	-2,938	0,000	0,000	IMO A.749(18)
I3E-TOLVA INFERIOR B3 ESTRIBOR	0%	866,904	0,000	845,760	0,000	95,275	2,938	0,000	0,000	IMO A.749(18)

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
I4B-TOLVA INFERIOR B4 BABOR	0%	860,892	0,000	839,895	0,000	77,837	-2,284	0,000	0,000	IMO A.749(18)
I4E-TOLVA INFERIOR B4 ESTRIBOR	0%	860,892	0,000	839,895	0,000	77,837	2,284	0,000	0,000	IMO A.749(18)
I5B-TOLVA INFERIOR B5 BABOR	0%	769,640	0,000	750,868	0,000	54,943	-1,029	0,000	0,000	IMO A.749(18)
I5E-TOLVA INFERIOR B5 ESTRIBOR	0%	769,640	0,000	750,868	0,000	54,943	1,029	0,000	0,000	IMO A.749(18)
PIQUE POPA BABOR	0%	271,223	0,000	264,608	0,000	8,299	-4,606	9,140	0,000	User Specified
PIQUE POPA ESTRIBOR	0%	271,223	0,000	264,608	0,000	8,299	4,606	9,140	0,000	User Specified
Total lastre	0%	13009,878	0,000	12692,564	0,000	0,000	0,000	0,000	0,000	
ADB-AGUA DULCE BABOR	97,9%	121,659	119,104	121,659	119,104	7,451	-8,283	15,165	131,283	IMO A.749(18)
ADE-AGUA DULCE ESTRIBOR	97,9%	74,189	72,631	74,189	72,631	6,534	8,168	15,176	0,000	IMO A.749(18)
ATE-AGUA TÉCNICA ESTRIBOR	100%	47,476	47,476	47,476	47,476	8,883	8,468	15,189	0,000	User Specified
Total agua	98,31%	243,325	239,212	243,325	239,212	7,457	0,036	15,173	131,283	
REFRIGERACIÓN EJE	100%	67,303	67,303	67,303	67,303	8,597	0,000	3,839	0,000	User Specified
LODOS	0%	22,540	0,000	22,540	0,000	11,401	0,000	1,000	0,000	User Specified
REBOSOS HFO BR	0%	15,908	0,000	16,233	0,000	20,233	-2,001	0,313	0,000	User Specified
REBOSOS ACEITE ER	0%	22,443	0,000	24,395	0,000	20,974	2,001	0,291	0,000	User Specified
AGUAS ACEITOSAS	0%	14,763	0,000	16,170	0,000	23,625	0,000	1,000	0,000	User Specified
SENTINAS	0%	7,974	0,000	8,734	0,000	28,919	0,000	0,000	0,000	User Specified
AGUAS RESIDUALES	0%	152,063	0,000	152,063	0,000	13,523	8,989	9,140	0,000	User Specified
Total misceláneos	22,21%	302,994	67,303	307,437	67,303	8,597	0,000	3,839	0,000	
SERVICIO ACEITE CILINDROS	100%	5,428	5,428	5,900	5,900	11,000	-5,750	9,570	0,000	User Specified
ALMACÉN ACEITE CILINDROS	100%	32,440	32,440	35,260	35,260	11,000	-5,750	12,570	0,000	User Specified
ALMACÉN ACEITE 1	100%	17,009	17,009	18,488	18,488	11,021	-8,471	11,771	0,000	User Specified
ALMACÉN ACEITE 2	100%	13,153	13,153	14,297	14,297	11,071	-10,529	12,530	0,000	User Specified
Total aceite	100%	68,030	68,030	73,945	73,945	11,019	-7,354	12,123	0,000	
SEDIMENTACIÓN HFO 1	100%	43,621	43,621	44,512	44,512	29,250	-1,000	9,570	0,000	User Specified
USO DIARIO HFO 1	100%	65,432	65,432	66,767	66,767	29,250	1,500	9,570	0,000	User Specified
USO DIARIO HFO 2	100%	65,432	65,432	66,767	66,767	29,250	4,500	9,570	0,000	User Specified
SEDIMENTACIÓN HFO 2	100%	43,621	43,621	44,512	44,512	29,250	7,000	9,570	0,000	User Specified
S4B-TOLVA SUPERIOR B4 BABOR	97,9%	405,778	397,256	414,059	405,363	70,405	-11,318	15,562	203,826	IMO A.749(18)
S4E-TOLVA SUPERIOR B4 ESTRIBOR	97,9%	405,778	397,256	414,059	405,363	70,405	11,318	15,562	203,826	IMO A.749(18)
S5B-TOLVA SUPERIOR B5 BABOR	97,9%	9,973	9,764	10,177	9,963	43,690	-11,263	14,110	0,000	IMO A.749(18)
S5E-TOLVA SUPERIOR B5 ESTRIBOR	97,9%	9,973	9,764	10,177	9,963	43,690	11,263	14,110	0,000	IMO A.749(18)
Total HFO	98,34%	1049,608	1032,147	1071,029	1053,211	61,203	0,634	14,269	407,652	
USO DIARIO DIÉSEL 1	97,9%	28,042	27,453	33,384	32,683	29,250	-2,750	9,411	0,000	IMO A.749(18)

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
USO DIARIO DIÉSEL 2	97,9%	28,042	27,453	33,384	32,683	29,250	-4,250	9,411	0,000	IMO A.749(18)
ALMACÉN DIÉSEL	97,9%	93,474	91,511	111,279	108,942	29,250	-7,500	9,411	0,000	IMO A.749(18)
Total diésel	97,9%	149,559	146,418	178,046	174,307	29,250	-6,000	9,411	0,000	
DIÉSEL EMERGENCIA	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	IMO A.749(18)
Total diésel emergencia	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	
LNG 1	97,9%	47,695	46,693	105,989	103,763	4,571	1,270	22,363	0,000	IMO A.749(18)
LNG 2	97,9%	47,878	46,873	106,396	104,161	-0,102	1,260	22,297	122,130	IMO A.749(18)
Total LNG	97,9%	95,573	93,566	212,385	207,925	2,230	1,265	22,330	122,130	
BODEGA 1	25%	25013,975	6253,493	8004,472	2001,118	146,394	0,000	4,076	0,000	User Specified
BODEGA 2	25%	34748,097	8687,024	11119,391	2779,848	123,118	0,000	4,000	0,000	User Specified
BODEGA 3	25%	35002,500	8750,626	11200,800	2800,200	96,798	0,000	3,995	0,000	User Specified
BODEGA 4	25%	35003,279	8750,823	11201,049	2800,263	70,402	0,000	3,995	0,000	User Specified
BODEGA 5	25%	34964,815	8741,202	11188,741	2797,185	44,016	0,000	4,066	0,000	User Specified
Total bodegas	25%	164732,667	41183,168	52714,453	13178,614	93,069	0,000	4,023	0,000	
Contenedor 1	0	440,000	0,000			147,000	0,000	22,800	0,000	User Specified
Contenedor 2	0	792,000	0,000			123,500	0,000	22,800	0,000	User Specified
Contenedor 3	0	792,000	0,000			97,000	0,000	22,800	0,000	User Specified
Contenedor 4	0	792,000	0,000			70,500	0,000	22,800	0,000	User Specified
Contenedor 5	0	792,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total contenedores			0,000			0,000	0,000	0,000	0,000	
Madera 1	0	400,000	0,000			147,000	0,000	22,800	0,000	User Specified
Madera 2	0	720,000	0,000			123,500	0,000	22,800	0,000	User Specified
Madera 3	0	720,000	0,000			97,000	0,000	22,800	0,000	User Specified
Madera 4	0	720,000	0,000			70,500	0,000	22,800	0,000	User Specified
Madera 5	0	720,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total madera			0,000			0,000	0,000	0,000	0,000	
Total Loadcase			52942,753	67496,358	14997,624	86,854	-0,012	5,820	661,066	
FS correction								0,012		
VCG fluid								5,833		

Draft Amidships m	12,154
Displacement t	52943
Heel deg	0,0

Draft at FP m	11,922
Draft at AP m	12,385
Draft at LCF m	12,159
Trim (+ve by stern) m	0,464
WL Length m	173,932
Beam max extents on WL m	30,165
Wetted Area m ²	8067,251
Waterpl. Area m ²	4637,290
Prismatic coeff. (Cp)	0,812
Block coeff. (Cb)	0,797
Max Sect. area coeff. (Cm)	0,995
Waterpl. area coeff. (Cwp)	0,884
LCB from zero pt. (+ve fwd) m	86,855
LCF from zero pt. (+ve fwd) m	83,139
KB m	6,283
KG fluid m	5,833
BMt m	6,061
BML m	185,446
GMt corrected m	6,510
GML m	185,896
KMt m	12,343
KML m	191,728
Immersion (TPc) tonne/cm	47,532
MTc tonne.m	577,573
RM at 1deg = GMt.Disp.sin(1) tonne.m	6015,459
Max deck inclination deg	0,1558
Trim angle (+ve by stern) deg	0,1558

Key point	Type	Freeboard m
Margin Line (freeboard pos = 30,275 m)		4,761
Deck Edge (freeboard pos = 30,275 m)		4,837
Entrada habilitación cta ppal 1	Downflooding point	6,336
Aseo público cubierta	Downflooding point	6,336
Local CO2	Downflooding point	6,336
Entrada habilitación cta ppal 2	Downflooding point	6,336
Local ropa de agua	Downflooding point	6,336
Entrada habilitación cta toldil	Downflooding point	9,111
Entrada habilitación cta toldil	Downflooding point	9,111
Local grupo emergencia	Downflooding point	9,080
Entrada a cta ppal desde cta to	Downflooding point	9,069

Stability calculation - D

Stability 22.01.00.131, build: 131

Model file: C:\Users\MARTA\Google Drive\TFG\Marta González\PROGRAMAS\MaxSURF\NUEVO (TFG)\D (Highest precision, 65 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 - Condición I

Damage Case - Intact

Free to Trim

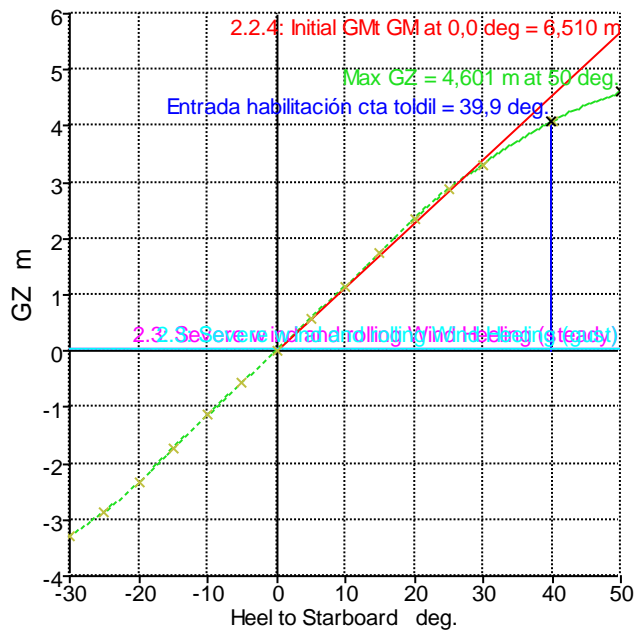
Specific gravity = 1,025; (Density = 1,025 tonne/m³)

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	10064,100	10064,100			68,650	0,000	11,800	0,000	User Specified
Total peso en rosca			10064,100			68,650	0,000	11,800	0,000	
Tripulación	20	0,125	2,500			15,000	0,000	22,000	0,000	User Specified
Pertrechos	1	40,000	40,000			90,000	0,000	15,000	0,000	User Specified
Total pesos fijos			42,500			85,588	0,000	15,412	0,000	
Viveres	1	3,700	3,700			17,000	0,000	20,000	0,000	User Specified
Total pesos variables			3,700			17,000	0,000	20,000	0,000	
P1-PIQUE PROA 1	0%	690,827	0,000	673,978	0,000	165,684	0,000	0,047	0,000	IMO A.749(18)
P2B-PIQUE PROA 2 BR	0%	445,266	0,000	434,406	0,000	158,040	-0,001	0,009	0,000	IMO A.749(18)
P2E-PIQUE PROA 2 ER	0%	445,266	0,000	434,406	0,000	158,040	0,001	0,009	0,000	IMO A.749(18)
S1B-TOLVA SUPERIOR B1 BABOR	0%	436,049	0,000	425,414	0,000	139,794	-12,904	12,700	0,000	IMO A.749(18)
S1E-TOLVA SUPERIOR B1 ESTRIBOR	0%	436,049	0,000	425,414	0,000	139,794	12,904	12,700	0,000	IMO A.749(18)
I1B-TOLVA INFERIOR B1 BABOR	0%	460,629	0,000	449,394	0,000	136,523	-0,671	0,005	0,000	IMO A.749(18)
I1E-TOLVA INFERIOR B1 ESTRIBOR	0%	460,629	0,000	449,394	0,000	136,523	0,671	0,005	0,000	IMO A.749(18)
S2B-TOLVA SUPERIOR B2 BABOR	0%	608,511	0,000	593,669	0,000	123,728	-14,225	12,700	0,000	IMO A.749(18)
S2E-TOLVA SUPERIOR B2 ESTRIBOR	0%	608,511	0,000	593,669	0,000	123,728	14,225	12,700	0,000	IMO A.749(18)
I2B-TOLVA INFERIOR B2 BABOR	0%	831,819	0,000	811,530	0,000	111,611	-1,566	0,000	0,000	IMO A.749(18)
I2E-TOLVA INFERIOR B2 ESTRIBOR	0%	831,819	0,000	811,530	0,000	111,611	1,566	0,000	0,000	IMO A.749(18)
S3B-TOLVA SUPERIOR B3 BABOR	0%	608,593	0,000	593,750	0,000	96,777	-14,339	12,700	0,000	IMO A.749(18)
S3E-TOLVA SUPERIOR B3 ESTRIBOR	0%	608,593	0,000	593,750	0,000	96,777	14,339	12,700	0,000	IMO A.749(18)
I3B-TOLVA INFERIOR B3 BABOR	0%	866,904	0,000	845,760	0,000	95,275	-2,938	0,000	0,000	IMO A.749(18)
I3E-TOLVA INFERIOR B3 ESTRIBOR	0%	866,904	0,000	845,760	0,000	95,275	2,938	0,000	0,000	IMO A.749(18)

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
I4B-TOLVA INFERIOR B4 BABOR	0%	860,892	0,000	839,895	0,000	77,837	-2,284	0,000	0,000	IMO A.749(18)
I4E-TOLVA INFERIOR B4 ESTRIBOR	0%	860,892	0,000	839,895	0,000	77,837	2,284	0,000	0,000	IMO A.749(18)
I5B-TOLVA INFERIOR B5 BABOR	0%	769,640	0,000	750,868	0,000	54,943	-1,029	0,000	0,000	IMO A.749(18)
I5E-TOLVA INFERIOR B5 ESTRIBOR	0%	769,640	0,000	750,868	0,000	54,943	1,029	0,000	0,000	IMO A.749(18)
PIQUE POPA BABOR	0%	271,223	0,000	264,608	0,000	8,299	-4,606	9,140	0,000	User Specified
PIQUE POPA ESTRIBOR	0%	271,223	0,000	264,608	0,000	8,299	4,606	9,140	0,000	User Specified
Total lastre	0%	13009,878	0,000	12692,564	0,000	0,000	0,000	0,000	0,000	
ADB-AGUA DULCE BABOR	97,9%	121,659	119,104	121,659	119,104	7,451	-8,283	15,165	131,283	IMO A.749(18)
ADE-AGUA DULCE ESTRIBOR	97,9%	74,189	72,631	74,189	72,631	6,534	8,168	15,176	0,000	IMO A.749(18)
ATE-AGUA TÉCNICA ESTRIBOR	100%	47,476	47,476	47,476	47,476	8,883	8,468	15,189	0,000	User Specified
Total agua	98,31%	243,325	239,212	243,325	239,212	7,457	0,036	15,173	131,283	
REFRIGERACIÓN EJE	100%	67,303	67,303	67,303	67,303	8,597	0,000	3,839	0,000	User Specified
LODOS	0%	22,540	0,000	22,540	0,000	11,401	0,000	1,000	0,000	User Specified
REBOSOS HFO BR	0%	15,908	0,000	16,233	0,000	20,233	-2,001	0,313	0,000	User Specified
REBOSOS ACEITE ER	0%	22,443	0,000	24,395	0,000	20,974	2,001	0,291	0,000	User Specified
AGUAS ACEITOSAS	0%	14,763	0,000	16,170	0,000	23,625	0,000	1,000	0,000	User Specified
SENTINAS	0%	7,974	0,000	8,734	0,000	28,919	0,000	0,000	0,000	User Specified
AGUAS RESIDUALES	0%	152,063	0,000	152,063	0,000	13,523	8,989	9,140	0,000	User Specified
Total misceláneos	22,21%	302,994	67,303	307,437	67,303	8,597	0,000	3,839	0,000	
SERVICIO ACEITE CILINDROS	100%	5,428	5,428	5,900	5,900	11,000	-5,750	9,570	0,000	User Specified
ALMACÉN ACEITE CILINDROS	100%	32,440	32,440	35,260	35,260	11,000	-5,750	12,570	0,000	User Specified
ALMACÉN ACEITE 1	100%	17,009	17,009	18,488	18,488	11,021	-8,471	11,771	0,000	User Specified
ALMACÉN ACEITE 2	100%	13,153	13,153	14,297	14,297	11,071	-10,529	12,530	0,000	User Specified
Total aceite	100%	68,030	68,030	73,945	73,945	11,019	-7,354	12,123	0,000	
SEDIMENTACIÓN HFO 1	100%	43,621	43,621	44,512	44,512	29,250	-1,000	9,570	0,000	User Specified
USO DIARIO HFO 1	100%	65,432	65,432	66,767	66,767	29,250	1,500	9,570	0,000	User Specified
USO DIARIO HFO 2	100%	65,432	65,432	66,767	66,767	29,250	4,500	9,570	0,000	User Specified
SEDIMENTACIÓN HFO 2	100%	43,621	43,621	44,512	44,512	29,250	7,000	9,570	0,000	User Specified
S4B-TOLVA SUPERIOR B4 BABOR	97,9%	405,778	397,256	414,059	405,363	70,405	-11,318	15,562	203,826	IMO A.749(18)
S4E-TOLVA SUPERIOR B4 ESTRIBOR	97,9%	405,778	397,256	414,059	405,363	70,405	11,318	15,562	203,826	IMO A.749(18)
S5B-TOLVA SUPERIOR B5 BABOR	97,9%	9,973	9,764	10,177	9,963	43,690	-11,263	14,110	0,000	IMO A.749(18)
S5E-TOLVA SUPERIOR B5 ESTRIBOR	97,9%	9,973	9,764	10,177	9,963	43,690	11,263	14,110	0,000	IMO A.749(18)
Total HFO	98,34%	1049,608	1032,147	1071,029	1053,211	61,203	0,634	14,269	407,652	
USO DIARIO DIÉSEL 1	97,9%	28,042	27,453	33,384	32,683	29,250	-2,750	9,411	0,000	IMO A.749(18)

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
USO DIARIO DIÉSEL 2	97,9%	28,042	27,453	33,384	32,683	29,250	-4,250	9,411	0,000	IMO A.749(18)
ALMACÉN DIÉSEL	97,9%	93,474	91,511	111,279	108,942	29,250	-7,500	9,411	0,000	IMO A.749(18)
Total diésel	97,9%	149,559	146,418	178,046	174,307	29,250	-6,000	9,411	0,000	
DIÉSEL EMERGENCIA	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	IMO A.749(18)
Total diésel emergencia	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	
LNG 1	97,9%	47,695	46,693	105,989	103,763	4,571	1,270	22,363	0,000	IMO A.749(18)
LNG 2	97,9%	47,878	46,873	106,396	104,161	-0,102	1,260	22,297	122,130	IMO A.749(18)
Total LNG	97,9%	95,573	93,566	212,385	207,925	2,230	1,265	22,330	122,130	
BODEGA 1	25%	25013,975	6253,494	8004,472	2001,118	146,394	0,000	4,076	0,000	User Specified
BODEGA 2	25%	34748,097	8687,027	11119,391	2779,849	123,118	0,000	4,000	0,000	User Specified
BODEGA 3	25%	35002,500	8750,622	11200,800	2800,199	96,798	0,000	3,995	0,000	User Specified
BODEGA 4	25%	35003,279	8750,819	11201,049	2800,262	70,402	0,000	3,995	0,000	User Specified
BODEGA 5	25%	34964,815	8741,204	11188,741	2797,185	44,016	0,000	4,066	0,000	User Specified
Total bodegas	25%	164732,667	41183,167	52714,453	13178,614	93,069	0,000	4,023	0,000	
Contenedor 1	0	440,000	0,000			147,000	0,000	22,800	0,000	User Specified
Contenedor 2	0	792,000	0,000			123,500	0,000	22,800	0,000	User Specified
Contenedor 3	0	792,000	0,000			97,000	0,000	22,800	0,000	User Specified
Contenedor 4	0	792,000	0,000			70,500	0,000	22,800	0,000	User Specified
Contenedor 5	0	792,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total contenedores			0,000			0,000	0,000	0,000	0,000	
Madera 1	0	400,000	0,000			147,000	0,000	22,800	0,000	User Specified
Madera 2	0	720,000	0,000			123,500	0,000	22,800	0,000	User Specified
Madera 3	0	720,000	0,000			97,000	0,000	22,800	0,000	User Specified
Madera 4	0	720,000	0,000			70,500	0,000	22,800	0,000	User Specified
Madera 5	0	720,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total madera			0,000			0,000	0,000	0,000	0,000	
Total Loadcase			52942,752	67496,358	14997,623	86,854	-0,012	5,820	661,066	
FS correction								0,012		
VCG fluid								5,833		



Stability	
█	GZ
█	Entrada habilitación cta toldil = 39,9 deg.
█	2.2.4: Initial GMT GM at 0,0 deg = 6,510 m
█	2.3: Severe wind and rolling Wind Heeling (steady)
█	2.3: Severe wind and rolling Wind Heeling (gust)
█	Max GZ = 4,601 m at 50 deg.

Heel to Starboard deg	-30,0	-25,0	-20,0	-15,0	-10,0	-5,0	0,0	5,0	10,0	15,0	20,0	25,0
GZ m	-3,293	-2,857	-2,338	-1,728	-1,135	-0,558	0,012	0,581	1,158	1,750	2,360	2,878
Area under GZ curve from zero heel m.deg	51,3399	35,9460	22,9126	12,7333	5,5910	1,3632	0,0106	1,4796	5,8231	13,0782	23,3724	36,5064
Displacement t	52942	52943	52943	52947	52946	52945	52943	52943	52941	52939	52939	52943
Draft at FP m	12,456	12,116	11,959	11,941	11,931	11,924	11,929	11,924	11,929	11,939	11,958	12,116
Draft at AP m	12,250	12,220	12,235	12,301	12,349	12,377	12,379	12,376	12,348	12,300	12,235	12,220
WL Length m	174,052	173,976	173,940	173,936	173,934	173,933	173,934	173,933	173,934	173,936	173,940	173,976
Beam max extents on WL m	29,876	29,754	30,850	31,223	30,628	30,279	30,165	30,279	30,628	31,223	30,853	29,754
Wetted Area m^2	8608,851	8433,514	8176,840	8080,936	8073,739	8069,036	8067,124	8068,865	8073,294	8080,311	8176,289	8433,492
Waterpl. Area m^2	4319,386	4482,722	4770,015	4788,932	4704,436	4654,080	4637,061	4654,051	4704,364	4788,834	4770,292	4482,716
Prismatic coeff. (Cp)	0,829	0,822	0,817	0,815	0,813	0,812	0,812	0,812	0,813	0,815	0,817	0,822
Block coeff. (Cb)	0,559	0,588	0,596	0,622	0,676	0,738	0,797	0,738	0,676	0,622	0,596	0,588
LCB from zero pt. (+ve fwd) m	86,842	86,853	86,854	86,854	86,854	86,855	86,869	86,855	86,855	86,854	86,854	86,853
LCF from zero pt. (+ve fwd) m	82,230	82,813	83,509	83,345	83,218	83,156	83,145	83,157	83,218	83,345	83,510	82,813
Max deck inclination deg	30,0001	25,0000	20,0002	15,0004	10,0010	5,0023	0,1515	5,0023	10,0010	15,0004	20,0002	25,0000
Trim angle (+ve by stern) deg	-0,0690	0,0348	0,0929	0,1212	0,1408	0,1521	0,1515	0,1521	0,1408	0,1212	0,0929	0,0348

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 55,229 m)		18	n/a
Deck Edge (immersion pos = 55,229 m)		18,3	n/a
Entrada habilitación cta ppal 1	Downflooding point	Not immersed in positive range	0
Aseo público cubierta	Downflooding point	Not immersed in positive range	0
Local CO2	Downflooding point	Not immersed in positive range	0
Entrada habilitación cta ppal 2	Downflooding point	Not immersed in positive range	0
Local ropa de agua	Downflooding point	Not immersed in positive range	0
Entrada habilitación cta toldil	Downflooding point	39,9	0
Entrada habilitación cta toldil	Downflooding point	Not immersed in positive range	0
Local grupo emergencia	Downflooding point	47,3	0
Entrada a cta ppal desde cta to	Downflooding point	Not immersed in positive range	0

Code	Criteria	Value	Units	Actual	Status	Margin %
267(85) Ch2 - General Criteria	2.3: IMO roll back angle	20,7	deg			
267(85) Ch2 - General Criteria	2.2.1: Area 0 to 30	3,1513	m.deg	52,0091	Pass	+1550,42
267(85) Ch2 - General Criteria	2.2.1: Area 0 to 40	5,1566	m.deg	88,8030	Pass	+1622,12
267(85) Ch2 - General Criteria	2.2.1: Area 30 to 40	1,7189	m.deg	36,7939	Pass	+2040,58
267(85) Ch2 - General Criteria	2.2.2: Max GZ at 30 or greater	0,200	m	4,601	Pass	+2200,50
267(85) Ch2 - General Criteria	2.2.3: Angle of maximum GZ	25,0	deg	50,0	Pass	+100,00
267(85) Ch2 - General Criteria	2.2.4: Initial GMt	0,150	m	6,510	Pass	+4240,00
267(85) Ch2 - General Criteria	2.3: Severe wind and rolling				Pass	
	Angle of steady heel shall not be greater than (\leq)	16,0	deg	0,1	Pass	+99,14

CONDICIÓN XIV

Llegada a puerto a plena carga
(mineral)

Equilibrium calculation - D

Stability 22.01.00.131, build: 131

Model file: C:\Users\MARTA\Google Drive\TFG\Marta González\PROGRAMAS\MaxSURF\NUEVO (TFG)\D (Highest precision, 65 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 - Condición I

Damage Case - Intact

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m³)

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	10064,100	10064,100			68,650	0,000	11,800	0,000	User Specified
Total peso en rosca			10064,100			68,650	0,000	11,800	0,000	
Tripulación	20	0,125	2,500			15,000	0,000	22,000	0,000	User Specified
Pertrechos	1	40,000	40,000			90,000	0,000	15,000	0,000	User Specified
Total pesos fijos			42,500			85,588	0,000	15,412	0,000	
Viveres	0,1	3,700	0,370			17,000	0,000	20,000	0,000	User Specified
Total pesos variables			0,370			17,000	0,000	20,000	0,000	
P1-PIQUE PROA 1	0%	690,827	0,000	673,978	0,000	165,684	0,000	0,047	0,000	IMO A.749(18)
P2B-PIQUE PROA 2 BR	0%	445,266	0,000	434,406	0,000	158,040	-0,001	0,009	0,000	IMO A.749(18)
P2E-PIQUE PROA 2 ER	0%	445,266	0,000	434,406	0,000	158,040	0,001	0,009	0,000	IMO A.749(18)
S1B-TOLVA SUPERIOR B1 BAVOR	0%	436,049	0,000	425,414	0,000	139,794	-12,904	12,700	0,000	IMO A.749(18)
S1E-TOLVA SUPERIOR B1 ESTRIBOR	0%	436,049	0,000	425,414	0,000	139,794	12,904	12,700	0,000	IMO A.749(18)
I1B-TOLVA INFERIOR B1 BAVOR	0%	460,629	0,000	449,394	0,000	136,523	-0,671	0,005	0,000	IMO A.749(18)
I1E-TOLVA INFERIOR B1 ESTRIBOR	0%	460,629	0,000	449,394	0,000	136,523	0,671	0,005	0,000	IMO A.749(18)
S2B-TOLVA SUPERIOR B2 BAVOR	0%	608,511	0,000	593,669	0,000	123,728	-14,225	12,700	0,000	IMO A.749(18)
S2E-TOLVA SUPERIOR B2 ESTRIBOR	0%	608,511	0,000	593,669	0,000	123,728	14,225	12,700	0,000	IMO A.749(18)
I2B-TOLVA INFERIOR B2 BAVOR	0%	831,819	0,000	811,530	0,000	111,611	-1,566	0,000	0,000	IMO A.749(18)
I2E-TOLVA INFERIOR B2 ESTRIBOR	0%	831,819	0,000	811,530	0,000	111,611	1,566	0,000	0,000	IMO A.749(18)
S3B-TOLVA SUPERIOR B3 BAVOR	0%	608,593	0,000	593,750	0,000	96,777	-14,339	12,700	0,000	IMO A.749(18)
S3E-TOLVA SUPERIOR B3 ESTRIBOR	0%	608,593	0,000	593,750	0,000	96,777	14,339	12,700	0,000	IMO A.749(18)
I3B-TOLVA INFERIOR B3 BAVOR	0%	866,904	0,000	845,760	0,000	95,275	-2,938	0,000	0,000	IMO A.749(18)
I3E-TOLVA INFERIOR B3 ESTRIBOR	0%	866,904	0,000	845,760	0,000	95,275	2,938	0,000	0,000	IMO A.749(18)
I4B-TOLVA INFERIOR B4 BAVOR	0%	860,892	0,000	839,895	0,000	77,837	-2,284	0,000	0,000	IMO A.749(18)
I4E-TOLVA INFERIOR B4 ESTRIBOR	0%	860,892	0,000	839,895	0,000	77,837	2,284	0,000	0,000	IMO A.749(18)

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
I5B-TOLVA INFERIOR B5 BABOR	0%	769,640	0,000	750,868	0,000	54,943	-1,029	0,000	0,000	IMO A.749(18)
I5E-TOLVA INFERIOR B5 ESTRIBOR	0%	769,640	0,000	750,868	0,000	54,943	1,029	0,000	0,000	IMO A.749(18)
PIQUE POPA BABOR	0%	271,223	0,000	264,608	0,000	8,299	-4,606	9,140	0,000	User Specified
PIQUE POPA ESTRIBOR	0%	271,223	0,000	264,608	0,000	8,299	4,606	9,140	0,000	User Specified
Total lastre	0%	13009,878	0,000	12692,564	0,000	0,000	0,000	0,000	0,000	
ADB-AGUA DULCE BABOR	10%	121,659	12,166	121,659	12,166	7,492	-7,942	13,365	131,285	IMO A.749(18)
ADE-AGUA DULCE ESTRIBOR	10%	74,189	7,419	74,189	7,419	6,554	7,777	13,370	0,000	IMO A.749(18)
ATE-AGUA TÉCNICA ESTRIBOR	10%	47,476	4,748	47,476	4,748	8,887	8,188	13,358	0,000	User Specified
Total agua	10%	243,325	24,332	243,325	24,332	7,478	-0,002	13,366	131,285	
REFRIGERACIÓN EJE	100%	67,303	67,303	67,303	67,303	8,597	0,000	3,839	0,000	User Specified
LODOS	100%	22,540	22,540	22,540	22,540	11,375	0,000	1,532	0,000	User Specified
REBOSES HFO BR	100%	15,908	15,908	16,233	16,233	18,841	-5,025	1,382	0,000	User Specified
REBOSES ACEITE ER	100%	22,443	22,443	24,395	24,395	18,954	5,046	1,380	0,000	User Specified
AGUAS ACEITOSAS	100%	14,763	14,763	16,170	16,170	23,625	0,000	1,500	0,000	User Specified
SENTINAS	100%	7,974	7,974	8,734	8,734	28,875	0,000	1,010	0,000	User Specified
AGUAS RESIDUALES	100%	152,063	152,063	152,063	152,063	12,650	10,081	13,659	0,000	User Specified
Total misceláneos	100%	302,994	302,994	307,437	307,437	13,409	5,169	8,096	0,000	
SERVICIO ACEITE CILINDROS	10%	5,428	0,543	5,900	0,590	11,000	-5,750	9,183	0,000	User Specified
ALMACÉN ACEITE CILINDROS	10%	32,440	3,244	35,260	3,526	11,000	-5,750	10,257	0,000	User Specified
ALMACÉN ACEITE 1	10%	17,009	1,701	18,488	1,849	11,178	-8,241	9,558	0,000	User Specified
ALMACÉN ACEITE 2	10%	13,153	1,315	14,297	1,430	11,268	-9,962	10,577	0,000	User Specified
Total aceite	10%	68,030	6,803	73,945	7,395	11,096	-7,187	10,058	0,000	
SEDIMENTACIÓN HFO 1	0%	43,621	0,000	44,512	0,000	29,250	-1,000	2,000	0,000	User Specified
USO DIARIO HFO 1	80,24%	65,432	52,500	66,767	53,571	29,250	1,500	8,074	0,000	User Specified
USO DIARIO HFO 2	80,24%	65,432	52,500	66,767	53,571	29,250	4,500	8,074	0,000	User Specified
SEDIMENTACIÓN HFO 2	0%	43,621	0,000	44,512	0,000	29,250	7,000	2,000	0,000	User Specified
S4B-TOLVA SUPERIOR B4 BABOR	0%	405,778	0,000	414,059	0,000	71,250	-13,611	12,700	0,000	IMO A.749(18)
S4E-TOLVA SUPERIOR B4 ESTRIBOR	0%	405,778	0,000	414,059	0,000	71,250	13,611	12,700	0,000	IMO A.749(18)
S5B-TOLVA SUPERIOR B5 BABOR	0%	9,973	0,000	10,177	0,000	44,162	-14,104	12,700	0,000	IMO A.749(18)
S5E-TOLVA SUPERIOR B5 ESTRIBOR	0%	9,973	0,000	10,177	0,000	44,162	14,104	12,700	0,000	IMO A.749(18)
Total HFO	10%	1049,608	105,000	1071,029	107,143	29,250	3,000	8,074	0,000	
USO DIARIO DIÉSEL 1	26,75%	28,042	7,500	33,384	8,929	29,250	-2,750	4,025	0,000	IMO A.749(18)
USO DIARIO DIÉSEL 2	26,75%	28,042	7,500	33,384	8,929	29,250	-4,250	4,025	0,000	IMO A.749(18)
ALMACÉN DIÉSEL	0%	93,474	0,000	111,279	0,000	29,250	-7,500	2,000	0,000	IMO A.749(18)

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
Total diésel	10,03%	149,559	15,000	178,046	17,857	29,250	-3,500	4,025	0,000	
DIÉSEL EMERGENCIA	10%	2,666	0,267	3,174	0,317	8,267	-7,570	20,260	0,000	IMO A.749(18)
Total diésel emergencia	10%	2,666	0,267	3,174	0,317	8,267	-7,570	20,260	0,000	
LNG 1	10%	47,695	4,770	105,989	10,599	4,549	1,266	20,938	0,000	IMO A.749(18)
LNG 2	10%	47,878	4,788	106,396	10,640	-0,067	1,235	20,762	122,132	IMO A.749(18)
Total LNG	10%	95,573	9,557	212,385	21,238	2,237	1,251	20,850	122,132	
BODEGA 1	25%	25013,975	6253,493	8004,472	2001,118	146,394	0,000	4,076	0,000	User Specified
BODEGA 2	25%	34748,097	8687,022	11119,391	2779,847	123,118	0,000	4,000	0,000	User Specified
BODEGA 3	25%	35002,500	8750,622	11200,800	2800,199	96,798	0,000	3,995	0,000	User Specified
BODEGA 4	25%	35003,279	8750,816	11201,049	2800,261	70,402	0,000	3,995	0,000	User Specified
BODEGA 5	25%	34964,815	8741,206	11188,741	2797,186	44,016	0,000	4,066	0,000	User Specified
Total bodegas	25%	164732,667	41183,160	52714,453	13178,611	93,069	0,000	4,023	0,000	
Contenedor 1	0	440,000	0,000			147,000	0,000	22,800	0,000	User Specified
Contenedor 2	0	792,000	0,000			123,500	0,000	22,800	0,000	User Specified
Contenedor 3	0	792,000	0,000			97,000	0,000	22,800	0,000	User Specified
Contenedor 4	0	792,000	0,000			70,500	0,000	22,800	0,000	User Specified
Contenedor 5	0	792,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total contenedores			0,000			0,000	0,000	0,000	0,000	
Madera 1	0	400,000	0,000			147,000	0,000	22,800	0,000	User Specified
Madera 2	0	720,000	0,000			123,500	0,000	22,800	0,000	User Specified
Madera 3	0	720,000	0,000			97,000	0,000	22,800	0,000	User Specified
Madera 4	0	720,000	0,000			70,500	0,000	22,800	0,000	User Specified
Madera 5	0	720,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total madera			0,000			0,000	0,000	0,000	0,000	
Total Loadcase			51754,083	67496,358	13664,331	87,631	0,035	5,585	253,417	
FS correction								0,005		
VCG fluid								5,590		

Draft Amidships m	11,910
Displacement t	51754
Heel deg	0,3
Draft at FP m	11,994
Draft at AP m	11,825

Draft at LCF m	11,908
Trim (+ve by stern) m	-0,168
WL Length m	173,948
Beam max extents on WL m	30,164
Wetted Area m ²	7964,654
Waterpl. Area m ²	4607,866
Prismatic coeff. (Cp)	0,811
Block coeff. (Cb)	0,803
Max Sect. area coeff. (Cm)	0,991
Waterpl. area coeff. (Cwp)	0,878
LCB from zero pt. (+ve fwd) m	87,631
LCF from zero pt. (+ve fwd) m	83,656
KB m	6,150
KG fluid m	5,590
BMt m	6,165
BML m	185,998
GMt corrected m	6,725
GML m	186,558
KMt m	12,315
KML m	192,146
Immersion (TPc) tonne/cm	47,231
MTc tonne.m	566,616
RM at 1deg = GMt.Disp.sin(1) tonne.m	6074,252
Max deck inclination deg	0,2999
Trim angle (+ve by stern) deg	-0,0567

Key point	Type	Freeboard m
Margin Line (freeboard pos = 150,667 m)		5,018
Deck Edge (freeboard pos = 150,667 m)		5,094
Entrada habilitación cta ppal 1	Downflooding point	6,775
Aseo público cubierta	Downflooding point	6,789
Local CO2	Downflooding point	6,797
Entrada habilitación cta ppal 2	Downflooding point	6,806
Local ropa de agua	Downflooding point	6,817
Entrada habilitación cta toldil	Downflooding point	9,527
Entrada habilitación cta toldil	Downflooding point	9,635
Local grupo emergencia	Downflooding point	9,552
Entrada a cta ppal desde cta to	Downflooding point	9,625

Stability calculation - D

Stability 22.01.00.131, build: 131

Model file: C:\Users\MARTA\Google Drive\TFG\Marta González\PROGRAMAS\MaxSURF\NUEVO (TFG)\D (Highest precision, 65 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 - Condición I

Damage Case - Intact

Free to Trim

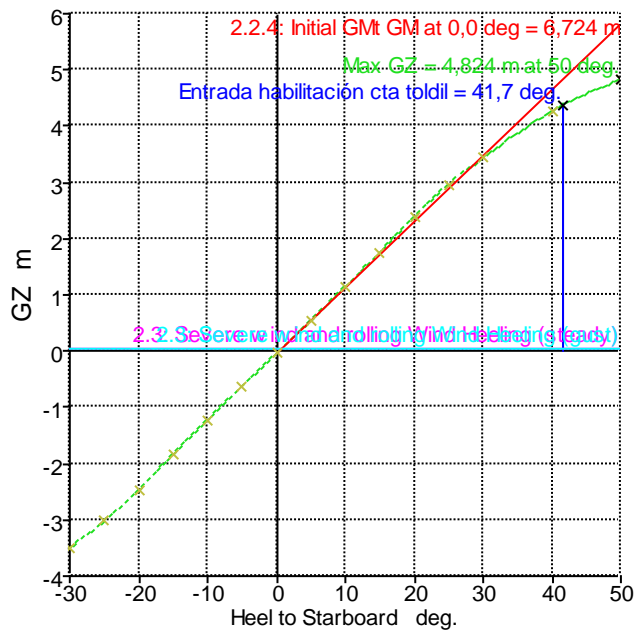
Specific gravity = 1,025; (Density = 1,025 tonne/m³)

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	10064,100	10064,100			68,650	0,000	11,800	0,000	User Specified
Total peso en rosca			10064,100			68,650	0,000	11,800	0,000	
Tripulación	20	0,125	2,500			15,000	0,000	22,000	0,000	User Specified
Pertrechos	1	40,000	40,000			90,000	0,000	15,000	0,000	User Specified
Total pesos fijos			42,500			85,588	0,000	15,412	0,000	
Viveres	0,1	3,700	0,370			17,000	0,000	20,000	0,000	User Specified
Total pesos variables			0,370			17,000	0,000	20,000	0,000	
P1-PIQUE PROA 1	0%	690,827	0,000	673,978	0,000	165,684	0,000	0,047	0,000	IMO A.749(18)
P2B-PIQUE PROA 2 BR	0%	445,266	0,000	434,406	0,000	158,040	-0,001	0,009	0,000	IMO A.749(18)
P2E-PIQUE PROA 2 ER	0%	445,266	0,000	434,406	0,000	158,040	0,001	0,009	0,000	IMO A.749(18)
S1B-TOLVA SUPERIOR B1 BABOR	0%	436,049	0,000	425,414	0,000	139,794	-12,904	12,700	0,000	IMO A.749(18)
S1E-TOLVA SUPERIOR B1 ESTRIBOR	0%	436,049	0,000	425,414	0,000	139,794	12,904	12,700	0,000	IMO A.749(18)
I1B-TOLVA INFERIOR B1 BABOR	0%	460,629	0,000	449,394	0,000	136,523	-0,671	0,005	0,000	IMO A.749(18)
I1E-TOLVA INFERIOR B1 ESTRIBOR	0%	460,629	0,000	449,394	0,000	136,523	0,671	0,005	0,000	IMO A.749(18)
S2B-TOLVA SUPERIOR B2 BABOR	0%	608,511	0,000	593,669	0,000	123,728	-14,225	12,700	0,000	IMO A.749(18)
S2E-TOLVA SUPERIOR B2 ESTRIBOR	0%	608,511	0,000	593,669	0,000	123,728	14,225	12,700	0,000	IMO A.749(18)
I2B-TOLVA INFERIOR B2 BABOR	0%	831,819	0,000	811,530	0,000	111,611	-1,566	0,000	0,000	IMO A.749(18)
I2E-TOLVA INFERIOR B2 ESTRIBOR	0%	831,819	0,000	811,530	0,000	111,611	1,566	0,000	0,000	IMO A.749(18)
S3B-TOLVA SUPERIOR B3 BABOR	0%	608,593	0,000	593,750	0,000	96,777	-14,339	12,700	0,000	IMO A.749(18)
S3E-TOLVA SUPERIOR B3 ESTRIBOR	0%	608,593	0,000	593,750	0,000	96,777	14,339	12,700	0,000	IMO A.749(18)
I3B-TOLVA INFERIOR B3 BABOR	0%	866,904	0,000	845,760	0,000	95,275	-2,938	0,000	0,000	IMO A.749(18)
I3E-TOLVA INFERIOR B3 ESTRIBOR	0%	866,904	0,000	845,760	0,000	95,275	2,938	0,000	0,000	IMO A.749(18)
I4B-TOLVA INFERIOR B4 BABOR	0%	860,892	0,000	839,895	0,000	77,837	-2,284	0,000	0,000	IMO A.749(18)
I4E-TOLVA INFERIOR B4 ESTRIBOR	0%	860,892	0,000	839,895	0,000	77,837	2,284	0,000	0,000	IMO A.749(18)

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
I5B-TOLVA INFERIOR B5 BABOR	0%	769,640	0,000	750,868	0,000	54,943	-1,029	0,000	0,000	IMO A.749(18)
I5E-TOLVA INFERIOR B5 ESTRIBOR	0%	769,640	0,000	750,868	0,000	54,943	1,029	0,000	0,000	IMO A.749(18)
PIQUE POPA BABOR	0%	271,223	0,000	264,608	0,000	8,299	-4,606	9,140	0,000	User Specified
PIQUE POPA ESTRIBOR	0%	271,223	0,000	264,608	0,000	8,299	4,606	9,140	0,000	User Specified
Total lastre	0%	13009,878	0,000	12692,564	0,000	0,000	0,000	0,000	0,000	
ADB-AGUA DULCE BABOR	10%	121,659	12,166	121,659	12,166	7,492	-7,942	13,365	131,283	IMO A.749(18)
ADE-AGUA DULCE ESTRIBOR	10%	74,189	7,419	74,189	7,419	6,554	7,777	13,370	0,000	IMO A.749(18)
ATE-AGUA TÉCNICA ESTRIBOR	10%	47,476	4,748	47,476	4,748	8,887	8,188	13,358	0,000	User Specified
Total agua	10%	243,325	24,332	243,325	24,332	7,478	-0,002	13,366	131,283	
REFRIGERACIÓN EJE	100%	67,303	67,303	67,303	67,303	8,597	0,000	3,839	0,000	User Specified
LODOS	100%	22,540	22,540	22,540	22,540	11,375	0,000	1,532	0,000	User Specified
REBOSES HFO BR	100%	15,908	15,908	16,233	16,233	18,841	-5,025	1,382	0,000	User Specified
REBOSES ACEITE ER	100%	22,443	22,443	24,395	24,395	18,954	5,046	1,380	0,000	User Specified
AGUAS ACEITOSAS	100%	14,763	14,763	16,170	16,170	23,625	0,000	1,500	0,000	User Specified
SENTINAS	100%	7,974	7,974	8,734	8,734	28,875	0,000	1,010	0,000	User Specified
AGUAS RESIDUALES	100%	152,063	152,063	152,063	152,063	12,650	10,081	13,659	0,000	User Specified
Total misceláneos	100%	302,994	302,994	307,437	307,437	13,409	5,169	8,096	0,000	
SERVICIO ACEITE CILINDROS	10%	5,428	0,543	5,900	0,590	11,000	-5,750	9,183	0,000	User Specified
ALMACÉN ACEITE CILINDROS	10%	32,440	3,244	35,260	3,526	11,000	-5,750	10,257	0,000	User Specified
ALMACÉN ACEITE 1	10%	17,009	1,701	18,488	1,849	11,178	-8,241	9,558	0,000	User Specified
ALMACÉN ACEITE 2	10%	13,153	1,315	14,297	1,430	11,268	-9,962	10,577	0,000	User Specified
Total aceite	10%	68,030	6,803	73,945	7,395	11,096	-7,187	10,058	0,000	
SEDIMENTACIÓN HFO 1	0%	43,621	0,000	44,512	0,000	29,250	-1,000	2,000	0,000	User Specified
USO DIARIO HFO 1	80,24%	65,432	52,500	66,767	53,571	29,250	1,500	8,074	0,000	User Specified
USO DIARIO HFO 2	80,24%	65,432	52,500	66,767	53,571	29,250	4,500	8,074	0,000	User Specified
SEDIMENTACIÓN HFO 2	0%	43,621	0,000	44,512	0,000	29,250	7,000	2,000	0,000	User Specified
S4B-TOLVA SUPERIOR B4 BABOR	0%	405,778	0,000	414,059	0,000	71,250	-13,611	12,700	0,000	IMO A.749(18)
S4E-TOLVA SUPERIOR B4 ESTRIBOR	0%	405,778	0,000	414,059	0,000	71,250	13,611	12,700	0,000	IMO A.749(18)
S5B-TOLVA SUPERIOR B5 BABOR	0%	9,973	0,000	10,177	0,000	44,162	-14,104	12,700	0,000	IMO A.749(18)
S5E-TOLVA SUPERIOR B5 ESTRIBOR	0%	9,973	0,000	10,177	0,000	44,162	14,104	12,700	0,000	IMO A.749(18)
Total HFO	10%	1049,608	105,000	1071,029	107,143	29,250	3,000	8,074	0,000	
USO DIARIO DIÉSEL 1	26,75%	28,042	7,500	33,384	8,929	29,250	-2,750	4,025	0,000	IMO A.749(18)
USO DIARIO DIÉSEL 2	26,75%	28,042	7,500	33,384	8,929	29,250	-4,250	4,025	0,000	IMO A.749(18)
ALMACÉN DIÉSEL	0%	93,474	0,000	111,279	0,000	29,250	-7,500	2,000	0,000	IMO A.749(18)

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
Total diésel	10,03%	149,559	15,000	178,046	17,857	29,250	-3,500	4,025	0,000	
DIÉSEL EMERGENCIA	10%	2,666	0,267	3,174	0,317	8,267	-7,570	20,260	0,000	IMO A.749(18)
Total diésel emergencia	10%	2,666	0,267	3,174	0,317	8,267	-7,570	20,260	0,000	
LNG 1	10%	47,695	4,770	105,989	10,599	4,549	1,266	20,938	0,000	IMO A.749(18)
LNG 2	10%	47,878	4,788	106,396	10,640	-0,067	1,235	20,762	122,130	IMO A.749(18)
Total LNG	10%	95,573	9,557	212,385	21,238	2,237	1,251	20,850	122,130	
BODEGA 1	25%	25013,975	6253,492	8004,472	2001,117	146,394	0,000	4,076	0,000	User Specified
BODEGA 2	25%	34748,097	8687,026	11119,391	2779,848	123,118	0,000	4,000	0,000	User Specified
BODEGA 3	25%	35002,500	8750,628	11200,800	2800,201	96,798	0,000	3,995	0,000	User Specified
BODEGA 4	25%	35003,279	8750,820	11201,049	2800,262	70,402	0,000	3,995	0,000	User Specified
BODEGA 5	25%	34964,815	8741,202	11188,741	2797,185	44,016	0,000	4,066	0,000	User Specified
Total bodegas	25%	164732,667	41183,167	52714,453	13178,614	93,069	0,000	4,023	0,000	
Contenedor 1	0	440,000	0,000			147,000	0,000	22,800	0,000	User Specified
Contenedor 2	0	792,000	0,000			123,500	0,000	22,800	0,000	User Specified
Contenedor 3	0	792,000	0,000			97,000	0,000	22,800	0,000	User Specified
Contenedor 4	0	792,000	0,000			70,500	0,000	22,800	0,000	User Specified
Contenedor 5	0	792,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total contenedores			0,000			0,000	0,000	0,000	0,000	
Madera 1	0	400,000	0,000			147,000	0,000	22,800	0,000	User Specified
Madera 2	0	720,000	0,000			123,500	0,000	22,800	0,000	User Specified
Madera 3	0	720,000	0,000			97,000	0,000	22,800	0,000	User Specified
Madera 4	0	720,000	0,000			70,500	0,000	22,800	0,000	User Specified
Madera 5	0	720,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total madera			0,000			0,000	0,000	0,000	0,000	
Total Loadcase			51754,091	67496,358	13664,333	87,631	0,035	5,585	253,414	
FS correction								0,005		
VCG fluid								5,590		



Stability	
█	GZ
█	Entrada habilitación cta toldil = 41,7 deg.
█	2.2.4: Initial GMt GM at 0,0 deg = 6,724 m
█	2.3: Severe wind and rolling Wind Heeling (steady)
█	2.3: Severe wind and rolling Wind Heeling (gust)
█	Max GZ = 4,824 m at 50 deg.

Heel to Starboard deg	-30,0	-25,0	-20,0	-15,0	-10,0	-5,0	0,0	5,0	10,0	15,0	20,0	25,0
GZ m	-3,493	-3,025	-2,464	-1,828	-1,218	-0,623	-0,035	0,554	1,150	1,762	2,399	2,962
Area under GZ curve from zero heel m.deg	54,6596	38,3417	24,5779	13,8400	6,2381	1,6408	-0,0314	1,2954	5,5501	12,8137	23,2255	36,6619
Displacement t	51754	51754	51754	51757	51756	51755	51754	51754	51753	51752	51751	51754
Draft at FP m	12,512	12,181	12,032	12,014	12,003	11,996	11,999	11,996	12,002	12,013	12,031	12,181
Draft at AP m	11,602	11,606	11,661	11,737	11,787	11,816	11,820	11,816	11,787	11,736	11,660	11,606
WL Length m	174,067	173,991	173,957	173,953	173,950	173,954	173,949	173,952	173,950	173,953	173,957	173,991
Beam max extents on WL m	30,291	29,492	31,629	31,222	30,627	30,278	30,164	30,278	30,627	31,222	31,631	29,492
Wetted Area m^2	8476,608	8296,224	8032,527	7981,926	7971,976	7966,440	7964,480	7966,327	7971,680	7981,493	8032,087	8296,200
Waterpl. Area m^2	4370,094	4535,323	4826,190	4761,687	4675,146	4624,451	4607,557	4624,430	4675,090	4761,608	4826,380	4535,325
Prismatic coeff. (Cp)	0,822	0,818	0,815	0,813	0,812	0,812	0,811	0,812	0,812	0,813	0,815	0,818
Block coeff. (Cb)	0,546	0,588	0,576	0,617	0,672	0,735	0,803	0,735	0,672	0,617	0,576	0,588
LCB from zero pt. (+ve fwd) m	87,622	87,631	87,631	87,631	87,631	87,631	87,643	87,631	87,631	87,631	87,631	87,631
LCF from zero pt. (+ve fwd) m	82,361	82,976	83,693	83,800	83,721	83,673	83,662	83,673	83,721	83,801	83,693	82,976
Max deck inclination deg	30,0011	25,0006	20,0003	15,0003	10,0003	5,0004	0,0603	5,0004	10,0003	15,0003	20,0003	25,0006
Trim angle (+ve by stern) deg	-0,3060	-0,1931	-0,1247	-0,0932	-0,0724	-0,0605	-0,0603	-0,0605	-0,0724	-0,0932	-0,1246	-0,1930

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 127,716 m)		18,8	n/a
Deck Edge (immersion pos = 127,716 m)		19,1	n/a
Entrada habilitación cta ppal 1	Downflooding point	Not immersed in positive range	0
Aseo público cubierta	Downflooding point	Not immersed in positive range	0
Local CO2	Downflooding point	Not immersed in positive range	0
Entrada habilitación cta ppal 2	Downflooding point	Not immersed in positive range	0
Local ropa de agua	Downflooding point	Not immersed in positive range	0
Entrada habilitación cta toldil	Downflooding point	41,7	0
Entrada habilitación cta toldil	Downflooding point	Not immersed in positive range	0
Local grupo emergencia	Downflooding point	49,7	0
Entrada a cta ppal desde cta to	Downflooding point	Not immersed in positive range	0

Code	Criteria	Value	Units	Actual	Status	Margin %
267(85) Ch2 - General Criteria	2.3: IMO roll back angle	20,4	deg			
267(85) Ch2 - General Criteria	2.2.1: Area 0 to 30	3,1513	m.deg	52,6791	Pass	+1571,68
267(85) Ch2 - General Criteria	2.2.1: Area 0 to 40	5,1566	m.deg	91,3007	Pass	+1670,55
267(85) Ch2 - General Criteria	2.2.1: Area 30 to 40	1,7189	m.deg	38,6215	Pass	+2146,91
267(85) Ch2 - General Criteria	2.2.2: Max GZ at 30 or greater	0,200	m	4,824	Pass	+2312,00
267(85) Ch2 - General Criteria	2.2.3: Angle of maximum GZ	25,0	deg	50,0	Pass	+100,00
267(85) Ch2 - General Criteria	2.2.4: Initial GMt	0,150	m	6,724	Pass	+4382,67
267(85) Ch2 - General Criteria	2.3: Severe wind and rolling				Pass	
	Angle of steady heel shall not be greater than (\leq)	16,0	deg	0,5	Pass	+96,67

CONDICIÓN XV

Salida de puerto a plena carga
(mineral) + contenedores sobre las
escotillas

Equilibrium calculation - D

Stability 22.01.00.131, build: 131

Model file: C:\Users\MARTA\Google Drive\TFG\Marta González\PROGRAMAS\MaxSURF\NUEVO (TFG)\D (Highest precision, 65 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 - Condición I

Damage Case - Intact

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m³)

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	10064,100	10064,100			68,650	0,000	11,800	0,000	User Specified
Total peso en rosca			10064,100			68,650	0,000	11,800	0,000	
Tripulación	20	0,125	2,500			15,000	0,000	22,000	0,000	User Specified
Pertrechos	1	40,000	40,000			90,000	0,000	15,000	0,000	User Specified
Total pesos fijos			42,500			85,588	0,000	15,412	0,000	
Viveres	1	3,700	3,700			17,000	0,000	20,000	0,000	User Specified
Total pesos variables			3,700			17,000	0,000	20,000	0,000	
P1-PIQUE PROA 1	0%	690,827	0,000	673,978	0,000	165,684	0,000	0,047	0,000	IMO A.749(18)
P2B-PIQUE PROA 2 BR	0%	445,266	0,000	434,406	0,000	158,040	-0,001	0,009	0,000	IMO A.749(18)
P2E-PIQUE PROA 2 ER	0%	445,266	0,000	434,406	0,000	158,040	0,001	0,009	0,000	IMO A.749(18)
S1B-TOLVA SUPERIOR B1 BAVOR	0%	436,049	0,000	425,414	0,000	139,794	-12,904	12,700	0,000	IMO A.749(18)
S1E-TOLVA SUPERIOR B1 ESTRIBOR	0%	436,049	0,000	425,414	0,000	139,794	12,904	12,700	0,000	IMO A.749(18)
I1B-TOLVA INFERIOR B1 BAVOR	0%	460,629	0,000	449,394	0,000	136,523	-0,671	0,005	0,000	IMO A.749(18)
I1E-TOLVA INFERIOR B1 ESTRIBOR	0%	460,629	0,000	449,394	0,000	136,523	0,671	0,005	0,000	IMO A.749(18)
S2B-TOLVA SUPERIOR B2 BAVOR	0%	608,511	0,000	593,669	0,000	123,728	-14,225	12,700	0,000	IMO A.749(18)
S2E-TOLVA SUPERIOR B2 ESTRIBOR	0%	608,511	0,000	593,669	0,000	123,728	14,225	12,700	0,000	IMO A.749(18)
I2B-TOLVA INFERIOR B2 BAVOR	0%	831,819	0,000	811,530	0,000	111,611	-1,566	0,000	0,000	IMO A.749(18)
I2E-TOLVA INFERIOR B2 ESTRIBOR	0%	831,819	0,000	811,530	0,000	111,611	1,566	0,000	0,000	IMO A.749(18)
S3B-TOLVA SUPERIOR B3 BAVOR	0%	608,593	0,000	593,750	0,000	96,777	-14,339	12,700	0,000	IMO A.749(18)
S3E-TOLVA SUPERIOR B3 ESTRIBOR	0%	608,593	0,000	593,750	0,000	96,777	14,339	12,700	0,000	IMO A.749(18)
I3B-TOLVA INFERIOR B3 BAVOR	0%	866,904	0,000	845,760	0,000	95,275	-2,938	0,000	0,000	IMO A.749(18)
I3E-TOLVA INFERIOR B3 ESTRIBOR	0%	866,904	0,000	845,760	0,000	95,275	2,938	0,000	0,000	IMO A.749(18)
I4B-TOLVA INFERIOR B4 BAVOR	0%	860,892	0,000	839,895	0,000	77,837	-2,284	0,000	0,000	IMO A.749(18)
I4E-TOLVA INFERIOR B4 ESTRIBOR	0%	860,892	0,000	839,895	0,000	77,837	2,284	0,000	0,000	IMO A.749(18)

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
I5B-TOLVA INFERIOR B5 BABOR	0%	769,640	0,000	750,868	0,000	54,943	-1,029	0,000	0,000	IMO A.749(18)
I5E-TOLVA INFERIOR B5 ESTRIBOR	0%	769,640	0,000	750,868	0,000	54,943	1,029	0,000	0,000	IMO A.749(18)
PIQUE POPA BABOR	0%	271,223	0,000	264,608	0,000	8,299	-4,606	9,140	0,000	User Specified
PIQUE POPA ESTRIBOR	0%	271,223	0,000	264,608	0,000	8,299	4,606	9,140	0,000	User Specified
Total lastre	0%	13009,878	0,000	12692,564	0,000	0,000	0,000	0,000	0,000	
ADB-AGUA DULCE BABOR	97,9%	121,659	119,104	121,659	119,104	7,451	-8,283	15,165	131,283	IMO A.749(18)
ADE-AGUA DULCE ESTRIBOR	97,9%	74,189	72,631	74,189	72,631	6,534	8,168	15,176	0,000	IMO A.749(18)
ATE-AGUA TÉCNICA ESTRIBOR	100%	47,476	47,476	47,476	47,476	8,883	8,468	15,189	0,000	User Specified
Total agua	98,31%	243,325	239,212	243,325	239,212	7,457	0,036	15,173	131,283	
REFRIGERACIÓN EJE	100%	67,303	67,303	67,303	67,303	8,597	0,000	3,839	0,000	User Specified
LODOS	0%	22,540	0,000	22,540	0,000	11,401	0,000	1,000	0,000	User Specified
REBOSES HFO BR	0%	15,908	0,000	16,233	0,000	20,233	-2,001	0,313	0,000	User Specified
REBOSES ACEITE ER	0%	22,443	0,000	24,395	0,000	20,974	2,001	0,291	0,000	User Specified
AGUAS ACEITOSAS	0%	14,763	0,000	16,170	0,000	23,625	0,000	1,000	0,000	User Specified
SENTINAS	0%	7,974	0,000	8,734	0,000	28,919	0,000	0,000	0,000	User Specified
AGUAS RESIDUALES	0%	152,063	0,000	152,063	0,000	13,523	8,989	9,140	0,000	User Specified
Total misceláneos	22,21%	302,994	67,303	307,437	67,303	8,597	0,000	3,839	0,000	
SERVICIO ACEITE CILINDROS	100%	5,428	5,428	5,900	5,900	11,000	-5,750	9,570	0,000	User Specified
ALMACÉN ACEITE CILINDROS	100%	32,440	32,440	35,260	35,260	11,000	-5,750	12,570	0,000	User Specified
ALMACÉN ACEITE 1	100%	17,009	17,009	18,488	18,488	11,021	-8,471	11,771	0,000	User Specified
ALMACÉN ACEITE 2	100%	13,153	13,153	14,297	14,297	11,071	-10,529	12,530	0,000	User Specified
Total aceite	100%	68,030	68,030	73,945	73,945	11,019	-7,354	12,123	0,000	
SEDIMENTACIÓN HFO 1	100%	43,621	43,621	44,512	44,512	29,250	-1,000	9,570	0,000	User Specified
USO DIARIO HFO 1	100%	65,432	65,432	66,767	66,767	29,250	1,500	9,570	0,000	User Specified
USO DIARIO HFO 2	100%	65,432	65,432	66,767	66,767	29,250	4,500	9,570	0,000	User Specified
SEDIMENTACIÓN HFO 2	100%	43,621	43,621	44,512	44,512	29,250	7,000	9,570	0,000	User Specified
S4B-TOLVA SUPERIOR B4 BABOR	97,9%	405,778	397,256	414,059	405,363	70,405	-11,318	15,562	203,826	IMO A.749(18)
S4E-TOLVA SUPERIOR B4 ESTRIBOR	97,9%	405,778	397,256	414,059	405,363	70,405	11,318	15,562	203,826	IMO A.749(18)
S5B-TOLVA SUPERIOR B5 BABOR	97,9%	9,973	9,764	10,177	9,963	43,690	-11,263	14,110	0,000	IMO A.749(18)
S5E-TOLVA SUPERIOR B5 ESTRIBOR	97,9%	9,973	9,764	10,177	9,963	43,690	11,263	14,110	0,000	IMO A.749(18)
Total HFO	98,34%	1049,608	1032,147	1071,029	1053,211	61,203	0,634	14,269	407,652	
USO DIARIO DIÉSEL 1	97,9%	28,042	27,453	33,384	32,683	29,250	-2,750	9,411	0,000	IMO A.749(18)
USO DIARIO DIÉSEL 2	97,9%	28,042	27,453	33,384	32,683	29,250	-4,250	9,411	0,000	IMO A.749(18)
ALMACÉN DIÉSEL	97,9%	93,474	91,511	111,279	108,942	29,250	-7,500	9,411	0,000	IMO A.749(18)

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
Total diésel	97,9%	149,559	146,418	178,046	174,307	29,250	-6,000	9,411	0,000	
DIÉSEL EMERGENCIA	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	IMO A.749(18)
Total diésel emergencia	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	
LNG 1	97,9%	47,695	46,694	105,989	103,763	4,571	1,270	22,363	0,000	IMO A.749(18)
LNG 2	97,9%	47,878	46,873	106,396	104,161	-0,102	1,260	22,297	122,130	IMO A.749(18)
Total LNG	97,9%	95,573	93,566	212,385	207,925	2,230	1,265	22,330	122,130	
BODEGA 1	20%	25013,975	5002,796	8004,472	1600,895	146,371	0,000	3,695	0,000	User Specified
BODEGA 2	20%	34748,097	6949,618	11119,391	2223,878	123,112	0,000	3,628	0,000	User Specified
BODEGA 3	20%	35002,500	7000,497	11200,800	2240,159	96,800	0,000	3,623	0,000	User Specified
BODEGA 4	20%	35003,279	7000,655	11201,049	2240,210	70,400	0,000	3,623	0,000	User Specified
BODEGA 5	20%	34964,815	6992,966	11188,741	2237,749	44,065	0,000	3,687	0,000	User Specified
Total bodegas	20%	164732,667	32946,532	52714,453	10542,890	93,075	0,000	3,649	0,000	
Contenedor 1	1	440,000	440,000			147,000	0,000	22,800	0,000	User Specified
Contenedor 2	1	792,000	792,000			123,500	0,000	22,800	0,000	User Specified
Contenedor 3	1	792,000	792,000			97,000	0,000	22,800	0,000	User Specified
Contenedor 4	1	792,000	792,000			70,500	0,000	22,800	0,000	User Specified
Contenedor 5	1	792,000	792,000			44,000	0,000	22,800	0,000	User Specified
Total contenedores			3608,000			91,463	0,000	22,800	0,000	
Madera 1	0	400,000	0,000			147,000	0,000	22,800	0,000	User Specified
Madera 2	0	720,000	0,000			123,500	0,000	22,800	0,000	User Specified
Madera 3	0	720,000	0,000			97,000	0,000	22,800	0,000	User Specified
Madera 4	0	720,000	0,000			70,500	0,000	22,800	0,000	User Specified
Madera 5	0	720,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total madera			0,000			0,000	0,000	0,000	0,000	
Total Loadcase			48314,117	67496,358	12361,900	86,142	-0,013	7,139	661,066	
FS correction								0,014		
VCG fluid								7,153		

Draft Amidships m	11,165
Displacement t	48313
Heel deg	0,0
Draft at FP m	10,480
Draft at AP m	11,849

Draft at LCF m	11,179
Trim (+ve by stern) m	1,369
WL Length m	173,613
Beam max extents on WL m	30,161
Wetted Area m ²	7710,400
Waterpl. Area m ²	4591,516
Prismatic coeff. (Cp)	0,801
Block coeff. (Cb)	0,765
Max Sect. area coeff. (Cm)	0,991
Waterpl. area coeff. (Cwp)	0,877
LCB from zero pt. (+ve fwd) m	86,135
LCF from zero pt. (+ve fwd) m	83,415
KB m	5,772
KG fluid m	7,153
BMt m	6,567
BML m	197,434
GMt corrected m	5,186
GML m	196,053
KMt m	12,339
KML m	203,199
Immersion (TPc) tonne/cm	47,063
MTc tonne.m	555,863
RM at 1deg = GMt.Disp.sin(1) tonne.m	4372,827
Max deck inclination deg	0,4604
Trim angle (+ve by stern) deg	0,4604

Key point	Type	Freeboard m
Margin Line (freeboard pos = 30,275 m)		5,458
Deck Edge (freeboard pos = 30,275 m)		5,534
Entrada habilitación cta ppal 1	Downflooding point	7,032
Aseo público cubierta	Downflooding point	7,032
Local CO2	Downflooding point	7,032
Entrada habilitación cta ppal 2	Downflooding point	7,032
Local ropa de agua	Downflooding point	7,032
Entrada habilitación cta toldil	Downflooding point	9,776
Entrada habilitación cta toldil	Downflooding point	9,776
Local grupo emergencia	Downflooding point	9,685
Entrada a cta ppal desde cta to	Downflooding point	9,653

Stability calculation - D

Stability 22.01.00.131, build: 131

Model file: C:\Users\MARTA\Google Drive\TFG\Marta González\PROGRAMAS\MaxSURF\NUEVO (TFG)\D (Highest precision, 65 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 - Condición I

Damage Case - Intact

Free to Trim

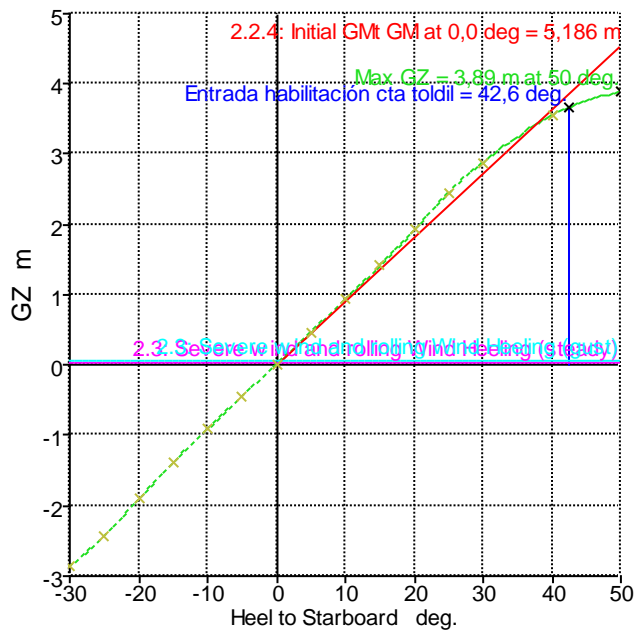
Specific gravity = 1,025; (Density = 1,025 tonne/m³)

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	10064,100	10064,100			68,650	0,000	11,800	0,000	User Specified
Total peso en rosca			10064,100			68,650	0,000	11,800	0,000	
Tripulación	20	0,125	2,500			15,000	0,000	22,000	0,000	User Specified
Pertrechos	1	40,000	40,000			90,000	0,000	15,000	0,000	User Specified
Total pesos fijos			42,500			85,588	0,000	15,412	0,000	
Viveres	1	3,700	3,700			17,000	0,000	20,000	0,000	User Specified
Total pesos variables			3,700			17,000	0,000	20,000	0,000	
P1-PIQUE PROA 1	0%	690,827	0,000	673,978	0,000	165,684	0,000	0,047	0,000	IMO A.749(18)
P2B-PIQUE PROA 2 BR	0%	445,266	0,000	434,406	0,000	158,040	-0,001	0,009	0,000	IMO A.749(18)
P2E-PIQUE PROA 2 ER	0%	445,266	0,000	434,406	0,000	158,040	0,001	0,009	0,000	IMO A.749(18)
S1B-TOLVA SUPERIOR B1 BAVOR	0%	436,049	0,000	425,414	0,000	139,794	-12,904	12,700	0,000	IMO A.749(18)
S1E-TOLVA SUPERIOR B1 ESTRIBOR	0%	436,049	0,000	425,414	0,000	139,794	12,904	12,700	0,000	IMO A.749(18)
I1B-TOLVA INFERIOR B1 BAVOR	0%	460,629	0,000	449,394	0,000	136,523	-0,671	0,005	0,000	IMO A.749(18)
I1E-TOLVA INFERIOR B1 ESTRIBOR	0%	460,629	0,000	449,394	0,000	136,523	0,671	0,005	0,000	IMO A.749(18)
S2B-TOLVA SUPERIOR B2 BAVOR	0%	608,511	0,000	593,669	0,000	123,728	-14,225	12,700	0,000	IMO A.749(18)
S2E-TOLVA SUPERIOR B2 ESTRIBOR	0%	608,511	0,000	593,669	0,000	123,728	14,225	12,700	0,000	IMO A.749(18)
I2B-TOLVA INFERIOR B2 BAVOR	0%	831,819	0,000	811,530	0,000	111,611	-1,566	0,000	0,000	IMO A.749(18)
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S3B-TOLVA SUPERIOR B3 BAVOR	0%	608,593	0,000	593,750	0,000	96,777	-14,339	12,700	0,000	IMO A.749(18)
S3E-TOLVA SUPERIOR B3 ESTRIBOR	0%	608,593	0,000	593,750	0,000	96,777	14,339	12,700	0,000	IMO A.749(18)
I3B-TOLVA INFERIOR B3 BAVOR	0%	866,904	0,000	845,760	0,000	95,275	-2,938	0,000	0,000	IMO A.749(18)
I3E-TOLVA INFERIOR B3 ESTRIBOR	0%	866,904	0,000	845,760	0,000	95,275	2,938	0,000	0,000	IMO A.749(18)
I4B-TOLVA INFERIOR B4 BAVOR	0%	860,892	0,000	839,895	0,000	77,837	-2,284	0,000	0,000	IMO A.749(18)
I4E-TOLVA INFERIOR B4 ESTRIBOR	0%	860,892	0,000	839,895	0,000	77,837	2,284	0,000	0,000	IMO A.749(18)

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
I5B-TOLVA INFERIOR B5 BABOR	0%	769,640	0,000	750,868	0,000	54,943	-1,029	0,000	0,000	IMO A.749(18)
I5E-TOLVA INFERIOR B5 ESTRIBOR	0%	769,640	0,000	750,868	0,000	54,943	1,029	0,000	0,000	IMO A.749(18)
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PIQUE POPA ESTRIBOR	0%	271,223	0,000	264,608	0,000	8,299	4,606	9,140	0,000	User Specified
Total lastre	0%	13009,878	0,000	12692,564	0,000	0,000	0,000	0,000	0,000	
ADB-AGUA DULCE BABOR	97,9%	121,659	119,104	121,659	119,104	7,451	-8,283	15,165	131,283	IMO A.749(18)
ADE-AGUA DULCE ESTRIBOR	97,9%	74,189	72,631	74,189	72,631	6,534	8,168	15,176	0,000	IMO A.749(18)
ATE-AGUA TÉCNICA ESTRIBOR	100%	47,476	47,476	47,476	47,476	8,883	8,468	15,189	0,000	User Specified
Total agua	98,31%	243,325	239,212	243,325	239,212	7,457	0,036	15,173	131,283	
REFRIGERACIÓN EJE	100%	67,303	67,303	67,303	67,303	8,597	0,000	3,839	0,000	User Specified
LODOS	0%	22,540	0,000	22,540	0,000	11,401	0,000	1,000	0,000	User Specified
REBOSES HFO BR	0%	15,908	0,000	16,233	0,000	20,233	-2,001	0,313	0,000	User Specified
REBOSES ACEITE ER	0%	22,443	0,000	24,395	0,000	20,974	2,001	0,291	0,000	User Specified
AGUAS ACEITOSAS	0%	14,763	0,000	16,170	0,000	23,625	0,000	1,000	0,000	User Specified
SENTINAS	0%	7,974	0,000	8,734	0,000	28,919	0,000	0,000	0,000	User Specified
AGUAS RESIDUALES	0%	152,063	0,000	152,063	0,000	13,523	8,989	9,140	0,000	User Specified
Total misceláneos	22,21%	302,994	67,303	307,437	67,303	8,597	0,000	3,839	0,000	
SERVICIO ACEITE CILINDROS	100%	5,428	5,428	5,900	5,900	11,000	-5,750	9,570	0,000	User Specified
ALMACÉN ACEITE CILINDROS	100%	32,440	32,440	35,260	35,260	11,000	-5,750	12,570	0,000	User Specified
ALMACÉN ACEITE 1	100%	17,009	17,009	18,488	18,488	11,021	-8,471	11,771	0,000	User Specified
ALMACÉN ACEITE 2	100%	13,153	13,153	14,297	14,297	11,071	-10,529	12,530	0,000	User Specified
Total aceite	100%	68,030	68,030	73,945	73,945	11,019	-7,354	12,123	0,000	
SEDIMENTACIÓN HFO 1	100%	43,621	43,621	44,512	44,512	29,250	-1,000	9,570	0,000	User Specified
USO DIARIO HFO 1	100%	65,432	65,432	66,767	66,767	29,250	1,500	9,570	0,000	User Specified
USO DIARIO HFO 2	100%	65,432	65,432	66,767	66,767	29,250	4,500	9,570	0,000	User Specified
SEDIMENTACIÓN HFO 2	100%	43,621	43,621	44,512	44,512	29,250	7,000	9,570	0,000	User Specified
S4B-TOLVA SUPERIOR B4 BABOR	97,9%	405,778	397,256	414,059	405,363	70,405	-11,318	15,562	203,826	IMO A.749(18)
S4E-TOLVA SUPERIOR B4 ESTRIBOR	97,9%	405,778	397,256	414,059	405,363	70,405	11,318	15,562	203,826	IMO A.749(18)
S5B-TOLVA SUPERIOR B5 BABOR	97,9%	9,973	9,764	10,177	9,963	43,690	-11,263	14,110	0,000	IMO A.749(18)
S5E-TOLVA SUPERIOR B5 ESTRIBOR	97,9%	9,973	9,764	10,177	9,963	43,690	11,263	14,110	0,000	IMO A.749(18)
Total HFO	98,34%	1049,608	1032,147	1071,029	1053,211	61,203	0,634	14,269	407,652	
USO DIARIO DIÉSEL 1	97,9%	28,042	27,453	33,384	32,683	29,250	-2,750	9,411	0,000	IMO A.749(18)
USO DIARIO DIÉSEL 2	97,9%	28,042	27,453	33,384	32,683	29,250	-4,250	9,411	0,000	IMO A.749(18)
ALMACÉN DIÉSEL	97,9%	93,474	91,511	111,279	108,942	29,250	-7,500	9,411	0,000	IMO A.749(18)

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
Total diésel	97,9%	149,559	146,418	178,046	174,307	29,250	-6,000	9,411	0,000	
DIÉSEL EMERGENCIA	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	IMO A.749(18)
Total diésel emergencia	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	
LNG 1	97,9%	47,695	46,693	105,989	103,763	4,571	1,270	22,363	0,000	IMO A.749(18)
LNG 2	97,9%	47,878	46,873	106,396	104,161	-0,102	1,260	22,297	122,130	IMO A.749(18)
Total LNG	97,9%	95,573	93,566	212,385	207,925	2,230	1,265	22,330	122,130	
BODEGA 1	20%	25013,975	5002,794	8004,472	1600,894	146,371	0,000	3,695	0,000	User Specified
BODEGA 2	20%	34748,097	6949,620	11119,391	2223,878	123,112	0,000	3,628	0,000	User Specified
BODEGA 3	20%	35002,500	7000,501	11200,800	2240,160	96,800	0,000	3,623	0,000	User Specified
BODEGA 4	20%	35003,279	7000,655	11201,049	2240,210	70,400	0,000	3,623	0,000	User Specified
BODEGA 5	20%	34964,815	6992,966	11188,741	2237,749	44,065	0,000	3,687	0,000	User Specified
Total bodegas	20%	164732,667	32946,535	52714,453	10542,891	93,075	0,000	3,649	0,000	
Contenedor 1	1	440,000	440,000			147,000	0,000	22,800	0,000	User Specified
Contenedor 2	1	792,000	792,000			123,500	0,000	22,800	0,000	User Specified
Contenedor 3	1	792,000	792,000			97,000	0,000	22,800	0,000	User Specified
Contenedor 4	1	792,000	792,000			70,500	0,000	22,800	0,000	User Specified
Contenedor 5	1	792,000	792,000			44,000	0,000	22,800	0,000	User Specified
Total contenedores			3608,000			91,463	0,000	22,800	0,000	
Madera 1	0	400,000	0,000			147,000	0,000	22,800	0,000	User Specified
Madera 2	0	720,000	0,000			123,500	0,000	22,800	0,000	User Specified
Madera 3	0	720,000	0,000			97,000	0,000	22,800	0,000	User Specified
Madera 4	0	720,000	0,000			70,500	0,000	22,800	0,000	User Specified
Madera 5	0	720,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total madera			0,000			0,000	0,000	0,000	0,000	
Total Loadcase			48314,120	67496,358	12361,901	86,142	-0,013	7,139	661,066	
FS correction								0,014		
VCG fluid								7,153		



Stability	
█	GZ
█	Entrada habilitación cta toldil = 42,6 deg.
█	2.2.4: Initial GMT GM at 0,0 deg = 5,186 m
█	2.3: Severe wind and rolling Wind Heeling (steady)
█	2.3: Severe wind and rolling Wind Heeling (gust)
█	Max GZ = 3,89 m at 50 deg.

Heel to Starboard deg	-30,0	-25,0	-20,0	-15,0	-10,0	-5,0	0,0	5,0	10,0	15,0	20,0	25,0
GZ m	-2,862	-2,428	-1,902	-1,388	-0,905	-0,441	0,013	0,467	0,930	1,412	1,926	2,452
Area under GZ curve from zero heel m.deg	42,4606	29,2038	18,3567	10,1493	4,4289	1,0695	0,0116	1,1971	4,6832	10,5276	18,8601	29,8123
Displacement t	48318	48314	48314	48314	48318	48317	48315	48313	48312	48310	48314	48309
Draft at FP m	10,744	10,556	10,520	10,501	10,490	10,482	10,479	10,481	10,488	10,501	10,519	10,555
Draft at AP m	11,592	11,608	11,680	11,758	11,812	11,842	11,851	11,841	11,810	11,757	11,680	11,607
WL Length m	173,668	173,627	173,620	173,617	173,615	173,615	173,613	173,613	173,614	173,617	173,620	173,627
Beam max extents on WL m	30,170	31,292	32,085	31,219	30,624	30,276	30,161	30,276	30,624	31,219	32,085	31,295
Wetted Area m^2	8082,398	7891,433	7740,494	7726,748	7717,706	7712,435	7710,600	7712,161	7717,162	7726,416	7740,493	7890,882
Waterpl. Area m^2	4585,179	4774,819	4865,843	4742,784	4657,780	4608,107	4591,613	4607,866	4657,679	4742,726	4865,838	4775,074
Prismatic coeff. (Cp)	0,821	0,812	0,807	0,804	0,802	0,801	0,801	0,801	0,802	0,804	0,807	0,812
Block coeff. (Cb)	0,537	0,542	0,555	0,604	0,660	0,724	0,765	0,724	0,660	0,604	0,555	0,542
LCB from zero pt. (+ve fwd) m	86,133	86,131	86,131	86,131	86,131	86,131	86,131	86,131	86,131	86,131	86,131	86,132
LCF from zero pt. (+ve fwd) m	83,333	84,004	83,675	83,553	83,475	83,427	83,413	83,431	83,476	83,554	83,675	84,004
Max deck inclination deg	30,0009	25,0019	20,0032	15,0054	10,0095	5,0207	0,4613	5,0207	10,0095	15,0054	20,0032	25,0019
Trim angle (+ve by stern) deg	0,2849	0,3536	0,3902	0,4225	0,4446	0,4572	0,4613	0,4572	0,4446	0,4226	0,3903	0,3536

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 49,898 m)		20,9	n/a
Deck Edge (immersion pos = 49,898 m)		21,2	n/a
Entrada habilitación cta ppal 1	Downflooding point	Not immersed in positive range	0
Aseo público cubierta	Downflooding point	Not immersed in positive range	0
Local CO2	Downflooding point	Not immersed in positive range	0
Entrada habilitación cta ppal 2	Downflooding point	Not immersed in positive range	0
Local ropa de agua	Downflooding point	Not immersed in positive range	0
Entrada habilitación cta toldil	Downflooding point	42,6	0
Entrada habilitación cta toldil	Downflooding point	Not immersed in positive range	0
Local grupo emergencia	Downflooding point	Not immersed in positive range	0
Entrada a cta ppal desde cta to	Downflooding point	Not immersed in positive range	0

Code	Criteria	Value	Units	Actual	Status	Margin %
267(85) Ch2 - General Criteria	2.3: IMO roll back angle	21,2	deg			
267(85) Ch2 - General Criteria	2.2.1: Area 0 to 30	3,1513	m.deg	43,2060	Pass	+1271,07
267(85) Ch2 - General Criteria	2.2.1: Area 0 to 40	5,1566	m.deg	75,5713	Pass	+1365,52
267(85) Ch2 - General Criteria	2.2.1: Area 30 to 40	1,7189	m.deg	32,3653	Pass	+1782,94
267(85) Ch2 - General Criteria	2.2.2: Max GZ at 30 or greater	0,200	m	3,890	Pass	+1845,00
267(85) Ch2 - General Criteria	2.2.3: Angle of maximum GZ	25,0	deg	50,0	Pass	+100,00
267(85) Ch2 - General Criteria	2.2.4: Initial GMt	0,150	m	5,186	Pass	+3357,33
267(85) Ch2 - General Criteria	2.3: Severe wind and rolling				Pass	
	Angle of steady heel shall not be greater than (\leq)	16,0	deg	0,4	Pass	+97,59

CONDICIÓN XVI

Llegada a puerto a plena carga
(mineral) + contenedores sobre las
escotillas

Equilibrium calculation - D

Stability 22.01.00.131, build: 131

Model file: C:\Users\MARTA\Google Drive\TFG\Marta González\PROGRAMAS\MaxSURF\NUEVO (TFG)\D (Highest precision, 65 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 - Condición I

Damage Case - Intact

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m³)

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	10064,100	10064,100			68,650	0,000	11,800	0,000	User Specified
Total peso en rosca			10064,100			68,650	0,000	11,800	0,000	
Tripulación	20	0,125	2,500			15,000	0,000	22,000	0,000	User Specified
Pertrechos	1	40,000	40,000			90,000	0,000	15,000	0,000	User Specified
Total pesos fijos			42,500			85,588	0,000	15,412	0,000	
Viveres	0,1	3,700	0,370			17,000	0,000	20,000	0,000	User Specified
Total pesos variables			0,370			17,000	0,000	20,000	0,000	
P1-PIQUE PROA 1	0%	690,827	0,000	673,978	0,000	165,684	0,000	0,047	0,000	IMO A.749(18)
P2B-PIQUE PROA 2 BR	0%	445,266	0,000	434,406	0,000	158,040	-0,001	0,009	0,000	IMO A.749(18)
P2E-PIQUE PROA 2 ER	0%	445,266	0,000	434,406	0,000	158,040	0,001	0,009	0,000	IMO A.749(18)
S1B-TOLVA SUPERIOR B1 BAVOR	0%	436,049	0,000	425,414	0,000	139,794	-12,904	12,700	0,000	IMO A.749(18)
S1E-TOLVA SUPERIOR B1 ESTRIBOR	0%	436,049	0,000	425,414	0,000	139,794	12,904	12,700	0,000	IMO A.749(18)
I1B-TOLVA INFERIOR B1 BAVOR	0%	460,629	0,000	449,394	0,000	136,523	-0,671	0,005	0,000	IMO A.749(18)
I1E-TOLVA INFERIOR B1 ESTRIBOR	0%	460,629	0,000	449,394	0,000	136,523	0,671	0,005	0,000	IMO A.749(18)
S2B-TOLVA SUPERIOR B2 BAVOR	0%	608,511	0,000	593,669	0,000	123,728	-14,225	12,700	0,000	IMO A.749(18)
S2E-TOLVA SUPERIOR B2 ESTRIBOR	0%	608,511	0,000	593,669	0,000	123,728	14,225	12,700	0,000	IMO A.749(18)
I2B-TOLVA INFERIOR B2 BAVOR	0%	831,819	0,000	811,530	0,000	111,611	-1,566	0,000	0,000	IMO A.749(18)
I2E-TOLVA INFERIOR B2 ESTRIBOR	0%	831,819	0,000	811,530	0,000	111,611	1,566	0,000	0,000	IMO A.749(18)
S3B-TOLVA SUPERIOR B3 BAVOR	0%	608,593	0,000	593,750	0,000	96,777	-14,339	12,700	0,000	IMO A.749(18)
S3E-TOLVA SUPERIOR B3 ESTRIBOR	0%	608,593	0,000	593,750	0,000	96,777	14,339	12,700	0,000	IMO A.749(18)
I3B-TOLVA INFERIOR B3 BAVOR	0%	866,904	0,000	845,760	0,000	95,275	-2,938	0,000	0,000	IMO A.749(18)
I3E-TOLVA INFERIOR B3 ESTRIBOR	0%	866,904	0,000	845,760	0,000	95,275	2,938	0,000	0,000	IMO A.749(18)
I4B-TOLVA INFERIOR B4 BAVOR	0%	860,892	0,000	839,895	0,000	77,837	-2,284	0,000	0,000	IMO A.749(18)
I4E-TOLVA INFERIOR B4 ESTRIBOR	0%	860,892	0,000	839,895	0,000	77,837	2,284	0,000	0,000	IMO A.749(18)

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
I5B-TOLVA INFERIOR B5 BABOR	0%	769,640	0,000	750,868	0,000	54,943	-1,029	0,000	0,000	IMO A.749(18)
I5E-TOLVA INFERIOR B5 ESTRIBOR	0%	769,640	0,000	750,868	0,000	54,943	1,029	0,000	0,000	IMO A.749(18)
PIQUE POPA BABOR	0%	271,223	0,000	264,608	0,000	8,299	-4,606	9,140	0,000	User Specified
PIQUE POPA ESTRIBOR	0%	271,223	0,000	264,608	0,000	8,299	4,606	9,140	0,000	User Specified
Total lastre	0%	13009,878	0,000	12692,564	0,000	0,000	0,000	0,000	0,000	
ADB-AGUA DULCE BABOR	10%	121,659	12,166	121,659	12,166	7,492	-7,942	13,365	131,287	IMO A.749(18)
ADE-AGUA DULCE ESTRIBOR	10%	74,189	7,419	74,189	7,419	6,554	7,777	13,370	0,000	IMO A.749(18)
ATE-AGUA TÉCNICA ESTRIBOR	10%	47,476	4,748	47,476	4,748	8,887	8,188	13,358	0,000	User Specified
Total agua	10%	243,325	24,332	243,325	24,332	7,478	-0,002	13,366	131,287	
REFRIGERACIÓN EJE	100%	67,303	67,303	67,303	67,303	8,597	0,000	3,839	0,000	User Specified
LODOS	100%	22,540	22,540	22,540	22,540	11,375	0,000	1,532	0,000	User Specified
REBOSES HFO BR	100%	15,908	15,908	16,233	16,233	18,841	-5,025	1,382	0,000	User Specified
REBOSES ACEITE ER	100%	22,443	22,443	24,395	24,395	18,954	5,046	1,380	0,000	User Specified
AGUAS ACEITOSAS	100%	14,763	14,763	16,170	16,170	23,625	0,000	1,500	0,000	User Specified
SENTINAS	100%	7,974	7,974	8,734	8,734	28,875	0,000	1,010	0,000	User Specified
AGUAS RESIDUALES	100%	152,063	152,063	152,063	152,063	12,650	10,081	13,659	0,000	User Specified
Total misceláneos	100%	302,994	302,994	307,437	307,437	13,409	5,169	8,096	0,000	
SERVICIO ACEITE CILINDROS	10%	5,428	0,543	5,900	0,590	11,000	-5,750	9,183	0,000	User Specified
ALMACÉN ACEITE CILINDROS	10%	32,440	3,244	35,260	3,526	11,000	-5,750	10,257	0,000	User Specified
ALMACÉN ACEITE 1	10%	17,009	1,701	18,488	1,849	11,178	-8,241	9,558	0,000	User Specified
ALMACÉN ACEITE 2	10%	13,153	1,315	14,297	1,430	11,268	-9,962	10,577	0,000	User Specified
Total aceite	10%	68,030	6,803	73,945	7,395	11,096	-7,187	10,058	0,000	
SEDIMENTACIÓN HFO 1	0%	43,621	0,000	44,512	0,000	29,250	-1,000	2,000	0,000	User Specified
USO DIARIO HFO 1	80,24%	65,432	52,500	66,767	53,571	29,250	1,500	8,074	0,000	User Specified
USO DIARIO HFO 2	80,24%	65,432	52,500	66,767	53,571	29,250	4,500	8,074	0,000	User Specified
SEDIMENTACIÓN HFO 2	0%	43,621	0,000	44,512	0,000	29,250	7,000	2,000	0,000	User Specified
S4B-TOLVA SUPERIOR B4 BABOR	0%	405,778	0,000	414,059	0,000	71,250	-13,611	12,700	0,000	IMO A.749(18)
S4E-TOLVA SUPERIOR B4 ESTRIBOR	0%	405,778	0,000	414,059	0,000	71,250	13,611	12,700	0,000	IMO A.749(18)
S5B-TOLVA SUPERIOR B5 BABOR	0%	9,973	0,000	10,177	0,000	44,162	-14,104	12,700	0,000	IMO A.749(18)
S5E-TOLVA SUPERIOR B5 ESTRIBOR	0%	9,973	0,000	10,177	0,000	44,162	14,104	12,700	0,000	IMO A.749(18)
Total HFO	10%	1049,608	105,000	1071,029	107,143	29,250	3,000	8,074	0,000	
USO DIARIO DIÉSEL 1	26,75%	28,042	7,500	33,384	8,929	29,250	-2,750	4,025	0,000	IMO A.749(18)
USO DIARIO DIÉSEL 2	26,75%	28,042	7,500	33,384	8,929	29,250	-4,250	4,025	0,000	IMO A.749(18)
ALMACÉN DIÉSEL	0%	93,474	0,000	111,279	0,000	29,250	-7,500	2,000	0,000	IMO A.749(18)

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
Total diésel	10,03%	149,559	15,000	178,046	17,857	29,250	-3,500	4,025	0,000	
DIÉSEL EMERGENCIA	10%	2,666	0,267	3,174	0,317	8,267	-7,570	20,260	0,000	IMO A.749(18)
Total diésel emergencia	10%	2,666	0,267	3,174	0,317	8,267	-7,570	20,260	0,000	
LNG 1	10%	47,695	4,770	105,989	10,599	4,549	1,266	20,938	0,000	IMO A.749(18)
LNG 2	10%	47,878	4,788	106,396	10,640	-0,067	1,235	20,762	122,133	IMO A.749(18)
Total LNG	10%	95,573	9,557	212,385	21,238	2,237	1,251	20,850	122,133	
BODEGA 1	20%	25013,975	5002,797	8004,472	1600,895	146,371	0,000	3,695	0,000	User Specified
BODEGA 2	20%	34748,097	6949,623	11119,391	2223,879	123,112	0,000	3,628	0,000	User Specified
BODEGA 3	20%	35002,500	7000,501	11200,800	2240,160	96,800	0,000	3,623	0,000	User Specified
BODEGA 4	20%	35003,279	7000,659	11201,049	2240,211	70,400	0,000	3,623	0,000	User Specified
BODEGA 5	20%	34964,815	6992,963	11188,741	2237,748	44,065	0,000	3,687	0,000	User Specified
Total bodegas	20%	164732,667	32946,543	52714,453	10542,894	93,075	0,000	3,649	0,000	
Contenedor 1	1	440,000	440,000			147,000	0,000	22,800	0,000	User Specified
Contenedor 2	1	792,000	792,000			123,500	0,000	22,800	0,000	User Specified
Contenedor 3	1	792,000	792,000			97,000	0,000	22,800	0,000	User Specified
Contenedor 4	1	792,000	792,000			70,500	0,000	22,800	0,000	User Specified
Contenedor 5	1	792,000	792,000			44,000	0,000	22,800	0,000	User Specified
Total contenedores			3608,000			91,463	0,000	22,800	0,000	
Madera 1	0	400,000	0,000			147,000	0,000	22,800	0,000	User Specified
Madera 2	0	720,000	0,000			123,500	0,000	22,800	0,000	User Specified
Madera 3	0	720,000	0,000			97,000	0,000	22,800	0,000	User Specified
Madera 4	0	720,000	0,000			70,500	0,000	22,800	0,000	User Specified
Madera 5	0	720,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total madera			0,000			0,000	0,000	0,000	0,000	
Total Loadcase			47125,466	67496,358	11028,614	86,978	0,038	6,915	253,420	
FS correction								0,005		
VCG fluid								6,920		

Draft Amidships m	10,917
Displacement t	47125
Heel deg	0,4
Draft at FP m	10,562
Draft at AP m	11,271

Draft at LCF m	10,922
Trim (+ve by stern) m	0,709
WL Length m	172,084
Beam max extents on WL m	30,161
Wetted Area m ²	7600,593
Waterpl. Area m ²	4554,701
Prismatic coeff. (Cp)	0,812
Block coeff. (Cb)	0,789
Max Sect. area coeff. (Cm)	0,987
Waterpl. area coeff. (Cwp)	0,878
LCB from zero pt. (+ve fwd) m	86,969
LCF from zero pt. (+ve fwd) m	84,066
KB m	5,634
KG fluid m	6,920
BMt m	6,693
BML m	197,281
GMt corrected m	5,407
GML m	195,995
KMt m	12,327
KML m	202,909
Immersion (TPc) tonne/cm	46,686
MTc tonne.m	542,040
RM at 1deg = GMt.Disp.sin(1) tonne.m	4447,099
Max deck inclination deg	0,4689
Trim angle (+ve by stern) deg	0,2384

Key point	Type	Freeboard m
Margin Line (freeboard pos = 30,275 m)		5,817
Deck Edge (freeboard pos = 30,275 m)		5,893
Entrada habilitación cta ppal 1	Downflooding point	7,479
Aseo público cubierta	Downflooding point	7,499
Local CO2	Downflooding point	7,509
Entrada habilitación cta ppal 2	Downflooding point	7,521
Local ropa de agua	Downflooding point	7,538
Entrada habilitación cta toldil	Downflooding point	10,185
Entrada habilitación cta toldil	Downflooding point	10,333
Local grupo emergencia	Downflooding point	10,158
Entrada a cta ppal desde cta to	Downflooding point	10,236

Stability calculation - D

Stability 22.01.00.131, build: 131

Model file: C:\Users\MARTA\Google Drive\TFG\Marta González\PROGRAMAS\MaxSURF\NUEVO (TFG)\D (Highest precision, 65 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 - Condición I

Damage Case - Intact

Free to Trim

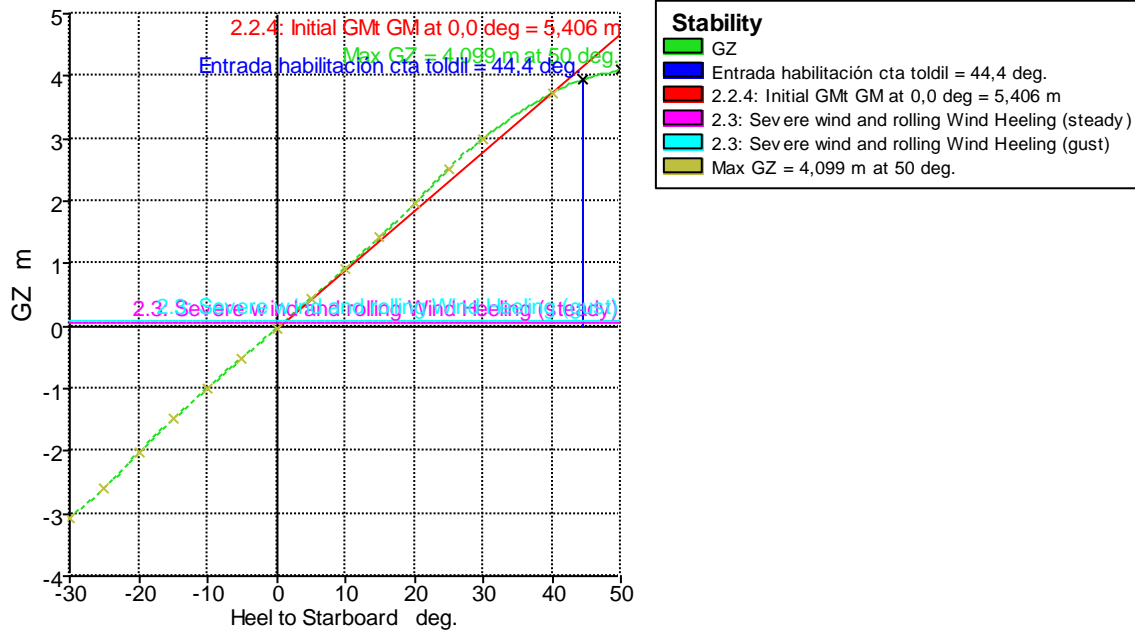
Specific gravity = 1,025; (Density = 1,025 tonne/m³)

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	10064,100	10064,100			68,650	0,000	11,800	0,000	User Specified
Total peso en rosca			10064,100			68,650	0,000	11,800	0,000	
Tripulación	20	0,125	2,500			15,000	0,000	22,000	0,000	User Specified
Pertrechos	1	40,000	40,000			90,000	0,000	15,000	0,000	User Specified
Total pesos fijos			42,500			85,588	0,000	15,412	0,000	
Viveres	0,1	3,700	0,370			17,000	0,000	20,000	0,000	User Specified
Total pesos variables			0,370			17,000	0,000	20,000	0,000	
P1-PIQUE PROA 1	0%	690,827	0,000	673,978	0,000	165,684	0,000	0,047	0,000	IMO A.749(18)
P2B-PIQUE PROA 2 BR	0%	445,266	0,000	434,406	0,000	158,040	-0,001	0,009	0,000	IMO A.749(18)
P2E-PIQUE PROA 2 ER	0%	445,266	0,000	434,406	0,000	158,040	0,001	0,009	0,000	IMO A.749(18)
S1B-TOLVA SUPERIOR B1 BABOR	0%	436,049	0,000	425,414	0,000	139,794	-12,904	12,700	0,000	IMO A.749(18)
S1E-TOLVA SUPERIOR B1 ESTRIBOR	0%	436,049	0,000	425,414	0,000	139,794	12,904	12,700	0,000	IMO A.749(18)
I1B-TOLVA INFERIOR B1 BABOR	0%	460,629	0,000	449,394	0,000	136,523	-0,671	0,005	0,000	IMO A.749(18)
I1E-TOLVA INFERIOR B1 ESTRIBOR	0%	460,629	0,000	449,394	0,000	136,523	0,671	0,005	0,000	IMO A.749(18)
S2B-TOLVA SUPERIOR B2 BABOR	0%	608,511	0,000	593,669	0,000	123,728	-14,225	12,700	0,000	IMO A.749(18)
S2E-TOLVA SUPERIOR B2 ESTRIBOR	0%	608,511	0,000	593,669	0,000	123,728	14,225	12,700	0,000	IMO A.749(18)
I2B-TOLVA INFERIOR B2 BABOR	0%	831,819	0,000	811,530	0,000	111,611	-1,566	0,000	0,000	IMO A.749(18)
I2E-TOLVA INFERIOR B2 ESTRIBOR	0%	831,819	0,000	811,530	0,000	111,611	1,566	0,000	0,000	IMO A.749(18)
S3B-TOLVA SUPERIOR B3 BABOR	0%	608,593	0,000	593,750	0,000	96,777	-14,339	12,700	0,000	IMO A.749(18)
S3E-TOLVA SUPERIOR B3 ESTRIBOR	0%	608,593	0,000	593,750	0,000	96,777	14,339	12,700	0,000	IMO A.749(18)
I3B-TOLVA INFERIOR B3 BABOR	0%	866,904	0,000	845,760	0,000	95,275	-2,938	0,000	0,000	IMO A.749(18)
I3E-TOLVA INFERIOR B3 ESTRIBOR	0%	866,904	0,000	845,760	0,000	95,275	2,938	0,000	0,000	IMO A.749(18)
I4B-TOLVA INFERIOR B4 BABOR	0%	860,892	0,000	839,895	0,000	77,837	-2,284	0,000	0,000	IMO A.749(18)
I4E-TOLVA INFERIOR B4 ESTRIBOR	0%	860,892	0,000	839,895	0,000	77,837	2,284	0,000	0,000	IMO A.749(18)

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
I5B-TOLVA INFERIOR B5 BABOR	0%	769,640	0,000	750,868	0,000	54,943	-1,029	0,000	0,000	IMO A.749(18)
I5E-TOLVA INFERIOR B5 ESTRIBOR	0%	769,640	0,000	750,868	0,000	54,943	1,029	0,000	0,000	IMO A.749(18)
PIQUE POPA BABOR	0%	271,223	0,000	264,608	0,000	8,299	-4,606	9,140	0,000	User Specified
PIQUE POPA ESTRIBOR	0%	271,223	0,000	264,608	0,000	8,299	4,606	9,140	0,000	User Specified
Total lastre	0%	13009,878	0,000	12692,564	0,000	0,000	0,000	0,000	0,000	
ADB-AGUA DULCE BABOR	10%	121,659	12,166	121,659	12,166	7,492	-7,942	13,365	131,283	IMO A.749(18)
ADE-AGUA DULCE ESTRIBOR	10%	74,189	7,419	74,189	7,419	6,554	7,777	13,370	0,000	IMO A.749(18)
ATE-AGUA TÉCNICA ESTRIBOR	10%	47,476	4,748	47,476	4,748	8,887	8,188	13,358	0,000	User Specified
Total agua	10%	243,325	24,332	243,325	24,332	7,478	-0,002	13,366	131,283	
REFRIGERACIÓN EJE	100%	67,303	67,303	67,303	67,303	8,597	0,000	3,839	0,000	User Specified
LODOS	100%	22,540	22,540	22,540	22,540	11,375	0,000	1,532	0,000	User Specified
REBOSES HFO BR	100%	15,908	15,908	16,233	16,233	18,841	-5,025	1,382	0,000	User Specified
REBOSES ACEITE ER	100%	22,443	22,443	24,395	24,395	18,954	5,046	1,380	0,000	User Specified
AGUAS ACEITOSAS	100%	14,763	14,763	16,170	16,170	23,625	0,000	1,500	0,000	User Specified
SENTINAS	100%	7,974	7,974	8,734	8,734	28,875	0,000	1,010	0,000	User Specified
AGUAS RESIDUALES	100%	152,063	152,063	152,063	152,063	12,650	10,081	13,659	0,000	User Specified
Total misceláneos	100%	302,994	302,994	307,437	307,437	13,409	5,169	8,096	0,000	
SERVICIO ACEITE CILINDROS	10%	5,428	0,543	5,900	0,590	11,000	-5,750	9,183	0,000	User Specified
ALMACÉN ACEITE CILINDROS	10%	32,440	3,244	35,260	3,526	11,000	-5,750	10,257	0,000	User Specified
ALMACÉN ACEITE 1	10%	17,009	1,701	18,488	1,849	11,178	-8,241	9,558	0,000	User Specified
ALMACÉN ACEITE 2	10%	13,153	1,315	14,297	1,430	11,268	-9,962	10,577	0,000	User Specified
Total aceite	10%	68,030	6,803	73,945	7,395	11,096	-7,187	10,058	0,000	
SEDIMENTACIÓN HFO 1	0%	43,621	0,000	44,512	0,000	29,250	-1,000	2,000	0,000	User Specified
USO DIARIO HFO 1	80,24%	65,432	52,500	66,767	53,571	29,250	1,500	8,074	0,000	User Specified
USO DIARIO HFO 2	80,24%	65,432	52,500	66,767	53,571	29,250	4,500	8,074	0,000	User Specified
SEDIMENTACIÓN HFO 2	0%	43,621	0,000	44,512	0,000	29,250	7,000	2,000	0,000	User Specified
S4B-TOLVA SUPERIOR B4 BABOR	0%	405,778	0,000	414,059	0,000	71,250	-13,611	12,700	0,000	IMO A.749(18)
S4E-TOLVA SUPERIOR B4 ESTRIBOR	0%	405,778	0,000	414,059	0,000	71,250	13,611	12,700	0,000	IMO A.749(18)
S5B-TOLVA SUPERIOR B5 BABOR	0%	9,973	0,000	10,177	0,000	44,162	-14,104	12,700	0,000	IMO A.749(18)
S5E-TOLVA SUPERIOR B5 ESTRIBOR	0%	9,973	0,000	10,177	0,000	44,162	14,104	12,700	0,000	IMO A.749(18)
Total HFO	10%	1049,608	105,000	1071,029	107,143	29,250	3,000	8,074	0,000	
USO DIARIO DIÉSEL 1	26,75%	28,042	7,500	33,384	8,929	29,250	-2,750	4,025	0,000	IMO A.749(18)
USO DIARIO DIÉSEL 2	26,75%	28,042	7,500	33,384	8,929	29,250	-4,250	4,025	0,000	IMO A.749(18)
ALMACÉN DIÉSEL	0%	93,474	0,000	111,279	0,000	29,250	-7,500	2,000	0,000	IMO A.749(18)

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
Total diésel	10,03%	149,559	15,000	178,046	17,857	29,250	-3,500	4,025	0,000	
DIÉSEL EMERGENCIA	10%	2,666	0,267	3,174	0,317	8,267	-7,570	20,260	0,000	IMO A.749(18)
Total diésel emergencia	10%	2,666	0,267	3,174	0,317	8,267	-7,570	20,260	0,000	
LNG 1	10%	47,695	4,770	105,989	10,599	4,549	1,266	20,938	0,000	IMO A.749(18)
LNG 2	10%	47,878	4,788	106,396	10,640	-0,067	1,235	20,762	122,130	IMO A.749(18)
Total LNG	10%	95,573	9,557	212,385	21,238	2,237	1,251	20,850	122,130	
BODEGA 1	20%	25013,975	5002,793	8004,472	1600,894	146,371	0,000	3,695	0,000	User Specified
BODEGA 2	20%	34748,097	6949,622	11119,391	2223,879	123,112	0,000	3,628	0,000	User Specified
BODEGA 3	20%	35002,500	7000,502	11200,800	2240,161	96,800	0,000	3,623	0,000	User Specified
BODEGA 4	20%	35003,279	7000,653	11201,049	2240,209	70,400	0,000	3,623	0,000	User Specified
BODEGA 5	20%	34964,815	6992,961	11188,741	2237,748	44,065	0,000	3,687	0,000	User Specified
Total bodegas	20%	164732,667	32946,531	52714,453	10542,890	93,075	0,000	3,649	0,000	
Contenedor 1	1	440,000	440,000			147,000	0,000	22,800	0,000	User Specified
Contenedor 2	1	792,000	792,000			123,500	0,000	22,800	0,000	User Specified
Contenedor 3	1	792,000	792,000			97,000	0,000	22,800	0,000	User Specified
Contenedor 4	1	792,000	792,000			70,500	0,000	22,800	0,000	User Specified
Contenedor 5	1	792,000	792,000			44,000	0,000	22,800	0,000	User Specified
Total contenedores			3608,000			91,463	0,000	22,800	0,000	
Madera 1	0	400,000	0,000			147,000	0,000	22,800	0,000	User Specified
Madera 2	0	720,000	0,000			123,500	0,000	22,800	0,000	User Specified
Madera 3	0	720,000	0,000			97,000	0,000	22,800	0,000	User Specified
Madera 4	0	720,000	0,000			70,500	0,000	22,800	0,000	User Specified
Madera 5	0	720,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total madera			0,000			0,000	0,000	0,000	0,000	
Total Loadcase			47125,454	67496,358	11028,610	86,978	0,038	6,915	253,414	
FS correction								0,005		
VCG fluid								6,920		



Heel to Starboard deg	-30,0	-25,0	-20,0	-15,0	-10,0	-5,0	0,0	5,0	10,0	15,0	20,0	25,0
GZ m	-3,064	-2,590	-2,028	-1,495	-0,993	-0,511	-0,038	0,435	0,918	1,421	1,956	2,521
Area under GZ curve from zero heel m.deg	45,8486	31,6814	20,1209	11,3358	5,1257	1,3710	-0,0345	0,9917	4,3701	10,2090	18,6353	29,8315
Displacement t	47125	47125	47129	47128	47128	47127	47126	47125	47124	47123	47122	47122
Draft at FP m	10,815	10,640	10,607	10,588	10,575	10,567	10,564	10,567	10,574	10,587	10,605	10,640
Draft at AP m	10,953	11,000	11,096	11,175	11,229	11,260	11,270	11,259	11,228	11,174	11,094	10,999
WL Length m	173,683	173,644	172,674	172,323	172,162	172,076	172,078	172,074	172,159	172,319	172,669	173,643
Beam max extents on WL m	29,952	31,617	32,084	31,218	30,623	30,275	30,160	30,275	30,623	31,218	32,084	31,619
Wetted Area m^2	7957,614	7755,635	7636,947	7618,811	7608,011	7602,338	7600,539	7602,182	7607,707	7618,372	7636,383	7755,165
Waterpl. Area m^2	4625,806	4819,064	4833,510	4706,445	4620,544	4570,800	4554,494	4570,767	4620,480	4706,352	4833,390	4819,248
Prismatic coeff. (Cp)	0,823	0,815	0,815	0,814	0,813	0,812	0,812	0,812	0,813	0,814	0,815	0,815
Block coeff. (Cb)	0,536	0,532	0,554	0,606	0,664	0,731	0,789	0,731	0,664	0,606	0,554	0,532
LCB from zero pt. (+ve fwd) m	86,967	86,974	86,973	86,973	86,973	86,973	86,973	86,973	86,973	86,973	86,974	86,975
LCF from zero pt. (+ve fwd) m	83,523	84,212	84,209	84,172	84,121	84,082	84,068	84,082	84,122	84,173	84,210	84,213
Max deck inclination deg	30,0000	25,0002	20,0006	15,0012	10,0023	5,0054	0,2372	5,0054	10,0023	15,0012	20,0006	25,0002
Trim angle (+ve by stern) deg	0,0462	0,1209	0,1644	0,1973	0,2199	0,2330	0,2372	0,2330	0,2199	0,1973	0,1644	0,1208

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 55,229 m)		22,2	n/a
Deck Edge (immersion pos = 55,229 m)		22,5	n/a
Entrada habilitación cta ppal 1	Downflooding point	Not immersed in positive range	0
Aseo público cubierta	Downflooding point	Not immersed in positive range	0
Local CO2	Downflooding point	Not immersed in positive range	0
Entrada habilitación cta ppal 2	Downflooding point	Not immersed in positive range	0
Local ropa de agua	Downflooding point	Not immersed in positive range	0
Entrada habilitación cta toldil	Downflooding point	44,4	0
Entrada habilitación cta toldil	Downflooding point	Not immersed in positive range	0
Local grupo emergencia	Downflooding point	Not immersed in positive range	0
Entrada a cta ppal desde cta to	Downflooding point	Not immersed in positive range	0

Code	Criteria	Value	Units	Actual	Status	Margin %
267(85) Ch2 - General Criteria	2.3: IMO roll back angle	21,0	deg			
267(85) Ch2 - General Criteria	2.2.1: Area 0 to 30	3,1513	m.deg	43,6885	Pass	+1286,38
267(85) Ch2 - General Criteria	2.2.1: Area 0 to 40	5,1566	m.deg	77,5466	Pass	+1403,83
267(85) Ch2 - General Criteria	2.2.1: Area 30 to 40	1,7189	m.deg	33,8581	Pass	+1869,79
267(85) Ch2 - General Criteria	2.2.2: Max GZ at 30 or greater	0,200	m	4,099	Pass	+1949,50
267(85) Ch2 - General Criteria	2.2.3: Angle of maximum GZ	25,0	deg	50,0	Pass	+100,00
267(85) Ch2 - General Criteria	2.2.4: Initial GMt	0,150	m	5,406	Pass	+3504,00
267(85) Ch2 - General Criteria	2.3: Severe wind and rolling				Pass	
	Angle of steady heel shall not be greater than (\leq)	16,0	deg	0,9	Pass	+94,25

CONDICIÓN XVII

Salida de puerto a plena carga
(mineral) + madera sobre las
escotillas

Equilibrium calculation - D

Stability 22.01.00.131, build: 131

Model file: C:\Users\MARTA\Google Drive\TFG\Marta González\PROGRAMAS\MaxSURF\NUEVO (TFG)\D (Highest precision, 65 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 - Condición I

Damage Case - Intact

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m³)

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	10064,100	10064,100			68,650	0,000	11,800	0,000	User Specified
Total peso en rosca			10064,100			68,650	0,000	11,800	0,000	
Tripulación	20	0,125	2,500			15,000	0,000	22,000	0,000	User Specified
Pertrechos	1	40,000	40,000			90,000	0,000	15,000	0,000	User Specified
Total pesos fijos			42,500			85,588	0,000	15,412	0,000	
Viveres	1	3,700	3,700			17,000	0,000	20,000	0,000	User Specified
Total pesos variables			3,700			17,000	0,000	20,000	0,000	
P1-PIQUE PROA 1	0%	690,827	0,000	673,978	0,000	165,684	0,000	0,047	0,000	IMO A.749(18)
P2B-PIQUE PROA 2 BR	0%	445,266	0,000	434,406	0,000	158,040	-0,001	0,009	0,000	IMO A.749(18)
P2E-PIQUE PROA 2 ER	0%	445,266	0,000	434,406	0,000	158,040	0,001	0,009	0,000	IMO A.749(18)
S1B-TOLVA SUPERIOR B1 BABOR	0%	436,049	0,000	425,414	0,000	139,794	-12,904	12,700	0,000	IMO A.749(18)
S1E-TOLVA SUPERIOR B1 ESTRIBOR	0%	436,049	0,000	425,414	0,000	139,794	12,904	12,700	0,000	IMO A.749(18)
I1B-TOLVA INFERIOR B1 BABOR	0%	460,629	0,000	449,394	0,000	136,523	-0,671	0,005	0,000	IMO A.749(18)
I1E-TOLVA INFERIOR B1 ESTRIBOR	0%	460,629	0,000	449,394	0,000	136,523	0,671	0,005	0,000	IMO A.749(18)
S2B-TOLVA SUPERIOR B2 BABOR	0%	608,511	0,000	593,669	0,000	123,728	-14,225	12,700	0,000	IMO A.749(18)
S2E-TOLVA SUPERIOR B2 ESTRIBOR	0%	608,511	0,000	593,669	0,000	123,728	14,225	12,700	0,000	IMO A.749(18)
I2B-TOLVA INFERIOR B2 BABOR	0%	831,819	0,000	811,530	0,000	111,611	-1,566	0,000	0,000	IMO A.749(18)
I2E-TOLVA INFERIOR B2 ESTRIBOR	0%	831,819	0,000	811,530	0,000	111,611	1,566	0,000	0,000	IMO A.749(18)
S3B-TOLVA SUPERIOR B3 BABOR	0%	608,593	0,000	593,750	0,000	96,777	-14,339	12,700	0,000	IMO A.749(18)
S3E-TOLVA SUPERIOR B3 ESTRIBOR	0%	608,593	0,000	593,750	0,000	96,777	14,339	12,700	0,000	IMO A.749(18)
I3B-TOLVA INFERIOR B3 BABOR	0%	866,904	0,000	845,760	0,000	95,275	-2,938	0,000	0,000	IMO A.749(18)
I3E-TOLVA INFERIOR B3 ESTRIBOR	0%	866,904	0,000	845,760	0,000	95,275	2,938	0,000	0,000	IMO A.749(18)
I4B-TOLVA INFERIOR B4 BABOR	0%	860,892	0,000	839,895	0,000	77,837	-2,284	0,000	0,000	IMO A.749(18)
I4E-TOLVA INFERIOR B4 ESTRIBOR	0%	860,892	0,000	839,895	0,000	77,837	2,284	0,000	0,000	IMO A.749(18)

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
I5B-TOLVA INFERIOR B5 BABOR	0%	769,640	0,000	750,868	0,000	54,943	-1,029	0,000	0,000	IMO A.749(18)
I5E-TOLVA INFERIOR B5 ESTRIBOR	0%	769,640	0,000	750,868	0,000	54,943	1,029	0,000	0,000	IMO A.749(18)
PIQUE POPA BABOR	0%	271,223	0,000	264,608	0,000	8,299	-4,606	9,140	0,000	User Specified
PIQUE POPA ESTRIBOR	0%	271,223	0,000	264,608	0,000	8,299	4,606	9,140	0,000	User Specified
Total lastre	0%	13009,878	0,000	12692,564	0,000	0,000	0,000	0,000	0,000	
ADB-AGUA DULCE BABOR	97,9%	121,659	119,104	121,659	119,104	7,451	-8,283	15,165	131,283	IMO A.749(18)
ADE-AGUA DULCE ESTRIBOR	97,9%	74,189	72,631	74,189	72,631	6,534	8,168	15,176	0,000	IMO A.749(18)
ATE-AGUA TÉCNICA ESTRIBOR	100%	47,476	47,476	47,476	47,476	8,883	8,468	15,189	0,000	User Specified
Total agua	98,31%	243,325	239,212	243,325	239,212	7,457	0,036	15,173	131,283	
REFRIGERACIÓN EJE	100%	67,303	67,303	67,303	67,303	8,597	0,000	3,839	0,000	User Specified
LODOS	0%	22,540	0,000	22,540	0,000	11,401	0,000	1,000	0,000	User Specified
REBOSES HFO BR	0%	15,908	0,000	16,233	0,000	20,233	-2,001	0,313	0,000	User Specified
REBOSES ACEITE ER	0%	22,443	0,000	24,395	0,000	20,974	2,001	0,291	0,000	User Specified
AGUAS ACEITOSAS	0%	14,763	0,000	16,170	0,000	23,625	0,000	1,000	0,000	User Specified
SENTINAS	0%	7,974	0,000	8,734	0,000	28,919	0,000	0,000	0,000	User Specified
AGUAS RESIDUALES	0%	152,063	0,000	152,063	0,000	13,523	8,989	9,140	0,000	User Specified
Total misceláneos	22,21%	302,994	67,303	307,437	67,303	8,597	0,000	3,839	0,000	
SERVICIO ACEITE CILINDROS	100%	5,428	5,428	5,900	5,900	11,000	-5,750	9,570	0,000	User Specified
ALMACÉN ACEITE CILINDROS	100%	32,440	32,440	35,260	35,260	11,000	-5,750	12,570	0,000	User Specified
ALMACÉN ACEITE 1	100%	17,009	17,009	18,488	18,488	11,021	-8,471	11,771	0,000	User Specified
ALMACÉN ACEITE 2	100%	13,153	13,153	14,297	14,297	11,071	-10,529	12,530	0,000	User Specified
Total aceite	100%	68,030	68,030	73,945	73,945	11,019	-7,354	12,123	0,000	
SEDIMENTACIÓN HFO 1	100%	43,621	43,621	44,512	44,512	29,250	-1,000	9,570	0,000	User Specified
USO DIARIO HFO 1	100%	65,432	65,432	66,767	66,767	29,250	1,500	9,570	0,000	User Specified
USO DIARIO HFO 2	100%	65,432	65,432	66,767	66,767	29,250	4,500	9,570	0,000	User Specified
SEDIMENTACIÓN HFO 2	100%	43,621	43,621	44,512	44,512	29,250	7,000	9,570	0,000	User Specified
S4B-TOLVA SUPERIOR B4 BABOR	97,9%	405,778	397,256	414,059	405,363	70,405	-11,318	15,562	203,826	IMO A.749(18)
S4E-TOLVA SUPERIOR B4 ESTRIBOR	97,9%	405,778	397,256	414,059	405,363	70,405	11,318	15,562	203,826	IMO A.749(18)
S5B-TOLVA SUPERIOR B5 BABOR	97,9%	9,973	9,764	10,177	9,963	43,690	-11,263	14,110	0,000	IMO A.749(18)
S5E-TOLVA SUPERIOR B5 ESTRIBOR	97,9%	9,973	9,764	10,177	9,963	43,690	11,263	14,110	0,000	IMO A.749(18)
Total HFO	98,34%	1049,608	1032,147	1071,029	1053,211	61,203	0,634	14,269	407,652	
USO DIARIO DIÉSEL 1	97,9%	28,042	27,453	33,384	32,683	29,250	-2,750	9,411	0,000	IMO A.749(18)
USO DIARIO DIÉSEL 2	97,9%	28,042	27,453	33,384	32,683	29,250	-4,250	9,411	0,000	IMO A.749(18)
ALMACÉN DIÉSEL	97,9%	93,474	91,511	111,279	108,942	29,250	-7,500	9,411	0,000	IMO A.749(18)

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
Total diésel	97,9%	149,559	146,418	178,046	174,307	29,250	-6,000	9,411	0,000	
DIÉSEL EMERGENCIA	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	IMO A.749(18)
Total diésel emergencia	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	
LNG 1	97,9%	47,695	46,694	105,989	103,763	4,571	1,270	22,363	0,000	IMO A.749(18)
LNG 2	97,9%	47,878	46,873	106,396	104,161	-0,102	1,260	22,297	122,130	IMO A.749(18)
Total LNG	97,9%	95,573	93,566	212,385	207,925	2,230	1,265	22,330	122,130	
BODEGA 1	20%	25013,975	5002,795	8004,472	1600,894	146,371	0,000	3,695	0,000	User Specified
BODEGA 2	20%	34748,097	6949,619	11119,391	2223,878	123,112	0,000	3,628	0,000	User Specified
BODEGA 3	20%	35002,500	7000,500	11200,800	2240,160	96,800	0,000	3,623	0,000	User Specified
BODEGA 4	20%	35003,279	7000,656	11201,049	2240,210	70,400	0,000	3,623	0,000	User Specified
BODEGA 5	20%	34964,815	6992,962	11188,741	2237,748	44,065	0,000	3,687	0,000	User Specified
Total bodegas	20%	164732,667	32946,532	52714,453	10542,890	93,075	0,000	3,649	0,000	
Contenedor 1	0	440,000	0,000			147,000	0,000	22,800	0,000	User Specified
Contenedor 2	0	792,000	0,000			123,500	0,000	22,800	0,000	User Specified
Contenedor 3	0	792,000	0,000			97,000	0,000	22,800	0,000	User Specified
Contenedor 4	0	792,000	0,000			70,500	0,000	22,800	0,000	User Specified
Contenedor 5	0	792,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total contenedores			0,000			0,000	0,000	0,000	0,000	
Madera 1	1	400,000	400,000			147,000	0,000	22,800	0,000	User Specified
Madera 2	1	720,000	720,000			123,500	0,000	22,800	0,000	User Specified
Madera 3	1	720,000	720,000			97,000	0,000	22,800	0,000	User Specified
Madera 4	1	720,000	720,000			70,500	0,000	22,800	0,000	User Specified
Madera 5	1	720,000	720,000			44,000	0,000	22,800	0,000	User Specified
Total madera			3280,000			91,463	0,000	22,800	0,000	
Total Loadcase			47986,117	67496,358	12361,900	86,106	-0,013	7,032	661,066	
FS correction								0,014		
VCG fluid								7,046		

Draft Amidships m	11,094
Displacement t	47985
Heel deg	0,0
Draft at FP m	10,386
Draft at AP m	11,802

Draft at LCF m	11,109
Trim (+ve by stern) m	1,416
WL Length m	173,592
Beam max extents on WL m	30,161
Wetted Area m ²	7684,646
Waterpl. Area m ²	4587,670
Prismatic coeff. (Cp)	0,800
Block coeff. (Cb)	0,764
Max Sect. area coeff. (Cm)	0,991
Waterpl. area coeff. (Cwp)	0,876
LCB from zero pt. (+ve fwd) m	86,098
LCF from zero pt. (+ve fwd) m	83,450
KB m	5,736
KG fluid m	7,046
BMt m	6,606
BML m	198,288
GMt corrected m	5,296
GML m	196,978
KMt m	12,342
KML m	204,017
Immersion (TPc) tonne/cm	47,024
MTc tonne.m	554,695
RM at 1deg = GMt.Disp.sin(1) tonne.m	4435,111
Max deck inclination deg	0,4761
Trim angle (+ve by stern) deg	0,4761

Key point	Type	Freeboard m
Margin Line (freeboard pos = 30,275 m)		5,513
Deck Edge (freeboard pos = 30,275 m)		5,589
Entrada habilitación cta ppal 1	Downflooding point	7,087
Aseo público cubierta	Downflooding point	7,087
Local CO2	Downflooding point	7,087
Entrada habilitación cta ppal 2	Downflooding point	7,087
Local ropa de agua	Downflooding point	7,087
Entrada habilitación cta toldil	Downflooding point	9,829
Entrada habilitación cta toldil	Downflooding point	9,829
Local grupo emergencia	Downflooding point	9,735
Entrada a cta ppal desde cta to	Downflooding point	9,702

Stability calculation - D

Stability 22.01.00.131, build: 131

Model file: C:\Users\MARTA\Google Drive\TFG\Marta González\PROGRAMAS\MaxSURF\NUEVO (TFG)\D (Highest precision, 65 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 - Condición I

Damage Case - Intact

Free to Trim

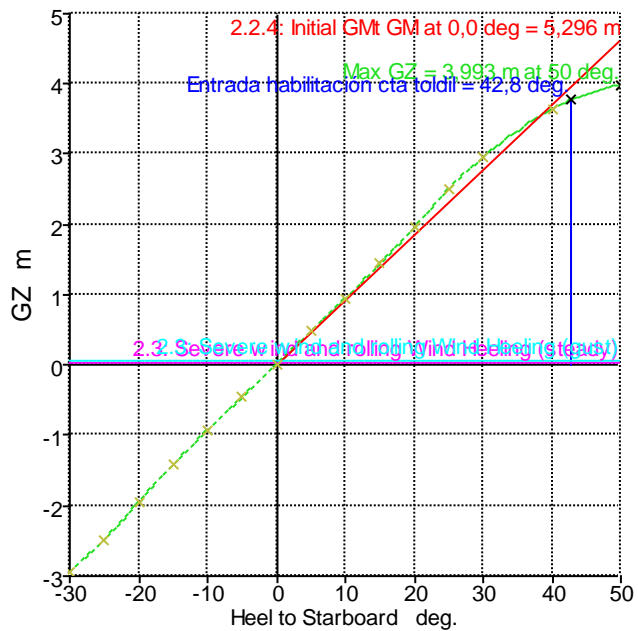
Specific gravity = 1,025; (Density = 1,025 tonne/m³)

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	10064,100	10064,100			68,650	0,000	11,800	0,000	User Specified
Total peso en rosca			10064,100			68,650	0,000	11,800	0,000	
Tripulación	20	0,125	2,500			15,000	0,000	22,000	0,000	User Specified
Pertrechos	1	40,000	40,000			90,000	0,000	15,000	0,000	User Specified
Total pesos fijos			42,500			85,588	0,000	15,412	0,000	
Viveres	1	3,700	3,700			17,000	0,000	20,000	0,000	User Specified
Total pesos variables			3,700			17,000	0,000	20,000	0,000	
P1-PIQUE PROA 1	0%	690,827	0,000	673,978	0,000	165,684	0,000	0,047	0,000	IMO A.749(18)
P2B-PIQUE PROA 2 BR	0%	445,266	0,000	434,406	0,000	158,040	-0,001	0,009	0,000	IMO A.749(18)
P2E-PIQUE PROA 2 ER	0%	445,266	0,000	434,406	0,000	158,040	0,001	0,009	0,000	IMO A.749(18)
S1B-TOLVA SUPERIOR B1 BAVOR	0%	436,049	0,000	425,414	0,000	139,794	-12,904	12,700	0,000	IMO A.749(18)
S1E-TOLVA SUPERIOR B1 ESTRIBOR	0%	436,049	0,000	425,414	0,000	139,794	12,904	12,700	0,000	IMO A.749(18)
I1B-TOLVA INFERIOR B1 BAVOR	0%	460,629	0,000	449,394	0,000	136,523	-0,671	0,005	0,000	IMO A.749(18)
I1E-TOLVA INFERIOR B1 ESTRIBOR	0%	460,629	0,000	449,394	0,000	136,523	0,671	0,005	0,000	IMO A.749(18)
S2B-TOLVA SUPERIOR B2 BAVOR	0%	608,511	0,000	593,669	0,000	123,728	-14,225	12,700	0,000	IMO A.749(18)
S2E-TOLVA SUPERIOR B2 ESTRIBOR	0%	608,511	0,000	593,669	0,000	123,728	14,225	12,700	0,000	IMO A.749(18)
I2B-TOLVA INFERIOR B2 BAVOR	0%	831,819	0,000	811,530	0,000	111,611	-1,566	0,000	0,000	IMO A.749(18)
I2E-TOLVA INFERIOR B2 ESTRIBOR	0%	831,819	0,000	811,530	0,000	111,611	1,566	0,000	0,000	IMO A.749(18)
S3B-TOLVA SUPERIOR B3 BAVOR	0%	608,593	0,000	593,750	0,000	96,777	-14,339	12,700	0,000	IMO A.749(18)
S3E-TOLVA SUPERIOR B3 ESTRIBOR	0%	608,593	0,000	593,750	0,000	96,777	14,339	12,700	0,000	IMO A.749(18)
I3B-TOLVA INFERIOR B3 BAVOR	0%	866,904	0,000	845,760	0,000	95,275	-2,938	0,000	0,000	IMO A.749(18)
I3E-TOLVA INFERIOR B3 ESTRIBOR	0%	866,904	0,000	845,760	0,000	95,275	2,938	0,000	0,000	IMO A.749(18)
I4B-TOLVA INFERIOR B4 BAVOR	0%	860,892	0,000	839,895	0,000	77,837	-2,284	0,000	0,000	IMO A.749(18)
I4E-TOLVA INFERIOR B4 ESTRIBOR	0%	860,892	0,000	839,895	0,000	77,837	2,284	0,000	0,000	IMO A.749(18)

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
I5B-TOLVA INFERIOR B5 BABOR	0%	769,640	0,000	750,868	0,000	54,943	-1,029	0,000	0,000	IMO A.749(18)
I5E-TOLVA INFERIOR B5 ESTRIBOR	0%	769,640	0,000	750,868	0,000	54,943	1,029	0,000	0,000	IMO A.749(18)
PIQUE POPA BABOR	0%	271,223	0,000	264,608	0,000	8,299	-4,606	9,140	0,000	User Specified
PIQUE POPA ESTRIBOR	0%	271,223	0,000	264,608	0,000	8,299	4,606	9,140	0,000	User Specified
Total lastre	0%	13009,878	0,000	12692,564	0,000	0,000	0,000	0,000	0,000	
ADB-AGUA DULCE BABOR	97,9%	121,659	119,104	121,659	119,104	7,451	-8,283	15,165	131,283	IMO A.749(18)
ADE-AGUA DULCE ESTRIBOR	97,9%	74,189	72,631	74,189	72,631	6,534	8,168	15,176	0,000	IMO A.749(18)
ATE-AGUA TÉCNICA ESTRIBOR	100%	47,476	47,476	47,476	47,476	8,883	8,468	15,189	0,000	User Specified
Total agua	98,31%	243,325	239,212	243,325	239,212	7,457	0,036	15,173	131,283	
REFRIGERACIÓN EJE	100%	67,303	67,303	67,303	67,303	8,597	0,000	3,839	0,000	User Specified
LODOS	0%	22,540	0,000	22,540	0,000	11,401	0,000	1,000	0,000	User Specified
REBOSES HFO BR	0%	15,908	0,000	16,233	0,000	20,233	-2,001	0,313	0,000	User Specified
REBOSES ACEITE ER	0%	22,443	0,000	24,395	0,000	20,974	2,001	0,291	0,000	User Specified
AGUAS ACEITOSAS	0%	14,763	0,000	16,170	0,000	23,625	0,000	1,000	0,000	User Specified
SENTINAS	0%	7,974	0,000	8,734	0,000	28,919	0,000	0,000	0,000	User Specified
AGUAS RESIDUALES	0%	152,063	0,000	152,063	0,000	13,523	8,989	9,140	0,000	User Specified
Total misceláneos	22,21%	302,994	67,303	307,437	67,303	8,597	0,000	3,839	0,000	
SERVICIO ACEITE CILINDROS	100%	5,428	5,428	5,900	5,900	11,000	-5,750	9,570	0,000	User Specified
ALMACÉN ACEITE CILINDROS	100%	32,440	32,440	35,260	35,260	11,000	-5,750	12,570	0,000	User Specified
ALMACÉN ACEITE 1	100%	17,009	17,009	18,488	18,488	11,021	-8,471	11,771	0,000	User Specified
ALMACÉN ACEITE 2	100%	13,153	13,153	14,297	14,297	11,071	-10,529	12,530	0,000	User Specified
Total aceite	100%	68,030	68,030	73,945	73,945	11,019	-7,354	12,123	0,000	
SEDIMENTACIÓN HFO 1	100%	43,621	43,621	44,512	44,512	29,250	-1,000	9,570	0,000	User Specified
USO DIARIO HFO 1	100%	65,432	65,432	66,767	66,767	29,250	1,500	9,570	0,000	User Specified
USO DIARIO HFO 2	100%	65,432	65,432	66,767	66,767	29,250	4,500	9,570	0,000	User Specified
SEDIMENTACIÓN HFO 2	100%	43,621	43,621	44,512	44,512	29,250	7,000	9,570	0,000	User Specified
S4B-TOLVA SUPERIOR B4 BABOR	97,9%	405,778	397,256	414,059	405,363	70,405	-11,318	15,562	203,826	IMO A.749(18)
S4E-TOLVA SUPERIOR B4 ESTRIBOR	97,9%	405,778	397,256	414,059	405,363	70,405	11,318	15,562	203,826	IMO A.749(18)
S5B-TOLVA SUPERIOR B5 BABOR	97,9%	9,973	9,764	10,177	9,963	43,690	-11,263	14,110	0,000	IMO A.749(18)
S5E-TOLVA SUPERIOR B5 ESTRIBOR	97,9%	9,973	9,764	10,177	9,963	43,690	11,263	14,110	0,000	IMO A.749(18)
Total HFO	98,34%	1049,608	1032,147	1071,029	1053,211	61,203	0,634	14,269	407,652	
USO DIARIO DIÉSEL 1	97,9%	28,042	27,453	33,384	32,683	29,250	-2,750	9,411	0,000	IMO A.749(18)
USO DIARIO DIÉSEL 2	97,9%	28,042	27,453	33,384	32,683	29,250	-4,250	9,411	0,000	IMO A.749(18)
ALMACÉN DIÉSEL	97,9%	93,474	91,511	111,279	108,942	29,250	-7,500	9,411	0,000	IMO A.749(18)

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
Total diésel	97,9%	149,559	146,418	178,046	174,307	29,250	-6,000	9,411	0,000	
DIÉSEL EMERGENCIA	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	IMO A.749(18)
Total diésel emergencia	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	
LNG 1	97,9%	47,695	46,693	105,989	103,763	4,571	1,270	22,363	0,000	IMO A.749(18)
LNG 2	97,9%	47,878	46,873	106,396	104,161	-0,102	1,260	22,297	122,130	IMO A.749(18)
Total LNG	97,9%	95,573	93,566	212,385	207,925	2,230	1,265	22,330	122,130	
BODEGA 1	20%	25013,975	5002,797	8004,472	1600,895	146,371	0,000	3,695	0,000	User Specified
BODEGA 2	20%	34748,097	6949,622	11119,391	2223,879	123,112	0,000	3,628	0,000	User Specified
BODEGA 3	20%	35002,500	7000,501	11200,800	2240,160	96,800	0,000	3,623	0,000	User Specified
BODEGA 4	20%	35003,279	7000,655	11201,049	2240,210	70,400	0,000	3,623	0,000	User Specified
BODEGA 5	20%	34964,815	6992,960	11188,741	2237,747	44,065	0,000	3,687	0,000	User Specified
Total bodegas	20%	164732,667	32946,535	52714,453	10542,891	93,075	0,000	3,649	0,000	
Contenedor 1	0	440,000	0,000			147,000	0,000	22,800	0,000	User Specified
Contenedor 2	0	792,000	0,000			123,500	0,000	22,800	0,000	User Specified
Contenedor 3	0	792,000	0,000			97,000	0,000	22,800	0,000	User Specified
Contenedor 4	0	792,000	0,000			70,500	0,000	22,800	0,000	User Specified
Contenedor 5	0	792,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total contenedores			0,000			0,000	0,000	0,000	0,000	
Madera 1	1	400,000	400,000			147,000	0,000	22,800	0,000	User Specified
Madera 2	1	720,000	720,000			123,500	0,000	22,800	0,000	User Specified
Madera 3	1	720,000	720,000			97,000	0,000	22,800	0,000	User Specified
Madera 4	1	720,000	720,000			70,500	0,000	22,800	0,000	User Specified
Madera 5	1	720,000	720,000			44,000	0,000	22,800	0,000	User Specified
Total madera			3280,000			91,463	0,000	22,800	0,000	
Total Loadcase			47986,120	67496,358	12361,901	86,106	-0,013	7,032	661,066	
FS correction								0,014		
VCG fluid								7,046		



Stability	
■	GZ
■	Entrada habilitación cta toldil = 42,8 deg.
■	2.2.4: Initial GMT GM at 0,0 deg = 5,296 m
■	2.3: Severe wind and rolling Wind Heeling (steady)
■	2.3: Severe wind and rolling Wind Heeling (gust)
■	Max GZ = 3,993 m at 50 deg.

Heel to Starboard deg	-30,0	-25,0	-20,0	-15,0	-10,0	-5,0	0,0	5,0	10,0	15,0	20,0	25,0
GZ m	-2,931	-2,481	-1,940	-1,416	-0,924	-0,451	0,013	0,476	0,949	1,441	1,964	2,505
Area under GZ curve from zero heel m.deg	43,3720	29,8097	18,7370	10,3637	4,5237	1,0930	0,0117	1,2215	4,7798	10,7446	19,2439	30,4221
Displacement t	47990	47986	47986	47986	47990	47989	47987	47985	47984	47982	47986	47982
Draft at FP m	10,637	10,460	10,426	10,408	10,396	10,388	10,385	10,387	10,394	10,407	10,426	10,459
Draft at AP m	11,538	11,556	11,633	11,711	11,765	11,795	11,804	11,794	11,763	11,710	11,633	11,555
WL Length m	173,645	173,606	173,599	173,596	173,594	173,593	173,592	173,593	173,594	173,596	173,599	173,606
Beam max extents on WL m	30,144	31,488	32,085	31,219	30,624	30,276	30,161	30,276	30,624	31,219	32,085	31,490
Wetted Area m^2	8046,781	7855,093	7715,420	7701,231	7691,923	7686,591	7684,850	7686,316	7691,380	7700,898	7715,419	7854,563
Waterpl. Area m^2	4602,527	4792,812	4862,376	4739,011	4653,873	4604,082	4587,770	4604,031	4653,772	4738,952	4862,373	4793,054
Prismatic coeff. (Cp)	0,820	0,812	0,806	0,803	0,801	0,800	0,800	0,800	0,801	0,803	0,806	0,812
Block coeff. (Cb)	0,536	0,537	0,553	0,603	0,659	0,723	0,763	0,723	0,659	0,603	0,553	0,537
LCB from zero pt. (+ve fwd) m	86,095	86,095	86,095	86,095	86,095	86,095	86,095	86,095	86,095	86,095	86,095	86,095
LCF from zero pt. (+ve fwd) m	83,407	84,058	83,695	83,582	83,509	83,465	83,448	83,465	83,510	83,583	83,695	84,059
Max deck inclination deg	30,0010	25,0021	20,0035	15,0058	10,0102	5,0221	0,4771	5,0221	10,0102	15,0058	20,0035	25,0021
Trim angle (+ve by stern) deg	0,3028	0,3686	0,4056	0,4381	0,4603	0,4730	0,4771	0,4730	0,4603	0,4382	0,4057	0,3687

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 44,716 m)		21,1	n/a
Deck Edge (immersion pos = 49,898 m)		21,4	n/a
Entrada habilitación cta ppal 1	Downflooding point	Not immersed in positive range	0
Aseo público cubierta	Downflooding point	Not immersed in positive range	0
Local CO2	Downflooding point	Not immersed in positive range	0
Entrada habilitación cta ppal 2	Downflooding point	Not immersed in positive range	0
Local ropa de agua	Downflooding point	Not immersed in positive range	0
Entrada habilitación cta toldil	Downflooding point	42,8	0
Entrada habilitación cta toldil	Downflooding point	Not immersed in positive range	0
Local grupo emergencia	Downflooding point	Not immersed in positive range	0
Entrada a cta ppal desde cta to	Downflooding point	Not immersed in positive range	0

Code	Criteria	Value	Units	Actual	Status	Margin %
267(85) Ch2 - General Criteria	2.3: IMO roll back angle	21,1	deg			
267(85) Ch2 - General Criteria	2.2.1: Area 0 to 30	3,1513	m.deg	44,1240	Pass	+1300,20
267(85) Ch2 - General Criteria	2.2.1: Area 0 to 40	5,1566	m.deg	77,3113	Pass	+1399,26
267(85) Ch2 - General Criteria	2.2.1: Area 30 to 40	1,7189	m.deg	33,1872	Pass	+1830,76
267(85) Ch2 - General Criteria	2.2.2: Max GZ at 30 or greater	0,200	m	3,993	Pass	+1896,50
267(85) Ch2 - General Criteria	2.2.3: Angle of maximum GZ	25,0	deg	50,0	Pass	+100,00
267(85) Ch2 - General Criteria	2.2.4: Initial GMt	0,150	m	5,296	Pass	+3430,67
267(85) Ch2 - General Criteria	2.3: Severe wind and rolling				Pass	
	Angle of steady heel shall not be greater than (\leq)	16,0	deg	0,4	Pass	+97,61

CONDICIÓN XVIII

Llegada a puerto a plena carga
(mineral) + madera sobre las
escotillas

Equilibrium calculation - D

Stability 22.01.00.131, build: 131

Model file: C:\Users\MARTA\Google Drive\TFG\Marta González\PROGRAMAS\MaxSURF\NUEVO (TFG)\D (Highest precision, 65 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 - Condición I

Damage Case - Intact

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m³)

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	10064,100	10064,100			68,650	0,000	11,800	0,000	User Specified
Total peso en rosca			10064,100			68,650	0,000	11,800	0,000	
Tripulación	20	0,125	2,500			15,000	0,000	22,000	0,000	User Specified
Pertrechos	1	40,000	40,000			90,000	0,000	15,000	0,000	User Specified
Total pesos fijos			42,500			85,588	0,000	15,412	0,000	
Viveres	0,1	3,700	0,370			17,000	0,000	20,000	0,000	User Specified
Total pesos variables			0,370			17,000	0,000	20,000	0,000	
P1-PIQUE PROA 1	0%	690,827	0,000	673,978	0,000	165,684	0,000	0,047	0,000	IMO A.749(18)
P2B-PIQUE PROA 2 BR	0%	445,266	0,000	434,406	0,000	158,040	-0,001	0,009	0,000	IMO A.749(18)
P2E-PIQUE PROA 2 ER	0%	445,266	0,000	434,406	0,000	158,040	0,001	0,009	0,000	IMO A.749(18)
S1B-TOLVA SUPERIOR B1 BAVOR	0%	436,049	0,000	425,414	0,000	139,794	-12,904	12,700	0,000	IMO A.749(18)
S1E-TOLVA SUPERIOR B1 ESTRIBOR	0%	436,049	0,000	425,414	0,000	139,794	12,904	12,700	0,000	IMO A.749(18)
I1B-TOLVA INFERIOR B1 BAVOR	0%	460,629	0,000	449,394	0,000	136,523	-0,671	0,005	0,000	IMO A.749(18)
I1E-TOLVA INFERIOR B1 ESTRIBOR	0%	460,629	0,000	449,394	0,000	136,523	0,671	0,005	0,000	IMO A.749(18)
S2B-TOLVA SUPERIOR B2 BAVOR	0%	608,511	0,000	593,669	0,000	123,728	-14,225	12,700	0,000	IMO A.749(18)
S2E-TOLVA SUPERIOR B2 ESTRIBOR	0%	608,511	0,000	593,669	0,000	123,728	14,225	12,700	0,000	IMO A.749(18)
I2B-TOLVA INFERIOR B2 BAVOR	0%	831,819	0,000	811,530	0,000	111,611	-1,566	0,000	0,000	IMO A.749(18)
I2E-TOLVA INFERIOR B2 ESTRIBOR	0%	831,819	0,000	811,530	0,000	111,611	1,566	0,000	0,000	IMO A.749(18)
S3B-TOLVA SUPERIOR B3 BAVOR	0%	608,593	0,000	593,750	0,000	96,777	-14,339	12,700	0,000	IMO A.749(18)
S3E-TOLVA SUPERIOR B3 ESTRIBOR	0%	608,593	0,000	593,750	0,000	96,777	14,339	12,700	0,000	IMO A.749(18)
I3B-TOLVA INFERIOR B3 BAVOR	0%	866,904	0,000	845,760	0,000	95,275	-2,938	0,000	0,000	IMO A.749(18)
I3E-TOLVA INFERIOR B3 ESTRIBOR	0%	866,904	0,000	845,760	0,000	95,275	2,938	0,000	0,000	IMO A.749(18)
I4B-TOLVA INFERIOR B4 BAVOR	0%	860,892	0,000	839,895	0,000	77,837	-2,284	0,000	0,000	IMO A.749(18)
I4E-TOLVA INFERIOR B4 ESTRIBOR	0%	860,892	0,000	839,895	0,000	77,837	2,284	0,000	0,000	IMO A.749(18)

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
I5B-TOLVA INFERIOR B5 BABOR	0%	769,640	0,000	750,868	0,000	54,943	-1,029	0,000	0,000	IMO A.749(18)
I5E-TOLVA INFERIOR B5 ESTRIBOR	0%	769,640	0,000	750,868	0,000	54,943	1,029	0,000	0,000	IMO A.749(18)
PIQUE POPA BABOR	0%	271,223	0,000	264,608	0,000	8,299	-4,606	9,140	0,000	User Specified
PIQUE POPA ESTRIBOR	0%	271,223	0,000	264,608	0,000	8,299	4,606	9,140	0,000	User Specified
Total lastre	0%	13009,878	0,000	12692,564	0,000	0,000	0,000	0,000	0,000	
ADB-AGUA DULCE BABOR	10%	121,659	12,166	121,659	12,166	7,492	-7,942	13,365	131,287	IMO A.749(18)
ADE-AGUA DULCE ESTRIBOR	10%	74,189	7,419	74,189	7,419	6,554	7,777	13,370	0,000	IMO A.749(18)
ATE-AGUA TÉCNICA ESTRIBOR	10%	47,476	4,748	47,476	4,748	8,887	8,188	13,358	0,000	User Specified
Total agua	10%	243,325	24,332	243,325	24,332	7,478	-0,002	13,366	131,287	
REFRIGERACIÓN EJE	100%	67,303	67,303	67,303	67,303	8,597	0,000	3,839	0,000	User Specified
LODOS	100%	22,540	22,540	22,540	22,540	11,375	0,000	1,532	0,000	User Specified
REBOSES HFO BR	100%	15,908	15,908	16,233	16,233	18,841	-5,025	1,382	0,000	User Specified
REBOSES ACEITE ER	100%	22,443	22,443	24,395	24,395	18,954	5,046	1,380	0,000	User Specified
AGUAS ACEITOSAS	100%	14,763	14,763	16,170	16,170	23,625	0,000	1,500	0,000	User Specified
SENTINAS	100%	7,974	7,974	8,734	8,734	28,875	0,000	1,010	0,000	User Specified
AGUAS RESIDUALES	100%	152,063	152,063	152,063	152,063	12,650	10,081	13,659	0,000	User Specified
Total misceláneos	100%	302,994	302,994	307,437	307,437	13,409	5,169	8,096	0,000	
SERVICIO ACEITE CILINDROS	10%	5,428	0,543	5,900	0,590	11,000	-5,750	9,183	0,000	User Specified
ALMACÉN ACEITE CILINDROS	10%	32,440	3,244	35,260	3,526	11,000	-5,750	10,257	0,000	User Specified
ALMACÉN ACEITE 1	10%	17,009	1,701	18,488	1,849	11,178	-8,241	9,558	0,000	User Specified
ALMACÉN ACEITE 2	10%	13,153	1,315	14,297	1,430	11,268	-9,962	10,577	0,000	User Specified
Total aceite	10%	68,030	6,803	73,945	7,395	11,096	-7,187	10,058	0,000	
SEDIMENTACIÓN HFO 1	0%	43,621	0,000	44,512	0,000	29,250	-1,000	2,000	0,000	User Specified
USO DIARIO HFO 1	80,24%	65,432	52,500	66,767	53,571	29,250	1,500	8,074	0,000	User Specified
USO DIARIO HFO 2	80,24%	65,432	52,500	66,767	53,571	29,250	4,500	8,074	0,000	User Specified
SEDIMENTACIÓN HFO 2	0%	43,621	0,000	44,512	0,000	29,250	7,000	2,000	0,000	User Specified
S4B-TOLVA SUPERIOR B4 BABOR	0%	405,778	0,000	414,059	0,000	71,250	-13,611	12,700	0,000	IMO A.749(18)
S4E-TOLVA SUPERIOR B4 ESTRIBOR	0%	405,778	0,000	414,059	0,000	71,250	13,611	12,700	0,000	IMO A.749(18)
S5B-TOLVA SUPERIOR B5 BABOR	0%	9,973	0,000	10,177	0,000	44,162	-14,104	12,700	0,000	IMO A.749(18)
S5E-TOLVA SUPERIOR B5 ESTRIBOR	0%	9,973	0,000	10,177	0,000	44,162	14,104	12,700	0,000	IMO A.749(18)
Total HFO	10%	1049,608	105,000	1071,029	107,143	29,250	3,000	8,074	0,000	
USO DIARIO DIÉSEL 1	26,75%	28,042	7,500	33,384	8,929	29,250	-2,750	4,025	0,000	IMO A.749(18)
USO DIARIO DIÉSEL 2	26,75%	28,042	7,500	33,384	8,929	29,250	-4,250	4,025	0,000	IMO A.749(18)
ALMACÉN DIÉSEL	0%	93,474	0,000	111,279	0,000	29,250	-7,500	2,000	0,000	IMO A.749(18)

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
Total diésel	10,03%	149,559	15,000	178,046	17,857	29,250	-3,500	4,025	0,000	
DIÉSEL EMERGENCIA	10%	2,666	0,267	3,174	0,317	8,267	-7,570	20,260	0,000	IMO A.749(18)
Total diésel emergencia	10%	2,666	0,267	3,174	0,317	8,267	-7,570	20,260	0,000	
LNG 1	10%	47,695	4,770	105,989	10,599	4,549	1,266	20,938	0,000	IMO A.749(18)
LNG 2	10%	47,878	4,788	106,396	10,640	-0,067	1,235	20,762	122,133	IMO A.749(18)
Total LNG	10%	95,573	9,557	212,385	21,238	2,237	1,251	20,850	122,133	
BODEGA 1	20%	25013,975	5002,793	8004,472	1600,894	146,371	0,000	3,695	0,000	User Specified
BODEGA 2	20%	34748,097	6949,621	11119,391	2223,879	123,112	0,000	3,628	0,000	User Specified
BODEGA 3	20%	35002,500	7000,499	11200,800	2240,160	96,800	0,000	3,623	0,000	User Specified
BODEGA 4	20%	35003,279	7000,654	11201,049	2240,209	70,400	0,000	3,623	0,000	User Specified
BODEGA 5	20%	34964,815	6992,960	11188,741	2237,747	44,065	0,000	3,687	0,000	User Specified
Total bodegas	20%	164732,667	32946,527	52714,453	10542,889	93,075	0,000	3,649	0,000	
Contenedor 1	0	440,000	0,000			147,000	0,000	22,800	0,000	User Specified
Contenedor 2	0	792,000	0,000			123,500	0,000	22,800	0,000	User Specified
Contenedor 3	0	792,000	0,000			97,000	0,000	22,800	0,000	User Specified
Contenedor 4	0	792,000	0,000			70,500	0,000	22,800	0,000	User Specified
Contenedor 5	0	792,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total contenedores			0,000			0,000	0,000	0,000	0,000	
Madera 1	1	400,000	400,000			147,000	0,000	22,800	0,000	User Specified
Madera 2	1	720,000	720,000			123,500	0,000	22,800	0,000	User Specified
Madera 3	1	720,000	720,000			97,000	0,000	22,800	0,000	User Specified
Madera 4	1	720,000	720,000			70,500	0,000	22,800	0,000	User Specified
Madera 5	1	720,000	720,000			44,000	0,000	22,800	0,000	User Specified
Total madera			3280,000			91,463	0,000	22,800	0,000	
Total Loadcase			46797,450	67496,358	11028,609	86,947	0,038	6,803	253,420	
FS correction								0,005		
VCG fluid								6,809		

Draft Amidships m	10,846
Displacement t	46797
Heel deg	0,4
Draft at FP m	10,469
Draft at AP m	11,223

Draft at LCF m	10,851
Trim (+ve by stern) m	0,754
WL Length m	171,893
Beam max extents on WL m	30,161
Wetted Area m ²	7575,082
Waterpl. Area m ²	4551,091
Prismatic coeff. (Cp)	0,812
Block coeff. (Cb)	0,788
Max Sect. area coeff. (Cm)	0,987
Waterpl. area coeff. (Cwp)	0,878
LCB from zero pt. (+ve fwd) m	86,937
LCF from zero pt. (+ve fwd) m	84,096
KB m	5,598
KG fluid m	6,809
BMt m	6,734
BML m	198,206
GMt corrected m	5,523
GML m	196,995
KMt m	12,331
KML m	203,797
Immersion (TPc) tonne/cm	46,649
MTc tonne.m	541,014
RM at 1deg = GMt.Disp.sin(1) tonne.m	4510,507
Max deck inclination deg	0,4720
Trim angle (+ve by stern) deg	0,2535

Key point	Type	Freeboard m
Margin Line (freeboard pos = 30,275 m)		5,875
Deck Edge (freeboard pos = 30,275 m)		5,951
Entrada habilitación cta ppal 1	Downflooding point	7,535
Aseo público cubierta	Downflooding point	7,555
Local CO2	Downflooding point	7,565
Entrada habilitación cta ppal 2	Downflooding point	7,577
Local ropa de agua	Downflooding point	7,593
Entrada habilitación cta toldil	Downflooding point	10,241
Entrada habilitación cta toldil	Downflooding point	10,387
Local grupo emergencia	Downflooding point	10,210
Entrada a cta ppal desde cta to	Downflooding point	10,286

Stability calculation - D

Stability 22.01.00.131, build: 131

Model file: C:\Users\MARTA\Google Drive\TFG\Marta González\PROGRAMAS\MaxSURF\NUEVO (TFG)\D (Highest precision, 65 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 - Condición I

Damage Case - Intact

Free to Trim

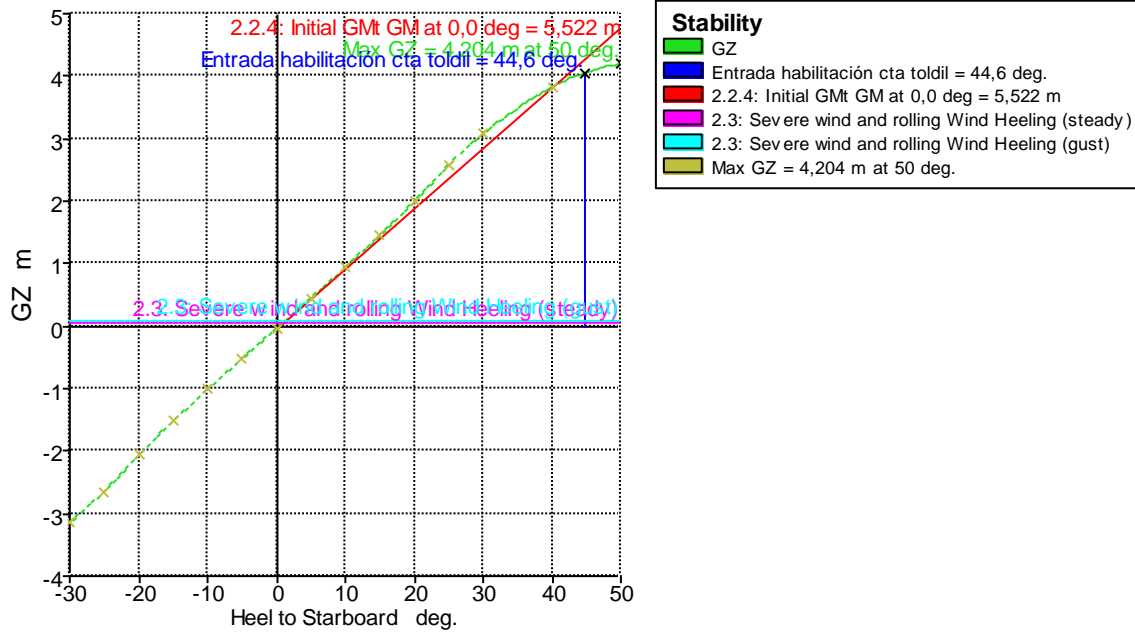
Specific gravity = 1,025; (Density = 1,025 tonne/m³)

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	10064,100	10064,100			68,650	0,000	11,800	0,000	User Specified
Total peso en rosca			10064,100			68,650	0,000	11,800	0,000	
Tripulación	20	0,125	2,500			15,000	0,000	22,000	0,000	User Specified
Pertrechos	1	40,000	40,000			90,000	0,000	15,000	0,000	User Specified
Total pesos fijos			42,500			85,588	0,000	15,412	0,000	
Viveres	0,1	3,700	0,370			17,000	0,000	20,000	0,000	User Specified
Total pesos variables			0,370			17,000	0,000	20,000	0,000	
P1-PIQUE PROA 1	0%	690,827	0,000	673,978	0,000	165,684	0,000	0,047	0,000	IMO A.749(18)
P2B-PIQUE PROA 2 BR	0%	445,266	0,000	434,406	0,000	158,040	-0,001	0,009	0,000	IMO A.749(18)
P2E-PIQUE PROA 2 ER	0%	445,266	0,000	434,406	0,000	158,040	0,001	0,009	0,000	IMO A.749(18)
S1B-TOLVA SUPERIOR B1 BAVOR	0%	436,049	0,000	425,414	0,000	139,794	-12,904	12,700	0,000	IMO A.749(18)
S1E-TOLVA SUPERIOR B1 ESTRIBOR	0%	436,049	0,000	425,414	0,000	139,794	12,904	12,700	0,000	IMO A.749(18)
I1B-TOLVA INFERIOR B1 BAVOR	0%	460,629	0,000	449,394	0,000	136,523	-0,671	0,005	0,000	IMO A.749(18)
I1E-TOLVA INFERIOR B1 ESTRIBOR	0%	460,629	0,000	449,394	0,000	136,523	0,671	0,005	0,000	IMO A.749(18)
S2B-TOLVA SUPERIOR B2 BAVOR	0%	608,511	0,000	593,669	0,000	123,728	-14,225	12,700	0,000	IMO A.749(18)
S2E-TOLVA SUPERIOR B2 ESTRIBOR	0%	608,511	0,000	593,669	0,000	123,728	14,225	12,700	0,000	IMO A.749(18)
I2B-TOLVA INFERIOR B2 BAVOR	0%	831,819	0,000	811,530	0,000	111,611	-1,566	0,000	0,000	IMO A.749(18)
I2E-TOLVA INFERIOR B2 ESTRIBOR	0%	831,819	0,000	811,530	0,000	111,611	1,566	0,000	0,000	IMO A.749(18)
S3B-TOLVA SUPERIOR B3 BAVOR	0%	608,593	0,000	593,750	0,000	96,777	-14,339	12,700	0,000	IMO A.749(18)
S3E-TOLVA SUPERIOR B3 ESTRIBOR	0%	608,593	0,000	593,750	0,000	96,777	14,339	12,700	0,000	IMO A.749(18)
I3B-TOLVA INFERIOR B3 BAVOR	0%	866,904	0,000	845,760	0,000	95,275	-2,938	0,000	0,000	IMO A.749(18)
I3E-TOLVA INFERIOR B3 ESTRIBOR	0%	866,904	0,000	845,760	0,000	95,275	2,938	0,000	0,000	IMO A.749(18)
I4B-TOLVA INFERIOR B4 BAVOR	0%	860,892	0,000	839,895	0,000	77,837	-2,284	0,000	0,000	IMO A.749(18)
I4E-TOLVA INFERIOR B4 ESTRIBOR	0%	860,892	0,000	839,895	0,000	77,837	2,284	0,000	0,000	IMO A.749(18)

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
I5B-TOLVA INFERIOR B5 BABOR	0%	769,640	0,000	750,868	0,000	54,943	-1,029	0,000	0,000	IMO A.749(18)
I5E-TOLVA INFERIOR B5 ESTRIBOR	0%	769,640	0,000	750,868	0,000	54,943	1,029	0,000	0,000	IMO A.749(18)
PIQUE POPA BABOR	0%	271,223	0,000	264,608	0,000	8,299	-4,606	9,140	0,000	User Specified
PIQUE POPA ESTRIBOR	0%	271,223	0,000	264,608	0,000	8,299	4,606	9,140	0,000	User Specified
Total lastre	0%	13009,878	0,000	12692,564	0,000	0,000	0,000	0,000	0,000	
ADB-AGUA DULCE BABOR	10%	121,659	12,166	121,659	12,166	7,492	-7,942	13,365	131,283	IMO A.749(18)
ADE-AGUA DULCE ESTRIBOR	10%	74,189	7,419	74,189	7,419	6,554	7,777	13,370	0,000	IMO A.749(18)
ATE-AGUA TÉCNICA ESTRIBOR	10%	47,476	4,748	47,476	4,748	8,887	8,188	13,358	0,000	User Specified
Total agua	10%	243,325	24,332	243,325	24,332	7,478	-0,002	13,366	131,283	
REFRIGERACIÓN EJE	100%	67,303	67,303	67,303	67,303	8,597	0,000	3,839	0,000	User Specified
LODOS	100%	22,540	22,540	22,540	22,540	11,375	0,000	1,532	0,000	User Specified
REBOSES HFO BR	100%	15,908	15,908	16,233	16,233	18,841	-5,025	1,382	0,000	User Specified
REBOSES ACEITE ER	100%	22,443	22,443	24,395	24,395	18,954	5,046	1,380	0,000	User Specified
AGUAS ACEITOSAS	100%	14,763	14,763	16,170	16,170	23,625	0,000	1,500	0,000	User Specified
SENTINAS	100%	7,974	7,974	8,734	8,734	28,875	0,000	1,010	0,000	User Specified
AGUAS RESIDUALES	100%	152,063	152,063	152,063	152,063	12,650	10,081	13,659	0,000	User Specified
Total misceláneos	100%	302,994	302,994	307,437	307,437	13,409	5,169	8,096	0,000	
SERVICIO ACEITE CILINDROS	10%	5,428	0,543	5,900	0,590	11,000	-5,750	9,183	0,000	User Specified
ALMACÉN ACEITE CILINDROS	10%	32,440	3,244	35,260	3,526	11,000	-5,750	10,257	0,000	User Specified
ALMACÉN ACEITE 1	10%	17,009	1,701	18,488	1,849	11,178	-8,241	9,558	0,000	User Specified
ALMACÉN ACEITE 2	10%	13,153	1,315	14,297	1,430	11,268	-9,962	10,577	0,000	User Specified
Total aceite	10%	68,030	6,803	73,945	7,395	11,096	-7,187	10,058	0,000	
SEDIMENTACIÓN HFO 1	0%	43,621	0,000	44,512	0,000	29,250	-1,000	2,000	0,000	User Specified
USO DIARIO HFO 1	80,24%	65,432	52,500	66,767	53,571	29,250	1,500	8,074	0,000	User Specified
USO DIARIO HFO 2	80,24%	65,432	52,500	66,767	53,571	29,250	4,500	8,074	0,000	User Specified
SEDIMENTACIÓN HFO 2	0%	43,621	0,000	44,512	0,000	29,250	7,000	2,000	0,000	User Specified
S4B-TOLVA SUPERIOR B4 BABOR	0%	405,778	0,000	414,059	0,000	71,250	-13,611	12,700	0,000	IMO A.749(18)
S4E-TOLVA SUPERIOR B4 ESTRIBOR	0%	405,778	0,000	414,059	0,000	71,250	13,611	12,700	0,000	IMO A.749(18)
S5B-TOLVA SUPERIOR B5 BABOR	0%	9,973	0,000	10,177	0,000	44,162	-14,104	12,700	0,000	IMO A.749(18)
S5E-TOLVA SUPERIOR B5 ESTRIBOR	0%	9,973	0,000	10,177	0,000	44,162	14,104	12,700	0,000	IMO A.749(18)
Total HFO	10%	1049,608	105,000	1071,029	107,143	29,250	3,000	8,074	0,000	
USO DIARIO DIÉSEL 1	26,75%	28,042	7,500	33,384	8,929	29,250	-2,750	4,025	0,000	IMO A.749(18)
USO DIARIO DIÉSEL 2	26,75%	28,042	7,500	33,384	8,929	29,250	-4,250	4,025	0,000	IMO A.749(18)
ALMACÉN DIÉSEL	0%	93,474	0,000	111,279	0,000	29,250	-7,500	2,000	0,000	IMO A.749(18)

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
Total diésel	10,03%	149,559	15,000	178,046	17,857	29,250	-3,500	4,025	0,000	
DIÉSEL EMERGENCIA	10%	2,666	0,267	3,174	0,317	8,267	-7,570	20,260	0,000	IMO A.749(18)
Total diésel emergencia	10%	2,666	0,267	3,174	0,317	8,267	-7,570	20,260	0,000	
LNG 1	10%	47,695	4,770	105,989	10,599	4,549	1,266	20,938	0,000	IMO A.749(18)
LNG 2	10%	47,878	4,788	106,396	10,640	-0,067	1,235	20,762	122,130	IMO A.749(18)
Total LNG	10%	95,573	9,557	212,385	21,238	2,237	1,251	20,850	122,130	
BODEGA 1	20%	25013,975	5002,797	8004,472	1600,895	146,371	0,000	3,695	0,000	User Specified
BODEGA 2	20%	34748,097	6949,622	11119,391	2223,879	123,112	0,000	3,628	0,000	User Specified
BODEGA 3	20%	35002,500	7000,497	11200,800	2240,159	96,800	0,000	3,623	0,000	User Specified
BODEGA 4	20%	35003,279	7000,656	11201,049	2240,210	70,400	0,000	3,623	0,000	User Specified
BODEGA 5	20%	34964,815	6992,963	11188,741	2237,748	44,065	0,000	3,687	0,000	User Specified
Total bodegas	20%	164732,667	32946,534	52714,453	10542,891	93,075	0,000	3,649	0,000	
Contenedor 1	0	440,000	0,000			147,000	0,000	22,800	0,000	User Specified
Contenedor 2	0	792,000	0,000			123,500	0,000	22,800	0,000	User Specified
Contenedor 3	0	792,000	0,000			97,000	0,000	22,800	0,000	User Specified
Contenedor 4	0	792,000	0,000			70,500	0,000	22,800	0,000	User Specified
Contenedor 5	0	792,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total contenedores			0,000			0,000	0,000	0,000	0,000	
Madera 1	1	400,000	400,000			147,000	0,000	22,800	0,000	User Specified
Madera 2	1	720,000	720,000			123,500	0,000	22,800	0,000	User Specified
Madera 3	1	720,000	720,000			97,000	0,000	22,800	0,000	User Specified
Madera 4	1	720,000	720,000			70,500	0,000	22,800	0,000	User Specified
Madera 5	1	720,000	720,000			44,000	0,000	22,800	0,000	User Specified
Total madera			3280,000			91,463	0,000	22,800	0,000	
Total Loadcase			46797,458	67496,358	11028,611	86,947	0,038	6,803	253,414	
FS correction								0,005		
VCG fluid								6,809		



Heel to Starboard deg	-30,0	-25,0	-20,0	-15,0	-10,0	-5,0	0,0	5,0	10,0	15,0	20,0	25,0	
GZ m	-3,136	-2,645	-2,068	-1,525	-1,014	-0,521	-0,038	0,445	0,938	1,451	1,996	2,575	
Area under GZ curve from zero heel m.deg	46,8076	32,3245	20,5285	11,5666	5,2290	1,3976	-0,0348	1,0156	4,4682	10,4319	19,0325	30,4614	
Displacement t	46797	46797	46801	46800	46800	46799	46798	46797	46796	46795	46794	46794	
Draft at FP m	10,708	10,545	10,514	10,496	10,482	10,474	10,471	10,474	10,482	10,495	10,513	10,544	
Draft at AP m	10,899	10,949	11,047	11,126	11,180	11,211	11,221	11,211	11,180	11,125	11,045	10,948	
WL Length m	173,659	173,542	172,508	172,156	171,987	171,890	171,886	171,888	171,984	172,153	172,504	173,539	
Beam max extents on WL m	30,013	31,802	32,083	31,218	30,623	30,275	30,160	30,275	30,623	31,218	32,083	31,803	
Wetted Area m^2	7921,601	7718,716	7610,844	7592,589	7581,585	7576,656	7575,028	7576,501	7581,275	7592,163	7610,297	7718,277	7
Waterpl. Area m^2	4642,437	4835,959	4828,978	4701,908	4615,895	4566,983	4550,884	4566,951	4615,820	4701,817	4828,862	4836,121	4
Prismatic coeff. (Cp)	0,822	0,815	0,815	0,814	0,813	0,812	0,812	0,812	0,813	0,814	0,815	0,815	
Block coeff. (Cb)	0,534	0,528	0,553	0,605	0,663	0,731	0,788	0,731	0,663	0,605	0,553	0,528	
LCB from zero pt. (+ve fwd) m	86,933	86,943	86,942	86,942	86,941	86,941	86,941	86,942	86,942	86,942	86,942	86,943	
LCF from zero pt. (+ve fwd) m	83,603	84,281	84,248	84,215	84,169	84,116	84,099	84,116	84,170	84,216	84,249	84,282	
Max deck inclination deg	30,0000	25,0003	20,0007	15,0014	10,0026	5,0061	0,2522	5,0061	10,0026	15,0014	20,0007	25,0003	
Trim angle (+ve by stern) deg	0,0642	0,1358	0,1791	0,2120	0,2347	0,2479	0,2522	0,2479	0,2347	0,2120	0,1791	0,1357	

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 55,229 m)		22,4	n/a
Deck Edge (immersion pos = 55,229 m)		22,7	n/a
Entrada habilitación cta ppal 1	Downflooding point	Not immersed in positive range	0
Aseo público cubierta	Downflooding point	Not immersed in positive range	0
Local CO2	Downflooding point	Not immersed in positive range	0
Entrada habilitación cta ppal 2	Downflooding point	Not immersed in positive range	0
Local ropa de agua	Downflooding point	Not immersed in positive range	0
Entrada habilitación cta toldil	Downflooding point	44,6	0
Entrada habilitación cta toldil	Downflooding point	Not immersed in positive range	0
Local grupo emergencia	Downflooding point	Not immersed in positive range	0
Entrada a cta ppal desde cta to	Downflooding point	Not immersed in positive range	0

Code	Criteria	Value	Units	Actual	Status	Margin %
267(85) Ch2 - General Criteria	2.3: IMO roll back angle	20,9	deg			
267(85) Ch2 - General Criteria	2.2.1: Area 0 to 30	3,1513	m.deg	44,6342	Pass	+1316,39
267(85) Ch2 - General Criteria	2.2.1: Area 0 to 40	5,1566	m.deg	79,3400	Pass	+1438,61
267(85) Ch2 - General Criteria	2.2.1: Area 30 to 40	1,7189	m.deg	34,7059	Pass	+1919,11
267(85) Ch2 - General Criteria	2.2.2: Max GZ at 30 or greater	0,200	m	4,204	Pass	+2002,00
267(85) Ch2 - General Criteria	2.2.3: Angle of maximum GZ	25,0	deg	50,0	Pass	+100,00
267(85) Ch2 - General Criteria	2.2.4: Initial GMt	0,150	m	5,522	Pass	+3581,33
267(85) Ch2 - General Criteria	2.3: Severe wind and rolling				Pass	
	Angle of steady heel shall not be greater than (\leq)	16,0	deg	0,9	Pass	+94,32

CONDICIÓN XIX

Salida de puerto en lastre

Equilibrium calculation - D

Stability 22.01.00.131, build: 131

Model file: C:\Users\MARTA\Google Drive\TFG\Marta González\PROGRAMAS\MaxSURF\NUEVO (TFG)\D (Highest precision, 65 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 - Condición I

Damage Case - Intact

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m³)

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	10064,100	10064,100			68,650	0,000	11,800	0,000	User Specified
Total peso en rosca			10064,100			68,650	0,000	11,800	0,000	
Tripulación	20	0,125	2,500			15,000	0,000	22,000	0,000	User Specified
Pertrechos	1	40,000	40,000			90,000	0,000	15,000	0,000	User Specified
Total pesos fijos			42,500			85,588	0,000	15,412	0,000	
Viveres	1	3,700	3,700			17,000	0,000	20,000	0,000	User Specified
Total pesos variables			3,700			17,000	0,000	20,000	0,000	
P1-PIQUE PROA 1	97,9%	690,827	676,320	673,978	659,824	168,219	0,000	7,378	358,502	IMO A.749(18)
P2B-PIQUE PROA 2 BR	97,9%	445,266	435,916	434,406	425,284	161,124	-3,417	5,505	296,453	IMO A.749(18)
P2E-PIQUE PROA 2 ER	97,9%	445,266	435,916	434,406	425,284	161,124	3,417	5,505	296,453	IMO A.749(18)
S1B-TOLVA SUPERIOR B1 BAVOR	97,9%	436,049	426,892	425,414	416,480	146,308	-11,496	15,328	190,513	IMO A.749(18)
S1E-TOLVA SUPERIOR B1 ESTRIBOR	97,9%	436,049	426,892	425,414	416,480	146,308	11,496	15,328	190,513	IMO A.749(18)
I1B-TOLVA INFERIOR B1 BAVOR	97,9%	460,629	450,956	449,394	439,957	145,405	-6,926	1,369	782,082	IMO A.749(18)
I1E-TOLVA INFERIOR B1 ESTRIBOR	97,9%	460,629	450,956	449,394	439,957	145,405	6,926	1,369	782,082	IMO A.749(18)
S2B-TOLVA SUPERIOR B2 BAVOR	97,9%	608,511	595,732	593,669	581,202	123,231	-12,163	15,355	510,211	IMO A.749(18)
S2E-TOLVA SUPERIOR B2 ESTRIBOR	97,9%	608,511	595,732	593,669	581,202	123,231	12,163	15,355	510,211	IMO A.749(18)
I2B-TOLVA INFERIOR B2 BAVOR	97,9%	831,819	814,350	811,530	794,488	123,031	-8,387	1,234	1802,844	IMO A.749(18)
I2E-TOLVA INFERIOR B2 ESTRIBOR	97,9%	831,819	814,350	811,530	794,488	123,031	8,387	1,234	1802,844	IMO A.749(18)
S3B-TOLVA SUPERIOR B3 BAVOR	97,9%	608,593	595,813	593,750	581,281	96,796	-12,200	15,364	510,881	IMO A.749(18)
S3E-TOLVA SUPERIOR B3 ESTRIBOR	97,9%	608,593	595,813	593,750	581,281	96,796	12,200	15,364	510,881	IMO A.749(18)
I3B-TOLVA INFERIOR B3 BAVOR	97,9%	866,904	848,699	845,760	827,999	96,773	-8,622	1,230	1928,188	IMO A.749(18)
I3E-TOLVA INFERIOR B3 ESTRIBOR	97,9%	866,904	848,699	845,760	827,999	96,773	8,622	1,230	1928,188	IMO A.749(18)
I4B-TOLVA INFERIOR B4 BAVOR	97,9%	860,892	842,813	839,895	822,257	70,475	-8,588	1,235	1908,174	IMO A.749(18)
I4E-TOLVA INFERIOR B4 ESTRIBOR	97,9%	860,892	842,813	839,895	822,257	70,475	8,588	1,235	1908,174	IMO A.749(18)

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
I5B-TOLVA INFERIOR B5 BABOR	97,9%	769,640	753,477	750,868	735,100	44,359	-7,918	1,369	1576,558	IMO A.749(18)
I5E-TOLVA INFERIOR B5 ESTRIBOR	97,9%	769,640	753,477	750,868	735,100	44,359	7,918	1,369	1576,558	IMO A.749(18)
PIQUE POPA BABOR	97,9%	271,223	265,527	264,608	259,051	3,587	-6,860	13,665	0,000	User Specified
PIQUE POPA ESTRIBOR	97,9%	271,223	265,527	264,608	259,051	3,587	6,860	13,665	0,000	User Specified
Total lastre	97,9%	13009,878	12736,671	12692,564	12426,021	104,004	0,000	5,984	19370,310	
ADB-AGUA DULCE BABOR	97,9%	121,659	119,104	121,659	119,104	7,451	-8,283	15,165	131,283	IMO A.749(18)
ADE-AGUA DULCE ESTRIBOR	97,9%	74,189	72,631	74,189	72,631	6,534	8,168	15,176	0,000	IMO A.749(18)
ATE-AGUA TÉCNICA ESTRIBOR	100%	47,476	47,476	47,476	47,476	8,883	8,468	15,189	0,000	User Specified
Total agua	98,31%	243,325	239,212	243,325	239,212	7,457	0,036	15,173	131,283	
REFRIGERACIÓN EJE	100%	67,303	67,303	67,303	67,303	8,597	0,000	3,839	0,000	User Specified
LODOS	0%	22,540	0,000	22,540	0,000	11,401	0,000	1,000	0,000	User Specified
REBOSES HFO BR	0%	15,908	0,000	16,233	0,000	20,233	-2,001	0,313	0,000	User Specified
REBOSES ACEITE ER	0%	22,443	0,000	24,395	0,000	20,974	2,001	0,291	0,000	User Specified
AGUAS ACEITOSAS	0%	14,763	0,000	16,170	0,000	23,625	0,000	1,000	0,000	User Specified
SENTINAS	0%	7,974	0,000	8,734	0,000	28,919	0,000	0,000	0,000	User Specified
AGUAS RESIDUALES	0%	152,063	0,000	152,063	0,000	13,523	8,989	9,140	0,000	User Specified
Total misceláneos	22,21%	302,994	67,303	307,437	67,303	8,597	0,000	3,839	0,000	
SERVICIO ACEITE CILINDROS	100%	5,428	5,428	5,900	5,900	11,000	-5,750	9,570	0,000	User Specified
ALMACÉN ACEITE CILINDROS	100%	32,440	32,440	35,260	35,260	11,000	-5,750	12,570	0,000	User Specified
ALMACÉN ACEITE 1	100%	17,009	17,009	18,488	18,488	11,021	-8,471	11,771	0,000	User Specified
ALMACÉN ACEITE 2	100%	13,153	13,153	14,297	14,297	11,071	-10,529	12,530	0,000	User Specified
Total aceite	100%	68,030	68,030	73,945	73,945	11,019	-7,354	12,123	0,000	
SEDIMENTACIÓN HFO 1	100%	43,621	43,621	44,512	44,512	29,250	-1,000	9,570	0,000	User Specified
USO DIARIO HFO 1	100%	65,432	65,432	66,767	66,767	29,250	1,500	9,570	0,000	User Specified
USO DIARIO HFO 2	100%	65,432	65,432	66,767	66,767	29,250	4,500	9,570	0,000	User Specified
SEDIMENTACIÓN HFO 2	100%	43,621	43,621	44,512	44,512	29,250	7,000	9,570	0,000	User Specified
S4B-TOLVA SUPERIOR B4 BABOR	97,9%	405,778	397,256	414,059	405,363	70,405	-11,318	15,562	203,826	IMO A.749(18)
S4E-TOLVA SUPERIOR B4 ESTRIBOR	97,9%	405,778	397,256	414,059	405,363	70,405	11,318	15,562	203,826	IMO A.749(18)
S5B-TOLVA SUPERIOR B5 BABOR	97,9%	9,973	9,764	10,177	9,963	43,690	-11,263	14,110	0,000	IMO A.749(18)
S5E-TOLVA SUPERIOR B5 ESTRIBOR	97,9%	9,973	9,764	10,177	9,963	43,690	11,263	14,110	0,000	IMO A.749(18)
Total HFO	98,34%	1049,608	1032,147	1071,029	1053,211	61,203	0,634	14,269	407,652	
USO DIARIO DIÉSEL 1	97,9%	28,042	27,453	33,384	32,683	29,250	-2,750	9,411	0,000	IMO A.749(18)
USO DIARIO DIÉSEL 2	97,9%	28,042	27,453	33,384	32,683	29,250	-4,250	9,411	0,000	IMO A.749(18)
ALMACÉN DIÉSEL	97,9%	93,474	91,511	111,279	108,942	29,250	-7,500	9,411	0,000	IMO A.749(18)

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
Total diésel	97,9%	149,559	146,418	178,046	174,307	29,250	-6,000	9,411	0,000	
DIÉSEL EMERGENCIA	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	IMO A.749(18)
Total diésel emergencia	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	
LNG 1	97,9%	47,695	46,693	105,989	103,763	4,571	1,270	22,363	0,000	IMO A.749(18)
LNG 2	97,9%	47,878	46,873	106,396	104,161	-0,102	1,260	22,297	122,130	IMO A.749(18)
Total LNG	97,9%	95,573	93,566	212,385	207,925	2,230	1,265	22,330	122,130	
BODEGA 1	55%	8204,584	4512,521	8004,472	4402,459	146,484	0,000	6,264	0,000	User Specified
BODEGA 2	55%	11397,376	6268,556	11119,391	6115,664	123,138	0,000	6,160	0,000	User Specified
BODEGA 3	55%	11480,820	6314,450	11200,800	6160,439	96,796	0,000	6,149	0,000	User Specified
BODEGA 4	55%	11481,075	6314,590	11201,049	6160,576	70,404	0,000	6,149	0,000	User Specified
BODEGA 5	55%	11468,459	6307,653	11188,741	6153,808	43,884	0,000	6,238	0,000	User Specified
Total bodegas	55%	54032,315	29717,770	52714,453	28992,947	93,059	0,000	6,188	0,000	
Contenedor 1	0	440,000	0,000			147,000	0,000	22,800	0,000	User Specified
Contenedor 2	0	792,000	0,000			123,500	0,000	22,800	0,000	User Specified
Contenedor 3	0	792,000	0,000			97,000	0,000	22,800	0,000	User Specified
Contenedor 4	0	792,000	0,000			70,500	0,000	22,800	0,000	User Specified
Contenedor 5	0	792,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total contenedores			0,000			0,000	0,000	0,000	0,000	
Madera 1	0	400,000	0,000			147,000	0,000	22,800	0,000	User Specified
Madera 2	0	720,000	0,000			123,500	0,000	22,800	0,000	User Specified
Madera 3	0	720,000	0,000			97,000	0,000	22,800	0,000	User Specified
Madera 4	0	720,000	0,000			70,500	0,000	22,800	0,000	User Specified
Madera 5	0	720,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total madera			0,000			0,000	0,000	0,000	0,000	
Total Loadcase			54214,026	67496,358	43237,977	89,563	-0,011	7,425	20031,376	
FS correction								0,369		
VCG fluid								7,795		

Draft Amidships m	12,445
Displacement t	54213
Heel deg	0,0
Draft at FP m	13,543
Draft at AP m	11,346

Draft at LCF m	12,435
Trim (+ve by stern) m	-2,198
WL Length m	172,908
Beam max extents on WL m	30,165
Wetted Area m ²	8130,366
Waterpl. Area m ²	4598,899
Prismatic coeff. (Cp)	0,796
Block coeff. (Cb)	0,755
Max Sect. area coeff. (Cm)	0,988
Waterpl. area coeff. (Cwp)	0,882
LCB from zero pt. (+ve fwd) m	89,572
LCF from zero pt. (+ve fwd) m	84,437
KB m	6,437
KG fluid m	7,795
BMt m	5,895
BML m	176,100
GMt corrected m	4,537
GML m	174,743
KMt m	12,331
KML m	182,523
Immersion (TPc) tonne/cm	47,139
MTc tonne.m	555,951
RM at 1deg = GMt.Disp.sin(1) tonne.m	4292,974
Max deck inclination deg	0,7389
Trim angle (+ve by stern) deg	-0,7389

Key point	Type	Freeboard m
Margin Line (freeboard pos = 154,534 m)		3,725
Deck Edge (freeboard pos = 154,534 m)		3,801
Entrada habilitación cta ppal 1	Downflooding point	6,907
Aseo público cubierta	Downflooding point	6,907
Local CO2	Downflooding point	6,907
Entrada habilitación cta ppal 2	Downflooding point	6,907
Local ropa de agua	Downflooding point	6,907
Entrada habilitación cta toldil	Downflooding point	9,770
Entrada habilitación cta toldil	Downflooding point	9,770
Local grupo emergencia	Downflooding point	9,916
Entrada a cta ppal desde cta to	Downflooding point	9,967

Stability calculation - D

Stability 22.01.00.131, build: 131

Model file: C:\Users\MARTA\Google Drive\TFG\Marta González\PROGRAMAS\MaxSURF\NUEVO (TFG)\D (Highest precision, 65 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 - Condición I

Damage Case - Intact

Free to Trim

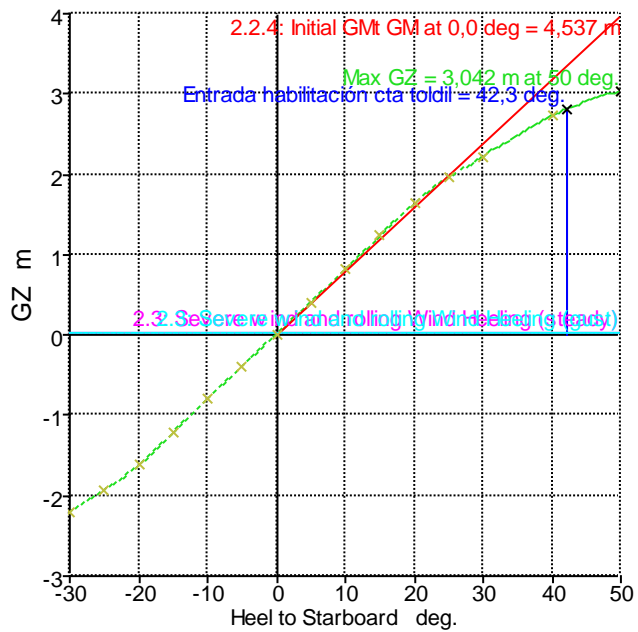
Specific gravity = 1,025; (Density = 1,025 tonne/m³)

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	10064,100	10064,100			68,650	0,000	11,800	0,000	User Specified
Total peso en rosca			10064,100			68,650	0,000	11,800	0,000	
Tripulación	20	0,125	2,500			15,000	0,000	22,000	0,000	User Specified
Pertrechos	1	40,000	40,000			90,000	0,000	15,000	0,000	User Specified
Total pesos fijos			42,500			85,588	0,000	15,412	0,000	
Viveres	1	3,700	3,700			17,000	0,000	20,000	0,000	User Specified
Total pesos variables			3,700			17,000	0,000	20,000	0,000	
P1-PIQUE PROA 1	97,9%	690,827	676,320	673,978	659,824	168,219	0,000	7,378	358,502	IMO A.749(18)
P2B-PIQUE PROA 2 BR	97,9%	445,266	435,916	434,406	425,283	161,124	-3,417	5,505	296,453	IMO A.749(18)
P2E-PIQUE PROA 2 ER	97,9%	445,266	435,916	434,406	425,284	161,124	3,417	5,505	296,453	IMO A.749(18)
S1B-TOLVA SUPERIOR B1 BABOR	97,9%	436,049	426,892	425,414	416,480	146,308	-11,496	15,328	190,513	IMO A.749(18)
S1E-TOLVA SUPERIOR B1 ESTRIBOR	97,9%	436,049	426,892	425,414	416,480	146,308	11,496	15,328	190,513	IMO A.749(18)
I1B-TOLVA INFERIOR B1 BABOR	97,9%	460,629	450,956	449,394	439,957	145,405	-6,926	1,369	782,082	IMO A.749(18)
I1E-TOLVA INFERIOR B1 ESTRIBOR	97,9%	460,629	450,956	449,394	439,957	145,405	6,926	1,369	782,082	IMO A.749(18)
S2B-TOLVA SUPERIOR B2 BABOR	97,9%	608,511	595,732	593,669	581,202	123,231	-12,163	15,355	510,211	IMO A.749(18)
S2E-TOLVA SUPERIOR B2 ESTRIBOR	97,9%	608,511	595,732	593,669	581,202	123,231	12,163	15,355	510,211	IMO A.749(18)
I2B-TOLVA INFERIOR B2 BABOR	97,9%	831,819	814,350	811,530	794,488	123,031	-8,387	1,234	1802,844	IMO A.749(18)
I2E-TOLVA INFERIOR B2 ESTRIBOR	97,9%	831,819	814,350	811,530	794,488	123,031	8,387	1,234	1802,844	IMO A.749(18)
S3B-TOLVA SUPERIOR B3 BABOR	97,9%	608,593	595,813	593,750	581,281	96,796	-12,200	15,364	510,881	IMO A.749(18)
S3E-TOLVA SUPERIOR B3 ESTRIBOR	97,9%	608,593	595,813	593,750	581,281	96,796	12,200	15,364	510,881	IMO A.749(18)
I3B-TOLVA INFERIOR B3 BABOR	97,9%	866,904	848,699	845,760	827,999	96,773	-8,622	1,230	1928,188	IMO A.749(18)
I3E-TOLVA INFERIOR B3 ESTRIBOR	97,9%	866,904	848,699	845,760	827,999	96,773	8,622	1,230	1928,188	IMO A.749(18)
I4B-TOLVA INFERIOR B4 BABOR	97,9%	860,892	842,813	839,895	822,257	70,475	-8,588	1,235	1908,174	IMO A.749(18)
I4E-TOLVA INFERIOR B4 ESTRIBOR	97,9%	860,892	842,813	839,895	822,257	70,475	8,588	1,235	1908,174	IMO A.749(18)

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
I5B-TOLVA INFERIOR B5 BABOR	97,9%	769,640	753,477	750,868	735,100	44,359	-7,918	1,369	1576,558	IMO A.749(18)
I5E-TOLVA INFERIOR B5 ESTRIBOR	97,9%	769,640	753,477	750,868	735,100	44,359	7,918	1,369	1576,558	IMO A.749(18)
PIQUE POPA BABOR	97,9%	271,223	265,527	264,608	259,051	3,587	-6,860	13,665	0,000	User Specified
PIQUE POPA ESTRIBOR	97,9%	271,223	265,527	264,608	259,051	3,587	6,860	13,665	0,000	User Specified
Total lastre	97,9%	13009,878	12736,671	12692,564	12426,020	104,004	0,000	5,984	19370,310	
ADB-AGUA DULCE BABOR	97,9%	121,659	119,104	121,659	119,104	7,451	-8,283	15,165	131,283	IMO A.749(18)
ADE-AGUA DULCE ESTRIBOR	97,9%	74,189	72,631	74,189	72,631	6,534	8,168	15,176	0,000	IMO A.749(18)
ATE-AGUA TÉCNICA ESTRIBOR	100%	47,476	47,476	47,476	47,476	8,883	8,468	15,189	0,000	User Specified
Total agua	98,31%	243,325	239,212	243,325	239,212	7,457	0,036	15,173	131,283	
REFRIGERACIÓN EJE	100%	67,303	67,303	67,303	67,303	8,597	0,000	3,839	0,000	User Specified
LODOS	0%	22,540	0,000	22,540	0,000	11,401	0,000	1,000	0,000	User Specified
REBOSES HFO BR	0%	15,908	0,000	16,233	0,000	20,233	-2,001	0,313	0,000	User Specified
REBOSES ACEITE ER	0%	22,443	0,000	24,395	0,000	20,974	2,001	0,291	0,000	User Specified
AGUAS ACEITOSAS	0%	14,763	0,000	16,170	0,000	23,625	0,000	1,000	0,000	User Specified
SENTINAS	0%	7,974	0,000	8,734	0,000	28,919	0,000	0,000	0,000	User Specified
AGUAS RESIDUALES	0%	152,063	0,000	152,063	0,000	13,523	8,989	9,140	0,000	User Specified
Total misceláneos	22,21%	302,994	67,303	307,437	67,303	8,597	0,000	3,839	0,000	
SERVICIO ACEITE CILINDROS	100%	5,428	5,428	5,900	5,900	11,000	-5,750	9,570	0,000	User Specified
ALMACÉN ACEITE CILINDROS	100%	32,440	32,440	35,260	35,260	11,000	-5,750	12,570	0,000	User Specified
ALMACÉN ACEITE 1	100%	17,009	17,009	18,488	18,488	11,021	-8,471	11,771	0,000	User Specified
ALMACÉN ACEITE 2	100%	13,153	13,153	14,297	14,297	11,071	-10,529	12,530	0,000	User Specified
Total aceite	100%	68,030	68,030	73,945	73,945	11,019	-7,354	12,123	0,000	
SEDIMENTACIÓN HFO 1	100%	43,621	43,621	44,512	44,512	29,250	-1,000	9,570	0,000	User Specified
USO DIARIO HFO 1	100%	65,432	65,432	66,767	66,767	29,250	1,500	9,570	0,000	User Specified
USO DIARIO HFO 2	100%	65,432	65,432	66,767	66,767	29,250	4,500	9,570	0,000	User Specified
SEDIMENTACIÓN HFO 2	100%	43,621	43,621	44,512	44,512	29,250	7,000	9,570	0,000	User Specified
S4B-TOLVA SUPERIOR B4 BABOR	97,9%	405,778	397,256	414,059	405,363	70,405	-11,318	15,562	203,826	IMO A.749(18)
S4E-TOLVA SUPERIOR B4 ESTRIBOR	97,9%	405,778	397,256	414,059	405,363	70,405	11,318	15,562	203,826	IMO A.749(18)
S5B-TOLVA SUPERIOR B5 BABOR	97,9%	9,973	9,764	10,177	9,963	43,690	-11,263	14,110	0,000	IMO A.749(18)
S5E-TOLVA SUPERIOR B5 ESTRIBOR	97,9%	9,973	9,764	10,177	9,963	43,690	11,263	14,110	0,000	IMO A.749(18)
Total HFO	98,34%	1049,608	1032,147	1071,029	1053,211	61,203	0,634	14,269	407,652	
USO DIARIO DIÉSEL 1	97,9%	28,042	27,453	33,384	32,683	29,250	-2,750	9,411	0,000	IMO A.749(18)
USO DIARIO DIÉSEL 2	97,9%	28,042	27,453	33,384	32,683	29,250	-4,250	9,411	0,000	IMO A.749(18)
ALMACÉN DIÉSEL	97,9%	93,474	91,511	111,279	108,942	29,250	-7,500	9,411	0,000	IMO A.749(18)

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
Total diésel	97,9%	149,559	146,418	178,046	174,307	29,250	-6,000	9,411	0,000	
DIÉSEL EMERGENCIA	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	IMO A.749(18)
Total diésel emergencia	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	
LNG 1	97,9%	47,695	46,693	105,989	103,763	4,571	1,270	22,363	0,000	IMO A.749(18)
LNG 2	97,9%	47,878	46,873	106,396	104,161	-0,102	1,260	22,297	122,130	IMO A.749(18)
Total LNG	97,9%	95,573	93,566	212,385	207,925	2,230	1,265	22,330	122,130	
BODEGA 1	55%	8204,584	4512,521	8004,472	4402,460	146,484	0,000	6,264	0,000	User Specified
BODEGA 2	55%	11397,376	6268,557	11119,391	6115,665	123,138	0,000	6,160	0,000	User Specified
BODEGA 3	55%	11480,820	6314,451	11200,800	6160,440	96,796	0,000	6,149	0,000	User Specified
BODEGA 4	55%	11481,075	6314,593	11201,049	6160,578	70,404	0,000	6,149	0,000	User Specified
BODEGA 5	55%	11468,459	6307,652	11188,741	6153,807	43,884	0,000	6,238	0,000	User Specified
Total bodegas	55%	54032,315	29717,774	52714,453	28992,951	93,059	0,000	6,188	0,000	
Contenedor 1	0	440,000	0,000			147,000	0,000	22,800	0,000	User Specified
Contenedor 2	0	792,000	0,000			123,500	0,000	22,800	0,000	User Specified
Contenedor 3	0	792,000	0,000			97,000	0,000	22,800	0,000	User Specified
Contenedor 4	0	792,000	0,000			70,500	0,000	22,800	0,000	User Specified
Contenedor 5	0	792,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total contenedores			0,000			0,000	0,000	0,000	0,000	
Madera 1	0	400,000	0,000			147,000	0,000	22,800	0,000	User Specified
Madera 2	0	720,000	0,000			123,500	0,000	22,800	0,000	User Specified
Madera 3	0	720,000	0,000			97,000	0,000	22,800	0,000	User Specified
Madera 4	0	720,000	0,000			70,500	0,000	22,800	0,000	User Specified
Madera 5	0	720,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total madera			0,000			0,000	0,000	0,000	0,000	
Total Loadcase			54214,031	67496,358	43237,981	89,563	-0,011	7,425	20031,376	
FS correction								0,369		
VCG fluid								7,795		



Stability	
Green	GZ
Blue	Entrada habilitación cta toldil = 42,3 deg.
Red	2.2.4: Initial GMt GM at 0,0 deg = 4,537 m
Magenta	2.3: Severe wind and rolling Wind Heeling (steady)
Cyan	2.3: Severe wind and rolling Wind Heeling (gust)
Olive	Max GZ = 3,042 m at 50 deg.

Heel to Starboard deg	-30,0	-25,0	-20,0	-15,0	-10,0	-5,0	0,0	5,0	10,0	15,0	20,0	25,0
GZ m	-2,200	-1,934	-1,618	-1,212	-0,791	-0,386	0,011	0,409	0,813	1,234	1,639	1,955
Area under GZ curve from zero heel m.deg	35,2337	24,8877	15,9730	8,8734	3,8705	0,9348	0,0104	1,0485	4,0972	9,2107	16,4206	25,4396
Displacement t	54214	54214	54214	54216	54214	54215	54214	54214	54214	54214	54214	54214
Draft at FP m	14,434	13,975	13,667	13,565	13,563	13,550	13,549	13,550	13,551	13,565	13,668	13,975
Draft at AP m	11,065	11,083	11,161	11,254	11,296	11,333	11,340	11,333	11,308	11,253	11,160	11,083
WL Length m	174,526	174,417	173,438	173,128	172,949	172,891	172,891	172,891	172,984	173,127	173,437	174,417
Beam max extents on WL m	30,219	29,400	31,260	31,224	30,628	30,280	30,165	30,280	30,628	31,224	31,260	29,400
Wetted Area m^2	8769,828	8614,747	8358,810	8149,233	8137,733	8132,151	8130,215	8132,112	8138,146	8149,023	8358,798	8614,727
Waterpl. Area m^2	4230,391	4318,440	4578,972	4754,586	4666,192	4615,486	4598,635	4615,478	4666,766	4754,533	4578,911	4318,415
Prismatic coeff. (Cp)	0,797	0,795	0,796	0,796	0,796	0,796	0,796	0,796	0,796	0,796	0,796	0,795
Block coeff. (Cb)	0,543	0,585	0,583	0,616	0,667	0,724	0,755	0,724	0,668	0,616	0,583	0,585
LCB from zero pt. (+ve fwd) m	89,580	89,589	89,585	89,582	89,597	89,581	89,583	89,581	89,572	89,583	89,586	89,590
LCF from zero pt. (+ve fwd) m	81,842	81,965	82,708	84,570	84,515	84,459	84,444	84,459	84,500	84,571	82,708	81,965
Max deck inclination deg	30,0145	25,0145	20,0150	15,0183	10,0278	5,0547	0,7426	5,0547	10,0273	15,0183	20,0150	25,0145
Trim angle (+ve by stern) deg	-1,1328	-0,9722	-0,8427	-0,7771	-0,7622	-0,7454	-0,7426	-0,7454	-0,7541	-0,7771	-0,8431	-0,9725

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 142,156 m)		14,7	n/a
Deck Edge (immersion pos = 142,156 m)		15	n/a
Entrada habilitación cta ppal 1	Downflooding point	Not immersed in positive range	0
Aseo público cubierta	Downflooding point	Not immersed in positive range	0
Local CO2	Downflooding point	Not immersed in positive range	0
Entrada habilitación cta ppal 2	Downflooding point	Not immersed in positive range	0
Local ropa de agua	Downflooding point	Not immersed in positive range	0
Entrada habilitación cta toldil	Downflooding point	42,3	0
Entrada habilitación cta toldil	Downflooding point	Not immersed in positive range	0
Local grupo emergencia	Downflooding point	Not immersed in positive range	0
Entrada a cta ppal desde cta to	Downflooding point	Not immersed in positive range	0

Code	Criteria	Value	Units	Actual	Status	Margin %
267(85) Ch2 - General Criteria	2.3: IMO roll back angle	21,6	deg			
267(85) Ch2 - General Criteria	2.2.1: Area 0 to 30	3,1513	m.deg	35,8765	Pass	+1038,48
267(85) Ch2 - General Criteria	2.2.1: Area 0 to 40	5,1566	m.deg	60,7015	Pass	+1077,16
267(85) Ch2 - General Criteria	2.2.1: Area 30 to 40	1,7189	m.deg	24,8250	Pass	+1344,26
267(85) Ch2 - General Criteria	2.2.2: Max GZ at 30 or greater	0,200	m	3,042	Pass	+1421,00
267(85) Ch2 - General Criteria	2.2.3: Angle of maximum GZ	25,0	deg	50,0	Pass	+100,00
267(85) Ch2 - General Criteria	2.2.4: Initial GMt	0,150	m	4,537	Pass	+2924,67
267(85) Ch2 - General Criteria	2.3: Severe wind and rolling				Pass	
	Angle of steady heel shall not be greater than (\leq)	16,0	deg	0,2	Pass	+98,96

CONDICIÓN XX

Llegada a puerto en lastre

Equilibrium calculation - D

Stability 22.01.00.131, build: 131

Model file: C:\Users\MARTA\Google Drive\TFG\Marta González\PROGRAMAS\MaxSURF\NUEVO (TFG)\D (Highest precision, 65 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 - Condición I

Damage Case - Intact

Free to Trim

Specific gravity = 1,025; (Density = 1,025 tonne/m³)

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	10064,100	10064,100			68,650	0,000	11,800	0,000	User Specified
Total peso en rosca			10064,100			68,650	0,000	11,800	0,000	
Tripulación	20	0,125	2,500			15,000	0,000	22,000	0,000	User Specified
Pertrechos	1	40,000	40,000			90,000	0,000	15,000	0,000	User Specified
Total pesos fijos			42,500			85,588	0,000	15,412	0,000	
Viveres	0,1	3,700	0,370			17,000	0,000	20,000	0,000	User Specified
Total pesos variables			0,370			17,000	0,000	20,000	0,000	
P1-PIQUE PROA 1	97,9%	690,827	676,320	673,978	659,824	168,219	0,000	7,378	358,511	IMO A.749(18)
P2B-PIQUE PROA 2 BR	97,9%	445,266	435,916	434,406	425,284	161,124	-3,417	5,505	296,461	IMO A.749(18)
P2E-PIQUE PROA 2 ER	97,9%	445,266	435,916	434,406	425,284	161,124	3,417	5,505	296,461	IMO A.749(18)
S1B-TOLVA SUPERIOR B1 BAVOR	97,9%	436,049	426,892	425,414	416,480	146,308	-11,496	15,328	190,518	IMO A.749(18)
S1E-TOLVA SUPERIOR B1 ESTRIBOR	97,9%	436,049	426,892	425,414	416,480	146,308	11,496	15,328	190,518	IMO A.749(18)
I1B-TOLVA INFERIOR B1 BAVOR	97,9%	460,629	450,956	449,394	439,957	145,405	-6,926	1,369	782,101	IMO A.749(18)
I1E-TOLVA INFERIOR B1 ESTRIBOR	97,9%	460,629	450,956	449,394	439,957	145,405	6,926	1,369	782,101	IMO A.749(18)
S2B-TOLVA SUPERIOR B2 BAVOR	97,9%	608,511	595,732	593,669	581,202	123,231	-12,163	15,355	510,224	IMO A.749(18)
S2E-TOLVA SUPERIOR B2 ESTRIBOR	97,9%	608,511	595,732	593,669	581,202	123,231	12,163	15,355	510,224	IMO A.749(18)
I2B-TOLVA INFERIOR B2 BAVOR	97,9%	831,819	814,350	811,530	794,488	123,031	-8,387	1,234	1802,889	IMO A.749(18)
I2E-TOLVA INFERIOR B2 ESTRIBOR	97,9%	831,819	814,350	811,530	794,488	123,031	8,387	1,234	1802,889	IMO A.749(18)
S3B-TOLVA SUPERIOR B3 BAVOR	97,9%	608,593	595,813	593,750	581,281	96,796	-12,200	15,364	510,894	IMO A.749(18)
S3E-TOLVA SUPERIOR B3 ESTRIBOR	97,9%	608,593	595,813	593,750	581,281	96,796	12,200	15,364	510,894	IMO A.749(18)
I3B-TOLVA INFERIOR B3 BAVOR	97,9%	866,904	848,699	845,760	827,999	96,773	-8,622	1,230	1928,236	IMO A.749(18)
I3E-TOLVA INFERIOR B3 ESTRIBOR	97,9%	866,904	848,699	845,760	827,999	96,773	8,622	1,230	1928,236	IMO A.749(18)
I4B-TOLVA INFERIOR B4 BAVOR	97,9%	860,892	842,813	839,895	822,257	70,475	-8,588	1,235	1908,222	IMO A.749(18)
I4E-TOLVA INFERIOR B4 ESTRIBOR	97,9%	860,892	842,813	839,895	822,257	70,475	8,588	1,235	1908,222	IMO A.749(18)

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
I5B-TOLVA INFERIOR B5 BABOR	97,9%	769,640	753,477	750,868	735,100	44,359	-7,918	1,369	1576,597	IMO A.749(18)
I5E-TOLVA INFERIOR B5 ESTRIBOR	97,9%	769,640	753,477	750,868	735,100	44,359	7,918	1,369	1576,597	IMO A.749(18)
PIQUE POPA BABOR	97,9%	271,223	265,527	264,608	259,051	3,587	-6,860	13,665	0,000	User Specified
PIQUE POPA ESTRIBOR	97,9%	271,223	265,527	264,608	259,051	3,587	6,860	13,665	0,000	User Specified
Total lastre	97,9%	13009,878	12736,671	12692,564	12426,021	104,004	0,000	5,984	19370,793	
ADB-AGUA DULCE BABOR	10%	121,659	12,166	121,659	12,166	7,492	-7,942	13,365	131,287	IMO A.749(18)
ADE-AGUA DULCE ESTRIBOR	10%	74,189	7,419	74,189	7,419	6,554	7,777	13,370	0,000	IMO A.749(18)
ATE-AGUA TÉCNICA ESTRIBOR	10%	47,476	4,748	47,476	4,748	8,887	8,188	13,358	0,000	User Specified
Total agua	10%	243,325	24,332	243,325	24,332	7,478	-0,002	13,366	131,287	
REFRIGERACIÓN EJE	100%	67,303	67,303	67,303	67,303	8,597	0,000	3,839	0,000	User Specified
LODOS	100%	22,540	22,540	22,540	22,540	11,375	0,000	1,532	0,000	User Specified
REBOSES HFO BR	100%	15,908	15,908	16,233	16,233	18,841	-5,025	1,382	0,000	User Specified
REBOSES ACEITE ER	100%	22,443	22,443	24,395	24,395	18,954	5,046	1,380	0,000	User Specified
AGUAS ACEITOSAS	100%	14,763	14,763	16,170	16,170	23,625	0,000	1,500	0,000	User Specified
SENTINAS	100%	7,974	7,974	8,734	8,734	28,875	0,000	1,010	0,000	User Specified
AGUAS RESIDUALES	100%	152,063	152,063	152,063	152,063	12,650	10,081	13,659	0,000	User Specified
Total misceláneos	100%	302,994	302,994	307,437	307,437	13,409	5,169	8,096	0,000	
SERVICIO ACEITE CILINDROS	10%	5,428	0,543	5,900	0,590	11,000	-5,750	9,183	0,000	User Specified
ALMACÉN ACEITE CILINDROS	10%	32,440	3,244	35,260	3,526	11,000	-5,750	10,257	0,000	User Specified
ALMACÉN ACEITE 1	10%	17,009	1,701	18,488	1,849	11,178	-8,241	9,558	0,000	User Specified
ALMACÉN ACEITE 2	10%	13,153	1,315	14,297	1,430	11,268	-9,962	10,577	0,000	User Specified
Total aceite	10%	68,030	6,803	73,945	7,395	11,096	-7,187	10,058	0,000	
SEDIMENTACIÓN HFO 1	0%	43,621	0,000	44,512	0,000	29,250	-1,000	2,000	0,000	User Specified
USO DIARIO HFO 1	80,24%	65,432	52,500	66,767	53,571	29,250	1,500	8,074	0,000	User Specified
USO DIARIO HFO 2	80,24%	65,432	52,500	66,767	53,571	29,250	4,500	8,074	0,000	User Specified
SEDIMENTACIÓN HFO 2	0%	43,621	0,000	44,512	0,000	29,250	7,000	2,000	0,000	User Specified
S4B-TOLVA SUPERIOR B4 BABOR	0%	405,778	0,000	414,059	0,000	71,250	-13,611	12,700	0,000	IMO A.749(18)
S4E-TOLVA SUPERIOR B4 ESTRIBOR	0%	405,778	0,000	414,059	0,000	71,250	13,611	12,700	0,000	IMO A.749(18)
S5B-TOLVA SUPERIOR B5 BABOR	0%	9,973	0,000	10,177	0,000	44,162	-14,104	12,700	0,000	IMO A.749(18)
S5E-TOLVA SUPERIOR B5 ESTRIBOR	0%	9,973	0,000	10,177	0,000	44,162	14,104	12,700	0,000	IMO A.749(18)
Total HFO	10%	1049,608	105,000	1071,029	107,143	29,250	3,000	8,074	0,000	
USO DIARIO DIÉSEL 1	26,75%	28,042	7,500	33,384	8,929	29,250	-2,750	4,025	0,000	IMO A.749(18)
USO DIARIO DIÉSEL 2	26,75%	28,042	7,500	33,384	8,929	29,250	-4,250	4,025	0,000	IMO A.749(18)
ALMACÉN DIÉSEL	0%	93,474	0,000	111,279	0,000	29,250	-7,500	2,000	0,000	IMO A.749(18)

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
Total diésel	10,03%	149,559	15,000	178,046	17,857	29,250	-3,500	4,025	0,000	
DIÉSEL EMERGENCIA	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	IMO A.749(18)
Total diésel emergencia	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	
LNG 1	10%	47,695	4,770	105,989	10,599	4,549	1,266	20,938	0,000	IMO A.749(18)
LNG 2	10%	47,878	4,788	106,396	10,640	-0,067	1,235	20,762	122,133	IMO A.749(18)
Total LNG	10%	95,573	9,557	212,385	21,238	2,237	1,251	20,850	122,133	
BODEGA 1	55%	8204,584	4512,521	8004,472	4402,459	146,484	0,000	6,264	0,000	User Specified
BODEGA 2	55%	11397,376	6268,557	11119,391	6115,665	123,138	0,000	6,160	0,000	User Specified
BODEGA 3	55%	11480,820	6314,450	11200,800	6160,439	96,796	0,000	6,149	0,000	User Specified
BODEGA 4	55%	11481,075	6314,592	11201,049	6160,578	70,404	0,000	6,149	0,000	User Specified
BODEGA 5	55%	11468,459	6307,653	11188,741	6153,808	43,884	0,000	6,238	0,000	User Specified
Total bodegas	55%	54032,315	29717,773	52714,453	28992,949	93,059	0,000	6,188	0,000	
Contenedor 1	0	440,000	0,000			147,000	0,000	22,800	0,000	User Specified
Contenedor 2	0	792,000	0,000			123,500	0,000	22,800	0,000	User Specified
Contenedor 3	0	792,000	0,000			97,000	0,000	22,800	0,000	User Specified
Contenedor 4	0	792,000	0,000			70,500	0,000	22,800	0,000	User Specified
Contenedor 5	0	792,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total contenedores			0,000			0,000	0,000	0,000	0,000	
Madera 1	0	400,000	0,000			147,000	0,000	22,800	0,000	User Specified
Madera 2	0	720,000	0,000			123,500	0,000	22,800	0,000	User Specified
Madera 3	0	720,000	0,000			97,000	0,000	22,800	0,000	User Specified
Madera 4	0	720,000	0,000			70,500	0,000	22,800	0,000	User Specified
Madera 5	0	720,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total madera			0,000			0,000	0,000	0,000	0,000	
Total Loadcase			53027,711	67496,358	41907,479	90,379	0,033	7,233	19624,213	
FS correction								0,370		
VCG fluid								7,603		

Draft Amidships m	12,194
Displacement t	53027
Heel deg	0,4
Draft at FP m	13,634
Draft at AP m	10,754

Draft at LCF m	12,192
Trim (+ve by stern) m	-2,880
WL Length m	170,994
Beam max extents on WL m	30,165
Wetted Area m ²	8022,381
Waterpl. Area m ²	4564,118
Prismatic coeff. (Cp)	0,794
Block coeff. (Cb)	0,743
Max Sect. area coeff. (Cm)	0,981
Waterpl. area coeff. (Cwp)	0,885
LCB from zero pt. (+ve fwd) m	90,391
LCF from zero pt. (+ve fwd) m	85,069
KB m	6,317
KG fluid m	7,603
BMt m	5,993
BML m	175,751
GMt corrected m	4,706
GML m	174,465
KMt m	12,308
KML m	182,038
Immersion (TPc) tonne/cm	46,782
MTc tonne.m	542,920
RM at 1deg = GMt.Disp.sin(1) tonne.m	4355,514
Max deck inclination deg	1,0493
Trim angle (+ve by stern) deg	-0,9682

Key point	Type	Freeboard m
Margin Line (freeboard pos = 154,534 m)		3,606
Deck Edge (freeboard pos = 154,534 m)		3,682
Entrada habilitación cta ppal 1	Downflooding point	7,364
Aseo público cubierta	Downflooding point	7,383
Local CO2	Downflooding point	7,394
Entrada habilitación cta ppal 2	Downflooding point	7,406
Local ropa de agua	Downflooding point	7,422
Entrada habilitación cta toldil	Downflooding point	10,190
Entrada habilitación cta toldil	Downflooding point	10,338
Local grupo emergencia	Downflooding point	10,401
Entrada a cta ppal desde cta to	Downflooding point	10,563

Stability calculation - D

Stability 22.01.00.131, build: 131

Model file: C:\Users\MARTA\Google Drive\TFG\Marta González\PROGRAMAS\MaxSURF\NUEVO (TFG)\D (Highest precision, 65 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 - Condición I

Damage Case - Intact

Free to Trim

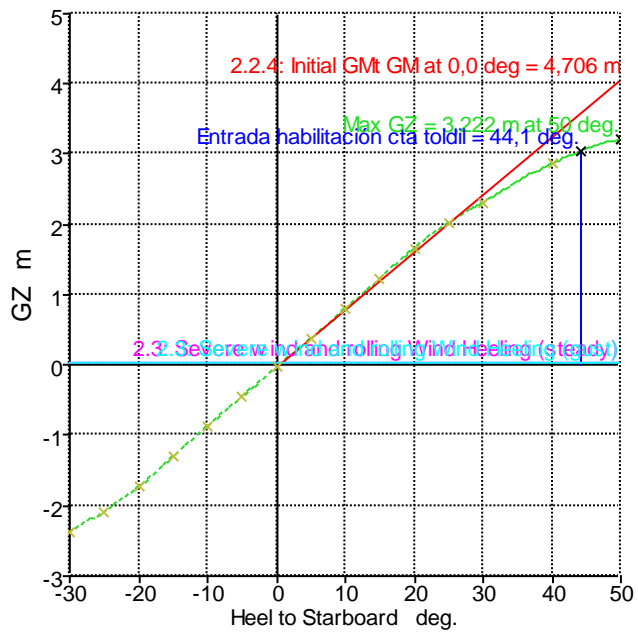
Specific gravity = 1,025; (Density = 1,025 tonne/m³)

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	10064,100	10064,100			68,650	0,000	11,800	0,000	User Specified
Total peso en rosca			10064,100			68,650	0,000	11,800	0,000	
Tripulación	20	0,125	2,500			15,000	0,000	22,000	0,000	User Specified
Pertrechos	1	40,000	40,000			90,000	0,000	15,000	0,000	User Specified
Total pesos fijos			42,500			85,588	0,000	15,412	0,000	
Viveres	0,1	3,700	0,370			17,000	0,000	20,000	0,000	User Specified
Total pesos variables			0,370			17,000	0,000	20,000	0,000	
P1-PIQUE PROA 1	97,9%	690,827	676,320	673,978	659,824	168,219	0,000	7,378	358,502	IMO A.749(18)
P2B-PIQUE PROA 2 BR	97,9%	445,266	435,916	434,406	425,283	161,124	-3,417	5,505	296,453	IMO A.749(18)
P2E-PIQUE PROA 2 ER	97,9%	445,266	435,916	434,406	425,284	161,124	3,417	5,505	296,453	IMO A.749(18)
S1B-TOLVA SUPERIOR B1 BAVOR	97,9%	436,049	426,892	425,414	416,480	146,308	-11,496	15,328	190,513	IMO A.749(18)
S1E-TOLVA SUPERIOR B1 ESTRIBOR	97,9%	436,049	426,892	425,414	416,480	146,308	11,496	15,328	190,513	IMO A.749(18)
I1B-TOLVA INFERIOR B1 BAVOR	97,9%	460,629	450,956	449,394	439,957	145,405	-6,926	1,369	782,082	IMO A.749(18)
I1E-TOLVA INFERIOR B1 ESTRIBOR	97,9%	460,629	450,956	449,394	439,957	145,405	6,926	1,369	782,082	IMO A.749(18)
S2B-TOLVA SUPERIOR B2 BAVOR	97,9%	608,511	595,732	593,669	581,202	123,231	-12,163	15,355	510,211	IMO A.749(18)
S2E-TOLVA SUPERIOR B2 ESTRIBOR	97,9%	608,511	595,732	593,669	581,202	123,231	12,163	15,355	510,211	IMO A.749(18)
I2B-TOLVA INFERIOR B2 BAVOR	97,9%	831,819	814,350	811,530	794,488	123,031	-8,387	1,234	1802,844	IMO A.749(18)
I2E-TOLVA INFERIOR B2 ESTRIBOR	97,9%	831,819	814,350	811,530	794,488	123,031	8,387	1,234	1802,844	IMO A.749(18)
S3B-TOLVA SUPERIOR B3 BAVOR	97,9%	608,593	595,813	593,750	581,281	96,796	-12,200	15,364	510,881	IMO A.749(18)
S3E-TOLVA SUPERIOR B3 ESTRIBOR	97,9%	608,593	595,813	593,750	581,281	96,796	12,200	15,364	510,881	IMO A.749(18)
I3B-TOLVA INFERIOR B3 BAVOR	97,9%	866,904	848,699	845,760	827,999	96,773	-8,622	1,230	1928,188	IMO A.749(18)
I3E-TOLVA INFERIOR B3 ESTRIBOR	97,9%	866,904	848,699	845,760	827,999	96,773	8,622	1,230	1928,188	IMO A.749(18)
I4B-TOLVA INFERIOR B4 BAVOR	97,9%	860,892	842,813	839,895	822,257	70,475	-8,588	1,235	1908,174	IMO A.749(18)
I4E-TOLVA INFERIOR B4 ESTRIBOR	97,9%	860,892	842,813	839,895	822,257	70,475	8,588	1,235	1908,174	IMO A.749(18)

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
I5B-TOLVA INFERIOR B5 BABOR	97,9%	769,640	753,477	750,868	735,100	44,359	-7,918	1,369	1576,558	IMO A.749(18)
I5E-TOLVA INFERIOR B5 ESTRIBOR	97,9%	769,640	753,477	750,868	735,100	44,359	7,918	1,369	1576,558	IMO A.749(18)
PIQUE POPA BABOR	97,9%	271,223	265,527	264,608	259,051	3,587	-6,860	13,665	0,000	User Specified
PIQUE POPA ESTRIBOR	97,9%	271,223	265,527	264,608	259,051	3,587	6,860	13,665	0,000	User Specified
Total lastre	97,9%	13009,878	12736,671	12692,564	12426,021	104,004	0,000	5,984	19370,310	
ADB-AGUA DULCE BABOR	10%	121,659	12,166	121,659	12,166	7,492	-7,942	13,365	131,283	IMO A.749(18)
ADE-AGUA DULCE ESTRIBOR	10%	74,189	7,419	74,189	7,419	6,554	7,777	13,370	0,000	IMO A.749(18)
ATE-AGUA TÉCNICA ESTRIBOR	10%	47,476	4,748	47,476	4,748	8,887	8,188	13,358	0,000	User Specified
Total agua	10%	243,325	24,332	243,325	24,332	7,478	-0,002	13,366	131,283	
REFRIGERACIÓN EJE	100%	67,303	67,303	67,303	67,303	8,597	0,000	3,839	0,000	User Specified
LODOS	100%	22,540	22,540	22,540	22,540	11,375	0,000	1,532	0,000	User Specified
REBOSES HFO BR	100%	15,908	15,908	16,233	16,233	18,841	-5,025	1,382	0,000	User Specified
REBOSES ACEITE ER	100%	22,443	22,443	24,395	24,395	18,954	5,046	1,380	0,000	User Specified
AGUAS ACEITOSAS	100%	14,763	14,763	16,170	16,170	23,625	0,000	1,500	0,000	User Specified
SENTINAS	100%	7,974	7,974	8,734	8,734	28,875	0,000	1,010	0,000	User Specified
AGUAS RESIDUALES	100%	152,063	152,063	152,063	152,063	12,650	10,081	13,659	0,000	User Specified
Total misceláneos	100%	302,994	302,994	307,437	307,437	13,409	5,169	8,096	0,000	
SERVICIO ACEITE CILINDROS	10%	5,428	0,543	5,900	0,590	11,000	-5,750	9,183	0,000	User Specified
ALMACÉN ACEITE CILINDROS	10%	32,440	3,244	35,260	3,526	11,000	-5,750	10,257	0,000	User Specified
ALMACÉN ACEITE 1	10%	17,009	1,701	18,488	1,849	11,178	-8,241	9,558	0,000	User Specified
ALMACÉN ACEITE 2	10%	13,153	1,315	14,297	1,430	11,268	-9,962	10,577	0,000	User Specified
Total aceite	10%	68,030	6,803	73,945	7,395	11,096	-7,187	10,058	0,000	
SEDIMENTACIÓN HFO 1	0%	43,621	0,000	44,512	0,000	29,250	-1,000	2,000	0,000	User Specified
USO DIARIO HFO 1	80,24%	65,432	52,500	66,767	53,571	29,250	1,500	8,074	0,000	User Specified
USO DIARIO HFO 2	80,24%	65,432	52,500	66,767	53,571	29,250	4,500	8,074	0,000	User Specified
SEDIMENTACIÓN HFO 2	0%	43,621	0,000	44,512	0,000	29,250	7,000	2,000	0,000	User Specified
S4B-TOLVA SUPERIOR B4 BABOR	0%	405,778	0,000	414,059	0,000	71,250	-13,611	12,700	0,000	IMO A.749(18)
S4E-TOLVA SUPERIOR B4 ESTRIBOR	0%	405,778	0,000	414,059	0,000	71,250	13,611	12,700	0,000	IMO A.749(18)
S5B-TOLVA SUPERIOR B5 BABOR	0%	9,973	0,000	10,177	0,000	44,162	-14,104	12,700	0,000	IMO A.749(18)
S5E-TOLVA SUPERIOR B5 ESTRIBOR	0%	9,973	0,000	10,177	0,000	44,162	14,104	12,700	0,000	IMO A.749(18)
Total HFO	10%	1049,608	105,000	1071,029	107,143	29,250	3,000	8,074	0,000	
USO DIARIO DIÉSEL 1	26,75%	28,042	7,500	33,384	8,929	29,250	-2,750	4,025	0,000	IMO A.749(18)
USO DIARIO DIÉSEL 2	26,75%	28,042	7,500	33,384	8,929	29,250	-4,250	4,025	0,000	IMO A.749(18)
ALMACÉN DIÉSEL	0%	93,474	0,000	111,279	0,000	29,250	-7,500	2,000	0,000	IMO A.749(18)

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
Total diésel	10,03%	149,559	15,000	178,046	17,857	29,250	-3,500	4,025	0,000	
DIÉSEL EMERGENCIA	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	IMO A.749(18)
Total diésel emergencia	97,9%	2,666	2,610	3,174	3,107	8,267	-7,570	21,310	0,000	
LNG 1	10%	47,695	4,770	105,989	10,599	4,549	1,266	20,938	0,000	IMO A.749(18)
LNG 2	10%	47,878	4,788	106,396	10,640	-0,067	1,235	20,762	122,130	IMO A.749(18)
Total LNG	10%	95,573	9,557	212,385	21,238	2,237	1,251	20,850	122,130	
BODEGA 1	55%	8204,584	4512,521	8004,472	4402,459	146,484	0,000	6,264	0,000	User Specified
BODEGA 2	55%	11397,376	6268,557	11119,391	6115,665	123,138	0,000	6,160	0,000	User Specified
BODEGA 3	55%	11480,820	6314,452	11200,800	6160,441	96,796	0,000	6,149	0,000	User Specified
BODEGA 4	55%	11481,075	6314,591	11201,049	6160,577	70,404	0,000	6,149	0,000	User Specified
BODEGA 5	55%	11468,459	6307,652	11188,741	6153,807	43,884	0,000	6,238	0,000	User Specified
Total bodegas	55%	54032,315	29717,773	52714,453	28992,949	93,059	0,000	6,188	0,000	
Contenedor 1	0	440,000	0,000			147,000	0,000	22,800	0,000	User Specified
Contenedor 2	0	792,000	0,000			123,500	0,000	22,800	0,000	User Specified
Contenedor 3	0	792,000	0,000			97,000	0,000	22,800	0,000	User Specified
Contenedor 4	0	792,000	0,000			70,500	0,000	22,800	0,000	User Specified
Contenedor 5	0	792,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total contenedores			0,000			0,000	0,000	0,000	0,000	
Madera 1	0	400,000	0,000			147,000	0,000	22,800	0,000	User Specified
Madera 2	0	720,000	0,000			123,500	0,000	22,800	0,000	User Specified
Madera 3	0	720,000	0,000			97,000	0,000	22,800	0,000	User Specified
Madera 4	0	720,000	0,000			70,500	0,000	22,800	0,000	User Specified
Madera 5	0	720,000	0,000			44,000	0,000	22,800	0,000	User Specified
Total madera			0,000			0,000	0,000	0,000	0,000	
Total Loadcase			53027,711	67496,358	41907,479	90,379	0,033	7,233	19623,724	
FS correction								0,370		
VCG fluid								7,603		



Stability	
■	GZ
■	Entrada habilitación cta toldil = 44,1 deg.
■	2.2.4: Initial GMT GM at 0,0 deg = 4,706 m
■	2.3: Severe wind and rolling Wind Heeling (steady)
■	2.3: Severe wind and rolling Wind Heeling (gust)
■	Max GZ = 3,222 m at 50 deg.

Heel to Starboard deg	-30,0	-25,0	-20,0	-15,0	-10,0	-5,0	0,0	5,0	10,0	15,0	20,0	25,0
GZ m	-2,372	-2,080	-1,728	-1,300	-0,864	-0,445	-0,033	0,379	0,799	1,235	1,665	2,020
Area under GZ curve from zero heel m.deg	38,1533	27,0088	17,4552	9,8676	4,4630	1,1950	-0,0304	0,8613	3,7982	8,8761	16,1471	25,3904
Displacement t	53028	53028	53028	53028	53028	53028	53028	53028	53028	53028	53023	53028
Draft at FP m	14,499	14,043	13,747	13,656	13,648	13,643	13,641	13,643	13,648	13,656	13,746	14,042
Draft at AP m	10,397	10,451	10,562	10,659	10,709	10,737	10,747	10,737	10,709	10,659	10,560	10,452
WL Length m	174,405	172,770	171,796	171,476	171,221	171,037	170,973	171,037	171,221	171,476	171,792	172,770
Beam max extents on WL m	29,988	29,781	31,969	31,223	30,628	30,279	30,164	30,279	30,628	31,223	31,968	29,781
Wetted Area m^2	8632,246	8462,361	8214,444	8042,062	8030,275	8024,017	8022,161	8024,016	8030,272	8042,067	8213,794	8462,340
Waterpl. Area m^2	4253,318	4360,766	4603,557	4719,716	4631,378	4580,305	4563,672	4580,305	4631,377	4719,712	4603,776	4360,766
Prismatic coeff. (Cp)	0,785	0,790	0,791	0,791	0,792	0,793	0,793	0,793	0,792	0,791	0,791	0,790
Block coeff. (Cb)	0,539	0,574	0,566	0,612	0,664	0,719	0,742	0,719	0,664	0,612	0,566	0,574
LCB from zero pt. (+ve fwd) m	90,412	90,411	90,406	90,404	90,405	90,406	90,407	90,406	90,405	90,404	90,407	90,411
LCF from zero pt. (+ve fwd) m	82,090	82,379	83,311	85,181	85,133	85,094	85,078	85,094	85,133	85,181	83,313	82,378
Max deck inclination deg	30,0216	25,0224	20,0243	15,0308	10,0468	5,0936	0,9732	5,0936	10,0468	15,0308	20,0243	25,0224
Trim angle (+ve by stern) deg	-1,3791	-1,2073	-1,0709	-1,0075	-0,9882	-0,9769	-0,9732	-0,9769	-0,9882	-1,0075	-1,0710	-1,2072

Key point	Type	Immersion angle deg	Emergence angle deg
Margin Line (immersion pos = 142,156 m)		14,8	n/a
Deck Edge (immersion pos = 142,156 m)		15,1	n/a
Entrada habilitación cta ppal 1	Downflooding point	Not immersed in positive range	0
Aseo público cubierta	Downflooding point	Not immersed in positive range	0
Local CO2	Downflooding point	Not immersed in positive range	0
Entrada habilitación cta ppal 2	Downflooding point	Not immersed in positive range	0
Local ropa de agua	Downflooding point	Not immersed in positive range	0
Entrada habilitación cta toldil	Downflooding point	44,1	0
Entrada habilitación cta toldil	Downflooding point	Not immersed in positive range	0
Local grupo emergencia	Downflooding point	Not immersed in positive range	0
Entrada a cta ppal desde cta to	Downflooding point	Not immersed in positive range	0

Code	Criteria	Value	Units	Actual	Status	Margin %
267(85) Ch2 - General Criteria	2.3: IMO roll back angle	21,4	deg			
267(85) Ch2 - General Criteria	2.2.1: Area 0 to 30	3,1513	m.deg	36,2303	Pass	+1049,71
267(85) Ch2 - General Criteria	2.2.1: Area 0 to 40	5,1566	m.deg	62,2535	Pass	+1107,25
267(85) Ch2 - General Criteria	2.2.1: Area 30 to 40	1,7189	m.deg	26,0232	Pass	+1413,97
267(85) Ch2 - General Criteria	2.2.2: Max GZ at 30 or greater	0,200	m	3,222	Pass	+1511,00
267(85) Ch2 - General Criteria	2.2.3: Angle of maximum GZ	25,0	deg	50,0	Pass	+100,00
267(85) Ch2 - General Criteria	2.2.4: Initial GMt	0,150	m	4,706	Pass	+3037,33
267(85) Ch2 - General Criteria	2.3: Severe wind and rolling				Pass	
	Angle of steady heel shall not be greater than (\leq)	16,0	deg	0,7	Pass	+95,54