

**ESCOLA POLITÉCNICA SUPERIOR  
UNIVERSIDADE DA CORUÑA**



**BUQUE ATUNERO 1200 TN**  
**CUADERNO 4**  
**CÁLCULOS DE ARQUITECTURA NAVAL**

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## RPA

### DEPARTAMENTO DE INGENIERÍA NAVAL Y OCEÁNICA

### GRADO EN INGENIERÍA DE PROPULSIÓN Y SERVICIOS DEL BUQUE

*CURSO 2.014-2015*

**PROYECTO NÚMERO:** 13-P8

**TIPO DE BUQUE:** ATUNERO

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

**CARACTERÍSTICAS DE LA CARGA:** 1200 Tn.

**VELOCIDAD Y AUTONOMÍA:** 16,5 nudos al 85% MCR y 15% de Margen de Mar. Autonomía de 8500 millas.

**SISTEMAS Y EQUIPOS DE CARGA / DESCARGA:** Escotilla en cubierta.

**PROPULSIÓN:** Una línea de ejes accionada por motor diésel.

**TRIPULACIÓN Y PASAJE:** 26 tripulantes.

**OTROS EQUIPOS E INSTALACIONES:** Hélice transversal en proa.

Ferrol, Enero de 2.016.

ALUMNO: Aitor Ramil Vizoso.

## INTRODUCCIÓN

En el presente cuaderno se definirán y desarrollarán los siguientes puntos:

- Zona estanca del buque y puntos de inundación progresiva.
- Espaciado entre cuadernas, disposición de mamparos, cubiertas y cofferdams.
- Cálculo de capacidades y centros de gravedad de compartimentos y tanques.
- Características hidrostáticas
- Tabla de valores KN.

Como base para la realización de este cuaderno, se emplearán las dimensiones principales obtenidas en el Cuaderno 1: *"Dimensionamiento preliminar y elección de la cifra de mérito"*. Estas dimensiones se recogen en la siguiente tabla:

L	L <sub>pp</sub>	B	D <sub>sup</sub>	D <sub>prin</sub>	T
75,50	64,45	13,45	8,90	6,50	5,85

Tabla 1. DIMENSIONES PRINCIPALES DEL BUQUE.

Así mismo, se emplearán y evaluarán las formas desarrolladas en el Cuaderno 3 *"Coeficientes y plano de formas"*.

Como punto de partida para la realización de este cuaderno, es importante determinar la extensión de la zona estanca del buque. Se considerará como zona estanca todo aquella que no tenga aberturas al exterior, o en caso de tenerlas, que posean cierres estancos a la intemperie. En este caso, la zona estanca quedará delimitada como todo el volumen de carena situado por debajo de la cubierta superior.

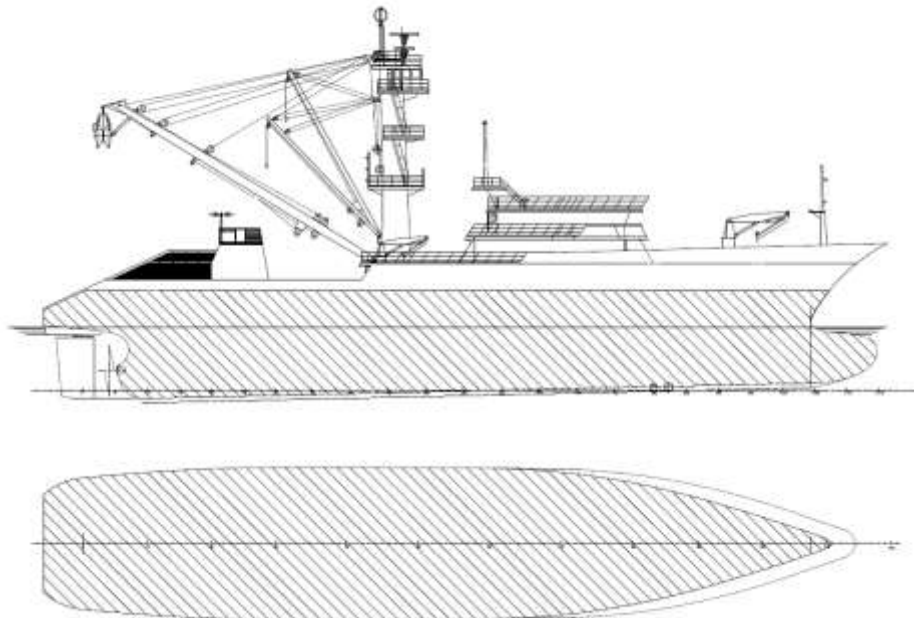
Análogo a lo anterior, se debe estudiar cuales son los puntos de inundación progresiva. Estos puntos son lugares por los que puede entrar agua al interior del buque, por no tener mecanismos de cierre estancos.

A lo largo de la parte restante del cuaderno se delimitan tanques y compartimentos. Estos tanques y compartimentos deberán de ser comprobados con objeto de satisfacer las necesidades operativas del buque y, por otra parte, servirán como soporte para estudiar la estabilidad para las distintas condiciones de carga en el Cuaderno 5: “*Condiciones de carga y estabilidad*”.

## COMPARTIMENTADO DEL CASCO

### DELIMITACIÓN DE LA ZONA ESTANCA DEL BUQUE

La zona estanca del buque de proyecto se corresponde con todo el volumen de carena hasta la cubierta superior. Esta cubierta dispone como zonas de apertura del casco cinco escotillas, pero no serán conflictivas desde el punto de vista de la delimitación de la zona estanca por disponer de mecanismos que permiten considerarlas estancas.



## **PUNTOS DE INUNDACIÓN PROGRESIVA**

Los puntos de inundación progresiva son puntos a través de los cuales es posible que se establezca una entrada de agua al buque (aperturas sin mecanismos de cierre), produciendo así una inundación progresiva.

En el caso del buque de proyecto, como punto de inundación progresiva más desfavorable, se establece la salida de ventilación situada en el guardacalor.

## **ESPACIADO DE CUADERNAS**

El primer paso a la hora de definir la compartimentación longitudinal del buque es determinar el espaciado de cuadernas. En base a esto se dispondrán los mamparos transversales estancos de acorde con la sociedad de clasificación aplicable, en este caso Bureau Veritas.

El espaciado de cuadernas en este caso se ha definido a partir de la información obtenida de algunos buques de la base de datos. Se observa que para este tipo de buques el espaciado no es constante a lo largo de la eslora, sino que cuentan con un espaciado mayor en la zona central del buque y una distancia entre cuadernas menor en los extremos del mismo.

De este modo se define:

- En la zona de popa, desde el extremo de popa hasta el mamparo de prensaestopas, una separación de cuadernas de 600 mm.
- En la zona de proa, desde el mamparo de colisión hasta el extremo de proa, una separación de 600 mm.
- Una separación de 670 mm. en el resto del buque.

## SITUACIÓN DE LOS MAMPAROS

De acuerdo con el reglamento Bureau Veritas, Part B, Ch2, Sec 1 apartado 2, todos los buques deberán de tener como mínimo los siguientes mamparos estancos:

- Mamparo de colisión.
- Mamparo de pique de popa.
- Mamparo estanco a proa de la cámara de máquinas.

### Mamparo de colisión

El cálculo del mamparo de colisión se ha hecho de acuerdo con el convenio SOLAS, Parte B – Regla 10. Acorde a esta regla, para buques con bulbo, el mamparo de colisión se situará en torno a un punto de referencia que se corresponderá con el menor de los siguientes:

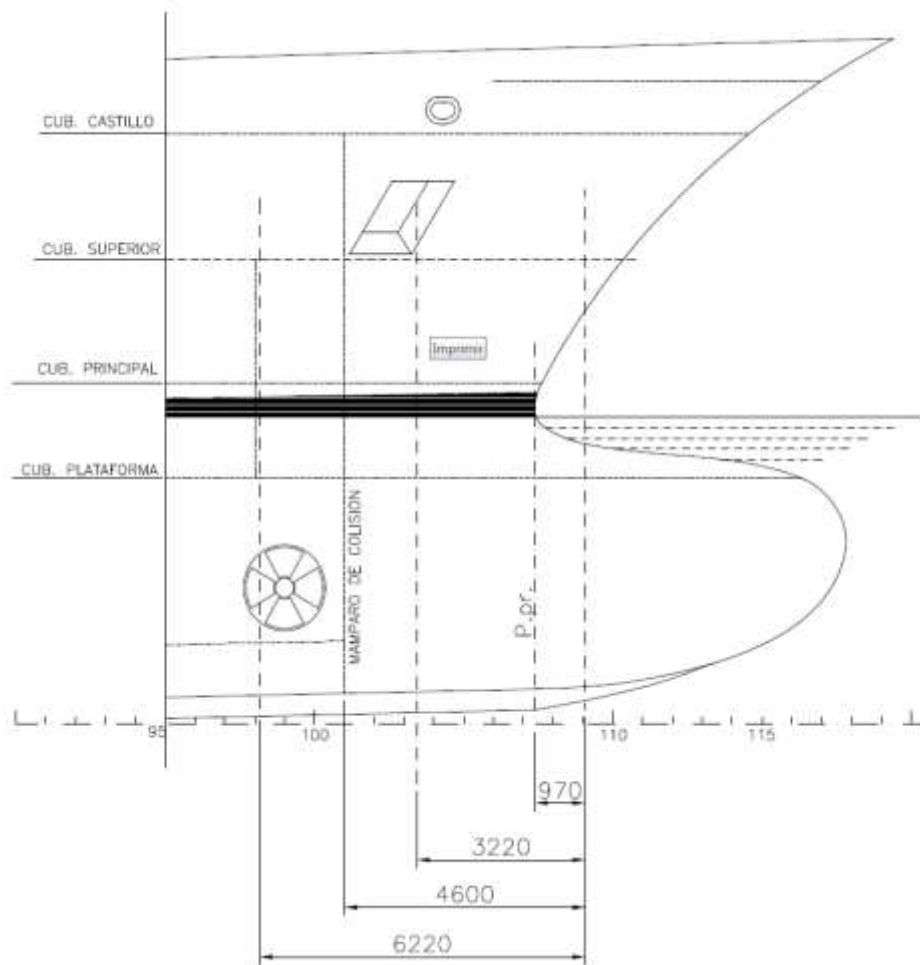
- Mitad de la eslora a proa de la Ppr. En este caso  $5,95 / 2 = 2,975$  m.
- 1,5 % de la eslora.  $64,45 \cdot 0,015 = 0,97$  m.
- 3 m.

El punto de referencia estará situado 0,97 metros a proa de la perpendicular de proa.

Para buques de este tipo el convenio fija el mamparo de colisión en un punto a popa del punto de referencia obtenido anteriormente, comprendido entre:

- 5% de la eslora: 3,22 m.
- 3 + 5% de la eslora:  $3 + 3,22 = 6,22$  m.

Acorde a esto, se ha fijado el mamparo de colisión de proa a 4,60 metros a popa del punto de referencia; o lo que es lo mismo, a una distancia de 3,63 metros a popa de la perpendicular de proa.



### Mamparo de pique de popa

El mamparo del pique de popa se ha situado a una distancia de 5,40 m. de la perpendicular de Pp., de acuerdo a las necesidades de espacio y distancia de la cámara de máquinas al codaste, y según las necesidades de capacidad de los distintos tanques (consumos, lastre).

### Mamparo de cámara de máquinas

La longitud de la cámara de máquinas se ha determinado a partir de las dimensiones del motor principal que se ha seleccionado en el Cuaderno 6: "Predicción de potencia propulsora y diseño de propulsor y timón". El motor con el reductor acoplado, mide alrededor de 8,50 m. de longitud y tomando un margen de 4 m., se ha optado por una longitud de C.M. de 12,50 m.



## CUBIERTAS

### Cubierta principal, superior y de castillo

El buque de proyecto cuenta con dos cubiertas que se extienden de popa a proa: la cubierta principal (situada 6,50 metros sobre línea de base), y la cubierta superior (situada 8,90 metros sobre línea de base). La cubierta de francobordo se corresponde con la cubierta principal.

Por otra parte, se dispone de una cubierta que empieza en la zona central del buque y se extiende hasta proa: la cubierta de castillo.

### Doble fondo

La altura del doble fondo en el buque de proyecto es de un metro.

En este caso, la sociedad de clasificación Bureau Veritas, en la Parte B, Capítulo 4, Sección 4; establece como requisito mínimo una altura de 0,7 metros de cubierta de doble fondo. Además, este espacio debe de ser accesible en cualquier punto del buque.

## CAPACIDADES DE TANQUES REQUERIDAS

### GAS OIL

Los principales consumidores de gas oil a bordo son el motor principal y los grupos generadores.

Los datos de partida a la hora de calcular las capacidades necesarias para el buque de proyecto se incluyen en las siguientes tablas:

Motor Principal	
Consumo Motor	<i>180 g/kWh</i>
Autonomía	<i>22 días (528 horas)</i>
Potencia del motor (BkW)	<i>4500 kW · 0,85</i>

Márgenes	10% autonomía
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Tabla 2. IMPUTS CAPACIDADES DEL MOTOR PRINCIPAL.

Grupos Generadores	
Consumo Motor	205,1 g/kWh
Autonomía	22 días (528 horas)
	10% maniobra (825,95 kW)
	50% navegación normal (681,86 kW)
	30% pesca y congelación (1471,17 kW)
	10% puerto (588,70 kW)
Márgenes	20 % autonomía

Tabla 3. IMPUTS CAPACIDADES DE LOS GRUPOS GENERADORES.

El consumo del motor principal será el siguiente:

$$\text{Cons}(MP) = 1,1 \cdot 180 \cdot 528 \cdot 4500 \cdot 0,85 \cdot 10^{-6} = 399,88 \text{ tn}$$

$$\text{Cons}(DDGG) = 1,2 \cdot 205,1 \cdot 528 \cdot 10^{-6} (0,1 \cdot 825,95 + 0,5 \cdot 681,86 + 0,3 \cdot 1471,17 + 0,1 \cdot 588,70) = 120,04 \text{ tn}$$

El cálculo de la capacidad de gas oil necesaria para los diésel generadores es conservador, ya que además de aplicar un margen de autonomía, no se ha contemplado la opción de generar electricidad empleando el alternador de cola.

Finalmente, la capacidad aproximada de gas oil será de 520 toneladas. Tomando una densidad de gas oil igual a 890 kg/m<sup>3</sup>, se obtiene un volumen necesario de 584,27 m<sup>3</sup>.

Dentro de los tanques de gas oil, se diferencian tres tipos: los tanques de almacén, el tanque de sedimentación y el de uso diario.

El tanque de sedimentación se dimensionará empleando la Project Guide del motor. Los requerimientos que se exponen en ella es que deberá tener tal capacidad que será capaz de alimentar la planta al máximo consumo durante 24 horas. De este modo el peso y volumen necesarios para este tanque son los siguientes:

$$Ptqsed = 4500 \cdot 180 \cdot 24 + 1471,17 \cdot 205,1 \cdot 24 = 26,68 \text{ tn.}$$

$$Vtqsed = \left( \frac{890}{26680} \right)^{-1} = 29,97 \text{ m}^3$$

El tanque de uso diario se dimensionará de igual forma, empleando la Project Guide. Para este tanque los requisitos son que deberá satisfacer las necesidades de gas oil durante 8 horas al consumo máximo. Se dispondrán dos tanques de uso diario.

$$Ptqud = 4500 \cdot 180 \cdot 8 + 1471,17 \cdot 205,1 \cdot 8 = 8,89 \text{ tn.}$$

$$Vtqsed = \left( \frac{890}{889} \right)^{-1} = 9,98 \text{ m}^3$$

Por último, los tanques de almacén deberán de ser tales que sean capaces de cubrir las necesidades requeridas de consumo de gas oil para la autonomía dada.

## ACEITE

La Project Guide del motor, en el apartado Technical Data, dimensiona la capacidad de aceite en 2,3 m<sup>3</sup>.

De forma paralela, y empleando la misma Project Guide, se conoce que el consumo de aceite a plena carga es de 0,35 g/kWh. La densidad del aceite se supone 890 kg/m<sup>3</sup>.

$$Ptqac = 0,35 \cdot 4500 \cdot 528 = 0,832 \text{ tn}$$

$$Vtqac = \left( \frac{890}{832} \right)^{-1} = 0,93 \text{ m}^3$$

## AGUA DULCE

Para el cálculo de capacidad de agua dulce, se empleará la norma UNE-EN ISO 15748-2.

En ella se establece un consumo de 150 litros por persona y día. De este modo el volumen necesario de agua dulce será:

$$Vtqad = 150 \cdot 26 \cdot 22 = 85,8 \text{ tn} = 85,8 \text{ m}^3$$

## AGUAS NEGRAS Y AGUAS GRISES

Para el cálculo de capacidad de aguas grises, se empleará la norma UNE-EN ISO 15748-1.

En ella se establece una generación de aguas grises de 25 litros por persona y día. De este modo el volumen necesario de agua dulce será:

$$V_{tqad} = 25 \cdot 26 \cdot 22 = 14,3 \text{ tn} = 14,3 \text{ m}^3$$

## FANGOS

El Convenio MARPOL, en la Regla 17, ofrece la siguiente expresión para la capacidad del tanque de lodos:

$$V_{tqlod} = k \cdot c \cdot D = 0,005 \cdot 23,64 \cdot 22 = 2,6 \text{ m}^3$$

Donde:

- $k=0,005$
- $c$ =Consumo de gas oil diario
- $D$ =Días de autonomía.

## CAPACIDAD DE CUBAS

La capacidad requerida para el almacenamiento de las capturas abordo viene dada por la RPA del proyecto.

De este modo se define una capacidad de cubas requerida de 1725 m<sup>3</sup>, para albergar 1200 toneladas de atún.

Para el cálculo de los volúmenes de las cubas se tendrá en cuenta lo siguiente:

- El factor de estiba del atún será de 0,70 tn/m<sup>3</sup>.
- El volumen efectivo de las cubas será de un 85%, teniendo en cuenta el aislamiento.

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## DISEÑO DEL COMPARTIMENTADO

### DEFINICIÓN DE TANQUES

En la tabla que sigue se muestran las dimensiones de cada tanque, así como el de las cubas de carga.

La permeabilidad empleada es de 0,98 para tanques de carga líquida y de 0,85 para las cubas, descontando así el volumen perdido por aislamiento y reforzado de la estructura.

Nombre	Tipo	Permeabilidad	Peso específico	Fluido	Aft	Fore	F. Port	F. Stbd.	F. Top	F. Bott.	A. Port	A. Stbd.	A. Top	A. Bott.
Tank001 GO BR	Tank	98	0,89	Gasoil	-4,599	1,2	-10	0	6,5	0	DITTO	DITTO	DITTO	DITTO
Tank001 GO BR	Linked Tank	98	0,89	Gasoil	-4,599	-0,6	-10	-1,8	10	6,5	DITTO	DITTO	DITTO	DITTO
Tank001 GO BR	Linked Tank	98	0,89	Gasoil	-4,599	-1,2	-1,8	0	10	6,5	DITTO	DITTO	DITTO	DITTO
Tank001 GO ER	Tank	98	0,89	Gasoil	-4,599	1,2	0	10	6,5	0	DITTO	DITTO	DITTO	DITTO
Tank001 GO ER	Linked Tank	98	0,89	Gasoil	-4,599	-0,6	1,8	10	10	6,5	DITTO	DITTO	DITTO	DITTO
Tank001 GO ER	Linked Tank	98	0,89	Gasoil	-4,599	-1,2	0	1,8	10	6,5	DITTO	DITTO	DITTO	DITTO
Tank002 GO BR	Tank	98	0,89	Gasoil	1,2	5,4	-10	-1,8	6,5	4	DITTO	DITTO	DITTO	DITTO
Tank002 GO C (SED)	Tank	98	0,89	Gasoil	1,2	5,4	-1,8	1,8	6,5	4	DITTO	DITTO	DITTO	DITTO
Tank002 GO ER	Tank	98	0,89	Gasoil	1,2	5,4	1,8	10	6,5	4	DITTO	DITTO	DITTO	DITTO
Tank003 GO BR (UD)	Tank	98	0,89	Gasoil	5,4	7,2	-10	-1,8	6,5	4	DITTO	DITTO	DITTO	DITTO
Tank003 GO ER (UD)	Tank	98	0,89	Gasoil	5,4	7,2	1,8	10	6,5	4	DITTO	DITTO	DITTO	DITTO
Tank001 AD	Tank	98	1	Fresh Water	9,6	14,4	-10	-1,8	3,3	-10	DITTO	DITTO	DITTO	DITTO
Tank002 AD	Tank	98	1	Fresh Water	14,4	17,4	-10	-1,8	3,3	-10	DITTO	DITTO	DITTO	DITTO
Tank001 Aceite MP	Tank	98	0,89	Lube Oil	16,2	17,4	1,8	10	3,3	-10	DITTO	DITTO	DITTO	DITTO
Tank002 Aceite MMAA	Tank	98	0,89	Lube Oil	15,6	16,2	1,8	10	3,3	-10	DITTO	DITTO	DITTO	DITTO
Tank003 Aceite Reductora	Tank	98	0,89	Lube Oil	15	15,6	1,8	10	3,3	-10	DITTO	DITTO	DITTO	DITTO
Tank009 Reboses GO	Tank	98	0,89	Gasoil	5,4	9,6	-10	10	0,75	-10	DITTO	DITTO	DITTO	DITTO
Tank001 Aguas Sucias	Tank	98	1	Aguas Sucias	9,6	14,4	1,8	10	3,3	-10	DITTO	DITTO	DITTO	DITTO
Tank001 Fangos/Lodos	Tank	98	1	Lodos	14,4	15	1,8	10	3,3	-10	DITTO	DITTO	DITTO	DITTO

Nombre	Tipo	Permeabilidad	Peso específico	Fluido	Aft	Fore	F. Port	F. Stbd.	F. Top	F. Bott.	A. Port	A. Stbd.	A. Top	A. Bott.
Tank004 GO DF BR	Tank	98	0,89	Gasoil	17,4	29,46	-10	0	0,9	-10	DITTO	DITTO	0,65	DITTO
Tank004 GO DF ER	Tank	98	0,89	Gasoil	17,4	29,46	0	10	0,9	-10	DITTO	DITTO	0,65	DITTO
Tank005 GO DF BR	Tank	98	0,89	Gasoil	29,46	41,52	-10	0	1,27	-10	DITTO	DITTO	0,9	DITTO
Tank005 GO DF ER	Tank	98	0,89	Gasoil	29,46	41,52	0	10	1,27	-10	DITTO	DITTO	0,9	DITTO
Tank006 GO DF BR	Tank	98	0,89	Gasoil	41,52	49,56	-10	0	1,45	-10	DITTO	DITTO	1,27	DITTO
Tank006 GO DF ER	Tank	98	0,89	Gasoil	41,52	49,56	0	10	1,45	-10	DITTO	DITTO	1,27	DITTO
Cuba 1 Br	Tank	85	0,70	Atún	17,4	21,42	-10	-0,7	3,44	0,74	DITTO	DITTO	DITTO	0,65
Cuba 1 Br	Linked Tank	85	0,70	Atún	17,4	21,42	-10	0	6,5	3,44	DITTO	DITTO	DITTO	DITTO
Cuba 1 Er	Tank	85	0,70	Atún	17,4	21,42	0,7	10	3,44	0,74	DITTO	DITTO	DITTO	0,65
Cuba 1 Er	Linked Tank	85	0,70	Atún	17,4	21,42	0	10	6,5	3,44	DITTO	DITTO	DITTO	DITTO
Cuba 2 Br	Tank	85	0,70	Atún	21,42	25,44	-10	-0,7	3,44	0,82	DITTO	DITTO	DITTO	0,74
Cuba 2 Br	Linked Tank	85	0,70	Atún	21,42	25,44	-10	0	6,5	3,44	DITTO	DITTO	DITTO	DITTO
Cuba 2 Er	Tank	85	0,70	Atún	21,42	25,44	0,7	10	3,44	0,82	DITTO	DITTO	DITTO	0,74
Cuba 2 Er	Linked Tank	85	0,70	Atún	21,42	25,44	0	10	6,5	3,44	DITTO	DITTO	DITTO	DITTO
Cuba 3 Br	Tank	85	0,70	Atún	25,44	29,46	-10	-0,7	3,44	0,9	DITTO	DITTO	DITTO	0,82
Cuba 3 Br	Linked Tank	85	0,70	Atún	25,44	29,46	-10	0	6,5	3,44	DITTO	DITTO	DITTO	DITTO
Cuba 3 Er	Tank	85	0,70	Atún	25,44	29,46	0,7	10	3,44	0,9	DITTO	DITTO	DITTO	0,82
Cuba 3 Er	Linked Tank	85	0,70	Atún	25,44	29,46	0	10	6,5	3,44	DITTO	DITTO	DITTO	DITTO
Cuba 4 Br	Tank	85	0,70	Atún	29,46	33,48	-10	-0,7	3,44	1,03	DITTO	DITTO	DITTO	0,9
Cuba 4 Br	Linked Tank	85	0,70	Atún	29,46	33,48	-10	0	6,5	3,44	DITTO	DITTO	DITTO	DITTO
Cuba 4 Er	Tank	85	0,70	Atún	29,46	33,48	0,7	10	3,44	1,03	DITTO	DITTO	DITTO	0,9
Cuba 4 Er	Linked Tank	85	0,70	Atún	29,46	33,48	0	10	6,5	3,44	DITTO	DITTO	DITTO	DITTO



TRABAJO FIN DE MASTER  
CUADERNO 4

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Nombre	Tipo	Permeabilidad	Peso específico	Fluido	Aft	Fore	F. Port	F. Stbd.	F. Top	F. Bott.	A. Port	A. Stbd.	A. Top	A. Bott.
Cuba 5 Br	Tank	85	0,70	Atún	33,48	37,5	-10	-0,7	3,44	1,15	DITTO	DITTO	DITTO	1,03
Cuba 5 Br	Linked Tank	85	0,70	Atún	33,48	37,5	-10	0	6,5	3,44	DITTO	DITTO	DITTO	DITTO
Cuba 5 Er	Tank	85	0,70	Atún	33,48	37,5	0,7	10	3,44	1,15	DITTO	DITTO	DITTO	1,03
Cuba 5 Er	Linked Tank	85	0,70	Atún	33,48	37,5	0	10	6,5	3,44	DITTO	DITTO	DITTO	DITTO
Cuba 6 Br	Tank	85	0,70	Atún	37,5	41,52	-10	-0,7	3,44	1,27	DITTO	DITTO	DITTO	1,15
Cuba 6 Br	Linked Tank	85	0,70	Atún	37,5	41,52	-10	0	6,5	3,44	DITTO	DITTO	DITTO	DITTO
Cuba 6 Er	Tank	85	0,70	Atún	37,5	41,52	0,7	10	3,44	1,27	DITTO	DITTO	DITTO	1,15
Cuba 6 Er	Linked Tank	85	0,70	Atún	37,5	41,52	0	10	6,5	3,44	DITTO	DITTO	DITTO	DITTO
Cuba 7 Br	Tank	85	0,70	Atún	41,52	45,54	-10	-0,7	3,44	1,38	DITTO	DITTO	DITTO	1,27
Cuba 7 Br	Linked Tank	85	0,70	Atún	41,52	45,54	-10	0	6,5	3,44	DITTO	DITTO	DITTO	DITTO
Cuba 7 Er	Tank	85	0,70	Atún	41,52	45,54	0,7	10	3,44	1,38	DITTO	DITTO	DITTO	1,27
Cuba 7 Er	Linked Tank	85	0,70	Atún	41,52	45,54	0	10	6,5	3,44	DITTO	DITTO	DITTO	DITTO
Cuba 8 Br	Tank	85	0,70	Atún	45,54	49,56	-10	-0,7	3,44	1,45	DITTO	DITTO	DITTO	1,38
Cuba 8 Br	Linked Tank	85	0,70	Atún	45,54	49,56	-10	0	6,5	3,44	DITTO	DITTO	DITTO	DITTO
Cuba 8 Er	Tank	85	0,70	Atún	45,54	49,56	0,7	10	3,44	1,45	DITTO	DITTO	DITTO	1,38
Cuba 8 Er	Linked Tank	85	0,70	Atún	45,54	49,56	0	10	6,5	3,44	DITTO	DITTO	DITTO	DITTO
Tank007 GO BR	Tank	98	0,89	Gasoil	49,56	53,58	-10	-1,2	6,5	1,57	DITTO	DITTO	DITTO	1,45
Tank007 GO ER	Tank	98	0,89	Gasoil	49,56	53,58	1,2	10	6,5	1,57	DITTO	DITTO	DITTO	1,45
Tank008 GO DF BR	Tank	98	0,89	Gasoil	53,58	61,62	-10	0	1,86	-10	DITTO	DITTO	1,57	-5
Tank008 GO DF ER	Tank	98	0,89	Gasoil	53,58	61,62	0	10	1,86	-10	DITTO	DITTO	1,57	-5
Pique Proa	Tank	98	1,025	Sea Water	61,62	71,862	-10	10	6,5	-5	DITTO	DITTO	DITTO	DITTO
Tanque Estabilizador	Tank	98	1,025	Sea Water	1,2	5,4	-1,8	1,8	7	6,5	DITTO	DITTO	DITTO	DITTO





TRABAJO FIN DE MASTER  
CUADERNO 4

Alumno: Aitor Ramil Vizoso  
Tutor: D. Fernando Lago Rodríguez



Nombre	Tipo	Permeabilidad	Peso específico	Fluido	Aft	Fore	F. Port	F. Stbd.	F. Top	F. Bott.	A. Port	A. Stbd.	A. Top	A. Bott.
Tanque Estabilizador	Linked Tank	98	1,025	Sea Water	1,2	5,4	-10	-1,8	8,9	6,5	DITTO	DITTO	DITTO	DITTO
Tanque Estabilizador	Linked Tank	98	1,025	Sea Water	1,2	5,4	1,8	10	8,9	6,5	DITTO	DITTO	DITTO	DITTO

Tabla 4. DEFINICIÓN DE TANQUES.

## CAPACIDADES Y CDG DE LOS TANQUES

Tanque	Capacidad (m3)	Capacidad (ton)	LCG	TCG	VCG
Tank001 GO BR	39,699	35,333	-1,506	-2,437	6,339
Tank001 GO ER	39,699	35,333	-1,506	2,437	6,339
Tank002 GO BR	24,9	22,161	3,565	-3,525	5,655
Tank002 GO C (SED)	29,527	26,279	3,494	0	5,476
Tank002 GO ER	24,9	22,161	3,565	3,525	5,655
Tank003 GO BR (UD)	16,871	15,016	6,317	-3,74	5,325
Tank003 GO ER (UD)	16,871	15,016	6,317	3,74	5,325
Tank001 AD	18,379	18,379	12,401	-3,236	2,649
Tank002 AD	21,03	21,03	15,987	-3,486	2,341
Tank001 Aceite MP	9,283	8,262	16,813	3,536	2,278
Tank002 Aceite MMAA	4,208	3,745	15,903	3,483	2,346
Tank003 Aceite Reductora	3,919	3,488	15,304	3,446	2,392
Tank009 Reboses GO	1,83	1,629	8,16	0	0,407
Tank001 Aguas Sucias	18,379	18,379	12,401	3,236	2,649
Tank001 Fangos/Lodos	3,621	3,621	14,704	3,405	2,441
Tank004 GO DF BR	38,777	34,512	24,688	-2,107	0,406
Tank004 GO DF ER	38,777	34,512	24,688	2,107	0,406
Tank005 GO DF BR	58,73	52,27	35,42	-2,689	0,655
Tank005 GO DF ER	58,73	52,27	35,42	2,689	0,655
Tank006 GO DF BR	31,174	27,745	45,264	-2,183	0,93
Tank006 GO DF ER	31,174	27,745	45,264	2,183	0,93
Cuba 1 Br	114,137	116,99	19,436	-3,262	3,883
Cuba 1 Er	114,137	116,99	19,436	3,262	3,883
Cuba 2 Br	120,481	123,493	23,44	-3,409	3,793
Cuba 2 Er	120,481	123,493	23,44	3,409	3,793
Cuba 3 Br	122,261	125,317	27,45	-3,484	3,777
Cuba 3 Er	122,261	125,317	27,45	3,484	3,777
Cuba 4 Br	120,859	123,881	31,463	-3,499	3,816
Cuba 4 Er	120,859	123,881	31,463	3,499	3,816
Cuba 5 Br	118,076	121,028	35,481	-3,489	3,878
Cuba 5 Er	118,076	121,028	35,481	3,489	3,878
Cuba 6 Br	114,035	116,886	39,495	-3,441	3,946
Cuba 6 Er	114,035	116,886	39,495	3,441	3,946
Cuba 7 Br	106,723	109,391	43,499	-3,299	4,029
Cuba 7 Er	106,723	109,391	43,499	3,299	4,029
Cuba 8 Br	92,567	94,881	47,482	-2,95	4,123

Tanque	Capacidad (m3)	Capacidad (ton)	LCG	TCG	VCG
Cuba 8 Er	92,567	94,881	47,482	2,95	4,123
Tank007 GO BR	61,739	54,947	51,407	-2,823	4,175
Tank007 GO ER	61,739	54,947	51,407	2,823	4,175
Tank008 GO DF BR	11,699	10,412	57,18	-0,842	1,283
Tank008 GO DF ER	11,699	10,412	57,18	0,842	1,283
Pique Proa	53,553	54,892	64,039	0	3,465
Tanque Estabilizador	87,764	89,958	3,388	0	7,596

Tabla 5. CAPACIDADES Y CDG DE LOS TANQUES.

## COMPROBACIÓN CAPACIDADES

Con el fin de validar esta disposición de tanques, se comprueba que las capacidades obtenidas superan los valores requeridos para la operatividad del buque.

Carga	Capacidad necesaria	Capacidad disponible	Validación
Gas Oil	585	598,535	Si
Agua Dulce	85,8	39,409	*
Aceite Lubricación	2,3	9,283	Si
Lodos/Fangos	2,6	3,621	Si
Atún	1725	1818,278	Si
Aguas Sucias	14,3	18,379	Si

Tabla 6. COMPROBACIÓN DE CAPACIDADES.

\* El buque dispondrá de planta potabilizadora, por lo que la capacidad disponible no deberá satisfacer la demanda total para la autonomía dada.

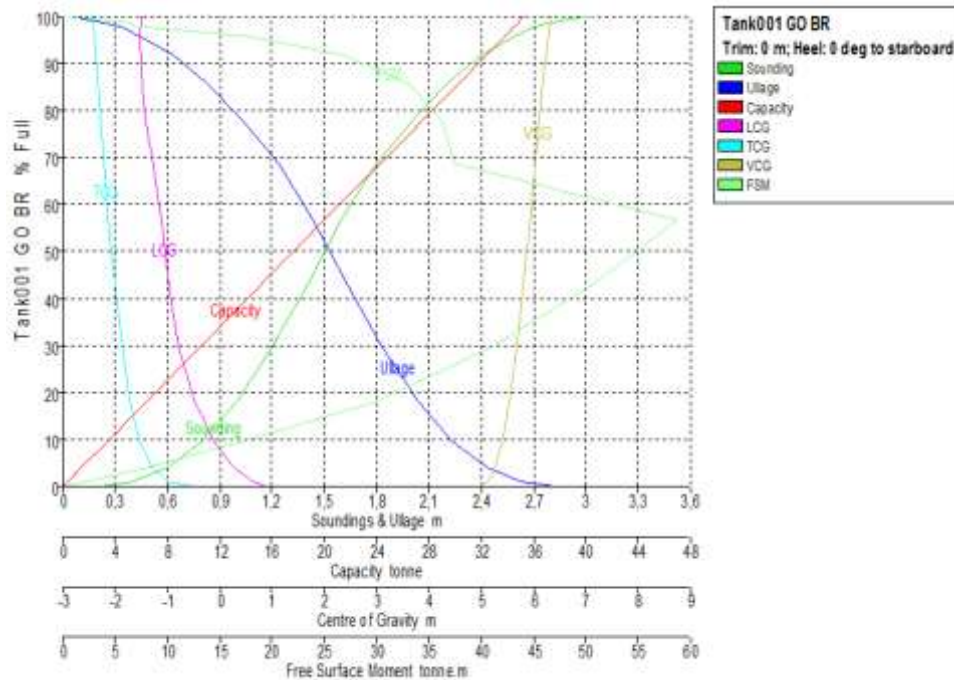
## CALIBRACIÓN DE TANQUES Y CUBAS

### Tank Calibrations - Tank001 GO BR

Fluid Type = Gasoil      Specific gravity = 0,89

Permeability = 98 %

Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



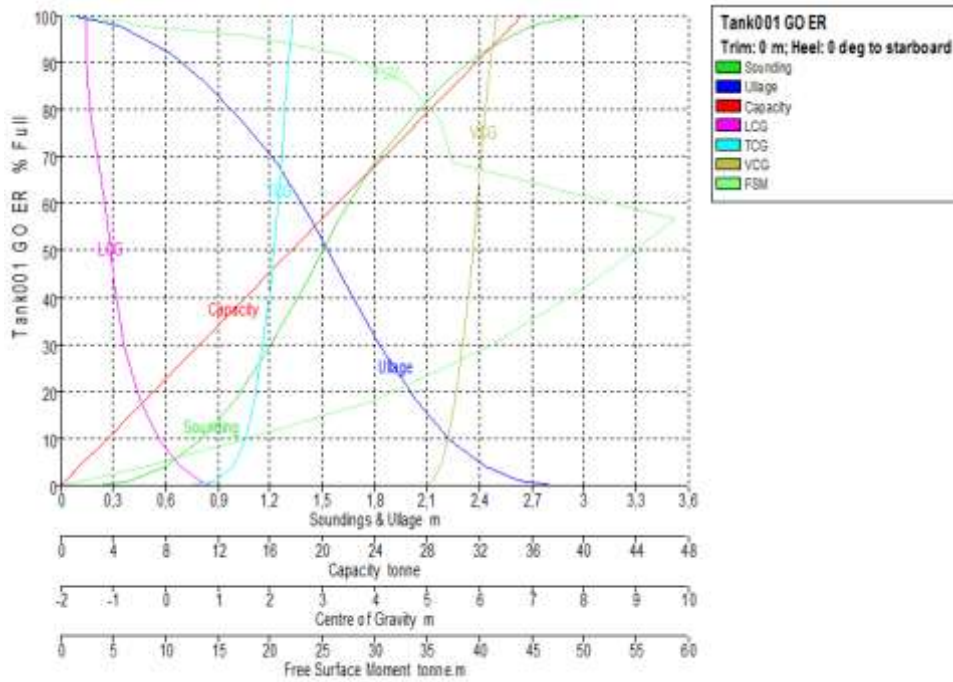
Tank Name	Sounding	Ullage	% Full	Capacity	Capacity	LCG m	TCG m	VCG m	FSM
Tank001 GO BR	3.037	0.000	100.000	39.699	35.333	-1.506	-2.437	6.339	0.000
	3.000	0.037	99.962	39.684	35.319	-1.507	-2.436	6.338	0.491
	2.800	0.237	98.649	39.163	34.855	-1.513	-2.421	6.320	6.656
	2.721	0.316	98.000	38.905	34.626	-1.516	-2.415	6.312	6.597
	2.709	0.328	97.900	38.866	34.591	-1.516	-2.414	6.311	6.588
	2.600	0.437	96.015	38.118	33.925	-1.518	-2.401	6.288	17.458
	2.400	0.637	91.700	36.405	32.400	-1.515	-2.371	6.241	26.831
	2.200	0.837	85.547	33.962	30.226	-1.486	-2.330	6.179	33.150
	2.000	1.037	77.767	30.873	27.477	-1.412	-2.279	6.107	36.268
	1.800	1.237	68.787	27.308	24.304	-1.272	-2.217	6.030	37.450
	1.600	1.437	56.687	22.504	20.029	-1.118	-2.129	5.932	58.666
	1.400	1.637	42.584	16.906	15.046	-0.980	-2.005	5.810	50.456
	1.200	1.837	29.636	11.765	10.471	-0.780	-1.862	5.683	40.885
	1.000	2.037	18.361	7.289	6.488	-0.476	-1.705	5.547	30.097
	0.800	2.237	9.721	3.859	3.435	-0.099	-1.529	5.406	17.150
	0.600	2.437	4.062	1.613	1.435	0.277	-1.300	5.263	8.115
	0.400	2.637	1.028	0.408	0.363	0.652	-0.976	5.118	2.091
	0.397	2.640	1.000	0.397	0.353	0.658	-0.969	5.115	2.038
	0.200	2.837	0.074	0.029	0.026	0.906	-0.441	4.965	0.095
	0.000	3.037	0.000	0.000	0.000	0.907	0.000	4.800	0.000

**Tank Calibrations - Tank001 GO ER**

Fluid Type = Gasoil      Specific gravity = 0,89

Permeability = 98 %

Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



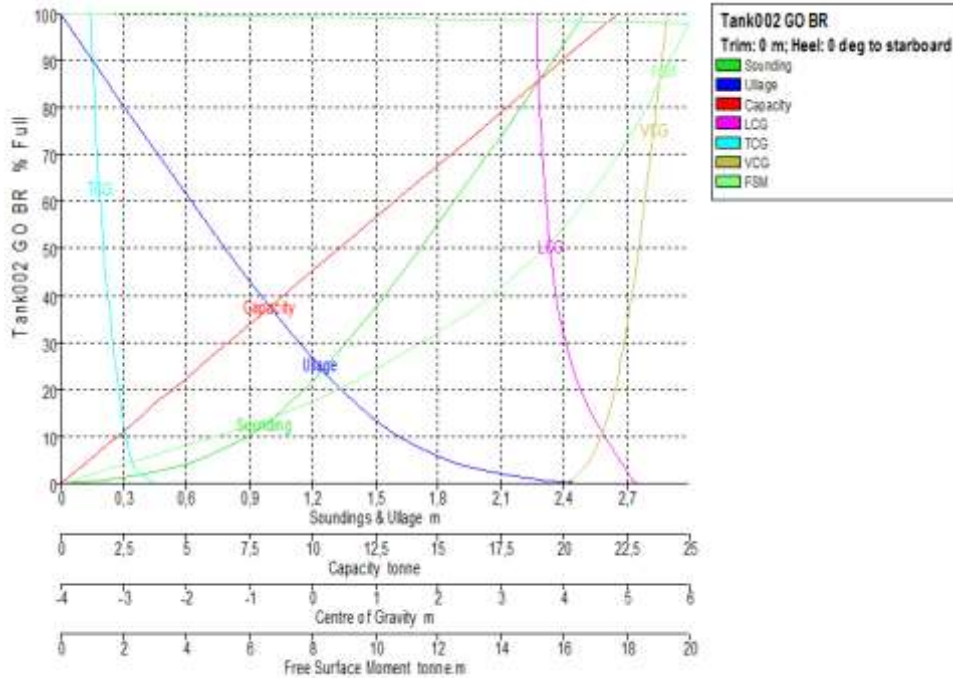
Tank Name	Sounding	Ullage	% Full	Capacity	Capacity	LCG m	TCG m	VCG m	FSM
Tank001 GO ER	3.037	0.000	100.000	39.699	35.333	-1.506	2.437	6.339	0.000
	3.000	0.037	99.962	39.684	35.319	-1.507	2.436	6.338	0.491
	2.800	0.237	98.649	39.163	34.855	-1.513	2.421	6.320	6.656
	2.721	0.316	98.000	38.905	34.626	-1.516	2.415	6.312	6.597
	2.709	0.328	97.900	38.866	34.591	-1.516	2.414	6.311	6.588
	2.600	0.437	96.015	38.118	33.925	-1.518	2.401	6.288	17.458
	2.400	0.637	91.700	36.405	32.400	-1.515	2.371	6.241	26.831
	2.200	0.837	85.547	33.962	30.226	-1.486	2.330	6.179	33.150
	2.000	1.037	77.767	30.873	27.477	-1.412	2.279	6.107	36.268
	1.800	1.237	68.787	27.308	24.304	-1.272	2.217	6.030	37.450
	1.600	1.437	56.687	22.504	20.029	-1.118	2.129	5.932	58.666
	1.400	1.637	42.584	16.906	15.046	-0.980	2.005	5.810	50.456
	1.200	1.837	29.636	11.765	10.471	-0.780	1.862	5.683	40.885
	1.000	2.037	18.361	7.289	6.488	-0.476	1.705	5.547	30.097
	0.800	2.237	9.721	3.859	3.435	-0.099	1.529	5.406	17.150
	0.600	2.437	4.062	1.613	1.435	0.277	1.300	5.263	8.115
	0.400	2.637	1.028	0.408	0.363	0.652	0.976	5.118	2.091
	0.397	2.640	1.000	0.397	0.353	0.658	0.969	5.115	2.038
	0.200	2.837	0.074	0.029	0.026	0.906	0.441	4.965	0.095
	0.000	3.037	0.000	0.000	0.000	0.907	0.000	4.800	0.000

**Tank Calibrations - Tank002 GO BR**

Fluid Type = Gasoil Specific gravity = 0,89

Permeability = 98 %

Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Tank Name	Sounding	Ullage	% Full	Capacity	Capacity	LCG m	TCG m	VCG m	FSM
Tank002 GO BR	2.500	0.000	100.000	24.900	22.161	3.565	-3.525	5.655	0.000
	2.470	0.030	98.000	24.402	21.718	3.570	-3.519	5.638	19.978
	2.468	0.032	97.900	24.377	21.696	3.570	-3.519	5.637	19.971
	2.400	0.100	93.408	23.259	20.700	3.581	-3.505	5.598	19.638
	2.300	0.200	86.871	21.631	19.252	3.599	-3.485	5.542	19.158
	2.200	0.300	80.390	20.017	17.816	3.620	-3.462	5.485	18.661
	2.100	0.400	73.973	18.419	16.393	3.644	-3.438	5.427	18.116
	2.000	0.500	67.625	16.839	14.987	3.671	-3.411	5.369	17.525
	1.900	0.600	61.358	15.278	13.598	3.704	-3.382	5.309	16.858
	1.800	0.700	55.184	13.741	12.229	3.742	-3.349	5.249	16.111
	1.700	0.800	49.120	12.231	10.886	3.788	-3.313	5.187	15.268
	1.600	0.900	43.193	10.755	9.572	3.843	-3.273	5.123	14.310
	1.500	1.000	37.441	9.323	8.297	3.910	-3.230	5.058	13.199
	1.400	1.100	31.917	7.947	7.073	3.991	-3.184	4.990	11.954
	1.300	1.200	26.683	6.644	5.913	4.090	-3.137	4.919	10.647
	1.200	1.300	21.813	5.431	4.834	4.209	-3.092	4.845	9.329
	1.100	1.400	17.398	4.332	3.856	4.351	-3.050	4.767	8.022
	1.000	1.500	13.569	3.379	3.007	4.502	-3.013	4.687	6.495
	0.900	1.600	10.410	2.592	2.307	4.639	-2.974	4.606	5.062
	0.800	1.700	7.851	1.955	1.740	4.762	-2.936	4.526	3.863
	0.700	1.800	5.832	1.452	1.292	4.863	-2.896	4.448	2.873
	0.600	1.900	4.277	1.065	0.948	4.938	-2.851	4.374	2.052
	0.500	2.000	3.079	0.767	0.682	4.987	-2.793	4.305	1.414
	0.400	2.100	2.105	0.524	0.466	5.034	-2.737	4.237	1.045
	0.300	2.200	1.358	0.338	0.301	5.066	-2.666	4.174	0.622
	0.242	2.258	1.000	0.249	0.222	5.080	-2.617	4.139	0.499
	0.200	2.300	0.765	0.191	0.170	5.092	-2.584	4.113	0.417
	0.100	2.400	0.305	0.076	0.068	5.134	-2.521	4.054	0.249
	0.000	2.500	0.000	0.000	0.000	5.186	-2.481	4.000	0.000

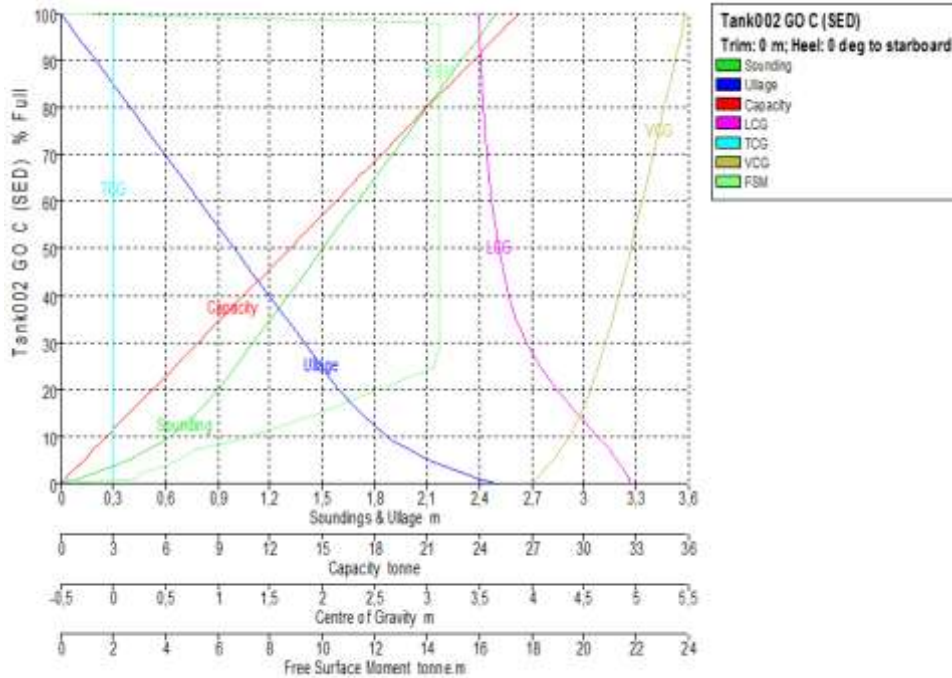


**Tank Calibrations - Tank002 GO C (SED)**

Fluid Type = Gasoil      Specific gravity = 0,89

Permeability = 98 %

Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



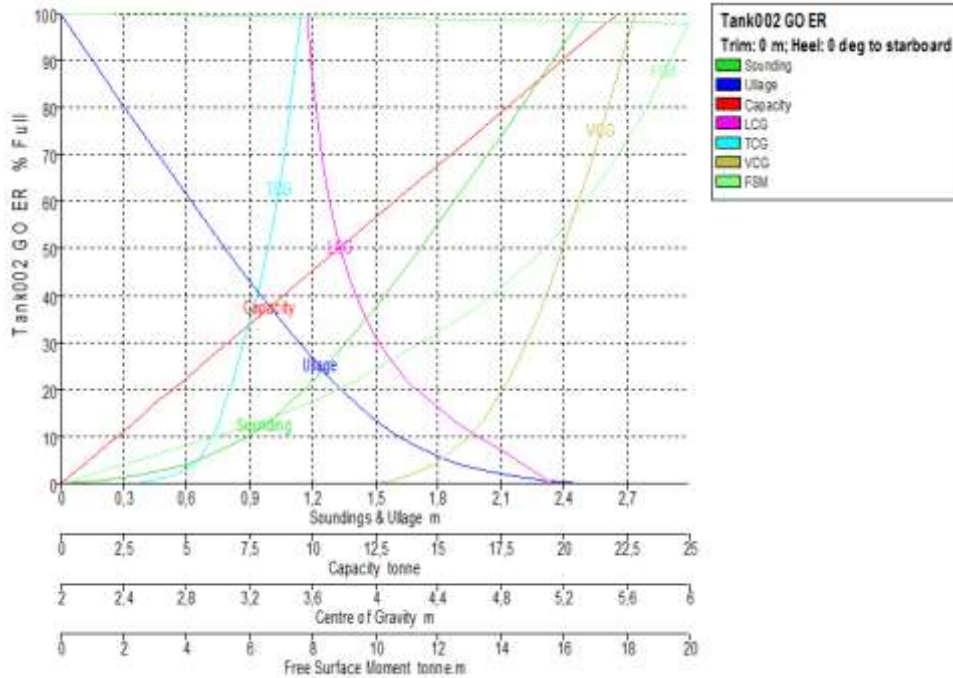
Tank Name	Sounding	Ullage	% Full	Capacity	Capacity	LCG m	TCG m	VCG m	FSM
Tank002 GO C (SED)	2.500	0.000	100.000	29.527	26.279	3.494	0.000	5.476	0.000
	2.460	0.040	98.000	28.937	25.754	3.498	0.000	5.455	14.533
	2.458	0.042	97.900	28.907	25.727	3.499	0.000	5.454	14.533
	2.400	0.100	94.982	28.046	24.961	3.505	0.000	5.424	14.533
	2.300	0.200	89.963	26.564	23.642	3.516	0.000	5.373	14.533
	2.200	0.300	84.945	25.082	22.323	3.529	0.000	5.321	14.533
	2.100	0.400	79.927	23.600	21.004	3.543	0.000	5.269	14.533
	2.000	0.500	74.909	22.119	19.685	3.560	0.000	5.216	14.533
	1.900	0.600	69.890	20.637	18.367	3.578	0.000	5.164	14.533
	1.800	0.700	64.872	19.155	17.048	3.600	0.000	5.111	14.533
	1.700	0.800	59.854	17.673	15.729	3.625	0.000	5.057	14.533
	1.600	0.900	54.836	16.191	14.410	3.654	0.000	5.003	14.533
	1.500	1.000	49.817	14.710	13.092	3.690	0.000	4.948	14.533
	1.400	1.100	44.799	13.228	11.773	3.734	0.000	4.891	14.533
	1.300	1.200	39.781	11.746	10.454	3.789	0.000	4.833	14.533
	1.200	1.300	34.763	10.264	9.135	3.859	0.000	4.773	14.533
	1.100	1.400	29.744	8.783	7.817	3.954	0.000	4.710	14.533
	1.000	1.500	24.729	7.302	6.499	4.086	0.000	4.641	14.298
	0.900	1.600	19.961	5.894	5.246	4.250	0.000	4.567	12.112
	0.800	1.700	15.854	4.681	4.166	4.402	0.000	4.493	10.252
	0.700	1.800	12.357	3.649	3.247	4.539	0.000	4.420	8.506
	0.600	1.900	9.427	2.783	2.477	4.660	0.000	4.348	6.784
	0.500	2.000	7.060	2.085	1.855	4.756	0.000	4.279	5.114
	0.400	2.100	5.219	1.541	1.371	4.814	0.000	4.219	4.519
	0.300	2.200	3.616	1.068	0.950	4.860	0.000	4.160	4.033
	0.200	2.300	2.234	0.660	0.587	4.903	0.000	4.103	3.055
	0.100	2.400	1.060	0.313	0.279	4.934	0.000	4.051	2.892
	0.095	2.405	1.000	0.295	0.263	4.935	0.000	4.048	2.890
	0.000	2.500	0.000	0.000	0.000	4.955	0.000	4.000	0.000

**Tank Calibrations - Tank002 GO ER**

Fluid Type = Gasoil      Specific gravity = 0,89

Permeability = 98 %

Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Tank Name	Sounding	Ullage	% Full	Capacity	Capacity	LCG m	TCG m	VCG m	FSM
Tank002 GO ER	2,500	0,000	100,000	24,900	22,161	3,565	3,525	5,655	0,000
	2,470	0,030	98,000	24,402	21,718	3,570	3,519	5,638	19,978
	2,468	0,032	97,900	24,377	21,696	3,570	3,519	5,637	19,971
	2,400	0,100	93,408	23,259	20,700	3,581	3,505	5,598	19,638
	2,300	0,200	86,871	21,631	19,252	3,599	3,485	5,542	19,158
	2,200	0,300	80,390	20,017	17,816	3,620	3,462	5,485	18,661
	2,100	0,400	73,973	18,419	16,393	3,644	3,438	5,427	18,116
	2,000	0,500	67,625	16,839	14,987	3,671	3,411	5,369	17,525
	1,900	0,600	61,358	15,278	13,598	3,704	3,382	5,309	16,858
	1,800	0,700	55,184	13,741	12,229	3,742	3,349	5,249	16,111
	1,700	0,800	49,120	12,231	10,886	3,788	3,313	5,187	15,268
	1,600	0,900	43,193	10,755	9,572	3,843	3,273	5,123	14,310
	1,500	1,000	37,441	9,323	8,297	3,910	3,230	5,058	13,199
	1,400	1,100	31,917	7,947	7,073	3,991	3,184	4,990	11,954
	1,300	1,200	26,683	6,644	5,913	4,090	3,137	4,919	10,647
	1,200	1,300	21,813	5,431	4,834	4,209	3,092	4,845	9,329
	1,100	1,400	17,398	4,332	3,856	4,351	3,050	4,767	8,022
	1,000	1,500	13,569	3,379	3,007	4,502	3,013	4,687	6,495
	0,900	1,600	10,410	2,592	2,307	4,639	2,974	4,606	5,062
	0,800	1,700	7,851	1,955	1,740	4,762	2,936	4,526	3,863
	0,700	1,800	5,832	1,452	1,292	4,863	2,896	4,448	2,873
	0,600	1,900	4,277	1,065	0,948	4,938	2,851	4,374	2,052
	0,500	2,000	3,079	0,767	0,682	4,987	2,793	4,305	1,414
	0,400	2,100	2,105	0,524	0,466	5,034	2,737	4,237	1,045
	0,300	2,200	1,358	0,338	0,301	5,066	2,666	4,174	0,622
	0,242	2,258	1,000	0,249	0,222	5,080	2,617	4,139	0,499
	0,200	2,300	0,765	0,191	0,170	5,092	2,584	4,113	0,417
	0,100	2,400	0,305	0,076	0,068	5,134	2,521	4,054	0,249
	0,000	2,500	0,000	0,000	0,000	5,186	2,481	4,000	0,000

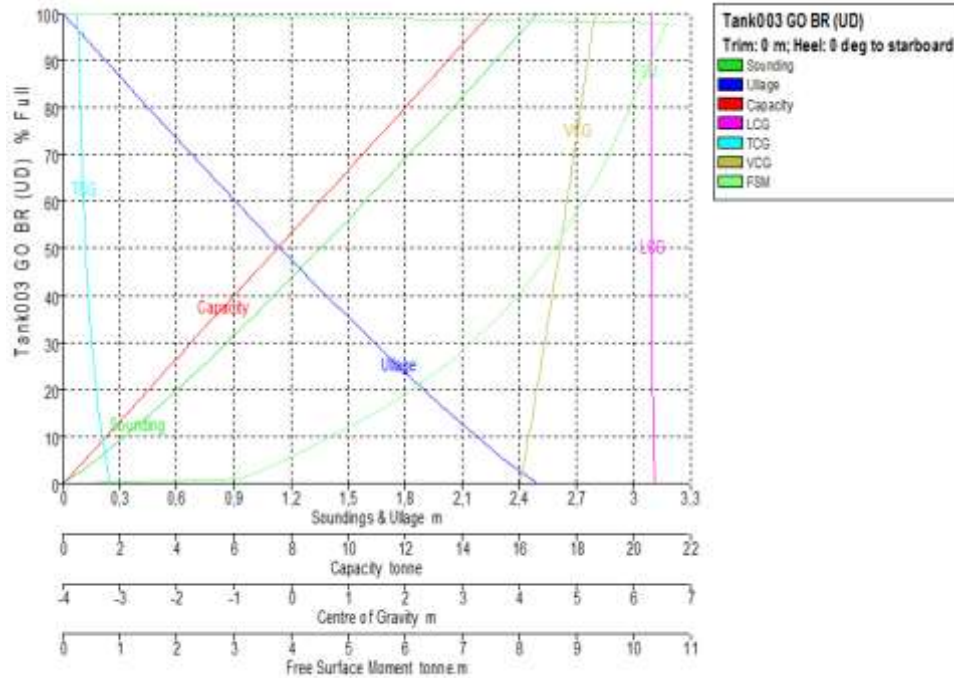


**Tank Calibrations - Tank003 GO BR (UD)**

Fluid Type = Gasoil      Specific gravity = 0,89

Permeability = 98 %

Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



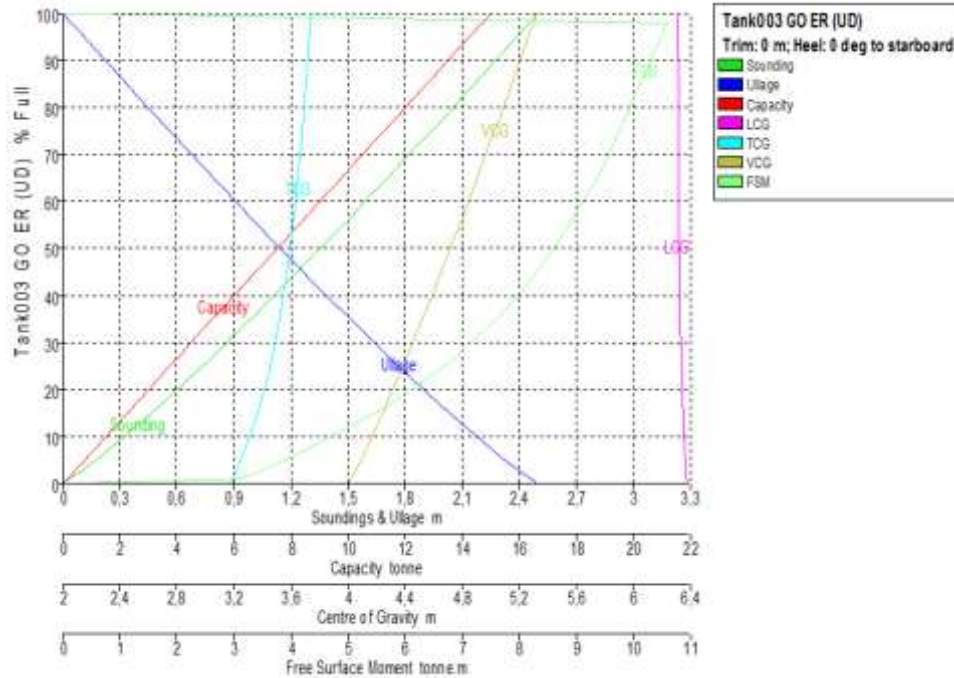
Tank Name	Sounding	Ullage	% Full	Capacity	Capacity	LCG m	TCG m	VCG m	FSM
Tank003 GO BR (UD)	2.500	0.000	100.000	16.871	15.016	6.317	-3.740	5.325	0.000
	2.456	0.044	98.000	16.534	14.715	6.317	-3.735	5.302	10.589
	2.453	0.047	97.900	16.517	14.700	6.317	-3.735	5.300	10.586
	2.400	0.100	95.510	16.114	14.341	6.318	-3.730	5.272	10.510
	2.300	0.200	91.042	15.360	13.670	6.318	-3.720	5.219	10.347
	2.200	0.300	86.597	14.610	13.003	6.319	-3.709	5.166	10.183
	2.100	0.400	82.176	13.864	12.339	6.319	-3.698	5.113	10.022
	2.000	0.500	77.778	13.122	11.679	6.320	-3.687	5.061	9.862
	1.900	0.600	73.404	12.384	11.022	6.321	-3.674	5.008	9.703
	1.800	0.700	69.055	11.651	10.369	6.322	-3.661	4.954	9.543
	1.700	0.800	64.731	10.921	9.720	6.323	-3.648	4.901	9.357
	1.600	0.900	60.438	10.197	9.075	6.324	-3.633	4.848	9.144
	1.500	1.000	56.181	9.478	8.436	6.325	-3.618	4.795	8.920
	1.400	1.100	51.958	8.766	7.802	6.326	-3.601	4.742	8.701
	1.300	1.200	47.771	8.060	7.173	6.328	-3.583	4.688	8.474
	1.200	1.300	43.625	7.360	6.550	6.329	-3.564	4.635	8.223
	1.100	1.400	39.523	6.668	5.935	6.331	-3.544	4.582	7.945
	1.000	1.500	35.472	5.985	5.326	6.333	-3.521	4.528	7.639
	0.900	1.600	31.479	5.311	4.727	6.336	-3.497	4.474	7.306
	0.800	1.700	27.549	4.648	4.137	6.338	-3.471	4.421	6.952
	0.700	1.800	23.693	3.997	3.558	6.342	-3.443	4.367	6.558
	0.600	1.900	19.922	3.361	2.991	6.345	-3.411	4.314	6.110
	0.500	2.000	16.253	2.742	2.440	6.349	-3.378	4.260	5.631
	0.400	2.100	12.698	2.142	1.907	6.353	-3.342	4.207	5.123
	0.300	2.200	9.276	1.565	1.393	6.358	-3.303	4.154	4.578
	0.200	2.300	6.004	1.013	0.902	6.364	-3.261	4.102	4.025
	0.100	2.400	2.904	0.490	0.436	6.371	-3.217	4.051	3.467
	0.035	2.465	1.000	0.169	0.150	6.377	-3.188	4.018	3.106
	0.000	2.500	0.000	0.000	0.000	6.380	-3.171	4.000	0.000

**Tank Calibrations - Tank003 GO ER (UD)**

Fluid Type = Gasoil      Specific gravity = 0,89

Permeability = 98 %

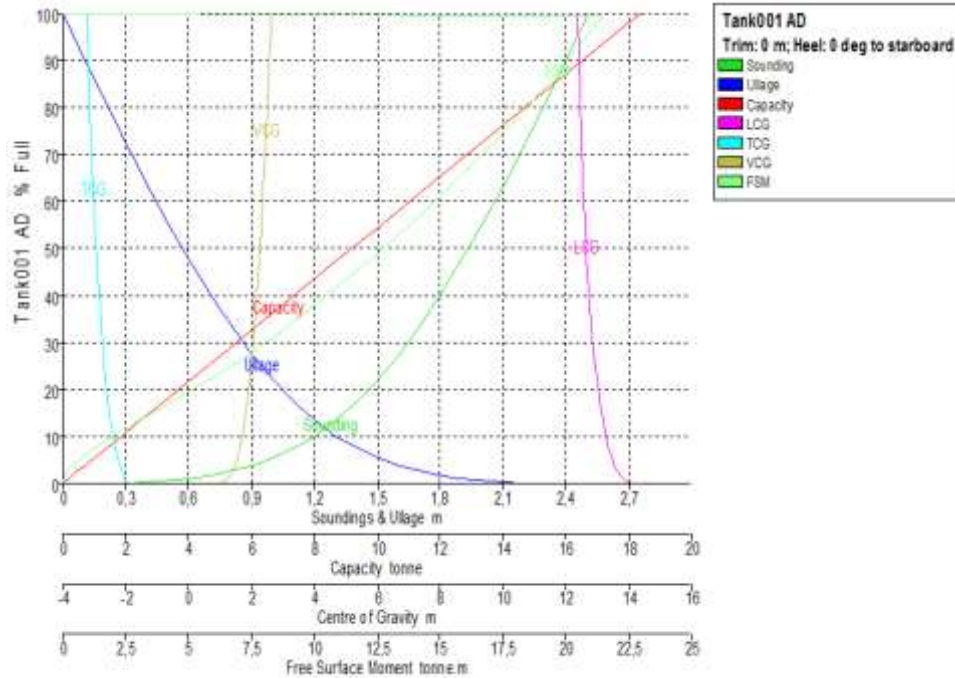
Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Tank Name	Sounding	Ullage	% Full	Capacity	Capacity	LCG m	TCG m	VCG m	FSM
Tank003 GO ER (UD)	2.500	0.000	100.000	16.871	15.016	6.317	3.740	5.325	0.000
	2.456	0.044	98.000	16.534	14.715	6.317	3.735	5.302	10.589
	2.453	0.047	97.900	16.517	14.700	6.317	3.735	5.300	10.586
	2.400	0.100	95.510	16.114	14.341	6.318	3.730	5.272	10.510
	2.300	0.200	91.042	15.360	13.670	6.318	3.720	5.219	10.347
	2.200	0.300	86.597	14.610	13.003	6.319	3.709	5.166	10.183
	2.100	0.400	82.176	13.864	12.339	6.319	3.698	5.113	10.022
	2.000	0.500	77.778	13.122	11.679	6.320	3.687	5.061	9.862
	1.900	0.600	73.404	12.384	11.022	6.321	3.674	5.008	9.703
	1.800	0.700	69.055	11.651	10.369	6.322	3.661	4.954	9.543
	1.700	0.800	64.731	10.921	9.720	6.323	3.648	4.901	9.357
	1.600	0.900	60.438	10.197	9.075	6.324	3.633	4.848	9.144
	1.500	1.000	56.181	9.478	8.436	6.325	3.618	4.795	8.920
	1.400	1.100	51.958	8.766	7.802	6.326	3.601	4.742	8.701
	1.300	1.200	47.771	8.060	7.173	6.328	3.583	4.688	8.474
	1.200	1.300	43.625	7.360	6.550	6.329	3.564	4.635	8.223
	1.100	1.400	39.523	6.668	5.935	6.331	3.544	4.582	7.945
	1.000	1.500	35.472	5.985	5.326	6.333	3.521	4.528	7.639
	0.900	1.600	31.479	5.311	4.727	6.336	3.497	4.474	7.306
	0.800	1.700	27.549	4.648	4.137	6.338	3.471	4.421	6.952
	0.700	1.800	23.693	3.997	3.558	6.342	3.443	4.367	6.558
	0.600	1.900	19.922	3.361	2.991	6.345	3.411	4.314	6.110
	0.500	2.000	16.253	2.742	2.440	6.349	3.378	4.260	5.631
	0.400	2.100	12.698	2.142	1.907	6.353	3.342	4.207	5.123
	0.300	2.200	9.276	1.565	1.393	6.358	3.303	4.154	4.578
	0.200	2.300	6.004	1.013	0.902	6.364	3.261	4.102	4.025
	0.100	2.400	2.904	0.490	0.436	6.371	3.217	4.051	3.467
	0.035	2.465	1.000	0.169	0.150	6.377	3.188	4.018	3.106
	0.000	2.500	0.000	0.000	0.000	6.380	3.171	4.000	0.000

**Tank Calibrations - Tank001 AD**

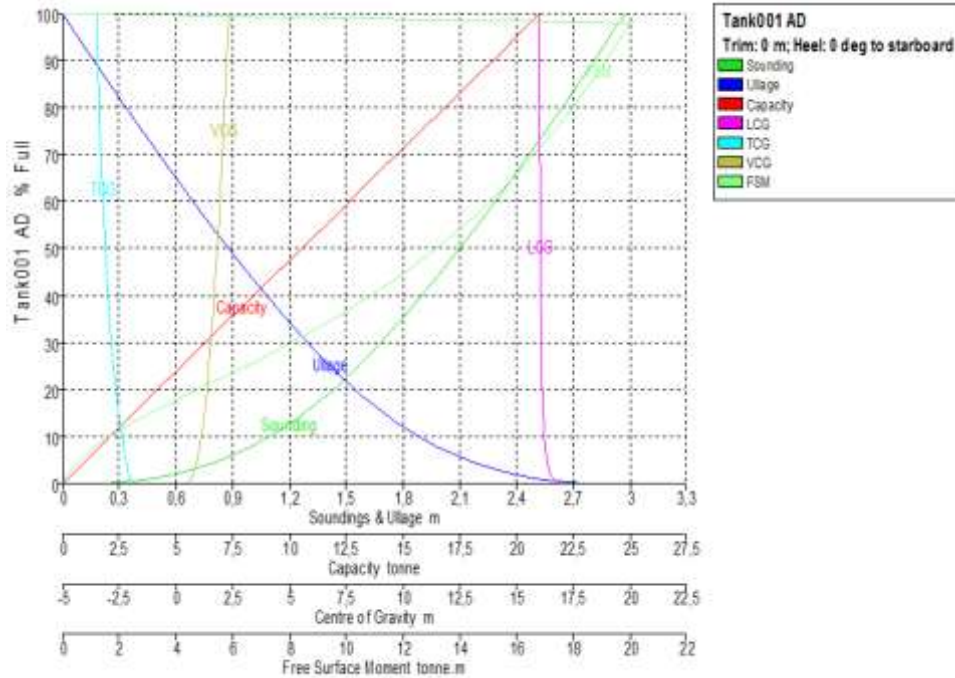
Fluid Type = Fresh Water      Specific gravity = 1  
 Permeability = 98 %  
 Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Tank Name	Sounding	Ullage	% Full	Capacity	Capacity	LCG m	TCG m	VCG m	FSM
Tank001 AD	2.507	0.000	100.000	18.379	18.379	12.401	-3.236	2.649	0.000
	2.500	0.007	99.349	18.259	18.259	12.403	-3.233	2.645	21.468
	2.486	0.021	98.000	18.011	18.011	12.407	-3.227	2.636	21.273
	2.485	0.022	97.900	17.993	17.993	12.408	-3.227	2.636	21.258
	2.400	0.107	89.917	16.526	16.526	12.434	-3.189	2.582	20.063
	2.300	0.207	80.740	14.839	14.839	12.470	-3.142	2.519	18.572
	2.200	0.307	71.851	13.205	13.205	12.510	-3.090	2.454	17.029
	2.100	0.407	63.284	11.631	11.631	12.557	-3.035	2.388	15.439
	2.000	0.507	55.090	10.125	10.125	12.612	-2.976	2.320	13.804
	1.900	0.607	47.324	8.698	8.698	12.675	-2.913	2.250	12.171
	1.800	0.707	40.057	7.362	7.362	12.746	-2.846	2.179	10.534
	1.700	0.807	33.361	6.131	6.131	12.826	-2.775	2.105	8.920
	1.600	0.907	27.305	5.018	5.018	12.912	-2.701	2.030	7.324
	1.500	1.007	21.938	4.032	4.032	13.004	-2.625	1.953	5.764
	1.400	1.107	17.292	3.178	3.178	13.099	-2.546	1.875	4.287
	1.300	1.207	13.371	2.457	2.457	13.192	-2.467	1.796	2.991
	1.200	1.307	10.134	1.862	1.862	13.284	-2.388	1.717	1.972
	1.100	1.407	7.512	1.381	1.381	13.374	-2.313	1.637	1.232
	1.000	1.507	5.430	0.998	0.998	13.466	-2.243	1.557	0.724
	0.900	1.607	3.817	0.701	0.701	13.556	-2.178	1.478	0.408
	0.800	1.707	2.596	0.477	0.477	13.645	-2.119	1.398	0.212
	0.700	1.807	1.693	0.311	0.311	13.733	-2.066	1.320	0.107
	0.600	1.907	1.050	0.193	0.193	13.816	-2.018	1.243	0.049
	0.591	1.916	1.000	0.184	0.184	13.824	-2.013	1.235	0.045
	0.500	2.007	0.603	0.111	0.111	13.904	-1.975	1.166	0.021
	0.400	2.107	0.313	0.058	0.058	13.982	-1.935	1.090	0.008
	0.300	2.207	0.136	0.025	0.025	14.070	-1.900	1.015	0.002
	0.200	2.307	0.043	0.008	0.008	14.159	-1.866	0.941	0.000
	0.100	2.407	0.006	0.001	0.001	14.250	-1.832	0.867	0.000
	0.000	2.507	0.000	0.000	0.000	14.373	-1.800	0.793	0.000

**Tank Calibrations - Tank002 AD**

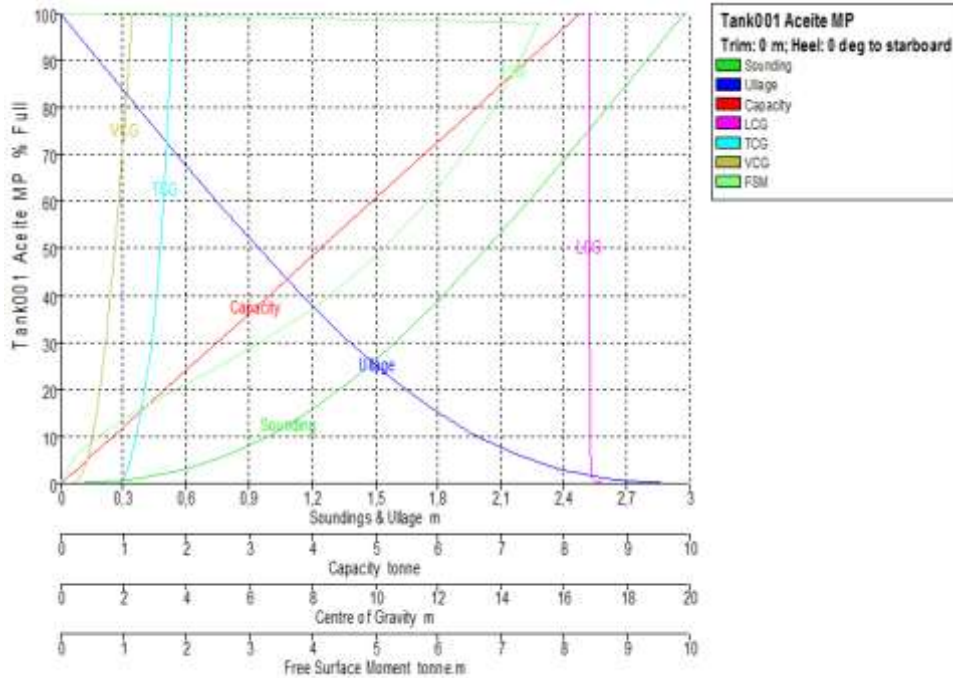
Fluid Type = Fresh Water      Specific gravity = 1  
 Permeability = 98 %  
 Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Tank Name	Sounding	Ullage	% Full	Capacity	Capacity	LCG m	TCG m	VCG m	FSM
Tank001 AD	2.976	0.000	100.000	21.030	21.030	15.987	-3.486	2.341	0.000
	2.943	0.033	98.000	20.609	20.609	15.988	-3.477	2.321	20.049
	2.941	0.035	97.900	20.588	20.588	15.988	-3.476	2.320	20.039
	2.800	0.176	89.461	18.814	18.814	15.994	-3.433	2.238	19.121
	2.600	0.376	77.754	16.352	16.352	16.005	-3.363	2.120	17.713
	2.400	0.576	66.387	13.961	13.961	16.018	-3.282	1.999	16.087
	2.200	0.776	55.434	11.658	11.658	16.035	-3.187	1.875	14.236
	2.000	0.976	45.000	9.463	9.463	16.056	-3.075	1.748	12.117
	1.800	1.176	35.244	7.412	7.412	16.083	-2.942	1.616	9.675
	1.600	1.376	26.408	5.554	5.554	16.118	-2.790	1.478	6.968
	1.400	1.576	18.790	3.952	3.952	16.159	-2.628	1.337	4.367
	1.200	1.776	12.588	2.647	2.647	16.209	-2.469	1.194	2.373
	1.000	1.976	7.813	1.643	1.643	16.272	-2.322	1.050	1.121
	0.800	2.176	4.351	0.915	0.915	16.360	-2.193	0.907	0.455
	0.600	2.376	2.026	0.426	0.426	16.499	-2.084	0.763	0.151
	0.463	2.513	1.000	0.210	0.210	16.646	-2.020	0.664	0.058
	0.400	2.576	0.670	0.141	0.141	16.725	-1.991	0.618	0.034
	0.200	2.776	0.097	0.020	0.020	17.011	-1.900	0.472	0.003
	0.000	2.976	0.000	0.000	0.000	17.383	-1.800	0.324	0.000

**Tank Calibrations - Tank001 Aceite MP**

Fluid Type = Lube Oil      Specific gravity = 0,89  
 Permeability = 98 %  
 Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Tank Name	Sounding	Ullage	% Full	Capacity	Capacity	LCG m	TCG m	VCG m	FSM
Tank001 Aceite MP	2.976	0.000	100.000	9.283	8.262	16.813	3.536	2.278	0.000
	2.940	0.036	98.000	9.097	8.097	16.813	3.527	2.257	7.605
	2.938	0.038	97.900	9.088	8.088	16.813	3.526	2.256	7.602
	2.800	0.176	90.223	8.375	7.454	16.814	3.487	2.176	7.312
	2.600	0.376	79.323	7.363	6.553	16.815	3.423	2.060	6.867
	2.400	0.576	68.683	6.376	5.674	16.817	3.349	1.941	6.329
	2.200	0.776	58.357	5.417	4.821	16.819	3.262	1.821	5.719
	2.000	0.976	48.421	4.495	4.000	16.822	3.160	1.697	5.015
	1.800	1.176	38.987	3.619	3.221	16.825	3.038	1.569	4.187
	1.600	1.376	30.224	2.806	2.497	16.830	2.895	1.436	3.207
	1.400	1.576	22.380	2.078	1.849	16.835	2.734	1.300	2.152
	1.200	1.776	15.704	1.458	1.297	16.842	2.568	1.161	1.239
	1.000	1.976	10.310	0.957	0.852	16.850	2.407	1.021	0.613
	0.800	2.176	6.182	0.574	0.511	16.860	2.259	0.882	0.258
	0.600	2.376	3.211	0.298	0.265	16.877	2.128	0.745	0.089
	0.400	2.576	1.255	0.116	0.104	16.912	2.009	0.610	0.022
	0.364	2.612	1.000	0.093	0.083	16.922	1.988	0.585	0.016
	0.200	2.776	0.214	0.020	0.018	17.030	1.900	0.472	0.002
	0.000	2.976	0.000	0.000	0.000	17.393	1.800	0.324	0.000

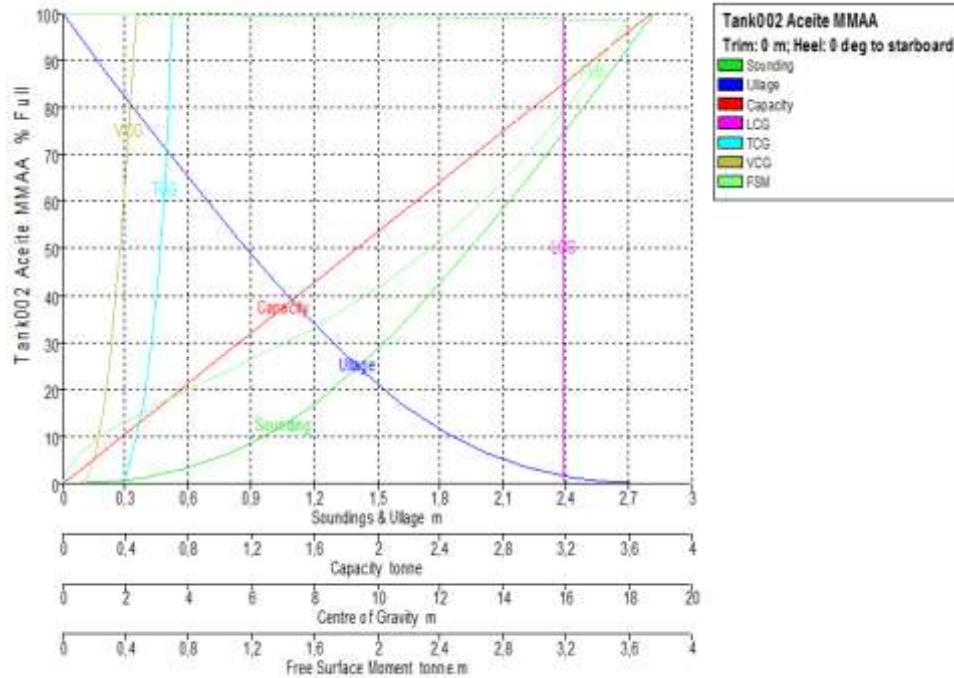


**Tank Calibrations - Tank002 Aceite MMAA**

Fluid Type = Lube Oil      Specific gravity = 0,89

Permeability = 98 %

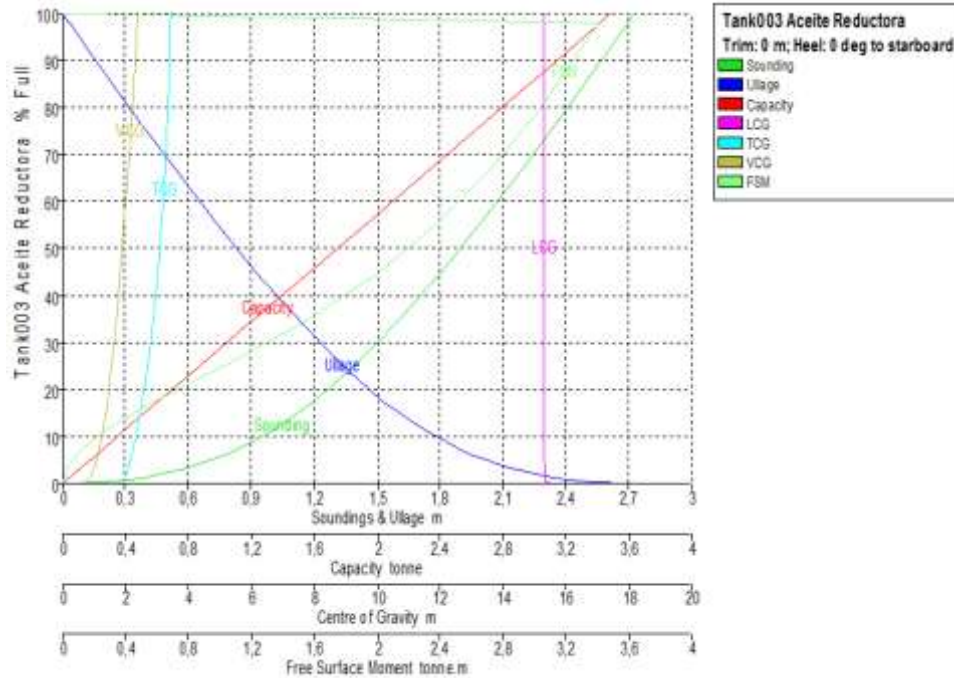
Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Tank Name	Sounding	Ullage	% Full	Capacity	Capacity	LCG m	TCG m	VCG m	FSM
Tank002 Aceite MMAA	2.821	0.000	100.000	4.208	3.745	15.903	3.483	2.346	0.000
	2.800	0.021	98.712	4.153	3.697	15.903	3.477	2.334	3.595
	2.788	0.033	98.000	4.123	3.670	15.903	3.473	2.327	3.583
	2.787	0.035	97.900	4.119	3.666	15.903	3.473	2.326	3.581
	2.600	0.221	86.766	3.651	3.249	15.904	3.413	2.217	3.356
	2.400	0.421	75.107	3.160	2.813	15.904	3.340	2.099	3.093
	2.200	0.621	63.799	2.684	2.389	15.905	3.254	1.979	2.794
	2.000	0.821	52.920	2.227	1.982	15.906	3.153	1.855	2.450
	1.800	1.021	42.582	1.792	1.595	15.906	3.032	1.728	2.049
	1.600	1.221	32.954	1.387	1.234	15.908	2.889	1.596	1.589
	1.400	1.421	24.296	1.022	0.910	15.909	2.724	1.458	1.072
	1.200	1.621	16.927	0.712	0.634	15.911	2.550	1.317	0.602
	1.000	1.821	11.027	0.464	0.413	15.913	2.382	1.175	0.283
	0.800	2.021	6.575	0.277	0.246	15.916	2.231	1.034	0.111
	0.600	2.221	3.425	0.144	0.128	15.921	2.100	0.895	0.036
	0.400	2.421	1.379	0.058	0.052	15.931	1.988	0.759	0.008
	0.347	2.474	1.000	0.042	0.037	15.935	1.960	0.724	0.005
	0.200	2.621	0.269	0.011	0.010	15.963	1.886	0.624	0.001
	0.000	2.821	0.000	0.000	0.000	16.197	1.800	0.479	0.000

**Tank Calibrations - Tank003 Aceite Reductora**

Fluid Type = Lube Oil      Specific gravity = 0,89  
 Permeability = 98 %  
 Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



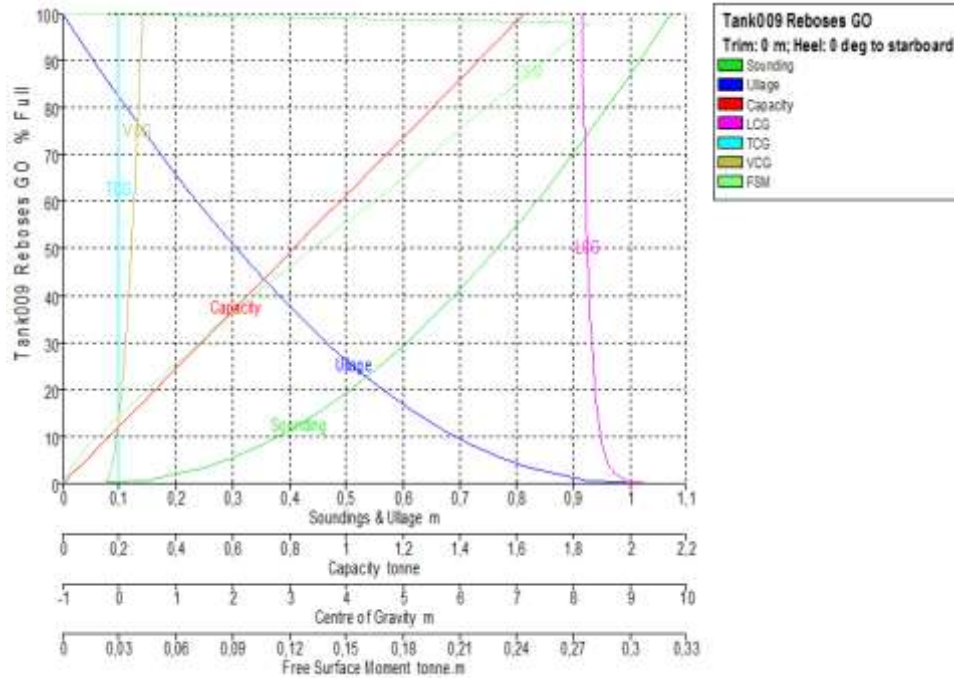
Tank Name	Sounding	Ullage	% Full	Capacity	Capacity	LCG m	TCG m	VCG m	FSM
Tank003 Aceite Reductora	2.728	0.000	100.000	3.919	3.488	15.304	3.446	2.392	0.000
	2.697	0.031	98.000	3.841	3.418	15.304	3.436	2.374	3.408
	2.695	0.033	97.900	3.837	3.415	15.304	3.436	2.373	3.406
	2.600	0.128	91.857	3.600	3.204	15.304	3.405	2.317	3.286
	2.400	0.328	79.430	3.113	2.771	15.304	3.332	2.199	3.028
	2.200	0.528	67.386	2.641	2.350	15.305	3.247	2.079	2.732
	2.000	0.728	55.804	2.187	1.947	15.306	3.146	1.956	2.392
	1.800	0.928	44.800	1.756	1.563	15.307	3.026	1.829	2.002
	1.600	1.128	34.548	1.354	1.205	15.308	2.883	1.697	1.550
	1.400	1.328	25.315	0.992	0.883	15.309	2.716	1.560	1.052
	1.200	1.528	17.461	0.684	0.609	15.312	2.537	1.418	0.584
	1.000	1.728	11.222	0.440	0.391	15.314	2.364	1.275	0.265
	0.800	1.928	6.584	0.258	0.230	15.318	2.211	1.132	0.099
	0.600	2.128	3.363	0.132	0.117	15.323	2.081	0.992	0.030
	0.400	2.328	1.320	0.052	0.046	15.334	1.971	0.854	0.006
	0.355	2.373	1.000	0.039	0.035	15.338	1.949	0.824	0.004
	0.200	2.528	0.247	0.010	0.009	15.371	1.877	0.718	0.001
	0.000	2.728	0.000	0.000	0.000	15.597	1.800	0.572	0.000

**Tank Calibrations - Tank009 Rebores GO**

Fluid Type = Gasoil      Specific gravity = 0,89

Permeability = 98 %

Trim = 0 m (+ve by stern); Heel = 0 deg to starboard

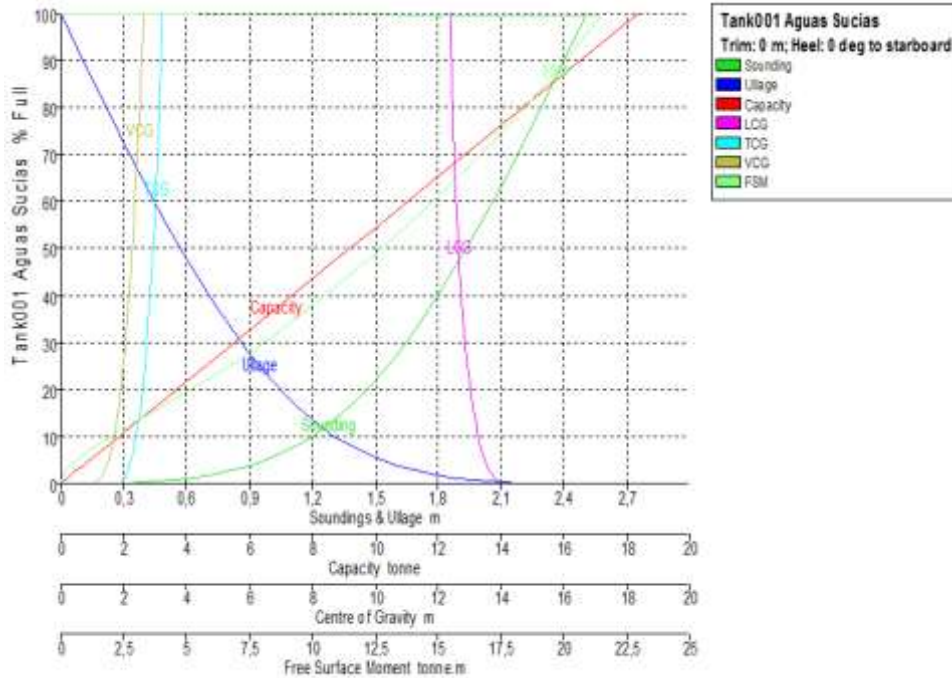


Tank Name	Sounding	Ullage	% Full	Capacity	Capacity	LCG m	TCG m	VCG m	FSM
Tank009 Rebores GO	1,072	0,000	100,000	1,830	1,629	8,160	0,000	0,407	0,000
	1,061	0,011	98,000	1,793	1,596	8,163	0,000	0,400	0,279
	1,061	0,011	97,900	1,792	1,594	8,163	0,000	0,399	0,279
	1,050	0,022	95,950	1,756	1,563	8,166	0,000	0,393	0,273
	1,000	0,072	86,996	1,592	1,417	8,178	0,000	0,361	0,245
	0,950	0,122	78,395	1,435	1,277	8,191	0,000	0,329	0,219
	0,900	0,172	70,159	1,284	1,143	8,206	0,000	0,296	0,194
	0,850	0,222	62,291	1,140	1,014	8,223	0,000	0,264	0,172
	0,800	0,272	54,820	1,003	0,893	8,240	0,000	0,231	0,148
	0,750	0,322	47,774	0,874	0,778	8,260	0,000	0,199	0,125
	0,700	0,372	41,166	0,753	0,670	8,282	0,000	0,166	0,105
	0,650	0,422	35,004	0,641	0,570	8,306	0,000	0,133	0,087
	0,600	0,472	29,298	0,536	0,477	8,334	0,000	0,100	0,070
	0,550	0,522	24,075	0,441	0,392	8,363	0,000	0,066	0,055
	0,500	0,572	19,339	0,354	0,315	8,396	0,000	0,033	0,043
	0,450	0,622	15,103	0,276	0,246	8,431	0,000	-0,001	0,032
	0,400	0,672	11,386	0,208	0,185	8,470	0,000	-0,035	0,022
	0,350	0,722	8,218	0,150	0,134	8,516	0,000	-0,070	0,014
	0,300	0,772	5,594	0,102	0,091	8,572	0,000	-0,104	0,008
	0,250	0,822	3,506	0,064	0,057	8,645	0,000	-0,139	0,004
	0,200	0,872	1,930	0,035	0,031	8,752	0,000	-0,174	0,002
	0,150	0,913	1,000	0,018	0,016	8,899	0,000	-0,204	0,001
	0,100	0,922	0,852	0,016	0,014	8,935	0,000	-0,211	0,001
	0,050	0,972	0,265	0,005	0,004	9,137	0,000	-0,248	0,000
	0,050	1,022	0,036	0,001	0,001	9,346	0,000	-0,285	0,000
	0,000	1,072	0,000	0,000	0,000	9,576	0,000	-0,322	0,000



**Tank Calibrations - Tank001 Aguas Sucias**

Fluid Type = Aguas Sucias      Specific gravity = 1  
 Permeability = 98 %  
 Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



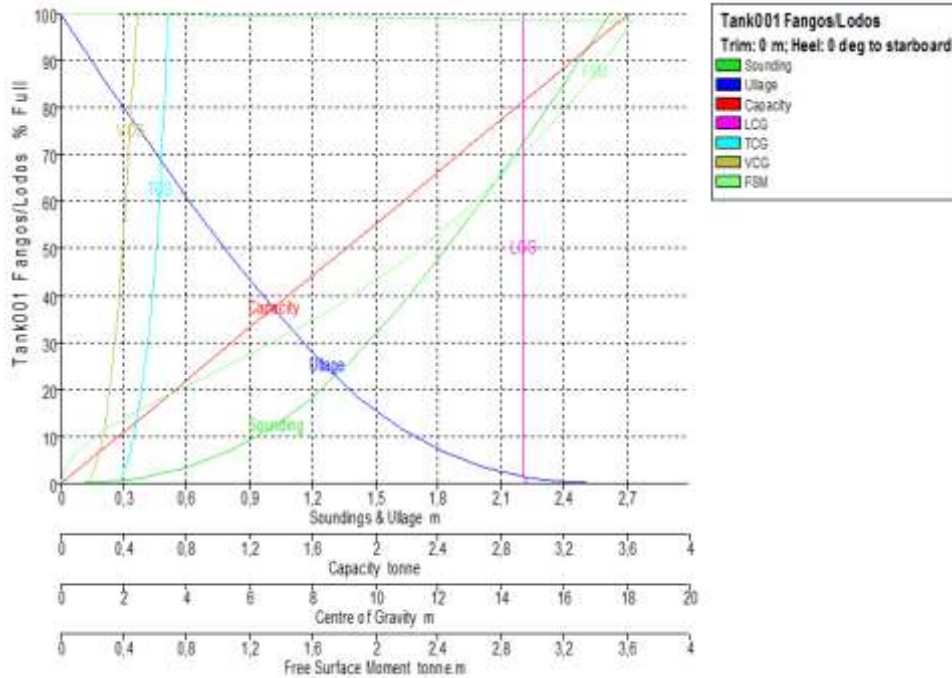
Tank Name	Sounding	Ullage	% Full	Capacity	Capacity	LCG m	TCG m	VCG m	FSM
Tank001 Aguas Sucias	2.507	0.000	100.000	18.379	18.379	12.401	3.236	2.649	0.000
	2.500	0.007	99.349	18.259	18.259	12.403	3.233	2.645	21.468
	2.486	0.021	98.000	18.011	18.011	12.407	3.227	2.636	21.273
	2.485	0.022	97.900	17.993	17.993	12.408	3.227	2.636	21.258
	2.400	0.107	89.917	16.526	16.526	12.434	3.189	2.582	20.063
	2.300	0.207	80.740	14.839	14.839	12.470	3.142	2.519	18.572
	2.200	0.307	71.851	13.205	13.205	12.510	3.090	2.454	17.029
	2.100	0.407	63.284	11.631	11.631	12.557	3.035	2.388	15.439
	2.000	0.507	55.090	10.125	10.125	12.612	2.976	2.320	13.804
	1.900	0.607	47.324	8.698	8.698	12.675	2.913	2.250	12.171
	1.800	0.707	40.057	7.362	7.362	12.746	2.846	2.179	10.534
	1.700	0.807	33.361	6.131	6.131	12.826	2.775	2.105	8.920
	1.600	0.907	27.305	5.018	5.018	12.912	2.701	2.030	7.324
	1.500	1.007	21.938	4.032	4.032	13.004	2.625	1.953	5.764
	1.400	1.107	17.292	3.178	3.178	13.099	2.546	1.875	4.287
	1.300	1.207	13.371	2.457	2.457	13.192	2.467	1.796	2.991
	1.200	1.307	10.134	1.862	1.862	13.284	2.388	1.717	1.972
	1.100	1.407	7.512	1.381	1.381	13.374	2.313	1.637	1.232
	1.000	1.507	5.430	0.998	0.998	13.466	2.243	1.557	0.724
	0.900	1.607	3.817	0.701	0.701	13.556	2.178	1.478	0.408
	0.800	1.707	2.596	0.477	0.477	13.645	2.119	1.398	0.212
	0.700	1.807	1.693	0.311	0.311	13.733	2.066	1.320	0.107
	0.600	1.907	1.050	0.193	0.193	13.816	2.018	1.243	0.049
	0.591	1.916	1.000	0.184	0.184	13.824	2.013	1.235	0.045
	0.500	2.007	0.603	0.111	0.111	13.904	1.975	1.166	0.021
	0.400	2.107	0.313	0.058	0.058	13.982	1.935	1.090	0.008
	0.300	2.207	0.136	0.025	0.025	14.070	1.900	1.015	0.002
	0.200	2.307	0.043	0.008	0.008	14.159	1.866	0.941	0.000
	0.100	2.407	0.006	0.001	0.001	14.250	1.832	0.867	0.000
	0.000	2.507	0.000	0.000	0.000	14.373	1.800	0.793	0.000

### Tank Calibrations - Tank001 Fangos/Lodos

Fluid Type = Specific gravity = 1

Permeability = 98 %

Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



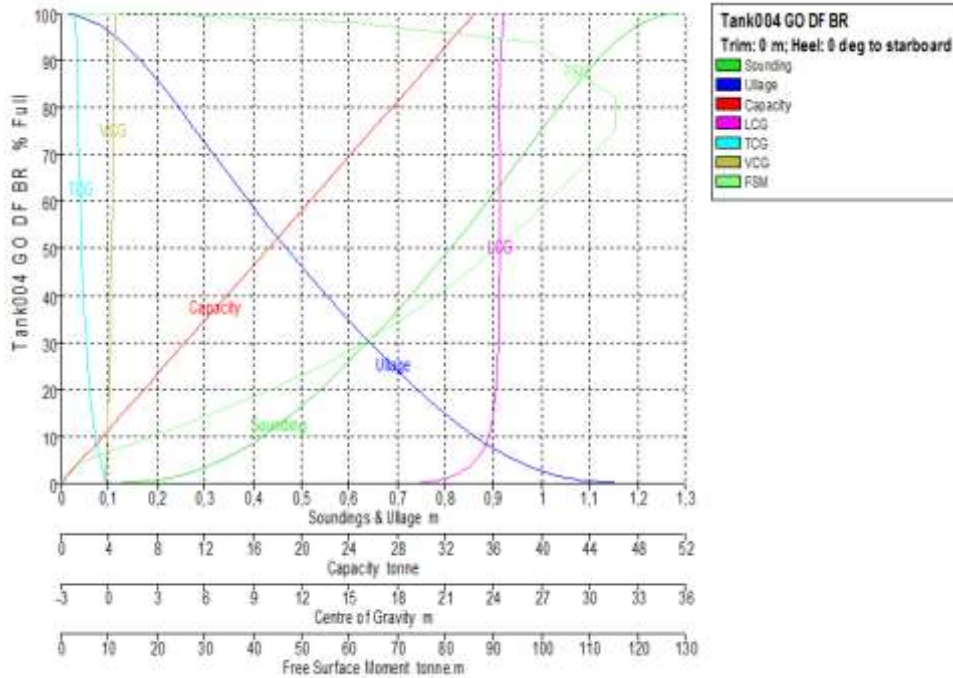
Tank Name	Sounding	Ullage	% Full	Capacity	Capacity	LCG m	TCG m	VCG m	FSM
Tank001 Fangos/Lodos	2,624	0,000	100,000	3,621	3,621	14,704	3,405	2,441	0,000
	2,600	0,024	98,375	3,562	3,562	14,704	3,397	2,427	3,634
	2,594	0,029	98,000	3,548	3,548	14,704	3,395	2,423	3,626
	2,593	0,031	97,900	3,545	3,545	14,704	3,395	2,422	3,624
	2,400	0,224	85,003	3,078	3,078	14,705	3,325	2,309	3,346
	2,200	0,424	72,048	2,609	2,609	14,705	3,240	2,189	3,004
	2,000	0,624	59,598	2,158	2,158	14,706	3,140	2,066	2,624
	1,800	0,824	47,777	1,730	1,730	14,707	3,022	1,939	2,197
	1,600	1,024	36,762	1,331	1,331	14,709	2,879	1,808	1,706
	1,400	1,224	26,836	0,972	0,972	14,711	2,712	1,671	1,164
	1,200	1,424	18,384	0,666	0,666	14,713	2,531	1,529	0,645
	1,000	1,624	11,697	0,424	0,424	14,716	2,355	1,385	0,288
	0,800	1,824	6,766	0,245	0,245	14,719	2,199	1,241	0,104
	0,600	2,024	3,385	0,123	0,123	14,725	2,067	1,100	0,030
	0,400	2,224	1,289	0,047	0,047	14,738	1,959	0,961	0,006
	0,360	2,264	1,000	0,036	0,036	14,742	1,940	0,933	0,004
	0,200	2,424	0,229	0,008	0,008	14,781	1,870	0,823	0,000
	0,000	2,624	0,000	0,000	0,000	14,997	1,800	0,676	0,000

**Tank Calibrations - Tank004 GO DF BR**

Fluid Type = Gasoil      Specific gravity = 0,89

Permeability = 98 %

Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



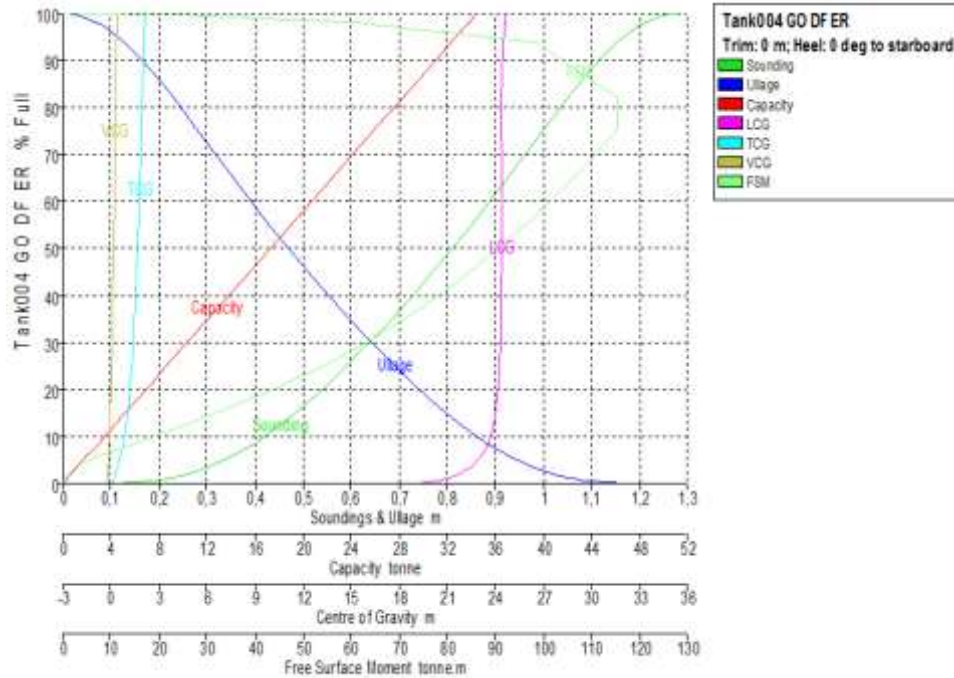
Tank Name	Sounding	Ullage	% Full	Capacity	Capacity	LCG m	TCG m	VCG m	FSM
Tank004 GO DF BR	1.280	0.000	100.000	38.777	34.512	24.688	-2.107	0.406	0.000
	1.250	0.030	99.614	38.628	34.379	24.671	-2.103	0.404	23.994
	1.209	0.071	98.000	38.002	33.822	24.615	-2.086	0.397	64.474
	1.207	0.073	97.900	37.963	33.787	24.612	-2.085	0.396	64.415
	1.200	0.080	97.474	37.798	33.640	24.599	-2.081	0.395	64.165
	1.150	0.130	93.678	36.326	32.330	24.506	-2.044	0.378	98.419
	1.100	0.180	88.387	34.274	30.504	24.424	-1.998	0.357	106.226
	1.050	0.230	82.042	31.814	28.314	24.381	-1.949	0.331	115.371
	1.000	0.280	75.090	29.118	25.915	24.383	-1.901	0.301	115.381
	0.950	0.330	68.237	26.461	23.550	24.388	-1.851	0.272	109.337
	0.900	0.380	61.559	23.871	21.245	24.391	-1.796	0.242	102.795
	0.850	0.430	55.067	21.354	19.005	24.390	-1.736	0.213	96.220
	0.800	0.480	48.776	18.914	16.833	24.385	-1.671	0.183	89.020
	0.750	0.530	42.700	16.558	14.737	24.373	-1.599	0.152	81.751
	0.700	0.580	36.861	14.294	12.722	24.353	-1.519	0.122	73.665
	0.650	0.630	31.283	12.131	10.797	24.319	-1.429	0.091	65.175
	0.600	0.680	26.000	10.082	8.973	24.267	-1.327	0.060	56.004
	0.550	0.730	21.049	8.162	7.265	24.188	-1.212	0.028	45.874
	0.500	0.780	16.479	6.390	5.687	24.068	-1.082	-0.004	35.399
	0.450	0.830	12.349	4.788	4.262	23.884	-0.935	-0.038	24.983
	0.400	0.880	8.725	3.383	3.011	23.598	-0.772	-0.072	15.201
	0.350	0.930	5.687	2.205	1.963	23.144	-0.600	-0.108	7.289
	0.300	0.980	3.329	1.291	1.149	22.429	-0.438	-0.147	2.552
	0.250	1.030	1.736	0.673	0.599	21.526	-0.309	-0.187	0.700
	0.214	1.067	1.000	0.388	0.345	20.865	-0.235	-0.216	0.248
	0.200	1.080	0.797	0.309	0.275	20.615	-0.212	-0.227	0.169
	0.150	1.130	0.306	0.119	0.106	19.771	-0.141	-0.266	0.034
	0.100	1.180	0.083	0.032	0.029	18.967	-0.085	-0.305	0.005
	0.050	1.230	0.010	0.004	0.003	18.204	-0.039	-0.343	0.000
	0.000	1.280	0.000	0.000	0.000	17.468	0.000	-0.380	0.000

**Tank Calibrations - Tank004 GO DF ER**

Fluid Type = Gasoil      Specific gravity = 0,89

Permeability = 98 %

Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



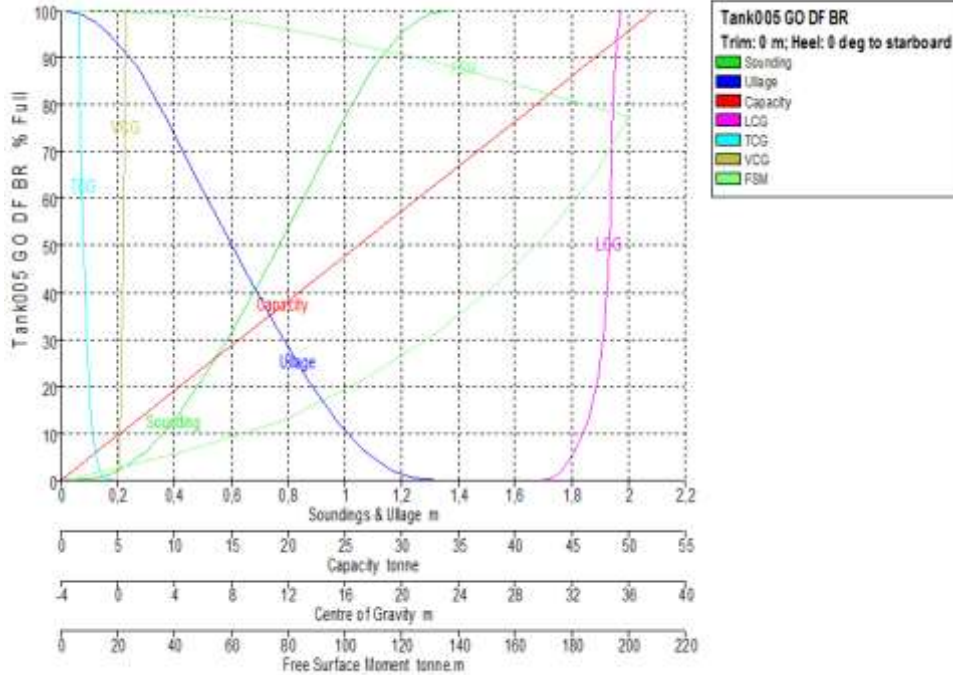
Tank Name	Sounding	Ullage	% Full	Capacity	Capacity	LCG m	TCG m	VCG m	FSM
Tank004 GO DF ER	1,280	0,000	100,000	38,777	34,512	24,688	2,107	0,406	0,000
	1,250	0,030	99,614	38,628	34,379	24,671	2,103	0,404	23,994
	1,209	0,071	98,000	38,002	33,822	24,615	2,086	0,397	64,474
	1,207	0,073	97,900	37,963	33,787	24,612	2,085	0,396	64,415
	1,200	0,080	97,474	37,798	33,640	24,599	2,081	0,395	64,165
	1,150	0,130	93,678	36,326	32,330	24,506	2,044	0,378	98,419
	1,100	0,180	88,387	34,274	30,504	24,424	1,998	0,357	106,226
	1,050	0,230	82,042	31,814	28,314	24,381	1,949	0,331	115,371
	1,000	0,280	75,090	29,118	25,915	24,383	1,901	0,301	115,381
	0,950	0,330	68,237	26,461	23,550	24,388	1,851	0,272	109,337
	0,900	0,380	61,559	23,871	21,245	24,391	1,796	0,242	102,795
	0,850	0,430	55,067	21,354	19,005	24,390	1,736	0,213	96,220
	0,800	0,480	48,776	18,914	16,833	24,385	1,671	0,183	89,020
	0,750	0,530	42,700	16,558	14,737	24,373	1,599	0,152	81,751
	0,700	0,580	36,861	14,294	12,722	24,353	1,519	0,122	73,665
	0,650	0,630	31,283	12,131	10,797	24,319	1,429	0,091	65,175
	0,600	0,680	26,000	10,082	8,973	24,267	1,327	0,060	56,004
	0,550	0,730	21,049	8,162	7,265	24,188	1,212	0,028	45,874
	0,500	0,780	16,479	6,390	5,687	24,068	1,082	-0,004	35,399
	0,450	0,830	12,349	4,788	4,262	23,884	0,935	-0,038	24,983
	0,400	0,880	8,725	3,383	3,011	23,598	0,772	-0,072	15,201
	0,350	0,930	5,687	2,205	1,963	23,144	0,600	-0,108	7,289
	0,300	0,980	3,329	1,291	1,149	22,429	0,438	-0,147	2,552
	0,250	1,030	1,736	0,673	0,599	21,526	0,309	-0,187	0,700
	0,214	1,067	1,000	0,388	0,345	20,865	0,235	-0,216	0,248
	0,200	1,080	0,797	0,309	0,275	20,615	0,212	-0,227	0,169
	0,150	1,130	0,306	0,119	0,106	19,771	0,141	-0,266	0,034
	0,100	1,180	0,083	0,032	0,029	18,967	0,085	-0,305	0,005
	0,050	1,230	0,010	0,004	0,003	18,204	0,039	-0,343	0,000
	0,000	1,280	0,000	0,000	0,000	17,468	0,000	-0,380	0,000

**Tank Calibrations - Tank005 GO DF BR**

Fluid Type = Gasoil      Specific gravity = 0,89

Permeability = 98 %

Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Tank Name	Sounding	Ullage	% Full	Capacity	Capacity	LCG m	TCG m	VCG m	FSM
Tank005 GO DF BR	1.370	0.000	100.000	58.730	52.270	35.420	-2.689	0.655	0.000
	1.300	0.070	99.156	58.234	51.829	35.376	-2.686	0.650	38.618
	1.261	0.109	98.000	57.556	51.225	35.322	-2.682	0.644	61.550
	1.258	0.111	97.900	57.497	51.172	35.318	-2.682	0.643	61.461
	1.200	0.170	95.198	55.910	49.760	35.210	-2.672	0.630	86.836
	1.100	0.270	87.973	51.667	45.984	34.998	-2.642	0.595	138.927
	1.000	0.370	77.466	45.496	40.492	34.840	-2.587	0.547	199.601
	0.900	0.470	65.415	38.419	34.193	34.752	-2.511	0.492	188.209
	0.800	0.570	53.691	31.533	28.064	34.634	-2.421	0.435	172.584
	0.700	0.670	42.376	24.887	22.150	34.469	-2.313	0.377	154.319
	0.600	0.770	31.594	18.555	16.514	34.221	-2.180	0.318	132.821
	0.500	0.870	21.559	12.662	11.269	33.819	-2.017	0.256	107.156
	0.400	0.970	12.706	7.462	6.642	33.118	-1.825	0.190	77.996
	0.300	1.070	6.040	3.547	3.157	32.167	-1.596	0.119	42.909
	0.200	1.170	2.034	1.195	1.063	31.241	-1.262	0.047	15.399
	0.155	1.215	1.000	0.587	0.523	30.834	-1.059	0.015	7.547
	0.100	1.270	0.292	0.171	0.152	30.356	-0.758	-0.025	1.840
	0.000	1.370	0.000	0.000	0.000	29.528	-0.001	-0.100	0.000

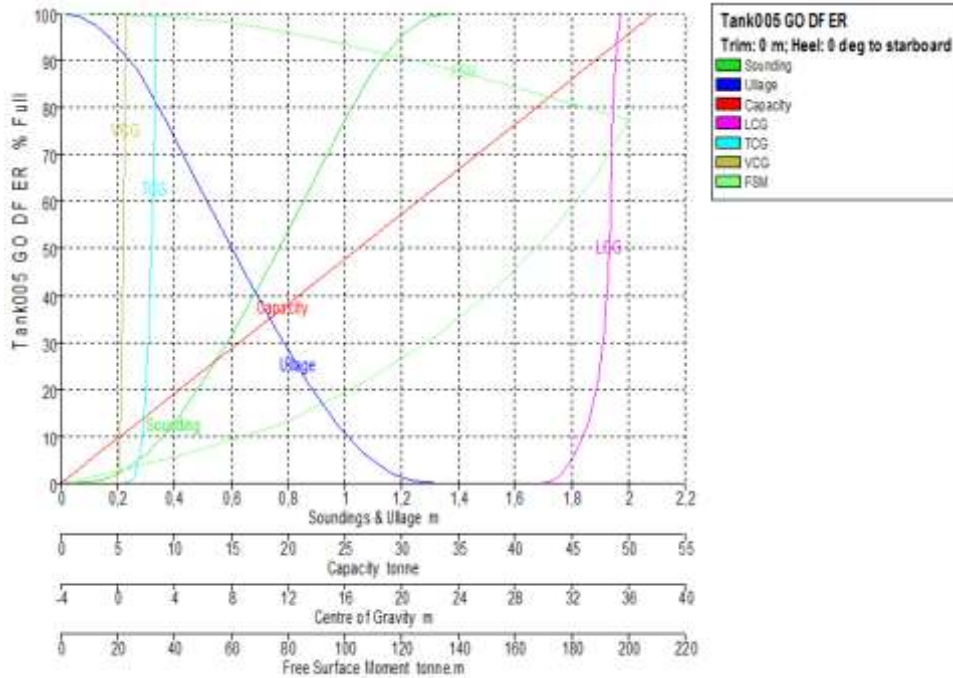


**Tank Calibrations - Tank005 GO DF ER**

Fluid Type = Gasoil      Specific gravity = 0,89

Permeability = 98 %

Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



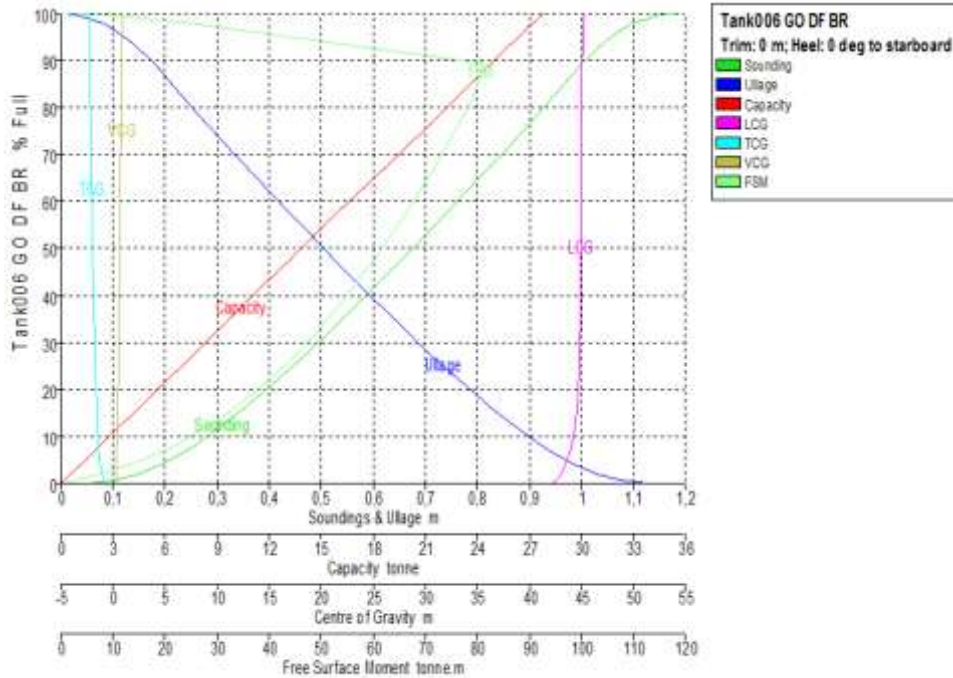
Tank Name	Sounding	Ullage	% Full	Capacity	Capacity	LCG m	TCG m	VCG m	FSM
Tank005 GO DF ER	1.370	0.000	100.000	58.730	52.270	35.420	2.689	0.655	0.000
	1.300	0.070	99.156	58.234	51.829	35.376	2.686	0.650	38.618
	1.261	0.109	98.000	57.556	51.225	35.322	2.682	0.644	61.550
	1.258	0.111	97.900	57.497	51.172	35.318	2.682	0.643	61.461
	1.200	0.170	95.198	55.910	49.760	35.210	2.672	0.630	86.836
	1.100	0.270	87.973	51.667	45.984	34.998	2.642	0.595	138.927
	1.000	0.370	77.466	45.496	40.492	34.840	2.587	0.547	199.601
	0.900	0.470	65.415	38.419	34.193	34.752	2.511	0.492	188.209
	0.800	0.570	53.691	31.533	28.064	34.634	2.421	0.435	172.584
	0.700	0.670	42.376	24.887	22.150	34.469	2.313	0.377	154.319
	0.600	0.770	31.594	18.555	16.514	34.221	2.180	0.318	132.821
	0.500	0.870	21.559	12.662	11.269	33.819	2.017	0.256	107.156
	0.400	0.970	12.706	7.462	6.642	33.118	1.825	0.190	77.996
	0.300	1.070	6.040	3.547	3.157	32.167	1.596	0.119	42.909
	0.200	1.170	2.034	1.195	1.063	31.241	1.262	0.047	15.399
	0.155	1.215	1.000	0.587	0.523	30.834	1.059	0.015	7.547
	0.100	1.270	0.292	0.171	0.152	30.356	0.758	-0.025	1.840
	0.000	1.370	0.000	0.000	0.000	29.528	0.001	-0.100	0.000

**Tank Calibrations - Tank006 GO DF BR**

Fluid Type = Gasoil      Specific gravity = 0,89

Permeability = 98 %

Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



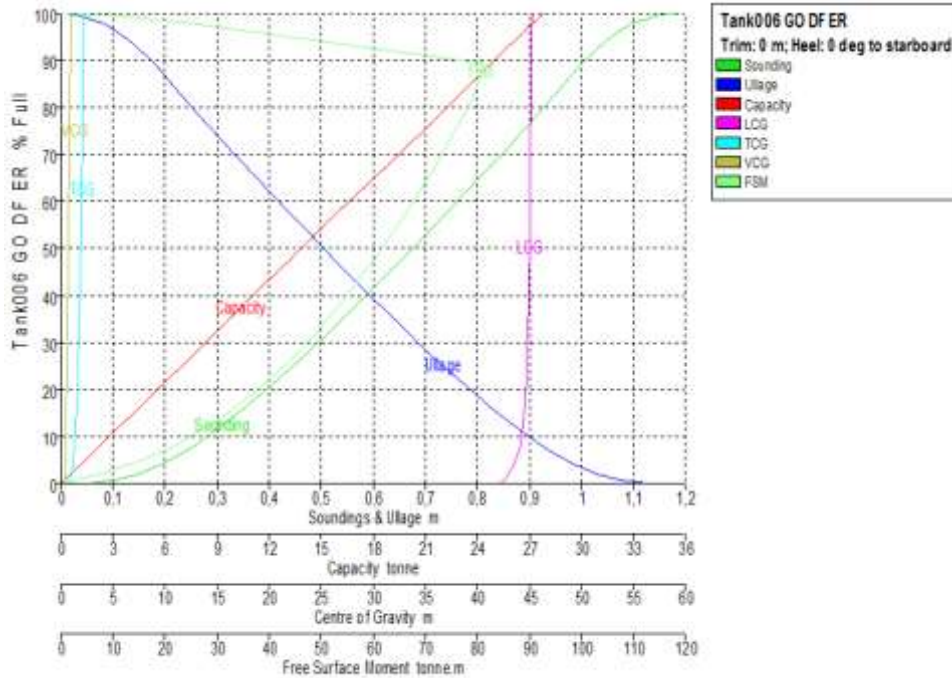
Tank Name	Sounding	Ullage	% Full	Capacity	Capacity	LCG m	TCG m	VCG m	FSM
Tank006 GO DF BR	1.180	0.000	100.000	31.174	27.745	45.264	-2.183	0.930	0.000
	1.150	0.030	99.729	31.090	27.670	45.253	-2.184	0.928	9.263
	1.100	0.080	98.010	30.554	27.193	45.203	-2.183	0.920	24.782
	1.100	0.080	98.000	30.551	27.190	45.202	-2.183	0.920	24.778
	1.098	0.082	97.900	30.520	27.162	45.200	-2.183	0.920	24.742
	1.050	0.130	94.587	29.487	26.243	45.136	-2.177	0.905	47.062
	1.000	0.180	89.281	27.833	24.771	45.093	-2.158	0.882	81.021
	0.950	0.230	82.974	25.866	23.021	45.080	-2.129	0.854	79.343
	0.900	0.280	76.746	23.925	21.293	45.066	-2.099	0.826	76.447
	0.850	0.330	70.604	22.010	19.589	45.050	-2.067	0.799	73.389
	0.800	0.380	64.554	20.124	17.910	45.032	-2.033	0.771	70.243
	0.750	0.430	58.602	18.269	16.259	45.011	-1.996	0.743	66.926
	0.700	0.480	52.756	16.446	14.637	44.987	-1.956	0.715	63.482
	0.650	0.530	47.024	14.660	13.047	44.957	-1.913	0.687	59.881
	0.600	0.580	41.418	12.912	11.492	44.922	-1.866	0.658	56.099
	0.550	0.630	35.951	11.207	9.975	44.878	-1.813	0.630	52.127
	0.500	0.680	30.639	9.552	8.501	44.822	-1.755	0.601	47.893
	0.450	0.730	25.507	7.952	7.077	44.750	-1.690	0.572	43.390
	0.400	0.780	20.589	6.418	5.712	44.654	-1.615	0.543	38.494
	0.350	0.830	15.930	4.966	4.420	44.519	-1.530	0.513	33.136
	0.300	0.880	11.602	3.617	3.219	44.322	-1.432	0.481	27.368
	0.250	0.930	7.716	2.406	2.141	44.017	-1.322	0.449	21.126
	0.200	0.980	4.472	1.394	1.241	43.556	-1.204	0.415	14.230
	0.150	1.030	2.144	0.668	0.595	43.041	-1.053	0.379	7.448
	0.112	1.067	1.000	0.312	0.277	42.651	-0.904	0.352	3.645
	0.100	1.080	0.736	0.230	0.204	42.531	-0.844	0.344	2.663
	0.050	1.130	0.111	0.035	0.031	42.030	-0.536	0.307	0.353
	0.000	1.180	0.000	0.000	0.000	41.566	-0.002	0.270	0.000

**Tank Calibrations - Tank006 GO DF ER**

Fluid Type = Gasoil      Specific gravity = 0,89

Permeability = 98 %

Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Tank Name	Sounding	Ullage	% Full	Capacity	Capacity	LCG m	TCG m	VCG m	FSM
Tank006 GO DF ER	1,180	0,000	100,000	31,174	27,745	45,264	2,183	0,930	0,000
	1,150	0,030	99,729	31,090	27,670	45,253	2,184	0,928	9,263
	1,100	0,080	98,010	30,554	27,193	45,203	2,183	0,920	24,782
	1,100	0,080	98,000	30,551	27,190	45,202	2,183	0,920	24,778
	1,098	0,082	97,900	30,520	27,162	45,200	2,183	0,920	24,742
	1,050	0,130	94,587	29,487	26,243	45,136	2,177	0,905	47,062
	1,000	0,180	89,281	27,833	24,771	45,093	2,158	0,882	81,021
	0,950	0,230	82,974	25,866	23,021	45,080	2,129	0,854	79,343
	0,900	0,280	76,746	23,925	21,293	45,066	2,099	0,826	76,447
	0,850	0,330	70,604	22,010	19,589	45,050	2,067	0,799	73,389
	0,800	0,380	64,554	20,124	17,910	45,032	2,033	0,771	70,243
	0,750	0,430	58,602	18,269	16,259	45,011	1,996	0,743	66,926
	0,700	0,480	52,756	16,446	14,637	44,987	1,956	0,715	63,482
	0,650	0,530	47,024	14,660	13,047	44,957	1,913	0,687	59,881
	0,600	0,580	41,418	12,912	11,492	44,922	1,866	0,658	56,099
	0,550	0,630	35,951	11,207	9,975	44,878	1,813	0,630	52,127
	0,500	0,680	30,639	9,552	8,501	44,822	1,755	0,601	47,893
	0,450	0,730	25,507	7,952	7,077	44,750	1,690	0,572	43,390
	0,400	0,780	20,589	6,418	5,712	44,654	1,615	0,543	38,494
	0,350	0,830	15,930	4,966	4,420	44,519	1,530	0,513	33,136
	0,300	0,880	11,602	3,617	3,219	44,322	1,432	0,481	27,368
	0,250	0,930	7,716	2,406	2,141	44,017	1,322	0,449	21,126
	0,200	0,980	4,472	1,394	1,241	43,556	1,204	0,415	14,230
	0,150	1,030	2,144	0,668	0,595	43,041	1,053	0,379	7,448
	0,112	1,067	1,000	0,312	0,277	42,651	0,904	0,352	3,645
	0,100	1,080	0,736	0,230	0,204	42,531	0,844	0,344	2,663
	0,050	1,130	0,111	0,035	0,031	42,030	0,536	0,307	0,353
	0,000	1,180	0,000	0,000	0,000	41,566	0,002	0,270	0,000

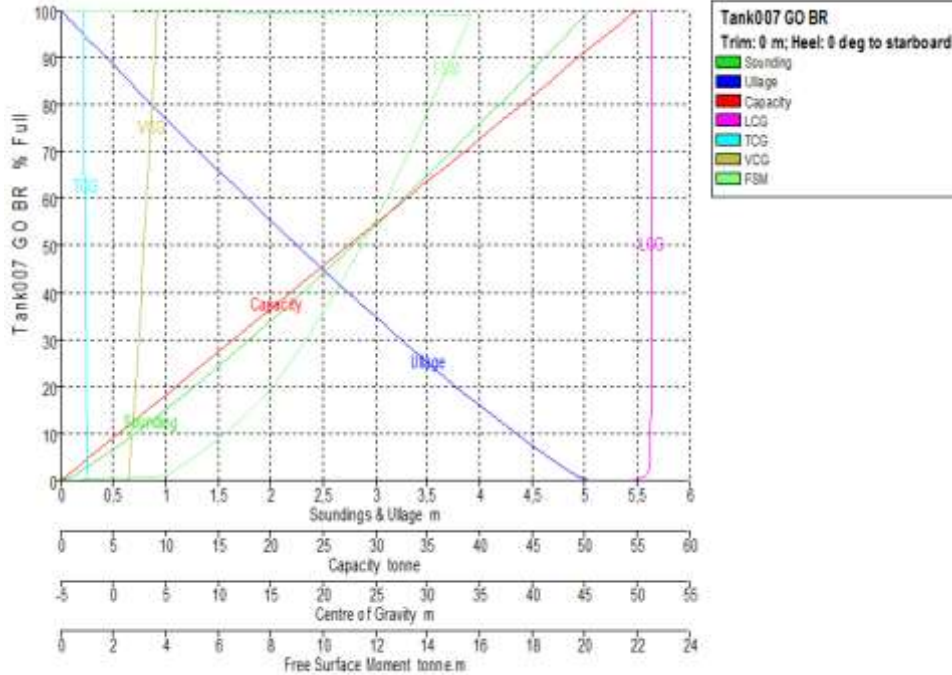


**Tank Calibrations - Tank007 GO BR**

Fluid Type = Gasoil      Specific gravity = 0,89

Permeability = 98 %

Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



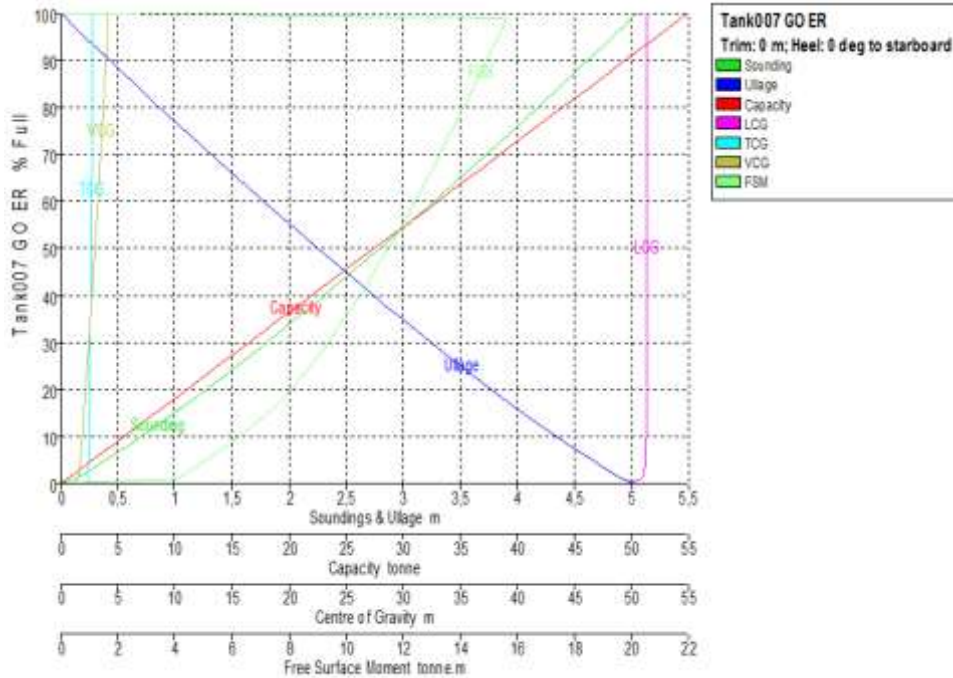
Tank Name	Sounding	Ullage	% Full	Capacity	Capacity	LCG m	TCG m	VCG m	FSM
Tank007 GO BR	5.050	0.000	100.000	61.739	54.947	51.407	-2.823	4.175	0.000
	5.000	0.050	98.831	61.017	54.305	51.407	-2.820	4.148	15.643
	4.964	0.086	98.000	60.504	53.848	51.406	-2.818	4.128	15.575
	4.960	0.090	97.900	60.442	53.793	51.406	-2.818	4.126	15.567
	4.800	0.250	94.180	58.146	51.750	51.405	-2.809	4.039	15.264
	4.600	0.450	89.572	55.300	49.217	51.403	-2.798	3.930	14.893
	4.400	0.650	85.005	52.481	46.708	51.401	-2.786	3.822	14.527
	4.200	0.850	80.481	49.688	44.222	51.399	-2.774	3.714	14.163
	4.000	1.050	76.000	46.922	41.760	51.397	-2.762	3.605	13.792
	3.800	1.250	71.564	44.183	39.323	51.395	-2.750	3.497	13.416
	3.600	1.450	67.173	41.472	36.910	51.392	-2.737	3.389	13.046
	3.400	1.650	62.828	38.789	34.522	51.390	-2.723	3.281	12.674
	3.200	1.850	58.531	36.136	32.161	51.387	-2.710	3.173	12.289
	3.000	2.050	54.283	33.513	29.827	51.385	-2.695	3.065	11.901
	2.800	2.250	50.085	30.922	27.521	51.382	-2.680	2.958	11.510
	2.600	2.450	45.941	28.363	25.243	51.379	-2.665	2.850	11.098
	2.400	2.650	41.853	25.839	22.997	51.376	-2.649	2.743	10.681
	2.200	2.850	37.823	23.352	20.783	51.372	-2.631	2.635	10.246
	2.000	3.050	33.856	20.902	18.603	51.368	-2.613	2.528	9.805
	1.800	3.250	29.954	18.493	16.459	51.363	-2.594	2.421	9.353
	1.600	3.450	26.121	16.127	14.353	51.358	-2.574	2.314	8.884
	1.400	3.650	22.364	13.807	12.288	51.351	-2.551	2.207	8.391
	1.200	3.850	18.692	11.540	10.271	51.344	-2.527	2.100	7.857
	1.000	4.050	15.117	9.333	8.306	51.334	-2.501	1.994	7.266
	0.800	4.250	11.654	7.195	6.403	51.321	-2.474	1.888	6.603
	0.600	4.450	8.319	5.136	4.571	51.300	-2.445	1.783	5.884
	0.400	4.650	5.127	3.166	2.817	51.256	-2.417	1.678	5.132
	0.200	4.850	2.098	1.296	1.153	51.100	-2.407	1.574	4.356
	0.124	4.926	1.000	0.617	0.549	50.813	-2.441	1.531	4.055
	0.000	5.050	0.000	0.000	0.000	49.583	-2.625	1.450	0.000

**Tank Calibrations - Tank007 GO ER**

Fluid Type = Gasoil Specific gravity = 0,89

Permeability = 98 %

Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



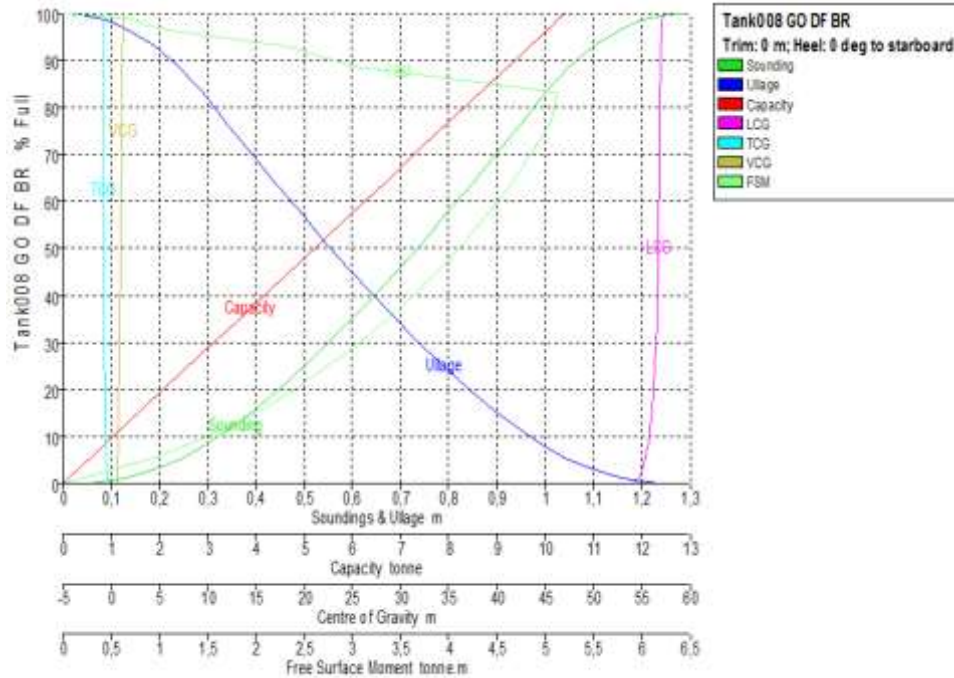
Tank Name	Sounding	Ullage	% Full	Capacity	Capacity	LCG m	TCG m	VCG m	FSM
Tank007 GO ER	5,050	0,000	100,000	61,739	54,947	51,407	2,823	4,175	0,000
	5,000	0,050	98,831	61,017	54,305	51,407	2,820	4,148	15,643
	4,964	0,086	98,000	60,504	53,848	51,406	2,818	4,128	15,575
	4,960	0,090	97,900	60,442	53,793	51,406	2,818	4,126	15,567
	4,800	0,250	94,180	58,146	51,750	51,405	2,809	4,039	15,264
	4,600	0,450	89,572	55,300	49,217	51,403	2,798	3,930	14,893
	4,400	0,650	85,005	52,481	46,708	51,401	2,786	3,822	14,527
	4,200	0,850	80,481	49,688	44,222	51,399	2,774	3,714	14,163
	4,000	1,050	76,000	46,922	41,760	51,397	2,762	3,605	13,792
	3,800	1,250	71,564	44,183	39,323	51,395	2,750	3,497	13,416
	3,600	1,450	67,173	41,472	36,910	51,392	2,737	3,389	13,046
	3,400	1,650	62,828	38,789	34,522	51,390	2,723	3,281	12,674
	3,200	1,850	58,531	36,136	32,161	51,387	2,710	3,173	12,289
	3,000	2,050	54,283	33,513	29,827	51,385	2,695	3,065	11,901
	2,800	2,250	50,085	30,922	27,521	51,382	2,680	2,958	11,510
	2,600	2,450	45,941	28,363	25,243	51,379	2,665	2,850	11,098
	2,400	2,650	41,853	25,839	22,997	51,376	2,649	2,743	10,681
	2,200	2,850	37,823	23,352	20,783	51,372	2,631	2,635	10,246
	2,000	3,050	33,856	20,902	18,603	51,368	2,613	2,528	9,805
	1,800	3,250	29,954	18,493	16,459	51,363	2,594	2,421	9,353
	1,600	3,450	26,121	16,127	14,353	51,358	2,574	2,314	8,884
	1,400	3,650	22,364	13,807	12,288	51,351	2,551	2,207	8,391
	1,200	3,850	18,692	11,540	10,271	51,344	2,527	2,100	7,857
	1,000	4,050	15,117	9,333	8,306	51,334	2,501	1,994	7,266
	0,800	4,250	11,654	7,195	6,403	51,321	2,474	1,888	6,603
	0,600	4,450	8,319	5,136	4,571	51,300	2,445	1,783	5,884
	0,400	4,650	5,127	3,166	2,817	51,256	2,417	1,678	5,132
	0,200	4,850	2,098	1,296	1,153	51,100	2,407	1,574	4,356
	0,124	4,926	1,000	0,617	0,549	50,813	2,441	1,531	4,055
	0,000	5,050	0,000	0,000	0,000	49,583	2,625	1,450	0,000

**Tank Calibrations - Tank008 GO DF BR**

Fluid Type = Gasoil      Specific gravity = 0,89

Permeability = 98 %

Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



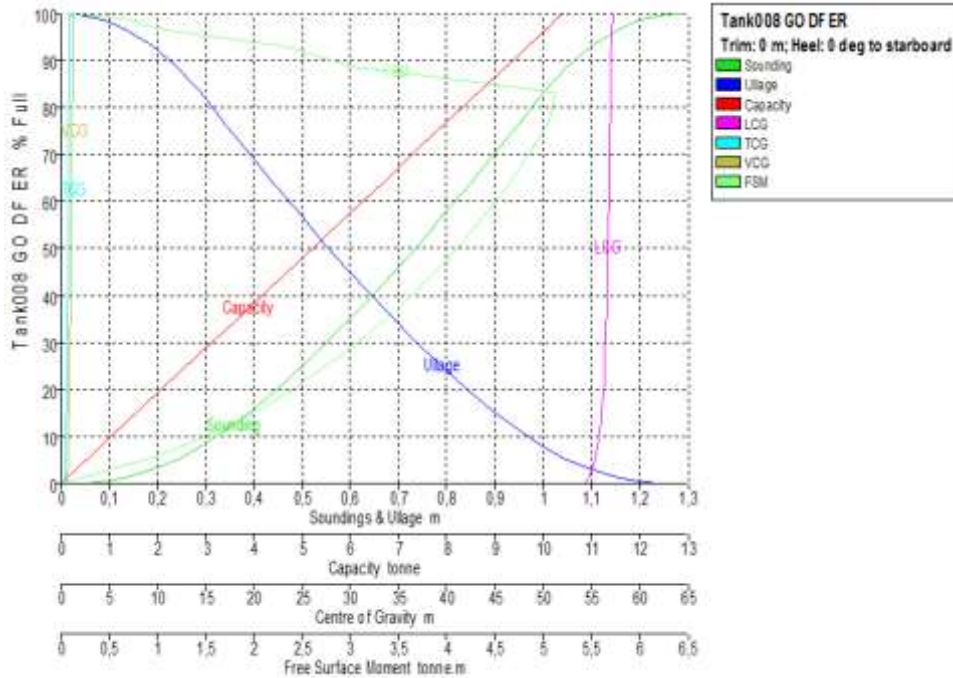
Tank Name	Sounding	Ullage	% Full	Capacity	Capacity	LCG m	TCG m	VCG m	FSM
Tank008 GO DF BR	1.290	0.000	100.000	11.699	10.412	57.180	-0.842	1.283	0.000
	1.250	0.040	99.703	11.665	10.381	57.168	-0.842	1.281	0.249
	1.200	0.090	98.455	11.519	10.252	57.124	-0.842	1.275	0.778
	1.186	0.103	98.000	11.465	10.204	57.109	-0.843	1.273	0.773
	1.183	0.106	97.900	11.454	10.194	57.106	-0.843	1.272	0.772
	1.150	0.140	96.309	11.268	10.028	57.061	-0.843	1.264	1.148
	1.100	0.190	93.082	10.890	9.692	56.987	-0.843	1.249	2.277
	1.050	0.240	88.701	10.377	9.236	56.915	-0.840	1.230	3.032
	1.000	0.290	83.034	9.714	8.646	56.868	-0.832	1.205	5.117
	0.950	0.340	76.620	8.964	7.978	56.843	-0.819	1.177	5.059
	0.900	0.390	70.301	8.225	7.320	56.816	-0.805	1.148	4.859
	0.850	0.440	64.085	7.497	6.673	56.784	-0.790	1.119	4.648
	0.800	0.490	57.987	6.784	6.038	56.748	-0.774	1.090	4.424
	0.750	0.540	52.023	6.086	5.417	56.706	-0.756	1.061	4.181
	0.700	0.590	46.209	5.406	4.812	56.657	-0.737	1.031	3.931
	0.650	0.640	40.566	4.746	4.224	56.600	-0.716	1.001	3.658
	0.600	0.690	35.116	4.108	3.656	56.532	-0.694	0.971	3.369
	0.550	0.740	29.889	3.497	3.112	56.451	-0.670	0.941	3.069
	0.500	0.790	24.916	2.915	2.594	56.351	-0.644	0.910	2.747
	0.450	0.840	20.234	2.367	2.107	56.228	-0.617	0.878	2.415
	0.400	0.890	15.896	1.860	1.655	56.074	-0.587	0.846	2.064
	0.350	0.940	11.961	1.399	1.245	55.878	-0.556	0.813	1.708
	0.300	0.990	8.512	0.996	0.886	55.640	-0.522	0.780	1.327
	0.250	1.040	5.639	0.660	0.587	55.380	-0.483	0.746	0.933
	0.200	1.090	3.366	0.394	0.350	55.105	-0.435	0.712	0.587
	0.150	1.140	1.695	0.198	0.176	54.805	-0.375	0.678	0.308
	0.121	1.168	1.000	0.117	0.104	54.616	-0.332	0.658	0.183
	0.100	1.190	0.615	0.072	0.064	54.465	-0.295	0.643	0.113
	0.050	1.240	0.098	0.011	0.010	54.082	-0.179	0.607	0.016
	0.000	1.290	0.000	0.000	0.000	53.626	0.000	0.570	0.000

**Tank Calibrations - Tank008 GO DF ER**

Fluid Type = Gasoil Specific gravity = 0,89

Permeability = 98 %

Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Tank Name	Sounding	Ullage	% Full	Capacity	Capacity	LCG m	TCG m	VCG m	FSM
Tank008 GO DF ER	1,290	0,000	100,000	11,699	10,412	57,180	0,842	1,283	0,000
	1,250	0,040	99,703	11,665	10,381	57,168	0,842	1,281	0,249
	1,200	0,090	98,455	11,519	10,252	57,124	0,842	1,275	0,778
	1,186	0,103	98,000	11,465	10,204	57,109	0,843	1,273	0,773
	1,183	0,106	97,900	11,454	10,194	57,106	0,843	1,272	0,772
	1,150	0,140	96,309	11,268	10,028	57,061	0,843	1,264	1,148
	1,100	0,190	93,082	10,890	9,692	56,987	0,843	1,249	2,277
	1,050	0,240	88,701	10,377	9,236	56,915	0,840	1,230	3,032
	1,000	0,290	83,034	9,714	8,646	56,868	0,832	1,205	5,117
	0,950	0,340	76,620	8,964	7,978	56,843	0,819	1,177	5,059
	0,900	0,390	70,301	8,225	7,320	56,816	0,805	1,148	4,859
	0,850	0,440	64,085	7,497	6,673	56,784	0,790	1,119	4,648
	0,800	0,490	57,987	6,784	6,038	56,748	0,774	1,090	4,424
	0,750	0,540	52,023	6,086	5,417	56,706	0,756	1,061	4,181
	0,700	0,590	46,209	5,406	4,812	56,657	0,737	1,031	3,931
	0,650	0,640	40,566	4,746	4,224	56,600	0,716	1,001	3,658
	0,600	0,690	35,116	4,108	3,656	56,532	0,694	0,971	3,369
	0,550	0,740	29,889	3,497	3,112	56,451	0,670	0,941	3,069
	0,500	0,790	24,916	2,915	2,594	56,351	0,644	0,910	2,747
	0,450	0,840	20,234	2,367	2,107	56,228	0,617	0,878	2,415
	0,400	0,890	15,896	1,860	1,655	56,074	0,587	0,846	2,064
	0,350	0,940	11,961	1,399	1,245	55,878	0,556	0,813	1,708
	0,300	0,990	8,512	0,996	0,886	55,640	0,522	0,780	1,327
	0,250	1,040	5,639	0,660	0,587	55,380	0,483	0,746	0,933
	0,200	1,090	3,366	0,394	0,350	55,105	0,435	0,712	0,587
	0,150	1,140	1,695	0,198	0,176	54,805	0,375	0,678	0,308
	0,121	1,168	1,000	0,117	0,104	54,616	0,332	0,658	0,183
	0,100	1,190	0,615	0,072	0,064	54,465	0,295	0,643	0,113
	0,050	1,240	0,098	0,011	0,010	54,082	0,179	0,607	0,016
	0,000	1,290	0,000	0,000	0,000	53,626	0,000	0,570	0,000

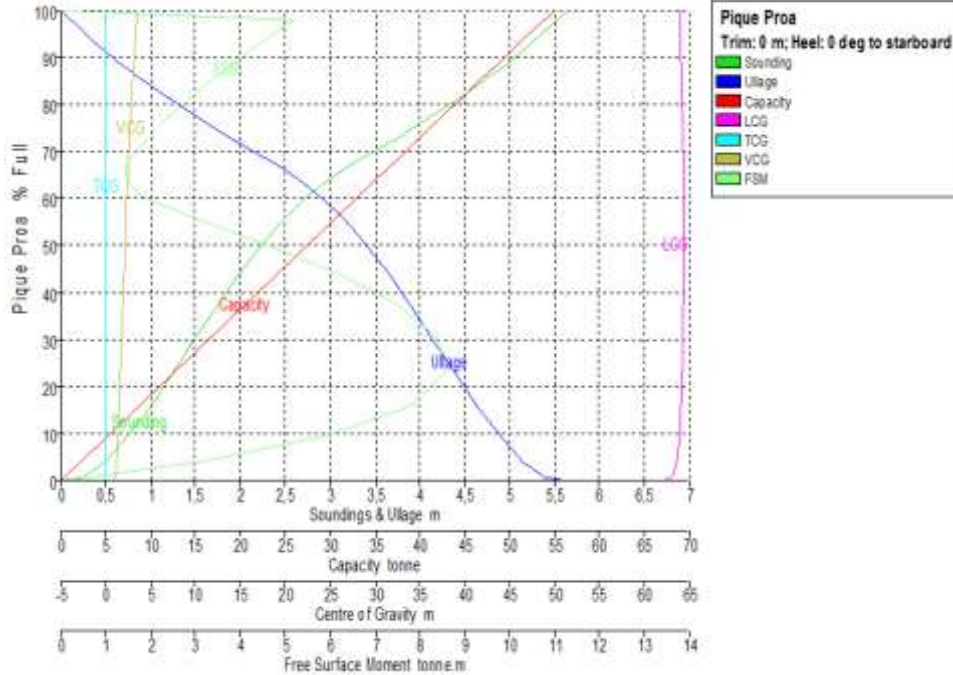


**Tank Calibrations - Pique Proa**

Fluid Type = Sea Water      Specific gravity = 1,025

Permeability = 98 %

Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



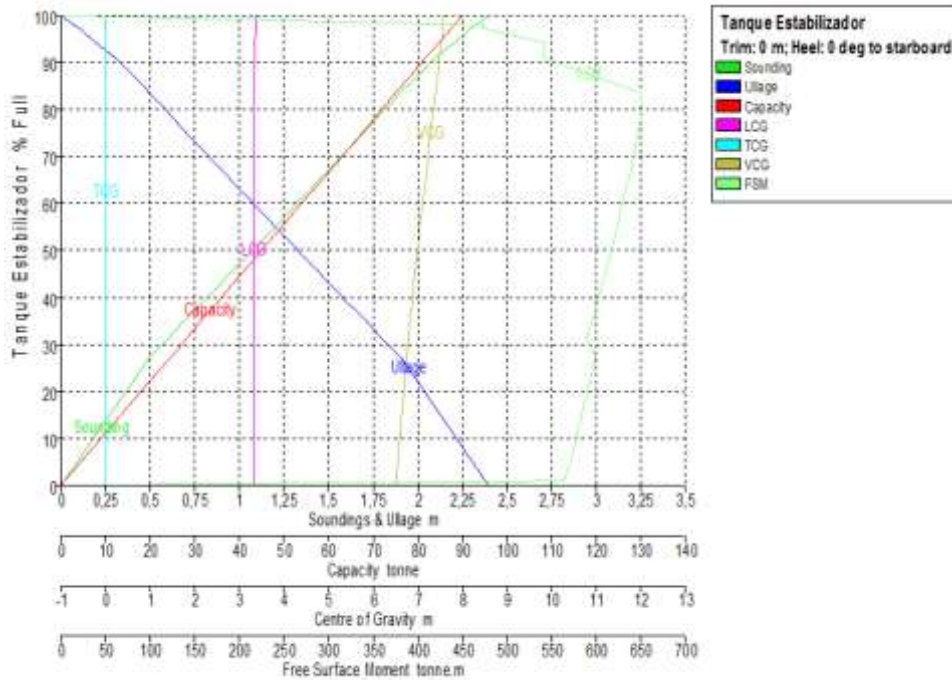
Tank Name	Sounding	Ullage	% Full	Capacity	Capacity	LCG m	TCG m	VCG m	FSM
Pique Proa	5.637	0.000	100.000	53.553	54.892	64.039	0.000	3.465	0.000
	5.530	0.107	98.000	52.482	53.794	64.048	0.000	3.405	5.218
	5.524	0.113	97.900	52.428	53.739	64.049	0.000	3.401	5.202
	5.500	0.137	97.458	52.191	53.496	64.051	0.000	3.388	5.132
	5.250	0.387	93.093	49.854	51.100	64.078	0.000	3.254	4.452
	5.000	0.637	89.142	47.738	48.932	64.110	0.000	3.133	3.883
	4.750	0.887	85.533	45.805	46.950	64.147	0.000	3.023	3.406
	4.500	1.137	82.144	43.990	45.090	64.186	0.000	2.921	2.978
	4.250	1.387	78.908	42.257	43.314	64.226	0.000	2.826	2.603
	4.000	1.637	75.824	40.606	41.621	64.268	0.000	2.738	2.260
	3.750	1.887	72.892	39.036	40.011	64.312	0.000	2.658	1.955
	3.500	2.137	70.112	37.547	38.485	64.357	0.000	2.585	1.682
	3.250	2.387	67.296	36.039	36.940	64.399	0.000	2.516	1.477
	3.000	2.637	64.104	34.330	35.188	64.427	0.000	2.443	1.430
	2.750	2.887	60.405	32.349	33.157	64.441	0.000	2.364	1.791
	2.500	3.137	55.892	29.932	30.680	64.441	0.000	2.273	2.927
	2.250	3.387	50.470	27.028	27.704	64.430	0.000	2.170	4.485
	2.000	3.637	44.256	23.700	24.293	64.406	0.000	2.056	6.111
	1.750	3.887	37.449	20.055	20.556	64.366	0.000	1.932	7.512
	1.500	4.137	30.280	16.216	16.621	64.306	0.000	1.800	8.395
	1.250	4.387	23.011	12.323	12.631	64.218	0.000	1.662	8.568
	1.000	4.637	15.970	8.552	8.766	64.095	0.000	1.517	7.779
	0.750	4.887	9.558	5.119	5.247	63.921	0.000	1.367	5.915
	0.500	5.137	4.273	2.288	2.346	63.630	0.000	1.210	3.178
	0.267	5.370	1.000	0.536	0.549	63.051	0.000	1.056	0.804
	0.250	5.387	0.850	0.455	0.466	62.997	0.000	1.045	0.682
	0.000	5.637	0.000	0.000	0.000	61.994	0.000	0.863	0.000

**Tank Calibrations - Tanque Estabilizador**

Fluid Type = Sea Water      Specific gravity = 1,025

Permeability = 98 %

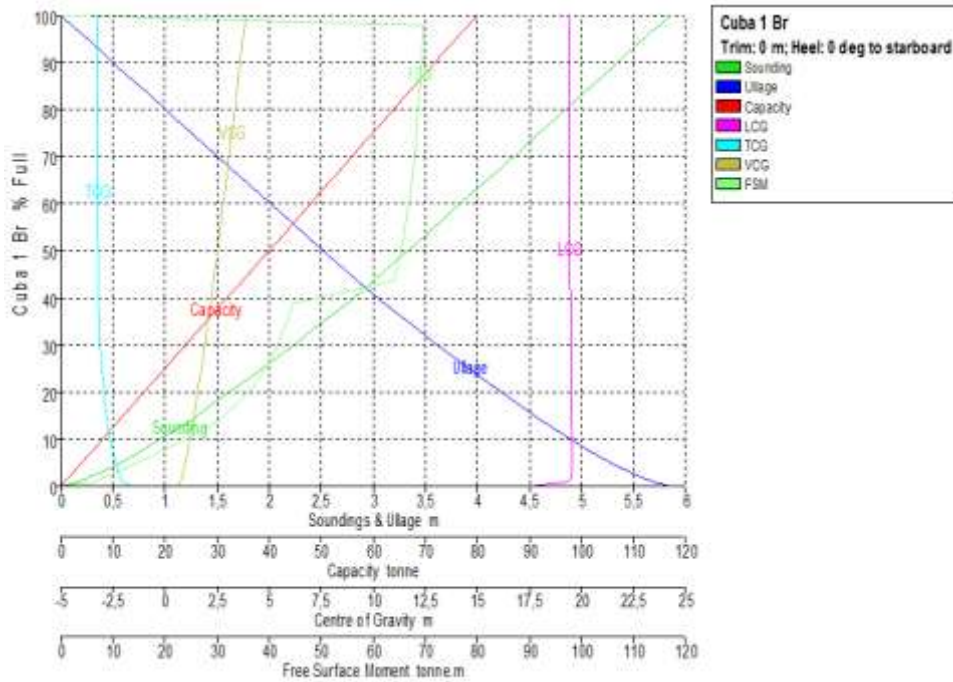
Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Tank Name	Sounding	Ullage	% Full	Capacity	Capacity	LCG m	TCG m	VCG m	FSM
Tanque Estabilizador	2.400	0.000	100.000	87.764	89.958	3.388	0.000	7.596	0.000
	2.326	0.074	98.000	86.009	88.159	3.374	0.000	7.571	474.193
	2.322	0.078	97.900	85.921	88.069	3.374	0.000	7.569	474.097
	2.300	0.100	97.259	85.359	87.493	3.370	0.000	7.561	473.487
	2.200	0.200	94.286	82.749	84.818	3.353	0.000	7.524	543.157
	2.100	0.300	90.959	79.829	81.825	3.339	0.000	7.483	539.942
	2.000	0.400	87.331	76.646	78.562	3.330	0.000	7.438	593.830
	1.900	0.500	83.434	73.225	75.056	3.325	0.000	7.391	649.935
	1.800	0.600	79.351	69.642	71.383	3.325	0.000	7.342	651.038
	1.700	0.700	75.278	66.067	67.719	3.325	0.000	7.292	646.870
	1.600	0.800	71.216	62.503	64.065	3.326	0.000	7.244	642.517
	1.500	0.900	67.168	58.950	60.423	3.326	0.000	7.195	637.962
	1.400	1.000	63.134	55.409	56.794	3.326	0.000	7.147	633.165
	1.300	1.100	59.113	51.880	53.177	3.326	0.000	7.099	628.050
	1.200	1.200	55.109	48.366	49.575	3.326	0.000	7.052	622.774
	1.100	1.300	51.120	44.865	45.986	3.326	0.000	7.005	617.531
	1.000	1.400	47.146	41.378	42.412	3.326	0.000	6.959	612.316
	0.900	1.500	43.189	37.904	38.852	3.325	0.000	6.914	607.131
	0.800	1.600	39.247	34.444	35.306	3.325	0.000	6.870	601.967
	0.700	1.700	35.321	30.999	31.774	3.325	0.000	6.828	596.101
	0.600	1.800	31.415	27.571	28.261	3.324	0.000	6.788	589.064
	0.500	1.900	27.531	24.163	24.767	3.323	0.000	6.751	598.821
	0.400	2.000	21.981	19.291	19.774	3.324	0.000	6.701	591.897
	0.300	2.100	16.452	14.439	14.800	3.324	0.000	6.650	585.034
	0.200	2.200	10.944	9.605	9.845	3.325	0.000	6.600	578.226
	0.100	2.300	5.459	4.791	4.911	3.326	0.000	6.550	570.896
	0.018	2.382	1.000	0.878	0.900	3.326	0.000	6.509	563.838
	0.000	2.400	0.000	0.000	0.000	3.326	0.000	6.500	0.000

**Tank Calibrations - Cuba 1 Br**

Fluid Type = Atún      Specific gravity = 0,7  
 Permeability = 85 %  
 Trim = 0 m (+ve by stern); Heel = 0 deg to starboard

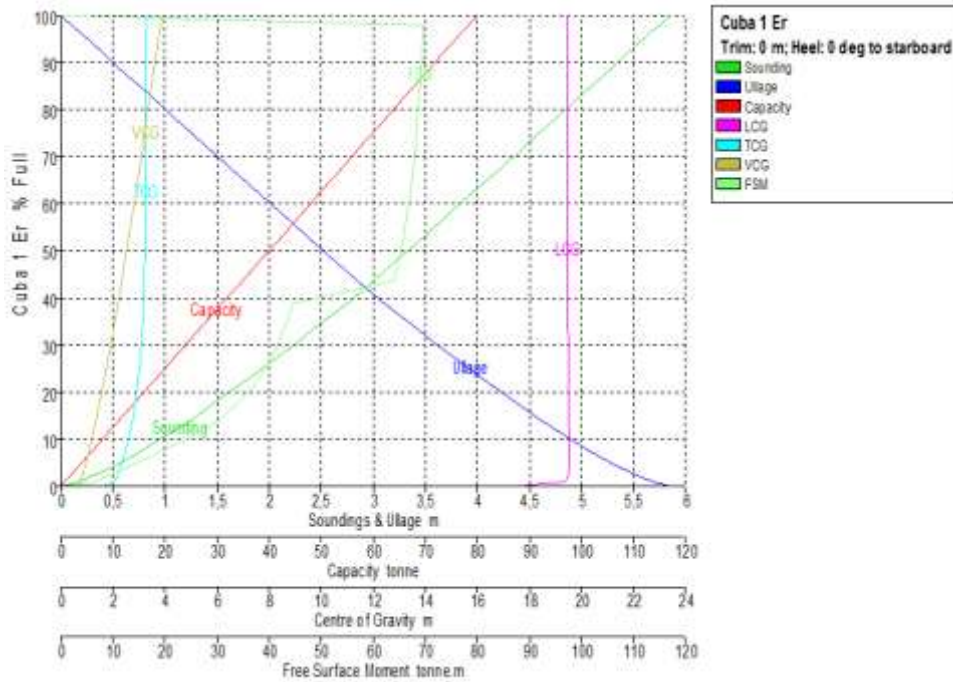


Tank Name	Sounding	Ullage	% Full	Capacity	Capacity	LCG m	TCG m	VCG m	FSM
Cuba 1 Br	5,850	0,000	100,000	114,137	79,896	19,436	-3,262	3,883	0,000
	5,750	0,100	98,002	111,856	78,299	19,437	-3,261	3,831	69,707
	5,750	0,100	98,000	111,854	78,298	19,437	-3,261	3,831	69,707
	5,745	0,105	97,900	111,740	78,218	19,437	-3,261	3,828	69,702
	5,500	0,350	93,009	106,158	74,311	19,438	-3,257	3,700	69,473
	5,250	0,600	88,023	100,467	70,327	19,439	-3,253	3,568	69,240
	5,000	0,850	83,042	94,782	66,347	19,441	-3,248	3,436	68,928
	4,750	1,100	78,071	89,108	62,376	19,442	-3,243	3,302	68,525
	4,500	1,350	73,109	83,445	58,411	19,444	-3,239	3,169	68,124
	4,250	1,600	68,158	77,793	54,455	19,446	-3,233	3,034	67,724
	4,000	1,850	63,217	72,153	50,507	19,449	-3,228	2,898	67,189
	3,750	2,100	58,291	66,531	46,572	19,451	-3,223	2,760	66,542
	3,500	2,350	53,381	60,927	42,649	19,455	-3,218	2,621	65,898
	3,250	2,600	48,489	55,344	38,741	19,458	-3,213	2,479	65,038
	3,000	2,850	43,622	49,788	34,852	19,462	-3,208	2,334	64,034
	2,750	3,100	38,865	44,359	31,052	19,467	-3,199	2,188	44,504
	2,500	3,350	34,585	39,474	27,632	19,472	-3,154	2,054	43,298
	2,250	3,600	30,351	34,642	24,249	19,478	-3,102	1,919	41,721
	2,000	3,850	26,176	29,877	20,914	19,485	-3,040	1,782	39,787
	1,750	4,100	22,079	25,200	17,640	19,493	-2,966	1,644	37,395
	1,500	4,350	18,082	20,639	14,447	19,503	-2,876	1,504	34,355
	1,250	4,600	14,226	16,237	11,366	19,515	-2,765	1,363	30,375
	1,000	4,850	10,574	12,069	8,448	19,528	-2,633	1,220	25,108
	0,750	5,100	7,221	8,241	5,769	19,537	-2,482	1,077	18,912
	0,500	5,350	4,250	4,851	3,395	19,535	-2,319	0,937	12,954
	0,250	5,600	1,709	1,951	1,366	19,472	-2,143	0,801	8,023
	0,171	5,679	1,000	1,141	0,799	19,382	-2,073	0,759	6,732
	0,000	5,850	0,000	0,000	0,000	17,423	-1,572	0,650	0,000



**Tank Calibrations - Cuba 1 Er**

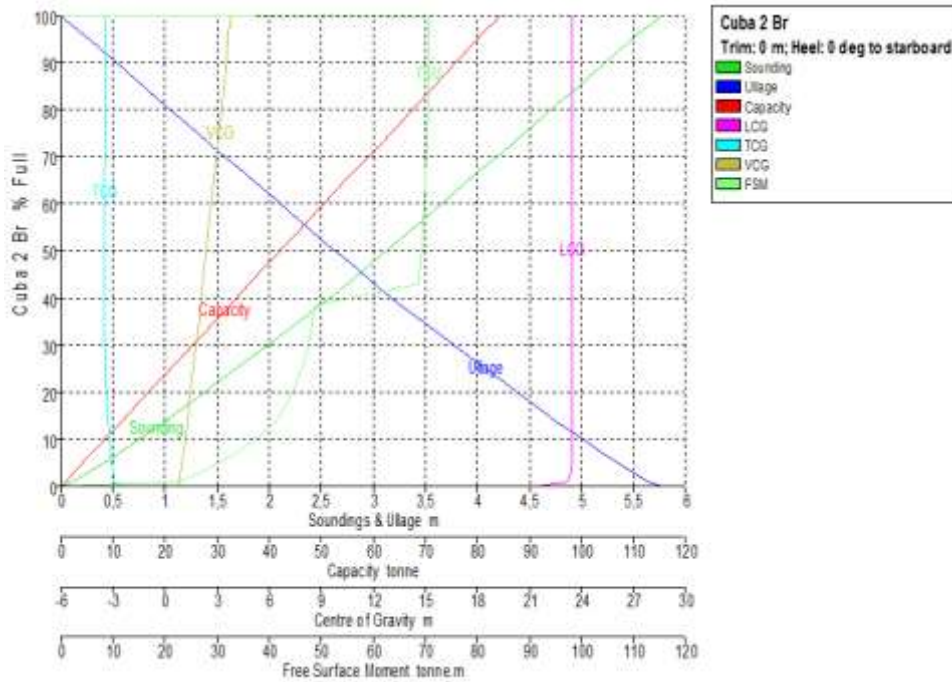
Fluid Type = Atún      Specific gravity = 0,7  
 Permeability = 85 %  
 Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Tank Name	Sounding	Ullage	% Full	Capacity	Capacity	LCG m	TCG m	VCG m	FSM
Cuba 1 Er	5.850	0.000	100.000	114.137	79.896	19.436	3.262	3.883	0.000
	5.750	0.100	98.002	111.856	78.299	19.437	3.261	3.831	69.707
	5.750	0.100	98.000	111.854	78.298	19.437	3.261	3.831	69.707
	5.745	0.105	97.900	111.740	78.218	19.437	3.261	3.828	69.702
	5.500	0.350	93.009	106.158	74.311	19.438	3.257	3.700	69.473
	5.250	0.600	88.023	100.467	70.327	19.439	3.253	3.568	69.240
	5.000	0.850	83.042	94.782	66.347	19.441	3.248	3.436	68.928
	4.750	1.100	78.071	89.108	62.376	19.442	3.243	3.302	68.525
	4.500	1.350	73.109	83.445	58.411	19.444	3.239	3.169	68.124
	4.250	1.600	68.158	77.793	54.455	19.446	3.233	3.034	67.724
	4.000	1.850	63.217	72.153	50.507	19.449	3.228	2.898	67.189
	3.750	2.100	58.291	66.531	46.572	19.451	3.223	2.760	66.542
	3.500	2.350	53.381	60.927	42.649	19.455	3.218	2.621	65.898
	3.250	2.600	48.489	55.344	38.741	19.458	3.213	2.479	65.038
	3.000	2.850	43.622	49.788	34.852	19.462	3.208	2.334	64.034
	2.750	3.100	38.865	44.359	31.052	19.467	3.199	2.188	64.504
	2.500	3.350	34.585	39.474	27.632	19.472	3.154	2.054	63.298
	2.250	3.600	30.351	34.642	24.249	19.478	3.102	1.919	61.721
	2.000	3.850	26.176	29.877	20.914	19.485	3.040	1.782	59.787
	1.750	4.100	22.079	25.200	17.640	19.493	2.966	1.644	57.395
	1.500	4.350	18.082	20.639	14.447	19.503	2.876	1.504	54.355
	1.250	4.600	14.226	16.237	11.366	19.515	2.765	1.363	50.375
	1.000	4.850	10.574	12.069	8.448	19.528	2.633	1.220	45.108
	0.750	5.100	7.221	8.241	5.769	19.537	2.482	1.077	38.912
	0.500	5.350	4.250	4.851	3.395	19.535	2.319	0.937	31.954
	0.250	5.600	1.709	1.951	1.366	19.472	2.143	0.801	24.023
	0.171	5.679	1.000	1.141	0.799	19.382	2.073	0.759	19.732
	0.000	5.850	0.000	0.000	0.000	17.423	1.572	0.650	0.000

**Tank Calibrations - Cuba 2 Br**

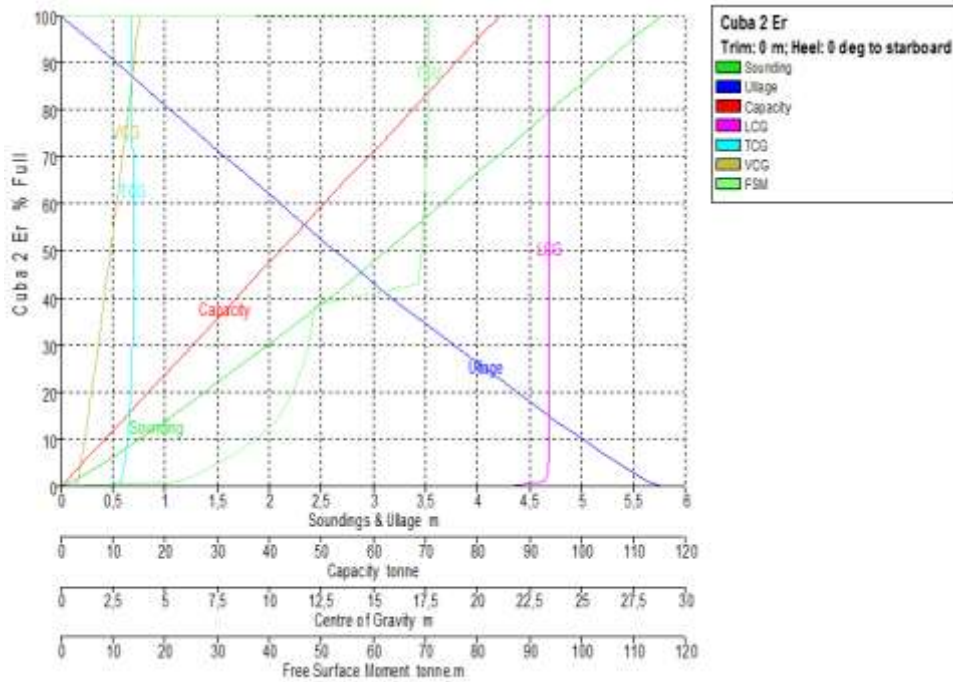
Fluid Type = Atún      Specific gravity = 0,7  
 Permeability = 85 %  
 Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Tank Name	Sounding	Ullage	% Full	Capacity	Capacity	LCG m	TCG m	VCG m	FSM
Cuba 2 Br	5,760	0,000	100,000	120,481	84,337	23,440	-3,409	3,793	0,000
	5,750	0,010	99,810	120,252	84,176	23,440	-3,409	3,788	70,896
	5,655	0,105	98,000	118,071	82,650	23,441	-3,410	3,739	70,868
	5,650	0,110	97,900	117,951	82,566	23,441	-3,410	3,736	70,867
	5,500	0,260	95,052	114,519	80,163	23,441	-3,412	3,659	70,824
	5,250	0,510	90,295	108,789	76,152	23,441	-3,415	3,529	70,752
	5,000	0,760	85,541	103,060	72,142	23,442	-3,419	3,400	70,680
	4,750	1,010	80,788	97,334	68,134	23,443	-3,423	3,269	70,562
	4,500	1,260	76,038	91,612	64,128	23,443	-3,427	3,138	70,428
	4,250	1,510	71,292	85,893	60,125	23,444	-3,432	3,007	70,294
	4,000	1,760	66,548	80,178	56,124	23,445	-3,439	2,874	70,160
	3,750	2,010	61,808	74,467	52,127	23,446	-3,446	2,741	69,953
	3,500	2,260	57,073	68,762	48,133	23,447	-3,455	2,606	69,719
	3,250	2,510	52,344	63,064	44,145	23,448	-3,466	2,470	69,485
	3,000	2,760	47,620	57,373	40,161	23,449	-3,479	2,331	69,135
	2,750	3,010	42,906	51,694	36,186	23,451	-3,496	2,190	68,740
	2,500	3,260	38,599	46,504	32,553	23,452	-3,485	2,059	48,803
	2,250	3,510	34,405	41,451	29,016	23,454	-3,464	1,930	48,289
	2,000	3,760	30,229	36,420	25,494	23,456	-3,440	1,801	47,545
	1,750	4,010	26,078	31,418	21,993	23,458	-3,410	1,672	46,595
	1,500	4,260	21,959	26,457	18,520	23,460	-3,373	1,541	45,348
	1,250	4,510	17,886	21,549	15,084	23,463	-3,327	1,411	43,651
	1,000	4,760	13,878	16,721	11,704	23,465	-3,269	1,280	41,146
	0,750	5,010	9,972	12,015	8,410	23,465	-3,196	1,148	37,479
	0,500	5,260	6,225	7,500	5,250	23,456	-3,104	1,017	32,359
	0,250	5,510	2,704	3,258	2,281	23,400	-2,989	0,886	26,268
	0,121	5,639	1,000	1,205	0,843	23,201	-2,892	0,819	22,910
	0,000	5,760	0,000	0,000	0,000	21,443	-2,477	0,740	0,000

**Tank Calibrations - Cuba 2 Er**

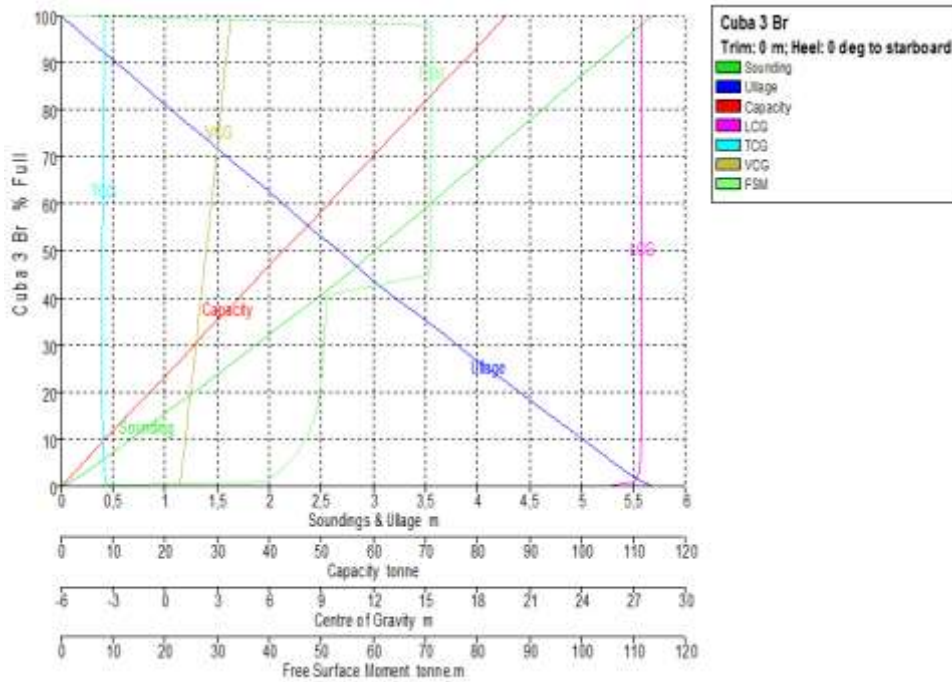
Fluid Type = Atún      Specific gravity = 0,7  
 Permeability = 85 %  
 Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Tank Name	Sounding	Ullage	% Full	Capacity	Capacity	LCG m	TCG m	VCG m	FSM
Cuba 2 Er	5.760	0.000	100.000	120.481	84.337	23.440	3.409	3.793	0.000
	5.750	0.010	99.810	120.252	84.176	23.440	3.409	3.788	70.896
	5.655	0.105	98.000	118.071	82.650	23.441	3.410	3.739	70.868
	5.650	0.110	97.900	117.951	82.566	23.441	3.410	3.736	70.867
	5.500	0.260	95.052	114.519	80.163	23.441	3.412	3.659	70.824
	5.250	0.510	90.295	108.789	76.152	23.441	3.415	3.529	70.752
	5.000	0.760	85.541	103.060	72.142	23.442	3.419	3.400	70.680
	4.750	1.010	80.788	97.334	68.134	23.443	3.423	3.269	70.562
	4.500	1.260	76.038	91.612	64.128	23.443	3.427	3.138	70.428
	4.250	1.510	71.292	85.893	60.125	23.444	3.432	3.007	70.294
	4.000	1.760	66.548	80.178	56.124	23.445	3.439	2.874	70.160
	3.750	2.010	61.808	74.467	52.127	23.446	3.446	2.741	69.953
	3.500	2.260	57.073	68.762	48.133	23.447	3.455	2.606	69.719
	3.250	2.510	52.344	63.064	44.145	23.448	3.466	2.470	69.485
	3.000	2.760	47.620	57.373	40.161	23.449	3.479	2.331	69.135
	2.750	3.010	42.906	51.694	36.186	23.451	3.496	2.190	68.740
	2.500	3.260	38.599	46.504	32.553	23.452	3.485	2.059	48.803
	2.250	3.510	34.405	41.451	29.016	23.454	3.464	1.930	48.289
	2.000	3.760	30.229	36.420	25.494	23.456	3.440	1.801	47.545
	1.750	4.010	26.078	31.418	21.993	23.458	3.410	1.672	46.595
	1.500	4.260	21.959	26.457	18.520	23.460	3.373	1.541	45.348
	1.250	4.510	17.886	21.549	15.084	23.463	3.327	1.411	43.651
	1.000	4.760	13.878	16.721	11.704	23.465	3.269	1.280	41.146
	0.750	5.010	9.972	12.015	8.410	23.465	3.196	1.148	37.479
	0.500	5.260	6.225	7.500	5.250	23.456	3.104	1.017	32.359
	0.250	5.510	2.704	3.258	2.281	23.400	2.989	0.886	26.268
	0.121	5.639	1.000	1.205	0.843	23.201	2.892	0.819	22.910
	0.000	5.760	0.000	0.000	0.000	21.443	2.477	0.740	0.000

**Tank Calibrations - Cuba 3 Br**

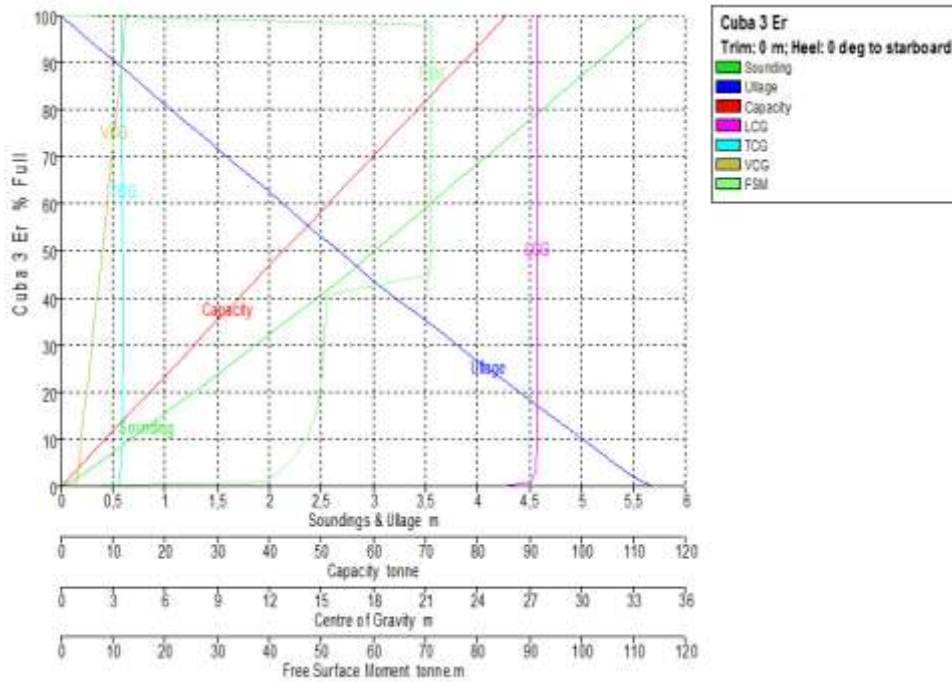
Fluid Type = Atún      Specific gravity = 0,7  
 Permeability = 85 %  
 Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Tank Name	Sounding	Ullage	% Full	Capacity	Capacity	LCG m	TCG m	VCG m	FSM
Cuba 3 Br	5,680	0,000	100,000	122,261	85,583	27,450	-3,484	3,777	0,000
	5,574	0,106	98,000	119,816	83,871	27,450	-3,486	3,723	71,248
	5,568	0,112	97,900	119,693	83,785	27,450	-3,486	3,720	71,247
	5,500	0,180	96,618	118,126	82,688	27,450	-3,488	3,685	71,244
	5,250	0,430	91,921	112,383	78,668	27,450	-3,495	3,557	71,232
	5,000	0,680	87,224	106,641	74,649	27,450	-3,502	3,428	71,220
	4,750	0,930	82,528	100,899	70,629	27,450	-3,510	3,299	71,205
	4,500	1,180	77,832	95,158	66,611	27,450	-3,519	3,170	71,180
	4,250	1,430	73,136	89,417	62,592	27,450	-3,529	3,040	71,156
	4,000	1,680	68,441	83,677	58,574	27,450	-3,541	2,909	71,132
	3,750	1,930	63,747	77,938	54,556	27,450	-3,554	2,777	71,104
	3,500	2,180	59,054	72,199	50,540	27,450	-3,569	2,645	71,058
	3,250	2,430	54,361	66,462	46,524	27,450	-3,588	2,511	71,013
	3,000	2,680	49,669	60,726	42,508	27,450	-3,609	2,375	70,961
	2,750	2,930	44,979	54,992	38,495	27,450	-3,636	2,238	70,880
	2,500	3,180	40,526	49,547	34,683	27,449	-3,649	2,105	50,868
	2,250	3,430	36,329	44,417	31,092	27,449	-3,643	1,979	50,755
	2,000	3,680	32,136	39,290	27,503	27,449	-3,636	1,853	50,615
	1,750	3,930	27,947	34,169	23,918	27,448	-3,626	1,727	50,420
	1,500	4,180	23,765	29,056	20,339	27,447	-3,615	1,600	50,139
	1,250	4,430	19,593	23,955	16,768	27,445	-3,600	1,474	49,698
	1,000	4,680	15,437	18,873	13,211	27,441	-3,579	1,347	48,968
	0,750	4,930	11,309	13,827	9,679	27,434	-3,552	1,219	47,648
	0,500	5,180	7,233	8,843	6,190	27,417	-3,515	1,092	45,385
	0,250	5,430	3,242	3,964	2,775	27,352	-3,464	0,965	41,938
	0,106	5,574	1,000	1,223	0,856	27,075	-3,413	0,889	39,330
	0,000	5,680	0,000	0,000	0,000	25,463	-3,229	0,820	0,000

**Tank Calibrations - Cuba 3 Er**

Fluid Type = Atún      Specific gravity = 0,7  
 Permeability = 85 %  
 Trim = 0 m (+ve by stern); Heel = 0 deg to starboard

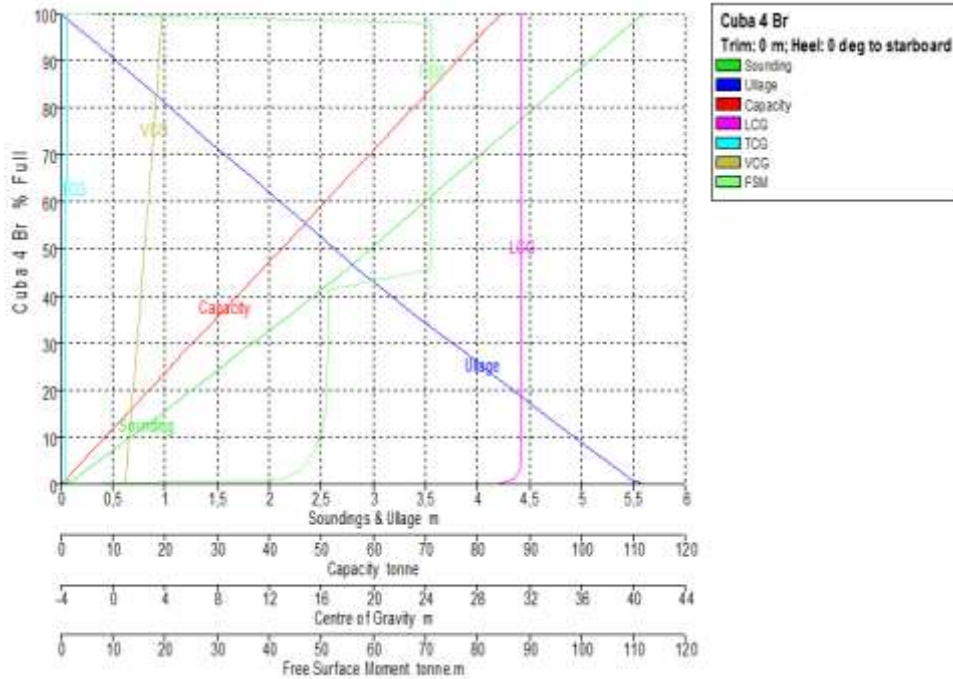


Tank Name	Sounding	Ullage	% Full	Capacity	Capacity	LCG m	TCG m	VCG m	FSM
Cuba 3 Er	5.680	0.000	100.000	122.261	85.583	27.450	3.484	3.777	0.000
	5.574	0.106	98.000	119.816	83.871	27.450	3.486	3.723	71.248
	5.568	0.112	97.900	119.693	83.785	27.450	3.486	3.720	71.247
	5.500	0.180	96.618	118.126	82.688	27.450	3.488	3.685	71.244
	5.250	0.430	91.921	112.383	78.668	27.450	3.495	3.557	71.232
	5.000	0.680	87.224	106.641	74.649	27.450	3.502	3.428	71.220
	4.750	0.930	82.528	100.899	70.629	27.450	3.510	3.299	71.205
	4.500	1.180	77.832	95.158	66.611	27.450	3.519	3.170	71.180
	4.250	1.430	73.136	89.417	62.592	27.450	3.529	3.040	71.156
	4.000	1.680	68.441	83.677	58.574	27.450	3.541	2.909	71.132
	3.750	1.930	63.747	77.938	54.556	27.450	3.554	2.777	71.104
	3.500	2.180	59.054	72.199	50.540	27.450	3.569	2.645	71.058
	3.250	2.430	54.361	66.462	46.524	27.450	3.588	2.511	71.013
	3.000	2.680	49.669	60.726	42.508	27.450	3.609	2.375	70.961
	2.750	2.930	44.979	54.992	38.495	27.450	3.636	2.238	70.880
	2.500	3.180	40.286	49.547	34.683	27.449	3.649	2.105	50.868
	2.250	3.430	36.329	44.417	31.092	27.449	3.643	1.979	50.755
	2.000	3.680	32.136	39.290	27.503	27.449	3.636	1.853	50.615
	1.750	3.930	27.947	34.169	23.918	27.448	3.626	1.727	50.420
	1.500	4.180	23.765	29.056	20.339	27.447	3.615	1.600	50.139
	1.250	4.430	19.593	23.955	16.768	27.445	3.600	1.474	49.698
	1.000	4.680	15.437	18.873	13.211	27.441	3.579	1.347	48.968
	0.750	4.930	11.309	13.827	9.679	27.434	3.552	1.219	47.648
	0.500	5.180	7.233	8.843	6.190	27.417	3.515	1.092	45.385
	0.250	5.430	3.242	3.964	2.775	27.352	3.464	0.965	41.938
	0.106	5.574	1.000	1.223	0.856	27.075	3.413	0.889	39.330
	0.000	5.680	0.000	0.000	0.000	25.463	3.229	0.820	0.000



**Tank Calibrations - Cuba 4 Br**

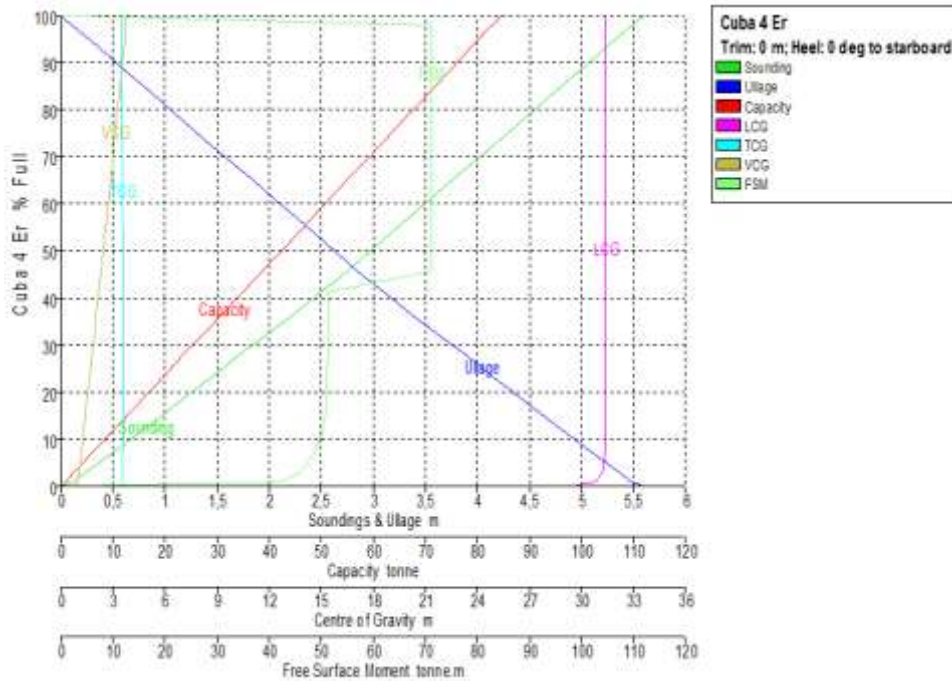
Fluid Type = Atún      Specific gravity = 0,7  
 Permeability = 85 %  
 Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Tank Name	Sounding	Ullage	% Full	Capacity	Capacity	LCG m	TCG m	VCG m	FSM
Cuba 4 Br	5.600	0.000	100.000	120.859	84.601	31.463	-3.499	3.816	0.000
	5.500	0.100	98.099	118.561	82.993	31.463	-3.502	3.764	71.316
	5.495	0.105	98.000	118.442	82.909	31.463	-3.502	3.762	71.316
	5.490	0.110	97.900	118.321	82.825	31.463	-3.502	3.759	71.316
	5.250	0.350	93.346	112.817	78.972	31.462	-3.509	3.637	71.316
	5.000	0.600	88.592	107.072	74.950	31.462	-3.516	3.508	71.315
	4.750	0.850	83.839	101.327	70.929	31.462	-3.525	3.380	71.314
	4.500	1.100	79.086	95.583	66.908	31.461	-3.535	3.251	71.312
	4.250	1.350	74.333	89.838	62.887	31.460	-3.546	3.122	71.311
	4.000	1.600	69.580	84.094	58.865	31.460	-3.559	2.992	71.309
	3.750	1.850	64.827	78.349	54.844	31.459	-3.573	2.861	71.308
	3.500	2.100	60.074	72.605	50.823	31.458	-3.590	2.729	71.305
	3.250	2.350	55.321	66.860	46.802	31.457	-3.609	2.596	71.302
	3.000	2.600	50.568	61.116	42.781	31.456	-3.632	2.462	71.299
	2.750	2.850	45.815	55.372	38.760	31.454	-3.660	2.326	71.294
	2.500	3.100	41.142	49.723	34.806	31.453	-3.689	2.189	51.262
	2.250	3.350	36.884	44.578	31.204	31.451	-3.686	2.064	51.255
	2.000	3.600	32.626	39.432	27.602	31.448	-3.682	1.939	51.247
	1.750	3.850	28.369	34.287	24.001	31.445	-3.678	1.813	51.234
	1.500	4.100	24.112	29.142	20.399	31.440	-3.672	1.688	51.202
	1.250	4.350	19.857	23.999	16.800	31.434	-3.664	1.562	51.098
	1.000	4.600	15.607	18.863	13.204	31.424	-3.653	1.436	50.814
	0.750	4.850	11.371	13.742	9.620	31.407	-3.636	1.309	50.109
	0.500	5.100	7.163	8.657	6.060	31.370	-3.613	1.182	48.648
	0.250	5.350	3.013	3.641	2.549	31.234	-3.580	1.054	46.122
	0.127	5.473	1.000	1.209	0.846	30.768	-3.561	0.984	42.527
	0.000	5.600	0.000	0.000	0.000	29.483	-3.526	0.900	0.000

**Tank Calibrations - Cuba 4 Er**

Fluid Type = Atún      Specific gravity = 0,7  
 Permeability = 85 %  
 Trim = 0 m (+ve by stern); Heel = 0 deg to starboard

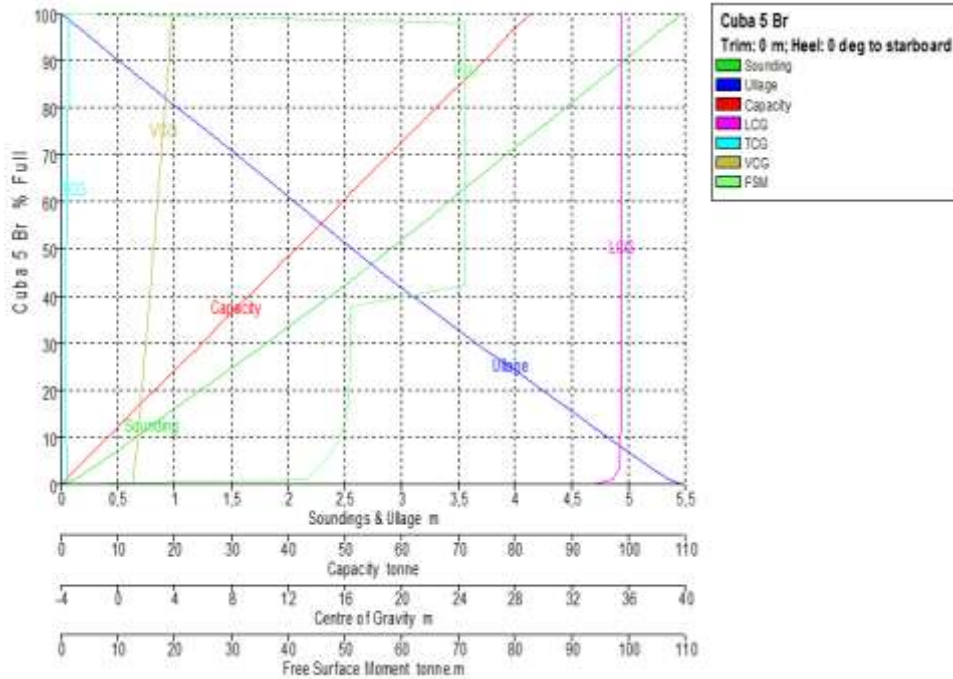


Tank Name	Sounding	Ullage	% Full	Capacity	Capacity	LCG m	TCG m	VCG m	FSM
Cuba 4 Er	5.600	0.000	100.000	120.859	84.601	31.463	3.499	3.816	0.000
	5.500	0.100	98.099	118.561	82.993	31.463	3.502	3.764	71.316
	5.495	0.105	98.000	118.442	82.909	31.463	3.502	3.762	71.316
	5.490	0.110	97.900	118.321	82.825	31.463	3.502	3.759	71.316
	5.250	0.350	93.346	112.817	78.972	31.462	3.509	3.637	71.316
	5.000	0.600	88.592	107.072	74.950	31.462	3.516	3.508	71.315
	4.750	0.850	83.839	101.327	70.929	31.462	3.525	3.380	71.314
	4.500	1.100	79.086	95.583	66.908	31.461	3.535	3.251	71.312
	4.250	1.350	74.333	89.838	62.887	31.460	3.546	3.122	71.311
	4.000	1.600	69.580	84.094	58.865	31.460	3.559	2.992	71.309
	3.750	1.850	64.827	78.349	54.844	31.459	3.573	2.861	71.308
	3.500	2.100	60.074	72.605	50.823	31.458	3.590	2.729	71.305
	3.250	2.350	55.321	66.860	46.802	31.457	3.609	2.596	71.302
	3.000	2.600	50.568	61.116	42.781	31.456	3.632	2.462	71.299
	2.750	2.850	45.815	55.372	38.760	31.454	3.660	2.326	71.294
	2.500	3.100	41.142	49.723	34.806	31.453	3.689	2.189	51.262
	2.250	3.350	36.884	44.578	31.204	31.451	3.686	2.064	51.255
	2.000	3.600	32.626	39.432	27.602	31.448	3.682	1.939	51.247
	1.750	3.850	28.369	34.287	24.001	31.445	3.678	1.813	51.234
	1.500	4.100	24.112	29.142	20.399	31.440	3.672	1.688	51.202
	1.250	4.350	19.857	23.999	16.800	31.434	3.664	1.562	51.098
	1.000	4.600	15.607	18.863	13.204	31.424	3.653	1.436	50.814
	0.750	4.850	11.371	13.742	9.620	31.407	3.636	1.309	50.109
	0.500	5.100	7.163	8.657	6.060	31.370	3.613	1.182	48.648
	0.250	5.350	3.013	3.641	2.549	31.234	3.580	1.054	46.122
	0.127	5.473	1.000	1.209	0.846	30.768	3.561	0.984	42.527
	0.000	5.600	0.000	0.000	0.000	29.483	3.526	0.900	0.000



**Tank Calibrations - Cuba 5 Br**

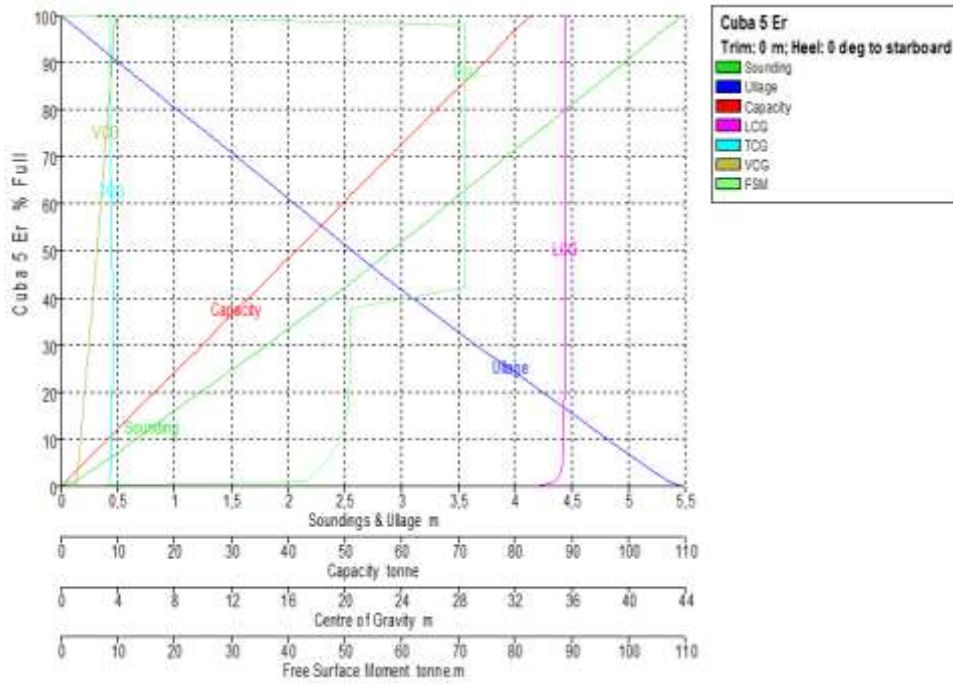
Fluid Type = Atún      Specific gravity = 0,7  
 Permeability = 85 %  
 Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Tank Name	Sounding	Ullage	% Full	Capacity	Capacity	LCG m	TCG m	VCG m	FSM
Cuba 5 Br	5.470	0.000	100.000	118.076	82.653	35.481	-3.489	3.878	0.000
	5.367	0.103	98.000	115.714	81.000	35.481	-3.491	3.825	71.143
	5.362	0.108	97.900	115.596	80.917	35.481	-3.491	3.822	71.143
	5.250	0.220	95.722	113.025	79.117	35.481	-3.494	3.765	71.140
	5.000	0.470	90.861	107.285	75.099	35.481	-3.502	3.637	71.135
	4.750	0.720	86.000	101.545	71.081	35.480	-3.510	3.509	71.130
	4.500	0.970	81.139	95.805	67.064	35.480	-3.519	3.381	71.123
	4.250	1.220	76.278	90.066	63.046	35.479	-3.529	3.252	71.116
	4.000	1.470	71.417	84.327	59.029	35.478	-3.540	3.122	71.109
	3.750	1.720	66.557	78.588	55.011	35.477	-3.554	2.992	71.101
	3.500	1.970	61.697	72.849	50.994	35.477	-3.569	2.861	71.091
	3.250	2.220	56.837	67.110	46.977	35.475	-3.587	2.729	71.081
	3.000	2.470	51.977	61.372	42.961	35.474	-3.608	2.596	71.069
	2.750	2.720	47.118	55.634	38.944	35.473	-3.634	2.461	71.051
	2.500	2.970	42.259	49.897	34.928	35.471	-3.666	2.323	71.033
	2.250	3.220	37.724	44.543	31.180	35.469	-3.677	2.193	51.037
	2.000	3.470	33.373	39.405	27.583	35.466	-3.673	2.067	51.012
	1.750	3.720	29.022	34.268	23.988	35.463	-3.668	1.942	50.978
	1.500	3.970	24.672	29.132	20.393	35.458	-3.661	1.816	50.925
	1.250	4.220	20.325	23.999	16.800	35.452	-3.652	1.690	50.792
	1.000	4.470	15.985	18.874	13.212	35.442	-3.639	1.564	50.456
	0.750	4.720	11.660	13.767	9.637	35.426	-3.620	1.437	49.646
	0.500	4.970	7.369	8.702	6.091	35.391	-3.594	1.310	47.996
	0.250	5.220	3.145	3.714	2.600	35.270	-3.560	1.182	45.194
	0.121	5.349	1.000	1.181	0.827	34.822	-3.546	1.110	43.169
	0.000	5.470	0.000	0.000	0.000	33.503	-3.547	1.030	0.000

**Tank Calibrations - Cuba 5 Er**

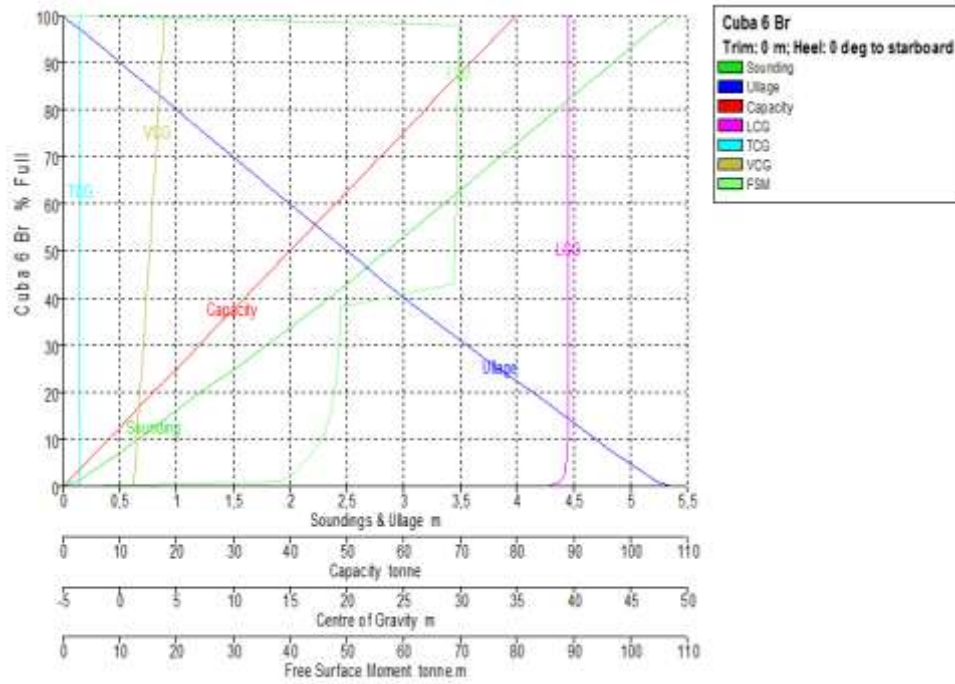
Fluid Type = Atún      Specific gravity = 0,7  
Permeability = 85 %  
Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Tank Name	Sounding	Ullage	% Full	Capacity	Capacity	LCG m	TCG m	VCG m	FSM
Cuba 5 Er	5.470	0.000	100.000	118.076	82.653	35.481	3.489	3.878	0.000
	5.367	0.103	98.000	115.714	81.000	35.481	3.491	3.825	71.143
	5.362	0.108	97.900	115.596	80.917	35.481	3.491	3.822	71.143
	5.250	0.220	95.722	113.025	79.117	35.481	3.494	3.765	71.140
	5.000	0.470	90.861	107.285	75.099	35.481	3.502	3.637	71.135
	4.750	0.720	86.000	101.545	71.081	35.480	3.510	3.509	71.130
	4.500	0.970	81.139	95.805	67.064	35.480	3.519	3.381	71.123
	4.250	1.220	76.278	90.066	63.046	35.479	3.529	3.252	71.116
	4.000	1.470	71.417	84.327	59.029	35.478	3.540	3.122	71.109
	3.750	1.720	66.557	78.588	55.011	35.477	3.554	2.992	71.101
	3.500	1.970	61.697	72.849	50.994	35.477	3.569	2.861	71.091
	3.250	2.220	56.837	67.110	46.977	35.475	3.587	2.729	71.081
	3.000	2.470	51.977	61.372	42.961	35.474	3.608	2.596	71.069
	2.750	2.720	47.118	55.634	38.944	35.473	3.634	2.461	71.051
	2.500	2.970	42.259	49.897	34.928	35.471	3.666	2.323	71.033
	2.250	3.220	37.724	44.543	31.180	35.469	3.677	2.193	51.037
	2.000	3.470	33.373	39.405	27.583	35.466	3.673	2.067	51.012
	1.750	3.720	29.022	34.268	23.988	35.463	3.668	1.942	50.978
	1.500	3.970	24.672	29.132	20.393	35.458	3.661	1.816	50.925
	1.250	4.220	20.325	23.999	16.800	35.452	3.652	1.690	50.792
	1.000	4.470	15.985	18.874	13.212	35.442	3.639	1.564	50.456
	0.750	4.720	11.660	13.767	9.637	35.426	3.620	1.437	49.646
	0.500	4.970	7.369	8.702	6.091	35.391	3.594	1.310	47.996
	0.250	5.220	3.145	3.714	2.600	35.270	3.560	1.182	45.194
	0.121	5.349	1.000	1.181	0.827	34.822	3.546	1.110	43.169
	0.000	5.470	0.000	0.000	0.000	33.503	3.547	1.030	0.000

**Tank Calibrations - Cuba 6 Br**

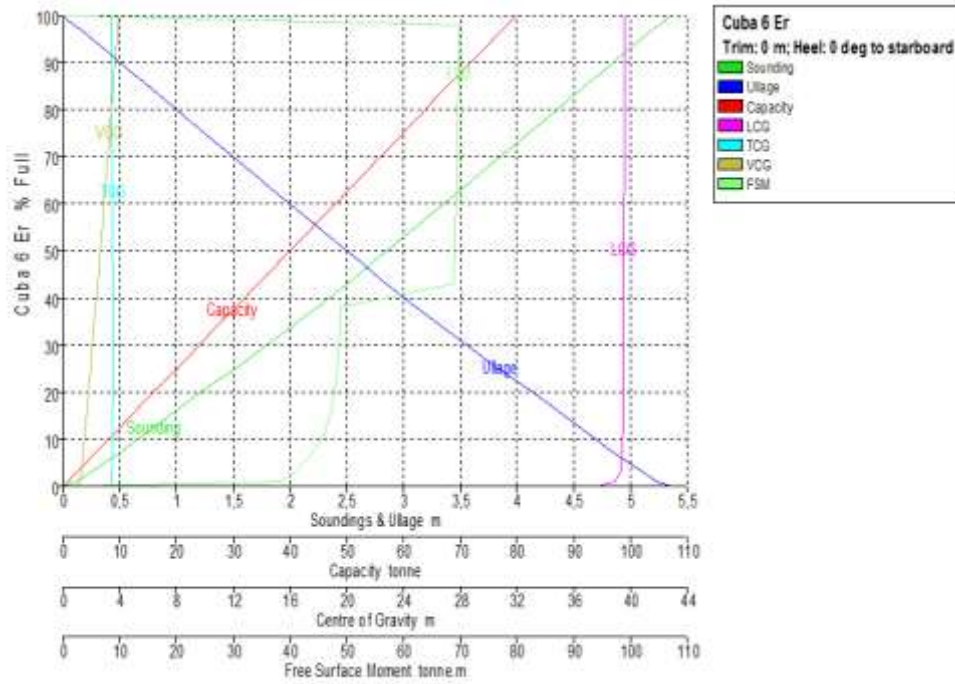
Fluid Type = Atún      Specific gravity = 0,7  
 Permeability = 85 %  
 Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Tank Name	Sounding	Ullage	% Full	Capacity	Capacity	LCG m	TCG m	VCG m	FSM
Cuba 6 Br	5.350	0.000	100.000	114.035	79.825	39.495	-3.441	3.946	0.000
	5.250	0.100	98.000	111.755	78.228	39.495	-3.443	3.895	69.713
	5.250	0.100	98.000	111.755	78.228	39.495	-3.443	3.895	69.713
	5.245	0.105	97.900	111.641	78.148	39.495	-3.443	3.892	69.712
	5.000	0.350	93.001	106.054	74.238	39.494	-3.449	3.767	69.664
	4.750	0.600	88.004	100.355	70.249	39.494	-3.455	3.639	69.613
	4.500	0.850	83.007	94.657	66.260	39.493	-3.463	3.510	69.547
	4.250	1.100	78.013	88.962	62.273	39.492	-3.471	3.381	69.481
	4.000	1.350	73.019	83.268	58.288	39.491	-3.480	3.251	69.414
	3.750	1.600	68.028	77.576	54.303	39.490	-3.491	3.121	69.344
	3.500	1.850	63.038	71.886	50.320	39.489	-3.504	2.990	69.248
	3.250	2.100	58.051	66.199	46.339	39.488	-3.519	2.859	69.152
	3.000	2.350	53.067	60.515	42.360	39.486	-3.537	2.726	69.045
	2.750	2.600	48.085	54.834	38.384	39.484	-3.559	2.591	68.901
	2.500	2.850	43.107	49.157	34.410	39.482	-3.586	2.454	68.751
	2.250	3.100	38.217	43.581	30.507	39.479	-3.614	2.317	49.062
	2.000	3.350	33.773	38.513	26.959	39.476	-3.607	2.191	48.862
	1.750	3.600	29.336	33.453	23.417	39.472	-3.599	2.065	48.633
	1.500	3.850	24.907	28.403	19.882	39.467	-3.588	1.938	48.342
	1.250	4.100	20.488	23.363	16.354	39.460	-3.575	1.812	47.951
	1.000	4.350	16.085	18.342	12.839	39.450	-3.557	1.685	47.321
	0.750	4.600	11.708	13.352	9.346	39.433	-3.533	1.558	46.157
	0.500	4.850	7.383	8.419	5.894	39.399	-3.502	1.430	44.080
	0.250	5.100	3.145	3.586	2.511	39.277	-3.463	1.302	40.832
	0.121	5.229	1.000	1.140	0.798	38.832	-3.457	1.230	38.614
	0.000	5.350	0.000	0.000	0.000	37.523	-3.481	1.150	0.000

**Tank Calibrations - Cuba 6 Er**

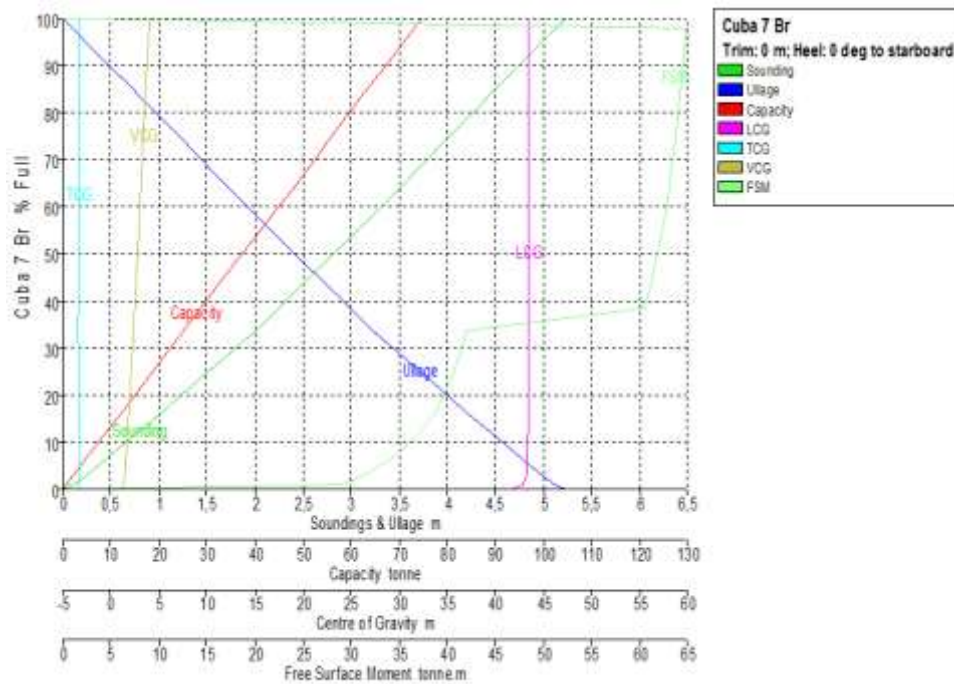
Fluid Type = Atún      Specific gravity = 0,7  
 Permeability = 85 %  
 Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Tank Name	Sounding	Ullage	% Full	Capacity	Capacity	LCG m	TCG m	VCG m	FSM
Cuba 6 Er	5.350	0.000	100.000	114.035	79.825	39.495	3.441	3.946	0.000
	5.250	0.100	98.000	111.755	78.228	39.495	3.443	3.895	69.713
	5.250	0.100	98.000	111.755	78.228	39.495	3.443	3.895	69.713
	5.245	0.105	97.900	111.641	78.148	39.495	3.443	3.892	69.712
	5.000	0.350	93.001	106.054	74.238	39.494	3.449	3.767	69.664
	4.750	0.600	88.004	100.355	70.249	39.494	3.455	3.639	69.613
	4.500	0.850	83.007	94.657	66.260	39.493	3.463	3.510	69.547
	4.250	1.100	78.013	88.962	62.273	39.492	3.471	3.381	69.481
	4.000	1.350	73.019	83.268	58.288	39.491	3.480	3.251	69.414
	3.750	1.600	68.028	77.576	54.303	39.490	3.491	3.121	69.344
	3.500	1.850	63.038	71.886	50.320	39.489	3.504	2.990	69.248
	3.250	2.100	58.051	66.199	46.339	39.488	3.519	2.859	69.152
	3.000	2.350	53.067	60.515	42.360	39.486	3.537	2.726	69.045
	2.750	2.600	48.085	54.834	38.384	39.484	3.559	2.591	68.901
	2.500	2.850	43.107	49.157	34.410	39.482	3.586	2.454	68.751
	2.250	3.100	38.217	43.581	30.507	39.479	3.614	2.317	49.062
	2.000	3.350	33.773	38.513	26.959	39.476	3.607	2.191	48.862
	1.750	3.600	29.336	33.453	23.417	39.472	3.599	2.065	48.633
	1.500	3.850	24.907	28.403	19.882	39.467	3.588	1.938	48.342
	1.250	4.100	20.488	23.363	16.354	39.460	3.575	1.812	47.951
	1.000	4.350	16.085	18.342	12.839	39.450	3.557	1.685	47.321
	0.750	4.600	11.708	13.352	9.346	39.433	3.533	1.558	46.157
	0.500	4.850	7.383	8.419	5.894	39.399	3.502	1.430	44.080
	0.250	5.100	3.145	3.586	2.511	39.277	3.463	1.302	40.832
	0.121	5.229	1.000	1.140	0.798	38.832	3.457	1.230	38.614
	0.000	5.350	0.000	0.000	0.000	37.523	3.481	1.150	0.000

**Tank Calibrations - Cuba 7 Br**

Fluid Type = Atún      Specific gravity = 0,7  
 Permeability = 85 %  
 Trim = 0 m (+ve by stern); Heel = 0 deg to starboard

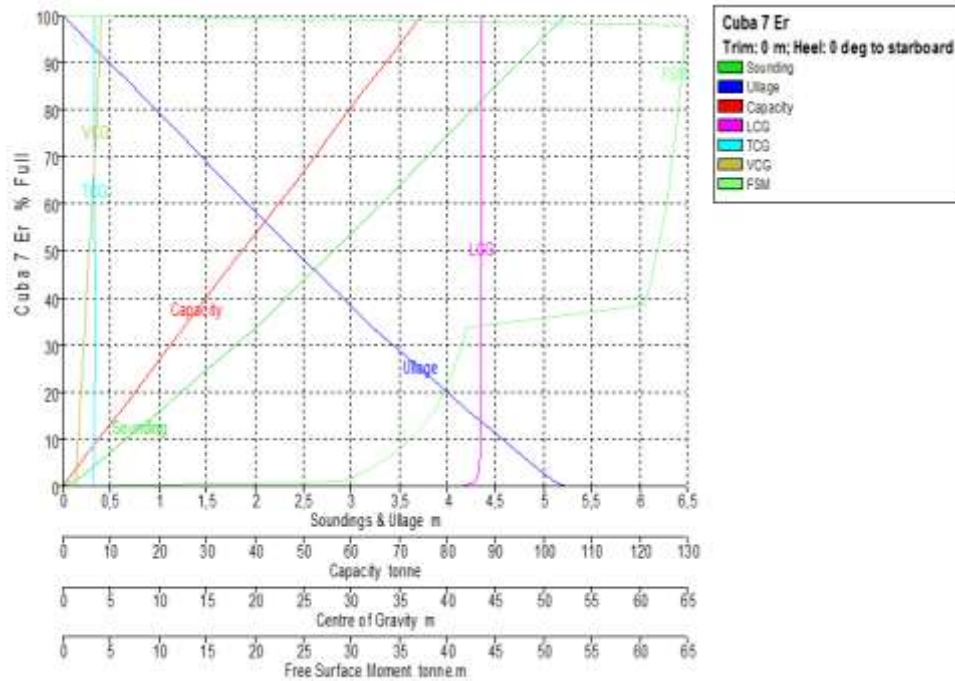


Tank Name	Sounding	Ullage	% Full	Capacity	Capacity	LCG m	TCG m	VCG m	FSM
Cuba 7 Br	5.230	0.000	100.000	106.723	74.706	43.499	-3.299	4.029	0.000
	5.134	0.096	98.000	104.588	73.212	43.499	-3.300	3.980	64.814
	5.129	0.101	97.900	104.482	73.137	43.499	-3.300	3.977	64.811
	5.000	0.230	95.205	101.605	71.124	43.498	-3.301	3.911	64.707
	4.750	0.480	89.998	96.049	67.234	43.497	-3.304	3.781	64.495
	4.500	0.730	84.798	90.499	63.349	43.496	-3.307	3.652	64.228
	4.250	0.980	79.605	84.957	59.470	43.495	-3.311	3.522	63.960
	4.000	1.230	74.420	79.423	55.596	43.494	-3.316	3.391	63.691
	3.750	1.480	69.242	73.897	51.728	43.492	-3.322	3.260	63.406
	3.500	1.730	64.073	68.381	47.866	43.491	-3.330	3.128	63.033
	3.250	1.980	58.915	62.876	44.013	43.489	-3.339	2.995	62.652
	3.000	2.230	53.768	57.382	40.168	43.487	-3.351	2.861	62.241
	2.750	2.480	48.634	51.903	36.332	43.484	-3.366	2.726	61.731
	2.500	2.730	43.514	46.440	32.508	43.481	-3.386	2.588	61.191
	2.250	2.980	38.413	40.995	28.697	43.477	-3.412	2.448	60.487
	2.000	3.230	33.714	35.980	25.186	43.474	-3.413	2.315	42.039
	1.750	3.480	29.219	31.183	21.828	43.469	-3.398	2.188	41.345
	1.500	3.730	24.751	26.415	18.490	43.464	-3.381	2.060	40.562
	1.250	3.980	20.315	21.680	15.176	43.457	-3.361	1.932	39.686
	1.000	4.230	15.916	16.986	11.890	43.447	-3.336	1.804	38.590
	0.750	4.480	11.569	12.346	8.642	43.431	-3.305	1.676	37.001
	0.500	4.730	7.300	7.790	5.453	43.400	-3.267	1.548	34.643
	0.250	4.980	3.148	3.360	2.352	43.293	-3.226	1.420	31.374
	0.117	5.113	1.000	1.067	0.747	42.898	-3.233	1.347	29.242
	0.000	5.230	0.000	0.000	0.000	41.543	-3.311	1.270	0.000



**Tank Calibrations - Cuba 7 Er**

Fluid Type = Atún      Specific gravity = 0,7  
 Permeability = 85 %  
 Trim = 0 m (+ve by stern); Heel = 0 deg to starboard

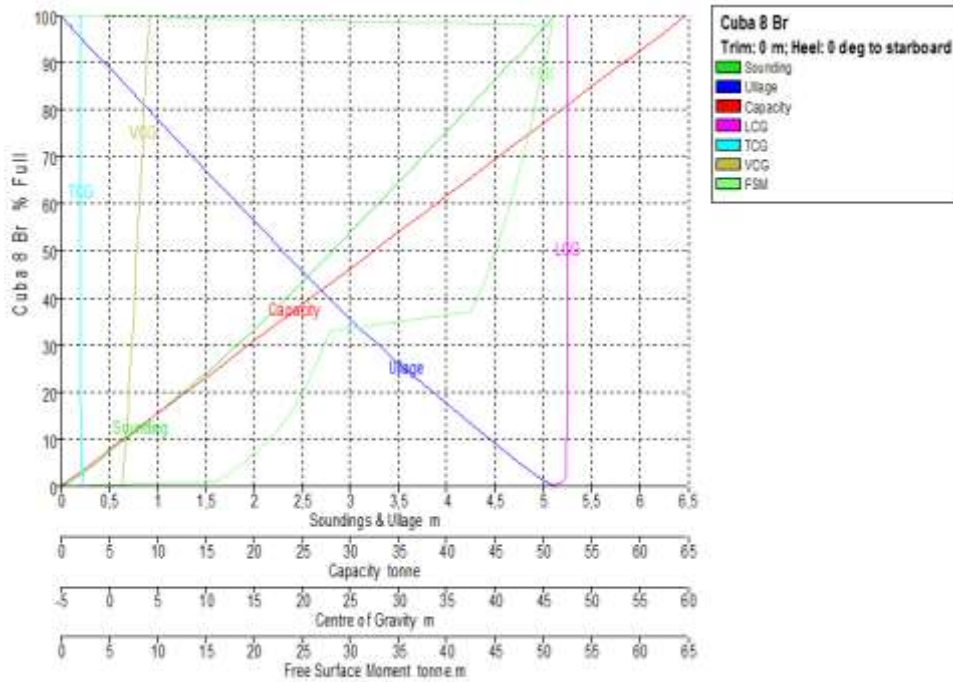


Tank Name	Sounding	Ullage	% Full	Capacity	Capacity	LCG m	TCG m	VCG m	FSM
Cuba 7 Er	5.230	0.000	100.000	106.723	74.706	43.499	3.299	4.029	0.000
	5.134	0.096	98.000	104.588	73.212	43.499	3.300	3.980	64.814
	5.129	0.101	97.900	104.482	73.137	43.499	3.300	3.977	64.811
	5.000	0.230	95.205	101.605	71.124	43.498	3.301	3.911	64.707
	4.750	0.480	89.998	96.049	67.234	43.497	3.304	3.781	64.495
	4.500	0.730	84.798	90.499	63.349	43.496	3.307	3.652	64.228
	4.250	0.980	79.605	84.957	59.470	43.495	3.311	3.522	63.960
	4.000	1.230	74.420	79.423	55.596	43.494	3.316	3.391	63.691
	3.750	1.480	69.242	73.897	51.728	43.492	3.322	3.260	63.406
	3.500	1.730	64.073	68.381	47.866	43.491	3.330	3.128	63.033
	3.250	1.980	58.915	62.876	44.013	43.489	3.339	2.995	62.652
	3.000	2.230	53.768	57.382	40.168	43.487	3.351	2.861	62.241
	2.750	2.480	48.634	51.903	36.332	43.484	3.366	2.726	61.731
	2.500	2.730	43.514	46.440	32.508	43.481	3.386	2.588	61.191
	2.250	2.980	38.413	40.995	28.697	43.477	3.412	2.448	60.487
	2.000	3.230	33.714	35.980	25.186	43.474	3.413	2.315	42.039
	1.750	3.480	29.219	31.183	21.828	43.469	3.398	2.188	41.345
	1.500	3.730	24.751	26.415	18.490	43.464	3.381	2.060	40.562
	1.250	3.980	20.315	21.680	15.176	43.457	3.361	1.932	39.686
	1.000	4.230	15.916	16.986	11.890	43.447	3.336	1.804	38.590
	0.750	4.480	11.569	12.346	8.642	43.431	3.305	1.676	37.001
	0.500	4.730	7.300	7.790	5.453	43.400	3.267	1.548	34.643
	0.250	4.980	3.148	3.360	2.352	43.293	3.226	1.420	31.374
	0.117	5.113	1.000	1.067	0.747	42.898	3.233	1.347	29.242
	0.000	5.230	0.000	0.000	0.000	41.543	3.311	1.270	0.000



**Tank Calibrations - Cuba 8 Br**

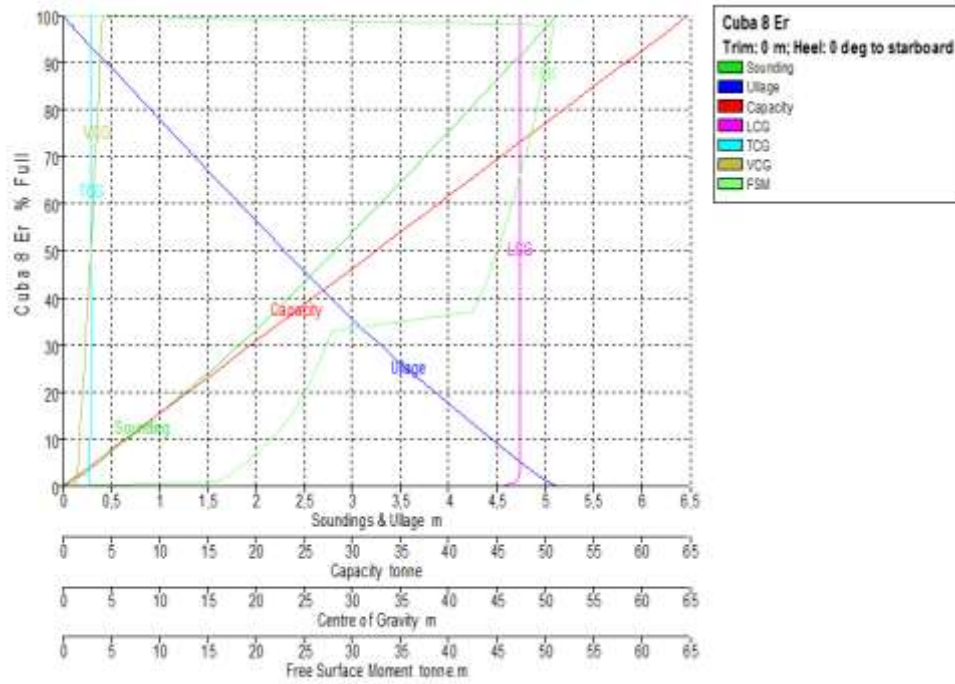
Fluid Type = Atún      Specific gravity = 0,7  
 Permeability = 85 %  
 Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Tank Name	Sounding	Ullage	% Full	Capacity	Capacity	LCG m	TCG m	VCG m	FSM
Cuba 8 Br	5.120	0.000	100.000	92.567	64.797	47.482	-2.950	4.123	0.000
	5.030	0.090	98.000	90.716	63.501	47.481	-2.949	4.076	50.904
	5.025	0.095	97.900	90.623	63.436	47.481	-2.949	4.073	50.895
	5.000	0.120	97.345	90.110	63.077	47.481	-2.949	4.060	50.845
	4.800	0.320	92.931	86.024	60.217	47.480	-2.947	3.955	50.422
	4.600	0.520	88.531	81.950	57.365	47.479	-2.945	3.849	49.949
	4.400	0.720	84.145	77.890	54.523	47.478	-2.943	3.743	49.476
	4.200	0.920	79.773	73.844	51.691	47.477	-2.942	3.637	49.005
	4.000	1.120	75.417	69.811	48.868	47.475	-2.941	3.531	48.535
	3.800	1.320	71.075	65.792	46.054	47.474	-2.941	3.424	48.028
	3.600	1.520	66.750	61.789	43.252	47.473	-2.941	3.316	47.460
	3.400	1.720	62.444	57.803	40.462	47.471	-2.942	3.209	46.895
	3.200	1.920	58.155	53.833	37.683	47.469	-2.945	3.100	46.313
	3.000	2.120	53.887	49.882	34.917	47.467	-2.948	2.991	45.652
	2.800	2.320	49.641	45.951	32.166	47.465	-2.954	2.881	44.946
	2.600	2.520	45.418	42.042	29.429	47.463	-2.962	2.769	44.222
	2.400	2.720	41.221	38.157	26.710	47.460	-2.973	2.656	43.402
	2.200	2.920	37.051	34.297	24.008	47.457	-2.989	2.541	42.546
	2.000	3.120	33.067	30.609	21.427	47.454	-2.999	2.427	27.999
	1.800	3.320	29.478	27.287	19.101	47.451	-2.981	2.323	27.250
	1.600	3.520	25.923	23.996	16.797	47.448	-2.963	2.219	26.464
	1.400	3.720	22.406	20.740	14.518	47.444	-2.942	2.116	25.647
	1.200	3.920	18.929	17.522	12.265	47.440	-2.919	2.012	24.766
	1.000	4.120	15.498	14.346	10.042	47.433	-2.893	1.908	23.765
	0.800	4.320	12.122	11.221	7.854	47.425	-2.864	1.805	22.562
	0.600	4.520	8.816	8.160	5.712	47.412	-2.830	1.701	21.069
	0.400	4.720	5.599	5.183	3.628	47.388	-2.794	1.598	19.278
	0.200	4.920	2.492	2.306	1.614	47.310	-2.761	1.496	17.230
	0.101	5.019	1.000	0.926	0.648	47.105	-2.768	1.444	16.121
	0.000	5.120	0.000	0.000	0.000	45.563	-2.958	1.380	0.000

**Tank Calibrations - Cuba 8 Er**

Fluid Type = Atún      Specific gravity = 0,7  
 Permeability = 85 %  
 Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Tank Name	Sounding	Ullage	% Full	Capacity	Capacity	LCG m	TCG m	VCG m	FSM
Cuba 8 Er	5.120	0.000	100.000	92.567	64.797	47.482	2.950	4.123	0.000
	5.030	0.090	98.000	90.716	63.501	47.481	2.949	4.076	50.904
	5.025	0.095	97.900	90.623	63.436	47.481	2.949	4.073	50.895
	5.000	0.120	97.345	90.110	63.077	47.481	2.949	4.060	50.845
	4.800	0.320	92.931	86.024	60.217	47.480	2.947	3.955	50.422
	4.600	0.520	88.531	81.950	57.365	47.479	2.945	3.849	49.949
	4.400	0.720	84.145	77.890	54.523	47.478	2.943	3.743	49.476
	4.200	0.920	79.773	73.844	51.691	47.477	2.942	3.637	49.005
	4.000	1.120	75.417	69.811	48.868	47.475	2.941	3.531	48.535
	3.800	1.320	71.075	65.792	46.054	47.474	2.941	3.424	48.028
	3.600	1.520	66.750	61.789	43.252	47.473	2.941	3.316	47.460
	3.400	1.720	62.444	57.803	40.462	47.471	2.942	3.209	46.895
	3.200	1.920	58.155	53.833	37.683	47.469	2.945	3.100	46.313
	3.000	2.120	53.887	49.882	34.917	47.467	2.948	2.991	45.652
	2.800	2.320	49.641	45.951	32.166	47.465	2.954	2.881	44.946
	2.600	2.520	45.418	42.042	29.429	47.463	2.962	2.769	44.222
	2.400	2.720	41.221	38.157	26.710	47.460	2.973	2.656	43.402
	2.200	2.920	37.051	34.297	24.008	47.457	2.989	2.541	42.546
	2.000	3.120	33.067	30.609	21.427	47.454	2.999	2.427	41.699
	1.800	3.320	29.478	27.287	19.101	47.451	2.981	2.323	40.850
	1.600	3.520	25.923	23.996	16.797	47.448	2.963	2.219	40.000
	1.400	3.720	22.406	20.740	14.518	47.444	2.942	2.116	39.150
	1.200	3.920	18.929	17.522	12.265	47.440	2.919	2.012	38.300
	1.000	4.120	15.498	14.346	10.042	47.433	2.893	1.908	37.450
	0.800	4.320	12.122	11.221	7.854	47.425	2.864	1.805	36.600
	0.600	4.520	8.816	8.160	5.712	47.412	2.830	1.701	35.750
	0.400	4.720	5.599	5.183	3.628	47.388	2.794	1.598	34.900
	0.200	4.920	2.492	2.306	1.614	47.310	2.761	1.496	34.050
	0.101	5.019	1.000	0.926	0.648	47.105	2.768	1.444	33.200
	0.000	5.120	0.000	0.000	0.000	45.563	2.958	1.380	32.350

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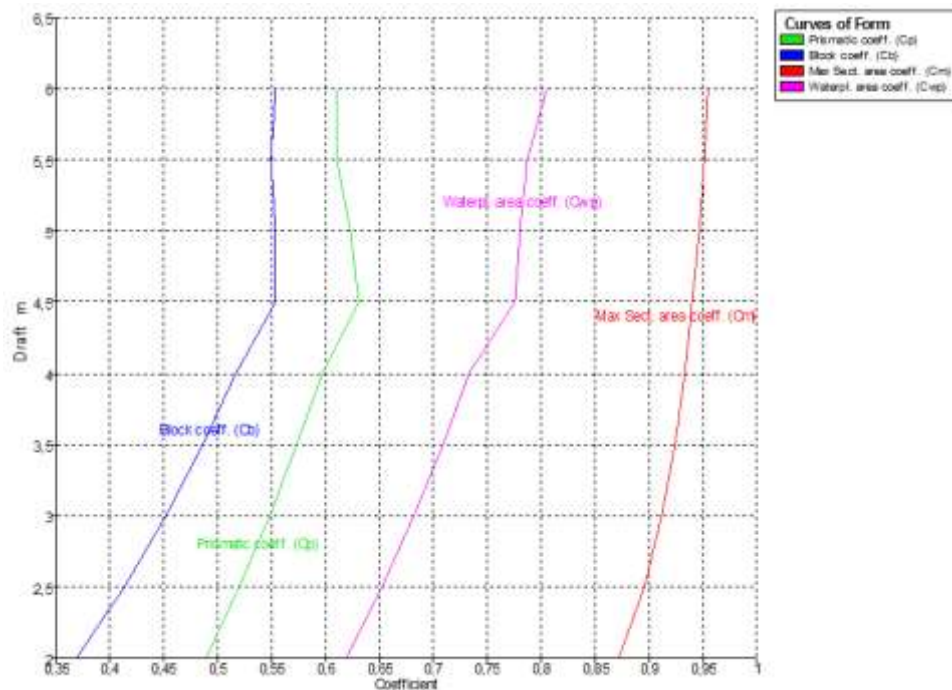
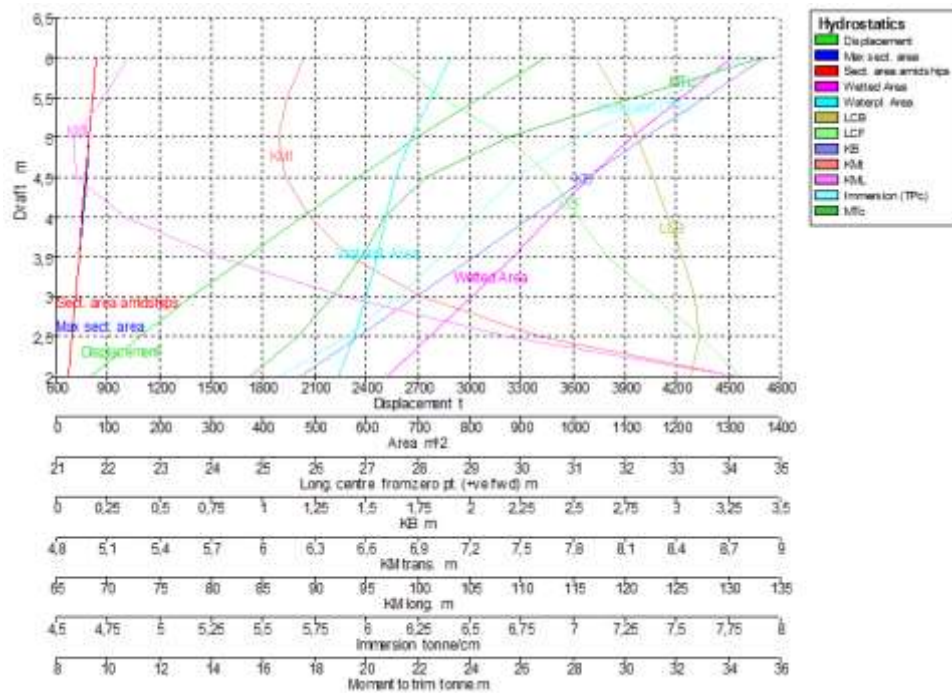
## TABLAS HIDROSTÁTICAS

Las tablas hidrostáticas se han realizado cubriendo un rango de calados que cubre desde un calado de 2 m. hasta un calado de 6 m., con variaciones de medio metro en medio metro.

Así mismo, se obtendrán las tablas hidrostáticas para cada condición de trimado que aparezca dentro del rango de operación del buque. Los trimados seleccionados son el trimado 0; trimados positivos de 0,5, 1, 1,5 y 2; y trimados negativos de -0,5, -1, y -1,5.

**Fixed Trim = 0 m (+ve by stern)**  
**Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)**

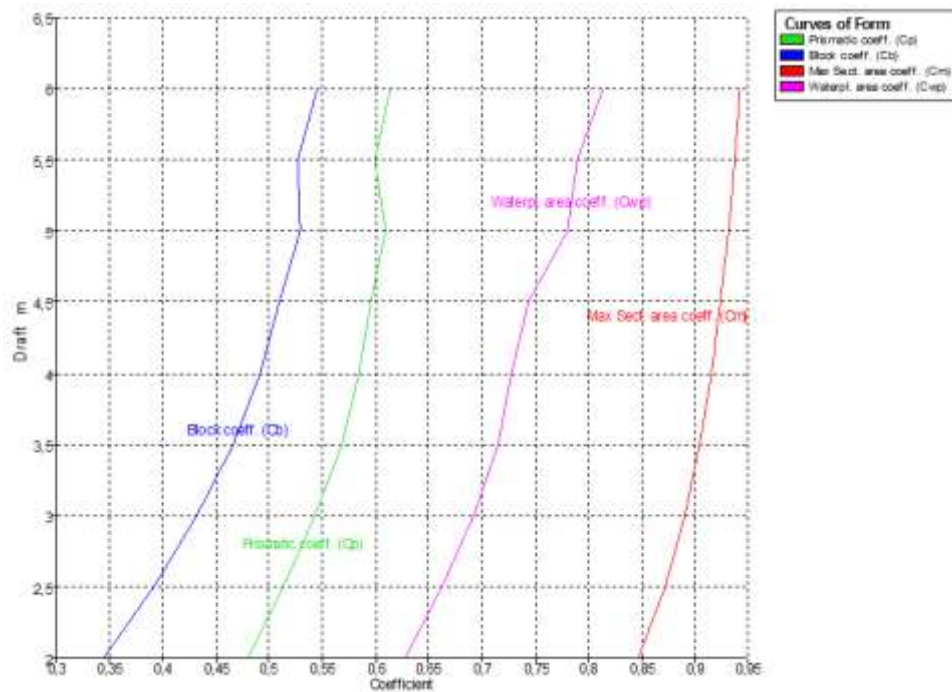
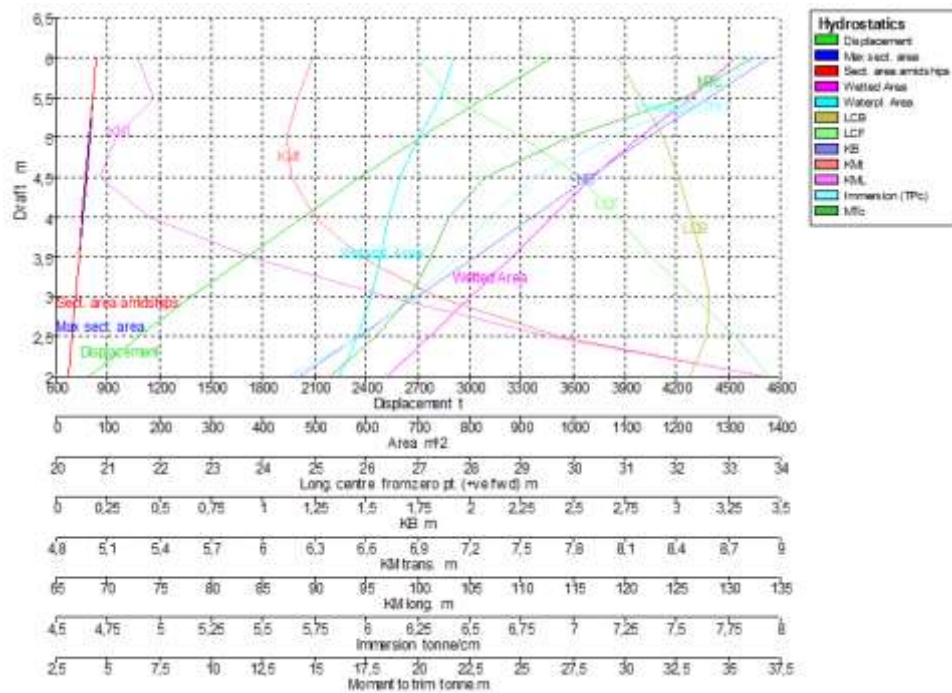
Draft Amidships m	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000
Displacement t	800,1	1088	1390	1703	2025	2356	2699	3061	3443
Heel deg	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Draft at FP m	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000
Draft at AP m	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000
Draft at LCF m	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000
Trim (+ve by stern) m	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
WL Length m	65,517	65,624	65,438	65,039	64,546	62,850	65,362	68,458	70,429
Beam max extents on WL m	13,427	13,448	13,449	13,449	13,450	13,450	13,450	13,450	13,450
Wetted Area m <sup>2</sup>	640,829	722,780	803,881	882,520	956,155	1031,693	1115,156	1209,528	1304,936
Waterpl. Area m <sup>2</sup>	544,669	576,170	600,512	620,377	636,349	655,927	685,927	725,056	762,312
Prismatic coeff. (Cp)	0,489	0,520	0,548	0,574	0,597	0,631	0,623	0,611	0,610
Block coeff. (Cb)	0,369	0,414	0,452	0,486	0,517	0,554	0,554	0,549	0,554
Max Sect. area coeff. (Cm)	0,872	0,895	0,912	0,924	0,933	0,940	0,946	0,951	0,955
Waterpl. area coeff. (Cwp)	0,619	0,653	0,682	0,709	0,733	0,776	0,780	0,787	0,805
LCB from zero pt. (+ve fwd) m	33,281	33,433	33,341	33,114	32,834	32,549	32,249	31,878	31,433
LCF from zero pt. (+ve fwd) m	34,224	33,459	32,559	31,671	31,107	30,565	29,720	28,494	27,404
KB m	1,181	1,464	1,744	2,021	2,296	2,571	2,848	3,132	3,423
KG m	5,850	5,850	5,850	5,850	5,850	5,850	5,850	5,850	5,850
BMt m	7,568	6,137	5,177	4,495	3,976	3,560	3,243	3,008	2,817
BML m	129,654	107,112	90,980	78,737	69,401	64,314	63,906	66,461	68,509
Gmt m	2,898	1,751	1,071	0,666	0,422	0,281	0,242	0,290	0,390
GML m	124,985	102,726	86,874	74,908	65,847	61,035	60,904	63,744	66,082
KMt m	8,748	7,601	6,921	6,516	6,272	6,131	6,092	6,140	6,240
KML m	130,835	108,576	92,724	80,758	71,697	66,885	66,754	69,594	71,932
Immersion (TPc) tonne/cm	5,583	5,906	6,155	6,359	6,523	6,723	7,031	7,432	7,814
MTc tonne.m	15,516	17,337	18,730	19,788	20,686	22,311	25,507	30,271	35,299
RM at 1deg = GMt.Disp.sin(1) tonne.m	40,474	33,248	25,966	19,779	14,928	11,553	11,384	15,513	23,408
Max deck inclination deg	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000
Trim angle (+ve by stern) deg	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000	0,0000



**Fixed Trim = 0,5 m (+ve by stern)**  
**Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)**

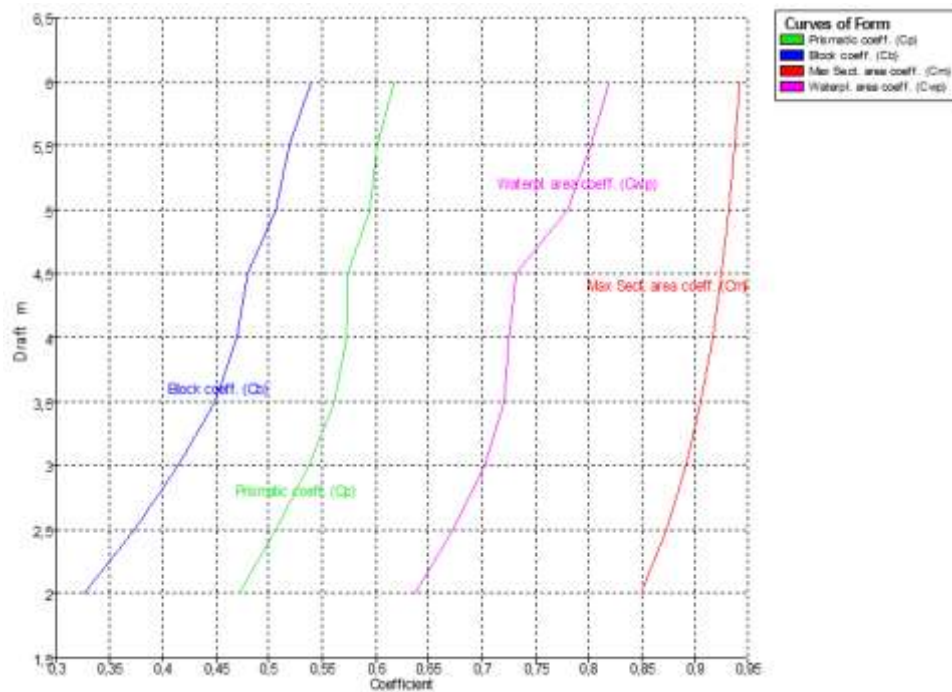
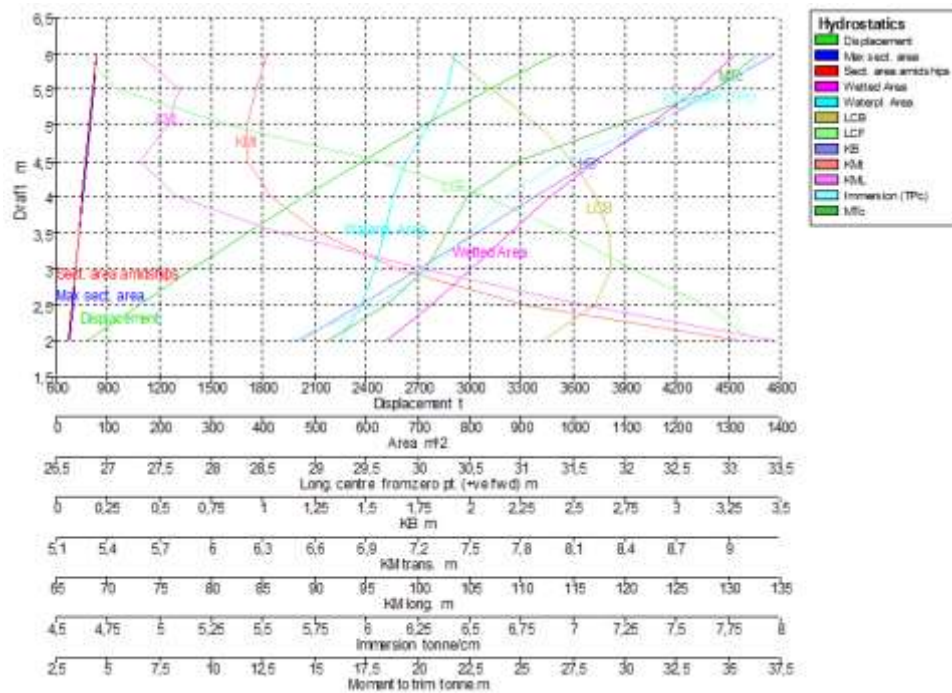
<b>Draft Amidships m</b>	<b>2,000</b>	<b>2,500</b>	<b>3,000</b>	<b>3,500</b>	<b>4,000</b>	<b>4,500</b>	<b>5,000</b>	<b>5,500</b>	<b>6,000</b>
Displacement t	792,3	1083	1388	1706	2031	2366	2715	3085	3473
Heel deg	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Draft at FP m	1,750	2,250	2,750	3,250	3,750	4,250	4,750	5,250	5,750
Draft at AP m	2,250	2,750	3,250	3,750	4,250	4,750	5,250	5,750	6,250
Draft at LCF m	1,988	2,493	2,999	3,505	4,011	4,516	5,025	5,536	6,041
Trim (+ve by stern) m	0,500	0,500	0,500	0,500	0,500	0,500	0,500	0,500	0,500
WL Length m	65,046	65,417	65,408	65,300	65,697	66,469	66,817	69,990	70,327
Beam max extents on WL m	13,428	13,448	13,449	13,449	13,450	13,450	13,450	13,450	13,450
Wetted Area m <sup>2</sup>	640,457	723,199	803,864	880,140	958,598	1036,904	1128,302	1226,963	1313,332
Waterpl. Area m <sup>2</sup>	548,266	583,038	608,726	627,664	643,263	664,624	700,997	743,629	769,219
Prismatic coeff. (Cp)	0,480	0,513	0,543	0,568	0,585	0,596	0,610	0,599	0,614
Block coeff. (Cb)	0,345	0,392	0,432	0,466	0,491	0,510	0,530	0,527	0,546
Max Sect. area coeff. (Cm)	0,847	0,872	0,891	0,905	0,915	0,924	0,931	0,937	0,942
Waterpl. area coeff. (Cwp)	0,628	0,663	0,692	0,715	0,728	0,743	0,780	0,790	0,813
LCB from zero pt. (+ve fwd) m	32,254	32,586	32,621	32,489	32,284	32,036	31,725	31,316	30,862
LCF from zero pt. (+ve fwd) m	33,787	33,151	32,334	31,531	30,856	30,143	29,006	27,640	26,998
KB m	1,177	1,463	1,746	2,026	2,304	2,581	2,863	3,153	3,448
KG m	5,850	5,850	5,850	5,850	5,850	5,850	5,850	5,850	5,850
BMt m	7,728	6,253	5,255	4,546	4,001	3,583	3,279	3,047	2,840
BML m	132,376	111,269	95,072	81,830	71,734	66,669	67,882	71,271	69,467
GMt m	3,055	1,868	1,154	0,724	0,455	0,313	0,288	0,343	0,428
GML m	127,703	106,884	90,970	78,008	68,188	63,398	64,891	68,568	67,054
KMt m	8,905	7,715	7,001	6,572	6,305	6,164	6,141	6,200	6,288
KML m	133,548	112,728	96,814	83,853	74,035	69,248	70,742	74,423	72,913
Immersion (TPc) tonne/cm	5,620	5,976	6,239	6,434	6,593	6,812	7,185	7,622	7,884
MTc tonne.m	15,699	17,956	19,598	20,645	21,488	23,271	27,334	32,821	36,138
RM at 1deg = GMt.Disp.sin(1) tonne.m	42,248	35,305	27,969	21,552	16,141	12,917	13,625	18,456	25,943
Max deck inclination deg	0,4445	0,4445	0,4445	0,4445	0,4445	0,4445	0,4445	0,4445	0,4445
Trim angle (+ve by stern) deg	0,4445	0,4445	0,4445	0,4445	0,4445	0,4445	0,4445	0,4445	0,4445





**Fixed Trim = 1 m (+ve by stern)**  
**Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)**

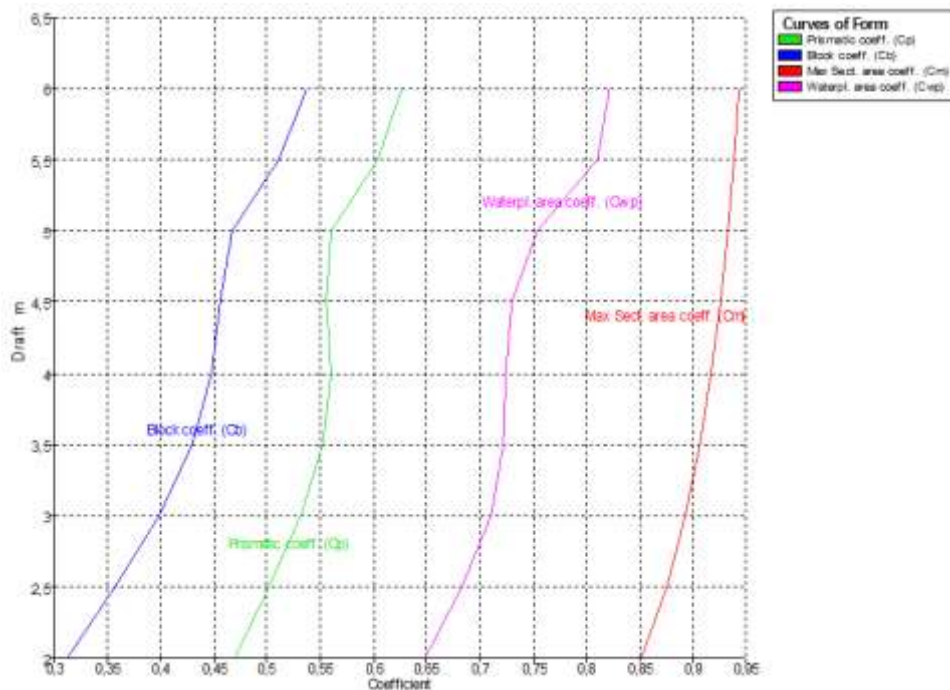
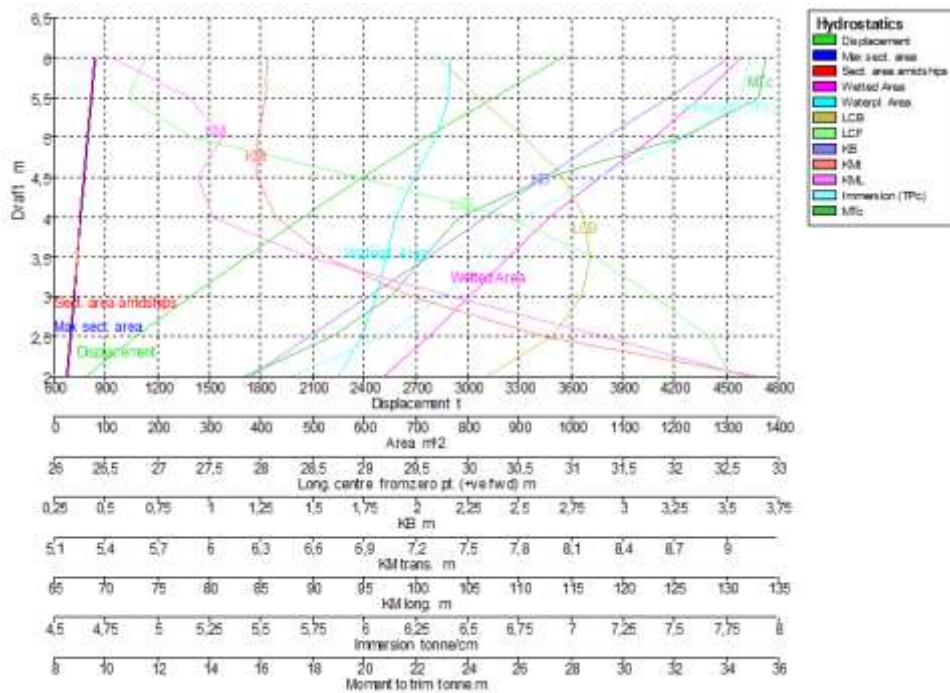
<b>Draft Amidships m</b>	<b>2,000</b>	<b>2,500</b>	<b>3,000</b>	<b>3,500</b>	<b>4,000</b>	<b>4,500</b>	<b>5,000</b>	<b>5,500</b>	<b>6,000</b>
Displacement t	786,6	1079	1389	1709	2039	2378	2735	3114	3506
Heel deg	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Draft at FP m	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500
Draft at AP m	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
Draft at LCF m	1,984	2,491	3,002	3,512	4,024	4,540	5,063	5,580	6,085
Trim (+ve by stern) m	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
WL Length m	64,350	65,118	65,306	65,457	66,742	68,799	68,534	69,972	70,140
Beam max extents on WL m	13,428	13,448	13,449	13,449	13,450	13,450	13,450	13,450	13,450
Wetted Area m <sup>2</sup>	639,835	723,809	803,624	877,997	956,445	1044,150	1144,645	1238,952	1314,979
Waterpl. Area m <sup>2</sup>	550,462	589,117	616,456	634,011	650,650	677,474	718,947	755,417	772,383
Prismatic coeff. (Cp)	0,472	0,506	0,537	0,562	0,572	0,574	0,594	0,601	0,618
Block coeff. (Cb)	0,326	0,373	0,414	0,449	0,469	0,480	0,506	0,519	0,539
Max Sect. area coeff. (Cm)	0,849	0,874	0,892	0,906	0,916	0,925	0,932	0,938	0,943
Waterpl. area coeff. (Cwp)	0,637	0,673	0,702	0,720	0,725	0,732	0,780	0,803	0,819
LCB from zero pt. (+ve fwd) m	31,212	31,709	31,870	31,844	31,713	31,497	31,159	30,718	30,288
LCF from zero pt. (+ve fwd) m	33,243	32,782	32,075	31,420	30,656	29,634	28,174	27,079	26,769
KB m	1,183	1,470	1,754	2,037	2,317	2,597	2,886	3,182	3,479
KG m	5,850	5,850	5,850	5,850	5,850	5,850	5,850	5,850	5,850
BMt m	7,871	6,362	5,327	4,590	4,029	3,615	3,319	3,082	2,849
BML m	133,141	114,623	98,793	84,532	74,333	70,553	72,824	73,804	69,416
GMt m	3,189	1,974	1,227	0,771	0,488	0,352	0,338	0,391	0,448
GML m	128,458	110,235	94,693	80,713	70,792	67,290	69,844	71,113	67,015
KMt m	9,053	7,830	7,081	6,626	6,345	6,212	6,204	6,264	6,327
KML m	134,307	116,079	100,536	86,559	76,640	73,142	75,701	76,977	72,886
Immersion (TPc) tonne/cm	5,642	6,038	6,319	6,499	6,669	6,944	7,369	7,743	7,917
MTc tonne.m	15,679	18,460	20,401	21,408	22,393	24,828	29,643	34,362	36,459
RM at 1deg = GMt.Disp.sin(1) tonne.m	43,777	37,174	29,729	22,998	17,348	14,593	16,152	21,261	27,398
Max deck inclination deg	0,8889	0,8889	0,8889	0,8889	0,8889	0,8889	0,8889	0,8889	0,8889
Trim angle (+ve by stern) deg	0,8889	0,8889	0,8889	0,8889	0,8889	0,8889	0,8889	0,8889	0,8889



**Fixed Trim = 1,5 m (+ve by stern)**  
**Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)**

<b>Draft Amidships m</b>	<b>2,000</b>	<b>2,500</b>	<b>3,000</b>	<b>3,500</b>	<b>4,000</b>	<b>4,500</b>	<b>5,000</b>	<b>5,500</b>	<b>6,000</b>
Displacement t	783,6	1078	1390	1714	2047	2394	2761	3147	3540
Heel deg	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Draft at FP m	1,250	1,750	2,250	2,750	3,250	3,750	4,250	4,750	5,250
Draft at AP m	2,750	3,250	3,750	4,250	4,750	5,250	5,750	6,250	6,750
Draft at LCF m	1,992	2,497	3,010	3,523	4,043	4,577	5,114	5,628	6,124
Trim (+ve by stern) m	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500	1,500
WL Length m	63,215	64,645	65,189	66,023	67,879	70,872	72,831	69,966	69,392
Beam max extents on WL m	13,428	13,448	13,449	13,449	13,450	13,450	13,450	13,450	13,450
Wetted Area m <sup>2</sup>	638,472	724,355	801,945	878,175	958,349	1056,277	1161,641	1247,926	1326,879
Waterpl. Area m <sup>2</sup>	550,598	593,984	622,891	641,477	660,724	695,474	738,387	762,590	767,255
Prismatic coeff. (Cp)	0,470	0,502	0,532	0,553	0,560	0,556	0,561	0,603	0,626
Block coeff. (Cb)	0,313	0,358	0,399	0,430	0,448	0,455	0,468	0,511	0,538
Max Sect. area coeff. (Cm)	0,851	0,875	0,893	0,907	0,917	0,925	0,932	0,938	0,943
Waterpl. area coeff. (Cwp)	0,649	0,683	0,710	0,722	0,724	0,730	0,754	0,810	0,822
LCB from zero pt. (+ve fwd) m	30,180	30,811	31,095	31,178	31,122	30,918	30,544	30,104	29,729
LCF from zero pt. (+ve fwd) m	32,557	32,333	31,799	31,224	30,391	28,934	27,336	26,708	26,883
KB m	1,200	1,485	1,771	2,054	2,335	2,621	2,918	3,218	3,514
KG m	5,850	5,850	5,850	5,850	5,850	5,850	5,850	5,850	5,850
BMt m	7,987	6,460	5,397	4,624	4,057	3,656	3,363	3,106	2,827
BML m	130,951	116,691	101,622	87,626	78,010	76,301	78,393	74,855	67,123
GMt m	3,290	2,063	1,292	0,805	0,518	0,398	0,392	0,426	0,433
GML m	126,254	112,294	97,518	83,806	74,470	73,043	75,423	72,174	64,729
KMt m	9,184	7,943	7,166	6,677	6,391	6,276	6,280	6,324	6,339
KML m	132,115	118,145	103,365	89,656	80,324	78,902	81,290	78,053	70,619
Immersion (TPc) tonne/cm	5,644	6,088	6,385	6,575	6,772	7,129	7,568	7,817	7,864
MTc tonne.m	15,351	18,777	21,032	22,288	23,657	27,131	32,315	35,237	35,549
RM at 1deg = GMt.Disp.sin(1) tonne.m	44,998	38,809	31,355	24,072	18,496	16,610	18,900	23,402	26,735
Max deck inclination deg	1,3333	1,3333	1,3333	1,3333	1,3333	1,3333	1,3333	1,3333	1,3333
Trim angle (+ve by stern) deg	1,3333	1,3333	1,3333	1,3333	1,3333	1,3333	1,3333	1,3333	1,3333

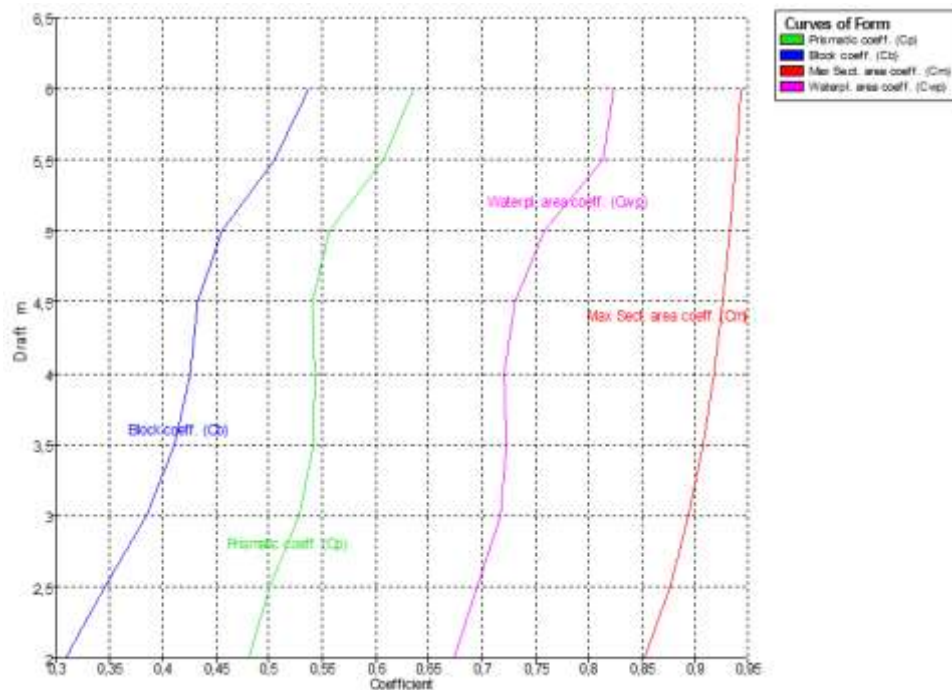
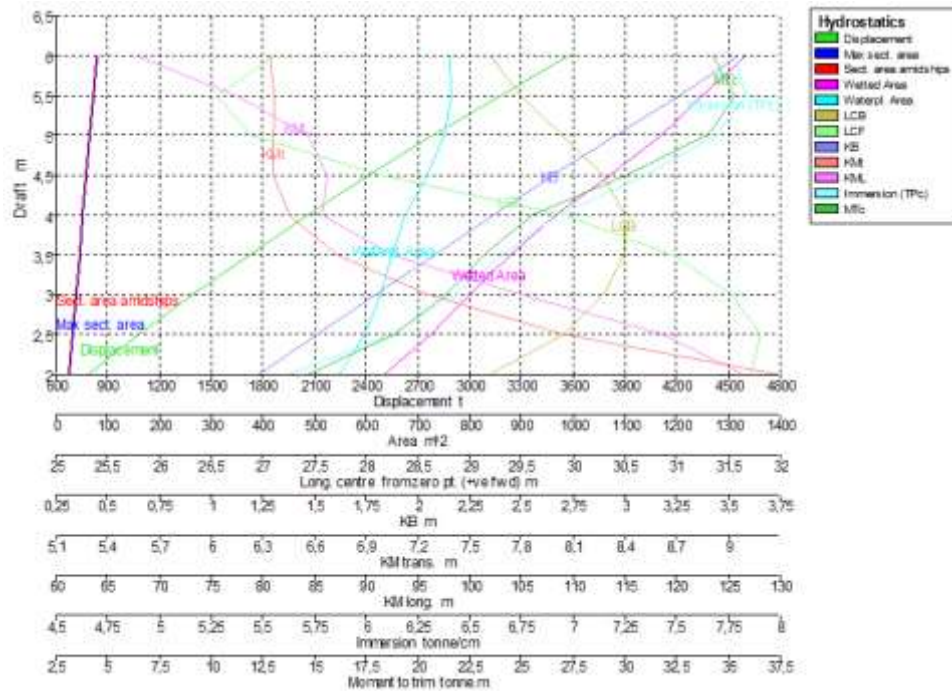




**Fixed Trim = 2 m (+ve by stern)**  
**Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)**

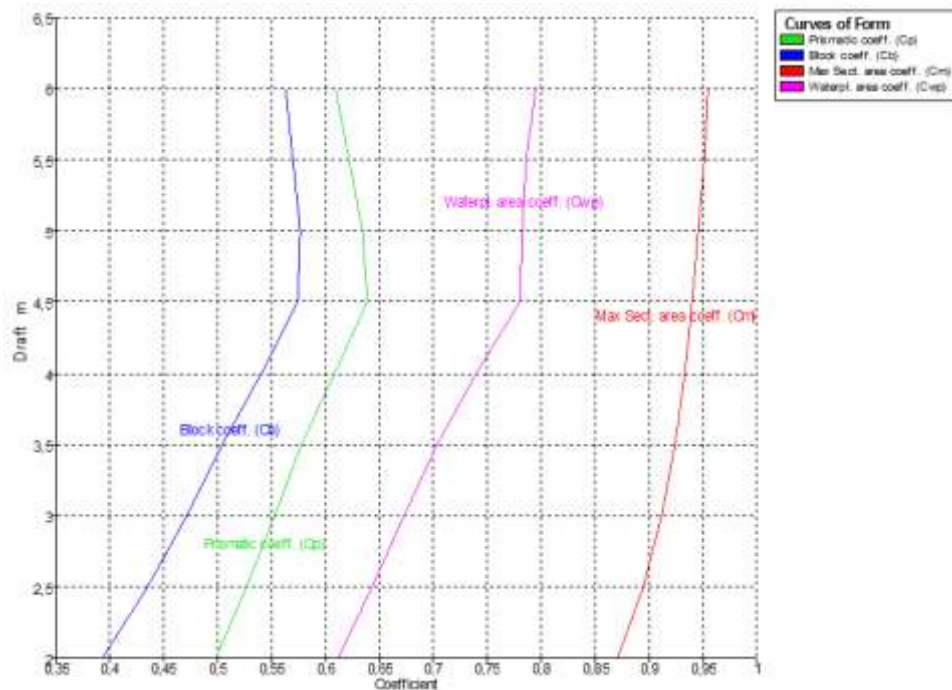
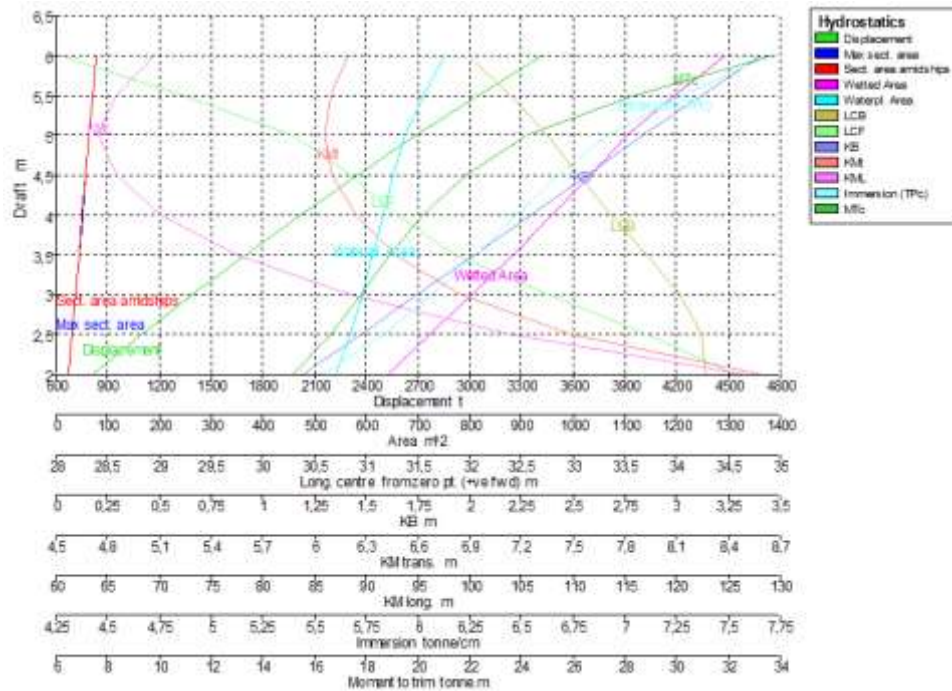
<b>Draft Amidships m</b>	<b>2,000</b>	<b>2,500</b>	<b>3,000</b>	<b>3,500</b>	<b>4,000</b>	<b>4,500</b>	<b>5,000</b>	<b>5,500</b>	<b>6,000</b>
Displacement t	784,0	1078	1393	1720	2058	2415	2792	3181	3571
Heel deg	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Draft at FP m	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000
Draft at AP m	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500	7,000
Draft at LCF m	2,016	2,513	3,022	3,539	4,071	4,627	5,166	5,676	6,159
Trim (+ve by stern) m	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
WL Length m	60,595	63,898	64,982	66,786	69,648	72,969	73,579	69,849	68,521
Beam max extents on WL m	13,428	13,448	13,449	13,449	13,450	13,450	13,450	13,450	13,450
Wetted Area m <sup>2</sup>	635,869	724,266	800,529	878,081	965,434	1071,317	1170,874	1249,861	1335,075
Waterpl. Area m <sup>2</sup>	548,359	597,281	627,187	649,144	675,557	717,024	750,642	764,323	759,275
Prismatic coeff. (Cp)	0,481	0,500	0,528	0,542	0,544	0,540	0,557	0,607	0,636
Block coeff. (Cb)	0,309	0,346	0,385	0,412	0,426	0,433	0,456	0,505	0,537
Max Sect. area coeff. (Cm)	0,853	0,877	0,894	0,908	0,918	0,926	0,933	0,939	0,944
Waterpl. area coeff. (Cwp)	0,674	0,695	0,718	0,723	0,721	0,731	0,759	0,814	0,824
LCB from zero pt. (+ve fwd) m	29,189	29,906	30,304	30,488	30,496	30,283	29,890	29,492	29,200
LCF from zero pt. (+ve fwd) m	31,711	31,806	31,524	30,970	29,925	28,144	26,873	26,553	27,109
KB m	1,227	1,511	1,795	2,077	2,361	2,655	2,959	3,260	3,551
KG m	5,850	5,850	5,850	5,850	5,850	5,850	5,850	5,850	5,850
BMt m	8,070	6,540	5,458	4,660	4,094	3,705	3,401	3,107	2,792
BML m	125,350	117,162	103,065	90,593	83,454	83,547	81,451	74,261	64,237
GMt m	3,355	2,131	1,345	0,836	0,553	0,451	0,438	0,434	0,400
GML m	120,635	112,753	98,952	86,768	79,913	80,293	78,489	71,587	61,845
KMt m	9,293	8,047	7,250	6,735	6,453	6,358	6,358	6,366	6,341
KML m	126,517	118,616	104,810	92,627	85,775	86,162	84,371	77,485	67,757
Immersion (TPc) tonne/cm	5,621	6,122	6,429	6,654	6,924	7,349	7,694	7,834	7,783
MTc tonne.m	14,674	18,866	21,385	23,154	25,521	30,082	34,001	35,329	34,268
RM at 1deg = GMt.Disp.sin(1) tonne.m	45,905	40,097	32,689	25,082	19,865	19,023	21,364	24,068	24,926
Max deck inclination deg	1,7774	1,7774	1,7774	1,7774	1,7774	1,7774	1,7774	1,7774	1,7774
Trim angle (+ve by stern) deg	1,7774	1,7774	1,7774	1,7774	1,7774	1,7774	1,7774	1,7774	1,7774





**Fixed Trim = -0,5 m (+ve by stern)**  
**Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)**

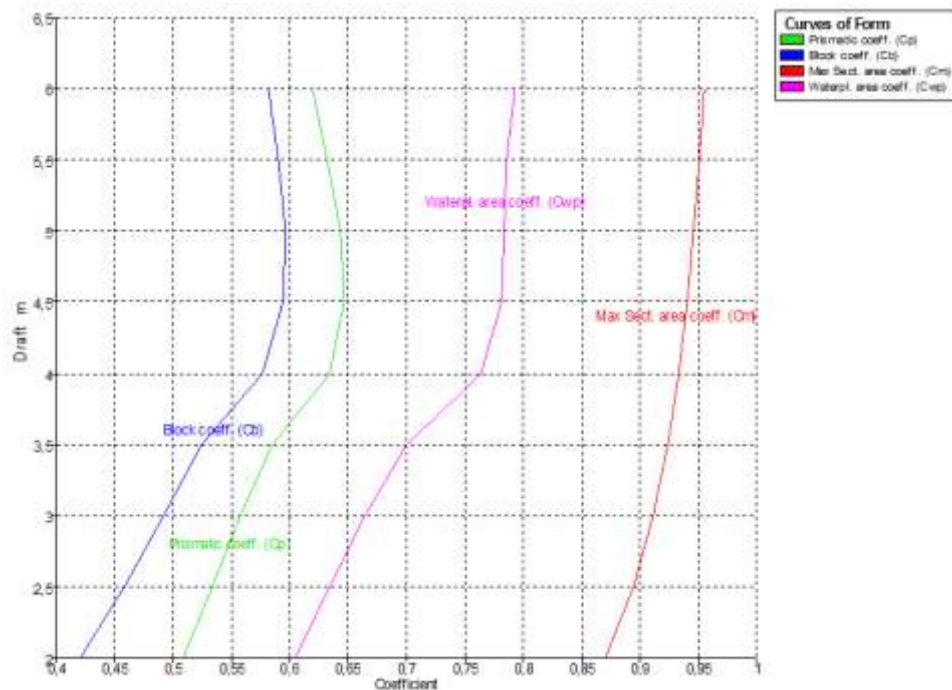
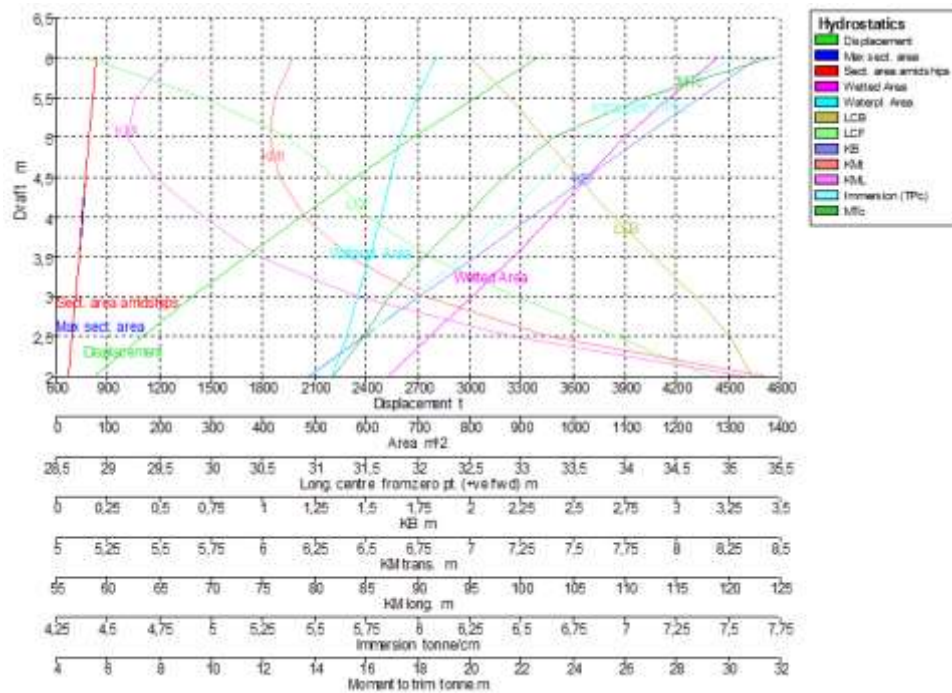
<b>Draft Amidships m</b>	<b>2,000</b>	<b>2,500</b>	<b>3,000</b>	<b>3,500</b>	<b>4,000</b>	<b>4,500</b>	<b>5,000</b>	<b>5,500</b>	<b>6,000</b>
Displacement t	809,5	1094	1392	1700	2020	2348	2687	3041	3415
Heel deg	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Draft at FP m	2,250	2,750	3,250	3,750	4,250	4,750	5,250	5,750	6,250
Draft at AP m	1,750	2,250	2,750	3,250	3,750	4,250	4,750	5,250	5,750
Draft at LCF m	2,018	2,512	3,004	3,497	3,993	4,489	4,985	5,477	5,968
Trim (+ve by stern) m	-0,500	-0,500	-0,500	-0,500	-0,500	-0,500	-0,500	-0,500	-0,500
WL Length m	65,721	65,737	65,401	64,792	63,474	62,068	64,082	67,084	70,145
Beam max extents on WL m	13,427	13,448	13,449	13,449	13,450	13,450	13,450	13,450	13,450
Wetted Area m <sup>2</sup>	641,422	722,761	803,970	883,893	957,599	1033,062	1106,061	1195,514	1293,069
Waterpl. Area m <sup>2</sup>	540,020	568,787	591,881	612,630	631,697	651,272	674,726	709,461	750,164
Prismatic coeff. (Cp)	0,498	0,526	0,553	0,578	0,608	0,639	0,635	0,621	0,610
Block coeff. (Cb)	0,393	0,435	0,471	0,504	0,540	0,575	0,577	0,569	0,563
Max Sect. area coeff. (Cm)	0,871	0,895	0,911	0,924	0,933	0,940	0,946	0,951	0,955
Waterpl. area coeff. (Cwp)	0,612	0,643	0,673	0,703	0,740	0,780	0,783	0,786	0,795
LCB from zero pt. (+ve fwd) m	34,275	34,242	34,027	33,713	33,370	33,051	32,743	32,400	31,988
LCF from zero pt. (+ve fwd) m	34,564	33,713	32,759	31,877	31,290	30,858	30,277	29,242	28,042
KB m	1,194	1,473	1,748	2,021	2,294	2,566	2,841	3,119	3,404
KG m	5,850	5,850	5,850	5,850	5,850	5,850	5,850	5,850	5,850
BMt m	7,397	6,019	5,098	4,445	3,946	3,535	3,214	2,973	2,785
BML m	125,486	102,447	86,580	75,516	67,911	63,338	61,117	62,626	65,994
GMt m	2,726	1,626	0,982	0,604	0,381	0,245	0,201	0,241	0,341
GML m	120,815	98,055	82,464	71,676	64,346	60,048	58,104	59,894	63,550
KMt m	8,591	7,492	6,846	6,466	6,240	6,101	6,055	6,092	6,189
KML m	126,677	103,917	88,326	77,535	70,203	65,902	63,956	65,743	69,396
Immersion (TPc) tonne/cm	5,535	5,830	6,067	6,279	6,475	6,676	6,916	7,272	7,689
MTc tonne.m	15,174	16,644	17,806	18,909	20,162	21,876	24,226	28,264	33,677
RM at 1deg = GMt.Disp.sin(1) tonne.m	38,509	31,053	23,851	17,935	13,442	10,043	9,420	12,782	20,348
Max deck inclination deg	0,4445	0,4445	0,4445	0,4445	0,4445	0,4445	0,4445	0,4445	0,4445
Trim angle (+ve by stern) deg	-0,4445	-0,4445	-0,4445	-0,4445	-0,4445	-0,4445	-0,4445	-0,4445	-0,4445



**Fixed Trim = -1 m (+ve by stern)**  
**Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)**

<b>Draft Amidships m</b>	<b>2,000</b>	<b>2,500</b>	<b>3,000</b>	<b>3,500</b>	<b>4,000</b>	<b>4,500</b>	<b>5,000</b>	<b>5,500</b>	<b>6,000</b>
Displacement t	820,1	1101	1395	1699	2015	2342	2678	3027	3393
Heel deg	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Draft at FP m	2,500	3,000	3,500	4,000	4,500	5,000	5,500	6,000	6,500
Draft at AP m	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000	5,500
Draft at LCF m	2,040	2,526	3,011	3,498	3,989	4,484	4,977	5,464	5,947
Trim (+ve by stern) m	-1,000	-1,000	-1,000	-1,000	-1,000	-1,000	-1,000	-1,000	-1,000
WL Length m	65,828	65,743	65,283	64,378	61,091	61,432	63,210	65,862	68,840
Beam max extents on WL m	13,428	13,448	13,449	13,449	13,450	13,450	13,450	13,450	13,450
Wetted Area m <sup>2</sup>	642,346	723,255	804,345	883,832	957,610	1026,736	1099,484	1184,220	1278,957
Waterpl. Area m <sup>2</sup>	534,635	561,110	583,442	605,854	627,871	645,774	665,794	696,155	734,698
Prismatic coeff. (Cp)	0,509	0,534	0,558	0,585	0,634	0,647	0,644	0,632	0,619
Block coeff. (Cb)	0,421	0,459	0,492	0,525	0,577	0,595	0,597	0,590	0,582
Max Sect. area coeff. (Cm)	0,870	0,894	0,911	0,923	0,933	0,940	0,946	0,951	0,955
Waterpl. area coeff. (Cwp)	0,605	0,635	0,665	0,700	0,764	0,782	0,783	0,786	0,794
LCB from zero pt. (+ve fwd) m	35,225	35,010	34,677	34,288	33,897	33,543	33,216	32,887	32,509
LCF from zero pt. (+ve fwd) m	34,832	33,918	32,940	32,125	31,524	31,187	30,745	29,927	28,809
KB m	1,216	1,489	1,758	2,027	2,296	2,567	2,839	3,113	3,393
KG m	5,850	5,850	5,850	5,850	5,850	5,850	5,850	5,850	5,850
BMt m	7,220	5,899	5,019	4,394	3,909	3,514	3,192	2,941	2,752
BML m	120,456	97,501	82,257	72,854	66,976	62,032	58,962	59,509	62,419
GMt m	2,540	1,495	0,890	0,539	0,330	0,211	0,165	0,195	0,291
GML m	115,775	93,097	78,128	68,999	63,397	58,729	55,936	56,762	59,958
KMt m	8,435	7,387	6,777	6,420	6,205	6,080	6,030	6,054	6,145
KML m	121,657	98,978	84,006	74,872	69,265	64,591	61,794	62,615	65,805
Immersion (TPc) tonne/cm	5,480	5,751	5,980	6,210	6,436	6,619	6,824	7,136	7,531
MTc tonne.m	14,732	15,906	16,905	18,191	19,824	21,338	23,243	26,656	31,566
RM at 1deg = GMt.Disp.sin(1) tonne.m	36,348	28,737	21,664	15,983	11,615	8,604	7,730	10,285	17,240
Max deck inclination deg	0,8889	0,8889	0,8889	0,8889	0,8889	0,8889	0,8889	0,8889	0,8889
Trim angle (+ve by stern) deg	-0,8889	-0,8889	-0,8889	-0,8889	-0,8889	-0,8889	-0,8889	-0,8889	-0,8889

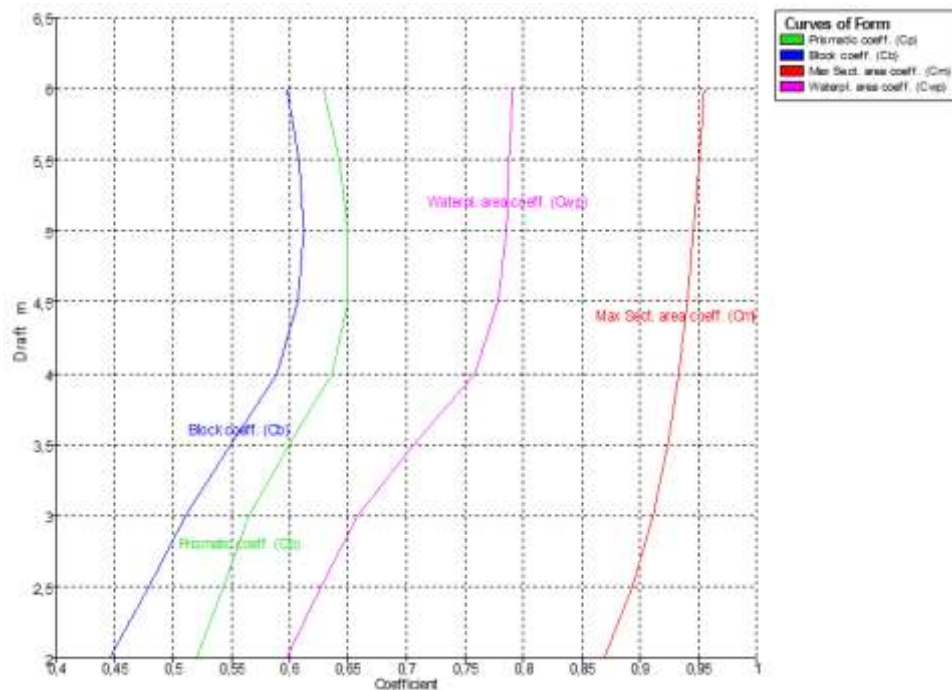
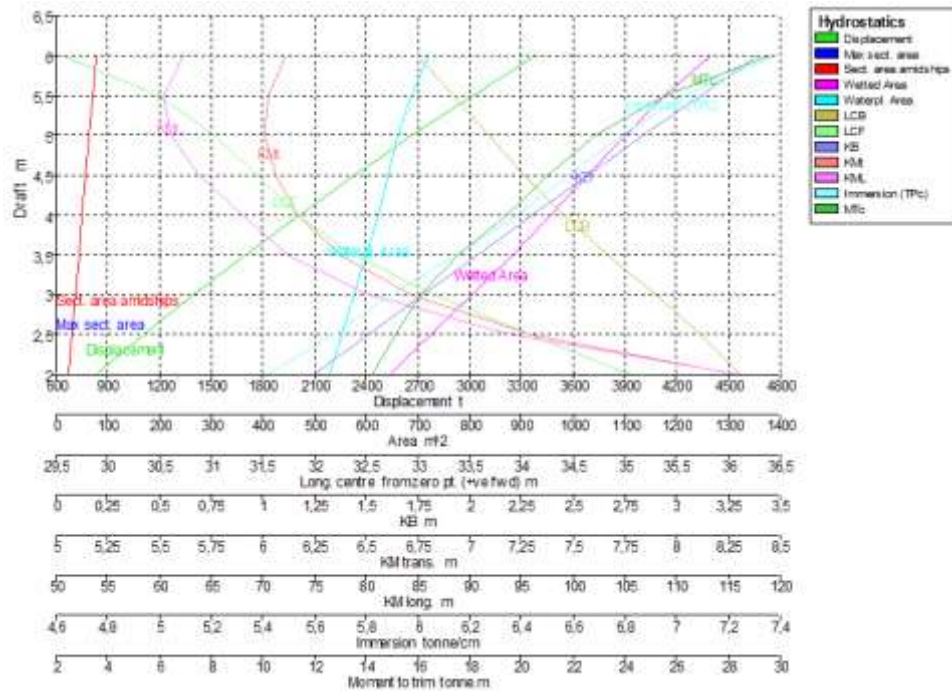




**Fixed Trim = -1,5 m (+ve by stern)**  
**Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)**

<b>Draft Amidships m</b>	<b>2,000</b>	<b>2,500</b>	<b>3,000</b>	<b>3,500</b>	<b>4,000</b>	<b>4,500</b>	<b>5,000</b>	<b>5,500</b>	<b>6,000</b>
Displacement t	831,6	1109	1398	1699	2013	2337	2671	3016	3375
Heel deg	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Draft at FP m	2,750	3,250	3,750	4,250	4,750	5,250	5,750	6,250	6,750
Draft at AP m	1,250	1,750	2,250	2,750	3,250	3,750	4,250	4,750	5,250
Draft at LCF m	2,066	2,543	3,021	3,504	3,991	4,482	4,972	5,460	5,938
Trim (+ve by stern) m	-1,500	-1,500	-1,500	-1,500	-1,500	-1,500	-1,500	-1,500	-1,500
WL Length m	65,860	65,634	65,039	63,139	61,066	61,308	62,642	64,759	67,666
Beam max extents on WL m	13,428	13,448	13,449	13,449	13,450	13,450	13,450	13,450	13,450
Wetted Area m <sup>2</sup>	643,686	724,217	804,670	883,424	957,141	1025,843	1103,006	1176,215	1265,549
Waterpl. Area m <sup>2</sup>	528,697	553,323	575,681	599,403	623,057	642,131	661,863	685,909	719,523
Prismatic coeff. (Cp)	0,521	0,543	0,565	0,599	0,636	0,649	0,650	0,643	0,628
Block coeff. (Cb)	0,446	0,480	0,510	0,549	0,590	0,607	0,612	0,608	0,598
Max Sect. area coeff. (Cm)	0,869	0,893	0,911	0,923	0,933	0,940	0,946	0,951	0,955
Waterpl. area coeff. (Cwp)	0,598	0,627	0,658	0,706	0,759	0,779	0,786	0,788	0,791
LCB from zero pt. (+ve fwd) m	36,125	35,735	35,292	34,841	34,414	34,024	33,676	33,348	32,997
LCF from zero pt. (+ve fwd) m	35,043	34,082	33,138	32,388	31,827	31,443	31,025	30,501	29,554
KB m	1,245	1,510	1,774	2,038	2,304	2,572	2,842	3,114	3,389
KG m	5,850	5,850	5,850	5,850	5,850	5,850	5,850	5,850	5,850
BMt m	7,042	5,782	4,941	4,338	3,868	3,491	3,169	2,915	2,720
BML m	114,828	92,430	78,368	70,401	65,757	61,247	58,251	57,241	58,914
GMt m	2,347	1,362	0,795	0,466	0,272	0,172	0,128	0,153	0,242
GML m	110,133	88,010	74,222	66,529	62,161	57,929	55,210	54,479	56,436
KMt m	8,285	7,291	6,714	6,375	6,171	6,062	6,010	6,028	6,108
KML m	116,042	93,916	80,121	72,420	68,044	63,803	61,078	60,339	62,287
Immersion (TPc) tonne/cm	5,419	5,672	5,901	6,144	6,386	6,582	6,784	7,031	7,375
MTc tonne.m	14,210	15,144	16,102	17,541	19,411	21,006	22,880	25,491	29,557
RM at 1deg = GMt.Disp.sin(1) tonne.m	34,067	26,362	19,392	13,828	9,561	7,025	5,966	8,048	14,246
Max deck inclination deg	1,3333	1,3333	1,3333	1,3333	1,3333	1,3333	1,3333	1,3333	1,3333
Trim angle (+ve by stern) deg	-1,3333	-1,3333	-1,3333	-1,3333	-1,3333	-1,3333	-1,3333	-1,3333	-1,3333





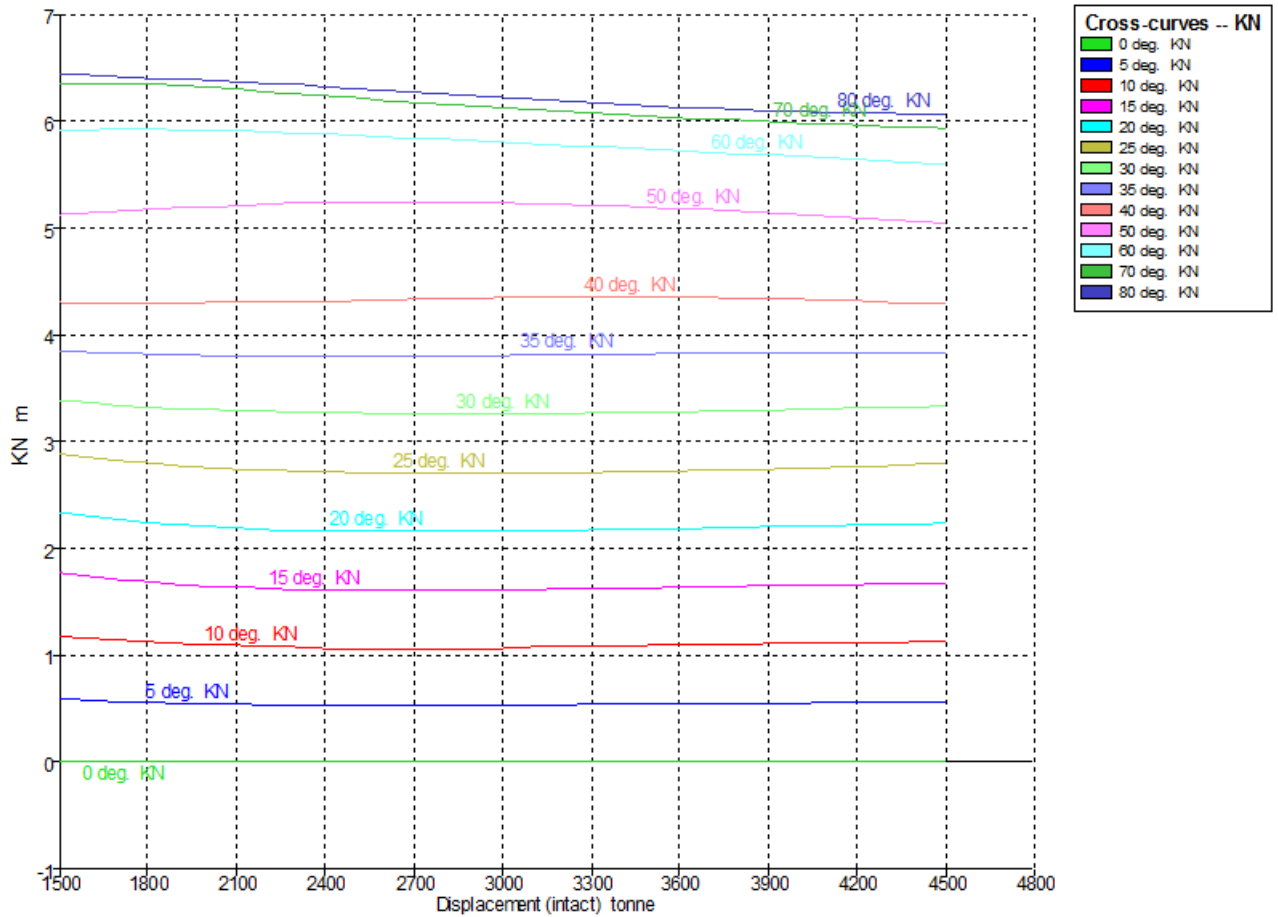
## TABLAS DE KN's

A partir de estas curvas se obtendrán las curvas de brazos adrizantes (GZ), ya que para cada ángulo de escora éste ángulo se obtiene de la siguiente manera:

$$GZ = KN - KG \cdot \text{sen } \alpha$$

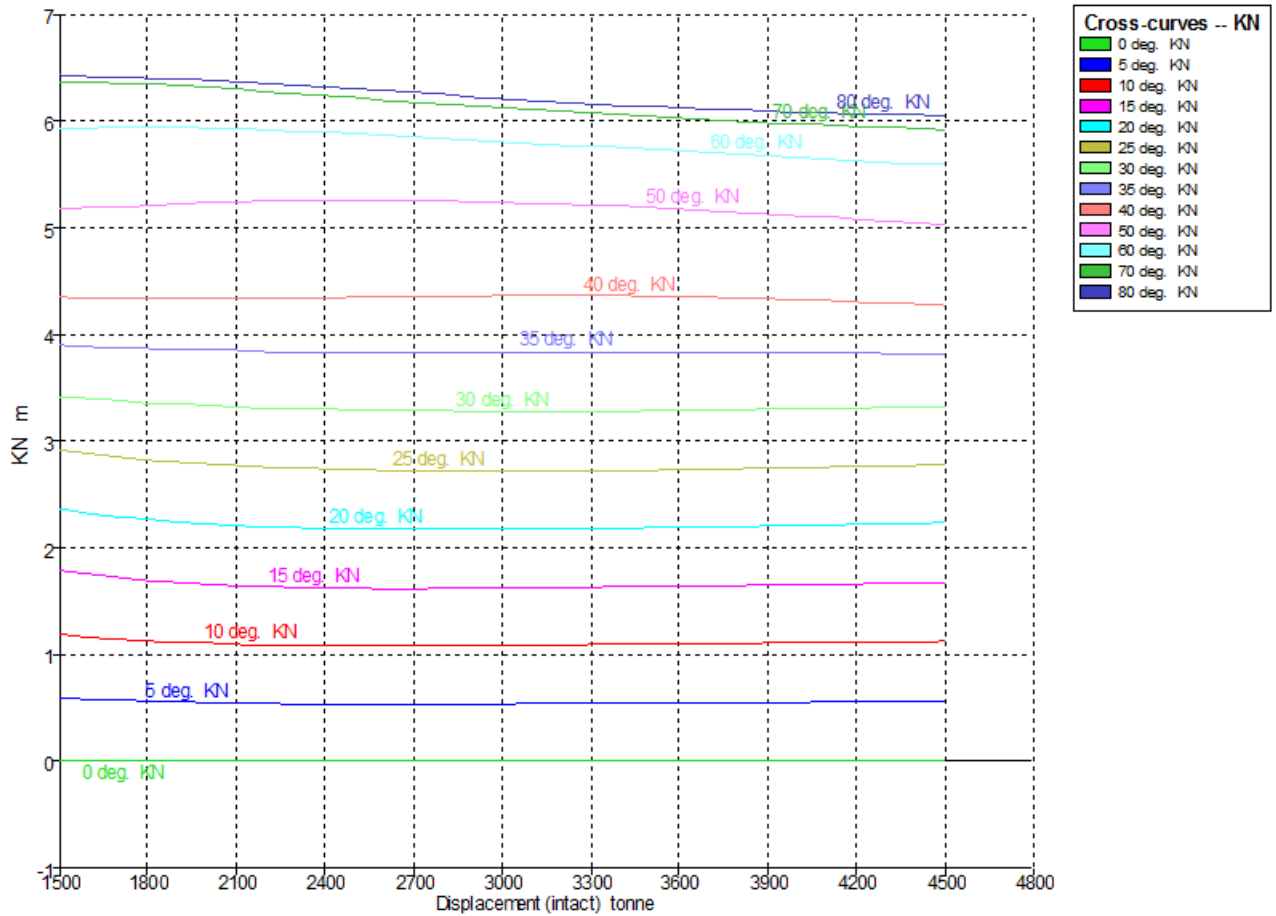
Los valores de KN se obtienen en función del desplazamiento, del ángulo de escora y del trimado. El rango de desplazamientos que se cubrirán irán desde 1500 toneladas (rosca aproximado), hasta 4500 toneladas. Los incrementos serán de 100 en 100 toneladas.

Fixed Trim = 0 m (+ve by stern)  
 Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)  
 VCG = 0 m; TCG = 0 m



Displacement (intact) tonne	0,0 deg.	5,0 deg.	10,0 deg.	15,0 deg.	20,0 deg.	25,0 deg.	30,0 deg.	35,0 deg.	40,0 deg.	50,0 deg.	60,0 deg.	70,0 deg.	80,0 deg.
1500	0,000	0,589	1,180	1,767	2,340	2,884	3,391	3,860	4,300	5,128	5,914	6,358	6,434
1600	0,000	0,578	1,158	1,737	2,305	2,851	3,365	3,845	4,297	5,142	5,925	6,360	6,428
1700	0,000	0,569	1,139	1,710	2,275	2,823	3,344	3,834	4,295	5,157	5,930	6,356	6,420
1800	0,000	0,561	1,123	1,686	2,248	2,799	3,326	3,825	4,295	5,171	5,930	6,348	6,411
1900	0,000	0,555	1,109	1,667	2,226	2,778	3,312	3,819	4,296	5,186	5,927	6,336	6,401
2000	0,000	0,549	1,098	1,651	2,207	2,761	3,300	3,814	4,299	5,201	5,922	6,320	6,390
2100	0,000	0,544	1,089	1,637	2,191	2,746	3,290	3,810	4,302	5,214	5,914	6,302	6,377
2200	0,000	0,540	1,081	1,627	2,179	2,735	3,283	3,808	4,305	5,226	5,905	6,282	6,362
2300	0,000	0,537	1,075	1,619	2,169	2,726	3,277	3,807	4,310	5,234	5,895	6,261	6,347
2400	0,000	0,534	1,071	1,613	2,162	2,719	3,272	3,807	4,314	5,240	5,884	6,239	6,330
2500	0,000	0,533	1,068	1,609	2,157	2,714	3,269	3,807	4,320	5,244	5,872	6,218	6,313
2600	0,000	0,532	1,067	1,607	2,155	2,711	3,266	3,808	4,325	5,245	5,859	6,198	6,295
2700	0,000	0,532	1,067	1,607	2,154	2,709	3,264	3,809	4,331	5,244	5,847	6,177	6,277
2800	0,000	0,533	1,068	1,608	2,155	2,708	3,263	3,810	4,337	5,242	5,833	6,158	6,258
2900	0,000	0,534	1,070	1,610	2,157	2,708	3,263	3,812	4,343	5,239	5,820	6,140	6,239
3000	0,000	0,535	1,072	1,614	2,159	2,709	3,263	3,814	4,349	5,234	5,807	6,122	6,220
3100	0,000	0,537	1,076	1,618	2,163	2,711	3,264	3,816	4,353	5,228	5,793	6,105	6,202
3200	0,000	0,539	1,079	1,622	2,166	2,714	3,266	3,819	4,357	5,221	5,780	6,089	6,186
3300	0,000	0,541	1,083	1,626	2,171	2,717	3,268	3,822	4,359	5,213	5,767	6,074	6,171
3400	0,000	0,544	1,087	1,631	2,175	2,721	3,272	3,825	4,360	5,204	5,754	6,059	6,157
3500	0,000	0,546	1,091	1,636	2,180	2,726	3,275	3,829	4,358	5,193	5,741	6,046	6,145
3600	0,000	0,548	1,095	1,640	2,185	2,731	3,280	3,833	4,356	5,182	5,728	6,033	6,134
3700	0,000	0,550	1,099	1,645	2,190	2,736	3,285	3,836	4,351	5,170	5,715	6,020	6,123
3800	0,000	0,552	1,102	1,650	2,196	2,742	3,291	3,839	4,346	5,157	5,701	6,009	6,113
3900	0,000	0,554	1,106	1,655	2,202	2,749	3,297	3,841	4,339	5,143	5,688	5,998	6,104
4000	0,000	0,556	1,109	1,659	2,208	2,755	3,304	3,842	4,332	5,129	5,674	5,988	6,096
4100	0,000	0,557	1,112	1,664	2,214	2,762	3,310	3,842	4,324	5,114	5,660	5,978	6,088
4200	0,000	0,559	1,115	1,669	2,220	2,769	3,317	3,840	4,315	5,099	5,645	5,968	6,081
4300	0,000	0,560	1,118	1,674	2,226	2,777	3,323	3,838	4,305	5,083	5,631	5,958	6,075
4400	0,000	0,561	1,121	1,679	2,233	2,784	3,329	3,836	4,295	5,066	5,616	5,947	6,069
4500	0,000	0,563	1,124	1,684	2,240	2,792	3,333	3,832	4,285	5,050	5,601	5,937	6,063

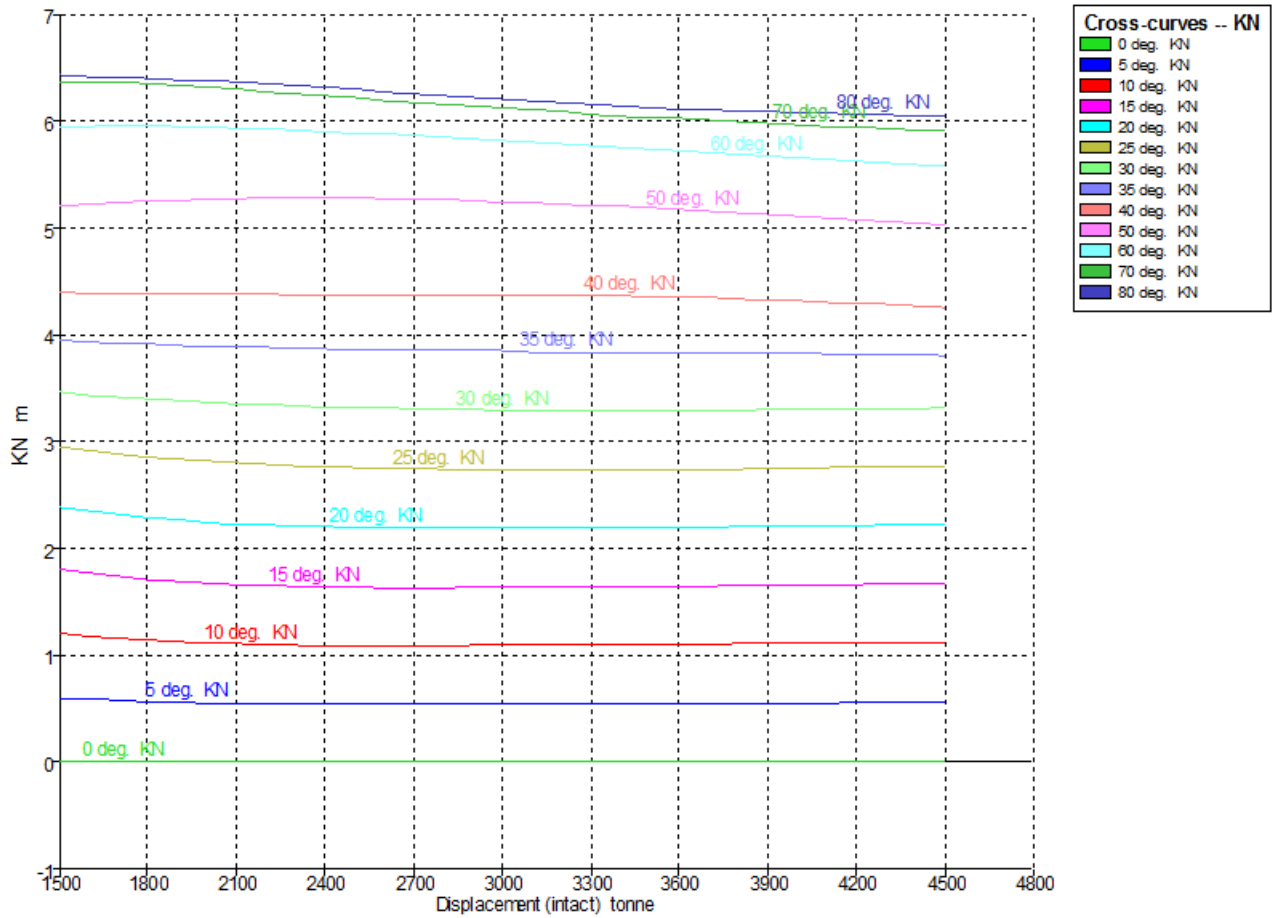
Fixed Trim = 0,5 m (+ve by stern)  
 Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)  
 VCG = 0 m; TCG = 0 m



Displacement (intact) tonne	0,0 deg.	5,0 deg.	10,0 deg.	15,0 deg.	20,0 deg.	25,0 deg.	30,0 deg.	35,0 deg.	40,0 deg.	50,0 deg.	60,0 deg.	70,0 deg.	80,0 deg.
1500	0,000	0,595	1,192	1,785	2,363	2,914	3,427	3,903	4,348	5,173	5,933	6,366	6,433
1600	0,000	0,584	1,169	1,752	2,327	2,880	3,402	3,889	4,345	5,187	5,943	6,366	6,427
1700	0,000	0,574	1,149	1,724	2,296	2,852	3,380	3,877	4,342	5,200	5,948	6,361	6,419
1800	0,000	0,566	1,132	1,701	2,269	2,827	3,362	3,868	4,341	5,213	5,948	6,353	6,409
1900	0,000	0,558	1,117	1,680	2,246	2,805	3,347	3,860	4,340	5,226	5,944	6,339	6,398
2000	0,000	0,552	1,106	1,663	2,226	2,788	3,334	3,853	4,341	5,238	5,938	6,323	6,386
2100	0,000	0,547	1,096	1,650	2,211	2,773	3,324	3,848	4,341	5,248	5,930	6,303	6,373
2200	0,000	0,543	1,088	1,639	2,198	2,761	3,314	3,843	4,342	5,256	5,920	6,282	6,359
2300	0,000	0,540	1,083	1,631	2,188	2,752	3,307	3,839	4,344	5,261	5,909	6,262	6,343
2400	0,000	0,538	1,079	1,626	2,181	2,744	3,300	3,836	4,345	5,264	5,897	6,241	6,326
2500	0,000	0,537	1,077	1,622	2,177	2,738	3,295	3,834	4,348	5,265	5,884	6,219	6,309
2600	0,000	0,536	1,076	1,621	2,174	2,733	3,290	3,833	4,351	5,263	5,870	6,199	6,290
2700	0,000	0,536	1,076	1,621	2,173	2,729	3,287	3,832	4,354	5,260	5,856	6,179	6,271
2800	0,000	0,537	1,077	1,622	2,172	2,727	3,284	3,831	4,357	5,255	5,842	6,160	6,250
2900	0,000	0,538	1,079	1,624	2,173	2,725	3,281	3,831	4,360	5,248	5,827	6,141	6,231
3000	0,000	0,540	1,082	1,626	2,174	2,725	3,280	3,831	4,363	5,241	5,812	6,123	6,212
3100	0,000	0,542	1,085	1,629	2,176	2,725	3,279	3,831	4,365	5,233	5,797	6,106	6,195
3200	0,000	0,543	1,088	1,632	2,178	2,726	3,279	3,832	4,366	5,224	5,781	6,089	6,179
3300	0,000	0,545	1,091	1,635	2,181	2,728	3,280	3,833	4,365	5,214	5,766	6,073	6,164
3400	0,000	0,547	1,094	1,639	2,184	2,731	3,281	3,835	4,364	5,203	5,752	6,057	6,151
3500	0,000	0,549	1,096	1,642	2,187	2,734	3,284	3,836	4,360	5,191	5,737	6,042	6,138
3600	0,000	0,551	1,099	1,646	2,191	2,737	3,287	3,837	4,356	5,178	5,722	6,028	6,127
3700	0,000	0,552	1,102	1,649	2,195	2,741	3,290	3,838	4,350	5,165	5,708	6,014	6,116
3800	0,000	0,553	1,104	1,653	2,199	2,746	3,294	3,839	4,343	5,151	5,694	6,001	6,106
3900	0,000	0,554	1,107	1,656	2,204	2,751	3,299	3,839	4,335	5,136	5,679	5,989	6,097
4000	0,000	0,555	1,109	1,660	2,209	2,756	3,304	3,838	4,326	5,121	5,665	5,978	6,088
4100	0,000	0,557	1,112	1,664	2,214	2,762	3,309	3,836	4,316	5,105	5,650	5,967	6,080
4200	0,000	0,558	1,114	1,668	2,219	2,768	3,313	3,833	4,306	5,089	5,635	5,957	6,072
4300	0,000	0,559	1,116	1,672	2,224	2,774	3,318	3,830	4,296	5,072	5,620	5,946	6,066
4400	0,000	0,560	1,119	1,676	2,230	2,781	3,322	3,826	4,284	5,055	5,604	5,936	6,059
4500	0,000	0,561	1,122	1,680	2,236	2,788	3,325	3,821	4,273	5,037	5,589	5,925	6,054

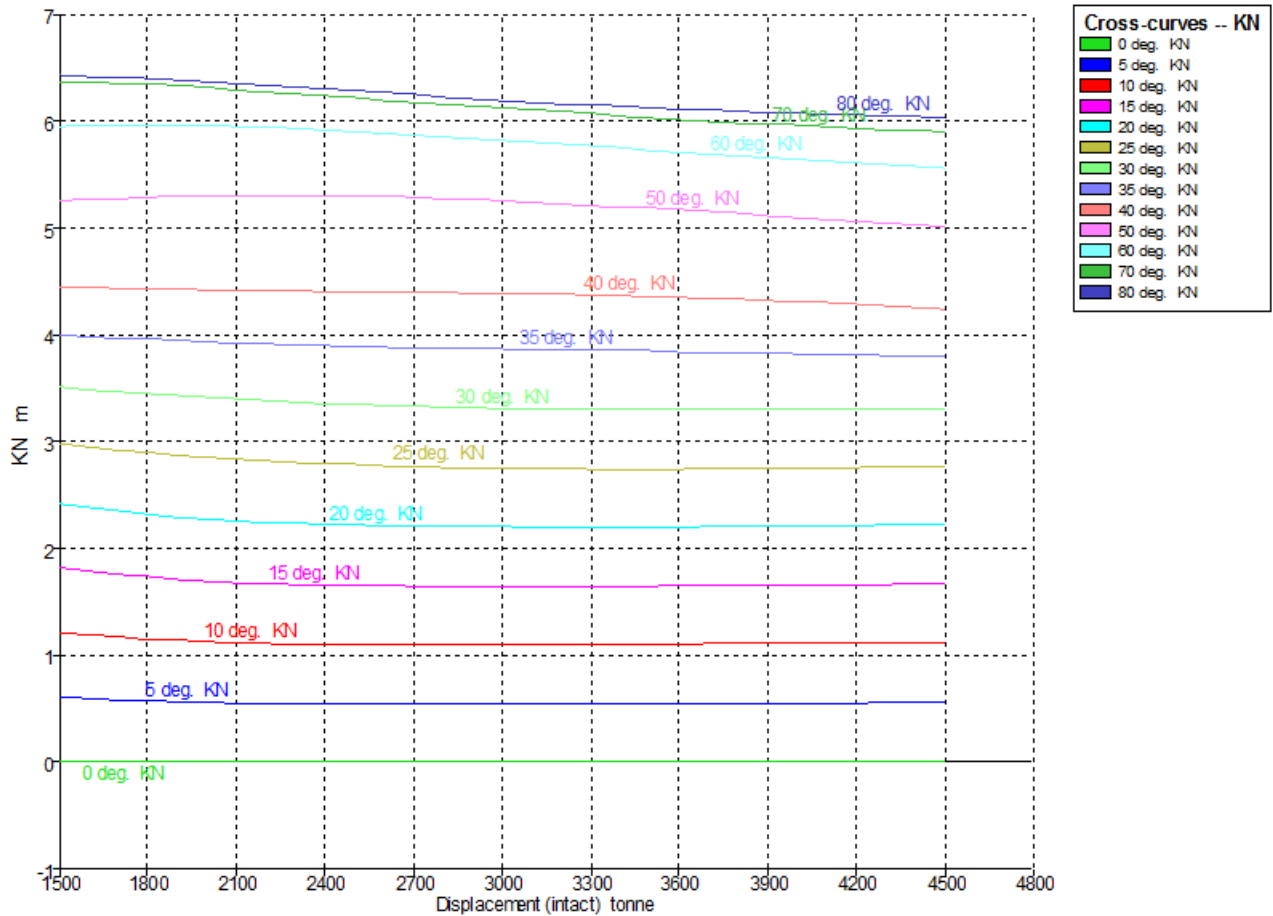


Fixed Trim = 1 m (+ve by stern)  
 Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)  
 VCG = 0 m; TCG = 0 m



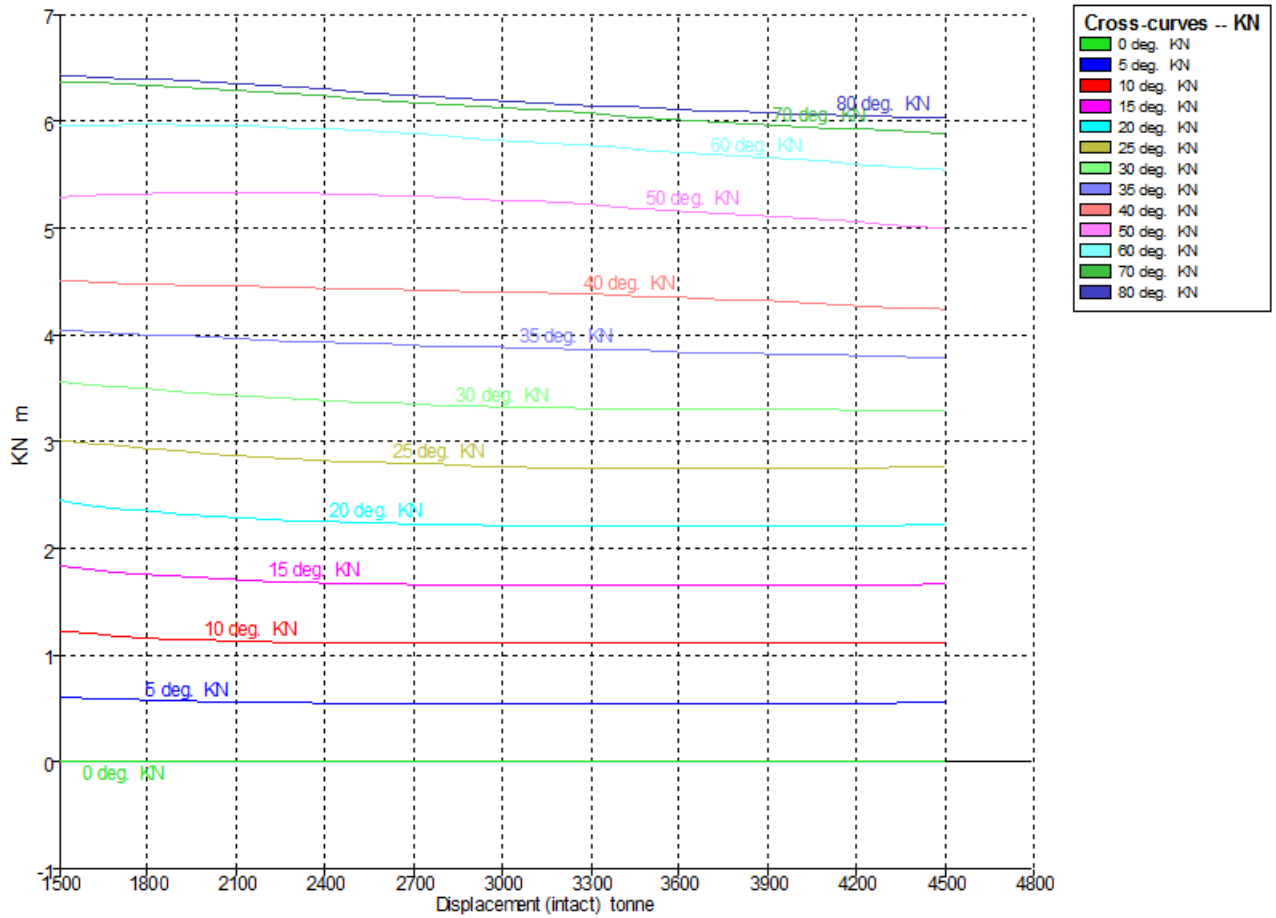
Displacement (intact) tonne	0,0 deg.	5,0 deg.	10,0 deg.	15,0 deg.	20,0 deg.	25,0 deg.	30,0 deg.	35,0 deg.	40,0 deg.	50,0 deg.	60,0 deg.	70,0 deg.	80,0 deg.
1500	0,000	0,602	1,205	1,803	2,389	2,946	3,467	3,951	4,399	5,217	5,947	6,371	6,433
1600	0,000	0,590	1,180	1,770	2,352	2,913	3,443	3,937	4,395	5,230	5,956	6,370	6,425
1700	0,000	0,579	1,159	1,741	2,320	2,884	3,422	3,925	4,391	5,242	5,961	6,363	6,416
1800	0,000	0,570	1,142	1,716	2,292	2,859	3,403	3,914	4,388	5,254	5,961	6,353	6,406
1900	0,000	0,562	1,127	1,696	2,269	2,838	3,387	3,904	4,386	5,264	5,958	6,339	6,394
2000	0,000	0,556	1,114	1,679	2,249	2,820	3,373	3,895	4,383	5,273	5,951	6,320	6,381
2100	0,000	0,551	1,105	1,665	2,234	2,804	3,360	3,887	4,382	5,280	5,943	6,301	6,368
2200	0,000	0,547	1,097	1,655	2,221	2,791	3,348	3,880	4,380	5,285	5,933	6,281	6,353
2300	0,000	0,544	1,092	1,647	2,211	2,780	3,338	3,873	4,379	5,287	5,921	6,260	6,337
2400	0,000	0,542	1,089	1,642	2,204	2,771	3,329	3,868	4,378	5,287	5,909	6,240	6,320
2500	0,000	0,541	1,087	1,639	2,198	2,763	3,322	3,863	4,377	5,285	5,895	6,220	6,302
2600	0,000	0,541	1,086	1,637	2,194	2,756	3,315	3,858	4,377	5,281	5,881	6,200	6,282
2700	0,000	0,542	1,086	1,637	2,191	2,750	3,309	3,855	4,377	5,275	5,865	6,180	6,262
2800	0,000	0,543	1,088	1,637	2,189	2,746	3,304	3,852	4,377	5,268	5,850	6,162	6,242
2900	0,000	0,544	1,089	1,638	2,188	2,743	3,300	3,849	4,377	5,259	5,834	6,143	6,223
3000	0,000	0,545	1,091	1,639	2,188	2,741	3,297	3,848	4,377	5,249	5,818	6,124	6,205
3100	0,000	0,547	1,093	1,640	2,188	2,739	3,294	3,846	4,376	5,238	5,801	6,107	6,189
3200	0,000	0,548	1,095	1,642	2,189	2,739	3,292	3,845	4,374	5,226	5,784	6,089	6,173
3300	0,000	0,549	1,097	1,644	2,190	2,739	3,291	3,844	4,371	5,214	5,767	6,072	6,159
3400	0,000	0,550	1,099	1,646	2,192	2,740	3,291	3,843	4,367	5,202	5,751	6,056	6,145
3500	0,000	0,551	1,101	1,648	2,194	2,741	3,292	3,842	4,361	5,188	5,734	6,040	6,133
3600	0,000	0,552	1,102	1,650	2,196	2,743	3,293	3,841	4,355	5,174	5,718	6,025	6,121
3700	0,000	0,553	1,104	1,652	2,199	2,746	3,295	3,839	4,347	5,160	5,702	6,010	6,110
3800	0,000	0,554	1,105	1,655	2,202	2,749	3,297	3,838	4,339	5,144	5,687	5,996	6,100
3900	0,000	0,554	1,107	1,657	2,206	2,753	3,300	3,836	4,329	5,129	5,671	5,982	6,090
4000	0,000	0,555	1,109	1,660	2,209	2,757	3,303	3,833	4,319	5,112	5,656	5,969	6,081
4100	0,000	0,556	1,110	1,663	2,213	2,761	3,306	3,830	4,308	5,096	5,640	5,957	6,073
4200	0,000	0,557	1,112	1,666	2,218	2,766	3,309	3,826	4,297	5,078	5,624	5,946	6,065
4300	0,000	0,558	1,114	1,670	2,222	2,771	3,312	3,821	4,285	5,061	5,609	5,935	6,057
4400	0,000	0,559	1,117	1,673	2,227	2,777	3,314	3,816	4,273	5,043	5,593	5,924	6,051
4500	0,000	0,560	1,119	1,677	2,232	2,782	3,315	3,810	4,261	5,025	5,577	5,913	6,044

Fixed Trim = 1,5 m (+ve by stern)  
 Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)  
 VCG = 0 m; TCG = 0 m



Displacement (intact) tonne	0,0 deg.	5,0 deg.	10,0 deg.	15,0 deg.	20,0 deg.	25,0 deg.	30,0 deg.	35,0 deg.	40,0 deg.	50,0 deg.	60,0 deg.	70,0 deg.	80,0 deg.
1500	0,000	0,609	1,217	1,823	2,417	2,983	3,513	4,001	4,449	5,257	5,956	6,374	6,432
1600	0,000	0,596	1,192	1,789	2,379	2,950	3,489	3,987	4,445	5,270	5,965	6,371	6,424
1700	0,000	0,584	1,171	1,760	2,347	2,921	3,467	3,973	4,440	5,281	5,970	6,363	6,413
1800	0,000	0,575	1,152	1,735	2,320	2,896	3,447	3,961	4,435	5,291	5,970	6,350	6,402
1900	0,000	0,567	1,137	1,714	2,296	2,875	3,429	3,949	4,431	5,300	5,967	6,333	6,390
2000	0,000	0,561	1,125	1,697	2,277	2,855	3,413	3,937	4,426	5,306	5,962	6,315	6,376
2100	0,000	0,556	1,116	1,684	2,261	2,838	3,398	3,927	4,422	5,310	5,954	6,296	6,361
2200	0,000	0,552	1,109	1,674	2,248	2,823	3,384	3,917	4,418	5,311	5,944	6,277	6,345
2300	0,000	0,550	1,104	1,666	2,237	2,810	3,371	3,908	4,414	5,311	5,932	6,258	6,329
2400	0,000	0,548	1,101	1,661	2,228	2,798	3,360	3,900	4,411	5,309	5,919	6,238	6,311
2500	0,000	0,548	1,099	1,657	2,221	2,788	3,349	3,892	4,407	5,305	5,905	6,219	6,292
2600	0,000	0,548	1,099	1,655	2,215	2,779	3,340	3,885	4,404	5,298	5,890	6,200	6,271
2700	0,000	0,548	1,099	1,653	2,210	2,772	3,332	3,879	4,401	5,290	5,874	6,182	6,252
2800	0,000	0,549	1,099	1,652	2,207	2,765	3,324	3,873	4,398	5,281	5,858	6,162	6,233
2900	0,000	0,550	1,100	1,651	2,204	2,760	3,318	3,868	4,394	5,270	5,840	6,144	6,216
3000	0,000	0,550	1,101	1,651	2,202	2,756	3,313	3,864	4,390	5,257	5,823	6,126	6,199
3100	0,000	0,551	1,101	1,650	2,200	2,753	3,309	3,860	4,386	5,244	5,805	6,108	6,184
3200	0,000	0,552	1,102	1,651	2,199	2,751	3,305	3,857	4,381	5,230	5,787	6,090	6,169
3300	0,000	0,552	1,103	1,651	2,199	2,749	3,302	3,853	4,375	5,216	5,769	6,073	6,155
3400	0,000	0,553	1,103	1,652	2,199	2,748	3,300	3,850	4,369	5,201	5,751	6,056	6,141
3500	0,000	0,553	1,104	1,652	2,200	2,748	3,299	3,847	4,362	5,186	5,733	6,039	6,128
3600	0,000	0,553	1,104	1,653	2,201	2,749	3,299	3,843	4,354	5,170	5,715	6,022	6,116
3700	0,000	0,553	1,105	1,655	2,203	2,750	3,299	3,840	4,344	5,154	5,698	6,007	6,105
3800	0,000	0,553	1,106	1,656	2,205	2,752	3,300	3,836	4,334	5,138	5,681	5,991	6,095
3900	0,000	0,554	1,107	1,658	2,207	2,754	3,301	3,832	4,323	5,121	5,664	5,976	6,084
4000	0,000	0,554	1,108	1,660	2,209	2,757	3,302	3,828	4,312	5,104	5,647	5,962	6,075
4100	0,000	0,555	1,109	1,662	2,212	2,761	3,303	3,823	4,300	5,086	5,631	5,949	6,066
4200	0,000	0,556	1,111	1,664	2,216	2,764	3,304	3,817	4,288	5,068	5,614	5,936	6,058
4300	0,000	0,557	1,113	1,667	2,219	2,768	3,305	3,812	4,275	5,050	5,598	5,924	6,050
4400	0,000	0,558	1,115	1,670	2,223	2,772	3,305	3,805	4,262	5,031	5,581	5,913	6,043
4500	0,000	0,559	1,117	1,674	2,228	2,776	3,305	3,799	4,249	5,012	5,565	5,902	6,036

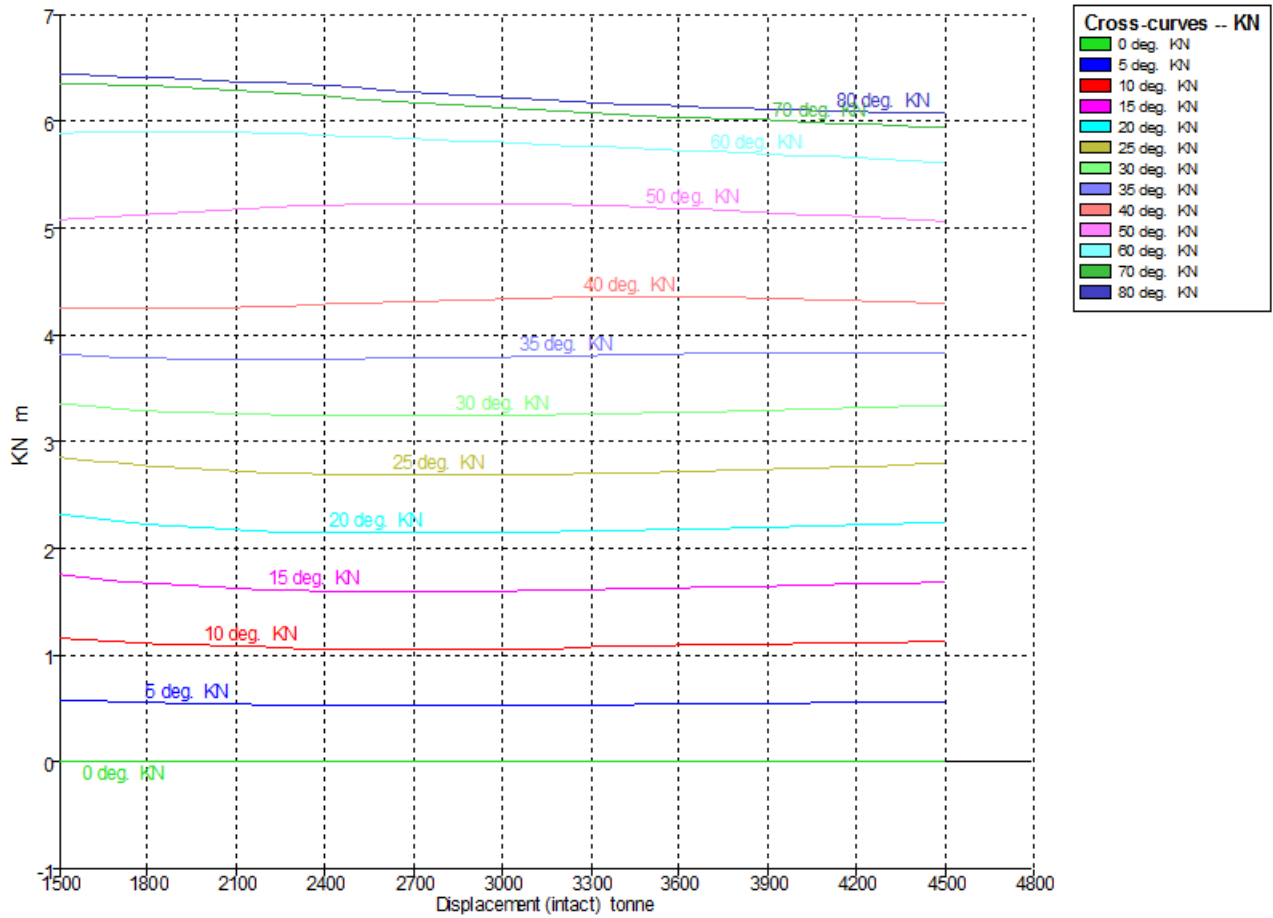
Fixed Trim = 2 m (+ve by stern)  
 Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)  
 VCG = 0 m; TCG = 0 m



Displacement (intact) tonne	0,0 deg.	5,0 deg.	10,0 deg.	15,0 deg.	20,0 deg.	25,0 deg.	30,0 deg.	35,0 deg.	40,0 deg.	50,0 deg.	60,0 deg.	70,0 deg.	80,0 deg.
1500	0,000	0,615	1,231	1,845	2,447	3,024	3,561	4,051	4,498	5,292	5,962	6,375	6,430
1600	0,000	0,602	1,205	1,810	2,410	2,992	3,537	4,036	4,493	5,305	5,971	6,369	6,421
1700	0,000	0,590	1,183	1,781	2,379	2,963	3,514	4,021	4,487	5,316	5,975	6,358	6,410
1800	0,000	0,581	1,165	1,756	2,351	2,937	3,493	4,007	4,481	5,325	5,976	6,343	6,397
1900	0,000	0,573	1,150	1,736	2,328	2,914	3,473	3,993	4,475	5,331	5,974	6,326	6,384
2000	0,000	0,567	1,139	1,719	2,309	2,893	3,454	3,980	4,468	5,335	5,969	6,308	6,370
2100	0,000	0,562	1,130	1,707	2,292	2,874	3,436	3,967	4,462	5,337	5,962	6,289	6,354
2200	0,000	0,559	1,123	1,696	2,277	2,856	3,420	3,955	4,456	5,336	5,952	6,271	6,337
2300	0,000	0,557	1,119	1,688	2,264	2,840	3,404	3,943	4,449	5,334	5,941	6,253	6,319
2400	0,000	0,556	1,116	1,682	2,253	2,826	3,390	3,932	4,443	5,329	5,928	6,236	6,299
2500	0,000	0,555	1,114	1,677	2,244	2,814	3,377	3,921	4,437	5,323	5,914	6,217	6,279
2600	0,000	0,555	1,112	1,672	2,236	2,802	3,365	3,912	4,431	5,314	5,898	6,199	6,260
2700	0,000	0,555	1,111	1,669	2,229	2,793	3,355	3,903	4,424	5,304	5,882	6,181	6,242
2800	0,000	0,555	1,110	1,666	2,223	2,784	3,345	3,895	4,418	5,293	5,864	6,163	6,225
2900	0,000	0,555	1,109	1,663	2,219	2,777	3,336	3,887	4,411	5,280	5,847	6,145	6,209
3000	0,000	0,555	1,109	1,661	2,215	2,771	3,329	3,880	4,404	5,266	5,828	6,126	6,193
3100	0,000	0,555	1,108	1,660	2,211	2,766	3,323	3,874	4,396	5,251	5,809	6,109	6,178
3200	0,000	0,555	1,107	1,658	2,209	2,762	3,317	3,868	4,388	5,235	5,791	6,091	6,164
3300	0,000	0,554	1,107	1,657	2,207	2,759	3,313	3,862	4,380	5,218	5,771	6,073	6,151
3400	0,000	0,554	1,106	1,657	2,206	2,756	3,309	3,857	4,371	5,201	5,752	6,055	6,137
3500	0,000	0,553	1,106	1,656	2,205	2,755	3,306	3,851	4,362	5,184	5,733	6,038	6,125
3600	0,000	0,553	1,106	1,656	2,205	2,754	3,304	3,845	4,351	5,166	5,714	6,021	6,113
3700	0,000	0,553	1,106	1,656	2,206	2,754	3,302	3,840	4,341	5,149	5,694	6,004	6,101
3800	0,000	0,553	1,106	1,657	2,206	2,755	3,301	3,834	4,329	5,131	5,675	5,988	6,090
3900	0,000	0,553	1,106	1,658	2,208	2,756	3,300	3,828	4,317	5,113	5,657	5,972	6,080
4000	0,000	0,554	1,107	1,659	2,209	2,757	3,300	3,822	4,304	5,095	5,639	5,957	6,070
4100	0,000	0,554	1,108	1,661	2,211	2,759	3,299	3,816	4,291	5,076	5,621	5,942	6,061
4200	0,000	0,555	1,109	1,663	2,214	2,762	3,298	3,809	4,278	5,057	5,604	5,928	6,052
4300	0,000	0,556	1,111	1,665	2,217	2,764	3,297	3,802	4,264	5,038	5,587	5,915	6,044
4400	0,000	0,557	1,113	1,668	2,220	2,767	3,296	3,795	4,250	5,019	5,570	5,902	6,036
4500	0,000	0,558	1,115	1,671	2,224	2,770	3,295	3,787	4,237	5,000	5,553	5,890	6,029

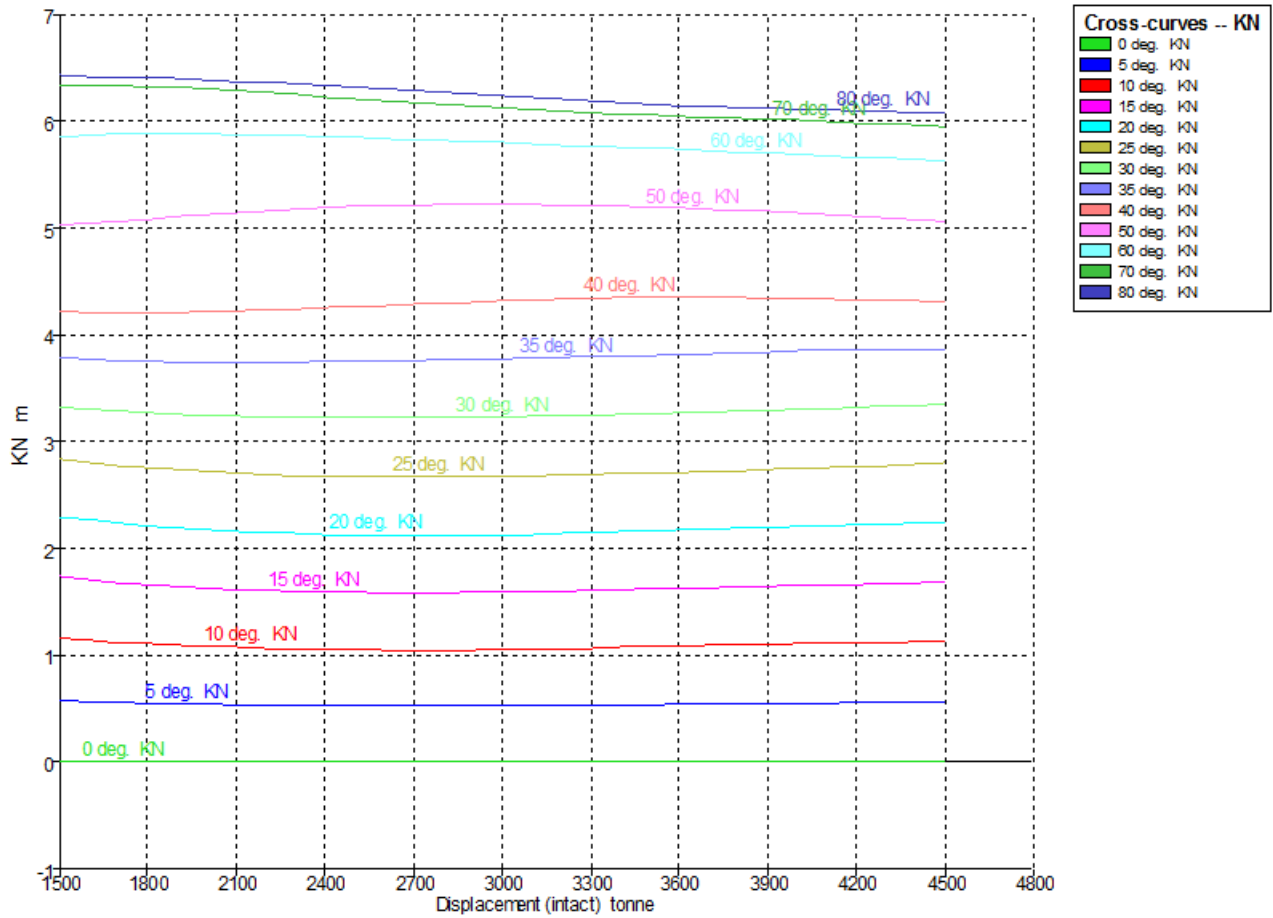


Fixed Trim = -0,5 m (+ve by stern)  
 Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)  
 VCG = 0 m; TCG = 0 m



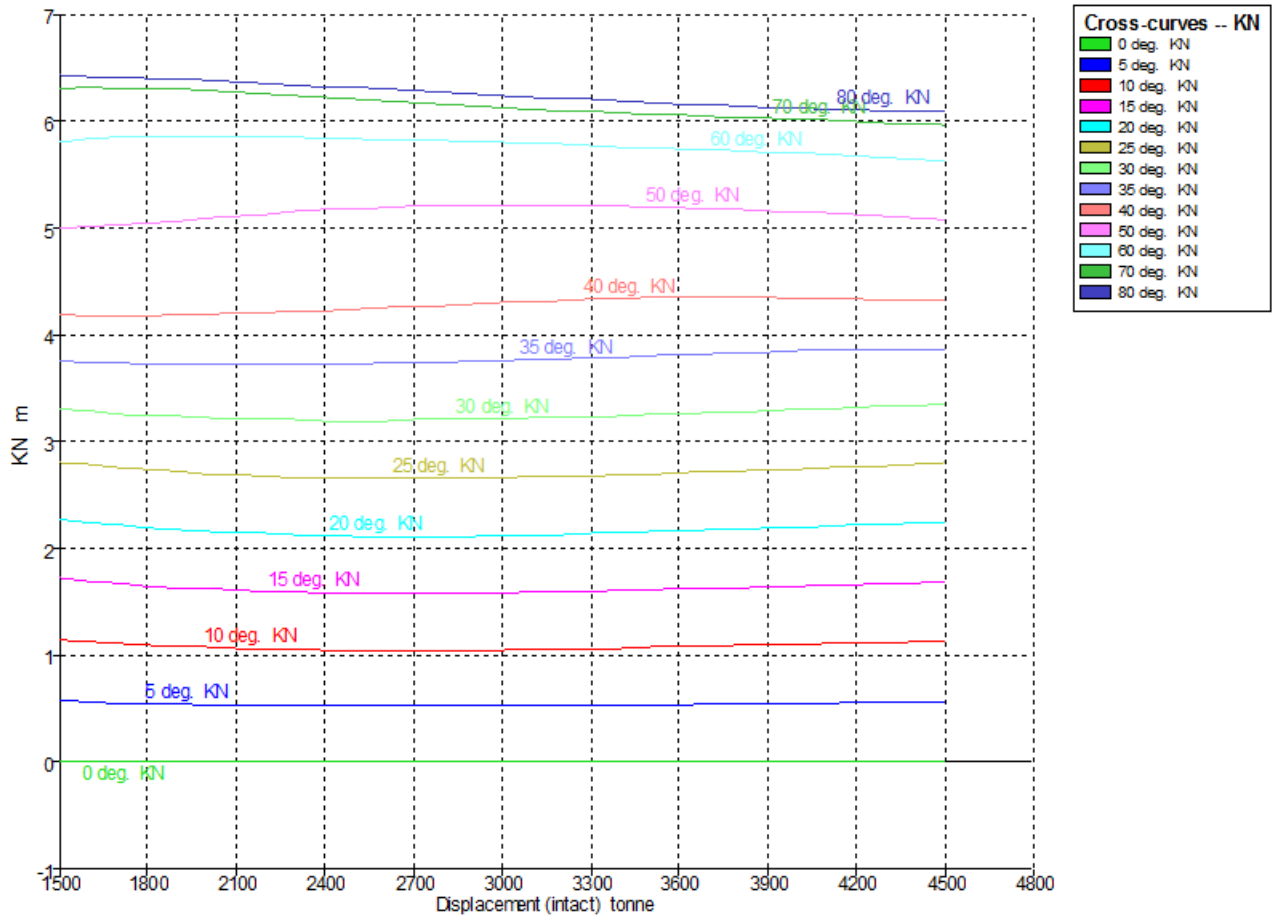
Displacement (intact) tonne	0,0 deg.	5,0 deg.	10,0 deg.	15,0 deg.	20,0 deg.	25,0 deg.	30,0 deg.	35,0 deg.	40,0 deg.	50,0 deg.	60,0 deg.	70,0 deg.	80,0 deg.
1500	0,000	0,584	1,168	1,750	2,319	2,857	3,358	3,822	4,257	5,081	5,887	6,347	6,433
1600	0,000	0,573	1,147	1,721	2,285	2,826	3,334	3,807	4,253	5,097	5,900	6,350	6,428
1700	0,000	0,564	1,130	1,696	2,256	2,799	3,313	3,796	4,251	5,113	5,907	6,346	6,421
1800	0,000	0,557	1,115	1,674	2,231	2,775	3,296	3,787	4,252	5,129	5,909	6,339	6,413
1900	0,000	0,551	1,102	1,655	2,209	2,755	3,281	3,781	4,255	5,146	5,907	6,327	6,403
2000	0,000	0,546	1,092	1,639	2,190	2,738	3,270	3,778	4,259	5,163	5,903	6,313	6,391
2100	0,000	0,541	1,082	1,627	2,175	2,724	3,261	3,776	4,264	5,180	5,897	6,297	6,378
2200	0,000	0,537	1,075	1,616	2,163	2,712	3,254	3,776	4,271	5,195	5,889	6,278	6,364
2300	0,000	0,534	1,070	1,608	2,153	2,703	3,249	3,777	4,278	5,207	5,880	6,257	6,348
2400	0,000	0,532	1,065	1,602	2,146	2,697	3,246	3,779	4,285	5,216	5,870	6,237	6,332
2500	0,000	0,530	1,062	1,598	2,141	2,692	3,244	3,781	4,293	5,223	5,860	6,216	6,315
2600	0,000	0,529	1,060	1,596	2,139	2,689	3,242	3,783	4,301	5,227	5,849	6,196	6,298
2700	0,000	0,529	1,060	1,596	2,138	2,689	3,242	3,786	4,309	5,230	5,837	6,176	6,281
2800	0,000	0,529	1,061	1,597	2,139	2,689	3,243	3,789	4,318	5,231	5,826	6,158	6,263
2900	0,000	0,530	1,062	1,599	2,142	2,691	3,244	3,793	4,325	5,230	5,814	6,139	6,246
3000	0,000	0,531	1,065	1,602	2,145	2,693	3,246	3,797	4,333	5,228	5,803	6,123	6,228
3100	0,000	0,533	1,068	1,606	2,150	2,697	3,249	3,801	4,341	5,224	5,791	6,106	6,211
3200	0,000	0,535	1,072	1,612	2,155	2,701	3,252	3,806	4,347	5,219	5,780	6,091	6,195
3300	0,000	0,537	1,076	1,617	2,160	2,706	3,257	3,811	4,352	5,212	5,768	6,077	6,180
3400	0,000	0,540	1,081	1,623	2,166	2,712	3,262	3,816	4,355	5,204	5,757	6,064	6,166
3500	0,000	0,542	1,085	1,629	2,172	2,718	3,267	3,821	4,355	5,195	5,745	6,051	6,154
3600	0,000	0,545	1,090	1,634	2,179	2,724	3,273	3,827	4,355	5,185	5,733	6,040	6,142
3700	0,000	0,548	1,095	1,640	2,185	2,731	3,280	3,833	4,352	5,174	5,721	6,029	6,132
3800	0,000	0,550	1,099	1,646	2,192	2,738	3,287	3,838	4,348	5,163	5,709	6,019	6,122
3900	0,000	0,553	1,104	1,652	2,199	2,746	3,295	3,842	4,343	5,150	5,696	6,009	6,113
4000	0,000	0,555	1,108	1,658	2,206	2,754	3,303	3,845	4,337	5,137	5,683	5,999	6,105
4100	0,000	0,557	1,112	1,664	2,213	2,762	3,311	3,846	4,330	5,123	5,670	5,989	6,098
4200	0,000	0,559	1,116	1,669	2,221	2,770	3,320	3,847	4,323	5,108	5,656	5,979	6,091
4300	0,000	0,561	1,120	1,675	2,228	2,779	3,328	3,846	4,314	5,093	5,642	5,969	6,085
4400	0,000	0,563	1,123	1,681	2,235	2,788	3,335	3,844	4,305	5,077	5,628	5,958	6,079
4500	0,000	0,564	1,127	1,687	2,243	2,797	3,341	3,842	4,296	5,061	5,614	5,948	6,073

Fixed Trim = -1 m (+ve by stern)  
 Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)  
 VCG = 0 m; TCG = 0 m



Displacement (intact) tonne	0,0 deg.	5,0 deg.	10,0 deg.	15,0 deg.	20,0 deg.	25,0 deg.	30,0 deg.	35,0 deg.	40,0 deg.	50,0 deg.	60,0 deg.	70,0 deg.	80,0 deg.
1500	0,000	0,579	1,158	1,735	2,298	2,834	3,330	3,789	4,219	5,037	5,854	6,332	6,431
1600	0,000	0,569	1,138	1,707	2,267	2,803	3,307	3,775	4,214	5,053	5,870	6,335	6,427
1700	0,000	0,560	1,121	1,683	2,239	2,777	3,286	3,763	4,213	5,070	5,879	6,332	6,421
1800	0,000	0,553	1,107	1,663	2,215	2,755	3,270	3,755	4,214	5,088	5,884	6,325	6,413
1900	0,000	0,547	1,095	1,645	2,194	2,735	3,256	3,750	4,218	5,107	5,885	6,315	6,403
2000	0,000	0,542	1,085	1,630	2,176	2,718	3,245	3,747	4,223	5,126	5,883	6,303	6,391
2100	0,000	0,538	1,077	1,617	2,161	2,705	3,236	3,746	4,231	5,146	5,879	6,287	6,377
2200	0,000	0,535	1,070	1,608	2,149	2,693	3,229	3,747	4,240	5,164	5,873	6,270	6,363
2300	0,000	0,532	1,064	1,600	2,140	2,684	3,225	3,749	4,249	5,180	5,865	6,252	6,348
2400	0,000	0,529	1,060	1,594	2,133	2,678	3,222	3,752	4,259	5,193	5,857	6,233	6,332
2500	0,000	0,528	1,057	1,590	2,128	2,673	3,220	3,756	4,268	5,203	5,848	6,213	6,316
2600	0,000	0,527	1,055	1,587	2,125	2,671	3,220	3,760	4,278	5,211	5,839	6,194	6,300
2700	0,000	0,526	1,055	1,587	2,124	2,670	3,221	3,764	4,288	5,216	5,829	6,176	6,284
2800	0,000	0,526	1,055	1,587	2,125	2,671	3,223	3,769	4,298	5,220	5,820	6,158	6,268
2900	0,000	0,527	1,056	1,589	2,128	2,674	3,226	3,774	4,308	5,222	5,810	6,141	6,252
3000	0,000	0,528	1,059	1,593	2,132	2,678	3,230	3,780	4,318	5,221	5,800	6,124	6,236
3100	0,000	0,530	1,062	1,597	2,137	2,683	3,234	3,786	4,328	5,219	5,791	6,109	6,221
3200	0,000	0,532	1,065	1,602	2,143	2,688	3,239	3,792	4,337	5,216	5,781	6,096	6,206
3300	0,000	0,534	1,069	1,608	2,150	2,695	3,245	3,799	4,344	5,211	5,771	6,082	6,191
3400	0,000	0,537	1,074	1,614	2,157	2,702	3,251	3,806	4,349	5,205	5,761	6,070	6,177
3500	0,000	0,539	1,079	1,621	2,164	2,709	3,259	3,814	4,352	5,197	5,750	6,059	6,164
3600	0,000	0,542	1,085	1,628	2,172	2,717	3,266	3,821	4,353	5,188	5,740	6,049	6,152
3700	0,000	0,545	1,090	1,635	2,179	2,725	3,274	3,829	4,352	5,179	5,728	6,039	6,142
3800	0,000	0,548	1,095	1,642	2,187	2,734	3,283	3,837	4,350	5,168	5,717	6,029	6,132
3900	0,000	0,551	1,101	1,649	2,196	2,743	3,292	3,843	4,347	5,156	5,705	6,019	6,123
4000	0,000	0,554	1,106	1,656	2,204	2,752	3,302	3,847	4,342	5,144	5,693	6,010	6,115
4100	0,000	0,556	1,111	1,663	2,212	2,761	3,312	3,850	4,336	5,131	5,680	6,000	6,108
4200	0,000	0,559	1,116	1,669	2,221	2,771	3,322	3,852	4,330	5,117	5,667	5,990	6,101
4300	0,000	0,561	1,120	1,676	2,229	2,780	3,332	3,853	4,323	5,103	5,654	5,980	6,094
4400	0,000	0,564	1,125	1,683	2,237	2,790	3,341	3,853	4,315	5,088	5,640	5,969	6,088
4500	0,000	0,566	1,129	1,689	2,246	2,801	3,349	3,851	4,306	5,072	5,626	5,958	6,082

Fixed Trim = -1,5 m (+ve by stern)  
 Specific gravity = 1,025; (Density = 1,025 tonne/m<sup>3</sup>)  
 VCG = 0 m; TCG = 0 m



Displacement (intact) tonne	0,0 deg.	5,0 deg.	10,0 deg.	15,0 deg.	20,0 deg.	25,0 deg.	30,0 deg.	35,0 deg.	40,0 deg.	50,0 deg.	60,0 deg.	70,0 deg.	80,0 deg.
1500	0,000	0,574	1,149	1,721	2,280	2,812	3,305	3,760	4,186	4,996	5,812	6,312	6,429
1600	0,000	0,564	1,130	1,694	2,250	2,784	3,283	3,747	4,182	5,012	5,834	6,315	6,426
1700	0,000	0,556	1,113	1,671	2,224	2,759	3,264	3,736	4,181	5,030	5,848	6,313	6,420
1800	0,000	0,550	1,100	1,651	2,201	2,737	3,248	3,729	4,182	5,050	5,856	6,308	6,411
1900	0,000	0,544	1,089	1,635	2,181	2,718	3,235	3,724	4,187	5,070	5,860	6,299	6,400
2000	0,000	0,539	1,080	1,621	2,163	2,702	3,224	3,722	4,193	5,092	5,861	6,287	6,388
2100	0,000	0,536	1,072	1,609	2,149	2,688	3,215	3,721	4,202	5,114	5,859	6,274	6,374
2200	0,000	0,532	1,065	1,600	2,138	2,677	3,209	3,722	4,212	5,135	5,855	6,260	6,360
2300	0,000	0,530	1,060	1,592	2,128	2,668	3,204	3,724	4,222	5,155	5,850	6,244	6,346
2400	0,000	0,528	1,056	1,587	2,122	2,662	3,201	3,728	4,233	5,171	5,844	6,227	6,331
2500	0,000	0,526	1,053	1,583	2,117	2,658	3,200	3,732	4,245	5,185	5,838	6,210	6,316
2600	0,000	0,525	1,052	1,580	2,114	2,655	3,200	3,737	4,256	5,195	5,831	6,193	6,301
2700	0,000	0,525	1,051	1,580	2,114	2,655	3,202	3,743	4,268	5,204	5,823	6,176	6,286
2800	0,000	0,525	1,051	1,580	2,115	2,656	3,205	3,750	4,279	5,210	5,815	6,159	6,272
2900	0,000	0,525	1,052	1,582	2,117	2,659	3,209	3,757	4,291	5,213	5,808	6,144	6,258
3000	0,000	0,526	1,054	1,585	2,121	2,664	3,214	3,764	4,303	5,215	5,800	6,129	6,244
3100	0,000	0,527	1,057	1,589	2,126	2,670	3,220	3,772	4,314	5,215	5,792	6,115	6,230
3200	0,000	0,529	1,060	1,594	2,132	2,676	3,226	3,780	4,325	5,213	5,784	6,102	6,216
3300	0,000	0,531	1,064	1,600	2,140	2,684	3,234	3,788	4,335	5,209	5,775	6,090	6,203
3400	0,000	0,534	1,069	1,606	2,147	2,692	3,242	3,797	4,342	5,205	5,766	6,079	6,189
3500	0,000	0,537	1,074	1,613	2,156	2,701	3,250	3,806	4,347	5,198	5,756	6,069	6,176
3600	0,000	0,539	1,079	1,621	2,164	2,710	3,259	3,815	4,350	5,191	5,746	6,059	6,164
3700	0,000	0,542	1,085	1,629	2,173	2,719	3,269	3,825	4,351	5,182	5,736	6,049	6,153
3800	0,000	0,545	1,091	1,637	2,183	2,729	3,279	3,835	4,351	5,173	5,725	6,040	6,143
3900	0,000	0,549	1,097	1,645	2,192	2,739	3,290	3,842	4,349	5,162	5,714	6,030	6,134
4000	0,000	0,552	1,103	1,653	2,201	2,750	3,301	3,849	4,346	5,151	5,702	6,020	6,126
4100	0,000	0,555	1,109	1,661	2,211	2,760	3,312	3,853	4,342	5,139	5,690	6,010	6,118
4200	0,000	0,558	1,115	1,668	2,220	2,771	3,324	3,857	4,336	5,126	5,678	6,000	6,111
4300	0,000	0,561	1,120	1,676	2,230	2,782	3,335	3,859	4,330	5,112	5,664	5,990	6,104
4400	0,000	0,564	1,125	1,684	2,239	2,793	3,346	3,860	4,323	5,098	5,651	5,979	6,097
4500	0,000	0,566	1,130	1,691	2,249	2,804	3,355	3,860	4,315	5,083	5,636	5,968	6,090