MTP101

Algemeen plan

Hans Hopman

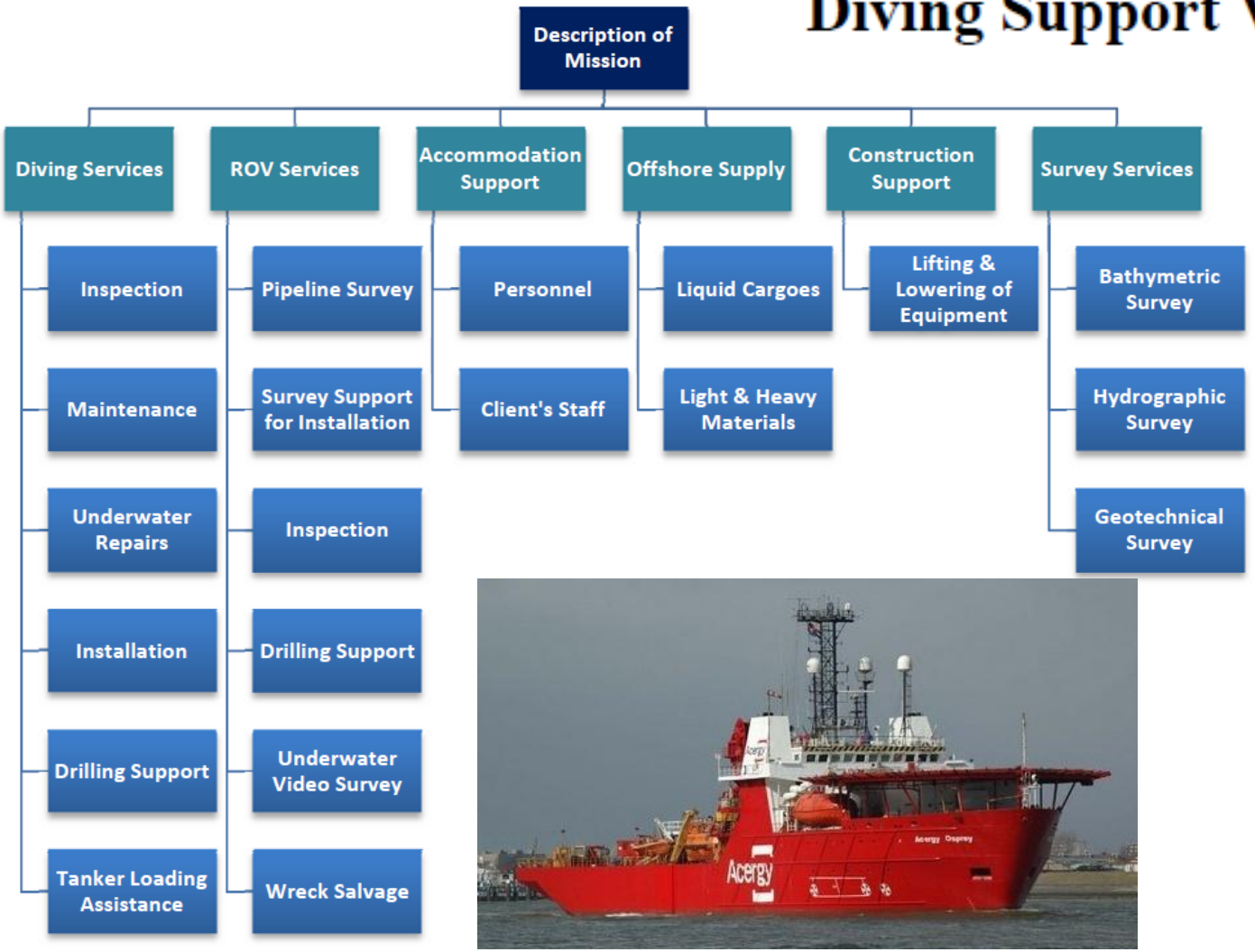
26 september 2011

Factors

- Main purpose of the ship
  - Transport ships: cargo stowage arrangement / loading/unloading
  - Passenger ships: cabins, public rooms, services
  - Service ships: efficient performance of service functions
  - Aesthetics
- Carrier platform:
  - meting deadweight, capacity, and speed requirements; stability, trim, seakeeping and manoeuvrability
- Structural & safety considerations:
  - frame spacing; ends and sides of deckhouses to line up with hull structure (bulkheads & deck longitudinals etc.)
  - Protection / access / escape / human factors etc.
- Minimum building and operational costs

Missie(s)

Diving Support Vessel



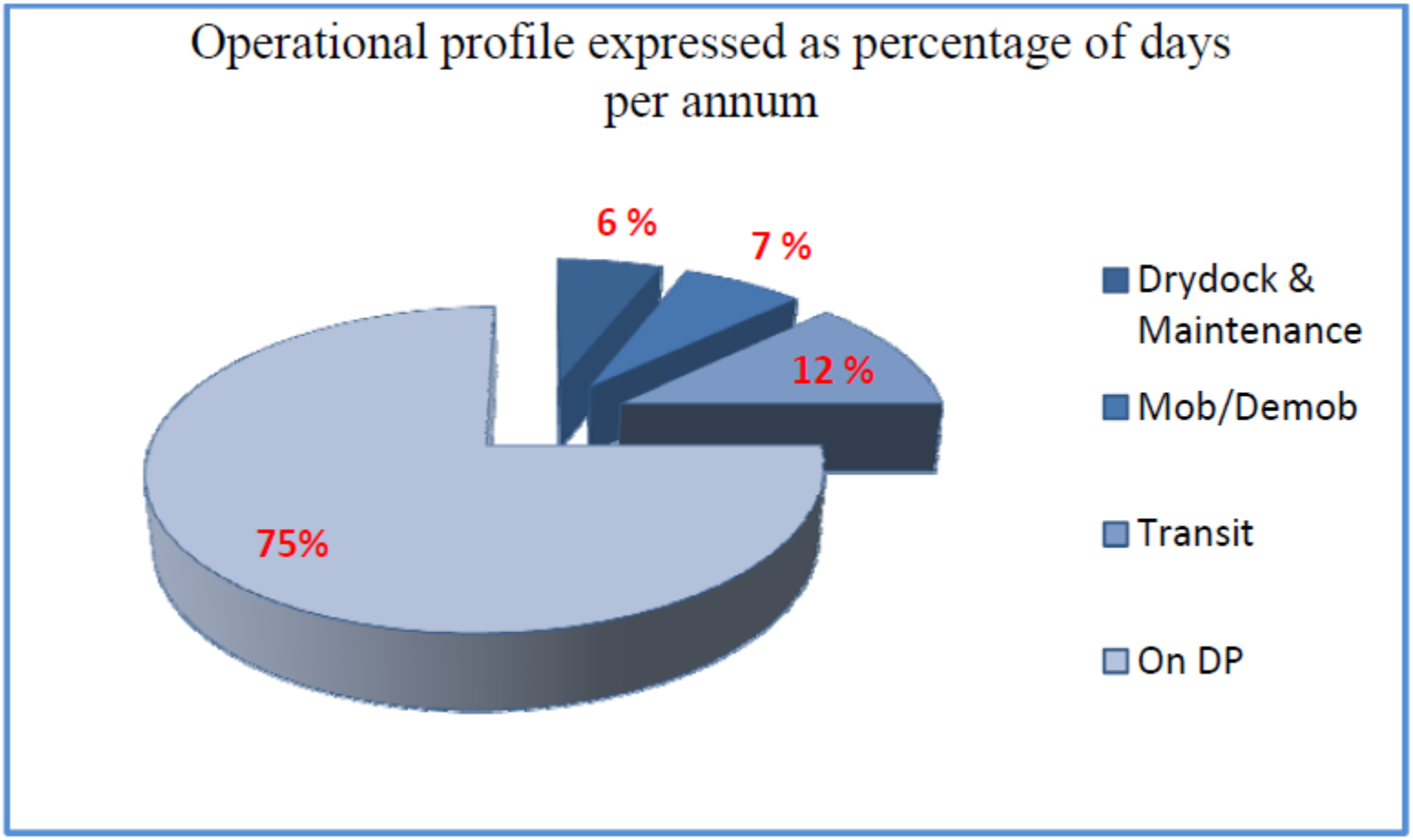
Payload – equipment

Diving Support Vessel

Item	System	Unit	Dimension L(mm) x W(mm) x H(mm)	Weight [ton]
1	Diving bell control console	1	3800 x 1310 x 2315	1
2	Chamber saturation control panel	1	5400 x 4700 x 2300	1.5
3	3 man Diving bell	2	Ø2750mm x 3520mm	19.3
4	Diving bell cursor	2		2.24
5	Bell onboard charging panel	1	605 x 390 2050	0.1
6	Gas pressure reduction panel	1	3785 x 560 x 2190	0.7
7	6 man DDC complex	3	9420 x 2704 x 2756	78
8	Gas transfer compressor	2	1900 x 1100 x 1434	1.8
9	Chamber + diver gas reclaim	1	3500 x 1200 x 1656	2.2
11	Hot water + portable water unit	3	1215 x 1000 x 924	0.7
12	HERS	4	2470 x 1370 x 2050	10
14	Self Propelled Hyperbaric Lifeboat	1	10500 x 3300	16.7
15	Emergency support module for SPHL	1	3048 x 2430 x 2430	2.1
21	Gas storage skid of 8 tubes	4	12050 x 1540 x 2900	**118**
	Total			**254.3**
	Ancillary Equipment			
15	Guide wire and shock absorber	2		1.9
16	Bell wire shock absorber	2		1
17	Bell winch	2		18.15
18	Anchor weight	2		4.825
19	Guide wire winches	2		9.41
20	Hyraulic power pack	3		10.5
22	Umbilical winch	2		7.59
	Subtotal			**53.4**
	Total Weight of Saturation Diving System + ancillary equipment			**307.7**

Operationeel profiel

Diving Support Vessel



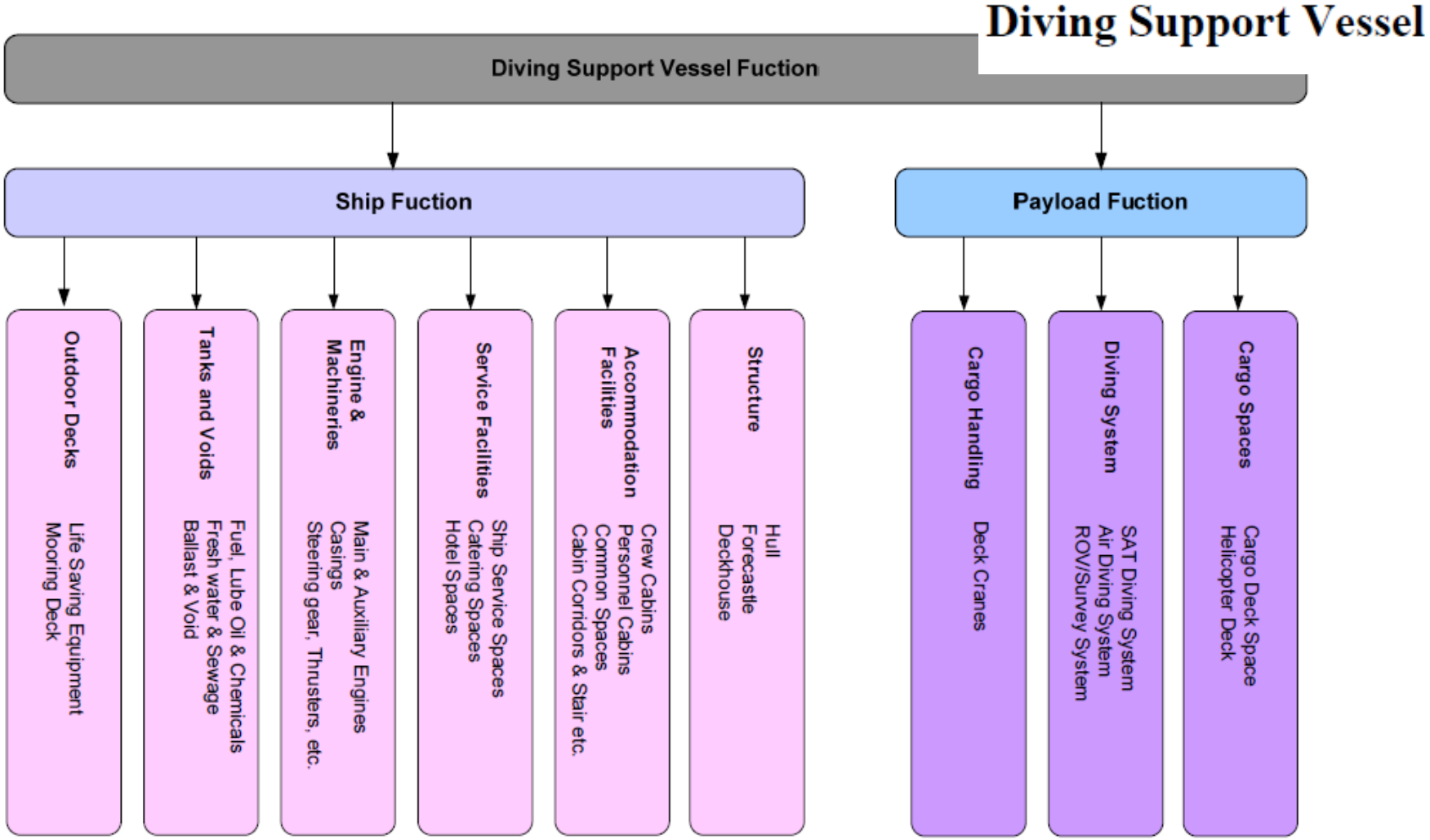
Genereren concepten

Diving Support Vessel

Features of the design concepts

Features	Concept A	Concept B	Concept C
Accommodation	120 Persons	120 Persons	120 Persons
Propulsion System	Diesel Electric	Diesel Electric	Diesel Electric
24-man SAT Diving System	Modularized-top side	Inbuilt	Inbuilt
Air Diving System	Inbuilt	Container Module	Inbuilt
ROV Control/Survey System	Inbuilt	Container Module	Container Module
Deck Space	>1000m^2	>1000m^2	>1000m^2
Deck Cargo Capacity	3000tons	3000tons	3000tons
Helideck Class	HELDK SH	HELDK SH	HELDK SH
DP System	DYNPOS-AUTRO	DYNPOS-AUTRO	DYNPOS-AUTRO
Cargo Handling System	250 tons	250tons	250tons

Functies – functionele systeemeisen



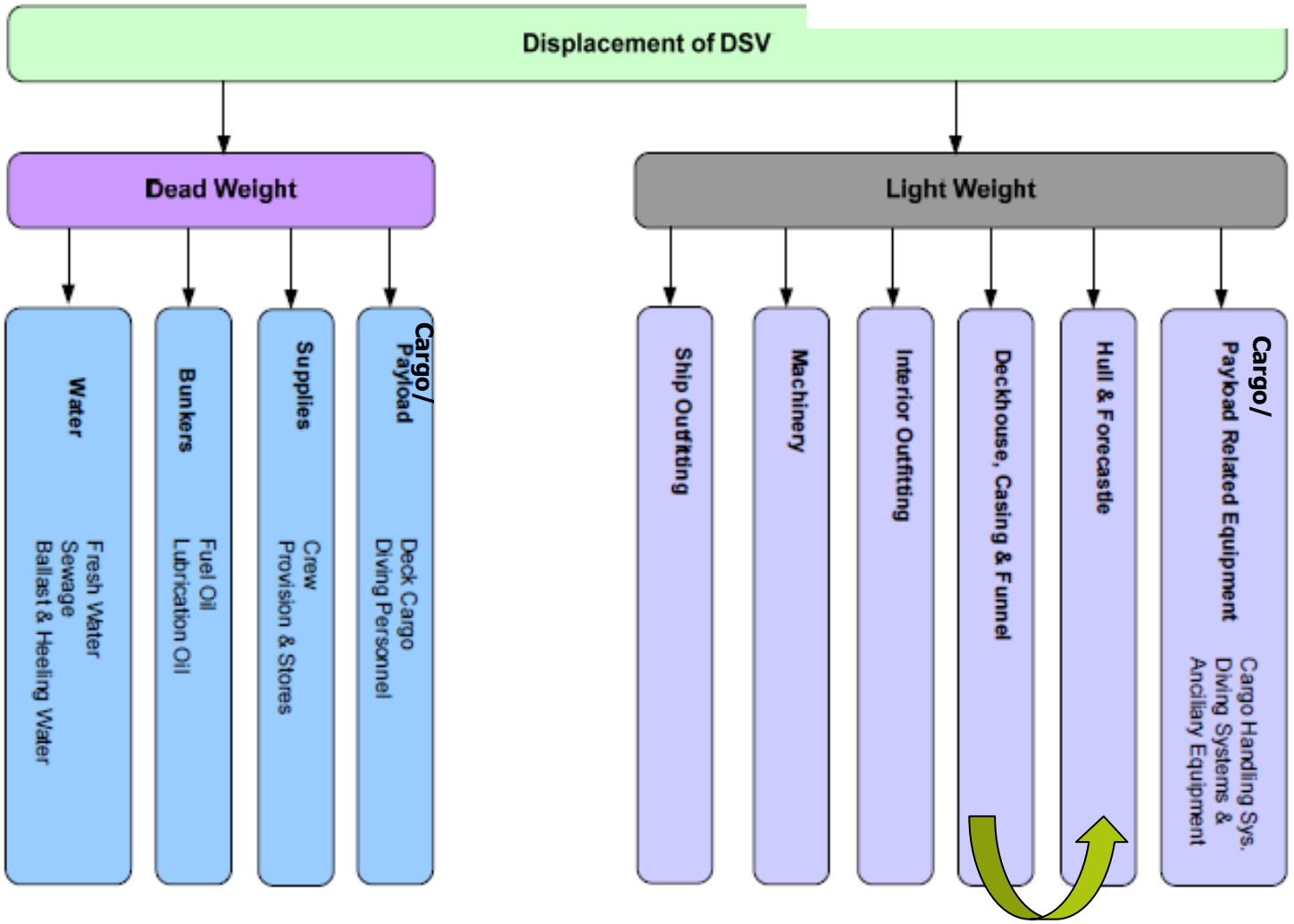
Systeem specificaties (per concept)

Diving Support Vessel

SYSTEM DESIGN SUMMARY	Concept A		Concept B		Concept C	
SPACE ALLOCATION	**Area [m2]**	**Volume [m3]**	**Area [m2]**	**Volume [m3]**	**Area [m2]**	**Volume [m3]**
Cargo Deck Space	1102		1262		1200	
Helideck	773		773		773	
Total Deck Spaces	**1875**		**2036**		**1973**	
Accommodation Spaces	1089	3048	1089	3048	1089	3048
Personnel Common Spaces	633	1773	633	1773	633	1773
Ship Service	769	2365	769	2365	769	2365
Catering Spaces	234	655	234	655	234	655
Hotel Spaces	43	440	43	440	43	440
Total Furnished Spaces	**2768**	**8282**	**2768**	**8282**	**2768**	**8282**
Technical Spaces in the Accommodation/Offices	271	954	271	943	271	949
Total Interior Spaces	**3039**	**9236**	**3039**	**9225**	**3039**	**9231**
Diving Systems	1489	6156	1368	5731	1433	5889
Engine & Machineries Room	1269	8901	1269	8901	1269	8901
Personnel & Emergency Stairways	76	302	76	302	76	302
Total Technical Spaces	**2758**	**15360**	**2637**	**14935**	**2702**	**15093**
Tanks		**7759**		**7759**		**7759**
System Area [m2]		**10440**		**10480**		**10463**
Gross Volume [m3]		**32354**		**31919**		**32081**
Gross Tonnage [Tons]		**10111**		**9975**		**10025**

Displacement

Diving Support Vessel



Arrangements

Diving Support Vessel

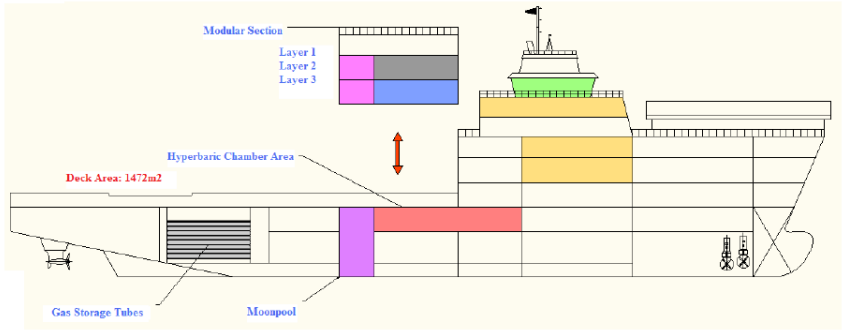


Figure 33 Profile view of concept A showing modular section

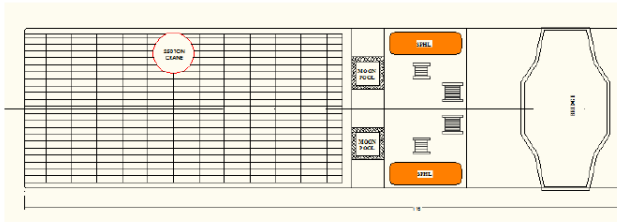
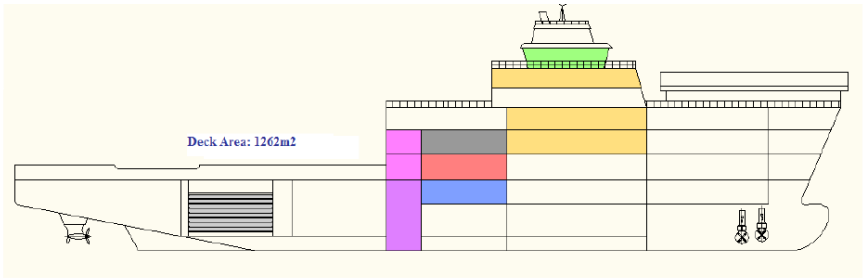
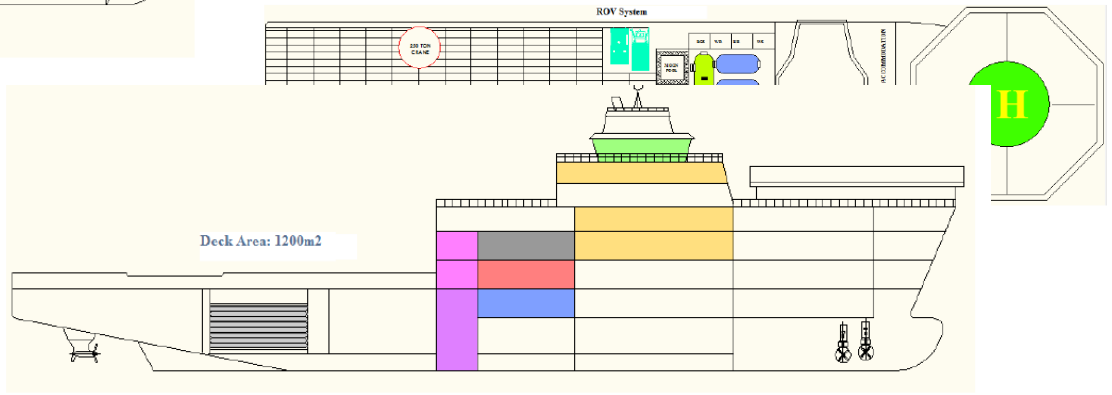


Figure 34 Plan View of Concept A





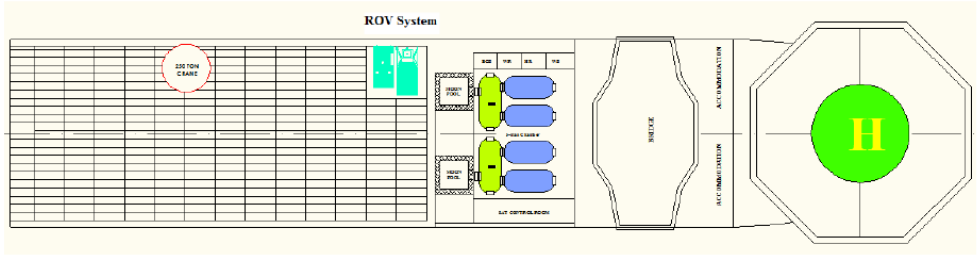
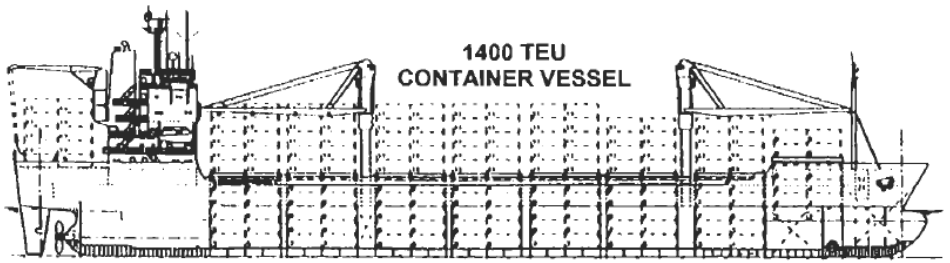
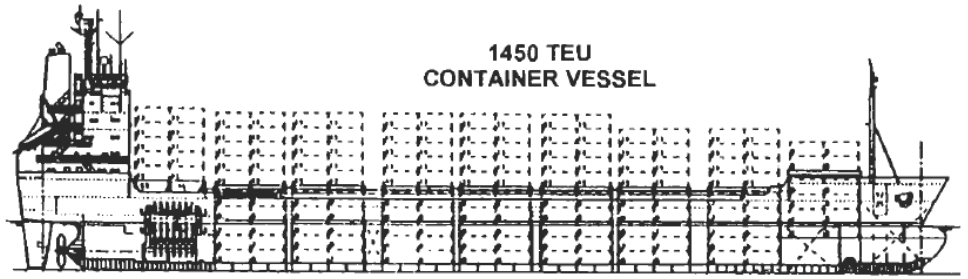


Figure 37 Profile and combination of main deck and plan views for concept C

Space allocation Cargo ship

- Cargo spaces
- Loading / unloading gear
- Machinery room / propulsion
- Deckhouse / accommodation
  - Galley / dining rooms / dry & refrigerated stores / stairs, lifts
- Lifeboats
- Anchoring, towing & mooring

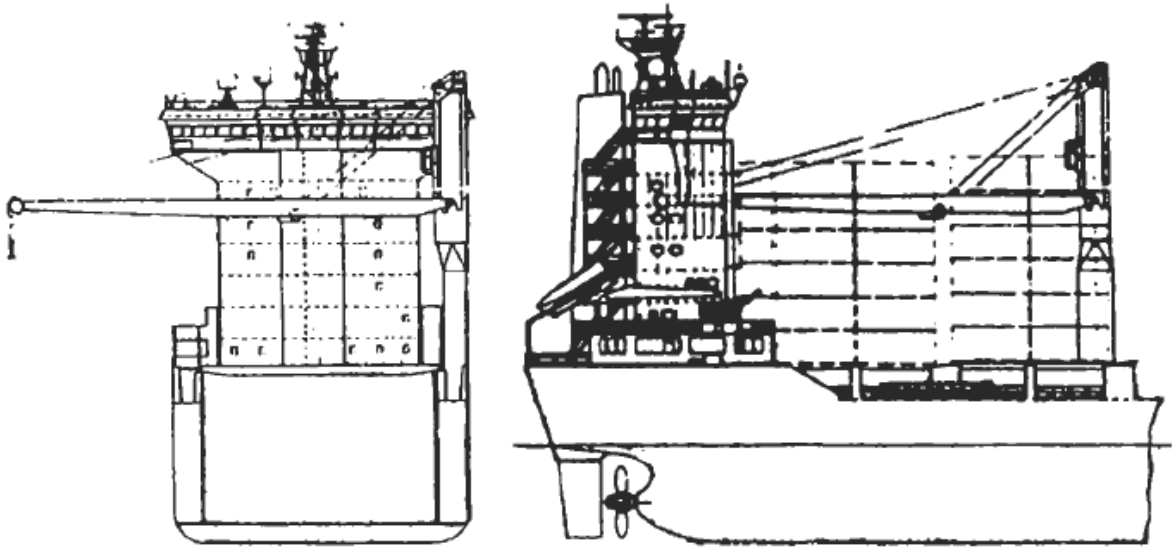




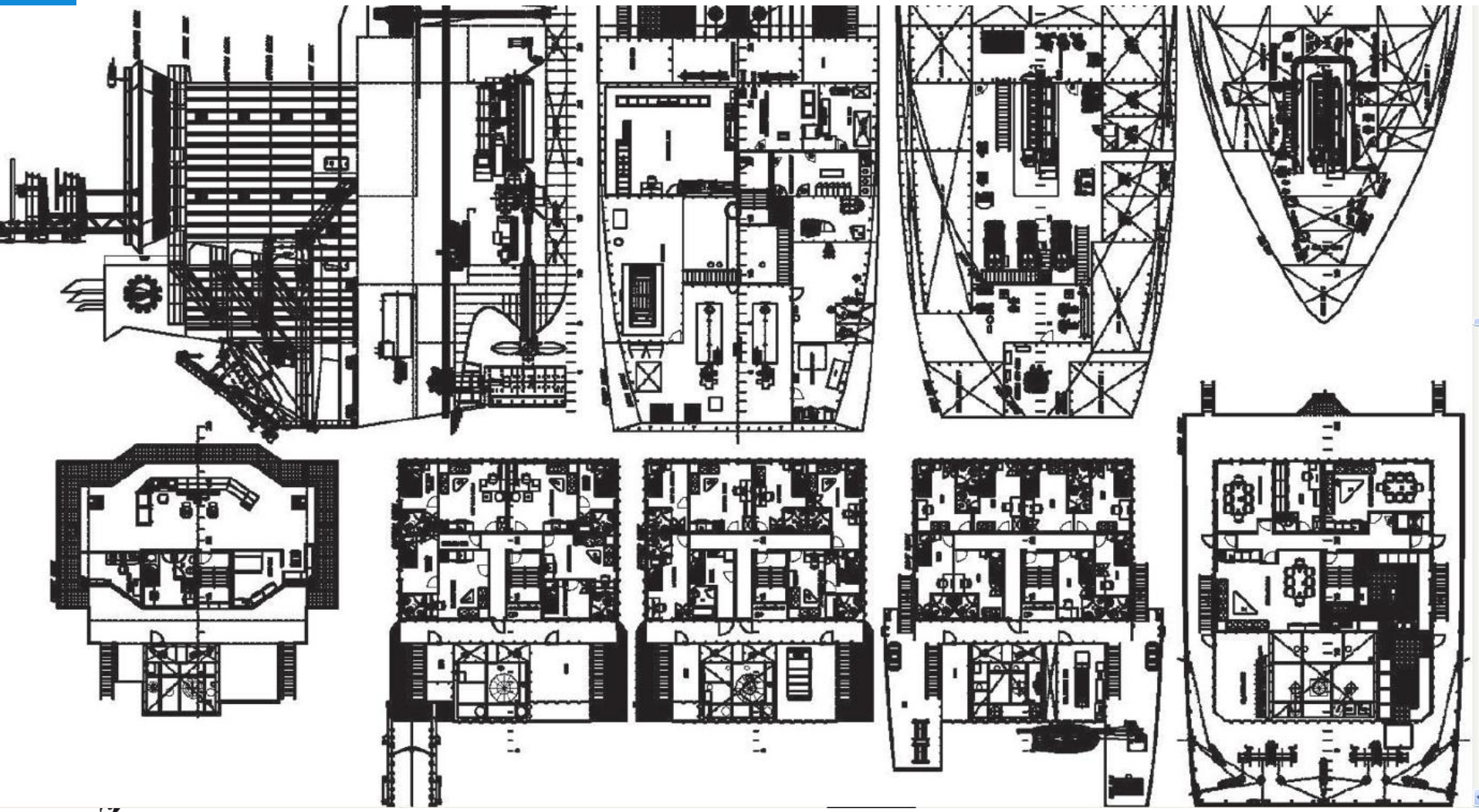
Space allocation Cargo ship

Deckhouse:

- Support of and safe access to wheelhouse / navigation & communication systems with maximum visibility
- Provide comfortable / safe working and hotel facilities for the crew
- Accommodating / access to related systems
- Minimum construction costs
- Easy maintenance

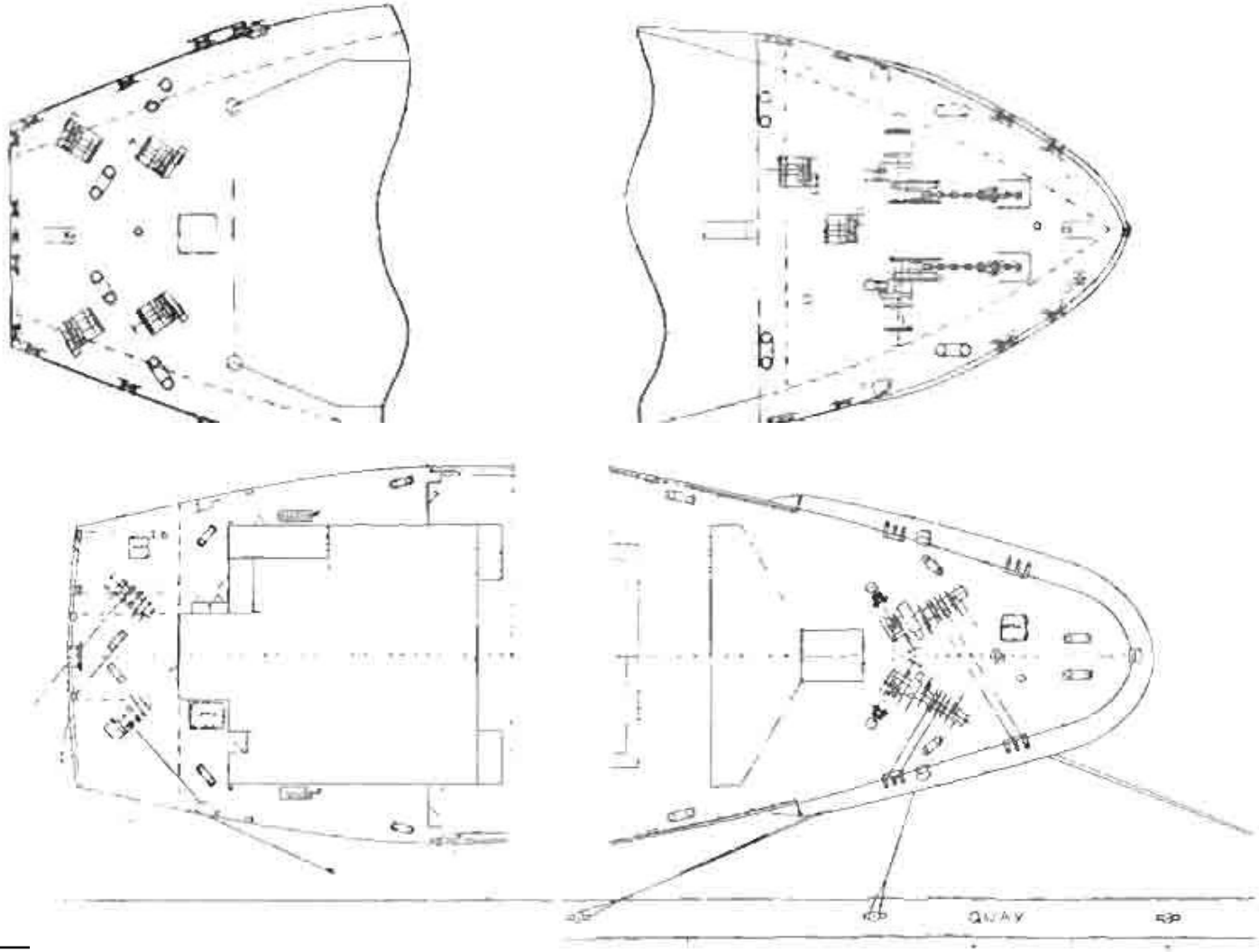


Deck house / work spaces

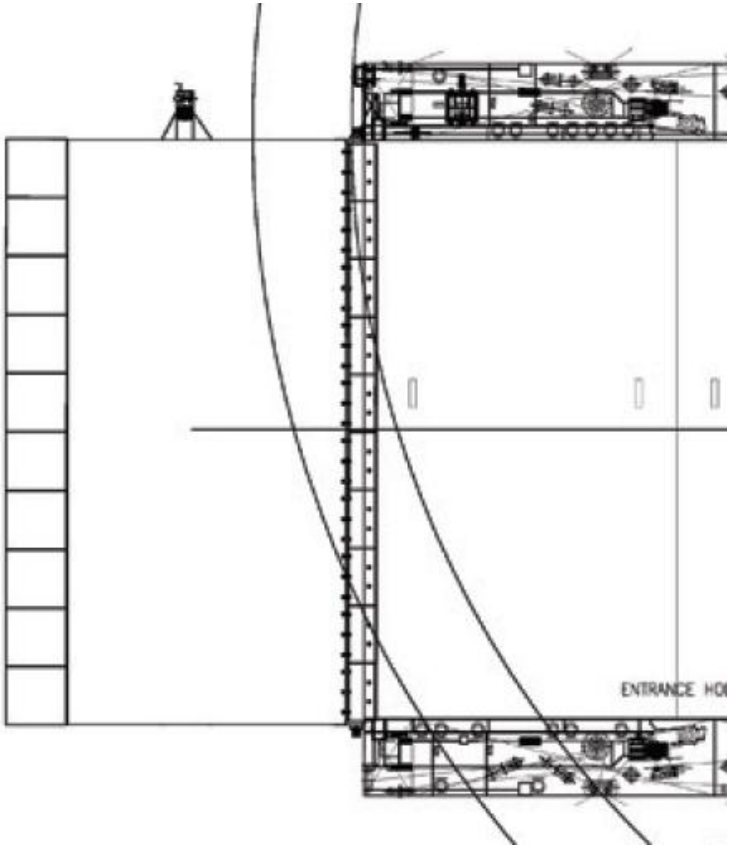


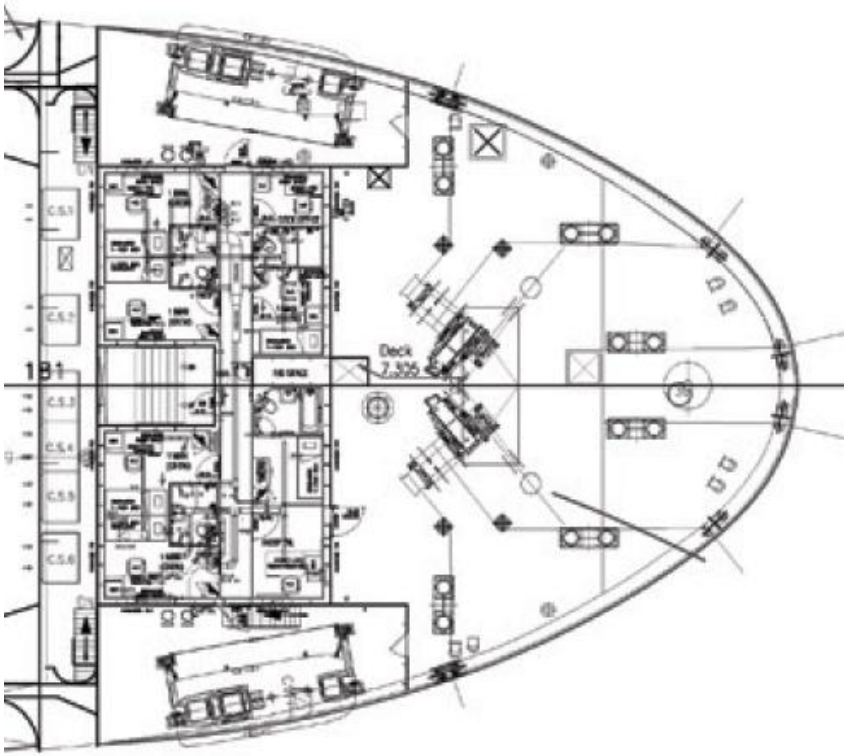
General Arrangement

Mooring arrangements



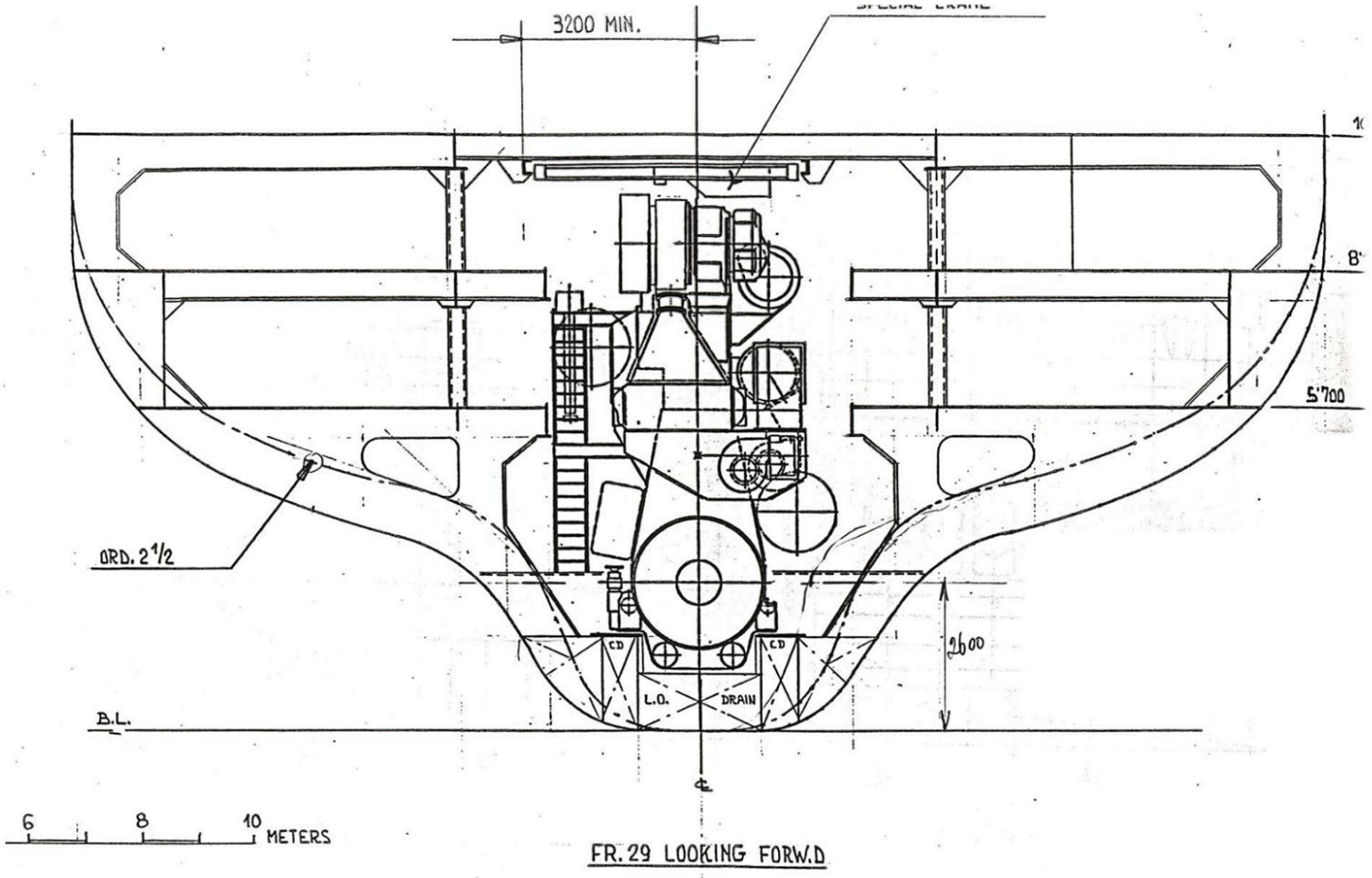
Mooring deck





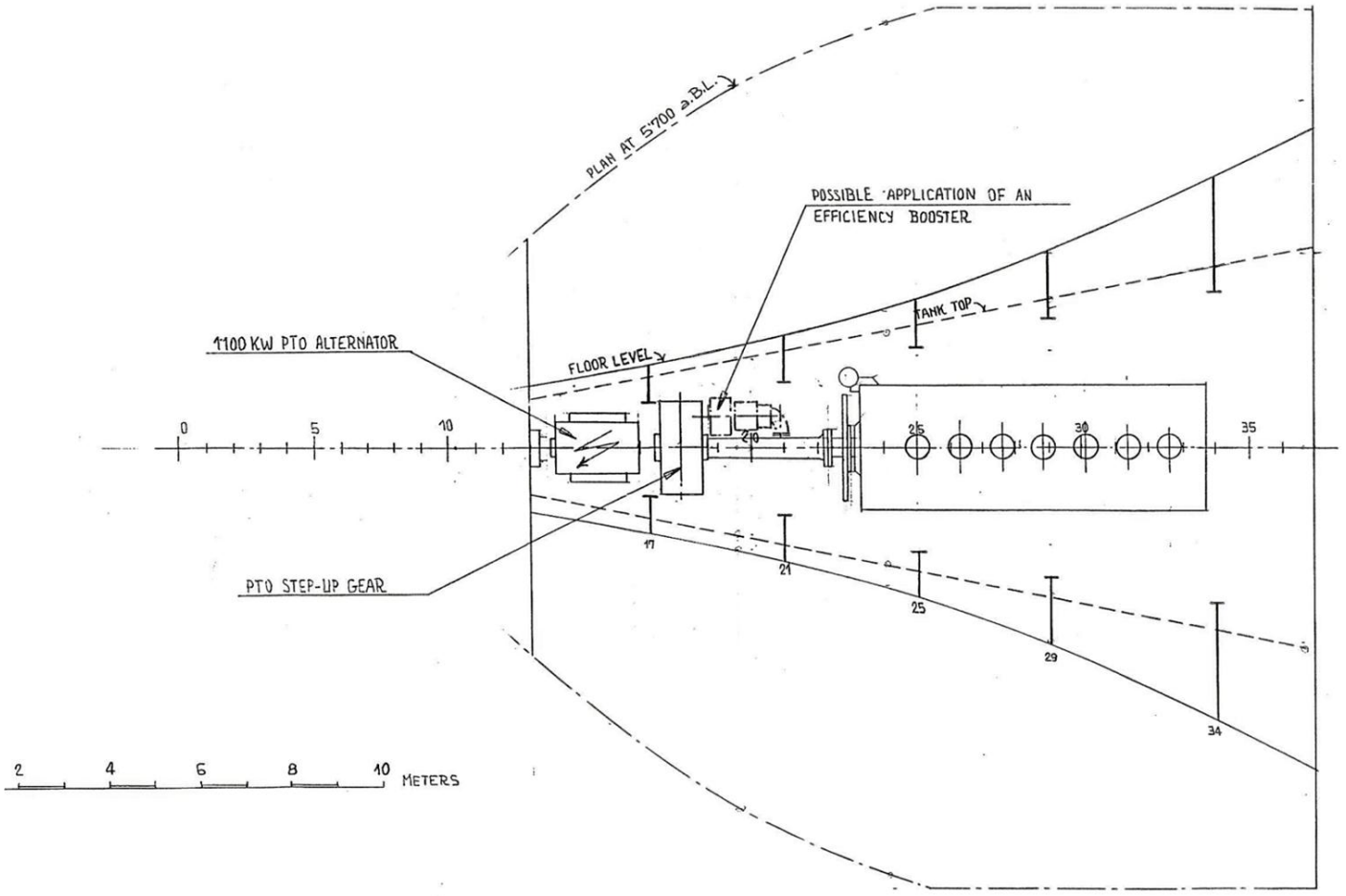
Propulsion system

Cross Section



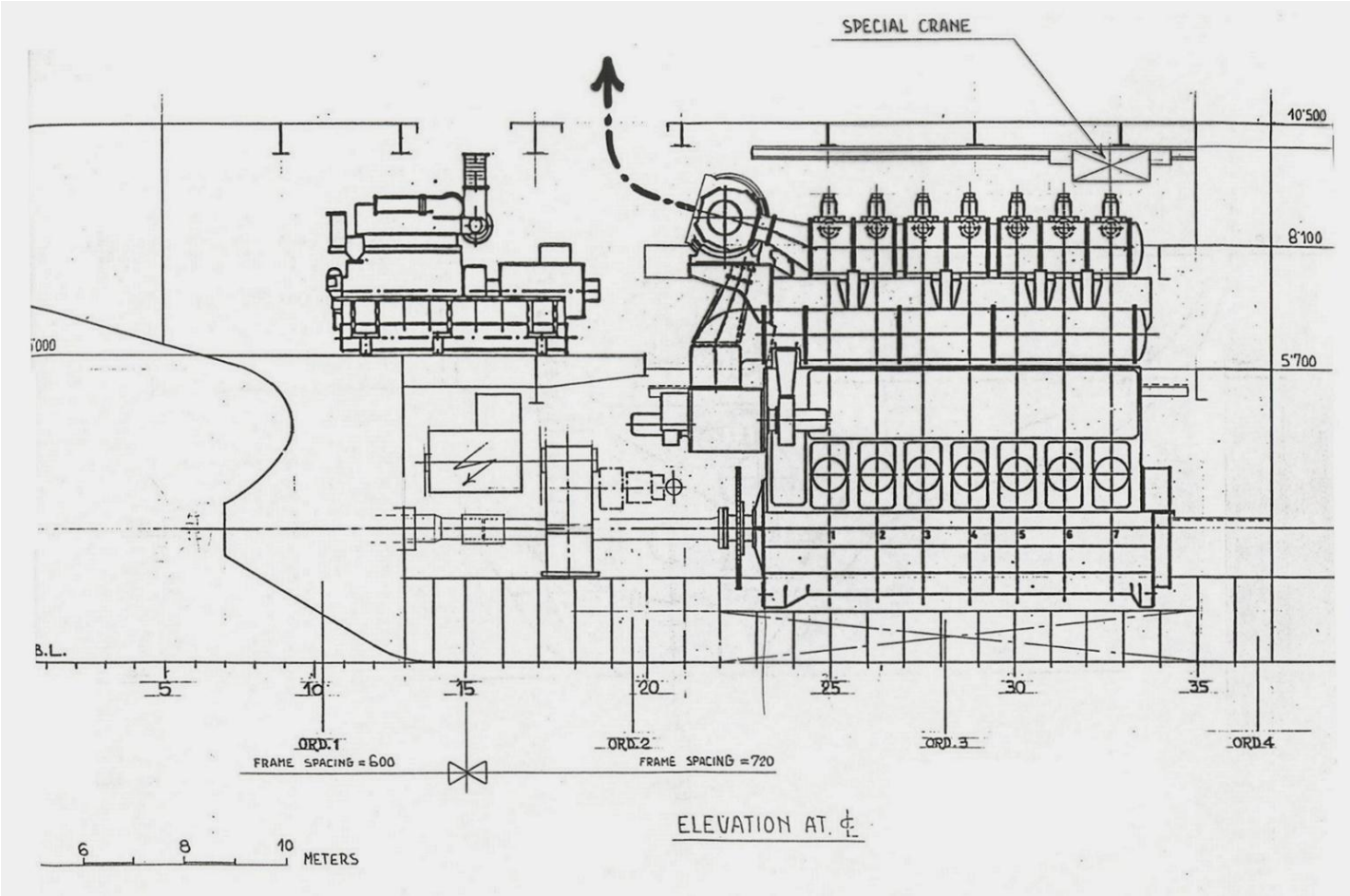
Propulsion system

Longitudinal Section



Propulsion system

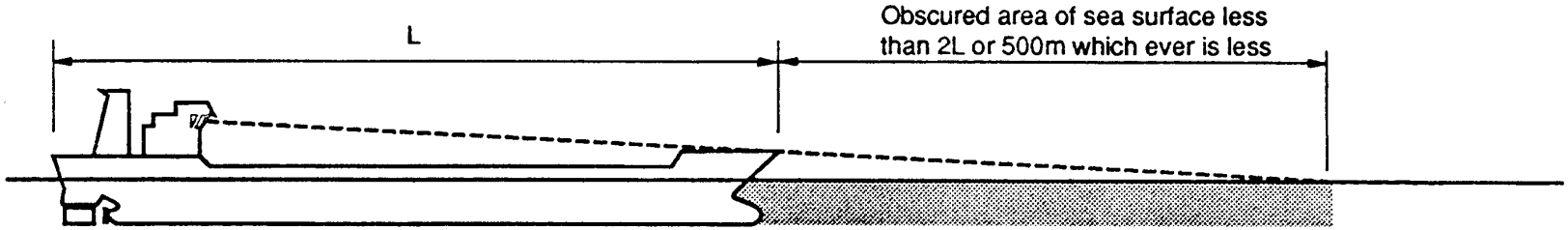
Longitudinal Section



SOLAS

Chapter V – Safety of Navigation

Functional Areas (guidelines IMO MSC 982)
As per 1 July 2002



Ships of not less than 55 m in length, as defined in regulation 2.4, constructed on or after 1 July 1998, shall meet the following requirements:

1. The view of the sea surface from the conning position shall not be obscured by more than two ship lengths, or 500 m, whichever is the less, forward of the bow to 10 degrees on either side under all conditions of draught, trim and deck cargo;

2. No blind sector caused by cargo, cargo gear or other obstructions outside of the wheelhouse forward of the beam which obstructs the view of the sea surface as seen from the conning position, shall exceed 10 degrees. The total arc of blind sectors shall not exceed 20 degrees. The clear sectors between blind sectors shall be at least 5 degrees. However, in the view described in 1, each individual blind sector shall not exceed 5 degrees; The ship's side shall be visible from the bridge wing;

3. The height of the lower edge of the navigation bridge front windows above the bridgedeck shall be kept as low as possible. In no case shall the lower edge present an obstruction to the forward view as described in this regulation;

4. The upper edge of the navigation bridge front windows shall allow a forward view of the horizon, for a person with a height of eye of 1,800 mm above the bridge deck at the conning position, when the ship is pitching in heavy seas. The Administration, if satisfied that a 1,800 mm height of eye is unreasonable and impractical, may allow reduction of the height of eye but not less than 1,600 mm;

SOLAS

Chapter III part B

Part B – Section I
"Passenger ships and Cargo ships"

- **Lifebuoys**
- **Lifejackets**
- **Immersions suits and anti-exposure suits**
- **Survival craft:**
  - **(partly) enclosed lifeboats (free-fall launched)**
  - **Inflatable / rigid life rafts (or Marine Evacuation System)**
    - **Passenger ships: marshalling life rafts by lifeboats/rescue boats**
- **Rescue boat**





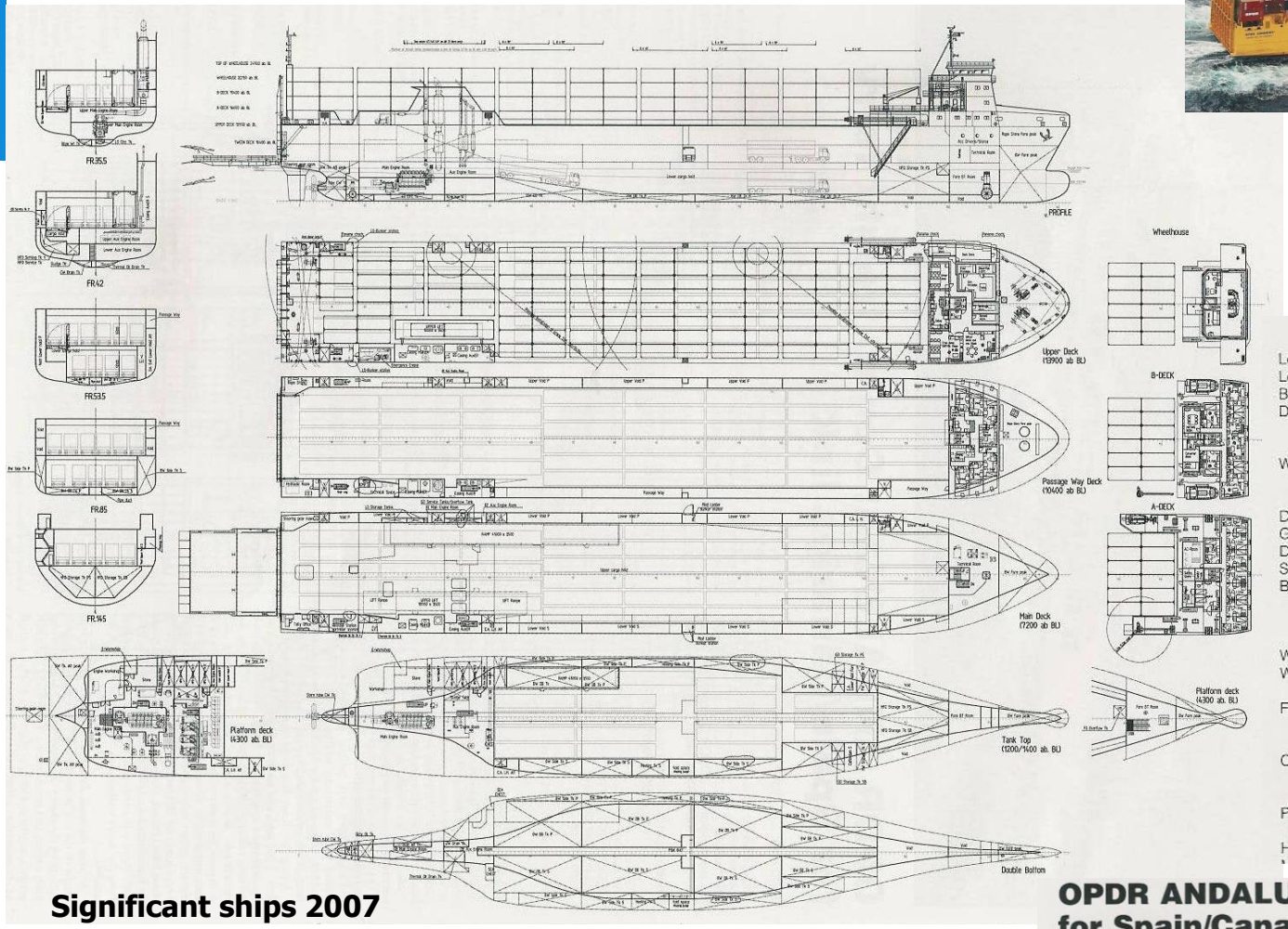



Ro-Ro carrier / ferry design

- Lading rollend (wielen) op en van boord:
  - Capaciteit: aantal voertuigen x standaard maat/gewicht
    - Lane meters x bruto breedte (2,80 – 3,00 m bij vrachtauto's)
    - Belasting: wheel print / axle load
    - Bruto vrije hoogte (ferries: viaducthoogte)
  - "Volumekritisch ontwerp"(~ s.g. lading < 0,77 t/m3)
  - Laad- en losmogelijkheden: stern-, side- en bow-ramps
  - Interne ramps (vast / beweegbaar (helling ca. 1:10)); liften
  - Extra ruimte ventilatie: 10 (op zee) – 20 (in haven) luchtwisselingen
  - Stabiliteitseisen!
- Typen:
  - Ro-Ro carriers (Con-Ro carrier)
  - Ro-Ro passenger ferries (RoPax) / cruise ferries
  - Car carrier
  - Train ferry

Ro-Ro vessels

RoRo carrier (Con-Ro)



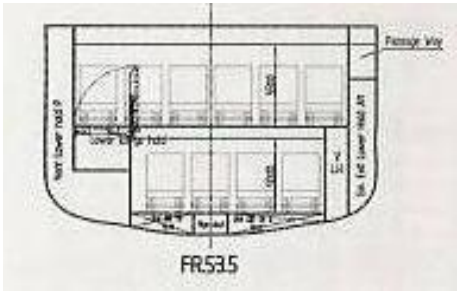
TECHNICAL PARTICULARS

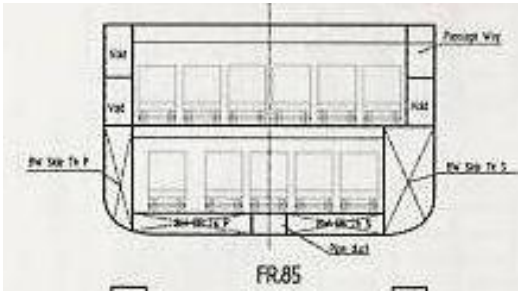
Length, oa	145.00m
Length, bp	136.70m
Breadth, moulded	22.00m
Depth, moulded	
to main deck	7.20m
to upper deck	13.90m
Width of double skin	
side	1.88m/3.40m
bottom	1.40m
Draught	6.00m
Gross	11,250gt
Deadweight	7239dwt
Speed, service (90% MCR, 15% sea margin)	16.40knots
Bunkers	
heavy oil (including service tanks)	768m³
heavy oil (no service tanks)	690m³
gas oil	108m³
Water ballast	4320m³
Water ballast carried in loaded condition	
arrival/departure	1250m³/480m³
Fuel consumption	
main engine only	23tonnes/day
auxiliaries	6tonnes/day
Classification	Germanischer Lloyd, + 100 A5 E, IW, BWM, RoRo Vessel, Equipped for Carriage of Containers, SOLAS II-2 Reg 19, + MC E, AUT
Percentage of high tensile steel used in construction	approx 30%
Heel control equipment	Cramer-S, 2 x 500m³/h pumps

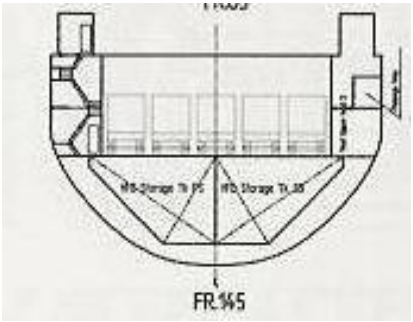
Significant ships 2007

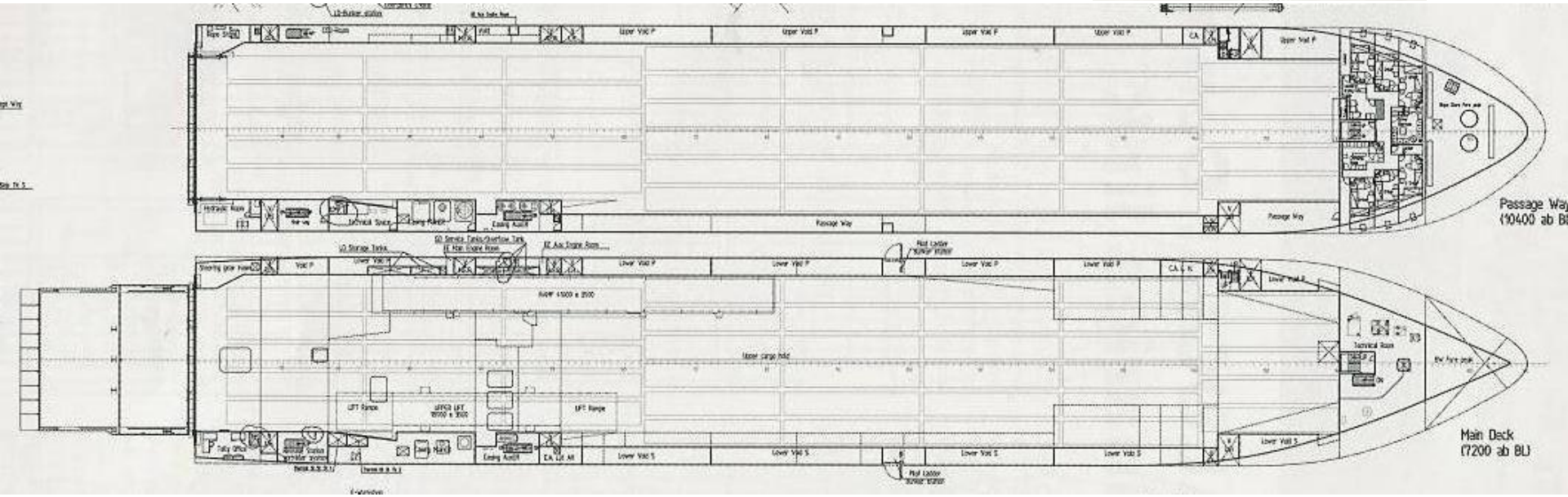
OPDR ANDALUCIA: Con-ro freight ferry for Spain/Canaries link

RoRo carrier (2)





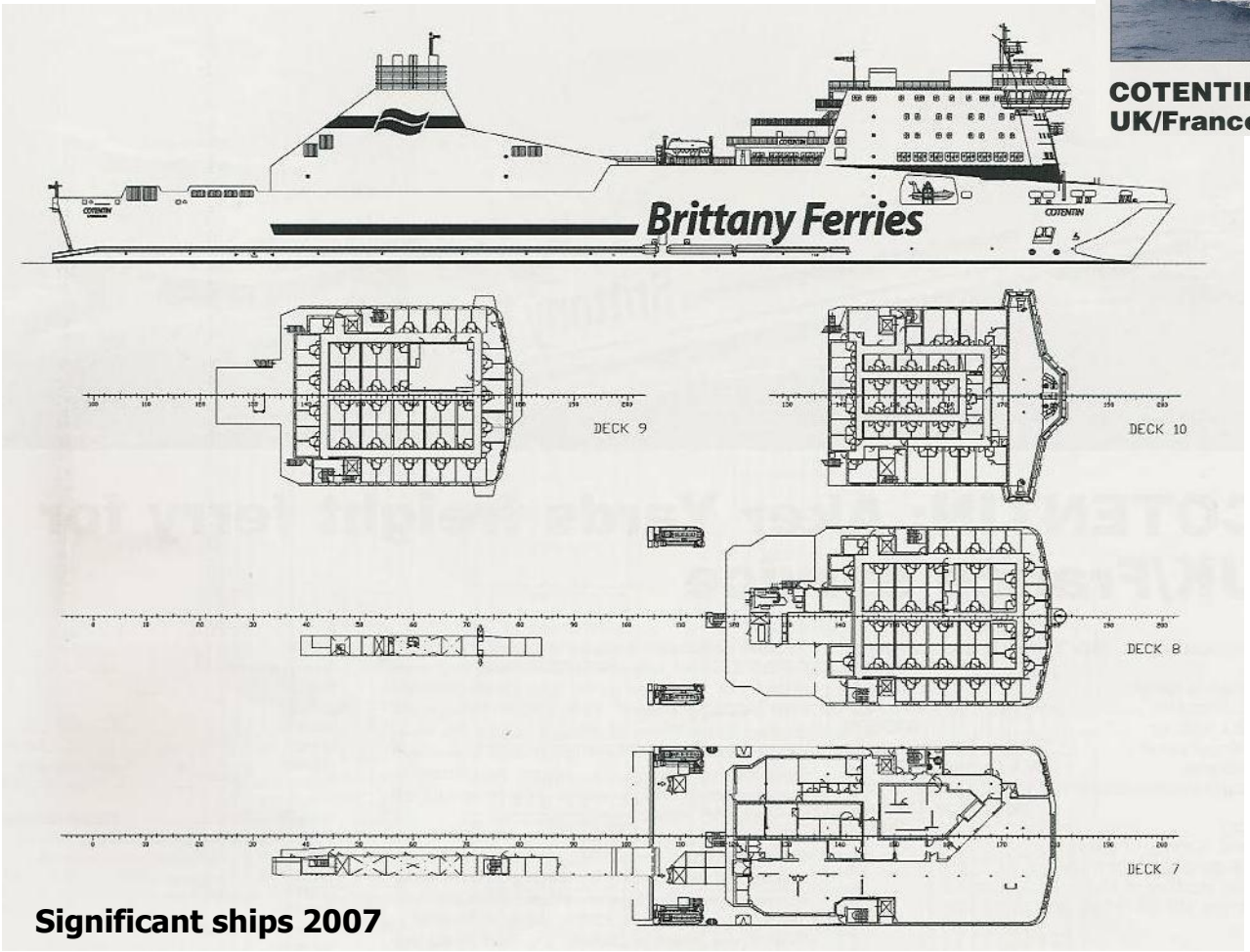




Significant ships 2007

RoRo freight ferry

COTENTIN: Aker Yards freight ferry for UK/France service



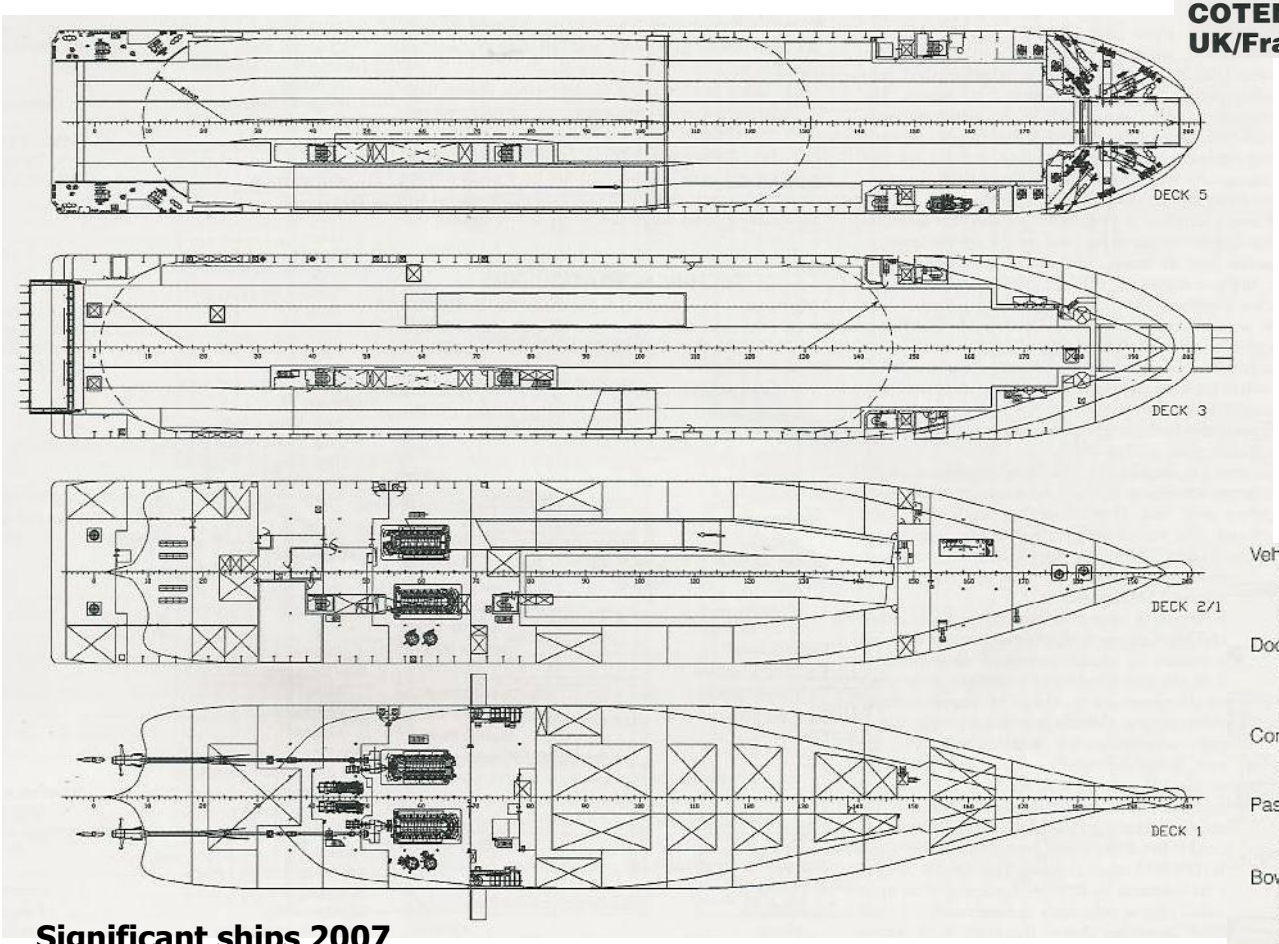
Significant ships 2007

TECHNICAL PARTICULARS

Length, oa	168.00m
Length, bp	155.00m
Breadth, moulded	26.80m
Depth, moulded	
to upper deck	15.60m
to main deck	9.30m
Draught	
design	6.30m
scantling	6.50m
Gross	22,532gt
Deadweight	
design	6200dwt
Speed, service, at 85% MCR	23.00knots
Bunkers	
heavy oil	approx 600m³
diesel oil	approx 130m³
Water ballast	approx 2000m³
Fuel consumption	
main engines	approx 65tonnes/day
auxiliaries	approx 4tonnes/day
Classification	Bureau Veritas I +Hull, RO-RO Passenger Ship, Unrestricted Navigation, + MACH, + AUT-IMS, + AUT-PORT, SYSNEQ-1, MON-SHAFT
Heel control equipment	Heeling tanks with Frank Mohn pumps
Roll stabilisation equipment	Blohm + Voss Industries fins
Main engines	
Design	MaK
Model	12VM43C
Manufacturer	Caterpillar Motoren GmbH

RoRo freight ferry (2)

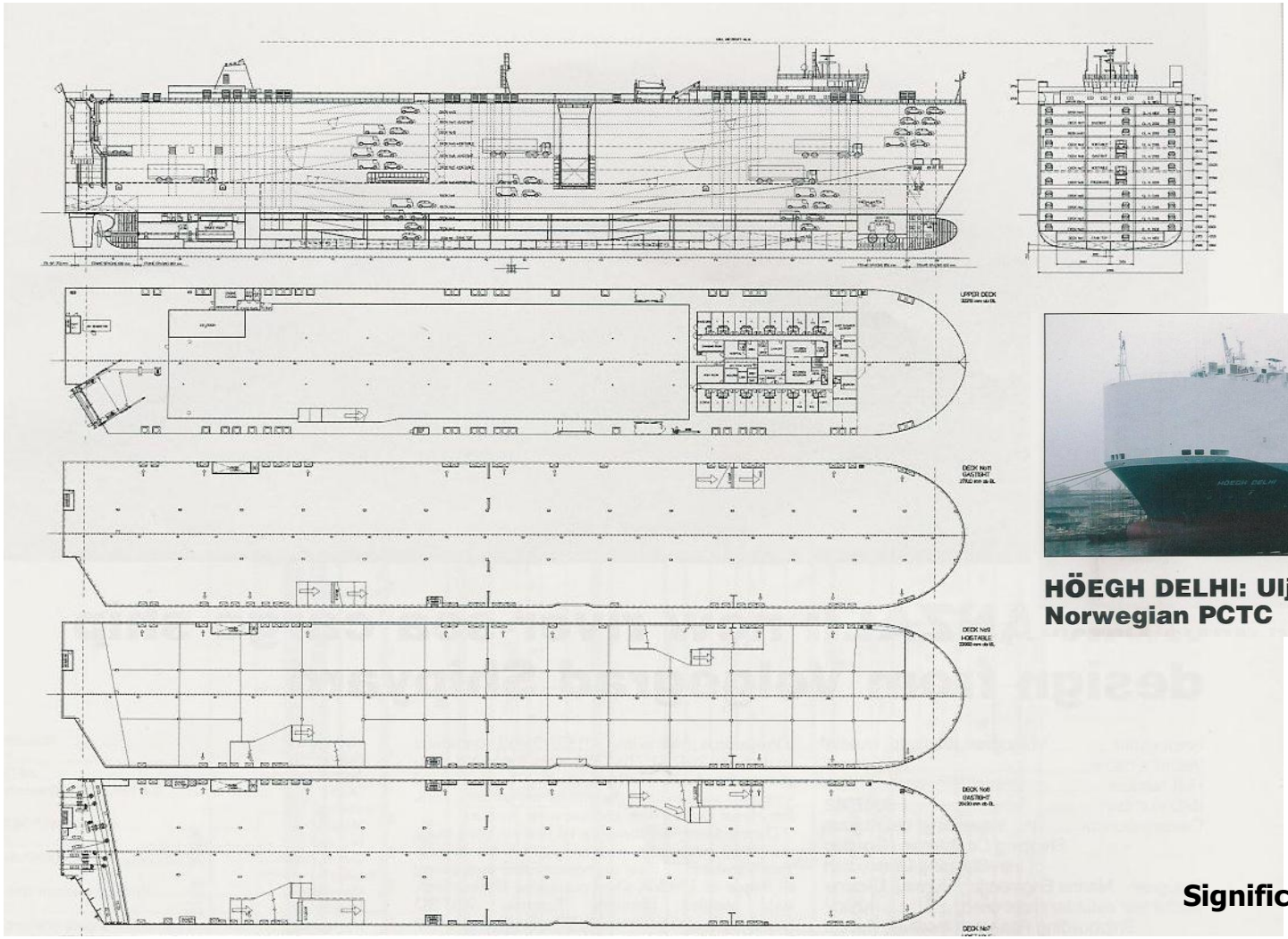
COTENTIN: Aker Yards freight ferry for UK/France service



Vehicles	
Number of decks	3
Total lane metres	2200m
Total freight vehicles	120
Doors/ramps	
Number/type	1 x bow door/ramp; 1 x stern door/ramp; 1 x tiltable ramp; 1 x gas tight door
Designer	MacGregor
Complement	
Officers	17
Crew	26
Passengers	
Total	160
Cabins	121
Bow thrusters	
Make	Wärtsilä
Number	2

Significant ships 2007

Car / truck carrier



HÖEGH DELHI: Uljanik-built 7094-unit Norwegian PCTC

Significant ships 2007

Car / truck carrier

Höegh Delhi finds a place in this *Significant Ships* review as one of the current 'world's largest' newly built pure car/truck carriers (PCTC), although larger capacity vessels are being delivered, and others have been enlarged whilst in service. The increase in the number of vehicles carried by this Uljanik design, compared with earlier types, has been achieved mainly by internal structural 'tweaking,' since the overall configuration conforms largely to the proven layout, established over the years, to allow the maximum intake of manufacturers' standard sizes of vehicle to be carried. *Höegh Delhi's* total capacity of 7094 is related to cars of dimensions 4.125m x 1.550m, and stowage clearances between units of 300mm longitudinally and 100mm in width.

Vehicles are carried on 12 continuous decks, two of which (7 and 9) are hoistable. Access is at deck 6, either over a stern quarter, combined ramp and weathertight steel hinged door, 10.1m x 5.1m x 32.2m long with a 100tonne swl capacity, or via a midships ramp, also combined with a weathertight steel door, 6.5m x 5.5m x 22m long, 20tonnes swl capacity, which can be adjusted to two working levels (decks 6 and 7) by means of jigger winches. Both ramps are on the starboard side and are operated hydraulically from deck-mounted pedestals.

HÖEGH DELHI: Uljanik-built 7094-unit Norwegian PCTC

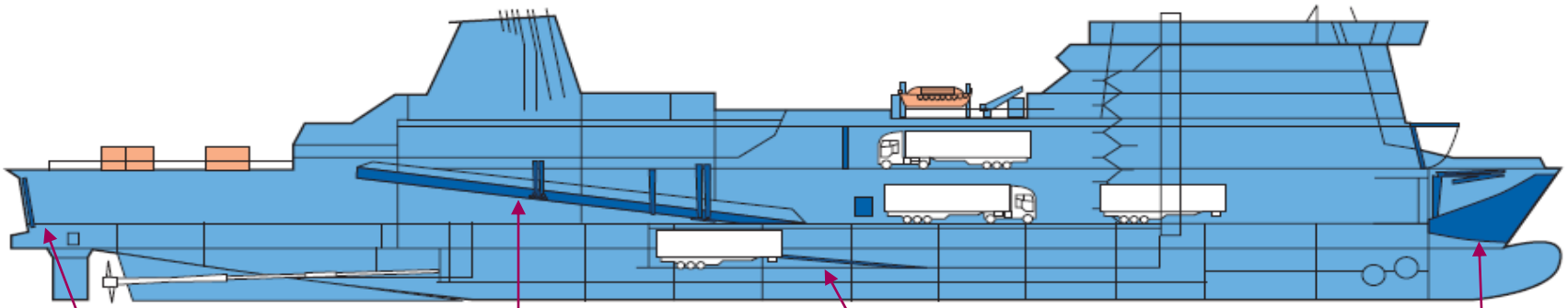
Internal movement between the vehicle decks is by means of fixed and hoistable ramps, 3.25m wide and maximum inclination 13deg.

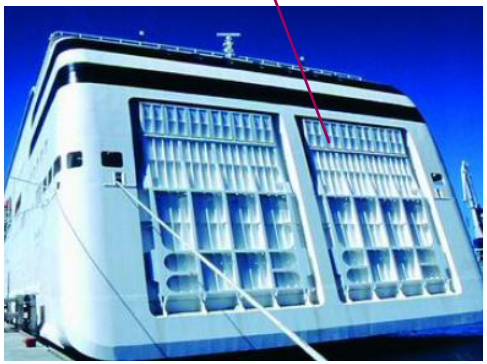
Longitudinal framing combined with two rows of pillars provides structural strength in the cargo spaces, with transverse frames elsewhere. The cargo spaces are divided into four zones for mechanical ventilation purposes, and a low pressure CO_2 fire extinguishing system is installed, with similar cover provided for the engineroom. Accommodation for 26 crew plus supernumaries is arranged in a deckhouse on the superstructure deck, at the aft end of which a freefall lifeboat slipway is installed.

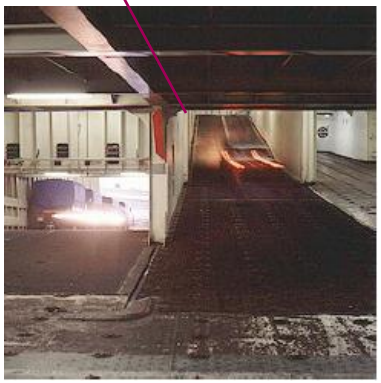
Significant ships 2007

General arrangement

RoRo equipment

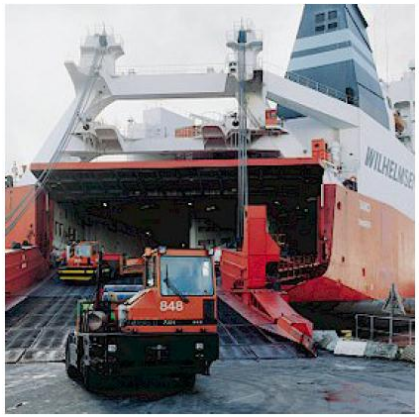


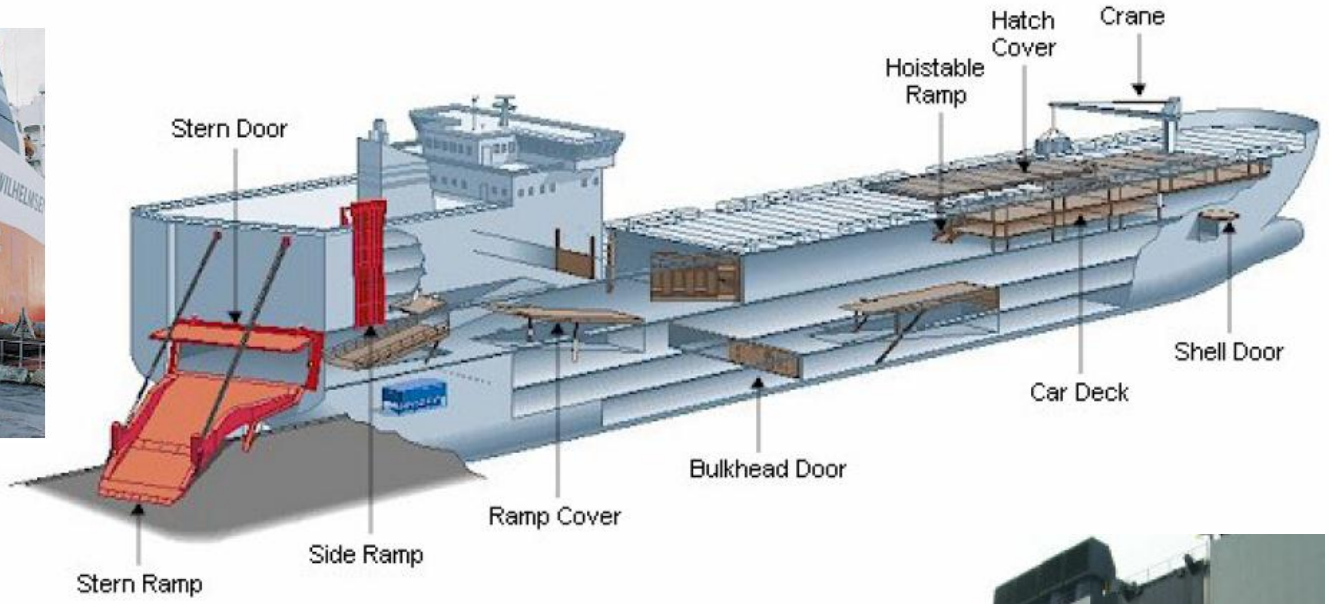


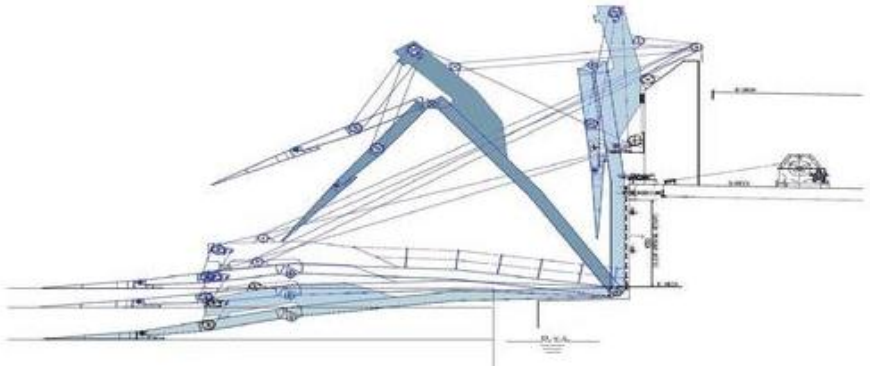


General arrangement

RoRo equipment – external ramps





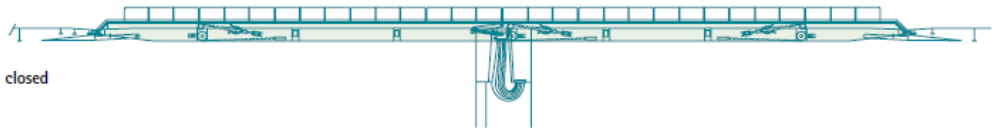


General arrangement

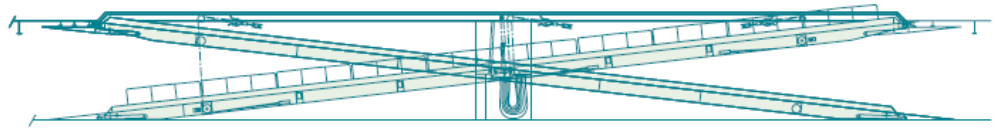
RoRo equipment – internal ramps

Examples of normal maximum slope for different types of vehicles are:

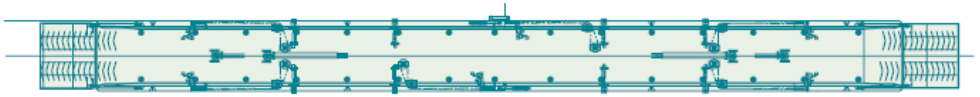
- private cars 8-9.5 deg (1:6)
- trailers 7.1 deg (1:8)
- translifters 5.7 deg (1:10), etc.

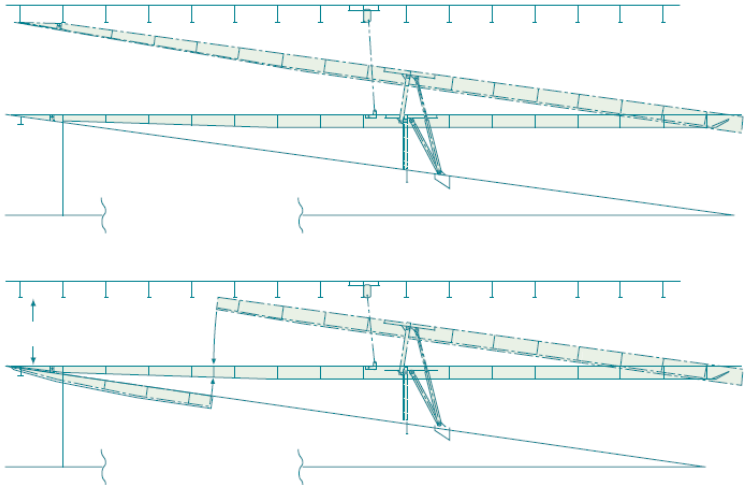


closed



open – either for or aft

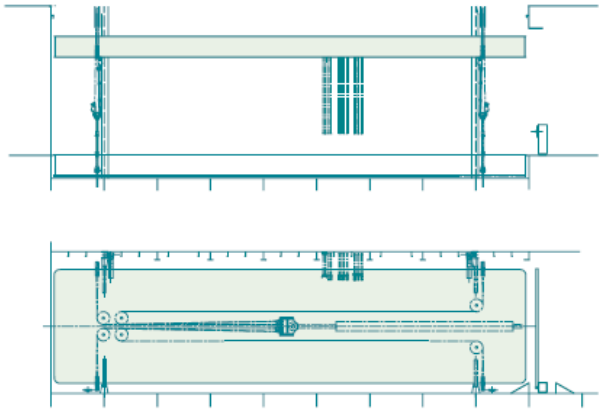




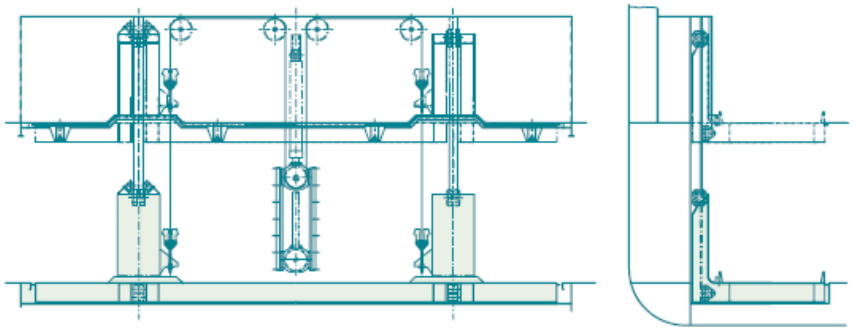
Tailor-made ramp cover showing split operation

General arrangement

RoRo equipment - elevators



View of the 4-point lift with jigger winch incorporated into the steel structured platform



View of the L-lift with jigger winch and guiding, installed in ship's hull

Side door pallet elevator

Scissors elevator

General arrangement

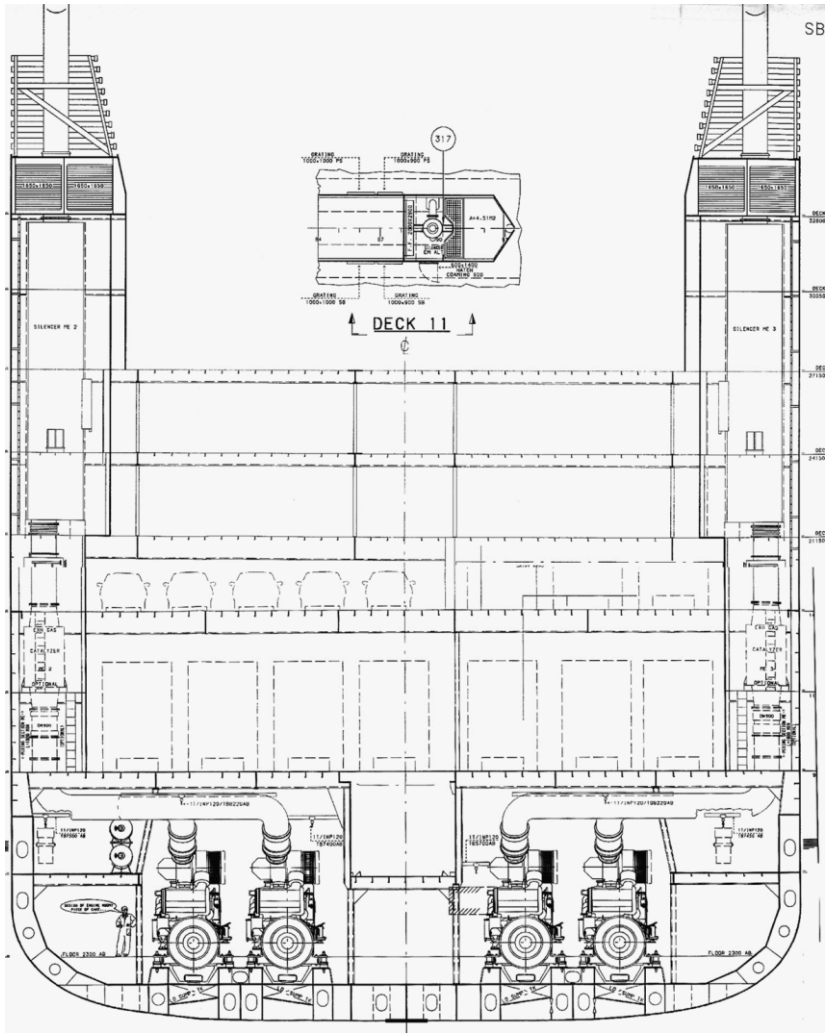
RoRo equipment – movable car decks

Liftable car decks

Hoistable car decks

Propulsion system

Exhaust systems Air inlets /-outlets



Container ship design

- Lading in containers (standaardafmetingen)
- Lift-on – lift off / luiken
- Capaciteit: aantal TEU (20’ equivalent)
  - Soorten containers (20’, 40’, 45’, high cubed, etc.) reefers (E-power!)
  - Aantal posities (incl. transport lege containers)/
  - Aantal homogeen beladen (a 14 ton/TEU);
- “Volumekritisch ontwerp” (~ s.g. lading < 0,77 t/m3)
- Ballastwater t.b.v. maximaliseren TEU-capaciteit
- Constructie: torsie > box girders
- Soms eigen laad- en losgerei (kranen)

Container Ship Evolution

Container ships today

Type of container vessel	Dimensions	Ship size, max. number of teu capacity
Small Ship breadth up to	Approx. 23.0 m	**Up to 1,000 teu**
Feeder Ship breadth	Approx. 23.0 - 30.2 m	**1,000 - 2,800 teu**
Panamax (existing) Ship breadth equal to Ship draught, tropical freshwater, up to Overall ship length, up to	**Max.** 32.2 - 32.3 m (106 ft.) 12.04 m (39.5 ft.) 294.1 m (965 ft.)	**2,800 - 5,100 teu**
Post-Panamax (existing) Ship breadth larger than 32.3 m	Approx. 39.8 - 45.6 m	**5,500 - 10,000 teu**
New Panamax Ship breadth, up to Ship draught, tropical freshwater, up to Overall ship length, up to	**Max.** 48.8 m (160 ft.) 15.2 m (50 ft.) 365.8 m (1,200 ft.)	**12,000 - 14,500 teu**
ULCV (Ultra Large Container Vessel) Ship breadth	More than 48.8 m	**More than 14,500 teu**

Containers

Types & Dimensions (ISO since 1964)

20’x8’x8’ / 20’x8’x8’6”

40’x8’x8’,6”

40’x8’x9’6” (high cubed)

Freight containers A, B, C, D etc. are 8' high. If the containers are 8'6" high, the letters are doubled to give AA, BB, CC, DD, for example.

Container dimensions as stipulated in DIN/ISO 668 or DIN 15190, Part 1

Desig-nation	Length			Height			Width			Maximum gross weight	
	mm	ft	in	mm	ft	in	mm	ft	in	kg	lb
1A	12,192	40		2,438	8		2,438	8		30,480	67,200
1AA	12,192	40		2,591	8	6	2,438	8		30,480	67,200
1B	9,125	29	11¼	2,438	8		2,438	8		25,400	56,000
1BB	9,125	29	11¼	2,591	8	6	2,438	8		25,400	56,000
1C	6,058	19	11¼	2,438	8		2,438	8		20,320	44,800
1CC	6,058	19	11¼	2,591	8	6	2,438	8		20,320	44,800
1D	2,991	9	9¾	2,438	8		2,438	8		10,160	22,400
1E	1,968	6	5½	2,438	8		2,438	8		7,110	15,700
1F	1,460	4	9½	2,438	8		2,438	8		5,080	11,200

For detailed information on containers, see:
www.containerhandbuch.de

Containers

Types & Dimensions (2)

20’ liquid

45’

40’
Open top

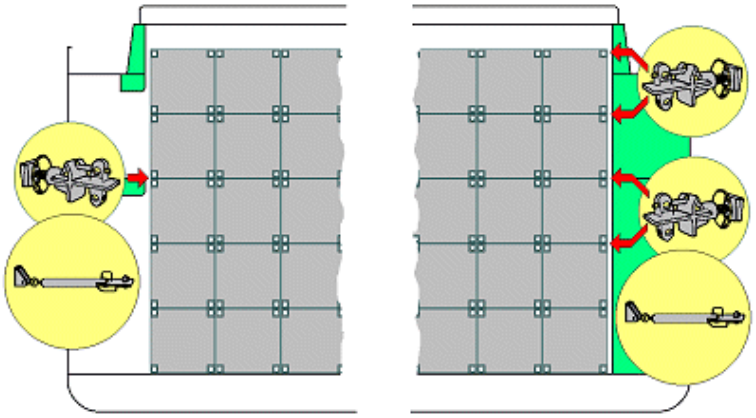
40’ reefer

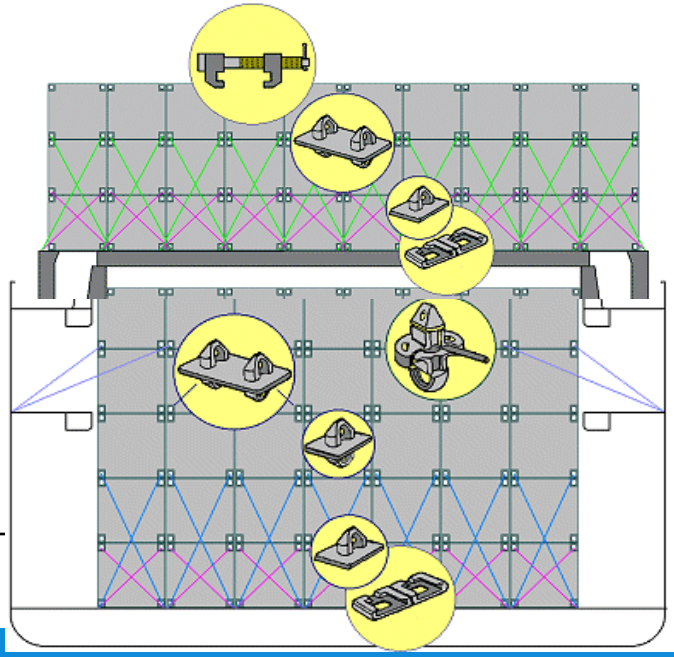
49’

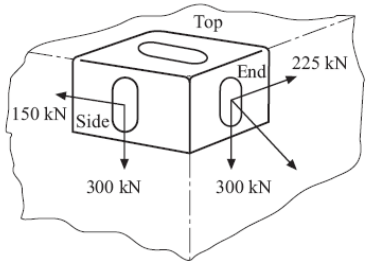
53’

Containers

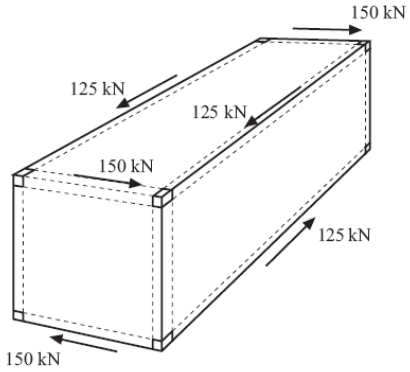
Lashings (2)



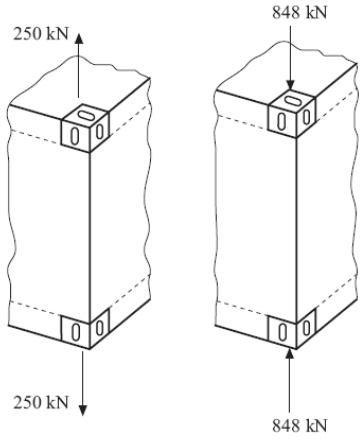




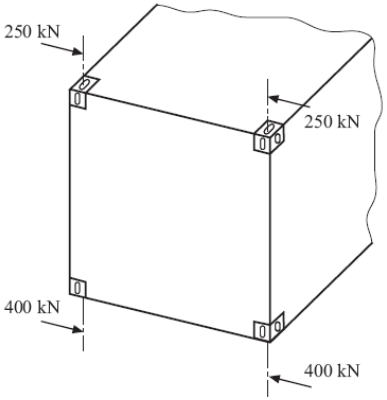
a) Corner casting lashing loads



b) Racking loads



c) Max. vertical corner lifting and compressive forces



d) Transverse compressive forces

Containers

Cargo systems

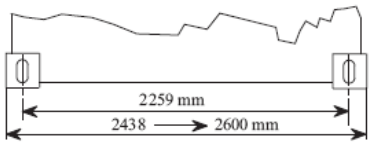
Containers

Types & Dimensions (3)

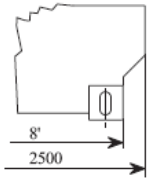
Größe	Länge (Seitenansicht)	Breite	Höhe
53' (16150 mm)		8' 6" (2591 mm)	9' 6 1/2"
49' (14935 mm)		2600 mm	9' 6" 2896 mm
2x24 1/2' (2x7442 mm)	51	2600 mm	9' 6" 2896 mm
48' (14630 mm)		8' 6" (2591 mm)	9' 6 1/2"
45' (13720 mm)		8' (2438 mm)	9' 6" 9' 6 1/2"
43' (13103 mm)		8' (2438 mm)	
40' ISO (12192 mm)		8' (2438 mm)	8' 9' 8' 6" 9' 6"
40' EURO (12192 mm)	*	2500 mm	8' 6" 9' 6"

40' Bell Lines (12192 mm)	*	2500 mm	
35' (10660 mm)		8' (2438 mm)	8' 6"
30' (9125 mm)		8' (2438 mm)	8' 8' 6"
24' (Matson) (7430 mm)		8' od. 8' 6" (2438 mm or 2591 mm)	8' 6" 9' 6"
2x20' (2x6058 mm)	76	8' (2438mm)	8' 8' 6" 9' 6"

Common for all containers in the transverse measure from center to center point of the holes of corner castings ≙ 2259 mm



* to EURO-/ "Bell Lines"-Container view on top

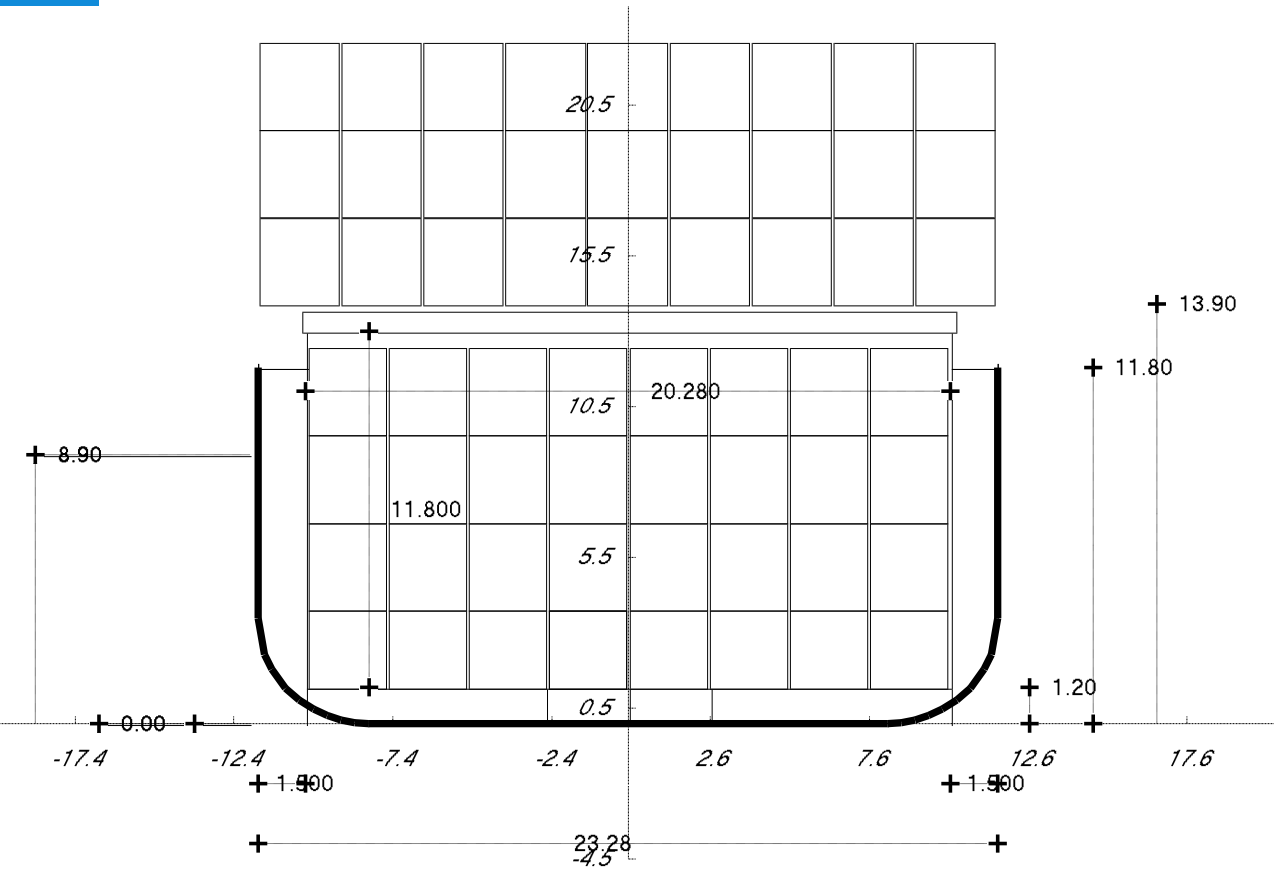


The dimensions of the non-ISO-standardized containersizes are preliminary.

Ship Design

TEU capacity

- Breadth = n rows• TEU + 2•side construction
- Depth = m tiers • TEU + Hdb + hatch cover + margin-walking height



Height of double bottom according LRS:

$H_{db} = 28 \cdot B + 205 \cdot \sqrt{T}$ (mm)

Height of double bottom according DNV:

$H_{db} = 250 + 20 \cdot B + 50 \cdot T$ (mm)

with minimum 650 mm

B = breadth (m)

T = draught (m)

In engineroom + 45% (with sump)

In engineroom + 30% (without sump)

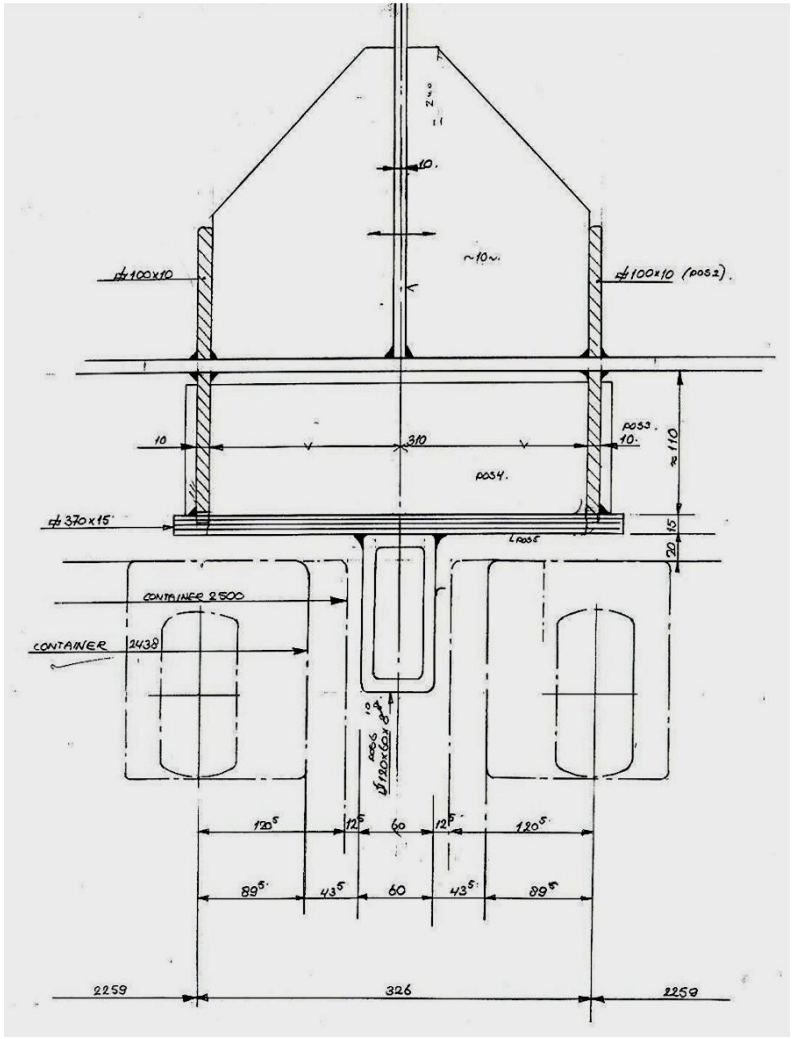
TEU Cell Guides

Typical margins inner cell guide dimensions:

- Longitudinally: 38 mm
- Transversally: 25 mm

Example:

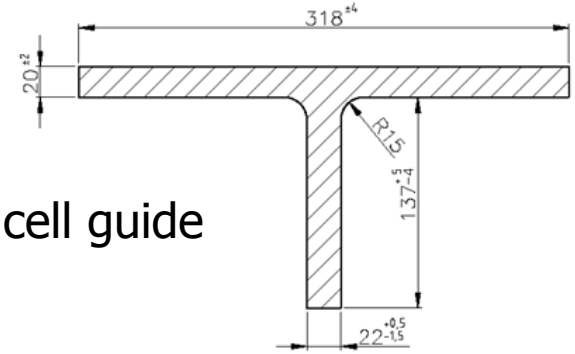
- Cell guide: 60x120x10 mm
- Distance between containers of 2500mm wide:
  85 mm (margin 12.5 mm)
- Distance between containers of 2438 mm wide:
  147 mm (margin 43.5 mm)
- hartafstand naaste rijen: 326 mm
- hartafstand rijen: 2259 mm



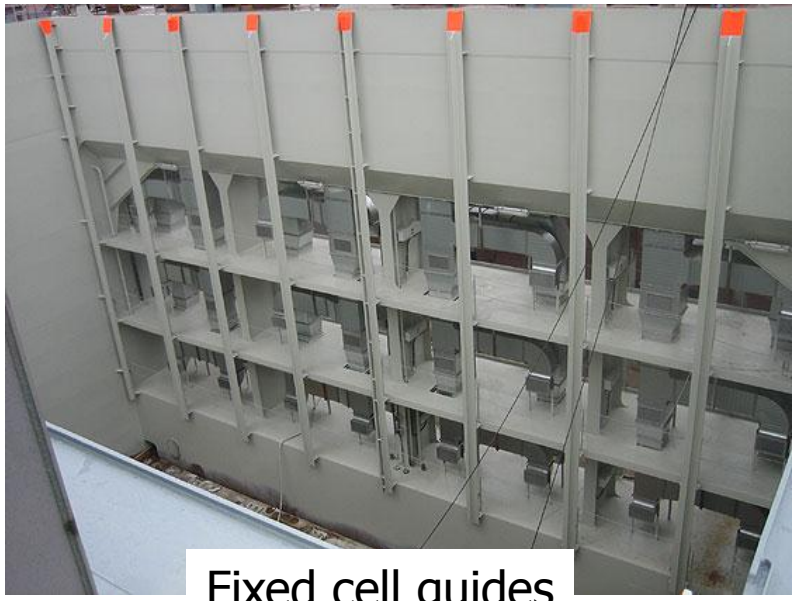
Top view container cell guide

Ship Design

TEU Cell Guides (2)



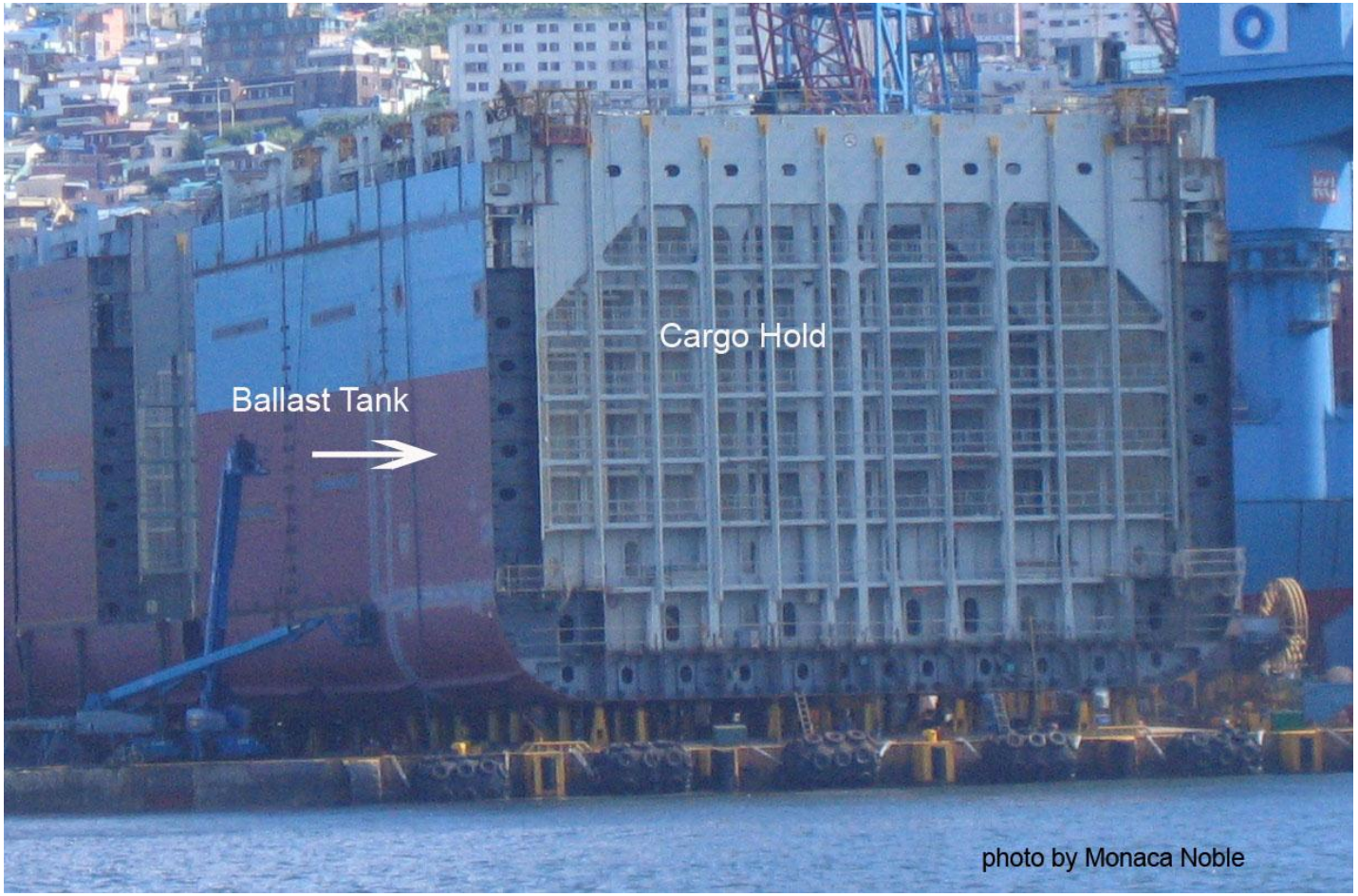
Standard cell guide



Fixed cell guides

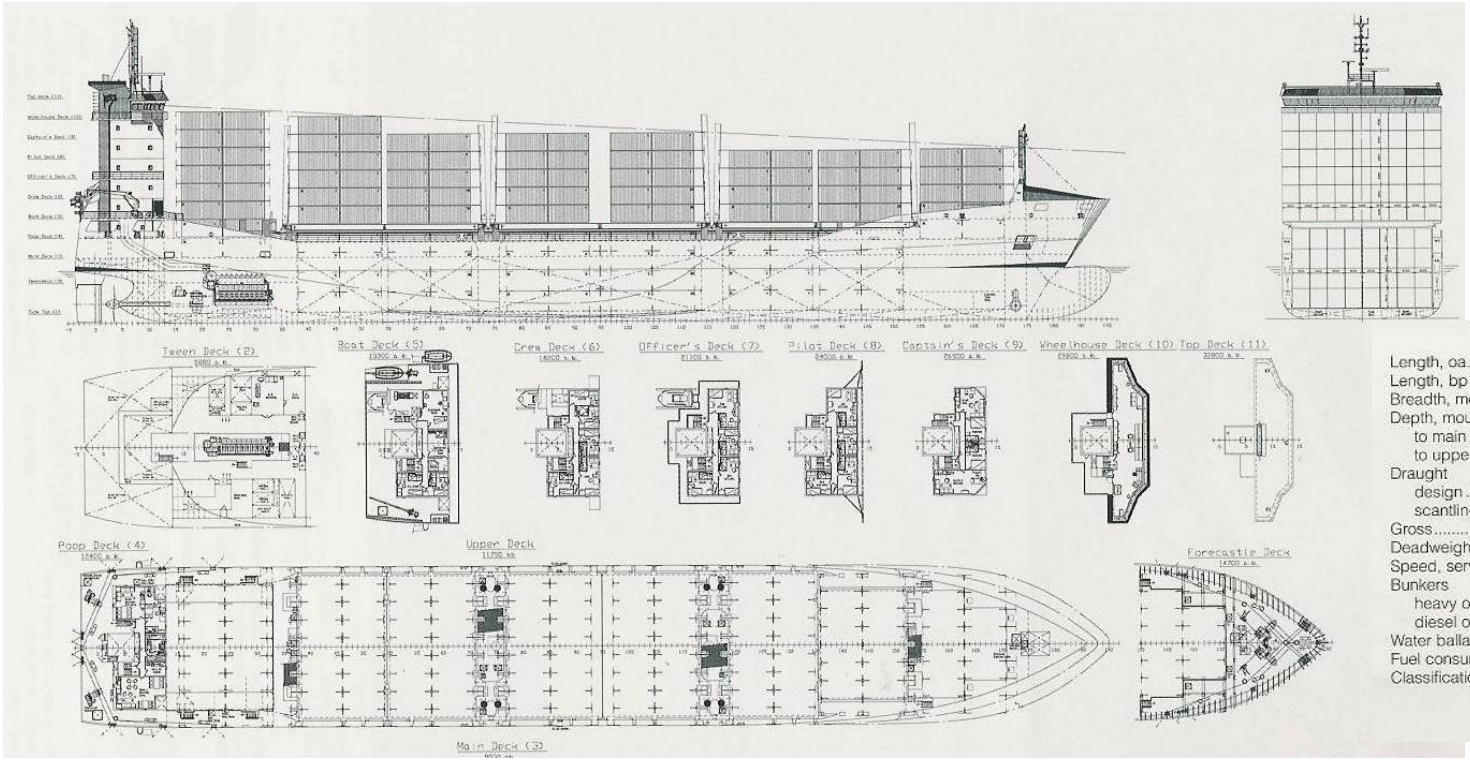
Movable cell guides

Dwarsdoorsnede t.p.v. cell guides



Container Ship Evolution

1036 TEU Feeder



TECHNICAL PARTICULARS

Length, oa	approx 151.72m
Length, bp	approx 142.35m
Breadth, moulded	23.40m
Depth, moulded	
to main deck	9.50m
to upper deck	11.75m
Draught	
design	7.60m
scantling	8.00m
Gross	10,371gt
Deadweight (8.00m draught)	13,030dwt
Speed, service, 85% MCR	18.50knots
Bunkers	
heavy oil	1036m³
diesel oil	138m³
Water ballast	5000m³
Fuel consumption, main engine only	36tonnes/day
Classification	Bureau Veritas, 1 + Hull + Mach, Container Ship, Unrestricted Navigation, + AUT-UMS, IWS, Finnish-Swedish Ice Class 1A ('Comfort Class' notation pending)

Container / multi purpose cargo ship

TECHNICAL PARTICULARS

Length, oa	207.30m
Length, bp	191.10m
Breadth, moulded	32.24m
Depth, moulded to main deck	18.70m
Width of double skin	
side	1.97m
bottom	1.73m
Draught	
design	10.50m
scantling	12.15m
Gross	33,000gt
Deadweight	
design	27,984dwt
scantling	37,212dwt
Service speed, 90% MCR	22.40knots
Cargo capacity	
bale	55,177m³
grain	60,276m³
Bunkers	
heavy oil	3820m³
diesel oil	287m³
Water ballast	13,878m³
Water ballast carried in loaded (container) condition	4545tonnes
Fuel consumption	
main engine only	99tonnes/day

CALA PANCALDO: Szczecinska-built multi-purpose cargo ship

THE Szczecinska shipyard has a long-held reputation for the development of innovative cargo ship designs, and this new B178-III series, of which *Cala Pancaldo* is the prototype, continues this tradition. The layout offers five cargo holds within a double-skin hull, each of which is fitted with cell guides suitable for 20ft/40ft containers, with arrangements allowing 45ft/49ft containers to be carried on deck.

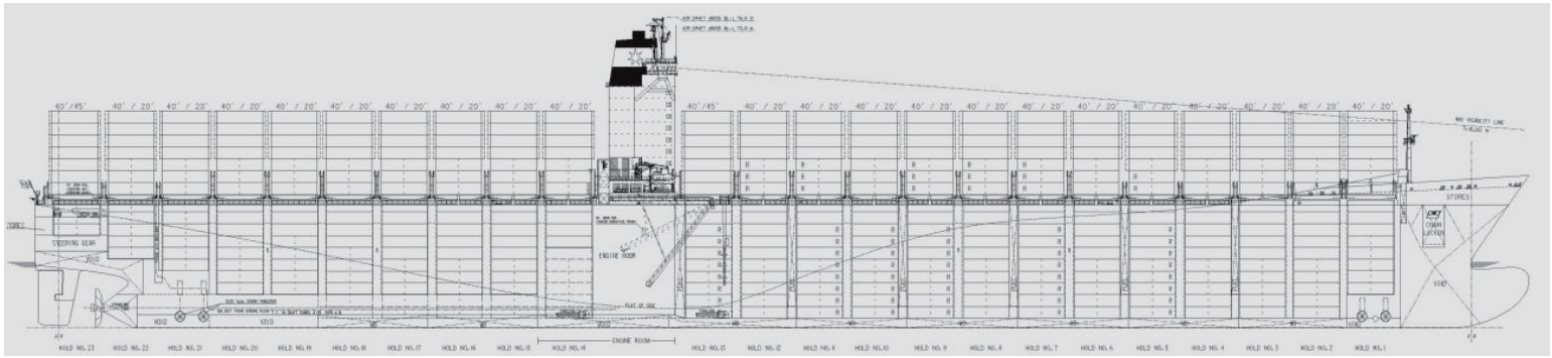
Hatch covers are of MacGregor lift-away design using Polypad bearing pads and Omega seals, with covers over holds 1 and 2 fitted with water spray systems to facilitate the carriage of dangerous cargoes. A feature of the ship's arrangement is an excessive freeboard, whilst a novel inclusion is the fitting of 'stoppers' to the cell guides in Nos 2 to 5 holds. These are positioned 5.25m above the tanktop to provide a space under the stacks of 40ft containers where break-bulk cargo can be loaded.

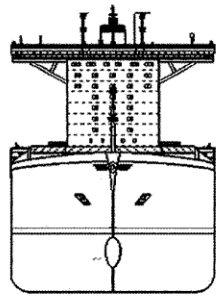
Lifesaving equipment	
Number	1 x freefall lifeboat; 1 x rescue boat; 2 x 35-person/1 x 6-person liferafts
Hatch covers	
Designer/Manufacturer	MacGregor
Type	Lift-away pontoons
Containers	
Lengths	20ft, 40ft, 45ft, 49ft
Heights	9.5ft, 8.5ft
Cell guides	in holds
Total TEU capacity	2785
on deck	1258
in holds	1527
homogeneously loaded to 14tonnes	2168
reefer plugs	332

Container Ship Evolution

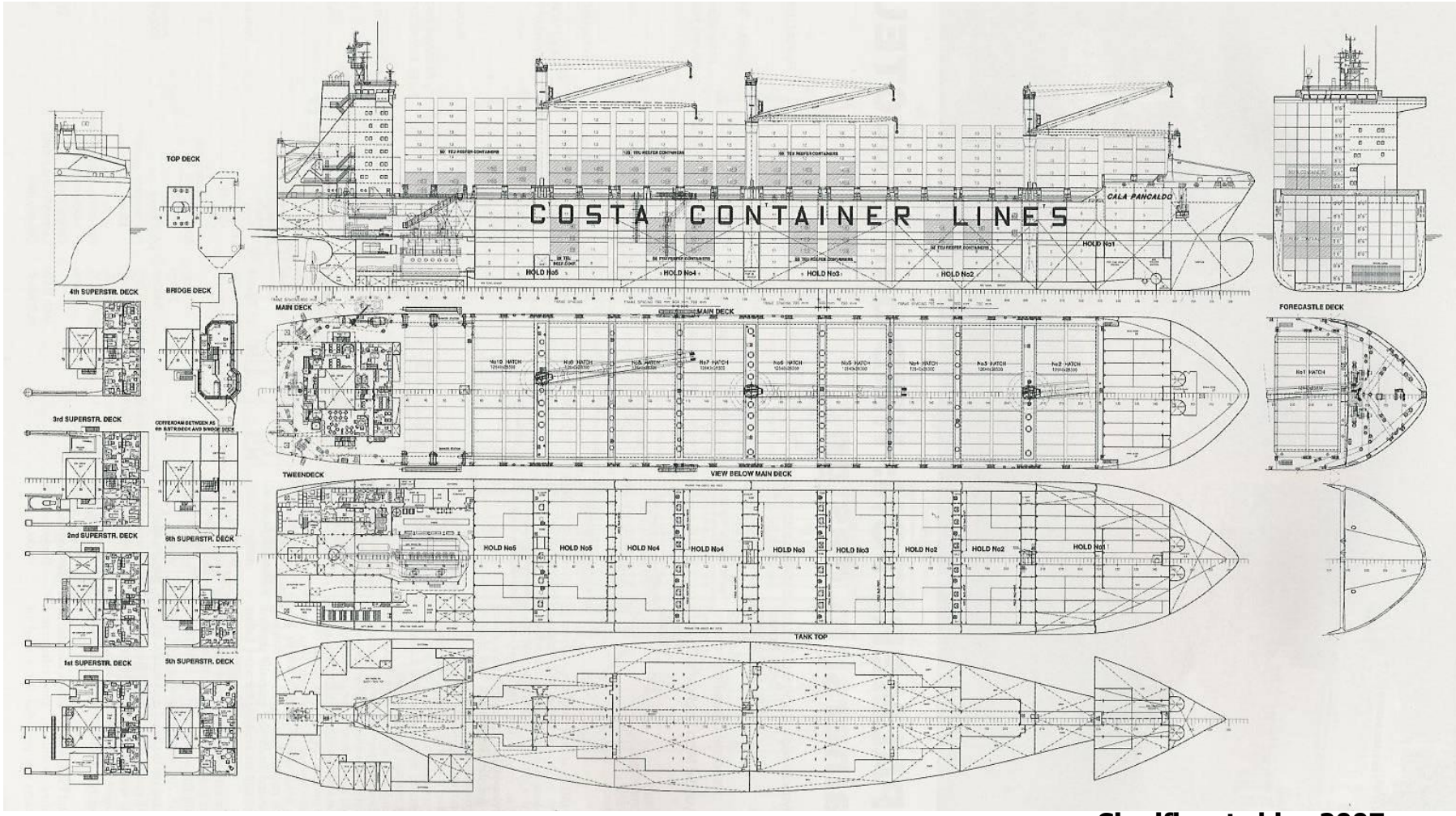
ULCV / Malacamax

Emma Maersk 2006





Container / multi purpose cargo ship



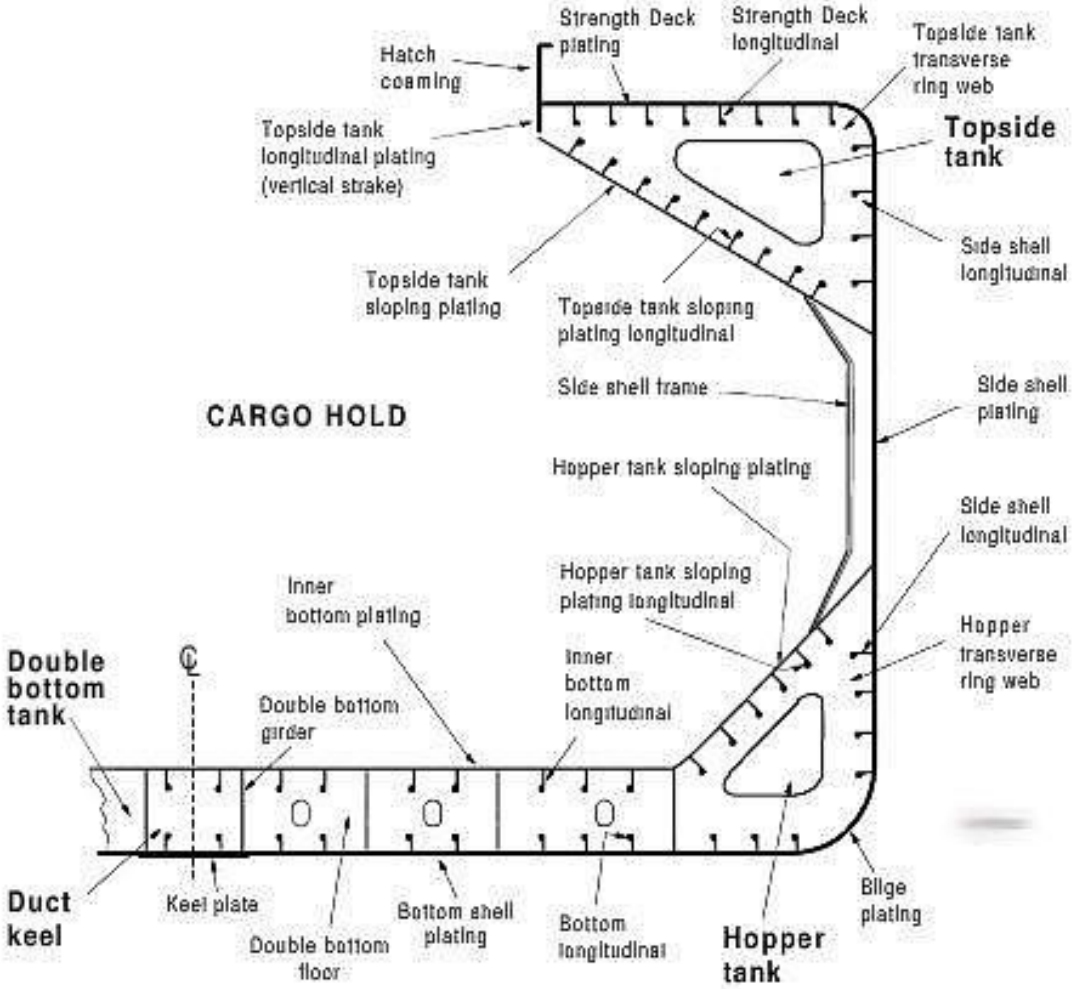
Significant ships 2007

Bulk Carrier design

- Lading: losse lading in bulk
  - Ertsen, kolen, cement, mineralen, graan
  - Belading in tonnen en/of m3
  - “Deplacementsschepen” (gewichtkritisch: ~s.g. lading > 0,77 t/m3)
  - Laden en lossen mbv (eigen) kranen met grijpers / pijpen / lopende banden etc.
  - Hopper tanks i.v.m. stabiliteit en lossen
  - Extra ballastcapaciteit t.b.v. compenseren zwaartepunt en/of beladingsgraad (minimum diepgang boeg en t.p.v. de schroef)

Bulk carriers

Grootspantdoorsnede Bulk carrier



Design constraints - dimensions

Bulk carrier type	Dimensions	Ship size (scantling)
Small Overall ship length up to	approx 115 m	**Up to 10,000 dwt**
Handysize Scantling draught up to	approx 10 m	**10,000 – 35,000 dwt**
Handymax Overall ship length (re port facilities in Japan)	max 190 m	**35,000 – 55,000 dwt**
Panamax Ship breadth equal to Overall ship length up to (re port facilities) Overall ship length up to (re canal lock chamber) Passing ship draught up to	**max:** 32.2 / 32.3 m (106 ft) 225 m 289.6 m (950 ft) 12.04 m (39.5 ft)	**60,000 – 80,000 dwt**
Capesize Breadth	approx 43 - 45 m for 90,000 - 180,000 dwt	**80,000 – 200,000 dwt**
VLBC – Very Large Bulk Carrier Overall ship length	above 300 m	**More than 200,000 dwt**

Examples on special Bulk carrier **sub-classes**

- Kamsarmax: ~82,000 dwt Panamax with increased L_{OA} = 229 m (for Port Kamsar in Equatorial Guinea)
- Dunkirkmax: ~175,000 dwt large Capesize with max L_{OA} = 289 m and max B = 45 m (for the French port's eastern harbour lock at Dunkirk)
- Newcastlemax: ~185,000 dwt large Capesize with max beam B = 47 m (for use of the Australian port of Newcastle)
- Setouchmax: ~205,000 dwt large Capesize (VLBC) with a low design draught of 16.10 m and max L_{OA} = 299.9 m (for ports in Setouch Sea in Japan)

Bulk carrier

TECHNICAL PARTICULARS

Length, oa	291.90m
Length, bp	283.oom
Breadth, moulded	45.00m
Depth, moulded	24.70m
Draught	
design	16.50m
scantling	18.20m
Gross	90,000gt
Deadweight	
design	179,660dwt
scantling	183,850dwt
Speed, service, 90% MCR, 15% sea margin	15.40knots
Cargo capacity, grain	198,000m³
Bunkers	
heavy oil	4300m³
diesel oil	250m³
Water ballast	79,000m³
Fuel consumption, main engine only	67.2tonnes/day
Classification	Lloyd's Register +100A1 Bulk Carrier, CSR, BC-A, (maximum Cargo density 3.0tonnes/m³), (holds 2, 4, 6 and 8 may be empty), ESP, GRAB [20], LI, *IWS, ShipRight(CM), +LMC, UMS with descriptive note ShipRight (SCM)
Main engine	
Design	MAN B&W
Model	6S70MC-C
Manufacturer	Doosan Engine Co Ltd

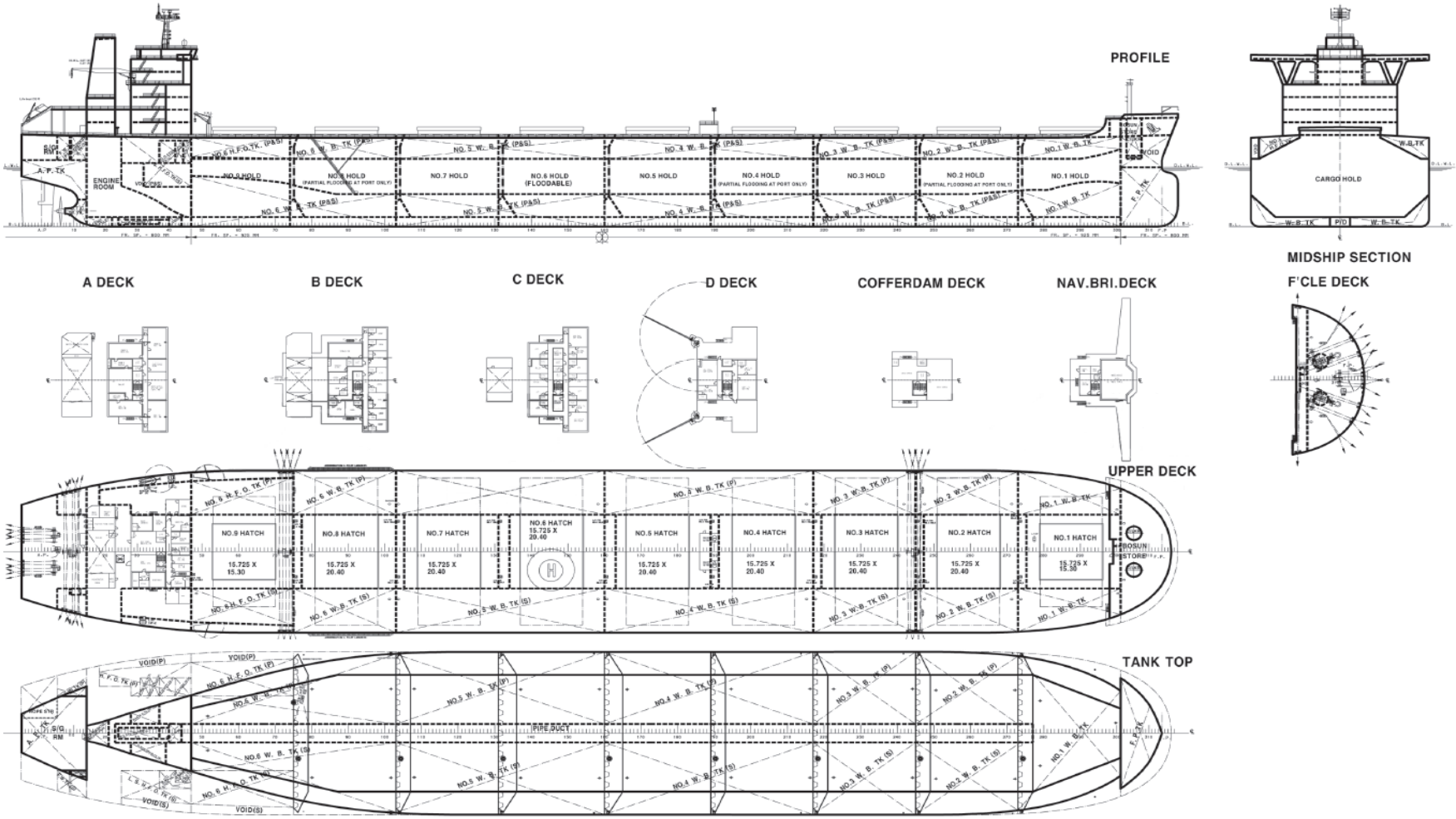
MARILOULA: 180,000dwt DSME-built bulker for veteran Greek owner

The hatches are closed by side-rolling covers stowing each side of the vessel, with all but those for Nos 1 and 9 holds providing clear openings 15.725m long by 20.40m wide, reduced to 15.725m long by 15.30m for the remainder. No 6 hold is dedicated as a floodable hold with Nos 2, 4 and 8 arranged for partial flooding in port. Water ballast is carried in all the topside wing tanks, except those in No 9 hold, which serve as oil fuel bunkers along with the bottom wing tanks in that hold.

A double skin is provided in way of these bunker tanks for safety purposes and is retained as a void space. All steelwork used in the construction of *Mariloula* has been prepared in accordance with proven international standards and is painted to PSPC (Performance Standard for Protection Coating) levels to provide a coating life of 15 years.

Significant ships 2008

Bulk carrier



Significant ships 2008

Bulk carrier (Newcastlemax)

CHINA STEEL TEAM: CSBC-built 'Newcastlemax' bulk carrier

LOCAL shipowner China Steel is a long-term customer of CSBC, and the two companies combined their efforts to develop this 'Newcastlemax' bulk carrier, based on the design of what is claimed to be the largest Capesize bulker yet produced by the Kaohsiung shipyard. The requirement was for a vessel which could meet the size limitations of the Newcastle port facilities in New South Wales, Australia, and discharge satisfactorily at mainland China terminals, taking into account future developments at those ports.

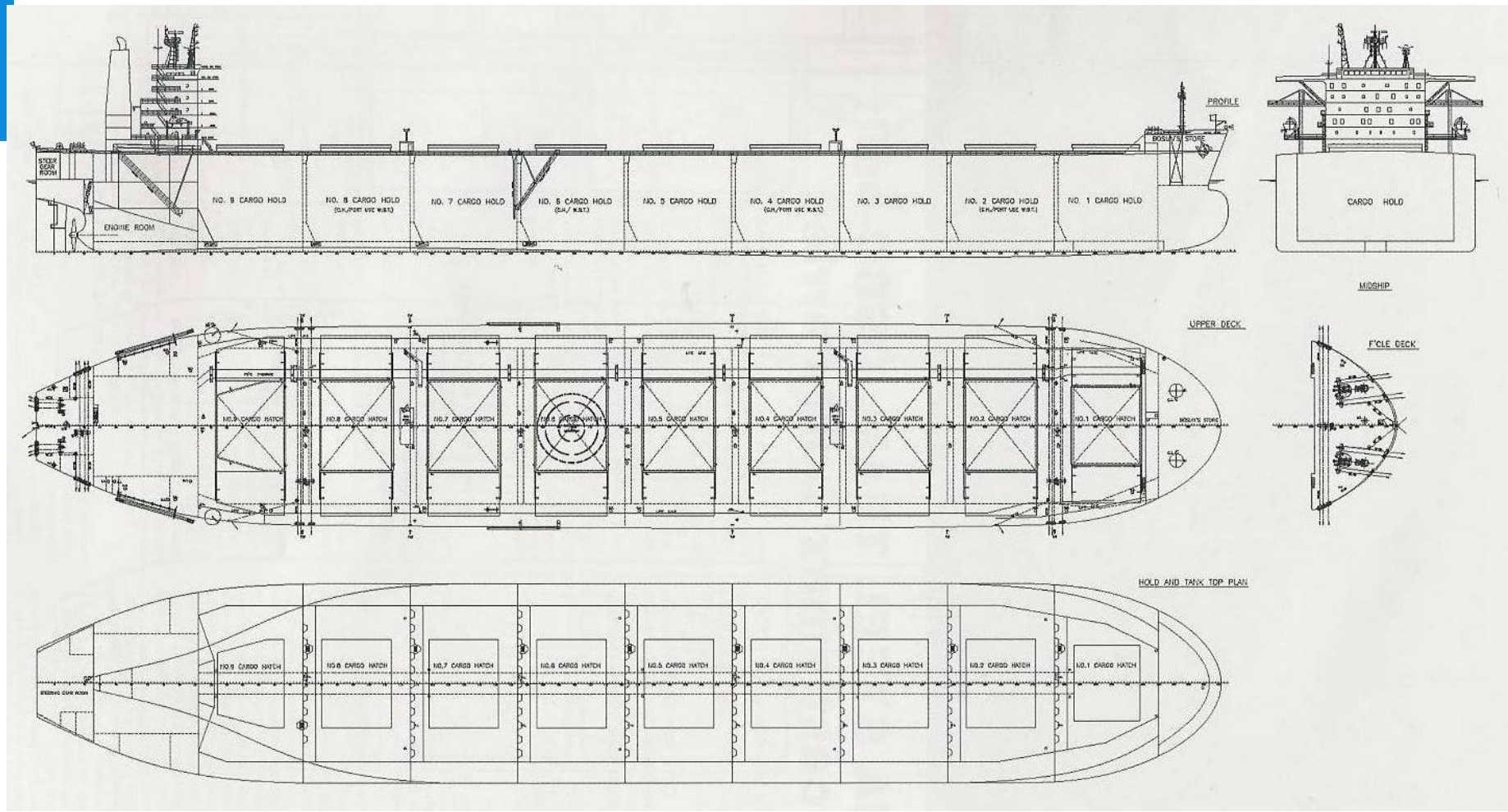
Investigation into the optimum layout of cargo holds resulted in the designers deciding that a nine hold configuration remained the most economical choice for this size of vessel, and that within this arrangement, Nos 2 to 8 holds, with 17.49m long x 22.80m wide hatches, would provide easy cargo handling. All the hatches are closed by MacGregor side rolling, hydraulic,

TECHNICAL PARTICULARS

Length, oa	299.50m
Length, bp	290.50m
Breadth, moulded	50.00m
Depth, moulded	24.40m
Gross	104,352gt
Deadweight	
design	175,040dwt
scantling	203,512dwt
Draught	
design	16.00m
scantling	18.07m
Speed, 85% MCR, 15% sea margin, design draught	
with shaft alternator engaged	14.80knots
without shaft alternator	15.10knots
Cargo capacity, grain	201,898m³
Bunkers	
heavy oil	5742m³
diesel oil	120m³
Water ballast (including No 6 hold)	106,891m³
Fuel consumption, main engine	64tonnes/day
Classification	American Bureau of Shipping, +A1 (E), Bulk Carrier, BC-A (Nos 2,4,6,8 Holds may be Empty), SH, SHCM, HCS, +AMS, +ACCU, ESP and UWILD, CR100, +E

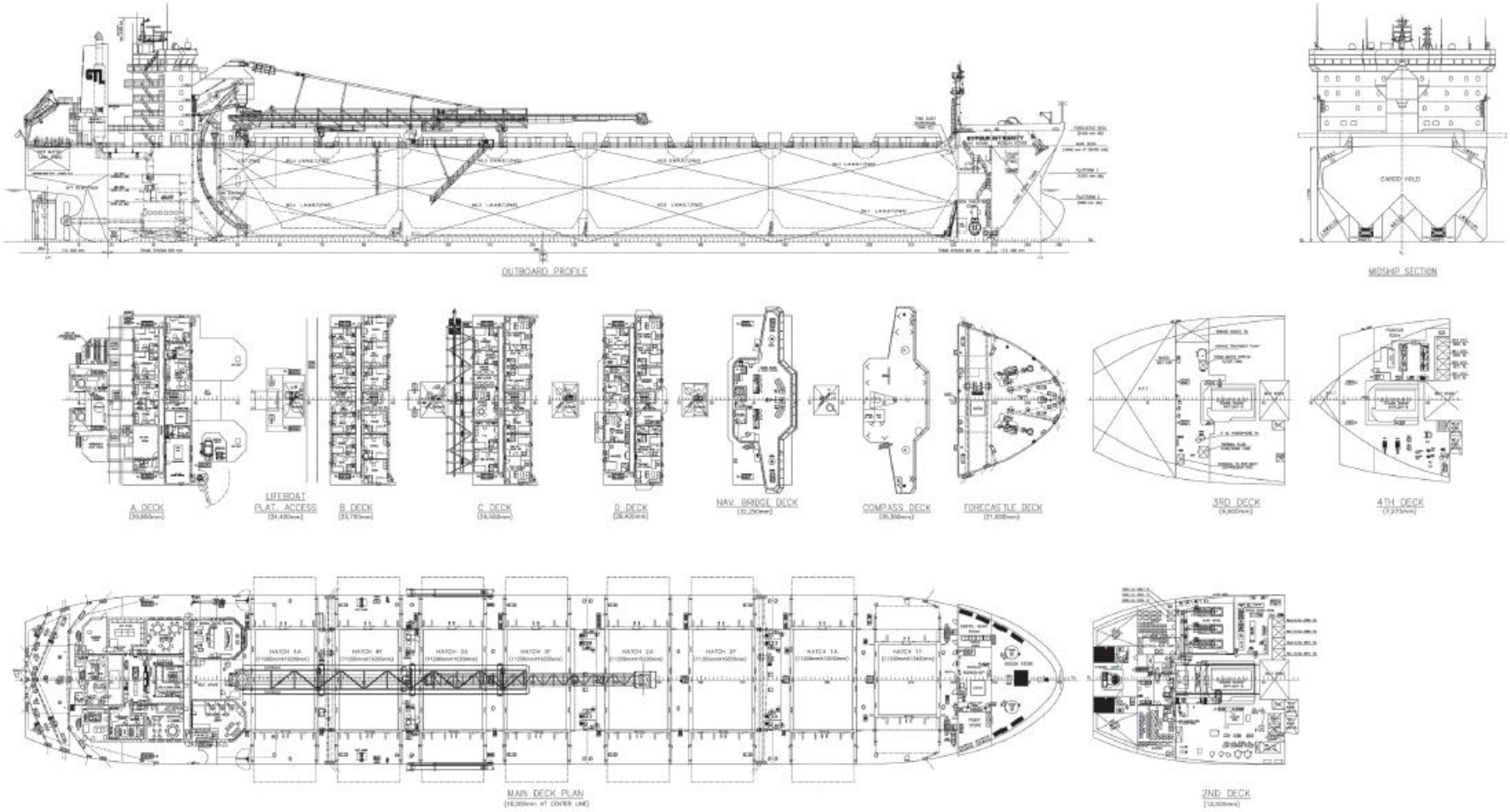
Significant ships 2007

Bulk carrier (Newcastlemax)



Significant ships 2007

Bulk carrier “self discharging”



Significant ships 2008