

SIGNIFICANT SHIPS OF 2009

A PUBLICATION OF THE ROYAL INSTITUTION OF NAVAL ARCHITECTS



FLENSBURGER
SHIPBUILDERS SINCE 1872

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SIGNIFICANT SHIPS of 2009

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Published by:
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Printed in Wales by
Pensord Press, Tram Road, Pontllifraith, Blackwood,
Gwent NP12 2YA

ISBN 978 1 905040 41 4

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SIGNIFICANT SHIPS OF 2009

So ended 2009, and with that milestone we present the 20th iteration of *Significant Ships*. This marks the beginning of a new era, as the first 19 Editions were compiled by the same person, John Lingwood, who retired from the task with *Significant Ships 2008*. For *Significant Ships 2009* you have a new Editor and a new Associate Editor. Nevertheless we believe that we have maintained the extensive, in-depth and informed coverage of ships of significance in the past year which has been the hallmark of the previous 19 editions.

If you look at the end of this introduction you'll see that I'm based in what Europeans sometimes call the antipodes. This also happens to be within about 10 hours' flight time of more than 90% of the world's shipbuilding activities. My perspective on things will naturally be a little different from my predecessor's.

As somebody who started in the shipbuilding industry in 1962 I felt that a look at the way things have changed in the business in the intervening 47 years might be worthwhile. So where were we in 1962?

- The first dedicated cellular containership, *Koorunga* – designed and built in Australia by the way – was still two years in the future.
- The first purpose-built LNG tanker, *Methane Princess*, was also two years away.
- Drill-ships and semi-submersibles were in the early stages of their development and the FPSO was over a decade away.
- Cars were exported as general "lift on lift off" cargo, often in crates, or in parts for assembly at the importing end.
- Passenger liners were an integral part of the shipping scene although the challenge from aircraft was looming. Cruising was something passenger liners only did in the "off season," when normal business was slack.

European shipbuilding produced 35% of the world's tonnage. Japan, beginning to be perceived as a challenge, produced 26%. Korea and China didn't figure in the world's statistics.

This contrasts sharply with the picture presented by *Significant Ships 2009* where:

- Of the 11 generally representative types of vessels featured, six types were either non-existent or rare in 1962.

- LPG/LNG carriers constitute 15% of the ships featured, chemical and product tankers 12%, offshore construction and support vessels 10%, and cruise vessels 8%.
- Two of the largest vessels included are container ships.
- Of the four cruise vessels included three are particularly notable because of their size.
- Passenger liners are nowhere to be seen.

At the same time it is interesting to note that bulk carriers and tankers still constitute 22% of the vessels included, proof that some things never change.

In parallel there has been an immense change in the sources of new vessels. The Japanese contribution, having peaked at somewhere around 40% of the world's tonnage, has fallen back to 10% or less while Korea and China, which were nowhere to be seen in 1962, now produce something like 50% and 30% respectively. China has made it clear that it intends to overtake Korea as the No. 1 shipbuilding nation within the next few years, while waiting in the wings are Vietnam and India. The next 10 years or so will certainly be interesting.

Returning to *Significant Ships 2009*, we all have our own ideas of just what is "significant" and you may agree and/or disagree with the selection offered. Some ships or features from the selection I find particularly interesting are, in no specific order:

- Jan de Nul's trailing suction hopper dredge, *Cristobal Colon*, built by Spain's la Naval shipyard. At 196m L_{bp} and 46,000m³ capacity this would have constituted a fairly decent bulk carrier in 1962.
- The re-gasifying LNG carriers *GDF Suez Neptune* – built by Samsung for Leif Höegh/ Mitsui OSK – and *Express* – built by Daewoo for EXMAR. Shipboard re-gasification is a comparatively new technology offering benefits to suppliers and consumers.
- The car-carrier *Auriga Leader*, built by Mitsubishi for FGL Shipping (Singapore), with its 40kW of solar electricity generating capacity, provides maybe a glimpse of the future, with a push to lower CO₂ emissions and an eye on the cost of diesel fuel.

There are others I'd like to mention, but I don't have the space. No doubt the first three which come to your mind will be different.

Finally I want to thank those who have made this publication possible, particularly the Builders and Owners who have furnished the necessary data on their ships. Without their support and, in several cases, patience and good humour, *Significant Ships 2009* would not have come about. Thank you, and I look forward to *Significant Ships 2010*.

Bryan Chapman, MRINA,
Melbourne, Australia.
January 2010

Notes

In the tables which form part of each ship description, all dimensions, also deadweight and displacement tonnages, are metric unless otherwise stated. Machinery powers have been specified as 'bhp' or 'kW' in accordance with information received from the shipbuilder or owner. Emergency alternators are not normally included in the number of alternators. When a dash (-) has been included against an item, this generally denotes lack of information but where it is known that features have not been included, this is indicated by 'nil'. The number of sister ships completed or on order does not include the ship presented. Some ships shown as 'on order' may have been delivered by the time this publication appears.

Further information on certain vessels included in *Significant Ships of 2009* can be found in the following editions of The Royal Institution of Naval Architects' publication, *The Naval Architect*:

| | |
|------------------|------------|
| Anafi | March 2009 |
| Beluga Houston | Sept 2009 |
| Carnival Dream | May 2009 |
| Costa Luminosa | May 2009 |
| LNG Barka | March 2009 |
| Seabourn Odyssey | May 2009 |



ANAFI: LPG carrier from Hyundai Mipo Dockyard

Shipbuilder: **Hyundai Mipo Dockyard Co., Ltd**
 Vessel's name: **Anafi**
 Hull No.: **8011**
 Owner/Operator: **Eletson Holdings, Greece**
 Designer: **Hyundai Mipo Dockyard Co Ltd, Korea**
 Model test establishment used: **Hyundai Maritime Research Institute, Korea**
 Flag: **Greece**
 IMO number: **9411733**
 Total number of sister ships already completed: **3**
 Total number of sister ships still on order: **Nil**

Anafi is the first liquefied petroleum gas (LPG) carrier ever built for Eletson Corporation. Built at Hyundai Mipo Dockyards (HMD) in Korea, the ship marks a milestone for the well known and respected Greek operator, recognised by the shipping industry for the ownership and management of tankers for more than four decades.

HMD has been acknowledged as one of the leading and most versatile shipbuilders in the sectors of medium-sized conventional ships and specialised vessels. Especially, HMD has achieved world-wide recognition for its medium-ranged product/chemical tankers and handy/panamax size containerships with optimised superior specifications and unchallenged quality gained by the competent design staff and the highly qualified workforce.

Anafi is an ocean going LPG carrier with bulbous bow, transom stern, flush deck, open water type stern frame, single rudder and single screw propeller driven by a slow speed diesel engine. The propulsion machinery and living quarters including the navigation bridge are located aft.

Anafi was designed for cargoes including propane, butane, butane and propane mixtures, butylene, propylene, anhydrous ammonia and butadiene. The cargo is carried in three prismatic cargo tanks with a centre longitudinal bulkhead while there are four topside and double bottom water ballast tanks each side. The cargo tanks are designed for a minimum temperature of -500°C and the design of specific cargo equipment is generally based on cargo temperature of -50°C .

TECHNICAL PARTICULARS

Length oa: 173.70m
 Length bp: 165.00m
 Breadth, moulded: 28.00m
 Depth, moulded to upper deck: 17.80m
 Width of double skin:
 side: 1.1m
 bottom: 1.7m
 Draught:
 scantling: 10.40m
 design: 9.50m

Gross: 22,971gt
 Deadweight
 Design: 22,870dwt
 scantling: 26,570dwt
 Speed, service: 16.7knots
 Cargo capacity (m³)
 Liquid volume: 35,530m³
 Bunkers:
 Heavy oil: 1590m³
 Diesel oil: 130m³
 Water ballast (m³): 11,300m³
 Daily fuel consumption:
 Main engine only: 34.58tonnes/day
 Auxiliaries: 4.56tonnes/day

Classification society and notations: LR, +100A1, Liquefied Gas Carrier, Ship Type 2G, propane, butane, butane and propane mixtures, butylenes, propylene, anhydrous ammonia and butadiene in independent tanks type A, maximum specific gravity 0.70, partial loading vinyl chloride monomer with maximum specific gravity 0.97, maximum vapour pressure 0.25bar (0.45bar in harbour), minimum cargo temperature -50°C , LI, *IWS, ShipRight (SDA, FDA, CM), EP, +LMC, UMS, NAV1, +Lloyd's RMC(LG) with descriptive notes of ShipRight (SCM, PCWBT(02/09), BWMP(S), SERS, ETA, Part Higher Tensile, Green Passport)

Main engine
 Design: MAN B&W
 Model: 6S50MC-C7
 Manufacturer: HHI-EMD
 Number: 1
 Type of fuel: HFO
 Output of each engine: 9480kW/127rev/min

Propeller
 Material: Nickel aluminum bronze
 Designer/Manufacturer: Hyundai Heavy Industries Co., Ltd

Number: 1
 Pitch: Fixed
 Diameter: 5800mm
 Speed: 127rev/min

Diesel-driven alternators
 Number: 3
 Engine make/type: HHI-EMD
 Engine type: 2 x 7L23/30H 1 x 6L23/30H
 Type of fuel: HFO & MDO
 Output/speed: 2 x 960kW/720rev/min
 1 x 780kW/720rev/min
 Alternator make/type: HHI-EES
 Output/speed of each set: 2 x 900kW/720rev/min
 1 x 730kW/720rev/min

Boilers
 Number: 1
 Type: Automatic, vertical forced draft, marine boiler, heavy fuel oil burning

Make: Kangrim Heavy Industries Co., Ltd.
 Output, each boiler: Oil fired 2500kg/h
 Exhaust Gas 1300kg/h
 Mooring equipment
 Number: 6 sets
 Make: Pusnes
 Type: Hydraulic
 Special lifesaving equipment
 Number of each and capacity: 1 x 30 persons
 Make: Hyundai Lifeboat Co. Ltd.
 Type: Free-fall lifeboat
 Cargo tanks
 Number: Hull tanks - 6 (3p/3s)
 Deck tanks - 2
 Grades of cargo carried: Ship Type 2G
 Product range: Max. vapour pressure 0.25bar, Min. cargo temp. -5°C

Cargo pumps
 Number: 6
 Type: Vertical deepwell
 Make: Hamworthy-Svanehoj A/S
 Stainless steel: Yes (316)
 Capacity (each): 400 m³/h

Cargo control system
 Make: Weir LGE
 Type: CMS

Ballast control system
 Make: Kongsberg
 Type: CMS

Complement
 Officers: 18
 Crew: 12
 Suez Repair Crew: 6

Bridge control system
 Make: Hyundai Heavy Industry Co., Ltd.
 Type: Floor mounting and self-standing

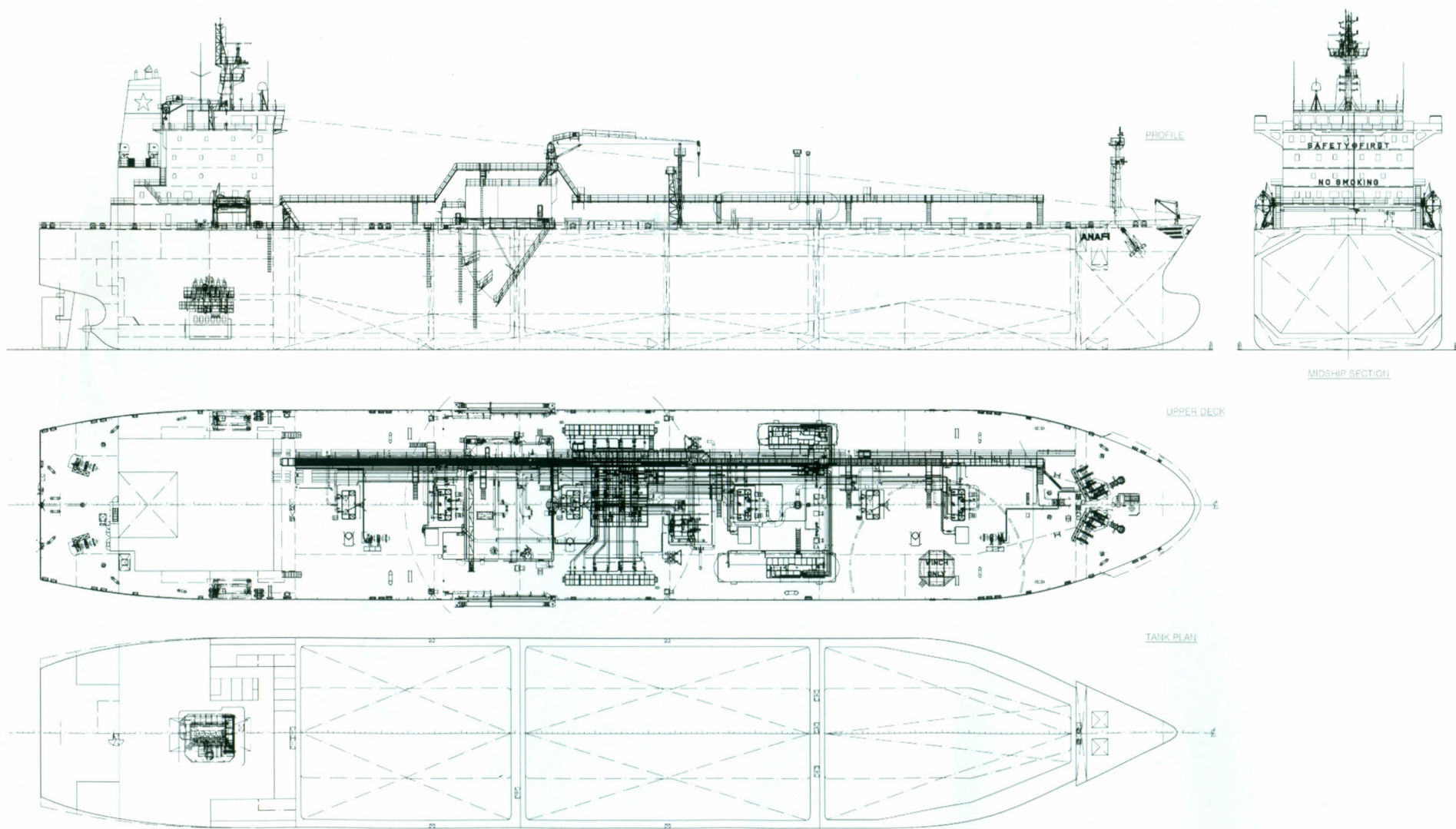
One-man operation: No
 Fire detection system
 Make: Autronica
 Type: UAK-2/24

Fire extinguishing systems
 Cargo holds: Inert gas system
 Engine room: CO₂
 Local fire fighting system: NK water based

Radars
 Number: 2
 Make: JRC
 Models: FAR-2837S; FAR-2827

Waste disposal plant
 Incinerator: Teamtec GS500CS
 Sewage plant: Jonghaph AEROB-18

Contract date: September, 2006
 Launch/float-out date: December, 2008
 Delivery date: February, 2009





ARAON: From Hanjin, the first Korean-built ice-breaking research vessel

Shipbuilder: **Hanjin Heavy Industries & Construction Co., Ltd**
 Vessel's name: **Araon**
 Hull No: **SS00065**
 Owner/Operator: **KOPRI**
 (Korea Polar Research Institute)
 Country: **Korea**
 Designer: **Hanjin Heavy Industries & Construction Co., Ltd**
 Country: **Korea**
 Model test establishment used:
 Open water tests: **MOERI**
 (Maritime and Ocean Engineering Research Institute), Korea
 Ice tests: **ILS OY/ Helsinki University, Finland**
 Flag: **Korea**
 IMO number: **9490935**

On 30 September 2009 Hanjin Heavy Industries & Construction Co., Ltd (HHIC) delivered the first Korean-built icebreaking research vessel, *Araon*. This was the culmination of a contract entered into on 4 January 2007, highlighted by steel cutting in January 2008 and launching on 17 October 2008.

Araon, which symbolises a ship sailing across the world's oceans, is an icebreaking research vessel of 7487 gross ton. It has a length of 111m and breadth of 19m with a cruising speed of up to 16knots. The icebreaker is equipped with more than 60 different types of state-of-the-art research equipment including a folding helicopter. This state-of-the-art vessel is designed for operation in one-metre-thick-multiple-year ice at 3knots and will be equipped with twin Azimuth propulsion units driven by diesel-electric propulsion plant. She can accommodate up to 85 persons, including 25 crew members, and can operate for 70 days over 20,000 nautical miles without refuelling or re-supplying.

HHIC has proven again its excellence in shipbuilding with the successful completion of this high-tech icebreaking research vessel. An official from HHIC commented, "Even though Korea has the world's best shipbuilding technology, the country has never designed or built an icebreaking vessel before."

With the launch of the Korean-built *Araon*, research activities and construction of a polar research base will be facilitated. Above all, since Korea will now be able to access more remote marine territory and carry out an in-depth research on the development of polar resources with new and modern infrastructure in the polar regions.

Araon will set sail for exploration, research and supply activities in polar areas beginning in 2010.

TECHNICAL PARTICULARS

Length oa: 111.0m
 Length bp: 95.0m
 Breadth moulded: 19.0m
 Depth moulded:
 to main deck: 9.9m

to other decks: 15.3m
 Shell plating thickness:
 side: 39mm (RE36 grade steel)
 bottom: 17.5mm (RE36 grade steel)
 Draught
 scantling: 7.6m
 design: 6.8m
 Gross: 7487gt
 Displacement: 9071tonnes
 Lightweight: 6001tonnes
 Deadweight
 Design: 1664dwt
 scantling: 3070dwt
 Block co-efficient (please state relevant draught): 0.616
 Speed:
 Cruising: ... 12knots at 25% MCR (incl. 16% sea margin)
 Maximum: 16knots at 100% MCR
 (incl. 16% sea margin)
 Bunkers:
 Diesel oil: 1216m³
 Water ballast: 2102m³
 Daily fuel consumption:
 Main engine only: 11.3tonnes/day
 Auxiliaries: 0.5tonnes/day
 Classification society and notations: KR +KRS1-Special
 purpose ship (Research), PL10, DAT(-30°), HMS1 /
 +KRM1-UMA3, DPS2, NBS2
 % high-tensile steel used in construction: 61% (AH32,
 AH36, DH36, EH36)
 Heel control equipment: Hoppe/Air blower type
 anti-rolling & heeling system
 Roll-stabilisation equipment: Hoppe/Air blower
 type anti-rolling & heeling system
 Propulsion Motors:
 Design & manufacturer: ABB OY
 Model: AMC 900
 Number: 2
 Output of each engine: 5000kW
 Propellers:
 Material: Stainless steel
 Designer/Manufacturer: Rolls-Royce OY
 Fixed/Controllable pitch: 2 x Fixed, Azimuth Type
 Diameter: 4.0m
 Speed: 143rev/min
 Main generator engine:
 Number: 4
 Engine make/type: STX engine/MAN B&W 7132/40
 Type of fuel: MDO
 Output/speed of each set: 4221kVA/720rev/min
 Alternator make/type: ABB OY/AMG 0710LT10 LSE
 Boilers:
 Number & type: 2 x MA0401P33
 Make: Kanrim
 Output, each boiler: Approx. 2500kg/hr
 Cargo cranes/cargo gear:
 Number & make: 1 x DMC
 Type: Telescopic type
 Performance: 25tonnes, max. working radius 20m
 Other cranes:

Number & make: 2 x DMC
 Type: Knuckle type
 Tasks: Deck crane
 Performance: 10tonnes, max. working radius
 12m & 3tonnes, max. working radius 16.5m

Mooring equipment:
 Number: 2
 Make: Sekwang Marine Machineries Co., Ltd
 Type: Electro-Hydraulic Type

Special lifesaving equipment:
 Number of each and capacity: 2 sets, 85pp
 Make: DSB Engineering Co., Ltd
 Type: Totally enclosed type lifeboat

Hatch covers:
 Design: Haeon Machinery Ind. Co., Ltd
 Type (upper deck/other decks): Hydraulic Folding Type/

Upper Deck
 Total TEU capacity:
 On deck: 13
 In holds: 18
 Reefer plugs: 8
 Tiers/rows (maximum)
 On deck: 2/3
 In holds: 3/3

Doors/ramps/lifts/moveable car decks:
 Type: 7 sets Hydraulic sliding doors
 Designer: Young Nam Machinery Co., Ltd

Ballast control system
 Make: Korea Emerson
 Type: Elec-Hyd. Actuator w/Butterfly valve

Complement:
 Crew: 25 (including Officers)
 Others: 65 (Scientists)

Bow thrusters:
 Number & make: 2 x Wartsila
 Output (each): 1200kW

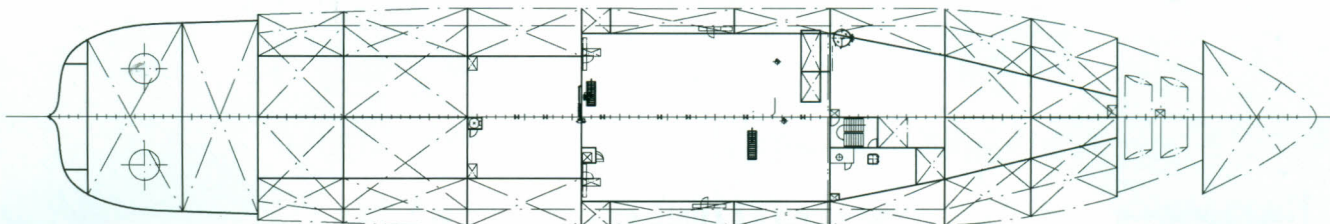
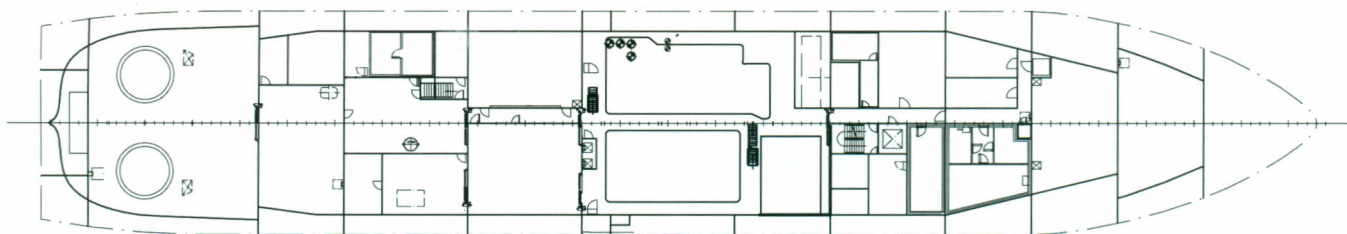
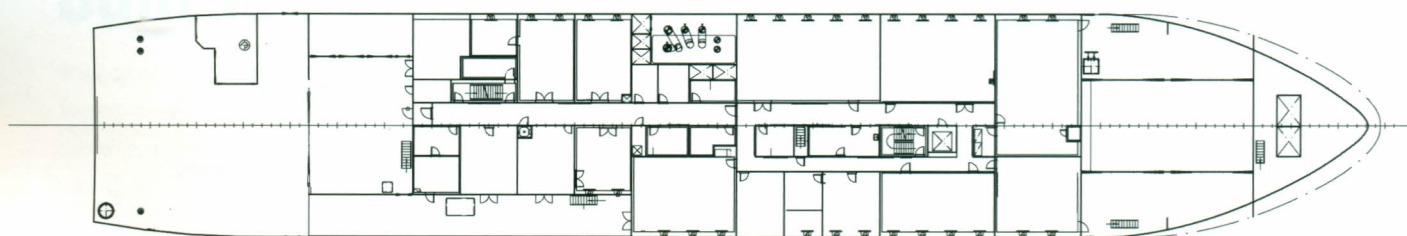
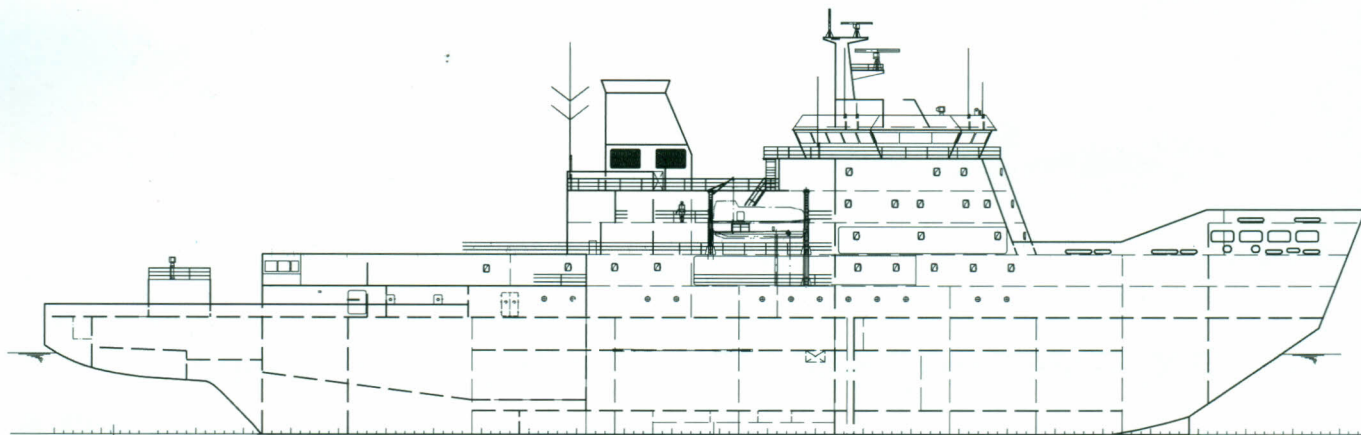
Fire detection system:
 Make: SEAPLUS
 Type: JB-QB-4508

Fire extinguishing systems:
 Cargo holds: NK/CO₂ (Fixed)
 Engine room: NK/CO₂ (Fixed)
 Engine room: 20 x FAIN, Foam/Dry powder (Portable)
 Public spaces: 72 x FAIN, Foam/Dry
 powder/CO₂ (Portable)

Radars:
 Number: 1 set x S-Band / 1 set x X-Band
 Make: JRC
 Models: JMA-9132-SA / 9122-9XA

Integrated bridge system:
 Make: JRC
 Model: JAN-901B(ECDIS) / JAN-701B-CON
 (Conning Display) / JAN-1186

Waste disposal plant
 Incinerator: Hyundai Industrial MAXI 24 SL WS
 Sewage plant: Ilsung ISS-85B
 Contract date: 4 January 2007
 Launch/float-out date: 17 October 2008
 Delivery date: 30 September 2009





AURIGA LEADER: An advanced environmentally friendly car-carrier

Shipbuilder: **Mitsubishi Heavy Industries Ltd(MHI) Kobe Shipyard & Machinery Works, Japan**
 Vessel's name: **Auriga Leader**
 Hull No: **1279**
 Owner: **FGL Shipping (Singapore) Pte Ltd**
 Operator: **Nippon Yusen Kabushiki Kaisha (NYK Line), Japan**
 Designer: **Mitsubishi Heavy Industries Ltd, Japan**
 Model test establishment used: **MHI Nagasaki R&D Center, Japan**
 Flag: **Singapore**
 IMO number: **9402718**
 Total number of sister ships already completed (excluding ship presented): **1**
 Total number of sister ships still on order: **2**

Auriga Leader is a most advanced environmentally friendly car carrier. Its features to reduce CO₂ emissions include a 40kW solar photovoltaic system and an inverter control system for main cooling seawater pump.

The solar photovoltaic system was jointly developed by Nippon Yusen Kabushiki Kaisha (NYK Line) and Nippon Oil Corporation (ENEOS). It includes 328 solar panels installed on the garage top deck to give a generating capacity of 40kW. This is connected to the vessel's electrical power system and is the largest among existing vessels in the world.

The inverter control system for main cooling seawater pump significantly reduces the pump's power consumption. Usually a main cooling seawater pump is driven at a rated load based on maximum output condition. In contrast the system on *Auriga Leader*, which was developed by MHI, can adjust the pump output in real time to accommodate the actual heat load.

The underwater hull form and propeller were developed by MHI Nagasaki R&D Center and are optimised for the vessel to achieve low fuel consumption. The upper deck area forward was also designed to reduce wind pressure, thereby lowering resistance.

The vessel has double bottom construction for the bunker oil tanks to reduce the risk of oil leakage from

the tanks in the case of an accident or grounding. A Mitsubishi UE engine type 7UEC60LSII(P/U) with a SIP lubrication system was selected as the main engine. This engine features low fuel oil and lubrication oil consumption and low NOx emissions.

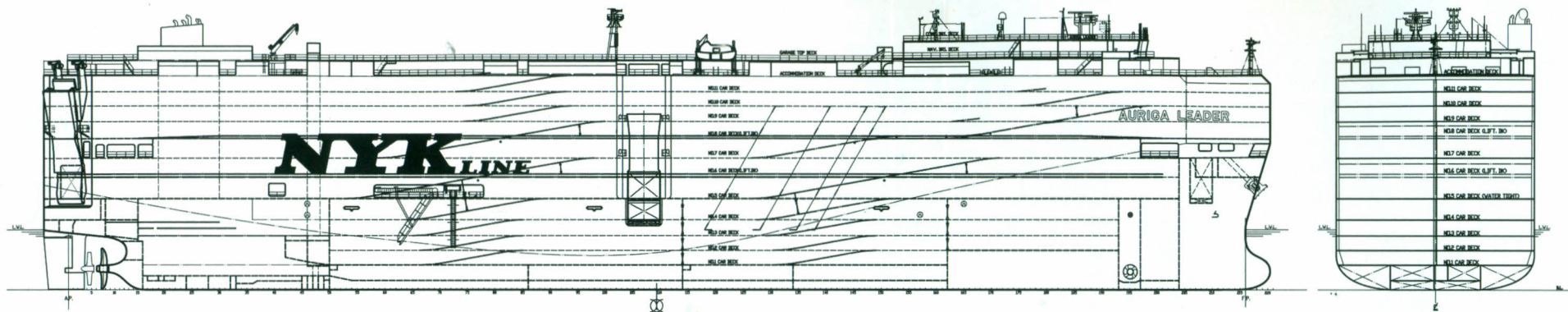
Auriga Leader has 12 car decks, including a garage deck at the aft end of the upper deck and two hoistable car decks for stowing large-sized vehicles such as dump trucks, bulldozers, etc. It is equipped with a stern ramp and a midship ramp on the starboard side. The stern ramp is strong enough to accommodate large vehicles up to a total weight of 100tonnes and the midship ramp can be adjusted to two working levels (No.5 deck and No.4 deck). The vessel has straight ramp ways between No 5 deck and No. 10 deck with adjustable ramps to enable fast and efficient roll-on roll-off cargo handling.

Auriga Leader was recognised as "Ship of the Year" at Lloyd's List Global Awards 2009.

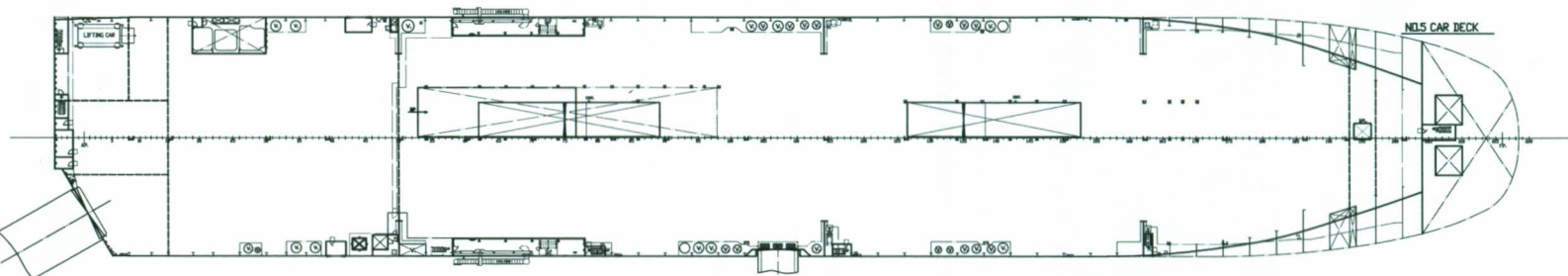
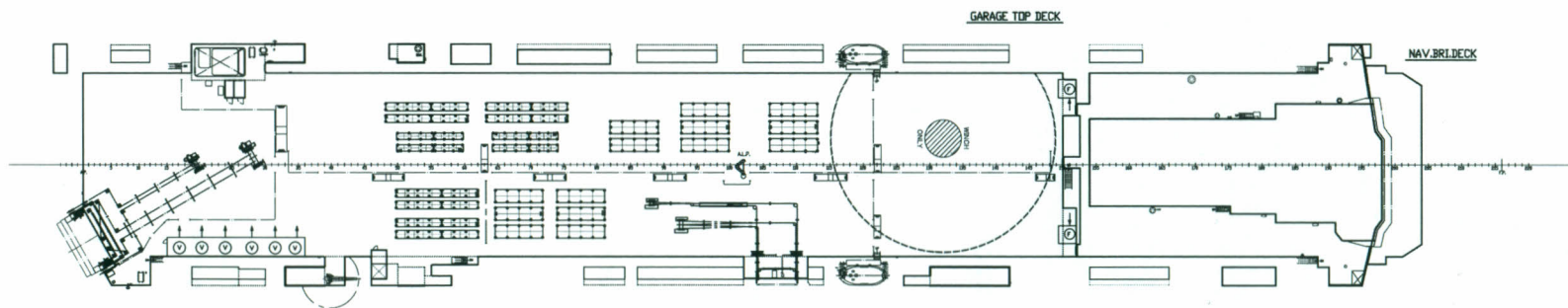
TECHNICAL PARTICULARS

Length oa: 199.99m
 Length bp: 192.00m
 Breadth moulded: 32.26m
 Depth moulded
 to main deck: 14.70m
 to upper deck: 34.52m
 Draught
 scantling: 9.70m
 design: 8.80m
 Gross: 60,213gt
 Deadweight
 design: 14,284dwt
 scantling: 18,686dwt
 Speed, service (85% MCR output): 20.35knots
 Bunkers:
 heavy oil: 2600m³
 diesel oil: 240m³
 Water ballast: 9300m³
 Daily fuel consumption:
 main engine only: 49tonnes/day
 Classification society and notations: Nippon Kaiji Kyokai NS* (RORO EQ C V), MNS* (M0)
 Heel control equipment: Automatic heel control system
 Roll-stabilisation equipment: Nil
 Main engine:
 Design: Mitsubishi Heavy Industries Ltd
 Model: 7UEC60LS II (P/U)
 Manufacturer: Mitsubishi Heavy Industries Ltd
 Number: 1

Type of fuel: HFO
 Output/speed: 14,315kW/105 rev/min
 Propeller:
 Material: Nickel-Aluminum-Bronze
 Designer/Manufacturer: Mitsubishi Heavy Industries, Ltd
 Number: 1
 Fixed/Controllable pitch: Fixed
 Speed: 105 rev/min
 Diesel-driven alternators
 Number: 3
 Engine make/type: Daihatsu Diesel Mfg. Co., Ltd
 Type of fuel: HFO
 Output/speed: 3 x 1150 kW/720rev/min
 Alternator output/speed: 3 x 1080kW/720rev/min
 Boilers:
 Number: 1
 Make: Osaka Boiler Mfg. Co., Ltd
 Mooring equipment
 Number: 2 x mooring winch/windlass, 4 x mooring winch
 Make: Manabe Zoki Co., Ltd
 Type (electric/hydraulic/steam): Electric
 Lifesaving equipment:
 Number of each and capacity: 2 x 30 persons
 Make: Shigi Shipbuilding Co., Ltd
 Type: FRP enclosed type lifeboat
 Vehicles:
 Number of vehicle decks (fixed/moveable): 10 fixed, 2 hoistable
 Total cars: 6400 standard passenger cars
 Doors/ramps:
 Number of each: 1 stern ramp, 1 side ramp
 Designer: Kyoritsu Kikai Co., Ltd
 Ballast control system:
 Make: Nakakita Seisakusho Co., Ltd
 Complement:
 Officers: 10
 Crew: 19
 Pilot: 1
 Bow thrusters:
 Make: Kawasaki Heavy Industries, Ltd
 Number: 1
 Output: 1350kW
 Fire detection system:
 Make: Autronica
 Radars:
 Number: 2
 Models: 1 x X-band with ARPA, 1 x S-band with ARPA
 Contract date: 31 May 2006
 Launch/float-out date: 18 August 2008
 Delivery date: 19 December 2008



HOLD SECTION & FRONT VIEW





BAOSTEEL EDUCATION: Namura completes ore carrier

Shipbuilder: **Namura Shipbuilding Co. Ltd**
 Vessel's name: **Baosteel Education**
 Hull No: **280**
 Owner: **Emerald Marine Limited**
 Country: **Liberia**
 Operator: **Mitsui O.S.K. Lines**
 Country: **Japan**
 Designer: **Namura Shipbuilding Co. Ltd**
 Country: **Japan**
 Flag: **Panama**
 IMO number: **9362970**
 Total number of sister ships already completed (excluding ship presented): **7**
 Total number of sister ships still on order: **1**

Namura Shipbuilding Co. Ltd. delivered *Baosteel Education*, a 228,527dwt ore carrier, to Emerald Marine Ltd. at its Imari Shipyard & Works on 31 March 2009. The vessel is the seventh 230,000dwt type ore carrier built by Namura and the strengthened hull offers flexible cargo loading of iron ore.

The vessel's hull form has been optimised for low fuel consumption.

Baosteel Education has five cargo holds and nine cargo hatches with electric-hydraulic driven side-rolling hatch covers. The double-hull cargo holds are designed for the handling and stowage of iron ore.

The vessel is powered by a two-cycle turbo-charged diesel engine, Mitsubishi type 6UEC85LSII, equipped with SIP, cylinder oil injection system, to reduce cylinder oil consumption. The machinery in the engine room is automated so that the vessel can be operated with the machinery spaces unattended and a central fresh water-cooling system is applied to the main engine and auxiliary machinery for easy maintenance.

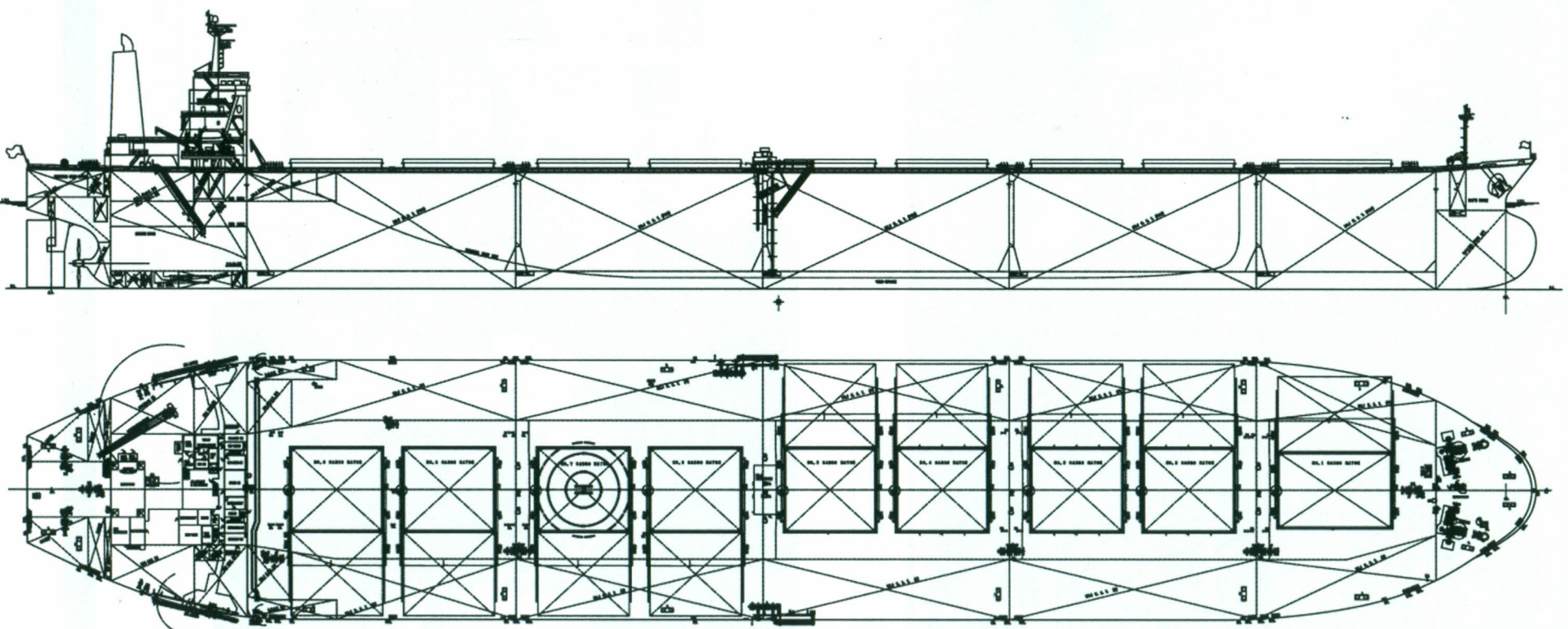
An air type stern tube sealing device is applied for the prevention of oil pollution and special attention is given to safety, environmental protection and reduction of labour and operational costs.

Baosteel Education sails between Western Australia and China under a 20-year continuous voyage charter contract with Chinese steelmaking giant, Baosteel.

TECHNICAL PARTICULARS

Length oa: 319.58m
 Length bp: 308.00m
 Breadth moulded: 54.0m
 Depth moulded
 to upper deck: 24.3m
 Width of double skin
 side: 12.55m
 bottom: 3.69m
 Draught
 scantling: 18.127m
 design: 18.127m
 Gross: 113,932gt
 Deadweight:
 Design: 228,527dwt
 scantling: 228,527dwt
 Speed, service: 15.1knots
 Cargo capacity (m³)
 Grain: 146,938.6m³
 Bunkers:
 Heavy oil: 7590.7m³
 Diesel oil: 284.1m³
 Water ballast: 155,412.1m³
 Daily fuel consumption (42,700kJ/kg fuel oil)
 Main engine only: 74.1tonnes/day (approx.)
 Auxiliaries: 2.9tonnes/day (approx.)
 in normal sea going conditions
 Classification society and notations: Nippon Kaiji Kyokai
 NS* (Ore carrier), ESP, MNS*, MO
 Percentage of high-tensile steel used in construction: 80%
 Roll-stabilisation equipment: Bilge keel
 Main engine:
 Design: Mitsubishi Heavy Industries Ltd.
 Model: Mitsubishi 6UEC85LS II
 Manufacturer: Mitsubishi Heavy Industries Ltd.
 Number: 1
 Type of fuel: HFO (380cSt at 50oC)
 Output: 22,432kW
 Propeller:
 Material: Nickel-Aluminium-Bronze
 Designer/Manufacturer: Mitsubishi Heavy Industries Ltd
 Number: 1
 Fixed/Controllable pitch: Fixed
 Special adaptations: Propeller Boss Cap Fins
 Diesel-driven alternators
 Number: 3
 Engine make/type: Yanmar Co. Ltd, 4 Cycle, Single Acting, Turbo-Charged
 Type of fuel: HFO (380cSt at 50oC)
 Output/speed of each set: 745kW x 720revs/min

Alternator make/type: Taiyo Electric Co. Ltd./A.C
 Brushless, Drip-Proof
 Output/speed of each set: 800kVA/(640kW) x 720rpm
 Boilers:
 Number: 1
 Type: Oil Fired Forced-Draft Cylindrical Water Tube Type
 Make: Osaka Boiler Mfg Co. Ltd.
 Output: 1600kg/h x 0.59MPa.
 Cranes:
 Provision crane: 2 sets
 Make: Tsuji Heavy Industries Co. Ltd.
 Type: Port side : Luffing type /
 Starboard side : Jib fixed type
 Tasks: For handling provisions and
 spare parts for machinery
 Capacity: Port side : 6.5tonnes /
 Starboard side : 0.9tonnes
 Mooring equipment:
 Number: Windlass: 2 sets / Mooring winch: 9 sets
 Make: Fukushima Ltd.
 Type: Electro-Hydraulic
 Hatch covers:
 Design: Tsuji Heavy Industries Co. Ltd.
 Manufacturer: Tsuji Heavy Industries Co. Ltd.
 Ballast control system:
 Make: Nakakita Seisakusho Co. Ltd.
 Type: Electric valve remote control
 Complement:
 Officers: 11
 Crew: 9
 Supernumeraries/Spare: 2
 Other spaces: 3
 Is bridge fitted for one-man operation? No
 Fire detection system:
 Make: Nippon Hakyuo Electronics Ltd.
 Type: Addressable type fire detector system
 Fire extinguishing systems:
 Cargo holds: Sea water hydrant
 Engine room: High-expansion foam fire extinguisher
 Cabins: Sea water hydrant
 Public spaces: Sea water hydrant
 Radars:
 Number: S-band with ARPA : 1 set, X-band
 with ARPA : 1set
 Make: Japan Radio Co. Ltd.
 Models: JMA-9133-SA / JMA9123-9XA
 Waste disposal plant:
 Incinerator: Sunflame Co. Ltd. OSG-900SDA
 Sewage plant: Taiko Kikai Industries Co. Ltd SBT-25
 Contract date: 26 December 2003
 Launch/float-out date: 25 January 2009
 Delivery date: 31 March 2009





BELUGA HOUSTON: First of Beluga Shipping's new "all-in-one" heavy-lift ships

Shipbuilder: **Volharding Shipyards, The Netherlands in cooperation with Hudong Zhonghua Shipyard, Shanghai, China**
 Vessel's name: **Beluga Houston**
 Hull No: **H1526A**
 Owner/Operator: **Beluga Shipping GmbH / Beluga Fleet Management GmbH**
 Country: **Germany**
 Designer: **Volharding Shipyards**
 Country: **The Netherlands**
 Model test establishment used: **Hamburgische Schiffbau-Versuchsanstalt (HSVA)**
 Flag: **Gibraltar**
 IMO number: **9424546**
 Total number of sister ships already completed (excluding ship presented): **Nil**
 Total number of sister ships still on order: **Nil**

From its foundation in 1995 as a regular cargo carrier Beluga Shipping has developed into a specialist heavy lift carrier with 63 multipurpose heavy-lift carriers in service. Lifting capacities range up to 1400tonnes using tandem cranes and there are plans to increase the fleet to 70 units by the end of 2010.

Beluga Shipping's core business has been the shipping of port cranes and modules for the oil and gas industry and offshore wind industry. On a strategic basis however Beluga sees the super heavy lift segment as an opportunity and accordingly has shifted its focus to that area. In Beluga's view, if complete industrial facilities are to be transported in the course of a project then the number of voyages should be kept to the minimum to reduce the costs as much as possible. To this end Beluga developed the P-class with a view to providing "all-in-one" heavy-lift services.

Beluga Houston, the first of these new P-class vessels, was delivered on 3 December 2009. Ten P-class series have now been delivered or are under construction. Four, including *Beluga Houston*, are of the P2-800 sub-class, with a maximum tandem crane lift of 800 tonnes and six are of the P2-1400 sub-class, with a maximum tandem crane lift of 1400tonnes.

In addition to their heavy-lift capabilities the P-series vessels feature adjustable 'tween-decks to allow carriage of a wide variety of heavy cargoes, GL Ice Class E3 strengthening and moderate fuel consumption. The cranes are faster and stronger than on previous classes of vessels and are equipped with additional loading tackle for smaller cargoes. Below decks high-performance ballast pumps provide compensation for heeling during the loading and discharge of heavy cargoes.

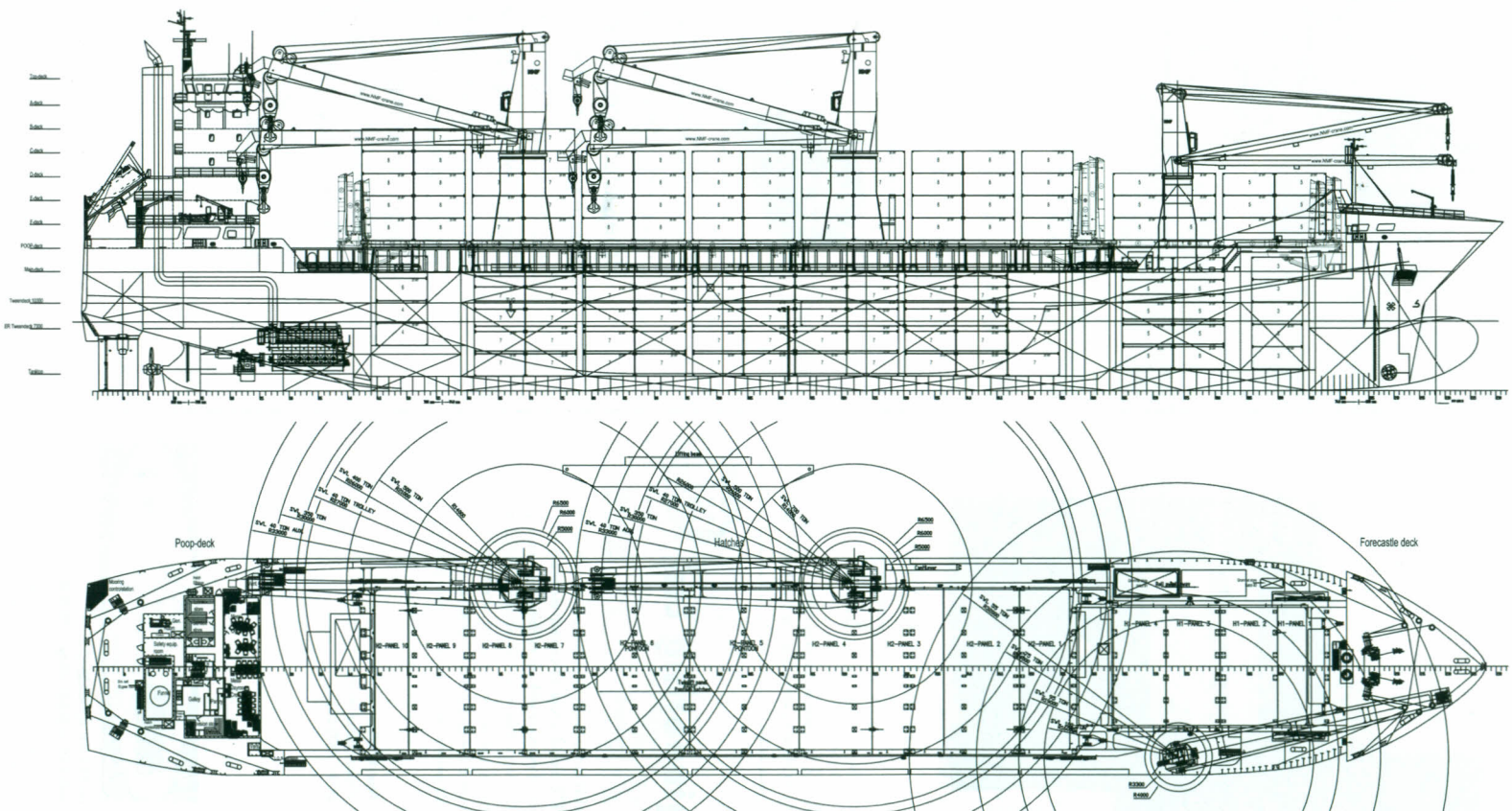
With their ice-class strengthening ships the P-Class will be able to traverse the route of the Northeast

Passage along the Siberian coast which abbreviates the sea transit from Europe to Asia by approximately one-third. The ships will also be fitted with ballast water filtration systems to avoid the so-called "marine invasion" of small creatures and micro-organisms into foreign habitats due to untreated ballast water.

TECHNICAL PARTICULARS

Length oa: 168,68m
 Length bp: 155,79m
 Breadth moulded: 25,20m
 Depth moulded:
 to main deck: 13,85m
 to other decks: Movable 'tween deck (13,85 m, 11,20 m, 8,20 m and 5,20 m in cargo hold #2)
 Width of double skin:
 side: 3620mm on port Side and 2920mm on starboard Side
 bottom: 1700mm
 Draught
 scantling: 9,50m
 design: 8,10m
 Displacement: 30,100tonnes @ 9,50m draft
 Lightweight: 9845,35 tonnes
 Deadweight
 design: 20,500dwt
 scantling: 20,170dwt
 Block co-efficient: 0,784 at 9,50m draft
 Speed, service: 17,5knots @ 90% MCR
 Cargo capacity:
 Cargo Hold #1: 4275m³
 Cargo Hold #2: 22,062m³
 Bunkers:
 Heavy oil: 1500m³
 Diesel oil: 200m³
 Water ballast: 12,000m³
 Daily fuel consumption:
 Main engine only: 38,7tonnes/day at 90% MCR
 Classification society and notations: GL 100 A5, Multipurpose Dry Cargo Ship, Iceclass E3, G (Strengthened for Heavy Cargoes), IWS (In-Water-Survey), EP (Environmental Passport), Equipped for the carriage of dangerous goods, SOLAS II-2, Reg. 19 + MC E3 AUT
 Heel control equipment: Anti-heeling system Hoppe Bordmesstechnik, Hamburg, Germany) 2 pumps 700 m³/h, 4 pairs of side tanks
 Main engine:
 Design: MAN B&W
 Model: 7L 58/64
 Manufacturer: MAN B&W, Augsburg, Germany
 Number: 1
 Type of fuel: HFO
 Output of each engine: 9800kW
 Propeller:
 Material: Ni Al Bronze
 Designer/Manufacturer: MAN Diesel
 Number: 1 x Type VBS1460-ODF
 Fixed/Controllable pitch: CPP
 Diameter: 5100 mm
 Speed: 145rev/min
 Main-engine driven alternators:
 Number: 1 (shaft generator)
 Make/type: AEM SE-450M4

Output/speed of each set: 1500kVA, 1800rev/min
 Diesel-driven alternators
 Number: 3 (plus one emergency generator)
 Engine make/type: Caterpillar (type C32) + SISU Diesel Finland (type 45DSB/G)
 Type of fuel: MGO
 Output/speed of each set: 3 x 850kW, 1 x 150 kW
 Alternator make/type: IS Leroy Somer
 Alternateurs LSA M502S4C6S/4 + ECO38-1SN/4
 Output/speed of each set: 200kW @ 1800rev/min
 Cargo cranes/cargo gear:
 Capacity: Cranes 2&3: 2 x 400 mt SWL handling gear El-Hydr.Cranes NMF, combinable up to 800 mt SWL; Crane: 1 x 120 mt SWL El-Hydr. Cranes NMF;
 Outreach:
 Cranes 2&3: 18m/400tonnes, 22m/325tonnes, 30m/240tonnes, 33m/40tonnes (aux. hoist);
 Crane 1: 16m/120tonnes, 19m/95tonnes, 24m/75tonnes, 2m/55tonnes
 Other cranes: Provisions crane
 Mooring equipment:
 Number: 2 forward and aft mooring winches
 Make & type: MARINER - hydraulic
 Special lifesaving equipment:
 Number of each and capacity: 1 x free fall lifeboat (27 persons) + 1 x rescue boat (6 persons)
 Make: Jiangyin Norsafe
 Type: GES 25 FFB
 Hatch covers:
 Design: MARINER
 Manufacturer: Hudong Zhonghua Shipyard
 Upper Deck: Hatch 1: abt. 23,28m (22,94m opening) x abt. 14,26m (13,76m opening), Hatch 2: abt. 85m (82,40m opening) x abt. 19,46m (18,66m opening)
 Tween deck: Hold 1: 22,94m x 13,76m
 Hold 2: 82,40m x 18,66m
 Containers:
 Lengths: 40' and 20'
 Heights: Normal and high cube
 Cell guides: No
 Total TEU capacity:
 On deck: 488TEU or 228FEU + 32TEU
 In holds: 470TEU or 200FEU + 70TEU
 Homogeneously loaded to 14tonnes: 940TEU
 Reefer plugs: 100FEU
 Water ballast Treatment System:
 Make & capacity: RWO 2 x 500m³/h
 Complement
 Officers & crew: 9 + 14 (incl. trainees)
 Bow thrusters:
 Number & output: 1 x 800kW
 Bridge control system:
 Make & type: SAM Electronics - Multipilot 1100
 Radars:
 Number & make: 3 x FURUNO
 Models: (1 x S-band / 1 x X-band + 1 x X-band at fwd mast)
 Waste disposal plant
 Incinerator: Golar
 Waste compactor: USON Model: UMCC-3
 Sewage plant: JETS
 Contract date: 7 December 2006
 Launch/float-out date: 10 October 2009
 Delivery date: 3 December 2009





C. GALAXY: A 317,000dwt VLCC from Hyundai

Shipbuilder: **Hyundai Heavy Industries Co., Ltd**
 Vessel's name: **C. Galaxy**
 Hull No.: **1964**
 Owner/Operator: **SK Shipping**
 Country: **Korea**
 Designer: **Hyundai Heavy Industries Co., Ltd**
 Country: **Korea**
 Model test establishment used:
 Flag: **Panama**
 IMO number: **IMO 9404924**
 Total number of sister ships already completed (excluding ship presented): **Nil**
 Total number of sister ships still on order: **Nil**

The 317,000dwt VLCC *C. Galaxy*, built by Hyundai Heavy Industries Co., Ltd, was delivered to SK Shipping, Korea, on 13 February 2009.

C. Galaxy is designed to carry three grades of cargo simultaneously. This is handled by three steam turbine cargo pumps, each delivering 5000m³/h, installed in a pump room at the forward of engine room. *C. Galaxy* has five centre cargo oil tanks, five pairs of side cargo oil tanks and one pair of slop tanks aft. Water ballast tanks form the vessel's double skin.

The cargo and ballast control systems of the ship are electro-hydraulically operated. Radar beam type level gauges are fitted to cargo tanks with electro pneumatic type level gauges being used in the ballast tanks.

The vessel is equipped with the highly advanced navigation system which supports integrated bridge operations of the ship such as route planning, manoeuvring for collision and grounding avoidance and navigation monitoring. A large rudder is fitted to ensure good manoeuvrability.

C. Galaxy has an overall length of 336m, width of 60m and depth of 29.6m with a design draft of 20.5m. She is powered by a Hyundai-B&W 6S90MC-C main engine with an MCR output of 29,340kW at 76rev/min, enabling her to sail at a service speed of 16knots. Electric power is supplied by three main diesel generators with an output of 1277kW and one 300kW emergency generator.

The ship is classed by American Bureau of Shipping 1A(E), Oil Carrier, ESP, CSR, SAFESHIP-CM, +AMS, +ACCU, VEC, RW, SPM, UWILD and Korea Register of Shipping + KRS1, Oil Tanker(Double Hull), ESP (CSR), Sea Trust(HCM), +KRM1, UMA, IGS, COW, LI, IWS.

SK Shipping, the Owner of *C. Galaxy* operates more than 10 vessels in the VLCC and Aframax classes and is part of Korea's SK Group of companies. *C. Galaxy* is on long term charter to SK Energy, a member company of the same group.

TECHNICAL PARTICULARS

Length oa: 336m
 Length bp: 324m

Breadth moulded: 60m
 Depth moulded to main deck: 29.6m
 Width of double skin:
 side: 3.55m
 bottom: 3.0m
 Draught:
 scantling: 22m
 design: 20.5m
 Gross: 160,600gt
 Displacement: 364,500tonnes
 Deadweight:
 Design: 289,100dwt
 scantling: 316,400dwt
 Speed, service: 16knots at 90% MCR with 15% sea margin

Cargo capacity:
 Liquid volume: 347,000m³
 Bunkers:
 Heavy oil: 8000m³
 Diesel oil: 380m³
 Water ballast: 101,000m³
 Daily fuel consumption:
 Main engine only: 104.5tonnes/day

Classification society and notations: American Bureau of Shipping, +A1(E), Oil Carrier, ESP, CSR, SAFESHIP-CM, +AMS, +ACCU, VEC, RW, SPM, UWILD, Korean Register of Shipping +KRS1, Oil Tanker(Double Hull), ESP, (CSR), Sea Trust(HCM), +KRM1, UMA, IGS, COW, LI, IWS

Main engine:
 Design: MAN - B&W
 Model: 6S90MC-C
 Manufacturer: Hyundai-B&W
 Number: 1
 Type of fuel: HFO
 Output: 29,340kW@76rev/min(MCR), 26,406kW@73.4rev/min(NCR)

Propeller(s)
 Material: Ni-Al Bronze
 Designer/Manufacturer: HHI-EMD
 Number: 1
 Fixed/Controllable pitch: Fixed
 Diameter: 9.6m x 4 blades
 Speed: 76rev/min at MCR, 73.4rev/min at NCR

Diesel-driven alternators
 Number: 3
 Engine make/type: Hyundai-Himsen / 7H21/32
 Type of fuel: HFO
 Output/speed of each set: 1277kW / 900rev/min
 Alternator make/type: HHI-EES / HFJ 568-8P
 Output/speed of each set: 1200kW / 900rev/min

Boilers
 Number: 2
 Type: Auto. Forced draft, HFO burning, marine boiler
 Make: Mitsubishi Heavy Industries

Output, each boiler: 45,000kg/h @ 16/6 bar(g)
 Cargo cranes/cargo gear
 Number: 2
 Make: Oriental Precision
 Type: Electro-hydraulic, cylinder luffing
 Performance: 20tonnes, 10m/min

Other cranes:
 Number: 2
 Make: Oriental Precision
 Type: Electro-hydraulic, cylinder luffing
 Tasks: Handling provision and spare parts
 Performance: 10/3tonnes, 10/25m/min

Mooring equipment:
 Number: 2 windlass/mooring winch combinations, 8 mooring winches
 Make: Rolls-Royce
 Type: Electro-hydraulic, low pressure

Special lifesaving equipment:
 Number of each and capacity: 2, 30 persons each.
 Make: Hyundai Lifeboat
 Type: Totally enclosed, FRP

Cargo tanks:
 Number: 5 at centre, 10 at sides
 Grades of cargo carried: Crude oil (Three grades simultaneously)

Cargo pumps:
 Number: 3
 Type: Vertical centrifugal
 Make: Hyundai Heavy Industries Co., Ltd.
 Capacity (each): 5000m³/h

Cargo control system:
 Make: Emerson Marine
 Type: Electro-Hydraulic

Complement:
 Officers: 12
 Crew: 18
 Suez/Repair Crew: 6
 Single/double/other rooms: 30 single, 1 multiple

Bridge control system:
 Make: Kongsberg
 Type: Autochief-C20
 Is bridge fitted for one-man operation? Yes

Fire detection system:
 Make: Saracom-Thorn
 Type: T2000, Addressable type

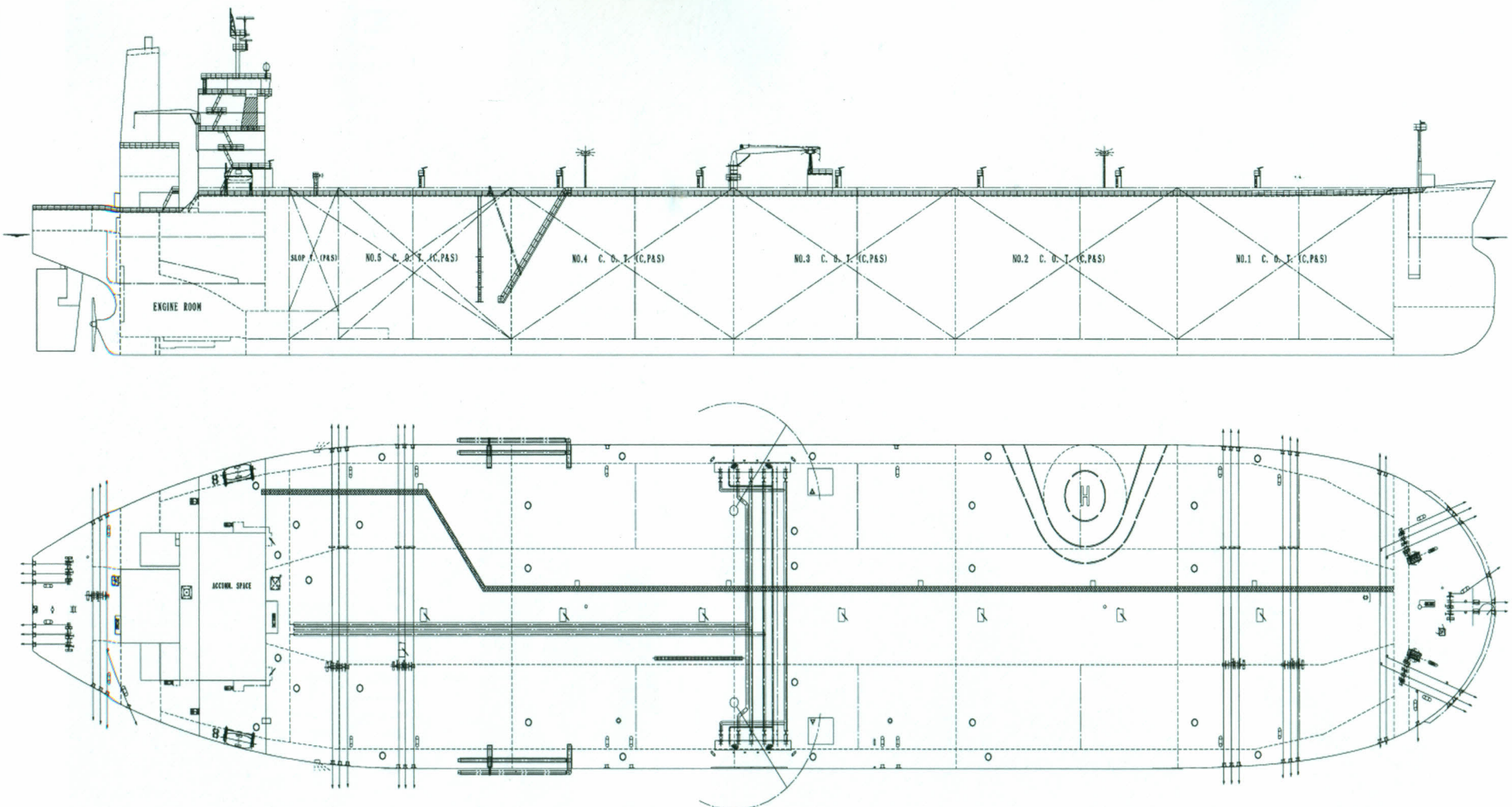
Fire extinguishing systems:
 Engine room: Kashiwa high expansion foam

Radars:
 Number: 2
 Models: Furuno FAR-2827, FAR-2837S

Integrated bridge:
 Make: Furuno

Waste disposal plant:
 Incinerator: G-C Tech Co. Ltd. Model GC-100IR

Contract date:
 Launch/float-out date:
 Delivery date: 13 February 2009





CAPE GARLAND: Second of eleven Dunkerque-max bulkers from Mitsui

Shipbuilder: **Mitsui Engineering & Shipbuilding Co., Ltd**
 Vessel's name: **Cape Garland**
 Hull No.: **1693**
 Owner/Operator: **Ri Shen Shipping Pte. Ltd**
 Country: **Singapore**
 Designer: **Mitsui Engineering & Shipbuilding Co., Ltd**
 Country: **Japan**
 Model test establishment used: **Akishima Laboratory (Mitsui Zosen) Inc**
 Flag: **Singapore**
 IMO number: **9397846**
 Total number of sister ships already completed (excluding ship presented): **1**
 Total number of sister ships still on order: **9**

Cape Garland is a newly designed Capesize bulk carrier of Dunkerque-max type, designed to suit the restrictions of the French port of Dunkerque. She was delivered to her Owner, Ri Shen Shipping Pte. Ltd of Singapore at Mitsui's Chiba Works on 30 January 2009 and is operated by K-Line.

Cape Garland was designed with double-skin cargo holds for effective cargo handling, easy maintenance of cargo holds and structural safety. Mitsui claims that notwithstanding the double-skin design the cargo capacity of the ship is equivalent to that of conventional capesize bulk carriers with holds bounded by a single skin. The ship was designed in accordance with IACS URS25 so that loading flexibility has been secured and structural safety has been improved.

Suitable arrangement of means of access as required by SOLAS enables safe and effective inspection in cargo holds and ballast tanks and further improvement of safety has been achieved by installation of a forecastle and by application of new requirements concerning reserve buoyancy to the ship.

Separate settling and service tanks for low sulphur HFO and regular HFO are provided to facilitate the changeover between low sulphur HFO and regular HFO in a SOx Emission Control Area. A low sulphur diesel oil tank and regular diesel oil tank are provided for the same reason.

The ship's main engine is a Mitsui-MAN B&W 6S70MC-C diesel, which satisfies International Maritime Organization Environment Standards for Exhaust Gas and achieves improvement of fuel saving

by optimum matching at normal service output. An electronic controlled cylinder oiling system is applied to the main engine achieving operational cost saving. Efficient ballasting and de-ballasting is facilitated by the separation of topside and bottom ballast tanks.

TECHNICAL PARTICULARS

Length oa: 292.00m
 Length bp: 282.00m
 Breadth moulded: 44.98m
 Depth moulded to upper deck: 24.70m
 Draught:
 scantling: 17.95m
 design: 16.50m
 Gross: 92,278gt
 Deadweight (scantling): 178,394dwt
 Speed, service: 15.3knots
 Cargo capacity:
 Grain: 197,392m³
 Bunkers:
 Heavy oil: 5503m³
 Diesel oil: 316m³
 Water ballast (m³): 80,089m³
 Classification society and notations: Class NK
 (Nippon Kaiji Kyokai) NS*, BULK CARRIER - TYPE A, ESP, MNS* (MO) WITH DESCRIPTIVE NOTE
 "STRENGTHENED FOR HEAVY CARGOES, HOLD NOS. 2, 4, 6 & 8 MAY BE EMPTY"
 Main engine:
 Design: Mitsui MAN B&W
 Model: 6S70MC-C (Mark 7)
 Manufacturer: Mitsui Engineering & Shipbuilding Co., Ltd
 Number: 1
 Type of fuel: HFO
 Output: 18,660kW/91min-1
 Propeller:
 Material: Ni-Al-Bronze
 Designer/Manufacturer: Nakashima Propeller
 Number: 1
 Fixed/Controllable pitch: Fixed pitch
 Speed: 91rev/min
 Diesel-driven alternators:
 Number: 3
 Engine make/type: Yanmar Diesel/6EY18AL
 Type of fuel: HFO

Output/speed of each set: 660kW/900rev/min
 Alternator make/type: Taiyo Electric/FE547A-8
 Output/speed of each set: 620kW/900rev/min

Boilers:
 Number: 1
 Type: Composite
 Make: Osaka Boiler
 Output: 1600kg/hr (oil fired)/ 1400kg/hr (exhaust gas)

Cargo cranes/cargo gear: None fitted

Other cranes:
 Number: 1
 Make: Kyoritsu Kikai
 Type: Electric driven
 Tasks: Provision & machinery parts handling
 Performance: 53.9kN x 14m/min.

Mooring equipment:
 Number: 8
 Make: Nippon Pusnes
 Type: Electro-hydraulic

Hatch covers:
 Design: MacGREGOR-Kayaba
 Manufacturer: MacGREGOR-Kayaba
 Type: Side rolling

Ballast control system:
 Make: Nakakita
 Type: Electro-hydraulic, conventional mimic console

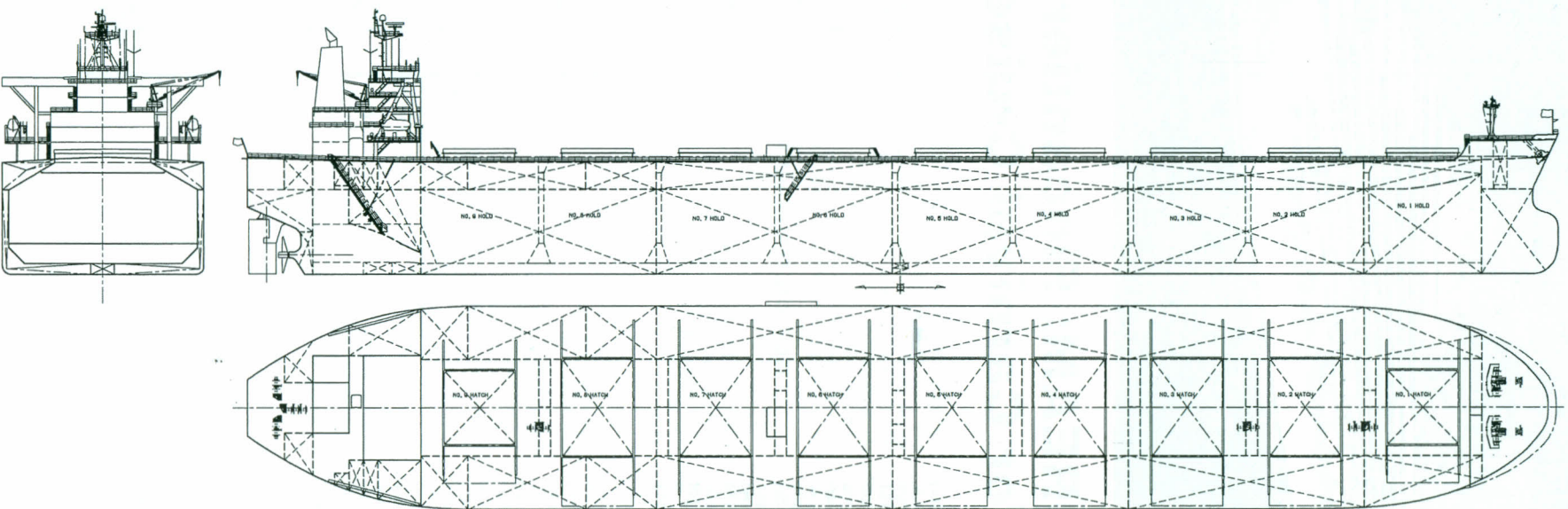
Complement
 Officers: 11
 Crew: 17

Fire detection system
 Make: Nohmi Bosai
 Type: FAC551B-25L

Fire extinguishing systems
 Cargo holds: Sea water
 Engine room: Kashiwa high expansion foam
 Cabins: Sea water
 Public spaces: Sea water

Radars
 Number: 2
 Make: JRC
 Model(s): 1 x JMA-9132-SA, 1 x JMA-9122-6XA

Waste disposal plant
 Incinerator: Sunflame OSV-600SAI
 Contract date: 26 December 2005
 Launch/float-out date: 25 November 2008
 Delivery date: 30 January 2009





CARNIVAL DREAM: Fincantieri's largest cruise ship for Carnival Cruises

Shipbuilder: **Fincantieri Cantieri Navali Italiani S.p.A.**
 Vessel's name: **Carnival Dream**
 Hull No: **6151**
 Owner/Operator: **Carnival Corporation**
 Port of Registry: **Panama**
 Designer: **Fincantieri Cantieri Navali Italiani S.p.A.**
 Country: **Italy**
 Model test establishment used: **Vienna Model Basin & Marin - Wageningen**
 Flag: **Panama**
 IMO number: **9378474**
 Total number of sister ships already completed (excluding ship presented): **Nil**
 Total number of sister ships still on order: **1**
(Carnival Magic to be delivered in 2011)

Fincantieri, the builder of *Carnival Dream*, hails the vessel as an enterprise, which will make its mark in the history of shipping. At 130,000gt and 306m long, with 2558 cabins accommodating approximately 6000 people (4633 guests and 1367 crew) she is one of the largest and most advanced cruise ships in the world. More than 5.5 million hours over a period of three years were spent to build her, involving around 5000 people working full time. Incorporating high technological standards and maximum passenger comfort, the new vessel weds majestic dimensions with a modern, eye-catching design. Thanks to advanced engineering solutions the public areas of *Carnival Dream*, unlike the ships which preceded her, are open to the outside, meaning that for the first time passengers will be able to walk round the whole perimeter of the ship along a walkway on Deck 5. Furthermore, the ship affords a wide range of entertainment satisfying the diverse tastes and demands of international customers, including a water park on the top-most deck with a four-slide installation.

Since 1990 Fincantieri, a world leader in the sector, has built 50 cruise ships, 47 of them for different brands in Carnival Group. A further 12 vessels are scheduled to be built in the group's shipyards by 2012.

Carnival Dream is 306m in overall length with a beam of 37m. She has 14 decks and can accommodate her 4633 passengers in 1823 cabins, 1145 of which are outside cabins, each with a private terrace. The ship is powered by a diesel-electric azipod propulsion system, allowing a cruising speed of 22.5knots.

Carnival Dream also includes a tropical, resort-style main pool, a giant LED screen, and a nine-hole golf course covering two decks. The ship's dance club can be opened up to allow access to outside decks during good weather. The Deluxe Ocean View staterooms have a full bathroom with shower, plus a separate

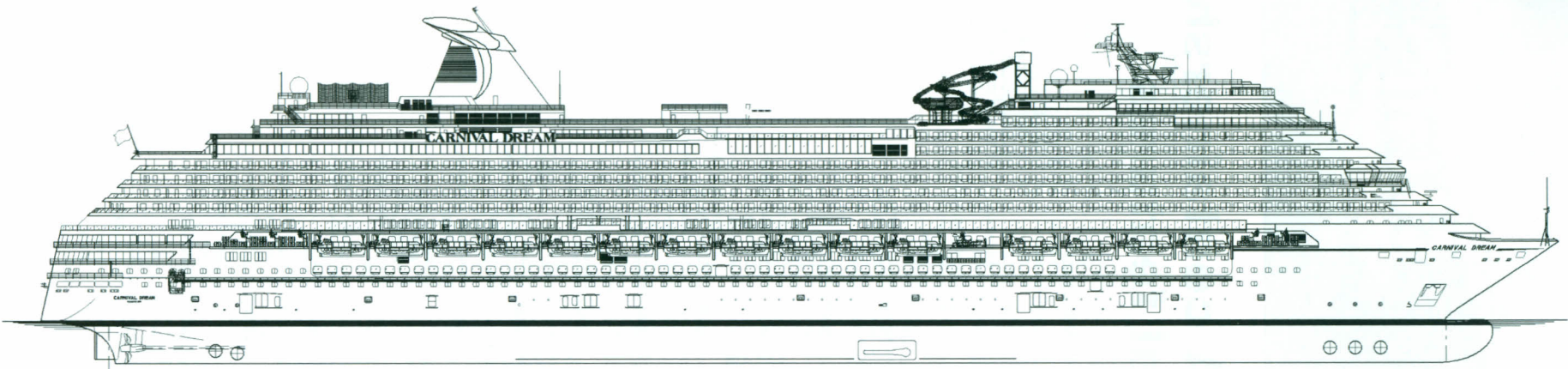
washroom sink and junior tub. Cove Balconies are a new category of stateroom, located on the lower Riviera Deck, which are closer to the waterline and offer smaller terraces with excellent ocean views as an alternative to larger balcony staterooms.

Carnival Dream is based at Port Canaveral (Orlando) Florida from where she operates alternating seven-days Eastern and Western Caribbean cruises.

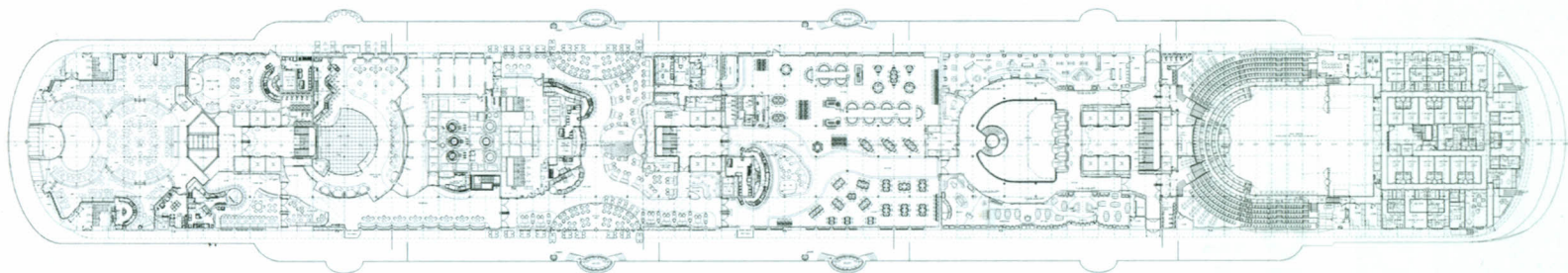
TECHNICAL PARTICULARS

Length oa: 305.60m
 Length bp: 269.20m
 Breadth moulded: 37.20m
 Depth moulded:
 to bulkhead deck: 11.2m
 to lido deck: 40.95m
 Draught:
 scantling: 8.40m
 design: 8.20m
 Gross: 128,251gt
 Deadweight (contractual): 10,250dwt
 Speed, service: 20.0knots
 Bunkers:
 Heavy oil: 3981m³
 Diesel oil: 255m³
 Water ballast: 12,105m³
 Classification society and notations: Lloyd's Register of Shipping Rules and Regulations, +100 A1, + LMC, UMS, Passenger Ship Unrestricted Service, Underwater Survey.
 Roll-stabilisation equipment: Fincantieri Navy Division
 Main engines:
 Design: Wartsila
 Model: 12 V 46 C
 Manufacturer: Wartsila Italy
 Number: 6
 Type of fuel: HFO up to 380 cST /50°C
 Output of each engine: 12,600kW at 514rev/min
 Propulsion motors:
 Number: 2
 Type: Synchronous
 Make: Converteam
 Output/speed: 22MW/133rev/min (each motor)
 Propellers:
 Material: Ni-Al-Bronze
 Designer/Manufacturer: MNG
 Number: 2
 Fixed/Controllable pitch: C.P. Propeller
 Diameter: 5800mm
 Speed: 140rev/min
 Main-engine driven alternators:
 Number: 6
 Make/type: Asi GSCR 11 Y 14
 Output/speed of each set: 14MVA / 514rev/min
 Fuel oil fired boilers:
 Number: 2
 Type: Vertical Cylindrical furnace

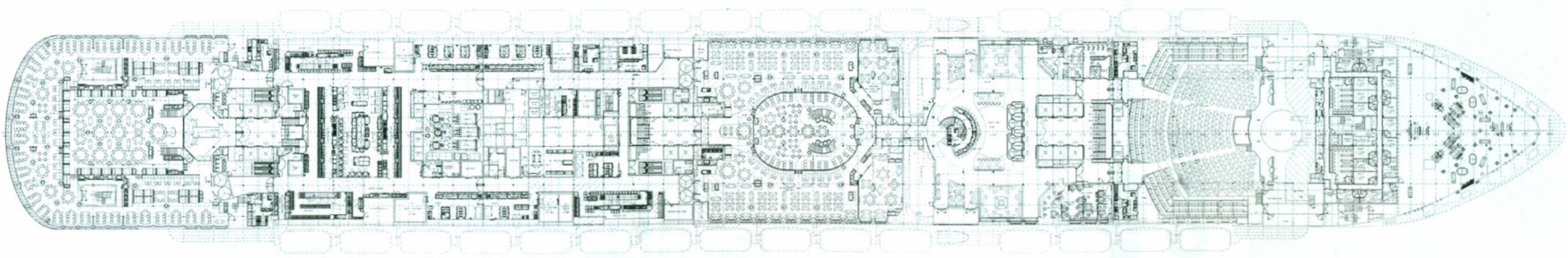
Make: Aalborg Industries
 Output, each boiler: 15,000kg/h at 9bar
 Exhaust Gas Boilers:
 Number: 6
 Make: Casinghini Heatex S.R.L.
 Output, each boiler: 3400Kg/h
 Mooring equipment:
 Number: 3mooring winches forward + 3 winches aft
 Make: Hydralift BLM
 Type: Electric type
 Special lifesaving equipment:
 90 davit-launched liferaft (each 30 persons)
 Make: Viking Life-Saving Equipment
 29 lifeboats (cap. 150 persons)
 One combined tender boat/life boat (cap. 150 seats as lifeboat)
 Two Rescue boats (cap. 6 persons)
 Make: Hatecke
 Complement:
 Officers: 51
 Crew: 38 petty officers, 1278 other crew
 Total: 1367 crew in 735 crew cabins
 Passengers: 4633 passengers in 1823 cabins
 Total people on board: 4633 passengers
 + 1367 crew = 6000
 Total number of cabins: 1823 passenger
 + 735 crew = 2558
 Stern appendages/special rudders: High lift twisted rudders
 Bow thrusters:
 Make: Fincantieri Naval Vessels Business Unit.
 Number: 3
 Output (each): 2200kW
 Stern thrusters:
 Make: Fincantieri Naval Vessels Business Unit.
 Number: 2
 Output (each): 2200kW
 Bridge control system:
 Make: SAM electronics
 Type: Nacos 65-5
 Fire detection system:
 Make: Autronica
 Type: Autromaster 5000
 Fire extinguishing systems:
 Engine room: Tyco CO₂ system and Local application
 Cabins: Marioff sprinkler Hi-Fog System
 Public spaces: Marioff sprinkler Hi-Fog Sistem
 Radars:
 Number & make: 2 x SAM electronics
 Models: 8ft X band GR3004G160, 14ft S-band GR3021G090
 Waste disposal plant
 Waste handled: Norsk Inova
 Waste compactor: Norsk Inova
 Food Waste treatment: Norsk Inova
 Sewage plant: ISIR Bioepuro B 600 (Seven units)
 Contract date: 31 January 2006
 Launch/float-out date: 24 October 2008
 Delivery date: 18 September 2009



Deck 5



Deck 3





CMA CGM ANDROMEDA: A containership with special environmental features

Shipbuilder : **Hyundai Heavy Industries Co., Ltd**
 Vessel's name : **CMA CGM Andromeda**
 Hull No: **1992**
 Owner/Operator : **CMA-CGM**
 Country : **France**
 Designer : **Hyundai Heavy Industries Co., Ltd**
 Country : **South Korea**
 Flag: **United Kingdom**
 IMO number: **IMO 9410727**
 Total number of sister ships already completed (excluding ship presented): **1**
 Total number of sister ships still on order : **10**

The 11,400TEU class containership *CMA CGM Andromeda* built at Hyundai Heavy Industries (HHI) was delivered to CMA CGM, in March 2009.

The vessel features a wider beam which ensures a better stability during sailing for worldwide service and it is also designed to have superior propulsion efficiency against the various draughts, which will be caused by loading scheme.

The vessel has 10 holds, eight of which are arranged forward of the engine room (20ft container/34 bay) and two are backward (20ft container/8 bay) and a maximum of 16 rows and 11 tiers of containers can be stowed in the holds. Two air changes per hour are provided to the entire holds.

CMA CGM Andromeda can carry a maximum 16 rows of containers in the holds and 18 rows on the deck. The total TEU capacity is 11,388, of which 5844TEU in holds and 5544TEU on deck with 800FEU reefer sockets on deck/hatches. Pontoon type hatch covers close the 10 holds.

Each hatch cover is made up of four panels with maximum panel weights kept below 40tonnes to suit handling by port cranes. The vessel is arranged to carry 20ft, 40ft and 45ft containers and cargo holds are provided with 40ft fixed cell guide.

Athwart lashing bridges are arranged with necessary fittings so that containers on hatch covers/stools on the upper deck can be easily lashed.

The vessel is provided with both optimum section profile of rudder (Becker) and tip-raked propeller to reduce the possible cavitations. For durability of the outside shell, tin-free self-polishing anti-fouling paint and ICCP are applied to the vessel.

Environmentally *CMA CGM Andromeda* is the world's first containership to be equipped with the "Fast Oil Recovery System" designed to help prevent marine pollution. Using a system that allows, if need be, a fast recovery of the oils in the tanks without having to open a hole in the vessel's hull. Initially designed for oil tankers, this device was adapted to containerships by CMA CGM's New Buildings Department and the French company JLMD Ecologic Group.

CMA CGM Andromeda also features a number of new environmental technologies, including:

- An electronically controlled engine, optimising

fuel and lubricants consumption, which are respectively reduced by 3 and 25%.

- An optimised hull design and a Twisted Leading Edge Rudder improving the vessel's hydrodynamic qualities.
- Pre-equipment allowing the use of alternative maritime power while at berth.

TECHNICAL PARTICULARS

Length oa: 363m
 Length bp: 348m
 Breadth moulded: 45.6m
 Depth moulded to upper deck: 29.74m
 Width of double skin:
 side: 2.35m
 bottom: 2.2m
 Draught:
 scantling: 15.5m
 design: 13m
 Gross: 131,330gt
 Displacement: 171,370tonnes
 Deadweight:
 Design: 97,160dwt
 scantling: 131,260dwt
 Speed, service: 24.7 knots at 90% MCR and 15m draft
 Bunkers:
 Heavy oil: 15,100m³
 Diesel oil: 450m³
 Water ballast: 27,300m³
 Daily fuel consumption:
 Main engine only: 261.4tonnes/day
 Auxiliaries: 35.8tonnes/day
 Classification society and notations: Bureau Veritas,
 +HULL, Unrestricted Navigation, Container ship,
 +MACH, +AUT-UMS, +AUT-PORT,
 INWATERSURVEY, +VeriSTAR-HULL, LASHING, SDS
 Heel control equipment: Anti-heeling pump (1300m³/h)
 Roll-stabilisation equipment: Nil
 Main engine:
 Model: 12K98ME-C7
 Manufacturer: Hyundai- B&W
 Number: 1
 Type of fuel: HFO
 Output of each engine: 72,240kW@104rev/min (MCR),
 65,016kW@100.4rev/min (NCR)
 Propeller:
 Material: Ni-Al Bronze
 Designer/Manufacturer: HHI-EMD
 Number: 1
 Fixed/Controllable pitch: Fixed
 Diameter: 8.9m x 6 blades
 Speed: 104rev/min at MCR, 100.4rev/min at NCR
 Diesel-driven alternators:
 Number: 5
 Engine make/type: Hyundai-B&W, 9L27/38 x 2sets,
 7L27/38 x 3 sets
 Type of fuel: HFO
 Alternator make/type: HHI-EES, RAH005 x 2sets,
 RAH017x 3sets
 Output/speed of each set: 2820kW@720rpm x 2 sets,
 2195kW@720rpm x 3 sets
 Boilers:
 Number: 1
 Type: Auto. forced draft, HFO burning, cylindrical
 marine boiler
 Make: Aalborg Industries Ltd

Output, each boiler: 5500kg/h@7bar (g)
 Cranes:
 Number: 1
 Make: FUCHS
 Type: Electric motor driven monorail hoist
 Tasks: Handling provision and spare parts
 Performance: .. 12.5tonnes lifting capacity, 5m outreach
 beyond vessel's parallel body

Mooring equipment:
 Number: 2 windlass, 10 winch for mooring
 Make: Rolls Royce
 Type: Electric auto- tension
 Hatch covers:
 Manufacturer: SEOHAE
 Type: Pontoon, non sequential operating,
 non-tight, open type construction

Containers:
 Lengths: 20ft
 Heights: 8ft6"
 Cell guides: Fixed for 40 feet container
 Total TEU capacity: 11,388
 On deck: 5544
 In holds: 5844
 Homogeneously loaded to 14tonnes: 8100
 Reefer plugs: 800FEU on deck
 Tiers/rows (maximum)
 On deck: 8/18
 In holds: 11/16

Ballast control system:
 Make: Emerson Marine
 Type: Electro-Hydraulic actuator

Complement:
 Officers: 13
 Crew: 18
 Supernumeraries/Spare: 1
 Suez/Repair Crew: 7
 Single/double/other rooms: 29/2/1

Passengers:
 Total: 5
 Number of cabins: 5

Bow thruster:
 Make: Kawasaki Heavy IND.
 Number: 1
 Output: 3000kW

Bridge control system:
 Make: Sperry Litton Marine
 Is bridge fitted for one-man operation: Yes

Fire detection system
 Make: Autronica
 Type: Addressable type

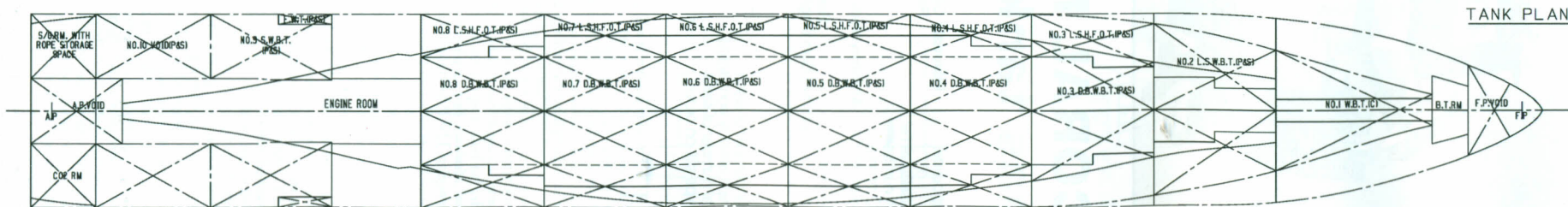
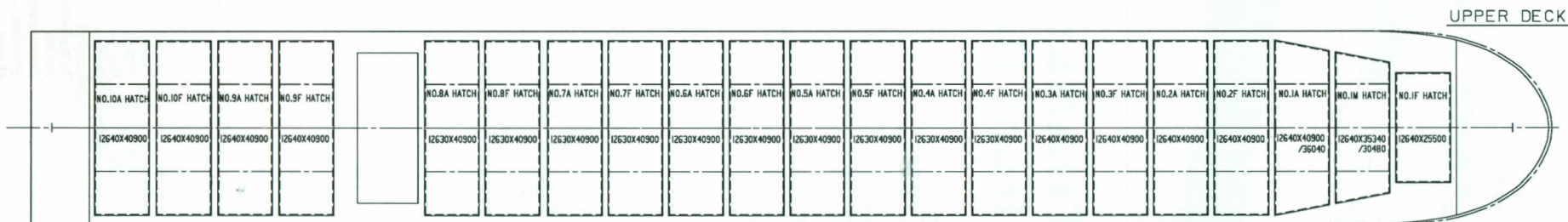
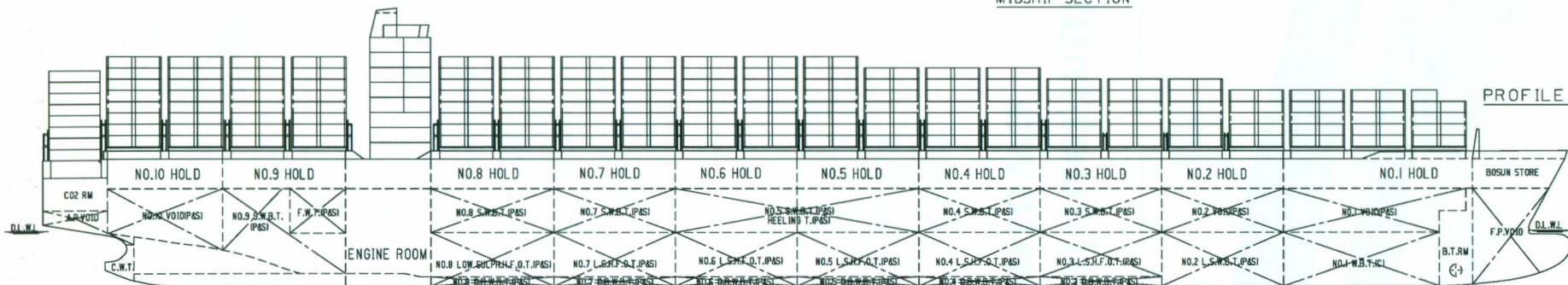
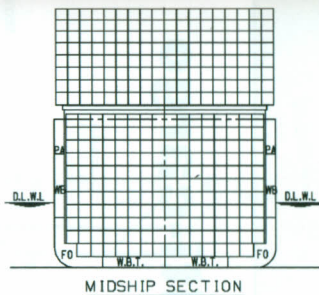
Fire extinguishing systems
 Cargo holds: CO₂ system
 Make/Type: NK Co., Ltd/high pressure
 Engine room: CO₂ system
 Make/Type: NK Co., Ltd/high pressure

Radars:
 Number: 1 S-band radar,
 2 X-band radar scanners
 Make: Sperry Marine
 Model: VisionMaster FT 340

Integrated bridge system:
 Make: Sperry Marine
 Model: VMS VisionMaster FT

Sewage plant
 Make: Hamworthy
 Model: ST6A

Delivery date: 18 March 2009





CORAL METHANE: Dual-fuel/multi-cargo gas tanker from Remontowa

Shipbuilder: **Pilsudski Gdansk Repair Yard**
Remontowa, Poland
Vessel's name: **Coral Methane**
Hull number: **1889**
IMO number: **9404584**
Owner/operator: **Anthony Veder Rederijzaken BV**
/ Gasno AS
Designer: **Remontowa, Poland/**
Tractebel Gas Engineering, Germany
Model test establishment used: **ICEPRONAV,**
Romania
Flag: **The Netherlands**
Total number of sister
ships already completed: **Nil**
Total number of sister
ships still on order: **Nil**

MORE readily known as a shiprepairer and expert in complicated conversion work, Gdansk-based Remontowa has recently also built up a sizeable reputation building 'one-off' ferries and specialised cargo vessels. The ice-strengthened *Coral Methane* is an excellent example of this yard's products, combining as it does, an unusual dual-fuel propulsion system, with a facility to transport both LNG and LPG, and a range of petrochemical gases such as ethylene, propylene, and ethane – cargoes upon which Dutch owner Anthony Veder has built a reputation for transporting worldwide. *Coral Methane's* first employment will be a charter to Norwegian LNG distributor Gasnor, delivering to an expanding gas consuming market around that country's fjords and coastline.

The cargo system has been developed by German exponent, Tractebel Gas Engineering (TGE), and is centred upon two independent, cylindrical, stainless steel tanks of IMO Type-C specification, housed in separate compartments within the double skin hull. Designed to transport cargoes of maximum density 0.65tonnes/m³, saturated pressure 3.0bar, and temperatures ranging to -163°C, the tanks are fully insulated and covered by galvanised steel sheets for protection. All gas piping is of stainless steel, and cargo is handled using two Svanehoj 480m³/h pumps, assisted by a 300m³/h booster pump. Reliquefaction plant, gas fuel supply, and cargo treatment systems are arranged in a deckhouse on the trunk deck.

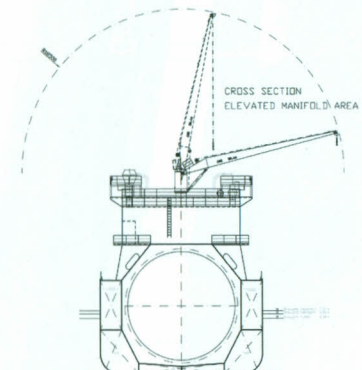
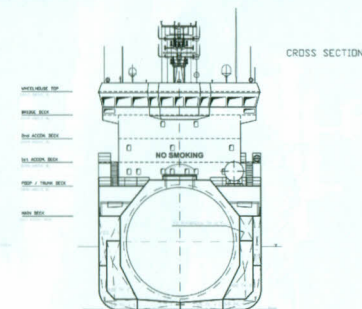
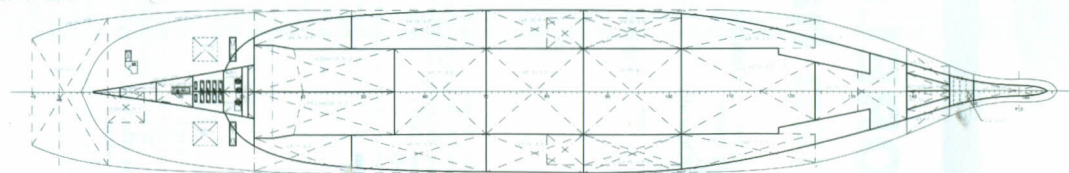
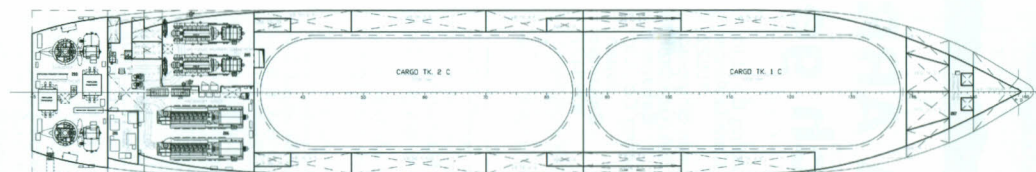
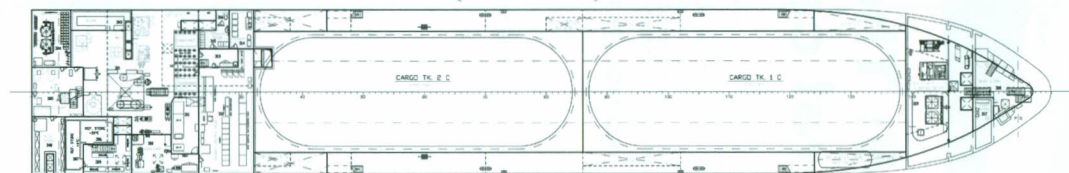
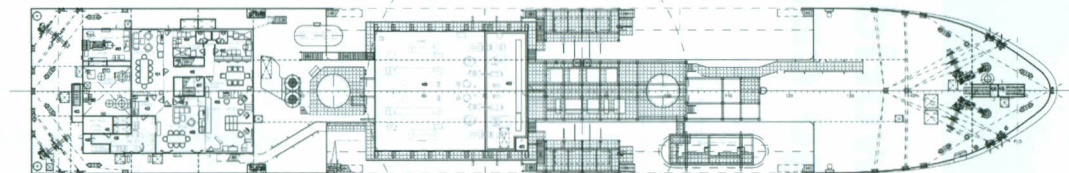
The major components of the diesel-electric, dual-fuel power system have been supplied by Rolls-Royce, to produce electric current for both domestic and propulsion purposes. The system is based on four alternators, two of which are driven by diesel engines using heavy/diesel oil fuel, and installed at the starboard side of the machinery space, and two driven by spark ignited gas engines installed port side, and fuelled by LNG. Both sets of prime mover have been supplied by Bergen Diesel, with the alternators coming from Alconza. The optional use of fuel depends on the cargo carried: if this is LNG, then boil-off or vaporised gases from that are used, if other gases are being carried, diesel/heavy oil is used.

Ship propulsion is by means of twin Rolls-Royce Ulstein Aquamaster 'pulling' type thrusters, positioned aft, each side of a central skeg, and taking their power from two Alconza main electric motors of 2450kW each. Two small 'buffer' gas tanks are installed on the main deck, serving as intermediaries when transferring evaporated gas to the gas-driven engines.

TECHNICAL PARTICULARS

| | |
|---|--|
| Length, oa | 117.80m |
| Length, bp | 110.20m |
| Breadth, moulded | 18.60m |
| Depth, moulded | |
| to main deck | 10.60m |
| to upper deck | 14.00m |
| Draught | |
| design | 6.80m |
| scantling | 7.15m |
| Gross | 7904gt |
| Displacement, design draught | 9966tonnes |
| Lightweight | 4851tonnes |
| Deadweight | |
| design | 5115dwt |
| scantling | 7500dwt |
| Block coefficient, 6.80m draught | 0.69 |
| Speed, service, 85% MCR, 15% weather margin | 15.5knots |
| Cargo capacity, refrigerated gases | 2 x 3750m ³ tanks |
| Bunkers | |
| heavy oil | 640m ³ |
| diesel oil | 127m ³ |
| Water ballast | 2655m ³ |
| Fuel consumption | |
| main engines | 16.5tonnes/day LNG when transporting LNG, 30.1tonnes/day HFO when transporting other gases and cooling down |
| Classification | Bureau Veritas I +Hull, +Mach, Liquefied Gas Carrier Type 2C, Unrestricted Navigation, Ice Class 1B, Inwatersurvey, +AUT-UMS, AVM-DPS, MON-SHAFT, Cleanship Super, Cold, also Finnish Ice Class 1B |
| Diesel-electric power system | |
| Main diesel-driven alternators | |
| Diesel engines | Bergen Diesel B32.40L8A |
| Type of fuel | HFO & MGO |
| Number | 2 |
| Output/speed | 2 x 3840kW/720rev/min |
| Alternators | Alconza |
| Number | 2 |
| Output | 2 x 2606kVa |
| Gas engines | Bergen Diesel KVBG-12G4 |
| Type of fuel used | LNG |
| Number | 2 |
| Output/speed | 2 x 2385kW/900rev/min |
| Alternators | Alconza |
| Number | 2 |
| Output | 2 x 2850kVa |

| | |
|--|---|
| Main electric motors | |
| Manufacturer | Alconza |
| Number | 2 |
| Output | 2 x 2450kW |
| Propulsion units | |
| Manufacturer | Rolls-Royce Ulstein Aquamaster |
| Number/type | 2 x azimuthing thrusters/ AZP120FP NBC 35 TME |
| Propeller material | Nickel-aluminium-bronze |
| Pitch | fixed |
| Diameter, each | 3000mm |
| Speed at MCR | 200rev/min inboard |
| Electrical connections for shore power | |
| Manufacturer | MORS |
| Boilers | |
| Manufacturer | Heatmaster |
| Number/type | 1 x thermal oil heater/HTF 2300, 2300kW |
| | 1 x exhaust gas heater/ETF 4-48, 570kW at 80% load of main gas alternators |
| | 1 x exhaust gas heater/ETF 4-52, 630kW at 80% load of main diesel alternators |
| Cargo tanks | |
| Number | 2 x 3750m ³ cylindrical |
| Grades of cargo carried | refrigerated LNG/LPG/LEG |
| Coated tanks | Thermal insulation suitable for inside temp -163°C |
| Stainless steel | Cargo and supply pipes for gas and main engines |
| Cargo pumps | |
| Number | 2 x 480m ³ /h |
| Manufacturer | Hamworthy Svanehoj |
| Booster pump | 1 x 300m ³ /h |
| Cargo control system | |
| Make | Siemens PLC system S7-400 |
| Ballast control system | |
| Make | S-two GmbH/Praxis Meta Guard |
| Complement | |
| Officers | 7 |
| Crew | 8 |
| Bow thruster | |
| Make | Rolls-Royce |
| Number | 1 x electric CP propeller, hydraulic control |
| Output | 600kW/374rev/min |
| Bridge control system | |
| Make/type | Rolls-Royce Helikon X-3 |
| One man operation | No |
| Fire detection system | |
| Make/type | Consilium/Salwico CS 4000 |
| Fire extinguishing systems | |
| Cargo tanks | Semco dry powder |
| Engine room | Semco CO ₂ |
| Radars | |
| Number | 2 |
| Make | Sperry |
| Models | Visionmaster FT 340 ARPA S; FT 340 FT 340 ARPA X |
| Contract date | 30 June 2006 |
| Launch/float-out date | 8 May 2008 |
| Delivery date (contract) | 29 April 2009 |





CORELLA ARROW: The world's largest open hatch general cargo carrier

Shipbuilder: **Oshima Shipbuilding Co., Ltd**
 Vessel's name: **Corella Arrow**
 Hull No.: **10522**
 Owner/Operator: **Glory Ocean Shipping S.A./Gearbulk**
 Country: **Bahamas**
 Designer: **Oshima Shipbuilding Co., Ltd**
 Country: **Japan**
 Flag: **Bahamas**
 IMO number: **9385477**
 Total number of sister ships already completed (excluding ship presented): **1**
 Total number of sister ships still on order: **2**

Corella Arrow, at 72,863dwt the world's largest open-hatch general cargo carrier, was delivered to Glory Shipping S.A. by Oshima Shipbuilding on 11 May 2009. *Corella Arrow* is operated by Gearbulk.

The vessel displays several significant features in the form of Oshima's Seaworthy bow and Flipper-fins and a high-lift Schilling rudder.

The Seaworthy bow is stated to give an average of five percent less fuel consumption under North Atlantic conditions and to reduce the speed loss when heading into waves. The Flipper-fins, fitted at the bilge, are stated to deflect the bilge vortex to achieve wake gain and reduce propeller-hull interaction, giving up to four percent reduction in fuel consumption.

The high-lift Schilling rudder improves manoeuvrability when compared with a conventional rudder. When combined with a bow thruster it provides effective manoeuvrability in restricted areas such as ports.

The ship's design will accommodate a wide variety of cargoes including pulp, packaged lumber, ore, grain, roll paper, aluminium ingots, coal and other solid bulk cargoes. On her maiden voyage *Corella Arrow* delivered components of a large stacker-reclaimer from Korea to Fraser-Surrey Docks, Vancouver, Canada.

Corella Arrow is a general cargo carrier of 225m length overall. She has eight cargo holds which are serviced by two 70tonnes SWL deck mounted travelling gantry cranes. The propulsion machinery, accommodation and wheelhouse are located aft and up to 445TEU container units can be carried above deck. A single propeller driven by a 12,577 Kawasaki MAN B&W 6S60ME-C diesel engine provides a service speed of 15.5knots.

Oshima Shipbuilding is a joint venture between the Sumitomo Corporation, Sumitomo Heavy Industries, and the Daizo Corporation. The company was founded on in 1973 and began operations in June 1974. It has built 400 bulk carriers and delivers about 25 new ships annually to a worldwide client base.

Oshima Shipbuilding specialises in building bulk carriers. It has a number of standard designs, featuring bulkers with capacities from 33,000dwt to 82,000dwt in the handy-size, handy-max, and panamax size classes. It also has a line of specialised coal carriers with capacities from 86,000dwt to 106,000dwt. Some of the handy-max-sized vessels

have optional open and semi-open hatch configurations.

Gearbulk operates the world's largest fleet of open hatch gantry and semi-open jib-craned vessels, purpose-built to carry forest products, non-ferrous metals, steel and other unitised break-bulk cargoes.

TECHNICAL PARTICULARS

Length oa: 225.00m
 Length bp:
 Breadth moulded: 32.26m
 Depth moulded to main deck: 20.56m
 Width of double skin:
 side: approx. 5.80m for No.1 hold, abt 2.40m No.2-8 hold
 bottom: approx. 2.0m
 Draught:
 scantling: 14.418m
 Gross: 44,684gt
 Deadweight, scantling: 72,863dwt
 Speed, service: 15.5knots at 85% MCR
 Cargo capacity:
 Grain: 85,086m³
 Bunkers:
 Heavy oil: 3143m³
 Diesel oil: 139m³
 Water ballast: 23,057m³

Classification society and notations: Det Norske Veritas
 +1A1 General Cargo Carrier HC-A
 Holds 2.5 and 7 may be empty E0
 BIS IB(+) TMON NAUTICUS (Newbuilding)

Main engine:
 Design: Kawasaki Heavy Industries. Co., Ltd.
 Model: Kawasaki MAN B&W 6S60ME-C
 Manufacturer: Kawasaki Heavy Industries. Co., Ltd.
 Number: 1
 Type of fuel: HFO
 Output: 12,577kW at 93.0rev/min

Propeller:
 Material: Nickel aluminum bronze
 Designer/Manufacturer: Nakashima Propeller Co., Ltd.
 Number: 1
 Fixed/Controllable pitch: Fixed pitch
 Speed: 93.0rev/min

Diesel-driven alternators:
 Number: 3
 Engine make/type: Yanmar Co., Ltd./ 6N21AL-SV: 1set,
 8N21AL-EV: 2 sets
 Type of fuel: HFO
 Output/speed of each set: 880kW at 900 rev/min/
 1300kW at 900rev/min
 Alternator make/type: Nishishiba Elect. Co., Ltd.
 Output/speed of each set: 750kW at 900rev/min/
 1199kW at 900rev/min

Boilers:
 Number: 1
 Type: Vertical cylindrical composite boiler
 Make: Aalborg Industries K.K.
 Output: .. Oil fired 1700kg/h x 5.5kg/cm²G, Exhaust gas heating 1200kg/h x 5.5kg /cm²G

Cargo cranes/cargo gear:
 Number: 2
 Make: Iknow Machinery Co., Ltd.
 Type: Gantry crane

Performance: 70tonnes
 Other cranes:
 Number: 2
 Make: Kyoritsu Kikai Co., Ltd.
 Type: Electric-hydraulic driven
 Tasks: Machinery parts & provision handling crane
 Performance: 4.0tonnes
 Mooring equipment:
 Number: 4 mooring winches,
 2 windlass/mooring winches
 Make: Nippon Pusnes Co., Ltd.
 Type: Electric
 Special lifesaving equipment:
 Number of each and capacity: ... 1 free-fall lifeboat x 32 persons
 Make: Umoe Schat-Harding A/S
 Type: F.R.P. totally enclosed
 Hatch covers:
 Design: Nakata Mac Co.Ltd.
 Manufacturer: Nakata Mac Co.Ltd.
 Type (upper deck/other decks): Weather-tight pontoon type (upper deck)

Containers:
 Lengths: 20' or 40'
 Heights: 8'6" or 9'6"
 Total TEU capacity: 445TEU's (on deck only)
 Tiers/rows (maximum): On deck only: No.1 & 2 holds:
 1 Tier, No.3-8 holds: 2 Tiers

Ballast control system:
 Make: Nakakita Seisakusho Co., Ltd.
 Type: Multi control panel

Complement:
 Officers: 10
 Crew: 19
 Supernumeraries/Spare: 1

Stern appendages/special rudders: Oshima High-Lift rudder

Bow thrusters:
 Make: Nakashima Propeller Co., Ltd.
 Number: 1

Bridge control system:
 Make: Furuno Electric Co., Ltd.
 Is bridge fitted for one-man operation? No

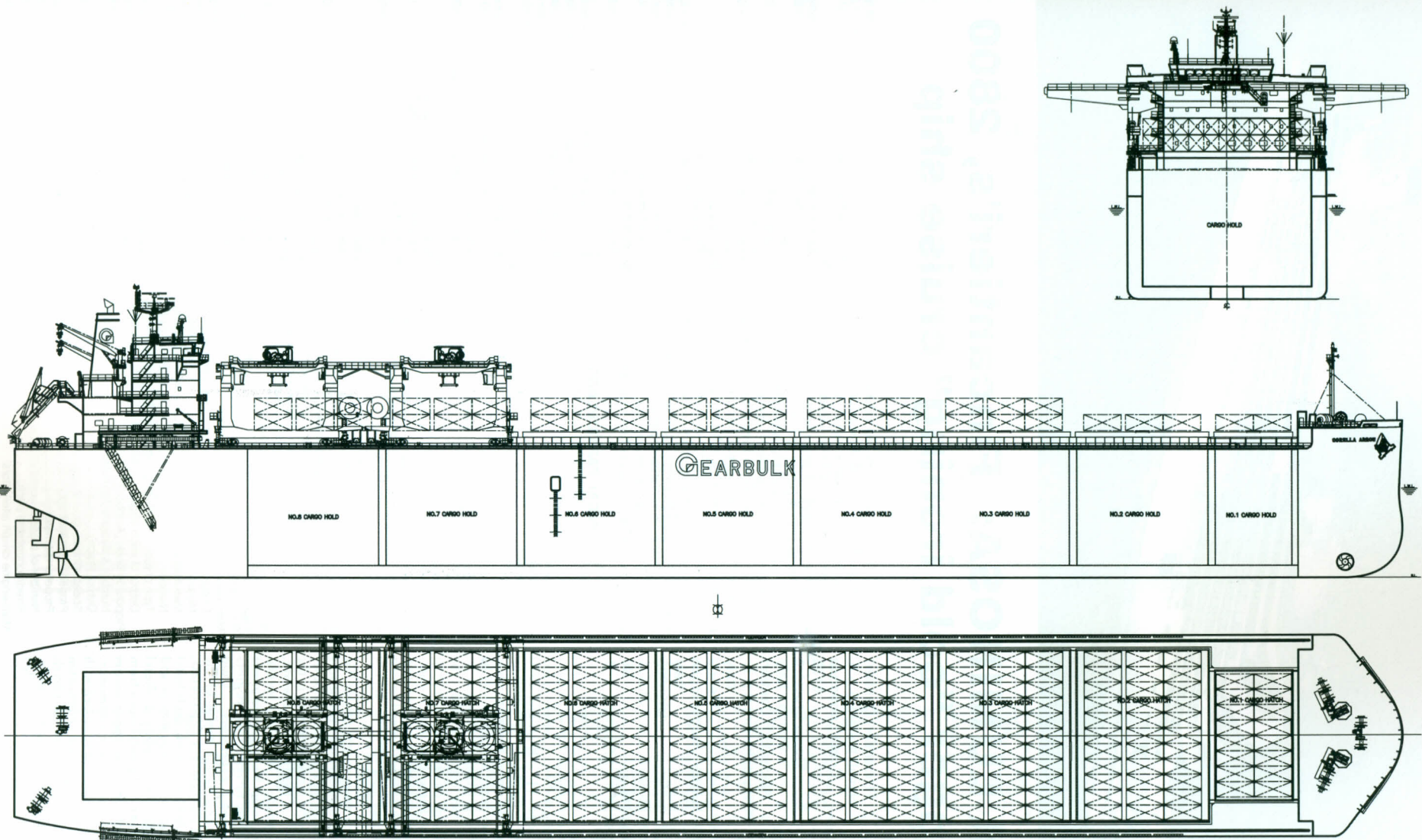
Fire detection system:
 Make: Nohmi Bosai Ltd.
 Type: Smoke, thermal, flame

Fire extinguishing systems:
 Cargo holds: Air Water Safety Service Inc. CO₂ fire extinguishing system as per rule requirement
 Engine room: ... Make/Type: Air Water Safety Service Inc CO₂ fire extinguishing system as per rule requirement

Cabins: As per rule requirement
 Public spaces: As per rule requirement

Radars:
 Number: 2
 Make: Furuno Electric Co., Ltd.
 Models: FAR-2837S/FAR-2827

Waste disposal plant
 Waste handled: Garbage and waste oil
 Incinerator: Sunflame Co., Ltd. OSV-600SAI
 Waste shredder/crusher: Mitsubishi Chuki Mfg. Co., Ltd. YS-15FC (disposer)
 Sewage plant: ... Taiko Kikai Industries Co., Ltd. SBT-40
 Delivery date: May 11, 2009





COSTA LUMINOSA: Fincantieri's, 2800 passenger "cold ironing" cruise ship

Shipbuilder: **Fincantieri Cantieri Navali Italiani S.p.A.**
 Vessel's name: **Costa Luminosa**
 Hull No: **6155**
 Owner/Operator: **Costa Crociere**
 Country: **Genoa - Italy**
 Designer: **Fincantieri Cantieri Navali Italiani S.p.A.**
 Country: **Italy**
 Model test establishment used: **Vienna Model Basin & MARIN - Wageningen**
 Flag: **Italy**
 IMO number: **9398905**
 Total number of sister ships already completed (excluding ship presented): **Nil**
 Total number of sister ships still on order: **1**

Costa Luminosa is the first of three new ships to be delivered by Fincantieri to Costa Crociere in less than one year. *Costa Pacifica* (112,000gt and 3780 passengers capacity), was delivered in May 2009 by the group's Sestri Ponente (Genoa) shipyard while *Costa Deliziosa*, *Costa Luminosa's* sistership, will be delivered by the Marghera (Venice) shipyard in January 2010. Costa's fleet expansion plan, the biggest in the world, includes two additional ships to be delivered by 2012. These five new cruisers represent a 50% increase in the capacity of the Costa fleet, Europe's largest. By 2012, the fleet will consist of 17 vessels with a total capacity of 46,400 passengers.

Costa Luminosa represents a new type of ship for the Costa fleet, drawing on previous experiences with other Costa vessels as well as those in other parts of the Carnival group. *Costa Luminosa* is the first ship in Italy and one of the first in the world, to be fitted for "cold ironing". With this special system ships berthed at the dock can receive power from shore without having to keep their engines running to feed the onboard generators. "Cold ironing" has been practised by the navies of the world for many years. In the merchant ship context, particularly in cruise vessels with their high hotel loads, it offers opportunities for economies and emissions reduction as the shipboard diesel generators can be shut down and power drawn from the shore-based grid. It also provides opportunities not otherwise available for onboard maintenance. The vessel's diesel generators are also equipped with flex cam technology (FCT) to optimise combustion and reduce visible soot emissions at low load levels by changing the valve and the injection timing. The timing is modified by a PLC-controlled pneumatic adjustment unit.

The Owner's desire with *Costa Luminosa* was to have a more flexible vessel both from the operational

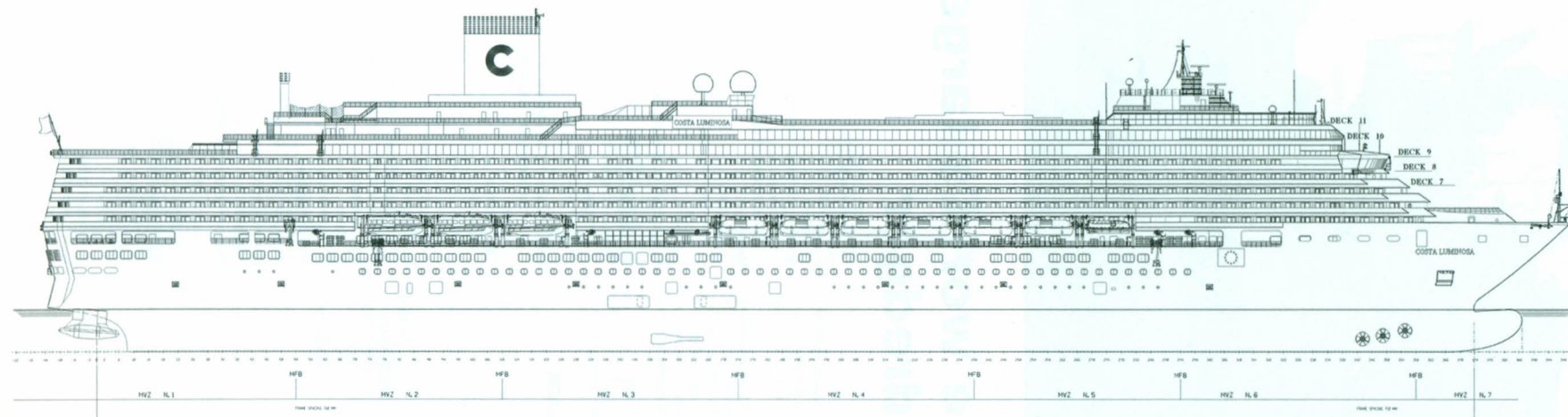
and marketing point of view. As a Panamax ship she was designed with overall dimensions suitable for the passage of the Panama Canal, so opening up opportunities not available to larger vessels. The adoption of the podded propulsion configuration has meant an improvement of between 6 to 8% in efficiency; hence a faster ship is possible without an increase in installed power. By careful design Fincantieri has been able to keep the topside weight down such that an additional cabin deck has been possible, thereby allowing a higher proportion of cabins with balconies – always a desirable feature in a cruise vessel. Environmentally *Costa Luminosa* has a large number of low power lighting units while the window glazing characteristics permit a reduction in air conditioning power requirements and the higher propulsion efficiency reduces fuel requirements.

TECHNICAL PARTICULARS

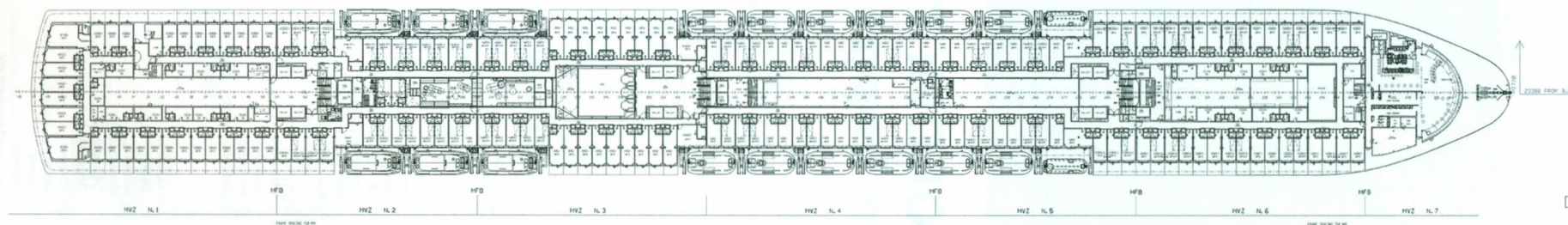
Length oa: 294.00m
 Length bp: 265.36m
 Breadth moulded: 32.25m
 Depth moulded:
 to main deck: 13.69m (Deck 1)
 to upper deck: 42.76m (Deck 11)
 to other decks: 19.81m (Deck 3); 36.98 m (DK 9)
 Draught:
 scantling: 8.10m
 design: 8.00m
 Gross tonnage: 92,600gt
 Deadweight: 7600dwt at 8.00m draft
 Block co-efficient: 0.682 at 8.00mdraft
 Speed, service: 21.6knots at 74.7%MCR
 Bunkers (m3):
 Heavy oil: 3072.6m³ max.
 Diesel oil: 237.5m³ max.
 Water ballast: 4706.8m³ max.
 Tankers - percentage segregated ballast:
 Classification society and notations: RINA, Class C +
 Passenger ship - unrestricted navigation
 + AUT-CCS; INWATERSURVEY
 % high-tensile steel used in construction: 100%
 Heel control equipment: Iron Pump
 Roll-stabilisation equipment: Fincantieri Navy Type
 Main diesel engines:
 Design: Four stroke diesel engines
 Model: Mak M43C
 Manufacturer: Mak Caterpillar
 Number: 4x 12V + 2x 8L
 Type of fuel: HFO up to viscosity of 380cSt/50°, or MGO
 Output of each engine: 12V=12,000kW, 8L= 8000kW
 Propulsion pods (Azipods):
 Number & designer/manufacturer: 2 x ABB
 Output (each): 17,600kW
 Speed range: 0-160rev/min
 Propeller material: Al-Bronze
 Propeller diameter: 5500mm
 Number of blades: 4
 Fixed/controllable pitch: Fixed
 Main-engine driven alternators:
 Number: 6
 Make/type: 4 ABB type AMG 1600JU14

LSE (16,629kVA) + 2 ABB type AMG
 1600QM14 LSE (11,086 kVA)
 Output/speed of each set: 514rev/min
 Boilers:
 Number & type: 2 x Vertical boiler
 UNEX CHB-12000/Horizontal boiler UNEX NB-12
 Make: Aalborg
 Output, each boiler: Steam capacity: 12,000kg/h
 Cargo cranes/cargo gear:
 Number & make: 2 x Concrane
 Type: S7E020
 Other cranes:
 Main Diesel overhead electric cranes
 Number & make: 6 x Concrane
 Type: F1E040 – Overhead electric crane
 Tasks: Main Diesel Engines
 Performance: 4.0tonnes
 Mooring equipment:
 Number & make: 7 x Rolls Royce
 Type: Electric
 Special lifesaving equipment (eg MES, free-fall lifeboats)
 12 x partially enclosed lifeboats (150 person)
 6 x partially enclosed tenders/lifeboats (150 persons as
 lifeboat, 120 persons as tender) 2 x partially enclosed
 rescue boats/lifeboats (60 persons)
 Hatch covers:
 Manufacturer: Officine Antonio Marino
 Type: YA/814A-YA/814B-YA/814C-YA/814D-YA814/E
 Complement
 Total: 934 Officers, Staff and Crew in 526 Cabins
 Passengers:
 Total: 2826
 Number of cabins: 1130 total
 Bow thrusters:
 Make: Fincantieri Navy Division
 Number: 3
 Output (each): 2200kW
 Max. transverse thrust: 290kN
 Max. speed: 300rev/min
 Blade dia: 2610mm
 Bridge control system:
 Make: SAM
 Type: Track pilot 100, Conning pilot 100
 Fire detection system:
 Make & type: Consilium NSAC-1
 Fire extinguishing systems:
 Engine room: Tyco CO₂ and Marioff Hi-Fog
 Cabins: Marioff Hi-Fog
 Public spaces: Marioff Hi-Fog and
 sea water fire hydrants

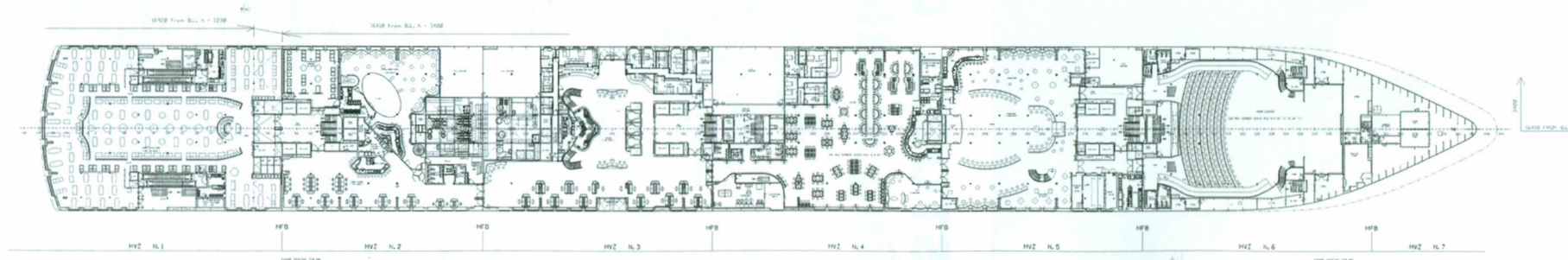
Radars:
 Number: 2 S-band + 2 X-band
 Make: SAM Electronics
 Models: S band - GR3021G090, X-band - GR3004G160
 Waste disposal plant:
 Incinerator: Deerberg Multi-stage Marine Incinerator
 Waste compactor: Deerberg Densifier
 Waste shredder/crusher: Deerberg In-line
 Tood Waste Shredo
 Sewage plant: Isir Biological Tank
 Contract date: 4 August 2006
 Launch/float-out date: 27 June 2008
 Delivery date: 30 April 2009



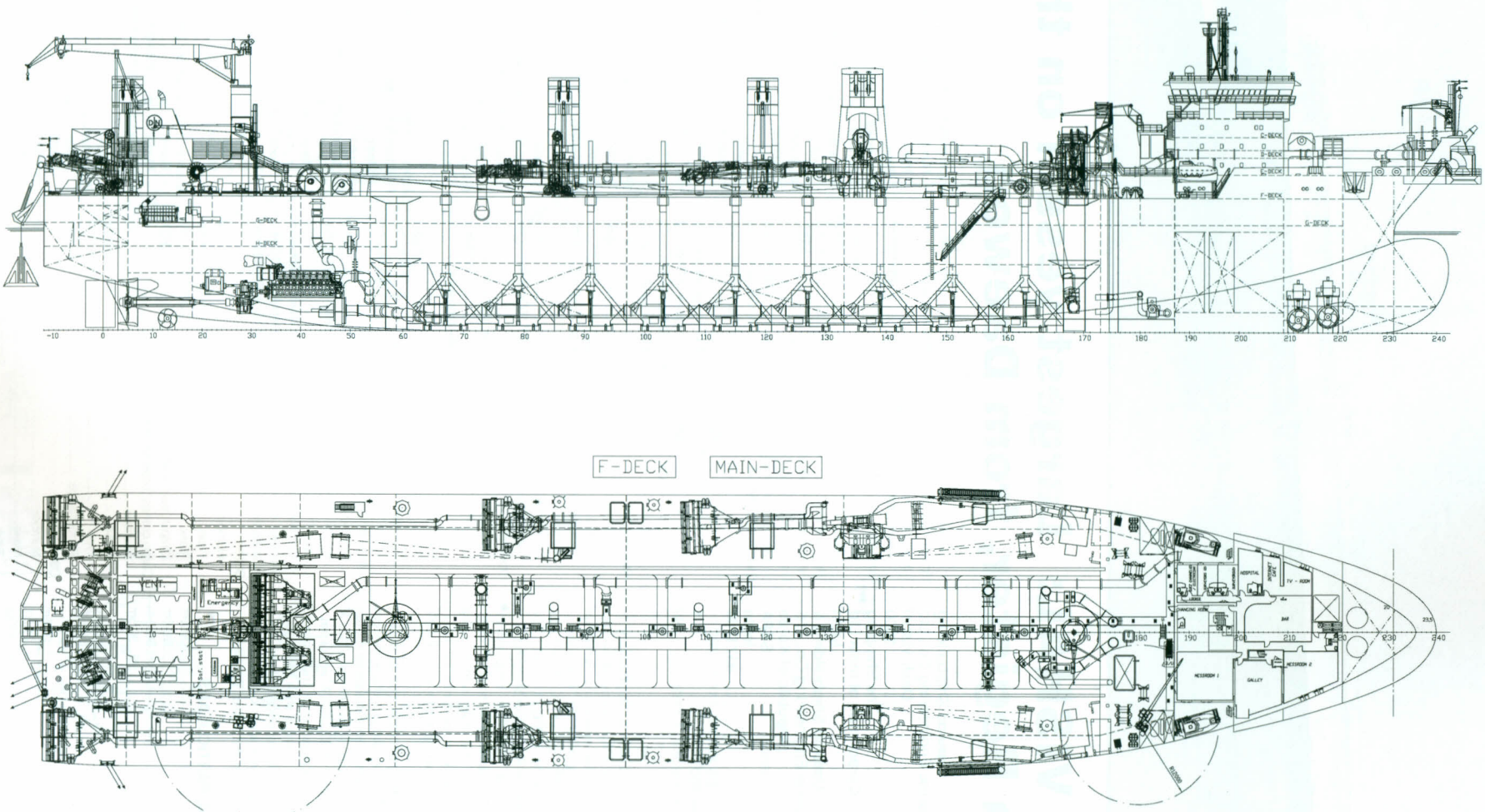
| | |
|-------|---------|
| 45650 | DECK 12 |
| 42760 | DECK 11 |
| 39870 | DECK 10 |
| 36980 | DECK 9 |
| 34090 | DECK 8 |
| 31140 | DECK 7 |
| 28250 | DECK 6 |
| 26100 | DECK 5 |
| 23200 | DECK 4 |
| 19810 | DECK 3 |
| 16410 | DECK 2 |
| 13590 | DECK 1 |
| 10800 | DECK A |
| 8080 | DECK B |
| 5360 | DECK C |
| 2000 | DECK D |



DECK 4



DECK 2





DESH VISHAL: Largest vessel on the Indian Register, from Daewoo

Shipbuilder: **Daewoo Shipbuilding & Marine Engineering Co., Ltd**
 Vessel's name: ***Desh Vishal***
 Hull No: **5300**
 Owner/Operator: **The Shipping Corporation of India Ltd**
 Country: **India**
 Designer: **Daewoo Shipbuilding & Marine Engineering Co., Ltd**
 Country: **Republic of Korea**
 Model test establishment used: **SSPA**
 Flag: **India**
 IMO number: **9371749**
 Total number of sister ships already completed (excluding ship presented): **1**
 Total number of sister ships still on order: **Nil**

Desh Vishal was built at Daewoo Shipbuilding & Marine Engineering Co's Okpo shipyard for the Shipping Corporation of India under the survey of American Bureau of Shipping with the notations of +A1(E), "Oil Carrier, ESP", SH, SHCM, +AMS, +ACCU, VEC, NIBS, ES, SPM, UWILD, TCM. The vessel is also classed with Indian Register of Shipping.

Desh Vishal was designed with four longitudinal bulkheads and transverse bulkheads to have 15 cargo tanks of the capacity of approx. 358,000m³ with two slop tanks and wing, and double bottom tanks for water ballast. Two pairs of heavy fuel oil tanks with double-hulled structure are arranged.

The vessel has a continuous upper deck with aft sunken deck, a raked stem with bulbous bow, a transom stern with open water type stern frame, a semi-balanced rudder and a fixed pitch propeller directly driven by a B&W 7S80MC-C with MCR output of 27,160kW at 76rpm.

The State-run Shipping Corporation of India placed orders for two very large crude carriers with Daewoo in October 2005. *Desh Vishal*, the second of these, has a gross tonnage of 162,412tonnes and is stated by the Owner to be the largest vessel in the Indian Register.

TECHNICAL PARTICULARS

Length oa: 333.0m
 Length bp: 320.0m
 Breadth moulded: 60.0m
 Depth moulded to upper deck: 30.5m
 Width of double skin:
 side: 3.40m
 bottom: 2.98m
 Draught
 scantling: 22.5m
 design: 21.5m
 Gross: 162,400gt
 Displacement: 363,700tonnes
 Deadweight
 design: 301,200dwt

scantling: 319,100dwt
 Speed, service: 15.5knots at 90% MCR
 Cargo capacity:
 Liquid volume: 358,000m³
 Bunkers:
 Heavy oil: 8000m³
 Diesel oil: 370m³
 Water ballast: 98,000m³
 Percentage segregated ballast: 100%
 Daily fuel consumption:
 Main engine only: 96.6tonnes
 Classification society and notations: American Bureau of Shipping +A1(E), "Oil Carrier, ESP", SH, SHCM, +AMS, +ACCU, VEC, NIBS, ES, SPM, UWILD, TCM. The Vessel will also be classed with Indian Register of Shipping with equivalent symbols. % high-tensile steel used in construction: 45%

Main engine:
 Design: B&W
 Model: 7S80MC-C
 Manufacturer: Doosan Engine Co., Ltd.
 Number: 1
 Type of fuel: HFO
 Output of each engine: 27,160kW/76rev/min

Propeller:
 Material: Nickel aluminium bronze
 Designer/Manufacturer: DSME / Hyundai Heavy Industries Co. Ltd
 Number: 1
 Pitch: Fixed
 Diameter: 10.0m
 Speed: 76.0rev/min

Diesel-driven alternators
 Number: 3
 Engine make/type: Yanmar / 8N21AL-GV
 Type of fuel: HFO
 Output/speed of each set: 1330kW/900rev/min

Alternator make/type: Nishishiba / NTAKL
 Output/speed of each set: 1562kVA (1250kW)/900rev/min

Boilers:
 Number: 2
 Type: Vertical water tube type
 Make: Aalborg Ind. A/S
 Output, each boiler: 50,000kg/h

Cargo cranes (hose handling):
 Number: 2
 Make: Oriental
 Type: Single jib, cylinder luffing
 Performance: SWL 20tonnes

Other cranes:
 Number: 2
 Make: Oriental
 Type: Single jib, cylinder luffing
 Tasks: Provision handling
 Performance: SWL 10tonnes x 1 set, 3tonnes x 1 set

Mooring equipment
 Number: 10 (2 x windlass, 8 x mooring winches)
 Make: Rolls-Royce
 Type: Electro-hydraulic

Cargo tanks:
 Number: 17
 Grades of cargo carried: Crude oil
 Type of tank coating: Tar free epoxy (top & bottom)

Cargo pumps
 Number: 3
 Type: Centrifugal, vertical, single stage
 Make: Shinko
 Material: Casing of bronze, impeller of phosphor bronze
 Capacity (each): 5500m³/h

Cargo control system
 Make: Emerson
 Type: Radar

Ballast control system
 Make: Emerson
 Type: Electro-pneumatic system

Complement
 Officers: 20
 Crew: 18
 Supernumeraries/Spare: 10
 Suez/Repair Crew: 6
 Single/double/other rooms: 20 /13/1

Bridge control system
 Make: NABTESCO
 Type: M-800-III
 Is bridge fitted for one-man operation? Yes (NIBS)

Fire detection system
 Make: AUTRONICA
 Type: AUTROSAFE

Fire extinguishing systems
 Cargo holds: Low expansion foam
 Make/Type: NK Co.
 Engine room: High pressure CO₂
 Make/Type: NK Co.

Radars:
 Number: 2
 Make: JRC
 Models: S-band(JMA-9132-SA), X-band(JMA-9122-6XA)

Integrated bridge system (yes/no?): Yes
 Make: JRC
 Model: CONNING(JAN-1801), ECDIS(JAN-901M)

Waste disposal plant Incinerator
 Make: Hyundai-Atlas
 Model: MAXI 1200SL WS

Waste compactor
 Make: Metos
 Model: IP-500

Sewage plant
 Make: Hamworthy
 Model: ST-6A

Contract date: 28 October 2005
 Launch/float-out date: February 2009
 Delivery date: November 2009





DISCOVERER CLEAR LEADER: Enhanced drillship with 40,000ft deep well capacity

Shipbuilder: **Daewoo Shipbuilding & Marine Engineering Co., Ltd**
 Vessel's name: **Discoverer Clear Leader**
 Hull No: **3501**
 Owner/Operator: **Transocean Offshore Deepwater Drilling Inc**
 Country: **USA**
 Designer: **Daewoo Shipbuilding & Marine Engineering Co., Ltd**
 Country: **KOREA**
 Flag: **Marshall Islands**
 IMO number: **9386122**
 Total number of sister ships already completed (excluding ship presented): **1**
 Total number of sister ships still on order: **3**

Discoverer Clear Leader was delivered by Daewoo Shipbuilding & Marine Engineering Co. Ltd. to Transocean Offshore Deepwater Drilling Inc. in March 2009.

Discoverer Clear Leader takes ultra-deepwater drilling to new depths beyond the frontiers already reached with the existing *Enterprise*-class drillships. In comparison, *Discoverer Clear Leader*, the first enhanced *Enterprise*-class drillship, has a 12,000-foot water-depth design capability.

In addition, *Discoverer Clear Leader* can drill wells 40,000 feet deep. The new drillship features two, 1250tonne top drives and it utilises a new power-management system, high-pressure mud system and other unique features.

This drillship can accommodate 200 personnel and can move between locations at up to approximately 12knots using its own power and six thrusters.

The vessel's capacity to generate 40MW of power is enough to light 40,000 homes.

The drillship features Transocean's patented dual-activity drilling technology designed to enable parallel drilling operations from a single derrick, saving time and money in deepwater well construction.

TECHNICAL PARTICULARS

Length oa: 254.4m

Length bp: 240.0m
 Breadth moulded: 38.0m
 Depth moulded
 to main deck: 19.0m
 to upper deck: 19.0m
 Width of double skin
 side: 7.0m
 bottom: 2.98m
 Draught
 scantling: 13.0m
 design: 12.0m
 Gross: 65,500gt
 Displacement: 101,500tonnes
 Lightweight: 37,700tonnes
 Deadweight:
 Design: 55,100tonnes
 scantling: 63,600tonnes
 Speed, service: about 13.2knots at 100 % at load (33,000kW)
 Cargo capacity:
 Liquid volume: 22,000m³
 Bunkers:
 Diesel oil: 5800m³
 Water ballast: 53,500m³
 Daily fuel consumption:
 Main engine only: 150 tonnes/day
 Classification society and notations: .. Det Norske Veritas (DNV) +1A1, "Ship Shaped Drilling Unit", E0, DYNPOS AUTR, TEMPSTORE, DRILL, HELDK-SH, CRANE, BIS, F-AMC, CCO, OPP-F, CSA-2, ICS
 % high-tensile steel used in construction: 67%
 Main engines:
 Design: MAN
 Model: 14V32/40
 Manufacturer: STX-MAN
 Number: 6
 Type of fuel: MGO
 Output of each engine: 6720 kW
 Propellers:
 Material: Nickel-Aluminum-Bronze
 Designer/Manufacturer: Rolls-Royce ISO 484 /1-1981 class 1
 Number: 1 per Thruster, total six/ship
 Fixed/Controllable pitch: Fixed
 Diameter: 4100mm
 Speed: Max. 157rev/min
 Diesel-driven alternators:
 Number: 6
 Alternator make/type: LDW SSE1250M50-10SP+WK
 Output/speed of each set: 720rev/min
 Boilers:
 Number: 1
 Type: Thermal oil heater

Make: Aalborg
 Output: 4000kW
 Cargo cranes/cargo gear:
 Number: 4 sets
 Make: NOV (National Oilwell Varco)
 Type: Knuckle boom crane
 Performance: 100tonne
 Mooring equipment:
 Number: 2 sets
 Make: PUSNES
 Type: Electro-Hydraulic
 Lifesaving equipment:
 Number of each and capacity: 6 sets (Each 75 pp)
 Make: Alexander-Ryan
 Type: Davit Launched
 Cargo tanks:
 Number: N/A
 Cargo pumps:
 Number: 2
 Type: Centrifugal, Vertical
 Make: HHI
 Material: Casing - Ni-Al-Bronze
 Capacity (each): 1500m³/h x 135tonnes/h
 Cargo control system:
 Make: KM
 Type: IAS
 Ballast control system:
 Make: KM
 Type: IAS
 Complement:
 Officers: 20 persons
 Crew: 180 persons
 Single/double/other rooms: 100 cabins for 2-persons
 Bridge control system:
 Make: Kongsberg
 Type: K-Bridge
 Is bridge fitted for one-man operation? : Yes. DNV Naut-AW Notation(SOC) has been applied
 Fire detection system:
 Make: Autronica Fire and Security A/S
 Type: BS320 + BC320
 Fire extinguishing systems:
 Engine room: Total flooding high press. CO₂ system
 Radars:
 Number: Three Kongsberg K-Bridge Radar
 Model(s): K-Bridge Radar
 Integrated bridge system: Kongsberg K-Bridge ECDIS & Radar
 Waste disposal plant:
 Waste shredder/crusher: Uson Marine 550-MC, UWD4-SI
 Sewage plant: Omnipure 15MXMP
 Delivery date: 26 March 2009





E.R. BERGAMO: First bulk carrier built by Hyundai Vinashin Shipyard

Shipbuilder: **Hyundai Mipo Dockyard Co., Ltd., Korea**
 Shipyard: **Hyundai - Vinashin Shipyard Co., Ltd, Vietnam**
 Vessel's name: **E.R. Bergamo**
 Hull No.: **S001**
 Owner/Operator: **E.R. Schiffahrt**
 Country: **Germany**
 Designer: **Hyundai Mipo Dockyard Co., Ltd**
 Country: **Korea**
 Model test establishment used: **Korea Ocean Research & Development Institute**
 Flag: **Liberia**
 IMO number: **9483188**
 Total number of sister ships already completed (excluding ship presented): **1**
 Total number of sister ships still on order: **12**

TECHNICAL PARTICULARS

Length oa: 187.88m
 Length bp: 182.50m
 Breadth moulded: 32.26m
 Depth moulded to upper deck: 18.30m
 Width of double skin:
 bottom: 1.70m
 Draught:
 scantling: 12.85m
 design: 11.30m
 Gross: 32,613gt
 Deadweight:
 design: 46,700dwt
 scantling: 55,500dwt
 Speed, service : 14.5knots
 Cargo capacity:
 Bale: 69,550m³
 Grain: 70,733 m³
 Bunkers:
 Heavy oil: 1920m³
 Diesel oil: 110m³
 Water ballast (m3): 15,542m³
 Daily fuel consumption:
 Main engine only: 32.15tonnes/day
 Classification society and notations: DNV / +1A1, Bulk Carrier ESP, GRAB[20], CSR, BC-A(Holds 2 & 4 may be empty), E0, DG-B, BIS, TMON, CRANE
 Main engine:
 Design: Hyundai - B & W
 Model: 6S50MC-C7
 Manufacturer: HHI-EMD
 Number: 1
 Type of fuel: HFO and MDO
 Output: 8820kW x 119 rev/min
 Propeller:
 Material: Nickel Aluminum Bronze
 Designer/Manufacturer: Hyundai Heavy Industries Co., Ltd
 Number: 1
 Fixed/Controllable pitch: Fixed
 Diameter: 6000mm
 Speed: 119rev/min
 Diesel-driven alternators:
 Number: 3
 Engine make/type: HHI-EMD / 6H17/28 x 3 set
 Type of fuel: HFO and MDO
 Output/speed of each set: 640kW x 900rev/min x 3 set
 Alternator make/type: HHI-EES / HFC7 504-84K x 3 set
 Output/speed of each set: 750kW x 900 rev/min x 3 set
 Boilers:
 Number: 1
 Type: Marine composite boiler, smoke tube & water tube
 Make: Kangrim Heavy Industries Co., Ltd
 Output: 1200kg/h

Cargo cranes/cargo gear
 Number: 4
 Make: MacGregor
 Type: Conventional electro-hydraulic wire-luffing type
 Performance: 30tonnes SWL (24tonnes in grab mode) x 26m
 Other cranes:
 Number: 1
 Make: DMC
 Type: Motor driven
 Tasks: Provision handling
 Performance: SWL 2tonnes
 Mooring equipment:
 Number: 4
 Make: Rolls-Royce
 Type: Hydraulic
 Special lifesaving equipment:
 Number of each and capacity: 1 x 25persons
 Make: Hyundai LifeBoats
 Type: Free-fall
 Hatch covers:
 Design: MacGregor
 Manufacturer: MacGregor
 Type: Hydraulic end folding type
 Cargo control system:
 Make: Kongsberg
 Type: Integrated Monitoring & Control
 Ballast Control System:
 Make: Kongsberg
 Type: Integrated Monitoring & Control
 Complement: 25 + 6 (Suez crew)
 Stern appendages: Semi-spade rudder
 Bridge control system:
 Make: HHI-EES
 Type: Self-Standing type
 Is bridge fitted for one-man operation? Yes
 Fire detection system:
 Make: Consilium Marine AB
 Type: CS4000/3L
 Fire extinguishing systems:
 Cargo holds: NK high pressure CO₂, sea water
 Engine Room: NK high pressure CO₂, total flooding, sea water, portable fire extinguisher, fixed local fire fighting system
 Cabins: Sea water, portable fire extinguisher
 Public Spaces: Sea water, portable fire extinguisher
 Radars:
 Number: 2 sets
 Make: Furuno
 Models: FAR-2837S, FAR-2827
 Integrated bridge system:
 Make: Furuno
 Model: ECDIS FEA-2087
 Contract date: October 2007
 Launch/float-out date: March 2009
 Delivery date: 31 July 2009

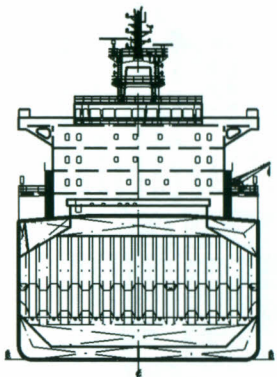
E.R. Bergamo is the first bulk carrier built by Hyundai Vinashin Shipyard. It is one of a series of 14 under construction for E.R. Schiffahrt of Germany and was delivered on 31 July 2009.

Hyundai Vinashin shipyard is a joint venture between the Korean builder, Hyundai, and the Vietnam Shipbuilding Industry Group. The shipyard has been active in the repair area since 1999 and *E.R. Bergamo* marks its entry into the new-construction field. Over US\$100million has been expended upgrading the shipyard's facilities for new construction activities.

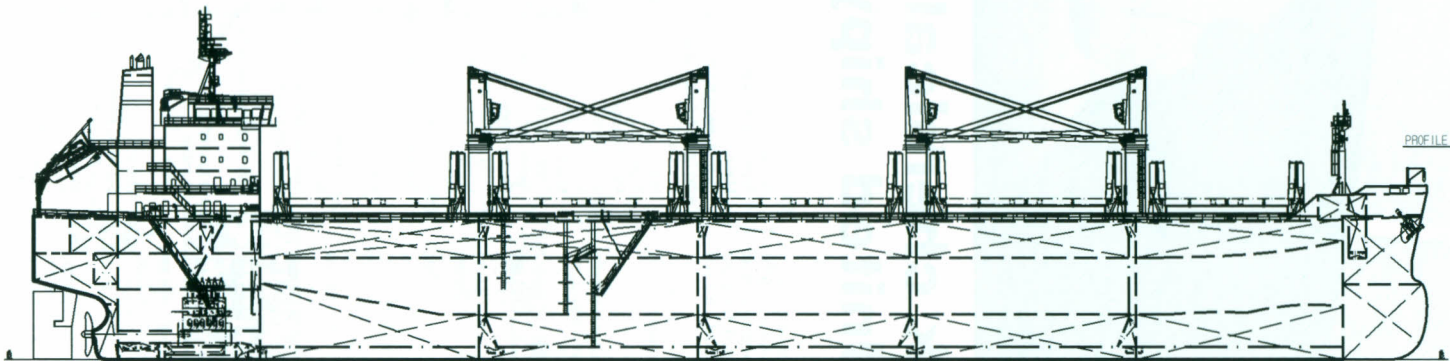
E.R. Bergamo is an ocean going geared bulk carrier with bulbous bow, transom stern, flush deck with forecastle, open water type stern frame, single rudder and single screw propeller driven by a slow speed diesel engine. The cargo space is divided into five cargo holds and five pairs of water ballast tanks, each arranged as a double bottom tank connected to a top side wing tank. The No.3 cargo hold may be used for water ballast tank in a heavy weather ballast voyage. The propulsion machinery and living quarters, including the navigation bridge deck, are located aft. Four 30tonnes SWL deck cranes are installed on the Upper Deck, located between the holds.

The vessel is intended primarily for cargoes of grain, iron ore, coal and hot coils. Power is provided by a Hyundai-B & W 6S50MC-C7 diesel engine driving a 6.0m diameter fixed pitch propeller to give a service speed of 14.5knots.

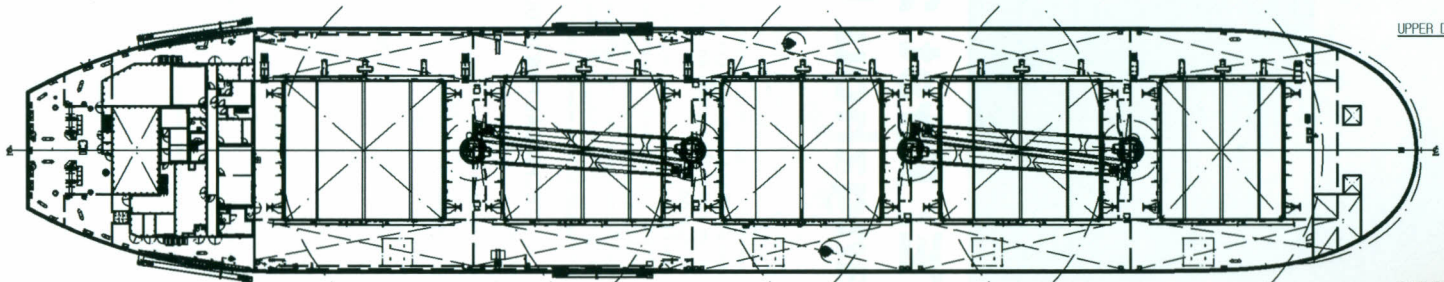
E.R. Schiffahrt is a ship owning and ship management company with activities in container, bulk and offshore segments. The company currently controls 114 vessels in service and under construction. The company has ordered 24 bulk carriers of supramax and capesize class, aggregating some 2,600,000dwt, for delivery between July 2009 and October 2011. *E.R. Bergamo* is one of these vessels.



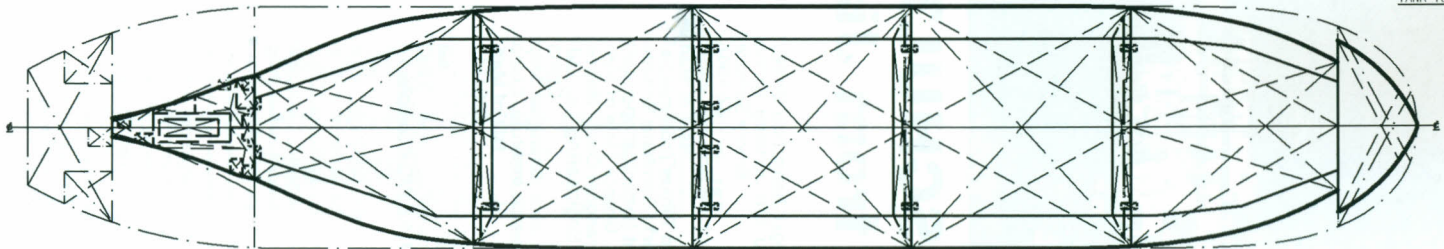
MIDSHIP SECTION



PROFILE



UPPER DECK



TANK TOP



EMMY SCHULTE: First 2k chemical tanker from Jiangzhou United shipyard

Shipbuilder: Jiangxi Jiangzhou United Shipbuilding Co. Ltd, Juijiang, China
 Vessel's name: **Emmy Schulte**
 Hull No: **JZ 1007**
 Owners: **Bernhard Schulte GmbH**
 Country: **Isle of Man**
 Operators: **Hanseatic Tanker (commercial operator) / Bernhard Schulte Shipmanagement (technical operator)**
 Country: **Greece / Isle of Man**
 Designer: **Shanghai Odely Marine Engineering Co., Ltd.**
 Country: **China**
 Model test establishment used: **Shanghai Ship and Shipping Research Institute, China**
 Flag: **Isle of Man**
 IMO number: **9394519**
 Total number of sister ships already completed (excluding ship presented): **Nil**
 Total number of sister ships still on order: **3 IMO 2k compliant plus 13 with full IMO II compliance**

Emmy Schulte was the first ship to her design built at Jiangzhou Union shipyard, but as the first of an order for 17 such vessels she has very quickly established a design specialisation for the shipyard. Jiangzhou Union Shipbuilding Co. Ltd. is located in RuiChang City, Jiangxi Province, China. Since 1974 this shipyard has built and delivered more than 200 vessels, including 4800dwt multi-purpose cargo vessels for Schulte Group, 670TEU multi-purpose container vessels, 12,000dwt multi-purpose bulk carriers, 16,000dwt crude oil tankers, 8000dwt water carriers, 5000dwt product oil tankers, 168 passenger deluxe cruise ships and special naval ships.

Emmy Schulte is an International Maritime Organization (IMO) 2k chemical tanker. As such she can carry IMO 3 categorised liquid cargoes and also has the ability to carry vegetable oils (normally restricted to IMO Type II vessels). She has 12 cargo tanks and two slop tanks with heavy liquid strengthening in order to be able to carry cargoes with specific gravities up to 1.3. With partial filling cargoes of higher specific gravities can be accommodated. The cargo and slop tanks are fully coated with Sigma PhenGuard Epoxy coating and underwater hull is provided with a five-year tin free SPC anti-fouling system. Significant features of Emmy Schulte include:

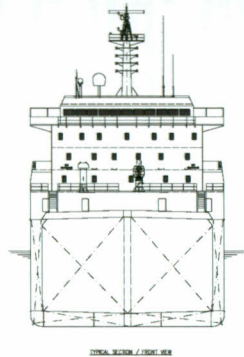
- Dual boiler arrangements with high steam production capacity (2 x 7tonnes/h)
- A fixed gas sampling system in the ballast tanks and void spaces
- An inert gas generator of 2500m³/h capacity; this is not a compulsory installation for a vessel of this size
- All cargo tanks are fitted with two fixed, programmable type cleaning machines to allow efficient tank cleaning.
- Every cargo pump has its "mirror", as cargo piping in the pump room is interconnected with pipe branches for redundancy in case of breakdown and to minimise the extent of line contamination.

- 20 extra valves have been fitted in the cargo lines. This means that when "line contamination" can be tolerated by Charterers, double valve segregation at manifolds and crossovers can be ensured for eight grades rather than only four as per vessel's natural segregation.
- Double hull protection in way of bunker tanks
- 750kW bow-thruster compared to the more typical 600kW for a vessel of this size.
- SAAB tank radar for cargo ullaging
- Design for 25 years fatigue life, which is not normally a requirement for a vessel less than 150m long.

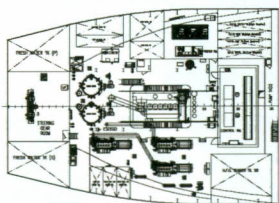
TECHNICAL PARTICULARS

Length oa: 144.0m
 Length bp: 135.6m
 Breadth moulded: 23.0m
 Depth moulded to main deck: 12.515m
 Width of double skin:
 side: 1.2m
 bottom: 1.4m
 Draught, design: 8.80m (summer load draft)
 Gross: 11,233gt
 Displacement: 21,901tonnes
 Lightweight: 12,515tonnes
 Deadweight:
 design: 16,500dwt
 scantling: 16,968dwt
 Block co-efficient: 0.7816 at 8.8m draft
 Speed, service: 13.5knots at 90%MCR
 Cargo capacity:
 Liquid volume: 19,411m³ (98% fill)
 Bunkers:
 Heavy oil: 714 m³ (95% fill)
 Diesel oil: 87 m³ (95% fill)
 Water ballast: 7,440 m³
 Percentage segregated ballast: 100%
 Daily fuel consumption:
 Main engine only: 16tonnes/day
 Auxiliaries: 2.5tonnes/day
 Classification society and notations: ABS: +A1 Chemical Carrier, Oil Carrier, (E), +AMS, +ACCU, TCM, ES, ESP, UWLD, CRC
 Main engine:
 Design: MAN B&W
 Model: 6S35MC MK 7
 Manufacturer: STX-MAN B&W
 Number: 1
 Type of fuel: HFO 380 cSt
 Output: 4440kW @ 173rev/min (MCR)
 Propeller:
 Material: Mn-Al-Bronze
 Designer/Manufacturer: Wartsila CME Zhenjiang
 Fixed/Controllable pitch: 1 x Fixed
 Diameter: 4.3m (4 blades)
 Speed: 173rev/min at MCR
 Diesel-driven alternators:
 Number: 3
 Engine make/type: Anqing Marine Diesel Engine/5DK-20
 Type of fuel: HFO 380 cSt
 Output/speed of each set: 660kW / 900rev/min
 Alternator make/type: Wuxi Fenxi Electrical Machine Co Ltd / Synchronous alternator
 Output/speed of each set: 750kVa, 60Hz / 900rev/min

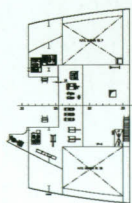
Boilers:
 Number: 2 x auxiliary + 1 x economizer
 Type: Water tube boilers; 2 x LSZ7-0.7 + 1 x GFL100-0.7
 Make: Greens Shazhou
 Output, each boiler: 2 x 7tonnes/h + 1 x 0.7tonnes/h
 Cargo cranes/cargo gear:
 Number: 1 (hose handling crane)
 Make: Zhenjiang Marine Auxiliary
 Type: HDC10-15
 Performance: 10tonnes SWL
 Other cranes:
 Number: 1 (rescue boat davit and provision crane)
 Make: Zhenjiang Marine Auxiliary
 Type: HDCL2-10
 Tasks: Rescue boat davit and provision crane
 Performance: 2tonnes SWL
 Mooring equipment:
 Number: 2 x windlasses + 2 x mooring winches
 Make: Wuhan Marine Machinery Plant Co. Ltd.
 Special lifesaving equipment:
 Number of each and capacity: 1 free fall type life boat (25 persons)
 Make: Jiangyin Norsafe F.R.P. Co. Ltd.
 Type: GES18F
 Cargo tanks:
 Number: 12 plus the 2 slop tanks (able to carry cargo)
 Grades of cargo carried: IMO III and IMO 2k compliant
 Make and type of coating: SigmaKalun - Sigma Phengard 900
 Stainless steel systems: Cargo piping system, stainless steel 316L throughout
 Cargo pumps:
 Number: 4 x 500m³/h
 Type: Twin spindle screw pump; PG HC232-85/2, frequency regulated speed control.
 Make: Per Gjerdrum AS
 Stainless steel: Yes
 Cargo & ballast control system:
 Make: Damcos
 Type: Marine TC Management
 Complement:
 Officers: 8
 Crew: 13
 Supernumeraries: 1
 Bow thruster:
 Make: HRP Asia Pte. Ltd.
 Number & output: 1 x 750 kW
 Fire detection system:
 Make: Tyco Fire & Security Marine Services China
 Type: M600
 Fire extinguishing systems:
 Cargo holds: NK Co. Ltd./ Fixed foam system
 Engine room: NK Co. Ltd./ Fixed CO₂ system
 Radars:
 Number: 2 x Furuno
 Models: FR-2827 and FR-2837S
 Integrated bridge system: Furuno
 Waste disposal plant
 Incinerator: CSSC-Nanjing Luzhou Machine Co. Ltd.
 Model OG120C
 Sewage plant: Jets Bio compact KSA-S20
 Contract date: 31 May 2007
 Launch/float-out date: 9 August 2008
 Delivery date: 10 March 2009



TYPICAL SECTION / RIGHT VIEW



DECK PLAN



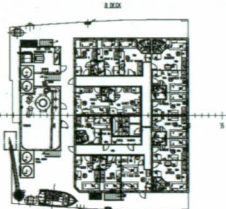
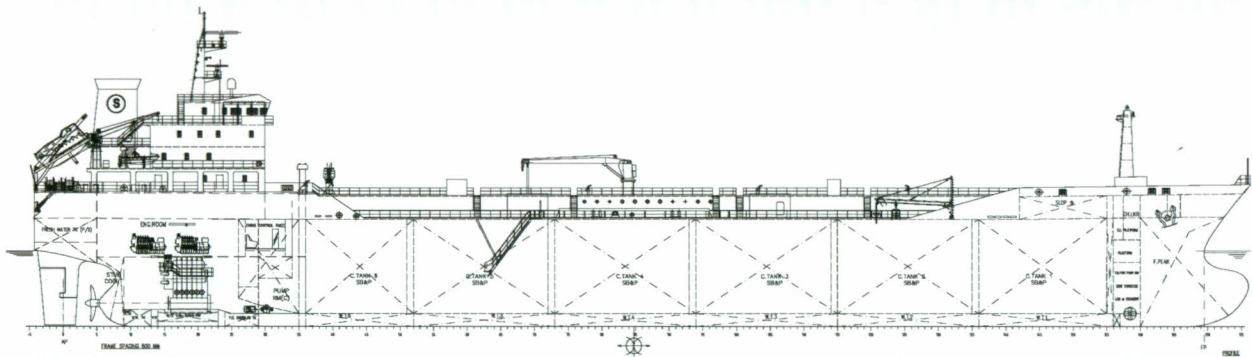
DECK PLAN



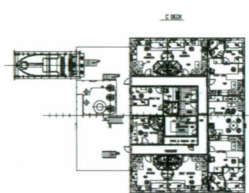
FLATIRON



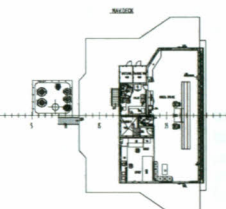
FLATIRON



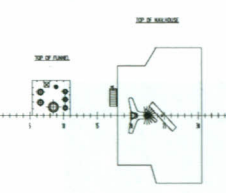
FLATIRON



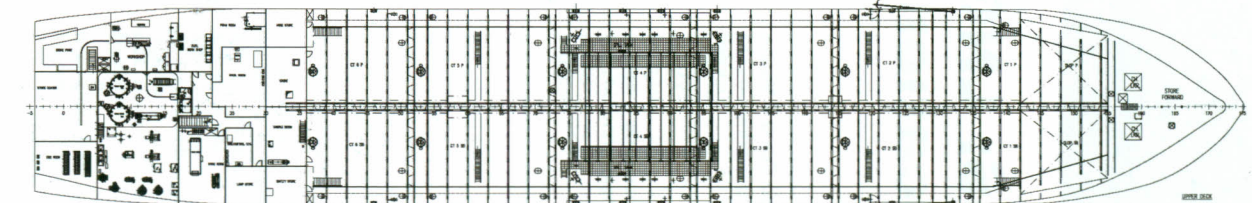
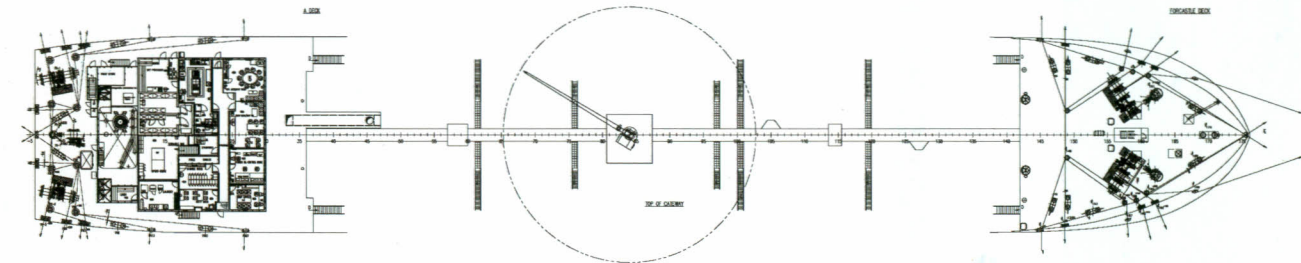
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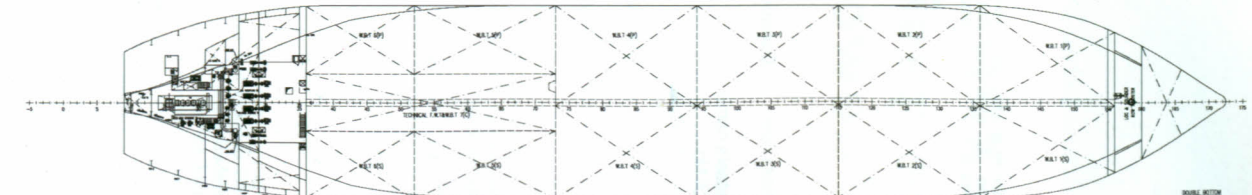
FLATIRON



FLATIRON



FLATIRON



FLATIRON



EXPRESS: LNG re-gasification vessel from Daewoo

Shipbuilder: **Daewoo Shipbuilding & Marine Engineering Co., Ltd**
 Vessel's name: **Express**
 Hull No: **2263**
 Owner/Operator: **EXMAR**
 Country: **Belgium**
 Designer: **Daewoo Shipbuilding & Marine Engineering Co., Ltd**
 Model test establishment used: **SSPA**
 Flag: **Belgium**
 Total number of sister ships already completed (excluding ship presented): **1**
 Total number of sister ships still on order: **3**

Express, a 74,700dwt LNGRV (liquefied natural gas re-gasification vessel) was delivered by Daewoo Shipbuilding & Marine Engineering Co. Ltd. (DSME) to EXMAR Marine NV of Belgium on May 11, 2009. *Express* is jointly owned by EXMAR and US company Excelerate Energy and is on a 25-year charter to Excelerate Energy. At the time of delivery *Express* was the fourth LNGRV in EXMAR's fleet.

LNGRVs are independent of shore-based re-gasification facilities, being capable of re-gasifying LNG onboard and delivering it directly into the distribution system. *Express* can discharge re-gasified liquid natural gas through a high pressure shore manifold connection or to a subsea pipeline through an internal turret arrangement connected to an offshore mooring buoy. The vessel can also operate as a conventional LNG vessel discharging to a shore-based re-gasification facility.

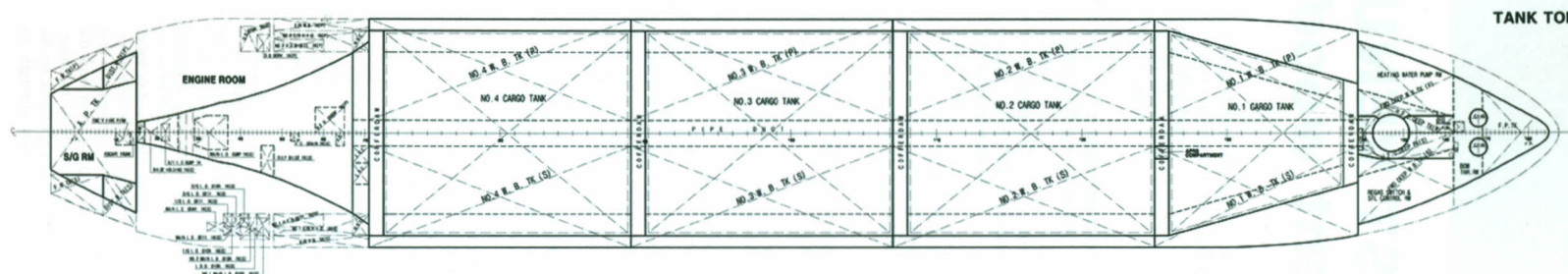
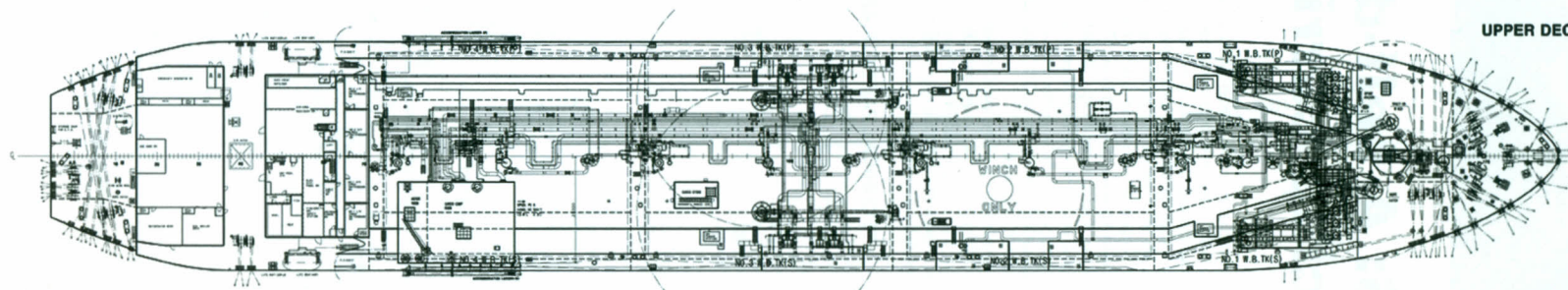
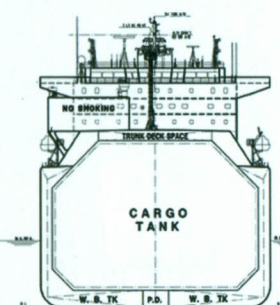
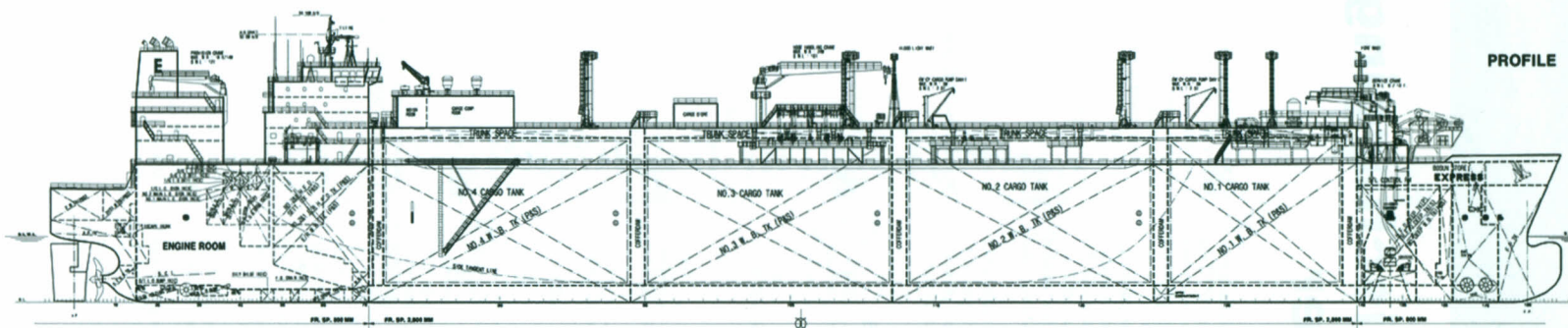
Express has a continuous upper deck with aft sunken deck, a raked stem with bulbous bow and a submerged turret unloading system, a transom stern with open water type stern frame, a semi balanced rudder and a fixed pitch propeller driven by a cross compound type marine steam turbine. The cargo area is of the double-hull type with a double bottom. Cofferdams are located at forward and after part of cargo area and between cargo tanks. Cargo is carried in four centre cargo tanks with the Gaz Transport & Technigaz membrane containment system ("GT NO 96 E-2").

The re-gasification plant, consisting of a number of high pressure pumps, vaporisers, heaters and other equipment is provided in way of No. 1 cargo tank. A SCR (Selective Catalytic NOx Reduction) system is provided for two main boilers and one auxiliary boiler in order to reduce the NOx level.

TECHNICAL PARTICULARS

Length oa: 291.0m
 Length bp: 280.0m
 Breadth moulded: 43.4m
 Depth moulded
 to main deck: 26.0m
 to upper deck: 32.95m
 Width of double skin
 side: 2.211m
 bottom: 3.2m
 Draught
 scantling: 12.4m
 design: 11.6m
 Gross: 100,300gt
 Displacement: 117,300tonnes
 Deadweight:
 Design: 74,700dwt
 Scantling: 83,200dwt
 Speed, service: 19.2knots
 (90% MCR with 21% sea margin)
 Cargo capacity:
 Liquid volume: 151,000m³
 Bunkers:
 Heavy oil: 5906m³
 Diesel oil: 480m³
 Water ballast: 55,000m³
 Daily fuel consumption:
 Main engine only: 170.3tonnes/day
 Classification society and notations: Bureau Veritas; I
 +HULL +MACH, Liquefied gas carrier/LNG,
 Ship Type 2G (membrane tank, 0.25 bar -163C, 500kg/m³),
 unrestricted navigation, +VeriSTAR Hull, AUT-UMS, +SYS-
 NEQ-1, SPM/STL, INWATERSURVEY, MON-SHAFT.
 % high tensile steel used in construction: 0.2%
 Main engine:
 Design: Cross compound, marine steam turbine
 Model: UA 360
 Manufacturer: KHI
 Number: 1
 Output: MCR: 26,480kW/88rev/min

Gearbox:
 Make: KHI
 Number: 1
 Output speed: 88rev/min
 Propeller:
 Material: Ni-Al-Bronze
 Designer/Manufacturer: Hyundai
 Number: 1
 Fixed/Controllable pitch: Fixed
 Diameter: 8.5m
 Speed (NCR): 85rev/min
 Special adaptations: Class I of ISO 484/1 and class S G
 ISO 484/
 Turbine driven alternators:
 Number: 3
 Turbine make/type: MHI/Multi-stage high efficiency
 turbine AT42CT
 Alternator make/type: HHI/Self-excited, brushless
 Output/speed of each set: 3700kW/1800rev/min
 Diesel-driven alternators:
 Number: 1
 Engine make/type: Wartsila 12V32DF / 4-stroke, dual fuel
 burning
 Type of fuel: MDO/Fuel gas
 Output: 4020kW
 Boilers
 Number: 2
 Type: Vertical, 2-drum, water tube type
 Make: MHI
 Output, each boiler: 71,000kg/hour x 6.03MPa
 Cargo cranes:
 Number: 2
 Make: TTS Marine Crane AS
 Type: Electro-hydraulically driven
 Performance: 12tonnes (SWL) x 12m/min.
 Other cranes
 Number: 2
 Make: TTS Marine Crane AS
 Type: Electro-hydraulically driven,
 Tasks: Engine spare part & provision handling
 Performance: 12tonnes (SWL) x 10m/min.
 Mooring equipment
 Number: 2 windlasses + 7 mooring winches
 Make: TTS KOCKS GMBH
 Type: Electro-hydraulically driven, high pressure type
 Special lifesaving equipment:
 Number of each and capacity: 2 x 40persons
 Make: UMOE Scharf-Harding
 Type: Totally enclosed type (FRP)
 Cargo tanks
 Number: 4
 Stainless steel: SUS 316L for cargo system
 Cargo pumps
 Number: 8
 Type: Cryogenic centrifugal
 Make: Ebara
 Materials: Aluminium alloy casing and impeller
 Capacity (each): 1700m³/h
 Cargo control system
 Make: Honeywell
 Type: Central computerised system
 Ballast control system
 Make: Honeywell
 Type: Central computerised system
 Complement
 Officers: 18
 Crew: 15
 Bow thrusters:
 Make: Brunvoll AS
 Number: 2
 Output (each): 1500kW
 Stern thrusters:
 Make: Brunvoll AS
 Number: 1
 Output: 2000kW
 Submerged Turret Unloading (STL)
 Make: Advanced Production & Loading AS
 Number: 1
 Capacity: Approx. 500 MMSCFD
 Bridge control system
 Make: KHI
 Type: UA 360
 Is bridge fitted for one-man operation? Yes
 Fire detection system
 Make: Consilium
 Type: Addressable
 Fire extinguishing systems
 Cargo holds: None
 Engine room: High expansion foam system / Kashiwa
 Cabins: Portable fire extinguishing system
 Public spaces: Portable fire extinguishing system
 Radars
 Number: X-band(one set) & S-band(one set)
 Make: SAM Electronics
 Model(s): Chart radar 1100
 Integrated bridge system:
 Make: SAM Electronics
 Model: Chart pilot 1100
 Waste disposal plant
 Incinerator: Kangrim KEI-70SDA
 Sewage plant: Jonghap AEROB-18
 Contract date: 10 January 2006
 Launch/float-out date: 21 June 2008
 Delivery date: 11 May 2009





FOREST VENUS: A self-discharging fuel-efficient wood chip carrier

Shipbuilder: **Imabari Shipbuilding Co., Ltd**
(Marugame Shipyard), Japan
 Vessel's name: **Forest Venus**
 Hull No.: **S-1523**
 Owner/Operator: **NYK Line**
 Country: **Japan**
 Designer: **Imabari Shipbuilding Co., Ltd**
(Marugame Shipyard)
 Country: **Japan**
 Model test establishment used: **Shipbuilding**
Research Centre of Japan
 Flag: **Marshall Islands**
 IMO number: **9477933**
 Total number of sister ships already completed
 (excluding ship presented): **1**
 Total number of sister ships still on order: **1**

Imabari Shipbuilding of Japan delivered the self-unloading 122,138m³ wood chip carrier *Forest Venus* on 17 April 2009.

Forest Venus was designed as a post-panamax type single-screw diesel engine-driven ocean-going wood chip carrier. She is a flush decker with an aft sunken deck and the maximum possible cargo capacity. *Forest Venus* has a raked stem with protruded bulbous bow and transom stern with mariner type stern frame and a hanging rudder. For efficient carriage of light density cargo such as wood chips her depth is greater than that of a conventional bulk carrier of same deadweight class. To enable loading grain cargo, a grain loading plan approved by the classification society has been prepared.

The cargo space is divided into six holds of the single side, double bottom type with side hopper construction. For easy cargo unloading, one slanted longitudinal side stringer system is adopted in the cargo hold. To ensure enough draught at ballast condition the No.4 cargo hold can be utilised as a water ballast tank. For efficient loading and unloading operations and for good compatibility with various shore facilities Nos.1 and 6 cargo holds can also be utilised as water ballast tanks when in port.

Each cargo hold has a long and wide hatch opening with forward and backward folding type steel weather-tight hatch covers operated by a hydraulic cylinder system. For efficient and easy cargo unloading the vessel has a large capacity (975tonnes/h) wood chip unloading system which consists of three deck cranes (14.5tonnes x 25m radius, average capacity 325tonnes/h each) each with a grab bucket, four sets of fixed type hoppers with feeder conveyors, a main conveyor on the starboard side of upper deck, a No.2 conveyor in the shuttle conveyor room and a shuttle conveyor. Emergency stop switches for the conveyors are provided on the upper deck, in the shuttle conveyor room and at the conveyor control panel arranged in the tally office. Each hopper has a vibrator and a water spray nozzle for easy cargo handling. As there are tall devices on upper deck the height of accommodation has been increased to ensure adequate visibility from the bridge. The upper deck on the starboard side has sufficient space and strength to

accommodate heavy mobile cargo handling equipment such as bulldozers. Water level detectors in each cargo hold, the fore peak tank and the bosun's store and a remote control system for drainage of the bosun's store and fore peak tank are arranged in accordance with rule requirements.

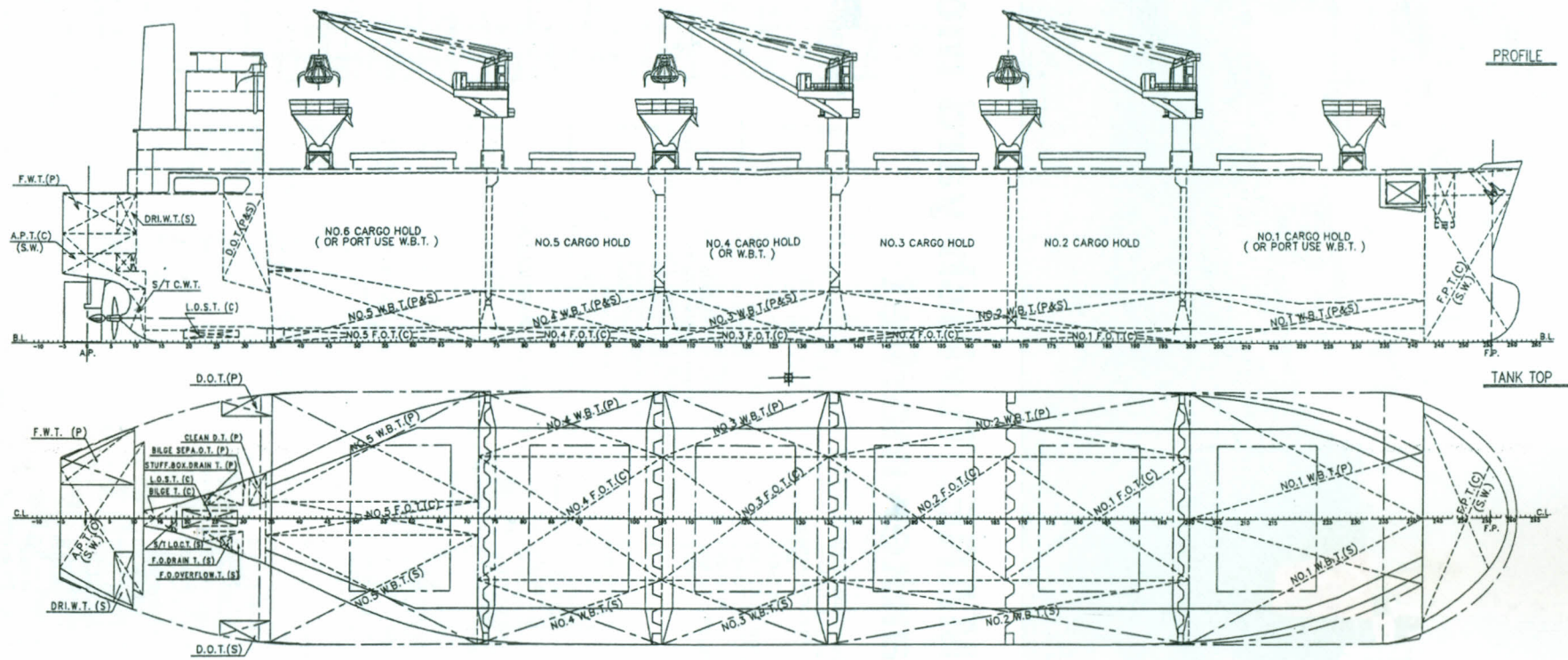
Forest Venus is fitted with an Imabari-developed energy saving device known as a "Hybrid Fin". Fitted at the leading edge of the rudder at the height of shaft centre line this device increases the propulsive efficiency by means of a two-dimensional aerofoil fin at centre and asymmetric aerofoil fins extended to both sides. A 3 - 7 % reduction in fuel consumption is expected.

The main engine is a low-speed, two-stroke cycle, single acting, direct reversible, crosshead diesel engine with turbocharger. A high-efficiency large-diameter propeller together with an efficient main engine will also contribute to improved fuel consumption.

TECHNICAL PARTICULARS

Length oa: 209.94m
 Length bp: 202.00m
 Breadth moulded: 36.00m
 Depth moulded: 23.50m
 to main deck: 20.70m (to Sunken deck)
 Width of double skin:
 bottom: 2.00m
 Draught:
 scantling: 11.40m
 design: 10.00m
 Gross: 49,549gt
 Deadweight:
 scantling: 58,766dwt
 Speed, service: 14.5knots at 85% MCR
 Cargo capacity:
 Grain: 122,138m³
 Bunkers:
 Heavy oil: 3812m³
 Diesel oil: 373m³
 Water ballast: 32,849 m³
 Daily fuel consumption:
 Main engine only: 34.7tonnes/day
 Auxiliaries: 2.0tonnes/day (for D/G)
 Classification society and notations: Nippon Kaiji
 Kyokai (NK) NS* (BC-XII) and MNS*
 CHG, MPP, LSA, RCF, AFS, M0
 Main engine:
 Design: 2 stroke cycle, single acting, direct reversible,
 crosshead diesel engine with turbocharger
 Model: 6S50MC-C (Mark 7)
 Manufacturer: Mitsui Engineering &
 Shipbuilding Co., Ltd
 Number: 1
 Type of fuel: HFO
 Output: 9370kW/ 126rev/min (MCR),
 7965kW/ 119rev/min (NCR)
 Propeller:
 Material: Nickel-Aluminium-Bronze
 Designer/Manufacturer: Nakashima Propeller Co., Ltd.
 Number: 1
 Fixed/Controllable pitch: Fixed
 Diameter: 5870mm
 Main-engine driven alternators:
 Number: 3
 Make/type: Nishishiba Electric Co., Ltd. / NTAKL

Output/speed of each set: 900kVA (720kW) / 900rev/min
 Diesel-driven alternators:
 Number: 3
 Engine make/type: Yanmar Co., Ltd. / 6EY18AL
 Type of fuel: HFO
 Output/speed of each set: 800kW/ 900rev/min
 Alternator make/type: Nishishiba Electric Co.,
 Ltd / NTAKL-VC
 Output/speed of each set: 720kW/ 900rev/min
 Boilers:
 Number: 1
 Type: OSV2-130/120-26
 Make: Osaka boiler MFG Co., Ltd.
 Output: Oil fire side: 1300kg/h
 Exhaust gas side: 1200kg/h
 Cargo cranes/cargo gear:
 Number: 3
 Make: Iknow Machinery Co., Ltd
 (Tsuiji Heavy Industries Co., Ltd)
 Type: Electric
 Performance: 14.5tonnes / 25m radius
 Other cranes:
 Number: 2
 Make: Sekigahara Seisakusho Ltd.
 Type: Electric
 Tasks: General purpose
 Performance: 0.9tonnes x 8m/min, 2tonnes x 8m/min
 Mooring equipment:
 Number: 2 x windlass, 4 x mooring winch
 Make: Nippon Pusnes Co., Ltd.
 Type: hydraulic
 Special lifesaving equipment:
 Number of each and capacity: 2 x 24 persons
 Make: Nishi-F Co., Ltd., Sekigahara Seisakusho Ltd.
 Type: Hinged gravity type
 Hatch covers:
 Design: Imabari Shipbuilding Co., Ltd.
 Manufacturer: Imabari Shipbuilding Co., Ltd.
 Type: Steel weathertight folding type
 Ballast control system:
 Make: Nakakita Seisakusho Co., Ltd.
 Type: Touch panel type
 Complement:
 Officers: 10
 Crew: 12
 Supernumeraries/Spare: 2
 Stern appendages/special rudders:
 Rudder: Hybrid fin
 Fire detection system:
 Make: Nippon Hakuyo Electronics, Ltd.
 Type: FF-1517-2
 Fire extinguishing systems
 Cargo holds: Sea Water
 Engine room: Kashiwa Co. Ltd high expansion foam
 Cabins: Sea Water
 Public spaces: Sea Water
 Radars:
 Number: 2
 Make: Japan Radio Co., Ltd.
 Models: JMA-9133-SA JMA-9123-7XA
 Waste disposal plant
 Incinerator: Sunflame Co., Ltd. OSG-360SDA
 Sewage plant: Taiko Kikai Industries Co., Ltd. SBT-25
 Contract date: 20 January 2009
 Launch/float-out date: 17 April 2009
 Delivery date: 17 April 2009





FRECCIAMARE: Turkish yard moves into smaller tanker market

Shipbuilder: **Deniz Industry Co/Cicek Shipyard, Turkey**
 Vessel's name: **Frecciamare**
 Hull number: **45**
 IMO number: **9479618**
 Owner/operator: **Ciane Arapo SpA, Italy**
 Designer: **Tomay Design Consultant, Turkey**
 Model test establishment used: **Istanbul Technical University, Turkey**
 Flag: **Italy**
 Total number of sister ships already completed: **1**
 Total number of sister ships still on order: **2**

WITH an eye on the phase-out of single-hull tankers planned to begin in 2010, Cicek Shipyard has introduced a new series of 3150dwt oil/chemical tankers into its portfolio, joining a range of larger tankers. It is hoped the design will satisfy the requirements of those owners seeking to replace existing tonnage, and to win approval from oil majors by offering vessels for charter with enhanced cargo handling, manoeuvrability and safety.

Frecciamare is the lead ship of a series which has been designed locally to Bureau Veritas class, and satisfies Ice Class 1B regulations. It is suitable for worldwide trading and can carry International Maritime Organization (IMO) II oil product and chemical cargoes, also vegetable, animal and fish oils, in tanks protected by Advanced Polymer Coatings' MarineLine products, selected by the shipbuilder because of their quick drying properties and the extended range of cargoes which they allow the vessel to carry.

The hull is double skinned, with the cargo space divided by troughed centreline and transverse bulkheads, into 12 tanks, each fitted with a Hamworthy-Svanehoj electrically driven, deepwell pump rated at 150m³/hour. Twelve segregations can be handled, and a full cargo can be discharged inside six hours through the midship manifolds. Alternate and asymmetrical loading at sea is possible. Also provided are two cylindrical slop tanks carried on the upper deck aft, port and starboard, and a residue tank.

Hamworthy-Svanehoj additionally supplied the explosion-proof pump motors, a frequency converter package, and a 70m³/h portable pump. A cargo level gauging system and high level alarms are fitted to the tanks, and a portable ullage device is also supplied. Scanjet cleaning machines are installed in each cargo tank, and Presvac high velocity pressure-vacuum valves are fitted. Nitrogen is produced in a generator delivering 750m³/h.

The propulsion system selected by Cicek for the new design is based on a pair of azimuthing rudder thrusters

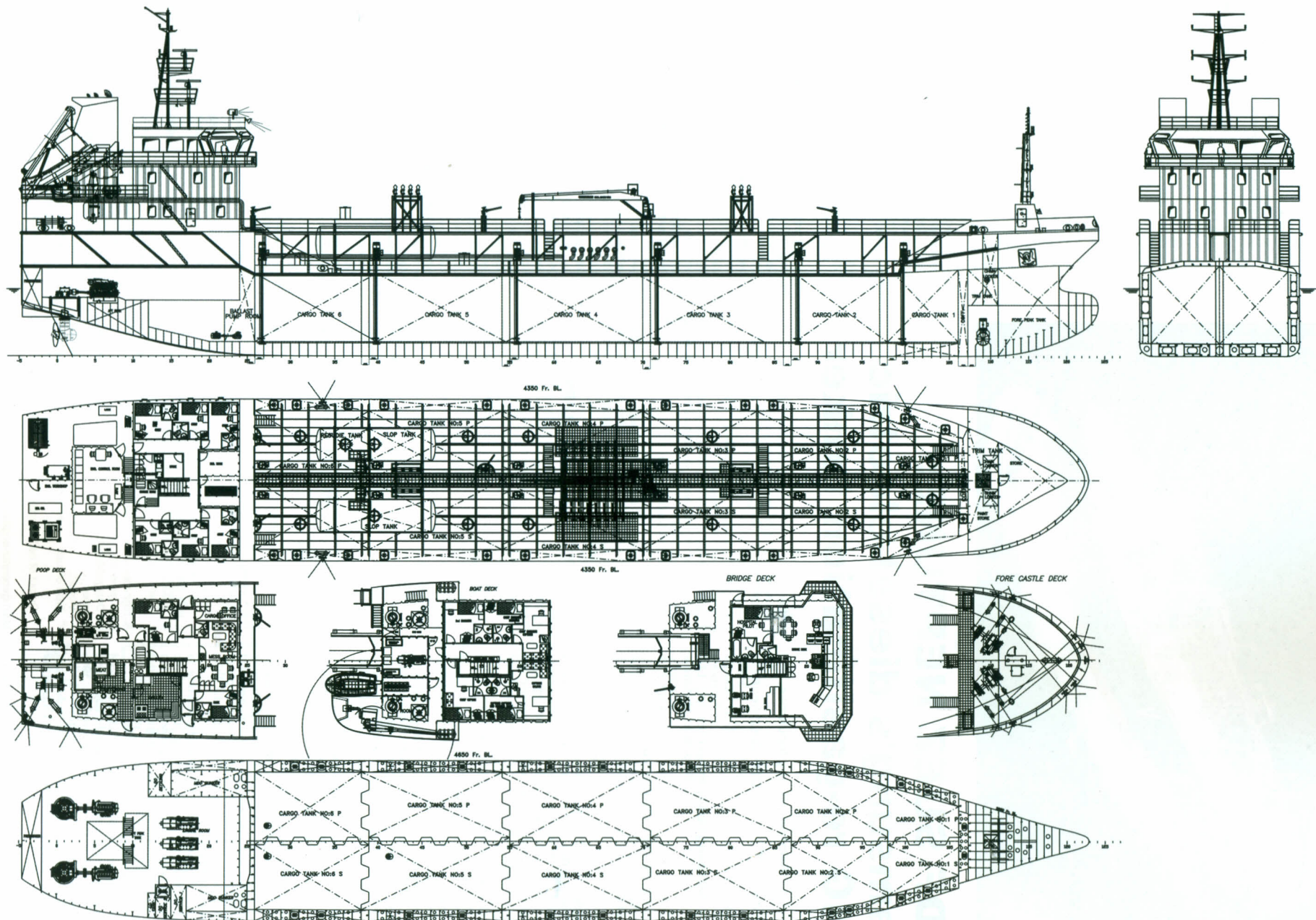
supplied by Dutch manufacturer HRP. Developing 940kW each, these type 7311WM units are fitted with open 1850mm diameter propellers conforming to Ice 1B class requirements. The thrusters are suspended under the pram stern, port and starboard of a central skeg, and installed in wells built into the hull in order to facilitate access for maintenance without trimming the vessel or entering drydock.

Driving them are two Mitsubishi S12R-MPTK main engines, each rated at 880kW/1600rev/min to produce a speed in service of 11.5knots. The machinery room also includes three Volvo Penta diesel engines turning 420kW Stamford alternators supplying, amongst other equipment, a 200kW tunnel bow thruster. Elta has supplied an electrical shore connection, and two S-Man thermal oil boilers, used mainly for cargo heating, and an Alfa Laval thermal oil exhaust gas boiler are also installed.

TECHNICAL PARTICULARS

Length, oa 84.975m
 Length, bp 77.966m
 Breadth, moulded 12.60m
 Depth, moulded
 to main deck 6.40m
 to upper (poop) deck 9.60m
 Width of double skin
 side 0.90m
 bottom 0.96m
 Draught
 design 5.30m
 scantling 5.40m
 Gross 2093gt
 Lightweight 1436tonnes
 Deadweight
 design 2996dwt
 scantling 3087dwt
 Block coefficient 0.85
 Speed, service 10.5knots@85% of MCR output
 Cargo capacity 3432m³
 Bunkers
 diesel oil 175.4m³
 Water ballast 1308.9m³
 Fuel consumption
 main engines 6.2tonnes/day
 auxiliaries 0.8tonnes/day
 Classification Bureau Veritas I + Hull + Mach,
 Oil/Chemical Tanker IMO II, Unrestricted
 Navigation, AUT-UMS, Clean Ship, AVM-DPS,
 Inwater Survey, VCS-Transfer, Ice-1B, Cargo Control,
 Alternate/Asymmetrical Loading at Sea
 Percentage of high-tensile steel
 used in construction approx 15%
 Main engines
 Design Mitsubishi
 Model S12R-MTK

Manufacturer Mitsubishi
 Number 2
 Type of fuel used MDO
 Output of each engine 940kW @ 1600rev/min
 Azimuthing propulsion/steering units
 Designer/manufacturer HRP
 Model 7311WM
 Number 2
 Propellers
 Material Nickel-aluminium-bronze
 Diameter 1850mm
 Output/speed 2 x 940kW/267rev/min
 Diesel-driven alternators
 Number 3
 Engine make/type Volvo Penta / D16 MG
 Type of fuel MDO
 Output/speed of each set 420 kW/1500rev/min
 Alternator make/type Volvo Penta / 534F-1
 Output/speed of each set 420 kW/1500rev/min
 Shore electrical connection Elta 200A
 Boilers
 Number 3
 Make/type Gaironi Naval: NGIC/2000+
 2xNG/EG 300
 Cargo tanks
 Number 12 plus 2 x slop tanks, 1 x residue tank
 Grades of cargo carried Oil products/IMO class II
 Tank coating Advanced Polymer Coatings' MarineLine
 Cargo pumps
 Number 12
 Make Hamworthy-Svanehoj
 Type DL 100 electric
 Stainless steel AISI 316L
 Capacity 12 x 150m³/h
 Cargo/ballast control systems
 Make Ariston Surveyor
 Type AN-ZB485, AN-SGCNV
 Complement
 Officers 6
 Crew 6
 Special rudder see Azimuthing Propulsion units
 Bow thrusters
 Make HRP
 Number 1
 Type TT
 Output 2001 TT
 200kW
 Bridge control system
 Make Furuno
 Fire detection system Polimm
 Fire extinguishing system
 Make/type Polimar fixed CO₂
 Radars
 Number 2
 Make Furuno
 Models 1 x FAR 2117, 1 x FAR 21375
 Contract date
 Launch/float-out date 17 October 2008
 Delivery date January 2009





GDF SUEZ NEPTUNE: Samsung's diesel-electric LNG re-gasification tanker

Shipbuilder: .. **Samsung Heavy Industries, Co. Ltd**
Vessel's name:..... **GDF Suez Neptune**
Hull No:..... **1688**
Owner/Operator:..... **Leif Høegh**
Country:..... **Norway**
Designer: **Samsung Heavy Industries, Co. Ltd**
Country:..... **Republic of Korea**
Flag:..... **Norway**
IMO number:..... **9385673**
Total number of sister ships already completed (excluding ship presented):..... **Nil**
Total number of sister ships still on order:..... **1**

"Diesel-electric" and "tanker" are not normally words which go together, certainly not since the famous World War II era turbo-electric T2 tankers disappeared to the recycling yards. While a few such vessels may have been built, crude carriers and products tankers have been almost universally direct-coupled diesel powered. LNG carriers have tended to be steam-turbine powered, with diesel appearing in the scene more recently.

On this basis alone *GDF Suez Neptune* is an unusual ship. When this is put together with its re-gasification capabilities it becomes almost a rarity.

GDF Suez Neptune was built by Samsung Heavy Industries (SHI), Korea, and delivered to her operator, Høegh LNG, on 30 November 2009. She is jointly owned by Høegh LNG and Mitsui OSK Lines and is under a long-term charter arrangement with GDF Suez.

GDF Suez Neptune incorporates the reinforced GTT MKIII cargo containment system with a 145,000m³ capacity. She is fitted with three state-of-the-art re-gasification skids for a total output capacity of approximately 21million standard m³ of natural gas per day. The LNG re-gasification system allows her to re-gasify and discharge natural gas under high pressure via an undersea pipeline directly into a shore-based distribution system. This enables economical supply of LNG to areas where shore-based re-gasification facilities may be uneconomical.

GDF Suez Neptune is also capable of operating as standard LNG carrier discharging to a shore re-gasification facility. *GDF Suez Neptune*, along with her sister ship *GDF Suez Cape Ann*, will initially service the Neptune LNG Deepwater Port 10 miles off the United States' New England coast.

GDF Suez Neptune is equipped with the Tri-Fuel Diesel Electric propulsion system, with a single screw and rudder. SHI claims that this system provides 30% higher efficiency than the more common steam turbine system. It is also stated to reduce the volume of greenhouse gas emissions. Other features claimed for the vessel are:

- No sea water usage during re-gasification operation
- No discharge of cooling sea water from the Engine

- Room, a sea water cooling circulation system
- Lowest level of NOx emission
- Hull structure designed for harsh area operation in the North Sea
- Propeller design optimisation for minimised underwater noise emission
- Minimisation of sea chest suction speed
- Prevention of rain water contaminated by oil from being discharged
- Non-toxic anti-fouling paint

The vessel received a "Green Passport" from Det Norske Veritas (DNV). The Green Passport Inventory service helps ship owners and operators to document onboard hazardous materials.

TECHNICAL PARTICULARS

Length oa:.....283.061m
Length bp:.....270.0m
Breadth moulded:.....43.4m
Depth moulded:
to main deck:.....26.0m
to other decks:.....32.8m (trunk deck)
Width of double skin:
side:.....2.378m
bottom:.....3.120m
Draught:
scantling:.....12.4m
design:.....11.4m
Gross:.....96,153gt
Deadweight:
design:.....70,860dwt
scantling:.....80,980dwt
Block co-efficient:.....0.7465 at 11.4m draft
Speed, service: ..19.5knots at 11.4m draft with 21% margin
Cargo capacity:
Liquid volume:.....145,130m³
Bunkers:
Heavy oil:.....4300m³
Diesel oil:.....1400m³
Water ballast:.....52,300 m³
Daily fuel consumption:
For propulsion only:.....129.7tonnes/day
Classification society and notations:.....Det Norske Veritas;
1A1 Tanker for Liquefied gas, ship type 2G (Membrane tank, Maximum pressure 25 kPaG, Minimum temperature -163°C), Nauticus (Newbuilding) Plus-2, CSA-2, Coat-2, Clean, E0, F-AMC, ICS, TMON, DYNPOS-AUT, STL, BIS, NAUT-AW.
% high-tensile steel used in construction:.....16%
Main generator engines:
Design/Manufacturer:.....Wärtsilä
Number:.....4 sets
Model:.....3 sets of 12V50DF and 1 set of 6L50DF
Type of fuel:.....HFO, MDO and Gas (Boil-off gas from cargo tank)
Output of each engine:.....3 x 11,400kW (12V50DF), 1 x 5700kW (6L50DF)
Main generator-engine driven alternators:
Number:.....4

Make/type:.....ABB / dual fuel engine driven
Output/speed:.....3 x 11,000kW (12V50DF), 1 x 5500kW (6L50DF) / 514rev/min
Propulsion Motors:
Number & manufacturer:.....2 x ABB A/S
Driver:.....PWM ACS 6000 SD
Output of each motor:.....13,200kW
Voltage:.....2800V
Speed range:.....150 – 720rev/min
Special features:.....Fitted with braking resistor to absorb regenerated power in emergency stop situations.
Gearbox:
Make:.....Renk
Number & model:.....1 x NDSH-3800
Output speed:.....88rev/min
Propeller:
Material:.....Ni-Al-Bronze
Designer/Manufacturer:.....MMG
Fixed/Controllable pitch:.....1 x Fixed
Diameter:.....8.6m
Speed:.....88rev/min
Exhaust-gas scrubbing equipment:
Manufacturer:.....Johnson Matthey (Argillon)
Type:.....SCR (selective catalytic reduction) unit
On main generator engines :.....2 sets for 12V50DF
On regas boilers:.....sets for regas boiler
Boilers:
Number:.....2 sets (auxiliary boiler), 2 sets (regas boiler)
Types:.....Oil fired marine boiler (auxiliary boiler), Gas fired marine boiler (regas boiler)
Make:.....MHI
Output, each boiler:.....5tonnes/h (auxiliary boiler), 100tonnes/h (regas boiler)
Cargo cranes/cargo gear:
Number & make:.....2 x TTS Marine
Type:.....Self contained electro-hydraulic single jib crane
Performance:.....Hoisting capacity - 12.0tonnes SWL, Hoisting/lowering speed - 10 m/min at rated load
Other cranes:
Number:.....2 sets provision cranes, one set STL crane
Make:.....TTS Marine
Type:.....Electro-hydraulic single jib crane
Provision crane:.....1 x 15.0tonnes SWL (starboard), 1 x 5.0tonnes SWL (port)
STL crane:.....Hoisting capacity - 25.0tonnes SWL
Mooring equipment
Number & make:.....9 sets Rolls-Royce
Type:.....Electric
Special lifesaving equipment:
Number of each and capacity:.....1 x 42 persons
Make:.....Schat Harding
Type:.....Freefall type
Cargo tanks:
Number & product range:.....4 x LNG only
Coated tanks:.....GTT Mark III type membrane tank
Stainless steel:.....SUS 304L tank and piping
Cargo pumps:
Number:.....8
Type:.....Centrifugal, single stage, submerged
Make:.....Shinko
Stainless steel:.....Shaft
Capacity (each):.....1700m³/h at 155mhc
Cargo & ballast control system:
Make:.....Kongsberg
Type:.....Remote control from the CCR as part of IAS
Complement
Officers:.....27
Crew:.....12
Suez/Repair Crew:.....6
Bow thrusters:
Make:.....Brunvoll
Number & output (each):.....2 x 2000kW
Stern thrusters:
Make:.....Brunvoll
Number & output:.....2 x 1200kW
Bridge control system:
Make:.....ABB
Type:.....AC800M/S800
Is bridge fitted for one-man operation?.....YES
Fire detection system:
Make:.....Autronica
Type:.....BS-320M
Fire extinguishing systems:
Cargo holds:.....NK dry powder system/sea water fire extinguishing system
Engine room:.....Kashiwa high expansion foam fire extinguishing system
Cabins & public spaces:.....Sea water fire extinguishing system/portable fire extinguishers
Radars:
Number:.....2 sets X-BAND / 1 set S-BAND
Make:.....Furuno
Models:.....FAR-2827W / FAR-2837SW / FCR-2827W
Integrated bridge system:
Make & model:.....Furuno - FEA-2807
Waste disposal plant
Waste handled:.....Solid garbage waste and sludge oil burning
Incinerator:.....Teamtec GS500C
Waste compactor:.....Metos IMC IP400
Sewage plant:.....Hamworthy ST3A
Contract date:.....7 April 2006
Launch/float-out date:.....20 September 2008
Delivery date:.....30 November 2009





HANDY WIND: First of twenty four from SPP Shipbuilding for Greek owners.

Shipbuilder: **SPP Shipbuilding,**
 Korea Vessel's name: **Handy Wind**
 Hull No: **H-4001**
 Owner/Operator: **Metro Star**
 Country: **Greece**
 Designer: **SPP Ship Building Co. Ltd**
 Country: **Korea**
 Model test establishment used: **Maritime and**
Ocean Engineering Research Institute
(MOERI), Korea
 Flag: **Liberia**
 IMO number: **9450703**
 Total number of sister ships already completed
 (excluding ship presented): **Nil**
 Total number of sister ships still on order: **23**

SPP first moved into shipbuilding in 2004 and its three yards, located in Southern Korea at Tongyoung, Gosung, and Sacheon have focused on 50,000dwt, 74,000dwt and 113,000dwt oil and chemical tankers and 35,000dwt, 59,000dwt and 81,000dwt bulk carriers. SPP Shipbuilding has shown sound and rapid growth at a rate rarely seen in the world. It had delivered 200 vessels by the end of 2008 with a further 57 vessels in the 50,000dwt class and two 35,000dwt bulk carriers being delivered by the end of October 2009. *Handy Wind*, SPP's first 35,000dwt bulk carrier, follows on from the 50,100dwt products tanker *Dubai Star* which featured in *Significant Ships 2007*.

With a maximum deadweight of 34,410dwt, *Handy Wind* is the first 35,000dwt bulk carrier built in SPP's Gosung shipyard. It features a side deck with forecastle, and a superstructure aft housing the accommodation and wheelhouse. This is positioned over a machinery room containing the main engine, a Doosan MAN B&W 5S50MC-C. The engine develops 7900kW at 127rev/min (85% MCR) for a service speed of 14.5knots. Electricity is supplied by three Yanmar/6EY 18A 660kW diesel-driven alternator sets and steam is generated by composite boiler which has capacity of 1400kg/h for oil fire section and 900kg/h for exhaust gas section.

The hull structure includes 65% high-tensile steel, and is reinforced for the carriage of iron ore/steel coil (2 tier) in holds 1,3 & 5. Holds Nos 2 & 4 may be empty and No. 3 hold is available for use as a water ballast tank designed to comply with International Maritime Organization (IMO) regulations relating to ballasting at sea. The hatch openings to Nos 2 to 5 holds at 19.2m x 20.2m are among the largest in vessels of this type, providing operators with easier cargo handling and faster loading/unloading times. MacGregor folding type covers are fitted to all cargo hatches, and these are operated by external hydraulic cylinders with manually operated cleat.

Cargo is handled by four sets of MacGregor-SPP GLB 3526-2 electro-hydraulic single jib deck crane of integrated pump type, lifting 35tonnes at 26m radius. These are mounted on tall pedestals to facilitate stowage of deck cargoes. The cranes are positioned between the holds and are capable of operation with radio-controlled

grabs. The accommodation block, built aft above the engine room, houses 12 officers and 13 crew with space for a Suez crew of six. Safety requirements are served by 25-person free-fall launching type lifeboat.

TECHNICAL PARTICULARS

Length oa: 180.00m
 Length bp: 172.00m
 Breadth moulded: 30.00m
 Depth moulded
 to main deck: 14.7m
 to upper deck: 14.7m
 Width of double skin
 bottom: 1.55m
 Draught
 scantling: 9.90m
 design: 9.00m
 Gross: 23,400gt
 Deadweight
 design: 30,050tonnes
 scantling: 34,410tonnes
 Speed, service: 14.5knots approx
 (85% MCR with 15% sea margin)

Cargo capacity:
 bale: 47,415m³
 grain: 48,765m³
 Bunkers (m3)
 heavy oil: 1554m³
 diesel oil: 188.5m³
 Water ballast: 11441m³

Daily fuel consumption:
 Main engine only: 17.8tonnes/day
 Auxiliaries: 5.7tonnes/day
 (generators + composite boiler)
 Classification society and notations: ABS
 +1A Bulk Carrier, BC-A(holds 2 and 4 may be empty),
 AMS, +ACCU, CSR, SafeShip-CM, GRAB[20],
 TCM, UWILD, CPS % high-tensile
 steel used in construction: 65%

Main engine:
 Design: MAN B&W
 Model: 5S50MC-C (MK7)
 Manufacturer: DOOSAN ENGINE
 Number: 1
 Type of fuel: HFO (MDO for cold starting)
 Output: 7900kW

Propeller:
 Material: Ni-Al-Br
 Designer/Manufacturer: Silla Metal
 Number: 1
 Fixed/Controllable pitch: Fixed
 Diameter: 5600mm
 Speed: 127rev/min

Diesel-driven alternators:
 Number: 3 sets
 Engine make/type: Yanmar/6EY18AL
 Type of fuel: HFO (MDO for cold starting & low load)
 Output/speed of each set: 660kW/900rev/min
 Alternator make/type: Taiyo/FE547A-8
 Output/speed of each set: 750kVA/900rev/min

Boilers:
 Number: 1

Type: Combined oil fired/exhaust gas
 Make: SPP-PARAT
 Output: 1400/900kg/hour x 7.0kg/cm² (686kPa)

Cargo cranes/cargo gear:
 Number: 4
 Make: MacGregor
 Type: GLB 3526-2, Electro-Hydraulic
 Performance: 35tonnes at 26m radius

Other cranes:
 Number: 1
 Make: SPP Heavy Industries
 Type: EPC-03072(Electric)
 Tasks: Provisions crane
 Performance: 3tonnes at 7.2m radius

Mooring equipment:
 Number: 4 sets
 Make: Rolls-Royce
 Type: Electro-hydraulic

Lifesaving equipment:
 Number of each and capacity: 1
 Make: Norsafe
 Type: GES 18 Free Fall
 Vertical or sloping chutes: Sloping chutes

Hatch covers:
 Design: MacGregor
 Manufacturer: SEO-HAE Marine System
 Type: Hydraulic folding & box type

Ballast control system:
 Make: Scanà Korea Hydraulic Ltd.
 Type: Remote hydraulic operating

Complement:
 Officers: 12persons
 Crew: 13persons
 Suez/Repair Crew: 6persons
 Single/double/other rooms: Single - 25 Rooms

Bridge control system:
 Make: Tokyo Keiki Inc.
 Type: PR-6412A-E0-SS2

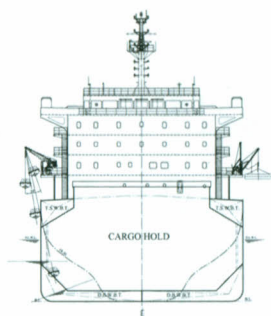
Fire detection system:
 Make: Consilium
 Type: CS4000

Fire extinguishing systems:
 Cargo holds: CO₂
 Make/Type: NK
 Engine room: CO₂
 Make/Type: NK
 Cabins: Portable fire extinguisher
 Make/Type: NK
 Public spaces: Portable fire extinguisher
 Make/Type: NK / Foam & CO₂

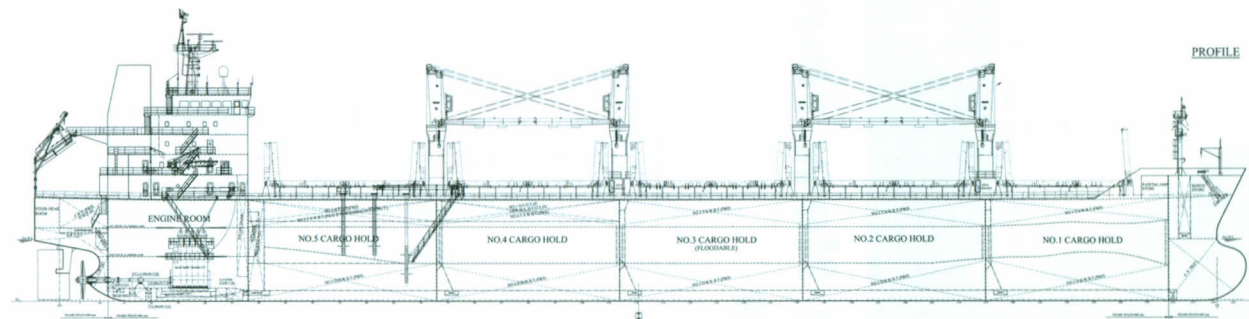
Radars:
 Number: 2 sets
 Make: FURUNO
 Model(s): FAR-2827 / FAR-2837S

Waste disposal plant:
 Incinerator: Hyundai-Atlas
 Model: MAXIING100SL WS
 Waste shredder/crusher: Loipart
 Model: 515 60 (for food)
 Sewage plant: JETS
 Model: DVZ-SKA-20

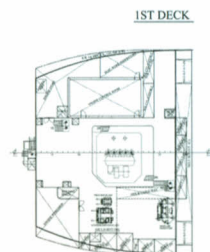
Contract date: 9 May 2007
 Launch/float-out date: 19 May 2009
 Delivery date: 15 July 2009



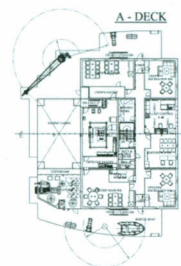
MIDSHIP SECTION



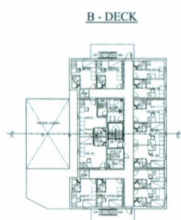
PROFILE



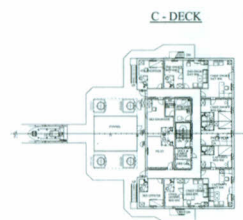
1ST DECK



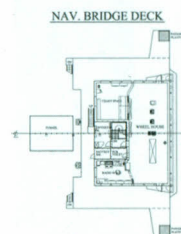
A-DECK



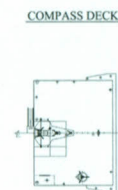
B-DECK



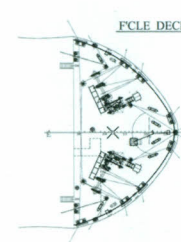
C-DECK



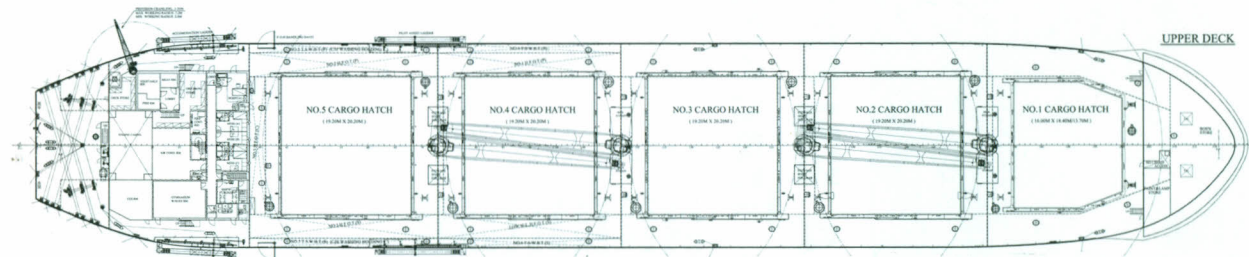
NAV. BRIDGE DECK



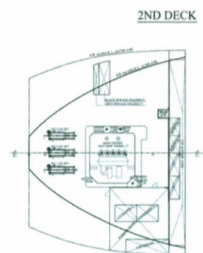
COMPASS DECK



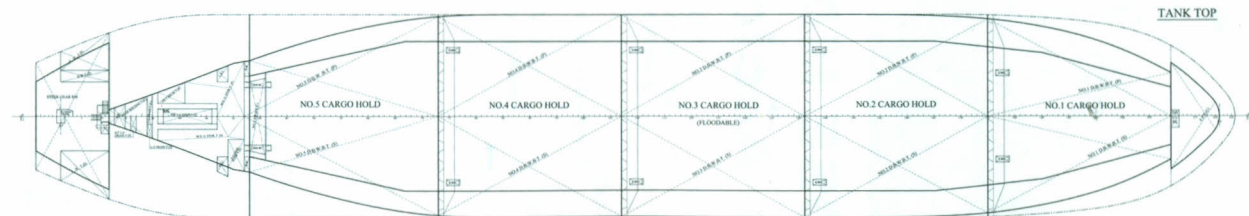
FCL DECK



UPPER DECK



2ND DECK



TANK TOP



JOSE MARIA ENTRECANALES: New ro-ro for Acciona Transmediterránea

Shipbuilder: **NAVANTIA Astillero**
San Fernando-Puerto Real
 Vessel's name: **Jose María Entrecanales**
 Hull No: **C509**
 Owner/Operator: **Compañía**
Trasmediterránea S.A.-ACCIONA
 Country: **Spain**
 Designer: **NAVANTIA Astillero**
San Fernando-Puerto Real
 Country: **Spain**
 Model test establishment used: **Marin**
 Flag: **Spain**
 IMO number: **9398527**
 Total number of sister ships already completed
 (excluding ship presented): **Nil**
 Total number of sister ships still on order: **1**

As 2009 drew to a close ACCIONA Transmediterránea prepared to take delivery of its new freight ferry, *José María Entrecanales*, for use in its Morocco, Spain and the Canary Islands. Under construction by Navantia at its San Fernando-Puerto Real facility.

The commissioning of the roll-on roll-off vessel *José María Entrecanales* will reinforce the intermodal service that ACCIONA Logística has been providing to Morocco's fresh product export sector, allowing the company to collect products from Agadir and deliver them to the port of Barcelona in only 36 hours for subsequent distribution to the rest of Europe.

With their service speed of 26.5 knots *José María Entrecanales* and her following sister ship have been designed to carry out two weekly return journeys on routes of between 700 and 800 nautical miles, or one weekly return trip over routes of 1500 miles, and are the biggest high-speed roll-on/roll-off ships available. With twin bow-thrusters and Becker flap rudders the vessel is also highly manoeuvrable.

The new vessels' 3521 lane metres provide space for 187 trailers and 23 MAFI trailers with double height containers. Roughly 50% of the open uppermost deck is suitable for dangerous cargo, providing space for up to 34 trailers. A separate car deck with an elevating ramp provides space for 100 cars. Loading is via a single stern ramp and accommodation is provided forward for 12 passengers and 28 crew.

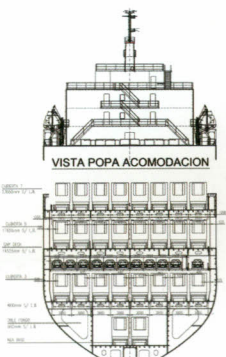
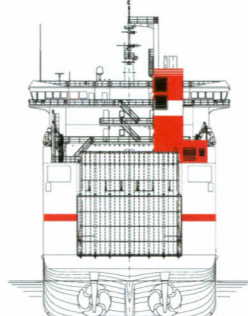
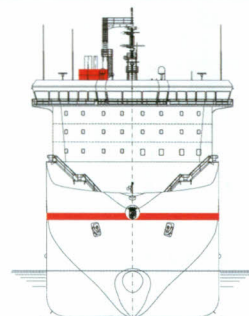
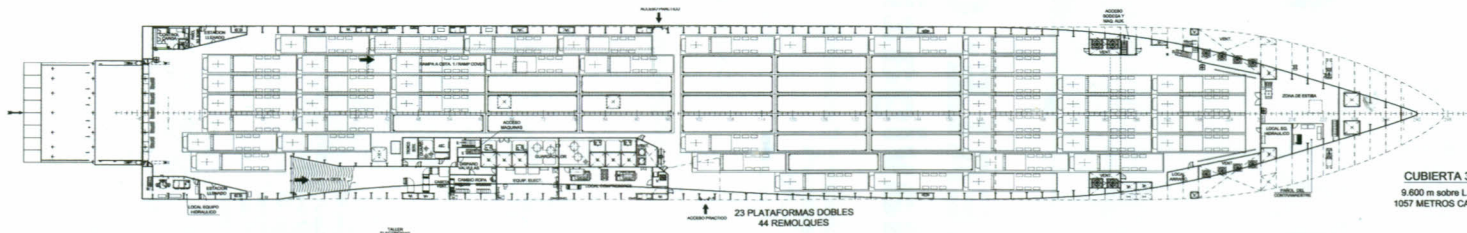
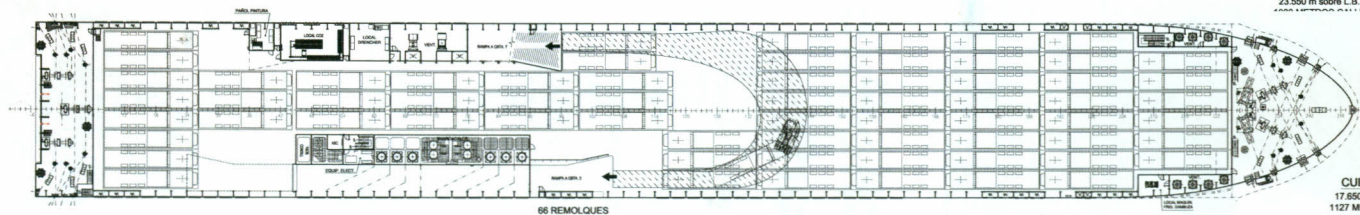
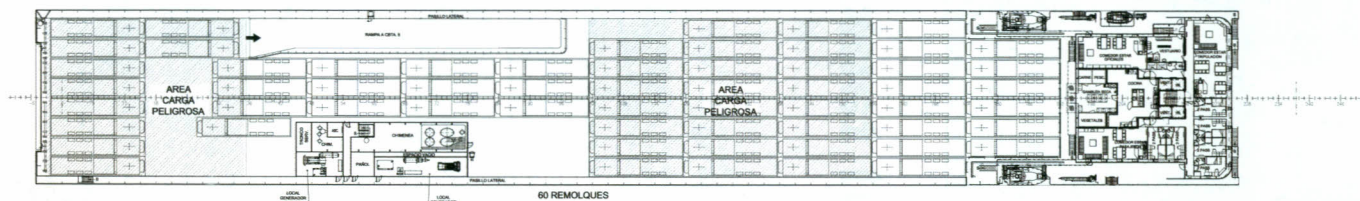
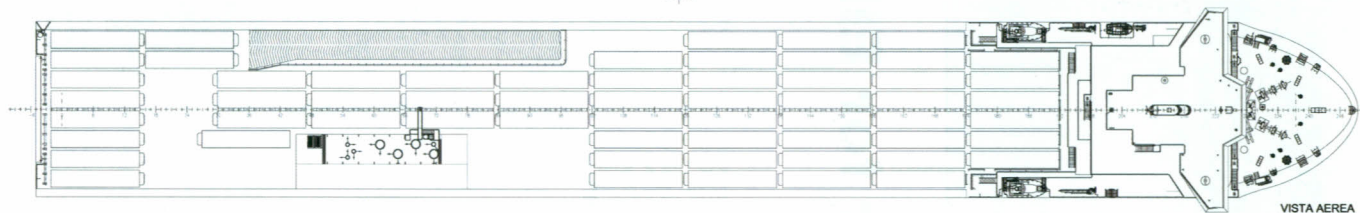
With 23 operational passenger and cargo vessels ACCIONA Transmediterránea is Spain's leading

shipping operator. In Morocco, the company provides regular connections to the ports of Agadir, Tangier and Nador with three of the main Spanish ports - Algeciras, Barcelona and Almería - for passengers and cargo.

TECHNICAL PARTICULARS

Length oa: 209.43m
 Length bp: 190.00m
 Breadth moulded: 26.50m
 Depth moulded:
 to main deck: 9.60m (Deck 3)
 to upper deck: 23.55m (Deck 7)
 Draught:
 scantling: 7.10m
 design: 7.00m
 Gross: 30,998gt
 Displacement: 22,140tonnes
 Lightweight: 12,000tonnes
 Deadweight: 10,140dwt
 Speed, service: 26.5knots at 82% MCR
 Bunkers:
 Heavy oil: 1150m³
 Diesel oil: 174m³
 Water ballast: 3586m³
 Daily fuel consumption:
 Main engine only: 160tonnes/day
 Auxiliaries: 13tonnes/day
 Classification society and notations: Bureau Veritas
 I + Hull, + Mach, Ro.Ro Para 210 Plataformas Cargo
 Ship, Unrestricted Navigation, Aut-Ums, Aut-Port, Sys-
 Neq-1, Mon-Shaft, Inwatersurvey.
 % high-tensile steel used in construction: 50%
 Heel control equipment: Interling anti-heeling system (A-H
 moment: 4200tonnes-metres)
 Main engines:
 Design: MAN B&W Diesel
 Model: 9L48/60B
 Number & manufacturer: 4 x MAN B&W
 Type of fuel: HFO
 Output of each engine: 10,800kW (100%MCR)
 Gearboxes:
 Make: RENK
 Number & model: 2 x HSNOL-1800
 Output speed: 150.42rev/min
 Propellers:
 Material: NIAI-Bronze
 Designer/Manufacturer: Rolls Royce (Kamewa)
 Number: 2
 Fixed/Controllable pitch: 4-bladed controllable pitch
 Diameter: 5200mm
 Speed: 150rev/min
 Main-engine driven alternators:
 Number & make/type: 2 x Siemens/ABB/Leroy

Output/speed of each set: 1800kW/1500rev/min
 Diesel-driven alternators:
 Number & engine make/type: 3 x MAN B&W
 Output/speed of each set: 1720kW/1000rev/min
 Alternator make/type: Hyundai/ HFJ7 C38-64K
 Output/speed of each set: 1635kW/1000rev/min
 Harbour generator
 Number & model: 1 x D2842 LE201
 Output: 597kW
 Emergency generator:
 Number & model: 1 x D2840 LE203
 Output: 430kW
 Boilers:
 Number & type: 1 x small oil fired boiler
 Make: Aalborg/Garioni
 Output: 2500kg/h @ 7.0bar
 Cranes:
 Number & make: 2 x Industrias FERRI
 Performance: Radial davit - 2tonnes/5m
 Mooring equipment:
 Number: Two windlass/winch + three mooring winch
 Special lifesaving equipment:
 Number and capacity: 2 x 40 persons
 Make: Ernst Hatecke
 Vehicles:
 Number of vehicle decks: 4
 Total lane length: 3521m
 Total cars: 100
 Total freight units: 210 trailers (40ft)
 Doors/ramps/lifts/moveable car decks:
 Number of each: 1 aft door ramp/
 3 fixed ramps /1 hoistable car ramp
 Designer: SP
 Complement:
 Officers: 11
 Crew: 17
 Passengers: 12
 Stern appendages/special rudders: Duck tail/ 2 BECKER
 Flap rudder, twisted leading edge
 Bow thruster(s):
 Number & make: 2 x Rolls-Royce (Kamewa Ulstein)
 Output (each): 1295kW @ 1480rev/min
 Propeller speed: 307rev/min
 Fire extinguishing systems
 Cargo holds & vehicle space: Drencher system
 Machinery space: CO₂ system
 Cabins: Sprinkler system
 Radars:
 Number & make: 4 x Sperry and Koden
 Sewage plant: Facet International VTP-1.5/0022
 Contract date: 15 June 2006
 Launch/float-out date: 14 March 2009
 Delivery date: January 2010



SECCION CDNA. MAESTRA

CUBIERTA 7
23.550 m sobre L.B.
1127 METROS CALLE

CUBIERTA 5
17.850 m sobre L.B.
1127 METROS CALLE

CUBIERTA 3
9.600 m sobre L.B.
1057 METROS CALLE

JOSE MARIA ENTRECANALES



LEALE: Chemical tanker for Elbana di Navigazione

Shipbuilder: ... **Cantiere Navale De Poli, Venice**
 Vessel's name: ... **Leale**
 Hull Number: ... **241**
 Owner/operator: ... **Elbana di Navigazione**
 Country: ... **Italy**
 Designer: ... **Cosnav Engineering SRL**
 Country: ... **Italy**
 Model test establishment used: ... **Krylov Shipbuilding Research Institute, St.Petersburg**
 Flag: ... **Italy**
 IMO number: ... **9404637**

Cantiere Navale De Poli, Venice, delivered the 7800m³ IMO II chemical/oil tanker *Leale* to Elbana di Navigazione during January 2009.

Leale was designed by Cosnav Engineering SRL whose scope of work included the basic design, structural and strength calculations, loading and stability requirements and the design of the piping arrangements for the cargo and main deck systems. This task brought the number of chemical carriers designed by Cosnav to 30.

Tank tests were conducted at the Krylov Shipbuilding Research Institute in St.Petersburg with positive results confirmed during the sea trials. In particular, the design of the hull form allows the vessel to exceed 14knots with a shaft power of 2800kW, delivering optimal manoeuvrability and seaworthiness in operation.

Leale was built for Piombino-based Elbana di Navigazione under the supervision of RINA and Bureau Veritas with class notations of AUT-UMS, AUT-PORT, VCS, Mon-Shaft, Manovr, Unrestricted Navigation, In Water Survey, AVM-APS-NS-VCS, IGS, CARGOCONTROL, and also RINA's Clean Sea and Clean Air notations which certify that the vessel is environmentally friendly.

With a length between perpendiculars of 105m and a beam of 16.80m *Leale* features 10 Avesta 2205 stainless steel cargo tanks and two sloped tanks. With a deadweight of 7300dwt she has a loaded draft of 7.50m. The cargo pumps were supplied by Marflex for

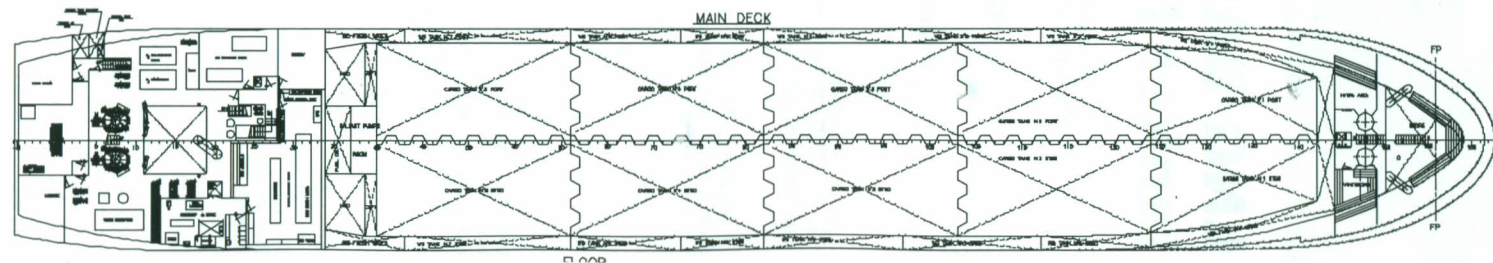
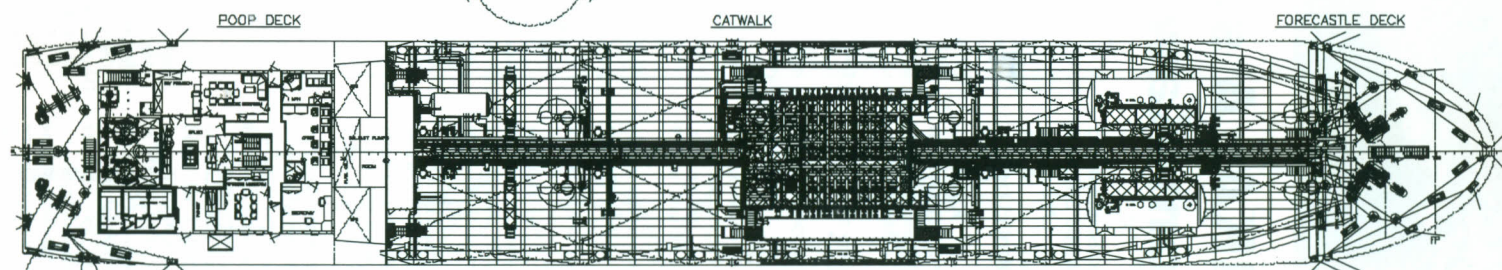
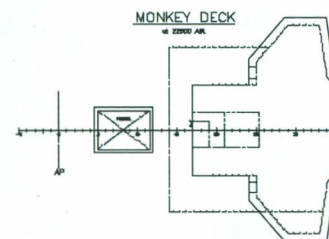
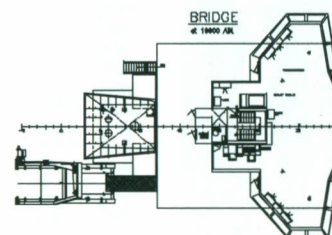
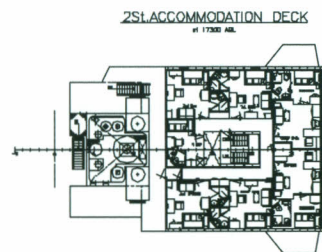
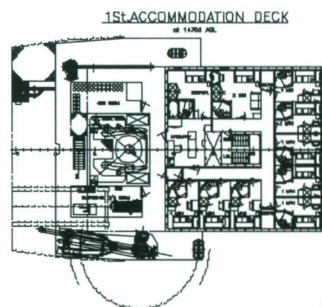
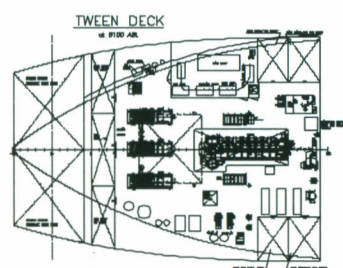
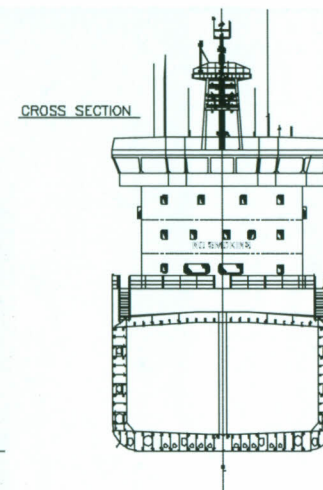
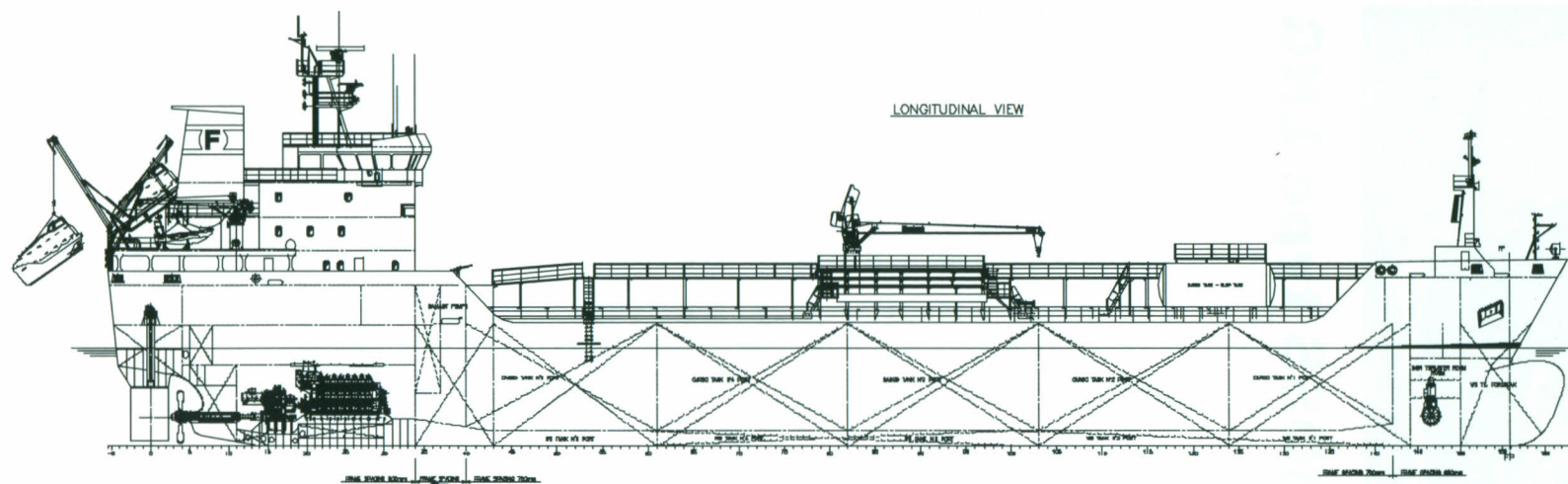
use in combination with a stern discharge system.

The main engine is a MAN B&W 8L32/40 rated at 4000kW at 750rev/min driving a four blade controllable pitch propeller. Power is supplied by a shaft generator of 800kW and three Volvo Penta D25A generators of 480kW each.

TECHNICAL PARTICULARS

Length, oa: 112.00m
 Length, bp: 105.00m
 Breadth, moulded: 16.80m
 Depth, moulded, main deck: 9.20m
 Draught:
 design: 7.5m
 scantling: 7.5m
 Gross:
 Deadweight, design: 7300dwt
 Block Coefficient: 0.747
 Speed, service: 14.0knots at 85% MCR
 Cargo capacity: 7800m³
 Bunkers:
 HFO: 380.7m³
 MDO: 102.30 m³
 Water Ballast: 2900m³
 Daily fuel consumption:
 Main engine only:
 Auxiliaries:
 Classification society and notations: Registro Italiano Navale (RINA) C*Oil Chemical Tanker, Bureau Veritas
 Unrestricted Navigation, AVM-APS-NS, IGS AUT-UMS, AUT PORT, CLEAN SEA, MANOVR, CLEAN AIR, MON SHAFT, VCS, CARGO CONTROL, INWATER SURVEY
 Main Engine:
 Design: MAN B&W
 Model: 8L 32/40
 Manufacturer: MAN B&W
 Number: 1
 Type of fuel used: IFO (Intermediate fuel oil)
 Output : 4000kW/750rev/min
 Gearbox:
 Make: Mistral - Flender
 Model: Navilus Guck 850 special
 Number : 1
 Propeller:
 Material: Nickel-Aluminium-Bronze

Designer / Manufacturer: Rolls Royce Marine
 Number: 1
 Fixed/Controllable pitch: CPP
 Diameter: 4.0m
 Speed: 165rev/min
 Main-Engine driven alternator:
 Number : 1
 Make/Type: Rolls Royce
 Output: 800kW
 Diesel -driven alternators
 Number: 3
 Engine make/type: Volvo Penta D25A
 Type of fuel used: HFO + MDO
 Output/speed: 3 x 480kW / 1800rev/min
 Boilers:
 Number: 2
 Type: 1 x oil -fired: 1 x exhaust gas
 Make: S-Man
 Output: 1 x 3000kW, 1 x 700kW
 Cargo Cranes:
 Number: 3
 Make: MEP Pellegrini
 Type: CHCD 206
 Mooring Equipment:
 Number: 4 (two x mooring winch/windlass + 2 x mooring winch)
 Make: MEP Pellegrini
 Type: Hydraulic
 Complement:
 Officers: 6
 Crew: 12
 Bow Thruster :
 Make: Jastram GMBH & Co. KG
 Number: 1
 Output: 400kW
 Fire Extinguishing system:
 Engine room: De Martini Group
 Radars:
 Number: 2
 Make: Saab Tank Radar Star
 Waste Disposal Plant:
 Incinerator: Detegasa Delta IRL-30
 Contract Date: May 2006
 Launch/float-out date: May 2008
 Delivery Date: January 2009





LNG BARKA: A stretched MOSS type LNG tanker from Kawasaki

Shipbuilder: **Kawasaki Shipbuilding Corporation, Sakaide Shipyard**
 Vessel's name: **LNG BARKA**
 Hull No.: **N1591**
 Operator: **NYK LNG (Atlantic) Limited**
 Country: **UK**
 Designer: **Kawasaki Shipbuilding Corporation**
 Country: **Japan**
 Flag: **Bahamas**
 IMO number: **9341299**
 Total number of sister ships already completed (excluding ship presented): **2**
 Total number of sister ships still on order: **Nil**

TECHNICAL PARTICULARS

Length oa: 289.50m
 Length bp: 277.00m
 Breadth moulded: 49.00m
 Depth moulded:
 to upper deck: 27.00m
 to other decks: 23.25m (2nd deck)
 Width of double skin:
 side: 2.50m
 bottom: 1.60m
 Draught:
 scantling: 12.4m
 design: 11.76m
 Gross: 121,514gt
 Deadweight:
 Design: 75,159dwt
 scantling: 82,308dwt
 Speed, service: abt. 19.5knot
 (90%MCR output with 21% S.M.)
 Cargo capacity:
 Liquid volume: 155,982m³ (-163°C, 100% full)
 Bunkers:
 Heavy oil: 5949m³
 Diesel oil: 211m³
 Water ballast: abt. 58,900m³
 Tankers - percentage segregated ballast: 100%
 Daily fuel consumption: abt. 168tonnes/day
 Classification society and notations: NK NS*
 (Liquefied Gas Carrier Type 2G), (PSCM), MNS*(M.O.B.),
 PMM, BRS1, (Descriptive Note: Maximum Pressure 0.025
 MPa and Minimum Temperature -163°C)
 % high-tensile steel used in construction: abt. 45%
 Main engine:
 Design: Kawasaki Heavy Industries Ltd.
 Model: UA-400 steam turbine
 Manufacturer: Kawasaki Heavy Industries Ltd.
 Number: 1
 Output of each engine: M.C.O. 27,600kW (SHP)
 Gearbox:
 Make: Kawasaki Heavy Industries Ltd.
 Model: 1 x Tandem articulated double reduction
 Output speed: 82rev/min
 Propeller:
 Material: Ni - Al - Bronze
 Designer/Manufacturer: Nakashima Propeller Co., Ltd.
 Number: 1
 Fixed/Controllable pitch: Fixed
 Diameter: 9500mm
 Speed: 82 rev/min at M.C.O.
 Steam turbine-driven alternators:
 Number: 2
 Make/type: Nishishiba Electric Co., Ltd./NTAKL
 Output/speed of each set: 3475kVA/1800rev/min
 Diesel-driven alternators:
 Number: 1
 Engine make/type: Daihatsu diesel generator
 Type of fuel: Diesel (DMB)
 Output/speed of each set: 1600kW/720rev/min
 Alternator make/type: Nishishiba Electric Co., Ltd./NTAKL
 Output/speed of each set: 1875kVA/720rev/min
 Boilers:
 Number: 2

Type: UME 58/48 main boiler, two drum, water tube
 Make: Kawasaki Plant Systems Ltd.
 Output, each boiler: Max. 58,000kg/h,
 Normal 48,000kg/h

Cargo cranes/cargo gear:
 Number & make: 2 x Sekigahara Seisakusho Ltd.
 Type: Electric-hydraulic, single deck crane
 Performance: 49kN

Other cranes:
 Number: 2 engine parts and
 provisions cranes + 2 sub-provision cranes
 Make: Sekigahara Seisakusho Ltd.
 Type: Electric-hydraulic (Single job type) /
 Fixed air motor
 Performance: 68.6kN (24.5kN) / 19.6kN

Mooring equipment:
 Number: 11 (2 x windlass + 9 x mooring winch)
 Make: Kawasaki Precision Machinery Ltd.
 Type: Electro-Hydraulic

Special lifesaving equipment:
 Number of each and capacity: 2 sets x 47-person
 Make: Nishi-F Co., Ltd.
 Type: Totally enclosed type, water sprinkler device

Cargo tanks:
 Number: 1 x spherical Moss tank,
 3 x stretched Moss tank

Grades of cargo carried: LNG

Cargo pumps:
 Number & type: 8 x Electric motor driven,
 centrifugal submerged type

Make: Shinko Ind., Ltd.
 Capacity (each): 1500m³/h x 145m

Cargo & ballast control system:
 Make: Yamatake Co., Ltd.
 Type: IAS

Complement:
 Officers: 10
 Crew: 19

Bow thrusters:
 Number & Make: 1 x Kawasaki Heavy Industries Ltd
 Output: 280kN

Bridge control system:
 Make: Nabtesco Co., Ltd.
 Is bridge fitted for one-man operation?: Yes (BRS1)

Fire detection system:
 Make: Autronica
 Type: Addressable type

Fire extinguishing systems:
 Engine room: Kashiwa Co Ltd High expansion foam
 Fire and deck wash system: Shinko Ind.,
 Ltd (Fire pump only)

Portable fire extinguishers: Sanyo Trading Co., Ltd.

Radars:
 Number & make: 3 x Furuno Electric Co., Ltd.
 Models: 1 x FAR-2837S(S-band),
 2 x FAR-2827(X-band)

Integrated bridge system:
 Make: Furuno Electric Co., Ltd.

Waste disposal plant:
 Incinerator: Sunflame Co., Ltd OSV-600SAI
 Sewage plant: Sasakura Engineering Co., Ltd SD-4A

Contract date: 13 December, 2004

Launch/float-out date: 5 February, 2008

Delivery date: 29 December, 2008

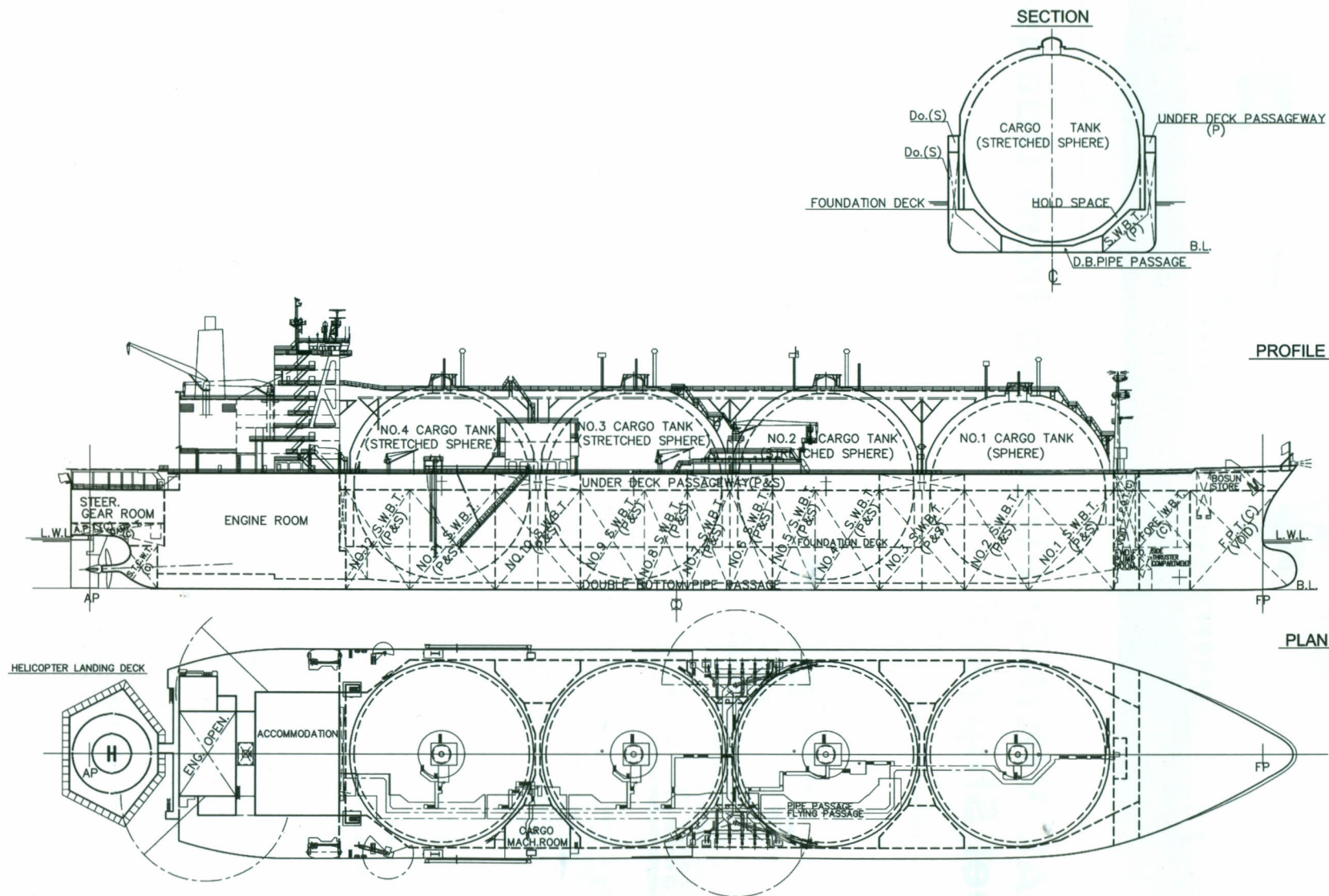
LNG BARKA, a 155,000m³ Moss type LNG carrier built by Kawasaki Shipbuilding Corporation at its Sakaide Shipyard, was delivered to its operator, UK-based NYK LNG (Atlantic) Limited, on 29 December 2008.

Intended for the LNG transportation service mainly from Qalhat in the eastern part of Oman to Japan, LNG BARKA has larger cargo tank capacity than Kawasaki's standard 147,000m³ LNG carrier due to adoption of the stretched cargo tank, but it has inherited the good qualities of the earlier design, such as excellent propulsive performance, compatibility with most LNG terminals around the world and reliable, cargo system and machinery because the basic design of hull form and machinery is common with 147,000m³ LNG carrier. Yet the cargo volume is increased by 8000m³ from Kawasaki's standard 147,000m³ LNG carrier by adopting the "Stretched Moss Cargo Tank" concept. This is achieved by inserting cylindrical sections of about 2m height at the equators of Nos. 2, 3 and 4 cargo tanks.

For the cargo tank insulation, the Kawasaki Panel System, which has excellent insulation performance (boil-off rate of 0.15% of cargo volume per day), was adopted. The cargo tanks are also protected against direct damage by a double-hull and a double bottom.

The propulsion system consists of one Kawasaki UA-400 steam turbine and two Kawasaki UME 58/48 type dual fuel boilers, giving a MCR output of 27,600kW at 82rev/min and a NCR of 24,840kW at 79rev/min. The vessel has a service speed of abt.19.5knots and a range of 12,900 nautical miles. A Kawasaki Heavy Industries electric bow thruster producing 280kN to enhanced manoeuvrability.

Monitoring and control of cargo-handling is done from the cargo control room, which is located in the best position to observe cargo-handling operations. The cargo control room is equipped with an Integrated Automation System (IAS), which monitors and controls the cargo system. The engine control room is also equipped with an IAS to monitor engine conditions.







MAERSK WEYMOUTH: Taiwan-built 1700TEU geared container vessel

Shipbuilder: **CSBC Corporation, Taiwan**
 Vessel's name: **Maersk Weymouth**
 Hull No.: **HNO940**
 Owner/Operator: **White Fig Shipping S.A.**
 Designer: **CSBC Corporation**
 Country: **Taiwan**
 Model test establishment used: **HSVA, Germany**
 Flag: **Hong Kong**
 IMO number: **9410260**
 Total number of sister ships already completed (excluding ship presented): **9**
 Total number of sister ships still on order: **4**

While most of the concerns about container vessels focus on the design of the ultra large container vessels Taiwan's CSBC Corporation also pays attention to improving the design of smaller feeder vessels. After its 1800TEU gearless type design covered in *Significant Ships 2006* CSBC has extended its product line to include 1700TEU geared container vessels.

The new design of 1700TEU geared container vessel has double skin format with poop deck. Five cargo holds in front of the deck house are serviced by two MacGregor deck cranes. The container capacity is maximised by the use of 10 rows of containers in the holds and the narrow wing tanks under the upper deck are designed as piping space, fuel oil tanks and water ballast tanks. A relatively high 1259 containers homogeneously loaded to 14tonnes may be carried and total 377 reefer plugs is arranged in the holds and on deck according to the owner's operational requirements.

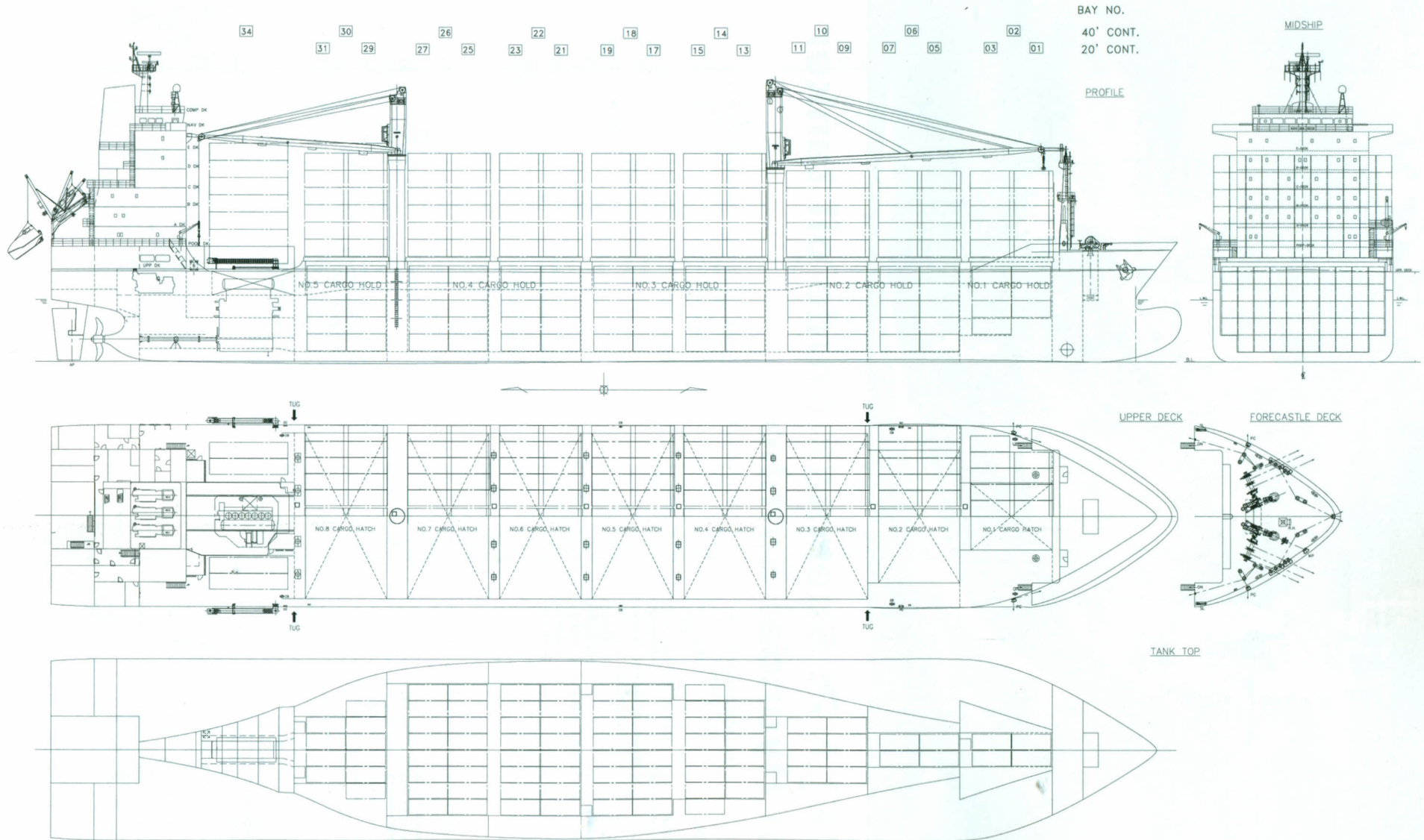
In order to avoid potential noise and vibration problems from the extreme-aft deck house design the vibration-reduction design of propeller and homogenous wake are designed to reduce the pressure pulse induced by the propeller. From sea trial results of noise and vibration measurements the noise levels comply with the International Maritime Organization standard and vibration levels for the most critical condition 109rpm at the most sensitive location, navigation deck and stern deck, are all lower than the lower limit specified by ISO 6954-1984(E).

TECHNICAL PARTICULARS

Length oa: 175.10m
 Length bp: 164.90m
 Breadth moulded: 27.90m

Depth moulded: 13.80m
 Width of double skin:
 side: 1.25m
 bottom: 1.50m
 Gross: 18,123gt
 Deadweight:
 design: 18,384dwt
 scantling: 22,314dwt
 Draught:
 design: 8.50m
 scantling: 9.50m
 Speed, service: 20.00knots at design draft at 90% MCR
 Bunkers:
 heavy oil: 2062m³
 diesel oil: 302m³
 Water ballast: 7249 m³
 Fuel consumption:
 main engine only: 57.4tonnes/day
 Classification: KR with the symbols of
 +KRS1 - Container Ship Sea Trust(DSA),
 IWS, CSA, LI +KRM1 - UMA
 Percentage of high-tensile steel used in construction: 34%
 Heeling control system: Auto control, 300 m³/h
 Main engine:
 Design: MAN B&W
 Model: 7S60MC-C
 Manufacturer: Kawasaki Heavy Industries Co., Ltd.
 Number: 1
 Type of fuel: HFO
 Output: 15,820kW / 105rev/min
 Propeller:
 Material: Nickel-aluminium-bronze
 Design/Manufacturer: CSBC/ HHI CO.,LTD
 Number: 1
 Pitch: Fixed
 Diameter: 6600mm
 Speed: 105rev/min
 Diesel-driven alternators:
 Number: 3
 Engine make/type: Yanmar/6EY26L
 Type of fuel: HFO
 Output: 1620kW x 720rev/min
 Alternator make/type: Hyundai/HFC6 636-14K-01
 Output: 1500kW x 720rev/min
 Boilers:
 Number: 1
 Type: ECP-3, Forced draft pressure jet
 Make: Aalborg Industries K.K.
 Output: 1500kg/h

Mooring equipment:
 Number: 2 x mooring winch/windlass,
 2 x mooring winch
 Make: Rauma Brattvaag
 Type: Electric-hydraulic
 Hatch covers:
 Design: CSBC/MacGregor
 Make: CSBC
 Type: Pontoon type
 Deck Crane:
 Number: 2 x 45tonnes
 Make: MacGregor
 Type: Electric-hydraulic slim type
 Containers:
 Lengths: 20ft/40ft/45ft
 Total TEU capacity: 1713
 on deck: 1095
 in hold: 618
 homogeneously loaded to 14tonnes: 1259
 Reefer plugs: 377FEU
 Tiers/rows (maximum):
 on deck: 6/11
 in hold: 5/10
 Ballast control system:
 Make: Nakakita
 Complement:
 Officers: 13
 Crew: 11
 Bow thruster:
 Make: KHI
 Number: 1
 Output: 800kW
 Fire detection system:
 Make: Nohmi Bosai
 Type: FIP511-20L
 Fire extinguishing system:
 Cargo hold/Engine room: NK Co. Ltd fixed CO₂
 Radars:
 Number: 2
 Make: Furuno
 Waste disposal plant:
 Incinerator: Volcano VIM-50
 Sewage plant: Hamworthy ST2A
 Contract date August 2006
 Launch date August 2009
 Delivery date October 2009





MIKELA P: Suezmax crude oil tanker from Hyundai Samho

Shipbuilder: **Hyundai Samho Heavy Industries Co., Ltd**
Vessel's name: **Mikela P**
Hull No.: **S401**
Owner/Operator: **Daniel Marine Corp**
Country: **Greece**
Designer: **Hyundai Samho Heavy Industries Co., Ltd**
Country: **Korea**
Model test establishment used: **Hyundai Maritime Research Institute**
Flag: **Liberia**
IMO number: **9440382**
Total number of sister ships already completed (excluding ship presented): **3**
Total number of sister ships still on order: **1**

Mikela P is the fourth in a series of five Suezmax vessels constructed by Hyundai Samho, Korea, for Daniel Marine Corporation, Greece.

Mikela P is a single decked tanker constructed with a double skin which combines side and bottom tanks to form six pairs of water ballast tanks surrounding a cargo space. The cargo space is also divided into six pairs of tanks which are used for the carriage of crude oil and dirty products. The underdeck area, including two metres down from the deck, the bottoms of the tanks and the two slop tanks in full are painted with International Paint's epoxy coatings. Cargo handling is by means of three Hyundai Heavy Industries (HHI) vertical, centrifugal pumps, each rated at 4000m³/hour which are installed in a pump room forward of the machinery space. The lower part of the pump room is equipped with a void space to ensure compliance with MARPOL Reg.22. In addition to the regulatory requirements a gas detection system and high level alarm were installed.

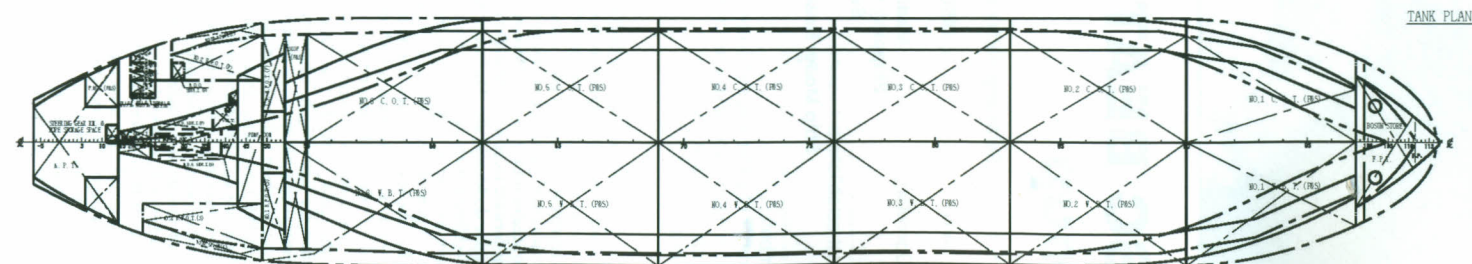
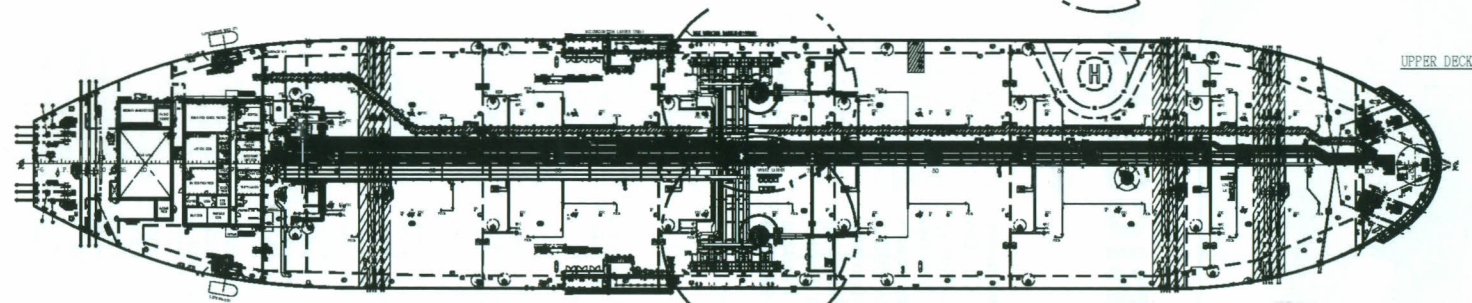
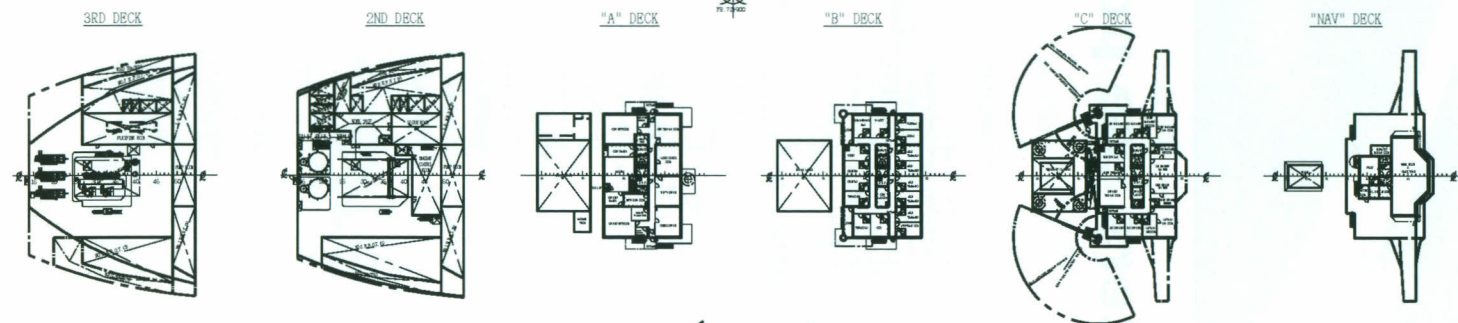
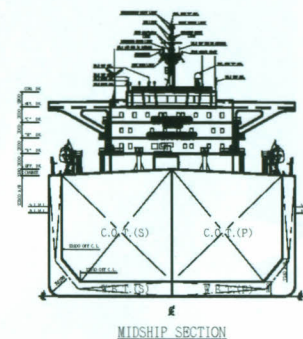
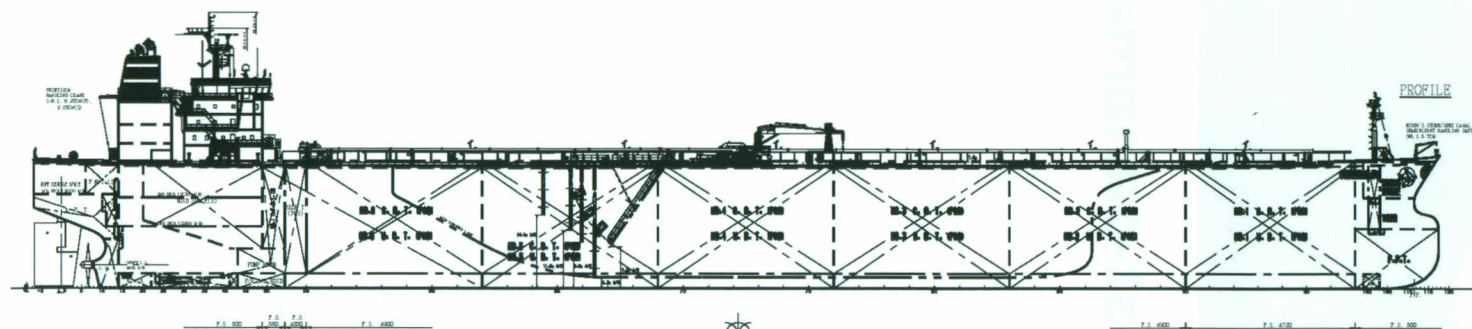
The shafting system is optimised by omitting a forward stern tube bush. The arrangement adopted results in a more flexible shafting system which assists on keeping loads at a low level considering the various operating conditions likely to be encountered. Three diesel generators are installed, each producing 860kW of electrical power.

Accommodation for a total crew of 30 is provided in a deck house above engine room, separated from the engine/funnel casing to reduce possible noise and vibration problems.

TECHNICAL PARTICULARS

Length oa: 274.34m
Length bp: 264.00m
Breadth moulded: 48.00 m
Depth moulded to main deck: 23.10m
Width of double skin:
side: 2.5m
bottom: 2.8m
Draught:
scantling: 17.15m
design: 16.00m
Gross: 81,347gt
Displacement: 183,839tonnes
Lightweight: 25,832tonnes
Deadweight:
Design : 144,452dwt
Scantling : 158,007dwt
Block co-efficient: 0.8235 at scantling draft
Speed, service: 15.8knots with 15% sea margin
Cargo capacity:
Liquid volume: 173,826m³
Bunkers:
Heavy oil: 4061m³
Diesel oil: 233m³
Water ballast: 54,292m³
Daily fuel consumption:
Main engine only: 67.3tonnes/day (MDO at normal seagoing condition)
Auxiliaries: 3.8tonnes/day (MDO at normal seagoing condition)
Classification society and notations: Lloyd's Register +100A1, Double Hull Oil Tanker, CSR, ESP, ShipRight(CM), LI, *IWS, SPM, +LMC, IGS, UMS With the descriptive note COW(LR), ShipRight(SCM), GREEN PASSPORT, ETA
% high-tensile steel used in construction: 33.5 %
Main engine:
Design/Manufacturer: HHI-EMD
Number & model: 1 x 6S70MC-C7
Type of fuel: HFO or MDO
Output: 18,660kW x 91rev/min
Propeller:
Material : Ni.Al.Bronze
Designer/Manufacturer : HHI
Fixed/Controllable pitch: 1 x Fixed
Diameter: 8200mm
Speed: 91rev/min
Special adaptations: TMON
Diesel-driven alternators:
Number: 3
Engine make/type: HHI-EMD/HIMSEN 4 stroke engine
Type of fuel: HFO or MDO

Output/speed of each set: 920kW @ 720rpm
Alternator make/type: HHI/water cooled
Output/speed of each set: 860kW @ 720rpm
Boilers:
Number & make: 2 x Aalborg
Type: Cylindrical type
Output, each boiler: 35tonnes/h x 16/6 K
Cargo cranes:
Make: 2 x Oriental Precision & Engineering Co., Ltd.
Type: Electric-hydraulic
Performance: SWL 15tonnes
Other cranes
Make: 2 x Oriental Precision & Engineering Co., Ltd.
Type: Electric-hydraulic
Performance: 6.3tonnes SWL (Port), 2tonnes SWL (Stbd)
Mooring equipment:
Number & make: 8 x Pusnes
Type: Hydraulic
Cargo tanks:
Number: 14 (including slop tanks p&s)
Grades of cargo carried: Crude oil
Cargo pumps:
Number & Make: 3 x HHI
Type: Centrifugal
Capacity (each): 4000m³/hr
Cargo & ballast control system:
Make: Nakakita
Type: Conventional mimic board type
Complement:
Officers: 12
Crew: 18
Bridge control system:
Make: HHI-EES
Type: Self standing type (Piano type)
Fire detection system
Make & type: Consilium - CS4000
Fire extinguishing systems
Cargo holds: Sea-Plus deck foam
Engine room: Tanktech / Local water mist type
Radars:
Number: S-band/X-Band, each one set
Make: JRC
Models: JMA-9132-SA/JMA-9122-6XA
Integrated bridge system:
Make & model: JRC - JAN-901B
Waste disposal plant:
Incinerator: TeamTec GS500CS
Sewage plant: Ilseung ISS-35
Contract date: 26 March 2007
Delivery date: 6 November 2009





MSC BEATRICE: Enters the post-panamax group

Shipbuilder: **Samsung Heavy Industries Co., Ltd**
 Vessel's name: **MSC Beatrice**
 Hull No: **HN1709**
 Owner/Operator: **Mediterranean Shipping Co. (MSC)**
 Country: **Switzerland**
 Model test establishment used: **Samsung Ship Model Basin (SSMB)**
 Flag: **Panama**
 IMO number: **9399014**
 Total number of sister ships already completed (excluding ship presented): **4**
 Total number of sister ships still on order: **8**

At 366m length overall and 14,000TEU capacity *MSC Beatrice* and her sister ships can lay fair claim to being the world's largest container ships. In any case they represent a small but growing class of vessels, the "post-panamax" jumbo containership.

Most noticeable feature of *MSC Beatrice* and her sister ships is the forward location of the deckhouse, leaving a smaller engine deckhouse aft. The major benefit of the forward deckhouse is an increase in container capacity without any increase in ships size. The International Maritime Organization (IMO) visibility criterion requires that the water surface 500m forward of the ship's bow must be visible from the wheelhouse. With the normal "all aft" configuration this is achieved by tapering the container stack heights from the wheelhouse towards the bow. With the "house forward" configuration the taper length is significantly reduced, providing extra container spaces in the area between the two deckhouses where full-height stacking is possible. There are no IMO requirements re visibility aft.

The "house forward" configuration also provides other benefits. Fuel tanks may be located in the protected area under the wheelhouse and the strength of the hull in bending and torsion is considerably improved. The shorter propeller shaft, due to the engine room location being further aft than otherwise possible, should also mean slightly reduced transmission power losses. There are also disadvantages of course; personnel access to the machinery space is somewhat less convenient and there is a requirement for systems cabling between the two areas which, brings with it increased construction and maintenance costs.

Containers are stacked 18 wide below deck and 20 wide above deck to a maximum of nine high above deck. Reefer plugs are provided above deck for a

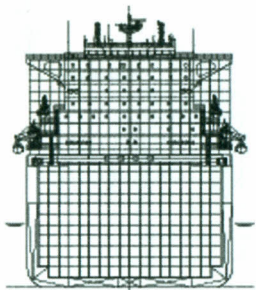
maximum of 1000FEU. A 9.2m diameter propeller provides the driving force.

Ultra-large container ships like *MSC Beatrice* stretch the envelope in many ways, including not only hull design and construction but also propulsion systems design, port facilities, cargo handling, channel depth and vessel manoeuvrability. However the economies of scale provided and the continuing evolutionary development of these large ships suggest that the envelope will be stretched somewhat further yet.

TECHNICAL PARTICULARS

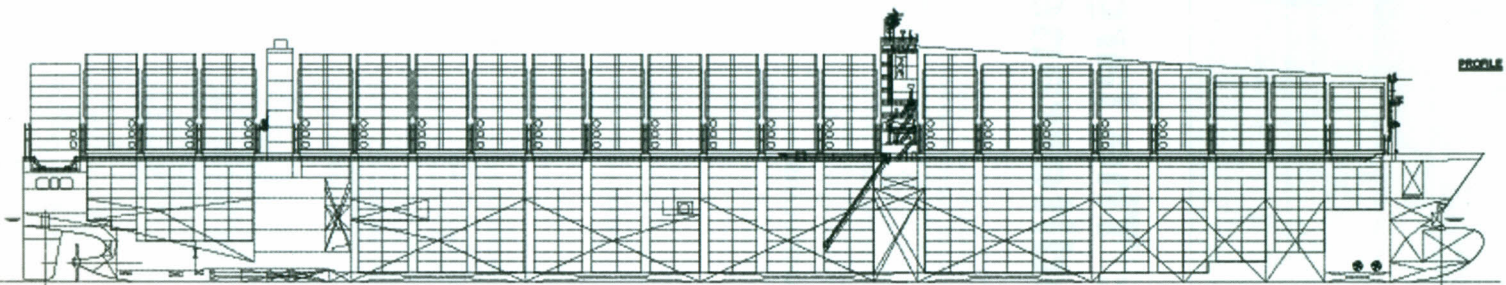
Length oa: 366.1m
 Length bp: 350.0m
 Breadth moulded: 51.2m
 Depth moulded to upper deck: 29.9m
 Draught:
 scantling: 15.6m
 design: 14.5m
 Gross: 151,560gt
 Deadweight:
 design: 138,460dwt
 scantling: 156,300dwt
 Speed, service: 24.3knots (90% MCR output)
 Cargo capacity:
 Bale: 13,798TEU
 Refrigerated cargo: 1000FEU
 Bunkers:
 Heavy oil: 12,900m³
 Diesel oil: 520m³
 Water ballast: 46,500m³
 Daily fuel consumption:
 Main engine only: 262tonnes/day
 Classification society and notations: .. Germanischer Lloyd, +100A5, Container ship, RSD STAR, MC, AUT, NAV-O, Environmental Passport, IW, BWM, DG
 % high-tensile steel used in construction: 68%
 Main engine:
 Design: MAN Diesel
 Model: 12K98MC-C7
 Manufacturer: MAN-Doosan
 Number: 1
 Type of fuel: HFO
 MCR power of an engine: 72,240kW x 104rev/min
 Propeller:
 Material: Nickel aluminium bronze
 Designer/Manufacturer: Samsung, MMG
 Fixed/Controllable pitch: 1 x Fixed
 Diameter: 9.2m
 Diesel-driven alternators:
 Number: 4
 Engine make/type: MAN-STX
 Type of fuel: HFO
 Output/speed of each set: 3500kW / 720rev/min

Alternator make/type: Hyundai, synchronous
 Output/speed of each set: 3380kW, 6600V, 3ph, 60Hz
 Exhaust-gas scrubbing equipment
 Manufacturer: Kangrim
 Type: Smoke tube type
 Boilers:
 Number & type: 1 x Vertical Water tube
 Make: Kangrim
 Output, each boiler: 6500kg/h, 7bar
 Mooring equipment:
 Number & make: 8 x Rolls-Royce
 Type: Electric motor driven (3 Pole change)
 Special lifesaving equipment:
 Number of each and capacity: 2 sets of 32 persons
 Make & type: CSIC (Beihai) totally enclosed
 Hatch covers:
 Design: MacGregor
 Manufacturer: Samsung Heavy Industry
 Type (upper deck/other decks): Non-tight type
 Containers:
 Total TEU capacity: 13,798TEU
 On deck: 7382TEU
 In holds: 6416TEU
 Homogeneously loaded to 14tonnes: 2540TEU
 Reefer plugs: 1000FEU (on deck only)
 Tiers/rows (maximum):
 On deck: 20
 In holds: 18
 Cargo & ballast control system:
 Make: Pleiger Far East
 Type: Electric self-powered type
 Complement:
 Officers: 15
 Crew: 13
 Single/double/other rooms: single room - 29 cabins, double room - 2 cabins
 Bow thrusters:
 Number & Make: 2 x Kawasaki
 Output (each): 1700kW
 Bridge control system:
 Make: Kongsberg
 Is bridge fitted for one-man operation? Yes
 Fire detection system:
 Make: Saracom
 Type: Addressable Analogue type
 Fire extinguishing systems:
 Cargo holds: NK CO2 total flooding
 Engine room: NK / CO2 total flooding
 Cabins: NK sea water hose with reel
 Radars:
 Number & make: 3 x Sperry Marine
 Contract date: 3 June 2006
 Launch/float-out date: 23 December 2008
 Delivery date: 4 March 2009

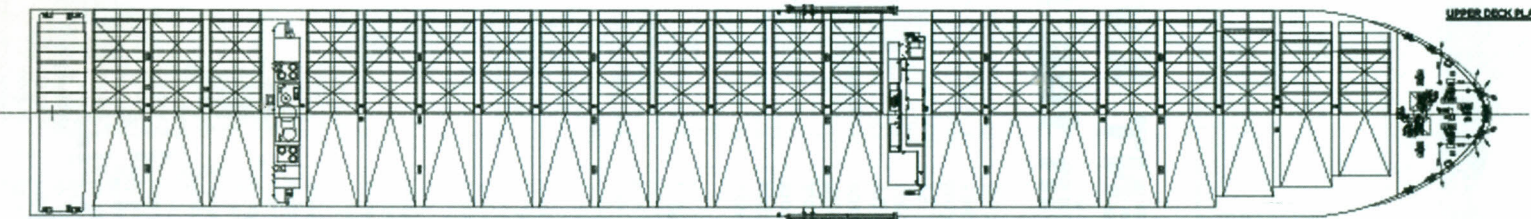


MIDSHIP SECTION

PROFILE



UPPER DECK PLAN





NAFTOCEMENT XVIII: The largest cement carrier built in the Mediterranean region

Shipbuilder: **Selah Makine VE Gemicilik**
Endustri Tic AS, Turkey
Vessel's name: **Naftocement XVIII**
Hull Number: **54**
Owner/operator: **Naftotrade Shipping**
and Commercial SA
Country: **Greece**
Designer: **Cosnav Engineering SRL**
Country: **Italy**
Model test establishment used: **Vienna Model**
Basin, Austria
Flag: **Malta**

Naftocement XVIII is the Mediterranean's biggest cement carrier yet. Cosnav Engineering SRL performed the basic and detailed design utilising their 30 years of knowledge in the design of high level technological vessels such as Gas Carriers, Chemical Carriers, Bitumen Carriers and ro-ro Vessels.

Naftocement XVIII was constructed in accordance with the class regulations of Registro Italiano Navale (RINA) and includes also the Italian Society's Clean Sea and Clean Air notations which certifies the vessel is environmentally friendly. This is the third vessel designed by Cosnav Engineering SRL for the Greek Shipowner Naftotrade Shipping and Commercial SA. This built on two previous projects which achieved excellent results in the international market. The tank test was carried out in the Vienna Model Basin, Austria producing excellent hydrodynamic results.

The design incorporates a tailor-made, automated, screw compressor-based loading and discharging system, which can receive cargo from shore either mechanically or pneumatically, and discharge it pneumatically. The hull is a bulk carrier type with a single skin in which six cargo holds are arranged, three forward and three aft of the midships loading position.

Loading and unloading is carried out through shore connections positioned at midships port and starboard. The maximum pneumatic loading rate is 600tonnes/h, with discharge accomplished at 500tonnes/h. The maximum mechanical loading rate is 750tonnes/h. Both systems carry cargo to either the forward or aft holds as required by means of an airslide system on deck. For discharge purposes, air is blown through the fabric of sloped aeration panels installed on the tanktop of each hold. This fluidises the cargo, allowing it to flow to

the centreline where a vertical screw conveyor equipped with two 35kW motors for each cargo hold, raises it to the horizontal conveyor above deck, and thence to shore. All surplus air circulating during these operations is removed by means of deck-mounted dust collectors, and the entire system is computerised for operation by one man. During loading, a 1000m³/h high-pressure fan, driven by a 4.6kW motor, supplies air to the hopper airslides.

TECHNICAL PARTICULARS

Length, oa: 156.52m
Length, bp: 145.30m
Breadth, moulded: 20.60m
Depth moulded, main deck: 10.70m
Draught:
design: 8.0m
scantling: 8.2m
Deadweight: 15,500dwt
Speed, service: 14.0knots at 90%MCR
Cargo capacity: 14350m³
Bunkers:
Heavy Oil: 771.5m³
Diesel Oil: 135.0 m³
Water Ballast: 6939.7m³
Classification: Registro Italiano Navale C*
General Cargo Ship, Non-hom-load,
(Max. Cargo Density 1.25/ m³),
Holds 1, 2, 3, 4, 5, 6 may be empty,
Unrestricted Navigation, Special Service
– Cement Carrier - Clean Sea – Clean Air,
AUT-UMS-IMS-PORT, SYS-NEQ-1, PMS,
MANOVR, INWATER SURVEY.
Percentage of high-tensile steel used in construction...10%
Main Engine:
Design: MAN Diesel
Model: 9L32/44 CR
Manufacturer: MAN Diesel
Number: 1
Type of fuel used: HFO
Output: 5040Kw/750rev/min
Gearbox:
Make: Reintjes
Model: LAF 7760/6.476:1
Number: 1
Output speed: 116rev/min
Propeller:
Material: Copper-Nickel-Aluminium-Bronze
Designer / Manufacturer: Berg Propulsion
Number: 1 (four blades)
Fixed/Controllable pitch: Controllable
Diameter: 5m
Speed: 116rev/min

Main-Engine driven alternators:
Number: 1
Make/Type: Marelli Motori SpA
Output: 1300kW
Diesel-driven alternators:
Number: 3
Engine make/type: Wartsila Auxpac 1050W6L20
Type of fuel used: HFO
Alternator make/type: Wartsila – Brushless
3-phase synchronous
Output/speed: 3 x 1313kVA/ 900rev/min
Boilers:
Number: 2
Type: One x oil –fired + one x exhaust gas
Make: S-Man (Garioni Naval Srl)
Output: 2 x 697kW
Cargo Cranes:
Number: 2
Make: Pesci
Type: 1 x SE 135 N/4 + 1 x SE 145/4
Mooring Equipment:
Number: 4 (two mooring winch/windlass;
two mooring winch)
Make: Gurdesan
Type: Hydraulic
Ballast & Cargo Control System:
Make: Konsberg Maritime
Type: C-20
Complement:
Officers: 10
Crew: 11
Bow Thruster :
Make: Schottel
Number: 1
Output: 600kW
Bridge Control System
Make: SAM Electronics
One man operation: Yes
Fire Detection system
Make: Consilium
Type: Salwico CS4000
Fire Extinguishing system
Engine room: Danfoss Semco
Radars
Number: 2
Make: SRH Marine Greece
Integrated Bridge System
Make: Radio Holland
Waste Disposal Plant
Incinerator: Detegasa Model Delta IRL-30
Sewage Plant: Triton-Format Model MSTP 1B Vakuum
Contract Date: November 2007
Launch/float-out date: 18 July 2009
Delivery Date: December 2009



NEXUS 1: Samsung FPSO, upgradeable and designed for harsh environments

Shipbuilder: **Samsung Heavy Industries Co., Ltd**
 Vessel's name: **Nexus 1**
 Hull No: **HN1716**
 Owner/Operator: **EBX Group**
 Country: **Brazil**
 Designer: **Samsung Heavy Industries Co., Ltd**
 Country: **South Korea**
 Model test establishment used: **SSMB (Samsung Ship Model Basin)**
 Flag: **Norway**
 IMO number: **9399832**
 Total number of sister ships already completed
 (excluding ship presented): **1**
 Total number of sister ships still on order: **2**

Nexus 1 is a generic FPSO developed to suit a harsh environment, a strict regulatory environment, a wide range of production scenarios and sequential field development strategies.

Nexus 1 is designed for a fatigue life of 20 years and to suit Norwegian sea design environmental conditions with a 100 year return period. A large storage capacity is provided for operation in remote areas and the hull and utility systems were designed to permit topsides expansion without structural modifications. The topsides design is modularised to facilitate expansion and can readily be doubled from its initial oil/liquids capacity of 80,000bbl/day.

Cargo offloading is via a 120m long 500mm diameter hose from a reel located aft. The cargo system includes a volatile organic compounds (VOC) recovery system and crude oil and hot/cold seawater washing of the cargo tanks. The cargo tanks are also serviced by a steam heating system.

Lifesaving appliances include four x 40persons lifeboats, eight x 25 and one 20 persons life rafts and one man overboard boat. A helicopter landing pad suitable for 12tonnes class helicopters is also provided.

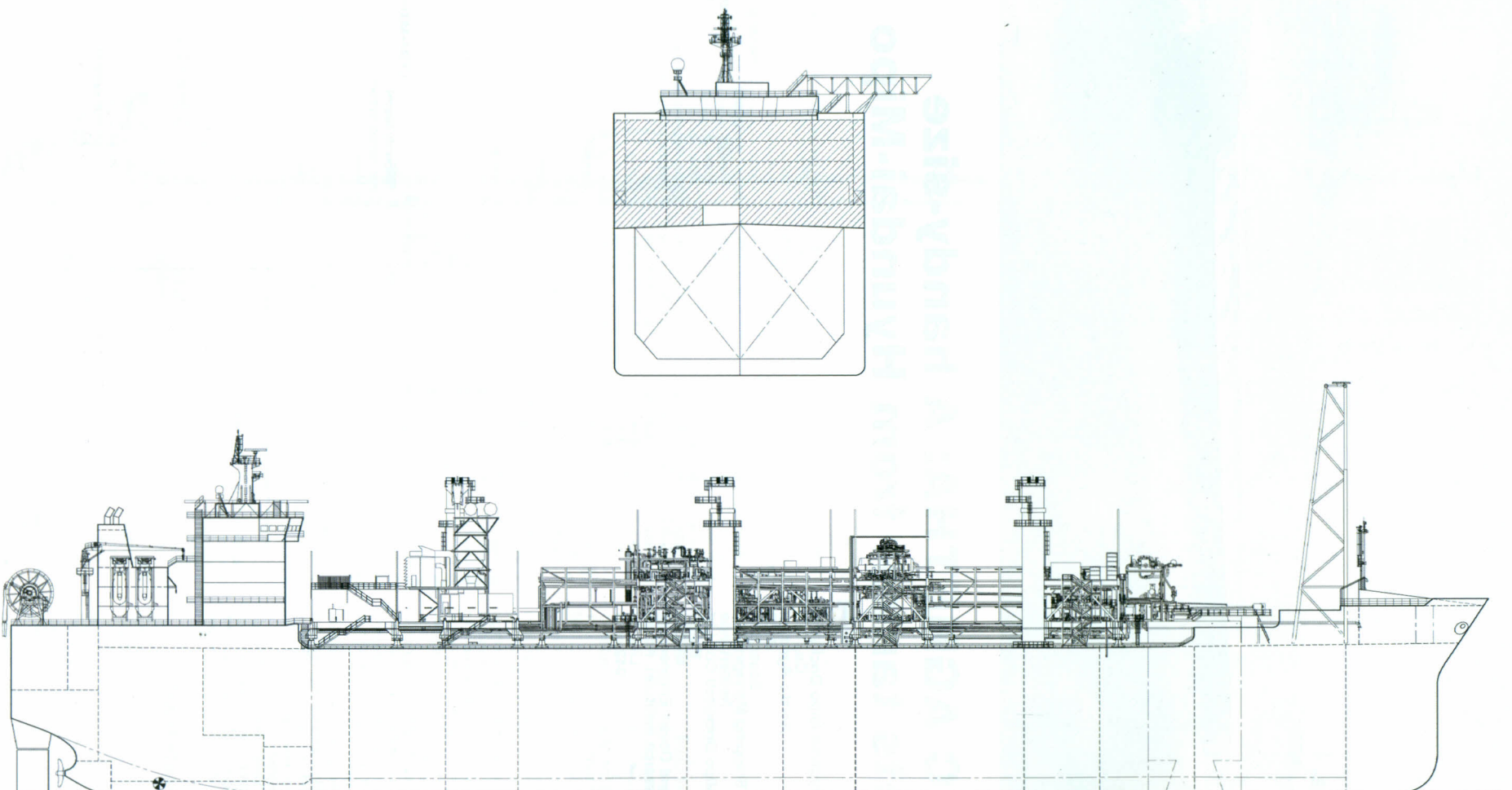
Initially ordered by Norwegian company Nexus Floating Production Ltd, *Nexus 1* has been sold during construction to the Brazilian EBX Group.

TECHNICAL PARTICULARS

Length oa: 271.8m
 Length bp: 258.0m
 Breadth moulded: 46.0m
 Depth moulded:

to main deck: 26.6m
 Width of double skin:
 side: 3.8m
 bottom: 3.0m
 Draught:
 scantling: 18.2m
 design: 18.2m
 Gross: 94,626gt
 Displacement: 184,800tonnes at 18.2m draft
 Lightweight: 37,100tonnes
 Deadweight:
 design: 147,700dwt at 18.2m draft
 scantling: 147,700dwt at 18.2m draft
 Speed, service: 10.5 knots @ 90%MCR
 Cargo capacity:
 Liquid volume: 154,000m³
 Bunkers:
 Diesel oil: 4200m³
 Water ballast (m3): 72,500m³
 Daily fuel consumption:
 Main engine only: 46.9tonnes/day
 Classification society and notations: .. Det Norske Veritas, +1A1 Ship-shaped production and storage unit(N), POSMOOR, CRANE, HELDK, ECO, PROD(N)
 % high-tensile steel used in construction: 63%
 Main engines:
 Design: MAN Diesel Vertical, 4 stroke, V-engine
 Model: 12V32/40
 Manufacturer: STX-MAN
 Number: 2
 Type of fuel: MDO
 Output of each engine: 6000kW / 750rev/min
 Gearboxes:
 Make: Scania Volda
 Model: ACG1080
 Number: 2
 Output speed: 120rev/min
 Propellers:
 Material: Nickel aluminum bronze
 Designer/Manufacturer: Rolls-Royce
 Number: 2
 Fixed/Controllable pitch: Controllable pitch
 Diameter: 5.2m
 Speed: 120rev/min
 Diesel-driven alternators:
 Number: 2
 Engine make/type: STX-MAN 8L27/38
 Type of fuel: MDO
 Output/speed of each set: 2640kW / 750rev/min
 Alternator make/type: HHI / AC11.000V, IP44
 Output/speed of each set: 2812.5kVA (2,250kW)
 Boilers:
 Number: 2

Type: Mission OM
 Make: AALBORG
 Output, each boiler: 25tonnes/h x 0.7MPa
 Mooring equipment:
 Number: 1
 Make: APL
 Type: Internal moon pool turret (submerged turret production system)
 Special lifesaving equipment:
 Number of each and capacity: 4 x 40 persons lifeboats
 Make: Schat Harding
 Type: Freefall type
 Life rafts: 8 x 25 persons + 1 x 20 persons
 Cargo tanks:
 Number: 12
 Grades of cargo carried: Crude Oil
 Coated tanks -
 make and type of coating: Samsung Sigma, Epoxy
 Cargo pumps:
 Number: 3
 Type: Vertical, single stage, double suction centrifugal
 Make: Hyundai
 Capacity (each): 4000m³/h x 150mlc at S.G:0.85
 Cargo control system:
 Make: Hanla
 Type: Radar beam
 Ballast control system:
 Make: Hanla
 Type: Electro-pneumatic
 Complement:
 Officers: 6
 Crew: 74
 Single/double/other rooms: 6 x single, 37 x double.
 Stern thrusters:
 Make: Kawasaki
 Number: 2
 Output (each): 1000kW (Tunnel type)
 Fire detection system:
 Make: Autronica
 Type: Addressable type (Autro-Safe)
 Fire extinguishing systems:
 Cargo holds: Tyco Marine low expansion foam
 Engine room: Tyco Marine high expansion foam
 Radars:
 Number: 4
 Make: SHI-JRC
 Models: JMA-9932-SA / JMA-9922-6XA, S-band X-band radar
 Contract date: 19 June 2006
 Launch/float-out date: 22 June 2008
 Delivery date: 15 January 2010





NORDIC AGNETHA: A handy-size products tanker from Hyundai-Mipo

Shipbuilder: **Hyundai Mipo Dockyard Co., Ltd**
Vessel's name: **Nordic Agnetha**
Hull No: **2102**
Owner/Operator: **Seaarland Shipping Management Netherlands**
Country: **Korea**
Designer: **Hyundai Mipo Dockyard Co., Ltd**
Country: **Korea**
Model test establishment used: **MOERI (Maritime and Ocean Engineering Research Institute), Korea**
Flag: **Liberia**
IMO number: **9422639**
Total number of sister ships already completed (excluding ship presented): **1**
Total number of sister ships still on order: **Nil**

Nordic Agnetha, a handy-size product tanker from Hyundai-Mipo, Korea, was delivered to Netherlands-based Seaarland Shipping Management during May 2009. Designed for International Maritime Organization (IMO) type 3 cargoes the 37,400dwt, 176m LBP vessel is powered by a six-cylinder MAN B&W 6S46MC-C7 diesel engine which gives it a service speed of 15knots.

Cargo is carried in six pairs (P & S) of cargo tanks with slop tanks, fuel oil tanks and a residual oil tank aft. One fuel tank may be used as a low-sulphur heavy fuel oil tank. A crew of 26 plus supernumeraries is accommodated in a house aft.

Delivery of *Nordic Agnetha* and its sister ship, *Nordic Amy*, continues a rejuvenation process for Seaarland Shipping Management and its part-owner, Nordic Shipping. These vessels are now part of one of the youngest tanker fleets in Europe.

The key parameters of *Nordic Agnetha* and *Nordic Amy* are Length over all 184.21m, Length between perpendiculars 176m, breadth moulded 27.4m, depth to upper deck 17.2m, design draft 9.8m and deadweight 30,170dwt.

TECHNICAL PARTICULARS

Length oa: 184.21m
Length bp: 176.00m
Breadth moulded: 27.40m
Depth moulded:
to main deck: 17.20m
to upper deck: 17.20m
Width of double skin:
side: 2.00m
bottom: 1.83m
Draught:
scantling: 11.50m
design: 9.80m
Gross: 23,224gt
Deadweight:

design: 30,170dwt
scantling: 37,790dwt
Speed, service: 15.0knots
Cargo capacity: 42,670m³
Bunkers:
Heavy oil: 1130m³
Diesel oil: 190m³
Water ballast: 18,100m³
Daily fuel consumption:
Main engine only: 29.25tonnes/day
Auxiliaries: 3.67tonnes/day
Classification society and notations: ABS +A1(E), "Oil Chemical carrier", CSR, SafeShip-CM, +AMS, +ACCU with description in the Record of ESP and IMO Ship Type3

Main engine:
Design: MAN B&W
Model: 6S46MC-C7
Manufacturer: HHI-EMD
Number: 1
Type of fuel: HFO
Output: 7860kW x 129rev/min

Propeller:
Material: Nickel Aluminum Bronze
Designer/Manufacturer: Hyundai Heavy Industries Co., Ltd

Number: 1
Fixed/Controllable pitch: Fixed
Diameter: 5600mm
Speed: 7860kW x 129rev/min

Diesel-driven alternators:
Number: 3
Engine make/type: Hyundai Heavy Industries Co., Ltd / 6L23-30H

Type of fuel: HFO
Output/speed of each set: 780kW x 720rev/min
Alternator make/type: Hyundai Heavy Industries Co., Ltd / HFC7506-14K
Output/speed of each set: 730kW x 720rev/min

Boilers:
Number: 1
Type: Water Tube
Make: Kangrim Heavy Industries Co., Ltd
Output: 18,000kg/h

Cargo cranes/cargo gear:
Number: 1
Make: Oriental Precision & Eng. Co., Ltd.
Type: Electro-hydraulic single jib
Performance: 10tonnes SWL x 21m
Tasks: Cargo oil hose, Suez mooring boat and fuel oil hose handling

Other cranes – provisions and spares crane:
Number: 1
Make: Dongnam Marine Crane Co., Ltd.
Type: Electro-hydraulic single jib
Performance: 2tonnes SWL x 8.5m
Tasks: Provisions and light machinery parts handling

Other cranes – Engine room crane:
Number: 1
Make: Oriental Precision & Eng. Co., Ltd.
Performance: 2tonnes SWL
Tasks: Handling main engine components

Mooring equipment:
Number: 6 winches + 10 mooring drums
Make: Aker Kvaerner Pusnes AS
Type: Hydraulic

Special lifesaving equipment:
Number of each and capacity: One free-fall lifeboat, 26 persons

Make: Hyundai Lifeboat Co., Ltd.
Type: Free-fall Lifeboat

Cargo tanks
Number: 6 pairs
Grades of cargo carried: In accordance with chemical tanker Type 3
Product range: Petroleum products, chemical cargoes compatible with ship Type3, crude oil

Stainless steel – structure/piping: SUS 316L (piping)

Cargo pumps
Number: 12
Type: Submerged centrifugal hydraulic motor driven
Make: Framo
Stainless steel: EN1.4432(Casting), CF3M+M0(Impeller), EN1.6582(Shaft)

Capacity (each): 500m³/h x 130MLC

Cargo control system
Make: Praxis
Type: Mega-Guard AMS and CMS

Ballast control system
Make: Praxis
Type: Mega-Guard AMS and CMS

Complement:
Officers: 15
Crew: 11
Suez/Repair Crew: 6
Single/double/other rooms: 22 / 4 / 1

Bow thrusters:
Make: Kawasaki Heavy Industries, Ltd.
Number: 1
Output: 900kW

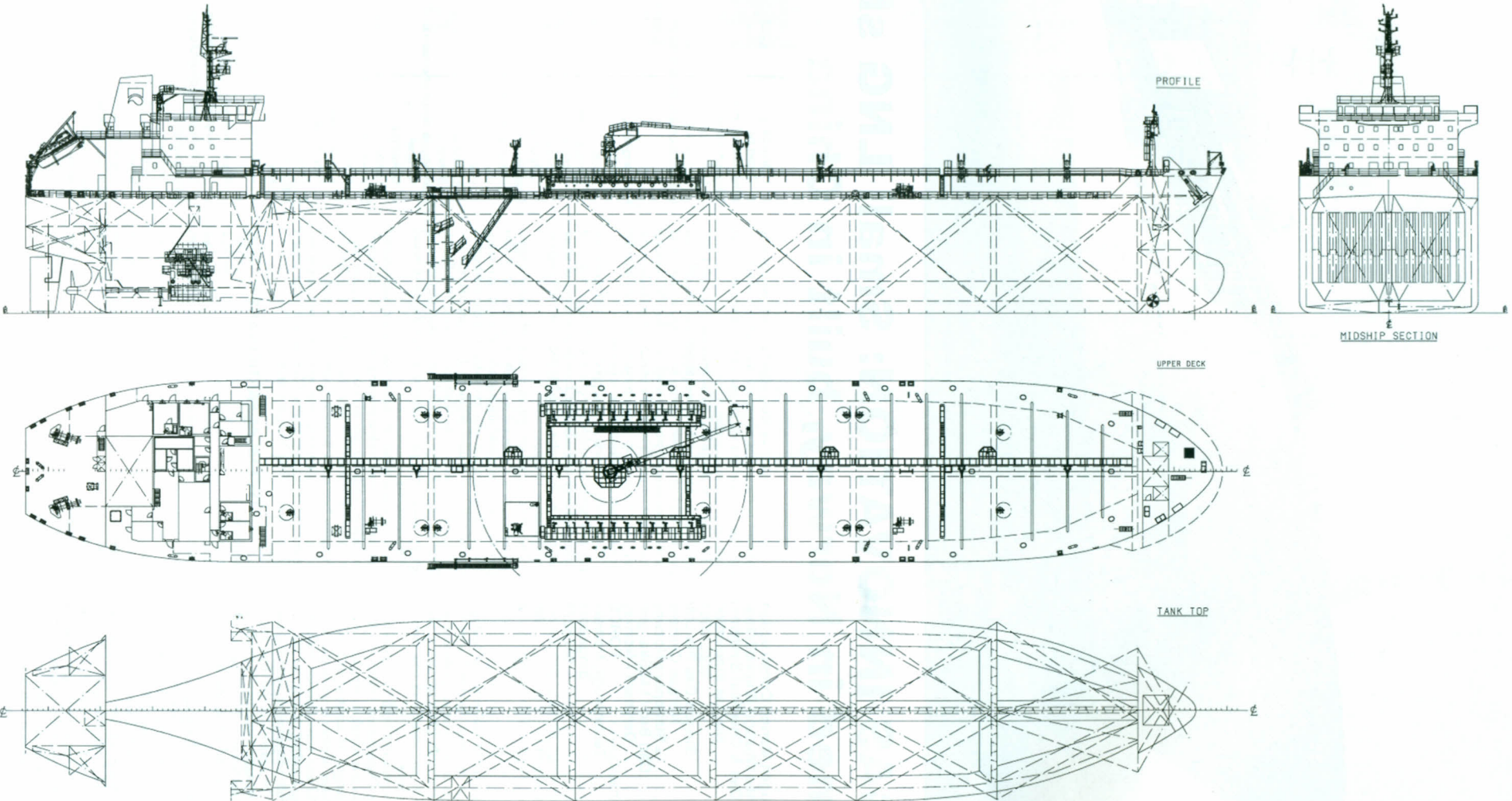
Fire detection system:
Make: Consilium
Type: CS4000 / 6L

Fire extinguishing systems
Cargo holds: Nil
Engine room: NK CO₂ system

Radars:
Number: 2 sets
Make: Furuno
Models: FAR-2837S, FAR-2837

Contract date: December, 2006
Launch/float-out date: March, 2009

Delivery date: May, 2009





NORGAS INNOVATION: Small LNG ship designed in Norway, built in China

Shipbuilder: **Skaugen Marine Construction**
(Taizhou Wuzhou Shipbuilding/
Shenghui Gas & Chemical Systems)
Vessel's name: **Norgas Innovation**
Hull No.: **WZL 0601**
Owner/Operator: **Singco Gas Pte Ltd/**
Norgas Carriers
Country: **Singapore/Norway**
Designer: **Carl Bro / I.M.Skaugen**
Country: **Denmark / Norway**
Model test establishment used: **FORCE**
Technology, Norway
Flag: **Singapore**
IMO number: **9378278**
Total number of sister ships already completed
(excluding ship presented): **Nil**
Total number of sister ships still on order: **3**

Norgas Innovation is the first of Skaugen's new Multigas carriers. This design has been developed with the small-scale LNG market in mind. The size of these vessels makes them ideal for small-scale LNG services, as they connect smaller customers and clusters of end users to traditional LNG supply chains.

Each Multigas ship is provided with two cylindrical International Maritime Organization (IMO) Type C pressure vessel cargo tanks and is built to the classic semi-refrigerated gas carrier design. In addition to LNG the vessels can carry a wide range of other liquefied gas cargoes including ethylene, LPG and vinyl chloride monomer (VCM). The ships' cargo-handling systems can also carry liquefied gases in either a fully refrigerated or semi refrigerated state and two grades of cargo can be transported simultaneously in a fully segregated manner. The tanks can handle carriage temperatures as low as -163°C, cargoes with densities up to 0.97tonne/m³ and carriage pressures as high as 5.2bar gauge.

Irrespective of the liquefied gas being carried, cargo boil-off gas on the Multigas ships will be re-liquefied by the cargo plant onboard and returned to the cargo tanks. When LNG is being carried an innovative Mini LNG plant will be utilised to reliquefy all LNG boil-off. The mini LNG plant's patented and licensed technology was developed by Skaugen in cooperation with SINTEF Energy Research in Norway. When ethylene or LPG is carried, the re-liquefaction duties will be handled by a newly developed, high-capacity cascade plant which is capable of cooling ethylene cargoes by 2.5°C per day in tropical waters. This system has been developed by Skaugen's own team in cooperation with designers based on the company's long experience with liquefied gas carriers.

Another key part of the cargo-handling equipment onboard is the gas combustion unit (GCU) which can function as a gas burner for gas-freeing operations or as back-up for pressure control.

In order to be able to load at conventional large scale LNG terminals, the Multigas ships are equipped with an additional elevated loading platform with a set of vapour and liquid manifolds to meet the working envelope of the LNG loading arms on the terminal's jetty. The principal manifolds on the ships are designed to accommodate the cargo transfer arrangements in place at smaller terminals.

The Multigas carriers are equipped with a nitrogen plant and deck tanks to enable the purging of cargo tanks and facilitate change of grade operations independent of shore facilities. The ship is able to load or discharge a full cargo in approximately 10 hours.

The ship's propulsion system consists of a diesel engine connected to a controllable pitch propeller. It is also provided with three auxiliary engines and a shaft generator. The shaft generator also provides a "take-me-home" capability in case of main engine or drive train failure.

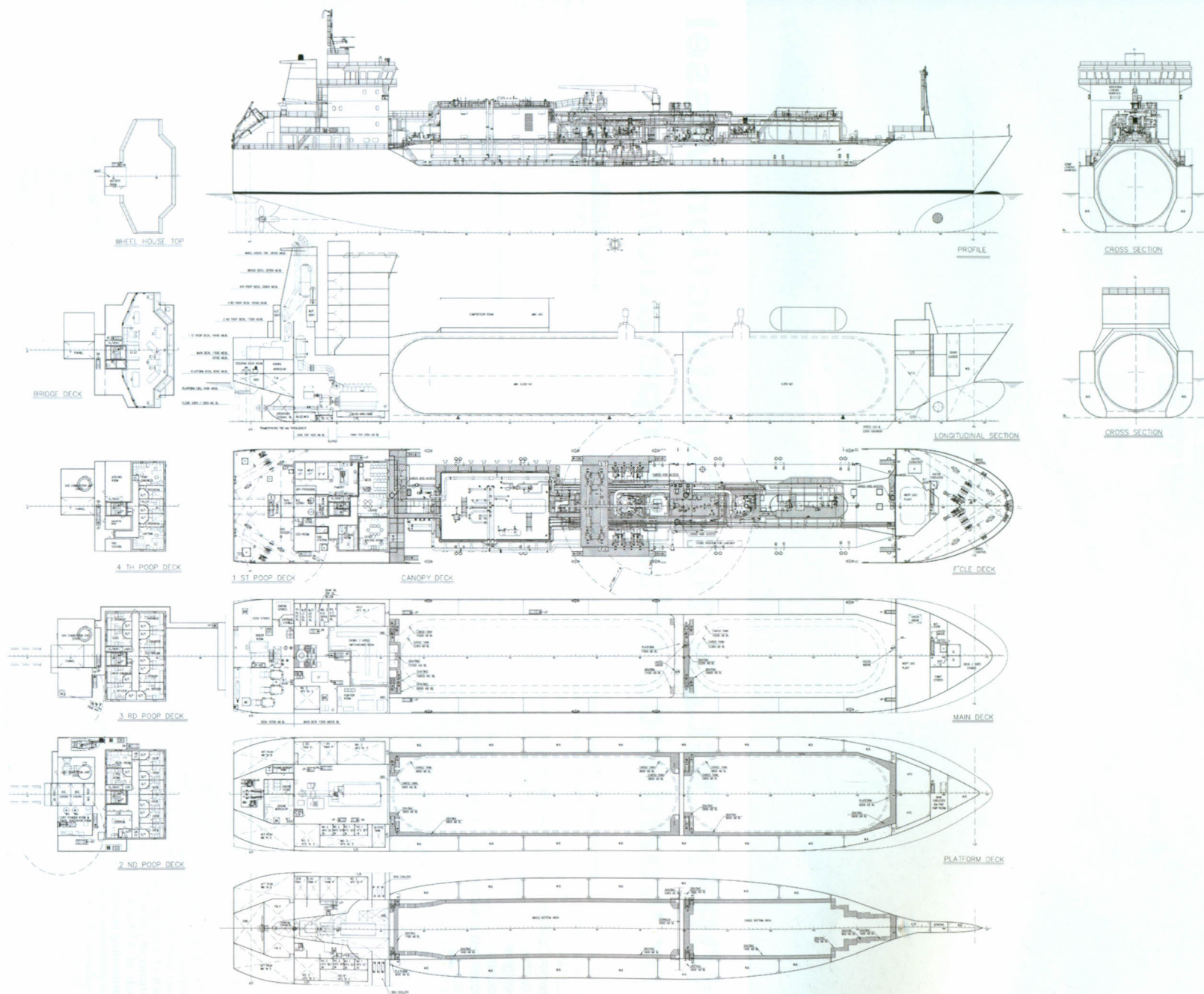
The service speed of the Multigas carriers is 16-17knots. Each Multigas ship is provided with a bow thruster and spade rudder with flap to ensure a high degree of vessel manoeuvrability.

The Multigas vessels are being built at privately-owned shipyards in China in close cooperation with I.M. Skaugen's own teams, while the core technology - the complete cargo containment system - is manufactured and installed by Shenghui Gas and Chemical Systems. All construction is being undertaken under the management, coordination and supervision of Skaugen Marine Construction. The vessels will be operated by Norgas Carriers.

TECHNICAL PARTICULARS

Length oa: 137.10m
Length bp: 127.16m
Breadth moulded: 19.8m
Depth moulded to main deck: 11.50m
Width of double skin
side: 2.3m (approx.)
Draught
scantling: 8.30m
design : 6.70m
Gross: 10,060gt
Deadweight:
design : 6800dwt
scantling: 10,600dwt
Speed, service: 16.5knots @ 85%MCR
Cargo capacity:
Liquid volume: 10,000m³
Bunkers (m³)

Heavy oil: 1050m³
Diesel oil: 180m³
Water ballast (m3): 5800m³
Daily fuel consumption:
Main engine only: 27tonnes/day
Auxiliaries: 1.5 - 10tonnes/day
Classification society and notations: GL + 100 A5 E
Liquefied Gas Tanker Type - 2G
+ MC E AUT RI Inert IW BWM
Main engine:
Design: MaK
Model: 7M43C
Manufacturer: Caterpillar MaK
Number: 1
Type of fuel: HFO
Output of: 7000kW @ 500rev/min
Propeller:
Designer/Manufacturer: Scana-Volda
Number: 1
Fixed/Controllable pitch: CPP
Diameter: 4.5m
Speed : 145rev/min (approx.)
Main-engine driven alternators
Number: 1
Make/type: AVK
Output: 1900kW
Diesel-driven alternators
Number: 3
Engine make/type: Caterpillar / 3508B
Type of fuel: MDO
Output: 910kW
Cargo tanks
Number: 2
Grades of cargo carried: Liquefied gases,
fully or semi-refrigerated
Product range : Includes VCM
(vinyl chloride monomer), LPG, ethylene and LNG
Stainless steel - structure/piping: 304N
Cargo pumps:
Number: 2
Type: Deepwell
Make: Svanhoj
Capacity (each): 640m³/h + 380m³/h
Stern appendages/special rudders: Flap rudder
Bow thrusters:
Make: Brunvoll
Number: 1
Output: 700kW
Contract date : January 2006
Launch/float-out date : October 2008
Delivery date : January 2010





NORTH OCEAN 103: Construction vessel for worldwide offshore operations

Shipbuilder: **Metalships & Docks, Spain**
 Vessel's name: **North Ocean 103**
 Hull No.: **287**
 Owner/Operator: **Technip Norway**
 Country: **France / Norway**
 Designer: **Sawicon**
 Country: **Norway**
 Model test establishment used: **Marintek**
 Flag: **Malta**
 IMO number: **9397951**
 Total number of sister ships already completed (excluding ship presented): **2**
 Total number of sister ships still on order: **1**

On 8 September 2009 the Spanish shipyard Metalships & Docks delivered the Multipurpose Offshore Construction Vessel *North Ocean 103* to the worldwide engineering and construction company Technip, of France. This new vessel, which Technip will later re-name *Apache II*, is the third in a series of five that Metalships has contracted with the Dutch/Norwegian consortium Oceanteam ASA. This large contract will keep the shipyard busy until the end of 2011.

The new DP-2 vessel is 135m long, 27m beam and 9.7m deep and is provided with a diesel-electric propulsion of a total output of 13,500 kW. Like her sister ships she is fitted with two stern azimuth thrusters, each of 3500kW, one forward swing-up azimuthing thruster of 1500kW and two forward tunnel thrusters, each of 1500kW. These provide the ship with outstanding manoeuvrability. After delivery the vessel was transferred to Technip's facilities in Finland for the installation of pipe laying equipment and it is expected to be in full operation as a pipe-laying vessel in the first quarter of 2010. Metalships is at the outfitting stage of the fourth vessel in the series, to be jointly owned by Oceanteam and Bourbon Offshore, and whose delivery is scheduled for the (northern) spring 2010.

Notable features of *North Ocean 103* include a 7.3m x 7.3m moon pool with a hydraulically operated flush hatch, 1000m² of working deck area and a helideck suitable for a Sikorsky S-92 (12tonnes). Accommodation is provided for 120 people.

Technip is a major operator in the fields of project management, engineering and construction for the oil & gas industry, offering a comprehensive portfolio of solutions and technologies. Present in 46 countries, Technip has operating centres and industrial assets

(manufacturing plants, spool bases and construction yards) on five continents, and operates its own fleet of specialised vessels for pipeline installation and subsea construction. *North Ocean 103* will join this fleet to support rigid pipe-laying operations in a wide variety of water depths around the world.

Metalships & Docks, S.A. is located at Vigo, on the north-west coast of Spain. It is a member of the Rodman Group, which also owns another yard in Vigo Bay, Rodman Polyships, S.A., devoted to GRP construction and a third, Conafi S.A., in the South of Portugal. Under its current management Metalships has been carrying out ship repair and conversion activities at Vigo since 1986. After a break of some years the yard also resumed shipbuilding in late 1999.

TECHNICAL PARTICULARS

Length oa: 137.50m
 Length bp: 120.4m
 Breadth moulded: 27.0m
 Depth moulded to main deck: 9.7m
 Draft, design: 6.50m
 Gross: 11,400gt
 Lightweight: 7500tonnes
 Deadweight, design: 10,900dwt
 Block co-efficient: 0.82 at design draft
 Speed, service: 15.5knots at 100% MCR
 Bunkers:
 Diesel oil: 1200m³
 Water ballast: 4000m³
 Classification society and notations: DNV + 1A1, DYNPOS- AUTR, EO, DKT, CLEAN, CONF (V3), NAUT - OSV, HELIDECK
 Heel control equipment: Framo pump system (Type RBP, flow = 1000m³/h)
 Roll-stabilization equipment: Passive (Two tanks)
 Main engines:
 Design: Wärtsilä Diesel-Electric
 Model: 9R32 Genset (including Alconza NIR 7186A-10LW generator)
 Manufacturer: Wärtsilä
 Number: 4
 Type of fuel: MDO
 Output of each set: 3300kW @ 900 rev/min
 Propulsion Units (aft):
 Designer/Manufacturer: Rolls-Royce
 Model: APZ-120 (3500kW each)
 Number: 2 (azimuthing)
 Fixed/Controllable pitch: Fixed
 Diameter: 3200mm
 Speed: 1200rev/min
 Special adaptations: AZIPULL
 Diesel-driven alternators:

Number: 1
 Engine make/type: SGR - MPTA / Mitsubishi
 Type of fuel: MDO
 Output/speed of each set: 600kW / 1800rev/min
 Alternator make/type: Stanford / 634 C
 Output/speed of each set: 800 kVA (690V, 60Hz) / 1800rev/min

Cranes:
 Number: 2
 Make: TTS
 Type: GP-80-2-12
 Tasks: Deck service
 Performance: 12tonnes @ 15m radius
 Mooring equipment

Number: 2 windlasses + 2 capstans
 Make: Carral
 Type: Electro - hydraulic

Special lifesaving equipment:
 Number of each and capacity: 2 x 60persons
 Make: Schat - Harding
 Type: KISS - 800 - C totally enclosed
 If MES, vertical or sloping chutes?: Vertical

Ballast control system:
 Make: Ariston
 Type: Pressure type

Complement
 Officers: 10
 Crew: 110
 Single/double/other rooms: 24 x single, 48 x double

Bow thrusters:
 Make: Rolls Royce
 Number: 2 x tunnel + 1 x retractable azimuthing
 Output (each): 1500kW

Bridge control system: Bridge fitted for one-man operation

Dynamic Positioning System:
 Make: Simrad Duel System SDP 21 DP
 Class: DNV Dynpos AUTR, complies NMD class 2
 Reference System: Simrad HIPAP DGPS 2 off Taut Wire System Fan Beam system

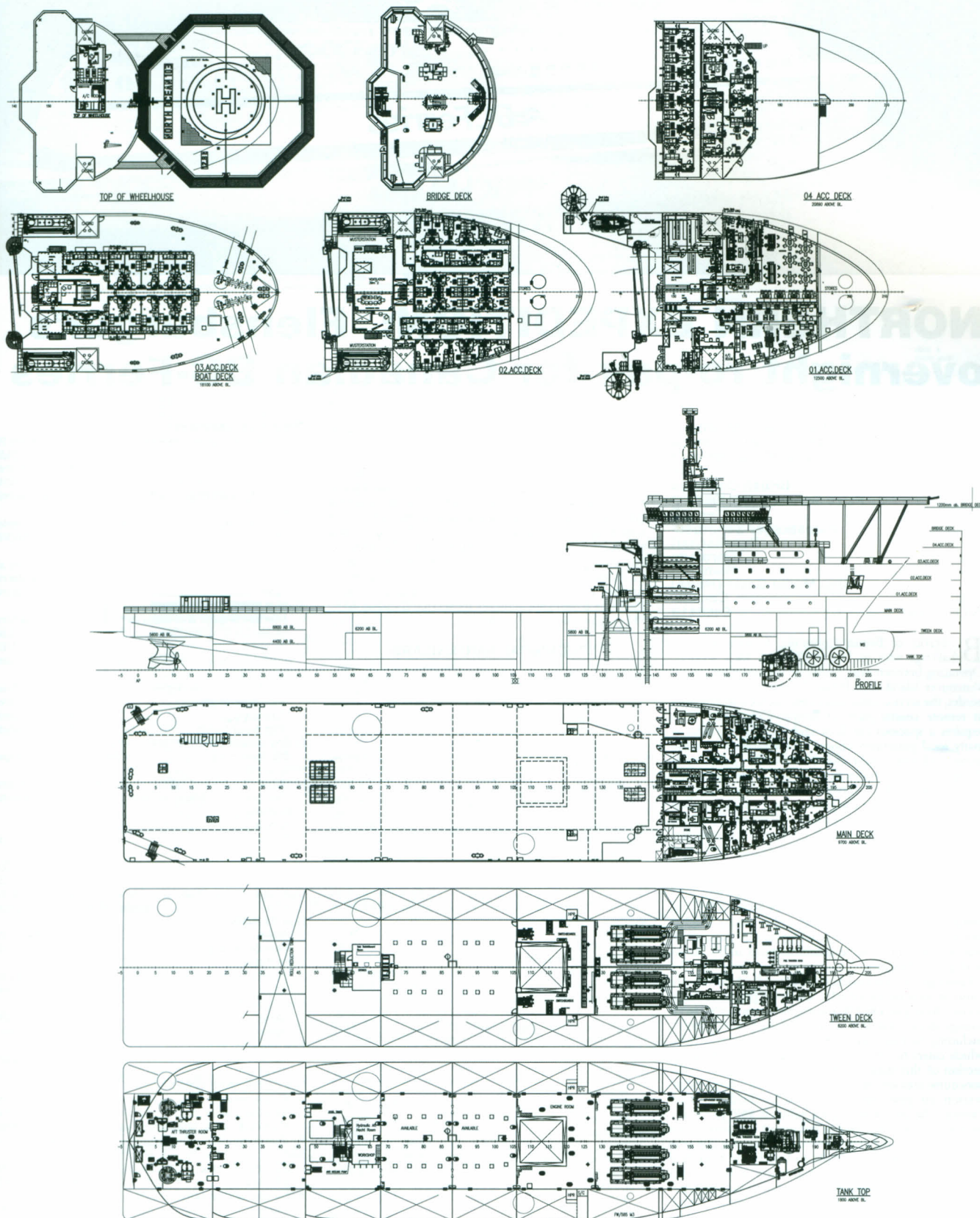
Fire detection system:
 Make: Westronic

Fire extinguishing systems:
 Engine room: Movengo water mist

Radars:
 Number: 2
 Make: JRC
 Model(s): JMA - 912

Waste disposal plant
 Incinerator: Detegasa Model No. Delta IRL - 65
 Waste compactor: Buraglia Model No. MP - 6

Contract date: 14 November 2006
 Launch/float-out date: 15 December 2008
 Delivery date: 8 September 2009





NORTHERN EXPEDITION: Flensburger's overnight ro-pax for Canadian BC-Ferries

Shipbuilder: **Flensburger-Schiffbau-Gesellschaft, Germany**
 Vessel's name: **Northern Expedition**
 Hull No: **748**
 Owner Operator: **British Columbia Ferry Services (BC-Ferries)**
 Country: **Canada**
 Designer: **Flensburger-Schiffbau-Gesellschaft**
 Country: **Germany**
 Model test establishment used: **Hamburg Ship Model Basin (HSVA)**
 Flag: **Canada**
 IMO number: **9408413**

BC-Ferries of British Columbia, Canada, offers a challenge with its "Inside Passage" ferry services. Operating between Port Hardy, at the northern end of Vancouver Island, and Prince Rupert, near the Alaska border, the service constitutes a lifeline for communities in remote coastal parts of British Columbia. This requires a spacious car deck and vast seating areas as many local passengers choose to travel without cabin accommodation. On the other hand, the "Inside Passage" also constitutes an attraction for tourists from all over the world. Travelling on the route just for pleasure these mini-cruise guests expect a high standard of accommodation and service. *Northern Expedition* and her sister ships, built by Germany's Flensburger-Schiffbau, are BC-Ferries' response to this challenge. At an overall length of 151.78m the vessels can transport up to 130 AEQs (automobile equivalent units) on 722 lane metres (stowing space per unit 5.34 x 2.6m) or 22 tractor trailers (19.80 x 3.2m) in addition to 19 AEQs. They also boast highly comfortable accommodation for up to 600 passengers, out of which 110 can be accommodated in 55 cabins with private facilities.

Passenger accommodation and public facilities are concentrated on two decks, Deck 4 (public food & service deck) and Deck 5 (passenger accommodation & lounge deck). Deck 4 is devoted to public rooms, including the huge buffet restaurant located in the front which caters for up to 174 passengers. The midships section of this deck is split into a reception & retail concourse area on the starboard side and a huge galley section on port side. Supplied by Finland-based Tritmar, the centrally located galley is able to supply food not only to the buffet restaurant but also to the cafeteria and to the crew mess. The spacious 208-seat cafeteria is located at the aft end of Deck 4 while a multi-purpose lounge accommodates another 103 travellers. Deck 5 is entirely dedicated to various types of accommodation. Its front section comprises four different lounges for a total of 331 passengers: The "Aurora" reserved seating lounge in the very front extends over the ship's entire beam, providing 120 reclining seats. The port and starboard viewing lounges located immediately aft offer 111 adjustable lounge seats in total, all facing the huge panorama windows. Finally the flexible seating lounge located amidships boasts 100 seats as well as a children's play area. Cabins

dedicated to mini-cruise passengers are concentrated amidships and astern on Deck 5.

The ship's hull was the subject of extensive calculation and testing. BC Ferries required the design to be optimised with regards to low power consumption while preferring an economic main diesel engine plant. Flensburger's team soon realised that the hull form would be one of the keys to success. The optimised hull form results in a consumption of only 34.5 tonnes/day sailing at design draught with a service speed of 20.5 knots. Powered by two MaK 9M 32C diesel main engines with a maximum output of 4500kW each, *Northern Expedition* achieves its service speed at 85% MCR, equivalent to 7650kW.

TECHNICAL PARTICULARS

Length oa: 151.78m
 Length bp: 142.30m
 Breadth moulded: 23.00m
 Depth moulded:
 to main deck: 7.55m
 to upper deck (1st House Deck): 13.80m
 Width of double skin:
 bottom: 1400mm
 Draught:
 scantling: 5.15m
 design: 4.90m
 Gross: 17,729gt
 Displacement: 8099tonnes
 Lightweight: 6873tonnes
 Deadweight:
 Design: 1550dwt
 scantling: 1853dwt
 Block co-efficient: 0.49 at design draft
 Speed, service: 20.5knots at 85% MCR
 Bunkers:
 Diesel oil: 260m³
 Water ballast: 430m³
 Daily fuel consumption (tonnes/day)
 Main engine only: 34.5tonnes/day
 Auxiliaries: 10.36tonnes/day
 Classification society and notations: ABS +A1, Vehicle Passenger Ferry, +AMS, COMF+, HAB, ES, (E)
 % high-tensile steel used in construction: 0.006%
 Roll-stabilisation equipment: One pair of fin stabilisers
 Main engines:
 Design: MaK medium-speed diesel
 Model: 9M 32C
 Number & manufacturer: 2 x MaK
 Type of fuel: MGO or MDO
 Output of each engine: 4500kW
 Gearboxes:
 Make: Flender
 Number & model: 2 x GU-CP 950
 Output speed: 135.7rev/min
 Propellers:
 Material: Ni-Al-bronze
 Designer/Manufacturer: Schottel
 Number: 2
 Fixed/Controllable pitch: CPP
 Diameter: 4.30m
 Speed: 135.7rev/min
 Special adaptations: Ice-class 1A
 Main-engine driven alternators:
 Number & make/type: 2 x AEM
 Output/speed of each set: 3250kVa / 1800rev/min

Diesel-driven alternators:

Number & engine make/type: 3 x MaK 8M 20
 Type of fuel: MGO or MDO-DMB
 Output/speed of each set: 1360kW at 900rev/min
 Alternator make/type: AEM
 Output/speed of each set: 1620kVa at 1800rev/min

Boiler:

Number & type: 1 x oil-fired hot water heater
 Make & output: Aalborg - 2000kW

Mooring equipment:

Number: 2 winches forward, 3 winches aft
 Make: KGW Marine
 Type: Electric

Special lifesaving equipment:

Number of each and capacity: 2 x 350 persons
 Make: LSA
 Type: MES
 If MES, vertical or sloping chutes: Sloping chutes

Vehicles:

Number of vehicle decks: 1 fixed
 Total lane length: 730lane-metres
 Total cars: 130 (American sized)
 Total freight units: 20 tractor trailers of 19.80m length

Doors/ramps/lifts/moveable car decks:

Number of each: 1 stern door/ramp, 2 passenger/service lifts

Type: Bottom-hinged ramp
 Designer: MacGregor (door/ramp), Lutz (elevators)

Complement:

Officers: 7
 Crew: 38

Passengers:

Total: 600
 Number of cabins: 55

Stern appendages/special rudders: FSG twist-flow full spade rudders with Costa bulb

Bow thrusters:

Make: Wärtsilä Lips
 Number & output (each): 2 x 1350 kW

Stern thrusters:

Number & make: 1 x Wärtsilä Lips
 Output: 900kW

Bridge control system:

Make: SAM
 Type: Nacos 65-5

Fire detection system:

Make: Consilium
 Type: Salwico NSAC-1

Fire extinguishing systems:

Engine room: Marioff / HiFog
 Vehicle spaces: Unitor drencher
 Cabins & public spaces: Marioff / HiFog
 Public spaces: Marioff / HiFog

Radars:

Number & make: 3 x SAM
 Models: Chart Radar 1100

Integrated bridge system:

Make: SAM
 Model: Nacos 65-5

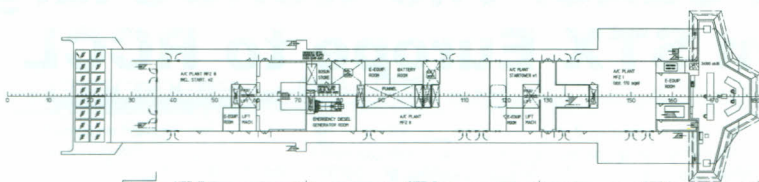
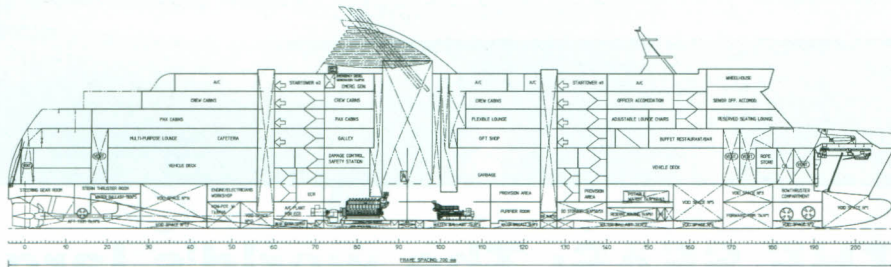
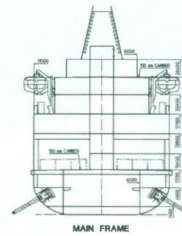
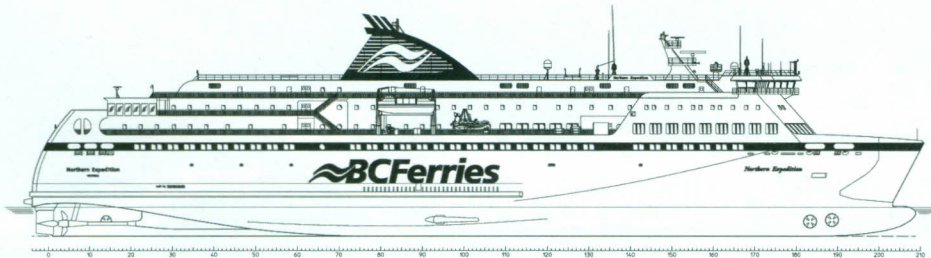
Waste disposal plant:

Waste compactor: Marathon
 Waste shredder/crusher: Usen Marine Model UMCC

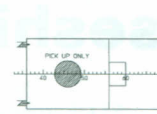
Sewage plant: Hamworthy Model: ST 25

Contract date: 3 July 2006
 Launch/float-out date: 25 September 2008
 Delivery date: 09 March 2009

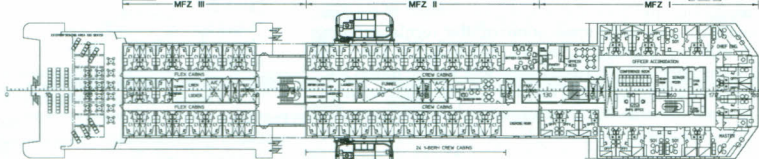
NORTHERN EXPEDITION



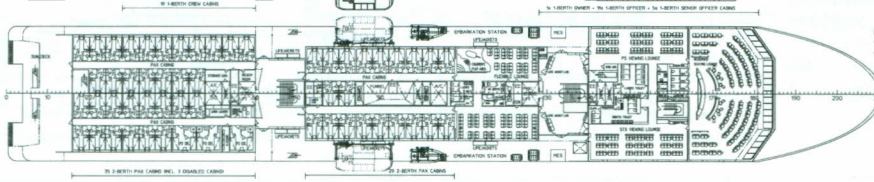
DECK 7
23400 / 24200 sq.BL



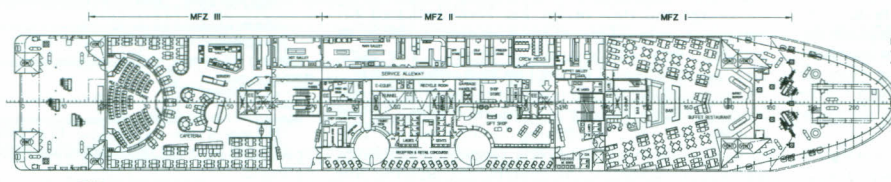
DECK 8
28400 sq.BL



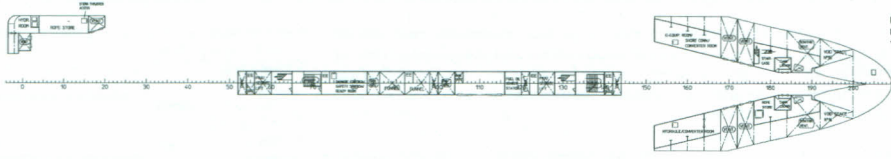
DECK 8
28400 sq.BL
"CREW DECK"



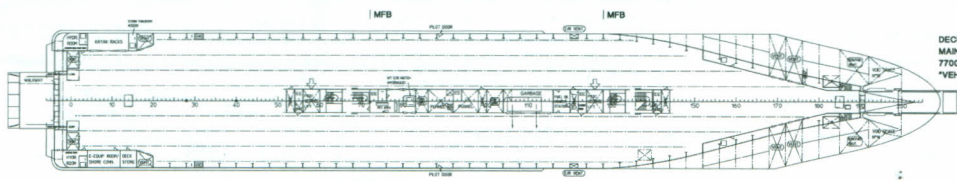
DECK 6
17800 sq.BL
"PAX ACCOMMODATION & LOUNGE DECK"



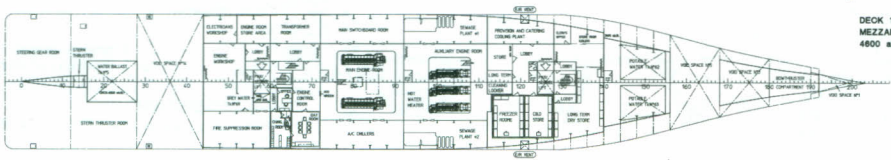
DECK 4
13800 sq.BL
"PUBLIC/FOOD SERVICE DECK"



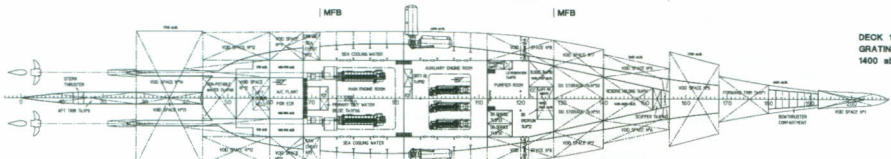
DECK 3
PLATFORM DECK
10400 sq.BL



DECK 2/
MAIN DECK
7700 sq.BL
"VEHICLE DECK"



DECK 1A/
MEZZANINE DECK
4800 sq.BL



DECK 1/
GRATING LEVEL
1400 sq.BL



OASIS OF THE SEAS: The world's largest cruiseship from STX Europe to RCCL

Shipbuilder: **STX Europe / Turku, Finland**
 Vessel's name: **Oasis of the Seas**
 Hull No: **1363**
 Owner/Operator: **Royal Caribbean International**
 Country: **USA**
 Designer: **STX Europe**
 Country: **Finland**
 Model test establishment used: **MARIN, Netherlands**
 Flag: **Bahamas**
 IMO number: **9383936**
 Total number of sister ships already completed (excluding ship presented): **Nil**
 Total number of sister ships still on order: **1**

Oasis of the Seas is the first ship in a series of two to be delivered by STX Europe from its Turku, Finland, shipyard. Her sister ship *Allure of the Seas* will be delivered in the second quarter of 2011. These two ships are the latest in a long series of revolutionary ships that have been designed and built during more than forty years of extensive collaboration between Royal Caribbean Cruise Lines (RCCL) and STX Finland Oy. *Oasis of the Seas* is the biggest passenger ship ever built.

The sailing area of both *Oasis of the Seas* and *Allure of the Seas* will be the Caribbean with Port Everglades, Florida, as homeport. Both eastern and western itineraries are included in the programme.

Oasis of the Seas is laid out with 16 decks allowing access for passengers. Passenger accommodation facilities are offered for a maximum of 6360 guests in 2704 staterooms. Of these 1956 are equipped with balconies whereas there are 272 window cabins. These include 27 loft cabins positioned on Decks 17 and 18 providing an unobstructed view from the large balcony.

The exceptional width of the ship (47m at waterline and 66m as maximum) has given the designers new degrees of freedom resulting in a ship with split superstructure and corresponding open air public areas in between. These open air decks are called Board Walk on Deck 6 aft and Central Park on Deck 8. The purposes of Central Park and Board Walk with their adjacent venues are activities like dining, shopping and entertainment as well as controlling the guest flow onboard. Royal Promenade also has the important function of connecting the two main staircases on the level of Deck 5 and offering access to the adjacent dining, shopping and entertainment areas. A completely new entertainment venue, in addition to the traditional Royal Caribbean 1350 seat Main Theatre and the 750 seat ice skating arena Studio B, is the Aquatheater which is located on Deck 6 at the aft end of Board Walk. This seats 650 and features water shows.

A service speed of 22knots is achieved from a diesel-electric propulsion system based on three azimuthing pods with an output of 20MW each. Four bow thrusters with an output of 5.5MW each are provided. The total main engine output is 97MW and the main engine installation is split into two independent main engine rooms with three diesel engines each. A redundant propulsion class notation of

DNV RPS is provided.

Safety aspects are addressed in accordance with the very latest International Maritime Organization (IMO) regulations and procedures and goals. *Oasis of the Seas* represents an early application of the regulations for Probabilistic Damage Stability and Safe Return to Port.

Since 1999 RCCL has adopted split engine rooms and redundant propulsion and thus the *Oasis* design is based on the Safe Return to Port Concept with redundant systems for power, propulsion and comfort. FMECA (Failure Mode, Effects, and Criticality Analysis) and system simulations were used to verify the configuration. *Oasis of the Seas* has vastly enhanced operability and can sustain the loss of any one watertight or fire compartment.

Operational safety and security features of *Oasis* include integrated and redundant navigation systems with a cockpit layout and class notation of Dynpos-Autr - Dynamic positioning system with redundancy in technical design and with an independent joystick back-up. Furthermore the Safety Centre is adjacent to the bridge and thus bridge has been dedicated for navigation only. This gives an improved ability to manage safety and security incidents. The same principle was adopted for the Engine Control Centre.

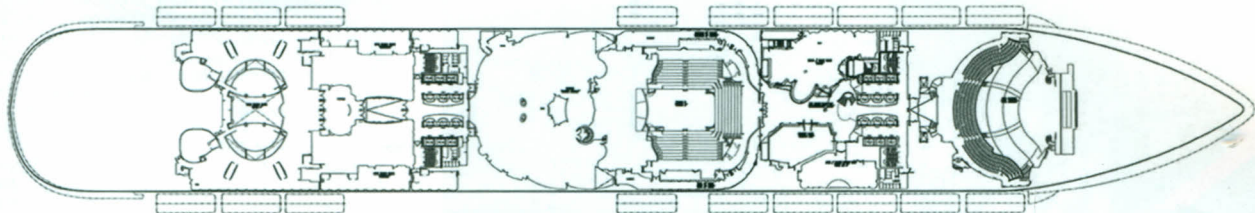
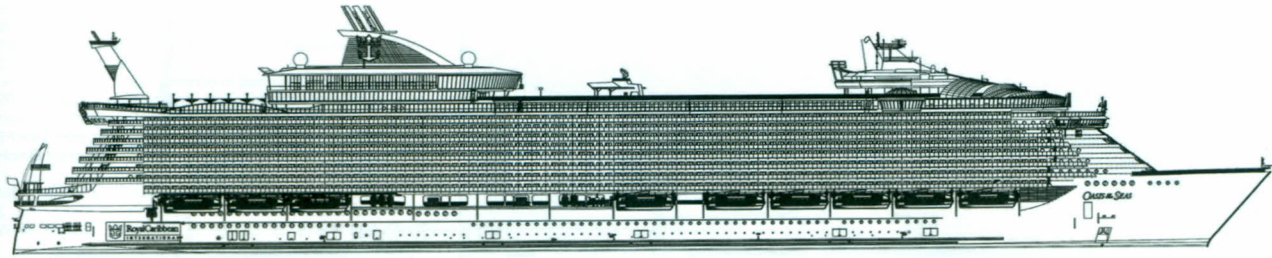
Comprehensive attention was given to environmental impact, energy efficiency and reduction of the carbon footprint by 15 to 25% by using the latest commercially available equipment, improving propulsion efficiency, utilising an advanced AC-system, introducing low energy light bulbs and optimising operational processes. Furthermore, the ship has common rail diesel technology for emission control and integrated advanced waste handling systems for all waste streams including an AWP (Advanced Wastewater Purification) system and two incinerators. A "No-ballast" concept allows normal operation with no ballasting action with only heeling/trimming tanks being used. CLEAN classification notation was adopted to assist in emission control through the whole lifecycle of the vessel. Even further, several hundred square metres of solar cells have been installed on top of the Viking Crown. Lounge on Deck 17.

TECHNICAL PARTICULARS

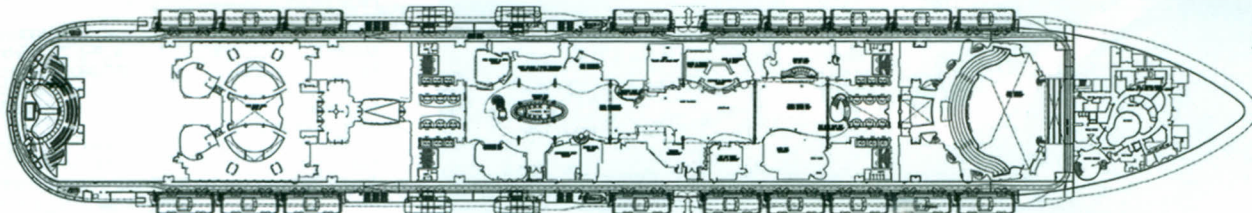
Length oa: 361m
 Length bp: 330m
 Breadth moulded: 47.0m
 Depth moulded:
 to main deck: 22.6m
 to upper deck: 50.0m
 Draught:
 scantling: 9.3m
 design: 9.15m
 Gross: 225,282gt
 Deadweight:
 Design: 15000dwt
 Speed, service: 22knots @ 78 %MCR
 Bunkers:
 Heavy oil: 4700m³
 Classification society and notations: Det Norske Veritas, 1A1, Passenger Ship, COMF-V(1), RPS, ECC-F-M, LCS-DC, CLEAN, FUEL(991 kg/m³), BIS Heel

control equipment - two pairs of heeling tanks,
 Roll-stabilisation equipment - fin stabilizers

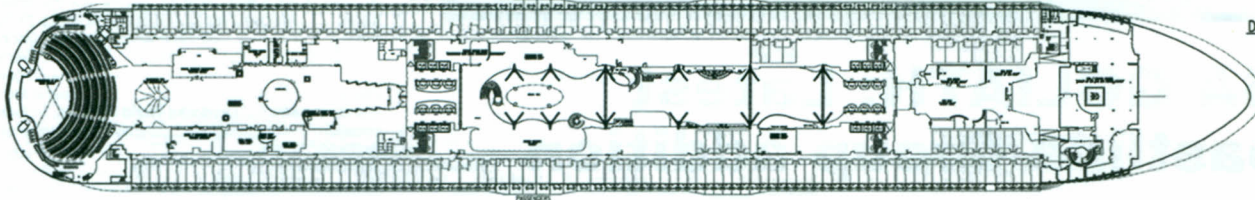
Main engines:
 Design: Wärtsilä diesel
 Model: 46D
 Manufacturer: Wärtsilä
 Number: 3 x V12 + 3 x V16
 Type of fuel: HFO
 Output of each engine: 13,860kW (V12) / 18,480kW (V16)
 Propellers:
 Designer/Manufacturer: ABB Azipod
 Number: 3 x 20MW
 Fixed/Controllable pitch: Fixed, electrical drive
 Diameter: 6.1m
 Speed: 150rpm
 Special adaptations: Electrical azimuthing pods
 Main-engine driven alternators:
 Number: 6
 Make/type: ABB
 Output/speed of each set: 3 x 13,400kW / 3 x 17,800kW
 Boilers:
 Number: 2
 Make: Aalborg Industries
 Output, each boiler: 20,000kg/h
 Mooring equipment:
 Number: 12
 Make: National Oilwell Varco - Hydralift BLM
 Special lifesaving equipment:
 Number of each and capacity: 18 x CRV55 boats (each 370 persons) + 4 x VEDC MES systems with double vertical chutes + liferafts.
 Make: Schat-Harding / Viking
 Complement:
 Officers and crew: 2160
 Passengers:
 Total: 6360 (max.)
 Number of cabins: 2704
 Bow thrusters:
 Make: Wärtsilä Propulsion
 Number: 4
 Output (each): 5500kW
 Bridge control system:
 Make: RCS Kongsberg Maritime
 Type: K-Thrust
 Is bridge fitted for one-man operation? No
 Fire detection system:
 Make: Autronica
 Fire extinguishing systems:
 Cabins: Marios / Hi-Fog
 Public spaces: Marios / Hi-Fog
 Radars:
 Number: 5
 Make: Northrop Grumman - Sperry Marine
 Models: Vision Master VT
 Integrated bridge system:
 Make: Northrop Grumman - Sperry Marine
 Model: Vision Master VT
 Waste disposal plant:
 Incinerator: Norsk Inova model NH2100kW
 Waste compactor: Orvak model 9020
 Waste shredder/crusher: Finlande Sant Andrea model G30/860
 Sewage plant: Headworks Bio Canada model: CB-3000
 Contract date: 3 February 2006
 Launch/float-out date: 21 November 2008
 Delivery date: 28 October 2009



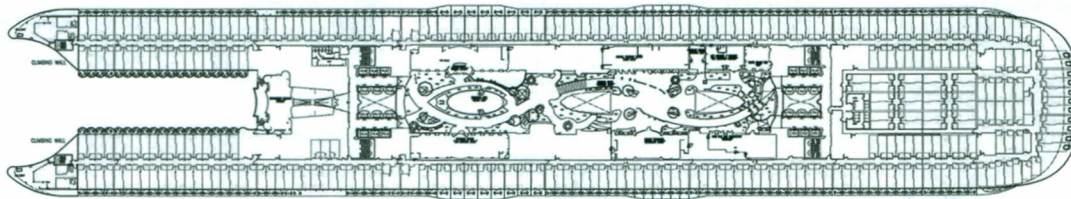
Deck 4



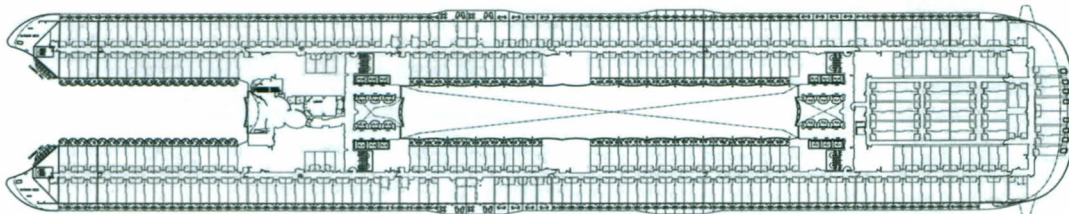
Deck 5



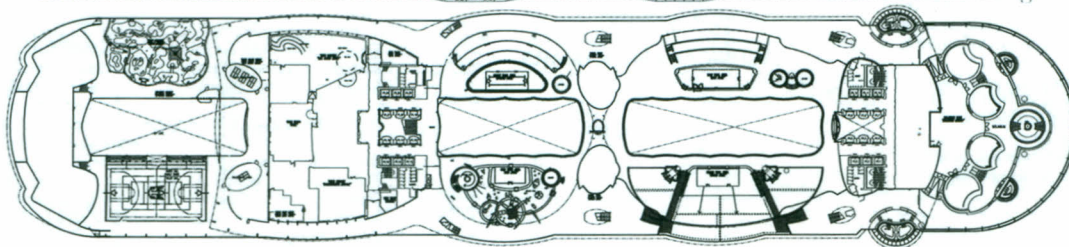
Deck 6



Deck 8



Deck 11



Deck 15



OSA GOLIATH: Latest Coastline Group addition

Shipbuilder: **Drydocks World Pertamina, Indonesia**
 Vessel's name: **OSA Goliath**
 Hull No: **158**
 Owner/Operator: **Handel Maritime S.A. / Coastline Maritime Pte Ltd**
 Country: **Panama / Singapore**
 Designer: **GB Marine Pte Ltd / Coastline Maritime Pte Ltd**
 Country: **Singapore**
 Flag: **Panama**
 IMO number: **9396933**
 Total number of sister ships already completed: **Nil**
 Total number of sister ships still on order: **2**
 (Samson and OSA Highlander)

Based on its experience with the 140m Length overall BSV *Azteca*, completed in 2003, Singapore-based Coastline Maritime concluded that the most important asset for a modern offshore construction vessel was size. In Coastline's judgement it would not be possible to make a ship too big, to give it too much deck area, to fit too much accommodation or to install too much power or crane capacity.

With this in mind when specifying the vessel which became *OSA Goliath* Coastline settled on a length of 180m. To facilitate good speed through the water, essential for worldwide service, a beam of 32m was chosen. Working back from these dimensions it was concluded that a crane capable of lifting 1600tonnes at 35m radius could be carried.

As this was to be a vessel of opportunity it was decided to offset the crane pedestal and to install a post crane so that pipe-laying equipment could also be installed. Two of 100tonnes supplementary cranes were decided on to complete the crane outfit and provide crane coverage to the entire deck area. To offset crane heeling moments an active anti-heeling system would also be required.

7000m² of deck area provides plenty of space for clients to place project equipment onboard and a stern ramp is provided for pipe-laying and other launch/recovery activities.

A Liebherr MTC 78000 crane, the first of its type to enter service, was installed on the starboard side as the main crane. Its capacity is 1600tonnes at 35m radius. Two smaller Liebherr CBO 3600-100 cranes mounted on pedestals on the port side provide the two x 100tonnes lifting capacity.

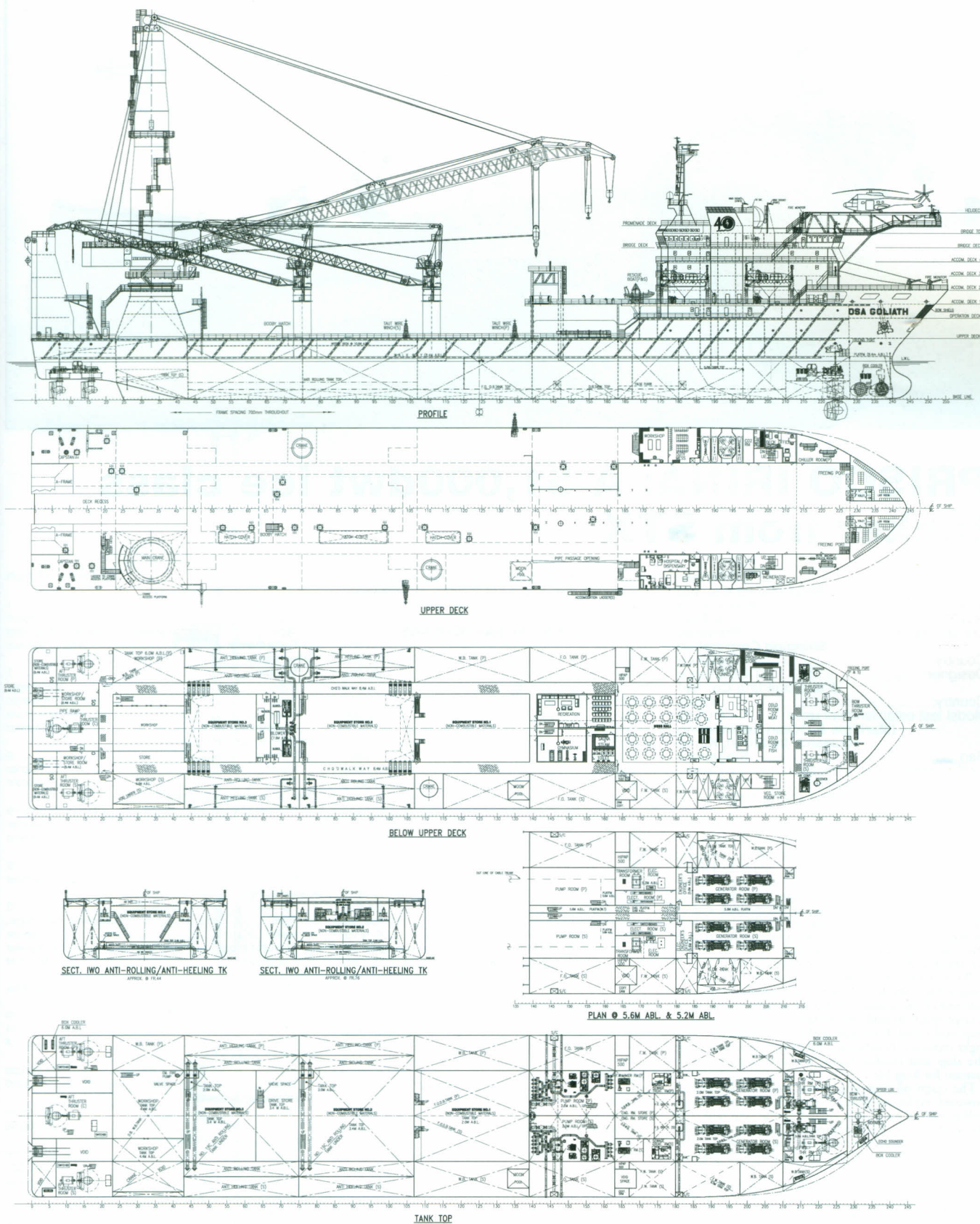
A helideck is provided forward, able to accommodate helicopters up to 12.8tonnes in weight – sufficient for the helicopters commonly used in offshore service. Accommodation is provided for 296 people with all the necessary support spaces including galley, fresh water storage, air-conditioning and recreation areas. After accommodating a crew of 46 to operate the vessel this leaves space for 250 client personnel. 21MW of installed power ensures that all propulsion and onboard requirements are met.

The highest rated Class III DP (dynamic positioning) system was installed in line with Coastline's belief that in future this will become standard practice. Three azimuthing thrusters aft, two drop-down azimuthing thrusters forward and two tunnel mounted bow thrusters ensure adequate manoeuvrability and produce a bollard pull of 275tonnes. A service speed of 12knots at 90% MCR is achieved.

TECHNICAL PARTICULARS

Length loa: 180.00m
 Length wl: 168.218m
 Breadth moulded: 32.00m
 Depth moulded:
 to main deck: 12.00m
 Width of double skin:
 side: 7.0m
 bottom: 2.0m
 Draught
 scantling: 7.50m
 design: 7.50m
 maximum: 10.50m (forward azimuthing thrusters extended)
 Gross: 25,423gt
 Displacement: 35,380tonnes
 Lightweight: 14,300tonnes
 Deadweight:
 Design: 21,000dwt
 Scantling: 21,080dwt

Block co-efficient: 0.86 @ 7.5m draft
 Speed, service: 14knots @ 100%MCR / 12knots @ 90%MCR
 Deck cargo space: 7000m² approx (includes open deck holds and hanger under accommodation block).
 Opendeck area: 3300m² approx
 Bunkers:
 Diesel oil: 4000m³
 Water ballast: 15,000m³
 Daily fuel consumption: 40tonnes/day
 Classification society and notations: ABS (99.99.99 Equivalent) +A1 (E) +AMS +ACCU +ICE CO +DP3 +HELIDECK + ES, +FiFi 2
 % high-tensile steel used in construction: 70% approx.
 Heel control equipment: Anti-heeling system HOPPE Bordmesstechnik GmbH
 Roll-stabilisation equipment: Anti-rolling system HOPPE Bordmesstechnik GmbH
 Propulsion thrusters (Azimuth):
 Make: Rolls-Royce Ulstein Aquamaster
 Number: 3
 Output (each): 3333kW
 Diesel-driven alternators:
 Number: 8 x 2445kVa (main generators) / 1 x 900kVa (emergency generator)
 Engine make/type: Caterpillar - 3516C-HD / 3412C
 Type of fuel: MDO
 Output/speed of each set: 2500kW @ 1800rev/min / 620kW @ 1800rev/min
 Alternator make/type: Leroy Somer / LSA 53 S7 - 4P CACW
 Main crane:
 Number: 1 x 1600tonnes
 Make: Liebherr
 Type: MTC 78000-1600 Litronic
 Performance: 1600tonnes SWL @ 35m radius
 Other cranes:
 Number: 2 x 100tonnes
 Make: Liebherr
 Type: CBO 3600-100 Litronic
 Tasks: Offshore construction
 Performance: 100tonnes SWL
 Mooring equipment
 Number: 2 x anchor windlass + 2 x Capstan
 Make: Mac Gregor Plimsoll
 Type: Hydraulic (anchor windlass) + electric (capstan)
 Special lifesaving equipment:
 Number of each and capacity: 4 x 102 persons
 Make: Jiangyin Neptune Marine Appliance Co. Ltd.
 Type: NPT95F totally enclosed lifeboats
 If MES, vertical or sloping chutes? Vertical Hatch covers
 Design: GB Marine Pte Ltd
 Manufacturer: Drydocks World Pertamina, Indonesia
 Location: Upper deck
 Cargo tanks, Stores
 Number: 3
 Grades of cargo carried: Offshore Engineering Equipment, etc.
 Ballast control system
 Make: HOPPE Bordmesstechnik GmbH
 Type: Combined Anti-Rolling System and Anti-Heeling System with Blower Unit
 Complement
 Officers: 21
 Crew: 25
 Passengers (Special Purpose personnel)
 Total: 250
 Bow thrusters (Azimuth):
 Make: Rolls-Royce Ulstein Aquamaster
 Number: 2
 Output (each): 2400kW
 Bow thrusters (Tunnel):
 Make: Kamewa Ulstein
 Number: 2
 Output (each): 1335kW
 Bridge control system:
 Make: Kongsberg
 Type: K-Bridge DP3
 Is the bridge fitted for one man operation? Yes
 Fire detection system:
 Make: Thorn Security Ltd
 Type: T1000
 Fire extinguishing systems:
 Engine room: CMA Engineering Singapore Pte Ltd (CO₂ system) plus Unitor (Fixed local application FiFi system)
 Cabins: CMA Engineering Singapore Pte Ltd (water sprinkler system)
 Public spaces: CMA Engineering Singapore Pte Ltd (water sprinkler system)
 Radars:
 Number: 2
 Make: Furuno
 Models: FAR2X17 & FAR2X37S
 Integrated bridge system:
 Make: Kongsberg
 Model: K-Bridge
 Waste disposal plant
 Incinerator: Miura Model BGW-20N
 Waste compactor: USON Marine Model UMCC
 Waste shredder/crusher: Electrolux Model 53060 + 169834
 Sewage plant: Hamworthy Model ST1 - ST30
 Launch/float-out date: 4 August 2008
 Delivery date: 22 April 2009





PRISCO IRINA: A 51,000dwt ice class tanker from STX

Shipbuilder: **STX Offshore & Shipbuilding Co., Ltd**
 Vessel's name: **Prisco Irina**
 Hull No: **S-2037**
 Owner/Operator: **Primorsk Shipping Corporation**
 Country: **Singapore**
 Designer: **STX Offshore & Shipbuilding Co., Ltd**
 Country: **Korea**
 Model test establishment used: **MOERI (Maritime & Ocean Engineering Research Institute), Korea**
 Flag: **Singapore**
 Total number of sister ships already completed (excluding ship presented): **2**
 Total number of sister ships still on order: **2**

Prisco Irina is a 51,000dwt crude oil/products/chemical tanker built for Primorsk Shipping Corporation by STX Corporation. Built to Lloyd's Ice Class 1a and Winterised (D-25) notation for navigation in ice, *Prisco Irina* can operate without icebreaker assistance in ice up to 10cm thick and at ambient temperatures as low as -25°C. Her hull includes a significant proportion of high yield strength steel including 32kg/mm² (314MPa) steel and, in the ice-affected area, 36kg/mm² (353MPa) steel.

Prisco Irina has been constructed for a 25-year fatigue life. She has a double-hull forming common side and centre double bottom water ballast tanks with a cargo space divided into 15 tanks (6 port + 6 stb'd, 2 slop tanks and 1 residue tank) by a centreline and eight transverse bulkheads. All cargo tanks, including the slop and residue tanks, are coated with epoxy systems for long life.

The cargo oil pumping system consists of electric-powered explosion-proof frequency converter deepwell pumps in each tank, including the slop tank and the residue tank. Each pump has a capacity 600m³/h, 300m³/h, 20m³/h depending on requirements. The maximum total cargo discharge rate is 3600m³/h based on S.G. visc. 1.0CST.

The propelling machinery consists of a slow speed, non-reversible, two stroke, STX MAN B&W 6S50MC-C (MK VII) diesel engine driving a controllable pitch propeller. This permits a service speed of 14.8knots at 85% MCR power (9600kW x 127RPM) with a 15% sea margin at the design loaded draft of 11.0m.

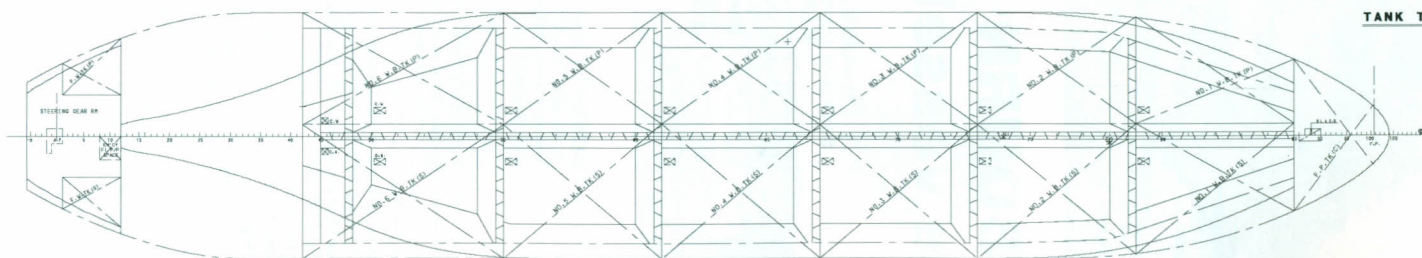
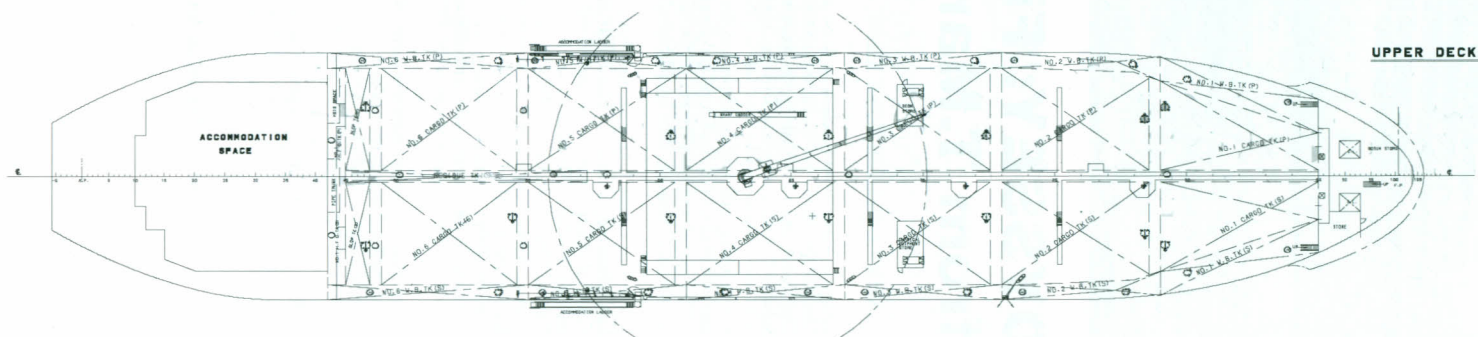
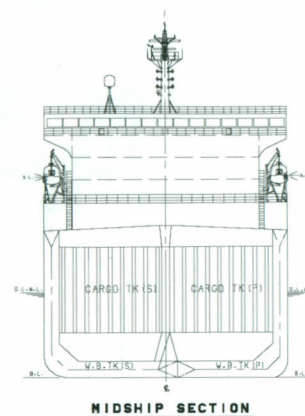
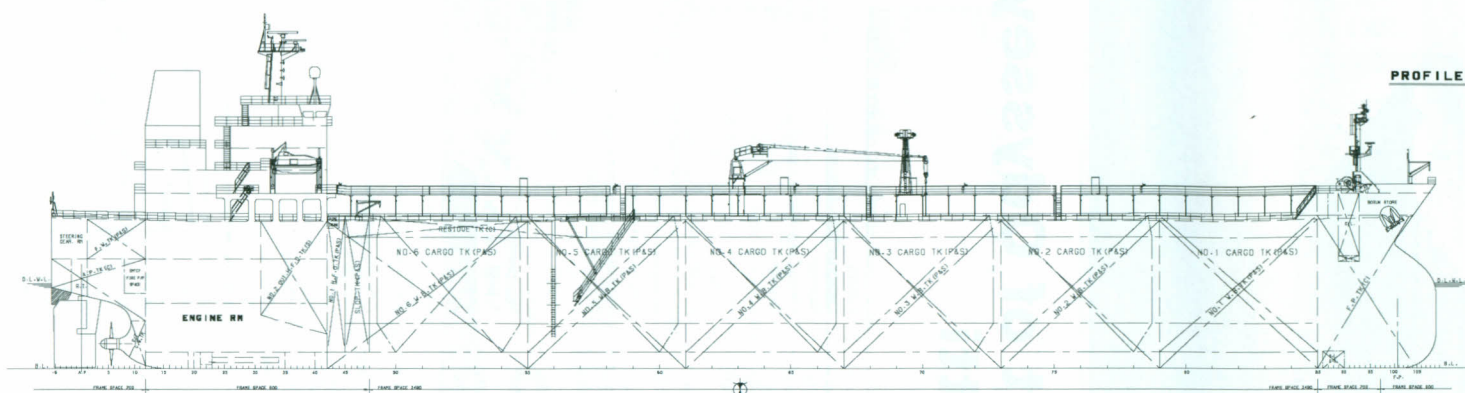
Three sets of diesel-driven alternators powered by STX-built diesel engines supply the electrical power. Steam is generated by an 18,000kg/h oil-fired boiler, and a 3000/1200kg/h composite boiler. Control can

be affected from either engine control room or wheelhouse using a SAM bridge manoeuvring system.

TECHNICAL PARTICULARS

Length oa: 183.00m
 Length bp: 173.90m
 Breadth moulded: 32.20m
 Depth moulded to main deck: 19.1m
 Width of double skin:
 side: 2.00m
 bottom: 2.15m
 Draught:
 scantling: 13.15m
 design: 11.00m
 Gross: 29,967gt
 Deadweight:
 scantling: 50,923dwt
 design: 39,851dwt
 Speed, service: 14.6knots (85% MCR)
 Cargo capacity:
 Liquid volume: 54,234m³
 Bunkers:
 Heavy oil: 1540.8 m³
 Diesel oil: 162.2 m³
 Water ballast: 23,809.7m³
 Classification Society and Notations: LR "A+100
 A1 Double-hull oil and chemical tanker,
 Ship type 2-ESP, Shipright (SDA, FDA, CM),
 +LMC, UMS, SCM, LI, IGS, ICE CLASS 1A,
 WINTERISED(D-25), IWS
 % high-tensile steel used in construction: 37%
 Main engine:
 Design: MAN B&W
 Model: 6S50MC-C MKII
 Manufacturer: STX Heavy Industries
 Number: 1
 Output: 9600kW at 127rev/min
 Propeller:
 Material: Ni-Al Bronze
 Designer/Manufacturer: Rolls-Royce
 Number: 1
 Fixed/Controllable pitch: Controllable pitch
 Diameter: 5700mm
 Speed: 127rev/min
 Diesel-driven alternators:
 Number: 3
 Engine make/type: STX Engine / 6L23/30H
 Output/speed of each set: 960kW / 900 rev/min
 Alternator make/type: Hyundai / HFC7 508-84K
 Output/speed of each set: 1125kVA / 900rev/min
 Boilers:
 Number: 1 auxiliary boiler / 1 composite boiler
 Type: OL 18000 / OC 3000/1200
 Make: Aalborg / Aalborg

Output: 18,000kg/h / 3000kg/h
 Cargo cranes/cargo gear:
 Number: 1
 Make: MacGregor
 Type: Electro-hydraulic (cylinder luffing type)
 Performance: SWL 10.0tonnes
 Other cranes:
 Number: 1
 Make: MacGregor
 Type: Electro-Hydraulic
 Tasks: Provision crane
 Performance: SWL 3.0tonnes
 Mooring equipment:
 Number: 6
 Make: Pusnes
 Type: Electric
 Special lifesaving equipment:
 Number of each and capacity: 2 sets x 25 persons
 Make: Fassmer
 Type: Totally enclosed type
 Cargo tanks:
 Number: 12
 Product range: Oil / Chemical
 Cargo pumps:
 Number: 12
 Type: Deepwell, centrifugal,
 Make: MarFlex
 Stainless steel: Pump casing, pump stack, impeller
 Capacity: 600m³/H
 Ballast control system:
 Make: MarFlex
 Complement:
 Officers: 10
 Crew: 14
 Suez Crew: 4
 Bridge control system:
 Make: STX Lyngso
 Type: DMS2100i/ DPS2100/EGS2200
 Fire detection system:
 Make: Consilium
 Type: CS4000/3S
 Fire extinguishing systems:
 Cargo holds: NK foam type
 Engine room: NK CO₂
 Paint store: Sprinkler
 Integrated bridge system:
 Make: SAM Electronics
 Model: Chartplot 1100 FOR ECDIS, Chartplot 1100
 FOR route planning Trackplot 1100 for conning
 Waste disposal plant:
 Incinerator: HMMCO MAXI NG50 SL WS
 Sewage plant: Jonghap AEROB-12
 Contract date: 21 February 2006
 Launch/float-out date: 2 January 2009
 Delivery date: 17 March 2009





SEABOURN ODYSSEY: First of Odyssey class vessels from T.Mariotti

Shipbuilder: **T.Mariotti S.p.A.**
 Vessel's name: **Seabourn Odyssey**
 Hull No.: **MAR062**
 Owner/Operator: **Seabourn Cruise Line**
 Country: **United States**
 Designer: **Y & S**
 Country: **Norway**
 Flag: **Bahamas**
 IMO number: **9417086**
 Total number of sister ships already completed (excluding ship presented): **Nil**
 Total number of sister ships still on order: **2**

At 32,000gt *Seabourn Odyssey* and her sister ships can accommodate 452 passengers in 225 suites with 90% of these suites having private balconies. The three ships are specifically designed to balance luxury and elegance with advanced technologies and new materials.

The vessels are of 198m length overall with a beam of 26m and a draft of 6.6m. Two fully independent engine rooms each house two VEM 6920kVa diesel generators powered by Wartsila 12V32 diesel engines. Two independent propulsion motor spaces house the 7.5MW VEM propulsion motors, each driving a 4.3m diameter five-blade fixed pitch propeller. The electrical propulsion system is by SAM Electronics and the vessels are each fitted with fin stabilisers and two 1500kW tunnel-mounted bow thrusters. The vessels' service speed is 19knots.

All the three ships comply with the latest IMO (International Maritime Organization) safety standards for damage stability that came into force in 2009, even though the construction began before the new rules took effect. The vessels were also designed to meet or exceed all the international standards for environmental management systems and qualify as "Green Ships" under the classification society RINA. Along with advanced wastewater treatment systems the ships have technically advanced systems for handling food waste that will reduce the consumption of fresh water in the galleys and fan-coil chillers that greatly reduce the amount of energy required to cool the suites and public rooms onboard.

The hull of *Seabourn Odyssey* was constructed by

CI.MAR San Giorgio di Nogaro, near Trieste in north-eastern Italy. CI.MAR is a jointly-owned company set up by T. Mariotti and Italian engineering company Cimolai specifically for the construction of ship hulls. The hull of *Seabourn Odyssey* was constructed in two halves which were then transferred by barge to Rijeka, in Croatia, where they were joined in a floating dock. The complete hull was then towed to the T. Mariotti shipyard in Genoa for outfitting and completion.

The second and third vessels of the trio, *Seabourn Sojourn* and *Seabourn Quest* are scheduled for delivery in 2010 and 2011 respectively.

Seabourn Cruise Line is an ultra-luxury cruise line headquartered in Miami, Florida. It is owned by Carnival Corporation. Its associated companies include Holland America Line, Princess Cruises, Cunard Line, Costa Cruises, P&O Cruises and AIDA Cruises. *Seabourn Odyssey* is the first new vessel built for Seabourn Cruise Line since the 1990s.

At 32,000gt *Seabourn Odyssey* and her sisters represent a significant size upgrade on previous Seabourn vessels, which are all in the 10,000gt range and Seabourn has gone to considerable lengths to ensure that they more intimate yacht-like ambience of the earlier vessels is maintained.

According to Micky Arison, chairman of Carnival Corporation: "This new trio of beautiful yacht-like ships will maintain Seabourn's role as the leader in the ultra-luxury segment, and position the company to satisfy the growing demand among affluent travellers for more ultra-luxury cruising options."

TECHNICAL PARTICULARS

Length oa: 198.15m
 Length bp: 169.20m
 Breadth moulded: 26.00m
 Depth moulded:
 to freeboard deck: 9.00m
 to boat deck: 15.25m
 Draught, design: 6.616m
 Gross: 31,650gt
 Deadweight, design: 3000dwt
 Speed, service: 19knots
 Water ballast: 1980m³

Classification society and notations: RINA Class 100A1

Propellers:

Designer/Manufacturer: Wärtsilä Propulsion
 Number: 2
 Fixed/Controllable pitch: Fixed
 Diameter: 4.3m (5 blades)

Propulsion motors:

Number: 2
 Make: VEM
 Output (each): 7500kW

Main-engine driven alternators:

Number: 4
 Engine make/type: Wartsila 12V32 diesel
 Type of fuel: HFO
 Output/speed of each set: 5760kW
 Alternator make/type: VEM DRKSX1032 (6600V, 60Hz)
 Output/speed of each set: 6920kVa/720rev/min

Boilers:

Number: 2
 Type: SG 60/9/N/NAY1
 Make: Bono
 Output, each boiler: 6000kg/h

Moorings equipment:

Make: Oilwell Varco

Complement:

Officers and crew: 348 total

Passengers:

Total: 452 max.
 Number of cabins: 225 suites (90% with balcony)

Bow thrusters:

Make: Fincantieri
 Number: 2
 Output (each): 1500kW

Bridge control system:

Make: SAM Electronics NACOS

Fire detection system:

Make: Microdata

Fire extinguishing systems:

Engine room: Hi-Fog

Radars:

Make: SAM L3

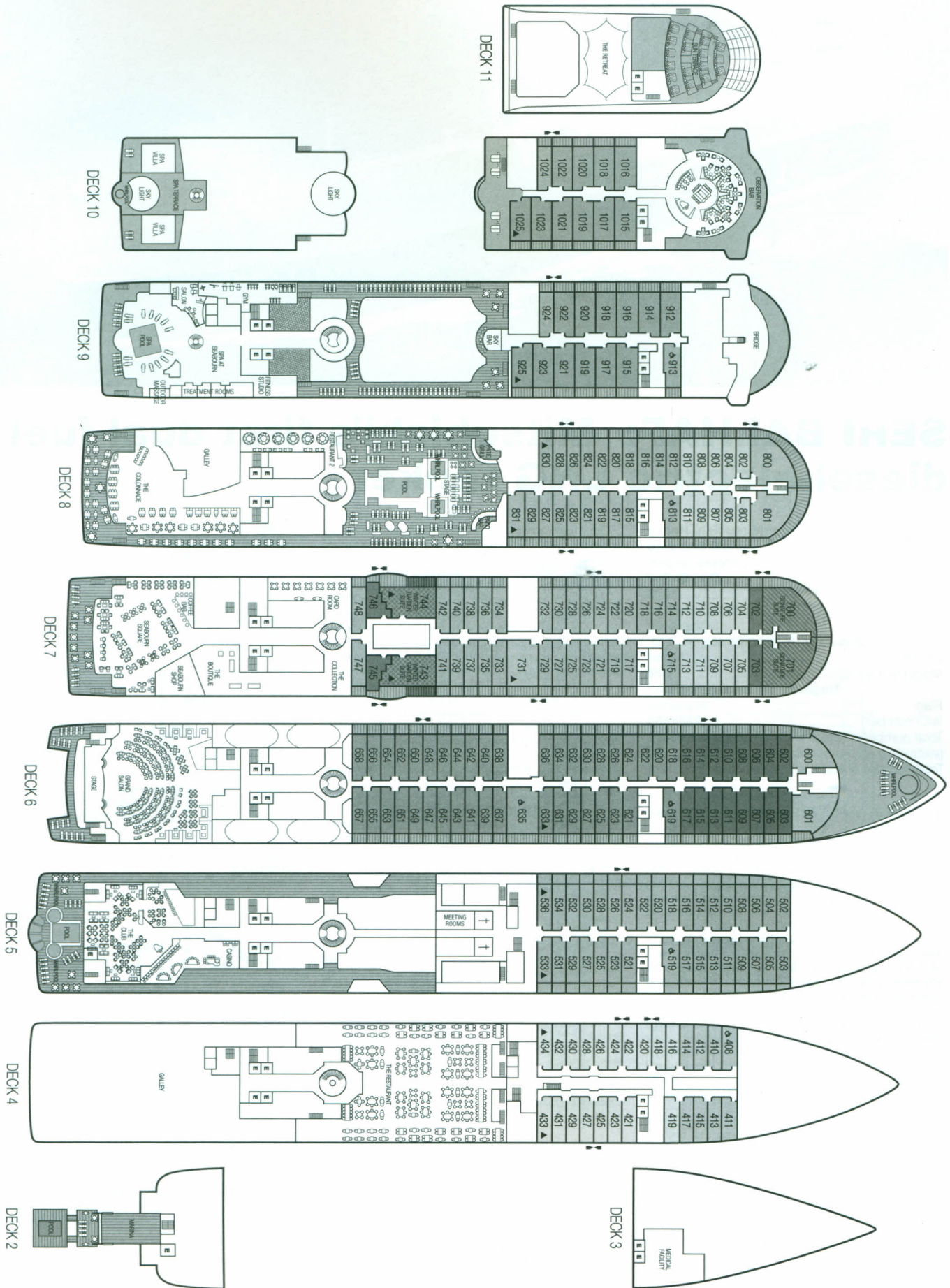
Waste disposal plant:

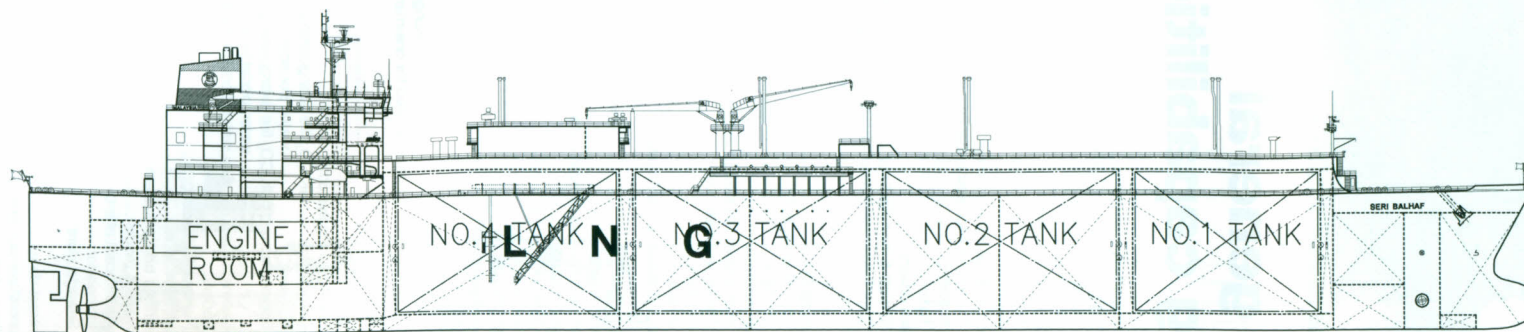
Make: Deerberg

Contract date: October 2006

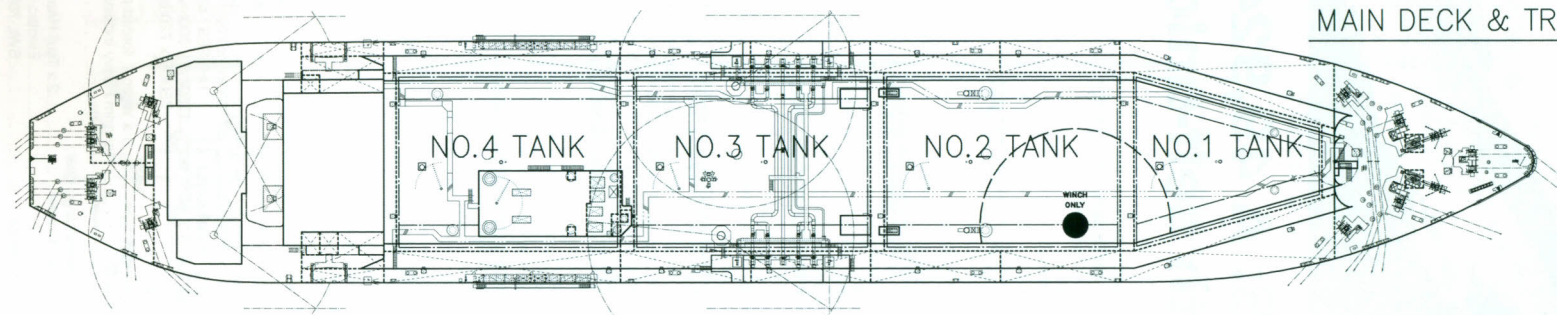
Launch/float-out date: June 2007

Delivery date: 18 June 2009

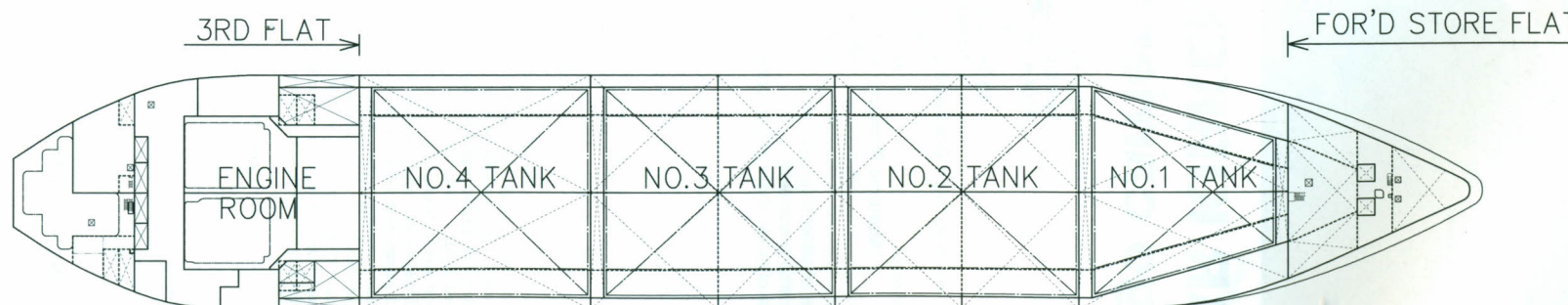




VIEW OF BRIDGE FRONT
& TANK SECTION



MAIN DECK & TRUNK DECK





STAR KIRKENES: A 49,924dwt general cargo carrier with self-unloading capabilities

Shipbuilder: **Hyundai Mipo Dockyard Co., Ltd**
Vessel's name: **Star Kirkenes**
Hull No: **8001**
Owner/Operator: **Grieg Shipping**
Country: **Norway**
Designer: **Hyundai Mipo Dockyard Co., Ltd**
Country: **Korea**
Model test establishment used: **Hyundai Maritime Research Institute**
Flag: **Norway**
IMO number: **9396127**
Total number of sister ships already completed (excluding ship presented): **2**
Total number of sister ships still on order: **1**

The most noticeable features of *Star Kirkenes* are the two 70tonne SWL gantry cranes on the deck. With this self-unloading capability the ship can carry a wide variety of cargoes.

Star Kirkenes is an ocean going general cargo carrier with double bottom, double-hull, bulbous bow, transom stern, flush deck with forecastle, open water type stern frame, single rudder fitted with bow and stern thruster and single screw propeller driven by a slow speed diesel engine. The vessel has transverse bulkheads dividing the cargo space into eleven cargo holds and nine pairs of water ballast tanks. The transverse bulkheads in way of the cargo holds are of double plate construction to give smooth-skinned holds. Under deck passageways are provided on port and starboard sides in way of the cargo hold space and hold access is provided from the starboard side under deck passage with ladders inside the transverse bulkhead spaces.

Weather tight steel hatch covers for cargo holds are of the pontoon type operated by the hydraulic cylinders arranged inside the gantry travelling cranes' legs. The cargo height on the hatch covers is limited by SOLAS requirements for visibility from the bridge. Three tiers of 8'6" high containers may be loaded in all cargo holds except Hold No.11 over the Engine room which is limited to one tier of containers. The holds generally are box-shaped for container carriage except for holds Nos 1, 2, 9 and 10 which have side benches to accommodate the vessel's hull shape.

With its scantling deadweight of 49,924dwt and overall length of 208.73m *Star Kirkenes* on delivery was the largest ship in the Grieg Shipping fleet.

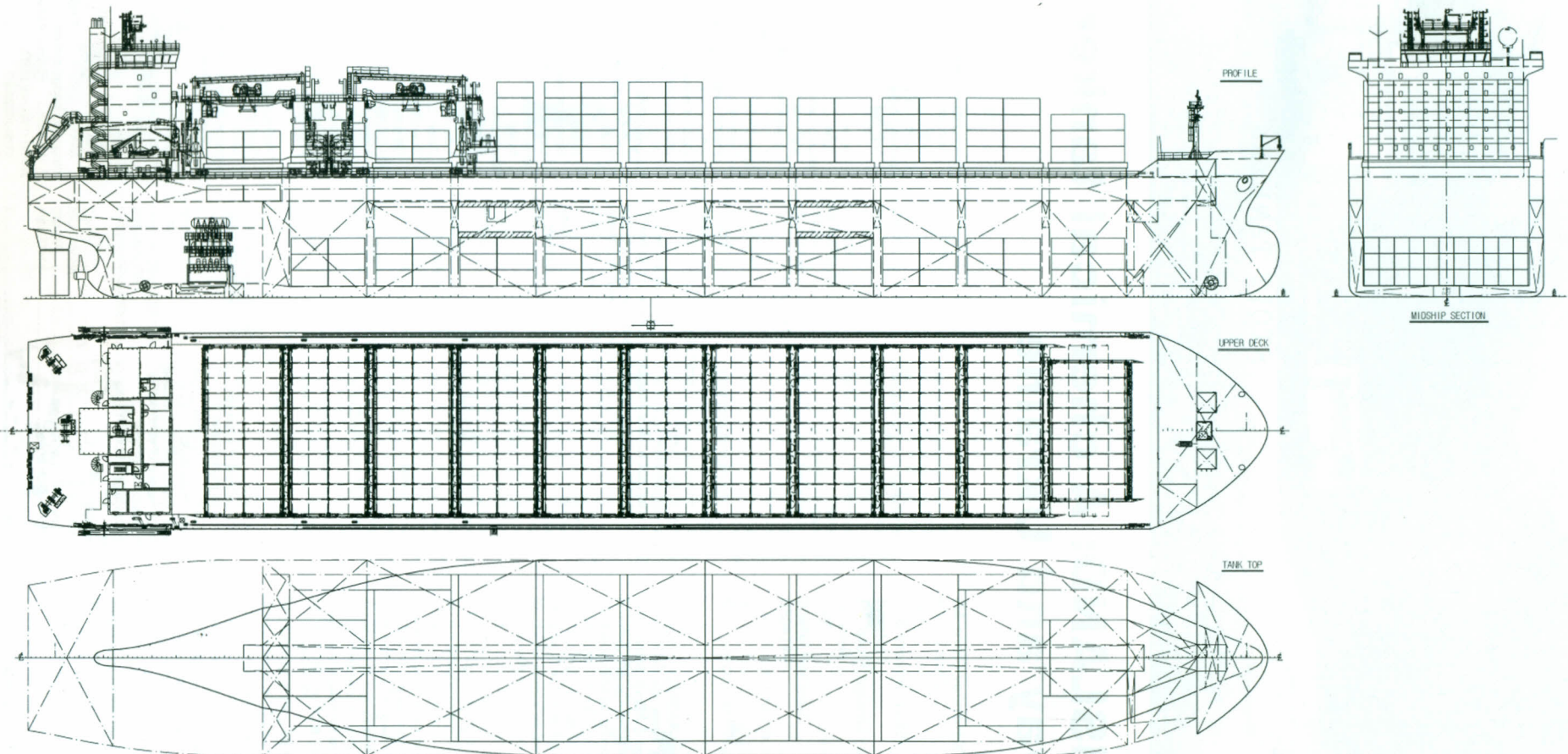
TECHNICAL PARTICULARS

Length oa: 208.73m
Length bp: 197.40m
Breadth moulded: 32.2m
Depth moulded:

to upper deck: 19.50m
to other decks: 15.71m
Width of double skin:
Side: 2.38m
Bottom: 1.79m
Draught:
scantling: 12.34m
design: 12.00m
Gross: 37,158gt
Deadweight:
design: 47,914dwt
scantling: 49,924dwt
Speed, service: 16knots
Cargo capacity:
Grain: 65,330 m³
Bunkers:
Heavy oil: 3130m³
Diesel oil: 374 m³
Water ballast: 20,700 m³
Daily fuel consumption:
Main engine only: 45.13tonnes/day
Auxiliaries: 2.9tonnes/day
Classification society and notations: DNV, +1A1, General Cargo Carrier, Container, HC-B*, HA(+), IB(+), TMON, EO, NAUT-OC. IB(+) notation to be applied for all holds except No.11 Hold. HC-B* notation to be applied as follows with exception of No.11 hold: Any one(1) hold empty or alternate loading such as No.1,3,5,7 & 9 holds empty or No.2,4,6,8 & 10 holds empty.
Main engine:
Design: MAN B&W
Model: 5S60MC-C8
Manufacturer: HHI-EMD
Number: 1
Type of fuel: HFO and MDO
Output: 11,900kW x 105rev/min
Propeller:
Material: Nickel-Aluminum-Bronze
Designer/Manufacturer: Hyundai Heavy Industries
Fixed/Controllable pitch: 1 x Fixed
Diameter: 5500mm
Special adaptations: PBCF (Propeller boss cap fins)
Diesel-driven alternators:
Number: 3
Engine make/type: HHI-EMD / HIMSSEN 7H21/32 x 2 set, 5H21/32 x 1 set
Type of fuel: HFO and MDO
Output/speed of each set: 1440kW x 900rev/min x 2 set, 800kW x 720rev/min x 1 set
Alternator make/type: HHI-EES / Marine Design
Output/speed of each set: 1350kW x 900rev/min x 2 set, 750kW x 720rev/min x 1 set
Boilers:
Number & type: 1 x Vertical, forced draft, oil fired
Make: Kangrim Heavy Industries Co., Ltd.
Output: 1600kg/h
Cargo cranes/cargo gear:
Number & make: 2 x Tsuji Heavy Industries
Type: Electric gantry crane
Performance: SWL 70tonnes /each
Other cranes:

Number & make: 1 x DMC
Type: Overhead electric travelling crane
Tasks: E/R overhead crane
Performance: SWL 4tonnes
Mooring equipment:
Number & make: 5 x Rolls-Royce
Type: Hydraulic
Special lifesaving equipment:
Number of each and capacity: 1 x 32persons
Make: Schat Harding
Type: Free-fall
Hatch covers:
Design & manufacturer: MacGregor
Type (upper deck/other decks): lift-away type operated by Gantry craneContainers:
Lengths: 6058mm
Heights: 2438mm
Total TEU capacity: 1453
On deck: 835
In holds: 618
Homogeneously loaded to 14tonnes: 1310
Tiers/rows (maximum)
On deck: 4 / 11
In holds: 3 / 11
Cargo & ballast control system:
Make: Kongsberg
Type: Integrated Monitoring & Control
Complement: 31
Stern appendages/special rudders: Flap Rudder
Bow thrusters:
Number & Make: 1 x Rolls-Royce
Output: 1500kW
Stern thrusters:
Number & Make: 1 x Rolls-Royce
Output: 865kW
Bridge control system:
Make & type: Kongsberg C20
Bridge is fitted for one-man operation
Fire detection system:
Make: Autronica
Type: BS-320M
Fire extinguishing systems:
Cargo holds: NK CO₂ fire extinguishing system, sea water, portable fire extinguisher
Engine Room: NK CO₂ fire extinguishing system, sea water, portable fire extinguisher
Cabin: Sea water, portable fire extinguisher
Radars:
Number & make: 2 sets Furuno
Model: FAR-2837S, FAR-2827
Integrated bridge system:
Make & model: Maris ECDIS900
Waste disposal plant:
Incinerator: Teamtec GS 500CS
Sewage plant: Jonghap Machinery Co., Ltd. JMC-BIO AEROB-18
Contract date: May, 2006
Launch/float-out date: March, 2009
Delivery date: 25 June, 2009

STAR KIRKENES





STOLT ISLAND: A chemical tanker built in Norway and Ukraine

Shipbuilder: **STX Norway Florø AS**
 Vessel's name: **Stolt Island**
 Hull No.: **151**
 Owner/Operator: **Stolt Tankers B.V.**
 Country: **Holland**
 Designer: **STX Norway Design Florø AS**
 Country: **Norway**
 Model test establishment used: **Yes**
 Flag: **Cayman Island**
 IMO number: **9414058**
 Total number of sister ships already completed (excluding ship presented): **2**
 Total number of sister ships still on order: **3**

Stolt Island, one of a series of six 43,593dwt chemical tankers built by STX Norway Florø, was delivered to her owner, Stolt Tankers B.V., on 2 March 2009. *Stolt Island* and her sister ships are state-of-the-art chemical tankers built to a design developed in close cooperation between the builder and the owner. With 39 cargo tanks ranging between 300m³ and 2200m³, 24 tanks being stainless steel and 15 zinc-coated steel, and with 39 cargo pumps the vessels are suited to a wide variety of parcel cargoes. The last vessel in the series is planned for delivery in March 2010.

Particularly interesting with *Stolt Island* and her sister ships is the construction method adopted. STX Norway Florø sub-contracted the steelwork and partial outfitting of their fore and aft ends to Wadan Yards Okean OJSC in Ukraine. These ends were joined to make complete 111.6m long "mini-ships" which, on completion, were towed to Norway where the mid-bodies were inserted and outfitting was completed. This process was adopted for five of the six vessels, with the first vessel having only its fore end constructed at Wadan yards. The mid-body sections include the stainless steel cargo tanks.

Pulsative power is provided by a STX-MAN 7S50 MC-C two-stroke diesel engine which, in combination with good hull design, gives the vessel low fuel oil consumption at its service speed of 15knots. Maintenance of the vessel, particularly the cargo area, was given close attention at the design stage with a view to keeping maintenance requirements as low as possible. To achieve this particular attention was given to access requirements and materials and coatings selection.

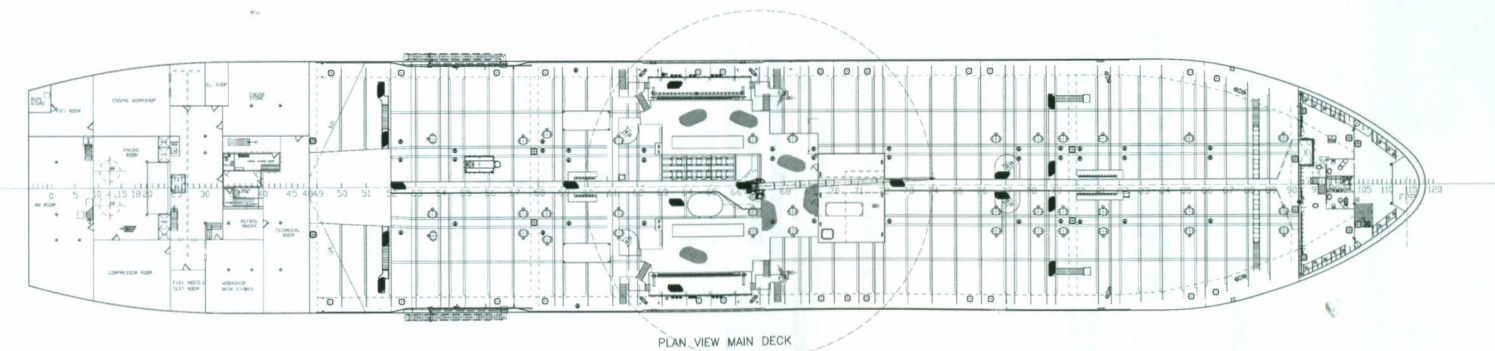
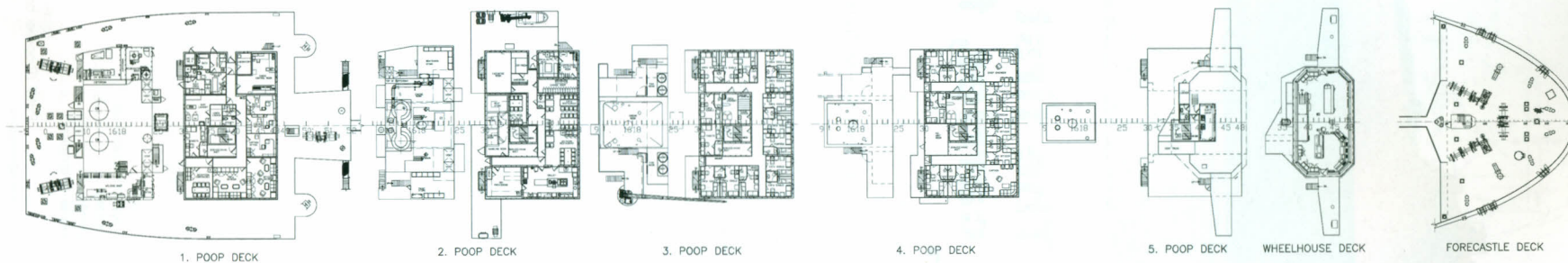
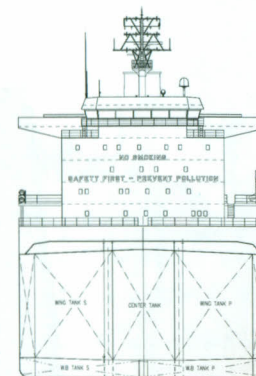
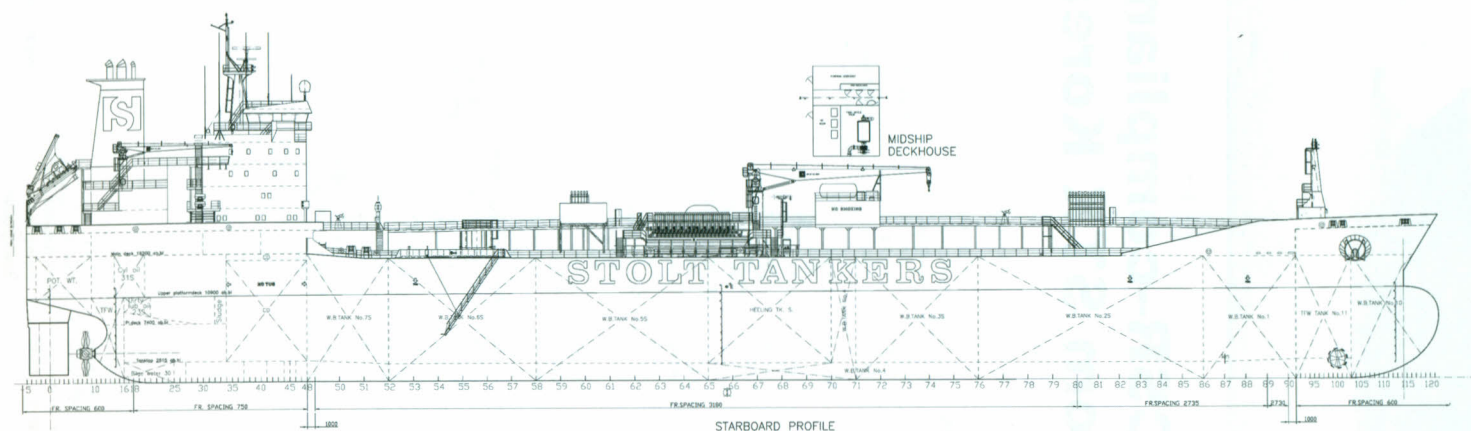
STX Europe AS comprises 15 shipyards in Finland, France, Norway, Romania, Brazil and Vietnam and has approximately 16,000 employees. Formerly known as Aker Yards, the group changed its name to STX Europe in November 2008.

TECHNICAL PARTICULARS

Length oa: 182.72m
 Length bp: 175.22m
 Breadth moulded: 32.20m
 Depth moulded to main deck: 15.60m

Width of double skin:
 side: 2000mm
 bottom: 2210mm
 Draught:
 scantling: 11.90m
 design: 11.87m
 Gross: 25,841gt
 Displacement: 54,736tonnes
 Lightweight: 13,427tonnes
 Deadweight, design: 43,593
 Block co-efficient: 0.82 at design draft
 Speed, service: 15knots at 73 % MCR
 Cargo capacity:
 Liquid volume: 45,400m³
 Bunkers:
 Heavy oil: 2200m³
 Diesel oil: 160m³
 Tankers - percentage segregated ballast: 16,240m³
 Daily fuel consumption:
 Main engine only: 47tonnes/day
 Classification society and notations:.. DnV +1A1 Tanker for chemicals and oil products ESP
 CSR E0 Naut-OC VCS-2 HL(1.85) TMON
 % high-tensile steel used in construction:29 %
 Main engine:
 Design: MAN
 Model: 7S50 MC-C
 Manufacturer: STX
 Number: 1
 Type of fuel: HFO
 Output: 11,060kW
 Gearbox:
 Make: Renk
 Model: SHHII-1280/905
 Number: 1
 Output speed: 127rev/min
 Propeller:
 Material: NiAlBronze
 Designer/Manufacturer: MAN Alpha
 Number: 1
 Fixed/Controllable pitch: CPP
 Diameter: 5700mm
 Speed: 127rev/min
 Main-engine driven alternators:
 Number: 1
 Make/type: MECC Alte spa/ECO 46-1L/4
 Output/speed of each set: 1100kW/1800rev/min
 Diesel-driven alternators:
 Number: 2
 Engine make/type: MAN/7L21/31
 Type of fuel: HFO
 Output/speed of each set: 1330kW/900rev/min
 Alternator make/type: HFC635-8YK
 Output/speed of each set: 1330kW/900rev/min
 Boilers:
 Number: 2
 Type: Mission OM
 Make: Aalborg
 Output, each boiler: 1400kg/h
 Cranes:
 Number: 3
 Make: TTS Marine - Fassmer
 Type: GP 380-10-22.5 GP 80-3-14 FSAR 14/3.5.
 Tasks: Hose crane, provision crane, rescue boat crane

Mooring equipment"
 Number: 6
 Make: Aker Solutions (Pusnes)
 Type: Hydraulic
 Special lifesaving equipment:
 Number of each and capacity: 1 free-fall lifeboat, 30 persons
 Make: Fassmer
 Type: GAR 6,7
 Hatch covers:
 Manufacturer:
 Hatches in cargo area: Nor-Marine in the cargo area, Rapp Bomek/Norpro elsewhere
 Cargo tanks
 Number: 39
 Product range: All types of cargo according to "List of products" from DnV
 Coated tanks: 15 tanks -zinc coated mild steel
 Stainless steel: 24 tanks - stainless duplex steel quality
 Cargo pumps
 Number: 39
 Type: Hydraulic driven deepwell pumps, SD125/SD150
 Make: Frank Mohn AS
 Stainless steel: Yes
 Capacity (each): 220-385m³/h
 Cargo control system
 Make: Ariston
 Ballast control system
 Make: Ariston
 Complement
 Officers: 10
 Crew: 16
 Suez/Repair Crew: 1
 Others: 1 (pilot)
 Bow thruster:
 Make: Rolls-Royce/TT1850 AUX CP
 Number: 1
 Output: 1000kW
 Bridge control system:
 Furuno: AIS, GPS, speedlog, echo sounder, VHF, DGPS
 AlphaCourse: Gyro
 Sperry Marine: Autopilot
 Maris: VDR, ECDIS
 Is bridge fitted for one-man operation? Yes
 Fire detection system:
 Make: Autronica
 Type: Autrosafe BS-310
 Fire extinguishing systems:
 Engine room: Unitor OSP 581-8
 Radars:
 Number: 2
 Make: Furuno
 Models: X-band: JH 20,1 S-band: JH 23,1
 Integrated bridge system:
 Model: Furuno, AlphaCourse, Maris, Sperry Marine
 Waste disposal plant
 Incinerator: Delta Model IRLA-50CC
 Sewage plant: RWO Model WWT4B10PUR
 Contract date: 30 August 2006
 Launch/float-out date: 20 November 2008
 Delivery date: 2 March 2009





STX FREESIA: The first CSR-compliant cape size bulk carrier, from STX Korea

Shipbuilder: **STX Offshore & Shipbuilding Co., Ltd**
 Vessel's name: **STX Freesia**
 Hull No: **S-1302**
 Owner/Operator: **STX Pan Ocean Co., Ltd**
 Country: **Korea**
 Designer: **STX Offshore & Shipbuilding Co., Ltd**
 Country: **Republic of Korea**
 Model test establishment used: **KORDI (Korea Ocean Research & Development Institute)**
 Flag: **Marshall Islands**
 Total number of sister ships already completed (excluding ship presented): **Nil**
 Total number of sister ships still on order: **3**

On 23 July 2009 STX Offshore & Shipbuilding delivered the 181,000dwt bulk carrier *STX Freesia* to its associated STX Group company, STX Pan Ocean. *STX Freesia* is the first cape size bulk carrier to comply with the new CSR (Common Structural Rules) for Bulk Carriers.

The hull of *STX Freesia* is divided into nine cargo holds by corrugated transverse bulkheads built on stools. There are five pairs of water ballast tanks in the double bottom and top side wings which are connected to each other through a side gravity trunk and pipe. The ballast tanks are coated a grey-coloured tar-free epoxy and ballast is handled by two off 3000m³/h pumps in the Engine Room.

STX Freesia is powered by a STX-MAN B&W 6S70MC-C(MK7) main engine developing 18,880kW at 91rpm. This permits a service speed in the loaded condition of 15.0knots at 85% of MCR.

Of particular interest is the installation of an STX-developed Wide Chord Tip (WCT) propeller. This has been shown to reduce pressure fluctuations and accordingly to reduce propeller-induced noise and vibration. From sea-trial records the vibration magnitude in accommodation at NCR was measured 0.9mm/sec which is only 10% of international allowable vibration magnitude (9mm/sec). Propeller Boss Cap Fins (PBCF) made by Motech were also installed to improve propeller efficiency.

Three sets of 950kW diesel-driven alternators powered by STX built diesel engines supply the electrical power. One 250kW emergency diesel alternator set is also installed.

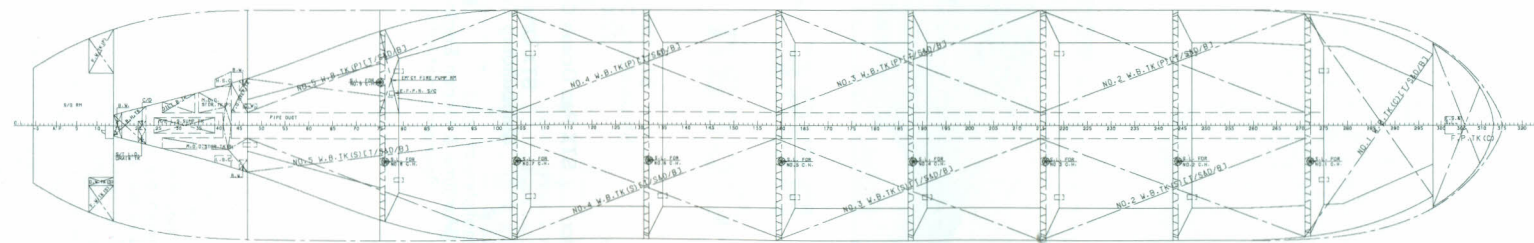
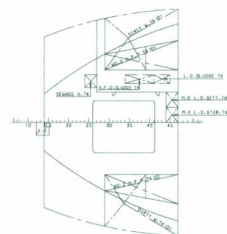
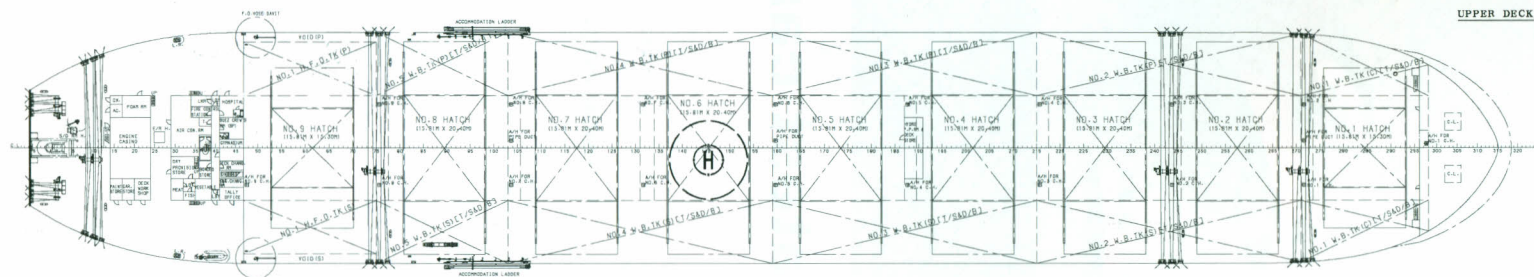
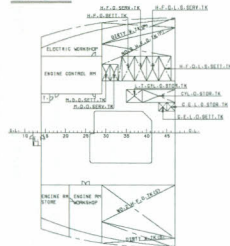
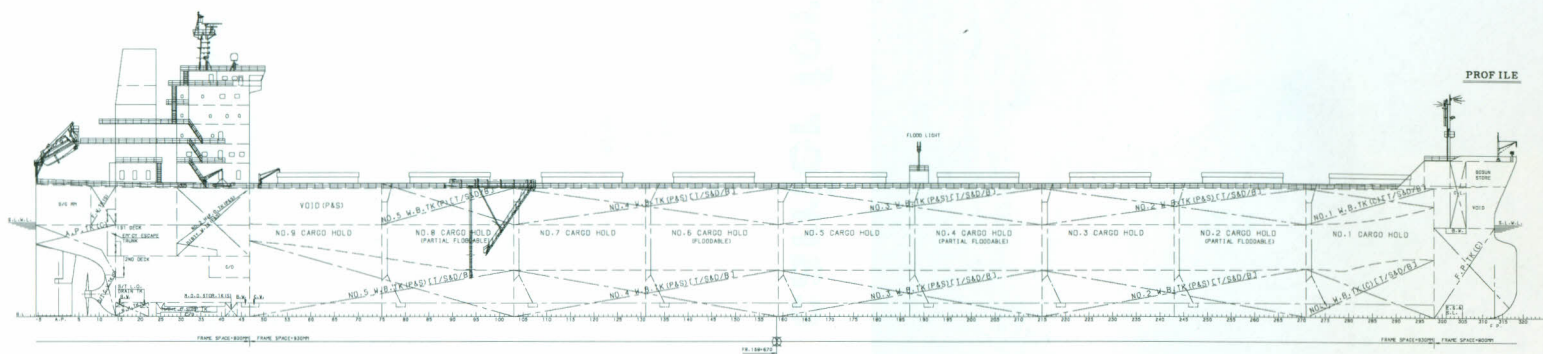
Accommodation is provided in the after deckhouse for 28 complement, with six additional berths for a

Suez Canal riding crew. A free-fall lifeboat is fitted, launching over the stern.

TECHNICAL PARTICULARS

Length oa: 292.0m
 Length bp: 283.0m
 Breadth moulded: 45.0m
 Depth moulded to upper deck: 24.8m
 Width of double skin: 2600mm
 Draught: 18.2m
 scantling: 16.5m
 design: 95,047gt
 Gross: 207,383tonnes
 Displacement: 180,736dwt
 Deadweight: 159,683dwt
 scantling: 15.0knots at 18.2m draft (90% MCR)
 design: 199,366 m3
 Grain: 4510m³
 Heavy oil: 264m³
 Diesel oil: 80,840m³
 Water ballast: 66.9tonnes/day
 Main engine only: KRS
 Classification Society and Notations: (Korean Register of Shipping)
 +KRS1-Bulk Carrier 'ESP', CSR, BC-A (Hold Nos. 2,4,6 & 8 may be empty), LI, Grab[20], IWS, ENV (BWMP(S+F), IAFS, IOPP, ISPP, IAPP) +KRM1-UMA, STCM
 % high-tensile steel used in construction: 72%
 Main engine: MAN B&W Diesel AG
 Design: STX MAN B&W 6S70MC-C(MK VII)
 Model: STX Engine Co., Ltd.
 Manufacturer: 1
 Number: 18,880kW 91rev/min
 Output: STX WCT
 Propeller: Ni-Al Bronze
 Material: STX Shipbuilding Co., Ltd / Hyundai Heavy Industries Co., Ltd
 Designer/Manufacturer: 1
 Number: Fixed pitch
 Fixed/Controllable pitch: 8200mm
 Diameter: 91rev/min
 Speed: STX WCT
 Special adaptations: (wide chord tip) design, PBCF (Propeller boss cap fins) fitted
 Diesel-driven alternators: 3
 Number: STX MAN B&W Holeby 5L21/31
 Engine make/type: 900kW X 900rev/min
 Output/speed of each set:

Alternator make/type: STX Cummins / 4-Cycle, single acting
 Output/speed of each set: 200kW X 1800rev/min
 Boilers: 1
 Number: Forced circulating, bare tube type
 Type: Kangrim
 Make: 2000kg/h(oil fired section) / 1600kg/h
 Output: (exhaust gas section) 7kg/cm² (686kPa)
 Cranes: 2
 Number: Oriental
 Make: Electric motor driven, jib type
 Type: Provision handling
 Tasks: Port-6.3tonnes, Stb'd-2tonnes, 10m/min
 Performance: Mooring equipment
 Number: 9 sets
 Make: Oriental
 Type: Hydraulic
 Special lifesaving equipment: 1 x 30persons
 Number of each and capacity: Fassmer
 Make: Totally enclosed type
 Type: Hatch covers
 Manufacturer: SEO-HAE
 Type: Side rolling - rack & pinion
 Ballast control system: Emerson
 Make: Hydraulic actuator, mimic control
 Type: Complement:
 Officers: 16
 Crew: 12
 Supernumeraries/Spare: 2
 Suez Crew: NK portable foam
 Single/double/other rooms: 23/ 3
 Bridge control system: KTE
 Make: Fire detection system:
 Make: CONSILIUM
 Type: CS4000
 Fire extinguishing systems: Fire hydrant
 Cargo holds: Kashiwa high expansion foam
 Engine room: NK portable foam
 Cabins: NK portable foam
 Public spaces: Radars:
 Number: 2
 Make: SAM
 Model: RADAR PILOT 1100
 Waste disposal plant: HMMCO MAXI T150 SL WS
 Incinerator: II Seung ISS-25N
 Sewage plant: 21 May 2007
 Contract date: 11 May 2009
 Launch/float-out date: 23 September 2009
 Delivery date:





STX ROSE 1: Latest cargo carrier for STX Pan Ocean

Shipbuilder: **STX Offshore & Shipbuilding Co., Ltd**
 Vessel's name: **STX Rose1**
 Hull No.: **S-8001**
 Owner/Operator: **STX Pan Ocean Co., Ltd**
 Country: **Korea**
 Designer: **STX Offshore & Shipbuilding Co., Ltd**
 Country: **Korea**
 Model test establishment used: **MOERI (Maritime & Ocean Engineering Research Institute), Korea**
 Flag: **Panama**
 Total number of sister ships already completed (excluding ship presented): **Nil**
 Total number of sister ships still on order: **Nil**

The heavy cargo carrier *STX Rose1*, built by STX Offshore & Shipbuilding, was delivered to her owner, STX Pan Ocean, on 30 December 2008. Registered in Panama, *STX Rose1* has both float on/float off and lift on/lift off capability. *STX Rose1* can also be used in a roll-on/roll-off capacity, using multi-wheel module transporters, or in any combination of modes. Her primary purpose is the carriage of ships' hull blocks and in this role she is expected to save more than 30% in transit time compared with the more traditional carriage of hull blocks by barge.

STX Rose1 consists of a total of 31 water ballast tanks including two detachable buoyancy tanks on the deck aft. The water ballast capacity is a total of 43,814m³ and the ballast tanks are serviced by four sets of electrically driven ballast pumps, each of 2500m³/h capacity. The two detachable buoyancy tanks aft are only fitted when required for handling float-on/float-off loads and perform the two functions of reserve buoyancy and water ballast tanks.

Two STX MAN B&W 8L32/40 main engines are fitted, each developing 3600kW full power at 750rev/min. These drive the vessel through Hitachi reduction gearboxes and 3.4m diameter propellers to provide a service speed of 11.7knots at 85% MCR. *STX Rose1* can cruise over 6000nm with three days fuel in reserve.

Three off 440kW generator sets and one off 120kW emergency generator powered by STX diesel engines supply the electrical power while a 1000kg/h auxiliary boiler satisfies steam demands.

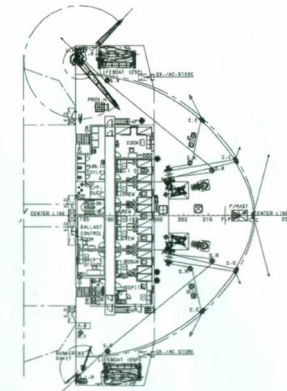
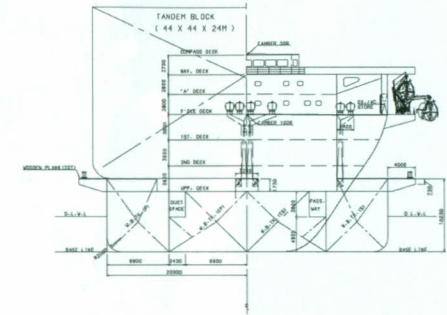
Accommodation forward is provided for a complement of eight officers and 12 crew, and two

totally enclosed lifeboats driven by water cooled diesel engines with electric starting are fitted.

TECHNICAL PARTICULARS

Length oa: 174.2m
 Length bp: 165.0m
 Breadth moulded: 40.0m
 Depth moulded to upper deck: 8.5m
 Draught:
 scantling: 5.0m
 design: 5.0m
 Gross: 17,824gt
 Displacement: 26,756tonnes
 Deadweight:
 scantling: 16,715dwt
 design: 16,715dwt
 Speed, service: 11.7knots at 85% MCR
 Bunkers (m3)
 Heavy oil: 756.4m³
 Gas oil: 167.9m³
 Water ballast: 43,814m³
 Daily fuel consumption:
 Main engine only: 30.8tonnes/day
 Auxiliaries: 8.7tonnes/day
 Classification Society and Notations: KR + KRS1-CARGO SHIP, +KRM1
 % high-tensile steel used in construction: 5 %
 Main engine:
 Design: MAN B&W Diesel
 Model: STX MAN B&W 8L32/40
 Manufacturer: STX Engine Co., Ltd.
 Number: 2
 Output of each engine: 3600kW x 750rev/min
 Gearbox:
 Make: Hitachi NICO
 Model: MGN 8044V
 Number: 2
 Output speed: 211.3rev/min
 Propellers:
 Material: Ni-Al Bronze
 Designer/Manufacturer: Hae Yang Metal Co., Ltd.
 Number: 2
 Fixed/Controllable pitch: Fixed pitch
 Diameter: 3400mm
 Speed: 211.3rev/min
 Diesel-driven alternators:
 Number: 3
 Engine make/type: STX Cummins KTA-19-DM
 Output/speed of each set: 478kW x 1800rev/min
 Alternator make/type: STX Cummins / 4-Cycle, Single Acting

Output/speed of each set: 440kW x 1800rev/min
 Boilers:
 Number: 1
 Type: Vertical, oil fired, cylindrical, water tube type
 Make: Kangrim
 Output: 1000kg/h x 6kg/cm² (588kPa)
 Cranes:
 Number: 1
 Make: Oriental
 Type: Electric
 Tasks: Provision handling
 Performance: 2tonnes x 2.4m, max. speed 8m/min at load, hoist height 19.2m
 Mooring equipment:
 Number: 4
 Make: Oriental
 Type: Electro-hydraulic
 Special lifesaving equipment:
 Number of each and capacity: 2 x 25 persons
 Make: Beihai
 Type: Totally enclosed type
 Ballast control system:
 Make: Emerson
 Type: Hydraulic actuator, mimic control
 Complement:
 Officers: 8
 Crew: 12
 Bow thruster:
 Make: KTE
 Number: 1
 Output: 500kW x 1782rev/min
 Bridge control system:
 Make: KTE
 Fire detection system:
 Make: Consilium
 Type: CS4000
 Fire extinguishing systems:
 Engine room: NK Fixed CO₂ system
 Cabins: NK portable foam
 Public spaces: NK portable foam
 Radars:
 Number: 2
 Make: SAM Electronics
 Model: Radarplot 1100 (S-BAND & X-BAND)
 Waste disposal plant:
 Incinerator: HMMCO MAXI NG 25 SL WS
 Sewage plant: Il Seung ISS-25
 Contract date: 31 August 2007
 Launch/float-out date: 14 August 2008
 Delivery date: 30 December 2008





TIRRANNA – A large car/truck carrier from Daewoo for Wilhelmsen

Shipbuilder: **Daewoo Shipbuilding & Marine Engineering Co., Ltd**
 Vessel's name: **Tirranna**
 Hull No: **4452**
 Owner/Operator: **Wilhelmsen Lines Shipowning AS**
 Country: **Norway**
 Designer: **Daewoo Shipbuilding & Marine Engineering Co., Ltd**
 Country: **Republic of Korea**
 Model test establishment used: **HSVA**
 Flag: **Norway**
 IMO number: **9377523**
 Total number of sister ships already completed (excluding ship presented): **3**

TECHNICAL PARTICULARS

Length oa: 231.6m
 Length bp: 219.3m
 Breadth moulded: 32.26m
 Depth moulded to upper deck: 34.7 m
 Width of double skin:
 side: 1.5m
 bottom: 3.0m
 Draught:
 scantling: 11.3m
 design: 9.5m
 Gross: 71,700gt
 Displacement: 42,300tonnes at design draft
 Lightweight: 23,500tonnes
 Deadweight:
 Design: 18,700dwt
 Scantling: 30,100tonnes
 Speed, service: 20.92knots at 80% MCR
 Bunkers:
 Heavy oil: 5080m³
 Diesel oil: 410 m³
 Water ballast: 11,800m³
 Daily fuel consumption:
 Main engine only: 57.8tonnes/day
 Classification society and notations: LR +100A1, vehicle carrier, movable decks, "Deck Nos. 1, 3, 5 and 8 strengthened for the carriage of Roll on/Roll off cargoes", +LMC, UMS, *IWS, NAV1, IBS.
 % high-tensile steel used in construction: 35%
 Main engine:
 Design: MAN
 Model: B&W8S60ME-C
 Manufacturer: Doosan Engine
 Number: 1
 Type of fuel: HFO
 Output: 18,060kW x 105rev/min
 Propeller:
 Material: Ni-Al-Bronze
 Designer/Manufacturer: DSME / HHI
 Number: 1
 Fixed/Controllable pitch: Fixed pitch
 Diameter: 6.9m
 Speed: 97.5rev/min
 Diesel-driven alternators:
 Number: 2
 Engine make/type: STX/9L21/31
 Type of fuel: HFO
 Output/speed of each set: 1800kW / 900rev/min
 Alternator make/type: HHI
 Output/speed of each set: 1700 kW / 900rev/min
 Boilers:
 Number: 1
 Type: Vertical water tube type
 Make: Kangrim
 Output: 2000kg/h

Cranes
 Number: 1
 Make: Oriental Precision
 Type: Single luffing jib type
 Tasks: Handling of provision, etc.
 Performance: 5tonnes SWL
 Mooring equipment
 Number: 8
 Make: Rolls-Royce
 Type: Electric
 Special lifesaving equipment:
 Number of each and capacity: 1
 free-fall lifeboat, 38 persons
 Make: Norsafe
 Type: Free-fall lifeboat
 Vehicles
 Number of vehicle decks (fixed/moveable): 8
 fixed / five moveable
 Total cars: 7887 Units
 Doors/ramps/lifts/moveable car decks
 Number of each: 2 doors, 10 moveable ramps,
 5 moveable decks
 Type: Electric, hydraulic
 Designer: MacGregor
 Complement
 Officers: 14
 Crew: 13
 Supernumeraries/Spare: 2
 Suez/Repair Crew: 4
 Single/other rooms: 29 / 1
 Bow thrusters:
 Make: KTE
 Number: 1
 Output: 2000kW
 Bridge control system:
 Make: Kongsberg Maritime
 Is bridge fitted for one-man operation? Yes
 Fire detection system:
 Make: Consilium
 Fire extinguishing systems:
 Engine room: Semco low pressure CO₂ system
 Vehicle spaces: Semco low pressure CO₂ system
 Radars:
 Number: 2
 Make: Furuno
 Integrated bridge system:
 Make: Furuno
 Model:
 Contract date: 18 April 2008
 Launch/float-out date: 8 March 2009
 Delivery date: 19 May 2009

Tirranna, the fourth Wilhelmsen ship to carry the name, was delivered by Daewoo Shipbuilding & Marine Engineering Co. Ltd (DSME) on 19 May 2009.

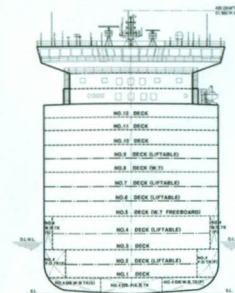
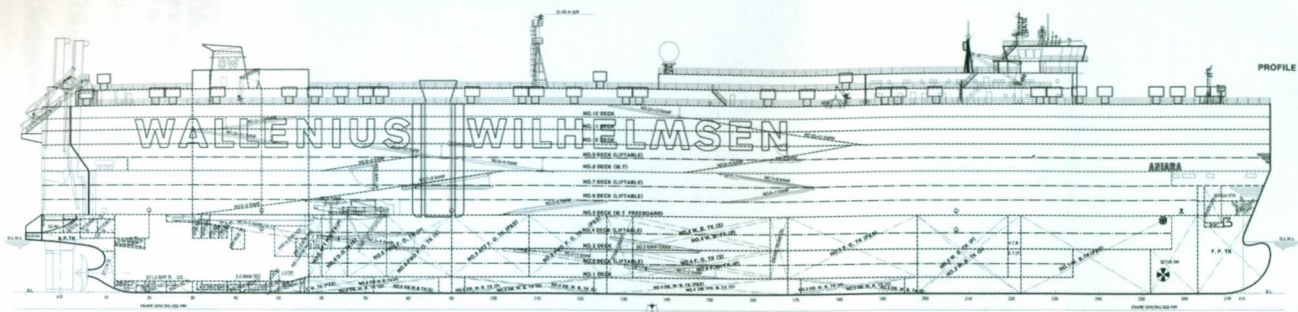
A roll-on/roll-off pure car truck carrier (PCTC) *Tirranna* has space for almost 8000 cars, making it one of the largest such vessels afloat. The ship was designed specifically for worldwide transport of rolling cargoes (cars, trucks and trailer-mounted cargo). It has 13 decks, of which five are divided into hoistable sections enabling the carriage of loads of various heights and four were designed specifically for heavy cargo units.

Cargo is handled via a wide stern ramp and a starboard side ramp. This permits simultaneous loading and discharging as required. A system of fixed and hoistable internal ramps provides good access to all cargo spaces.

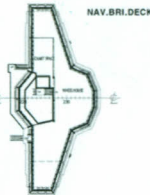
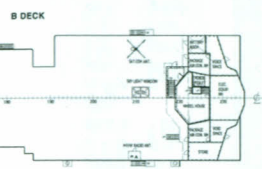
Power is provided by single MAN B+W 8S60ME-C diesel engine driving a 6.9m diameter fixed-pitch propeller for a service speed of 20.92knots at 80% of MCR. A bow thruster is fitted for improved in-harbour manoeuvrability.

Tirranna encompasses a number of environmental initiatives including:

- A Green Passport, issued by Lloyd's Register in accordance with International Maritime Organisation's (IMO's) Guidelines on Ship Recycling, 2003, listing all onboard materials and substances known to be potentially hazardous.
- A water ballast system arranged for later installation of a water ballast treatment system.
- Biodegradable oil is used in all hydraulic systems and in the stern-tube seal.
- The main and auxiliary engines are designed with an improved combustion process resulting in NOx significantly below current international requirements.
- Electronically controlled cylinder oil lubrication reduces the use of cylinder oil to a minimum.

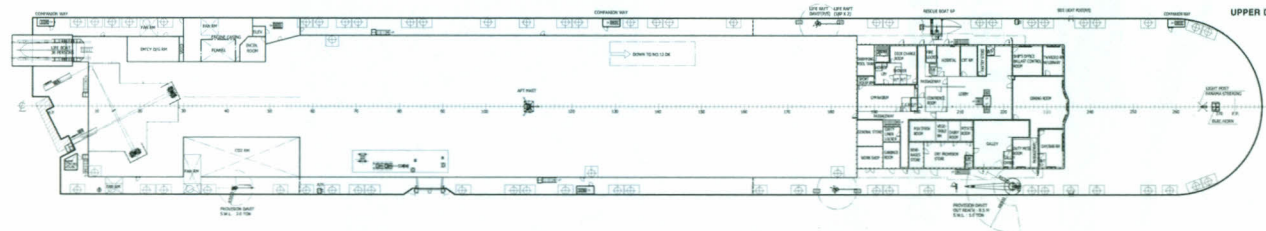
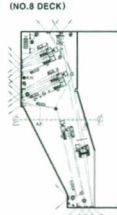


MIDSHIP SECTION



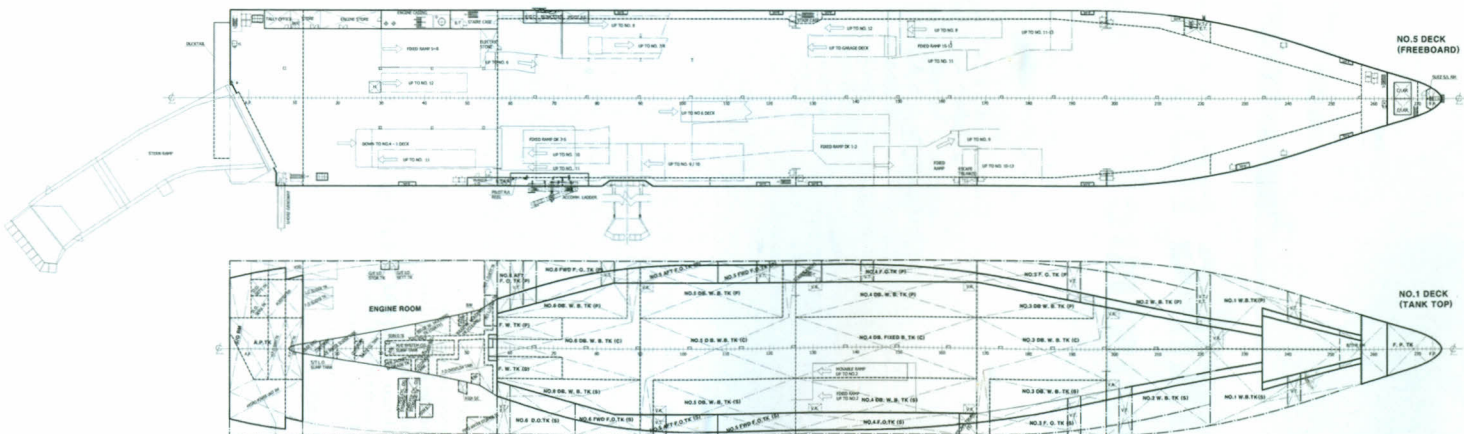
NAV. BRIDGE

AFT MOORING



UPPER DECK

FWD MOORING





VIKING POSEIDON: Large subsea construction vessel for Eidesvik

Shipbuilder: **Ulstein Verft AS**
 Vessel's name: **Viking Poseidon**
 Hull No: **281**
 Owner/Operator: **Eidesvik OCV KS/
 Eidesvik AS**
 Country: **Norway**
 Designer: **Ulstein Design AS**
 Country: **Norway**
 Model test establishment used: **HSVA,
 Hamburg**
 Flag: **Norway**
 IMO number: **9413535**
 Total number of sister ships already completed
 (excluding ship presented): **2**
 Total number of sister ships still on order: **1**

Viking Poseidon is an Ulstein SX121, a large subsea-construction vessel with the Ulstein X-Bow design. Constructed by Ulstein Verft AS for Eidesvik OCV KS, the vessel is 130m long and 25m wide with a deck area of approx 1600m². She is fitted out for 106 persons and her features include an ROV garage, helideck and a diesel electric propulsion system.

The personnel facilities on *Viking Poseidon* include five suites for senior client officers, and a variety of single, double and multiple cabins for client staff and crew. A project office and two client offices are also provided and a lift is fitted for handling passengers and stores between the main deck and the wheelhouse roof helideck. Propulsion is by a diesel electric system with stern-located azimuthing thrusters. Two tunnel bow-thrust units and two swing-up azimuthing thrusters are fitted for positioning and manoeuvrability. Post-delivery a 250tonnes offshore crane was fitted and the working deck is strengthened to carry 10tonnes/m².

"This large modern construction vessel will strengthen Eidesvik within the subsea sector. It is important for Eidesvik that this concept provides better safety and comfort for our employees, as well as being economical, with an expected reduction in fuel," said Eidesvik managing director, Jan Fredrik Meling.

"Eidesvik Offshore is an innovative shipowner that is known for adapting new solutions. We are, therefore, very happy that Eidesvik has chosen vessels with ULSTEIN X-BOW. Ulstein has great focus on continuous development of vessels for demanding marine operations. *Viking Poseidon* is an environmentally friendly and future oriented vessel. I believe both the shipowner, the crew and the clients will have vast pleasure of *Viking Poseidon*," said Ulstein Group CEO, Gunvor Ulstein.

Eidesvik signed a long-term contract with Veolia ES Special Services Inc. (USA) for *Viking Poseidon* in April 2008. The contract is for eight years with options. The ship will be a base for advanced ROV

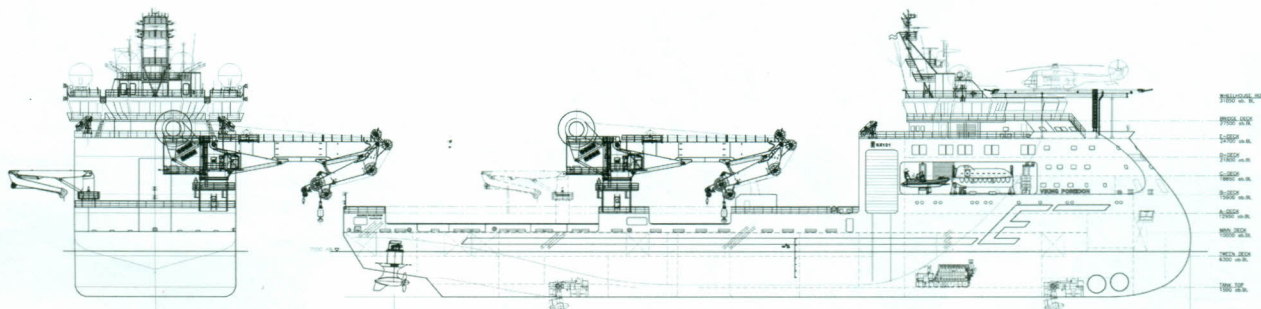
vehicles which will inspect and repair offshore installations in the Gulf of Mexico.

TECHNICAL PARTICULARS

Length oa: 130m
 Length bp: 122.1m
 Breadth moulded: 25.0m
 Depth moulded:
 to main deck: 10.0m
 to bridge deck: 27.5m
 to forecastle deck: 24.4m
 Width of double skin:
 side: 2.0m
 bottom: 1.5m
 Draught:
 scantling: 7.8m
 design: 7.0m
 Gross: 11,719gt
 Displacement: 18,256tonnes
 Lightweight: 6895tonnes
 Deadweight:
 Design: 9683dwt
 scantling: 11,361dwt
 Block co-efficient: 0.748 at 7.8m draft
 Speed, service: .. 14 knots at 80% MCR (15 knots at 100%)
 Bunkers:
 Diesel oil: 3.280m³
 Daily fuel consumption:
 Main engine only: 34.5tonnes/day (at service speed)
 Classification society and notations: Det Norske Veritas
 + 1A1 SF, E0, DYNPOS-AUTRO, NAUT-OSV,
 OPP-F, CRANE, CLEAN, COMF-V(3),
 COMF-C(3), DK(+), HELIDK-SH.
 Heel control equipment: 3 pumps x 800m³/h at 1.5 bar
 Roll-stabilisation equipment: .. Passive Roll reduction tanks.
 Propulsion Units:
 Number: 2
 Designer/Manufacturer: Rolls Rolls Azipull 120
 Propeller material: NiAlCu
 Propeller diameter: 3.0m
 Fixed/Controllable pitch: CPP
 Speed: 201rev/min
 Propulsion motors:
 Manufacturer: ABB
 Number: 2
 Model: AMI 560L6L BAFMH
 Output (each): 3500kW
 Main-engine driven alternators:
 Number: 6
 Engine make/type: MaK
 Type of fuel: MGO
 Output/speed of each set: 4 x 2700kW at
 720rev/min + 2 x 1450kW at 900rev/min
 Boilers:
 Number: 1
 Type: Series 5 type.
 Make: Pyro

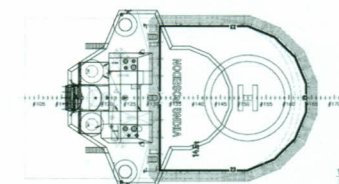
Output, each boiler: 750,000Kcal/h (3138MJ/h)
 Main Offshore Pedestal Crane:
 Number: 1
 Make: Macgregor Hydramarine
 Type: Knuckle jib crane
 Tasks: Heave compensated offshore crane
 Performance: 250tonnes at 9.0m radius,
 maximum working radius 35m.
 Cargo cranes/cargo gear:
 Number: 3
 Type: 2 folding cranes + 1 knuckle boom crane.
 Performance: 2 x 2.850tonnes at 10m
 + 1 x 10.0tonnes at 20m
 Mooring equipment:
 Number: 2 combined windlass/
 mooring winch + 1 x 12.5tonnes
 double mooring winch +
 2 x 12.5tonnes mooring winches
 Special lifesaving equipment:
 Lifeboats: 2 semi-enclosed (106 persons)
 Man-overboard boat: 1 davit launched (10 persons)
 Liferaft: 4 x 35 persons
 + 2 x 37 persons (davit launched)
 Cargo control system:
 Make: Ulstein IAS
 Ballast control system:
 Make: Ulstein IAS
 Complement:
 Officers / Crew: 106 in total
 Single/double/other rooms: 5 suites, 47 single,
 13 double, 7 four-person with two bedrooms
 Bow thrusters:
 Make: Rolls Royce
 Number: 3
 Output (each): 2 tunnels at 1800kW,
 1 swing-up at 1500kW
 Stern thrusters:
 Make: Rolls Royce
 Number: 1
 Output (each): 1 Swing-up at 1800kW
 Fire detection system
 Make: Stand alone addressable fire detection central
 Type: Tyco
 Fire extinguishing systems
 Engine room: Danfoss - Semco - Watertight
 Radars:
 Number: 2
 Make: Furuno
 Models: S-band and X-band ARPA radars
 Waste disposal plant
 Incinerator: Teamtec Model GS 500 C
 Waste compactor: Global Enviro Model W 320 NOR
 Sewage plant: Jets Vakum Model DVZ-100-SKA
 Contract date: 29 September 2006
 Launch/float-out date: 19 September 2008
 Delivery date: 13 January 2009

VIKING POSEIDON

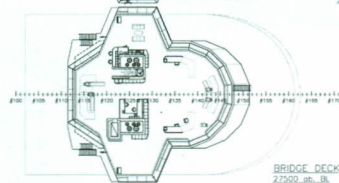


SEEN FROM AFT

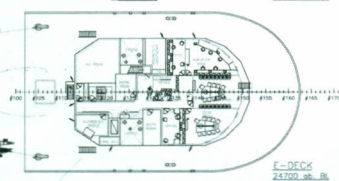
PROFILE



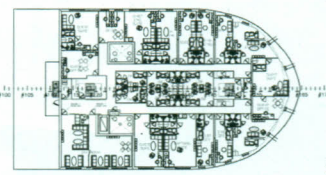
WHEELHOUSE ROOF
31050 sq. ft.



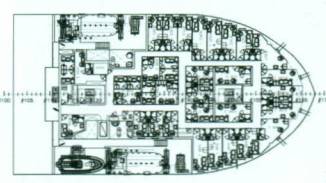
BRIDGE DECK
27500 sq. ft.



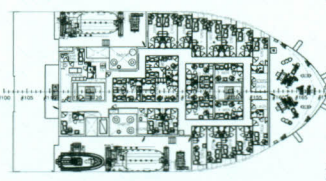
E-DECK
24700 sq. ft.



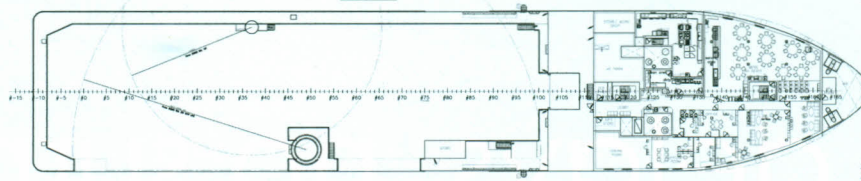
D-DECK
21800 sq. ft.



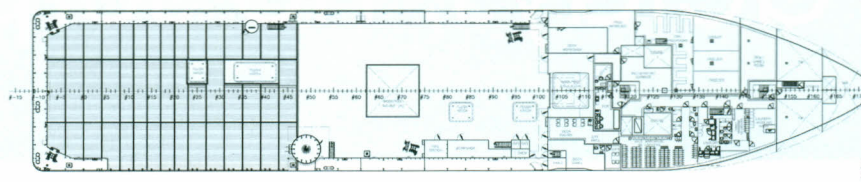
C-DECK
18850 sq. ft.



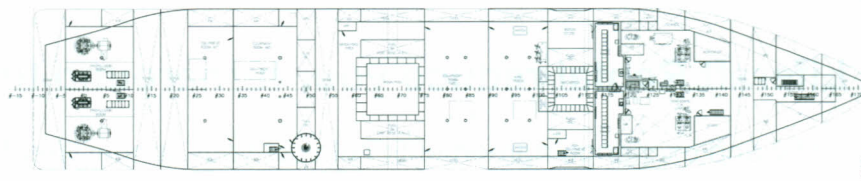
B-DECK
15900 sq. ft.



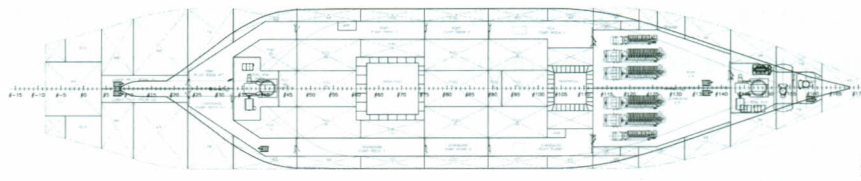
A-DECK
12950 sq. ft.



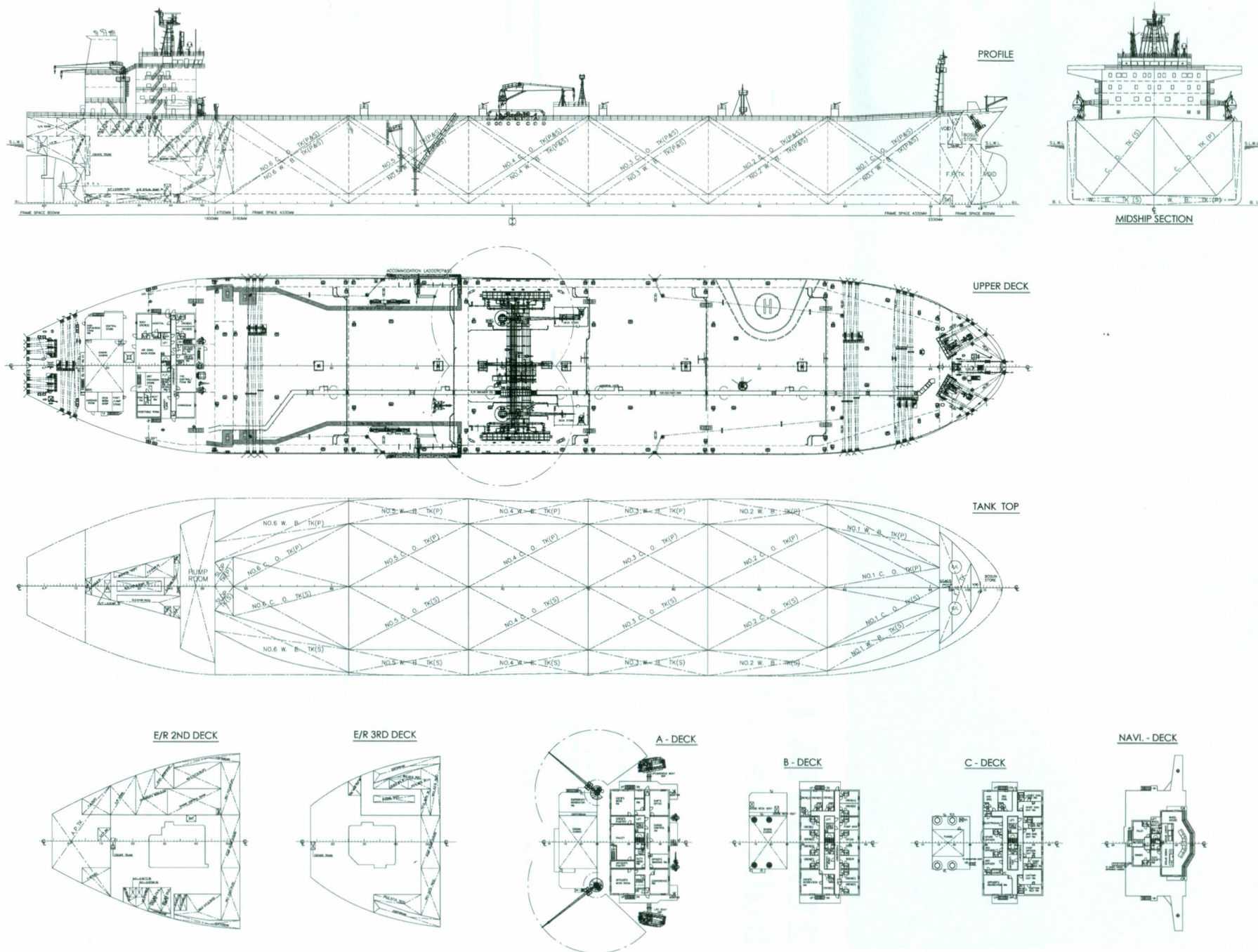
MAIN DECK
10000 sq. ft.



TWEEN DECK
6300 sq. ft.



TANK TOP
1500 sq. ft.



SIGNIFICANT SHIPS OF 2010

A publication of The Royal Institution of Naval Architects

The twenty-first edition of our annual Significant Ships series, *Significant Ships of 2010*, will be published in February 2011. As in previous editions we shall be including up to 50 of the most innovative and interesting commercial ship designs (of mostly 100m length and above) which will be delivered during the forthcoming year.

The Editor invites shipbuilders, designers and owners to submit details of vessels for possible inclusion in *Significant Ships of 2010*. Presentation will follow on the established two-page format, with a colour photograph, descriptive text and tabular details (including major equipment suppliers) on the first page, followed by a full page of technical general arrangement plans. Initial potential entries should comprise a short technical description (100 words) of the proposed vessel highlighting the special features and the delivery date.

All entries should be addressed to:

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Tel: +44 (0) 20 7235 4622 Fax: +44 (0) 20 7245 6959 Email: editorial@rina.org.uk

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