

YATE DE 87m

CÁLCULOS DE ARQUITECTURA NAVAL

Cuaderno 4

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Proyecto: 16-05 Yate de lujo de 87m

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Escola Politécnica Superior
UNIVERSIDADE DA CORUÑA

DEPARTAMENTO DE INGENIERÍA NAVAL Y OCEÁNICA
ANTEPROYECTO Y PROYECTO FIN DE CARRERA

CURSO 2.015-2016

PROYECTO NÚMERO 16-05

TIPO DE BUQUE: *YATE DE LUJO DE DESPLAZAMIENTO*

CLASIFICACIÓN , COTA Y REGLAMENTOS DE APLICACIÓN : *BUQUE DE PASAJE, OCEANICO, SOLAS MARPOL MCA.*

CARACTERÍSTICAS DE LA CARGA: PERSONAS EN CRUCEROS TURÍSTICOS DE GRAN LUJO

VELOCIDAD Y AUTONOMÍA: 15 KN A MOTOR DE VELOCIDAD MAXIMA

SISTEMAS Y EQUIPOS DE CARGA / DESCARGA: *GRUA A BORDO, JACUZZI, GARAJE PARA MOTOS DE AGUA*

PROPULSIÓN: *UNO O DOS MOTORES DIESEL*

TRIPULACIÓN Y PASAJE: *40 PASAJEROS 20 TRIPULANTES*

OTROS EQUIPOS E INSTALACIONES: *GARAJE, HELICE TRASVERSAL PROA, HELIDECK*

Ferrol, Octubre de 2015

ALUMNO: D. VICTOR GAVIN

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CUADERNO 4

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1 Introducción

En el presente cuaderno se realizarán los **cálculos de las hidrostáticas** y **curvas KN** a diferentes calados y asientos.

Se realizará una descripción del **compartimentado** incluyendo la separación de cuadernas, la posición de los mamparos estancos y los espacios de carga.

Se estudiarán los **tanques a bordo** del buque, así como las **capacidades** necesarias de consumos y lastre.

Los datos de partida del estudio realizado en los cuadernos anteriores son:

Dimensiones		
L	Eslora	87,5 m
L_{pp}	Eslora perpendiculares	73 m
L_{wl}	Eslora flotación	78,86 m
B	Manga	13,47 m
T	Calado	4,32 m
D	Puntal a c. super	7,61 m
	Tripulación	20
	Pasaje	40

Displacement	2356	t
Volume (displaced)	2298,634	m³
Draft Amidships	4,300	m
Immersed depth	4,309	m
WL Length	78,867	m
Beam max extents on WL	13,355	m
Wetted Area	1198,923	m²
Max sect. area	50,465	m²
Waterpl. Area	832,905	m²
Prismatic coeff. (Cp)	0,578	
Block coeff. (Cb)	0,506	
Max Sect. area coeff. (Cm)	0,897	
Waterpl. area coeff. (Cwp)	0,791	
LCB length	33,219	from zero pt. (+ve fwd) m
LCF length	26,989	from zero pt. (+ve fwd) m
LCB %	42,121	from zero pt. (+ve fwd) % Lwl
LCF %	34,221	from zero pt. (+ve fwd) % Lwl
KB	2,544	m
KG fluid	0,000	m
BMt	4,316	m
BML	140,668	m
GMt corrected	6,860	m
GML	143,213	m
KMt	6,860	m
KML	143,213	m
Immersion (TPc)	8,537	tonne/cm
MTc	46,666	tonne.m
RM at 1deg = GMt.Disp.sin(1)	282,094	tonne.m
Length:Beam ratio	5,905	
Beam:Draft ratio	3,099	
Length:Vol ^{0.333} ratio	5,976	
Precision	Medium	66 stations

2 Tablas de cálculos hidrostáticos

Las curvas hidrostáticas son necesarias porque definen los valores de la carena en diferentes situaciones de calados, datos necesarios para el cálculo de la estabilidad del buque. Estos cálculos se realizarán **desde 2 metros hasta 5 metros en intervalos de 0.2 m**. Este margen permite ampliar el calado máximo y mínimo (rosca y plena carga) a las que en condiciones normales el buque se va a enfrentar.

Los datos que se van a aportar son:

Referencia	Descripción	Unidad
Draft Amidsh.	Calado	m
Displacement	Desplazamiento	t
WL Length	Eslora en la flotación	m
WL Beam	Manga en la flotación	m
Wetted Area	Superficie mojada	m ²
Waterpl. Area	Área del plano de flotación	m ²
Prismatic Coeff.	Coefficiente prismático	
Block Coeff.	Coefficiente de bloque	
Midship Area Coeff.	Coefficiente de maestra	
Waterpl. Area Coeff.	Coefficiente de flotación	
LCB from zero pt. (+ve fwd)	Posición longitudinal del centro de carena (+ a proa)	m
LCF from zero pt. (+ve fwd)	Posición longitudinal del centro de flotación (+ a proa)	m
KB	Radio metacéntrico transversal	m
BMt	Radio metacéntrico longitudinal	m
GMt	Altura metacéntrica transversal	m
GMI	Altura metacéntrica longitudinal	m
Immersion (TPc)	Toneladas por centímetro de inmersión	t/cm
MTc	Momento para cambiar el trimado 1 cm	t/cm

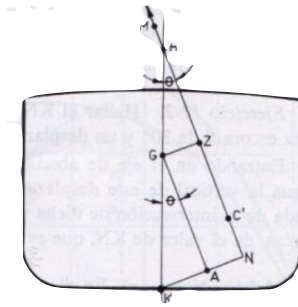
Anexos incluidos en este apartado:

- Hidrostáticas: *anexo 4.2.1*

3 Tablas de brazos adrizantes (KN)

Las curvas KN representan el valor de la distancia KN para diferentes valores de escora de la embarcación. El valor de KN es el equivalente al brazo adrizante del barco con el centro de gravedad en la posición hipotética de K (en la línea base), siendo los valores de KN dependientes únicamente de las formas de la carena. La utilidad de estas curvas reside en que permiten calcular de un modo sencillo el valor de GZ, una vez conocida la altura del centro de gravedad. De modo que:

$$GZ = KN - KG \text{ sen } \theta$$



Los cálculos se han realizado con escoras comprendidas entre 0° y 90° en tramos de 10° y superando los márgenes del desplazamiento en rosca (1700t) y máximo en plena carga (2200t), en saltos de 20t.

Anexos incluidos en este apartado:

- Cálculos KN: *anexo 4.3.1*

4 Zona estanca

Se consideran en este apartado las instrucciones recogidas en la SC que se aplica al buque: "Special Service Craft" (SSC) de Lloyd's Register.

4.1 Mamparos estancos

Definido en:

Table 2.4.1 Total number of bulkheads

Length, L_R , in metres		Total number of bulkheads	
		Machinery amidships	Machinery aft
> 15	≤ 25	3	2
> 25	≤ 65	4	3*
> 65	≤ 85	4	4*
> 85	≤ 90	5	5*
> 90	≤ 105	5	5*
> 105	≤ 115	6	5*
> 115	≤ 125	6	6*
> 125	≤ 145	7	6*
> 145		To be individually considered	

* With afterpeak bulkhead forming after boundary of machinery space

Teniendo esto en cuenta, la configuración óptima será de 4 mamparos estancos. No obstante, se ha optado por una configuración de 5 mamparos ya que esto favorecerá el grado de fiabilidad del buque.

Consideraciones practicas:

- La situación de los mamparos estancos coincidirá con sus respectivas cuadernas.
- Por lo dicho anteriormente, será necesario definir la separación entre cuadernas. Este parámetro no viene definido en el SSC, por lo tanto, se tomará como referencia la clara del buque base, correspondiente a 600mm. Este valor es estándar dentro de los barcos de estas dimensiones, que oscilan entre 500mm a 700mm. Por el momento el valor de la clara va a ser constante, pero se considerará en cálculos futuros reducirlo, si fuese necesario, en piques de proa y popa.

4.2 Mamparo de colisión

Definido en:

Table 2.4.3 Collision bulkhead for passenger craft, patrol craft and yachts

Arrangement	Distance of collision bulkhead aft of fore perpendicular, in metres	
	Minimum	Maximum
(a)	$0,05L_{pp}$	$3 + 0,05L_{pp}$
(b)	$0,05L_{pp} - f$	$3 + 0,05L_{pp} - f$
Symbols and definitions		
$f = \frac{G}{2} \text{ or } 0,015L_{pp}, \text{ whichever is the lesser}$		
$G = \text{Projection of bulbous bow forward of fore perpendicular, in metres}$		
L_{pp} is as defined in Pt 3, Ch 1, 6.2 <i>Principal particulars</i> .		
Arrangement (a) A craft that has no part of its underwater body extending forward of the fore perpendicular.		
Arrangement (b) A craft with part of its underwater body extending forward of the fore perpendicular (e.g. bulbous bow).		

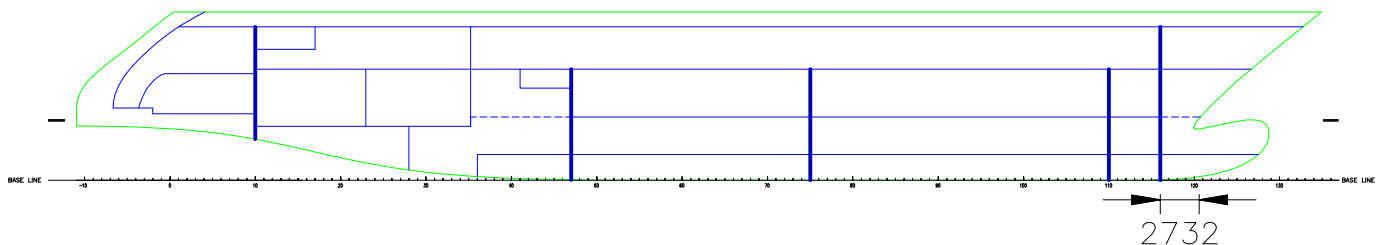
Teniendo esto en cuenta y realizando los cálculos obtenemos:

- Distancia mínima desde la perpendicular de proa hacia popa: 2,65m
- Distancia máxima desde la perpendicular de proa hacia popa: 5,65m

Consideraciones prácticas:

- Se ha decidido utilizar la mínima para poder optimizar el espacio de habilitación. Es decir, el mamparo irá situado lo más a proa posible.

Mamparos estancos Compartimentado



5 Puntos de inundación progresiva

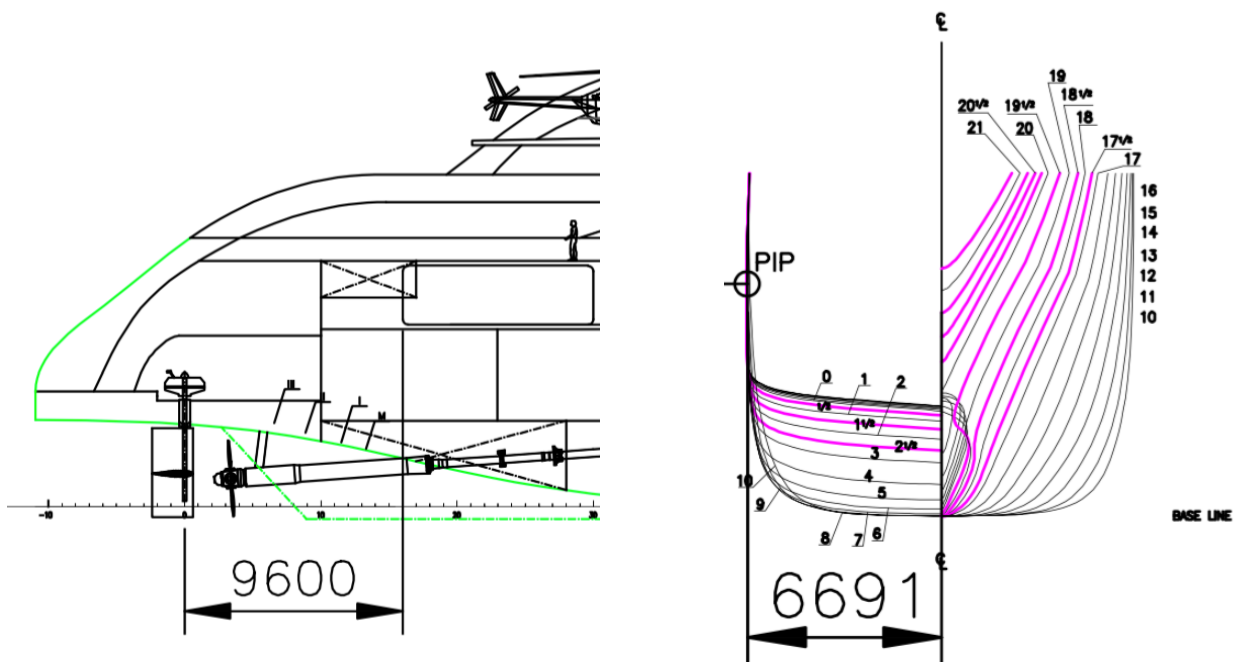
Los puntos de inundación progresiva son todos aquellos puntos que, estando situados por encima de la cubierta de francobordo pueden dar lugar, en caso de un embarque de agua o de una escora determinada, a la inundación del buque.

Pueden corresponder a puertas, portillos o cualquier tipo de abertura que presentan las superestructuras y a través de las cuales puede entrar agua.

El punto de inundación progresiva más bajo será el acceso al garaje en la cubierta *Main Deck* ($h = 6691$ mm), ya que el resto de aberturas, más cercanas a la flotación, dispondrán de cierres estancos y no se prevé inundación a través de ellos. Este acceso encontrándose cerrado debería comportarse como estanco, para ello debería ir provisto de cilindros hidráulicos que retranqueén el portón. No obstante no siempre se encontrara cerrado.

La situación del punto de inundación será el punto más bajo de la puerta y el que esté más alejado de crujía. La situación longitudinal del PIP es a 9600 mm de la perpendicular de popa.

En el Cuaderno 5 se incluirán los puntos de inundación progresiva (PIP) en el cálculo de estabilidad.



Anexos incluidos en este apartado:

- Plano puntos de inundación progresiva: *anexo 4.5.1*

6 Plano de compartimentado

Comenzaremos este apartado definiendo las capacidades necesarias para cada fluido. De este modo las podremos repartir en sus respectivos tanques:

Autonomía = 6300 millas náuticas - 17 días de navegación

Consumo planta (MTU 10V 2000 M93) [x2 ud.] = 287,7 l/h

Consumo generadores (Caterpillar Marine Generator SET C9) = 50 l/h

Velocidad = 15kn

nº motores = 2

nº generadores = 3

	CAPACIDAD NECESARIA	CAPACIDAD INSTALADA
PLANTA PROPULSORA Tanques combustible (m ³) $V = (\text{autonomía/velocidad}) \times \text{consumo} \times \text{n}^\circ \text{motores}$	241,668	-
GENERADORES Tanques combustible (m ³) $V = (\text{autonomía/velocidad}) \times \text{consumo} \times \text{n}^\circ \text{motores}$	36	-
GENERADOR EMERGENCIA SOLAS (36h)	1,8	-
TOTAL COMBUSTIBLE	279,47	283,13
TANQUE USO DIARIO (24h x consumo h x nºmotores)	11,51	12,74
Tanques de aceite (m³) $V = 0,03 \times \text{Total combustible}$ (3% del total de los tanques de combustible)	8,4	8,39
Tanques de agua (m³) $V = 125\text{l/persona} \times \text{personas} \times \text{autonomía}$	112,5	123,91
Aguas negras (m³) $V = 10\text{l/persona} \times \text{personas} \times \text{autonomía}$	8,4	8,74
Aguas grises (m³) $V = 15\text{l/persona} \times \text{personas} \times \text{autonomía}$	12,6	13,42

Actualizamos las características de autonomía del buque con respecto a las capacidades reales de los tanques:

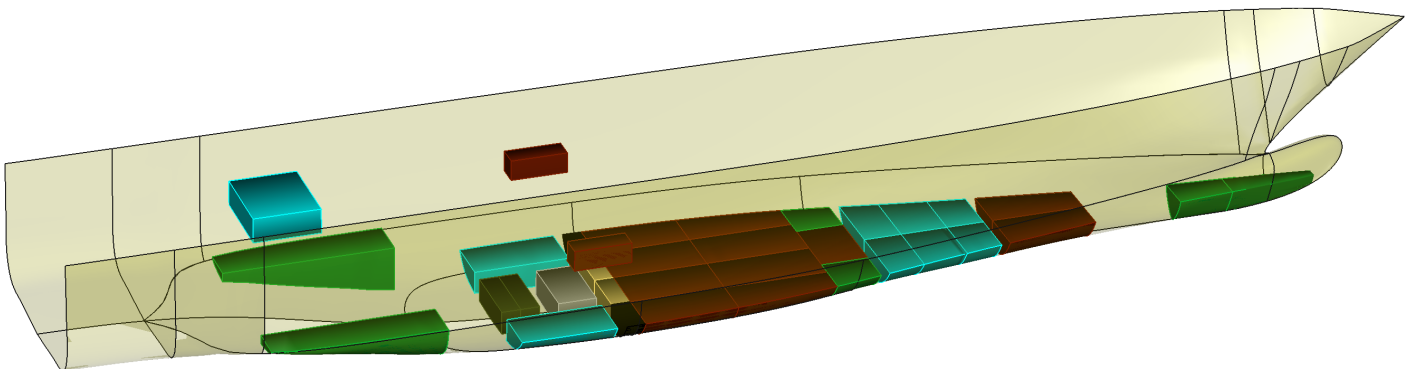
- Autonomía: 6350 millas.
- Litros de agua por persona: 140l.

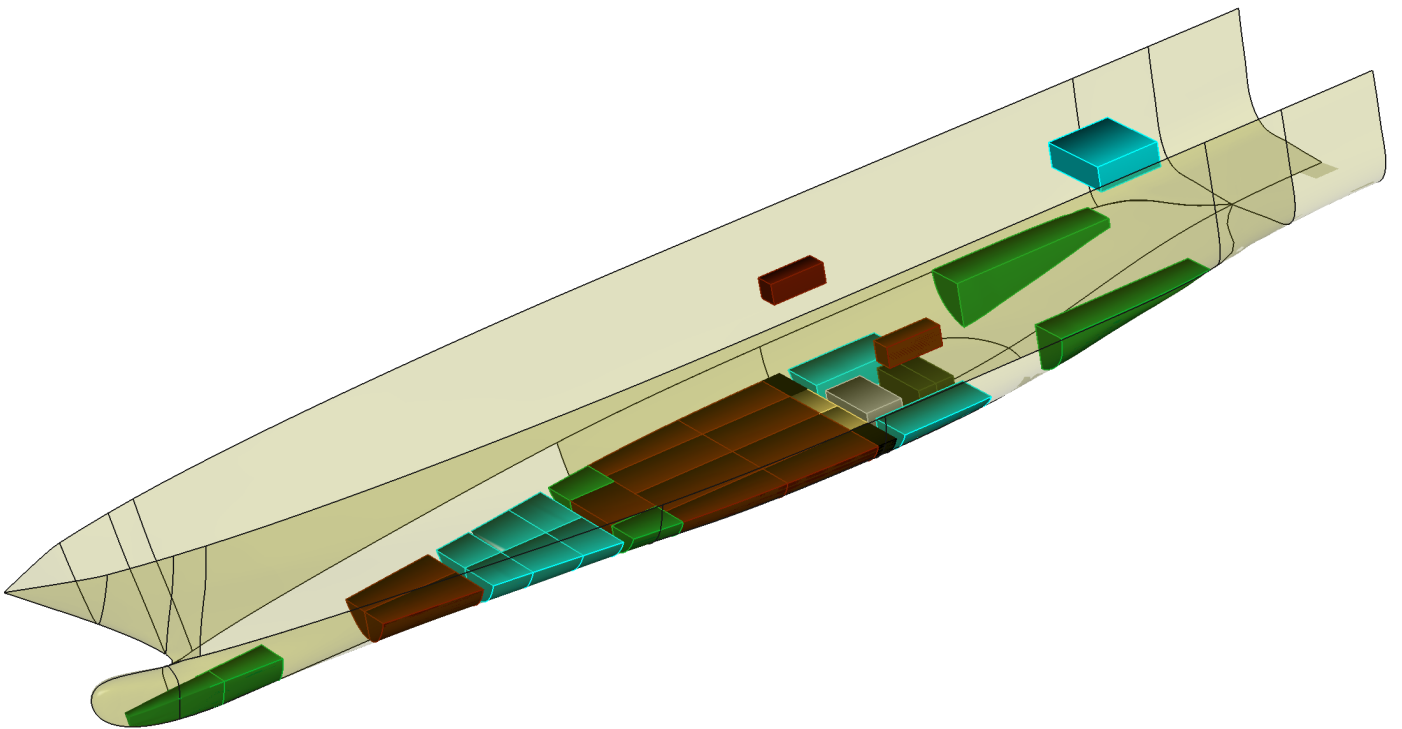
7 Plano de tanques

En el anexo relativo a este apartado se puede consultar la disposición de tanques.

Consideraciones prácticas:

- Se utilizará la clara de cuadernas para hacer coincidir el inicio y el fin de cada tanque con una cuaderna (600mm).
- Configuración de tanques simétrica para no entorpecer la estabilidad, trimado...
- Tanques de agua dulce separados por una clara de cuaderna en todas sus disposiciones del resto de tanques (coferdam).
- Según la normativa no se pueden poner tanques de combustible en cámara de máquinas, salvo uso diario.
- Los tanques impares corresponden a babor y los pares a estribor.
- Renunciando a capacidad de tanques de combustible, se instalará en este espacio un sistema de tanques estabilizadores pasivos (que se estudiará en el Cuaderno 5).





Leyenda de colores:

- **Ballast**
- **Diesel**
- **Fresh water**
- **Grey water**
- **Black water**
- **Lube and Oil**
- **JP5**
- **Swimming pool**

Anexos incluidos en este apartado:

- Arrangement tank: *anexo 4.7.1*

8 Tabla de capacidades y CDG

TANK	CAPACITY (m3)	LCG (m)	TCG (m)	VCG (m)
Oil	8,04	22,204	0,000	1,021
TOTAL OIL	8,04			
Grey Water	17,719	26,407	0,000	0,941
TOTAL GREY WATER	17,719			
Black Water 1	4,374	28,801	-4,344	1,085
Black Water 2	4,374	28,801	4,344	1,085
TOTAL BLACK WATER	8,748			
Diesel 1	20,857	32,339	-4,299	1,090
Diesel 3	33,834	32,402	-1,580	0,914
Diesel 2	20,857	32,339	4,299	1,090
Diesel 4	33,834	32,402	1,580	0,914
Diesel 5	17,508	38,428	-4,104	1,136
Diesel 7	37,146	38,695	-1,575	0,916
Diesel 6	17,508	38,428	4,104	1,136
Diesel 8	37,146	38,695	1,575	0,916
Diesel 9	20,205	56,778	-1,025	1,040
Diesel 10	20,205	56,778	1,025	1,040
Diesel 11	24,03	43,499	0,000	0,906
TOTAL DIESEL	283,13			
Fresh Water 1	20,618	24,699	-4,302	1,148
Fresh Water 2	20,618	24,699	4,302	1,148
Fresh Water 3	14,481	46,777	-1,750	1,003
Fresh Water 4	14,481	46,777	1,750	1,003
Fresh Water 5	15,856	49,462	-1,541	1,008
Fresh Water 6	15,856	49,462	1,541	1,008
Fresh Water 7	11	52,173	-1,347	1,017
Fresh Water 8	11	52,173	1,347	1,017
TOTAL FRESH WATER	123,91			
Ballast 1	36,82	12,718	-5,097	2,947
Ballast 2	36,82	12,718	5,097	2,947
Ballast 3	8,275	67,671	0,000	1,126
Ballast 4_Forward	6,367	71,789	0,000	1,238
Ballast Balance 1	9,103	43,425	-3,249	1,118
Ballast Balance 2	9,103	43,425	3,249	1,118
TOTAL BALLAST	106,488			
Swimming Pool	33,602	8,100	0,000	10,000
TOTAL SWIMMING POOL	33,602			

TANK	CAPACITY (m3)	LCG (m)	TCG (m)	VCG (m)
Vertidos	8,04	23,403	0,000	0,992
TOTAL Vertidos	8,04			

TANK	CAPACITY (m3)	LCG (m)	TCG (m)	VCG (m)
JP5 1	6,711			
JP5 2	6,711			
TOTAL JP5	13,422			
Uso Diario 1	6,369	26,396	-6,020	7,143
Uso Diario 2	6,369	26,396	6,020	7,143
TOTAL USO DIARIO	12,738			

La tabla anterior presenta una recopilación de los tanques instalados, pudiéndose consultar en su anexo correspondiente el report directo del software.

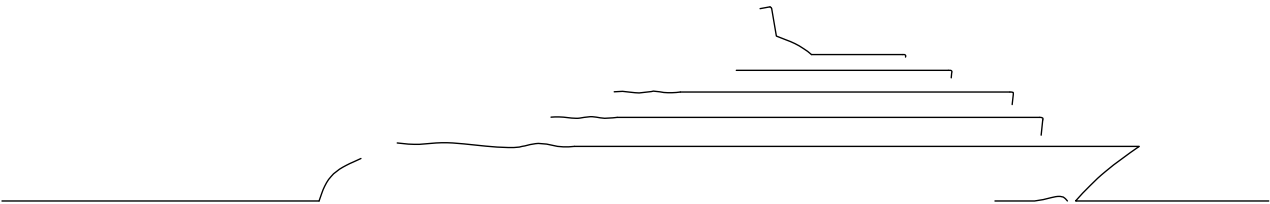
Como se puede comprobar en la tabla, se han definido unos tanques dedicados a agua de lastre. Se ha considerado que era importante realizar una idea preliminar de esta carga y se ha utilizado el espacio sobrante en los dobles fondos para ello. En el Cuaderno 5 se estudiará si es necesario ampliar o corregir esta capacidad.

También se ha decidido modelizar la piscina como si de un tanque se tratase, debido a la importante influencia en la estabilidad del barco que va a suponer elevar tanto un tanque. En función de los estudios posteriores que realizaremos a la estabilidad, podremos considerar la posibilidad de modificar sus dimensiones o disposición.

Anexos incluidos en este apartado:

- Tank calibration: *anexo 4.8.1*

ANEXO 4.2.1

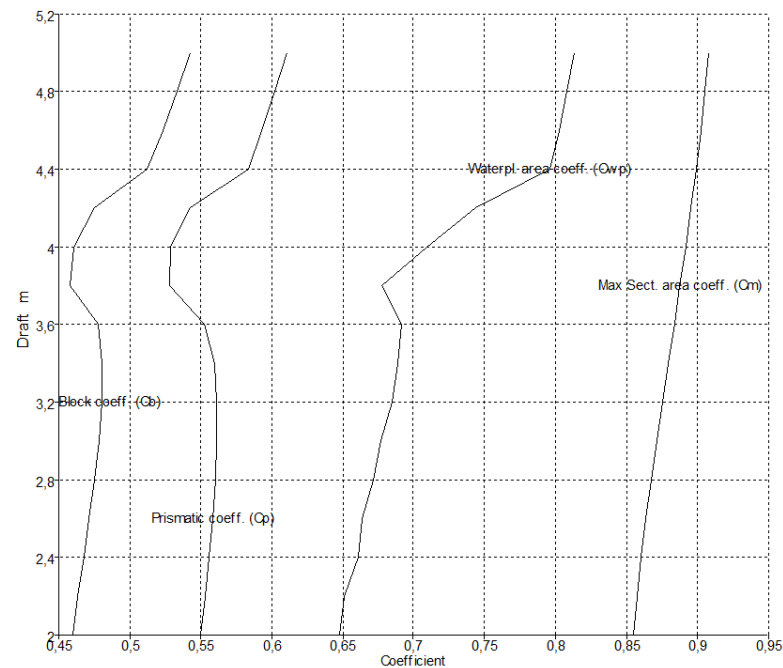
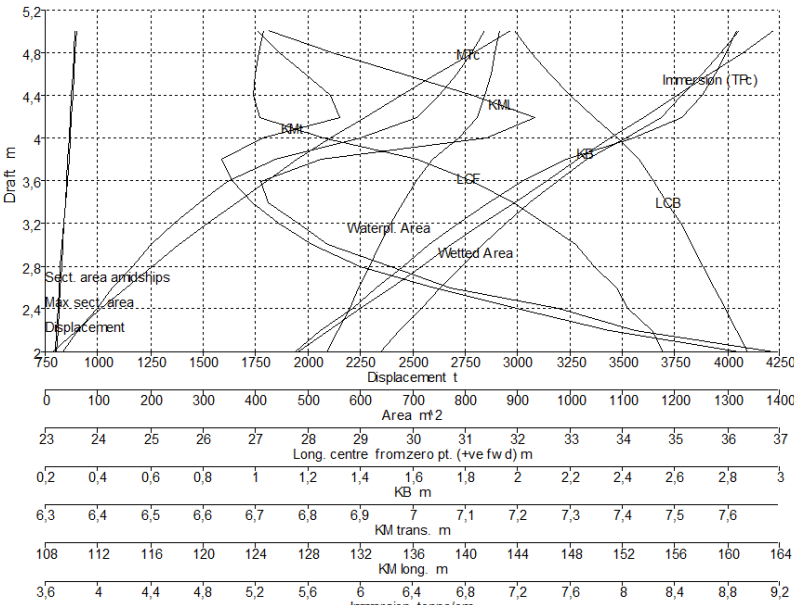


YATE DE 87m

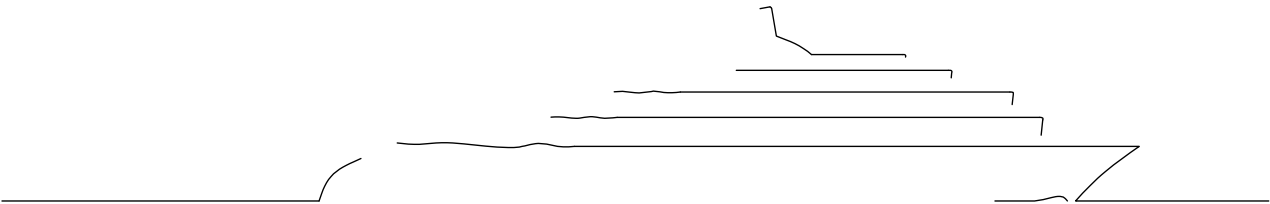
Hydrostatic - tfg maxurf

Stability 20.00.04.9, build: 9
 Model file: \\MacHome\Dropbox\0 TFG\Cuaderno 4\tfg maxurf (Medium precision, 66 sections, Trimming off, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp. %: 0,01000(0,100); Trim % (LCG-TCG): 0,01000(0,100); Heel% (LCG-TCG): 0,01000(0,100)
 Damage Case - Intact

	2,000	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,400	4,600	4,800	5,000
Draft Amidships m	2,000	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,400	4,600	4,800	5,000
Displacement t	784,9	896,7	1013	1134	1259	1387	1521	1658	1801	1948	2105	2271	2442	2615	2790	2967
Heel deg	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Draft at FP m	2,000	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,400	4,600	4,800	5,000
Draft at AP m	2,000	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,400	4,600	4,800	5,000
Draft at LCF m	2,000	2,200	2,400	2,600	2,800	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,400	4,600	4,800	5,000
Trim (+ve by stern) m	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000
WL Length m	66,568	67,609	68,635	69,665	70,728	71,880	73,167	74,741	76,913	81,996	83,506	83,091	78,958	79,133	79,312	79,496
Beam max extents on WL m	12,454	12,631	12,778	12,906	13,007	13,092	13,162	13,220	13,263	13,292	13,320	13,347	13,362	13,369	13,381	13,388
Wetted Area m^2	640,092	676,150	717,418	753,299	794,047	833,493	876,231	923,564	973,920	1032,048	1108,331	1172,961	1212,805	1250,196	1287,203	1323,208
Waterpl. Area m^2	537,056	556,205	579,679	596,795	617,829	636,691	659,389	681,208	705,840	738,866	789,063	825,115	839,085	849,555	857,779	865,622
Prismatic coeff. (Cp)	0,550	0,553	0,556	0,558	0,560	0,561	0,561	0,559	0,553	0,528	0,528	0,542	0,583	0,593	0,602	0,610
Block coeff. (Cb)	0,460	0,464	0,468	0,472	0,475	0,478	0,480	0,480	0,477	0,458	0,461	0,512	0,522	0,523	0,533	0,543
Max Sect. area coeff. (Cm)	0,854	0,857	0,860	0,864	0,867	0,871	0,875	0,879	0,884	0,888	0,892	0,895	0,899	0,902	0,905	0,908
Waterpl. area coeff. (Cwp)	0,648	0,651	0,661	0,664	0,672	0,677	0,685	0,689	0,692	0,678	0,709	0,744	0,795	0,803	0,808	0,813
LCB from zero pt. (+ve fwd) m	36,375	36,172	35,961	35,748	35,539	35,324	35,100	34,859	34,594	34,298	33,911	33,451	33,000	32,601	32,251	31,945
LCF from zero pt. (+ve fwd) m	34,788	34,566	34,106	33,882	33,459	33,095	32,521	31,924	31,139	30,080	28,281	27,081	26,960	26,978	27,061	27,150
KB m	1,165	1,281	1,399	1,516	1,633	1,751	1,869	1,988	2,107	2,228	2,353	2,481	2,608	2,733	2,856	2,978
KG m	4,300	4,300	4,300	4,300	4,300	4,300	4,300	4,300	4,300	4,300	4,300	4,300	4,300	4,300	4,300	4,300
BMT m	6,456	6,093	5,798	5,525	5,267	5,058	4,876	4,706	4,548	4,406	4,360	4,382	4,235	4,064	3,889	3,726
BML m	162,341	151,628	145,677	137,329	132,761	127,760	125,423	123,018	122,305	126,804	139,310	142,865	137,986	132,555	127,070	122,032
GMT m	3,321	3,075	2,897	2,741	2,600	2,509	2,445	2,394	2,356	2,334	2,413	2,562	2,543	2,497	2,446	2,404
GML m	159,206	148,609	142,776	134,545	130,095	125,211	122,992	120,706	120,113	124,732	137,363	141,046	136,294	130,988	125,626	120,710
KM m	7,621	7,375	7,197	7,041	6,900	6,809	6,745	6,694	6,656	6,634	6,713	6,862	6,843	6,797	6,746	6,704
KML m	163,506	152,909	147,076	138,845	134,394	129,511	127,292	125,006	124,413	129,032	141,663	145,346	140,594	135,288	129,926	125,010
Immersion (TPc) tonne/cm	5,505	5,701	5,942	6,117	6,333	6,526	6,759	6,982	7,235	7,573	8,088	8,457	8,601	8,708	8,792	8,873
MTC tonne.m	17,283	18,429	20,005	21,099	22,644	24,026	25,865	27,680	29,909	33,608	39,992	44,302	46,028	47,373	48,475	49,527
RM at 1deg = GMT.Disp.sin(1) tonne.m	45,499	48,121	51,222	54,244	57,115	60,746	64,887	69,282	74,029	79,370	88,663	101,567	108,371	113,959	119,103	124,496



ANEXO 4.3.1

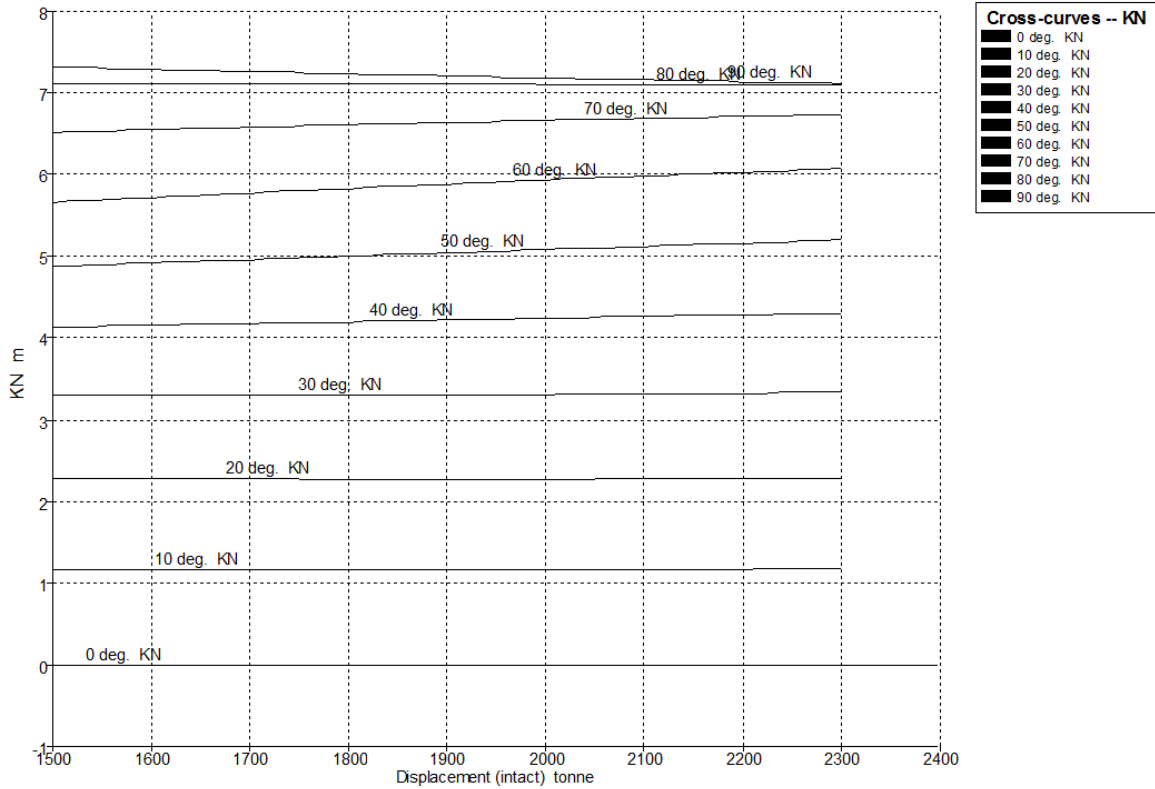


YATE DE 87m

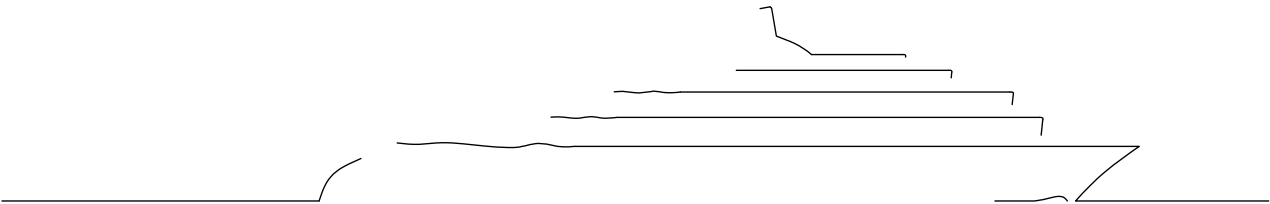
KN Calculation - tfg maxurf

Stability 20.00.04.9, build: 9
 Model file: \\MacHome\Dropbox\0 TFG\Cuaderno 4\ tfg maxurf (Medium precision, 66 sections, Trimming off, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp. %: 0,01000(0,100); Trim % (LCG-TCG): 0,01000(0,100); Heel% (LCG-TCG): 0,01000(0,100)
Damage Case - Intact

Displacement (intact) tonne	Draft Amidships m	LCG m	KN 10,0 deg. Starb.	KN 20,0 deg. Starb.	KN 30,0 deg. Starb.	KN 40,0 deg. Starb.	KN 50,0 deg. Starb.	KN 60,0 deg. Starb.	KN 70,0 deg. Starb.	KN 80,0 deg. Starb.	KN 90,0 deg. Starb.
1700	3,460	34,783	1,159	2,277	3,295	4,177	4,960	5,775	6,580	7,114	7,259
1720	3,488	34,746	1,159	2,276	3,296	4,181	4,968	5,787	6,586	7,113	7,254
1740	3,516	34,709	1,158	2,276	3,297	4,185	4,976	5,798	6,591	7,113	7,248
1760	3,544	34,672	1,158	2,275	3,297	4,189	4,984	5,809	6,597	7,112	7,243
1780	3,572	34,634	1,158	2,275	3,298	4,194	4,992	5,820	6,603	7,112	7,237
1800	3,599	34,595	1,159	2,274	3,299	4,198	5,000	5,831	6,608	7,111	7,232
1820	3,627	34,557	1,159	2,274	3,299	4,202	5,008	5,842	6,614	7,110	7,227
1840	3,654	34,518	1,159	2,274	3,300	4,206	5,016	5,852	6,619	7,109	7,222
1860	3,682	34,479	1,159	2,274	3,301	4,210	5,024	5,863	6,625	7,108	7,216
1880	3,709	34,439	1,160	2,274	3,302	4,215	5,032	5,873	6,630	7,107	7,211
1900	3,736	34,399	1,160	2,273	3,303	4,219	5,040	5,883	6,635	7,106	7,206
1920	3,763	34,358	1,160	2,273	3,304	4,223	5,048	5,894	6,641	7,105	7,201
1940	3,789	34,316	1,161	2,273	3,305	4,227	5,056	5,903	6,646	7,104	7,196
1960	3,816	34,272	1,161	2,274	3,306	4,231	5,064	5,913	6,651	7,103	7,191
1980	3,842	34,227	1,162	2,274	3,308	4,236	5,072	5,923	6,656	7,102	7,187
2000	3,868	34,180	1,162	2,274	3,309	4,240	5,080	5,933	6,661	7,101	7,182
2020	3,893	34,131	1,163	2,274	3,310	4,244	5,088	5,943	6,666	7,100	7,177
2040	3,919	34,081	1,163	2,275	3,312	4,249	5,096	5,953	6,671	7,099	7,172
2060	3,944	34,029	1,164	2,275	3,313	4,253	5,104	5,962	6,676	7,098	7,168
2080	3,969	33,977	1,165	2,276	3,315	4,258	5,112	5,972	6,681	7,097	7,163
2100	3,994	33,924	1,165	2,277	3,317	4,262	5,120	5,981	6,686	7,096	7,159
2120	4,018	33,871	1,166	2,277	3,318	4,267	5,128	5,991	6,691	7,095	7,154
2140	4,043	33,817	1,166	2,278	3,320	4,271	5,136	6,000	6,696	7,094	7,150
2160	4,067	33,762	1,167	2,278	3,322	4,276	5,144	6,009	6,700	7,093	7,145
2180	4,091	33,707	1,167	2,279	3,323	4,280	5,152	6,018	6,705	7,092	7,141
2200	4,116	33,651	1,168	2,280	3,325	4,285	5,159	6,027	6,710	7,090	7,137

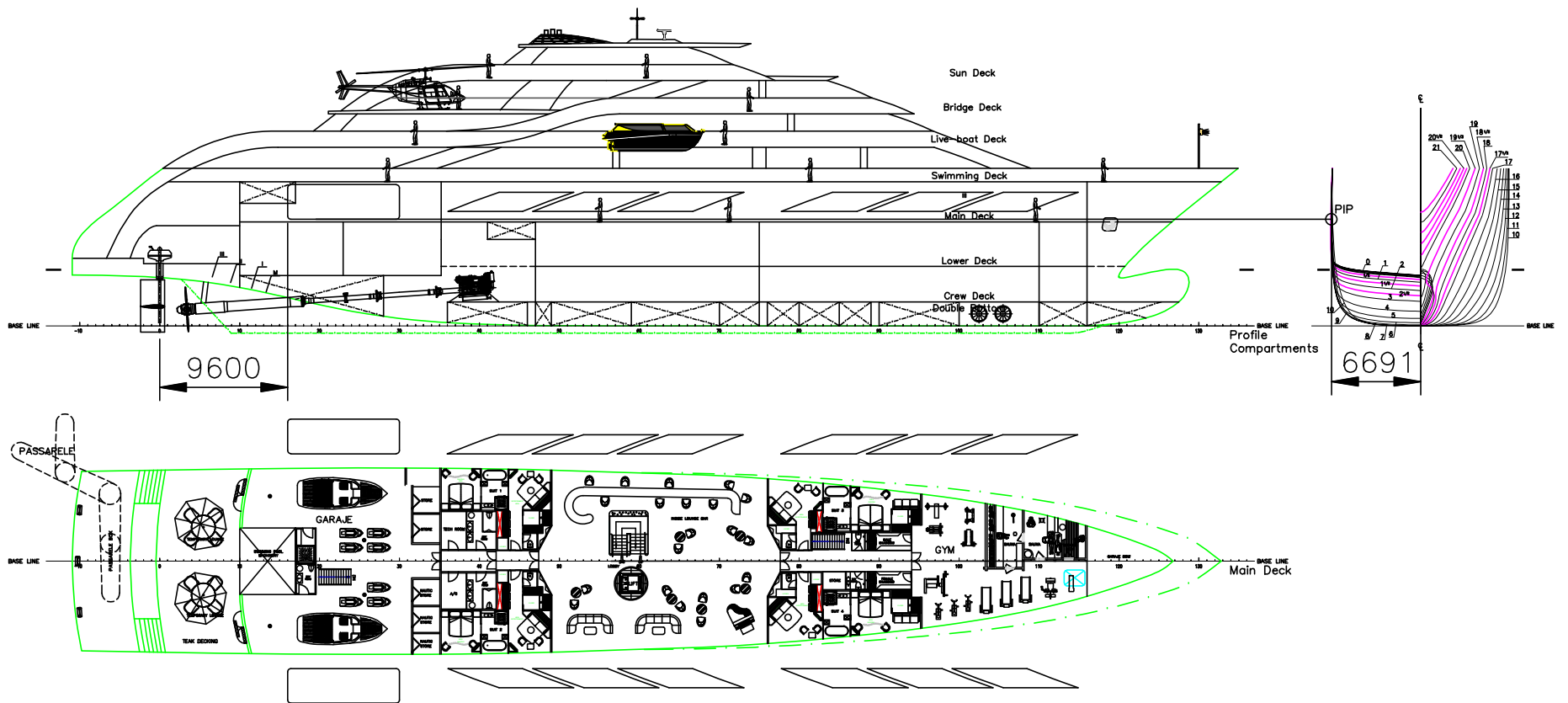


ANEXO 4.5.1

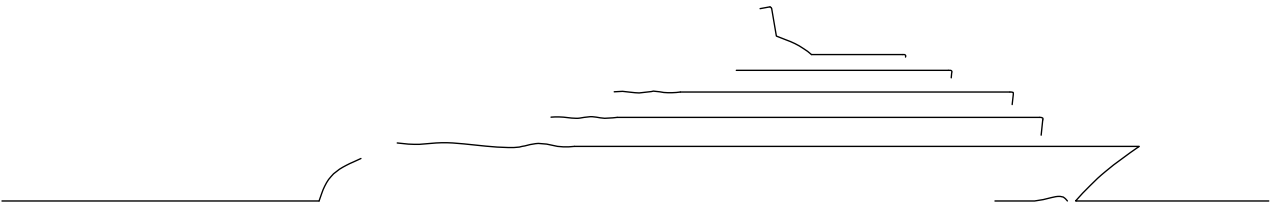


YATE DE 87m

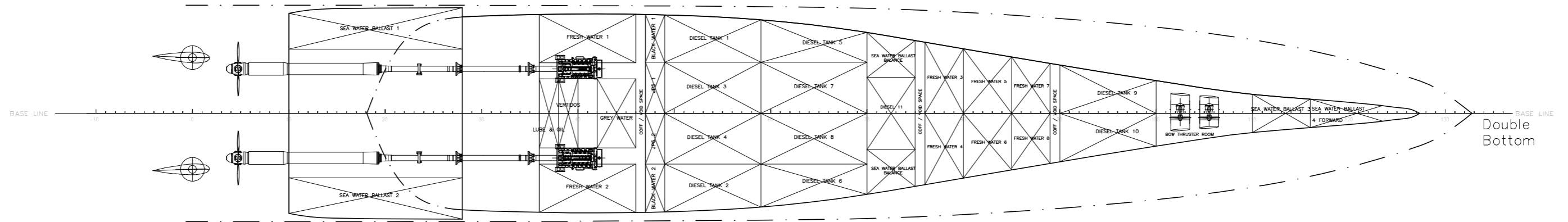
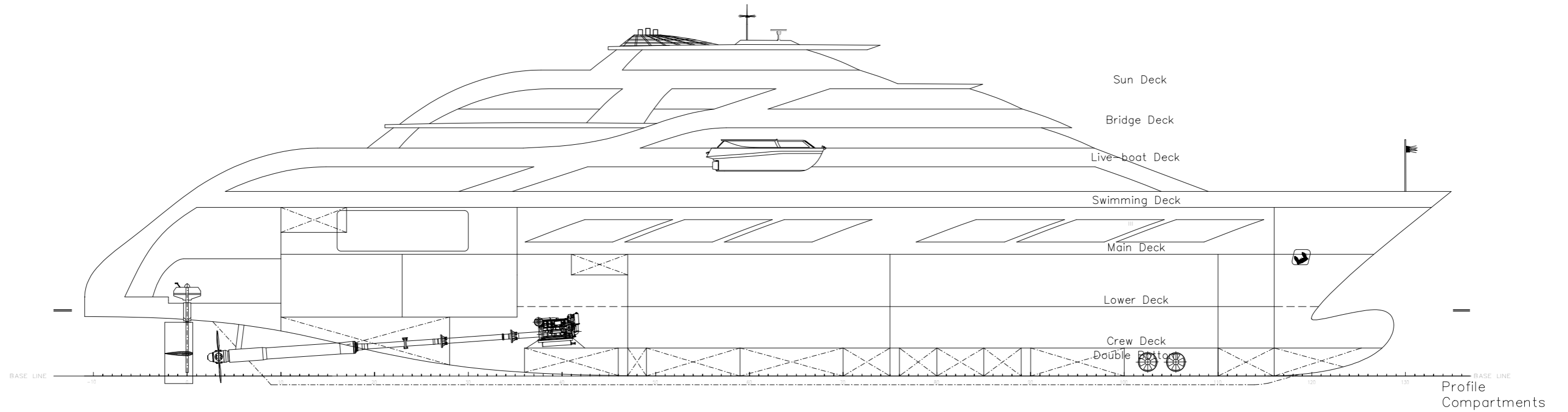
PIP - Punto de inundación progresiva




ANEXO 4.7.1

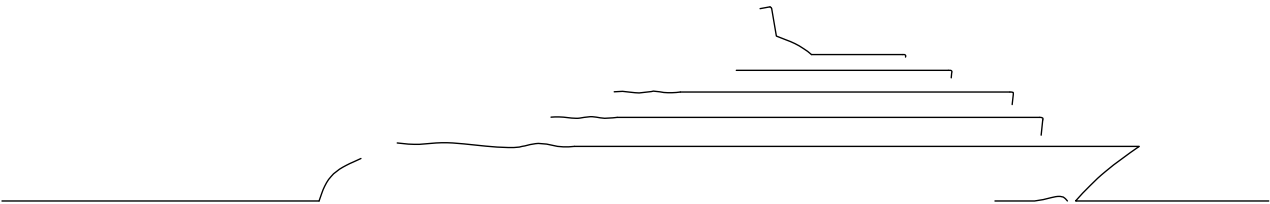


YATE DE 87m



 UNIVERSIDAD DE LA CORUÑA ESCUELA POLITÉCNICA SUPERIOR – FERROL	
ARQUITECTURA NAVAL PROYECTO FIN DE GRADO N° 16-05	ALUMNO: Víctor J. Gavín Barberán
TIPO DE BUQUE: YATE DE LUJO DE 87M	
DENOMINACIÓN PLANO: ARRANGEMENT TANK	
ESCALA: 1:250 ANEXO 4.7.1 – C4 FECHA: SEPTIEMBRE 2016	

ANEXO 4.8.1



YATE DE 87m

Tank Calibrations - tfg maxurf

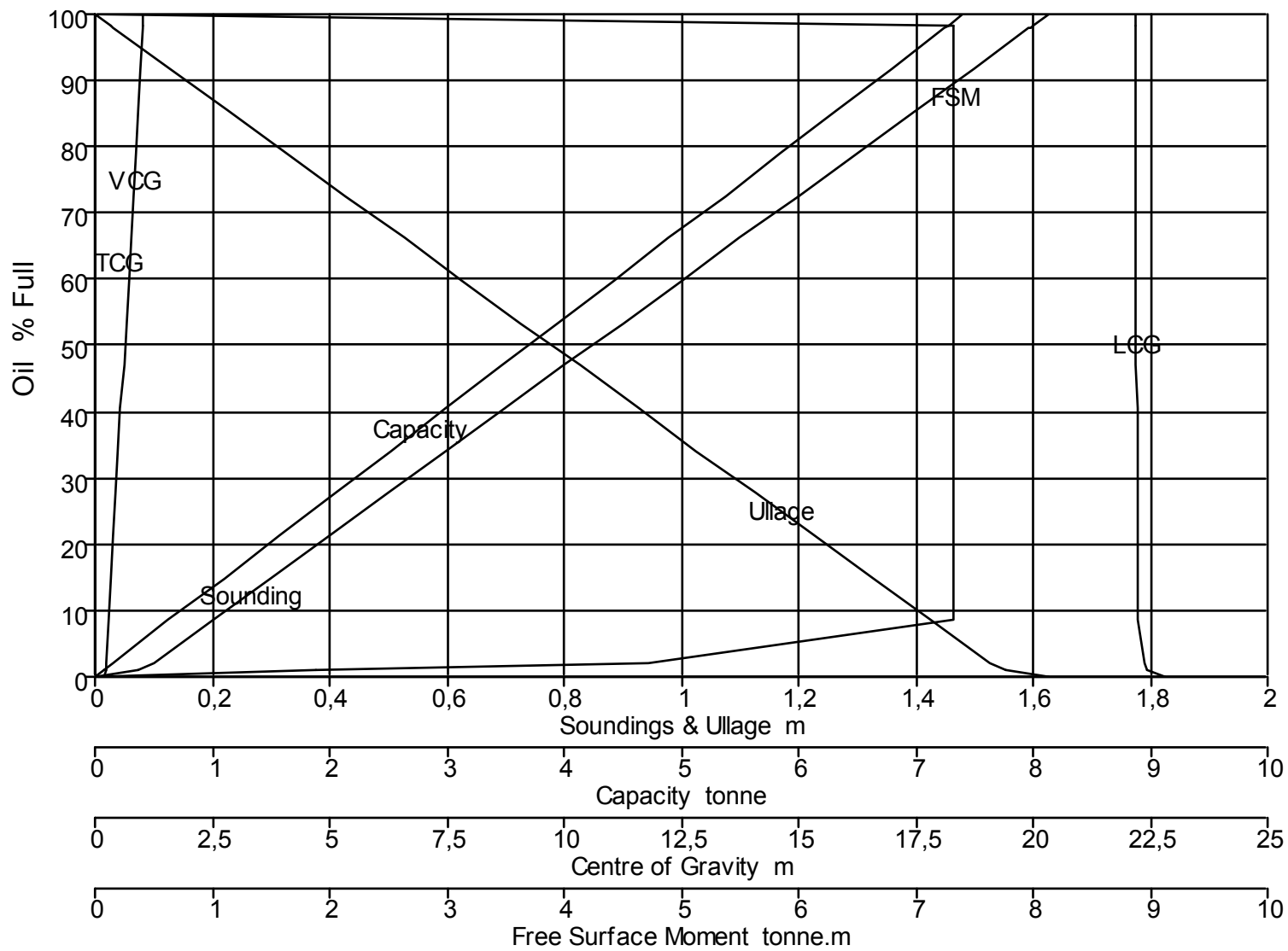
Stability 20.00.04.9, build: 9

Tank Calibrations - Oil

Fluid Type = Lube Oil Specific gravity = 0,92

Permeability = 100 %

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



Oil
Trim: 0 m; Heel: 0 deg to starboard

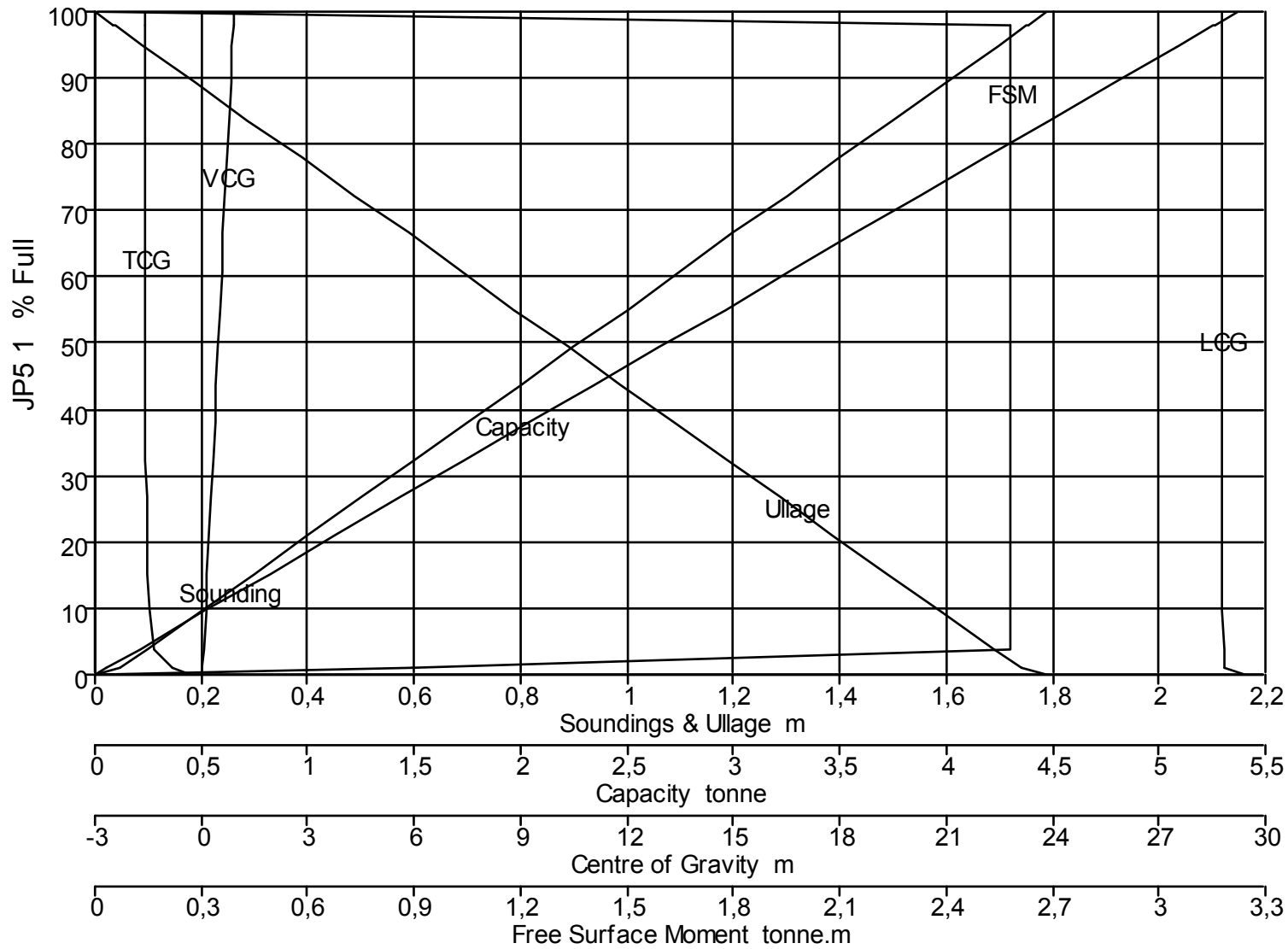
- Sounding
- Ullage
- Capacity
- LCG
- TCG
- VCG
- FSM

Tank Name	Sounding m	Ullage m	% Full	Capacity m ³	Capacity tonne	LCG m	TCG m	VCG m	FSM tonne.m
Oil	1,626	0,000	100,000	8,040	7,396	22,204	0,000	1,021	0,000
	1,600	0,026	98,317	7,904	7,272	22,204	0,000	1,008	7,315
	1,595	0,031	98,000	7,879	7,248	22,204	0,000	1,005	7,315

	1,594	0,033	97,900	7,871	7,241	22,204	0,000	1,004	7,315
	1,500	0,126	91,899	7,388	6,797	22,204	0,000	0,958	7,315
	1,400	0,226	85,481	6,872	6,323	22,205	0,000	0,908	7,315
	1,300	0,326	79,062	6,356	5,848	22,205	0,000	0,858	7,315
	1,200	0,426	72,644	5,840	5,373	22,205	0,000	0,808	7,315
	1,100	0,526	66,226	5,324	4,898	22,206	0,000	0,757	7,315
	1,000	0,626	59,808	4,808	4,424	22,207	0,000	0,707	7,315
	0,900	0,726	53,389	4,292	3,949	22,207	0,000	0,657	7,315
	0,800	0,826	46,971	3,776	3,474	22,208	0,000	0,607	7,315
	0,700	0,926	40,553	3,260	2,999	22,210	0,000	0,557	7,315
	0,600	1,026	34,135	2,744	2,525	22,212	0,000	0,507	7,315
	0,500	1,126	27,716	2,228	2,050	22,214	0,000	0,457	7,315
	0,400	1,226	21,298	1,712	1,575	22,219	0,000	0,407	7,315
	0,300	1,326	14,880	1,196	1,101	22,227	0,000	0,356	7,315
	0,200	1,426	8,462	0,680	0,626	22,247	0,000	0,304	7,315
	0,100	1,526	2,189	0,176	0,162	22,356	0,000	0,246	4,723
	0,074	1,552	1,000	0,080	0,074	22,437	0,000	0,228	1,892
	0,000	1,626	0,000	0,000	0,000	22,793	0,000	0,174	0,000

Tank Calibrations - JP5 1

Fluid Type = JP5 Specific gravity = 0,8
Permeability = 100 %
Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



JP5 1
Trim: 0 m; Heel: 0 deg to starboard

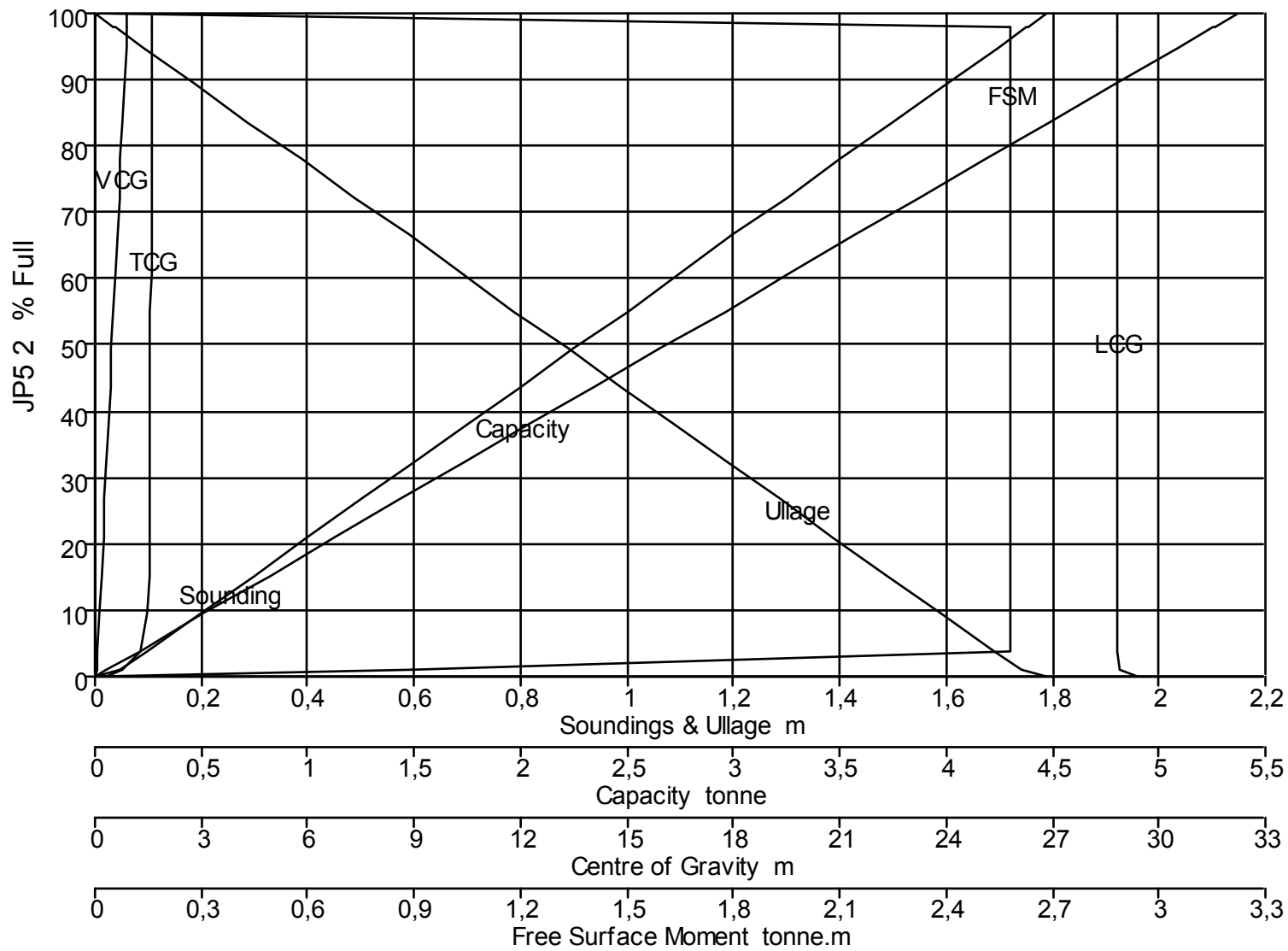
- Sounding
- Ullage
- Capacity
- LCG
- TCG
- VCG
- FSM

Tank Name	Sounding m	Ullage m	% Full	Capacity m ³	Capacity tonne	LCG m	TCG m	VCG m	FSM tonne.m
JP5 1	1,789	0,000	100,000	6,711	5,368	28,801	-1,581	0,921	0,000
	1,753	0,035	98,000	6,576	5,261	28,801	-1,580	0,904	2,580
	1,752	0,037	97,900	6,570	5,256	28,801	-1,580	0,903	2,580

	1,700	0,089	94,958	6,372	5,098	28,801	-1,580	0,877	2,580
	1,600	0,189	89,267	5,990	4,792	28,801	-1,579	0,827	2,580
	1,500	0,289	83,575	5,608	4,487	28,801	-1,578	0,777	2,580
	1,400	0,389	77,883	5,226	4,181	28,801	-1,578	0,727	2,580
	1,300	0,489	72,191	4,844	3,876	28,802	-1,576	0,677	2,580
	1,200	0,589	66,499	4,462	3,570	28,802	-1,575	0,627	2,580
	1,100	0,689	60,807	4,081	3,264	28,802	-1,574	0,577	2,580
	1,000	0,789	55,115	3,699	2,959	28,802	-1,572	0,527	2,580
	0,900	0,889	49,423	3,317	2,653	28,802	-1,569	0,477	2,580
	0,800	0,989	43,732	2,935	2,348	28,803	-1,567	0,427	2,580
	0,700	1,089	38,040	2,553	2,042	28,803	-1,563	0,377	2,580
	0,600	1,189	32,348	2,171	1,737	28,803	-1,558	0,327	2,580
	0,500	1,289	26,656	1,789	1,431	28,804	-1,551	0,277	2,580
	0,400	1,389	20,964	1,407	1,125	28,805	-1,540	0,227	2,580
	0,300	1,489	15,272	1,025	0,820	28,807	-1,520	0,176	2,580
	0,200	1,589	9,580	0,643	0,514	28,812	-1,478	0,126	2,580
	0,100	1,689	3,888	0,261	0,209	28,829	-1,311	0,074	2,580
	0,045	1,744	1,000	0,067	0,054	28,865	-0,798	0,040	0,890
	0,000	1,789	0,000	0,000	0,000	29,393	-0,335	0,011	0,000

Tank Calibrations - JP5 2

Fluid Type = JP5 Specific gravity = 0,8
Permeability = 100 %
Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



JP5 2
Trim: 0 m; Heel: 0 deg to starboard

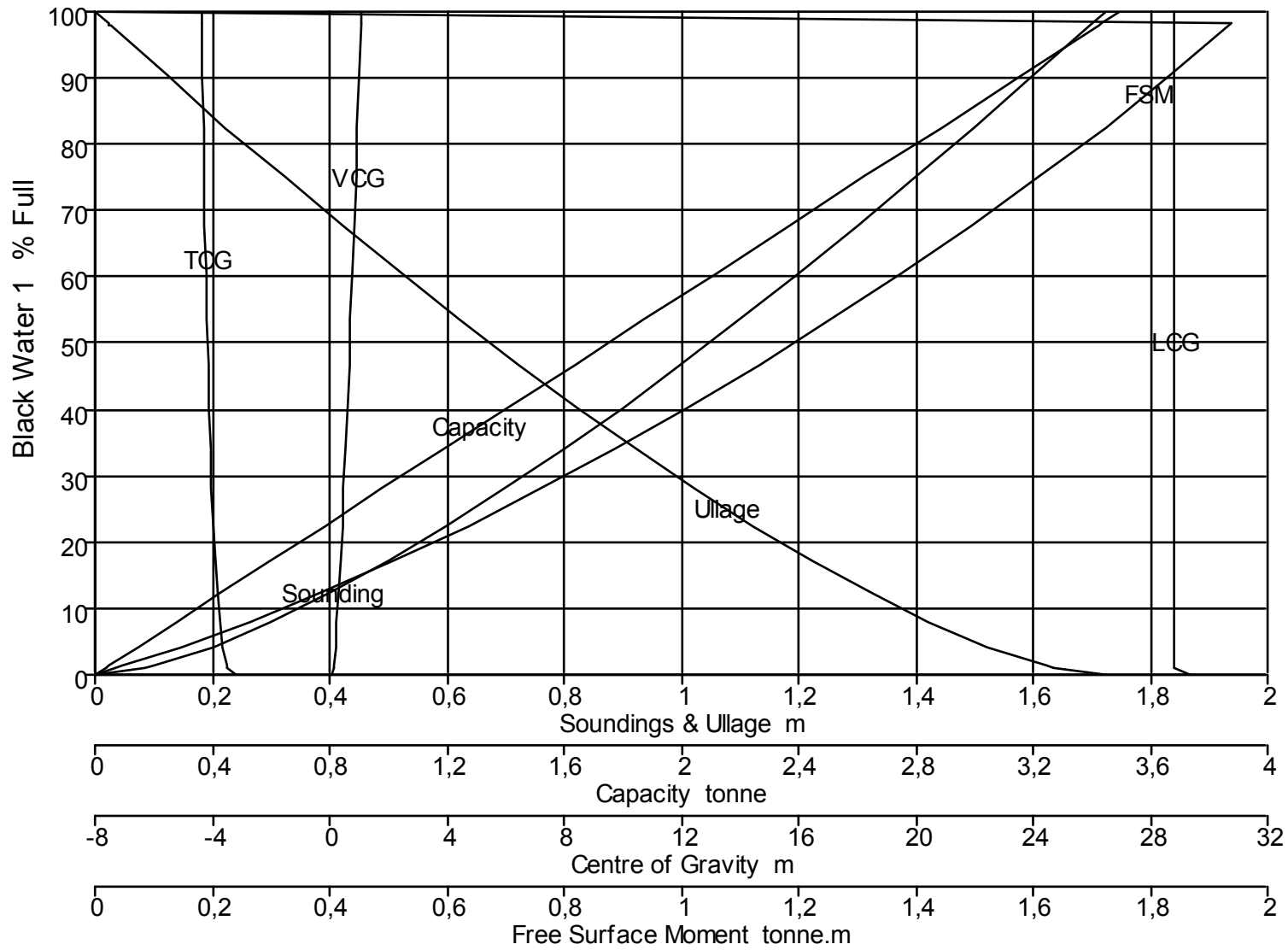
- Sounding
- Ullage
- Capacity
- LCG
- TCG
- VCG
- FSM

Tank Name	Sounding m	Ullage m	% Full	Capacity m ³	Capacity tonne	LCG m	TCG m	VCG m	FSM tonne.m
JP5 2	1,789	0,000	100,000	6,711	5,368	28,801	1,581	0,921	0,000
	1,753	0,035	98,000	6,576	5,261	28,801	1,580	0,904	2,580
	1,752	0,037	97,900	6,570	5,256	28,801	1,580	0,903	2,580

	1,700	0,089	94,958	6,372	5,098	28,801	1,580	0,877	2,580
	1,600	0,189	89,267	5,990	4,792	28,801	1,579	0,827	2,580
	1,500	0,289	83,575	5,608	4,487	28,801	1,578	0,777	2,580
	1,400	0,389	77,883	5,226	4,181	28,801	1,578	0,727	2,580
	1,300	0,489	72,191	4,844	3,876	28,802	1,576	0,677	2,580
	1,200	0,589	66,499	4,462	3,570	28,802	1,575	0,627	2,580
	1,100	0,689	60,807	4,081	3,264	28,802	1,574	0,577	2,580
	1,000	0,789	55,115	3,699	2,959	28,802	1,572	0,527	2,580
	0,900	0,889	49,423	3,317	2,653	28,802	1,569	0,477	2,580
	0,800	0,989	43,732	2,935	2,348	28,803	1,567	0,427	2,580
	0,700	1,089	38,040	2,553	2,042	28,803	1,563	0,377	2,580
	0,600	1,189	32,348	2,171	1,737	28,803	1,558	0,327	2,580
	0,500	1,289	26,656	1,789	1,431	28,804	1,551	0,277	2,580
	0,400	1,389	20,964	1,407	1,125	28,805	1,540	0,227	2,580
	0,300	1,489	15,272	1,025	0,820	28,807	1,520	0,176	2,580
	0,200	1,589	9,580	0,643	0,514	28,812	1,478	0,126	2,580
	0,100	1,689	3,888	0,261	0,209	28,829	1,311	0,074	2,580
	0,045	1,744	1,000	0,067	0,054	28,865	0,798	0,040	0,890
	0,000	1,789	0,000	0,000	0,000	29,393	0,335	0,011	0,000

Tank Calibrations - Black Water 1

Fluid Type = Black Water Specific gravity = 0,8
Permeability = 100 %
Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Black Water 1
Trim: 0 m; Heel: 0 deg to starboard

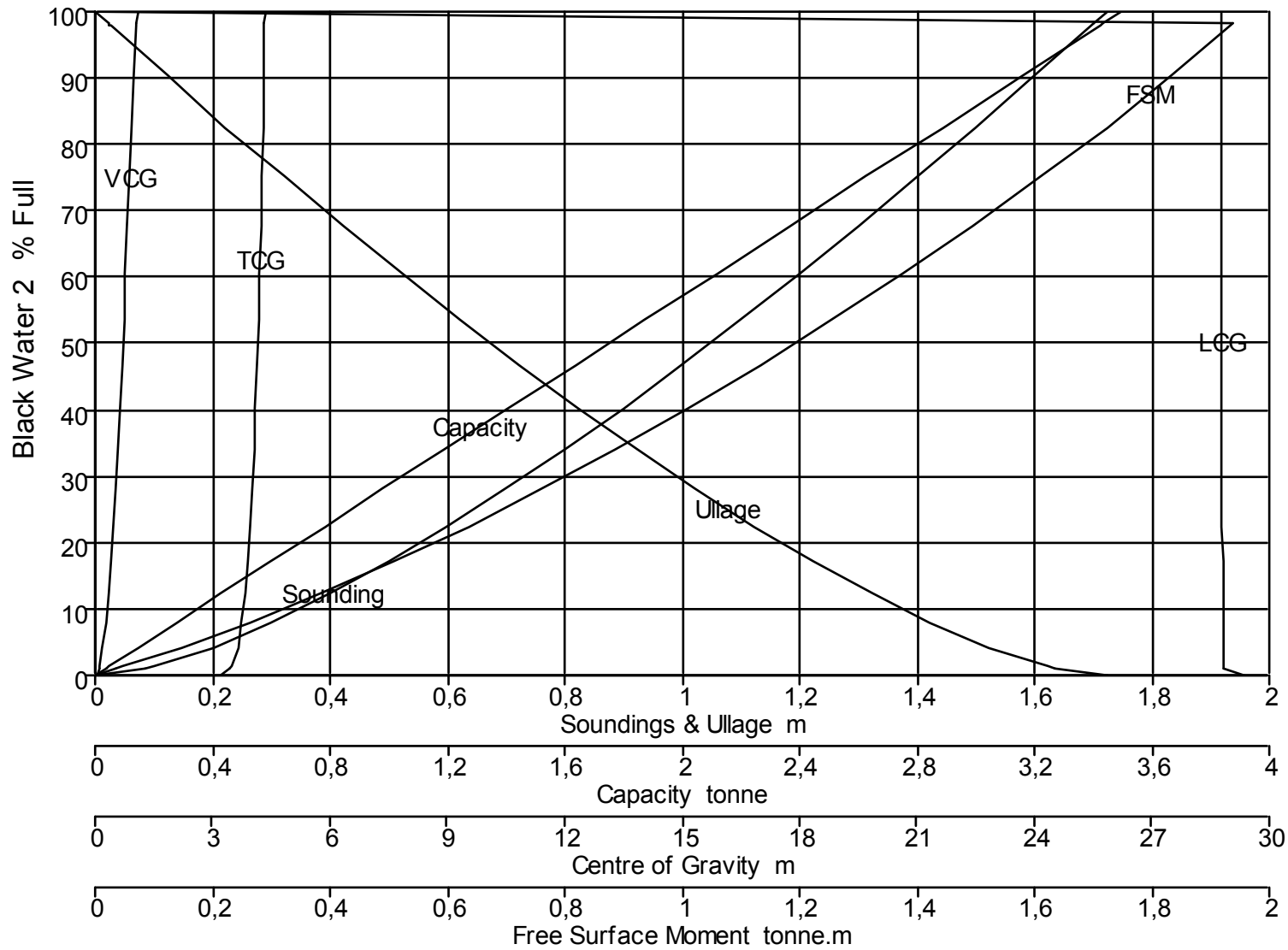
- Sounding
- Ullage
- Capacity
- LCG
- TCG
- VCG
- FSM

Tank Name	Sounding m	Ullage m	% Full	Capacity m ³	Capacity tonne	LCG m	TCG m	VCG m	FSM tonne.m
Black Water 1	1,722	0,000	100,000	4,374	3,499	28,801	-4,344	1,085	0,000
	1,700	0,022	98,217	4,296	3,437	28,801	-4,339	1,072	1,939
	1,697	0,025	98,000	4,286	3,429	28,801	-4,338	1,071	1,936

	1,696	0,026	97,900	4,282	3,425	28,801	-4,338	1,070	1,934
	1,600	0,122	90,350	3,952	3,161	28,801	-4,315	1,015	1,833
	1,500	0,222	82,637	3,614	2,891	28,801	-4,289	0,958	1,723
	1,400	0,322	75,088	3,284	2,627	28,801	-4,262	0,901	1,610
	1,300	0,422	67,715	2,962	2,369	28,801	-4,233	0,843	1,494
	1,200	0,522	60,534	2,648	2,118	28,802	-4,203	0,786	1,376
	1,100	0,622	53,557	2,342	1,874	28,802	-4,170	0,728	1,255
	1,000	0,722	46,801	2,047	1,638	28,802	-4,134	0,671	1,133
	0,900	0,822	40,286	1,762	1,410	28,803	-4,096	0,613	1,010
	0,800	0,922	34,032	1,488	1,191	28,803	-4,055	0,555	0,886
	0,700	1,022	28,064	1,227	0,982	28,804	-4,009	0,497	0,761
	0,600	1,122	22,419	0,981	0,784	28,805	-3,957	0,439	0,636
	0,500	1,222	17,136	0,749	0,600	28,806	-3,899	0,381	0,511
	0,400	1,322	12,269	0,537	0,429	28,808	-3,831	0,322	0,386
	0,300	1,422	7,900	0,346	0,276	28,812	-3,749	0,263	0,263
	0,200	1,522	4,159	0,182	0,146	28,819	-3,643	0,203	0,148
	0,100	1,622	1,292	0,056	0,045	28,843	-3,489	0,143	0,047
	0,087	1,636	1,000	0,044	0,035	28,851	-3,462	0,135	0,036
	0,000	1,722	0,000	0,000	0,000	29,333	-3,184	0,078	0,000

Tank Calibrations - Black Water 2

Fluid Type = Black Water Specific gravity = 0,8
Permeability = 100 %
Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Black Water 2
Trim: 0 m; Heel: 0 deg to starboard

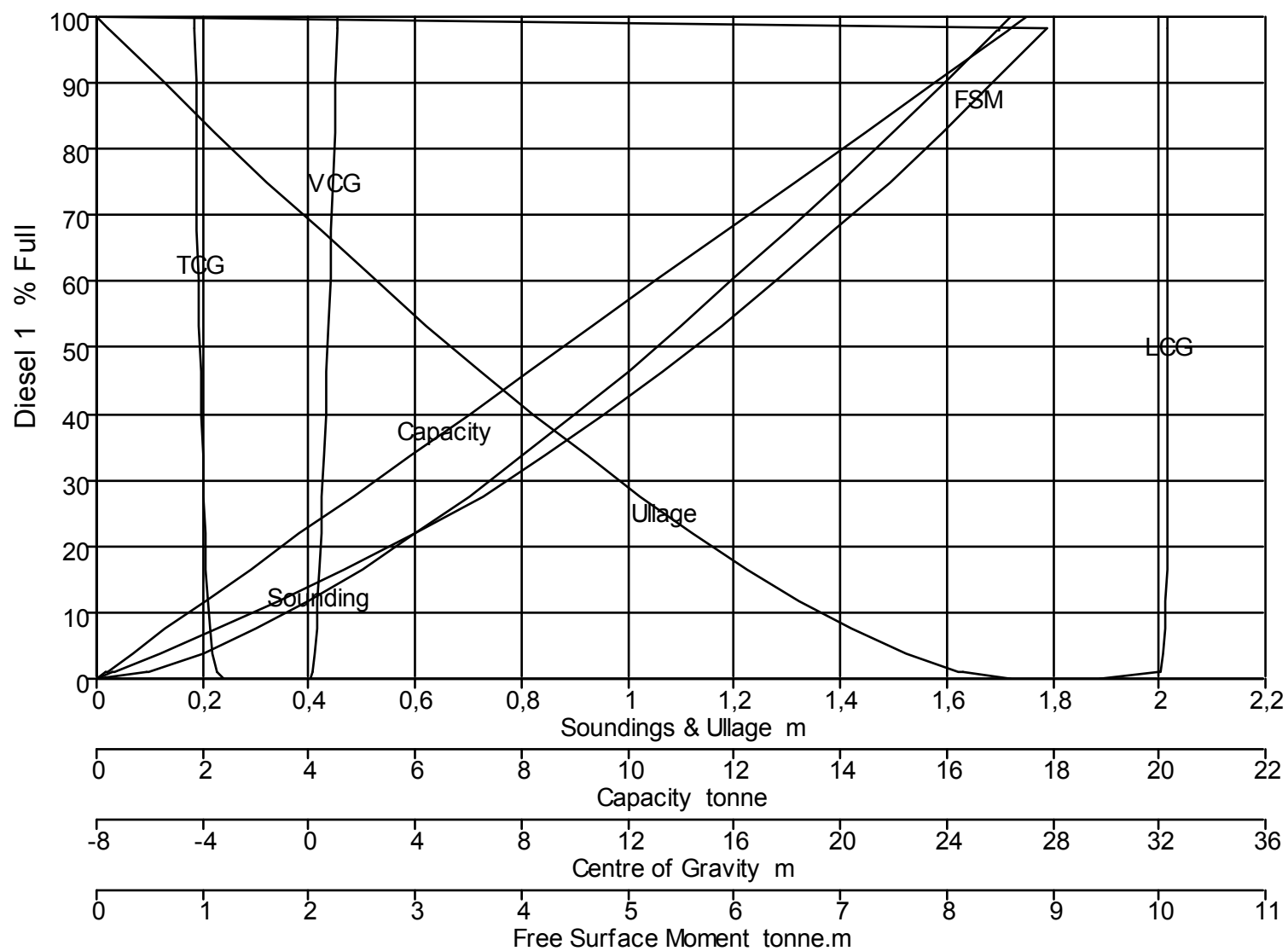
- Sounding
- Ullage
- Capacity
- LCG
- TCG
- VCG
- FSM

Tank Name	Sounding m	Ullage m	% Full	Capacity m ³	Capacity tonne	LCG m	TCG m	VCG m	FSM tonne.m
Black Water 2	1,722	0,000	100,000	4,374	3,499	28,801	4,344	1,085	0,000
	1,700	0,022	98,217	4,296	3,437	28,801	4,339	1,072	1,939
	1,697	0,025	98,000	4,286	3,429	28,801	4,338	1,071	1,936

	1,696	0,026	97,900	4,282	3,425	28,801	4,338	1,070	1,934
	1,600	0,122	90,350	3,952	3,161	28,801	4,315	1,015	1,833
	1,500	0,222	82,637	3,614	2,891	28,801	4,289	0,958	1,723
	1,400	0,322	75,088	3,284	2,627	28,801	4,262	0,901	1,610
	1,300	0,422	67,715	2,962	2,369	28,801	4,233	0,843	1,494
	1,200	0,522	60,534	2,648	2,118	28,802	4,203	0,786	1,376
	1,100	0,622	53,557	2,342	1,874	28,802	4,170	0,728	1,255
	1,000	0,722	46,801	2,047	1,638	28,802	4,134	0,671	1,133
	0,900	0,822	40,286	1,762	1,410	28,803	4,096	0,613	1,010
	0,800	0,922	34,032	1,488	1,191	28,803	4,055	0,555	0,886
	0,700	1,022	28,064	1,227	0,982	28,804	4,009	0,497	0,761
	0,600	1,122	22,419	0,981	0,784	28,805	3,957	0,439	0,636
	0,500	1,222	17,136	0,749	0,600	28,806	3,899	0,381	0,511
	0,400	1,322	12,269	0,537	0,429	28,808	3,831	0,322	0,386
	0,300	1,422	7,900	0,346	0,276	28,812	3,749	0,263	0,263
	0,200	1,522	4,159	0,182	0,146	28,819	3,643	0,203	0,148
	0,100	1,622	1,292	0,056	0,045	28,843	3,489	0,143	0,047
	0,087	1,636	1,000	0,044	0,035	28,851	3,462	0,135	0,036
	0,000	1,722	0,000	0,000	0,000	29,333	3,184	0,078	0,000

Tank Calibrations - Diesel 1

Fluid Type = Diesel Specific gravity = 0,84
Permeability = 100 %
Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Diesel 1
Trim: 0 m; Heel: 0 deg to starboard

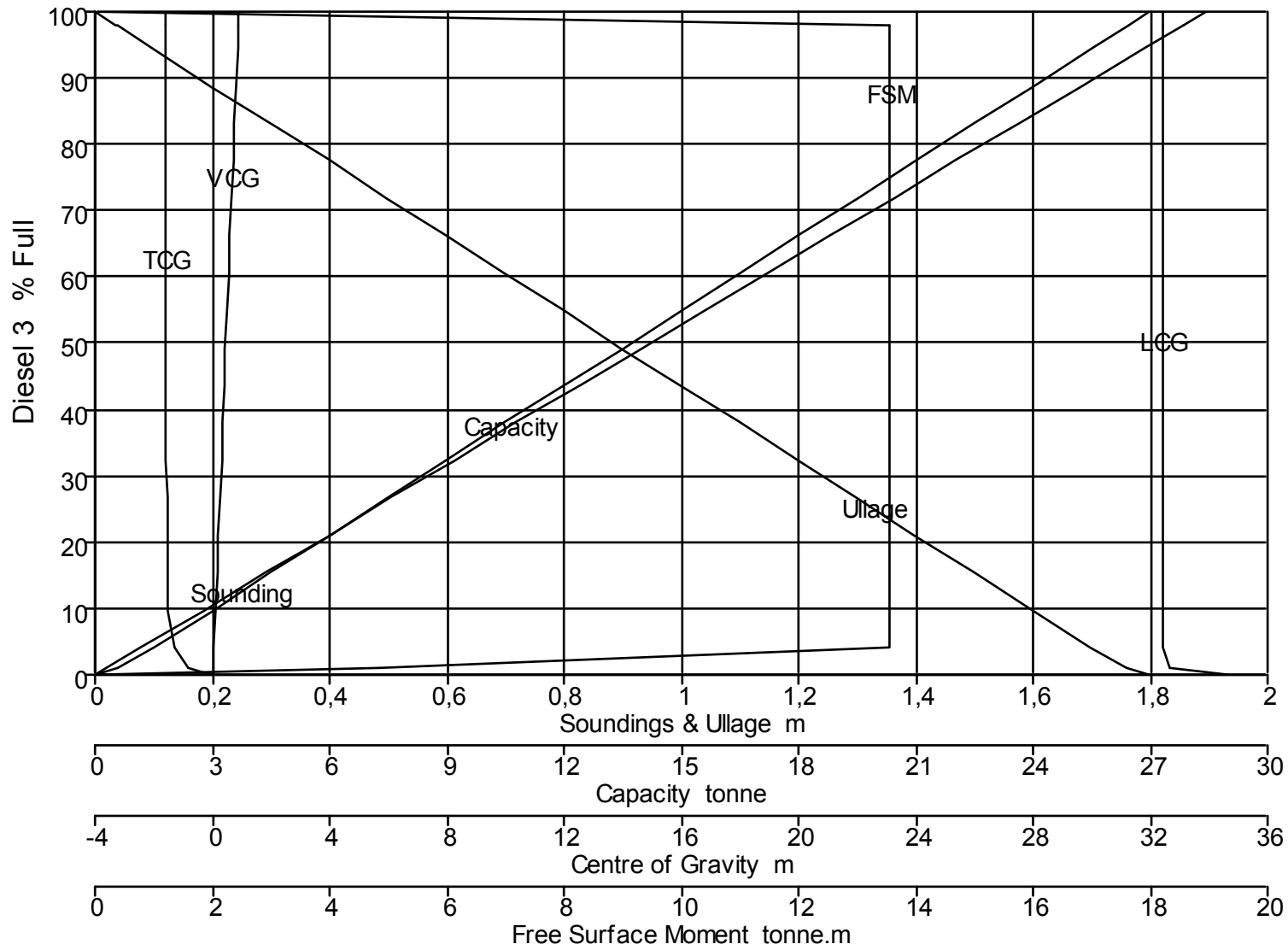
- Sounding
- Ullage
- Capacity
- LCG
- TCG
- VCG
- FSM

Tank Name	Sounding m	Ullage m	% Full	Capacity m ³	Capacity tonne	LCG m	TCG m	VCG m	FSM tonne.m
Diesel 1	1,723	0,000	100,000	20,857	17,520	32,339	-4,299	1,090	0,000
	1,700	0,023	98,203	20,482	17,205	32,339	-4,294	1,077	8,938
	1,697	0,025	98,000	20,440	17,169	32,339	-4,294	1,076	8,926

	1,696	0,026	97,900	20,419	17,152	32,339	-4,293	1,075	8,920
	1,600	0,123	90,316	18,837	15,823	32,338	-4,272	1,020	8,460
	1,500	0,223	82,578	17,223	14,467	32,337	-4,247	0,963	7,969
	1,400	0,323	75,000	15,643	13,140	32,335	-4,222	0,906	7,462
	1,300	0,423	67,594	14,098	11,842	32,334	-4,194	0,849	6,943
	1,200	0,523	60,371	12,591	10,577	32,332	-4,165	0,792	6,415
	1,100	0,623	53,346	11,126	9,346	32,329	-4,133	0,735	5,878
	1,000	0,723	46,533	9,705	8,152	32,325	-4,099	0,677	5,334
	0,900	0,823	39,950	8,332	6,999	32,321	-4,061	0,619	4,779
	0,800	0,923	33,618	7,012	5,890	32,315	-4,019	0,561	4,221
	0,700	1,023	27,561	5,748	4,829	32,306	-3,972	0,503	3,648
	0,600	1,123	21,846	4,556	3,827	32,294	-3,918	0,444	2,987
	0,500	1,223	16,539	3,449	2,898	32,279	-3,857	0,385	2,342
	0,400	1,323	11,697	2,440	2,049	32,258	-3,787	0,325	1,719
	0,300	1,423	7,407	1,545	1,298	32,226	-3,702	0,265	1,131
	0,200	1,523	3,802	0,793	0,666	32,170	-3,596	0,205	0,596
	0,100	1,623	1,133	0,236	0,198	32,028	-3,447	0,143	0,170
	0,093	1,629	1,000	0,209	0,175	32,009	-3,435	0,139	0,149
	0,000	1,723	0,000	0,000	0,000	29,760	-3,184	0,078	0,000

Tank Calibrations - Diesel 3

Fluid Type = Diesel Specific gravity = 0,84
Permeability = 100 %
Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Diesel 3
Trim: 0 m; Heel: 0 deg to starboard

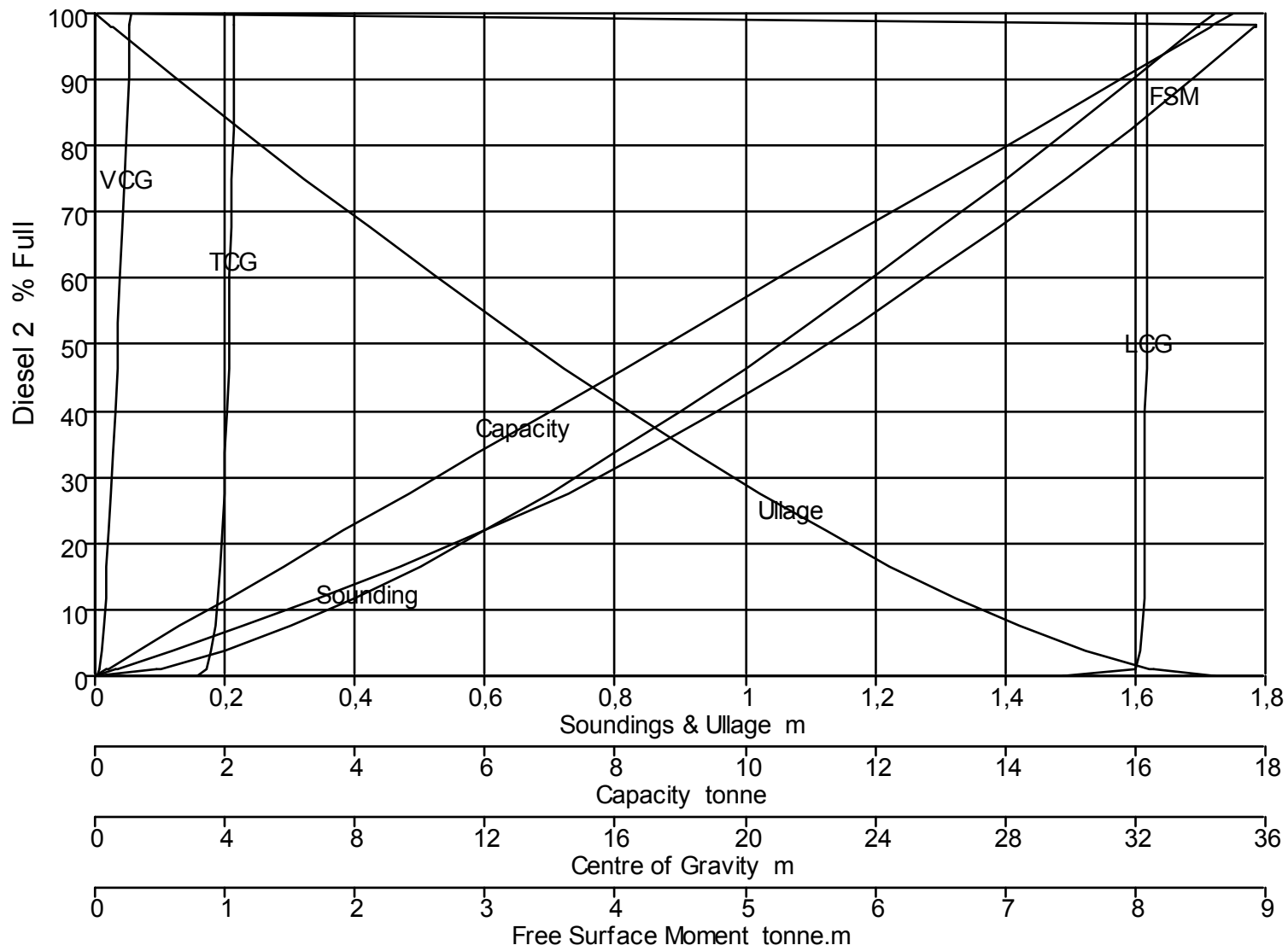
- Sounding
- Ullage
- Capacity
- LCG
- TCG
- VCG
- FSM

Tank Name	Sounding m	Ullage m	% Full	Capacity m ³	Capacity tonne	LCG m	TCG m	VCG m	FSM tonne.m
Diesel 3	1,799	0,000	100,000	33,834	28,420	32,402	-1,580	0,914	0,000
	1,763	0,035	98,000	33,157	27,852	32,402	-1,580	0,896	13,544
	1,762	0,037	97,900	33,123	27,823	32,402	-1,580	0,896	13,544

	1,700	0,099	94,428	31,948	26,837	32,403	-1,580	0,865	13,544
	1,600	0,199	88,784	30,039	25,232	32,403	-1,579	0,815	13,544
	1,500	0,299	83,139	28,129	23,628	32,403	-1,578	0,765	13,544
	1,400	0,399	77,494	26,219	22,024	32,403	-1,577	0,715	13,544
	1,300	0,499	71,850	24,309	20,420	32,403	-1,576	0,665	13,544
	1,200	0,599	66,205	22,399	18,816	32,404	-1,575	0,615	13,544
	1,100	0,699	60,560	20,490	17,211	32,404	-1,573	0,565	13,544
	1,000	0,799	54,915	18,580	15,607	32,404	-1,571	0,515	13,544
	0,900	0,899	49,271	16,670	14,003	32,405	-1,569	0,465	13,544
	0,800	0,999	43,626	14,760	12,399	32,406	-1,566	0,415	13,544
	0,700	1,099	37,981	12,850	10,794	32,406	-1,562	0,365	13,544
	0,600	1,199	32,337	10,941	9,190	32,407	-1,557	0,314	13,544
	0,500	1,299	26,692	9,031	7,586	32,409	-1,549	0,264	13,544
	0,400	1,399	21,047	7,121	5,982	32,411	-1,538	0,214	13,544
	0,300	1,499	15,403	5,211	4,377	32,416	-1,519	0,164	13,544
	0,200	1,599	9,758	3,301	2,773	32,425	-1,476	0,113	13,544
	0,100	1,699	4,113	1,392	1,169	32,459	-1,318	0,061	13,544
	0,040	1,759	1,000	0,338	0,284	32,624	-0,846	0,026	4,856
	0,000	1,799	0,000	0,000	0,000	34,641	-0,011	0,001	0,000

Tank Calibrations - Diesel 2

Fluid Type = Diesel Specific gravity = 0,84
Permeability = 100 %
Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Diesel 2
Trim: 0 m; Heel: 0 deg to starboard

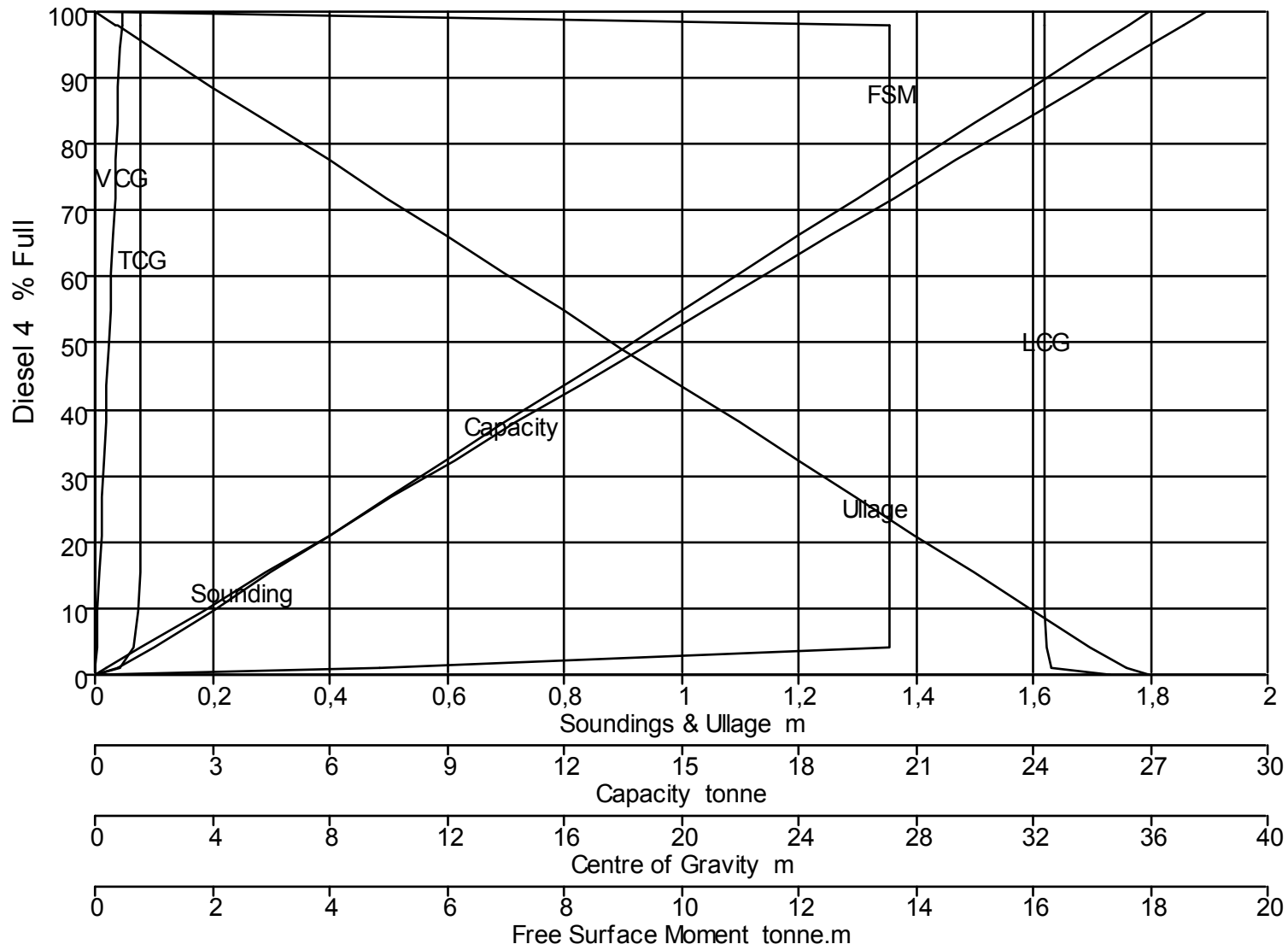
- Sounding
- Ullage
- Capacity
- LCG
- TCG
- VCG
- FSM

Tank Name	Sounding m	Ullage m	% Full	Capacity m ³	Capacity tonne	LCG m	TCG m	VCG m	FSM tonne.m
Diesel 2	1,723	0,000	100,000	20,857	17,520	32,339	4,299	1,090	0,000
	1,700	0,023	98,203	20,482	17,205	32,339	4,294	1,077	8,938
	1,697	0,025	98,000	20,440	17,169	32,339	4,294	1,076	8,926

	1,696	0,026	97,900	20,419	17,152	32,339	4,293	1,075	8,920
	1,600	0,123	90,316	18,837	15,823	32,338	4,272	1,020	8,460
	1,500	0,223	82,578	17,223	14,467	32,337	4,247	0,963	7,969
	1,400	0,323	75,000	15,643	13,140	32,335	4,222	0,906	7,462
	1,300	0,423	67,594	14,098	11,842	32,334	4,194	0,849	6,943
	1,200	0,523	60,371	12,591	10,577	32,332	4,165	0,792	6,415
	1,100	0,623	53,346	11,126	9,346	32,329	4,133	0,735	5,878
	1,000	0,723	46,533	9,705	8,152	32,325	4,099	0,677	5,334
	0,900	0,823	39,950	8,332	6,999	32,321	4,061	0,619	4,779
	0,800	0,923	33,618	7,012	5,890	32,315	4,019	0,561	4,221
	0,700	1,023	27,561	5,748	4,829	32,306	3,972	0,503	3,648
	0,600	1,123	21,846	4,556	3,827	32,294	3,918	0,444	2,987
	0,500	1,223	16,539	3,449	2,898	32,279	3,857	0,385	2,342
	0,400	1,323	11,697	2,440	2,049	32,258	3,787	0,325	1,719
	0,300	1,423	7,407	1,545	1,298	32,226	3,702	0,265	1,131
	0,200	1,523	3,802	0,793	0,666	32,170	3,596	0,205	0,596
	0,100	1,623	1,133	0,236	0,198	32,028	3,447	0,143	0,170
	0,093	1,629	1,000	0,209	0,175	32,009	3,435	0,139	0,149
	0,000	1,723	0,000	0,000	0,000	29,760	3,184	0,078	0,000

Tank Calibrations - Diesel 4

Fluid Type = Diesel Specific gravity = 0,84
Permeability = 100 %
Trim = 0 m (+ve by stern); Heel = 0 deg to starboard

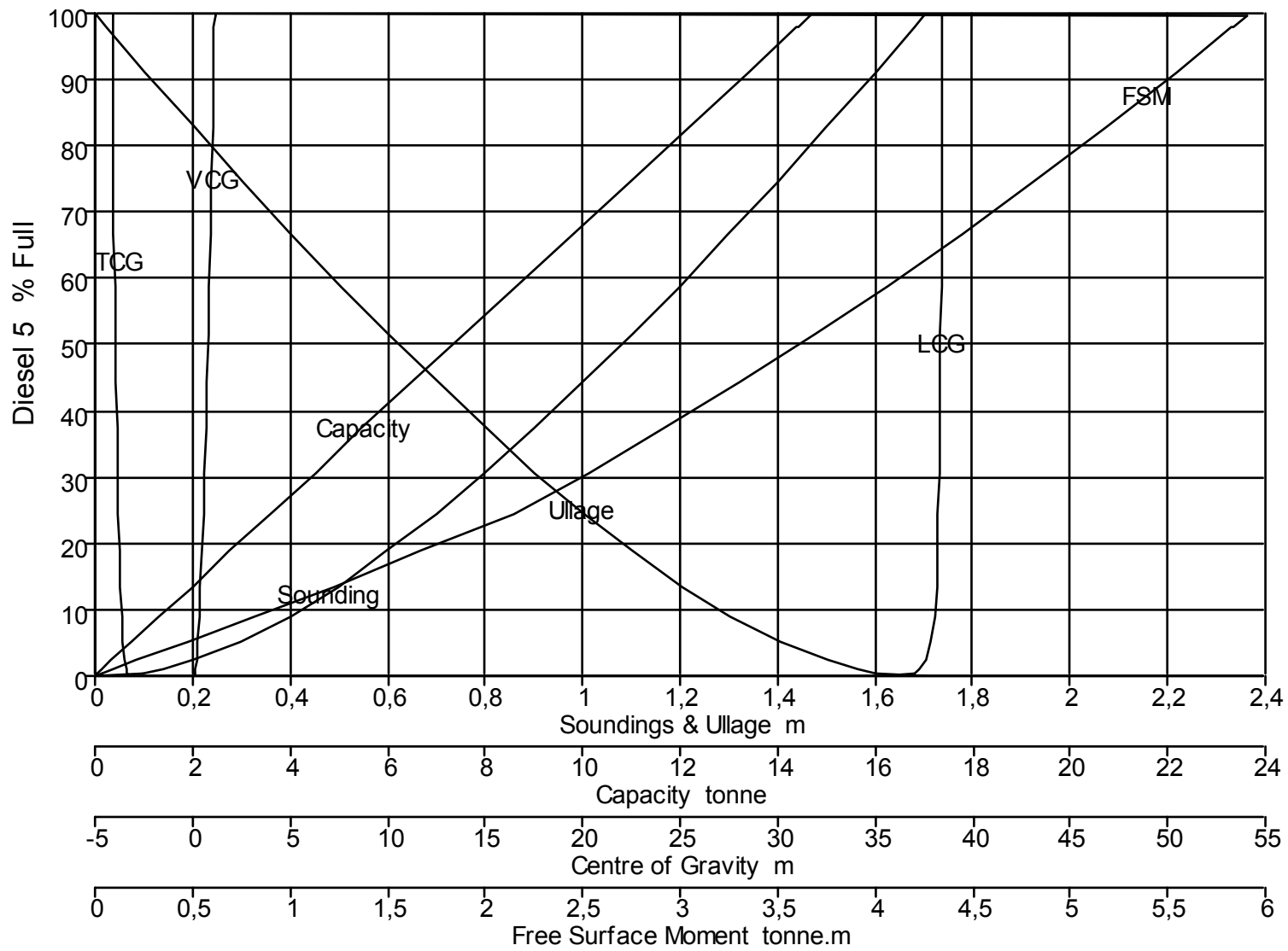


Tank Name	Sounding m	Ullage m	% Full	Capacity m ³	Capacity tonne	LCG m	TCG m	VCG m	FSM tonne.m
Diesel 4	1,799	0,000	100,000	33,834	28,420	32,402	1,580	0,914	0,000
	1,763	0,035	98,000	33,157	27,852	32,402	1,580	0,896	13,544
	1,762	0,037	97,900	33,123	27,823	32,402	1,580	0,896	13,544

	1,700	0,099	94,428	31,948	26,837	32,403	1,580	0,865	13,544
	1,600	0,199	88,784	30,039	25,232	32,403	1,579	0,815	13,544
	1,500	0,299	83,139	28,129	23,628	32,403	1,578	0,765	13,544
	1,400	0,399	77,494	26,219	22,024	32,403	1,577	0,715	13,544
	1,300	0,499	71,850	24,309	20,420	32,403	1,576	0,665	13,544
	1,200	0,599	66,205	22,399	18,816	32,404	1,575	0,615	13,544
	1,100	0,699	60,560	20,490	17,211	32,404	1,573	0,565	13,544
	1,000	0,799	54,915	18,580	15,607	32,404	1,571	0,515	13,544
	0,900	0,899	49,271	16,670	14,003	32,405	1,569	0,465	13,544
	0,800	0,999	43,626	14,760	12,399	32,406	1,566	0,415	13,544
	0,700	1,099	37,981	12,850	10,794	32,406	1,562	0,365	13,544
	0,600	1,199	32,337	10,941	9,190	32,407	1,557	0,314	13,544
	0,500	1,299	26,692	9,031	7,586	32,409	1,549	0,264	13,544
	0,400	1,399	21,047	7,121	5,982	32,411	1,538	0,214	13,544
	0,300	1,499	15,403	5,211	4,377	32,416	1,519	0,164	13,544
	0,200	1,599	9,758	3,301	2,773	32,425	1,476	0,113	13,544
	0,100	1,699	4,113	1,392	1,169	32,459	1,318	0,061	13,544
	0,040	1,759	1,000	0,338	0,284	32,624	0,846	0,026	4,856
	0,000	1,799	0,000	0,000	0,000	34,641	0,011	0,001	0,000

Tank Calibrations - Diesel 5

Fluid Type = Diesel Specific gravity = 0,84
Permeability = 100 %
Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Diesel 5
Trim: 0 m; Heel: 0 deg to starboard

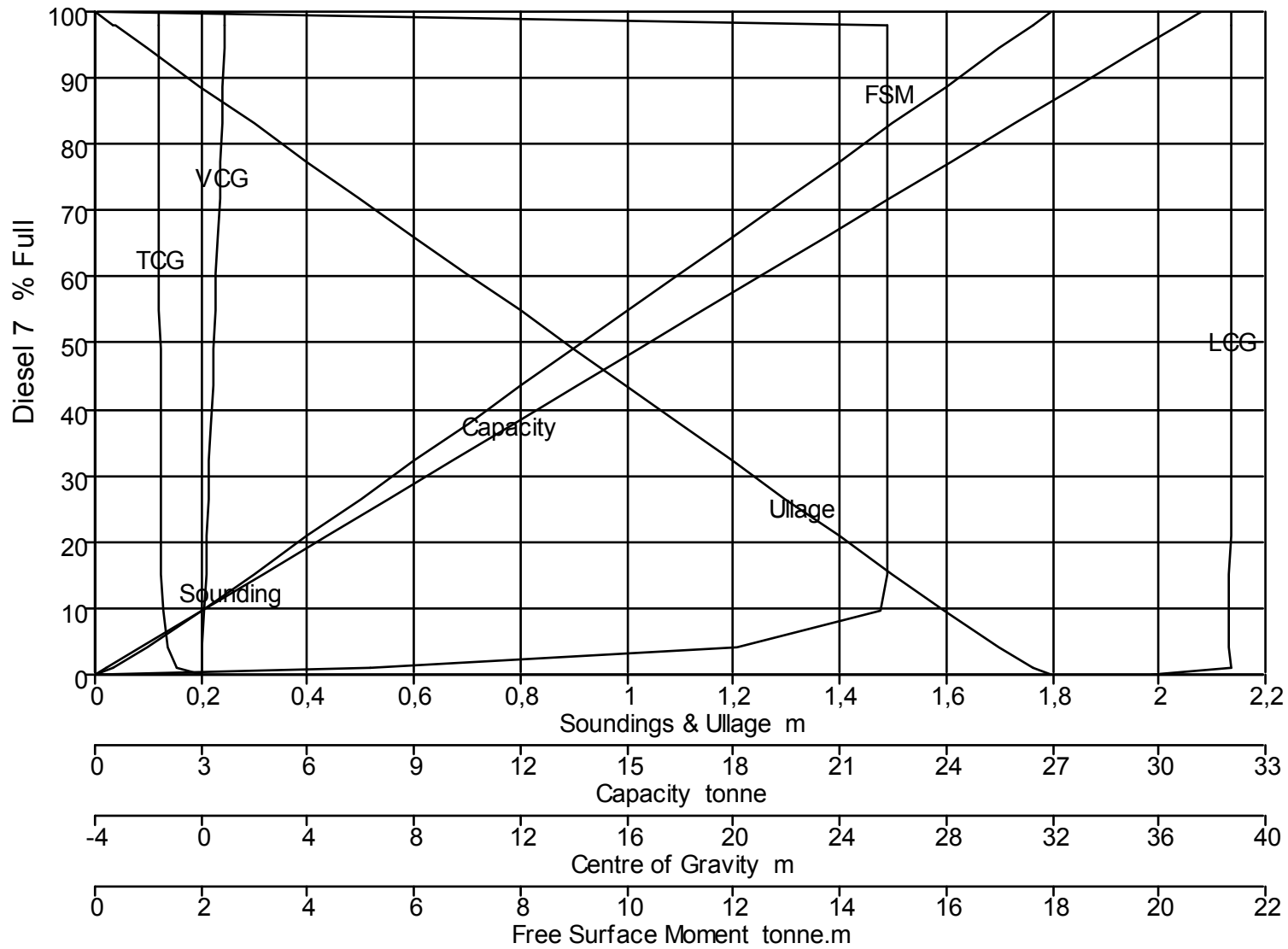
- Sounding
- Ullage
- Capacity
- LCG
- TCG
- VCG
- FSM

Tank Name	Sounding m	Ullage m	% Full	Capacity m ³	Capacity tonne	LCG m	TCG m	VCG m	FSM tonne.m
Diesel 5	1,703	0,000	100,000	17,508	14,707	38,428	-4,104	1,136	0,000
	1,700	0,003	99,718	17,459	14,665	38,428	-4,104	1,135	5,904
	1,680	0,023	98,000	17,158	14,412	38,426	-4,099	1,123	5,833

	1,679	0,024	97,900	17,140	14,398	38,426	-4,099	1,123	5,829
	1,600	0,103	91,137	15,956	13,403	38,419	-4,082	1,077	5,544
	1,500	0,203	82,751	14,488	12,170	38,408	-4,060	1,019	5,181
	1,400	0,303	74,570	13,056	10,967	38,397	-4,036	0,961	4,814
	1,300	0,403	66,608	11,662	9,796	38,384	-4,010	0,903	4,442
	1,200	0,503	58,882	10,309	8,659	38,369	-3,982	0,845	4,064
	1,100	0,603	51,408	9,000	7,560	38,352	-3,952	0,787	3,683
	1,000	0,703	44,207	7,740	6,501	38,332	-3,920	0,728	3,302
	0,900	0,803	37,303	6,531	5,486	38,308	-3,884	0,669	2,919
	0,800	0,903	30,723	5,379	4,518	38,279	-3,844	0,609	2,532
	0,700	1,003	24,503	4,290	3,604	38,243	-3,797	0,548	2,149
	0,600	1,103	18,731	3,279	2,755	38,196	-3,744	0,487	1,674
	0,500	1,203	13,532	2,369	1,990	38,133	-3,686	0,425	1,221
	0,400	1,303	8,978	1,572	1,320	38,043	-3,620	0,363	0,819
	0,300	1,403	5,161	0,904	0,759	37,897	-3,546	0,300	0,479
	0,200	1,503	2,237	0,392	0,329	37,617	-3,458	0,235	0,207
	0,139	1,564	1,000	0,175	0,147	37,300	-3,395	0,194	0,088
	0,100	1,603	0,465	0,081	0,068	37,014	-3,348	0,168	0,037
	0,000	1,703	0,000	0,000	0,000	35,437	-3,183	0,097	0,000

Tank Calibrations - Diesel 7

Fluid Type = Diesel Specific gravity = 0,84
Permeability = 100 %
Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Diesel 7
Trim: 0 m; Heel: 0 deg to starboard

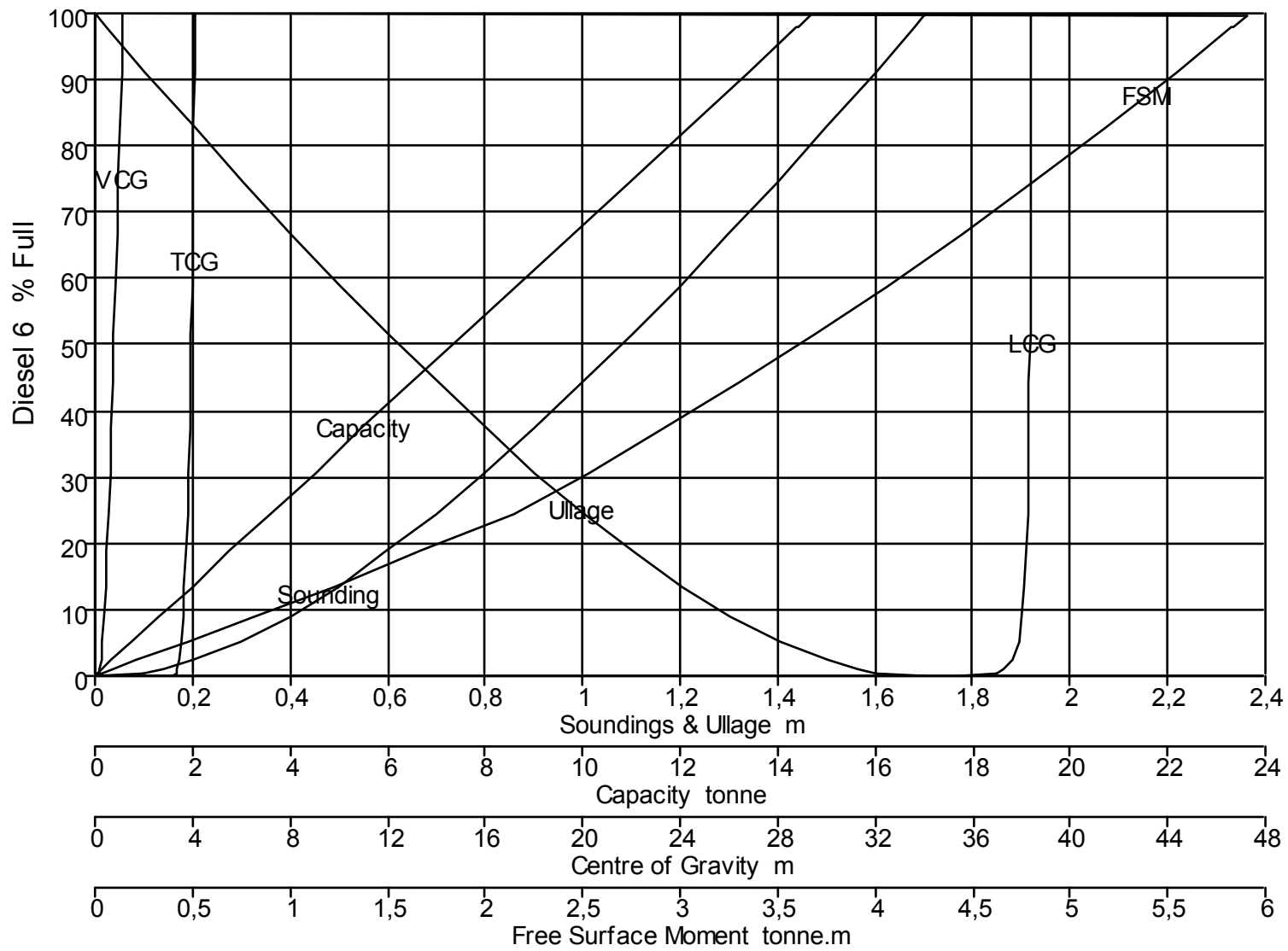
- Sounding
- Ullage
- Capacity
- LCG
- TCG
- VCG
- FSM

Tank Name	Sounding m	Ullage m	% Full	Capacity m ³	Capacity tonne	LCG m	TCG m	VCG m	FSM tonne.m
Diesel 7	1,799	0,000	100,000	37,146	31,202	38,695	-1,575	0,916	0,000
	1,763	0,035	98,000	36,403	30,578	38,695	-1,575	0,898	14,899
	1,761	0,037	97,900	36,366	30,547	38,695	-1,575	0,897	14,899

	1,700	0,099	94,425	35,075	29,463	38,694	-1,574	0,866	14,899
	1,600	0,199	88,769	32,974	27,698	38,694	-1,573	0,816	14,899
	1,500	0,299	83,114	30,873	25,933	38,694	-1,571	0,766	14,899
	1,400	0,399	77,458	28,772	24,169	38,693	-1,570	0,716	14,899
	1,300	0,499	71,803	26,672	22,404	38,693	-1,568	0,666	14,899
	1,200	0,599	66,147	24,571	20,640	38,692	-1,566	0,616	14,899
	1,100	0,699	60,492	22,470	18,875	38,691	-1,564	0,566	14,899
	1,000	0,799	54,836	20,369	17,110	38,690	-1,561	0,516	14,899
	0,900	0,899	49,181	18,269	15,346	38,689	-1,558	0,466	14,899
	0,800	0,999	43,525	16,168	13,581	38,688	-1,553	0,416	14,899
	0,700	1,099	37,870	14,067	11,816	38,686	-1,548	0,366	14,899
	0,600	1,199	32,214	11,966	10,052	38,684	-1,540	0,315	14,899
	0,500	1,299	26,559	9,865	8,287	38,680	-1,529	0,265	14,899
	0,400	1,399	20,903	7,765	6,522	38,675	-1,512	0,215	14,899
	0,300	1,499	15,248	5,664	4,758	38,665	-1,482	0,164	14,899
	0,200	1,599	9,594	3,564	2,994	38,645	-1,418	0,112	14,780
	0,100	1,699	4,082	1,516	1,274	38,643	-1,236	0,058	12,084
	0,035	1,764	1,000	0,371	0,312	38,757	-0,927	0,022	5,182
	0,000	1,799	0,000	0,000	0,000	35,755	-0,007	0,001	0,000

Tank Calibrations - Diesel 6

Fluid Type = Diesel Specific gravity = 0,84
Permeability = 100 %
Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Diesel 6
Trim: 0 m; Heel: 0 deg to starboard

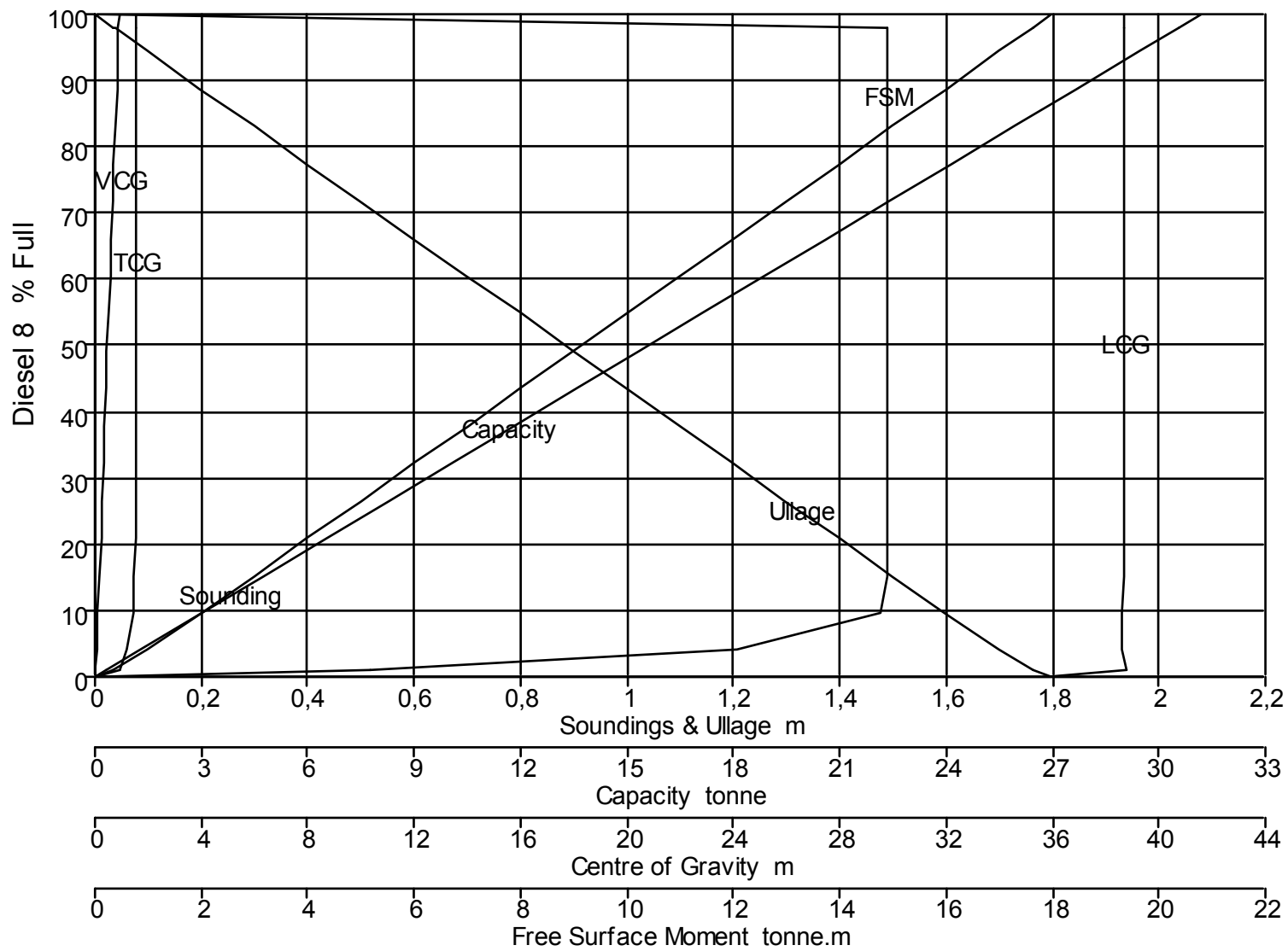
- Sounding
- Ullage
- Capacity
- LCG
- TCG
- VCG
- FSM

Tank Name	Sounding m	Ullage m	% Full	Capacity m ³	Capacity tonne	LCG m	TCG m	VCG m	FSM tonne.m
Diesel 6	1,703	0,000	100,000	17,508	14,707	38,428	4,104	1,136	0,000
	1,700	0,003	99,718	17,459	14,665	38,428	4,104	1,135	5,904
	1,680	0,023	98,000	17,158	14,412	38,426	4,099	1,123	5,833

	1,679	0,024	97,900	17,140	14,398	38,426	4,099	1,123	5,829
	1,600	0,103	91,137	15,956	13,403	38,419	4,082	1,077	5,544
	1,500	0,203	82,751	14,488	12,170	38,408	4,060	1,019	5,181
	1,400	0,303	74,570	13,056	10,967	38,397	4,036	0,961	4,814
	1,300	0,403	66,608	11,662	9,796	38,384	4,010	0,903	4,442
	1,200	0,503	58,882	10,309	8,659	38,369	3,982	0,845	4,064
	1,100	0,603	51,408	9,000	7,560	38,352	3,952	0,787	3,683
	1,000	0,703	44,207	7,740	6,501	38,332	3,920	0,728	3,302
	0,900	0,803	37,303	6,531	5,486	38,308	3,884	0,669	2,919
	0,800	0,903	30,723	5,379	4,518	38,279	3,844	0,609	2,532
	0,700	1,003	24,503	4,290	3,604	38,243	3,797	0,548	2,149
	0,600	1,103	18,731	3,279	2,755	38,196	3,744	0,487	1,674
	0,500	1,203	13,532	2,369	1,990	38,133	3,686	0,425	1,221
	0,400	1,303	8,978	1,572	1,320	38,043	3,620	0,363	0,819
	0,300	1,403	5,161	0,904	0,759	37,897	3,546	0,300	0,479
	0,200	1,503	2,237	0,392	0,329	37,617	3,458	0,235	0,207
	0,139	1,564	1,000	0,175	0,147	37,300	3,395	0,194	0,088
	0,100	1,603	0,465	0,081	0,068	37,014	3,348	0,168	0,037
	0,000	1,703	0,000	0,000	0,000	35,437	3,183	0,097	0,000

Tank Calibrations - Diesel 8

Fluid Type = Diesel Specific gravity = 0,84
Permeability = 100 %
Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Diesel 8
Trim: 0 m; Heel: 0 deg to starboard

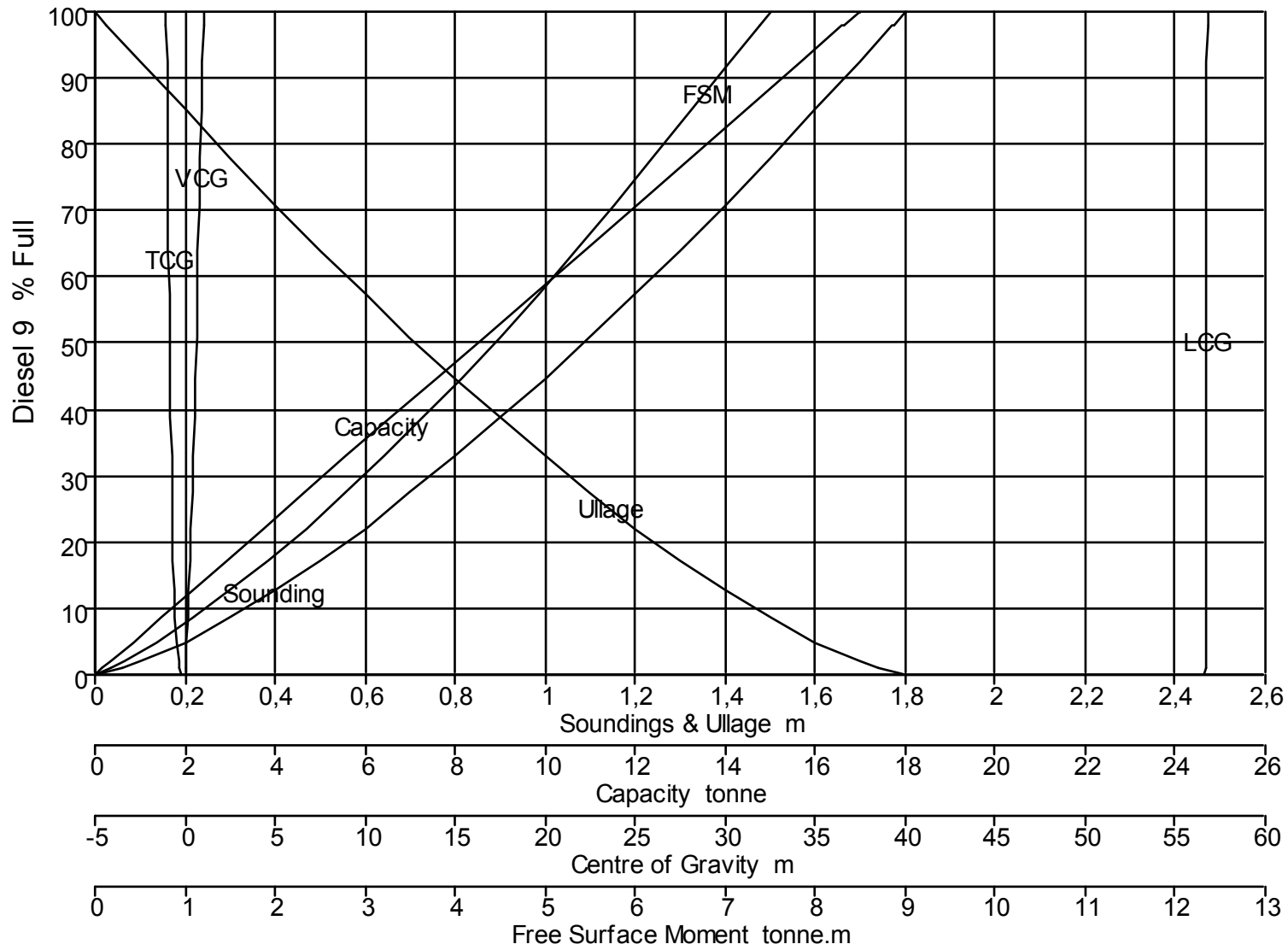
- Sounding
- Ullage
- Capacity
- LCG
- TCG
- VCG
- FSM

Tank Name	Sounding m	Ullage m	% Full	Capacity m ³	Capacity tonne	LCG m	TCG m	VCG m	FSM tonne.m
Diesel 8	1,799	0,000	100,000	37,146	31,202	38,695	1,575	0,916	0,000
	1,763	0,035	98,000	36,403	30,578	38,695	1,575	0,898	14,899
	1,761	0,037	97,900	36,366	30,547	38,695	1,575	0,897	14,899

	1,700	0,099	94,425	35,075	29,463	38,694	1,574	0,866	14,899
	1,600	0,199	88,769	32,974	27,698	38,694	1,573	0,816	14,899
	1,500	0,299	83,114	30,873	25,933	38,694	1,571	0,766	14,899
	1,400	0,399	77,458	28,772	24,169	38,693	1,570	0,716	14,899
	1,300	0,499	71,803	26,672	22,404	38,693	1,568	0,666	14,899
	1,200	0,599	66,147	24,571	20,640	38,692	1,566	0,616	14,899
	1,100	0,699	60,492	22,470	18,875	38,691	1,564	0,566	14,899
	1,000	0,799	54,836	20,369	17,110	38,690	1,561	0,516	14,899
	0,900	0,899	49,181	18,269	15,346	38,689	1,558	0,466	14,899
	0,800	0,999	43,525	16,168	13,581	38,688	1,553	0,416	14,899
	0,700	1,099	37,870	14,067	11,816	38,686	1,548	0,366	14,899
	0,600	1,199	32,214	11,966	10,052	38,684	1,540	0,315	14,899
	0,500	1,299	26,559	9,865	8,287	38,680	1,529	0,265	14,899
	0,400	1,399	20,903	7,765	6,522	38,675	1,512	0,215	14,899
	0,300	1,499	15,248	5,664	4,758	38,665	1,482	0,164	14,899
	0,200	1,599	9,594	3,564	2,994	38,645	1,418	0,112	14,780
	0,100	1,699	4,082	1,516	1,274	38,643	1,236	0,058	12,084
	0,035	1,764	1,000	0,371	0,312	38,757	0,927	0,022	5,182
	0,000	1,799	0,000	0,000	0,000	35,755	0,007	0,001	0,000

Tank Calibrations - Diesel 9

Fluid Type = Diesel Specific gravity = 0,84
Permeability = 100 %
Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Diesel 9
Trim: 0 m; Heel: 0 deg to starboard

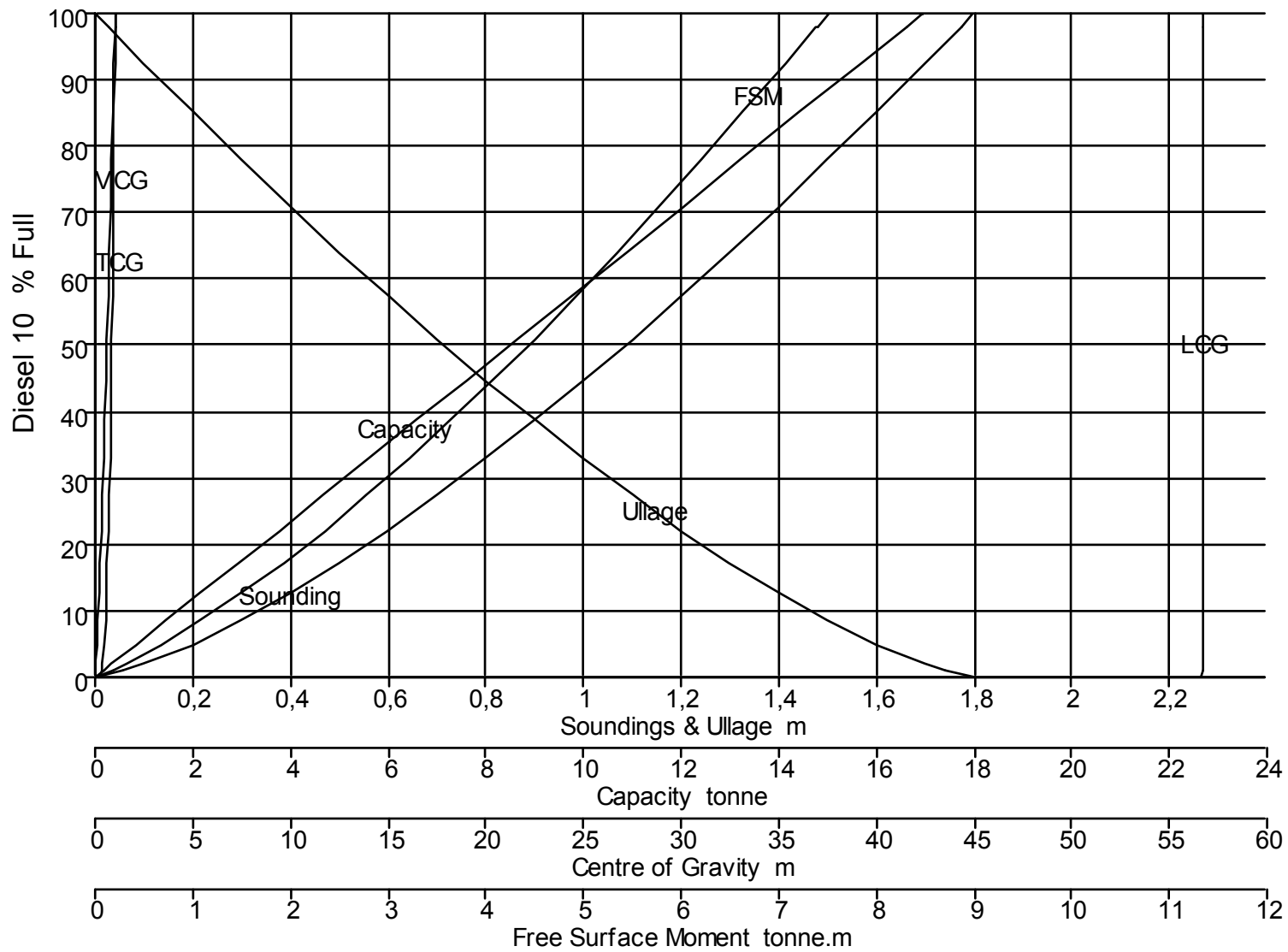
- Sounding
- Ullage
- Capacity
- LCG
- TCG
- VCG
- FSM

Tank Name	Sounding m	Ullage m	% Full	Capacity m ³	Capacity tonne	LCG m	TCG m	VCG m	FSM tonne.m
Diesel 9	1,800	0,000	100,000	20,205	16,972	56,778	-1,025	1,040	0,000
	1,800	0,000	99,996	20,204	16,972	56,778	-1,025	1,040	7,509
	1,774	0,026	98,000	19,801	16,633	56,777	-1,019	1,025	7,391

	1,772	0,028	97,900	19,781	16,616	56,777	-1,019	1,024	7,385
	1,700	0,100	92,484	18,687	15,697	56,775	-1,004	0,983	7,066
	1,600	0,200	85,130	17,201	14,449	56,772	-0,982	0,925	6,632
	1,500	0,300	77,940	15,748	13,228	56,769	-0,960	0,867	6,204
	1,400	0,400	70,919	14,329	12,037	56,766	-0,936	0,810	5,772
	1,300	0,500	64,076	12,947	10,875	56,762	-0,911	0,752	5,346
	1,200	0,600	57,419	11,602	9,745	56,758	-0,885	0,694	4,924
	1,100	0,700	50,961	10,297	8,649	56,754	-0,858	0,636	4,494
	1,000	0,800	44,711	9,034	7,588	56,750	-0,828	0,578	4,068
	0,900	0,900	38,685	7,816	6,566	56,745	-0,796	0,520	3,644
	0,800	1,000	32,901	6,648	5,584	56,741	-0,762	0,462	3,221
	0,700	1,100	27,381	5,532	4,647	56,735	-0,725	0,404	2,786
	0,600	1,200	22,151	4,476	3,760	56,730	-0,684	0,346	2,352
	0,500	1,300	17,243	3,484	2,927	56,725	-0,638	0,288	1,926
	0,400	1,400	12,700	2,566	2,156	56,719	-0,587	0,230	1,504
	0,300	1,500	8,581	1,734	1,456	56,714	-0,526	0,171	1,085
	0,200	1,600	4,966	1,003	0,843	56,708	-0,454	0,113	0,685
	0,100	1,700	1,993	0,403	0,338	56,700	-0,360	0,056	0,324
	0,058	1,742	1,000	0,202	0,170	56,694	-0,307	0,032	0,188
	0,000	1,800	0,000	0,000	0,000	56,646	-0,211	0,000	0,000

Tank Calibrations - Diesel 10

Fluid Type = Diesel Specific gravity = 0,84
Permeability = 100 %
Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Diesel 10
Trim: 0 m; Heel: 0 deg to starboard

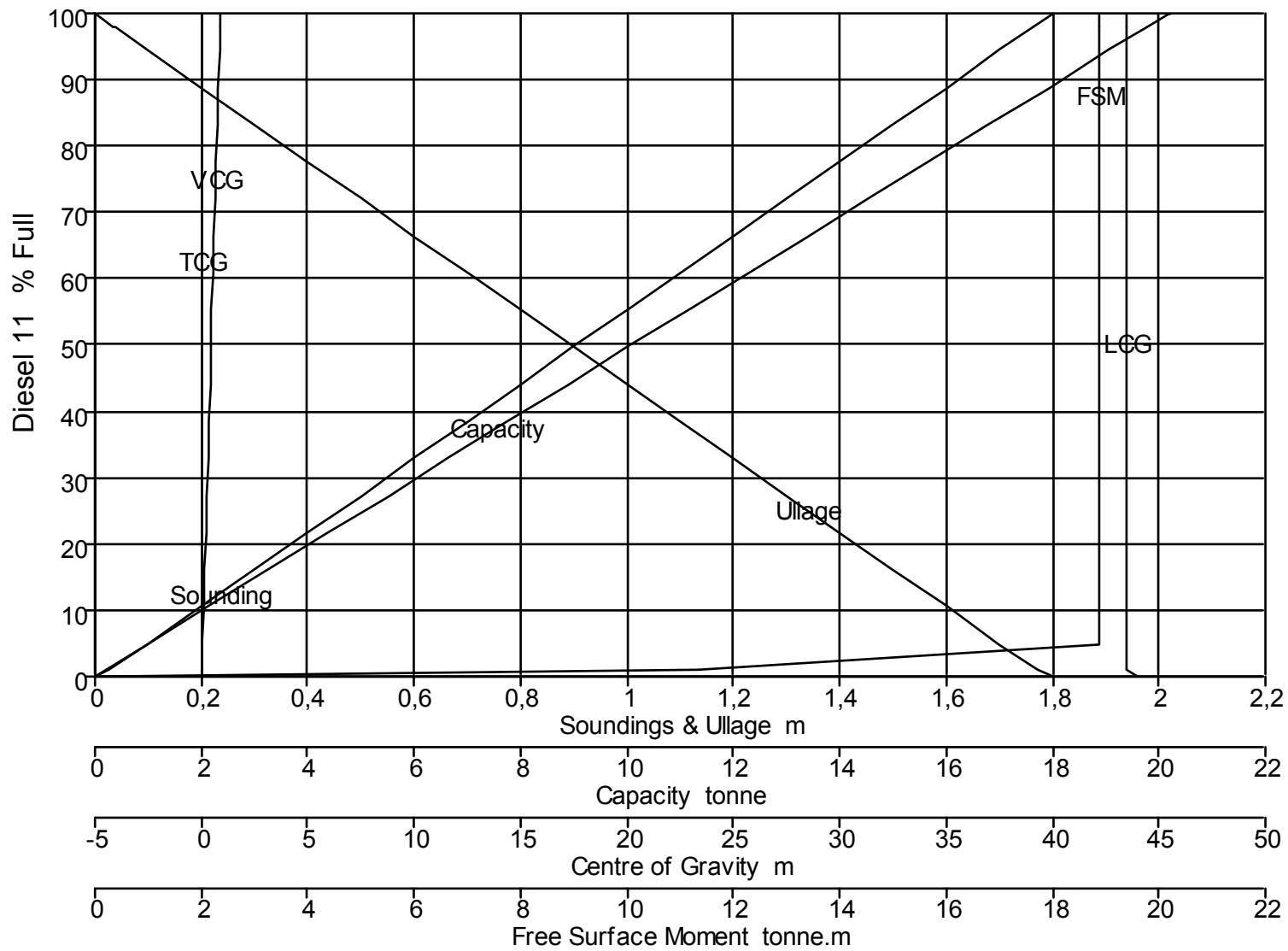
- Sounding
- Ullage
- Capacity
- LCG
- TCG
- VCG
- FSM

Tank Name	Sounding m	Ullage m	% Full	Capacity m ³	Capacity tonne	LCG m	TCG m	VCG m	FSM tonne.m
Diesel 10	1,800	0,000	100,000	20,205	16,972	56,778	1,025	1,040	0,000
	1,800	0,000	99,996	20,204	16,972	56,778	1,025	1,040	7,509
	1,774	0,026	98,000	19,801	16,633	56,777	1,019	1,025	7,391

	1,772	0,028	97,900	19,781	16,616	56,777	1,019	1,024	7,385
	1,700	0,100	92,484	18,687	15,697	56,775	1,004	0,983	7,066
	1,600	0,200	85,130	17,201	14,449	56,772	0,982	0,925	6,632
	1,500	0,300	77,940	15,748	13,228	56,769	0,960	0,867	6,204
	1,400	0,400	70,919	14,329	12,037	56,766	0,936	0,810	5,772
	1,300	0,500	64,076	12,947	10,875	56,762	0,911	0,752	5,346
	1,200	0,600	57,419	11,602	9,745	56,758	0,885	0,694	4,924
	1,100	0,700	50,961	10,297	8,649	56,754	0,858	0,636	4,494
	1,000	0,800	44,711	9,034	7,588	56,750	0,828	0,578	4,068
	0,900	0,900	38,685	7,816	6,566	56,745	0,796	0,520	3,644
	0,800	1,000	32,901	6,648	5,584	56,741	0,762	0,462	3,221
	0,700	1,100	27,381	5,532	4,647	56,735	0,725	0,404	2,786
	0,600	1,200	22,151	4,476	3,760	56,730	0,684	0,346	2,352
	0,500	1,300	17,243	3,484	2,927	56,725	0,638	0,288	1,926
	0,400	1,400	12,700	2,566	2,156	56,719	0,587	0,230	1,504
	0,300	1,500	8,581	1,734	1,456	56,714	0,526	0,171	1,085
	0,200	1,600	4,966	1,003	0,843	56,708	0,454	0,113	0,685
	0,100	1,700	1,993	0,403	0,338	56,700	0,360	0,056	0,324
	0,058	1,742	1,000	0,202	0,170	56,694	0,307	0,032	0,188
	0,000	1,800	0,000	0,000	0,000	56,646	0,211	0,000	0,000

Tank Calibrations - Diesel 11

Fluid Type = Diesel Specific gravity = 0,84
Permeability = 100 %
Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Diesel 11
Trim: 0 m; Heel: 0 deg to starboard

- Sounding
- Ullage
- Capacity
- LCG
- TCG
- VCG
- FSM

Tank Name	Sounding m	Ullage m	% Full	Capacity m ³	Capacity tonne	LCG m	TCG m	VCG m	FSM tonne.m
Diesel 11	1,800	0,000	100,000	24,030	20,185	43,499	0,000	0,906	0,000
	1,800	0,000	99,997	24,029	20,184	43,499	0,000	0,906	18,882
	1,764	0,036	98,000	23,549	19,781	43,499	0,000	0,888	18,882

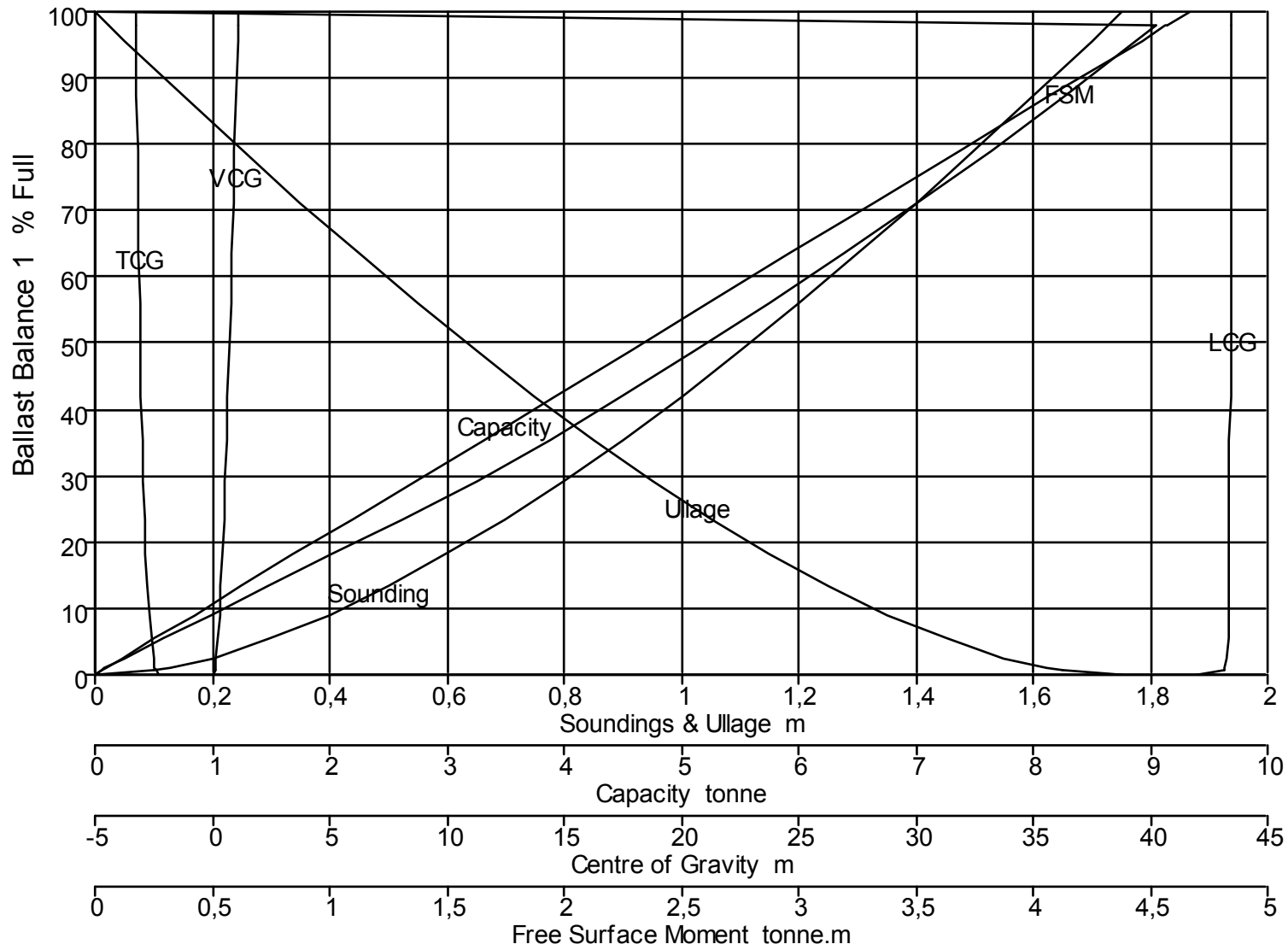
	1,763	0,038	97,900	23,525	19,761	43,499	0,000	0,887	18,882
	1,700	0,100	94,404	22,685	19,055	43,499	0,000	0,856	18,882
	1,600	0,200	88,811	21,341	17,926	43,499	0,000	0,806	18,882
	1,500	0,300	83,218	19,997	16,797	43,499	0,000	0,756	18,882
	1,400	0,400	77,625	18,653	15,668	43,499	0,000	0,706	18,882
	1,300	0,500	72,032	17,309	14,540	43,499	0,000	0,656	18,882
	1,200	0,600	66,439	15,965	13,411	43,499	0,000	0,606	18,882
	1,100	0,700	60,846	14,621	12,282	43,499	0,000	0,556	18,882
	1,000	0,800	55,252	13,277	11,153	43,499	0,000	0,506	18,882
	0,900	0,900	49,659	11,933	10,024	43,498	0,000	0,456	18,882
	0,800	1,000	44,066	10,589	8,895	43,498	0,000	0,406	18,882
	0,700	1,100	38,473	9,245	7,766	43,498	0,000	0,356	18,882
	0,600	1,200	32,880	7,901	6,637	43,498	0,000	0,306	18,882
	0,500	1,300	27,287	6,557	5,508	43,497	0,000	0,256	18,882
	0,400	1,400	21,694	5,213	4,379	43,496	0,000	0,206	18,882
	0,300	1,500	16,101	3,869	3,250	43,495	0,000	0,156	18,882
	0,200	1,600	10,508	2,525	2,121	43,493	0,000	0,105	18,882
	0,100	1,700	4,915	1,181	0,992	43,484	0,000	0,054	18,882
	0,027	1,773	1,000	0,240	0,202	43,489	0,000	0,016	11,339
	0,000	1,800	0,000	0,000	0,000	44,057	0,000	0,000	0,000

Tank Calibrations - Ballast Balance 1

Fluid Type = Water Ballast Specific gravity = 1,025

Permeability = 100 %

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



Ballast Balance 1
Trim: 0 m; Heel: 0 deg to starboard

- Sounding
- Ullage
- Capacity
- LCG
- TCG
- VCG
- FSM

Tank Name	Sounding m	Ullage m	% Full	Capacity m ³	Capacity tonne	LCG m	TCG m	VCG m	FSM tonne.m
Ballast Balance 1	1,751	0,000	100,000	9,103	9,331	43,425	-3,249	1,118	0,000
	1,728	0,023	98,000	8,921	9,144	43,424	-3,243	1,104	4,525
	1,726	0,025	97,900	8,912	9,135	43,424	-3,243	1,103	4,521

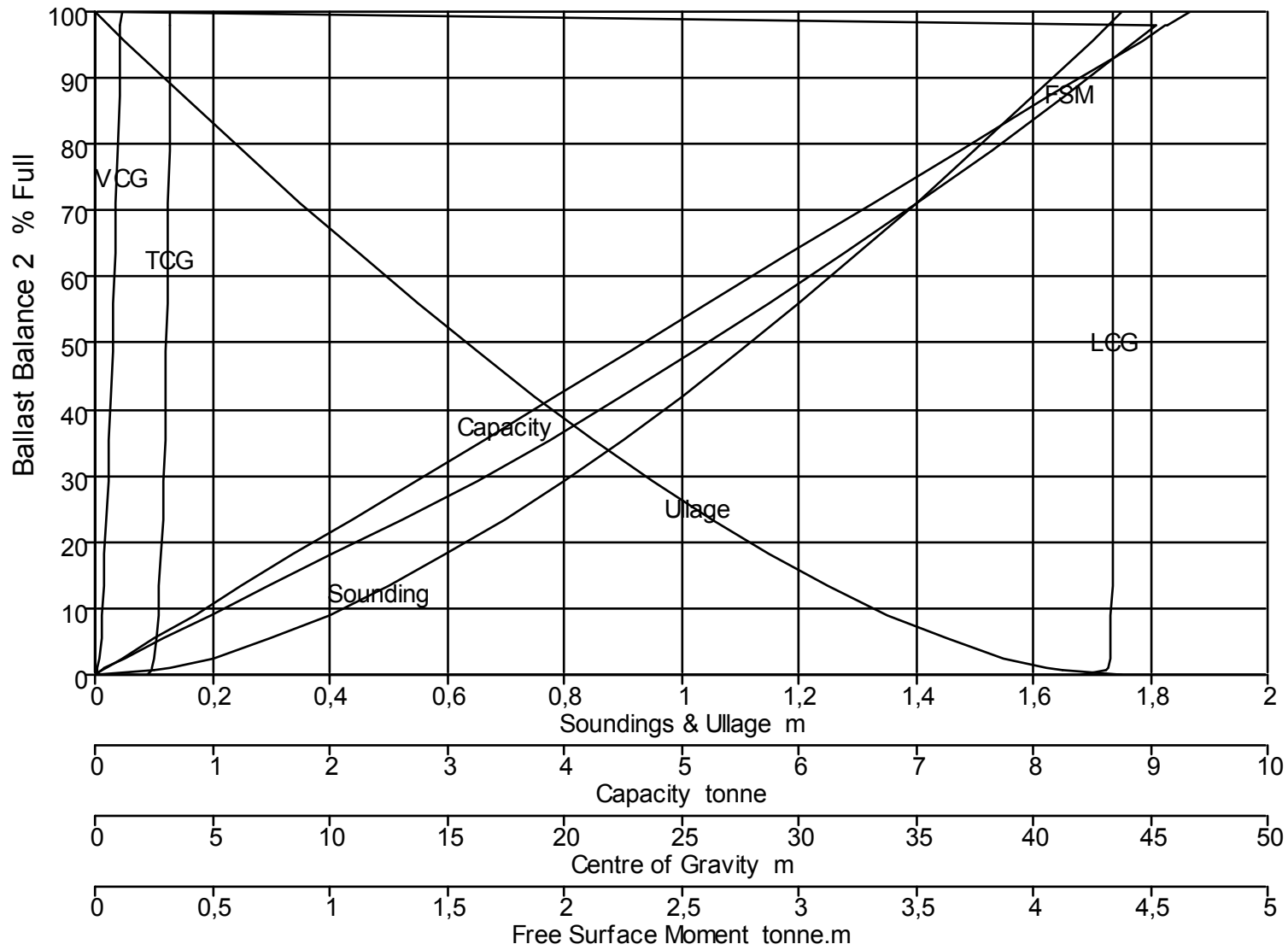
	1,700	0,051	95,655	8,708	8,925	43,424	-3,236	1,088	4,440
	1,600	0,151	87,284	7,946	8,144	43,421	-3,209	1,029	4,133
	1,500	0,251	79,126	7,203	7,383	43,418	-3,181	0,970	3,821
	1,400	0,351	71,192	6,481	6,643	43,415	-3,151	0,911	3,507
	1,300	0,451	63,497	5,780	5,925	43,412	-3,120	0,852	3,194
	1,200	0,551	56,060	5,103	5,231	43,408	-3,086	0,793	2,876
	1,100	0,651	48,899	4,451	4,563	43,404	-3,050	0,733	2,556
	1,000	0,751	42,040	3,827	3,923	43,400	-3,011	0,674	2,243
	0,900	0,851	35,499	3,232	3,312	43,395	-2,969	0,614	1,940
	0,800	0,951	29,304	2,668	2,734	43,389	-2,922	0,553	1,632
	0,700	1,051	23,508	2,140	2,193	43,382	-2,872	0,492	1,314
	0,600	1,151	18,169	1,654	1,695	43,373	-2,817	0,431	1,012
	0,500	1,251	13,338	1,214	1,245	43,362	-2,756	0,370	0,736
	0,400	1,351	9,055	0,824	0,845	43,346	-2,688	0,309	0,496
	0,300	1,451	5,410	0,492	0,505	43,322	-2,610	0,247	0,289
	0,200	1,551	2,522	0,230	0,235	43,274	-2,515	0,183	0,124
	0,126	1,625	1,000	0,091	0,093	43,188	-2,431	0,136	0,043
	0,100	1,651	0,608	0,055	0,057	43,128	-2,398	0,119	0,024
	0,000	1,751	0,000	0,000	0,000	42,017	-2,240	0,049	0,000

Tank Calibrations - Ballast Balance 2

Fluid Type = Water Ballast Specific gravity = 1,025

Permeability = 100 %

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



Ballast Balance 2
Trim: 0 m; Heel: 0 deg to starboard

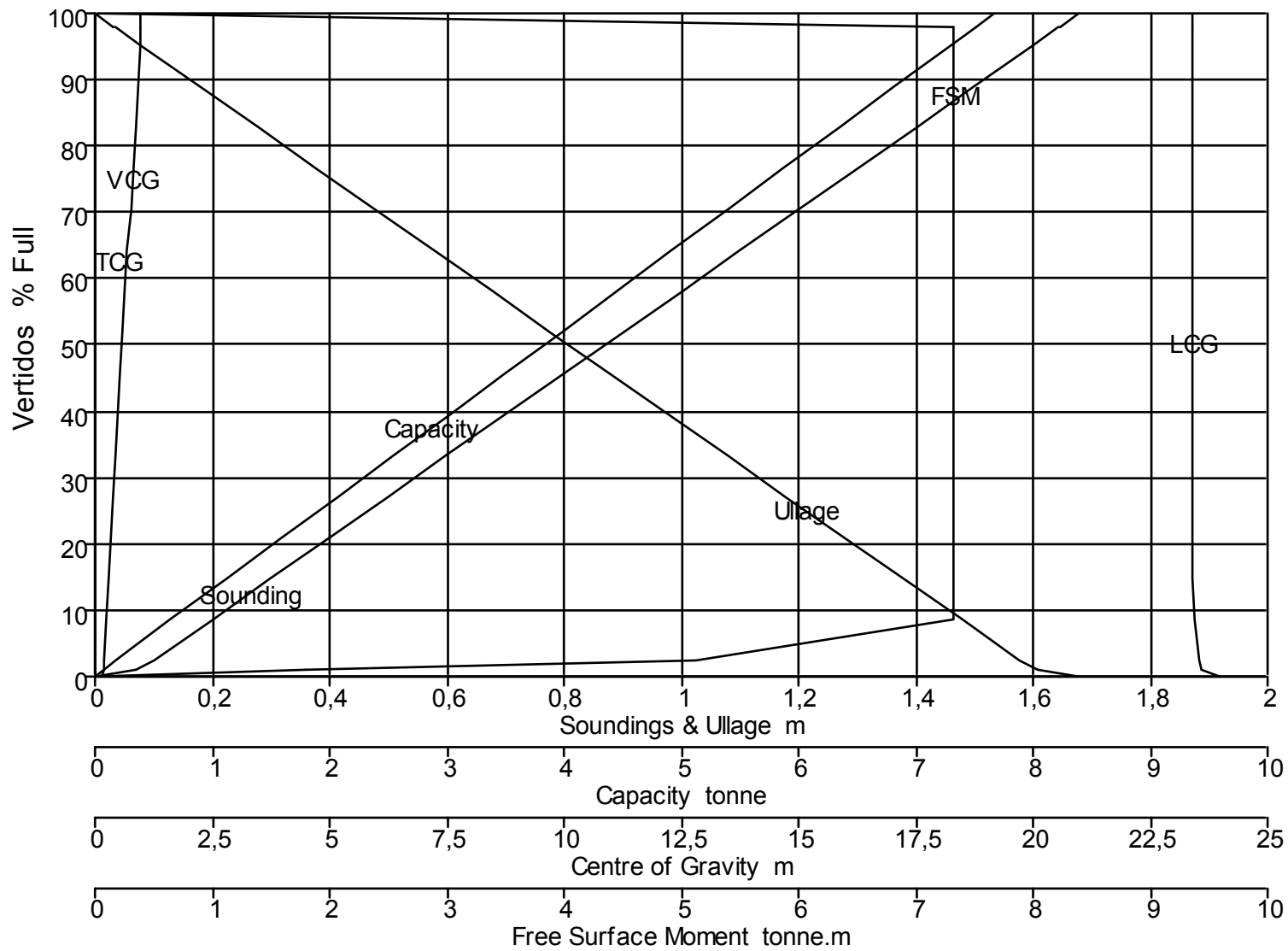
- Sounding
- Ullage
- Capacity
- LCG
- TCG
- VCG
- FSM

Tank Name	Sounding m	Ullage m	% Full	Capacity m ³	Capacity tonne	LCG m	TCG m	VCG m	FSM tonne.m
Ballast Balance 2	1,751	0,000	100,000	9,103	9,331	43,425	3,249	1,118	0,000
	1,728	0,023	98,000	8,921	9,144	43,424	3,243	1,104	4,525
	1,726	0,025	97,900	8,912	9,135	43,424	3,243	1,103	4,521

	1,700	0,051	95,655	8,708	8,925	43,424	3,236	1,088	4,440
	1,600	0,151	87,284	7,946	8,144	43,421	3,209	1,029	4,133
	1,500	0,251	79,126	7,203	7,383	43,418	3,181	0,970	3,821
	1,400	0,351	71,192	6,481	6,643	43,415	3,151	0,911	3,507
	1,300	0,451	63,497	5,780	5,925	43,412	3,120	0,852	3,194
	1,200	0,551	56,060	5,103	5,231	43,408	3,086	0,793	2,876
	1,100	0,651	48,899	4,451	4,563	43,404	3,050	0,733	2,556
	1,000	0,751	42,040	3,827	3,923	43,400	3,011	0,674	2,243
	0,900	0,851	35,499	3,232	3,312	43,395	2,969	0,614	1,940
	0,800	0,951	29,304	2,668	2,734	43,389	2,922	0,553	1,632
	0,700	1,051	23,508	2,140	2,193	43,382	2,872	0,492	1,314
	0,600	1,151	18,169	1,654	1,695	43,373	2,817	0,431	1,012
	0,500	1,251	13,338	1,214	1,245	43,362	2,756	0,370	0,736
	0,400	1,351	9,055	0,824	0,845	43,346	2,688	0,309	0,496
	0,300	1,451	5,410	0,492	0,505	43,322	2,610	0,247	0,289
	0,200	1,551	2,522	0,230	0,235	43,274	2,515	0,183	0,124
	0,126	1,625	1,000	0,091	0,093	43,188	2,431	0,136	0,043
	0,100	1,651	0,608	0,055	0,057	43,128	2,398	0,119	0,024
	0,000	1,751	0,000	0,000	0,000	42,017	2,240	0,049	0,000

Tank Calibrations - Vertidos

Fluid Type = Lube Oil Specific gravity = 0,92
Permeability = 100 %
Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Vertidos
Trim: 0 m; Heel: 0 deg to starboard

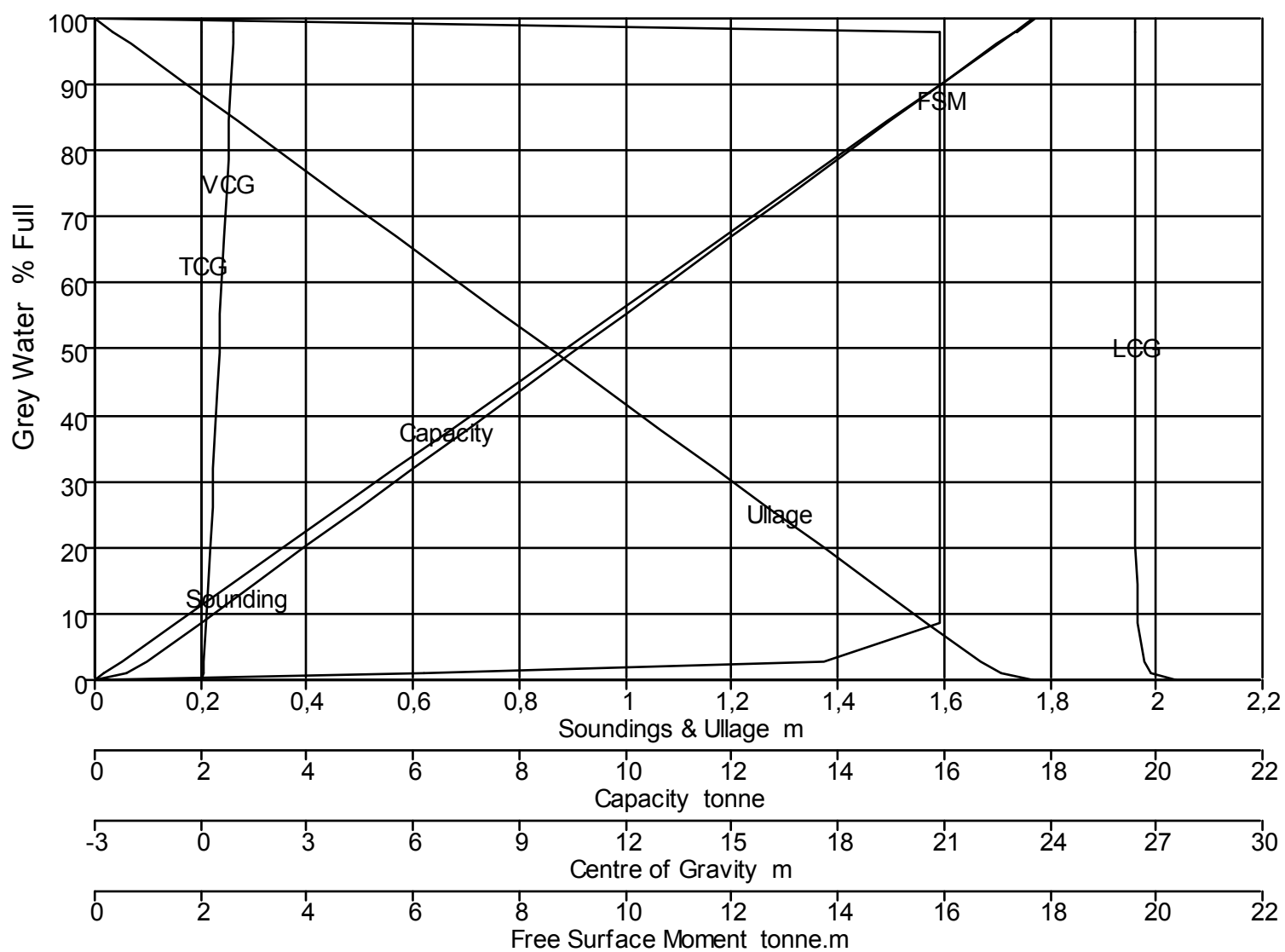
- Sounding
- Ullage
- Capacity
- LCG
- TCG
- VCG
- FSM

Tank Name	Sounding m	Ullage m	% Full	Capacity m ³	Capacity tonne	LCG m	TCG m	VCG m	FSM tonne.m
Vertidos	1,678	0,000	100,000	8,333	7,666	23,403	0,000	0,992	0,000
	1,646	0,032	98,000	8,166	7,513	23,403	0,000	0,976	7,315
	1,644	0,034	97,900	8,158	7,505	23,403	0,000	0,975	7,315

	1,600	0,078	95,156	7,929	7,295	23,403	0,000	0,953	7,315
	1,500	0,178	88,964	7,413	6,820	23,404	0,000	0,903	7,315
	1,400	0,278	82,771	6,897	6,345	23,404	0,000	0,853	7,315
	1,300	0,378	76,579	6,381	5,871	23,404	0,000	0,803	7,315
	1,200	0,478	70,387	5,865	5,396	23,405	0,000	0,753	7,315
	1,100	0,578	64,194	5,349	4,921	23,405	0,000	0,703	7,315
	1,000	0,678	58,002	4,833	4,447	23,406	0,000	0,653	7,315
	0,900	0,778	51,810	4,317	3,972	23,406	0,000	0,603	7,315
	0,800	0,878	45,617	3,801	3,497	23,407	0,000	0,553	7,315
	0,700	0,978	39,425	3,285	3,022	23,408	0,000	0,503	7,315
	0,600	1,078	33,233	2,769	2,548	23,410	0,000	0,453	7,315
	0,500	1,178	27,040	2,253	2,073	23,412	0,000	0,402	7,315
	0,400	1,278	20,848	1,737	1,598	23,415	0,000	0,352	7,315
	0,300	1,378	14,655	1,221	1,124	23,422	0,000	0,302	7,315
	0,200	1,478	8,463	0,705	0,649	23,438	0,000	0,250	7,315
	0,100	1,578	2,367	0,197	0,181	23,520	0,000	0,193	5,132
	0,070	1,608	1,000	0,083	0,077	23,589	0,000	0,173	1,805
	0,000	1,678	0,000	0,000	0,000	23,993	0,000	0,122	0,000

Tank Calibrations - Grey Water

Fluid Type = Grey Water Specific gravity = 1
Permeability = 100 %
Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Grey Water
Trim: 0 m; Heel: 0 deg to starboard

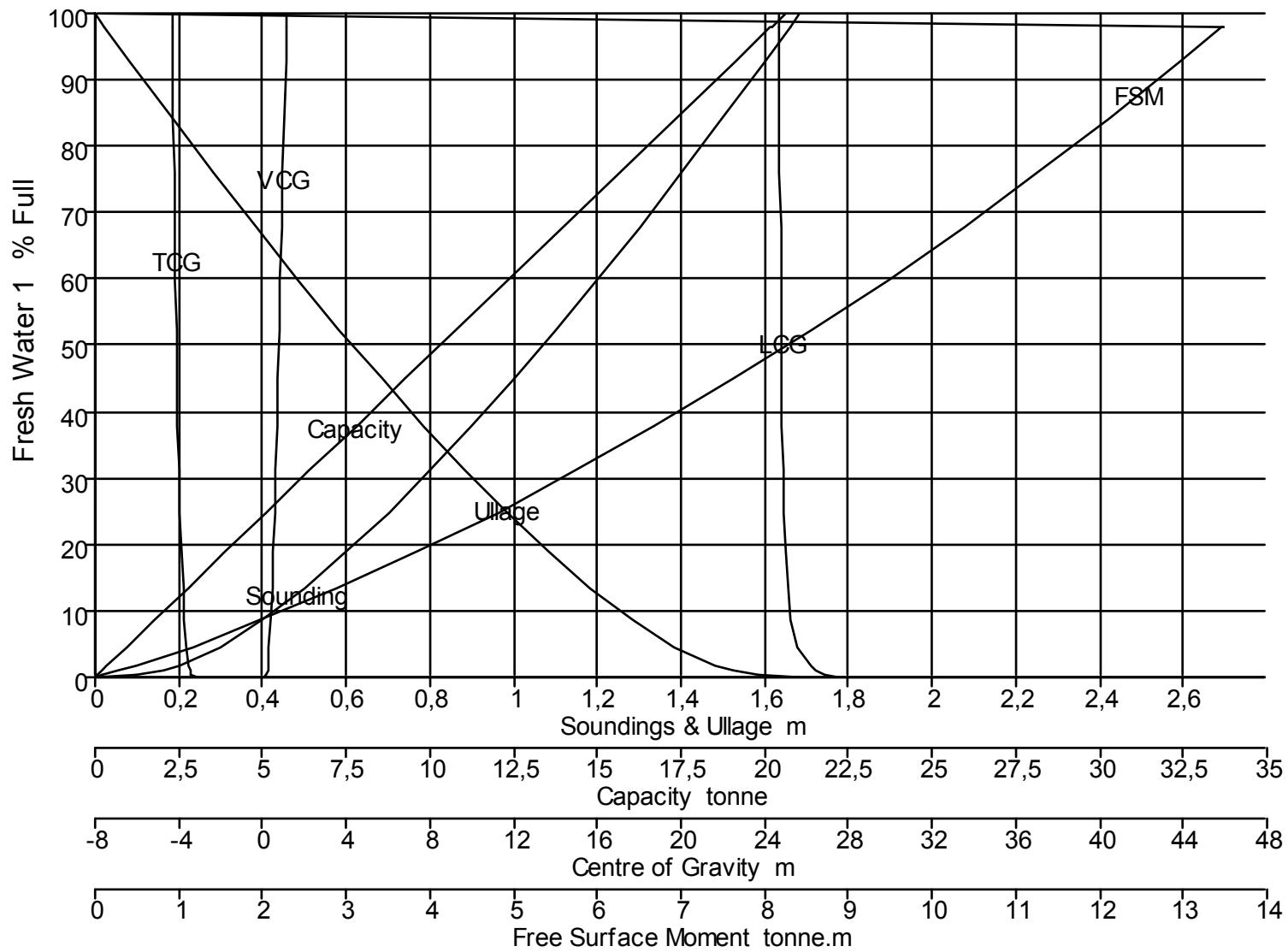
- Sounding
- Ullage
- Capacity
- LCG
- TCG
- VCG
- FSM

Tank Name	Sounding m	Ullage m	% Full	Capacity m ³	Capacity tonne	LCG m	TCG m	VCG m	FSM tonne.m
Grey Water	1,768	0,000	100,000	17,719	17,719	26,407	0,000	0,941	0,000
	1,733	0,034	98,000	17,365	17,365	26,408	0,000	0,924	15,901
	1,732	0,036	97,900	17,347	17,347	26,408	0,000	0,923	15,901

	1,700	0,068	96,064	17,022	17,022	26,408	0,000	0,908	15,901
	1,600	0,168	90,240	15,990	15,990	26,408	0,000	0,858	15,901
	1,500	0,268	84,416	14,958	14,958	26,409	0,000	0,808	15,901
	1,400	0,368	78,592	13,926	13,926	26,409	0,000	0,757	15,901
	1,300	0,468	72,767	12,894	12,894	26,410	0,000	0,707	15,901
	1,200	0,568	66,943	11,862	11,862	26,411	0,000	0,657	15,901
	1,100	0,668	61,119	10,830	10,830	26,412	0,000	0,607	15,901
	1,000	0,768	55,295	9,798	9,798	26,413	0,000	0,557	15,901
	0,900	0,868	49,471	8,766	8,766	26,415	0,000	0,507	15,901
	0,800	0,968	43,646	7,734	7,734	26,417	0,000	0,457	15,901
	0,700	1,068	37,822	6,702	6,702	26,420	0,000	0,407	15,901
	0,600	1,168	31,998	5,670	5,670	26,423	0,000	0,357	15,901
	0,500	1,268	26,174	4,638	4,638	26,428	0,000	0,307	15,901
	0,400	1,368	20,350	3,606	3,606	26,436	0,000	0,257	15,901
	0,300	1,468	14,525	2,574	2,574	26,451	0,000	0,206	15,901
	0,200	1,568	8,701	1,542	1,542	26,485	0,000	0,155	15,901
	0,100	1,668	2,909	0,515	0,515	26,645	0,000	0,100	13,751
	0,060	1,707	1,000	0,177	0,177	26,852	0,000	0,075	6,218
	0,000	1,768	0,000	0,000	0,000	27,586	0,000	0,032	0,000

Tank Calibrations - Fresh Water 1

Fluid Type = Specific gravity = 1
Permeability = 100 %
Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Fresh Water 1
Trim: 0 m; Heel: 0 deg to starboard

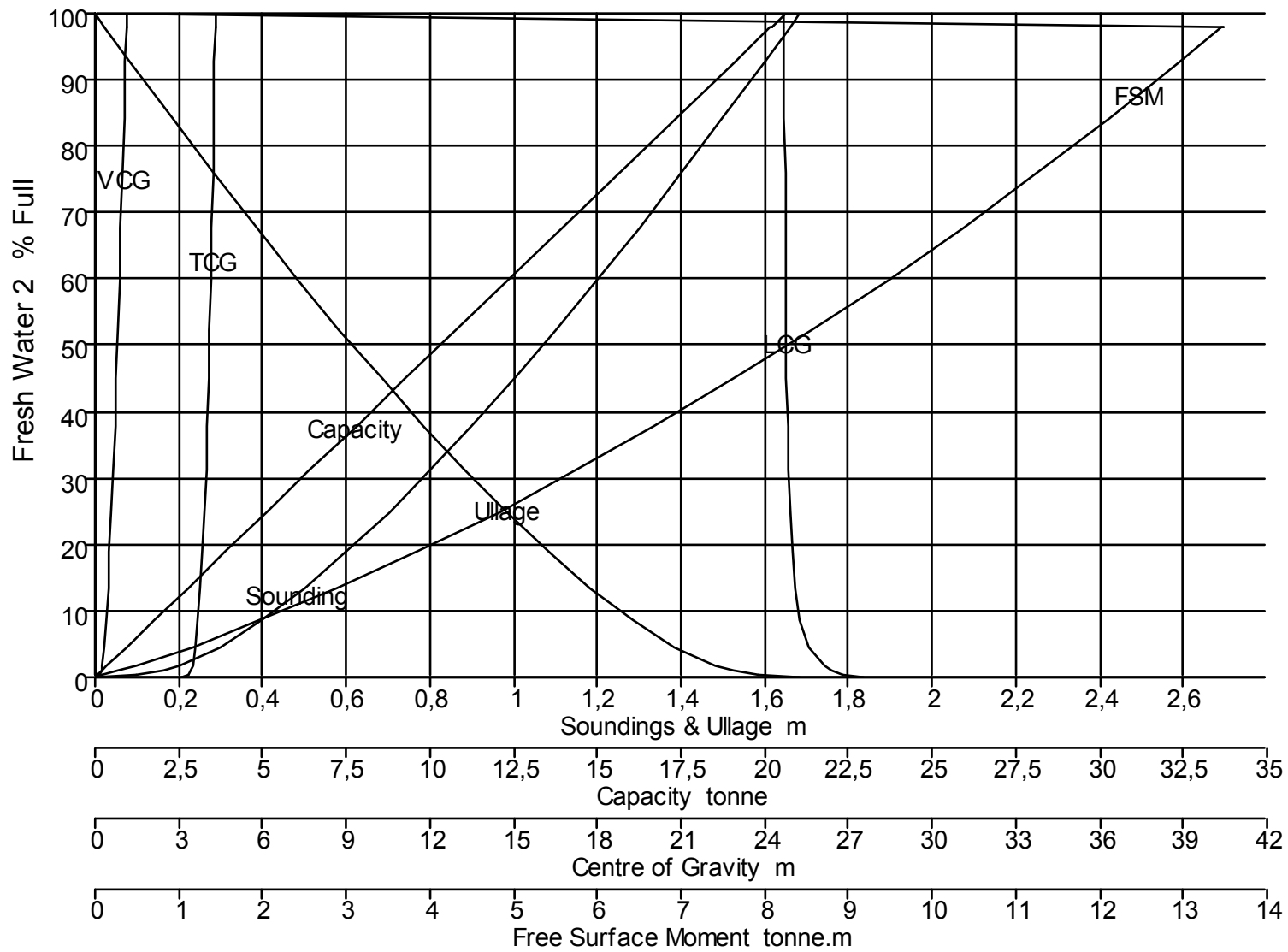
- Sounding
- Ullage
- Capacity
- LCG
- TCG
- VCG
- FSM

Tank Name	Sounding m	Ullage m	% Full	Capacity m ³	Capacity tonne	LCG m	TCG m	VCG m	FSM tonne.m
Fresh Water 1	1,684	0,000	100,000	20,618	20,618	24,699	-4,302	1,148	0,000
	1,661	0,023	98,000	20,206	20,206	24,701	-4,296	1,134	13,471
	1,660	0,024	97,900	20,185	20,185	24,701	-4,296	1,134	13,462

	1,600	0,084	92,694	19,112	19,112	24,707	-4,280	1,099	12,969
	1,500	0,184	84,174	17,355	17,355	24,716	-4,251	1,042	12,128
	1,400	0,284	75,853	15,640	15,640	24,728	-4,220	0,985	11,259
	1,300	0,384	67,746	13,968	13,968	24,741	-4,187	0,927	10,371
	1,200	0,484	59,872	12,345	12,345	24,757	-4,152	0,869	9,466
	1,100	0,584	52,248	10,773	10,773	24,776	-4,115	0,811	8,547
	1,000	0,684	44,898	9,257	9,257	24,799	-4,074	0,753	7,618
	0,900	0,784	37,846	7,803	7,803	24,828	-4,030	0,695	6,683
	0,800	0,884	31,122	6,417	6,417	24,865	-3,980	0,636	5,746
	0,700	0,984	24,759	5,105	5,105	24,915	-3,925	0,577	4,820
	0,600	1,084	18,816	3,880	3,880	24,986	-3,862	0,517	3,840
	0,500	1,184	13,391	2,761	2,761	25,092	-3,791	0,456	2,874
	0,400	1,284	8,583	1,770	1,770	25,266	-3,709	0,394	1,971
	0,300	1,384	4,566	0,941	0,941	25,592	-3,616	0,329	1,165
	0,200	1,484	1,711	0,353	0,353	26,163	-3,515	0,259	0,477
	0,161	1,523	1,000	0,206	0,206	26,409	-3,468	0,232	0,285
	0,100	1,584	0,297	0,061	0,061	26,818	-3,377	0,188	0,083
	0,000	1,684	0,000	0,000	0,000	27,566	-3,101	0,116	0,000

Tank Calibrations - Fresh Water 2

Fluid Type = Specific gravity = 1
Permeability = 100 %
Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Fresh Water 2
Trim: 0 m; Heel: 0 deg to starboard

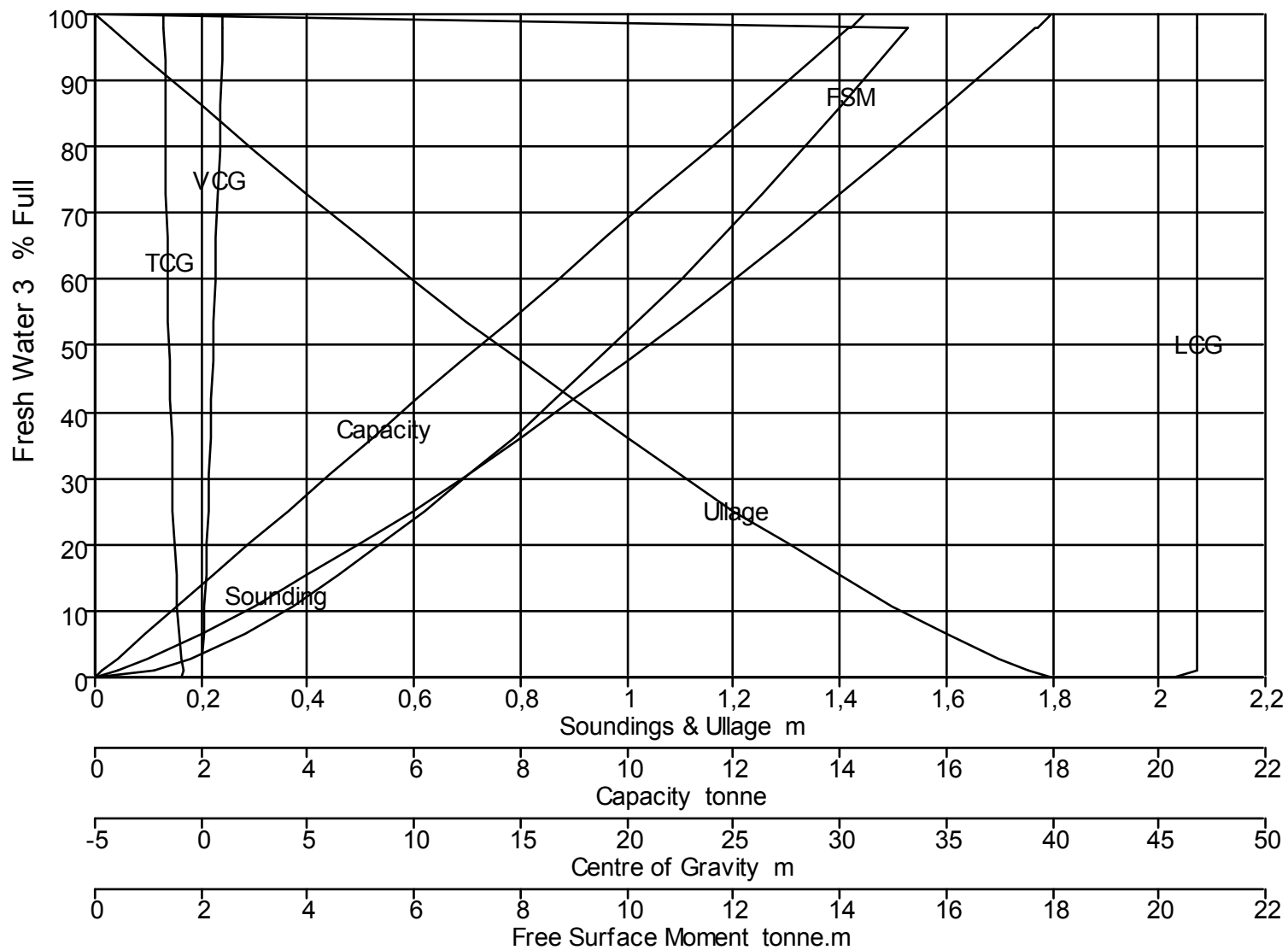
- Sounding
- Ullage
- Capacity
- LCG
- TCG
- VCG
- FSM

Tank Name	Sounding m	Ullage m	% Full	Capacity m ³	Capacity tonne	LCG m	TCG m	VCG m	FSM tonne.m
Fresh Water 2	1,684	0,000	100,000	20,618	20,618	24,699	4,302	1,148	0,000
	1,661	0,023	98,000	20,206	20,206	24,701	4,296	1,134	13,471
	1,660	0,024	97,900	20,185	20,185	24,701	4,296	1,134	13,462

	1,600	0,084	92,694	19,112	19,112	24,707	4,280	1,099	12,969
	1,500	0,184	84,174	17,355	17,355	24,716	4,251	1,042	12,128
	1,400	0,284	75,853	15,640	15,640	24,728	4,220	0,985	11,259
	1,300	0,384	67,746	13,968	13,968	24,741	4,187	0,927	10,371
	1,200	0,484	59,872	12,345	12,345	24,757	4,152	0,869	9,466
	1,100	0,584	52,248	10,773	10,773	24,776	4,115	0,811	8,547
	1,000	0,684	44,898	9,257	9,257	24,799	4,074	0,753	7,618
	0,900	0,784	37,846	7,803	7,803	24,828	4,030	0,695	6,683
	0,800	0,884	31,122	6,417	6,417	24,865	3,980	0,636	5,746
	0,700	0,984	24,759	5,105	5,105	24,915	3,925	0,577	4,820
	0,600	1,084	18,816	3,880	3,880	24,986	3,862	0,517	3,841
	0,500	1,184	13,391	2,761	2,761	25,092	3,791	0,456	2,874
	0,400	1,284	8,583	1,770	1,770	25,266	3,709	0,394	1,971
	0,300	1,384	4,566	0,941	0,941	25,592	3,616	0,329	1,165
	0,200	1,484	1,711	0,353	0,353	26,163	3,515	0,259	0,477
	0,161	1,523	1,000	0,206	0,206	26,409	3,468	0,232	0,285
	0,100	1,584	0,297	0,061	0,061	26,818	3,377	0,188	0,083
	0,000	1,684	0,000	0,000	0,000	27,566	3,101	0,116	0,000

Tank Calibrations - Fresh Water 3

Fluid Type = Specific gravity = 1
Permeability = 100 %
Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Fresh Water 3
Trim: 0 m; Heel: 0 deg to starboard

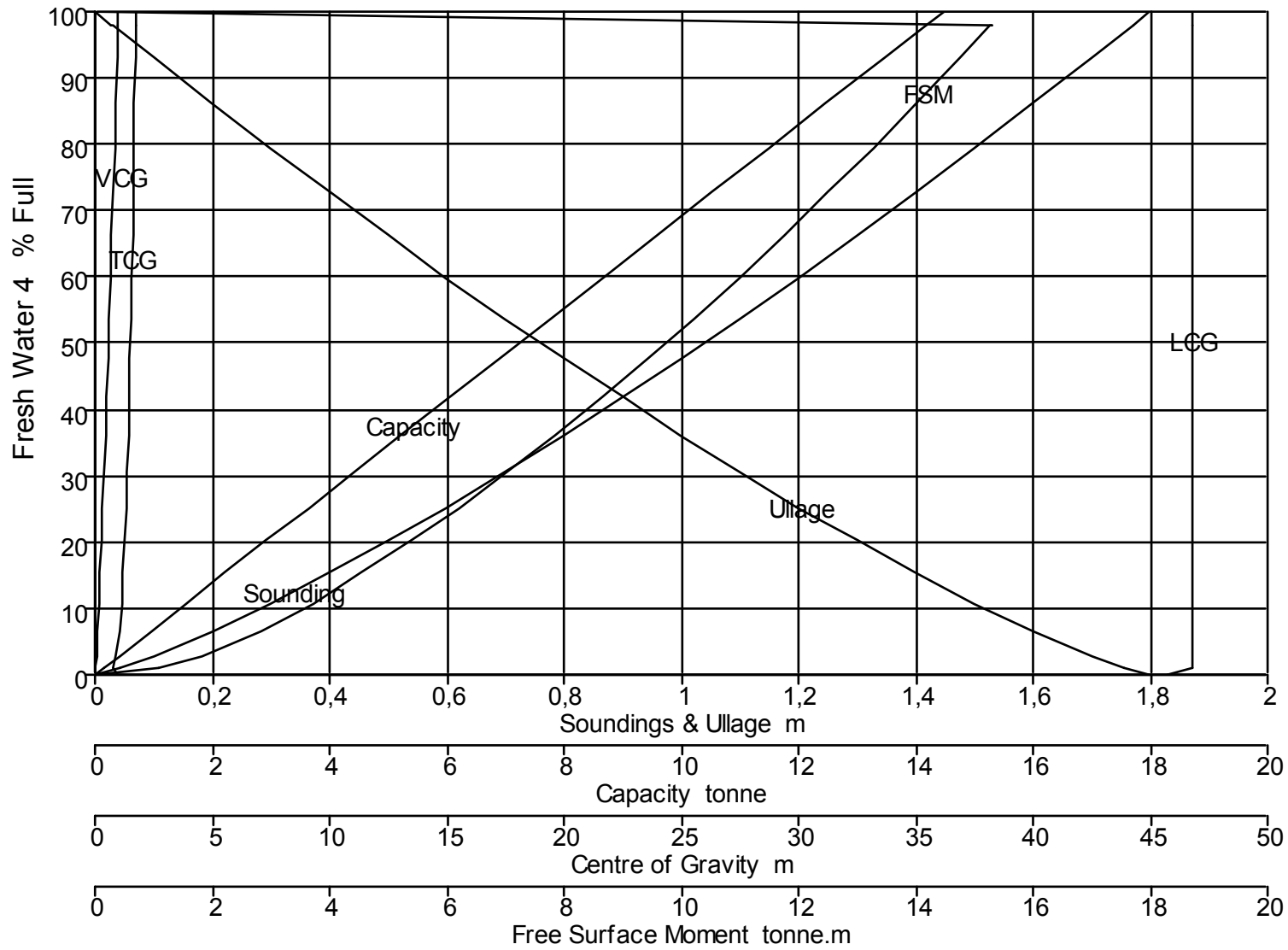
- Sounding
- Ullage
- Capacity
- LCG
- TCG
- VCG
- FSM

Tank Name	Sounding m	Ullage m	% Full	Capacity m ³	Capacity tonne	LCG m	TCG m	VCG m	FSM tonne.m
Fresh Water 3	1,799	0,000	100,000	14,481	14,481	46,777	-1,750	1,003	0,000
	1,771	0,028	98,000	14,192	14,192	46,777	-1,742	0,987	15,289
	1,770	0,030	97,900	14,177	14,177	46,777	-1,742	0,986	15,278

	1,700	0,099	93,043	13,474	13,474	46,776	-1,723	0,947	14,766
	1,600	0,199	86,162	12,477	12,477	46,776	-1,695	0,891	14,022
	1,500	0,299	79,403	11,499	11,499	46,776	-1,665	0,835	13,279
	1,400	0,399	72,771	10,538	10,538	46,776	-1,634	0,779	12,521
	1,300	0,499	66,272	9,597	9,597	46,776	-1,602	0,722	11,754
	1,200	0,599	59,913	8,676	8,676	46,776	-1,568	0,666	10,988
	1,100	0,699	53,704	7,777	7,777	46,776	-1,533	0,610	10,206
	1,000	0,799	47,650	6,900	6,900	46,775	-1,495	0,554	9,432
	0,900	0,899	41,759	6,047	6,047	46,775	-1,455	0,498	8,654
	0,800	0,999	36,044	5,220	5,220	46,775	-1,412	0,443	7,855
	0,700	1,099	30,526	4,421	4,421	46,775	-1,366	0,387	7,033
	0,600	1,199	25,217	3,652	3,652	46,775	-1,316	0,331	6,203
	0,500	1,299	20,139	2,916	2,916	46,775	-1,261	0,276	5,411
	0,400	1,399	15,309	2,217	2,217	46,774	-1,198	0,220	4,562
	0,300	1,499	10,765	1,559	1,559	46,773	-1,124	0,165	3,722
	0,200	1,599	6,573	0,952	0,952	46,772	-1,033	0,110	2,830
	0,100	1,699	2,838	0,411	0,411	46,767	-0,904	0,056	1,806
	0,043	1,757	1,000	0,145	0,145	46,758	-0,786	0,025	1,098
	0,000	1,799	0,000	0,000	0,000	45,731	-0,969	0,001	0,000

Tank Calibrations - Fresh Water 4

Fluid Type = Specific gravity = 1
Permeability = 100 %
Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Fresh Water 4
Trim: 0 m; Heel: 0 deg to starboard

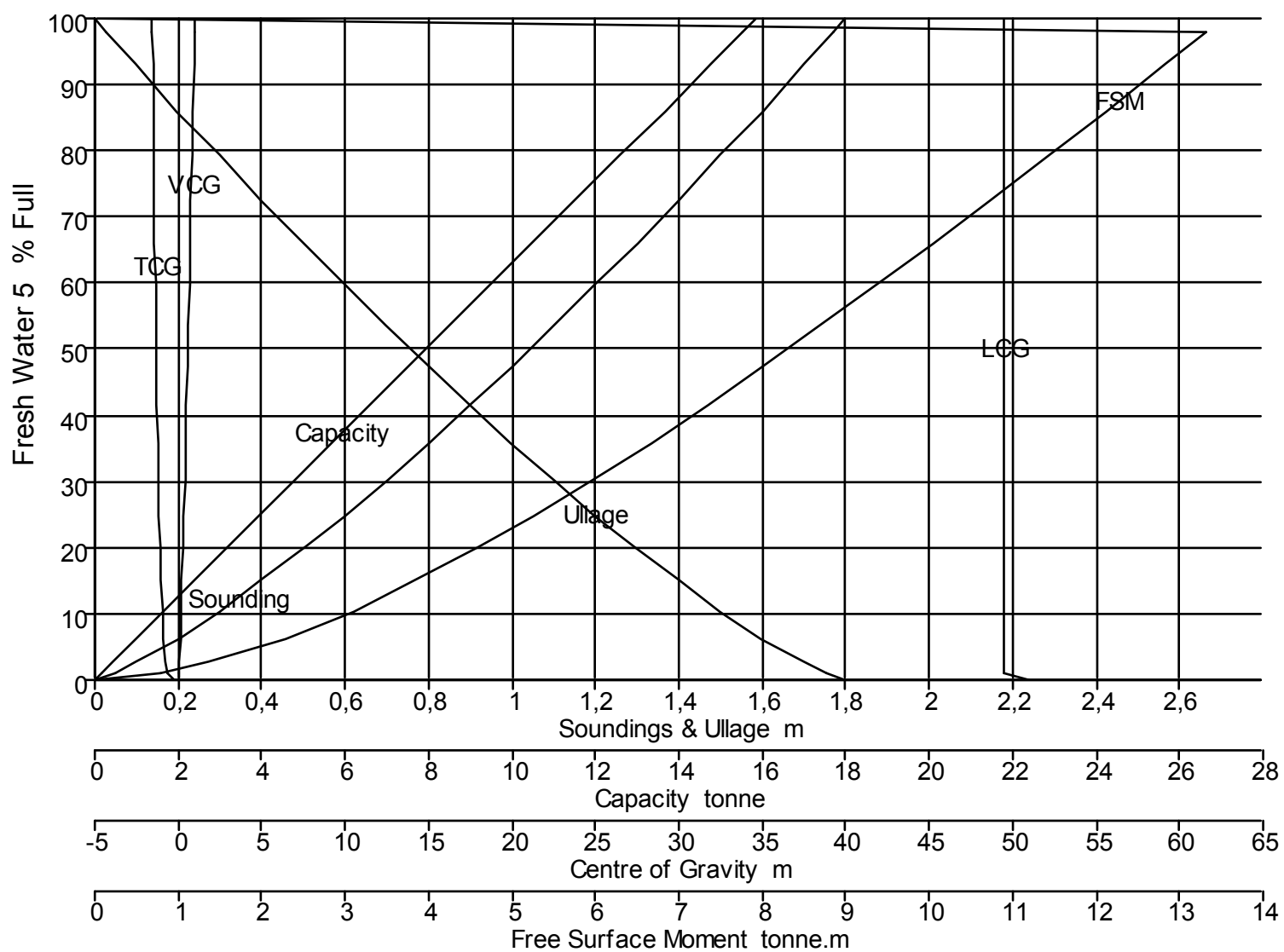
- Sounding
- Ullage
- Capacity
- LCG
- TCG
- VCG
- FSM

Tank Name	Sounding m	Ullage m	% Full	Capacity m ³	Capacity tonne	LCG m	TCG m	VCG m	FSM tonne.m
Fresh Water 4	1,799	0,000	100,000	14,481	14,481	46,777	1,750	1,003	0,000
	1,771	0,028	98,000	14,192	14,192	46,777	1,742	0,987	15,289
	1,770	0,030	97,900	14,177	14,177	46,777	1,742	0,986	15,278

	1,700	0,099	93,043	13,474	13,474	46,776	1,723	0,947	14,766
	1,600	0,199	86,162	12,477	12,477	46,776	1,695	0,891	14,022
	1,500	0,299	79,403	11,499	11,499	46,776	1,665	0,835	13,279
	1,400	0,399	72,771	10,538	10,538	46,776	1,634	0,779	12,521
	1,300	0,499	66,272	9,597	9,597	46,776	1,602	0,722	11,754
	1,200	0,599	59,913	8,676	8,676	46,776	1,568	0,666	10,988
	1,100	0,699	53,704	7,777	7,777	46,776	1,533	0,610	10,206
	1,000	0,799	47,650	6,900	6,900	46,775	1,495	0,554	9,432
	0,900	0,899	41,759	6,047	6,047	46,775	1,455	0,498	8,654
	0,800	0,999	36,044	5,220	5,220	46,775	1,412	0,443	7,855
	0,700	1,099	30,526	4,421	4,421	46,775	1,366	0,387	7,033
	0,600	1,199	25,217	3,652	3,652	46,775	1,316	0,331	6,203
	0,500	1,299	20,139	2,916	2,916	46,775	1,261	0,276	5,411
	0,400	1,399	15,309	2,217	2,217	46,774	1,198	0,220	4,562
	0,300	1,499	10,765	1,559	1,559	46,773	1,124	0,165	3,722
	0,200	1,599	6,573	0,952	0,952	46,772	1,033	0,110	2,830
	0,100	1,699	2,838	0,411	0,411	46,767	0,904	0,056	1,806
	0,043	1,757	1,000	0,145	0,145	46,758	0,786	0,025	1,098
	0,000	1,799	0,000	0,000	0,000	45,731	0,969	0,001	0,000

Tank Calibrations - Fresh Water 5

Fluid Type = Specific gravity = 1
Permeability = 100 %
Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Fresh Water 5
Trim: 0 m; Heel: 0 deg to starboard

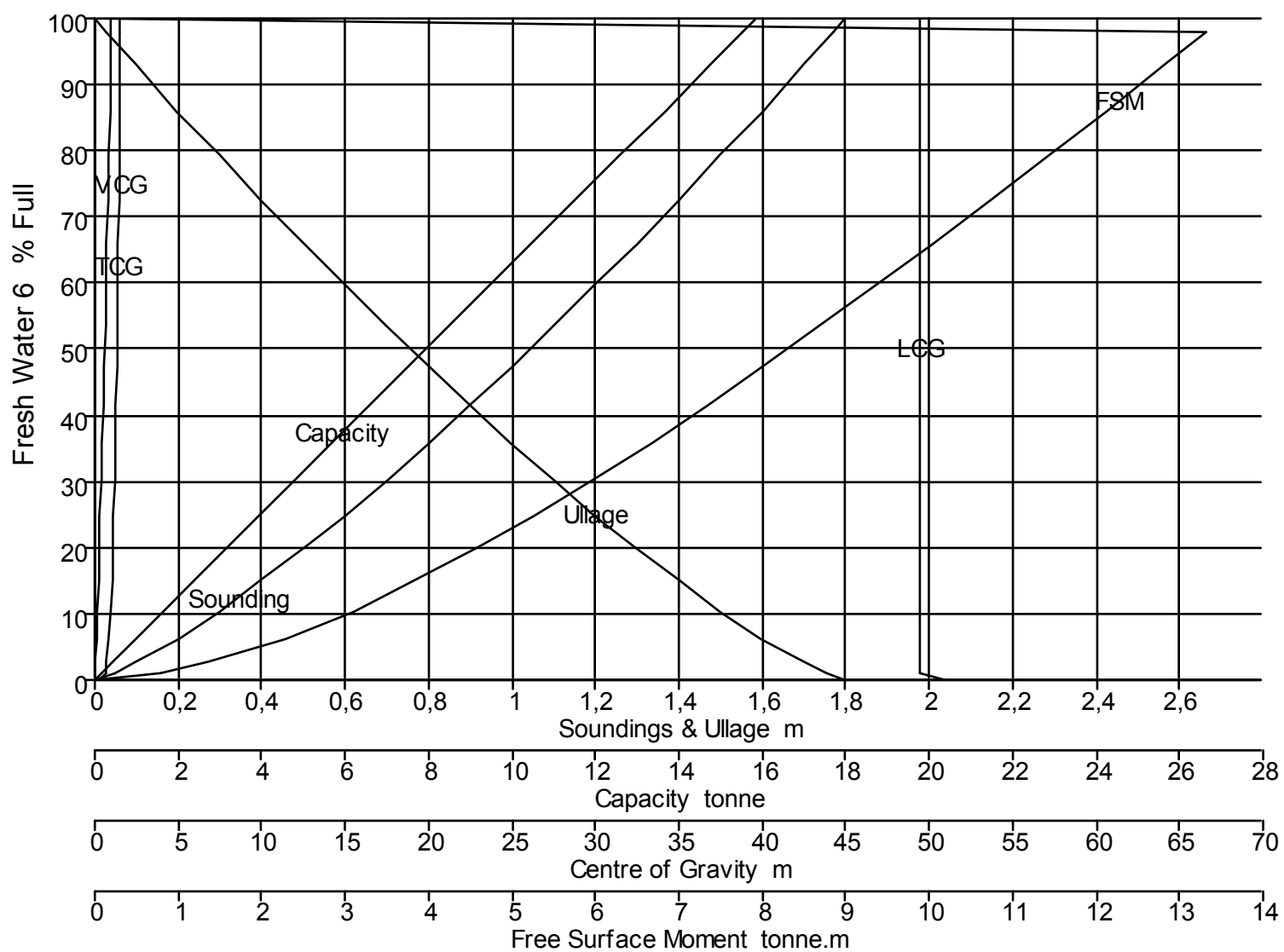
- Sounding
- Ullage
- Capacity
- LCG
- TCG
- VCG
- FSM

Tank Name	Sounding m	Ullage m	% Full	Capacity m ³	Capacity tonne	LCG m	TCG m	VCG m	FSM tonne.m
Fresh Water 5	1,799	0,000	100,000	15,856	15,856	49,462	-1,541	1,008	0,000
	1,771	0,028	98,000	15,539	15,539	49,462	-1,534	0,992	13,318
	1,769	0,030	97,900	15,523	15,523	49,462	-1,533	0,991	13,308

	1,700	0,099	93,014	14,748	14,748	49,462	-1,516	0,952	12,817
	1,600	0,199	86,073	13,647	13,647	49,462	-1,490	0,896	12,117
	1,500	0,299	79,265	12,568	12,568	49,462	-1,463	0,839	11,429
	1,400	0,399	72,592	11,510	11,510	49,462	-1,435	0,783	10,738
	1,300	0,499	66,059	10,474	10,474	49,461	-1,406	0,727	10,052
	1,200	0,599	59,673	9,462	9,462	49,461	-1,376	0,671	9,374
	1,100	0,699	53,441	8,473	8,473	49,461	-1,344	0,615	8,690
	1,000	0,799	47,368	7,510	7,510	49,460	-1,310	0,559	8,017
	0,900	0,899	41,462	6,574	6,574	49,460	-1,274	0,503	7,346
	0,800	0,999	35,734	5,666	5,666	49,459	-1,235	0,447	6,666
	0,700	1,099	30,204	4,789	4,789	49,458	-1,193	0,391	5,965
	0,600	1,199	24,884	3,946	3,946	49,457	-1,147	0,335	5,258
	0,500	1,299	19,797	3,139	3,139	49,455	-1,096	0,280	4,582
	0,400	1,399	14,966	2,373	2,373	49,452	-1,036	0,224	3,845
	0,300	1,499	10,431	1,654	1,654	49,448	-0,965	0,168	3,100
	0,200	1,599	6,269	0,994	0,994	49,442	-0,873	0,113	2,293
	0,100	1,699	2,620	0,415	0,415	49,430	-0,738	0,057	1,364
	0,047	1,752	1,000	0,159	0,159	49,419	-0,615	0,028	0,787
	0,000	1,799	0,000	0,000	0,000	50,983	-0,236	0,001	0,000

Tank Calibrations - Fresh Water 6

Fluid Type = Specific gravity = 1
Permeability = 100 %
Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Fresh Water 6
Trim: 0 m; Heel: 0 deg to starboard

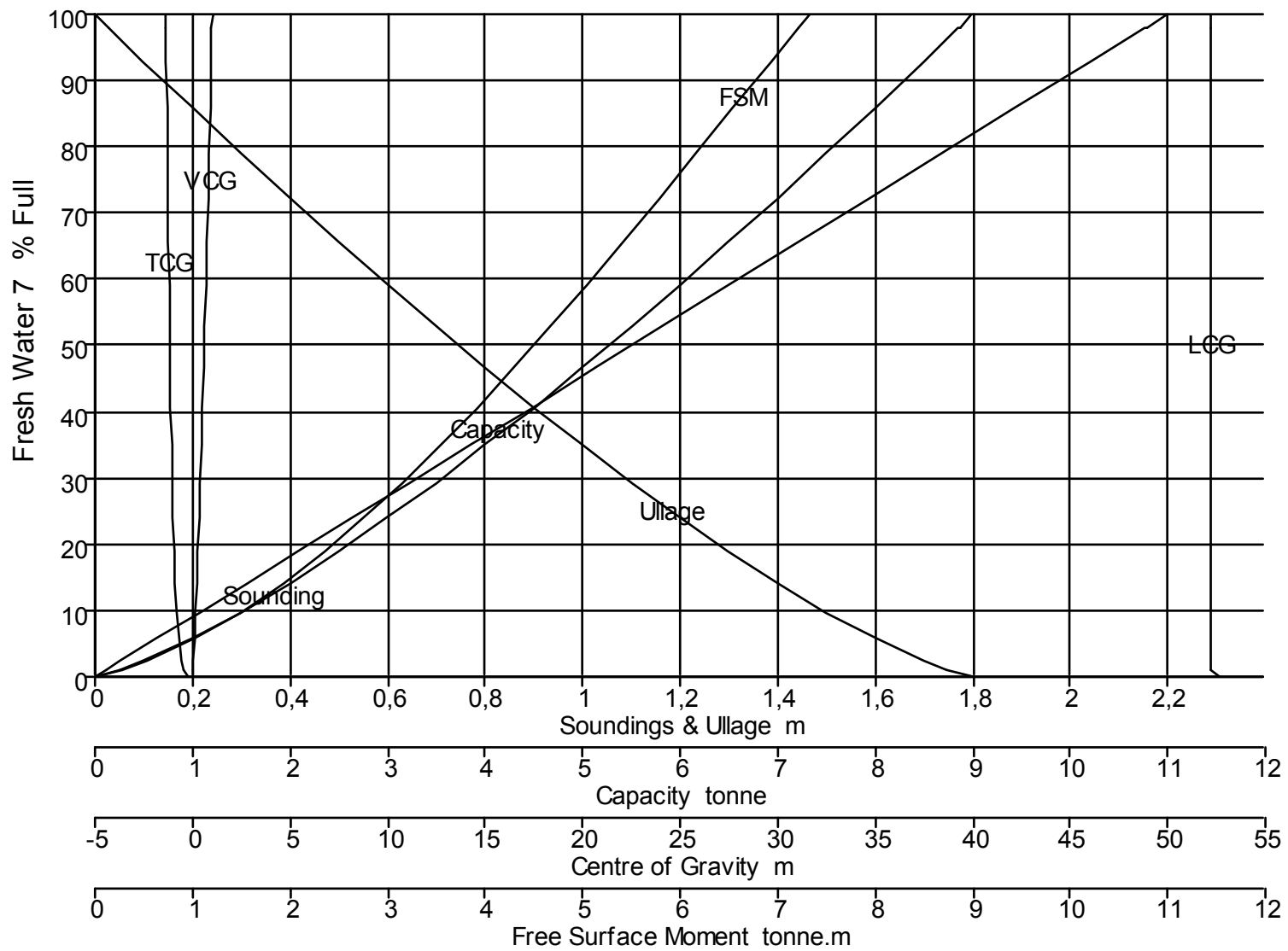
- Sounding
- Ullage
- Capacity
- LCG
- TCG
- VCG
- FSM

Tank Name	Sounding m	Ullage m	% Full	Capacity m ³	Capacity tonne	LCG m	TCG m	VCG m	FSM tonne.m
Fresh Water 6	1,799	0,000	100,000	15,856	15,856	49,462	1,541	1,008	0,000
	1,771	0,028	98,000	15,539	15,539	49,462	1,534	0,992	13,318
	1,769	0,030	97,900	15,523	15,523	49,462	1,533	0,991	13,308

	1,700	0,099	93,014	14,748	14,748	49,462	1,516	0,952	12,817
	1,600	0,199	86,073	13,647	13,647	49,462	1,490	0,896	12,117
	1,500	0,299	79,265	12,568	12,568	49,462	1,463	0,839	11,429
	1,400	0,399	72,592	11,510	11,510	49,462	1,435	0,783	10,738
	1,300	0,499	66,059	10,474	10,474	49,461	1,406	0,727	10,052
	1,200	0,599	59,673	9,462	9,462	49,461	1,376	0,671	9,374
	1,100	0,699	53,441	8,473	8,473	49,461	1,344	0,615	8,690
	1,000	0,799	47,368	7,510	7,510	49,460	1,310	0,559	8,017
	0,900	0,899	41,462	6,574	6,574	49,460	1,274	0,503	7,346
	0,800	0,999	35,734	5,666	5,666	49,459	1,235	0,447	6,666
	0,700	1,099	30,204	4,789	4,789	49,458	1,193	0,391	5,965
	0,600	1,199	24,884	3,946	3,946	49,457	1,147	0,335	5,258
	0,500	1,299	19,797	3,139	3,139	49,455	1,096	0,280	4,582
	0,400	1,399	14,966	2,373	2,373	49,452	1,036	0,224	3,845
	0,300	1,499	10,431	1,654	1,654	49,448	0,965	0,168	3,100
	0,200	1,599	6,269	0,994	0,994	49,442	0,873	0,113	2,293
	0,100	1,699	2,620	0,415	0,415	49,430	0,738	0,057	1,364
	0,047	1,752	1,000	0,159	0,159	49,419	0,615	0,028	0,787
	0,000	1,799	0,000	0,000	0,000	50,983	0,236	0,001	0,000

Tank Calibrations - Fresh Water 7

Fluid Type = Specific gravity = 1
Permeability = 100 %
Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Fresh Water 7
Trim: 0 m; Heel: 0 deg to starboard

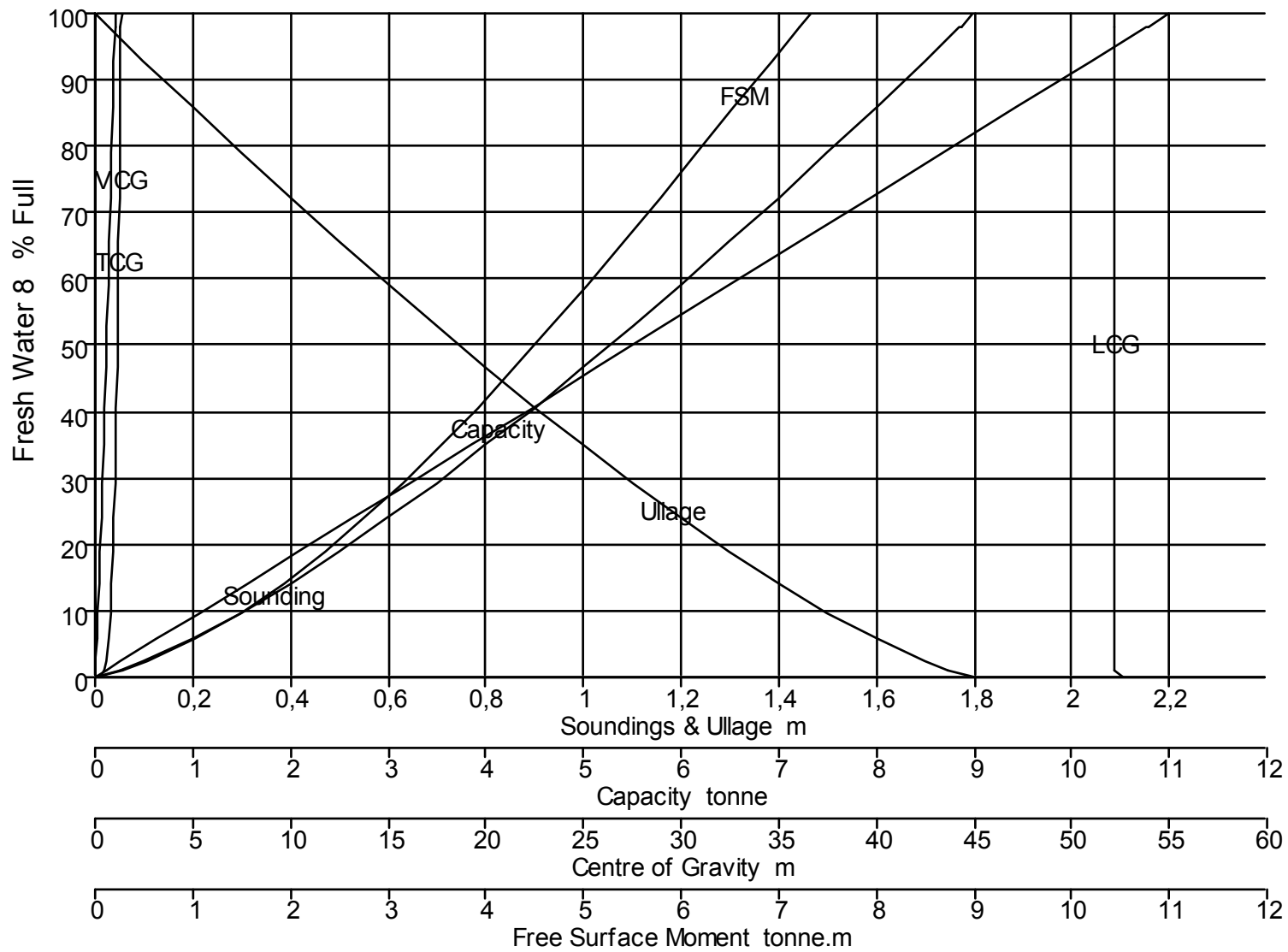
- Sounding
- Ullage
- Capacity
- LCG
- TCG
- VCG
- FSM

Tank Name	Sounding m	Ullage m	% Full	Capacity m ³	Capacity tonne	LCG m	TCG m	VCG m	FSM tonne.m
Fresh Water 7	1,800	0,000	100,000	11,000	11,000	52,173	-1,347	1,017	0,000
	1,800	0,000	99,996	11,000	11,000	52,173	-1,347	1,017	7,333
	1,772	0,028	98,000	10,780	10,780	52,173	-1,340	1,001	7,221

	1,771	0,029	97,900	10,769	10,769	52,173	-1,340	1,001	7,216
	1,700	0,100	92,832	10,212	10,212	52,173	-1,324	0,960	6,935
	1,600	0,200	85,801	9,439	9,439	52,173	-1,300	0,904	6,546
	1,500	0,300	78,907	8,680	8,680	52,172	-1,275	0,847	6,167
	1,400	0,400	72,153	7,937	7,937	52,172	-1,250	0,791	5,788
	1,300	0,500	65,544	7,210	7,210	52,171	-1,223	0,735	5,412
	1,200	0,600	59,086	6,500	6,500	52,171	-1,195	0,678	5,041
	1,100	0,700	52,786	5,807	5,807	52,170	-1,165	0,622	4,665
	1,000	0,800	46,652	5,132	5,132	52,170	-1,133	0,566	4,294
	0,900	0,900	40,692	4,476	4,476	52,169	-1,098	0,509	3,922
	0,800	1,000	34,920	3,841	3,841	52,168	-1,061	0,453	3,544
	0,700	1,100	29,357	3,229	3,229	52,167	-1,020	0,396	3,150
	0,600	1,200	24,022	2,643	2,643	52,165	-0,974	0,340	2,750
	0,500	1,300	18,939	2,083	2,083	52,163	-0,922	0,284	2,363
	0,400	1,400	14,147	1,556	1,556	52,161	-0,862	0,227	1,940
	0,300	1,500	9,697	1,067	1,067	52,158	-0,788	0,170	1,496
	0,200	1,600	5,688	0,626	0,626	52,155	-0,693	0,113	1,028
	0,100	1,700	2,288	0,252	0,252	52,153	-0,556	0,056	0,535
	0,053	1,747	1,000	0,110	0,110	52,157	-0,457	0,030	0,291
	0,000	1,800	0,000	0,000	0,000	52,634	-0,265	0,000	0,000

Tank Calibrations - Fresh Water 8

Fluid Type = Specific gravity = 1
Permeability = 100 %
Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Fresh Water 8
Trim: 0 m; Heel: 0 deg to starboard

- Sounding
- Ullage
- Capacity
- LCG
- TCG
- VCG
- FSM

Tank Name	Sounding m	Ullage m	% Full	Capacity m ³	Capacity tonne	LCG m	TCG m	VCG m	FSM tonne.m
Fresh Water 8	1,800	0,000	100,000	11,000	11,000	52,173	1,347	1,017	0,000
	1,800	0,000	99,996	11,000	11,000	52,173	1,347	1,017	7,333
	1,772	0,028	98,000	10,780	10,780	52,173	1,340	1,001	7,221

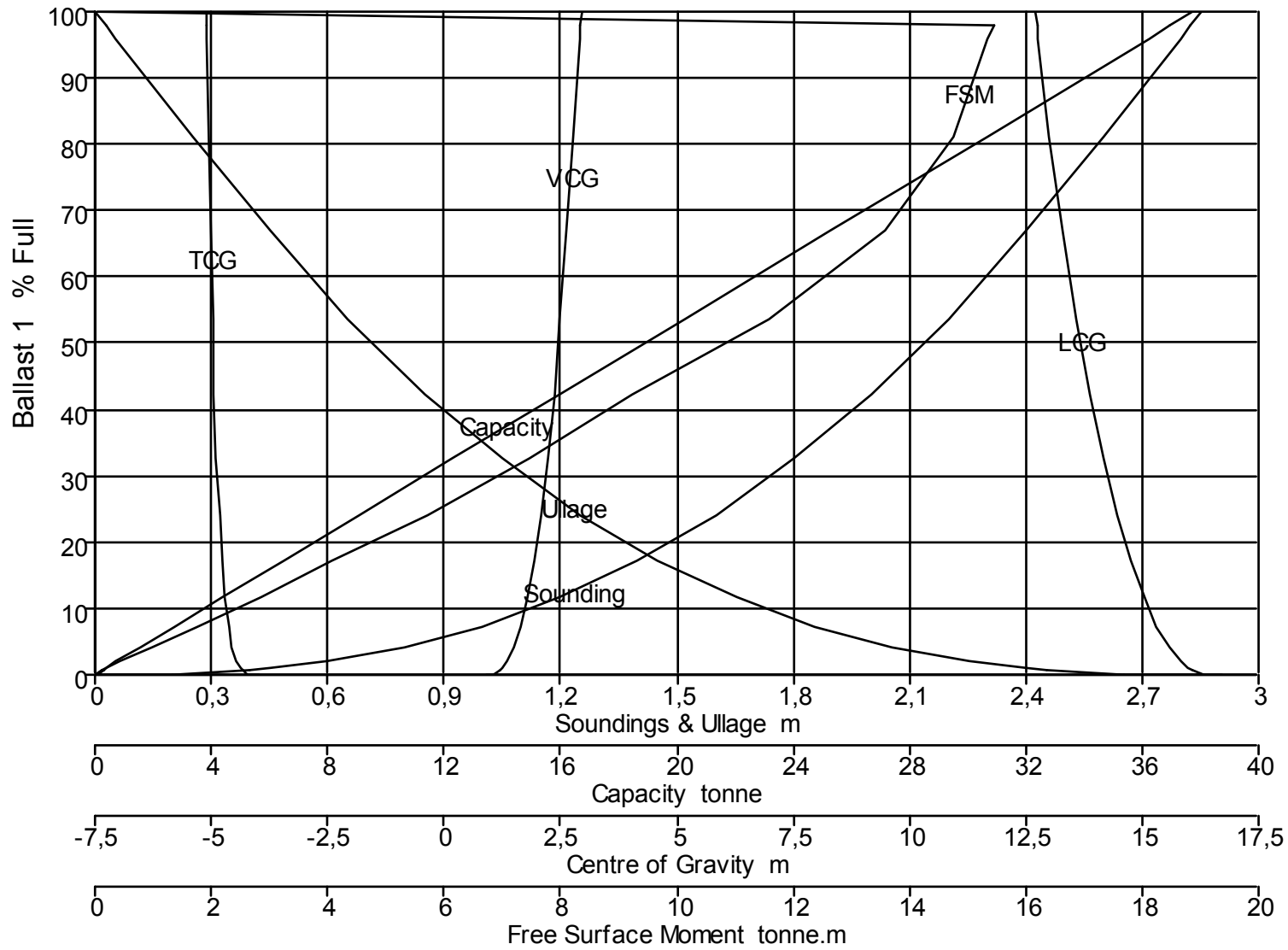
	1,771	0,029	97,900	10,769	10,769	52,173	1,340	1,001	7,216
	1,700	0,100	92,832	10,212	10,212	52,173	1,324	0,960	6,935
	1,600	0,200	85,801	9,439	9,439	52,173	1,300	0,904	6,546
	1,500	0,300	78,907	8,680	8,680	52,172	1,275	0,847	6,167
	1,400	0,400	72,153	7,937	7,937	52,172	1,250	0,791	5,788
	1,300	0,500	65,544	7,210	7,210	52,171	1,223	0,735	5,412
	1,200	0,600	59,086	6,500	6,500	52,171	1,195	0,678	5,041
	1,100	0,700	52,786	5,807	5,807	52,170	1,165	0,622	4,665
	1,000	0,800	46,652	5,132	5,132	52,170	1,133	0,566	4,294
	0,900	0,900	40,692	4,476	4,476	52,169	1,098	0,509	3,922
	0,800	1,000	34,920	3,841	3,841	52,168	1,061	0,453	3,544
	0,700	1,100	29,357	3,229	3,229	52,167	1,020	0,396	3,150
	0,600	1,200	24,022	2,643	2,643	52,165	0,974	0,340	2,750
	0,500	1,300	18,939	2,083	2,083	52,163	0,922	0,284	2,363
	0,400	1,400	14,147	1,556	1,556	52,161	0,862	0,227	1,940
	0,300	1,500	9,697	1,067	1,067	52,158	0,788	0,170	1,496
	0,200	1,600	5,688	0,626	0,626	52,155	0,693	0,113	1,028
	0,100	1,700	2,288	0,252	0,252	52,153	0,556	0,056	0,535
	0,053	1,747	1,000	0,110	0,110	52,157	0,457	0,030	0,291
	0,000	1,800	0,000	0,000	0,000	52,634	0,265	0,000	0,000

Tank Calibrations - Ballast 1

Fluid Type = Water Ballast Specific gravity = 1,025

Permeability = 100 %

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



Ballast 1
Trim: 0 m; Heel: 0 deg to starboard

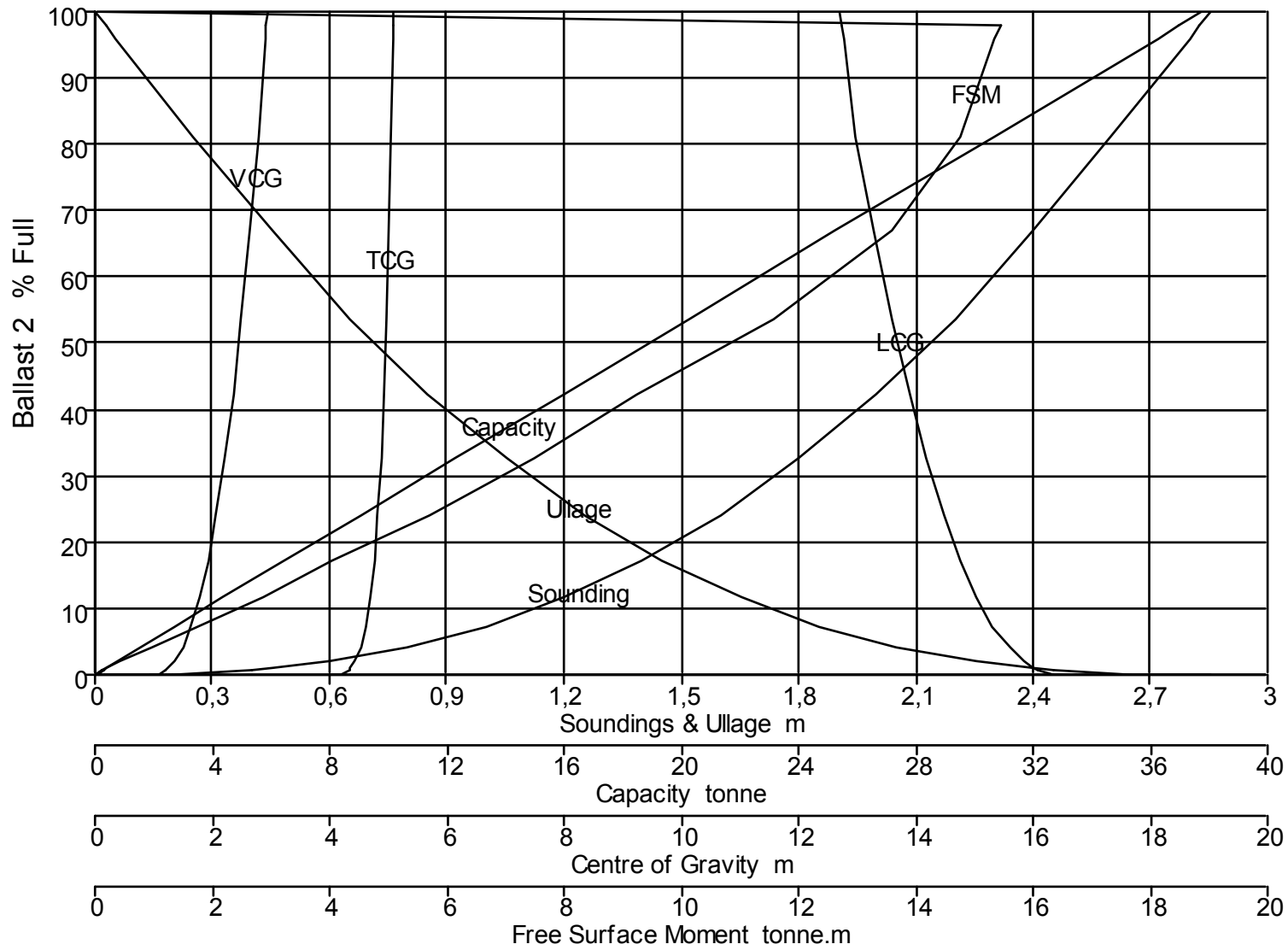
- Sounding
- Ullage
- Capacity
- LCG
- TCG
- VCG
- FSM

Tank Name	Sounding m	Ullage m	% Full	Capacity m ³	Capacity tonne	LCG m	TCG m	VCG m	FSM tonne.m
Ballast 1	2,853	0,000	100,000	36,820	37,740	12,718	-5,097	2,947	0,000
	2,826	0,027	98,000	36,083	36,985	12,742	-5,094	2,930	15,451
	2,825	0,028	97,900	36,046	36,948	12,743	-5,093	2,929	15,446

	2,800	0,053	96,041	35,362	36,246	12,767	-5,090	2,913	15,346
	2,600	0,253	81,256	29,918	30,666	12,986	-5,058	2,783	14,747
	2,400	0,453	66,924	24,641	25,257	13,271	-5,020	2,645	13,575
	2,200	0,653	53,763	19,795	20,290	13,592	-4,979	2,503	11,576
	2,000	0,853	42,347	15,592	15,982	13,893	-4,934	2,361	9,230
	1,800	1,053	32,527	11,976	12,276	14,182	-4,885	2,219	7,483
	1,600	1,253	24,143	8,889	9,112	14,470	-4,829	2,076	5,706
	1,400	1,453	17,151	6,315	6,473	14,767	-4,770	1,932	4,051
	1,200	1,653	11,596	4,270	4,376	15,042	-4,704	1,789	2,874
	1,000	1,853	7,306	2,690	2,757	15,306	-4,630	1,646	1,759
	0,800	2,053	4,089	1,506	1,543	15,599	-4,545	1,499	0,967
	0,600	2,253	1,970	0,725	0,743	15,854	-4,445	1,354	0,445
	0,453	2,400	1,000	0,368	0,377	16,005	-4,364	1,251	0,180
	0,400	2,453	0,738	0,272	0,279	16,060	-4,331	1,215	0,135
	0,200	2,653	0,128	0,047	0,048	16,342	-4,198	1,072	0,017
	0,000	2,853	0,000	0,000	0,000	16,739	-4,000	0,927	0,000

Tank Calibrations - Ballast 2

Fluid Type = Water Ballast Specific gravity = 1,025
Permeability = 100 %
Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Ballast 2
Trim: 0 m; Heel: 0 deg to starboard

- Sounding
- Ullage
- Capacity
- LCG
- TCG
- VCG
- FSM

Tank Name	Sounding m	Ullage m	% Full	Capacity m ³	Capacity tonne	LCG m	TCG m	VCG m	FSM tonne.m
Ballast 2	2,853	0,000	100,000	36,820	37,740	12,718	5,097	2,947	0,000
	2,826	0,027	98,000	36,083	36,985	12,742	5,094	2,930	15,451
	2,825	0,028	97,900	36,046	36,948	12,743	5,093	2,929	15,446

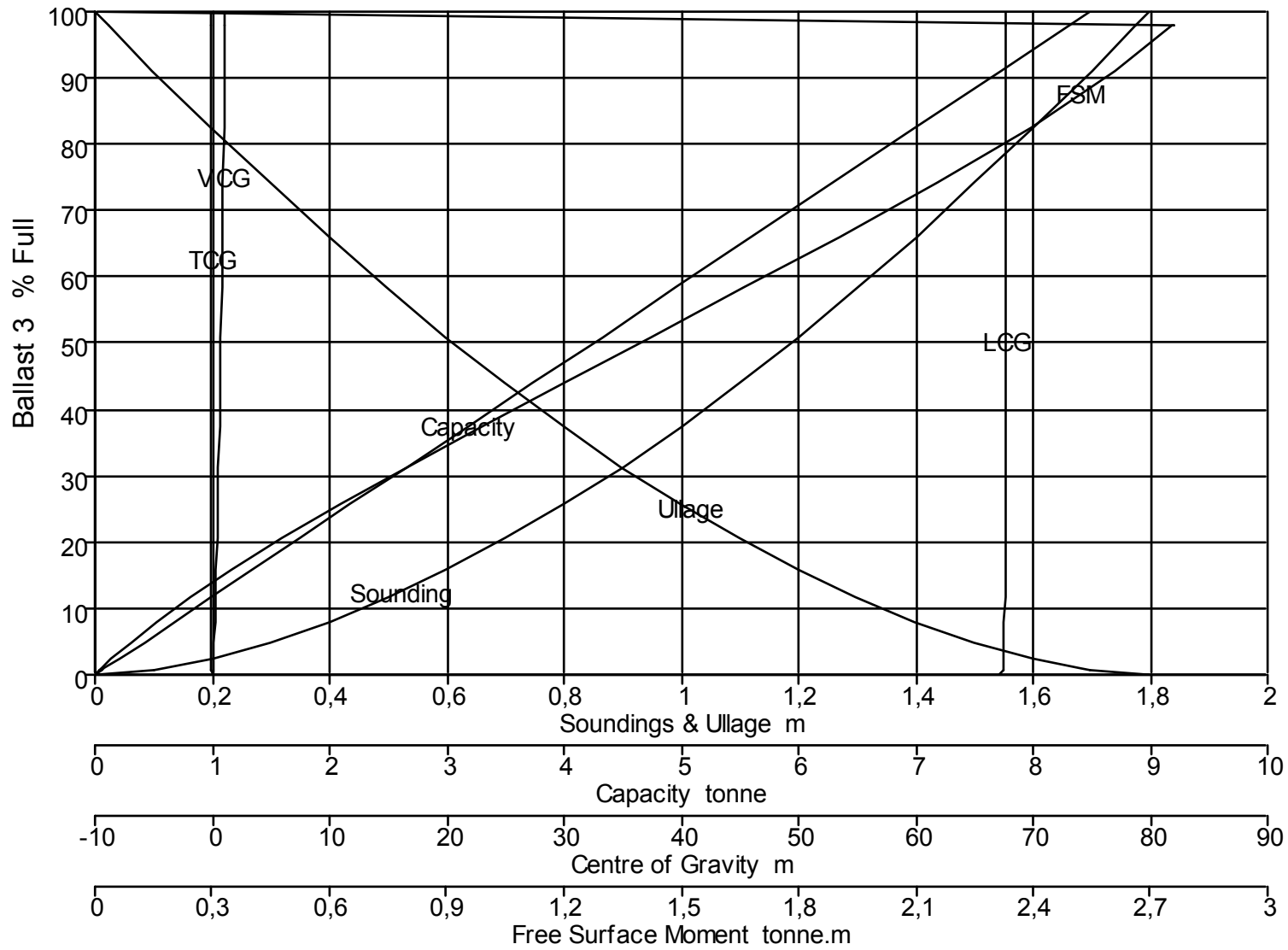
	2,800	0,053	96,041	35,362	36,246	12,767	5,090	2,913	15,346
	2,600	0,253	81,256	29,918	30,666	12,986	5,058	2,783	14,747
	2,400	0,453	66,924	24,641	25,257	13,271	5,020	2,645	13,575
	2,200	0,653	53,763	19,795	20,290	13,592	4,979	2,503	11,576
	2,000	0,853	42,347	15,592	15,982	13,893	4,934	2,361	9,230
	1,800	1,053	32,527	11,976	12,276	14,182	4,885	2,219	7,483
	1,600	1,253	24,143	8,889	9,112	14,470	4,829	2,076	5,706
	1,400	1,453	17,151	6,315	6,473	14,767	4,770	1,932	4,051
	1,200	1,653	11,596	4,270	4,376	15,042	4,704	1,789	2,874
	1,000	1,853	7,306	2,690	2,757	15,306	4,630	1,646	1,759
	0,800	2,053	4,089	1,506	1,543	15,599	4,545	1,499	0,967
	0,600	2,253	1,970	0,725	0,743	15,854	4,445	1,354	0,445
	0,453	2,400	1,000	0,368	0,377	16,005	4,364	1,251	0,180
	0,400	2,453	0,738	0,272	0,279	16,060	4,331	1,215	0,135
	0,200	2,653	0,128	0,047	0,048	16,342	4,198	1,072	0,017
	0,000	2,853	0,000	0,000	0,000	16,739	4,000	0,927	0,000

Tank Calibrations - Ballast 3

Fluid Type = Water Ballast Specific gravity = 1,025

Permeability = 100 %

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



Ballast 3
Trim: 0 m; Heel: 0 deg to starboard

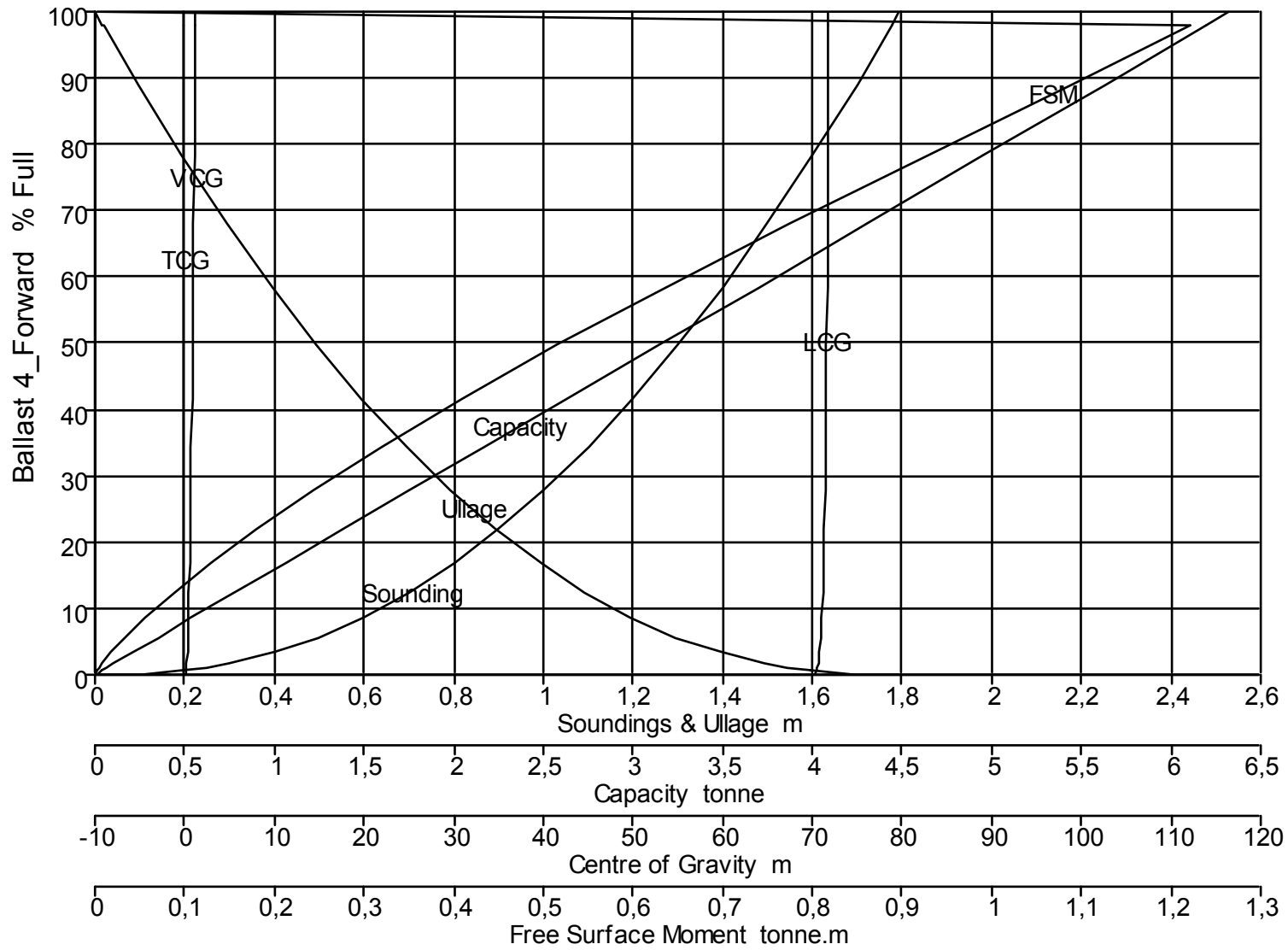
- Sounding
- Ullage
- Capacity
- LCG
- TCG
- VCG
- FSM

Tank Name	Sounding m	Ullage m	% Full	Capacity m ³	Capacity tonne	LCG m	TCG m	VCG m	FSM tonne.m
Ballast 3	1,798	0,000	100,000	8,275	8,482	67,671	0,000	1,126	0,000
	1,776	0,022	98,000	8,109	8,312	67,670	0,000	1,113	2,760
	1,775	0,023	97,900	8,101	8,303	67,670	0,000	1,112	2,758

	1,700	0,098	91,211	7,547	7,736	67,666	0,000	1,066	2,607
	1,600	0,198	82,521	6,828	6,999	67,661	0,000	1,004	2,397
	1,500	0,298	74,114	6,133	6,286	67,656	0,000	0,942	2,155
	1,400	0,398	66,028	5,464	5,600	67,651	0,000	0,880	1,906
	1,300	0,498	58,298	4,824	4,945	67,646	0,000	0,817	1,661
	1,200	0,598	50,950	4,216	4,321	67,640	0,000	0,755	1,423
	1,100	0,698	44,002	3,641	3,732	67,635	0,000	0,692	1,198
	1,000	0,798	37,471	3,101	3,178	67,629	0,000	0,629	0,988
	0,900	0,898	31,377	2,596	2,661	67,623	0,000	0,566	0,798
	0,800	0,998	25,739	2,130	2,183	67,615	0,000	0,504	0,627
	0,700	1,098	20,567	1,702	1,744	67,607	0,000	0,441	0,479
	0,600	1,198	15,880	1,314	1,347	67,597	0,000	0,379	0,351
	0,500	1,298	11,697	0,968	0,992	67,583	0,000	0,316	0,245
	0,400	1,398	8,035	0,665	0,681	67,565	0,000	0,254	0,160
	0,300	1,498	4,930	0,408	0,418	67,540	0,000	0,192	0,093
	0,200	1,598	2,450	0,203	0,208	67,502	0,000	0,130	0,043
	0,120	1,678	1,000	0,083	0,085	67,453	0,000	0,080	0,015
	0,100	1,698	0,715	0,059	0,061	67,435	0,000	0,067	0,010
	0,000	1,798	0,000	0,000	0,000	67,142	0,000	0,002	0,000

Tank Calibrations - Ballast 4_Forward

Fluid Type = Water Ballast Specific gravity = 1,025
Permeability = 100 %
Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Ballast 4_Forward
Trim: 0 m; Heel: 0 deg to starboard

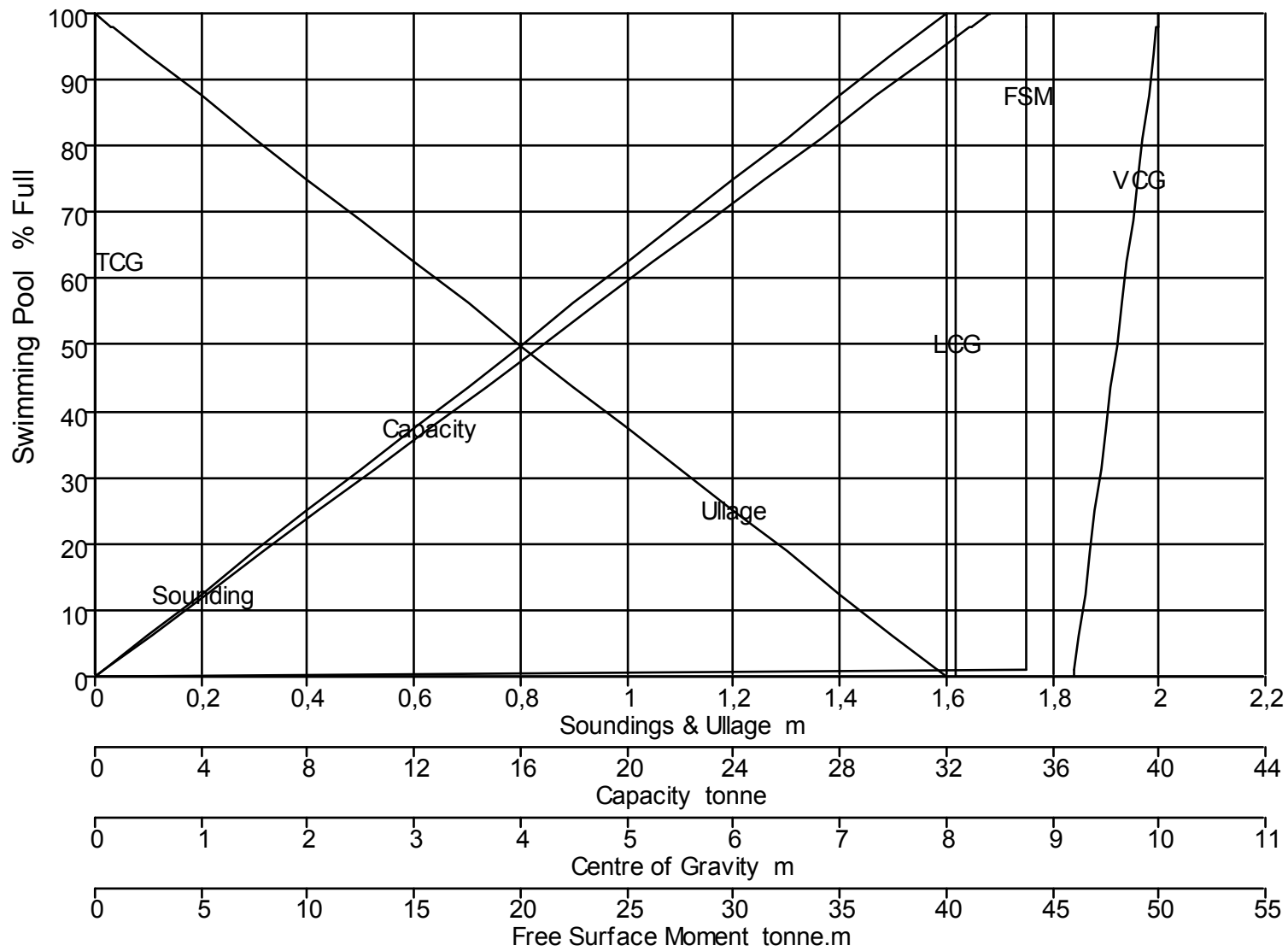
- Sounding
- Ullage
- Capacity
- LCG
- TCG
- VCG
- FSM

Tank Name	Sounding m	Ullage m	% Full	Capacity m ³	Capacity tonne	LCG m	TCG m	VCG m	FSM tonne.m
Ballast 4_Forward	1,794	0,000	100,000	6,174	6,328	71,789	0,000	1,238	0,000
	1,777	0,017	98,000	6,050	6,201	71,784	0,000	1,227	1,222
	1,776	0,018	97,900	6,044	6,195	71,784	0,000	1,227	1,221

	1,700	0,094	89,172	5,505	5,643	71,761	0,000	1,176	1,090
	1,600	0,194	78,286	4,833	4,954	71,728	0,000	1,109	0,929
	1,500	0,294	68,068	4,202	4,307	71,691	0,000	1,042	0,775
	1,400	0,394	58,540	3,614	3,704	71,648	0,000	0,974	0,638
	1,300	0,494	49,720	3,070	3,146	71,600	0,000	0,907	0,516
	1,200	0,594	41,616	2,569	2,633	71,546	0,000	0,838	0,410
	1,100	0,694	34,246	2,114	2,167	71,483	0,000	0,770	0,319
	1,000	0,794	27,717	1,711	1,754	71,425	0,000	0,702	0,243
	0,900	0,894	21,907	1,352	1,386	71,360	0,000	0,635	0,179
	0,800	0,994	16,770	1,035	1,061	71,279	0,000	0,567	0,128
	0,700	1,094	12,297	0,759	0,778	71,173	0,000	0,497	0,088
	0,600	1,194	8,520	0,526	0,539	71,033	0,000	0,426	0,056
	0,500	1,294	5,628	0,347	0,356	70,934	0,000	0,358	0,034
	0,400	1,394	3,358	0,207	0,212	70,829	0,000	0,291	0,018
	0,300	1,494	1,629	0,101	0,103	70,616	0,000	0,219	0,008
	0,248	1,546	1,000	0,062	0,063	70,479	0,000	0,180	0,004
	0,200	1,594	0,611	0,038	0,039	70,434	0,000	0,147	0,002
	0,100	1,694	0,114	0,007	0,007	70,298	0,000	0,079	0,000
	0,000	1,794	0,000	0,000	0,000	69,900	0,000	0,006	0,000

Tank Calibrations - Swimming Pool

Fluid Type = Specific gravity = 1
Permeability = 100 %
Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Swimming Pool
Trim: 0 m; Heel: 0 deg to starboard

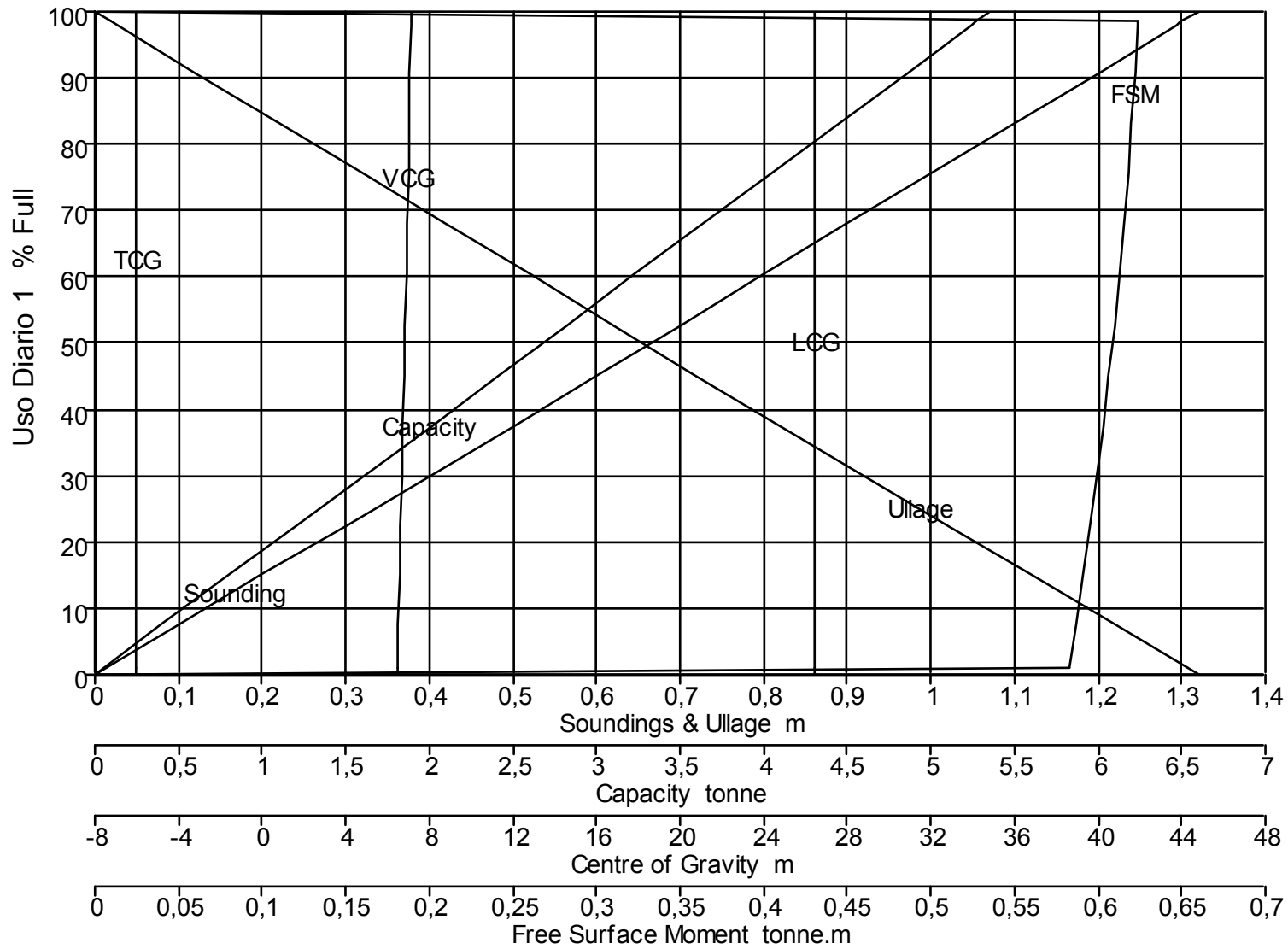
- Sounding
- Ullage
- Capacity
- LCG
- TCG
- VCG
- FSM

Tank Name	Sounding m	Ullage m	% Full	Capacity m ³	Capacity tonne	LCG m	TCG m	VCG m	FSM tonne.m
Swimming Pool	1,600	0,000	100,000	33,602	33,602	8,100	0,000	10,000	0,000
	1,600	0,000	99,994	33,600	33,600	8,100	0,000	10,000	43,750
	1,568	0,032	98,000	32,930	32,930	8,100	0,000	9,984	43,750

	1,566	0,034	97,900	32,896	32,896	8,100	0,000	9,983	43,750
	1,500	0,100	93,744	31,500	31,500	8,100	0,000	9,950	43,750
	1,400	0,200	87,495	29,400	29,400	8,100	0,000	9,900	43,750
	1,300	0,300	81,245	27,300	27,300	8,100	0,000	9,850	43,750
	1,200	0,400	74,995	25,200	25,200	8,100	0,000	9,800	43,750
	1,100	0,500	68,746	23,100	23,100	8,100	0,000	9,750	43,750
	1,000	0,600	62,496	21,000	21,000	8,100	0,000	9,700	43,750
	0,900	0,700	56,247	18,900	18,900	8,100	0,000	9,650	43,750
	0,800	0,800	49,997	16,800	16,800	8,100	0,000	9,600	43,750
	0,700	0,900	43,747	14,700	14,700	8,100	0,000	9,550	43,750
	0,600	1,000	37,498	12,600	12,600	8,100	0,000	9,500	43,750
	0,500	1,100	31,248	10,500	10,500	8,100	0,000	9,450	43,750
	0,400	1,200	24,998	8,400	8,400	8,100	0,000	9,400	43,750
	0,300	1,300	18,749	6,300	6,300	8,100	0,000	9,350	43,750
	0,200	1,400	12,499	4,200	4,200	8,100	0,000	9,300	43,750
	0,100	1,500	6,250	2,100	2,100	8,100	0,000	9,250	43,750
	0,016	1,584	1,000	0,336	0,336	8,100	0,000	9,208	43,750
	0,000	1,600	0,000	0,000	0,000	8,100	0,000	9,200	0,000

Tank Calibrations - Uso Diario 1

Fluid Type = Diesel Specific gravity = 0,84
Permeability = 100 %
Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Usó Diario 1
Trim: 0 m; Heel: 0 deg to starboard

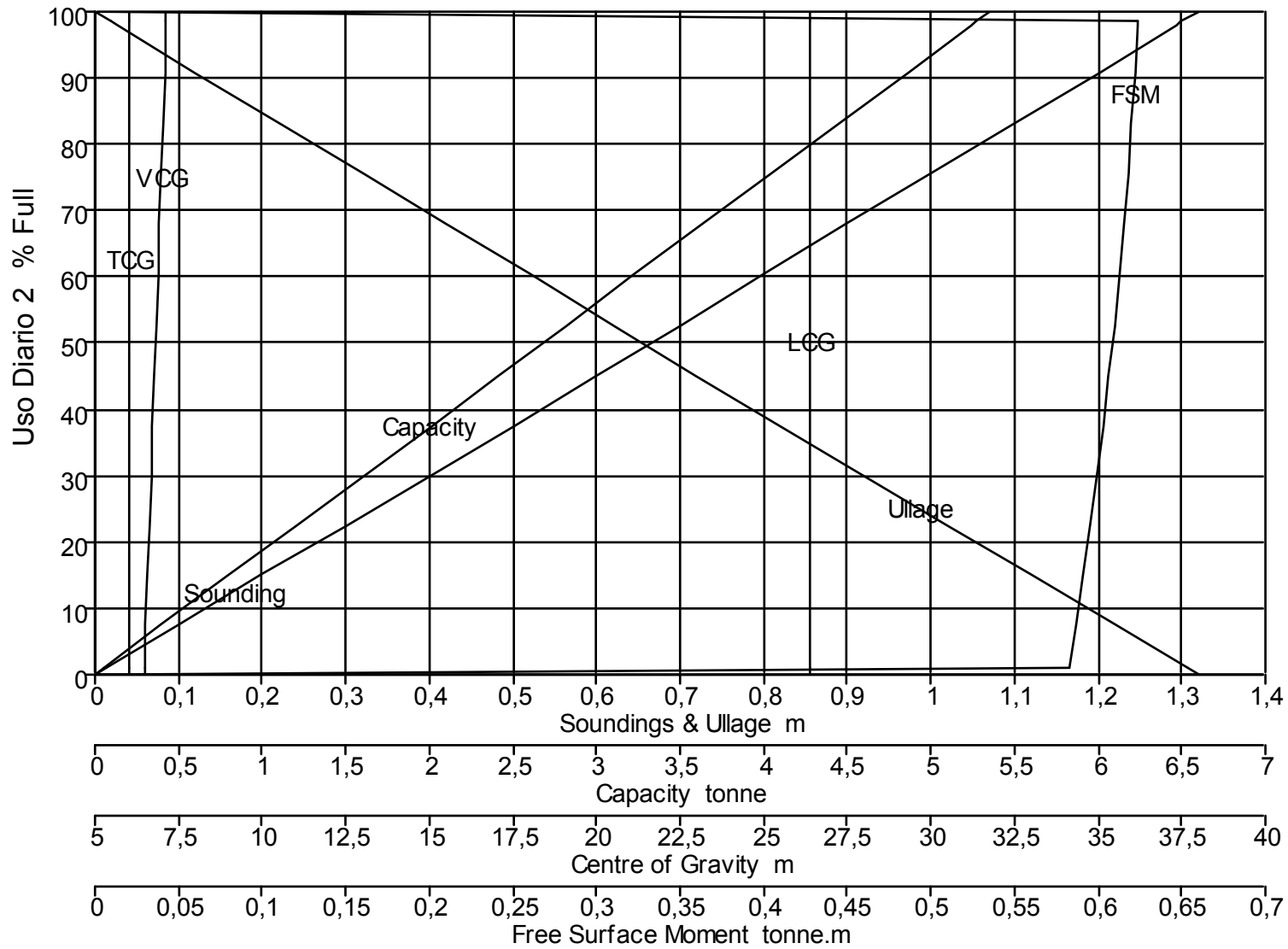
- Sounding
- Ullage
- Capacity
- LCG
- TCG
- VCG
- FSM

Tank Name	Sounding m	Ullage m	% Full	Capacity m ³	Capacity tonne	LCG m	TCG m	VCG m	FSM tonne.m
Usó Diario 1	1,320	0,000	100,000	6,369	5,350	26,396	-6,020	7,143	0,000
	1,300	0,020	98,466	6,271	5,268	26,396	-6,020	7,132	0,623
	1,294	0,026	98,000	6,242	5,243	26,396	-6,020	7,129	0,623

	1,293	0,027	97,900	6,235	5,238	26,396	-6,020	7,129	0,623
	1,200	0,120	90,824	5,785	4,859	26,396	-6,020	7,082	0,622
	1,100	0,220	83,191	5,298	4,451	26,396	-6,019	7,032	0,620
	1,000	0,320	75,565	4,813	4,043	26,396	-6,018	6,982	0,618
	0,900	0,420	67,948	4,328	3,635	26,396	-6,018	6,931	0,615
	0,800	0,520	60,342	3,843	3,228	26,396	-6,017	6,881	0,613
	0,700	0,620	52,747	3,359	2,822	26,396	-6,017	6,831	0,610
	0,600	0,720	45,165	2,877	2,416	26,396	-6,016	6,781	0,607
	0,500	0,820	37,596	2,395	2,011	26,396	-6,015	6,730	0,603
	0,400	0,920	30,043	1,913	1,607	26,395	-6,014	6,680	0,599
	0,300	1,020	22,506	1,433	1,204	26,395	-6,014	6,630	0,596
	0,200	1,120	14,985	0,954	0,802	26,395	-6,013	6,580	0,591
	0,100	1,220	7,483	0,477	0,400	26,395	-6,012	6,530	0,587
	0,013	1,307	1,000	0,064	0,053	26,395	-6,011	6,487	0,583
	0,000	1,320	0,000	0,000	0,000	26,395	-6,011	6,480	0,000

Tank Calibrations - Uso Diario 2

Fluid Type = Diesel Specific gravity = 0,84
Permeability = 100 %
Trim = 0 m (+ve by stern); Heel = 0 deg to starboard



Usó Diario 2
Trim: 0 m; Heel: 0 deg to starboard

- Sounding
- Ullage
- Capacity
- LCG
- TCG
- VCG
- FSM

Tank Name	Sounding m	Ullage m	% Full	Capacity m ³	Capacity tonne	LCG m	TCG m	VCG m	FSM tonne.m
Usó Diario 2	1,320	0,000	100,000	6,369	5,350	26,396	6,020	7,143	0,000
	1,300	0,020	98,466	6,271	5,268	26,396	6,020	7,132	0,623
	1,294	0,026	98,000	6,242	5,243	26,396	6,020	7,129	0,623

	1,293	0,027	97,900	6,235	5,238	26,396	6,020	7,129	0,623
	1,200	0,120	90,824	5,785	4,859	26,396	6,020	7,082	0,622
	1,100	0,220	83,191	5,298	4,451	26,396	6,019	7,032	0,620
	1,000	0,320	75,565	4,813	4,043	26,396	6,018	6,982	0,618
	0,900	0,420	67,948	4,328	3,635	26,396	6,018	6,931	0,615
	0,800	0,520	60,342	3,843	3,228	26,396	6,017	6,881	0,613
	0,700	0,620	52,747	3,359	2,822	26,396	6,017	6,831	0,610
	0,600	0,720	45,165	2,877	2,416	26,396	6,016	6,781	0,607
	0,500	0,820	37,596	2,395	2,011	26,396	6,015	6,730	0,603
	0,400	0,920	30,043	1,913	1,607	26,395	6,014	6,680	0,599
	0,300	1,020	22,506	1,433	1,204	26,395	6,014	6,630	0,596
	0,200	1,120	14,985	0,954	0,802	26,395	6,013	6,580	0,591
	0,100	1,220	7,483	0,477	0,400	26,395	6,012	6,530	0,587
	0,013	1,307	1,000	0,064	0,053	26,395	6,011	6,487	0,583
	0,000	1,320	0,000	0,000	0,000	26,395	6,011	6,480	0,000