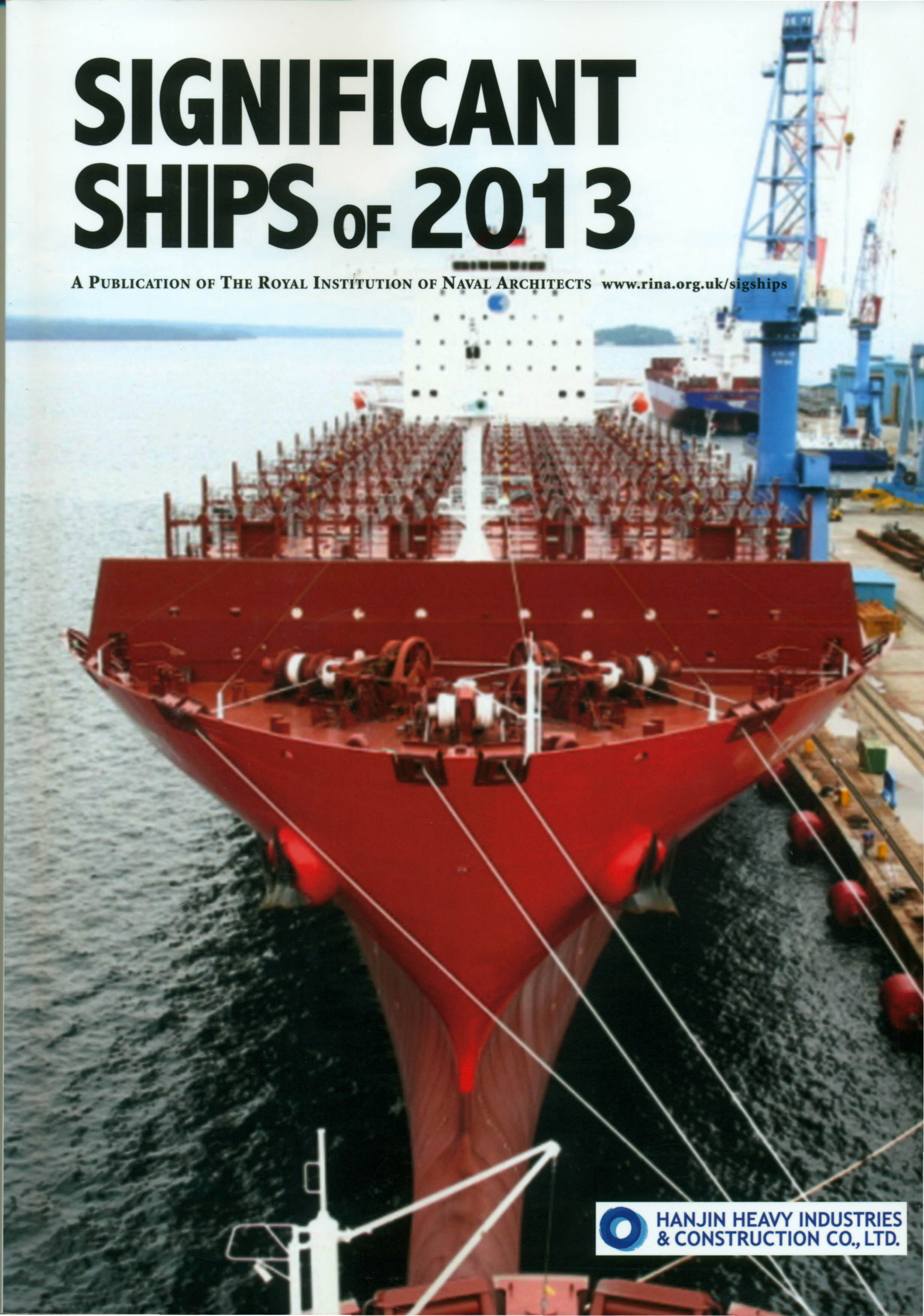


SIGNIFICANT SHIPS OF 2013

A PUBLICATION OF THE ROYAL INSTITUTION OF NAVAL ARCHITECTS www.rina.org.uk/sigships



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SIGNIFICANT SHIPS OF 2013

The continued growth of environmentally friendly ships has kept up the pace throughout 2013, therefore, many of the ships in this year's publication sport some form of green design feature. With pressure coming from the regulators to clean up shipping, innovative technology has been incorporated in many of the designs that we see being launched today.

LNG is pitched as being the fuel of the future with engine manufacturers now focusing on this fuel as well. 2013 has seen two of the leading manufacturers announce their latest dual fuel LNG engine designs on to the market. However, even with the technology development for this fuel picking up fast, shipowners remain hesitant to make the switch due to logistical problems of bunkering that have still not been fully resolved and which leave LNG in the same position as the chicken and the egg – that is which came first?

Further questions still remain over the future success of LNG for vessels that trade globally, but Norway and the Scandinavian countries are making LNG work for their market.

In this year's publication we see the launch of two LNG ferries for this region *Viking Grace* and *Stavangerfjord*. *Viking Grace* is the largest LNG passenger ferry to be launched and is also aimed at showing how LNG can be applied to larger vessels. *Viking Grace* uses four 8-cylinder dual fuel engines that are supplied with LNG from two 200m³ fuel tanks located at the aft of the vessel on the open deck. The vessel operates on a route from Stockholm, Sweden to Turku, Finland and is bunkered in Stockholm by the bunker ferry *Seagas*.

However, for those owners that are not totally convinced by LNG, other solutions are also on the market such as MGO distillate fuel, scrubber systems and exhaust gas recirculation (EGR) systems that will also help cut energy consumption and clean up ships' emissions.

It was reported that the latest leviathan of the seas *Maersk Mc-Kinney Moller* the first 18,000TEU Triple E design was to have a waste heat recovery (WHR) system fitted in order to save on energy consumption.

However, the most important feature about this ship is its size. Size it seems does still matter, last year we featured the *CMG CMA Marco Polo* that at the time was the largest vessel, but it has been superseded by the Triple E ships. At a time when the market is

still recovering from the global recession, questions have been posed as to the necessity of such large ships. But, since the launch of the first Triple E further orders for 18,000TEU vessels have been made from China and the Arab Emirates.

The Triple E design developed by Maersk stands for economy of scale, energy efficiency and environmentally improved. Based on these key elements the Triple E design is expected to emit 20% less CO₂ than *Emma Maersk*. Maersk plans to use the ships to service routes between Europe and Asia, projecting that Chinese exports will continue to grow.

New environmentally friendly bulk carrier designs have also emerged in 2013 such as the first Dolphin 64 and B.Delta designs being launched. The first B.Delta 37, *Wuchang*, developed by Deltamarin, Finland was launched late 2013, its design focused on lower fuel consumption and additional cargo deadweight and cargo cubic volume compared to the best current designs. *Amber Champion* was launched in March 2013 and is another example of a green bulk carrier that was designed by Germanischer Lloyd (GL) (now DNV GL) and Shanghai Design and Research Institute (SDARI). Both these vessels were also constructed in China, with the country still dominating in the shipbuilding sector in 2013.

This year has also featured more Japanese built vessels than in recent years. Japan has picked up the gauntlet when it comes to green shipping and has been researching green solutions to environmental problems.

Japan Marine United (JMU) which was formed at the very start of 2013 between Universal Shipbuilding and IHIMU, saw its first vessel launched in January, *Kaimon Maru*, which has been fitted with a fuel-efficient Wärtsilä 6RTA58T-D. The vessel also features other energy saving features on its propulsion such as a low viscous resistance fin and an additional thrusting fin.

JMU has also been working on eco-ship designs. *Cape Green* is the first one of JMU's latest 'G Series' (green ship series) to be delivered. JMU expects that the vessel will achieve a 25% reduction in environmental loads and 25% reduction in fuel consumption through its optimised design and environmental innovations.

Shipbuilding in 2013 has been very successful with a number of yards able to

showcase their latest technological developments in the market place, but with a slow recovery from the recession will it be enough to drive more of these vessels on to the water during 2014? The answer to such a question, for now, remains elusive.

Finally, the Royal Institution of Naval Architects would like to thank all of those who have made this publication possible, especially the builders and owners who have given their time to supply the information found in this magazine. We thank you all for your support and help and look forward to contacting you again for Significant Ships 2014.

Samantha Fisk
Associate Editor
January 2014

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 2013* can be found in the following editions of The Royal Institution of Naval Architects' publication, *The Naval Architect*:

Almetjevsk – July/Aug
Greenstream – October
Kaimon Maru – November
Maersk McKinney Moller – June
Norwegian Breakaway – September
SVL Liberty – July/Aug
Viking Grace – February



ALMETYEVSK: Eco inland tanker

Shipbuilder: **PHC, Zelenodolsk, Russia**
 Vessel's name: **Almet'yevsk**
 Hull No: **271**
 Owner/operator: **AK BARS Leasing**
 Country: **Russia**
 Designer: **Marine Engineering Bureau (MEB)**
 Country: **Russia**
 Model test establishment used: **Odessa National Maritime University basin and Krylov Shipbuilding Research Institute**
 Flag: **Russia**
 IMO number: **9621558**
 Total number of sister ships already completed (excluding ship presented): **1**
 Total number of sister ships still order: **nil**

ALMETYEVSK is the latest 'ECO' class oil river-sea tanker designed by the Russian-based Marine Engineering Bureau (MEB) and constructed by PHC, Zelenodolsk, Russia. The vessel is a one off build, which was delivered in March.

Almet'yevsk has been designed as part of the latest 'New Volgoneft' design, which is intended to replace the ex-Soviet Union series of 'Volgoneft' non-MARPOL type tankers. The latest design has a significantly higher standard of overall hull strength and more powerful main engines, which ensure a higher level of navigational safety.

The design has an optimised hull form and hull structure for mixed river-sea navigation, which allows it to reach 6,640dwt at sea (draught 4.175m) and 5,160dwt in river conditions with a limited draught of 3.60m. In comparison with the 'Volgoneft' type tankers, which are less than 320dwt in river conditions and 1,810dwt at sea, which have navigational restrictions on their wave height of 2.5m compared to that of a wave height of 6.0m for the 'New Volgoneft' design. The main dimensions of the tanker have been maximised as much as possible to allow it to pass through the Volgo-Don Channel.

The vessel is a universal tanker designed for carrying crude oil and petroleum products, including benzine without restrictions on the flash-point, meaning the temperature of the carried cargo is up to 60°C and can also provide simultaneous carriage of two types of cargo.

Almet'yevsk is classed to navigate in area R2-RSN (according to the Russian Maritime Register of Shipping) allowing the vessel to operate in closed Seas 100 miles from a place of refuge with an allowable distance between the places of refuge that is not greater than 200 miles and operate in the internal waterways of Russia with limited draughts as well as in the Azov and Caspian Seas.

The vessel has a double hull structure that is increased by an equivalent depth of the hull through the application of the trunk deck to minimise the structure inside the cargo tanks without adding a centreline (CL) bulkhead. The ship's motion and manoeuvrability is provided by two fully rotating rudder propellers with fixed pitch propellers in nozzles and a bow tunnel thruster.

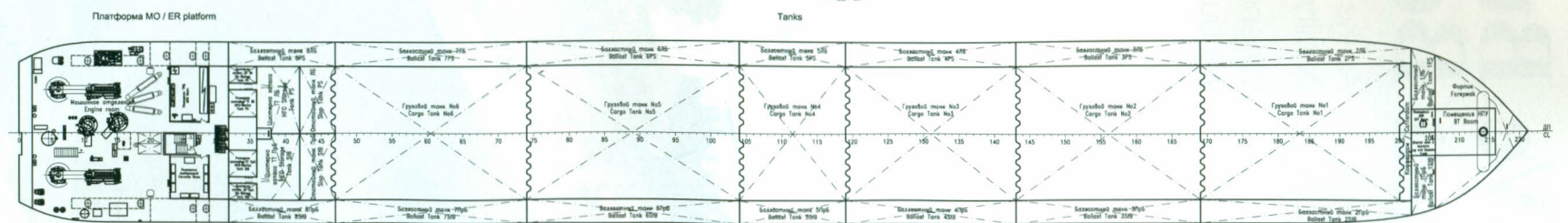
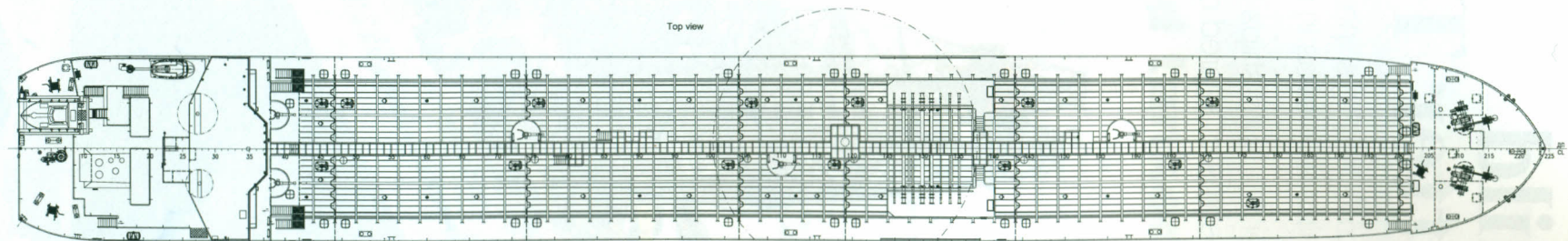
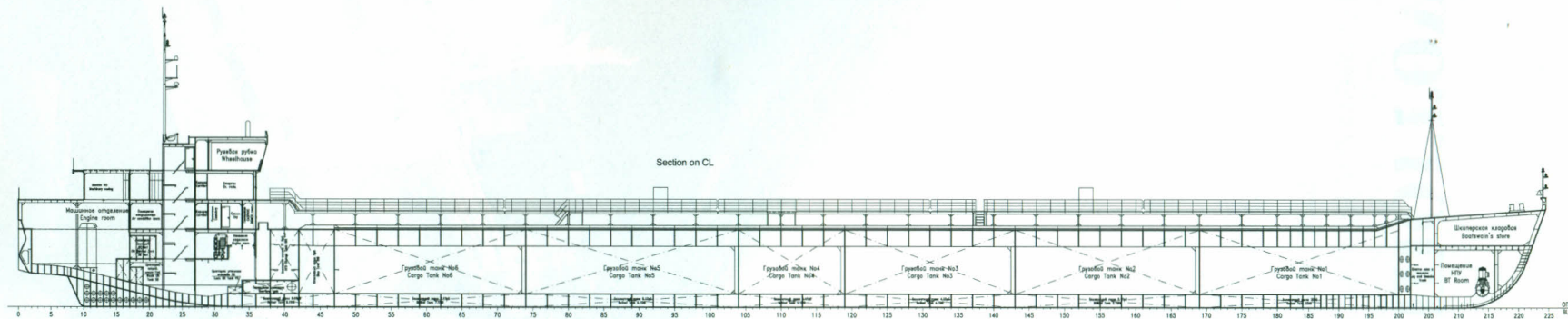
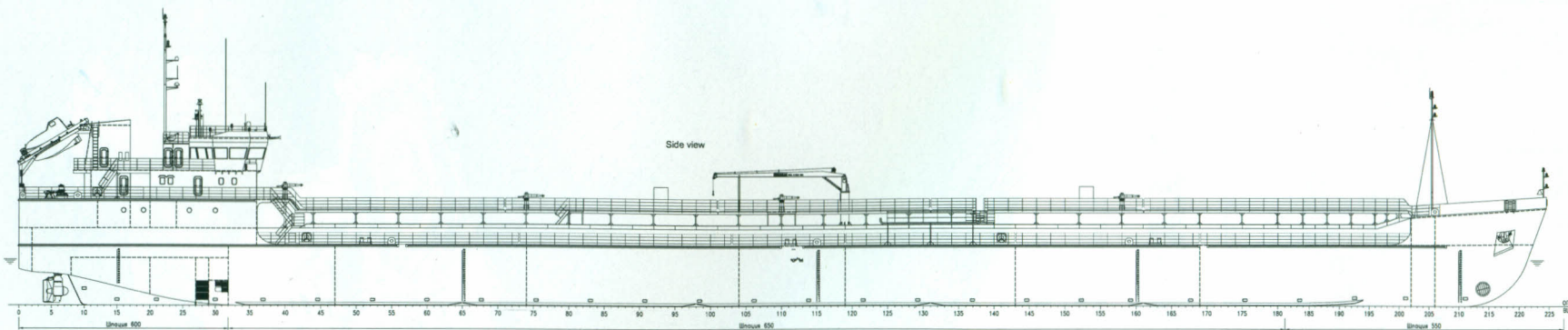
Almet'yevsk is powered by a Wärtsilä 6L20 that has a power output of 1,200kW giving the vessel a service

speed of 10.5knots at 85% MCR. The vessel has a sailing range of 4,000 miles. Automation of the tanker also allows for its operation with unattended machinery spaces and one man bridge operation.

TECHNICAL PARTICULARS

Length oa: 139.99m
 Length bp: 138.24m
 Breadth moulded: 16.60m
 Depth moulded
 To main deck: 5.50m
 Width of double skin
 Side: 2.18m
 Bottom: 1.20m
 Draught
 Design: 4,175m (at sea)
 3.6m (in river)
 Gross: 4,531gt
 Displacement: 8,819tonnes
 Lightweight: 2,178tonnes
 Deadweight
 Design: 6,640dwt (at sea)
 5,159dwt (in river)
 Block co-efficient: 0.898
 Speed, service: 10.5knots
 Cargo capacity
 Liquid volume: 6,690m³
 Bunkers
 Heavy oil: 297m³
 Diesel oil: 34m³
 Water ballast: 4,349m³
 Daily fuel consumption
 Main engine only: 8tonnes/day
 Auxiliaries: 0.5tonnes/day
 Classification society and notations: **RS*KMlce 1, R2-RSN, AUT1-ICS, OMBO, VCS, ECO, Oil tanker (ESP)**
 Main engine
 Model: 6L20
 Manufacturer: Wärtsilä
 Number: 2
 Type of fuel: HFO
 Output of each engine: 1,200kW
 Rudder propellers
 Make: Schottel
 Model: SRP1012FP
 Number: 2
 Output/speed: 307rpm
 Propellers
 Number: 2
 Fixed/controllable pitch: Fixed
 Diameter: 1.9m
 Speed: 307rpm
 Diesel-driven alternators
 Number: 3
 Engine make/type: Liag/MAN D 2876 LE 301
 Type of fuel: MDO
 Output/speed of each set: 292kW
 Boilers
 Number: 2

Type: CHB-2000
 Make: Aalborg
 Output, each boiler: 2tonnes/h, 0.7MPa
 Other cranes
 Number: 1
 Make: Gurdesan
 Type: GD-HK 2/12
 Tasks: Manifold crane
 Performance: Flame-proof construction
 Mooring equipment
 Number: 2 x Anchor-mooring winch
 1 x Anchor-mooring capstan
 Make: Adria Winch
 Type: Electro-hydraulic
 Special lifesaving equipment
 Number of each and capacity: 1 x 16 persons
 Make: Davit International
 Type: JY-FF-4.90
 Cargo tanks
 Number: 6 + 2
 Product range: Crude oil and petroleum products
 Cargo pumps
 Number: 6
 Make: Marflex
 Capacity: 150m³/h, 0.96MPa
 Cargo control system
 Make: Valcom
 Type: TSS/Control
 Ballast control system
 Make: Valcom
 Type: TSS/Control
 Complement
 Crew: 9
 Stern appendages/special rudders: 2 full revolving rudder propellers with fixed-pitch propellers in nozzles SRP-1012FP "Schottel"
 Bow thruster
 Make: Schottel
 Number: 1
 Output: 230kW
 Bridge control system
 Make: Northrup Grumman Sperry marine
 One-man operation: Yes
 Fire detection system
 Make: Autronica
 Type: BX40
 Radars
 Number: 2
 Make: Northrup Grumman Sperry Marine
 Model: Visionmaster FT, ECAT2 25 - Radar Systems
 Integrated bridge system
 Make: Valcom
 Model: TSS
 Launch/float-out date: 13 June 2012
 Delivery date: 15 March 2013





AMBER CHAMPION: First Dolphin 64 design delivered from Chengxi

Shipbuilder: **Chengxi Shipyard Co., Ltd**
 Vessel's name: **Amber Champion**
 Hull No: **CX0601**
 Owner/operator: **Ray Champion Shipping**
 Country: **Hong Kong, China**
 Designer: **Shanghai merchant Ship Design & Research Institute (SDARI)**
 Country: **China**
 Model test establishment used: **HSVA**
 Flag: **Hong Kong**
 IMO number: **9637210**
 Total number of sister ships already completed (excluding ship presented): **1**
 Total number of sister ships still on order: **nil**

Adequate ballast water capacity is provided in the double sides and double bottom. The cargo holds are equipped with compressed air, power and wash water supply. Wash water holding tanks are included for the storage of clean and dirty cargo hold wash water. The concept design features a ballast water treatment system as well as holding tanks and a treatment system for sewage and bilge water.

Amber Champion is further equipped with wide foldable double-skin steel hatch covers and four energy efficient fully electric deck cranes with variable frequency drive that are of 30tonnes and 30m outreach. The mooring systems and windlass are also electrically driven. The stern tube bearing features water lubrication instead of oil.

THE Dolphin 65 concept design was developed by DNV GL and SDARI for a new eco-friendly handymax design. The concept has now become a reality in the form of *Amber Champion* that was constructed at Chengxi Shipyard, China for Ray Champion Shipping.

Amber Champion is a five-cargo-hold CSR double-hull bulk carrier with a large cubic volume and deadweight capacity of 63,800dwt, an 11% increase from 57,000dwt. The high transport capacity in combination with low fuel consumption and operational strengths such as no designated cargo hold for ballast water is expected to give the vessel a significant advantage in today's challenging market according to the company.

The hull is designed to achieve optimal fuel efficiency without compromising on strength and operational flexibility. For this the hull has been optimised with finer hull lines. The propulsion efficiency has also been increased through the fitting of a wake-equalising duct in front of a large-diameter, slow-rotating propeller. A rudder transition bulb and rudder fins reduce the hub vortex and recover some of the rotational losses.

Amber Champion is fitted with an efficient, Tier II compliant, Wärtsilä two-stroke low-speed main engine, a 5RT-flex50-D. Several fuel tanks for different fuel grades ensure sufficient capacity and flexibility to carry a combination of HFO, low sulphur fuel/ distillates as required, as well as allowing strategic fuel purchasing.

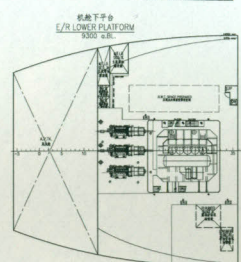
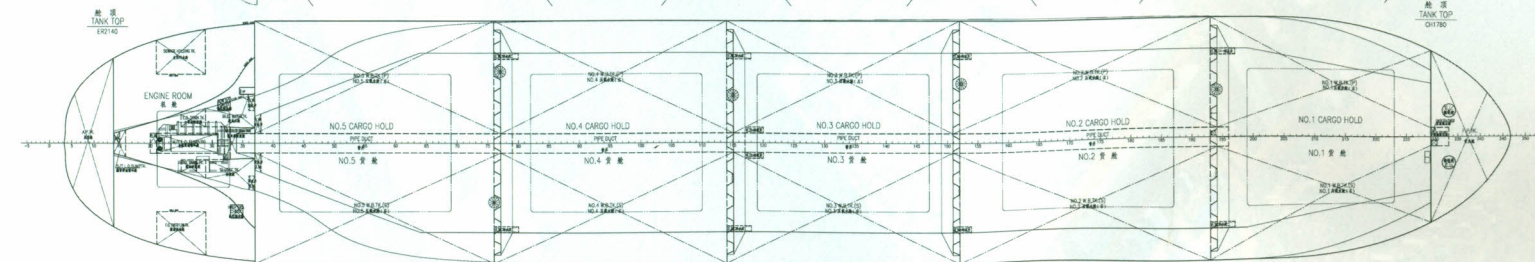
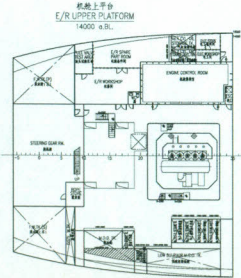
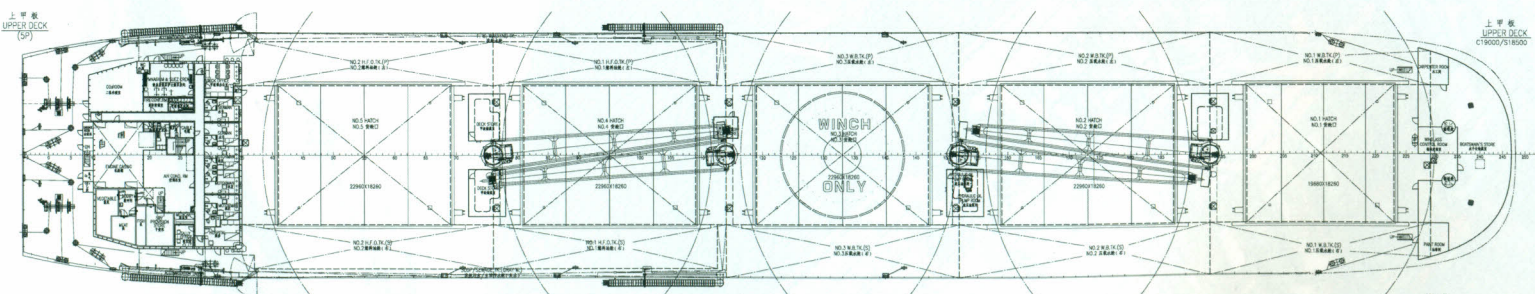
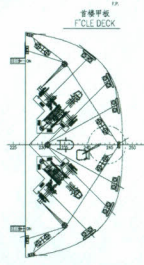
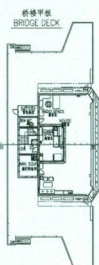
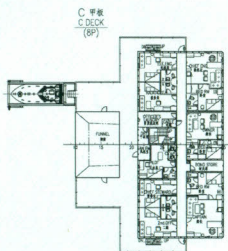
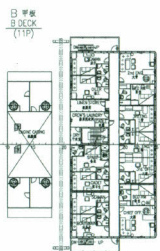
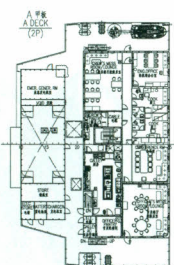
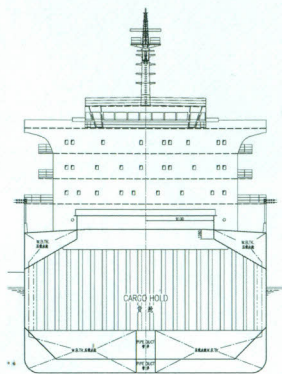
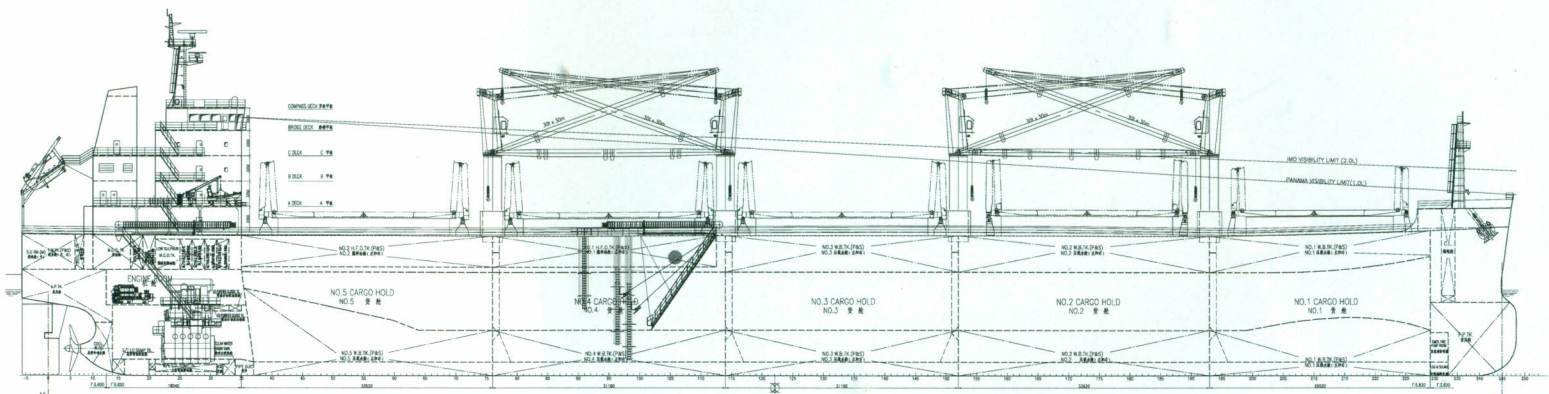
The daily main engine fuel consumption at 14knots at CSR with a 15% sea margin and 9.5m draught is 17.7tonnes (ISO Ambient Conditions, LCV=42,700 kJ/kg). The attained Energy Efficiency Design Index (EEDI) is more than 20% less than the required index set by the IMO reference line for bulk carriers, thus meeting the 2020 requirement.

The double hull with flush cargo holds (no hopper or top wing tanks in cargo holds 2, 3 and 4) and wide hatch openings improve the loading/discharge operations and facilitate the easy cleaning of the holds, thereby improving the port turnaround time. All fuel oil tanks are arranged aft of the forward engine room A-60 bulkhead, which means no fuel oil tanks are adjacent to cargo holds, making the ship suitable for carrying a wider range of dangerous bulk and package cargoes.

TECHNICAL PARTICULARS

Length oa: 199.85m
 Length bp: 194.50m
 Breadth moulded: 32.26m
 Depth moulded
 To main deck: 18.50m
 To upper deck: 18.50m
 Draught
 Scantling: 13.30m
 Design: 11.30m
 Gross: 36,332gt
 Displacement: 75,196tonnes
 Lightweight: 11,671tonnes
 Deadweight
 Design: 51,099dwt
 Scantling: 63,525dwt
 Block co-efficient: 0.877
 Speed, service: 14.48knots
 Cargo capacity
 Bale: 73,680m³
 Grain: 78,771m³
 Bunkers
 Heavy oil: 2,018m³
 Diesel oil: 242m³
 Water ballast: 17,705m³
 Daily fuel consumption
 Main engine: 27.3tonnes/day
 Auxiliaries: 3.1tonnes/day
 Classification society and notations: DNV +1A1
 Bulk Carrier, ESP, ES(S), CSR, Nauticus (Newbuilding), COAT-PSPC(B) BC-A (Holds No 2&4 may be empty), Grab(20), E0, TMON, BIS
 % high-tensile steel used in construction: 82%
 Main engine
 Design: MAN B&W
 Model: 5S60ME-C8.2
 Manufacturer: Hyundai
 Number: 1
 Type of fuel: HFO, MDO, MGO
 Output of each engine: 8,050kW x 89rpm
 Propellers
 Material: Ni-Al-Bronze, CU3

Designer/manufacturer: CSSRC
 Number: 1
 Fixed/controllable pitch: Fixed
 Diameter: 6.7m
 Diesel-driven alternators
 Number: 3
 Engine make/type: 5DK-20e
 Type of fuel: HFO, MDO, MGO
 Output/speed of each set: 700kW x 900rpm
 Alternator make/type: Siemens E/1FC5
 Output/speed of each set: 616kW x 900rpm
 Boilers
 Number: 1
 Type: CMB-VS
 Make: Saake
 Output, each boiler: 1,500/750kg/h
 Cargo cranes/cargo gear
 Number: 4
 Make: Masada-Mitsubishi
 Type: Hydraulic deck crane
 Performance: 30tonnes x 30m
 Mooring equipment
 Number: 2 x combined windlass
 2 x mooring winch
 Make: Masada
 Type: Electric-hydraulic
 Special lifesaving equipment
 Number of each and capacity: 1 x 26 persons
 Make: Jiangyinshi Beihai LSA
 Type: Freefall lifeboat
 Hatch covers
 Design: TTS
 Manufacturer: TTS
 Type: Folding type hatch cover
 Water ballast treatment system
 Make: BSKY
 Capacity: 2 x 1,000m³
 Complement
 Crew: 13
 Bridge control system
 Make: JRCS
 Fire detection system
 Make: Tyco
 Type: Addressable type
 Fire extinguishing systems
 Cargo holds: CO₂
 Engine room: CO₂
 Cabins & public spaces: Water
 Radars
 Number: 2
 Make: JRC
 Model: NKE-1125, NKE-1139
 Waste disposal plant
 Incinerator: Hunsun/ HSINC-50A
 Sewage plant: Luzhou/ STC-2
 Contract date: 3 August 2011
 Launch/float-out date: 31 October 2012
 Delivery date: 28 March 2013





APL TEMASEK: Large eco-friendly box ship

Shipbuilder: **Hyundai Samho Heavy Industries Co., Ltd**
 Vessel's name: **APL Temasek**
 Hull No.: **S630**
 Owner/operator: **Neptune Orient Line**
 Country: **Singapore**
 Designer: **Hyundai Samho Heavy Industries Co., Ltd**
 Country: **Korea**
 Model test establishment used: **Hyundai Maritime Research Institute (HMRI)**
 Flag: **Singapore**
 IMO number: **9631955**
 Total number of sister ships already completed (excluding ship presented): **6**
 Total number of sister ships still on order: **3**

APL Temasek is the first in the series of 10 13,900TEU container carriers ordered by Neptune Orient Lines (NOL). The vessel constructed at Hyundai Samho Heavy Industries Co., Ltd (HSHI) is the one of the largest and most environmentally friendly vessels constructed for the NOL fleet, which was delivered in March.

The delivery of NOL's first 14,000TEU ship comes on the heels of 10 new 10,000TEU ships which joined the fleet between 2011 and 2012. These newbuildings are part of a US\$4 billion fleet renewal programme aimed at lowering NOL's slot costs. They are replacing older, less efficient ships that are either being sold or returned to charter owners.

The 14,000TEU series of ships feature several innovations that improve operational efficiency. For example, its S-type long-stroke main engine is equipped with electronic fuel injection which is optimised to operate at various loads efficiently. An X-Twisted Rudder has been fitted that will allow the vessel to increase its propulsion performance.

In addition, its specially designed bow and broader hull form improve the operating efficiency at various speeds, especially for slow steaming. NOL estimates that with the new design, it is able to improve fuel efficiency by about 20% to 30% per TEU for a speed range of 15-18knots, compared to previous designs.

By consuming less fuel, this new series of ships will also emit less carbon emissions. Its fuel efficiency, measured by the Energy Efficiency Design Index (EEDI), is certified to be 33% better than guidelines set by the International Maritime Organization (IMO). DNV has also verified the results which shows that the vessel also meets with the phase 3 EEDI required value.

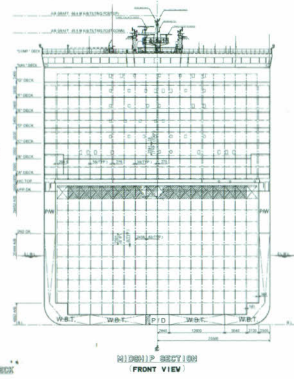
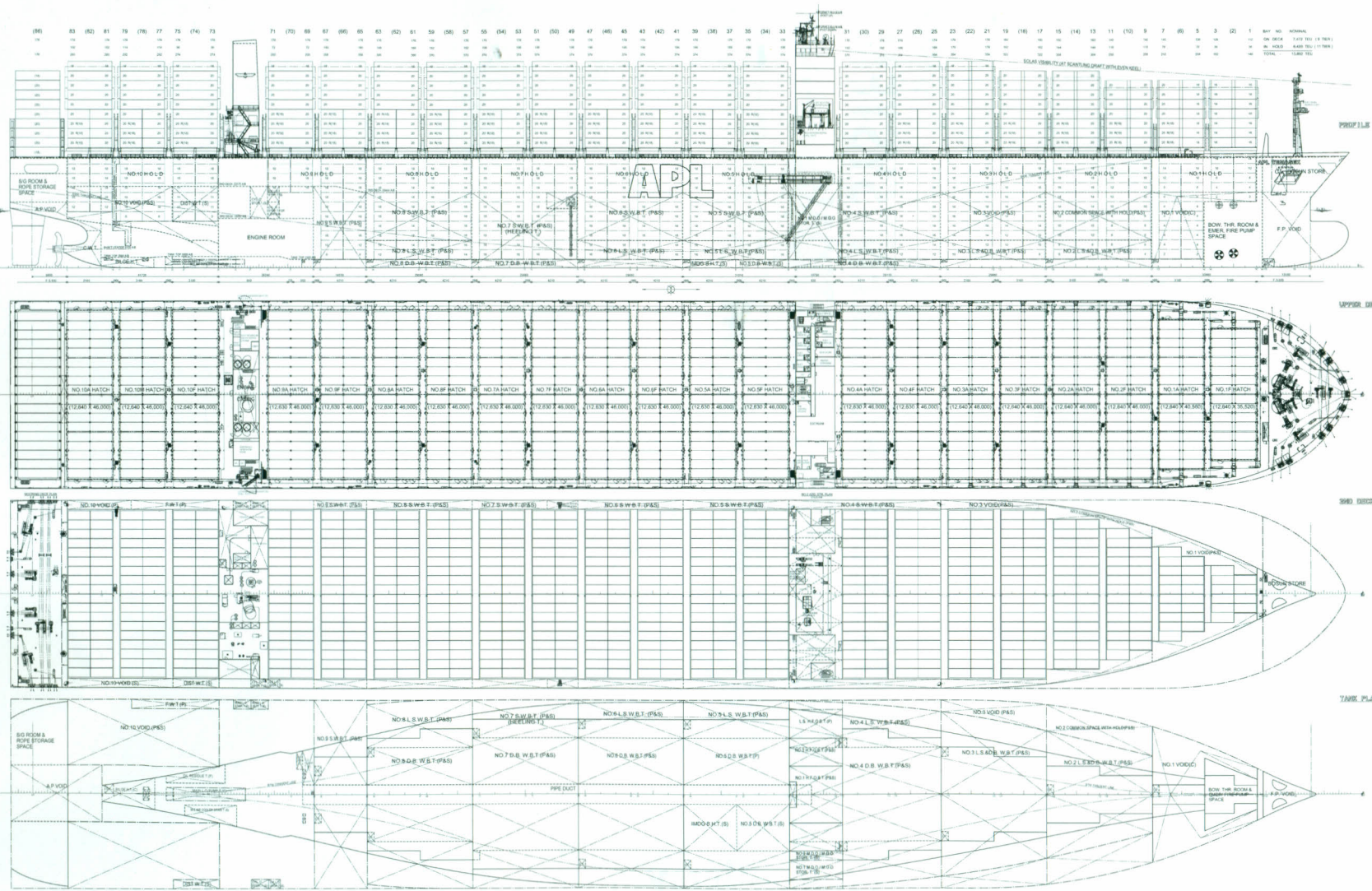
Added to this APL Temasek is equipped with a Hyundai Heavy Industries (HHI) HiBallast ballast water treatment system, which has a capacity of 1,000m³. An energy efficiency management system, Bluetracker & Bluewave, have also been installed to monitor and optimise the operation of the vessel.

Crew safety is an important factor for NOL and with this in mind APL Temasek has been designed as an anti-piracy feature, such as a full-beam type of enclosed accommodation to prevent pirates getting onboard.

TECHNICAL PARTICULARS

Length oa: 368.82m
 Length bp: 352.00m
 Breadth moulded: 51.00m
 Depth moulded
 To main deck: 29.85m
 To upper deck: 29.85m
 To other decks: 20.44m
 Width of double skin
 Side: 2.50m
 Bottom: 2.30m
 Draught
 Scantling: 15.50m
 Design: 14.50m
 Gross: 151.963gt
 Displacement: 195,751tonnes
 Lightweight: 45,585tonnes
 Deadweight
 Design: 134,362dwt
 Scantling: 150,166dwt
 Block co-efficient: 0.6845
 Speed, service: 22.60knots
 Bunkers
 Heavy oil: 11,673m³
 Diesel oil: 2,517m³
 Water ballast: 36,239m³
 Daily fuel consumption
 Main engine only: 217tonnes/day
 Auxiliaries: 20tonnes/day
 Classification society and notations: DNV, +A1, Container Carrier, E0, Nauticus (Newbuilding), BIS, TMON, BWI-T, CLEAN, COAT-PSPC(B)
 % high-tensile steel used in construction: 63%
 Heel control equipment: Anti-heeling pump
 Main engine
 Model: 11S90ME-C9.2
 Manufacturer: HHI-EMD
 Number: 1

Type of fuel: HFO, MDO
 Output of each engine: 62,030kW x 83rpm
 Propellers
 Material: Ni-Al-Bronze
 Designer/manufacturer: HHI-EMD
 Number: 1
 Fixed/controllable pitch: Fixed
 Diameter: 9.9m
 Speed: 83rpm
 Diesel-driven alternators
 Number: 4
 Engine make/type: HHI-EMD/ 9H32/40, HHI-EMD/8H32/40
 Type of fuel: HFO, MDO
 Output/speed of each set: 3,800kW x 720rpm, 4,300kW x 720rpm
 Alternator make/type: HHI-EES/HSJ7 915-10P, HHI-EES/HSJ7 809-10P
 Output/speed of each set: 3,360kW
 Boilers
 Number: 1
 Type: Forced draft, HFO burning marine boiler
 Make: Kangrim
 Output, each boiler: 5,500kg/h
 Other cranes
 Number: 1
 Make: Oriental
 Type: Electric driven
 Tasks: Accommodation/ machinery space/ engine room service
 Performance: 12.5tonnes
 Mooring equipment
 Number: 2 x windlass, 8 x winches
 Make: Aker
 Type: Electric, frequency controlled
 Special lifesaving equipment
 Number of each and capacity: 2 x 45 persons, 2 x 6 persons, 2 x 20 persons, 2 x 25 persons
 Make: Norsafe/ Viking
 Type: Lifeboat/liferaft
 Hatch covers
 Design: Seohae Marine Systems
 Manufacturer: Seohae Marine Systems
 Type: Pontoon, non-sequential operation
 Containers
 Lengths: 20ft/40ft/45ft
 Heights: 8' 6" 9' 6"
 Total TEU capacity: 13,892
 On decks: 7,472
 In holds: 6,420
 Homogenously loaded: 9,630
 Reefer plugs: 1,200
 Tier/rows
 On deck: 9 tiers/20 rows
 In holds: 11 tiers/ 18 rows
 Ballast control system
 Make: Hyundai Heavy Industries
 Type: Electro-hydraulic
 Water ballast treatment system
 Make: Hyundai Heavy Industries
 Capacity: 1,000m³/h
 Complement
 Crew: 12
 Stern appendages/special rudders: X-twisted leading edge
 Bow thrusters
 Make: Hyundai Heavy Industries
 Number: 2
 Output: 1,800kW
 Bridge control system
 Make: Hyundai Heavy Industries
 Type: Self-standing piano type
 One-man operation: Yes
 Fire detection system
 Make: Consilium Marine
 Type: Smoke, thermal, flame detecting type
 Fire extinguishing systems
 Cargo holds: NK/ CO₂
 Engine room: NK/ CO₂
 Cabins/ public spaces: Seawater
 Radars
 Number: 2
 Make: Sperry Marine
 Model: CATJ34
 Waste disposal plant
 Incinerator: HMM/ DH 160 E2
 Sewage plant: II Seung/ ISS-35N, ISS-60N
 Contract date: 23 June 2011
 Launch/float-out date: 4 January 2013
 Delivery date: 14 March 2013





BAHRI ABHA: Modern con-ro design

Shipbuilder: **Hyundai Mipo Dockyard Co., Ltd**
 Vessel's name: **Bahri Abha**
 Hull No.: **8085**
 Owner/operator: **Bahri (National Shipping Company of Saudi Arabia)**
 Country: **Saudi Arabi**
 Designer: **Hyundai Mipo Dockyard Co., Ltd**
 Country: **Korea**
 Model test establishment used: **SSPA Sweden**
 Flag: **Saudi Arabia**
 IMO number: **9620944**
 Total number of sister ships already completed (excluding ship presented): **2**
 Total number of sister ships still on order: **3**

BAHRI Abha, the first in six container/ro-ro (con-ro) carriers, was designed by Knud E. Hansen and built at Hyundai Mipo Dockyard Co., Ltd. HMD), which was delivered to its owner Bahri (NSCSA) in February 2013.

As part of the rebranding of NSCSA, Bahri as it is now known, has ordered these six latest vessels to further expand the fleet and to also renew it. Sporting the new blue livery *Bahri Abha* will be replacing the vessel *Saudi Abha*. The latest series will also offer a different cargo structure compared to the previous con-ro vessels, which had the capacity for 2,310 TEU. *Bahri Abha* has a reduced capacity of 364 TEU, but has increased its ro-ro capacity to 24,000m³.

With deadweight of 26,000dwt each, these vessels are unique in their smaller size compared to the current fleet and in that they have more cargo lifting capabilities with lower fuel consumption. It is estimated that these lighter weight vessels will consume 45% less fuel, the company has claimed. To enable this fuel saving the vessel is powered by a Hyundai-Wärtsilä 7RT-flex58T-D (Tier-II) that has MCR of 12,450kW giving the vessel a service speed of 17knots at 85% MCR.

Bahri Abha has a bulbous bow, transom stern, open water type stern frame, single bulb rudder and single-screw controllable-pitch propeller driven by a slow-speed diesel engine. The integrated propeller and rudder, Energopac, has been designed by Wärtsilä with a silicon coating applied to increase the propulsion efficiency.

The con-ro vessels are specialised in carrying general and project cargo and several other types of ro-ro cargo. These vessels are equipped with a loading bridge with a capacity of 250tonnes and heavy-lift cranes with a capacity of 240tonnes enabling them to load different types of goods.

Bahri Abha has five fixed decks and two hoistable decks and has one row of pillars close to the centre line of the vessel. There is one stern quarter ramp on deck three and two sets of deck cranes on number four forward open deck.

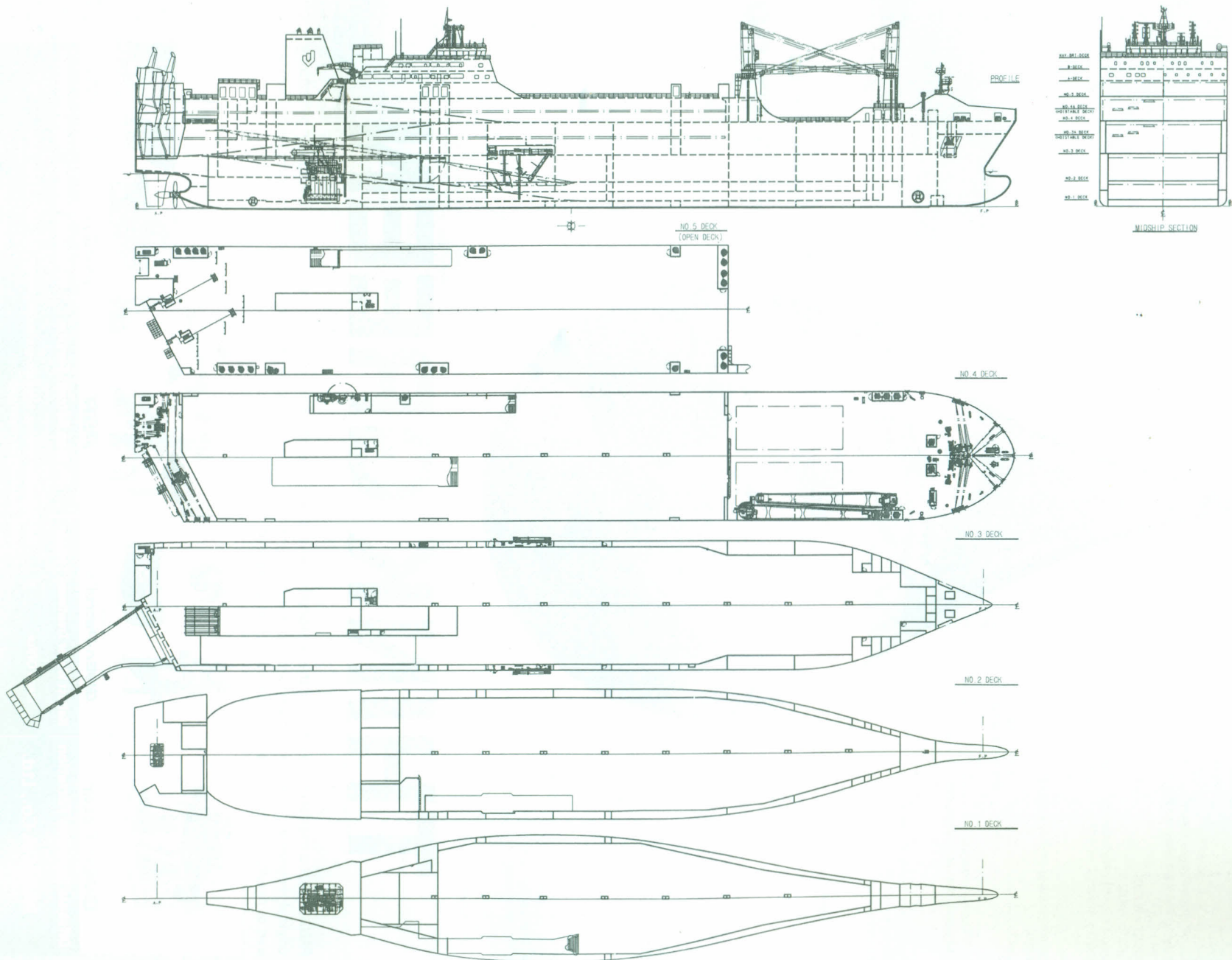
Dangerous goods in packaged form can be loaded on the weather deck and closed ro-ro cargo space. The air draught from the waterline of ballast condition with arrival bunker is not more than 41.3m.

The vessel has subdivisions for the fore peak tank, chain lockers, bosun store and bow thruster and emergency fire pump space. A double side space under deck 3 is used for water ballast tanks and pipe ducts and a double side space on deck 3 to be arranged as void spaces.

TECHNICAL PARTICULARS

Length oa: 224.96m
 Length bp: 211.30m
 Breadth moulded: 32.30m
 Depth moulded
 To main deck: 13.30m
 To upper deck: 27.70m
 Width of double skin
 Side: 2.13m
 Bottom: 1.70m
 Draught
 Scantling: 9.50m
 Design: 8.90m
 Gross: 50,714gt
 Deadweight
 Design: 22,400dwt
 Scantling: 25,960dwt
 Speed, service: 17knots
 Bunkers
 Heavy oil: 3,101m³
 Diesel oil: 220m³
 Water ballast: 11,480m³
 Daily fuel consumption
 Main engine only: 41tonnes/day
 Classification society and notations: LR, + 100A1, Roll On Roll Off Cargo Ship, *IWS, LI, ACS(B), EP, +LMC, UMS, NAV1
 Descriptive notes: Part Higher tensile steel, ShipWright(BWMP(T), SCM, SERS)
 % high-tensile steel used in construction: 50%
 Main engines
 Design: Wärtsilä
 Model: 7RT-flex58T-D(Tier II)
 Manufacturer: Hyundai Heavy Industry Co., Ltd
 Number: 1
 Type of fuel: HFO/MDO
 Output of each engine: 12,450kW x 97rpm
 Propellers
 Material: Ni-Al-Bronze

Design/manufacture: Wärtsilä
 Number: 1
 Fixed/controllable pitch: Controllable
 Diameter: 6.7m
 Speed: 97rpm
 Main-engine driven alternators
 Number: 1
 Make/type: Nishishiba Electric Co., Ltd
 Output/speed of each set: 2,200kW x 97rpm
 Diesel-driven alternators
 Number: 3
 Engine make/type: Hyundai Heavy Industry Co., Ltd/
 Vertical in-line, trunk piston, 4-cycle
 Type of fuel: MDO
 Output/speed of each set: 1,560kW x 720rpm/
 2,320kW x 720rpm
 Alternator make/type: Hyundai Heavy Industry Co., Ltd
 Output/speed of each set: 1,875kVA, 2,750kVA x 720rpm
 Boilers
 Number: 1
 Type: Aux. boiler, small oil-fired, pressure atomising
 Make: Aalborg
 Output, each boiler: 2,500kg/h
 Cargo cranes/cargo gear
 Number: 2
 Make/type: Cargotec Hydraulic Crane
 Performance: 120tonnes x 15m, 40tonnes x 32.5m
 Other cranes
 Number: 2
 Make/type: Oriental Electric-hydraulic driven
 Tasks: Provisions handling
 Performance: 5tonnes x 9m
 Mooring equipment
 Number: 5
 Make/type: Rolls-Royce Marine Electric
 Special lifesaving equipment
 Number of each and capacity: 1 x 36persons
 Maketype: Fassmer-Marland Ltd
 Hatch covers
 Design: Cargotec
 Manufacturer: Cargotec
 Type: Lift away type
 Containers
 Total TEU capacity: 702
 On deck: 300
 In holds: 402
 Tier/rows
 On deck: 4/12
 In holds: 2/8
 Doors/ramps/lifts/movable car decks
 Number of each: 1 x quarter ramp,
 2 x stern door, ramp
 door, 2 x hoistable car deck,
 1 x weather tight bulkhead door
 Type: hydraulic motor driven
 Designer: MacGregor
 Cargo control system
 Make: Hyundai Heavy Industry Co., Ltd
 Ballast control system
 Make: Hyundai Heavy Industry Co., Ltd
 Water ballast treatment system
 Make/Capacity: Techcross/600m³/h
 Passengers
 Total: 6
 Cabins: 3
 Stern appendages/special rudders: Energypac
 Bow thrusters
 Make: Hyundai Heavy Industry Co., Ltd
 Number/Output: 2,000kW
 Stern thruster
 Make: Hyundai Heavy Industry Co., Ltd
 Number: 500kW
 Bridge control system
 Make: Hyundai Heavy Industry Co., Ltd
 One-man operation: Yes
 Fire detection system
 Make/type: Consilium Salwico Ro Ro
 Fire extinguishing systems
 Engine room: Seaplug/ Local water mist
 MK/ Low pressure CO₂
 Vehicle spaces: NK/ Low pressure CO₂
 Radars
 Number: 3
 Make: Sperry Marine
 Model: Vision Master FT 340 Chart Kit Format Flat Panel
 Waste disposal plant
 Incinerator: Hyundai Marine Machinery Co., Ltd/ MAXI
 1500SL WS
 Waste compactor: Metos/ IP400
 Waste shredder/crusher: Metos/ GFK550
 Sewage plant: Il Seung Co., Ltd/ ISS-43N
 Contract date: 6th March 2011
 Launch/float-out date: 23 October 2012
 Delivery date: 5 February 2013



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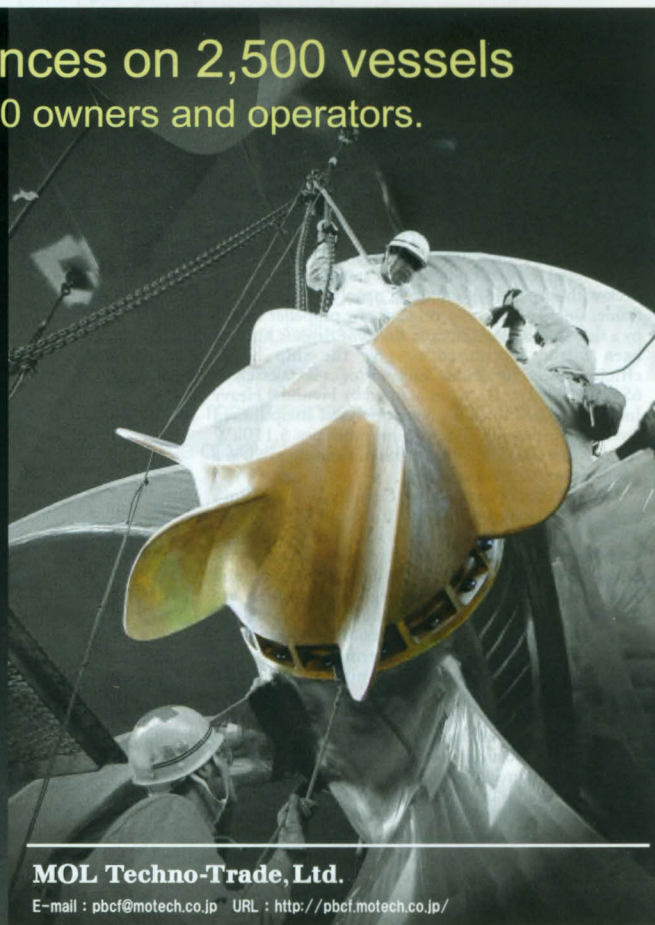
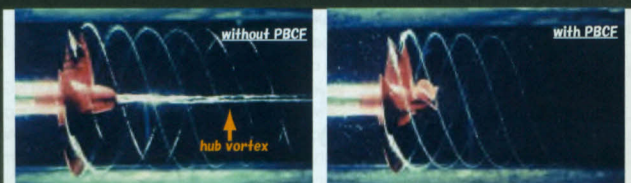
The PBCF has been developed and commercialized in 1987 by the corporate group centered in Mitsui O.S.K. Lines, Ltd..
PBCF is the originated device to be focused in the recovery of energy from the flow out energy in propeller hub vortex.

Research and development on the PBCF started in 1986, and sales began the following year. Since then, an increasing number of shipowners, mainly in Japan, began to adopt the system.

By 2006, the 19th year since the start of sales, the PBCF had been ordered for 1,000 vessels. Since then, it has gained worldwide recognition by vessel owners and operators, and the number of ships adopting it has doubled in just five years, reaching the 2,000 vessels milestone.

Basic principle of PBCF effect

As the flows accelerated down after the blade trailing edges are blocked and rectified to a straight ship-stream by the fins of the PBCF, the hub vortex will be eliminated.



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BLUEBIRD ARROW: Chemical tanker for Gearbulk

Shipbuilder: **Hyundai Mipo Dockyard Co., Ltd**
 Vessel's name: **Bluebird Arrow**
 Hull No.: **2324**
 Owner/operator: **Gearbulk (UK) Limited**
 Country: **UK**
 Designer: **Hyundai Mipo Dockyard Co., Ltd**
 Country: **Korea**
 Model test establishment used: **Korea Ocean Research & Development Institute**
 Flag: **Bahamas**
 IMO number: **9635377**
 Total number of sister ships already completed (excluding ship presented): **nil**
 Total number of sister ships still on order: **1**

BLUEBIRD Arrow was delivered to its owner Gearbulk from Hyundai Mipo Dockyard Co., Ltd (HMD) in January 2013. It is the first in the series of two asphalt & oil/chemical tankers for the owner.

The vessel, a 19,000dwt ocean going asphalt & oil / chemical tanker, has been designed by HMD and registered under the Bahamian flag with DNV class society. HMD has been specialising in the mid-sized ship market for the last 16 years with particular focus on the petrochemical market. The development of *Bluebird Arrow* shows a clear indicator that HMD is still holding strong in this market.

The vessel features bulbous bow, transom stern, flush deck with forecastle, poop deck, open water type stern frame, single rudder and single-screw propeller driven by a slow-speed diesel engine. *Bluebird Arrow's* hull has been further optimised to give the ship better efficiencies. The main engine of the vessel, a 6S42MC7.1 (Tier II) manufactured by Hyundai Heavy Industry, is also aimed at giving the vessel an optimised power performance. The engine produces 5,110kW for a service speed of 14knots when running at 90% a MCR power of main engine.

Bluebird Arrow has a cargo capacity of 18,179m³, with the capacity of 1,147m³ for heavy fuel oil and 194m³ for diesel oil. The vessel has three cargo holds with double hull structure, five pairs of cargo oil tanks, five pairs of water ballast tanks, fore peak tank and aft peak tank. The cargo tank units are independent and isolated from the hull structure and surrounded by cargo hold spaces. The vessel has a nitrogen generating plant and thermal oil generating plants with the thermal oil running through two separate loop heating coils inside the cargo tanks, which heats the cargo up to 250°C.

The vessel has subdivisions for the fore peak tank, chain lockers, bosun store and cargo gear store. The cargo area has three cargo holds that are double hulled. No.2 cargo hold is used for cargo pump space and No.3 cargo tank (P) is used as a slop tank. The engine room has two pairs of heavy fuel oil storage tanks, which are located between the cargo spaces. The fore peak tank is located between the cargo space and engine room. The aft peak tank, steering gear compartment, fresh water tanks, marine diesel oil storage tanks, CO₂ room, N2

generator room and stern tube cooling water tank are located in the engine room.

TECHNICAL PARTICULARS

Length oa: 156.96m
 Length bp: 148.50m
 Breadth moulded: 23.50m
 Depth moulded:
 To main deck: 15.00m
 To upper deck: 15.00m
 Width of double skin:
 Side: 1.50m
 Bottom: 1.60m
 Draught:
 Scantling: 9.60m
 Design: 9.60m
 Gross: 15,607gt
 Deadweight:
 Design: 19,350dwt
 Scantling: 19,350dwt
 Speed, service: 14knots
 Bunkers:
 Heavy oil: 1,147m³
 Diesel oil: 194m³
 Water ballast: 9,403m³
 Daily fuel consumption:
 Main engine only: 19.4tonnes/day
 Classification society and notations: DNV + 1A1 Tanker for oil product with FR above 60°C, Tanker for Chemicals, ESP, HL(1.3), COMF-V(3), E0, BIS, TMON
 % high-tensile steel used in construction: 40%
 Main engines:
 Design: Hyundai Heavy Industry Co., Ltd
 Model: Hyundai B&W 6S42MC7.1 (Tier II)
 Manufacturer: Hyundai Heavy Industry Co., Ltd
 Number: 1
 Type of fuel: HFO
 Output of each engine: 5,110kW
 Propellers:
 Material: Ni-AL-Bronze
 Designer/manufacturer: Hyundai Heavy Industry Co., Ltd
 Number: 1
 Fixed/controllable pitch: Fixed
 Diameter: 5.3m
 Speed: 119.3m
 Diesel-driven alternators:
 Number: 3
 Engine make/type: HH/ 5H21/ 32
 Type of fuel: MDO
 Output/speed of each set: 800kW
 Alternator make/type: HH/ HFC7 506-14K
 Output/speed of each set: 750kW
 Cargo cranes/cargo gear:
 Number: 1
 Make: Oriental
 Type: Electric-hydraulic
 Performance: 10tonnes x 30m

Other cranes

Number: 1
 Make: Dongnam Marine Crane Co., Ltd
 Type: Electro-hydraulic
 Tasks: Provisions
 Performance: 2tonnes x10m

Mooring equipment

Number: 2
 Make: Rolls-Royce
 Type: Hydraulic

Special lifesaving equipment

Number of each and capacity: 1 x 30 persons
 Make: Fassmer-Marland Ltd
 Type: Freefall lifeboats

Cargo tanks

Number: 10
 Grades of cargo carried: Type 2
 Product range: Coal tar, coal tar naphtha solvent, coal tar pitch, creosote, naphthalene

Cargo pumps

Number: 3
 Type: Electric motor driven, horizontal screw, jacketed
 Make: Allweiler
 Capacity: 450m³

Cargo control system

Make: Allweiler
 Type: Remotely controlled

Ballast control system

Make: Kongsberg Maritime Korea
 Type: Remotely controlled

Water ballast treatment system

Make: Panasia
 Type: 250m³/h

Complement

Crew: 16

Bridge control system

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

Fire detection system

Make: Autronica
 Type: Fire Alarm and smoke detection

Fire extinguishing systems

Cargo holds: Fain/ Foam
 Engine room: NK/ CO₂
 Cabins and public spaces: NK/ fire hydrant

Radars

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

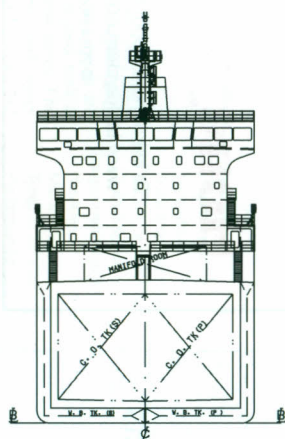
Waste disposal plant

Incinerator: Hyundai Atlas/ MAXI NG50SL WS
 Sewage plant: Il Seung/ ISS-25N

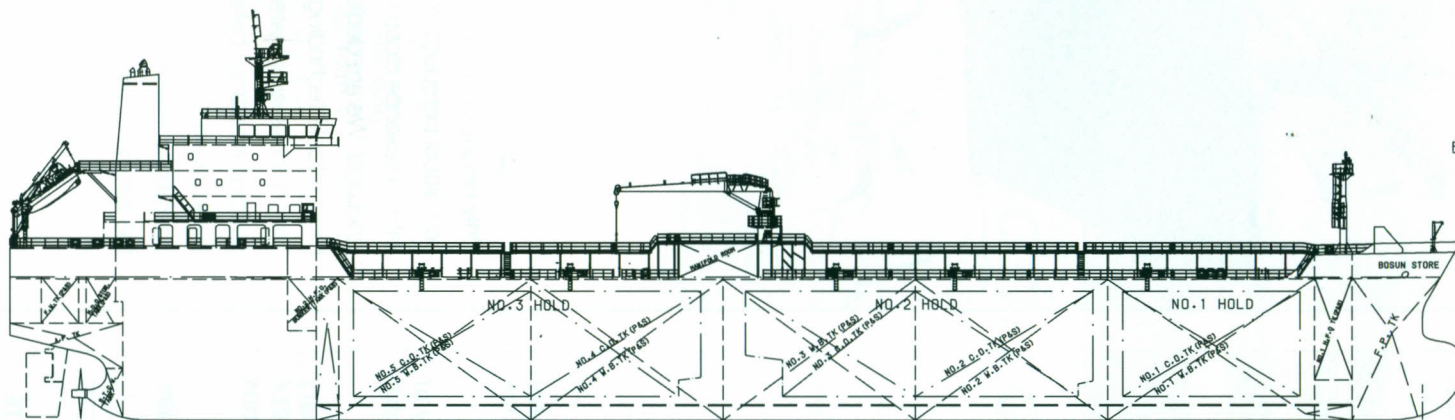
Contract date: 31 March 2011

Launch/float-out date: 03 November 2012

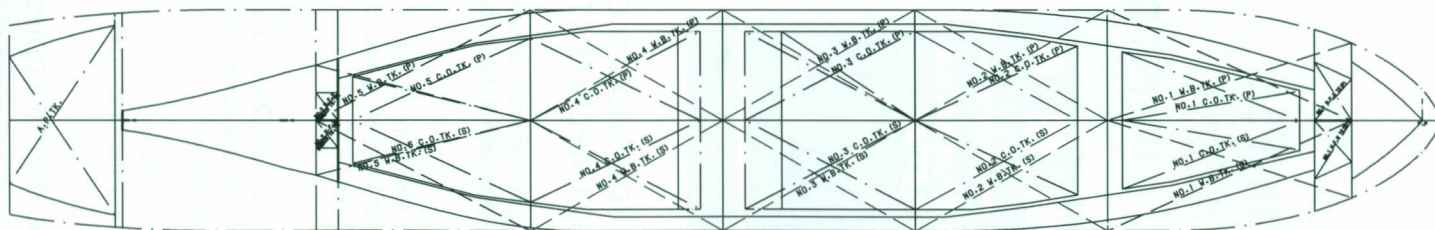
Delivery date: 18 January 2013



MIDSHIP SECTION



PROFILE



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BRASIL VOYAGER: Shuttle tanker for Brazil operation

Shipbuilder: **Samsung Heavy Industries**
 Vessel's name: **Brasil Voyager**
 Hull No.: **2033**
 Owner/operator: **Chevron Shipping Company**
 Country: **Bahamas**
 Designer: **Samsung Heavy Industries**
 Country: **Korea**
 Model test establishment: **Samsung Ship Model Basin**
 Flag: **Bahamas**
 IMO number: **963777**
 Total number of sister ships already completed (excluding ship presented): **nil**
 Total number of sister ships still on order: **nil**

DUE to the development of Brazilian oil fields, a rise in vessels built to handle the geographic location of the fields was initiated in 2013. US-based Chevron placed its order for a one-off vessel, *Brasil Voyager*, that was delivered in May to operate in the Papa Terra field in Brazil. The vessel has been optimised to meet the requirements of working in Brazilian waters and also has a large cargo capacity. *Brasil Voyager* transports high viscosity oil from the fields in offshore Brazil to Bahamas oil refinery company (BORCO).

In order for the vessel to carry out operations in the location *Brasil Voyager*, has been specially designed with a finer hull shape and is equipped with dynamic positioning (DP2) technology. To create the finer hull form Samsung has used its Green Future hull design.

For the dynamic positioning at operation field, the vessel is equipped with one retractable type azimuth thruster and two tunnel thrusters in the forward and one retractable type azimuth thruster and one tunnel thruster in the aft. Also a full spade with flap high lift rudder, which has been developed by Becker marine systems, is applied together with a controllable pitch propeller. In order to increase the propulsion efficiency Saver-Fin technology has been applied.

Brasil Voyager is powered by a MAN Diesel & Turbo 6S70ME-C8.2 manufactured by Doosan that

has a power output of 16,900kW and gives the vessel a service speed of 15.13knots at 90% MCR with a 15% sea margin.

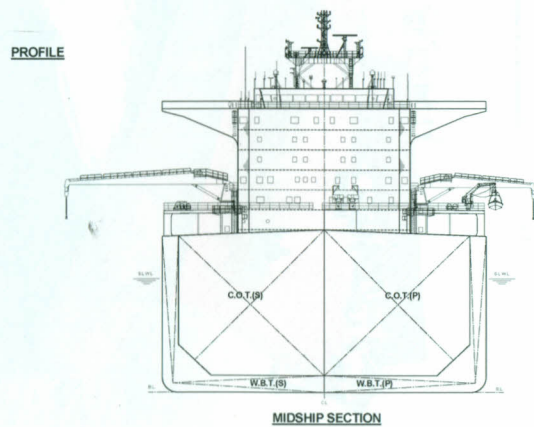
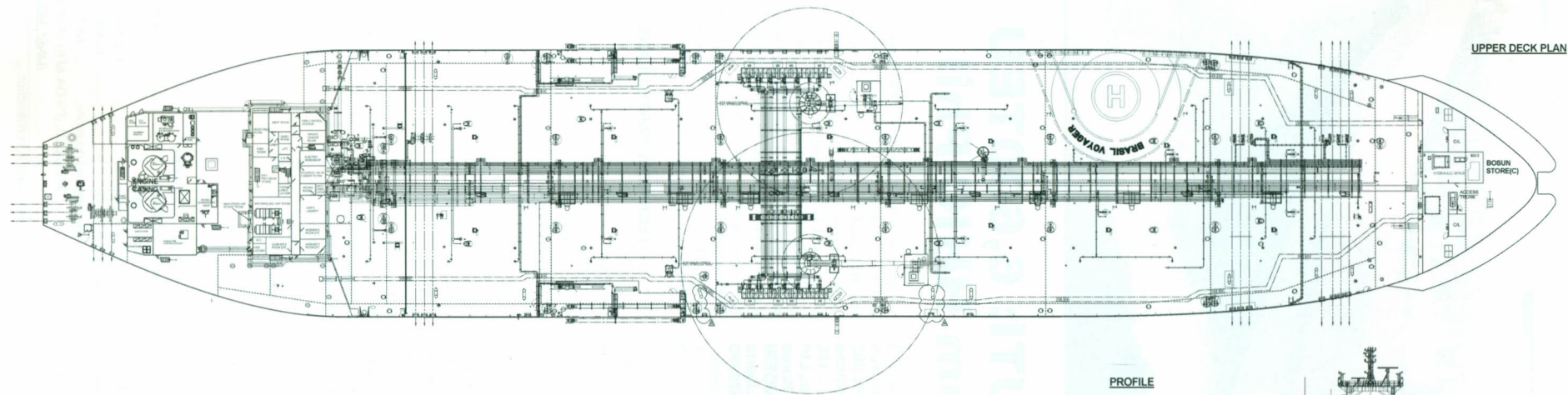
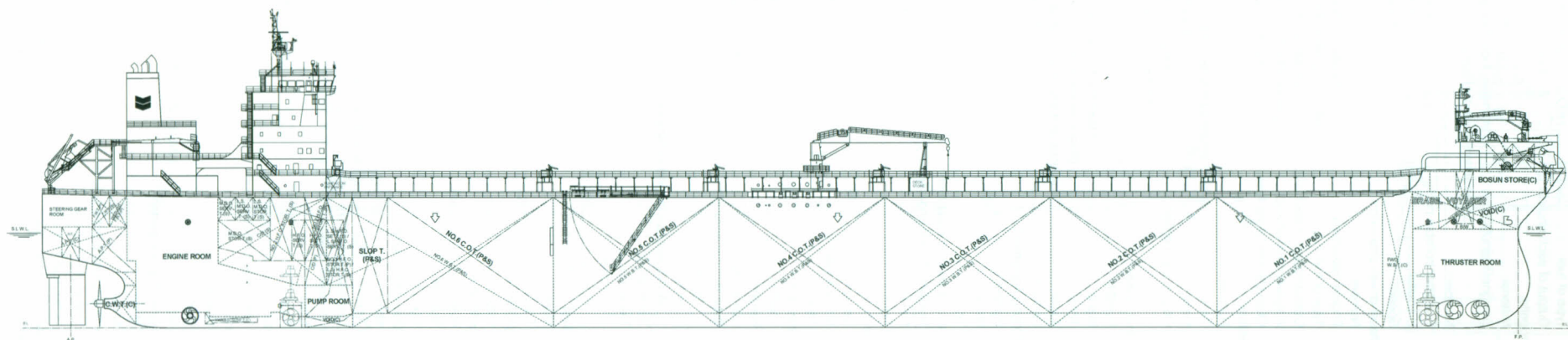
To enhance the loading and unloading of the vessel, Samsung has fitted it with a bow loading (BLS) system which has been designed for mooring the vessel to an offshore or crude loading terminal. Also the control system for cargo operations in the cargo control room is available in the wheelhouse via ICMS system. To further meet with the latest environmental regulations a Samsung Purimar ballast water treatment system with electrolysis (indirect) with a capacity of 5,500m³/h has been fitted.

TECHNICAL PARTICULARS

Length oa: 282.14m
 Length bp: 267.00m
 Breadth moulded: 49.00m
 Depth moulded
 To main deck: 23.60m
 Width of double skin
 Side: 2.45m
 Bottom: 2.55m
 Draught
 Scantling: 17.20m
 Design: 16.20m
 Gross: 83,942gt
 Deadweight
 Design: 141,470dwt
 Scantling: 153,680dwt
 Speed, service: 15.13knots
 Cargo capacity
 Liquid volume: 167,885m³
 Bunkers
 Heavy oil: 3,215m³
 Diesel oil: 555m³
 Water ballast: 51,200m³
 Daily fuel consumption
 Main engine only: 62tonnes/day
 Classification society and notations: ABS +A1, Ⓢ, Oil Carrier, CSR, AB-CM, SH-DLA, SFA(25), RES, PMA+, CPS, * AMS, * ACCU, NIBS, CRC, ESP, VEC-L, CPP, TCM, UWILD(no seachest blanking device), PORT, POT,

ENVIRO, GP, BLU, SEC, MLC-ACCOM, RW, BWE, DPS-2, * APS

Main engine
 Design: MAN Diesel & Turbo
 Model: 6S70ME-C8.2
 Manufacturer: Doosan Engine
 Number: 1
 Type of fuel: HFO, MDO
 Output of each engine: 16,900kW x 86.6rpm
 Propeller
 Material: Ni-Al-Bronze
 Designer/manufacturer: Kawasaki Heavy Industries
 Number: 1
 Fixed/controllable pitch: Controllable
 Diameter: 8.3m
 Speed: 86.6rpm
 Boilers
 Number: 2
 Type: Vertical, water drum
 Make: Alfa Laval Aalborg
 Output, each boiler: 35tonnes/h x 1.6MPa
 Cargo cranes/cargo gear
 Number: 2
 Make: Oriental
 Type: Electro-hydraulic luffing jib
 Performance: 15tonnes
 Other cranes
 Number: 2 + 1
 Make: Oriental
 Type: Electro Hydraulic luffing jib
 Tasks: Provision handling, BLS service
 Performance: 5tonnes + 5tonnes
 Mooring equipment
 Number: 2 x Windlass
 6 x Mooring winch
 Make: Rolls-Royce
 Type: Electro-hydraulic
 Special lifesaving equipment
 Number of each and capacity: 1 x 42 persons
 Make: Hatecke
 Type: Freefall totally enclosed
 Cargo tanks
 Number: 12 + 2
 Cargo pumps
 Number: 3
 Type: Vertical, single stage, centrifugal
 Make: Hyundai
 Material: Stainless steel for impeller shaft
 Capacity: 3,500m³/h x 150m at S.G 1.025
 Cargo control system
 Make: AMRI-Seil
 Type: Valve remote control
 Water ballast treatment system
 Make: Samsung Purimar
 Capacity: 5,500m³/h
 Complement
 Crew: 15
 Bow thruster
 Make: Rolls-Royce
 Number: 2 x Tunnel
 1 x Azimuth
 Output: 3,300kW, 3,000kW
 Stern thruster
 Make: Rolls-Royce
 Number: 1 x Tunnel
 1 x Azimuth
 Output: 1,600kW, 3,000kW
 Bridge control system
 Make: Nabtesco
 One-man operation: Yes
 Fire detection system
 Make: Consilium
 Type: Addressable type
 Fire extinguishing systems
 Engine room: Wilhelmsen/ High expansion foam
 Cabins & public spaces: Samsung/ Seawater and portable fire extinguisher
 Radars
 Number: 2
 Make: Sperry Marine
 Integrated bridge system
 Make: Sperry Marine
 Model: VisionMaster FT ECDIS
 Contract date: 9 June 2011
 Launch/float-out date: 29 Dec 2012
 Delivery date: 28 May 2013





CAP ARNAUTI: 6,600TEU box ship from HHIC-Phil

Shipbuilder: **HHCI-Phil**
 Vessel's name: **Cap Arnauti**
 Hull No: **PN-082**
 Owner/operator: **Zodiac Maritime**
 Country: **UK**
 Designer: **Total Marine Services Co., Ltd**
 Country: **Korea**
 Model test establishment used: **MOERI**
 Flag: **Liberia**
 IMO number: **9629380**
 Total number of sister ships already completed (excluding ship presented): **1**
 Total number of sister ships still on order: **2**

ZODIAC Maritime took delivery of its first 6,600TEU containership, *Cap Arnauti*, in April. The vessel was delivered from Hanjin Heavy and Construction Industries Philippines (HHCI-Phil) with the second in the series, *Cap Akritas* delivered shortly afterwards.

Cap Arnauti is an example of the more compact containerships which are now coming onto the market. Compared to the technical principles of a standard containership of this size (300m length x 40m breadth), *Cap Arnauti* is 271m in length and 42m in breadth, which allows the vessel to carry an extra row of containers.

Cap Arnauti has been designed to give a highly economic performance, along with being further optimised for reduced vibration and noise. The vessel is manufactured using a lower amount of high-tensile steel, has an optimised hull form and uses minimum ballast water to save on fuel consumption.

The vessel is fitted with an electronically controlled main engine, 6S80ME-C9.2 that meets with IMO Tier II NOx emissions standards and the phase III IMO EEDI INDEX. The engine develops 27,060kW MCR at 78.0rpm, to give a service speed at NCR (24,354kW at 75.3rpm) with 15% sea margin at 21.0knots and design draught, which is designed to optimise daily fuel oil consumption. The vessel runs on ultra-low sulphur marine gas oil (ULSMGO) and can be cooled by an ULSMGO cooler to increase the viscosity to the main engine's allowable operation range.

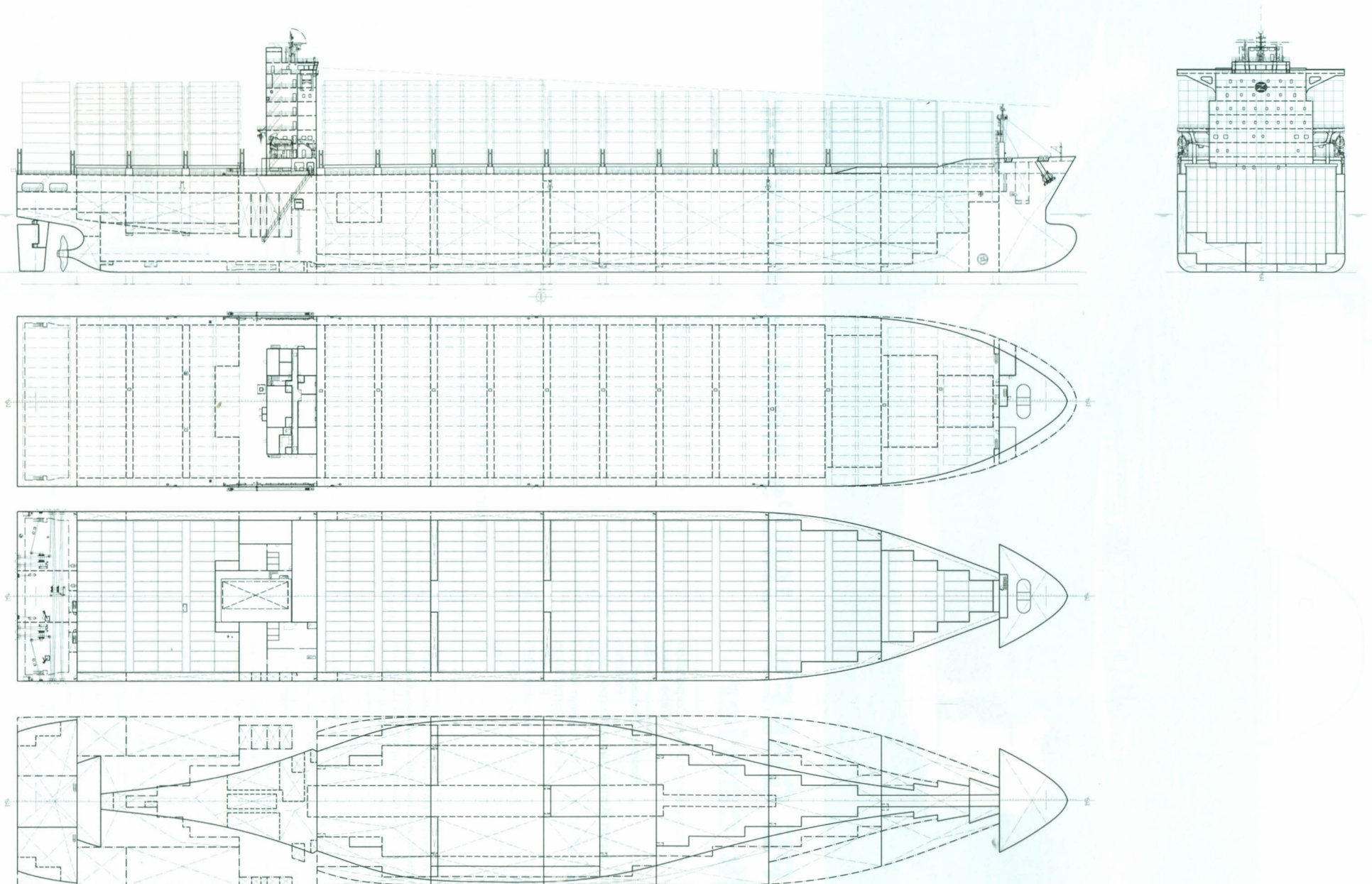
Cap Arnauti has a fixed pitch five-bladed propeller that was designed by HHIC and has been developed to reduce the cavitation effects from the propeller.

The vessel is classified by Nippon Kaiji Kyokai (ClassNK) with special notation of BRS1A, which means that the vessel has bridge layouts and navigational equipment including accident prevention systems and bridge work assist systems. The coating in the ballast water tank complies with PSPC (Performance Standard for Protective Coatings) requirements.

TECHNICAL PARTICULARS

Length oa: 270.90m
 Length bp: 258.40m
 Breadth moulded: 42.80m
 Depth moulded
 To upper deck: 24.60m
 Width of double skin
 Side: 2.20m
 Bottom: 2.10m
 Draught
 Scantling: 14.56m
 Design: 13.00m
 Gross: 69,809gt
 Displacement: 103,166tonnes
 Lightweight: 22,589tonnes
 Deadweight
 Design: 66,115dwt
 Scantling: 80,577dwt
 Block co-efficient: 0.6240
 Speed, service: 21.43knots
 Bunkers
 Heavy oil: 5,125m³
 Diesel oil: 318m³
 Water ballast: 21,528m³
 Containerships water ballast
 in loaded conditions: 6,842tonnes
 Daily fuel consumption
 Main engine only: 111.18tonnes/day
 Auxiliaries: 10.59tonnes/day
 Classification society and notations: NK NS* (CNC, EQ C DG), (PS-DA &FA), (PSCM, IWS), /MNS*, M0, BRS1A
 % high tensile steel used in construction: 67%

Main engine
 Model: MAN B&W 6S80ME-C 9.2
 Manufacturer: STX-MAN B&W
 Number: SB6S80-12585
 Type of fuel: HFO, LSO, MDO, MGO
 Output of each engine: 27,060kW x 78rpm
 Propeller
 Material: Ni-Al-Bronze
 Designer/manufacturer: Hanjin Heavy Industries and Construction/ Hyundai Heavy Industries
 Number: 1
 Fixed/controllable pitch: Fixed
 Diameter: 8.8m
 Speed: 75.3rpm
 Diesel-driven alternators
 Number: 4
 Engine make/type: STX-MAN 7L37/38
 Type of fuel: HFO, LSO, MDO, MGO
 Output/speed of each set: 2,310kW x 720rpm
 Alternator make/type: Hyundai/ HFC7 712-14K
 Output/speed of each set: 2,100kW x 720rpm
 Boilers
 Number: 1
 Type: Vertical smoke tube type comp boiler
 Make: Kangrim
 Output, each boiler: 3,000kg/h oil fired
 2,500kg/h x 7kg/cm²
 Other cranes
 Number: 1
 Make: Haen Machinery Industry
 Type: Electric motor driven monorail
 Tasks: Provisions and engine part handling
 Performance: 10tonnes
 Mooring equipment
 Number: 5
 Make: Towimor
 Type: Electric
 Special lifesaving equipment
 Number of each and capacity: 2 x 28 persons
 Make: DSB
 Type: Hinged gravity type
 Hatch covers
 Design: SMS
 Manufacturer: HHIC-Phil
 Type: Upper deck
 Containers
 Lengths: 20'/ 40'/ 45'
 Heights: 8.6'/ 9.6'
 Cell guides: No 1-7 Hold
 Total TEU capacity: 6,622
 On deck: 3,845
 In holds: 2,777
 Homogenously loaded to 14tonnes: 4,835TEU
 Reefer plugs: 600
 Tiers/rows
 On deck: 9/17
 In holds: 9/15
 Ballast control system
 Make: Hanla IMS
 Type: Electro-hydraulic
 Complement
 Crew: 15
 Bow thruster
 Make: Kawasaki
 Number: 1
 Output: 2,150kW
 Bridge control system
 Make: Nabtesco
 Type: M-800III
 One-man operation: Yes
 Fire detection system
 Make: Consilium
 Type: Salwico Cargo
 Fire extinguishing systems
 Cargo holds/engine room: Seaplug/ CO₂
 Radars
 Number: 2
 Make: JRC
 Model: JMA-9132-SA, JMA-9122-9XA
 Integrated bridge system
 Make: JRC
 Model: JAN-901B
 Waste disposal plant
 Incinerator: Kangrim/ KFB-73S
 Sewage plant: Il Seung/ ISS-35N
 Launch/float-out date: 12 April 2013
 Delivery date: 29 April 2013





CAPE GREEN: JMU's next generation bulk carrier

Shipbuilder:.....**Japan Marine United Corporation**
 Vessel's name:.....**Cape Green**
 Hull No:.....**186**
 Owner/operator:.....**Newport Pioneer One**
 Country:.....**Panama**
 Designer:.....**Japan Marine United Corporation**
 Country:.....**Japan**
 Model test establishment used:.....**Japan Marine United Corporation**
 Flag:.....**Panama**
 IMO Number:.....**9651072**
 Total number of sister ships already completed (excluding ship presented):.....**nil**
 Total number of sister ships still on order:.....**nil**

Cape Green is the first ship from Japan Marine United Corporation (JMU) of its "G Series", which has been developed to reduce fuel oil consumption and CO₂ emissions by 25% through optimised design and installed energy efficiency devices, the shipyard has claimed. JMU delivered its latest 209,000dwt bulk carrier to Newport Pioneer One in August.

In 2010 JMU developed its "eFuture" environmental ship design that integrated the environmental technologies that were on the market. The line up of concept designs included a large-scale containership "eFuture13000" with a capacity of 13,000TEU, the VLCC "eFuture310T" and the handymax class bulk carrier "eFuture 56B", all of which at the time the company said would have a 30% reduction in CO₂ emissions. From these concept designs came the development of *Cape Green*.

The vessel aims to achieve these saving through eco-technology and design optimisation. The vessels hull has a low-resistance hull form, which has been optimised to, both, reduce resistance and improve the propulsion efficiency. The bow of the vessel features a "Leadge" (lead edge) bow, which reduces the speed lost by waves, especially in rough seas.

Adding to this the vessel has been fitted out with the latest in energy saving devices, such as a super stream duct (SSD) & Surf-Bulb (rudder fin with bulb) and further optimisation of the JMU/Nakashima propeller. A voyage support system, Sea-Navi has also been fitted, which can optimise the routing of the vessel by real-time monitoring of the vessel's data.

Cape Green has a MAN B&W 7S65ME-C engine, which utilises the shaft motor to assist the main engine propulsion by using a surplus electric power generated by the waste heat recover system that has been installed. The waste heat recovery system consists of a turbocharger generator (hybrid-turbocharger and a turbo generator).

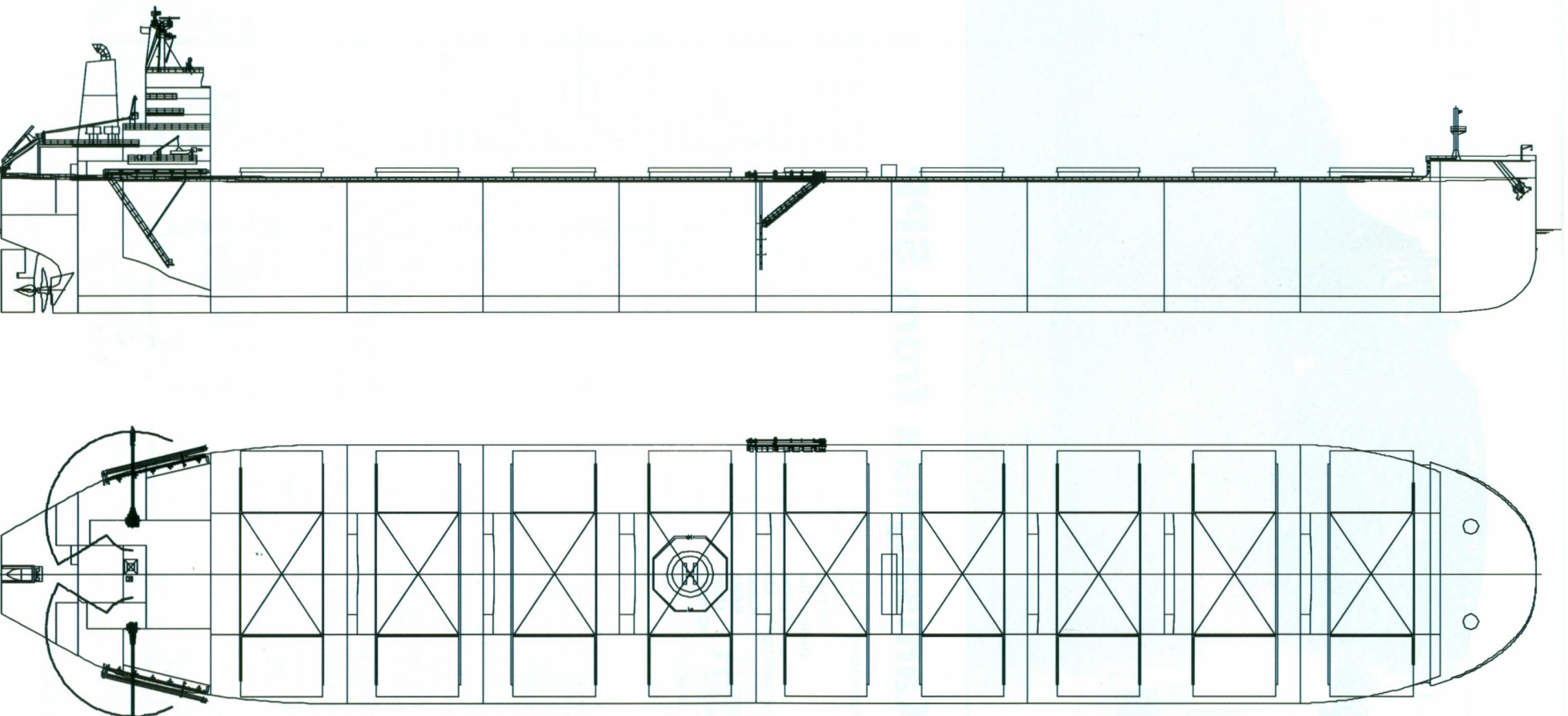
The vessel has attained an Energy Efficiency Design Index (EEDI) Phase 2 of MARPOL Annex VI, which is the requirement for vessels delivered between 2020 and 2024. The design of *Cape Green* takes over from the Newcastlemax concept (200,000dwt type) bulk carriers designed to carry coal and iron ore, by having a higher deadweight at shallow draught with increased cargo capacity.

TECHNICAL PARTICULARS

Length oa:.....299.99m
 Length bp:.....296.00m
 Breadth moulded:.....50.00m
 Depth moulded
 To upper deck:.....25.00m
 Draught
 Scantling:.....18.40m
 Gross:.....107,100gt
 Deadweight
 Scantling:.....209,800dwt
 Speed, service:.....14.7knots
 Cargo capacity
 Grain:.....221,400m³
 Water ballast:.....94,760m³
 Daily fuel consumption
 Main engine only:.....50tonnes/day
 Classification society and notations:.....ClassNK NS* (CSR, BC-A, BC-XII, GRAB 25, PSPC-WBT), ESP, IWS, PSCM, MNS* M0
 Main engine
 Design:.....MAN B&W
 Model:.....7S65ME-C
 Manufacturer:.....Hitachi Zosen
 Number:.....1
 Type of fuel:.....HFO, MDO, DMA
 Output of each engine:.....16,000kW
 Propeller
 Material:.....Ni-Al-Bronze
 Designer/manufacturer:.....Japan Marine United/Nakashima
 Propeller
 Number:.....1
 Fixed/controllable pitch:.....Fixed

Diesel-driven alternators
 Number:.....3
 Engine make/type:.....Daihatsu Diesel
 Type of fuel:.....HFO, MDO, DMA
 Alternator make/type:.....Taiyo Electric
 Boilers
 Number:.....1
 Type:.....Vertical water tube type
 Make:.....Osaka Boiler
 Output:.....each boiler 2tonnes/h
 Mooring equipment
 Number:.....2 x Windlass/mooring winch
 4 x mooring winch
 Make:.....Fukushima
 Type:.....Electro-hydraulic
 Special lifesaving equipment
 Number of each and capacity:.....1 x 25 persons
 Make:.....Nishi-F
 Type:.....Freefall
 Hatch covers
 Design:.....Iknow Machinery
 Manufacturer:.....Iknow Machinery
 Type:.....Side rolling type
 Ballast control system
 Make:.....Nakakita Seisakusho
 Type:.....Hydraulic remote control
 Complement
 Crew:.....13
 Stern appendages/special rudders:.....Super stream duct/
 Surf-Bulb
 Bridge control system
 Make:.....Nabtesco
 Type:.....M-800 III
 Fire detection system
 Make:.....Consilium
 Fire extinguishing systems
 Engine room:.....Kashiwa/ high expansion foam
 Radars
 Number:.....2
 Make:.....Japan Radio
 Waste disposal plant
 Incinerator:.....Sunflame
 Sewage plant:.....Taiko Kikai Industries
 Launch/float-out date:.....29 May 2013
 Delivery date:.....1 August 2013

CAPE GREEN





CASH: Kamsarmax from SPP

Shipbuilder: **SPP Shipbuilding Co., Ltd**
 Vessel's name: **Cash**
 Hull No: **H1060**
 Owner/operator: **Geden Line**
 Country: **Turkey**
 Designer: **SPP Shipbuilding Co., Ltd**
 Country: **Korea**
 Model test establishment used: **SSPA**
 Flag: **Malta**
 IMO number: **9628087**
 Total number of sister ships already completed (excluding ship presented): **nil**
 Total number of sister ships still on order: **3**

CASH is the latest Kamsarmax design from SPP shipbuilding that was delivered to its owner, Geden Line, in May. The 82,000dwt bulk carrier is the first in a series of three sister vessels ordered by Geden Line. *Cash* has been fully designed by SPP with the aim of designing an advanced Kamsarmax vessel.

The cargo holds have a capacity of 97,000m³ with the water ballast tanks having a capacity of 23,000m³. The cargo areas consist of seven cargo holds having double bottom water ballast tanks with hopper and top side wing ballast tanks. The heavy fuel oil tanks are arranged in the engine room and top side wing tanks. The No.4 hold can be used as water ballast tank during heavy sea conditions.

The vessel is powered by a Doosan manufactured 6S60MC-C(MK8.1) that has a power output of 10,450kW that gives the vessel a service speed of 14.92knots. The yard noted at the time that the vessel made a remarkable achievement for its speed performance of about 14.92knots at design draught and NCR with 15% of sea margin by the sea trial. With the capacity of 2,500m³ for the fuel oil, the cruising range is about 20,000 nautical miles on the basis of speed of 14.5knots considering three reserve days.

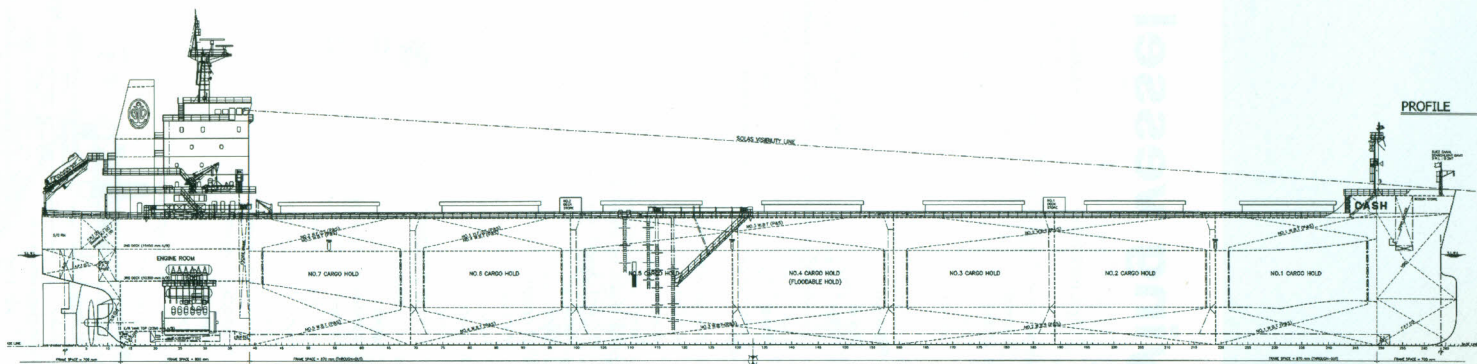
The vessel has a bulbous bow, transom stern and a continuous deck with forecastle deck. The hatch covers that are manufactured by Tanktech are rack and pinion operated. A Six-tiered deckhouse that complies with the SOLAS visibility regulation provides accommodation for a complement of 24 persons excluding the Suez crew cabin.

TECHNICAL PARTICULARS

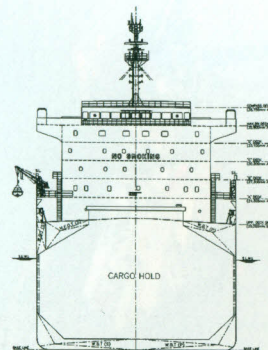
Length oa: 229.00m
 Length bp: 223.00m

Breadth moulded: 32.26m
 Depth moulded
 To main deck: 20.20m
 To upper deck: 20.20m
 Width of double skin
 Side: 1.50m
 Bottom: 1.75m
 Draught
 Scantling: 14.517m
 Design: 12.20m
 Gross: 44,619gt
 Displacement: 94,867tonnes
 Lightweight: 13,432tonnes
 Deadweight
 Design: 65,154.2dwt
 Scantling: 81,434.8dwt
 Block co-efficient: 0.8699 (design)/ 0.8851 (scantling)
 Speed, service: 14.92knots
 Cargo capacity
 Bale: 92,534.8m³
 Grain: 97,090.7m³
 Bunkers
 Heavy oil: 2,461m³
 Diesel oil: 196.6m³ + 240.5m³ (MGO)
 Water ballast: 22,603m³
 Daily fuel consumption
 Main engine only: 37.5tonnes/day
 Auxiliaries: 3.1tonnes/day
 Classification society and notations: . DNV 1A1, Bulk Carrier, ESP ES(S), CSR, BC-A, Holds 2,4 and 6 may be empty, GRAB[20], BIS, TMON, BWM-E(f), E0, COAT-PSPC(B)
 % high-tensile steel used in construction: 80%
 Main engine
 Model: 6S60MC-C(MK8.1)
 Manufacturer: Doosan Engine
 Number: 1
 Type of fuel: HFO, MDO, MGO
 Output of each engine: 10,450kW x 96rpm
 Propellers
 Material: Ni-Al-Bronze
 Designer/manufacturer: Hyundai Heavy Industries
 Number: 1
 Fixed/controllable pitch: Fixed
 Diameter: 7.1m
 Speed: 96rpm
 Diesel-driven alternators
 Number: 3
 Engine make/type: Yanmar/ 6EY18ALW
 Type of fuel: HFO, MDO, MGO

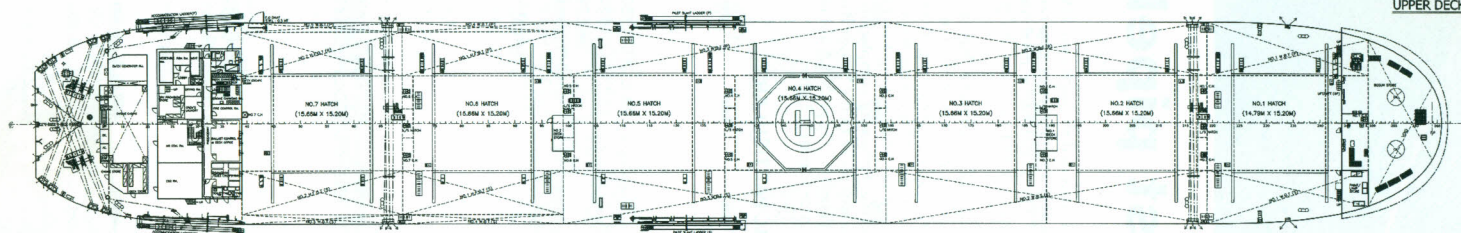
Output/speed of each set: 660kW x 900rpm
 Alternator make/type: Taiyo/Fe
 Output/speed of each set: 600kW x 900rpm
 Boilers
 Number: 1
 Type: MC
 Make: SPP Machine Tech
 Output, each boiler: 1,300kg/h 1,200kg/h x 7kg/cm²
 Other cranes
 Number: 1
 Make: SPP Machine Tech
 Type: M/E overhead crane
 Mooring equipment
 Number: 6
 Make: Flutek
 Type: Hydraulic
 Special lifesaving equipment
 Number of each and capacity: 1 x 24 persons
 Make: Beihai
 Type: Freefall
 Hatch covers
 Design: SMS
 Manufacturer: Tanktech
 Type: Rack & pinion side rolling
 Ballast control system
 Make: Scana Korea Hydraulic
 Type: Plano type
 Complement
 Crew: 13
 Bridge control system
 Make: Samsung
 Type: Self-standing type
 Fire detection system
 Make: Consilium
 Type: Addressable
 Fire extinguishing systems
 Cargo holds: NK/ CO₂
 Engine room: NK/ CO₂
 Radars
 Number: 2
 Make: Furuno
 Models: FAR-2827/ FAR-2837S
 Waste disposal plant
 Incinerator: Hyundai-Atlas/ MAXI T50SL WS
 Waste shredder: Samjoo Eng/ BS515
 Sewage plant: Il Seung/ ISS-25N
 Contract date: 24 August 2010
 Launch/float-out date: 5 December 2012
 Delivery date: 2 May 2013



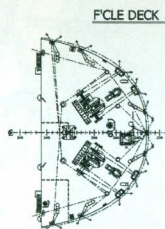
PROFILE



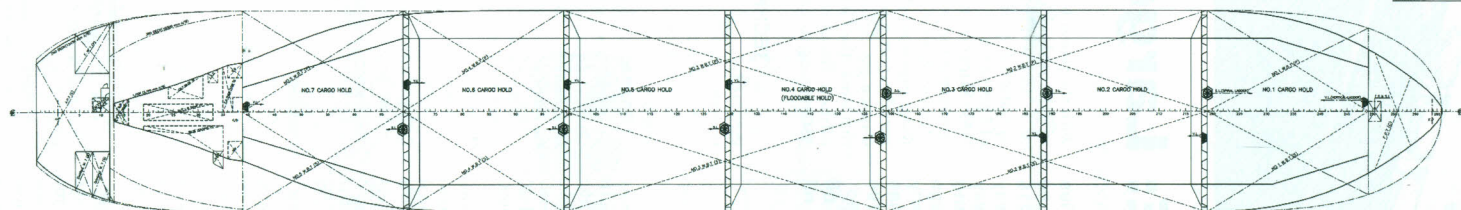
MIDSHIP SECTION



UPPER DECK

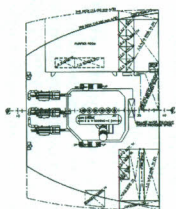


FORECASTLE DECK

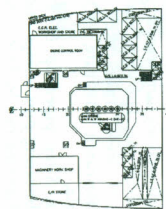


TANK TOP

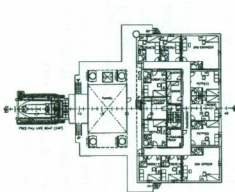
3RD DECK



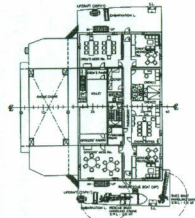
2ND DECK



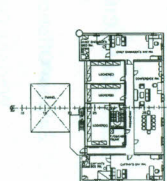
B DECK



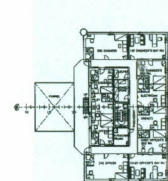
A DECK



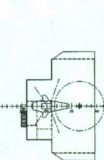
D DECK



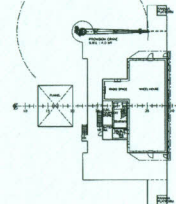
C DECK



COMPASS DECK



NAVAL DECK





CASTORONE: Largest pipelaying vessel

Shipbuilder: **Yantai CIMC Raffles**
 Vessels name: **Castorone**
 Hull No: **H216**
 Owner/operator: **Saipem Offshore Norway**
 Country: **Norway**
 Designer: **Wärtsilä Deutschland GmbH Ship Design**
 Country: **Germany**
 Flag: **Bahamas**
 IMO number: **9444194**
 Total number of sister ships already completed (excluding ship presented): **nil**
 Total number of sister ships still on order: **nil**

CASTORONE the World's largest pipelaying vessel was delivered from Yantai CIMC Raffles to Saipem at the beginning of the year. The vessel is designed for the installation of large diameter pipes in deep and ultra-deep water as well as extreme environments, including the Arctic.

Saipem operates one of the largest and most diversified offshore construction fleets, for both conventional and deepwater pipelines. Already the company operates a unique fleet of pipelay vessels, such as *Semac*, *Castoro 6* and *Castoro 7*. With *Castorone* Saipem is aiming for the large gas trunklines and oil export pipelines that operate in difficult environments, deepwater and/or arctic conditions.

The length between the vessel's perpendiculars have also been altered from the original 260m to 266.4m to increase the buoyancy and to give better structural support to the hull at the bow. The vessel was fitted together in the aft sections using two structural skags to support the shaft line. The vessel's resistance and propulsion tests were undertaken at Krylov Shipbuilding Research Institute (KSRI) of St. Petersburg, Russia.

Castorone can S-lay pipes up to 1,524mm in diameter, prefabricating pipe strings 36m long with the capability of joining two by 18m-long pipes as an alternative to three by 12m conventional joints. The vessel is also equipped for the future addition of a fixed tower for 'J' laying pipe. The stinger that has been installed is specifically designed for any pipe diameter and water depth through continuous control of the over-bend stresses in the pipe.

With a handling capacity of over 500m/hr, the vessel's pipe deck receivers, handling and storage systems help to minimise the transfer time between the pipe barge and pipelaying vessel (PLV) holds. For each pipe hold, the system can handle single or multiple pipe holds and pipe stores. The vessel also features a 4,300m² cargo deck.

Castorone has eight main gensets powering it, which are capable of generating 8,400kW x 600rpm,

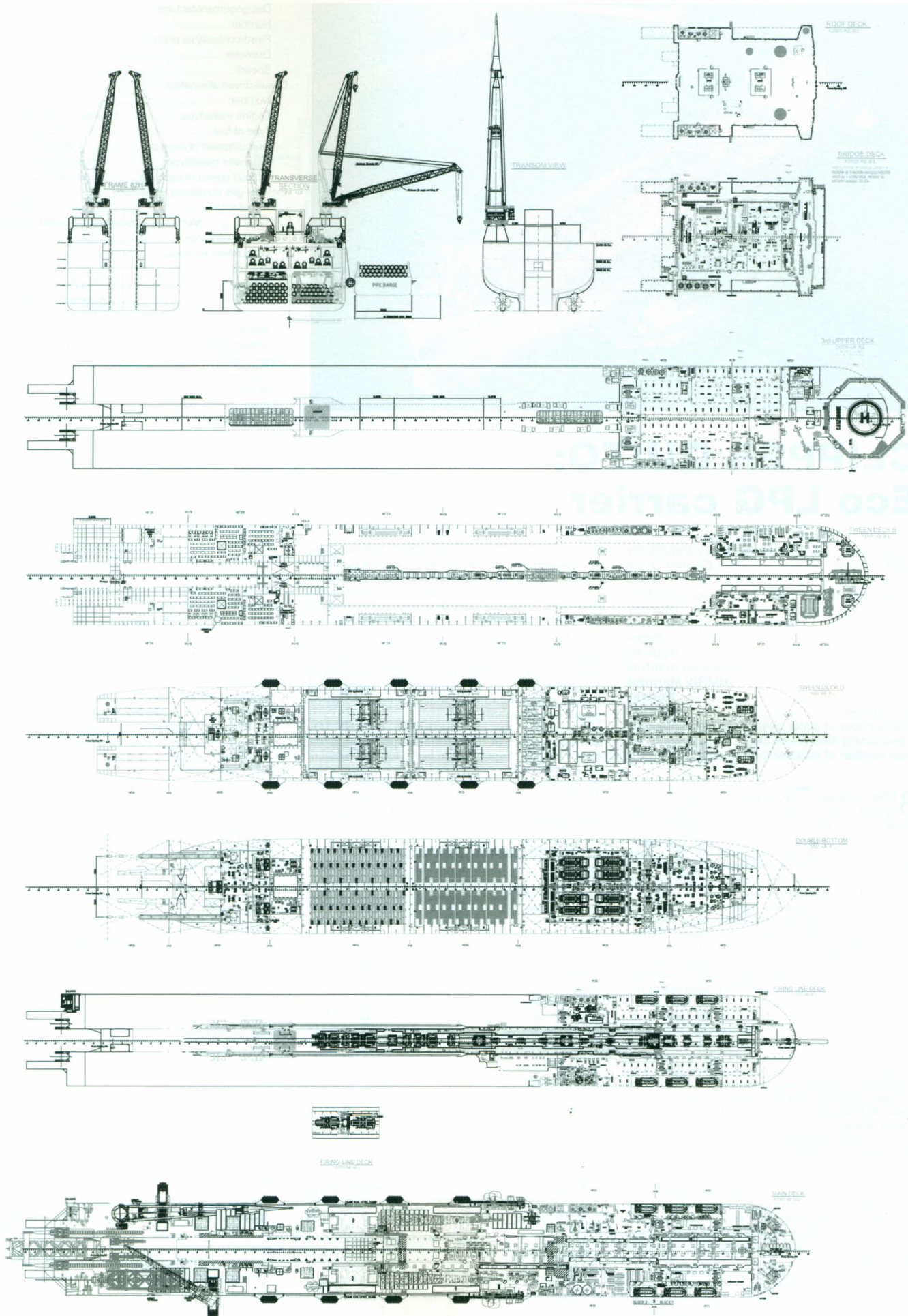
with the power being distributed through two 11kV switchboards. There is also an emergency generator of 1,200kW capacity. The vessel has a maximum operational speed of 14knots and has a bollard pull of 180tonnes.

As Saipem's new flagship, *Castorone* has been contracted for work on three projects in the Gulf of Mexico: Amberjack Pipeline's 219km-long Walker Ridge export pipeline; Enbridge's 60km-long Big Foot lateral export pipeline; and the 350km long Keathley Canyon gas export pipeline. Following completion of that work, the *Castorone* will move to the Santos Basin offshore Brazil to lay Petrobras' Tupi NE Cabiunas 380km-long trunkline in depths to 2,230m.

TECHNICAL PARTICULARS

Length oa: 325.00m
 Breadth moulded: 39.00m
 Depth moulded
 To main deck: 24.00m
 Draught
 Scantling: 10.50m
 Design: 6.50m
 Gross: 56,529gt
 Displacement: 100,000tonnes
 Deadweight
 Scantling: 32,602dwt
 Speed, service: 12.50knots
 Bunkers
 Heavy oil: 7,497m³
 Diesel oil: 2,137m³
 Daily fuel consumption
 Main engine only: 100tonnes/day
 Classification society and notations: ABS +A1, ©, +AMS, +ACCU, TCM, HELIDECK, Ice Class A0 +Baltic Ice 1A, +DPS-3
 Propellers
 Number: 2
 Fixed/controllable pitch: Fixed
 Diameter:
 Speed: Diesel-driven alternators
 Number: 8
 Engine make/type: Wärtsilä 12V38B
 Type of fuel: IFI 180
 Output/speed of each set: 8,700kW x 600rpm
 Alternator make/type: Ansaldo GSCR 10W12
 Output/speed of each set: 8,400kW
 Boilers
 Number: 2 x Composite
 2 x Fire oil
 2 x Exhaust
 Type: Mission OC, UNEX, Mission XS-2V
 Make: Aalborg

Output, each boiler: 6,600kg/h, 5,000kg/h, 3,590kg/h at 8bar
 Cargo cranes/cargo gear
 Number: 1
 Make: Huismann
 Type: 600tonnes OMC
 Performance: 600tonnes x 30m, whip hoist 55tonnes x 72m
 Other cranes
 Number: 4
 Make: Huismann/ Italgru
 Type: 110tonne GMOC gantry crane
 T1200 E pedestal crane
 Knuckle TK820EH
 Tasks: Pipe loading/ service
 Performance: 110tonnes x 42m, 30tonnes x 35m, 25tonnes x 15m
 Mooring equipment
 Number: 20
 Make: Pelligrini
 Type: Electric
 Special lifesaving equipment
 Number of each and capacity: 6 x 15persons
 Make: Noreq
 Type: LBT 935 T
 Hatch covers
 Manufacturer: Navalimpianti
 Type: Upper deck, main deck
 Complement
 Crew: 702
 Number of cabins: 284
 Bow thrusters
 Make: Wärtsilä
 Number: 1
 Output: 2,000kW
 Bridge control system
 Make: Kongsberg
 Type: DP 3 system
 One-man operation: Yes
 Fire detection system
 Make: Autronica
 Type: CS 4000
 Fire extinguishing systems
 Engine room: CO₂/ water
 Cabins: Sprinkler
 Radars
 Number: 2
 Make: Kongsberg
 Waste disposal plant
 Sewage plant: Evac/ MSP VIII
 Contract date: 6 April 2007
 Launch/float-out date: 17 January 2011
 Delivery date: January 2013





CLIPPER QUITO: Eco LPG carrier

Shipbuilder: **Hyundai Heavy Industries**
 Vessel's name: **Clipper Quito**
 Hull No.: **2516**
 Owner/operator: **Solvang ASA**
 Country: **Norway**
 Designer: **Hyundai Heavy Industries**
 Country: **Korea**
 Model test establishment used: **Hyundai Maritime Research Institute (HMRI)/ Marintek**
 Flag: **Norway**
 IMO number: **9630755**
 Total number of sister ships already completed (excluding ship presented): **nil**
 Total number of sister ships still on order: **1**

BEING environmentally friendly is a necessity for all types of vessel, even those who carry oil and oil-based products; companies are now looking to transport their not-so eco-friendly goods in a greener way. Norwegian-based Solvang has 'greened' up its profile with *Clipper Quito* the first in a series of eco-friendly and fuel-efficient very large gas carriers (VLGC) that was delivered from Hyundai Heavy Industries in June.

A 9.5% power saving has been achieved from the design of the hull with hull form development including LWL lengthening and propeller optimisation. The pre-swirl duct which has been fitted is expected to give the vessel a 6% power saving shown through model tests. The electrical supply for the vessel is derived from three diesel driven alternators of 1,200 kW, plus an emergency unit of 130kW.

The vessel's cargo space is divided into four cargo holds. Each hold accommodates a free-standing and saddle supported prismatic cargo tank, designed for a maximum vapour pressure of 0.275bars g and a lowest operating temperature of -50°C. Cargo tanks are insulated with 120mm thick sprayed polyurethane foam with 1-3mm polymeric coating. Fuel oil tanks are constructed in double hull structure to protect the fuel oil tanks from external damage.

Clipper Quito is designed for simultaneous loading and discharging of two grades of cargo, both of which may be refrigerated. It is capable of containing and handling commercial butane (ISO and normal), pure propane, commercial propane (max 5.0 mole % ethane in the liquid phase), mixture of propane and butane in any proportion and propylene, but is also capable of carrying other products, provided that their toxicity, aggressiveness, pressure, temperature and specific gravity are within the limits of the design.

The reliquefaction plant on the carrier can simultaneously handle two grades of refrigerated cargo, and major equipment such as two oil-free, four cylinder three stage cargo compressors, one butane blower and motor are located on main deck in an enclosed deck

house. One cargo heater (combined with vaporiser), one inert gas generator and one nitrogen generator have been installed. Along with three 1,200kW diesel generators, one auxiliary boiler (3,000kg/h), one exhaust gas economiser (1,600kg/h) for main engine and two exhaust gas economisers (300kg/h) for diesel generator engines.

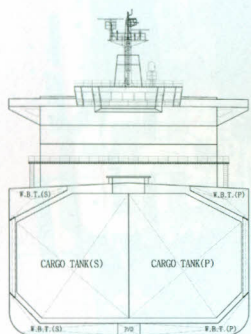
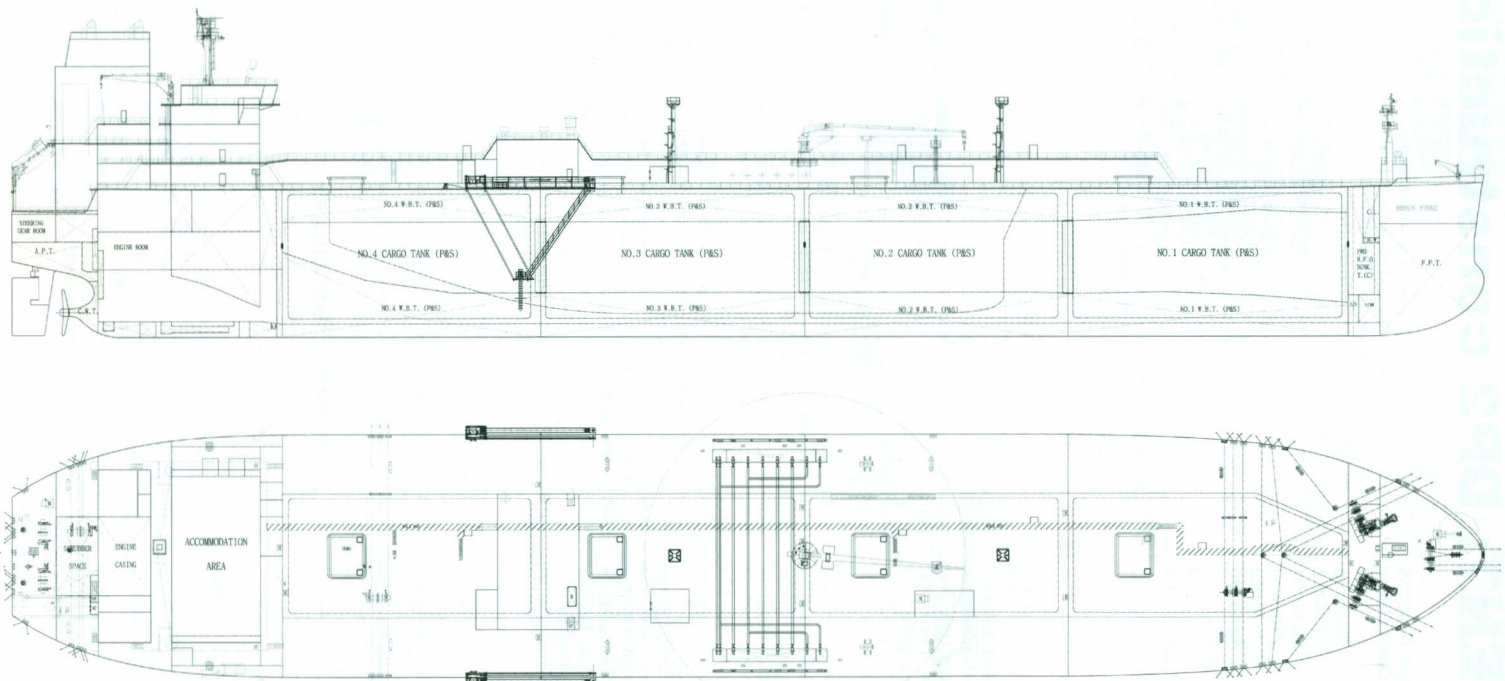
Cargo unloading is done by the two deep well pumps located on each cargo tank, each with a capacity of 600m³/h, allowing for discharge of a full cargo in about 19 hours. Loading a full cargo, at maximum rate of 4,800m³/h from fully refrigerated atmospheric storage is accomplished in about 19 hours based on vapour return to shore.

The exhaust gas cleaning system (EGCS) SOx scrubber installed in the machinery space enables the vessel to continue operating on heavy fuel oil instead of more expensive low sulphur fuel oil such as marine gas oil in order to meet the new IMO regulation, limiting the amount of sulphur in exhaust gas, coming into force in 2015 (SECA, SOx Emission Control Areas) and 2020 (Worldwide).

TECHNICAL PARTICULARS

Length oa: 225.00m
 Length bp: 220.00m
 Breadth moulded: 36.60m
 Depth moulded
 To main deck: 22.20m
 To upper deck: 22.20m
 Width of double skin
 Side: 1.10m
 Bottom: 1.85m
 Draught
 Scantling: 12.00m
 Design: 11.60m
 Gross: 48,920gt
 Deadweight
 Scantling: 54,500dwt
 Block co-efficient: 0.7422
 Speed, service: 16.8knots
 Cargo capacity
 Liquid volume: 84,000m³
 Bunkers
 Heavy oil: 2,750m³
 Diesel oil: 200m³
 Water ballast: 20,800m³
 Daily fuel consumption
 Main engine only: 46.8tonnes/day
 Classification society and notations: DNV
 % high-tensile steel used in construction: 66%
 Main engine
 Model: Hyundai-MAN B&W 6S60MC-C8.1
 Manufacturer: Hyundai-MAN B&W
 Number: 1
 Type of fuel: HFO/MDO/MGO
 Output of each engine: 12,600kW x92.7rpm
 Propeller
 Material: Ni-Al-Bronze

Designer/manufacturer: Hyundai
 Number: 1
 Fixed/controllable pitch: Fixed
 Diameter: 7.4m
 Speed: 16.8knots
 Diesel-driven alternators
 Number: 3
 Engine make/type: Hyundai-Himsen 8H21/32
 Type of fuel: HFO/MDO/MGO
 Output/speed of each set: 1,280kW x 720rpm
 Alternator make/type: Hyundai/ Synchronous
 Output/ speed of each set: 1,200kW x 720rpm
 Exhaust-gas scrubbing equipment
 Manufacturer: Wärtsilä
 Type: Multi-stage, open-loop sea water scrubber
 On main engines: 1
 On auxiliary engines: 1
 Boilers
 Number: 1
 Type: Automatic, forced draft, heavy fuel oil burning, marine boiler
 Make: Kangrim
 Output, each boiler: 3,000kg/h (6kg/cm²)
 Cargo cranes/cargo gear
 Number: 1
 Make: Oriental Precision
 Type: Electro-hydraulic
 Performance: 10tonnes x 10m
 Other cranes
 Number: 2
 Make: Oriental Precision
 Type: Electro-hydraulic
 Tasks: Provisions handling
 Performance: 4tonnes x 10m
 Mooring equipment
 Number: 2 x windlasses
 6 x mooring winches
 Make: Oriental Precision
 Type: Hydraulic, high pressure
 Special lifesaving equipment
 Number of each and capacity: 1 x 32 persons
 Make: Oriental Precision
 Type: Freefall
 Cargo tanks
 Number: 4
 Grades of cargo carried: 2
 Product range: Commercial butane, pure propane, commercial propane, mixture of propane and butane in any proportion, propylene
 Stainless steel: Piping
 Cargo pumps
 Number: 8
 Type: Vertical deepwell, electric motor driven
 Make: Wärtsilä Svanehoj
 Stainless steel: AISI 304
 Capacity: 600m³/h
 Cargo control system
 Make: Kongsberg
 Type: Integrated automation system
 Ballast control system
 Make: Scana
 Type: Integrated automation system
 Water ballast treatment system
 Make: Techcross
 Capacity: ECS 900B x 2
 Complement
 Crew: 15
 Bridge control system
 Make: Kongsberg
 Type: Autochief C20
 One-man operation: Yes
 Fire detection system
 Make: Tyco Marine Services
 Type: Addressable
 Fire extinguishing systems
 Cargo area: NK/ dry powder
 Engine room: NK/ CO₂
 Radars
 Number: 2
 Make: Kongsberg
 Model: 703041/ 703038
 Waste disposal plant
 Incinerator: Hyundai Marine Atlas/ MAXI 100 SL WS
 Sewage plant: Il Seung/ ISS-35N
 Contract date: 10 June 2011
 Launch/float-out date: 12 April 2013
 Delivery date: 26 June 2013





DEEP ORIENT: DP2 construction vessel

Shipbuilder: **Metal Ships & Docks**
 Vessel's name: **Deep Orient**
 Hull No: **294**
 Owner/operator: **Technip**
 Country: **France**
 Designer: **Sawicon**
 Country: **Norway**
 Flag: **Malta**
 IMO number: **9644330**
 Total number of sister ships already completed (excluding vessel presented): **nil**
 Total number of sister ships still on order: **nil**

DEEP Orient is a medium construction vessel that has been designed for subsea construction and flexible pipelay projects. The vessel, constructed at Metal Ships & Docks, Vigo, Spain was delivered to Technip as part of its strategy to expand its fleet flexibility in March.

Thanks to a successful cooperation between Technip's Marine New Builds team in Aberdeen, UK and the MSD team, vessel construction was completed within a tight time frame. The initial contracts were agreed in December 2010 and fabrication, as well as assembly, started in mid-2011. After final outfitting and commissioning, sea trials were successfully completed.

Deep Orient is equipped with a 250tonne main crane, dynamic positioning (DP2) station-keeping capability, two work-class remotely operated vehicles and a large 1,900m² deck area for ample storage of equipment while working on remotely located projects. Moreover, the vessel can accommodate 120 people and complies with the latest marine environmental standards.

The vessel has the capability to work in deepwater locations and carry large payloads on the reinforced back deck. Deep Orient is fitted with two roll reduction tanks, one aft and one forward in the accommodation block. The progressive filling of these tanks helps to minimise vessel motion, making the vessel stable in a range of loaded conditions – maximising its workability and that of the crane.

The main deck has been reinforced to accommodate up to 15tonnes/m² uniform load across the entire 1,900m² working deck area. Additionally, Deep Orient has local reinforcement around the moonpool to accommodate loads imposed from a flexlay tower such as VLS7. The active heave compensated/constant tension crane has been supplied by Huisman. This crane enables the vessel to lift and install project structures with acute accuracy, meeting the client's requirements. The crane is rated to 3,000m with a maximum offshore lift weight of 200tonnes in air. The crane has an enhanced harbour mode to allow the lifting of 250tonnes during mobilisation alongside.

Deep Orient has two remotely operated vehicles (ROVs), which are Triton XLX 150 that have 150hp and can go down to 3,000m water depth. Both vehicles are launched from a hangar via an overhead rail gantry system. The ROV umbilical winches are active heave compensated to increase the sea state workability of the system.

The vessel is equipped with a fully redundant Kongsberg DP-2 class dynamic positioning system with up to eight independent reference systems,

enabling the vessel to maintain position during a variety of offshore activities and sea states. There are two HIPAP 500 (high precision acoustic positioning system) units installed in separate trunks port and starboard, along with a taught wire and Cyscan. The vessel is also fitted with four differential global positioning systems.

Deep Orient is powered by a diesel-electric power plant consisting of four Wärtsilä generator sets of 3,840kW each. Power is fed to two main distribution boards for use around the vessel and for propulsion; these are operated in a totally different split mode during DP operations for increased redundancy. The two main electric, controllable pitch azimuthing 'Azipull' thrusters at the aft of the vessel produce a total of 7,000kW power. There is a forward retractable azimuthing thruster, which produces 1,500kW and two forward transverse tunnel thrusters producing 1,500kW each.

The accommodation onboard the vessel can cater for up to 120 personnel. Onboard facilities include full medical, office, conference, gym. The accommodation is fully compliant with DNV's comfort class C(2) V(3) requirements for worldwide operations with respect particularly to amenity and noise standards and is also fully IPS compliant. A helideck and reception is provided for personnel transfers. The helideck is internationally classed to CAA standard and is suitable for helicopter operations worldwide.

Deep Orient is fitted with the latest measures to reduce the potential impact of vessel emissions on the environment. The vessel has a NOx reducing selective catalytic reduction (SCR) system supplied by Wärtsilä, bringing emissions down to IMO Tier III levels and has DNV CLEAN DESIGN class notation.

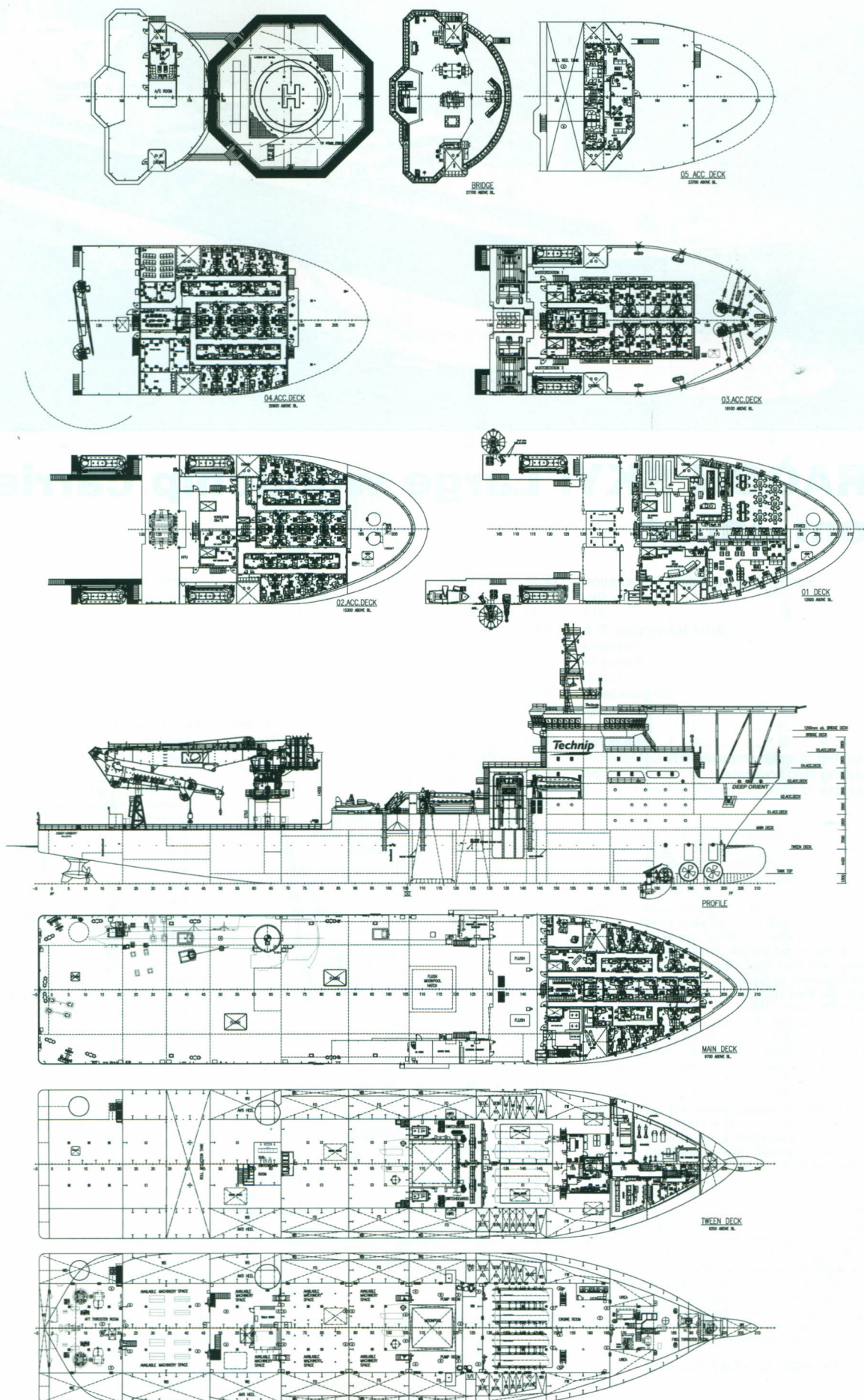
Technip was awarded by Sarawak Shell Berhad an engineering, procurement, construction, installation and commissioning contract for two new gas-export lines at the Laila and D12 fields, respectively located 50km Northwest of Miri, at a water depth of 75m, and 140km offshore Bintulu, Malaysia, at a water depth of 50m, which Deep Orient has been contracted to work on. The contract covers the design, fabrication and installation of a 5km flexible pipe and a 10km flexible pipe respectively of 177.79mm and 325.12mm diameters, diver installation of riser clamps at both jacket platforms, pre-commissioning of the two flowlines and project management.

Technip's operating centre in Kuala Lumpur, Malaysia, is executing the contract, which is scheduled to be completed in the first semester of 2014. The flexible flowlines will be manufactured at Technip's Asiaflex Products plant, in Tanjung Langsat, Malaysia.

TECHNICAL PARTICULARS

Length oa: 135.65m
 Length bp: 120.40m
 Breadth moulded: 27.00m
 Depth moulded
 To main deck: 9.70m
 Draught
 Scantling: 6.85m
 Design: 6.85m
 Gross: 12,113gt
 Displacement: 16,828tonnes
 Lightweight
 Design: 6,450dw

Speed, service: 14knots
 Bunkers
 Diesel oil: 2,200m³
 Classification society and notations: DNV +1A1, DYNPOS-AUTR, E0, DK(+), CLEAN DESIGN, COMF-V(3), NAUT-OSV A), HELDK, BIS
 Heel control equipment: 2 x Framo 600m³/h heel reduction pumps
 Roll-stabilisation equipment: 2 x passive roll reduction tanks
 Main engines
 Design: Diesel electric generators
 Model: 9L32
 Manufacturer: Wärtsilä
 Number: 4
 Type of fuel: MGO
 Output of each engine: 3,840kW
 Propellers
 Type: Electric driven thrusters
 Number: 2 x main aft propulsion
 azipull thrusters 3,300kW
 1 x fwd electrical driven
 retractable azimuth thruster 1,500kW
 2 x fwd electrical driven tunnel thrusters 1,500kW
 Designer/manufacturer: Rolls-Royce
 Exhaust gas scrubbing equipment
 Manufacturer: Wärtsilä
 Type: Selective catalytic reduction (SCR)
 On main engines: Yes
 Cargo cranes/cargo gear
 Number: 1
 Make: National Oilwell Varco
 Type: 250tonnes knuckle boom offshore
 subsea AHC/CT crane
 Performance: 3,000m of wire
 Other cranes
 Number: 2
 Make: TTS
 Type: Fixed boom crane
 Tasks: Provision crane
 Performance: 5tonnesx 12m
 Mooring equipment
 Number: 2 x Windlass fwd
 2 x Mooring winch aft
 Make: Ibercisa
 Type: Fwd hydraulic, aft electric
 Special lifesaving equipment
 Number of each and capacity: 4 x 60 persons
 4 x 60 persons
 Make: FRB Norsafe Magnum 750
 Type: Lifeboat/liferaft
 Complement
 Crew: 21
 Accommodation capacity: 120
 Bow thruster
 Make: Wärtsilä
 Number: 3
 Output: 1,500kW
 Bridge control system
 Make: Wärtsilä
 Type: IAS
 One-man operation: Yes
 Fire extinguishing systems
 Engine room: Water mist
 Radars
 Number: 2
 Contract date: December 2010
 Launch/float-out date: June 2012
 Delivery date: March 2013





DRAGON SKY: Large woodchip carrier from Japan

Shipbuilder: .. **Sanoyas Shipbuilding Corporation**
 Vessel's name: **Dragon Sky**
 Hull No: **1311**
 Owner/operator: **Alba Navigation S.A**
 Country: **Panama**
 Designer: **Sanoyas**
 Country: **Japan**
 Model test establishment used: **Shipbuilding Research Centre of Japan**
 Flag: **Panama**
 IMO number: **9539250**
 Total number of sister ships already completed (excluding ship presented): **nil**
 Total number of sister ships still on order: **2**

THE woodchip carrier *Dragon Sky* was built at Sanoyas Mizushima Shipyard, Japan and was delivered to Ocean Woodland Shipping Co., Ltd in February. *Dragon Sky* has been built with an exceptionally large cargo hold for this vessel type and also features energy saving devices to improve its propulsion efficiency. The vessel is the first in a series of three vessels.

The vessel is a Sanoyas 121,000m³ type woodchip carrier with a wide beam and shallow draught, with one of the largest cargo hold capacities in the world. This vessel is said to be the first vessel to apply the fuel oil tank protection regulation and the Performance Standard for Protective Coatings (PSPC) of the IMO.

The vessel has a flush deck with the engine room and accommodation block located at the aft of the vessel. The cargo space is divided into six holds, the structures of which are designed and arranged for efficient loading and unloading of woodchips. This type of vessel has a greater depth than a conventional bulk carrier of the same deadweight class, as it is designed to carry low-density cargoes such as woodchips.

To help improve the propulsion efficiency the vessel is equipped with a low-speed, long-stroke main engine combined with an energy efficient propeller. A Sanoyas Tandem Fin (STF) device has been fitted to the stern of the ship, which the company has claimed can give energy saving of up to 6% and helps cut the vessel's CO₂ emissions accordingly.

Dragon Sky is fitted with a 975t/h woodchip unloader, three deck cranes and four hoppers have been installed between the cargo hatches. The main belt conveyor that moves the cargo into the holds has been laid from the fore to the aft over the main deck; a shuttle conveyor is fitted on the bow to unload woodchip from the ship to a shore facility. The cargo handling equipment has been designed for quick and safe unloading. The cargo hatch covers are of folding type driven by the electro-hydraulic system.

TECHNICAL PARTICULARS

Length oa: 209.99m
 Breadth moulded: 37.00m

Depth moulded
 To main deck: 22.85m
 To upper deck: 22.85m
 Width of double skin
 Bottom: 1.94m
 Draught
 Scantling: 11.90m
 Gross: 49,718gt
 Deadweight
 Scantling: 63,415dwt
 Speed, service: 14.6knots
 Cargo capacity
 Grain: 121,605m³
 Bunkers
 Heavy oil: 3,160m³
 Diesel oil: 210m³
 Water ballast: 29,960m³
 Classification society and notations: ClassNK NS* (BC-XII, PSPC-WBT) MNS*, M0 and Chapter 20 of Part C in the rule "relaxation from requirements where the ship has an unusually large freeboard"

Main engine
 Design: Mitsui Engineering & Shipbuilding Co., Ltd
 Model: MAN B&W 6S50MC-C Mark 7
 Manufacturer: Mitsui Engineering & Shipbuilding Co., Ltd
 Number: 1
 Type of fuel: HFO or MDO
 Output of each engine: 9,480kW x 127rpm
 Propeller
 Material: Ni-Al-Bronze
 Designer/manufacturer: Nakashima Propeller Co., Ltd
 Number: 1
 Fixed/controllable pitch: Fixed
 Special adaptations: Propeller Boss Cap Fins (PBCF)
 Diesel-driven alternators
 Number: 3
 Engine make/type: Yanmar Co., Ltd
 Type of fuel: HFO or MDO
 Output/speed of each set: 800kW x 720rpm
 Alternator make/type: Taiyo Electric Co., Ltd
 Output/speed of each set: 720kW x 720rpm
 Boilers
 Number: 1
 Type: GK-2028-1000/800
 Make: Miura Co., Ltd
 Output, each boiler: Oil burning 1,000kg/h Exh. Gas 800kg/h

Cargo cranes/cargo gear
 Number: 3
 Make: Iknow machinery Co., Ltd
 Type: Electric driven fixed type jib crane

Performance: 14.7tonnes x 28-8.5m
 Other cranes
 Number: 4
 Make: Kyoritsu Kikai Co., Ltd
 Type: 2 x Electric motor driven jib crane
 2 x Air motor driven fixed davit
 Tasks: Engine parts, provisions handling, hose handling
 Performance: 3tonnes x 10m, 0.95tonnes x 6m, 0.5tonnes x 1.2m

Mooring equipment
 Number: 2 x windlass, 6 x mooring winches
 Make: Kawasaki Heavy Industries
 Type: Electro-hydraulic driven
 Special lifesaving equipment
 Number of each and capacity: 2 x 28 persons
 Make: NISHI-F Co., Ltd
 Type: Enclosed

Hatch covers
 Design: Iknow Machinery
 Manufacturer: Iknow Machinery
 Type: End folding type

Doors/ramps/lifts/movable car decks
 Number of each: 2 x side port door
 Type: Under hinged type
 Designer: Kyoritsu Kikai Co., Ltd

Ballast control system
 Make: Nakakita Seisakusho Co., Ltd
 Type: Electric-hydraulic valve remote operation system
 Complement
 Crew: 18
 Stern appendages/special rudders: STF (Sanoyas Tandem Fin), Surf Bulb

Bridge Control System
 Make: BMS-2000III
 Type: Mitsuzosen Systems Research INC.

Fire detection system
 Make: Nohmi Bosai Ltd
 Type: FAC513-P4

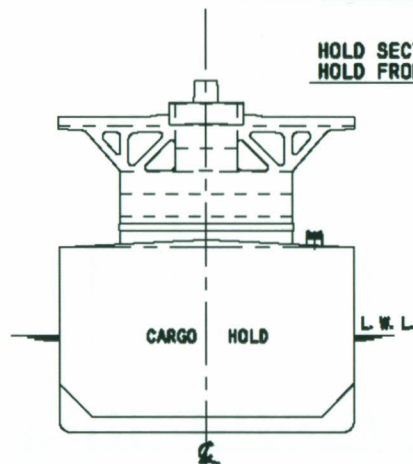
Fire extinguishing systems
 Cargo holds: Air Water Safety Service Inc/ CO₂
 Engine room: Kashiwa Co., Ltd/ High expansion foam
 Cabins/public spaces: Sea water

Radars
 Number: 2
 Make: Japan Radio
 Models: JMA-9132-SA, JMA-9122-9XA

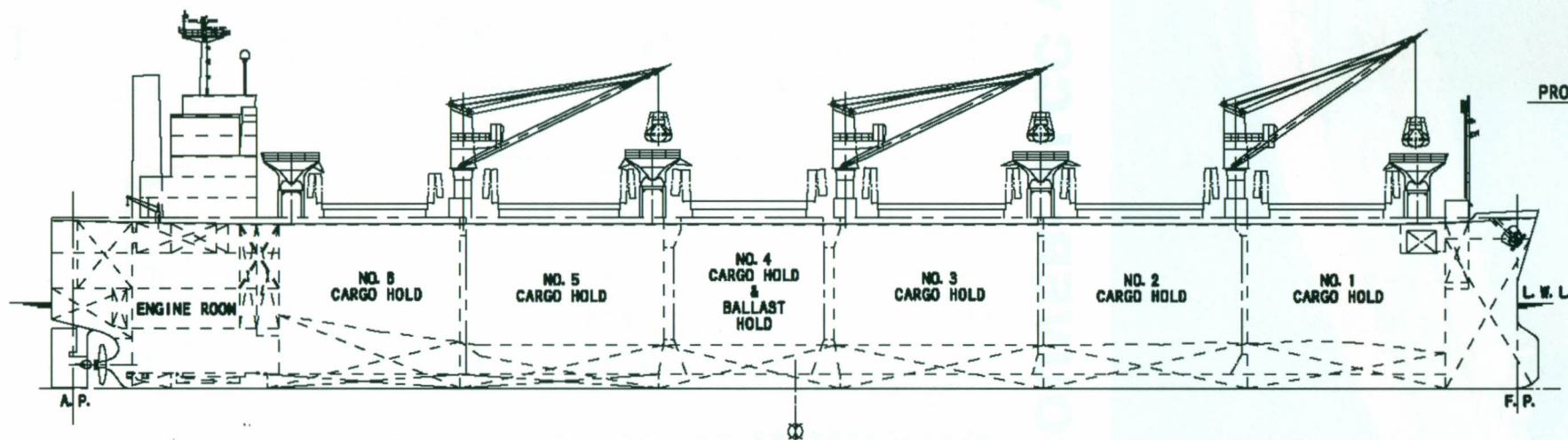
Waste disposal plant
 Incinerator: Sunflame Co., Ltd/ OSV-600SDAI
 Sewage plant: Taiko Kikai Industries/ SBH-40

Contract date: 12 May 2008
 Launch/float-out date: 8 August 2012
 Delivery date: 26 February 2013

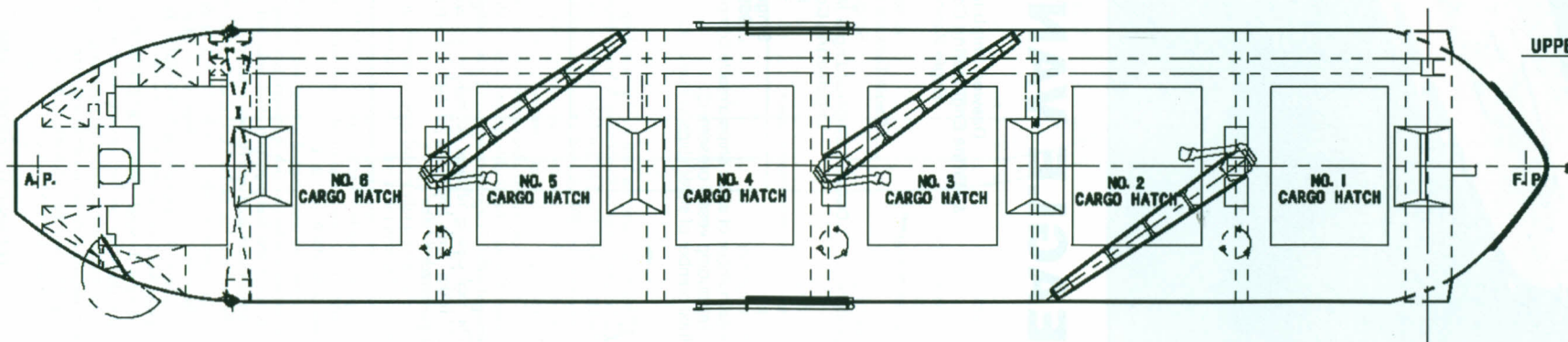
**HOLD SECTION
HOLD FRONT VIEW**



PROFILE



UPPER DECK





EAGLE VANCOUVER: VLCC with BWTS

Shipbuilder: **Daewoo Shipbuilding & Marine Engineering Co., Ltd**
 Vessel's name: **Eagle Vancouver**
 Hull No: **5380**
 Owner/operator: **American Eagle Tankers (AET)**
 Country: **Singapore**
 Designer: **Daewoo Shipbuilding & Marine Engineering Co., Ltd**
 Country: **Korea**
 Model test establishment used: **SSPA**
 Flag: **Singapore**
 IMO number: **9597240**
 Total number of sister ships already completed (excluding vessel presented): **2**
 Total number of sister ships still on order: **nil**

EAGLE Vancouver was built for American Eagle Tankers Inc. Ltd by Daewoo Shipbuilding & Marine Engineering (DSME), delivered in July, amid the debate of the ballast water convention (BWMc) still waiting to be ratified, at the time, along with concerns for ballast water treatment capacity of these larger vessels. *Eagle Vancouver* is one of the first VLCCs to be built with a ballast water system fitted onboard.

Eagle Vancouver has double skinned cargo holds and is arranged with 17 cargo oil tanks and 12 water ballast tanks. The total capacity of cargo oil tanks is approximately 357,000m³ with heavy fuel oil tanks of capacity of approximately 8,100m³.

The vessel has a fully welded upper deck with aft sunken deck, a raked stem with a bulbous bow, a transom stern with open water type stern frame, a semi-balanced rudder and a fixed-pitch propeller directly driven by a MAN B&W 7S80MC-C8.2 slow-speed diesel engine with maximum rating of 26,900kW at 75.8rpm.

The vessel has been designed to meet with environmental regulations with features such as enlarged grey water holding tank, full double hull protection of oil tanks, ballast water treatment system, and Green Passport notations.

The hull form has also been optimised for a wide range of the vessel's operations. Also, a variety of energy saving devices have been fitted, such as a Pre-Swirl Stator (PSS), weather routing and trim optimisation system, rudder bulb, and Propeller Boss Cap Fins (PBCF).

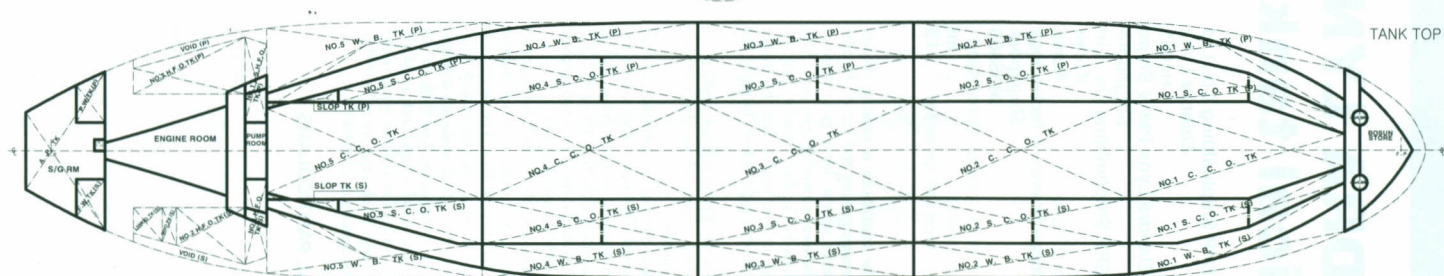
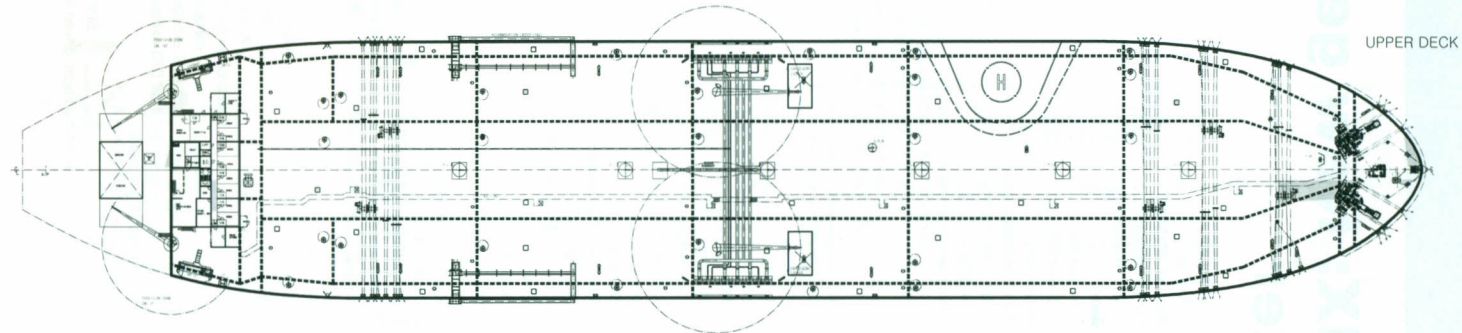
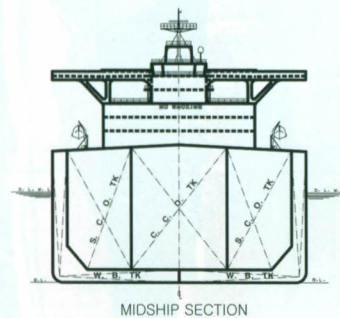
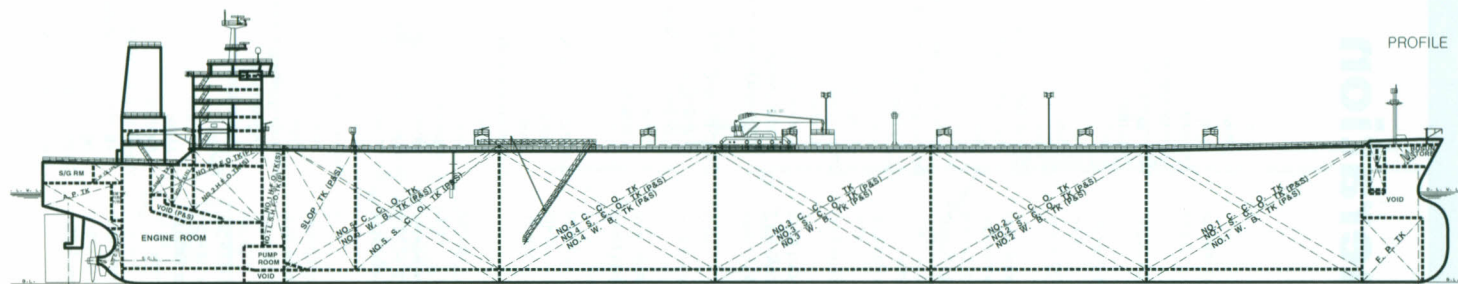
Adding to the vessel's green credentials is the derated main engine that offers low fuel consumption, however, all the auxiliary machinery including the propeller and shaft have been designed at the full nominal rating of the main engine. The speed of the vessel is 15.8knots at the designed draught of 21.0m on even keel at 85% MCR.

TECHNICAL PARTICULARS

Length oa: 333.00m
 Length bp: 320.00m
 Breadth moulded: 60.00m

Depth moulded
 To main deck: 30.50m
 To sunken deck: 27.37m
 Width of double skin
 Side: 3.40m
 Bottom: 3.00m
 Draught
 Scantling: 22.50m
 Design: 21.00m
 Gross: 161,974gt
 Deadweight
 Design: 292,880dwt
 Scantling: 319,580dwt
 Speed, service: 15.8knots
 Cargo capacity
 Oil cargo: 357,000m³
 Bunkers
 Heavy oil: 8,100m³
 Diesel oil: 500m³
 Water ballast: 97,000m³
 Tankers segregated ballast: 93.7%
 Daily fuel consumption
 Main engine only: 91.5tonnes/day
 Classification society and notations: GL + 100A5E, Container Ship, +MC E, AUT, IW, DG, NAV-O, RSD, STAR, EP, CM (shaft monitoring)
 % high-tensile steel used in construction: 48%
 Main engines
 Design: MAN B&W
 Model: 7S80MC-C8.2
 Manufacturer: Doosan Engine
 Number: 1
 Type of fuel: HFO/MDO & LSMGO
 Output of each engine: 26,900kW x 75.8rpm
 Propeller
 Material: Ni-Al-Bronze
 Designer/manufacturer: DSME/MMG
 Number: 1
 Fixed/controllable pitch: Fixed
 Diameter: 9.9m
 Speed: 71.8rpm
 Diesel-driven alternator
 Number: 3
 Engine make/type: Hyundai HiMSEN 6H21/32
 Type of fuel: HFO, MDO & LSMGO
 Output/speed of each set: 1,320kW x 900rpm
 Alternator make/type: HHI
 Output/ speed of each set: 1,250kW x 900rpm
 Boilers
 Number: 2
 Type: Vertical, water tube
 Make: Alfa Laval - Aalborg
 Output, each boiler: 40,000kg/h at 20bar

Other cranes
 Number: 2
 Make: Oriental
 Type: Electro-hydraulic, luffing jib type
 Performance: 20tonnes
 Mooring equipment
 Number: 2 x windlass
 8 x mooring winches
 Make: TTS-Kocks
 Type: Electro-hydraulic high pressure
 Special lifesaving equipment
 Number of each and capacity: 2 x 40 persons
 Make: Hyundai Lifeboat
 Type: Conventional
 Cargo tanks
 Number: 15 + 2 slop tanks
 Grades of cargo carried: 3
 Cargo pumps
 Number: 3
 Type: Centrifugal, vertical, single stage, direct coupled steam turbine
 Make: Shinko
 Capacity: 5,500m³/h
 Cargo control system
 Make: Kongsberg Maritime
 Type: Radar beam type cargo monitoring
 Ballast control system
 Make: Scan-jet Macron
 Type: Electro-pneumatic type level gauging
 Water ballast treatment system
 Make: Techcross
 Capacity: 6,000m³/h
 Complement
 Crew: 17
 Bridge control system
 Make: Kongsberg Maritime
 Type: AC C20
 One-man operation: Yes
 Fire detection system
 Make: Consilium
 Type: Addressable type
 Fire extinguishing systems
 Cargo holds: NK/ Foam
 Engine room: NK/ Foam
 Radars
 Number: 3
 Make: JRC
 Model: JMA-9100s
 Integrated bridge system
 Make: JRC
 Model: JAN-901s
 Contract date: 20 July 2010
 Launch/float-out date: 7 October 2012
 Delivery date: 16 July 2013





ELANDRA LYNX: New generation chemical tanker

Shipbuilder: SPP Shipbuilding Co., Ltd
Vessel's name: **Elandra Lynx**
Hull No.: **H4085**
Owner/operator: **Elandra Lynx Pte/V Ships**
Country: **Singapore**
Designer: **SPP Shipbuilding Co., Ltd**
Country: **Korea**
Model test establishment used: **Korea**
Institute of Ocean Science & Technology
Flag: **Singapore**
IMO number: **9635808**
Total number of sister ships already completed
(excluding ship presented): **nil**
Total number of sister ships still on order: **13**

KEEPING up with the regulations is making owners strive to make their vessels greener and leaner. *Elandra Lynx* is the first in a series of the latest generation of 50,300dwt oil product/chemical tanker designs from SPP that was delivered to V Ships in October. *Elandra Lynx* was originally ordered as series of five vessels, but the owner exercised the option for a further eight vessels, bringing the total up to 13 ships.

The shipyard has said that this first generation vessel is 1.5 times more efficient when compared to the previous generation of 50,000dwt tankers.

To get these efficiency gains the yard has optimised the hull form at the fore/aft of the vessel. The power / rpm ratio of the main engine has also been designed to attain better fuel oil efficiency. *Elandra Lynx* has satisfied the final phase of EEDI (Phase 3 / 2025-Onwards) in its sea trial. The vessel received its certificate of EEDI issued by Lloyd's Register.

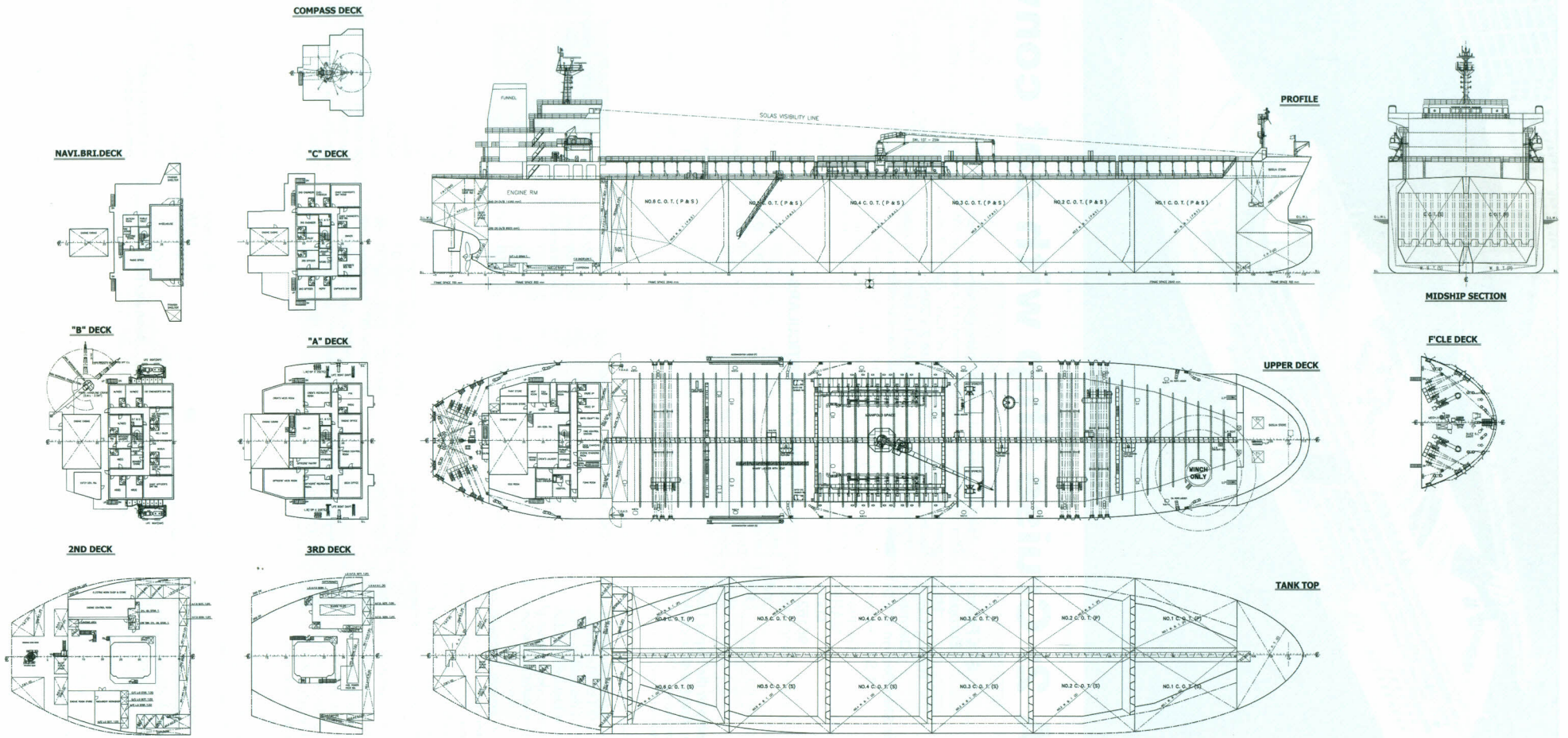
The vessel is an ocean going 50,300dwt Kamsarmax tanker, which can load type 2 & 3 cargoes with a bulbous bow, transom stern and a continuous deck. The cargo areas consist of six pairs of cargo oil tanks, one pair of slop tanks and one residue tank. The heavy fuel oil tanks are arranged in engine room and top side wing tanks. And there are six pairs of water ballast tanks. The vessel is fitted with an MAN B&W Licensed 6S50ME-b8.2 (Tier II) that has a power output of 7,240kW. The cargo holds capacity is 54,092m³ with the water ballast tanks capacity at 22,406m³.

TECHNICAL PARTICULARS

Length oa: 183.00m
Length bp: 174.00m
Breadth moulded: 32.20m
Depth moulded
To main deck: 19.10m
To upper deck: 19.80m
Width of double skin
Side: 2.00m
Bottom: 2.15m
Draught
Scantling: 13.30m
Design: 11.00m
Gross: 29,000gt
Displacement: 60,958tonnes

Deadweight
Design: 49,999dwt
Block co-efficient: 0.818
Cargo capacity
Liquid volume: 54,092m³
Bunkers
Heavy oil: 1,258.3m³
Diesel oil: 115m³
Water ballast: 22,421m³
Daily fuel consumption
Main engine only: 28.14tonnes/day
Auxiliaries: 4.39tonnes/day
Classification society and notations: LR +100A1, Double
Hull Oil Tank and Chemical Tanker, Ship Type 2,
CSR, ESP, ShipRight(CM, ACS(B)), LI, *IWS,
SPM, +LMC, UMS, with descriptive notes
ShipRight (BWMP(S), SCM), Pt, Ht, Green Passport
% high-tensile steel used in construction: 47%
Roll stabilisation equipment: Bilge Keel
Main engine
Design: STX MAN B&W
Model: 6S50ME-B9.2
Manufacturer: STX Heavy Industries
Number: 1
Type of fuel: HFO
Output of each engine: 7,240kW x 99rpm
Propellers
Material: Ni-Al-Bronze
Designer/manufacturer: Sila Metal
Number: 1
Fixed/controllable pitch: Fixed
Diameter: 6.4m
Speed: 99rpm
Diesel-driven alternators
Number: 3
Engine make/type: Yanmar
Type of fuel: HFO
Output/speed of each set: 970kW x 900rpm
Alternator make/type: Taiyo Electric/ FE 547C-8
Output/speed of each set: 900kW x 900rpm
Boilers
Number: 2
Type: Water tube/ composite
Make: SPP Machine Tech
Output, each boiler: Aux boiler 1,800kg/h
Comp boiler (oil fired 1,200kg/h/
exhaust gas 400kg/h)
No1 D/G exhaust gas 190kg/h/
No2 D/G exhaust gas 190kg/h
Cargo cranes/cargo gear
Number: 1
Make: SPP Machine Tech
Type: Electro-hydraulic driven luffing jib crane
Performance: 10tonne x 25m
Other cranes
Number: 1

Make: SPP Machine Tech
Type: Electric motor driven luffing jib type
Tasks: Provisions crane
Performance: 3.5tonnes x 8m/2.8m
Mooring equipment
Number: 2 x Windlass
5 x Mooring winch
1 x SPM winch
Make: Flutek
Type: Electric-hydraulic motor driven
Special lifesaving equipment
Number of each and capacity: 2 x 26 persons
Make: Norsafe
Type: FRP enclosed
Vertical or sloping chutes: Vertical
Doors/ramps/lifts/movable car decks
Number of each: 121
Type: Joiner door, steel door
Designer: Sung-Mi, Kwang-Lim
Cargo tanks
Number: 6
Grades of cargo carried: Ship type 2 7 3 cargoes
Product range: Ship type 2 7 3 cargoes
Make and type of coating: Chugoku Marine/
Phenol Epoxy
Cargo pumps
Number: 15
Type: Submerged, centrifugal, hydraulic driven
Make: Framo
Capacity: cargo pump 600m³/h x 125mlc
Slop pump 300m³/h x 125mlc
Residual pump 100m³/h x 125mlc
Cargo control system
Make: Emerson
Type: Piano type
Ballast control system
Make: Emerson
Type: Piano type
Complement
Crew: 14
Bridge control system
Make: Nabtesco
Type: M-800-III main engine remote control
Fire detection system
Make: Consilium
Type: SG26180
Fire extinguishing systems
Engine room: Fain/ CO₂
Public spaces: Il-Jin/ KS2000
Radars
Number: 2
Make: JRC
Models: JMA-9132-SA/ JMA-9122-9XA
Waste disposal plant
Incinerator: Hyundai Marine Machinery/ MAXI NG100SL
Sewage plant: Il Seung/ ISS-35N
Contract date: 8 July 2011
Launch/flout-out date: 26 July 2013
Delivery date: October 2013





EUROPA 2: Cruise ship with cat convertor

Shipbuilder: **STX France**
 Vessel's name: **Europa 2**
 Hull No: **H33**
 Owner/operator: **Hapag-Lloyd**
 Country: **Germany**
 Designer: **Partner Ship Design (PSD) & STX France**
 Country: **Germany**
 Model test establishment used: **MARIN**
 Flag: **Malta**
 IMO number: **9616230**
 Total number of sister ships already completed (excluding ship presented): **nil**
 Total number of sister ships still on order: **nil**

EUROPA 2 is the latest flagship in the Hapag-Lloyd cruise fleet that has been fitted with a catalytic convertor to reduce its NOx emissions. The vessel was constructed at STX France and delivered to its owner in April.

Europa 2 is claimed to be the first newbuild in the world to have a catalytic converter fitted to its diesel engines, with a performance equivalent to the IMO Tier III requirements, reducing its NOx emissions by 95%; the catalytic converter is supplied by Metso. Other green highlights include an advanced wastewater treatment plant, desalination plant, LED lighting, and comprehensive waste separation and disposal facilities aboard.

The Metso DNA automation system integrates the management of the electric power plant, monitoring the various controls in the fire, bilge, ballast, ballast water treatment, fuel oil filling and transfer, sea and fresh water cooling, swimming pools, engine room ventilation, propulsion, incinerator, boiler, fresh water production and black and grey water systems.

Through the Metso DNA system operators have a full monitoring overview and access to the control functions of the integrated systems. They also have at hand an Information Management System that includes supporting documents and versatile trending, replay and analysing tools.

The vessel has 11 decks, deck 3 being the Bulkhead deck. Deck 4 is the main public spaces deck with an outstanding deck height over 4.5m in some areas, which is almost never achieved in modern cruise liners. The main pool is located on deck 9 inside a two-deck mezzanine/magrodome area. All outside decks including balconies are covered with real wood of the highest quality.

Significant design and testing investment was carried out to obtain an optimised hull and propulsion combination with low resistant hull forms and high efficiency twin pod propulsion. The ship features a triple fuel system capable of dealing with low sulphur fuel oil and diesel oil, with rapid change over to manage the shift to cleaner fuels when entering an environment protected area.

Black and grey waters are treated with an Alfa Laval waste water treatment plant that has a capacity of 250m³/h, fulfilling latest requirements and the ballast water is processed in an IMO approved treatment system in anticipation of the Regulation.

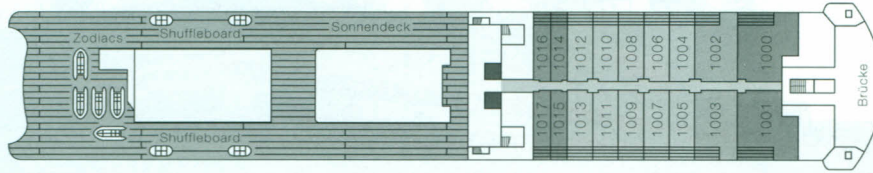
The ship is equipped with 258 passenger suites of at least 28m², which all offer a spacious veranda of at least 7m². 38 grand suites have an interior area of 42m². Europa 2 also features seven family apartments of 2 x 20m². The vessel carries zodiacs stored on the aft of deck 10. These zodiacs can easily be launched via dedicated cranes to offer guests an outstanding expedition and leisure experience. During the vessel's sea trials the ship demonstrated good passenger comfort performance with silent and vibration free accommodation spaces.

TECHNICAL PARTICULARS

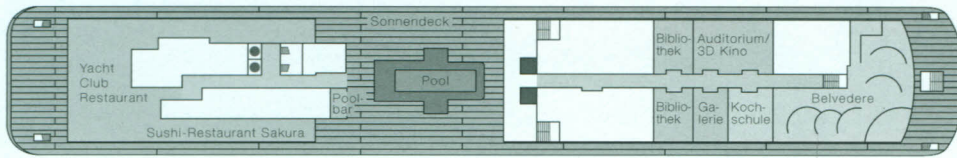
Length: 225.00m
 Length bp: 205.00m
 Breadth moulded: 26.70m
 Depth moulded
 To Deck 4: 12.50m
 To Deck 9: 27.25m
 Width of double skin
 Bottom: 1.50m
 Draught
 Scantling: 6.50m
 Design: 6.30m
 Gross: 42,830gt
 Displacement: 23,000tonnes
 Lightweight: 19,000tonnes
 Deadweight
 Design: 40,000dwt
 Scantling: 50,000dwt
 Block co-efficient: 0.65
 Speed, service: 21.6knots
 Bunkers
 Heavy oil: 1,000m³
 Diesel oil: 600m³
 Water ballast: 2,000m³ + 2 x 150m³ (heeling tanks)
 Classification society and notations: GL*100, A5, E1, IW NAV-OC, Passenger ship, *MC, AUT RP3-50%, EP
 % high-tensile steel used in construction: 33%
 Heel control equipment: 2 x 150m³ heeling tanks
 Roll stabilisation equipment: 2 x 14m³ active fins
 Main engines
 Model: M43C 6 cylinder
 Manufacture: MaK
 Number: 4
 Type of fuel: HFO, MDO
 Output of each engine: 6MW
 Propellers
 Material: Cu-Ni-Al
 Designer/manufacture: Mermaid/ Rolls-Royce
 Number: 2
 Fixed/controllable pitch: Fixed
 Diameter: 4.6m
 Speed: 160rpm
 Diesel-driven alternators
 Number: 4
 Engine make/type: MAK

Output/speed of each set: 514rpm
 Alternator make/type: Jeumont
 Boilers
 Number: 2
 Type: Unex CHB-6000 HE
 Make: Aalborg
 Output, each boiler: 6tonnes/h
 Other cranes
 Number: 2 deck cranes + 2 knuckle boom cranes
 Make: Davit International/ Palfinger
 Type: C-SH 20/2.8/ PK 3200 2 MC
 Tasks: Loading for stores/ Zodiac handling
 Performance: 2tonnes x 13m/ 1tonnes x 11.3m
 Mooring equipment
 Number: 6 x winches
 2 x combined winch/windlass
 Make: Hatlapa
 Type: Electric
 Special lifesaving equipment
 Number of each and capacity: 4 x combined
 tender/lifeboat
 28 x rafts
 Type: Davit launched
 Ballast water treatment system
 Make: Alfa Laval
 Capacity: 250m³/h
 Complement
 Officers: 32
 Crew: 416
 Passengers
 Total: 544
 Number of cabins: 258
 Percentage/number outboard: 100%
 Bow thrusters
 Make: Brunvoll
 Number: 2
 Output: 1,500kW
 Bridge control system
 One-man operation: Yes
 Fire detection system
 Make: Consilium
 Type: Salvico CCP
 Fire extinguishing systems
 Engine room: Water mist
 Cabins/ public spaces: Water mist
 Radars
 Number: 2
 Make: SAM Electronics
 Integrated bridge system
 Make: SAM Electronics
 Model: NACOS Platinum
 Waste disposal plant
 Waste handled: food waste/bio waste / sewage
 Incinerator: Deerberg
 Waste compactor: Deerberg
 Waste shredder/crusher: Deerberg
 Sewage plant: Triton
 Contract date: 4 November 2010
 Launch/float-out date: 5 July 2012
 Delivery date: 26 April 2013

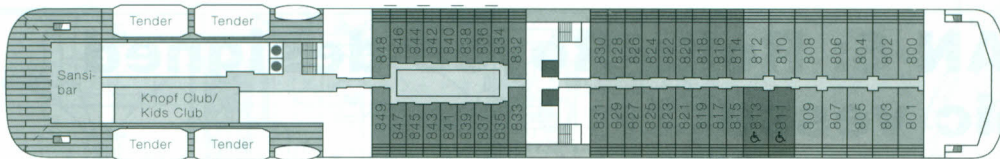
Deck 10



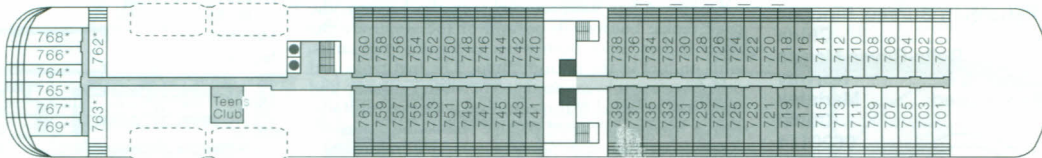
Deck 9



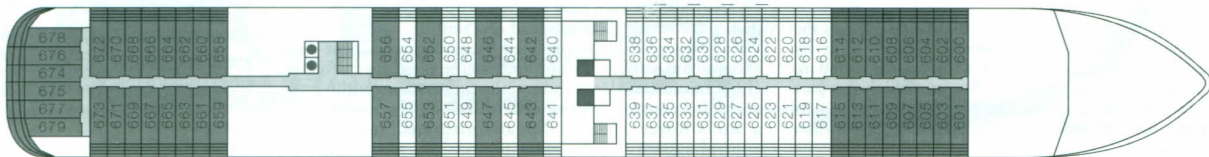
Deck 8



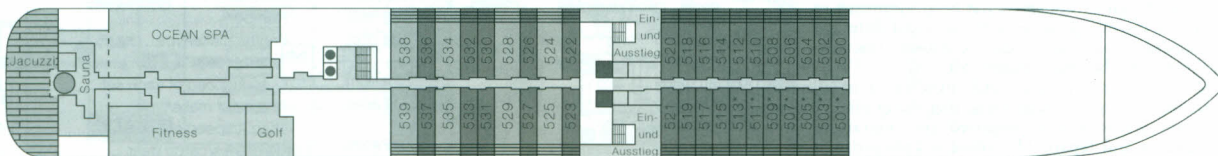
Deck 7



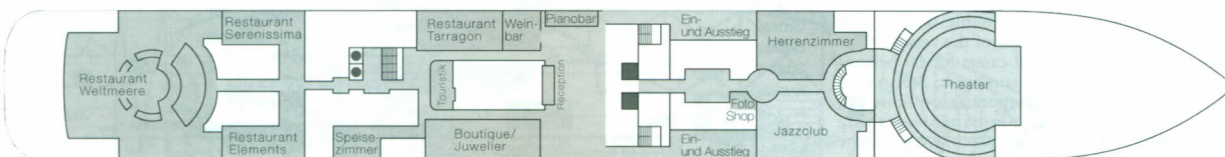
Deck 6



Deck 5



Deck 4





FA XIAN 6: Rolls-Royce designed seismic vessel

Shipbuilder: **Shanghai Shipyard Co., Ltd**
 Vessel's name: **Fa Xian 6**
 Hull No: **S8002**
 Owner/operator: **Shanghai Offshore Petroleum Bureau, Sinopec**
 Country: **China**
 Designer: **Rolls-Royce Marine**
 Country: **Norway**
 Model test establishment used: **Marintek**
 Flag: **China**
 IMO number: **9620114**
 Total number of sister ships already completed (excluding ship presented): **1**
 Total number of sister ships still on order: **nil**

FA Xian 6, a Rolls-Royce UT 830 CD design, is the first of its type to be built in China. Built by Shanghai Shipyard Co., Fa Xian 6 was delivered to Shanghai Offshore Petroleum Bureau, which is a part of the Chinese conglomerate Sinopec, expanding its current fleet of seismic and geophysical exploration survey vessels.

Fa Xian 6 is a customised vessel based on Rolls-Royce's previous designs. The UT 830 CD is designed according to environmental class rules and according to IMO Annex 25 with no oil liquids towards the shell. The design of the vessel has been optimised so that it will provide good sea-keeping capabilities, be cost efficient through its lifetime and also construction-friendly despite the vessel's complexity.

The design, arrangement and installation of all components has been calculated so that the minimum personnel attendance is required for operation, maintenance and repair. The vessel is arranged as a mono-hull with a centre skeg in the aft ship and with moderate flare and a bulbous bow in the fore ship. The hull has been designed for optimum fuel efficiency and verified by model tank tests and CFD calculations. The vessel is constructed with double bottom and wing tanks, throughout the length of the vessel.

The accommodation onboard caters for 66 persons along with safety equipment according to SOLAS for 68 persons. The design also incorporates low noise and vibration levels in all permanent staying accommodation. This has been achieved by the installation of floating floor/bulkhead systems, double windows, extra insulation and other actions taken to meet with the noise and vibration criteria as specified in Comfort Class regulations.

During research missions the vessel will tow up to 14 cables, or 'streamers', each will be 12 kilometres long. Seismic waves are sent deep into the seabed and the reflected waves are detected by hydrophones spread

along the network of streamers. This data is then used to give a detailed 3D profile of the geological features, including the location of oil and gas, often thousands of meters below sea level.

Fa Xian 6 has a continuous tank top between the peak tanks. Located in bottom of the vessel are the water ballast tanks, fresh water tanks and void tanks, with no fuel in the bottom tanks. The fuel tanks and other service tanks are arranged between Tank Top and Deck 2. The vessel is also equipped with two off Rolls-Royce Marine designed passive stabilising tanks for minimising the roll amplitudes in service conditions.

It is equipped with a Rolls-Royce package of power and propulsion systems as well as advanced automated handling systems for deploying the seismic equipment. The vessel is powered by two Rolls-Royce, Bergen B32:40L8P that each have a power output of 4,000kW giving the vessel a service speed of 15knots.

Rolls-Royce has also supplied its Acon automation system consisting of bridge and engine control room (ECR) consoles, alarm and monitoring system, pump and valve control, remote tank sounding, along with a Rolls-Royce Helicon X3 an integrated remote control system for the main propulsion, tunnel & azimuth thruster.

TECHNICAL PARTICULARS

Length oa: 100.10m
 Length bp: 88.35m
 Breadth moulded: 24.00m
 Depth moulded
 To main deck: 9.00m
 To upper deck: 17.80m
 Width of double skin
 Side: 1.00m/4.2m
 Bottom: 2.00m
 Draught
 Scantling: 7.30m
 Design: 6.40m
 Gross: 10,882gt
 Deadweight
 Speed, service: 15.00knots
 Bunkers
 Diesel oil: 3,400m³
 Water ballast: 2,800m³
 Classification society and notations: ... CCS +CSA Research
 Ship Helicopter Facilities, Ice CIB, BWMP
 (MEPC. 127(53)), PSPC (B), +CSM AUT-0,
 PR-1, CLEAN, COMF (NOISE) 3
 DNV +1A1, E0, ICE C, CLEAN DESIGN,
 NAUT-AW, HELIDK-SH, COMF-V(3)C(3),
 RP, BIS, TMON, IMO res. MSC.266(84)
 Code of safety for Special Purpose Ships 2008

Roll-stabilisation equipment: 2 x Rolls-Royce
 passive roll reduction tanks

Main engine
 Design: Rolls-Royce Bergen
 Model: B32:40L8P
 Manufacturer: Rolls-Royce
 Number: 2
 Type of fuel: MGO
 Output of each engine: 4,000kW
 Gearbox

 Make: Rolls-Royce
 Model: 1500 AGHC-KSC56
 Number: 2
 Output speed: 148rpm

Propeller
 Material: Ni-Al-Bronze
 Designer/manufacturer: Rolls-Royce
 Number: 2
 Fixed/controllable pitch: Controllable
 Diameter: 3.9m
 Speed: 148rpm

Main-engine driven alternators
 Number: 2
 Make/type: Rolls-Royce
 Output/speed of each set: 2,000kW x 1,200rpm

Diesel-driven alternators
 Number: 2
 Engine make/type: Rolls-Royce
 Type of fuel: MGO
 Output/speed of each set: 2,880kW x 900rpm
 Alternator make/type: Rolls-Royce
 Output/speed of each set: 3,456kVA x 900rpm

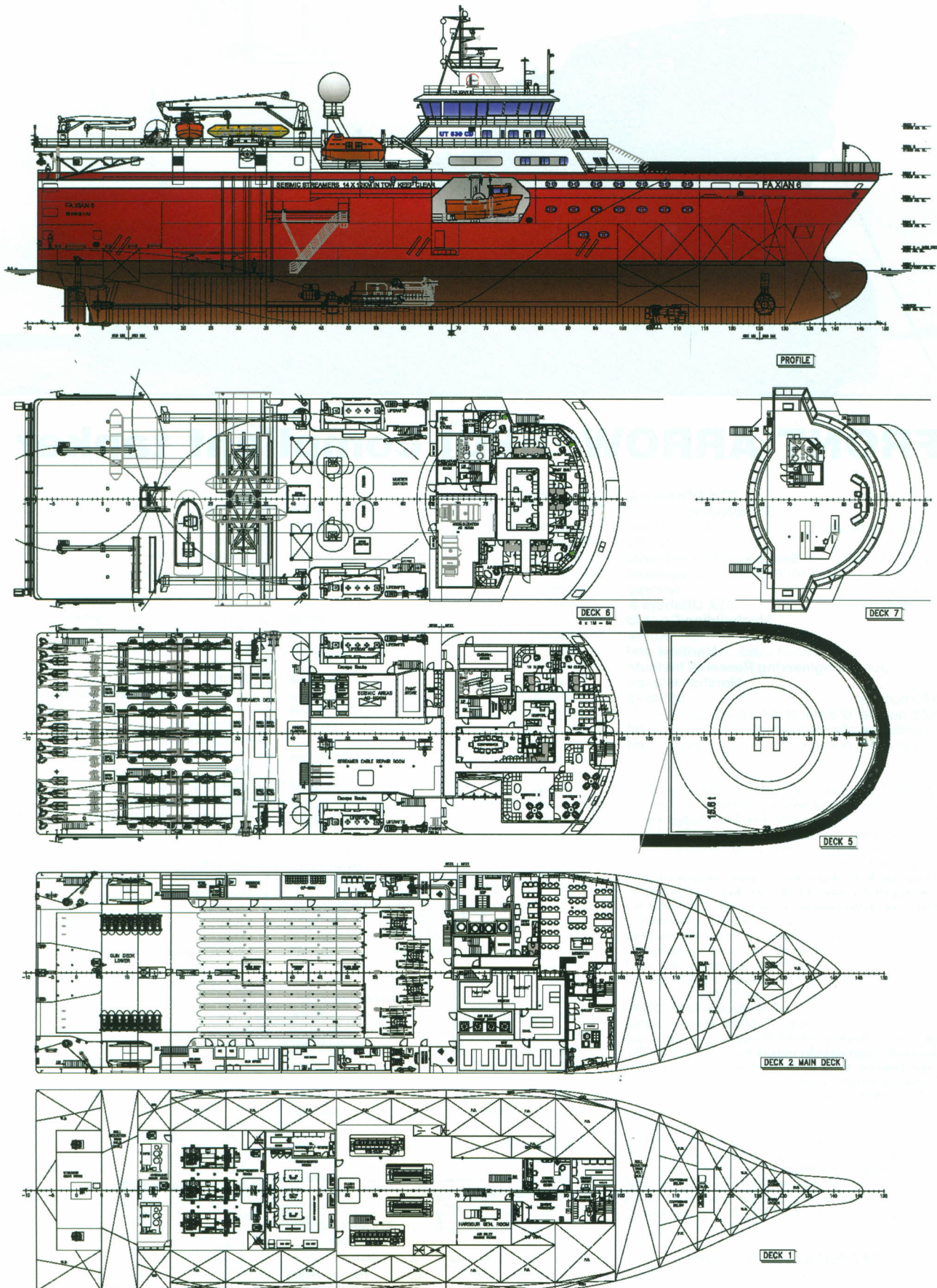
Cargo cranes/cargo gear
 Number: 2
 Make: TTS
 Type: Folding boom
 Performance: 36tonnes

Mooring equipment
 Number: 2
 Make: Rolls-Royce
 Type: Electric

Water ballast treatment system
 Make: Alfa Laval
 Capacity: 250m³/h

Complement
 Crew: 43

Bow thrusters
 Make: Rolls-Royce
 Number: 2
 Delivery date: October 2013





FRONT ARROW: EEDI compliant tanker

Shipbuilder: **STX Offshore & Shipbuilding Co., Ltd**
 Vessel's name: **Front Arrow**
 Hull No: **S1595**
 Owner/operator: **Seatankers Management Co., Ltd/ Frontline Management**
 Country: **Norway**
 Designer: **STX Offshore & Shipbuilding Co., Ltd**
 Country: **Korea**
 Model test establishment used: ... **Maritime and Ocean Engineering Research Institute**
 Flag: **Marshall Islands**
 IMO number: **9654555**
 Total number of sister ships already completed (excluding ship presented): **nil**
 Total number of sister ships still on order: **nil**

Front Arrow is the first in a series of six fuel efficient MR type tankers that has been delivered from STX Offshore & Shipbuilding to Norwegian Frontline Management in September. Front Arrow is also the first vessel to be delivered out of an order of 60 vessels that Frontline placed in 2012.

The order for the 60 vessels covers product tankers, LNG carriers and bulk carriers. The company currently owns six very large crude carriers (VLCCs) and four Suezmax tankers. This round of fleet expansion is due to end in 2016 when the last vessels of this order are due to be delivered to Frontline.

To make the vessel more appealing environmentally Front Arrow has been fitted with the latest green technology. In addition, according to the technical feedback, the vessel attained an EEDI of 4.64g CO₂/tonnes-nm and has achieved an above average EEDI with a score of 25.4%.

Front Arrow is powered by an efficient MAN B&W 6S50ME-B9.2 with an output 7,260kW that has a service speed of 14.60knots at 84%MCR output. The vessel is also fitted with a larger propeller manufactured by Silla Metal. The larger propeller, 6.8m in diameter, gives the vessel better propulsion through the water.

The 49,000dwt tanker has a double hull which meets with requirements from Exxon Mobil and also has been designed with reduced noise and vibration. To allow the vessel to transport high-density cargoes (S.G=1.53tonnes/m³), additional structural reinforcement has been carried out with further verification of stability.

Front Arrow has 12 cargo tanks that have individual cargo pumps for each of the holds and slop tanks, which have a capacity of 550m³/h and 330m³/h for the slop tanks that are manufactured by Framo.

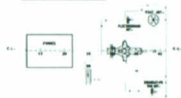
TECHNICAL PARTICULARS

Length oa: 183.00m
 Length bp: 175.90m
 Breadth moulded: 32.20m

Depth moulded
 To main deck: 19.10m
 To upper deck: 20.10m
 Width of double skin
 Side: 3.20m
 Draught
 Scantling: 13.30m
 Design: 11.00m
 Gross: 29,993gt
 Displacement: 60,562tonnes
 Lightweight: 11,110tonnes
 Deadweight
 Design: 37,644dwt
 Scantling: 49,452dwt
 Block co-efficient: 0.7825
 Speed, service: 14.60knots
 Cargo capacity
 Liquid volume: 53,851m³
 Bunkers
 Heavy oil: 1,409m³
 Diesel oil: 209m³
 Water ballast: 20,938m³
 Daily fuel consumption
 Main engine only: 23.44tonnes/day
 Auxiliaries: 4.5tonnes/day
 Classification society and notations: ... DNV +1A1, Tanker for oil and chemicals, ESP, E0, CSR, COAT-PSPC(B), TMON, BIS, VCS-2B, CLEAN, BWM-E(s), COW
 % high-tensile steel used in construction: 52.16%
 Main engine
 Design: MAN B&W
 Model: MAN B&W 6S50ME-B9.2
 Manufacturer: STX HI
 Number: 1
 Type of fuel: HFO, MDO, MGO
 Output of each engine: 7,260kW
 Propellers
 Material: Ni-Al-Bronze
 Designer/manufacturer: Silla Metal
 Number: 1
 Fixed/controllable pitch: Fixed
 Diameter: 6.8m
 Speed: 99rpm
 Diesel-driven alternators
 Number: 3
 Engine make/type: STX-MAN 6L23/30H
 Type of fuel: HFO, MDO, MGO
 Output/speed of each set: 960kW x 900rpm
 Alternator make/type: Hyundai Heavy Industries/ HFC7 508-84K
 Output/speed of each set: 1,137.5KVa x 900rpm

Boilers
 Number: 1
 Type: PB0301AS12
 Make: Kangrim
 Output, each boiler: 18,000kg/hr
 Cargo cranes/ cargo gear
 Number: 2
 Make: Oriental
 Type: Electric-hydraulic, cylinder luffing type
 Performance: 10tonnes
 Other cranes
 Number: 1
 Make: Oriental
 Type: Electric-hydraulic, cylinder luffing type jib crane
 Tasks: Provisions handling
 Performance: 4tonnes
 Mooring equipment
 Number: MLFA-870-F1
 Make: Flutek-Kawasaki
 Type: Electric-hydraulic
 Special lifesaving equipment
 Number of each and capacity: 2 x 28 persons
 Make: Hyundai Lifeboats
 Cargo tanks
 Number: 12+2
 Coated tanks: IPK Interline 994, Phenolic epoxy
 Cargo pumps
 Number: 12 + 2
 Type: Centrifugal, hyd. Motor driven
 Make: Framo
 Stainless steel: SUS316L
 Capacity: 550m³/h
 Cargo control systems
 Make: Scana
 Type: Hydraulic double acting actuator
 Ballast control system
 Make: Scana
 Type: Hydraulic double acting actuator
 Complement
 Crew: 10
 Bridge control system
 Make/ Type: Tokyo Keiki/PR-6000
 One-man operation: Yes
 Fire detection system
 Make/ Type: Consilium/Salwico cargo
 Fire extinguishing systems
 Engine room: NK/ High expansion foam
 Radars
 Number: 2
 Make: JRC
 Model: JMA-9132-SA
 JMA- 9122-9XA
 Launch/float-out date: 7 May 2013
 Delivery date: 9 September 2013

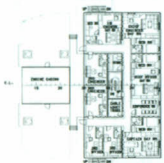
COMPASS DECK



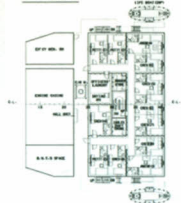
NAV. BR. 1. DECK



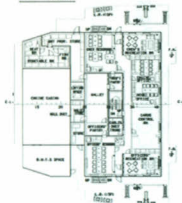
C - DECK



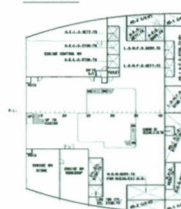
B - DECK



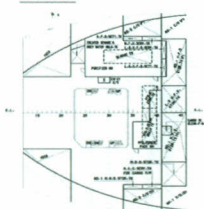
A - DECK



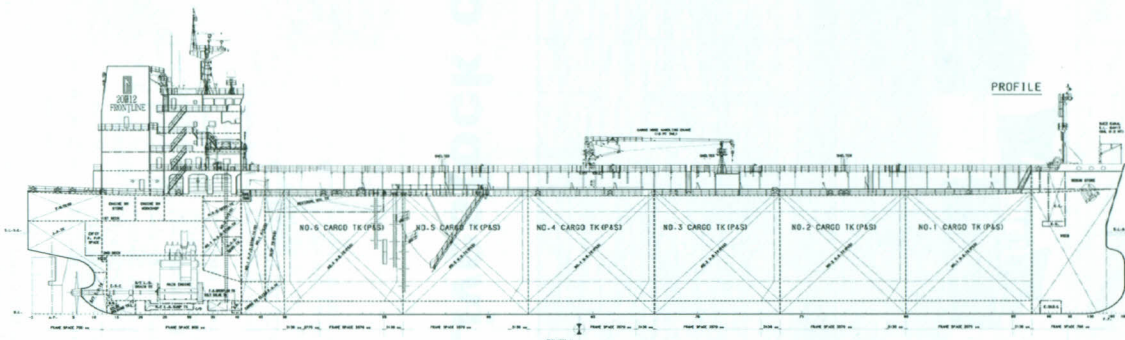
1ST DECK



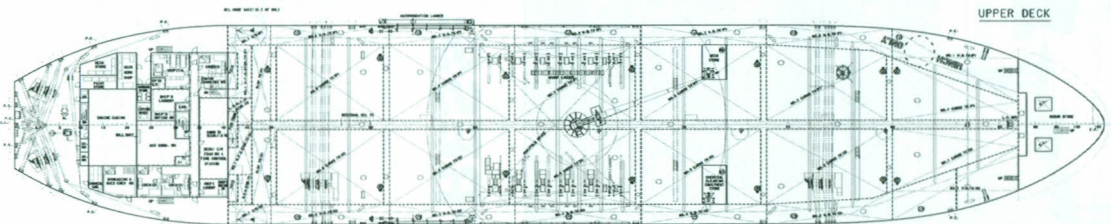
2ND DECK



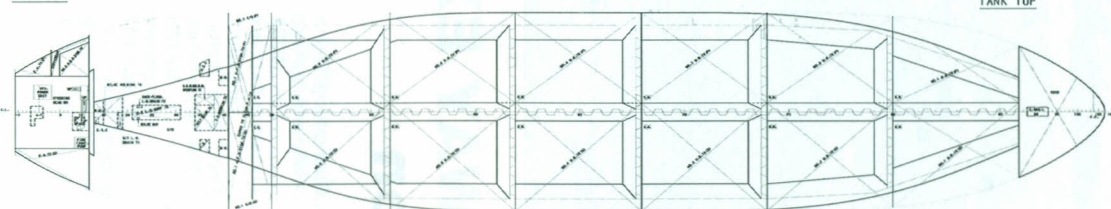
S/G DECK



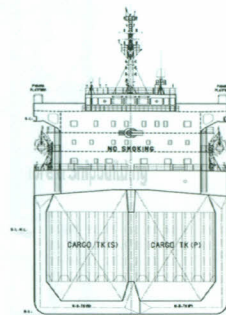
PROFILE



UPPER DECK



TANK TOP



MIDSHIP SECTION

F'CLE DECK





GALLOWAY EXPRESS: Livestock carrier for Vroon

Shipbuilder: **COSCO, Guangdong, China**
 Vessel's name: **Galloway Express**
 Hull No: **N392**
 Owner/operator: **Livestock Express**
 Country: **Singapore**
 Designer: **Groot Ship Design**
 Country: **The Netherlands**
 Model test establishment used: **MARIN**
 Flag: **Singapore**
 IMO number: **9621194**
 Total number of sister ships already completed (excluding ship presented): **2**
 Total number of sister ships still on order: **1**

GALLOWAY Express is the first in a series of four livestock carriers to be built at Chinese Shipyard COSCO (Guangdong) for Dutch operator Vroon, which was delivered in September. Another two vessels in the series have since been delivered with the last vessel expected to be delivered in early 2014.

Despite the controversy which may surround it, the trade in live animals is one that employs a number of highly specialised vessels, the modern ones being purpose-built and sophisticated to provide the best possible condition for the sheep and cattle, which comprise the bulk of the deep-sea cargoes. New Zealand and Australia export hundreds of thousands of sheep to the ports of the Middle East, while cattle are moved from North Europe to Mediterranean destinations. Livestock is also carried into South East Asia.

The construction of these vessels not only fills the gap for livestock carrier construction technology in the domestic shipbuilding industry, but also shows that development is happening in this market segment. The vessel is fitted out with animal welfare services (ventilation / watering / feeding) that exceed Australian (AMSA) regulations.

The livestock carriers will be mainly used for the transport of live animals. Each vessel can accommodate about approximately 4,000 head of cattle at 350kg/head with a net area of the cattle stalls reaches 4,600m.

Galloway Express measure 134.8m in length overall, 19.6m in breadth, has a design draft of 11.3m and a cruising speed of 16.75knots with 30 days of endurance ability and a cruising range of approx. 18,000NM, sufficient for a voyage from Brazil to China and back without refuelling.

Galloway Express has a single-engine / single propeller propulsion system set with unrestricted navigation area. It also features a new design of bow which will result in significant fuel savings whilst still being able to maintain a high service speed of about 16.75knots in heavy weather without a detrimental impact on the comfort of the livestock cargo onboard. Powering the vessels is a Wärtsilä X 35 which has a power output of 6,090kW.

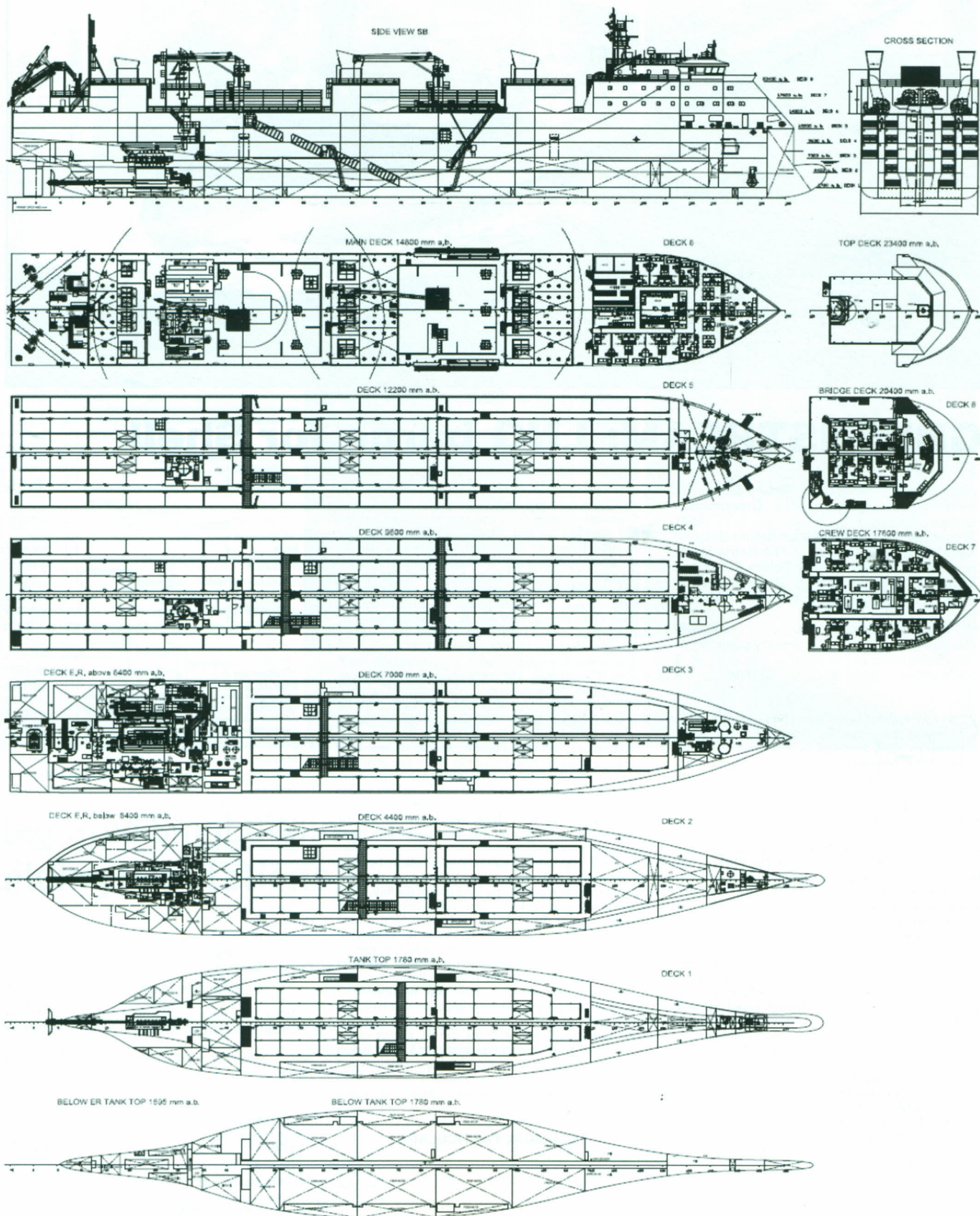
Classed by Bureau Veritas (BV), the overall design, construction technology, safety capabilities and fuel efficiency of the vessels has been reached at an advanced level. The safety capabilities of the vessels meet the Australian Maritime Safety specifications.

TECHNICAL PARTICULARS

Length oa: 134.80m
 Length bp: 125.25m
 Breadth moulded: 19.60m
 Depth moulded
 To main deck: 15.90m
 Draught
 Design: 6.80m
 Gross: 9,900gt
 Deadweight
 Design: 5,448dwt
 Speed, service: 16.75knots
 Cargo capacity
 Pen area: 4,500m²
 Bunkers
 Heavy oil: 802tonnes
 Diesel oil: 330tonnes
 Freshwater: 2,646m³
 Classification society and notations: BV I +Hull, +Mach,

Livestock Carrier, Unrestricted Navigation,
 +AUT-UMS, In water survey, Cleanship,
 MON SHAFT, COMF-NOISE 2, COMF-VIB2,
 Green Passport

Main engine
 Design: Wärtsilä
 Model: X 35
 Number: 1
 Type of fuel used: HFO
 Output of each engine: 6,090kW
 Propeller
 Material: Ni-Al-Bronze
 Designer/manufacturer: Wärtsilä
 Number: 1
 Fixed/controllable pitch propeller: Fixed
 Main-engine driven alternators
 Number: 1
 Output/speed of each set: 1,050kW
 Diesel-driven alternators
 Number: 3+1
 Type of fuel: HFO
 Output/speed of each set: 1,050kW + 465kW
 Cargo cranes/ cargo gear
 Number: 2
 Performance: 3tonnes x 24m
 Mooring equipment
 Number: 2 x combined anchor/mooring winch
 2 x mooring winch
 Make: SEC
 Type: Electric/hydraulic
 Special lifesaving equipment
 Number of each and capacity: 1
 Type: Freefall
 Bow thruster
 Number: 1
 Output: 750kW
 Launch/float-out date: 9 April 2013
 Delivery date: 23 September 2013





GREENSTREAM: LNG barge for Shell

Shipbuilder: **Peters Shipyards**
 Vessel's name: **Greenstream**
 Hull No: **1401**
 Owner/operator: **Shell/ Interstream Barging**
 Country: **The Netherlands**
 Designer: **Peters Shipyards**
 Country: **The Netherlands**
 Model test establishment used: **MARIN**
 Flag: **Dutch**
 IMO number: **9664990**
 Total number of sister ships already completed (excluding ship presented): **1**
 Total number of sister ships still on order: **2**

GREENSTREAM is the first LNG-powered LNG-carrying barge to be delivered from Peters Shipyards to Shell, managed by Interstream Barging, as part of the company's longer term development of a new European LNG marine fuel industry with the potential to fuel inland barges, ferries, tugs or even cruise ships. *Greenstream* is the first of two new LNG powered barges with the second vessel being delivered late in 2013. The order also covers a further two vessels to be delivered in the following year. This new LNG-powered barge will operate in The Netherlands, Belgium, Germany and Switzerland.

Greenstream has been designed with many new safety and efficiency features. For example, the vessel has four small efficient engines rather than one large engine as in traditional barges. This means that power can be varied as less is required to travel downstream than upstream with potential for fuel savings. These engines will operate at a lower frequency than traditional barges, reducing vibration and noise levels which could be advantageous when travelling through populated areas on the Rhine.

Greenstream is propelled by two electrically powered Z-drives. These Z-drives with a single rudder propeller (in a nozzle) ensure that the aft ship sections can be optimised for shallow water. The thrusters give the vessel better manoeuvrability and eliminate the need for separate rudders. Their electric motors are placed inboard, which keeps the hub of the pod compact. Electric power is generated in four 300kW LNG-powered gensets, which are mounted in pairs in containers on the aft deck.

An LNG generator set consists of two Scania engines, with spark plugs to enable the combustion of natural gas, and an alternator. Each container, or LNG Pack, houses two LNG gensets and the necessary ventilation and fire extinguishing equipment and can be easily coupled and shipped to a workshop by truck. A spare LNG Pack will be available to be swapped with an onboard unit in a matter of hours. This will reduce the downtime of the vessel from a week to half a day. The four LNG engines can run at either 1,500 or 1,800rpm and switch two engines on or off to run an optimal load.

Going upstream the vessel can run four engines and downstream can run on two engines.

Greenstream electrical systems run on a direct current (DC) main bus bar that is provided by Alewijnse. The generator power is connected to this bus bar by converters. A DC bus bar has the advantage of a power connection to the bus bar without synchronisation, which enables the rapid start-up of the generators for available power. The AC power is generated by the gensets which then goes to the DC current bus bar. The cargo pumps and all electrical systems onboard are powered through the DC/AC inverter.

The vessel is equipped with six cargo tanks with double skinned hull. The intermediate space between the hull and cargo tanks is used for the 'U' shaped ballast tanks. The cargo tanks are separated from the fore and the aft ship by a cofferdam, which can also be used as a ballast tank.

The loading and the unloading system is done by a double piping system and is connected to five manifold positions. Manifolds have a DIN 200 flange for the shore connection hose, which are linked with sample valves for the hose connections. Cargo tanks are connected to one of these piping systems. Both piping systems can be connected to each other by dedicated valves with blind flanges for more flexibility.

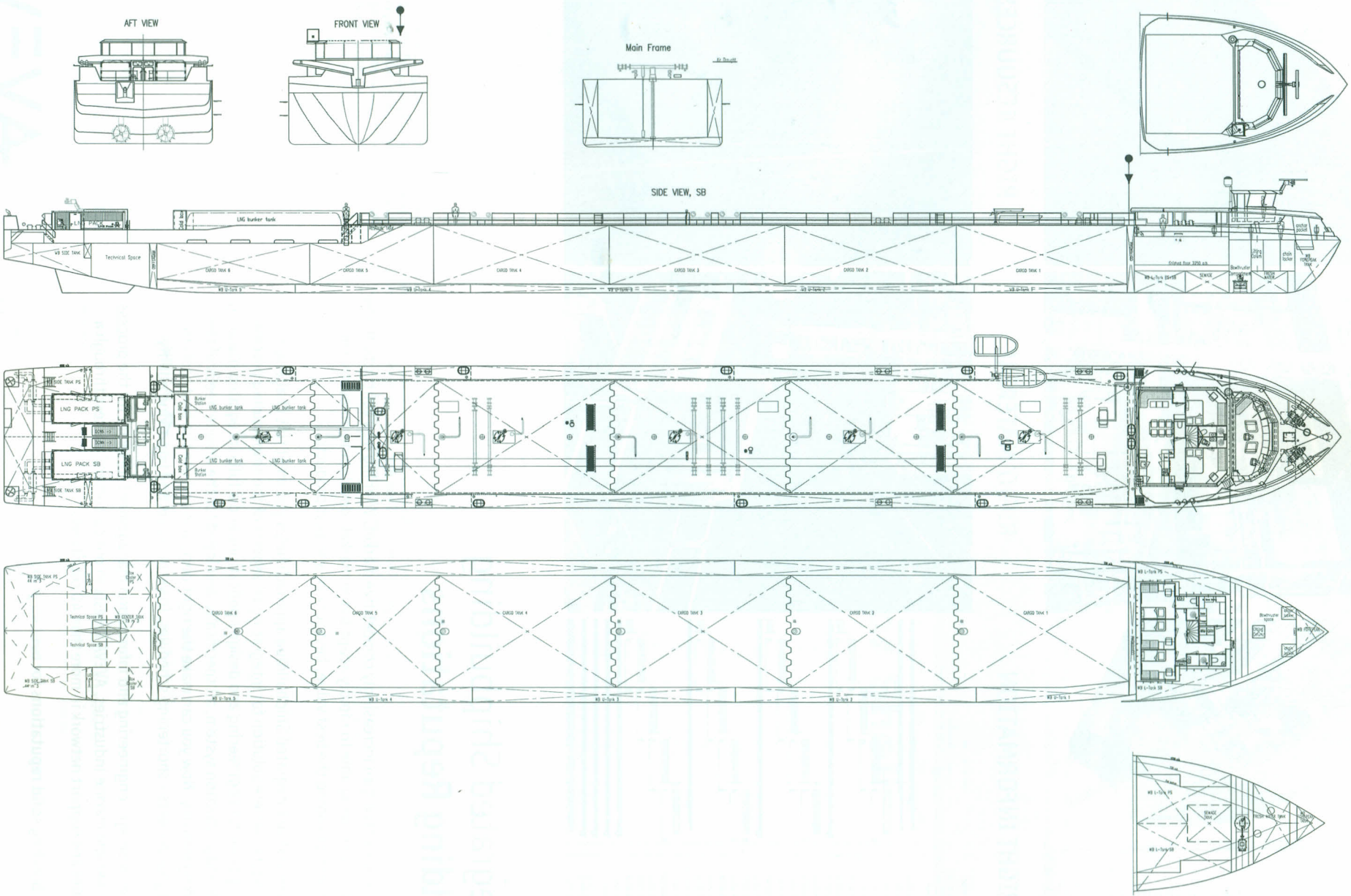
The hull is optimised for an economic balance between speed, power and cargo intake. To reduce the hull resistance and to secure the performance of the hull, CFD studies and model tank tests have been carried out. The strengthening of the mid-ship section has been carried out in the side plating. Called IJsselhuid the benefits of the design is the additional resistance against impact of the mid-ship section and the capacity for larger fuel tanks of up to 600m³ instead of the standard 380m³.

The hull form for the vessel was optimised by Australian-based Vipac. This optimisation was based on the draught of 2.90m, which corresponded with the vessel having full tanks with the specific gravity of the cargo. *Greenstream's* maximum draught is 3.45m. Model tests were carried out using three loading conditions and two water depths. The results concluded that the vessel needed a longer foreship and a sharp straight bow with a short aft with V-shaped sections.

TECHNICAL PARTICULARS

Length oa: 110.00m
 Length bp: 109.50m
 Breadth moulded: 11.40m
 Depth moulded
 To main deck: 5.45m
 Draught
 Scantling: 3.45m
 Design: 3.45m
 Gross tonnage: 2,500gt
 Deadweight
 Design: 2,900dwt

Speed/service: 11.33knots
 Cargo capacity
 Liquid volume: 3,130m³
 Bunkers
 LNG: 2 x 40m³
 Water ballast: 1,840m³
 Daily fuel consumption
 Main engine: abt.4.5tonnes/day
 Classification society and notations: LR +A1 IWW Tanker
 Type C, P.V +50kPa, SG 100
 Main engine
 Design: Sandfirden Technics
 Model: S61-16-CGM
 Manufacturer: Scania
 Number: 4
 Type of fuel: LNG
 Output of each engine: 300kW x 1,800rpm
 Propeller
 Material: Cu-Ni-AL
 Designer/manufacturer: Veth Propulsion
 Number: 2
 Fixed/controllable pitch: Fixed
 Diameter: 1.2m
 Speed: 1,800rpm
 Special adaptations: Z-drive Type VZ 550
 Mooring equipment
 Number: 3 x Anchor/mooring winch
 Make: C-Nautical
 Type: Electrical
 Cargo tanks
 Number: 6
 Grades of cargo carried: LNG
 Cargo pumps
 Number: 6
 Type: Deepwell
 Make: Marflex
 Capacity: 4 x 200m³/h
 2 x 120m³/h
 Stern appendages/special rudders: Z-drive Veth
 Bow thruster
 Make: Veth-Jet 2K
 Number: 1
 Output: 275kW
 Bridge control system
 Make: Alweijnse
 One-man operation: Yes
 Fire detection system
 Make: MX Brandbeuillig
 Fire extinguishing systems
 Engine room: MX Brandbeuillig
 Cabins/public spaces: MX Brandbeuillig
 Radars
 Number: 2
 Make: Alewijnse
 Model: River radar
 Delivery date: April 2013





HANJIN CALIFORNIA: Optimised containership

Shipbuilder: **Sungdong Shipbuilding & Marine Engineering Co., Ltd**
 Vessel's name: **Hanjin California**
 Hull No.: **S4028**
 Owner/operator: **Zodiac Maritime Agencies**
 Country: **UK**
 Designer: **Sungdong Shipbuilding & Marine Engineering Co., Ltd**
 Country: **Korea**
 Model test establishment used: **KIOST, Korea**
 Flag: **Liberia, Monrovia**
 IMO number: **9631101**
 Total number of sister ships already completed (excluding ship presented): **4**
 Total number of sister ships still on order: **nil**

HANJIN California is the first in the series of four 3,600TEU container ships, constructed by Sungdong for the British shipping company ZODIAC, delivered in September. The vessel features a wide beam of 37.3m and optimised hull performance and stability for a better seakeeping ability.

Due to the optimised hull form and propeller design and the electrically controlled engine, which contributes to an improved propulsion performance, the vessel can navigate at a speed of over 21knots at the scantling draught of 12.45m with a daily fuel consumption at 90% MCR (24,462kW) with 15% sea margin of about 99.7tonnes based on marine diesel oil of 10,200kcal/kg in lower calorific value under ISO reference condition.

Hanjin California features a transverse bulkhead and double bottom, which has been extended between the collision bulkhead and aft peak bulkhead. The vessel has double skinned cargo holds, of which there are five and 13 bays for 40ft containers with 11 hatches. This vessel has a fully welded upper deck with forecastle and has a raked stem with bulbous bow, a transom stern, a semi-balanced rudder and a fixed-pitch propeller. This vessel is able to load seven tiers of containers across 13 rows in the hold and six tiers on deck / seven tiers on hatch covers by 15 rows and the number of loadable containers of around 14tonnes/TEU is approximately 2,970TEU at the scantling draught of 12.45m.

Dangerous goods in classes 1, 2, 3, 4, 5.1, 6.1, 8 and 9 can be carried in closed containers in No.1 hold (excluding goods containing hydrogen or a hydrogen mixture) and classes 2, 3, 4, 5.1, 6.1, 8 and 9 in closed containers in No.2 & 3 holds (excluding goods containing hydrogen or a hydrogen mixture) and classes 1, 2, 3, 4, 5.1, 5.2 6.1, 8 and 9 in closed containers on all hatch covers except above the engine room are allowed to be carried.

The latest environmental guidelines such as the MARPOL Annex I Reg. 12A oil fuel tank protection, inventory of hazardous materials (IHM) for the ship's recycling have also been taken into consideration in the design of the vessel. To meet with the requirements the heavy fuel oil (HFO) tank has a double skin and located in a centre tank between

cargo holds 4 and 5 for prevention of an oil spill accident. The bridge which has been designed by Hyundai Heavy Industries complies with Lloyd's Register rules for Bridge Design on Seagoing ships and complies with the notation for One-Man Console at Ocean area.

TECHNICAL PARTICULARS

Length oa: 228.00m
 Length bp: 217.50m
 Breadth moulded
 Main deck: 19.30m
 Upper deck: 19.30m
 Width of double skin
 Side: 2.03m
 Bottom: 1.90m
 Draught
 Scantling: 12.00m
 Design: 12.45m
 Gross: 36,600gt
 Displacement: 67,400tonnes
 Deadweight
 Design: 47,000dwt
 Scantling: 51,000dwt
 Speed, service: 21knots
 Bunkers
 Heavy oil: 4,500m³
 Diesel oil: 400m³
 Water ballast: 17,000m³
 Daily fuel consumption
 Main engine only: 99.7tonnes/day
 Classification society and notations: LR
 % high-tensile steel used in construction: 59%
 Main engine
 Design: MAN B&W
 Model: 6K80ME-C9.2
 Manufacturer: Hyundai Heavy Industries
 Number: 1
 Type of fuel: HFO, MDO
 Output of each engine: 27,180kW x 104rpm
 Propeller
 Material: Ni-Al-Bronze
 Designer/manufacturer: Sungdong Shipbuilding & Marine Engineering/ Hyundai Heavy Industries
 Number: 1
 Fixed/controllable pitch: Fixed
 Diameter: 8m
 Speed: 104rpm
 Diesel-driven alternators
 Number: 4
 Engine make/type: STX Engine/ 7L27/38
 Type of fuel: MDO
 Output/speed of each set: 2,310kW x 720rpm
 Alternator make/type: Hyundai Heavy Industries/ HFC7 710-14K-EB
 Output/speed of each set: 1,970kW x 720rpm
 Boilers
 Number: 1
 Type: MC3205R21
 Make: Kangrim Heavy Industries

Output, each boiler: 2,500kg/h
 Other cranes
 Number: 2
 Make: Oriental
 Type: Electro-hydraulic, cylinder luffing type jib crane
 Tasks: Engine part handling, provisioning handling, Suez mooring boat handling

Mooring equipment
 Number: 4
 Make: Mirae Industries
 Type: Electric motor driven

Special lifesaving equipment
 Number of each and capacity: 25 persons
 Make: Umoe Schat-Harding
 Type: Lifeboat/ Life-rescue boat

Hatch covers
 Manufacturer: MacGregor
 Type: Weatherdeck hatch cover lift-away

Container
 Length: 6,058mm
 Heights: 2,591mm
 Cell guides: Yes
 Total TEU: 3,670
 On deck: 2,190
 In holds: 1,480
 Homogenously loaded to 14tonnes: 2,970
 Reefer plugs: 500
 Tiers/rows
 On deck: 7/15
 In holds: 7/13

Ballast control system
 Make: Pleiger
 Type: Elect

Complement
 Crew: 11

Bow thruster
 Make: Kawasaki Heavy Industries
 Number: 1
 Output: 1,500kW

Bridge control system
 Make: Hyundai Heavy Industries
 Type: T-Shape

Fire detection system
 Make: Sea-plus
 Type: Smoke detection

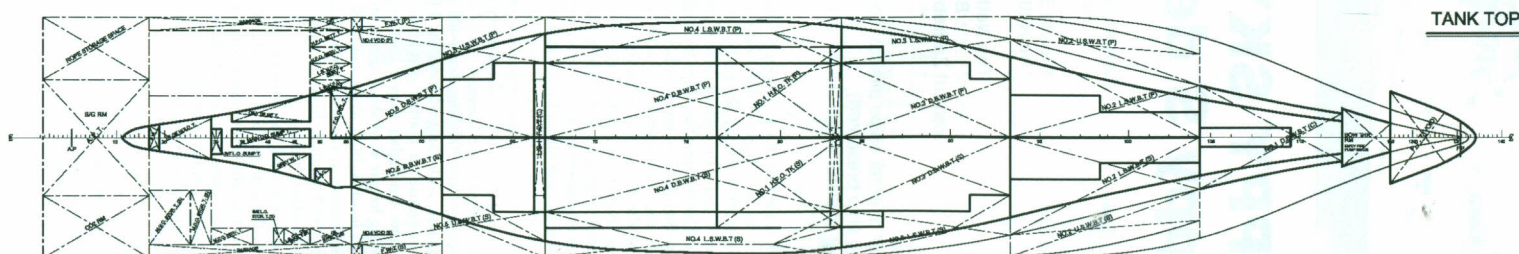
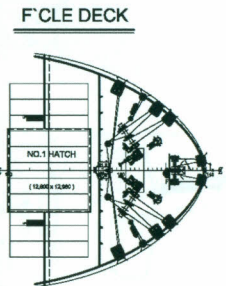
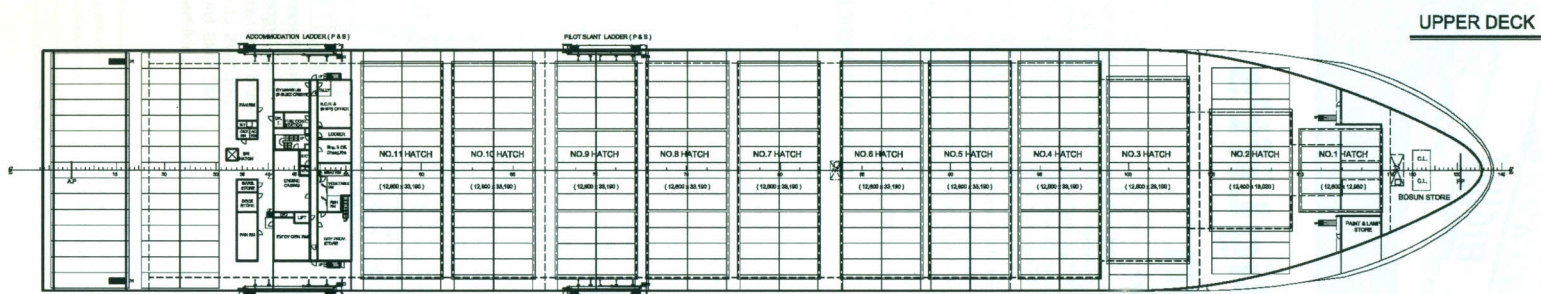
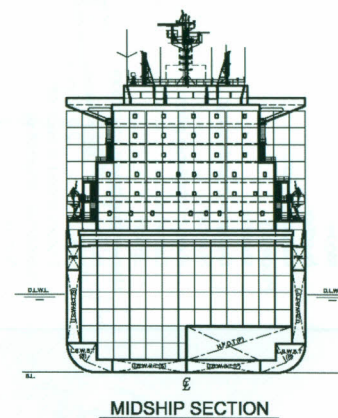
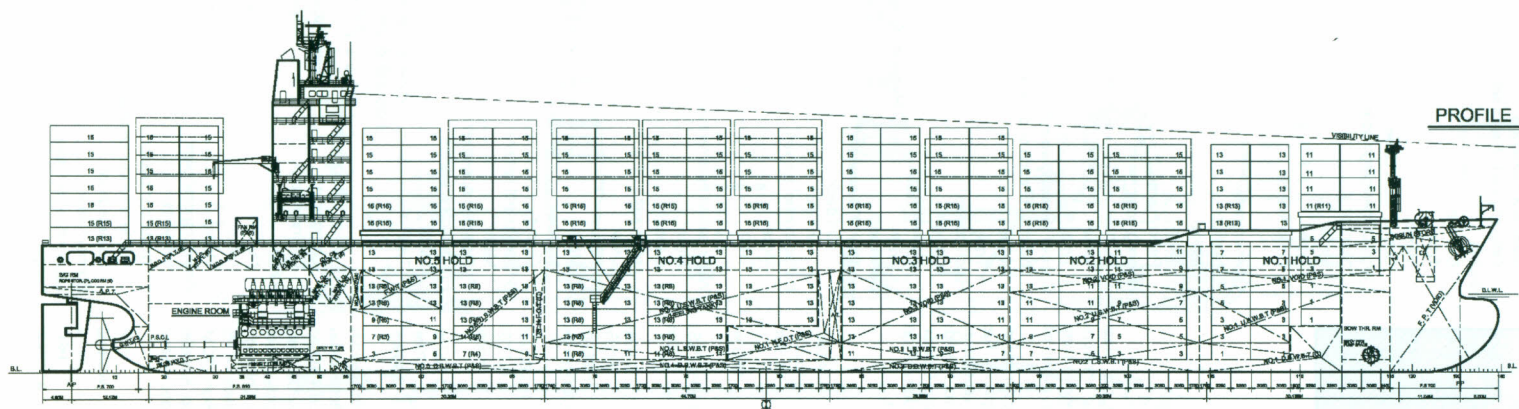
Fire extinguishing systems
 Cargo holds: Sea-plus/CO₂
 Engine room: Sea-Plus/CO₂

Radars
 Number: 2
 Make: JRC
 Model: JMA-9132-SA, JMA-9122-9XA

Waste disposal plant
 Incinerator: Hyundai Marine Machinery/ MAXI NG150SL
 Sewage plant: Il Seung/ ISS-25N

Contract date: May 2011
 Launch/float-out date: June 2013

Delivery date: September 2013





HAPPY SKY: BigLift's Happy S design

Shipbuilder: **Larsen & Toubro**
 Vessel's name: **Happy Sky**
 Hull No: **81007**
 Owner/operator: **BigLift Shipping**
 Country: **The Netherlands**
 Designer: **Big Lift**
 Country: **The Netherlands**
 Model test establishment used: **Brodarski Institut Zagreb, Croatia**
 Flag: **Dutch**
 IMO number: **9457220**
 Total number of sister ships already completed (excluding ship presented): **nil**
 Total number of sister ships still on order: **1**

HAPPY Sky is the first of two Happy S Class vessels to be added to the BigLift fleet with *Happy Star* following early in 2014. *Happy Sky* was built by Larsen & Toubro in India and delivered in March and with its sister vessels will be the new flag ships for BigLift.

To make sure BigLift could meet the latest requirements of the market, the specifications of both vessels were changed during the design and construction period. The S Design from BigLift is a new design that has been developed from the company's knowledge in the heavy-lift field. The most important changes to the design were the increase in the crane lifting height and outreach and the decision to operate both vessels without a stability pontoon. It has been acknowledged that the use of pontoons for vessels of this size is a large safety risk during loading and discharging operations.

Happy Sky features two 900tonne heavy-lift mast cranes built by Huisman and commissioned at Huisman in China. In a response to market demands, the crane pedestals are now 4m higher than in the original plans and have a lifting height 41m above the main deck. The two 900tonne Huisman built mast cranes are capable to lift up to 1,800tonne in tandem mode. Each crane is provided with a 37.5 auxiliary hoist on a jib trolley and a 10tonne sling handling hoist.

Happy Sky's length and the forward position of its superstructure offer a single, large cargo hold and a wide, open deck area. The 20,561m³ single cargo hold can be divided in two, by using the tweendeck pontoons in a vertical position as a watertight bulkhead. *Happy Sky's* tween deck is adjustable in height and is allowed to sail with open weather deck hatches at a draught of up to 7.5m. The vessel has folding hatch covers, a large poop deck and cargo rails, which make the vessel's full deck area available for cargo stowage. The hatch opening on main deck level is 96 x 17.7m. Allowable deck loads for the hatch covers are (WD and TD) 12.5t/m² and for the tank top in the cargo hold 20tonnes/m².

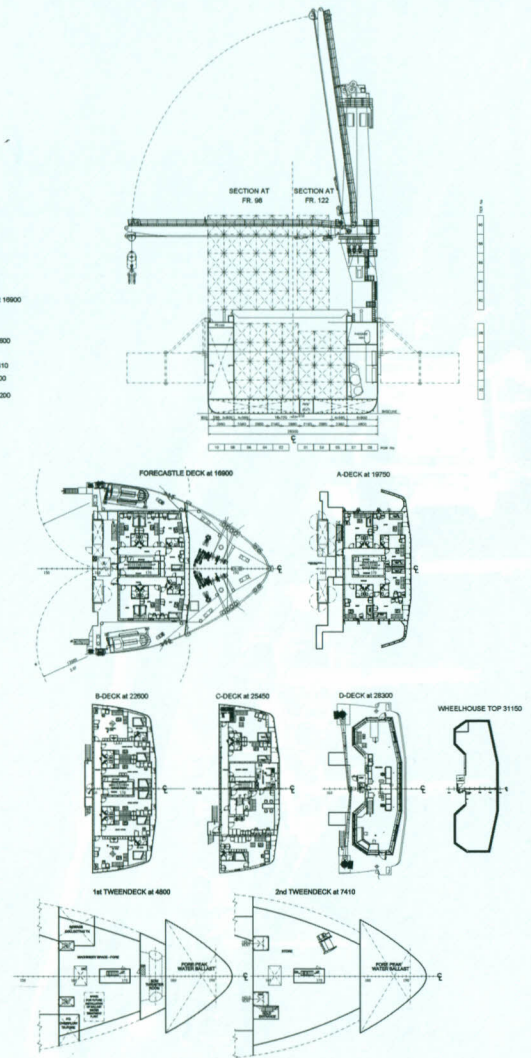
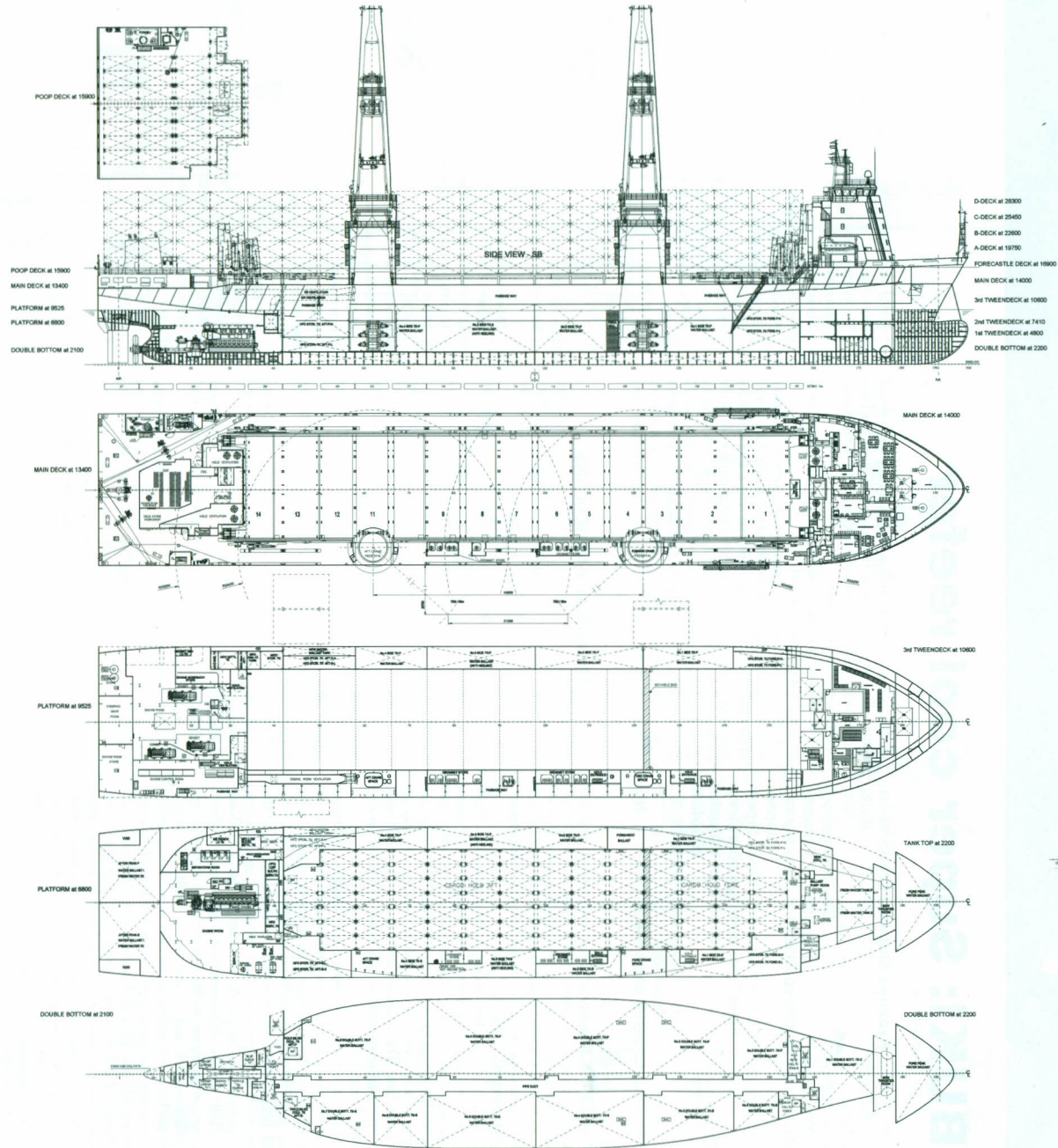
Furthermore, the vessel has been given the class notation Finnish/Swedish 1A Ice. Utilising modern design methods special attention was given to optimising the power performance, where *Happy Sky* achieved 17knots in its trial speed.

The vessel has been equipped with drenching sprinklers in the weather deck hatch covers, high capacity fire monitors on deck, high capacity cargo hold ventilators and special bilge arrangements in order to comply with the requirements for a wide variety of Dangerous Goods, INF 2 and solid bulk cargoes including aluminium nitrate and barium nitrate (UN 1438 & 1446).

TECHNICAL PARTICULARS

Length oa: 154.68m
 Length bp: 145.80m
 Breadth moulded: 26.50m
 Depth moulded
 To main deck: 14.00m
 Width of double skin
 Side: 4.00m/4.80m(P&S)
 Bottom: 2.20m
 Draught
 Scantling: 9.50m
 Design: 7.00m
 Gross: 15,989gt
 Displacement: 28,250tonnes
 Deadweight
 Design: 18,680dwt
 Block co-efficient: 0.7770
 Speed, service: 16.7knots
 Bunkers
 Heavy oil: 1,557m³
 Diesel oil: 179m³
 Water ballast: 9,409m³
 Daily fuel consumption
 Main engine only: 35tonnes/day
 Auxiliaries: 3tonnes/day
 Classification society and notations: LR + 100A1
 Strengthened for Heavy Cargoes,
 Container Cargoes in all holds and on
 deck and on all hatch covers, ShipRight
 (ACS (B)), *IWS, LI, LA, Ice Class 1A FS,
 +LMC, UMS, NAV1, ShipRight (SCM)
 Heel control equipment: anti-heeling pump, Allweiler
 automatic system
 Main engines
 Model: W46
 Manufacturer: Wärtsilä
 Number: 1
 Type of fuel: HFO
 Output of each engine: 8,775kW

Gearboxes
 Make: Renk
 Model: RSV-1260C
 Number: 1
 Output speed: 500/139rpm
 Propellers
 Material: Cu-Ni-Al
 Designer/manufacturer: Wärtsilä
 Number: 1
 Fixed/controllable pitch: Controllable
 Diameter: 5m
 Speed: 139rpm
 Main-engine driven alternators
 Number: 1
 Make/type: AVK
 Output/speed of each set: 1,250kW
 Diesel-driven alternators
 Number: 3
 Engine make/type: Wärtsilä A6L20
 Type of fuel: HFO
 Output/speed of each set: 975kW x 900rpm
 Alternator make/type: Fenxi
 Output/speed of each set: 975kW
 Boilers
 Number: 2
 Type: Thermal oil heaters
 Make: Aalborg
 Output, each boiler: 1,000/1,250kW
 Cargo cranes/cargo gear
 Number: 2
 Make: Huisman
 Type: Mast crane
 Performance: 900tonnes x 25/27.5m
 504tonnes x 35.5m
 Other cranes
 Number: 2
 Make: Ned-Deck
 Tasks: Store handling
 Performance: 2.5tonnes x 12m
 Mooring equipment
 Number: 6
 Make: Rolls-Royce
 Type: Hydraulic
 Special lifesaving equipment
 Number of each and capacity: 2 x 13 persons
 Make: Fassmer
 Type: Davit launched
 Hatch covers
 Design: MacGregor
 Manufacturer: MacGregor
 Type: Hydraulic folding/ pontoon system
 Containers
 Total TEU capacity: 1,238
 On deck: 850
 In holds: 388
 Ballast control system
 Make: SAM Electronics/Hoppe
 Type: Electric hydraulic remote control
 and video read out
 Water ballast treatment system
 Make: Techcross
 Capacity: ECS 1000
 Complement
 Crew: 12
 Bow thruster
 Make: Wärtsilä
 Number: 1
 Output: 1,000kW
 Bridge control system
 Make: Wärtsilä/Sperry
 One-man operation: Yes
 Fire detection system
 Make: Ajax Chubb Varel
 Type: Smoke extraction system for cargo
 hold and looped smoke/fire detection
 system for other spaces
 Fire extinguishing systems
 Cargo holds: Allweiler/Ajax Chubb Varel/ CO₂
 Engine room: Ajax Chubb Varel/ CO₂
 Radars
 Number: 2
 Make: Sperry Marine
 Model: Vision Master FT 340 CAT
 Waste disposal plant
 Incinerator: Teamtec/ OG 400CS
 Waste compactor: Loipart/ TT
 Waste shredder/crusher: Disperator/ GKF 550
 Sewage plant: Evac/ Biological STP 40C
 Contract date: March 2007
 Launch/float-out date: 1 September 2011
 Delivery date: 1 March 2013





IBUKI: Super cool reefer

Shipbuilder: **Kyokuyo Shipyards Corporation**
 Vessel's name: **ibuki**
 Hull No: **507**
 Owner/operator: **Star Navigation**
 Country: **Republic of Vanuatu**
 Designer: **Kyokuyo Shipyards Corporation**
 Country: **Japan**
 Model test establishment used: **West Japan**
Fluid Engineering Laboratory
 Flag: **Republic of Vanuatu**
 IMO number: **9666481**
 Total number of sister ships already completed
 (excluding ship presented): **2**
 Total number of sister ships still on order: **Nil**

KYOKUYO Shipyards in Japan has entered into the refrigerated cargo carrier market with the delivery of *ibuki*, delivered in January as a first ship in a series of three ships to Star Navigation. *ibuki*'s design has been remodelled and is claimed as being the biggest ultra-low temperature reefer constructed to date.

To achieve this ultra-low cooling; in the engine room, there are three "two-stage compressing type" compressors for ultra-low temperature, which are driven by electric motors and compress R404A gas for liquefying. The liquid gas is led to air coolers, which have expansion valves, cooling coils and air circulation fans. The air coolers are located at the end of each refrigerated compartment of the holds as shown on the General Arrangement.

The chilled air from the cooling coils is led by circulation fans to the ducts arranged longitudinally on the bottom of each refrigerated compartment from air cooler room to other ends. On the top of ducts, wooden gratings are fitted with small holes, from which chilled air is blown into the refrigerated compartment. The chilled air, after cooling cargoes, is returned back to the air coolers. In the case of No.1 hold (A+B), and No.2/3/4 hold (B+C), chilled air is led from the lower compartment to the compartment above through the skeleton deck, and returned back to the air coolers. Urethane foam and glass wool are used as heat insulation for the refrigerated hold, and applied to the shell, double bottom, intermediate deck, upper deck and transverse bulkhead.

Adding to this *ibuki* has been designed as a ballast water free design. Kyokuyo shipyard has opted to remove the ballast water feature of the vessel due to the environmental issues surrounding ballast water and de-ballasting. The ballast water free design has the advantages of having no ballast pumps/piping, no ballast tank maintenance, no ballast water treatment system and no application of PSPC.

The yard said that although it couldn't divulge how this has been achieved the vessel has been designed so that the propeller, the diameter of which is related to the engine power/revolution and the number of blades on the propeller, can be immersed below the minimum navigable draught. For this purpose, the hull dimensions and hold/tank

configuration as well as hull form optimising the vertical distribution of displacement (vertical prismatic), has been carried out without any negative effects to the performance of resistance and propulsion.

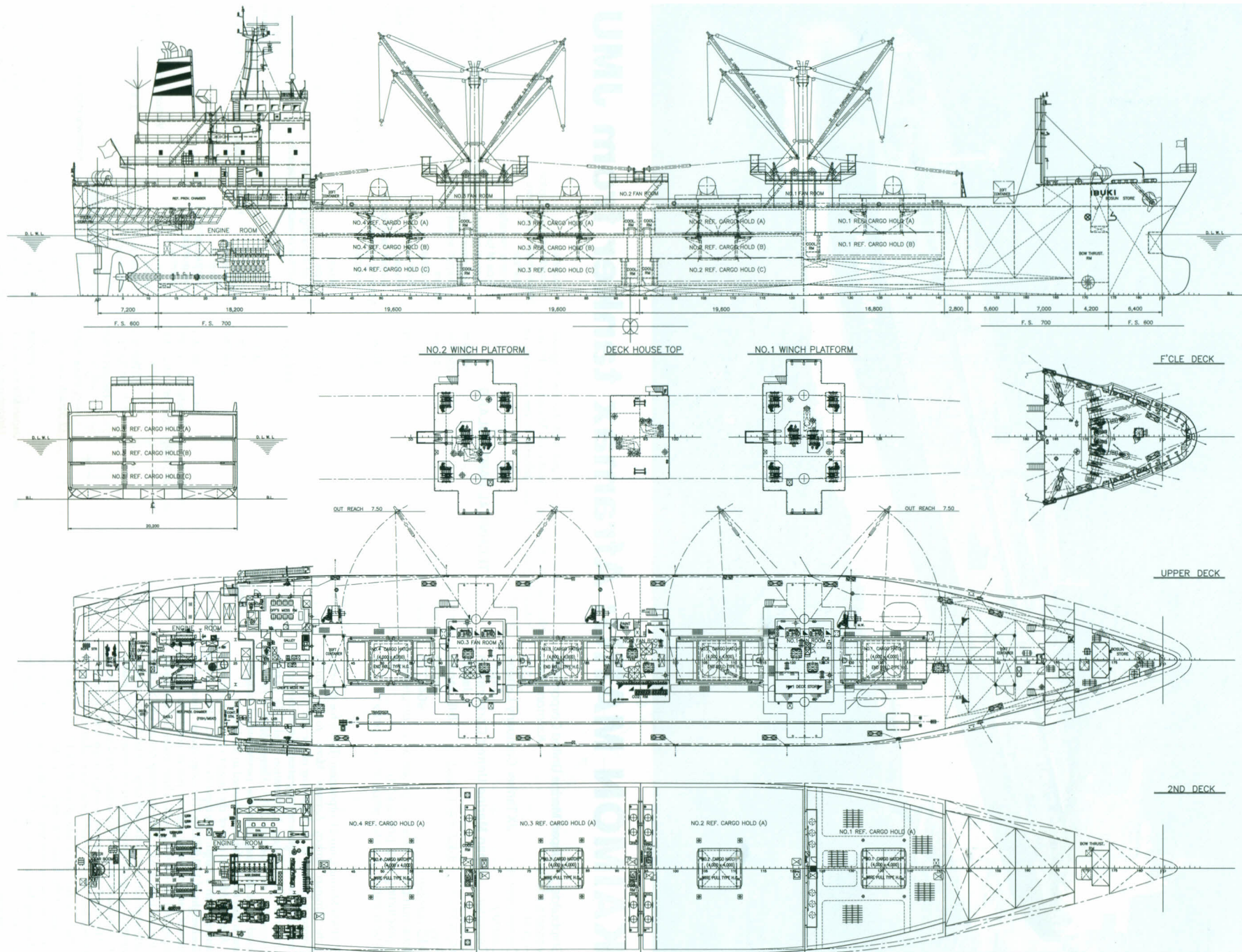
There is also a permanent ballast installed on the upper deck to slow the ship's rolling period.

In the cargo hold and engine room, there is a double bottom, but no longitudinal bulkhead nor double skin. In way of forward part of the ship, fuel oil tanks have a double skin for tank protection, and the inside skin has the same form as the outer skin (shell plating) in order to get a bigger tank capacity than the conventional double skin design. This ship has 11 compartments in four holds on three decks. The vessel carries cargoes of bananas, fruits as well as frozen tuna at a minimum temperature of -50°C. The hold floor area has been maximised as much as possible for pallet cargoes.

TECHNICAL PARTICULARS

Length oa: 134.15m
 Length bp: 127.00m
 Breadth moulded: 20.20m
 Depth moulded
 To upper deck: 10.30m
 Width of double skin
 Bottom: 1.25m
 Draught
 Scantling: 7.10m
 Design: 7.10m
 Gross: 6,558gt
 Deadweight
 Design: 7,314dwt
 Scantling: 7,314dwt
 Speed, service: 15.4knots
 Cargo capacity
 Bale: 8,043m³
 Refrigerated cargo: 8,043m³
 Bunkers
 Heavy oil: 1,179m³
 Diesel oil: 536m³
 Daily fuel consumption
 Main engine only: 18.3tonnes/day
 Auxiliaries: 4.8tonnes/day
 Classification society and notations: NK NS* (PSCM),
 MNS*, RMC* descriptive note
 designed for carriage of refrigerated
 cargoes of minimum temperature -50°C
 Main engine
 Design: MAN B&W
 Model: 7L35MC6.1
 Manufacturer: Makita
 Number: 1
 Type of fuel: HFO
 Output of each engine: 4,440kW x 210rpm
 Propeller
 Material: Ni-Al-Bronze

Designer/manufacturer: Nakashima propeller
 Number: 1
 Fixed/manufacturer pitch: Fixed
 Diameter: 3.5m
 Speed: 210rpm
 Diesel-driven alternators
 Number: 3
 Engine make/type: Yanmar
 Type of fuel: HFO
 Output/speed of each set: 745kW x 720rpm
 Alternator make/type: Taiyo Electric
 Output/speed of each set: 850kW x 720rpm
 Boilers
 Number: 1
 Type: Auxiliary boiler, composite type
 Make: Tortoise Engineering
 Output, each boiler: Oil fired 1,300kg/h,
 exhaust gas 730kg/h
 Mooring equipment
 Number: 2 x windlass
 5 x mooring winches
 Make: Nippon Pusnes
 Type: Hydraulic
 Special lifesaving equipment
 Number of each and capacity: 2 x 33 persons
 Make: Nishi-F
 Type: Totally enclosed
 Hatch covers
 Design: Nakata MAC
 Manufacturer: Nakata MAC
 Complement
 Crew: 14
 Bow thrusters
 Make: Nakashima propeller
 Number: 1
 Output: 88.3kN
 Fire detection system
 Make: Nippon Hakuyo electronics
 Type: Addressable
 Fire extinguishing systems
 Cargo holds: Air Water Safety Service/ CO₂
 Engine room: Air Water Safety Service/ CO₂
 Cabins & public spaces: Sea water & portable
 fire extinguishers
 Radars
 Number: 2
 Make: Furuno Electric
 Model: FAR-2127, FAR-2137S
 Waste disposal plant
 Incinerator: Muira/ BGW-20N
 Sewage plant: Taiko Kikai/ SBH-40
 Contract date: 13 September 2011
 Launch/float-out date: 20 August 2012
 Delivery date: 17 January 2013





KAIMON MARU: Aframax tanker from JMU

Shipbuilder: **Japan Marine United Corporation**
 Vessel's name: **Kaimon Maru**
 Hull No: **3335**
 Owner/operator: **JX Tanker Company Limited**
 Country: **Japan**
 Designer: **Japan Marine United Corporation**
 Country: **Japan**
 Model test establishment used: **IHI, Japan**
 Flag: **Japan**
 IMO number: **9648776**
 Total number of sister ships already completed (excluding ship presented): **1**
 Total number of sister ships still on order: **1**

JAPAN Marine United Corporation (JMU) has delivered the Aframax tanker, *Kaimon Maru*, to JX Tanker Company Limited at the beginning of the year. JMU was created by the management integration of two companies, Universal Shipbuilding Corporation and IHI Marine United Inc. on 1 January 2013. *Kaimon Maru* is the first vessel to be delivered from this newly formed company and is also notable for its optimised in its design.

Kaimon Maru is one of the largest classes of Aframax tankers with a cargo tank capacity of 142,000m³ and a deadweight of 120,000dwt. The cargo spaces consist of six pairs of cargo oil tanks and one pair of slop tanks that are segregated into three groups. Three steam turbine driven cargo oil pumps with a self-stripping system (AUS), three cargo segregation systems, and cargo oil heating systems are adopted. A vapour emission control system (VECS) is used in compliance with the US Coast Guard requirements.

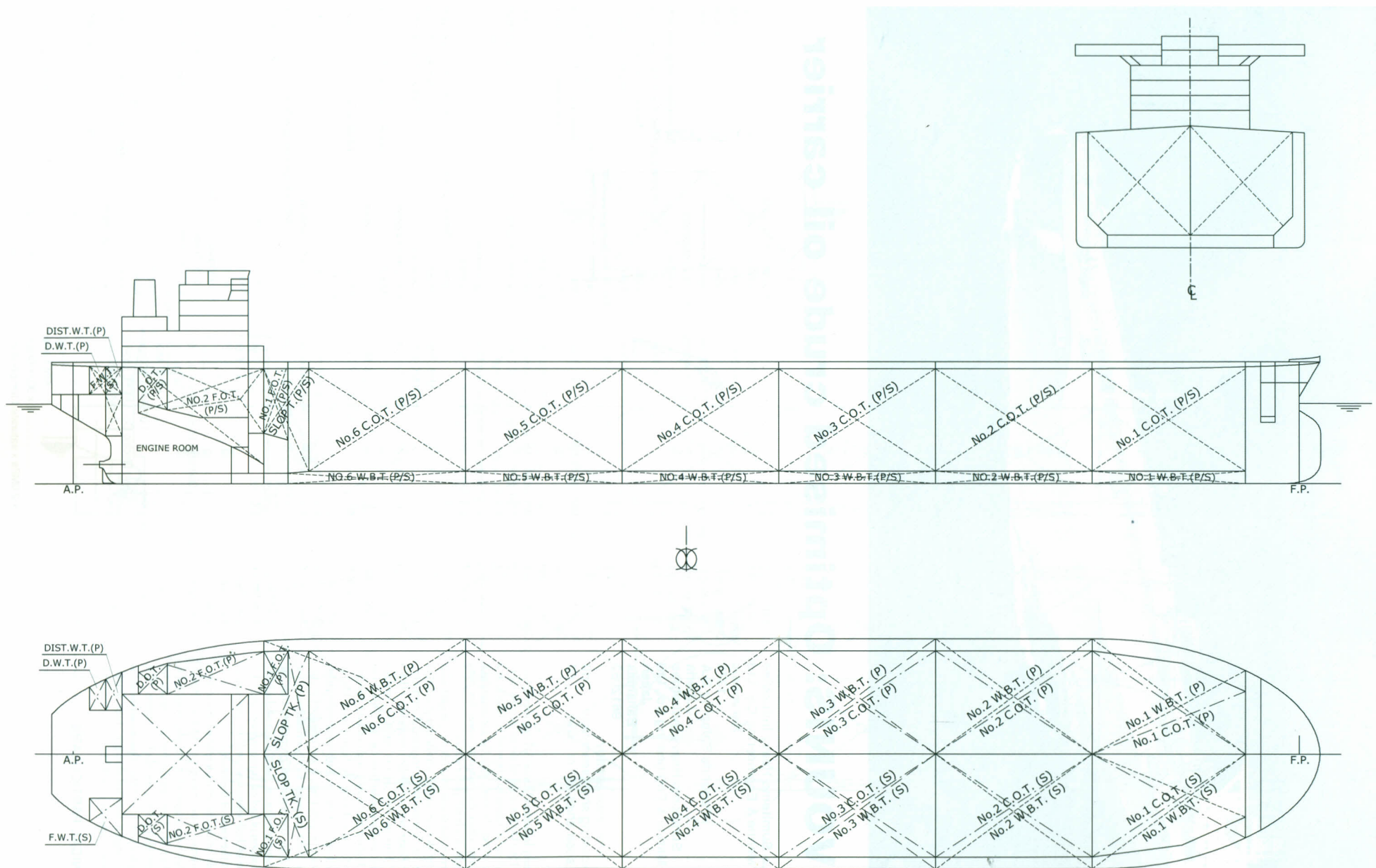
The vessel also features a single screw and eco-engine propulsion system, which have been adapted in order to reduce the fuel oil consumption and CO₂ emissions. For the sake of the highest propulsion performance, the L.V. Fin (Low Viscous resistance Fin) and A.T. Fin (Additional Thrusting Fin) are provided. Furthermore, a ballast water treatment system is installed on the vessel for the environmental conservation.

This carrier was designed and built by the Nagasaki Shipyard & Machinery Works of Mitsubishi Heavy Industries, Ltd. (MHI) and delivered to the owner on 18 January 2013.

TECHNICAL PARTICULARS

Length oa: 246.80m
 Length bp: 238.40m
 Breadth moulded: 44.40m
 Depth moulded
 To upper deck: 22.00m
 Draught
 Scantling: 15.44m
 Gross: 66,071gt
 Deadweight
 Scantling: 120,015dwt
 Speed, service: 14.5knots
 Cargo capacity
 Liquid cargo: 139,000m³
 Bunkers
 Heavy oil: 2,830m³
 Diesel oil: 270m³
 Water ballast: 39,600m³
 Daily fuel consumption
 Main engine only: 47.7tonnes/day
 Classification society and notations: ClassNK NS*, (CSR, TOB, PSPC-WBT), ESP, IWS, MNS* M0
 Main engine
 Design: Wärtsilä
 Model: 6RTA58T-D
 Manufacturer: Diesel United
 Number: 1
 Type of fuel: HFO, DMA, DMZ
 Output of each engine: 12,210kW x 94.5rpm
 Propellers
 Material: Ni-Al-Bronze
 Designer/manufacturer: Japan Marine United/
 Nakashima propeller

Number: 1
 Fixed/controllable pitch: Fixed
 Diesel-driven alternators
 Number: 3
 Engine make/type: Yanmar
 Type of fuel: HFO, DMA, DMZ
 Output/ speed of each set: 680kW x 900rpm
 Alternator make/type: Nishishiba Electric
 Output/ speed of each set: 680kW x 900rpm
 Boilers
 Number: 1
 Type: Two drum type
 Make: MHI
 Output, each boiler: 45tonnes/h
 Mooring equipment
 Number: 2 x windlass/mooring winch
 6 x mooring winch
 Make: Fukushima
 Type: Electro-hydraulic
 Special lifesaving equipment
 Number of each and capacity 2 x 32 persons
 1 x 6 persons
 1 x 6 persons
 2 x 15 persons
 Type: Lifeboat/rescue boat/liferaft 1 x 6 persons
 Cargo tanks
 Number: 12
 Product range: Oil
 Cargo pumps
 Number: 3
 Type: Vertical turbo-centrifugal
 Make: Shinko
 Capacity: 3,000m³/h x 130mTH
 Complement
 Crew: 15
 Fire extinguishing systems
 Engine room: Kashiwa/ High expansion foam
 Radars
 Number: 2
 Make: Furuno Electric
 Contract date: 21 July 2011
 Launch/float-out date: 12 October 2012
 Delivery date: 11 January 2013



KAIMON MARU



KARVOUNIS: Optimised crude oil carrier

Shipbuilder: **Sumitomo Heavy Industries Marine & Engineering Co., Ltd**
 Vessel's name: **Karvounis**
 Hull No.: **1375**
 Owner/operator: **Pagonda Shipping S.A**
 Country: **Liberia**
 Designer: **Sumitomo Heavy Industries Marine & Engineering Co., Ltd**
 Country: **Japan**
 Flag: **Bahamas**
 IMO number: **9612052**
 Total number of sister ships already completed (excluding ship presented): **nil**
 Total number of sister ships still on order: **nil**

SUMITOMO Heavy Industries Marine & Engineering Co., Ltd delivered the 156,000dwt crude oil carrier, *Karvounis*, to Pagonda Shipping SA at its Yokosuka Shipyard in March as a one off vessel for the owner. To meet with the environmental regulations coming into effect the Suezmax vessel has been further optimised to give it a better performance.

To improve efficiency *Karvounis* has been equipped with various energy saving devices using Sumitomo's patented technology such as its Sumitomo Integrated Lammeren Duct (SILD), New Blade Section (NBS) propeller, HLES Rudder, and SUP Fins as well as the smooth surface antifouling (AF) paint and propeller boss cap fin (PBCF) in order to achieve the highest fuel saving and manoeuvrability.

The NBS propeller, developed by Sumitomo Heavy Industries Marine & Engineering Co., Ltd. is not only a high propulsive performance propeller but, is also compact in size. The diameter of the NBS propeller is 5% smaller, and the weights 20% less, than conventional propellers that are designed under the same conditions. Advantages of the NBS propeller are the reduction of fuel oil consumption and CO₂ emissions, reduction of hull vibrations and the increase of design flexibility and the value of the vessel.

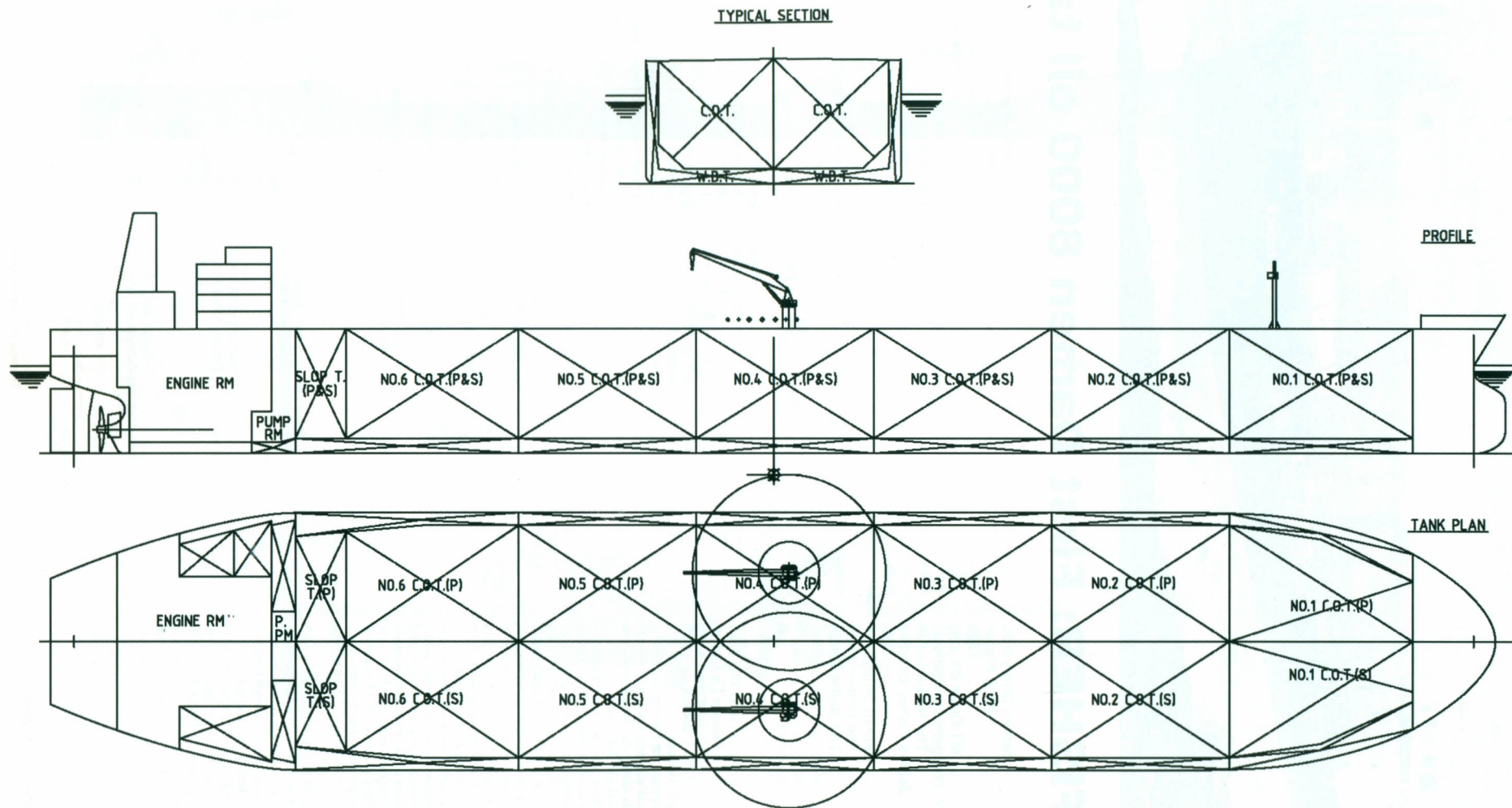
To further comply with the environmental protection regulations Sumitomo has fitted a MAN B&W 6S70MC-C8.1 as the main engine that complies with NOx emission control Tier II. The engine has an output of 16,270kW x 77.7rpm that gives a speed of 15.4knots. The vessel has a cargo capacity of 171,500m³ that is carried in its 12 cargo tanks. The cargo is handled through three Shinko cargo pumps that have a capacity of 4,000m³/h x 135mTH.

TECHNICAL PARTICULARS

Length oa: 274.00m
 Breadth moulded: 48.00m
 Depth moulded
 To upper deck: 22.80m

Draught
 Scantling: 16.37m
 Gross: 80,500gt
 Deadweight
 Scantling: 156,000dwt
 Speed, service: 15.4knots
 Cargo capacity
 Liquid volume: 171,500m³
 Bunkers
 Heavy oil: 4,200m³
 Diesel oil: 320m³
 Water ballast
 Tankers percentage segregated ballast: 51,700m³
 Daily fuel consumption
 Main engine only: 60.1tonnes/day
 Classification society and notations: LR + 100A1 Double Hull Oil Tanker, CSR, ESP, ShipRight (CM, ACS(B)), DSPM4, *IWS, LI, +LMC, IGS, UMS, EP(B,P,V) with descriptive notes pt higher tensile steel, ShipRight (BWMP(S), SCM), ETA PL(LR), COW(LR), Green Passport
 Main engine
 Design: MAN B&W
 Model: 6S70MC-C8.1
 Manufacturer: Mitsui Engineering & Shipbuilding Co., Ltd
 Number: 1
 Type of fuel: HFO & MDO
 Output of each engine: 16,270kW x 77.7rpm
 Propellers
 Material: Ni-Al-Bronze
 Designer/manufacturer: Sumitomo Heavy Industries Marine & Engineering Co., Ltd
 Number: 1
 Fixed/controllable pitch: Fixed
 Diameter: 8.5m
 Diesel-driven alternators
 Number: 3
 Engine make/type: Daihatsu Diesel Mfg. Co., Ltd/ 8-DK-20e
 Type of fuel: HFO/ MDO
 Output/speed of each set: 1,070kW x 900rpm
 Alternator make/type: Taiyo Electric Co., Ltd/ FE 553A-8
 Output/speed of each set: 1,000kW x 900rpm
 Boilers
 Number: 2
 Type: Oil-fired
 Make: Alfa Laval
 Output, each boiler: 2 x 30,000kg/h x 2.0MPa x saturated temperature

Cargo cranes/cargo gear
 Number: 2
 Make: Kyoritsu Kikai Co., Ltd
 Type: Cylinder luffing type
 Performance: 12tonnes x 10m
 Mooring equipment
 Number: 2 x windlass combined with mooring winches, 6 x mooring winches
 Make: Nippon Pusnes Co., Ltd
 Type: Hydraulic driven
 Special lifesaving equipment
 Number of each and capacity: 2 x 29 persons
 Make: Shigi Shipbuilding Co., Ltd
 Type: Enclosed type with water cooled motor
 Cargo tanks
 Number: 12 cargo tank + 2 slop tank
 Grades of cargo carried: Crude oil having a flash point below 60°C
 Cargo pumps
 Number: 3
 Type: Steam turbine driven, vertical centrifugal type
 Make: Shinko Ind., Ltd
 Capacity: 4,000m³/h x 135mTH
 Cargo control system
 Make: Nakakita Seisakusho Co., Ltd
 Ballast control system
 Make: Nakakita Seisakusho Co., Ltd
 Complement
 Crew: 15
 Bridge control system
 Make: Mitsui Engineering & Shipbuilding Co., Ltd
 Type: BMS-2000 III
 Fire detection system
 Make: Consilum
 Type: Salwico
 Fire extinguishing systems
 Cargo holds: Kashiwa/ Foam
 Engine room: Kashiwa/ Foam
 Radars
 Number: 2
 Make: Japan Radio Co., Ltd
 Model: JMA-9172-SA, JMA-9122-9XA
 Waste disposal plant
 Incinerator: Miura Co., Ltd/ BGW-80N
 Waste compactor: Nippon Control/ T-4BX
 Sewage plant: EVAC/ MBR16C
 Contract date: 6 October 2008
 Launch/float-out date: 15 December 2011
 Delivery date: 22 March 2013





Cargo cranes/cargo gear

Number: 1
Make: Gündesan
Type: Hose handling crane GD HK-15/16
Performance: 15kN x 16m

Other cranes

Number: 1
Make: Global Davit
Type: RMS 10.3.5
Tasks: Rescue boat

Mooring equipment

Number: 4 x mooring winches
..... 2 x anchors
Make: C-Nautical
Type: Electro-hydraulic self-tensioning

Special lifesaving equipment

Number of each and capacity: 12 persons
Make: Hatecke
Type: CFF 5,7C-12P

Cargo tanks

Number: 10
Grades of cargo carried: 5
Product range: Kerosene, gas oil, flame, diesels, lube oils
Coated tanks: International Epoxy Interline 704
Stainless steel structure/piping: Both

Cargo pumps

Number: 10
Type: Electrical deepwell
Make: Marflex
Stainless steel: Yes
Capacity: 200m³/h
Loading rate: 800m³/h
Discharge rate: 1,200m³/h
with 3 products simultaneously

Cargo control system

Make: Scanjet Ariston

Ballast control system

Make: Damen Bosch-Rexroth
Type: Compressed air controlled

Complement

Crew: 6

Rudder: High lift type Damen design and supply

Bow thruster

Make: Veth
Number: 1
Output: 300kW

Bridge control system

Make: Eekels
One-man operation: Yes

Fire extinguishing systems

Cargo area: Watermist
Engine room: CO₂/watermist

Radars

Number: 2
Make: Furuno
Models: 1 x FAR 2117, 1x FAR 2137S

Waste disposal plant

Sewage plant: Hamworthy

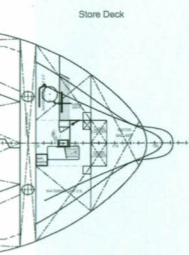
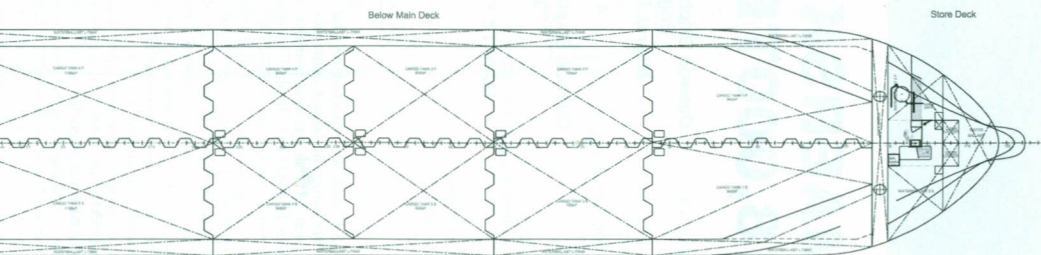
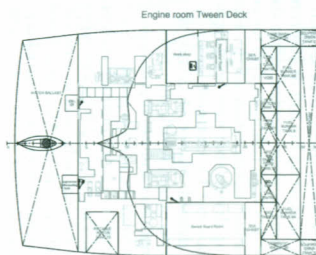
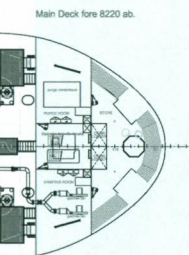
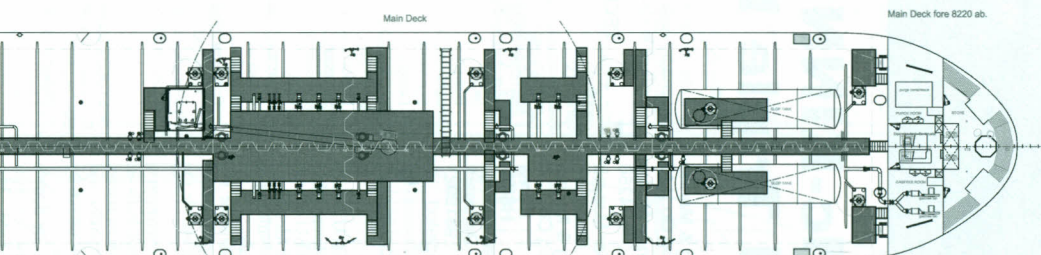
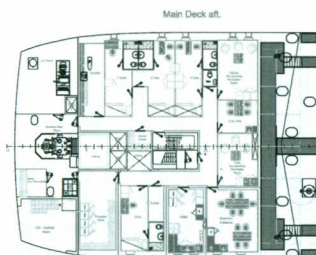
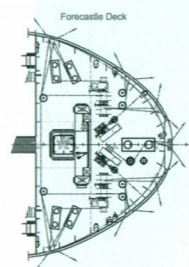
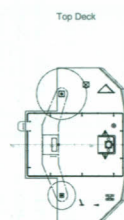
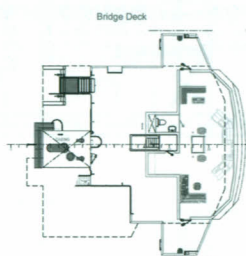
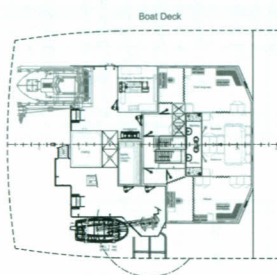
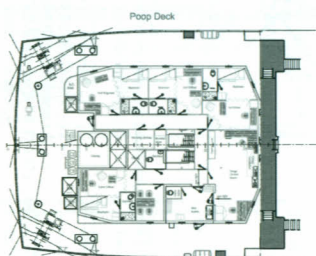
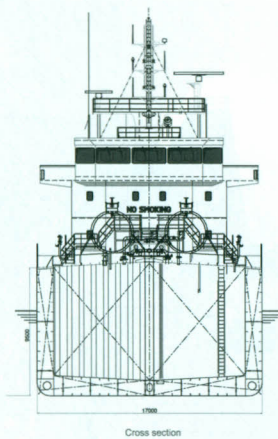
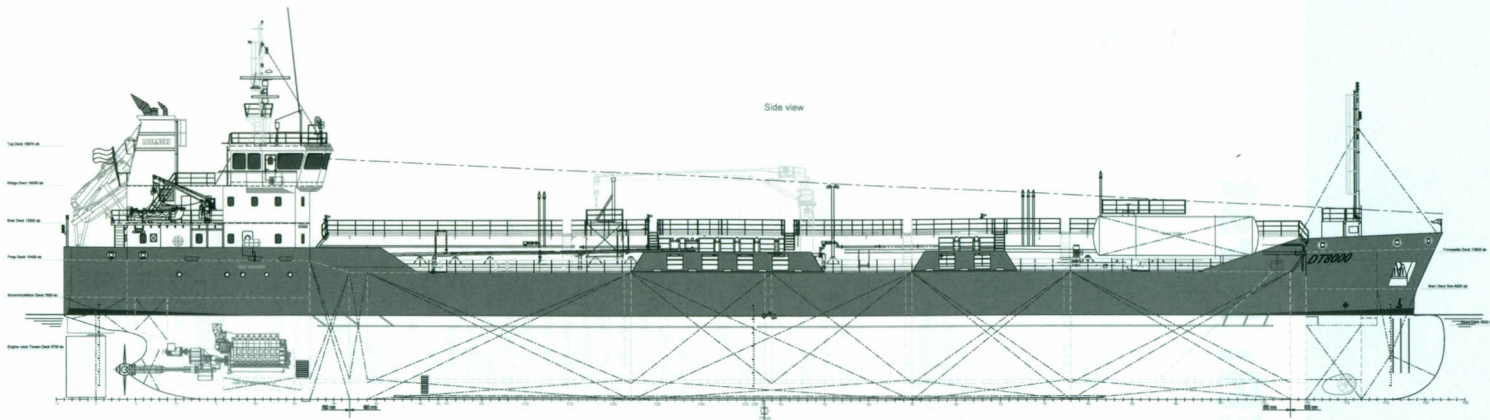
Contract date: 30 December 2011
Launch date: 14 December 2011
Delivery date: 17 June 2013

Length: 104.52m
Length bp: 99.92m
Breadth moulded: 17.00m

Boilers

Number:	1
Type:	Thermal oil heater/boiler
Make:	Aalborg
Output, each boiler:	1,500kW

Launch date: 14 December 2011





MAERSK Mc-KINNEY MØLLER: First 18,000TEU Triple E

Shipbuilder: **Daewoo Shipbuilding & Marine Engineering Co., Ltd**
 Vessel's name: **Maersk Mc-Kinney Møller**
 Hull No.: **4250**
 Owner/operator: **A.P. Møller-Maersk**
 Country: **Denmark**
 Designer: **Daewoo Shipbuilding & Marine Engineering Co., Ltd**
 Country: **Korea**
 Model test establishment used: **HSVA, MARIN & Force Technology**
 Flag: **Denmark**
 IMO number: **9619921**
 Total number of sister ships already completed (excluding ship presented): **nil**
 Total number of sister ships still on order: **9**

LAST year we reported on the *CMA CGM Marco Polo* being the largest container vessel delivered, but this year Maersk has smashed that 16,000TEU barrier with its 18,000TEU 'Triple-E' design *Maersk Mc-Kinney Møller* that was delivered from Daewoo Shipbuilding & Marine Engineering Co., Ltd (DSME) in July.

The Triple-E design started out as the basis for the new Maersk vessels, it stood for scale, energy efficiency and environmentally improved. From this principle the latest and largest container ships were born.

The vessel has a continuous upper deck without a forecastle, aft sunken deck, a raked stem with bulbous bow, a transom stern with open water type stern frame, two DSME full spade rudders with rudder bulbs and two fixed-pitch propellers, which are directly driven by a slow-speed diesel engine and a shaft motor.

Maersk Mc-Kinney Møller's 11 cargo holds are double skinned. The vessel consists of 24 bays for 40ft containers with 22 hatches over each hold. The containers that are carried on the deck are arranged to be carried in 23 rows in tiers of six, seven, eight, nine or 10. The hatch covers, deck supports and lashing points have been set up for 20ft or 40ft containers and for 45ft containers where needed. Also, the vessels unusually have four-high lashing bridges for extra cargo stability.

Further optimisation of the hull form and energy saving devices that have been applied to the vessel will reduce its CO₂ emissions by up to 30% the company has claimed. *Maersk Mc-Kinney Møller* has had a waste heat recovery (WHR) unit fitted with ME exhaust gas economisers and turbo generators that utilise the waste heat from the main engines.

Further, environmental features include the Alfa Laval Pureballast 2.0 ballast water treatment system. The original order was to have all the Triple-E vessels fitted out with the Alfa Laval 3.0 system, at the time of installation Alfa Laval fitted its 2.0 system due to on-going tests on the 3.0, which it says will be retrofitted at a later date.

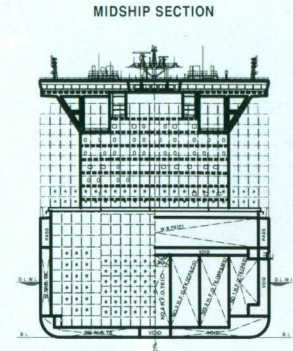
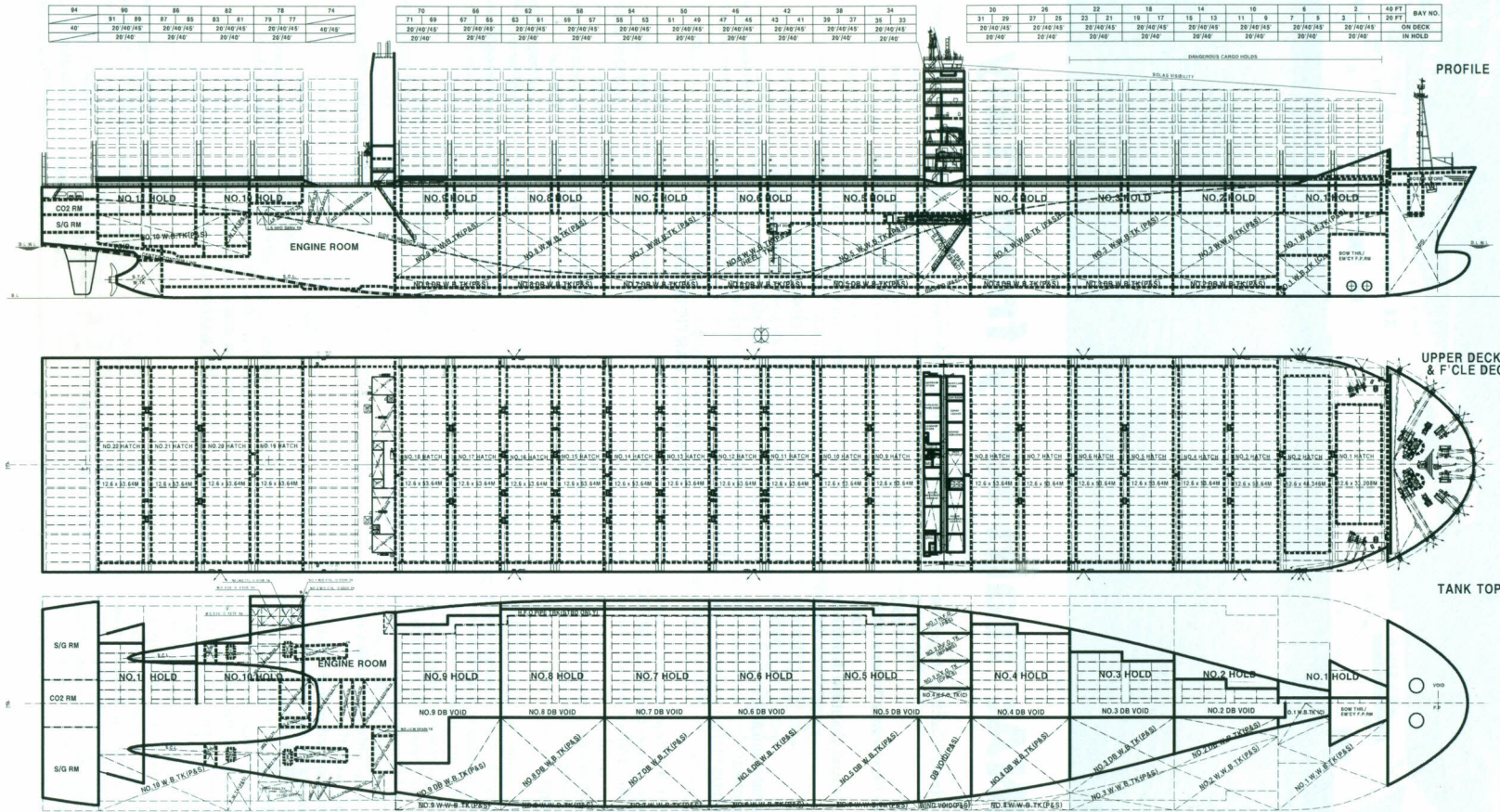
Maersk Mc-Kinney Møller is powered by two MAN B&W 8S80ME-C9.2 with an power output of 29,680kW x 73.1rpm, allowing the vessel an optimal service speed of 23knots. Driving the two fixed-pitch DSME propellers, special adaptations have been added to

give the vessel better propulsion. A full spade rudder and rudder bulb has been added, which will give better water flow to the propeller and reduce its engine load.

TECHNICAL PARTICULARS

Length oa: 399.00m
 Length bp: 377.40m
 Breadth moulded: 59.00m
 Depth moulded
 To upper deck: 30.30m
 Width of double skin
 Side: 2.68m
 Bottom: 2.55m
 Draught
 Scantling: 16.00m
 Design: 14.50m
 Gross: 194,849gt
 Deadweight
 Design: 166,500dwt
 Scantling: 196,050dwt
 Speed, service: 23knots
 Bunkers
 Heavy oil: 14,000m³
 Diesel oil: 950m³
 Water ballast: 59,000m³
 Containerships water ballast
 in loaded condition: 41,000tonnes
 Classification society and notations: ABS +A1(E), Containers Carrier, SH, SHCM, SH-DLA, SFA(25), FL(25), +AMS, +ACCU, MAN, SLAM-B, SLAM-S, PMP, CSM, SEC
 Heel control equipment: Anti-heeling pump
 Roll-stabilisation equipment: Bilge keel & anti-rolling tank
 Main engines
 Design: MAN B&W
 Model: 8S80ME-C9.2
 Manufacture: Doosan Engine
 Number: 2
 Type of fuel: HFO, LSHFO, MDO and LSMGO
 Output of each engine: 29,680kW x 73.1rpm
 Propellers
 Material: Ni-Al-Bronze
 Designer: DSME/MMG
 Number: 2
 Fixed/controllable pitch: Fixed
 Diameter: 9.65m
 Speed:
 Main-engine driven alternators
 Number: 2
 Make/type: Siemens/Intermediate shaft mounted
 Output/speed of each set: 3,000kW x 1,800rpm
 Diesel-driven alternators
 Number: 4
 Engine make/type: 2 x Doosan-MAN 9L32/40 2 x Doosan-MAN 6L32/40
 Type of fuel: HFO, LSHFO, MDO and LSMGO
 Output/speed of each set: 4,500kW x 720rpm 3,000kW x 720rpm
 Alternator make/type: Hyundai
 Output/speed of each set: 4,320kW x 720rpm 2,800kW x 720rpm
 Boilers
 Number: 1

Type: Vertical, water tube
 Make: Alfa Laval-Aalborg
 Output, each boiler: 5,000kg/h
 Other cranes
 Number: 1
 Make: DMC
 Type: Monorail
 Tasks: Provisions crane
 Performance: 12.5tonnes
 Mooring equipment
 Number: 16
 Make: TTS-Kocks
 Type: Electric
 Special lifesaving equipment
 Number of each and capacity: 2 x 34 persons
 Make: Fassmer
 Type: Conventional totally enclosed
 Hatch covers
 Design: Cargotec
 Manufacturer: DSME-Cargotec
 Type: Pontoon
 Containers
 Total TEU capacity: 18,340
 On deck: 10,644
 In holds: 7,696
 Homogenously loaded to 14tonnes: 10,562
 Reefer plugs: 600
 Tiers/rows
 On deck: 10/23
 In holds: 11/21
 Water ballast treatment system
 Make: Alfa Laval
 Capacity: 1,000m³/h
 Complement
 Crew: 14
 Bow thrusters
 Make: Kawasaki
 Number: 2
 Output: 2,500kW
 Bridge control system
 Make: L3
 One-man operation: Yes
 Fire detection system
 Make: Consilium
 Type: Addressable type
 Fire extinguishing systems
 Cargo holds: Semco/ CO₂
 Engine room: Semco/ CO₂
 Radars
 Number: 2
 Make: L3
 Model: RadarPilot Platinum
 Integrated Bridge system
 Make: L3
 Model: NACOS Platinum
 Waste disposal plant
 Sewage plant: Il Seung/ ISS-85N, ISS-15N
 Contract date: 21 February 2011
 Launch/float-out date: 24 February 2013
 Delivery date: 2 July 2013



MAERSK MC-KINNEY MØLLER



MESSINA: Train ferry from Italy

Shipbuilder: **Nuovi Cantieri Apuania**
 Vessel's name: **Messina**
 Hull No: **C.1250**
 Owner/operator: **Rete Ferroviaria Italiana (RFI)**
 Country: **Italy**
 Designer: **Nuovi Cantieri Apuania**
 Country: **Italy**
 Flag: **Italian**
 IMO number: **89533**
 Total number of sister ships already completed (excluding ship presented): **nil**
 Total number of sister ships still on order: **nil**

MESSINA is the latest development of a train ro-ro for Rete Ferroviaria Italiana (RFI) that was constructed by Italian-based Nuovi Cantieri Apuania and delivered to the owner in July. The ferry is a one off design and operates on the strait of Messina route to transfer railway carriages and coaches from Messina, Sicily to the mainland of Italy.

The ferry fleet is rapidly aging and urgently needs to be renewed, along with the pressure from environmental regulations, owners will need to start looking at the options that are available. Italy is hoping it will start seeing increased demand for these types of vessels to boost the countries shipbuilding capacity. The 148m train ferry ordered by Bluvia (a subsidiary of the Italian Railways) at Nuovi Cantieri Apuania is the only ferry of this type that has been built in Italy recently.

The vessel has also been designed to meet with the latest environmental, noise and comfort standards from Italian class society RINA and meets with their notations for COMF NOISE, COMF-VIB, and GREEN PLUS. The Green Plus notation takes a goal-based approach to combining the efficiency and the reduced environmental impact of any ship. Rather than a set of prescriptive rules, Green Plus sets targets and builds an index, taking into account all the different environmental impacts of the ship, and the different ways in which these impacts may be reduced. The new Green Plus notation allows designers and shipyards to select the most cost-effective combination from various possible design solutions and operational procedures, which can be applied to a ship in order to improve its environmental performance level and reach the fixed goals.

The vessel is fitted with three Wärtsilä 6L26 engines that give the vessel a power output of 2,040kW x 1,000rpm and a speed of 18knots. The ferry ship also has high manoeuvrability that comes from the installation of three azimuth thrusters at the stern, two bow thrusters and a rudder manufactured by Schottel.

The 3,000dwt vessel has a capacity for 158 cars and 15 rail carriages, which are carried on one deck. The vessel is accessed from the aft and then vehicles leave via the bow that has a visor which opens to allow an easy exit.

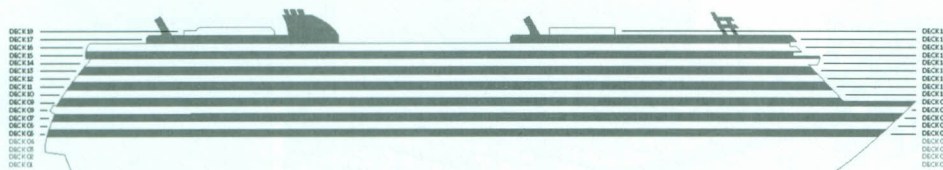
TECHNICAL PARTICULARS

Length oa: 147.00m
 Length bp: 139.10m
 Breadth moulded
 To main deck: 7.90m
 To upper deck: 13.30m
 To other decks: 16.15m
 Draught
 Scantling: 5.40m
 Design: 5.25m
 Gross: 5,700gt
 Displacement: 7,182tonnes
 Lightweight: 4,111tonnes
 Deadweight
 Design: 3,071dwt
 Block co efficient: 0.52
 Speed, service: 18knots
 Bunkers
 Diesel oil: 400m³
 Water ballast: 900m³/800m³
 Classification society and notations: RINA C * ro-ro
 Passenger Ship - Class D COMF NOISE, COMF-VIB, GREEN PLUS, AUT UMS; AUT PORT; AVM-DPS-NS, Water survey
 Main engine
 Model: 6L26
 Manufacturer: Wärtsilä
 Number: 3
 Type of fuel: MDO
 Output of each engine: 2,040kW x 1,000rpm
 Pod propulsion
 Designer/manufacturer: Schottel
 Number: 3

Fixed/controllable pitch: Fixed
 Diameter: 2.5m
 Speed: 225rpm
 Mooring equipment
 Number: 2 x Fwd capstans
 2 x Fwd windlasses
 2 x Aft capstans
 Make: SCM
 Type: Hydraulic type
 Special lifesaving equipment
 Number of each and capacity: 2 x MES
 12 x 100 persons
 2 x 25 persons
 Make: Viking Lifesaving
 Type: MES/Liferaft
 Vertical or sloping chutes: Vertical
 Vehicles
 Number of vehicle decks (fixed/movable): 1
 Total cars: 138
 Total freight units: 24 (trailers)
 Total rail units: 15
 Doors/ramps/lifts/movable car decks
 Number of each: 1 x Bow visor
 2 x lateral door
 1 x Aft door
 Cargo control system
 Make: Brunvoll
 Complement
 Crew: 18
 Passengers
 Total: 900
 Stern appendages/special rudders: Bow rudder
 Bow thruster
 Make: Schottel
 Number: 2
 Output: 470kW
 Stern thrusters
 Make: Schottel
 Number: 3
 Fire detection system
 Make: Autotitalia
 Contract date: 18 November 2010
 Launch/float-out date: 28 March 2013
 Delivery date: 26 July 2013

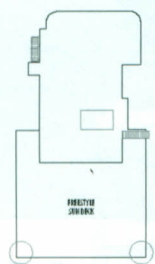


NORWEGIAN BREAKAWAY

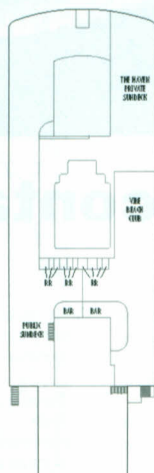


Gross Tonnage: 144,017
 Overall Length: 1,062 feet
 Beam: 130 feet
 Draft: 27 feet
 Engines: Diesel Electric
 Cruise Speed: 21 knots
 Guests: 4,028 (double occupancy)
 Crew: 1,595

NORWEGIAN BREAKAWAY



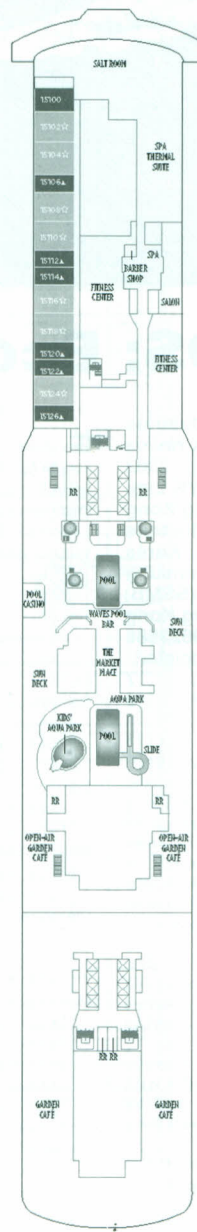
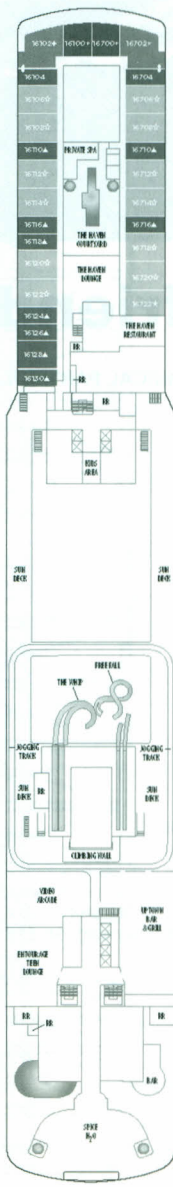
Deck 18



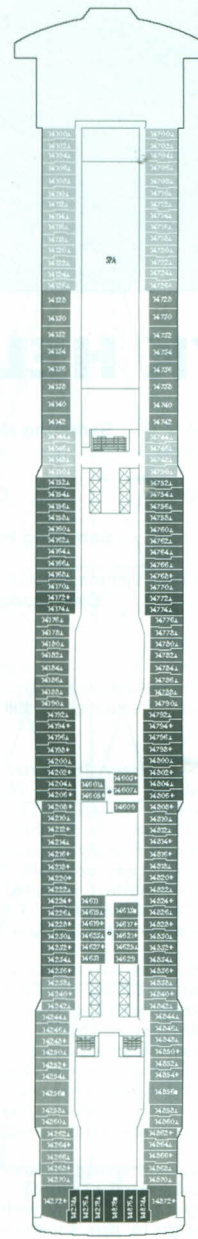
Deck 17



Deck 16



Deck 15



Deck 14

S2 S3 S4 S5

S4 S5

S6 S9 M9 MA B9 B1
 BA BC IA



NYK HELIOS: Eco-friendly containership

Shipbuilder: **Samsung Heavy Industries**
 Vessel's name: **NYK Helios**
 Hull No: **2002**
 Owner/operator: **OOCL/NYK Line**
 Country: **Hong Kong**
 Designer: **Samsung Heavy Industries**
 Country: **Korea**
 Model test establishment used: **Samsung Ship Model Basin (SSMB)**
 Flag: **Hong Kong**
 IMO number: **9622588**
 Total number of sister ships already completed (excluding ship presented): **7**
 Total number of sister ships still on order: **2**

SAMSUNG Heavy Industries Co., Ltd (SHI) delivered the vessel *NYK Helios* to its owner Orient Overseas Container Line Ltd.(OOCL) in January. *NYK Helios* is the first in a series of 10 environmentally friendly containerships. The order placed in 2011 was originally for six vessels of OOCL, but was then extended to another four vessels for NYK Lines. The 13,208TEU container vessels operate on the G6 Asia-Europe Route on loop 4.

NYK Helios has an expanded width of 48.2m, which is the maximum size for the new expanded Panama Canal transit and has a 29.8m depth with a scantling draught of 15.5m, suitable for carrying 144,000tonnes weighted cargo.

To make the vessel more environmentally friendly it has been fitted with a full spade type rudder with asymmetric rudder bulb, to save energy and an advanced rake fixed pitch propeller is driven by a diesel engine.

The propulsion system onboard *NYK Helios* is a single 2-stroke diesel 12S90ME – C9.2 engine that has an output of 69,720kW with part load tuning and exhaust gas by-pass, capable of burning marine diesel oil (MDO) and heavy fuel oil (HFO). An automatic fuel oil change over system from HFO and MDO has been provided to allow for the flexible operation of the main engine and generator engines, which are fully compliant with MARPOL Annex VI regulation 14 (Sulphur oxides).

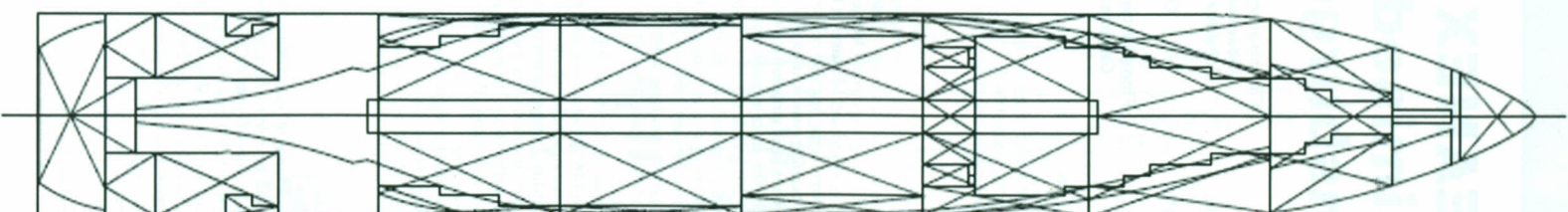
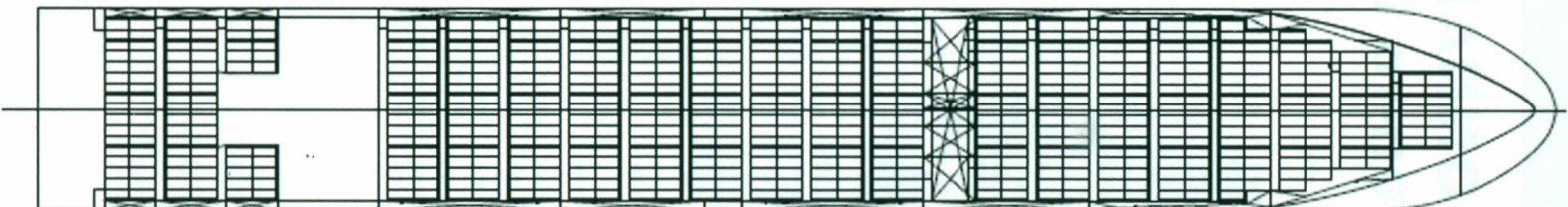
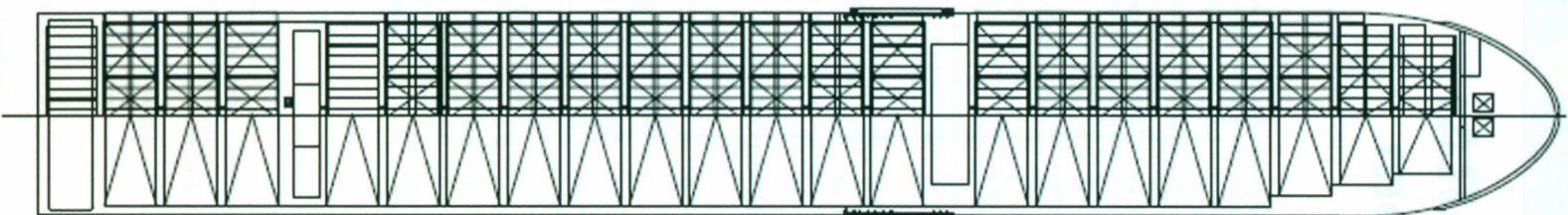
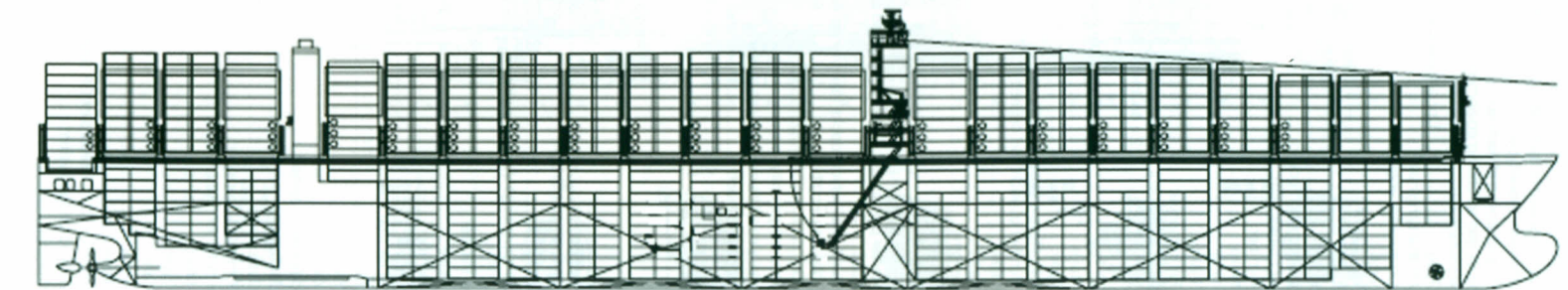
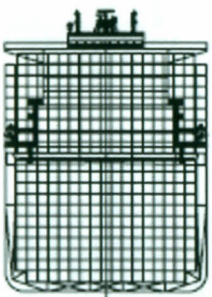
The engine control room contains all facilities to allow for centralised operations of the plant and equipment and also allows for unattended operation of the machinery plant under all operation modes.

NYK Helios' design also meets with classification notations for 'GP' & 'Enviro' notation, Eco-friendly anti-fouling paint, AMP (for no air pollution in port), ballast treatment system, shaft generator (PTO) for fuel oil saving which fully satisfies EEDI requirement below -43% from baseline.

TECHNICAL PARTICULARS

Length oa: 366.00m
 Length bp: 350.00m
 Breadth moulded: 48.20m
 Depth moulded
 To main deck: 29.80m
 Width of double skin
 Side: 2.35m
 Bottom: 2.20m
 Draught
 Scantling: 15.50m
 Design: 14.00m
 Gross: 141,000gt
 Deadweight
 Design: 122,000dwt
 Scantling: 144,000dwt
 Speed, service: 23.5knots
 Bunkers
 Heavy oil: 10,200m³
 Diesel oil: 400m³
 Water ballast: 42,000m³
 Daily fuel consumption
 Main engine only: 189.3tonnes/day
 Classification society and notations: ABS* A1 , Container Carrier, *AMS, *ACCU, SH, SHCM, SH-DLA, SFA, FL(25), UWILD, ENVIRO, BWT*, NIBS, CSC, GP, CPS, POT, SLAM-B/S
 Main engine
 Design: MAN Diesel & Turbo
 Model: 12S90ME – C9.2
 Manufacturer: MAN Diesel & Turbo – Hyundai
 Number: 1
 Type of fuel: HFO, MDO
 Output of each engine: 69,720kW
 Propeller
 Material: Ni-Al-Bronze
 Designer/manufacturer: Samsung- Nakashima
 Number: 1
 Fixed/controllable pitch: Fixed
 Boilers
 Number: 2
 Type: Vertical, cylindrical
 Make: Kangrim
 Output, each boiler: 5,000kg/h, 8bar
 Equipment handling crane
 Number: 1
 Make: Oriental Precision Engineering
 Type: Electro motor driven, monorail type
 Performance: 13tonnes
 Other cranes
 Number: 2
 Make: Oriental Precision Engineering
 Type: Electro-hydraulic, self-contained single jib

Tasks: Provisions and Suez mooring boat handling
 Performance: 4tonnes
 Mooring equipment
 Number: 2 x Windlass combined with winch
 Make: Flutek-Kawasaki
 Type: Electro-hydraulic
 Special lifesaving equipment
 Number of each and capacity: 2 x 30 persons
 Make: Hyundai Lifeboats
 Type: Conventional totally enclosed
 Ballast control system
 Make: Samsung
 Type: ICMS
 Water ballast treatment system
 Make: Techcross
 Capacity: 3,000m³/h
 Complement
 Crew: 12
 Bow thruster
 Make: Kawasaki Heavy Industries
 Number: 2
 Output: 1,800kW
 Bridge control system
 Make: Nabtesco
 Type: ICMS
 Water ballast treatment system
 Make: Techcross
 Capacity: 3,000m³/h
 Complement
 Crew: 12
 Bow thruster
 Make: Kawasaki Heavy Industries
 Number: 2
 Output: 1,800kW
 Bridge control system
 Make: Nabtesco
 One-man operation: Yes
 Fire detection system
 Make: Tyco
 Type: Smoke detection type
 Fire extinguishing systems
 Cargo holds: NK/ CO₂
 Engine room: NK/ CO₂
 Radars
 Number: 3
 Make: JRC
 Integrated bridge system
 Make: JRC
 Model: JAN-901B, JAN-2000-CON1, JAN-1186
 Contract date: 23 March 2011
 Delivery date: 22 January 2013







RAMFORM TITAN: Ramform seismic vessel design

Shipbuilder: **Mitsubishi Heavy Industries**
 Vessel's name: **Ramform Titan**
 Hull No: **2291**
 Owner/operator: **PGS Titans**
 Country: **Norway**
 Designer: **Mitsubishi Heavy Industries**
 Country: **Japan**
 Model test establishment used: **SSPA Sweden**
 Flag: **Bahamas**
 IMO number: **9629885**
 Total number of sister ships already completed (excluding ship presented): **nil**
 Total number of sister ships still on order: **3**

MITSUBISHI Heavy Industries, Ltd delivered *Ramform Titan* to petroleum Geo-services (PGS) at the Nagasaki Shipyard & Machinery works in May. Petroleum Geo-services has opted for a less conventional hull form design for its latest seismic vessel.

Ramform Titan is the first one of four sister vessels which will form the state-of-the-art 5th generation Ramform Titan-class fleet. The 1st to 4th generation Ramforms have had a breadth of 40m and have been able to tow up to 22 streamers at most, while the 5th generation Titan-class Ramform has a wider breadth of 70m and can deploy and recover up to 24 streamers.

The vessel has a distinctive triangular hull called 'ramform' measuring 104m in length and 70m wide, which allows for the vessel to be more efficient at seismic surveying and also makes it one of the world's largest surveying vessels. The vessel will conduct seismic surveys using acoustic waves (also referred to as seismic waves). Air gun sources emit the acoustic waves that strike the seabed and strata boundaries and bounce back as echoes. These echoes are detected by sensors inside multiple streamer cables several kilometres in length, which are towed from the stern of the vessel.

When the data from the cables has been processed and analysed by computer, it is possible to identify likely oil or natural gas deposits below the seabed. Adding more cables allows the vessel to explore a wider area of the seabed, improving efficiency and safety.

Offshore seismic surveys are conducted around the clock and if a survey field is extensive, it takes several months to complete. For crew comfort the vessel is fully equipped with recreational facilities including a lounge, TV room, sauna, an outdoor pool and an indoor ball game court as well as facilities including a living room and dining room. The vessel is also equipped with a helicopter deck to transport members of the crew or replenish supplies without mooring and interrupting observations. Bunkering by a bunker ship is also possible while the vessel tows streamer cables.

TECHNICAL PARTICULARS

Length oa: 104.21m
 Length bp: 96.00m
 Breadth moulded: 70.00m

Depth moulded
 To main deck: 8.10m
 To upper deck: 17.60m
 Draught
 Scantling: 6.42m
 Design: 6.00m
 Gross: 20,637gt
 Deadweight
 Scantling: 7,351dwt
 Speed, service: 16.5knots
 Bunkers
 Heavy oil: 6,417m³
 Diesel oil: 227m³
 Water ballast: 5,544m³
 Classification society and notations: DNV, +1A1, SPS, ICE
 C, E0, HELDK, RP, CLEAN DESIGN,
 TMON, BIS, NAUT-OSV(A), VIBR,
 COMF-C(3)-V(3)

Propulsion plant
 Make: ABB
 Number: 3
 Model: Propulsion electric motor AMZ 1250VV12LSF
 Maximum output per shaft: 6,000kW x 125rpm
 Propellers
 Material: Ni-Al-Bronze
 Designer/manufacturer: Wärtsilä
 Number: 3
 Fixed/controllable pitch: Controllable
 Diameter: 4.30m
 Speed: 125rpm
 Special adaptations: Nozzle attached

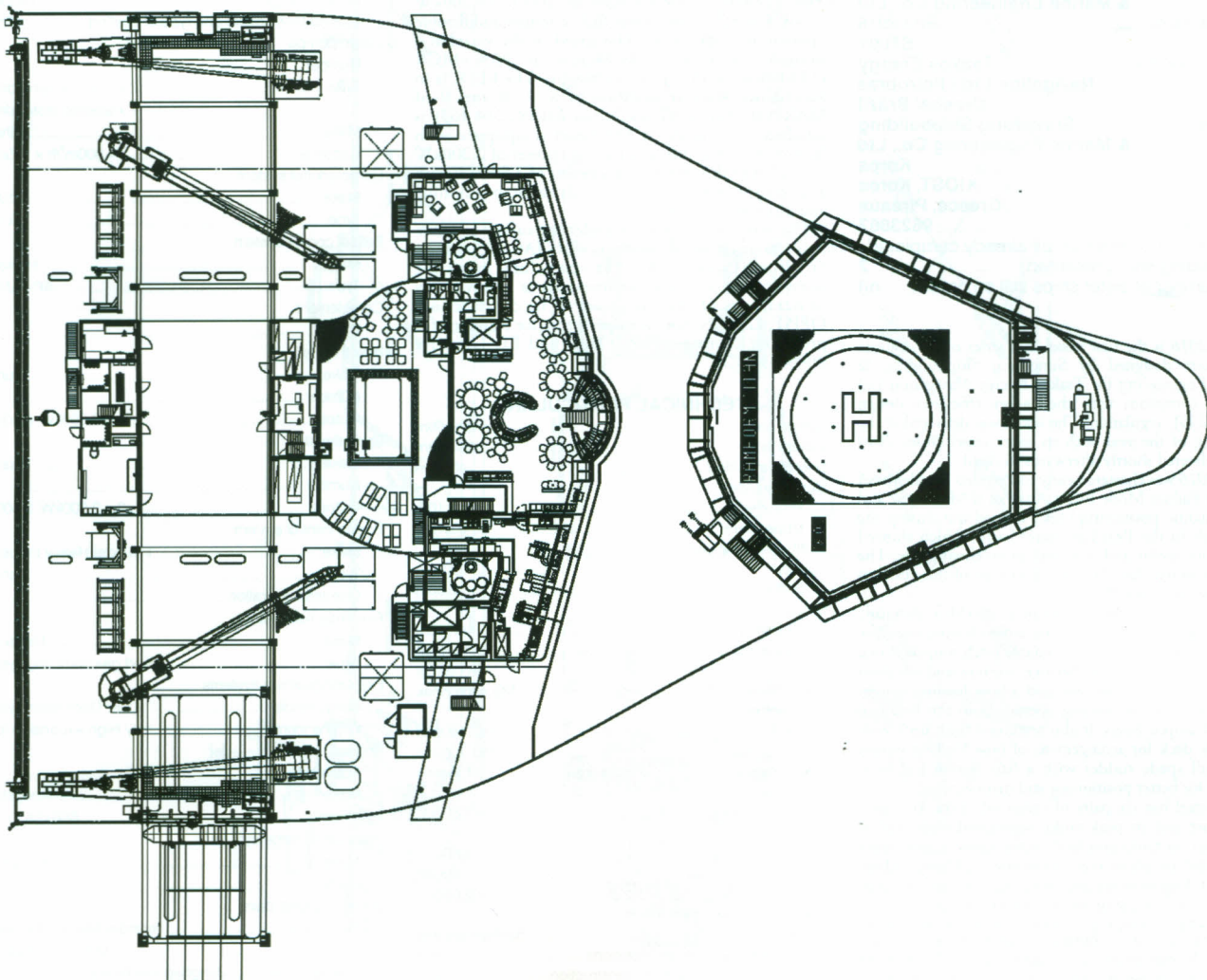
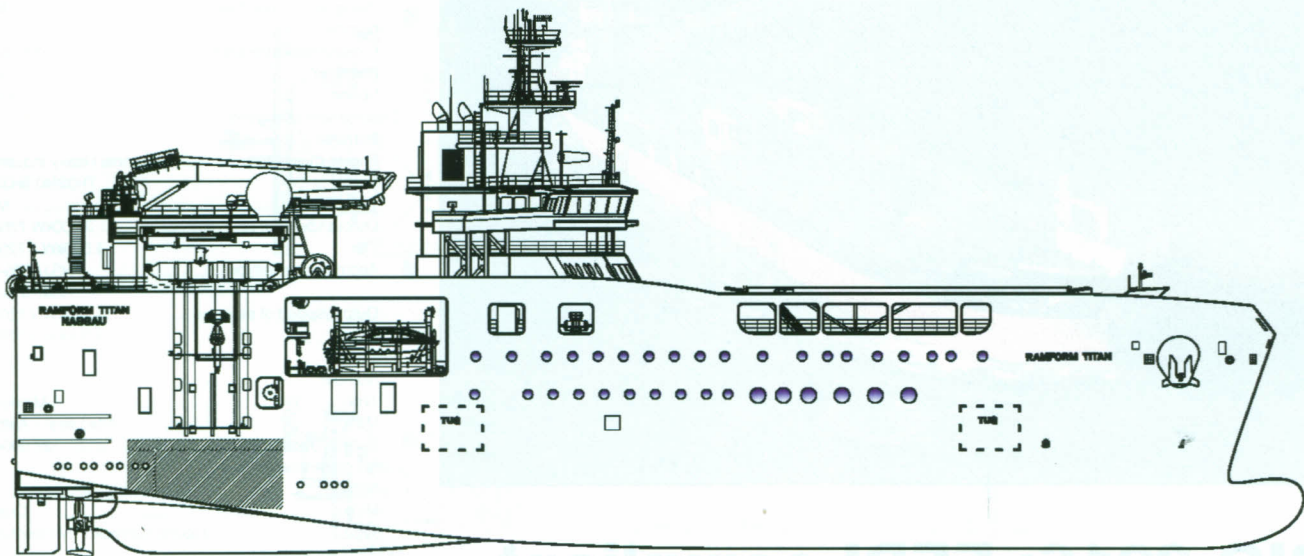
Diesel-driven alternators
 Number: 6
 Engine make/type: Wärtsilä/ 8L32
 Type of fuel: HFO, MDO
 Output/speed of each set: 3,840kW x 720rpm
 Alternator make/type: ABB/AMG 0900SM10 LSE
 Output/speed of each set: 3,960kW x 720rpm

Exhaust-gas scrubber equipment
 Manufacturer: H+H Umwelt und Industrietechnik
 Type: Selective catalytic converter
 On main engines: On main generator system

Seismic air compressor
 Number: 3
 Make/type: Loberdorfer Maschinenfabrik/
 LMF 48/ 138-207-E60

Boilers
 Number: 2
 Type: Composite
 Make: Osaka Boiler
 Output, each boiler: 2,000kg/h
 Streamer winches
 Number: 10 x single streamer
 6 x double streamer
 2 x single HD streamer
 (24 sets of streamer reels with
 12,000m length capacity)
 Make: Kongsberg Evotec, Rolls-Royce Marine

Type: Hydraulic
 Telescopic boom
 Number: 6 x telescopic boom for gun arrays
 2 x telescopic boom for work boat
 Make: Kongsberg Evotec
 Type: Hydraulic
 Other cranes
 Number: 2 x rotating elbow derrick crane
 Make: Rolls-Royce
 Type: Electro-hydraulic
 Mooring winches
 Number: 2 x windlass
 5 x mooring winch
 Make: Hatlapa
 Type: Electric
 Special lifesaving equipment
 Number of each and capacity: 2 x 40 persons
 2 x 80 persons
 Make: Fassmer/ Brude Safety
 Type: Lifeboat SEL-RT 8.5
 MES Brude MES SPS
 Vertical of sloping chute: Vertical
 Ballast control system
 Make: Høglund Marine Automation
 Water ballast treatment system
 Make: Optimarin
 Capacity: 400m³/h
 Complement
 Crew: 64
 Stern appendages/special rudders: 3 x twisted leading
 edge flap rudder
 Bow thruster
 Make: Brunvoll
 Number: 1
 Output: 2,200kW
 Bridge control system
 Make: Kongsberg Marine
 Fire detection system
 Make: Consilium Nittan Marine
 Type: Optical, thermal flame
 Fire extinguishing systems
 Engine room: Marioff/ Water mist
 Accommodation: Marioff/ water mist
 Public spaces: Marioff/ water mist
 Helideck: Danfoss Semco/ Foam
 Around streamer cable: Danfoss Semco/ Foam
 Radars
 Number: 3
 Make: Kongsberg Marine
 Integrated bridge system
 Make: Høglund Marine Automation
 Waste disposal plant
 Waste compactor: Delitek
 Waste shredder/crusher: Delitek
 Sewage plant: Gertsen & Olufsen
 Contract date: 14 April 2011
 Launch/float-out date: 10 December 2012
 Delivery date: 10 May 2013





RIO 2016: EEDI compliant shuttle tanker

Shipbuilder: **Sungdong Shipbuilding & Marine Engineering Co., Ltd**
 Vessel's name: **RIO 2016**
 Hull No: **S7001**
 Owner/operator: **Tsakos Energy Navigation Ltd./ Petrobras**
 Country: **Greece/ Brazil**
 Designer: **Sungdong Shipbuilding & Marine Engineering Co., Ltd**
 Country: **Korea**
 Model test establishment used: **KIOST, Korea**
 Flag: **Greece, Pireaus**
 IMO number: **9623867**
 Total number of sister ships already completed (excluding ship presented): **2**
 Total number of sister ships still on order: **nil**

RIO 2016 is the first vessel in a series of two shuttle tankers designed by Sungdong Shipbuilding & Marine Engineering for Tsakos Energy Navigation Ltd that are compliant with the energy efficiency design index (EEDI) regulation. The vessel was delivered at the beginning of the year with its sister vessel *Brasil 2014* being delivered shortly afterwards in April.

RIO 2016 was chartered early to Petroleo Brasileiro SA with the Failure Mode Effect Analysis (FMEA) test and DP (dynamic positioning) tests carried out during the field trials in the Brazilian water basin, which showed satisfactory results and recorded an excellent grade. The company noted that this is the first type of this vessel to sail under the Greek flag.

The vessel has been designed as IMO dynamic positioning (DP) Class 2 shuttle tanker having one slow speed diesel engine, one controllable pitch propeller, two bow and one stern tunnel thruster, one bow and one stern retractable azimuth thruster and a bow loading system suitable for tandem loading operations in the Brazilian Waters-Campos Basin. It also features a flush deck with forecastle deck for arrangement of bow loading system and a full spade rudder with a flap system has been installed for better positioning and manoeuvring.

The vessel has six pairs of cargo oil tanks, two slop tanks, fore and aft peak tanks, segregated water ballast tanks, fuel oil tanks and fresh water tanks. Cargo tanks are divided by plane type transverse and longitudinal bulkhead. Engine room and living quarters, including an enclosed type navigation bridge, are located aft.

The cargo pumping system allows a maximum unloading rate of 12,000m³/hr with three cargo oil pumps. The maximum cargo loading rate is 17,000m³/hr through the midship cargo manifold. Alternatively, a cargo loading rate of 9,000m³/h can be achieved through the bow loading station, based on the flow velocity of about 6m/s.

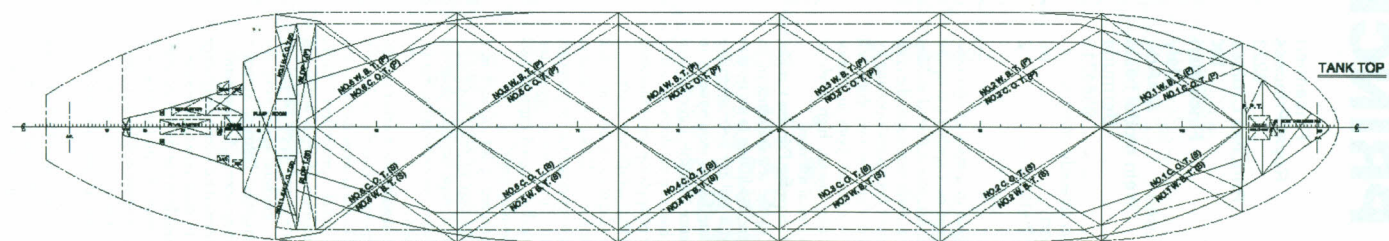
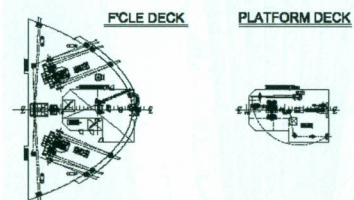
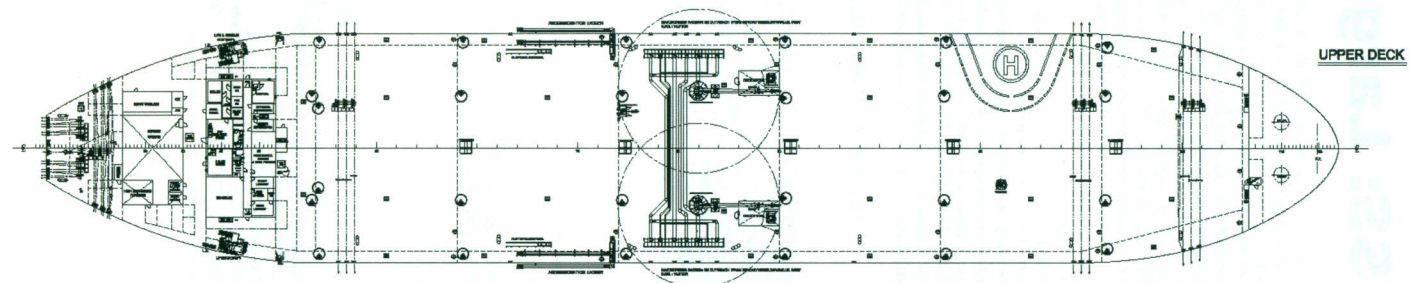
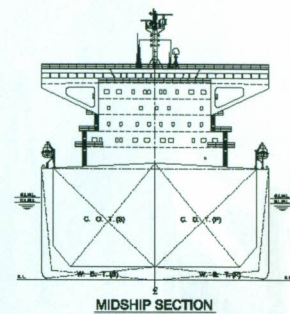
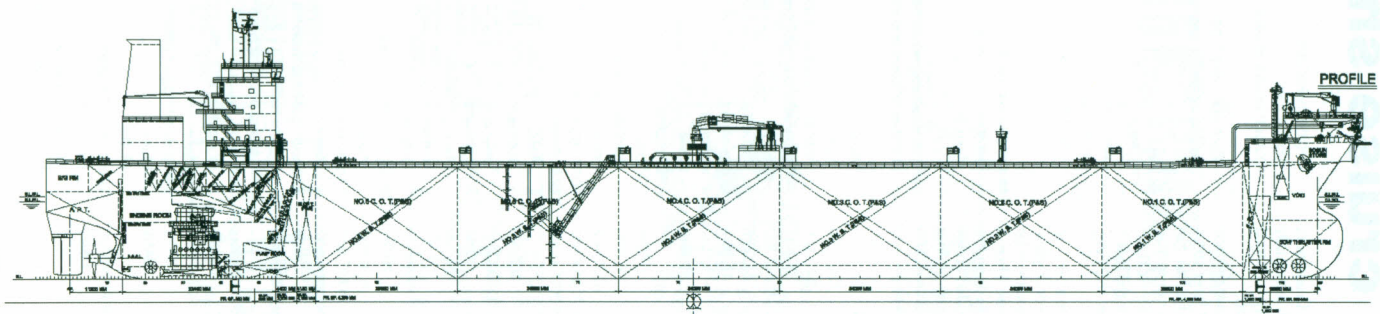
The main engine, a MAN 6S70ME-C8.2, is IMO Tier II compliant and has been de-rated to 15,200kW of MCR at 82rpm for better fuel economy and flexible operations at part load. The speed of the vessel at a draught of 16m is 14.8knots at 90% MCR (13,680kW) with a 15% sea margin. The EEDI is in accordance with regulations 5, 6, 7, 8 and 9 of MARPOL Annex VI resolution MEPC.214 (63) is satisfied up to phase 1. The vessel is equipped with Bow/Stern tunnel thruster having a power of 2,200kW and azimuth thruster having a power of 2,500kW with a single-speed motor for using dynamic positioning and auxiliary propulsion.

The vessel has been built under the survey of DNV and designed in accordance with IACS Common Structural Rules (CSR). The vessel fully meets the latest environmental guidelines such as an inventory of hazardous of materials used in its construction, OPP-F, CLEAN notation, performance standard for protective coatings (PSPC) rules and EU Directive 2005/33/EC.

TECHNICAL PARTICULARS

Length oa: 278.50m
 Length bp: 264.00m
 Breadth moulded: 48.00m
 Depth moulded
 Main deck: 23.10m
 Upper deck: 23.10m
 Width of double skin
 Side: 2.50m
 Bottom: 2.80m
 Draught
 Scantling: 17.15m
 Design: 16.00m
 Gross: 83,087gt
 Displacement: 183,400tonnes
 Deadweight
 Design: 142,100dwt
 Scantling: 155,700dwt
 Speed, service: 14.8knots
 Cargo capacity
 Liquid volume: 167,500m³
 Bunkers
 Heavy oil: 3,600m³
 Diesel oil: 500m³
 Water ballast: 52,600m³
 Daily fuel consumption
 Main engine: 53.4tonnes/day
 Classification society and notations: DNV
 % high-tensile steel used in construction: 35%
 Main engine
 Design: MAN B&W
 Model: 6S70ME-C8.2

Manufacturer: Hyundai Heavy Industries
 Number: 1
 Type of fuel: HFO, MDO
 Output of each engine: 15,200kW x 82kW
 Propellers
 Material: Ni-Al-Bronze
 Designer/manufacturer: Berg
 Number: 1
 Fixed/controllable pitch: Controllable
 Diameter: 8.3m
 Speed: 82rpm
 Diesel-driven alternators
 Number: 4
 Engine make/type: Hyundai Heavy Industries/ 7H32/40 9H32/40
 Type of fuel: MDO
 Output/speed of each set: 3,500kW 720rpm
 4,500kW x 720rpm
 Alternator make/type: HSJ7 805-10P
 HSJ7 913-10P
 Output/speed of each set: 3,300kW x 720rpm
 4,300kW x 720rpm
 Boilers
 Number: 2
 Type: Mission Oil
 Make: Alfa Laval - Aalborg
 Output, each boiler: 27,000kg/h
 Cargo cranes/cargo gear
 Number: 2
 Make: Oriental
 Type: Electro-hydraulic, cylinder luffing
 Mooring equipment
 Number: 6
 Make: Aker Pusnes
 Type: Electro-hydraulic
 Cargo tanks
 Number: 12 + 2 slop tanks
 Grades of cargo carried: Crude oil having a flash point below 60°C
 Product range: Crude oil
 Coated tanks make and type of coating: Epoxy
 Cargo pumps
 Number: 3
 Type: 2 x steam turbine driven
 1 x electric motor driven
 Make: Shinko
 Capacity: 4,000m³/h x 135mTH
 Cargo control system
 Make: SAAB
 Type: GL-300
 Ballast control system
 Make: Hanla Ins
 Type: AP-PAN31E
 Complement
 Crew: 12
 Bow thruster
 Make: Brunvoll
 Number: 3
 Output: 2 x 2,200kW, 2,500kW
 Stern thruster
 Make: Brunvoll
 Number: 2
 Output: 2 x 2,200kW, 2,500kW
 Bridge control system
 Make: Hyundai Heavy Industries
 Type: T-shape
 One-man operation: Yes
 Fire detection system
 Make: Hanla-IMS
 Type: Fixed gas sampling system
 Fire extinguishing systems
 Cargo holds: NK/ Deck foam system
 Engine room: NK/ High expansion foam
 Radars
 Number: 2
 Make: Kongsberg
 Model: 65612A, 65608
 Integrated bridge system
 Make: Kongsberg
 Model: K-Bridge
 Waste disposal plant
 Incinerator: Hyundai Marine Machinery/
 MAXI NG150SL WS
 Sewage plant: Jonghaph machinery/ BIO Aerob-18N
 Contract date: March 2011
 Launch/float-out date: November 2012
 Delivery date: March 2013





ROYAL PRINCESS: Large cruise ship

Shipbuilder: **Fincantieri**
 Vessel's name: **Royal Princess**
 Hull No: **6223**
 Owner/operator: **Princess Cruises**
 Country: **UK**
 Designer: **Fincantieri**
 Country: **Italy**
 Model test establishment used: **MARIN/Wein model basin**
 Flag: **Bermuda**
 IMO number: **9584712**
 Total number of sister ships already completed (excluding ship presented): **nil**
 Total number of sister ships still on order: **2**

Royal Princess is the first vessel in a series of two new-generation cruise ships ordered by Carnival Group for Princess Cruises from Fincantieri that was delivered in May. The two prototype ships are Fincantieri's response to the crisis in the world market, where there have been some openings for large vessels. The shipyard said that the two ships will constitute a new technological benchmark both in Europe and worldwide for their innovative layout, high levels of performance and cutting edge technical solutions.

In designing the new class of ships for Princess Cruises, Fincantieri set out to respond to the requirements of an increasingly complex market, where, in addition to the need to keep prices low, there was also a call for new operating solutions, which would anticipate future requirements in terms of safety and performance for the international regulatory framework. The result has been the development of a new design approach, capable of applying and enhancing new solutions without increasing ship complexity or costs.

Royal Princess' design has been adapted to meet with a full range of cruising profiles, operating from Alaska to Australia, in all areas even where navigation is restricted for the purposes of safeguarding the environment. Fincantieri designed the space inside of the vessel 'rationally', wasted capacity was avoided as this would increase operating costs.

The design of the vessel required a lot of technical investment, which has led Fincantieri to what it calls its "future-proof design". This class of ships has been designed today with a view to tomorrow, incorporating future regulations, which are not yet in force.

In order to meet these future regulations further energy saving measures have been incorporated into the design. An innovative approach was adopted in many areas, including the hydrodynamic components (keel, propellers, bulb, appendages), plant for the generation of fresh water and drinking water, plant for fuel treatment and supply, propulsion machinery and auxiliary plant, machine ventilation, air conditioning plant, electric engines, lighting systems, laundries, kitchens, marine outfitting systems, hotel systems.

The air conditioning plant, conceived for maximum energy efficiency, comprises machinery to treat air which ensures a sufficient flow of fresh air from outside, while the temperature will be regulated by air converters which, for the first time, will also be installed in public areas and controlled by automated systems. Furthermore, in this way smaller sized machinery can be employed thereby freeing technical space for passenger cabins or public areas.

Fincantieri's design department has also developed the activity customarily carried out by external studies appointed by the shipowner. The aim is to coordinate requirements related to architecture and décor with technical issues – priority plant, such as weight containment, integration with the air conditioning and entertainment systems, noise containment,

use of sources of natural light, diffused or reflected. In addition, by analysing the main cost items, solutions which are equally attractive to the shipowner, but more efficiently managed during the construction process, have been adopted.

Contractually this is the first cruise ship laid since the new international regulations to safeguard life at sea have come into force. Accordingly, it is claimed to have the first full application on a cruise ship of the regulations comprised under "safe return to port" exactly as issued by SOLAS (Safety of Life at Sea, international convention of the IMO, which sets out to ensure the safety of merchant shipping, with no exceptions or interpretations.

The 3,600-passenger ship *Royal Princess* features an expanded atrium, an over-water 'SeaWalk' a top-deck glass-bottomed walkway, which extends to 8.53m beyond the edge of the vessel; and balconies on all outside staterooms. There is an outdoor art installation by marine artist Wyland a dramatic, custom piece of sea-inspired art that has been installed on the ship's top deck. Aboard *Royal Princess*, is the largest outdoor movie screen at sea. The Movies Under the Stars screen is 30% larger than other screens on Royal Princess Cruises ships.

TECHNICAL PARTICULARS

Length oa: 330.00m
 Length bp: 306.00m
 Breadth moulded: 38.40m
 Depth moulded
 To Deck 7: 21.00m
 To Deck 17: 47.26m
 Width of double skin
 Bottom: 1.95m
 Draught
 Scantling: 8.55m
 Design: 8.30m
 Gross: 142,714gt
 Displacement: 68,155tonnes
 Lightweight: 58,300tonnes
 Deadweight
 Design: 10,500dwt
 Scantling: 13,000dwt
 Block co-efficient: 0.68
 Speed, service: 22knots
 Bunkers
 Heavy oil: 2,890m³
 Diesel oil: 700m³
 Water ballast: 1,800m³
 Classification society and notations: LR*100A1, *LMC with CCS notation IWS
 % high-tensile steel used in construction: 45%
 Roll-stabilisation equipment: Fin stabilisers
 Main propulsion units
 Design: Synchronous double-winding motors
 Motor: DTMSZ 3466-16YS
 Manufacturer: VEM
 Number: 2
 Output of each motor: 18MW
 Propeller
 Material: Ni-Al-Bronze
 Designer/manufacturer: MMG
 Number: 2
 Fixed/controllable pitch: Fixed
 Diameter: 5.7m
 Speed: 135rpm
 Diesel driven alternators
 Number: 4

Engine make/type: Wärtsilä/ 46F
 Type of fuel: HFO, MDO
 Output/ speed of each set: 2 x 14.4MW
 2 x 16.8MW
 Alternator make/type: VEM
 Output/ speed of each set: 2 x 19.2MVA
 2 x 22.4MVA

Boilers
 Number: 2 + 4
 Type: Oil fired/ exhaust gas
 Make: Saare TPK Nova/ Greens Power
 Output, each boiler: 15tonnes/h (9bar)
 2 x 3.9tonnes/h
 2 x 4.5tonnes/h (9.5bar)

Mooring equipment
 Number: 10
 Make: Tech Marine
 Type: Electric

Special lifesaving equipment
 Number of each and capacity: 11 x 293 persons,
 5 x 235 persons, 2 x 632 persons
 Make: Hateke/ RFD
 Type: Lifeboats/ MES
 Vertical or sloping chutes: Sloping

Water ballast treatment system
 Make: Hyde Marine
 Capacity: 350m³/h

Complement
 Officers: 177
 Crew: 1,222

Passengers
 Total: 4,610
 Number of cabins: 1,780
 Percentage/number outboard: 81%/ 1,438

Stern appendages/special rudders: Ducktail

Bow thruster
 Make: Wärtsilä
 Number: 3
 Output: 2,500kW

Stern thruster
 Make: Wärtsilä
 Number: 3
 Output: 2,500kW

Bridge control system
 Make: SAM Electronics

Fire detection system
 Make: Consilium

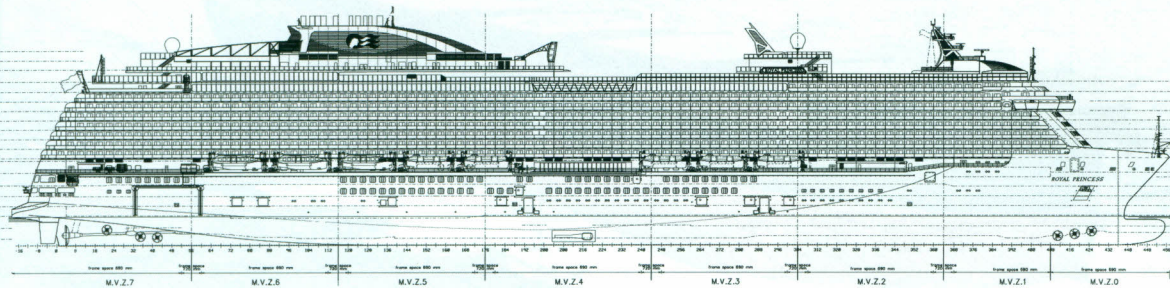
Fire extinguishing systems
 Engine room: Eusebi/ CO₂ + water mist
 Cabins/ public spaces: Eusebi/ water mist

Radars
 Number: 5
 Make: SAM Electronics

Integrated bridge systems
 Make: SAM Electronics
 Model: NACOS Platinum

Waste disposal plant
 Incinerator: Deerberg
 Waste compactor: Deerberg
 Waste shredder/crusher: Deerberg
 Sewage plant: Hamworthy

Contract date: 10 April 2010
 Launch/float-out date: 31 July 2012
 Delivery date: 1 May 2013



DECK 16
AT 14200 FROM B.L.

DECK 15
AT 13800 FROM B.L.

DECK 14
AT 13400 FROM B.L.

DECK 13
AT 13000 FROM B.L.

DECK 12
AT 12600 FROM B.L.

DECK 11
AT 12200 FROM B.L.

DECK 10
AT 11800 FROM B.L.

DECK 9
AT 11400 FROM B.L.

DECK 8
AT 11000 FROM B.L.

DECK 7
AT 10600 FROM B.L.

DECK 6
AT 10200 FROM B.L.

DECK 5
AT 9800 FROM B.L.

DECK 4
AT 9400 FROM B.L.

DECK 3
AT 9000 FROM B.L.

DECK 2
AT 8600 FROM B.L.

DECK 1
AT 8200 FROM B.L.

DECK 0
AT 7800 FROM B.L.

DECK -1
AT 7400 FROM B.L.

DECK -2
AT 7000 FROM B.L.

DECK -3
AT 6600 FROM B.L.

DECK -4
AT 6200 FROM B.L.

DECK -5
AT 5800 FROM B.L.

DECK -6
AT 5400 FROM B.L.

DECK -7
AT 5000 FROM B.L.

DECK -8
AT 4600 FROM B.L.

DECK -9
AT 4200 FROM B.L.

DECK -10
AT 3800 FROM B.L.

DECK -11
AT 3400 FROM B.L.

DECK -12
AT 3000 FROM B.L.

DECK -13
AT 2600 FROM B.L.

DECK -14
AT 2200 FROM B.L.

DECK -15
AT 1800 FROM B.L.

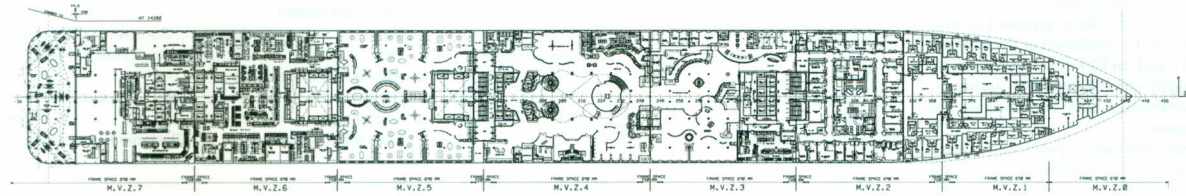
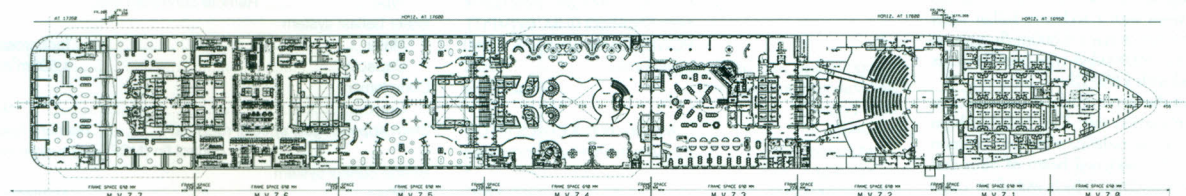
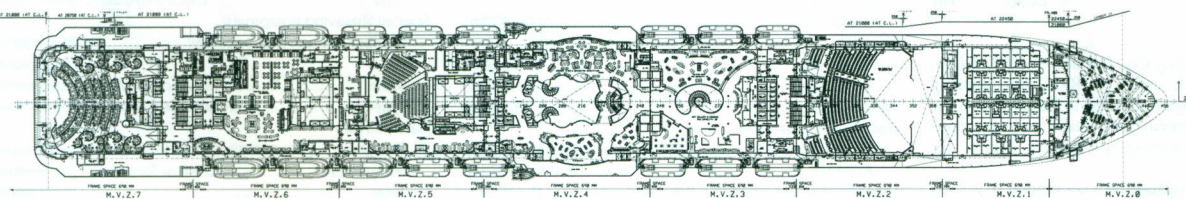
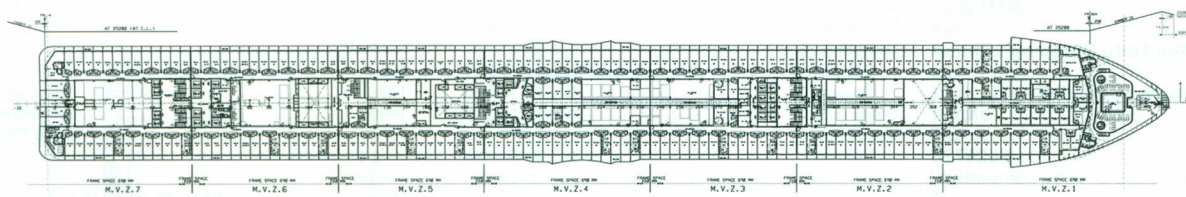
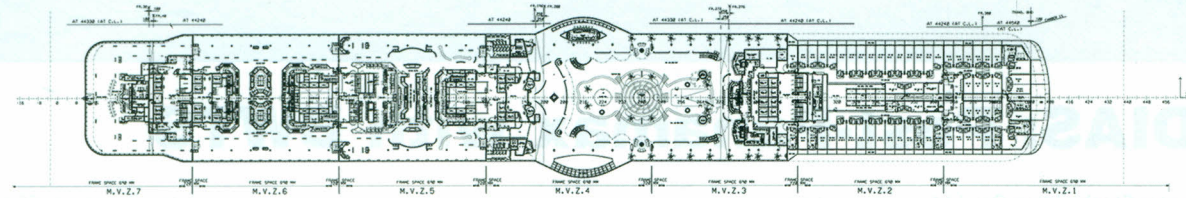
DECK -16
AT 1400 FROM B.L.

DECK -17
AT 1000 FROM B.L.

DECK -18
AT 600 FROM B.L.

DECK -19
AT 200 FROM B.L.

DECK -20
AT 0 FROM B.L.





RTM DIAS: Post-Panamax with BWTS

Shipbuilder: **Namura Shipbuilding Co., Ltd**
 Vessel's name: **RTM Dias**
 Hull No: **364**
 Owner/operator: **Rio Tinto Shipping Limited**
 Country: **UK**
 Designer: **Namura Shipbuilding Co., Ltd**
 Country: **Japan**
 Flag: **UK**
 IMO number: **9629720**
 Total number of sister ships already completed
 (excluding ship presented): **1**
 Total number of sister ships still on order: **nil**

NAMURA Shipbuilding Co., Ltd delivered *RTM Dias*, an 89,892dwt bulk carrier, to Rio Tinto Shipping Limited at its Imari Shipyard & works in January. With the development of the Panama Canal under way, the post-Panamax design is becoming a favourite option for shipowners.

With the ballast water management convention (BWMC) still hanging in the wings to be ratified, some owners are being slow to react. But, UK-based Rio Tinto Shipping has taken up the challenge of getting ahead of the environmental convention by fitting its vessel with a Techcross ballast water treatment system (BWTS), which has a 4,800m³/h capacity. This is the first vessel of the 89,000dwt type post-Panamax bulk carrier to be equipped with a BWTS.

Further developments of the ship to make it more efficient in service have also been carried out. The hull has been designed and constructed in accordance with the common structural rules (CSR) with a widened beam of 38m and shallow draught 13.90m (scantling), which will allow cargo loading to happen more efficiently, the vessel will mainly carry bauxite to an Australian aluminium refinery.

The propulsion performance has been approved to give better fuel oil savings through the installation of the Namura flow control fins (NCF) and rudder fins, developed by Namura, along with a highly efficient propeller. Adding to this, corners of the superstructure have been flattened to reduce the vessel's air resistance.

RTM Dias has been fitted with large capacity water ballast pumps to speed up the process of cargo loading operations and also has the IMO PSPC-WBT notation for corrosion protection of the ballast tanks to increase the safety of the vessel. A fixed hold cleaning machine has been fitted under each cargo hatch cover to reduce cleaning work.

TECHNICAL PARTICULARS

Length oa: 234.87m
 Length bp: 226.00m
 Breadth moulded: 38.00m
 Depth moulded
 To upper deck: 20.00m

Width of double skin
 Side: 2.40m
 Bottom: 1.90m
 Draught
 Scantling: 13.90m
 Design: 13.00m
 Gross: 51,057gt
 Deadweight
 Design: 82,521dwt
 Scantling: 89,892dwt
 Speed, service: 14.30knots
 Cargo capacity
 Grain: 96,430m³
 Bunkers
 Heavy oil: 2,224m³
 Diesel oil: 129.4m³
 Water ballast: 43,892m³
 Daily fuel consumption
 Main engine only: 33.8tonnes/day
 Auxiliaries: 2.40tonnes/day
 Classification society and notations: LR + 100A1,
 Bulk Carrier, CSR, BC-B, GRAB[25],
 ESP, ShipRight (CM, ACS(B)),
 *IWS, LI, +LMC, UMS with descriptive
 note ShipRight (IHM, BWMP(T),
 PCWBT (01/2013), SERS, SCM)
 % high-tensile steel used in construction: 75%
 Roll-stabilisation equipment: Bilge Keels
 Main Engines
 Model: Mitsubishi 6UEC60LS II-ECO
 Manufacturer: Mitsubishi Heavy Industries
 Number: 1
 Type of fuel: HFO/MDO
 Output of each engine: 9,760kW x 97rpm
 Propellers
 Material: Ni-Al-Bronze
 Designer/manufacturer: Nakashima Propeller
 Number: 1
 Diameter: 7m
 Speed: 97rpm
 Diesel-driven alternators
 Number: 3
 Engine make/type: Yanmar/ 6EY18ALW
 Type of fuel: HFO/MDO
 Output/speed of each set: 660kW x 900rpm
 Alternator make/type: Taiyo Electric/ FE 547A-8
 Output/speed of each set: 600kW x 900rpm
 Alternator make/type: Taiyo Electric/ FE 547A-8
 Output/speed of each set: 600kW x 900rpm
 Boilers
 Number: 1
 Type: OVS2-120/80-26
 Make: Osaka Boiler Manufacturing

Output, each boiler: Oil fired 1,200kg/h x 0.59MPa,
 exhaust gas 800kg/h x 0.50MPa

Other cranes
 Number: 1
 Make: Manseil Inc
 Type: Electro motor driven
 Tasks: Provisions
 Performance: 4tonnes x 8.75m

Mooring equipment
 Number: 6
 Make: Kawasaki Heavy Industries Ltd
 Type: Electro-hydraulic driven type

Special lifesaving equipment
 Number of each and capacity: 1 x 26 persons
 1 x 6 persons
 Make: Jiangsu Jiaoyan Marine Equipment
 Type: FRP enclosed type/ FRP open type

Hatch covers
 Design: Two panels of double skin, side rolling type
 Manufacturer: Genkai Technical Engineering
 Type: Upper deck

Ballast control system
 Make: Amco Engineering Corp.
 Type: Remote controlled electro-hydraulic

Water ballast system
 Make: Techcross
 Capacity: 4,800m³/h

Complement
 Crew: 16
 Stern appendages/ special rudders: Namura flow
 control fin (NCF) and rudder-fin

Bridge control system
 Make: Nabtesco
 Type: M-800-III

Fire detection system
 Make: Consilium Nittan Marine
 Type: Addressable type

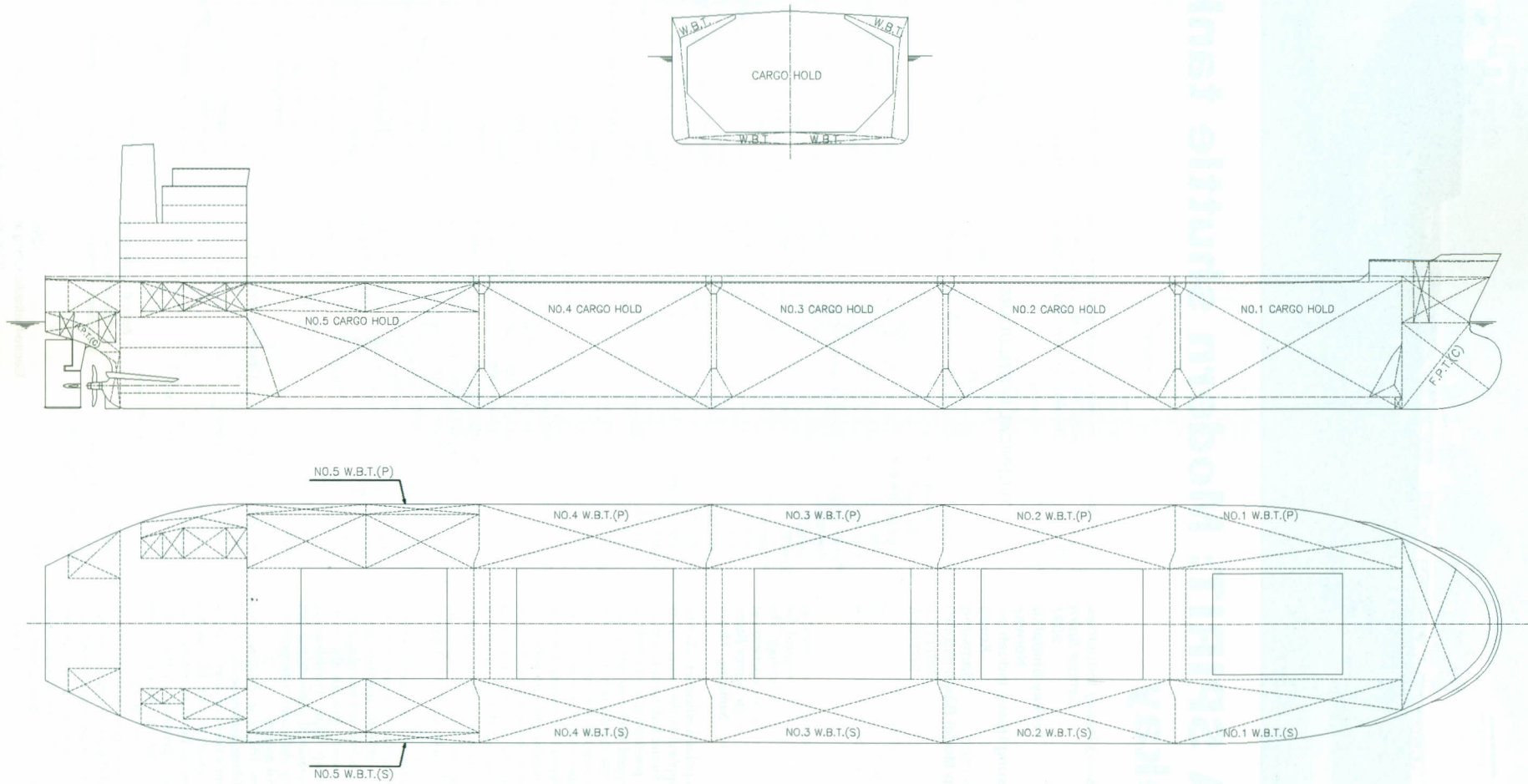
Fire extinguishing systems
 Cargo holds: Sea water hydrants
 Engine room: Foam
 Cabins/public spaces: Portable fire extinguisher

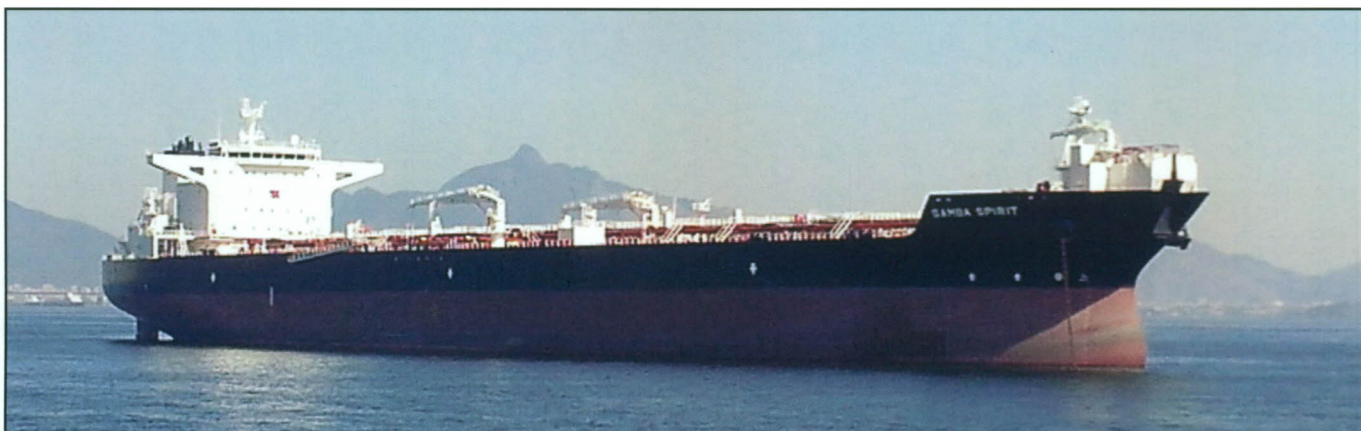
Radars
 Number: 2
 Make: Radio Japan
 Model: JMA-9132-SA, JMA-9122-9XA

Waste disposal plant
 Incinerator: Sunflame/ OSV-360SAI
 Waste shredder/crusher: Washio Churi Industrial/
 MD-15

Sewage plant: Evac/ EVAC MBR 16 C
 Contract date: 7 March 2011
 Launch/float-out date: 13 October 2012
 Delivery date: 11 January 2013

MIDSHIP SECTION





SAMBA SPIRIT: Modern shuttle tanker for Teekay

Shipbuilder: **Samsung Heavy Industries**
 Vessel's name: **Samba Spirit**
 Hull No: **2037**
 Owner/operator: **Teekay Shipping**
 Country: **Norway**
 Designer: **Samsung Heavy Industries**
 Country: **Korea**
 Model test establishment used: **Samsung Ship Model Basin (SSMB)**
 Flag: **Bahamas**
 IMO number: **9637686**
 Total number of sister ships already completed (excluding ship presented): **2**
 Total number of sister ships still on order: **4**

THE latest shuttle tanker, *Samba Spirit*, delivered as the first out of four units specially designed for Brazilian waters, is equipped with DP2 technology. The vessel will be chartered by BG Group for operation at the Lula field (formerly Tupi field) in the Santos Basin. *Samba Spirit* was delivered by Samsung Heavy Industries (SHI) in May.

In order to increase the propulsion efficiency SAVER-FIN technology has been applied to the vessel, along with the yard's latest Green Future hull form to reduce resistance. For the dynamic positioning in the field of operation the vessel is equipped with two retractable type azimuth thrusters and one tunnel thruster in the forward and one retractable azimuth thruster and one tunnel thruster in the aft. Also a fish tail type high lift rudder, which has been developed by Samsung, has been applied together with a controllable pitch propeller.

It is believed *Samba Spirit* is the most advanced shuttle tanker ever built based on the new technology; a Knutsen volatile organic compound (KVOC) system is provided as a means of reduction for volatile organic compounds during loading and laden voyage. The KVOC system was designed by Knutsen OAS Shipping and approved by the class society.

The compact volatile organic compound (CVOC) system has also been fitted for the recovery of VOC during loaded voyages. A mix of VOC and inert gas is ejected from the main inert gas line and into the crude oil by circulating an oil stream through the swirl absorber located in the pump room. Furthermore, efficiency in the vessel's operational performance has been improved by increasing the cargo tank pressure compared with a conventional system.

The bow loading system (BLS) is designed for mooring the vessel to an offshore loading terminal and also for crude oil loading from a terminal where there is the possibility to discharge through the BLS as per Petrobras' requirement for use in Brazilian waters. Also the control system for cargo operations in the cargo control room is available in the wheelhouse via the integrated monitoring control system (ICMS).

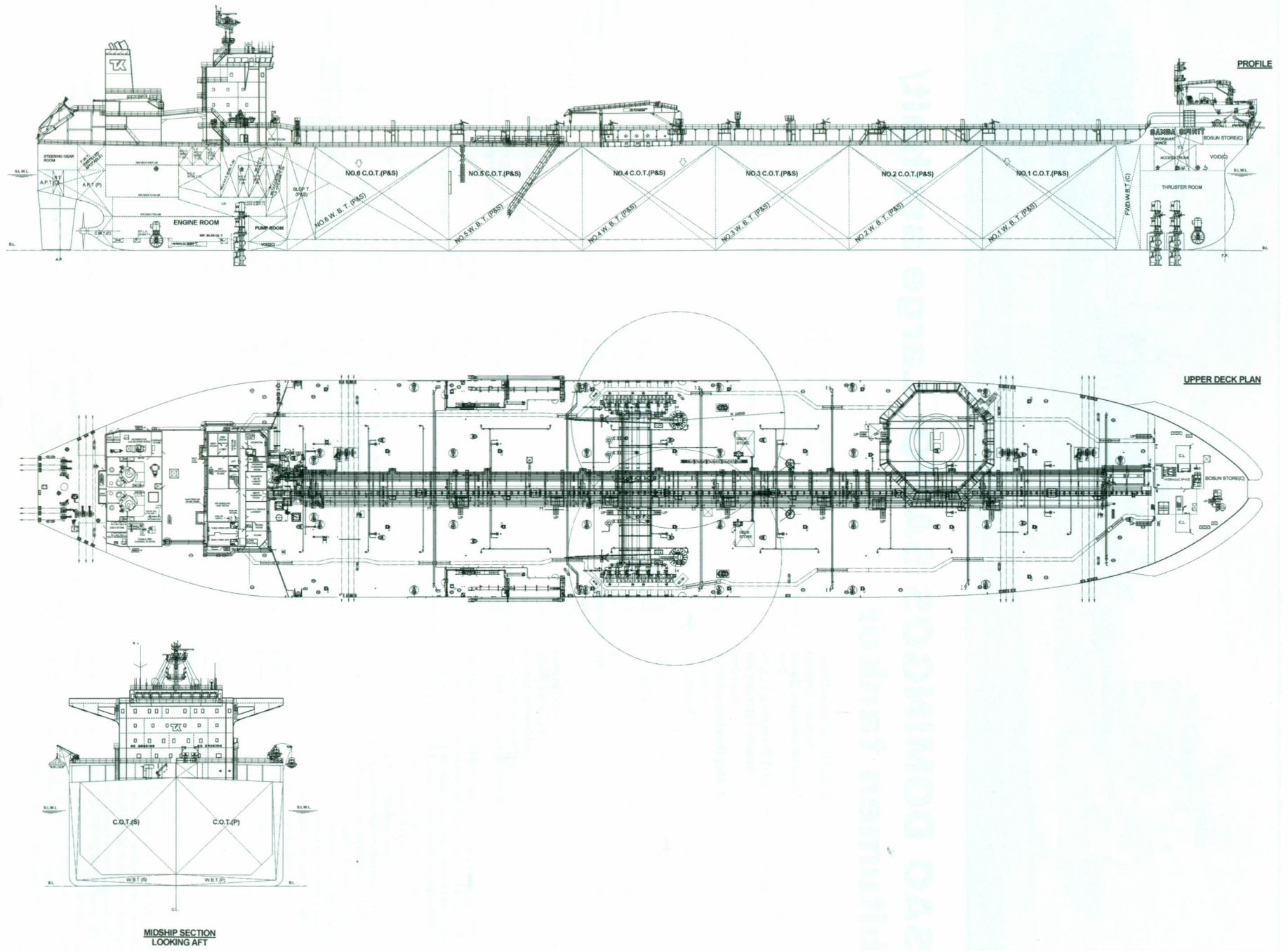
For the power supply, four sets of main diesel generators have been installed along with one emergency generator. The high and low voltage switchboards are divided into four sections to separate the power feeding from the main generator and the switchboard, this configuration gives better flexibility during operation and minimises the loss of availability even in a worst single failure case scenario.

The ballast water treatment system with electrolysis (indirect), is a Samsung Purimar with a capacity of 5,500m³/h has been installed to meet with the ballast water convention.

TECHNICAL PARTICULARS

Length oa: 282.14m
 Length bp: 267.00m
 Breadth: 49.00m
 Depth moulded
 To main deck: 23.60m
 Width of double skin
 Side: 2.45m
 Bottom: 2.55m
 Draught
 Scantling: 17.20m
 Design: 16.20m
 Gross: 83,882gt
 Deadweight
 Design: 142,190dwt
 Scantling: 154,101dwt
 Speed, service: 14.62knots
 Cargo capacity
 Liquid volume: 164,540m³
 Bunkers
 Heavy oil: 3,135m³
 Diesel oil: 545m³
 Water ballast: 51,205m³
 Daily fuel consumption
 Main engine only: 51.2tonnes/day
 Classification society and notations: ABS +A1, (E), Oil Carrier, CSR, AB-CM, DPS-2, SH, SHCM, SH-DLA, SFA(25), HIMP, RES, PMA, CPS, IGS-Ballast, +AMS, +ACCU, +APS, NIBS, ESP, VEC-L, TCM, R1 (single shaft), UWILD, POT, ENVIRO, GP, BLU, BWE, Statement of compliance for DNV's F-AMC (excluding requirement B.201)
 Main engine
 Design: MAN Diesel & Turbo
 Model: 6S70ME-C8.2
 Manufacturer: Doosan Engine
 Number: 1
 Type of fuel: HFO, MDO
 Output of each engine: 14,270kW x 81.8rpm
 Propeller
 Material: Ni-Al-Bronze
 Designer/manufacturer: Kawasaki Heavy Industries
 Number: 1
 Fixed/controllable pitch: Controllable
 Diameter: 8.3m
 Speed: 81.8rpm
 Boilers
 Number: 2
 Type: Vertical, water drum
 Make: Alfa Laval Aalborg
 Output, each boiler: 30tonnes/h x 16kg/cm²
 Cargo cranes/cargo gear
 Number: 2
 Make: DMC
 Type: Electro-hydraulic luffing jib
 Performance: 15tonnes

Other cranes
 Number: 2+1
 Make: DMC
 Type: Electro-hydraulic luffing jib
 Tasks: Provisions handling & BLS service
 Performance: 2tonnes, 3.4tonnes, 5tonnes
 Mooring equipment
 Number: 2 x Windlass
 8 x Mooring winch
 Make: Flutek Kawasaki
 Type: Electro-hydraulic driven
 Special lifesaving equipment
 Number of each and capacity: 1 x 40 persons
 Make: Norsafe
 Type: Freefall totally enclosed
 Cargo tanks
 Number: 12 + 1
 Cargo pumps
 Number: 3
 Type: Vertical, single stage, centrifugal
 Make: Shinko
 Material: Stainless steel for impeller shaft
 Capacity: 3,800m³/h x 135 at SG 1.025
 Cargo control system
 Make: Samsung - AMRI SEIL
 Type: Valve remote control system
 Water ballast treatment system
 Make: Samsung Purimar
 Capacity: 5,500m³/h
 Complement
 Crew: 15
 Bow thruster
 Make: Brunvoll
 Number: 1 x Tunnel
 2 x Azimuth
 Output: 2,200kW
 Stern thruster
 Make: Brunvoll
 Number: 1 x Tunnel
 2 x Azimuth
 Output: 2,200kW
 Bridge control system
 Make: Yokogawa
 One-man operation: Yes
 Fire detection system
 Make: Consilium
 Type: Addressable type
 Fire extinguishing systems
 Engine room: Wilhelmsen/ high expansion foam
 Cabins/public spaces: Samsung/ Sea water fire and portable fire extinguishers
 Radars
 Number: 2
 Make: Samsung
 Integrated bridge system
 Make: Samsung
 Model: SSAS-Pro
 Contract date: 21 June 2011
 Launch/float-out date: 24 December 2012
 Delivery date: 10 May 2013





SAO DOMINGOS SAVIO: Large asphalt/bitumen tanker

Shipbuilder: **3. Maj Brodogradiliste, Rijeka, Croatia**
 Vessels name: **Sao Domingos Savio**
 Hull No: **717**
 Owner/operator: **DBT Shipping I LLC/ Wisby Tankers AB**
 Country: **Sweden**
 Designer: **3. Maj Brodogradiliste**
 Country: **Croatia**
 Model test establishment used: **Brodarski Institut Zagreb**
 Flag: **Marshall Islands**
 IMO number: **9492311**
 Total number of sister ships already completed (excluding ship presented): **3**
 Total number of sister ship still on order: **nil**

Sao Domingos Savio is one of the largest asphalt/bitumen tankers constructed to date for Swedish shipowner Wisby Tankers that was delivered in March from Croatian shipyard 3 Maj Brodogradiliste. *Sao Domingos Savio* is the second vessel out of four in series delivered to the owner with the first ship delivered in 2012.

Although the vessel has about 15,000tonnes deadweight only, it is classed as one of the largest asphalt / bitumen carriers with independent cargo tanks in the world. Designed by 3.MAJ design office, besides asphalt/bitumen, the vessel can transport oil, oil products and chemicals as specified in compliance with latest IMO rules and regulations. The vessel is intended to transport asphalt/bitumen and similar cargoes in independent cargo tanks heated to a maximum of 250°C. The vessel's cargo tanks are made of high tensile steel and insulated at outside areas.

After extensive strength, thermal and finite element analysis (FEM) were carried out, independent cargo tanks (two blocks of six tanks each) were placed on more than 200 special supports with Tenmat Ferroform pads, which are used as a thermal insulation against the supporting ship structure and as a sliding area to enable expected thermal expansion of the tanks. A set of anti-pitching, anti-rolling and anti-floating keys have also been fitted.

Considerable attention has been paid to the effectiveness of the tank insulation system, so that in the event of any technical problems the cargo temperature can be maintained sufficiently to keep the cargo fluid and the cargo can be pumped ashore. The body lines of the vessel have been based on a previous vessels that 3.Maj have constructed with further optimisation on these body lines, which were checked by the Ship Model Basin Brodarski Institut, Zagreb and proven during the vessel's trials.

The main engine is low speed Wärtsilä 6X35 with power of 4,500kW at 144rpm, built in 5.MAJ Engines & Cranes Factory. This engine is first of its type in the world, which has received type approval. The Wärtsilä 6X35 is an electronically controlled main engine complying with NOx Tier II requirements, along with this the vessel is fitted with low sulphur tanks (for operation in SECA) with double skin fuel oil tanks that fully comply with IMO regulations for oil fuel tank protection.

Sao Domingos Savio meets with Bureau Veritas' (BV) CLEANSHIP (C) additional class notation. The notation is assigned to ships fitted with the latest equipment and arrangements enabling them to control and limit the

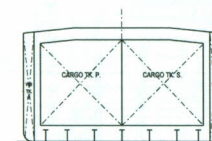
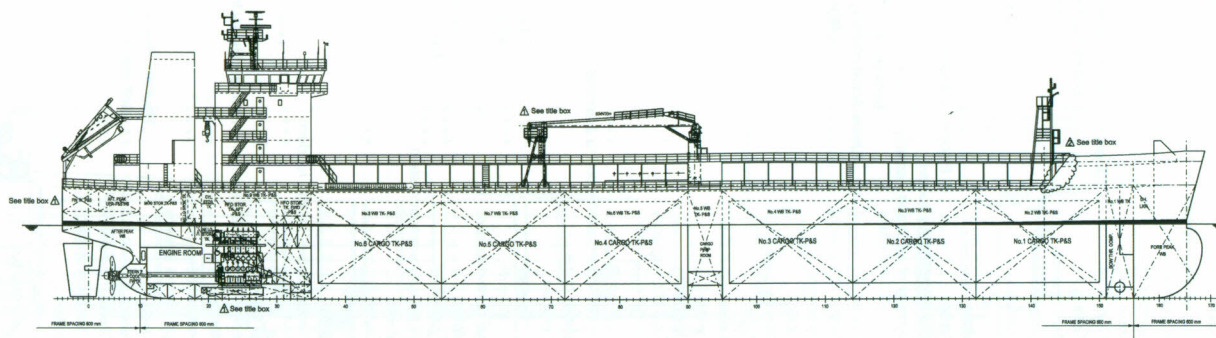
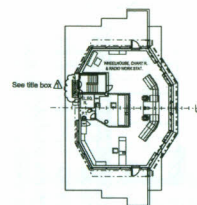
emission of polluting substances in the sea and the air. The vessel has space reserved for the future installation of a ballast water treatment plant to add to the vessel's environmentally friendly qualities.

TECHNICAL PARTICULARS

Length oa: 133.28m
 Length bp: 128.20m
 Breadth moulded: 23.00m
 Depth moulded
 To main deck: 12.40m
 Width of double skin
 Side: 1.25m
 Draught
 Scantling: 8.618m
 Gross: 10,830gt
 Displacement: 21,282tonnes
 Lightweight
 Scantling: 14,936
 Block co-efficient: 0.815
 Speed, service: 13.62knots
 Cargo capacity
 Liquid volume: 14,900m³
 Bunkers
 Heavy oil: 634m³
 Diesel oil: 100m³
 Water ballast: 5,030m³
 Daily fuel consumption
 Main engine only: 18tonnes/day
 Auxiliaries: 2.5tonnes/day
 Classification society and notations: BV I Oil Tanker, Asphalt carrier (max. cargo temp. 250°C)
 Chemical Tanker unrestricted navigation
 % high-tensile steel used in construction: 10%
 Main engine
 Model: Wärtsilä 6X35
 Manufacturer: 3. Maj Engines & Cranes
 Number: 1
 Type of fuel: HFO/MDO
 Output of each engine: 4,500kW
 Propeller
 Material: Ni-Al-Bronze
 Designer/manufacturer: Berg
 Number: 1
 Fixed/controllable pitch: Controllable
 Diameter: 4.6m
 Speed: 140rpm
 Main-engine driven alternators
 Number: 1
 Make/type: Ulanik TESU
 Output/speed of each set: 624kW x 1,800rpm
 Diesel-driven alternators
 Number: 3
 Engine make/type: Wärtsilä/4L20
 Type of fuel: HFO/MDO
 Output/speed of each set: 680kW x 900rpm
 Alternator make/type: FENXI 1 FC&TFJ6
 Output/speed of each set: 806kVA x 900rpm
 Boilers
 Number: 3
 Type: TOH2200V40, TOH2200V40, EGH 719V40

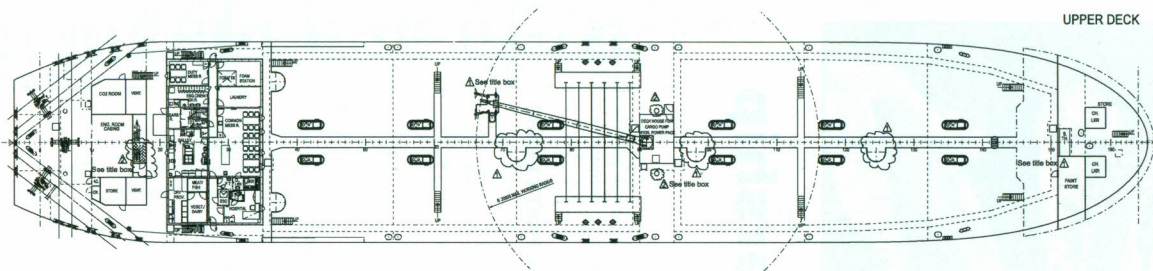
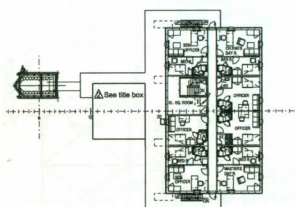
Make: Gesab
 Output, each boiler: 2,200kW, 2,200kW, 500kW
 Other cranes
 Number: 1
 Make: 3. Maj- MacGregor
 Type: HH160-520-2
 Tasks: Hose handling
 Performance: 50KN – 20m
 Mooring equipment
 Number: 6
 Make: Vulkan – NOVA
 Type: Hydraulic 100KN x 12m/min
 Special lifesaving equipment
 Number of each and capacity: 1 x 22 persons
 1 x 6 persons
 Make: Greben
 Type: FFL- 28FP, RB-4.3
 Cargo tanks
 Number: 12
 Grades of cargo carried: Asphalt/bitumen, crude oil & oil products, coal tar pitch, coal tar naphtha solvent, coal tar creosote
 Cargo pumps
 Number: 2
 Type: Twin screw, hydraulically driven, W8.52-75/2
 Make: EPS
 Capacity: 600m³/h
 Cargo control system
 Make: Kongsberg
 Type: K-gauge CLS GL-300
 Ballast control system
 Make: Kongsberg
 Complement
 Crew: 17
 Bow thruster
 Make: Berg
 Number: 1
 Output: 500kW
 Bridge control system
 Make: Raytheon Anschütz
 One-man operation: Yes
 Fire detection system
 Make: Consilium
 Fire extinguishing systems
 Engine room: Wilhelmsen/ CO₂
 Radars
 Number: 2
 Make: Raytheon Anschütz
 Model: Synapsis multifunctional workstations
 Integrated bridge system
 Make: Raytheon Anschütz
 Model: Synapsis
 Waste disposal plant
 Incinerator: Atlas/ 200 SL WS P
 Waste compactor: Delitek Marine/ DT-220PN
 Sewage plant: Brodopur/ BS 20
 Contract date: 7 September 2010
 Launch/float-out date: 30 June 2012
 Delivery date: 1 March 2013

WHEELHOUSE

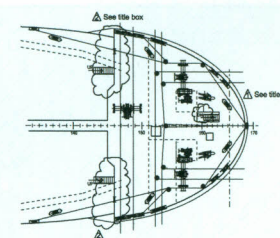


FORECASTLE DECK

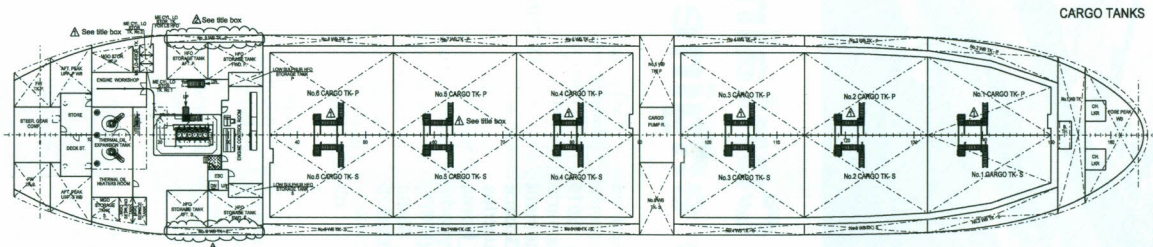
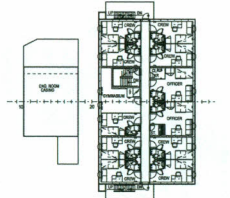
3rd POOP DECK



UPPER DECK

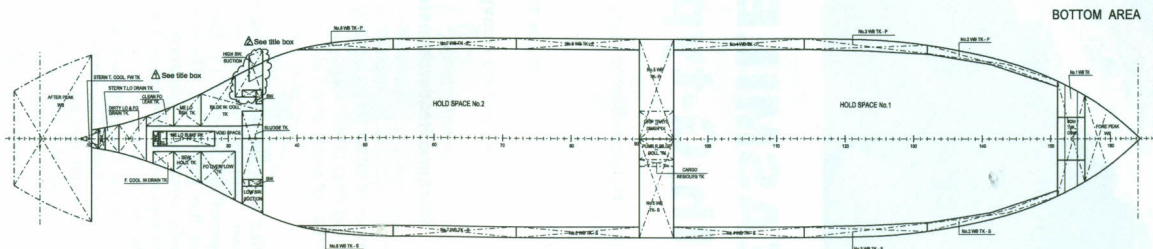
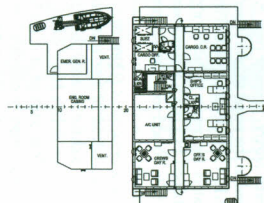


2nd POOP DECK



CARGO TANKS

1st POOP DECK



BOTTOM AREA



SEASMILE: Containership with G-type engine

Shipbuilder: **Hyundai Samho Heavy Industries**
 Vessel's name: **Seasmile**
 Hull No.: **S616**
 Owner/operator: **Thenamaris Ships Management**
 Country: **Greece**
 Designer: **Hyundai Samho Heavy Industries**
 Country: **Korea**
 Model test establishment used: **Hyundai Maritime Research Institute (HMRI)**
 Flag: **Malta**
 IMO number: **9632820**
 Total number of sister ships already completed (excluding ship presented): **nil**
 Total number of sister ships still on order: **1**

SEASMILE is the first in the series of two 5,000TEU container carriers ordered by Thenamaris Shipmanagement Inc. *Seasmile* and its sister vessel is part of Thenamaris' fleet renewal plan. The vessel was delivered from Hyundai Samho Heavy Industries Co., Ltd (HSHI) to Thenamaris ships management Inc. in August.

The baby over-Panamax, as the vessel type is known, operates on the Far East to West Africa routes under a Maersk Charter. At 5,000TEU, *Seasmile* is one of the largest vessels employed on this route and is approximately 500TEU larger than other Wafmax (West Africa max) type vessels that operate on the same route.

Seasmile is the first vessel to have the G-type Super Long Stroke Engine installed at HSHI shipyard to increase its propulsion efficiency. It is estimated that the application of the G-type engine prompted an overall efficiency increase of 4-5%, compared with the S-type engine or an alternative engine with same engine speed, according to the engine maker Hyundai-MAN. A spade type X twisted rudder has also been fitted to the vessel to give it better efficiency.

The EP (Ede) Class notation means that *Seasmile* received Lloyd's Register's statement of fact rating of 59.61%, which means its attained EEDI 11.318 is lower than the required EEDI of 18.986. To add to the environmental efficiency the vessel has been fitted with a Panasia ballast water treatment system that has a capacity of 800m³/h.

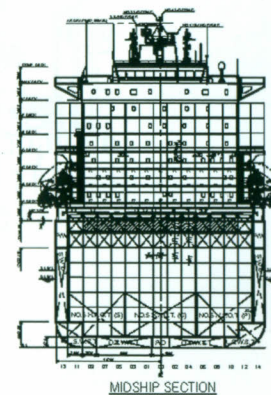
Further optimisation of the vessel operation has been carried out to reduce energy being wasted, for this variable frequency drives have been introduced to the engine room coding pumps and deck machinery, while diesel switch units have been added for the optimum use and operation when switching to different fuels to all main and generating engines.

The loading instrument of *Seasmile* provides the lashing calculation function, which is in accordance with LI (Lash) of LR's notation.

TECHNICAL PARTICULARS

Length oa: 255.49m
 Length bp: 242.00m
 Breadth moulded: 37.40m
 Depth moulded
 To main deck: 21.10m
 To upper deck: 21.10m
 To upper decks: 18.28m
 Width of double skin
 Side: 2.02m
 Bottom: 1.87m
 Draught
 Scantling: 13.50m
 Design: 12.00m
 Gross: 52,467gt
 Displacement: 81,976tonnes
 Lightweight: 19,373tonnes
 Deadweight
 Design: 51,020dwt
 Scantling: 62,603dwt
 Block co-efficient: 0.6523
 Speed, service: 21.50knots
 Bunkers
 Heavy oil: 5,225.1m³
 Diesel oil: 415.1m³
 Water ballast: 19,671m³
 Daily fuel consumption
 Main engine only: 87.1tonnes/day
 Classification society and notations: LR, +1000A1, Container Ship, ShipRight, (SDA, FDA Plus (25, WW), CM, ACS (B)), CCSA, EP (Bt, Ede, I), *IWS, LI, +LMC, UMS, NAV1 with descriptive notes LI (lash), Part Higher Tensile Steel, ShipRight (BWMP(T,S), IHM, SERS, SCM
 % high-tensile steel used in construction: 52%
 Heel control equipment: Anti-heeling pump
 Main engine
 Model: 6G80ME-C9.2
 Manufacturer: HHI-EMD
 Number: 1
 Type of fuel: HFO, MDO, MGO
 Output of each engine: 28,360kW x 72rpm

Propeller
 Material: Ni-Al-Bronze
 Designer/manufacturer: HHI-EMD
 Number: 1
 Fixed/controllable pitch: Fixed
 Diameter: 8.9m
 Speed: 72rpm
 Diesel-driven alternator
 Number: 4
 Engine make/type: HHI-EMD/ 8H25/33
 Type of fuel: HFO, MDO, MGO
 Output/ speed of each set: 2,450kW x 900rpm
 Alternator make/type: HHI-EES/ HSJ7 716-84K
 Output/speed of each set: 2,300kW
 Boilers
 Number: 1
 Type: Pin tube type, oil fired burning
 Make: Kangrim volcano
 Output, each boiler: 3,000kg/h
 Other cranes
 Number: 1
 Make: Oriental
 Type: Electric motor driven sliding type
 Tasks: Engine room servicing
 Performance: 12.5tonnes
 Mooring equipment
 Number: 2 x windlass
 4 x winch
 Make: Towimor
 Type: Electric-hydraulic/ electric driven
 Special lifesaving equipment
 Number of each and capacity: 2 x 28 persons, 2 x 6 persons, 4 x 16 persons
 Make: Umoe Schat-Harding/ Survitec
 Type: Lifeboat/liferaft
 Hatch covers
 Design: Cargotec
 Manufacturer: Marine tech Inc
 Type: Pontoon, non-sequential operation type
 Containers
 Lengths: 20ft/40ft/45ft
 Heights: 8'6"/ 9'6"
 Total TEU capacity: 5,071
 On deck: 3,089
 In holds: 1,982
 Homogenously loaded to 14tonnes: 3,752
 Reefer plugs: 700FEU
 Tier/rows
 On deck: 9 tiers/ 15 rows
 In holds: 8 tiers/ 13 rows
 Ballast control system
 Make: Scana Korea
 Type: Electro-hydraulic
 Water ballast treatment system
 Make: Panasia
 Capacity: 800m³/h
 Complement
 Crew: 16
 Stern appendages/ special rudders: Spade type (X-twist rudder)
 Bow thruster
 Make: Hyundai Heavy Industries
 Number: 1
 Output: 1,800kW
 Bridge control system
 Make: Hyundai Heavy Industries
 Type: Self-standing Piano type
 One-man operation: Yes
 Fire detection system
 Make: Consilium
 Fire extinguishing systems
 Cargo holds: Fain/ CO₂
 Engine room: Fain/ CO₂
 Cabins/public spaces: Seawater
 Radars
 Number: 3
 Make: JRC
 Model: JMA-9132-SA/ JMA-9122-6XA
 Ship Performance monitoring
 Waste: KYMA
 Display unit: KDU-110
 Waste disposal plant
 Incinerator: Hyundai Marine Machinery/ MAXI T150 SL WS
 Sewage plant: Jonghap Machinery/ Biological
 Contract date: 3 June 2011
 Launch/float-out date: 25 May 2013
 Delivery date: 7 August 2013





SEVEN VIKING: Latest IMR offshore vessel

Shipbuilder: **Ulstein**
 Vessel's name: **Seven Viking**
 Hull No: **295**
 Owner/operator: **Eidesvik Seven**
 Country: **Norway**
 Designer: **Ulstein**
 Country: **Norway**
 Flag: **Norway**
 IMO number: **9619373**
 Total number of sister ships already completed
 (excluding ship presented): **nil**
 Total number of sister ships still on order: **nil**

SEVEN Viking is an Inspection Maintenance & Repair (IMR) Vessel, designed by Ulstein Design and Solutions for Eidesvik Seven and delivered at the beginning of the year. The vessel is designed to meet the high demands of IMR, survey, and light construction in some of the harshest environments. The versatility of the vessel allows for scale treatment and light diving support services.

Seven Viking has been custom-built according to the operator's specifications to carry out tasks including inspection, maintenance and repair of subsea installations, in addition to scale treatment and RFO (Ready for Operations) work scope and is contracted to work for Statoil for five years.

The hull form has been designed with the ULSTEIN X-BOW, combined with a redundant diesel-electric propulsion system; this allows the vessel to achieve a good performance with regard to station keeping, speed and fuel economy. The main propulsion system comprises of three azimuth propellers, each propeller driven by a variable speed electric motor.

The X-BOW hull has been incorporated into the design to reduce motion in transit and give increased stability in the potentially high waves that characterise the North Sea. Despite this enviable stability usually associated with size, this version of the SX148 has been constructed to be compact in stature; measuring only 106.5m long and 24.5m wide. The dimensions will allow *Seven Viking* to manoeuvre with ease in confined spaces, such as between platforms, accessing difficult to reach areas. *Seven Viking* is an ICE-C class vessel, with a crew capacity of 90 and a top speed of 17knots.

Thanks to a clever configuration whereby the hull space has been maximised and equipment is integrated within a large hangar area, *Seven Viking* can carry all necessary maintenance equipment onboard, ensuring that operational downtime is kept to a minimum. Safety, efficiency and environmental

considerations have been the prime focus for the three partners when developing the vessel, which carries the Clean Design notation.

A customised module handling system (MHS) has been integrated in the ship's hangar for the safe launch and retrieval of subsea modules weighing up to 70tonnes through the moon pool. To facilitate cooperation and communication, all operational personnel are gathered in one area adjacent to the hangar, with panoramic windows in the control room giving a full overview of this key activity area.

Seven Viking has been developed to meet the highest working environment standards, and is classified as a comfort class COMF-V (3) vessel. Minimal noise levels in the hangar have been achieved by opting for electric winches for the ROVs, the MHS and other utility equipment. In addition, the vessel features a separate accommodation unit, positioned away from all active work areas, to ensure that the crew can rest without any disturbances.

Further environmental initiatives that have been included in the design of the vessel include the diesel-electric propulsion, which reduces atmospheric emissions, and the electrical winches, which nullify the risk of emissions of hydraulic oil.

TECHNICAL PARTICULARS

Length oa: 106.50m
 Length bp: 100.00m
 Breadth moulded: 24.50m
 Depth moulded
 To main deck: 11.50m
 Draught
 Max: 8.00m
 Design: 6.50m
 Gross: 11,266gt
 Net: 3,380tonnes
 Deadweight
 Design: 1,950dwt
 Speed, service: 17knots
 Bunkers
 Heavy oil: 2,073m³
 Water ballast: 3,340m³
 Classification society and notations: DNV +1A1,
 Well Stimulation Vessel, SF, E0,
 DYNPOS-AUTR, CLEAN DESIGN,
 LFL*, NAUT-AW, COMF-V(3), COMF-C(3),
 ICE-C, DEICE, HELDK-SH
 Register notations: SPS Code 2008
 Main engine
 Model: 9M32/ 6M25C

Manufacturer: MaK
 Number: 2 + 2
 Type of fuel: HFO
 Output of each engine: 4,320kW x 600rpm/
 1,800kW x 720rpm

Propeller
 Designer/manufacturer: Steerprop
 Number: 3
 Fixed/controllable pitch: Controllable
 Diameter: 3.2m/ 2.6m
 Speed: 175rpm

Boilers
 Number: 1
 Type: Central heating
 Output, each boiler: 1,744kW

Cargo cranes/cargo gear
 Number: 1
 Make: Huisman
 Type: Hydraulic/ hydraulic folding
 Tasks: Deck/ provisions
 Performance: 1.5tonnes x 9m/ 3.8tonnes x 9m/
 1.5tonnes x 11m/ 2tonnes x 15m

Mooring equipment
 Number: 2 x Anchors
 2 x Windlass/mooring winches
 2 x mooring winches
 2 x electric storage winch

Special lifesaving equipment
 Number of each and capacity: 1 x 15 persons
 2 x 50 persons
 2 x 65 persons

Type: MOB boats, lifeboats, liferafts
 Complement
 Crew: 135

Bow thrusters
 Number: 3
 Output: 1,700kW/ 1,400kW

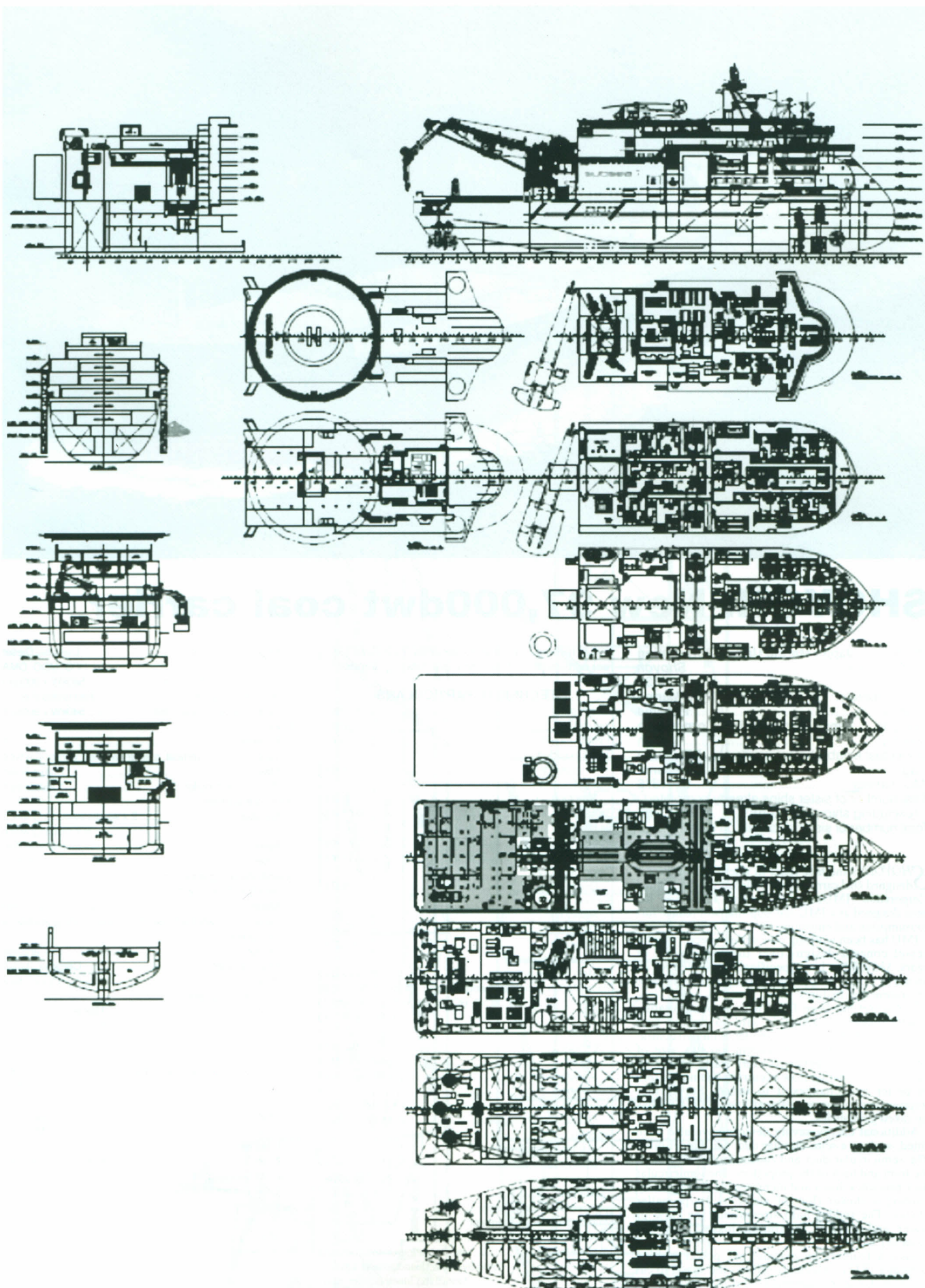
Bridge control system
 Make: Kongsberg
 Type:

Fire detection system
 Type: Integrated

Fire extinguishing systems
 Machinery spaces: watermist

Radars
 Number: 2

Model: S-Bond + x-band
 Launch/float-out date: October 2012
 Delivery date: 23 January 2013





SHOYOH: New 97,000dwt coal carrier

Shipbuilder: **Japan Marine United Corporation**
 Vessel's name: **Shoyoh**
 Hull no: **3336**
 Owner/operator: **TDC/Dsichi Chuo Marine**
 Country: **Panama**
 Designer: **Japan Marine United Corporation**
 Country: **Japan**
 Model test establishment used: **IHI, Japan**
 Flag: **Panama**
 IMO number: **9641376**
 Total number of sister ships already completed (excluding ship presented): **nil**
 Total number of sister ships still on order: **2**

SHOYOH is the first vessel in a series of three eco-designed coal carriers built by Japan Marine United Corporation (JMU) Kure Shipyard. The vessel has been designed as a JMU eco ship that will reduce fuel consumption and emissions.

JMU has been working on a series of eco-friendly vessel concept designs over the past couple of years. **Shoyoh** has been specifically designed for its owner, TDC Shipping, incorporating those environmental features.

The vessel has been fitted with a contra-rotating (CRP) propeller, which is said to be the first installation of this type of propeller, with two contra-rotating screws fitted in tandem, on this size of vessel. The aft propeller recovers waste energy by means of the rotating flow occurring behind the fore propeller and changes it to thrust. For further improvement of the propeller efficiency the CRP has tip raked geometries.

Additional energy saving devices have also been fitted, such as a semi-circular duct and rudder bulb. The semicircular duct and rudder bulb are fitted in the front and back of the propellers. The semicircular duct generates thrust and increases the wake gain by guiding a slower flow of water to the propeller blades. The rudder bulb streamlines the flow of water and reduces separation losses from the propeller hub.

Shoyoh features an exhaust gas power turbine generator (PTG), which also allows the vessel to cut down on its fuel consumption. This is done by some of the exhaust gas from the main engine, a Wärtsilä 58TD, which also meets with the IMO Tier II regulations for NOx, being by-passed to the gas

power turbine, which generates electricity and saves fuel consumption from the main diesel generator.

TECHNICAL PARTICULARS

Length oa: 239.90m
 Length bp: 134.50m
 Breadth moulded: 43.00m
 Depth moulded
 To upper deck: 20.50m
 Draught
 Scantling: 13.05m
 Gross: 60,876gt
 Deadweight
 Scantling: 97,114dwt
 Speed, service: 14.2knots
 Cargo capacity
 Grain: 115,800m³
 Bunkers
 Heavy oil: 3,330m³
 Diesel oil: 460m³
 Water ballast: 53,000m³
 Daily fuel consumption
 Main engine only: 33.4tonnes/day
 Classification society and notations: ClassNK NS* (CSR, BC-B, BC-XII, GRAB 20, PSPC-WBT) (ESP) MNS* M0
 Main engine
 Design: Wärtsilä
 Model: 6RT-flex58TD
 Manufacturer: Diesel United
 Number: 1
 Type of fuel: HFO, MDO, DMA
 Output of each engine: 9.680kW x 90rpm
 Propeller
 Material: Ni-Al-Bronze
 Designer/manufacturer: Japan Marine United/Nakashima Propeller
 Number: 1
 Fixed/controllable pitch: Fixed
 Main-engine driven alternator
 Number: 1
 Make/type: Japan Marine United (Design) Turbo Systems United (power turbine) Nishishiba Electric (alternator)
 Output/speed of each set: 300kW x 1,800rpm
 Diesel-driven alternators
 Number: 3

Engine make/type: Daihatsu Diesel
 Type of fuel: HFO, MDO, DMA
 Output/speed of each set: 580kW x 900rpm
 Alternator make/type: Nishishiba Electric
 Output/speed of each set: 540kW x 900rpm

Boilers

Number: 1
 Type: Vertical, cylindrical shell, composite type
 Make: Osaka Boiler
 Output, each boiler: 1.25tonnes/h

Mooring equipment

Number: 2 x windlass/mooring winch
 6 x mooring winch
 Make: Manabe Zoki
 Type: Electric-hydraulic

Special lifesaving equipment

Number of each and capacity: 1 x 25 persons
 Make: Japan Marine United
 Type: Freefall with electro-hydraulic lifting appliance

Hatch covers

Design: Cargotec
 Manufacturer: Cargotec Japan
 Type: Upper deck

Ballast control system

Make: Nakakita Seisakusho
 Type: Hydraulic remote control

Complement

Crew: 15
 Stern appendages/special rudders: Semicircular duct, rudder bulb

Bridge control system

Make: Nabtesco
 Type: M-800 III

Fire detection system

Make: Consilium Nittan Marine

Fire extinguishing systems

Engine room: Kashiwa/ high expansion foam

Radars

Number: 2
 Make: Japan Radio

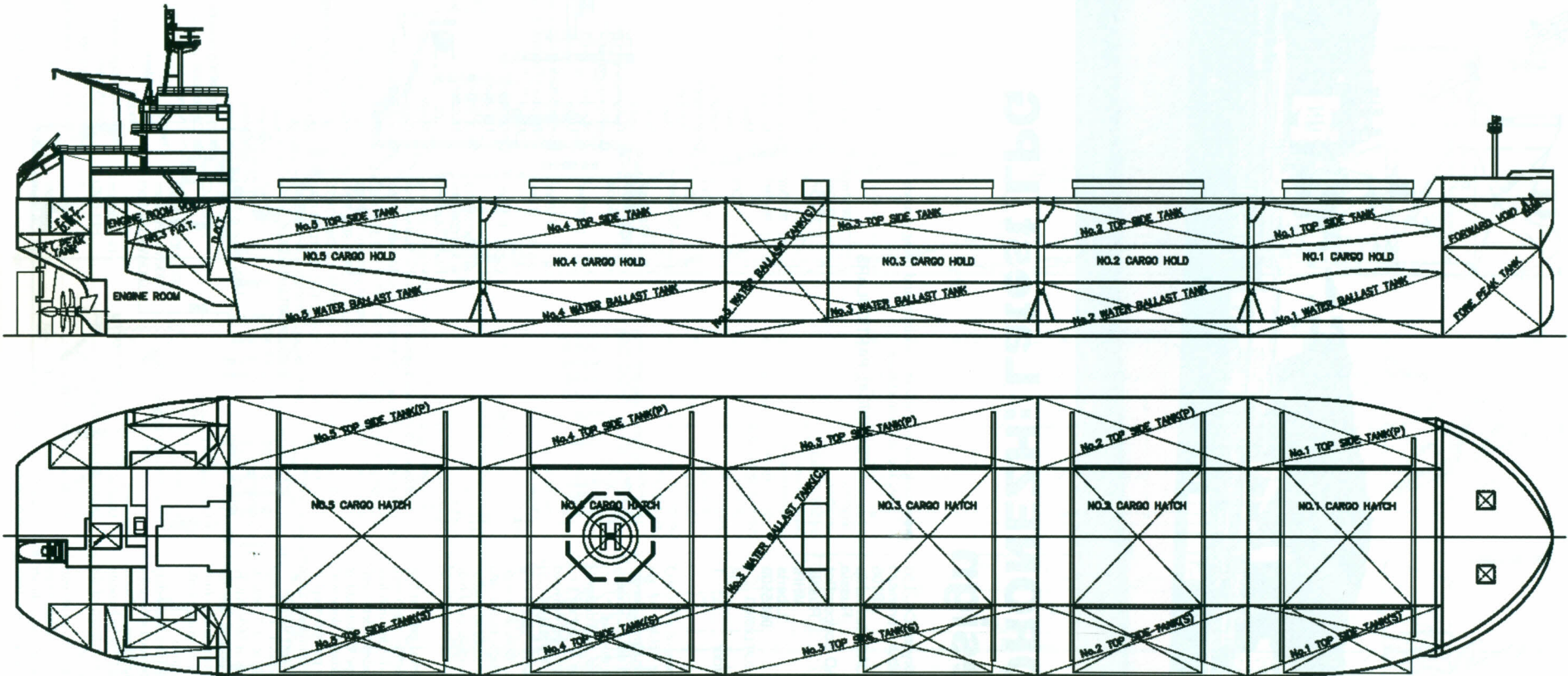
Waste disposal plant

Incinerator: Volcano
 Sewage plant: Sasakura

Contract date: 30 September 2011

Launch/float-out date: 12 April 2013

Delivery date: 25 July 2013





SIBUR VORONEZH: Latest LPG carrier design

Shipbuilder: **Hyundai Mipo Dockyard Co., Ltd**
 Vessel's name: **Sibur Voronezh**
 Hull No: **8106**
 Owner/operator: **OAO Novoship**
 Country: **Russia**
 Designer: **OAO Sovcomflot**
 Country: **Russia**
 Model test establishment used: **MHRI**
 Flag: **Liberia**
 IMO number: **9655509**
 Total number of sister ships already completed (excluding ship presented): **nil**
 Total number of sister ships still on order: **1**

IN the next several years, Novoship, part of the OAO Sovcomflot Group, expects to see the volume of gas production and export to rise significantly in Russia. For this increase Sovcomflot is taking steps to meet the challenge by increasing its fleet for the transportation of this fuel.

The first in a series of two, *Sibur Voronezh*, was delivered to its owner in July from Hyundai Mipo Dockyard Co., Ltd (HMD) with the second vessel *Sibur Tobol* delivered later in the year. The 20,600m³ Class LPG/NH3/VCM carrier an ocean going Liquefied Petroleum Gas (LPG) Carrier with bulbous bow, transom stern, flush deck with forecabin, open water type stern frame, single rudder and single-screw propeller driven by a slow-speed diesel engine. The vessel has four pairs of water ballast tanks and a Hyde Marine UV and filter ballast water treatment system fitted that has a 370m³/h capacity.

Sibur Voronezh is designed to carry liquefied gases such as propane, butylene, propylene, anhydrous ammonia, butadiene and VCM. The cargo space is divided into four cargo holds to accommodate four independent self-supporting cargo tanks built to IMO type C standard of bi-lobe shape with centre longitudinal bulkhead; along with one cylindrical type deck tank. The vapour pressure range of the cargoes carried is up to 5.3bar and the minimum cargo temperature is -48°C, maximum specific gravity 0.972.

The vessel also has a Hyundai-B&W 6S46MC-C8.1 that meets with Tier-II criteria, which has MCR of 7,780kW giving the vessel a service speed of 16knots at 90% MCR. Three heavy fuel oil storage tanks that are isolated from the side shell are located behind the fore peak tank and in front of the engine room. Some of the heavy fuel oil storage tanks can be used as low sulphur fuel oil storage tanks.

The hulls of the new gas carriers are made from heavy-duty steel, which will provide them with an estimated service life of 25 years if engaged in year-round operations in North Atlantic conditions. The vessels are Ice class 1B, which means they can operate effectively in the low temperatures of the Baltic Sea during the winter navigation period.

The pipe ducting in the vessel is arranged in the centre part of the double bottom of the cargo hold space and has access at fore, mid, and aft ends from upper deck. While at the aft of the vessel is the aft peak tank, steering gear room, fresh water tanks, drinking water tank and stern tube cooling

water tank, the propulsion machinery and living quarters including the navigation bridge.

TECHNICAL PARTICULARS

Length oa: 159.97m
 Length bp: 152.20m
 Breadth moulded: 25.60m
 Depth moulded:
 To main deck: 16.40m
 To upper deck: 16.40m
 Width of double skin:
 Bottom: 1.70m
 Draught:
 Scantling: 10.90m
 Design: 8.30m
 Gross: 18,425gt
 Deadweight:
 Design: 13,650dwt
 Scantling: 22,700dwt
 Speed, service: 16knots
 Cargo capacity:
 Liquid volume: 20,800m³
 Bunkers:
 Heavy oil: 1,630m³
 Diesel oil: 500m³
 Water ballast:
 Percentage segregated ballast: 8,480m³
 Daily fuel consumption: 29.3tonnes/day
 Main engine only: 3.1tonnes/day
 Auxiliaries:
 Classification society and notations: LR + 100A1, Liquefied Gas Carrier, Ship Type 2G, Anhydrous Ammonia, Butadiene, Butane, Butane/propane mixture, Butylene, Diethyl ether, Dim ethylamine, Isoprene, Isopropyl amine, Mon ethylamine, propane, propylene, VCM and vinyl ethyl ether in independent tanks type C, Max. SG 0.972, Max. vapour pressure 5.3bar g, min. temperature -48°C, ShipRight (ACS(B)), SDA, FDA, CM), ECO (P, IHM, BWT), *IWS, LI, SPM4, Ice Class 1B FS +LMC, UMS, NAV1, +Lloyd's RMC(LG) descriptive note: Green Passport, Part Higher Tensile Steel, ShipRight(BWMP(S,T), SCM, SERS)
 % high tensile steel used in construction: 40%
 Main engine:
 Design: MAN Diesel & Turbo
 Model: 6S46MC-C8.1
 Manufacturer: HHI-EMD
 Number: 1
 Type of Fuel: HFO, MDO & MGO
 Output of each engine: 7,780kW x 128.5rpm, 7,000kW x 124.1rpm
 Propellers:
 Material: Ni-Al-Bronze
 Designer/manufacturer: HHI-EMD
 Number: 1
 Fixed/controllable pitch: Fixed
 Diameter: 5.5m
 Speed: 128.5rpm
 Diesel-driven alternators:
 Number: 3

Engine make/type: HHI-EMD/ 2 x 6H21/32, 1 x 5H21/32
 Type of fuel: HFO, MDO & MGO
 Output/speed of each set: 1,320kW x 900rpm, 850kW x 900rpm
 Alternator make/type: HHI-ESS/ 2 x HFC7 568-84K-EH, 1 x HFC7 506-84K-EH
 Type: 1,250kW x 900rpm, 800kW x 900rpm
 Output/speed of each set: 800kW x 900rpm

Cargo cranes/cargo gear:
 Number: 1
 Make: Dongnam Marine Crane
 Type: Electro-hydraulic
 Performance: 2tonnes

Other cranes:
 Number: 1
 Make: Dongnam Marine Crane
 Type: Electro-hydraulic
 Tasks: Provisions crane
 Performance: 2tonnes

Mooring equipment:
 Number: 6
 Make: TTS

Special lifesaving equipment:
 Number of each and capacity: 1 x 25 persons
 Make: Hyundai Life Boat

Cargo tanks:
 Number: 9

Cargo pumps:
 Number: 8
 Type: Vertical deep well
 Make: Wärtsilä
 Capacity: 250m³/h x 120MLC

Cargo control system:
 Make: LGE

Ballast control system:
 Make/type: Kongsberg/K/Chief600

Water ballast treatment system:
 Make/Capacity: Hyde Marine/370m³/h

Bridge control system:
 Make: Dong-Yang

Fire detection system:
 Make: Consilium

Fire extinguishing systems:
 Type: Salwico

Cargo holds:
 Engine room: NK/ High pressure CO₂

Radars:
 Number/Make: 2/Furuno

Model: FAR-2837S, FAR-2827

Integrated bridge system:
 Make/Model: Transas/Navi Sailor ECDIS

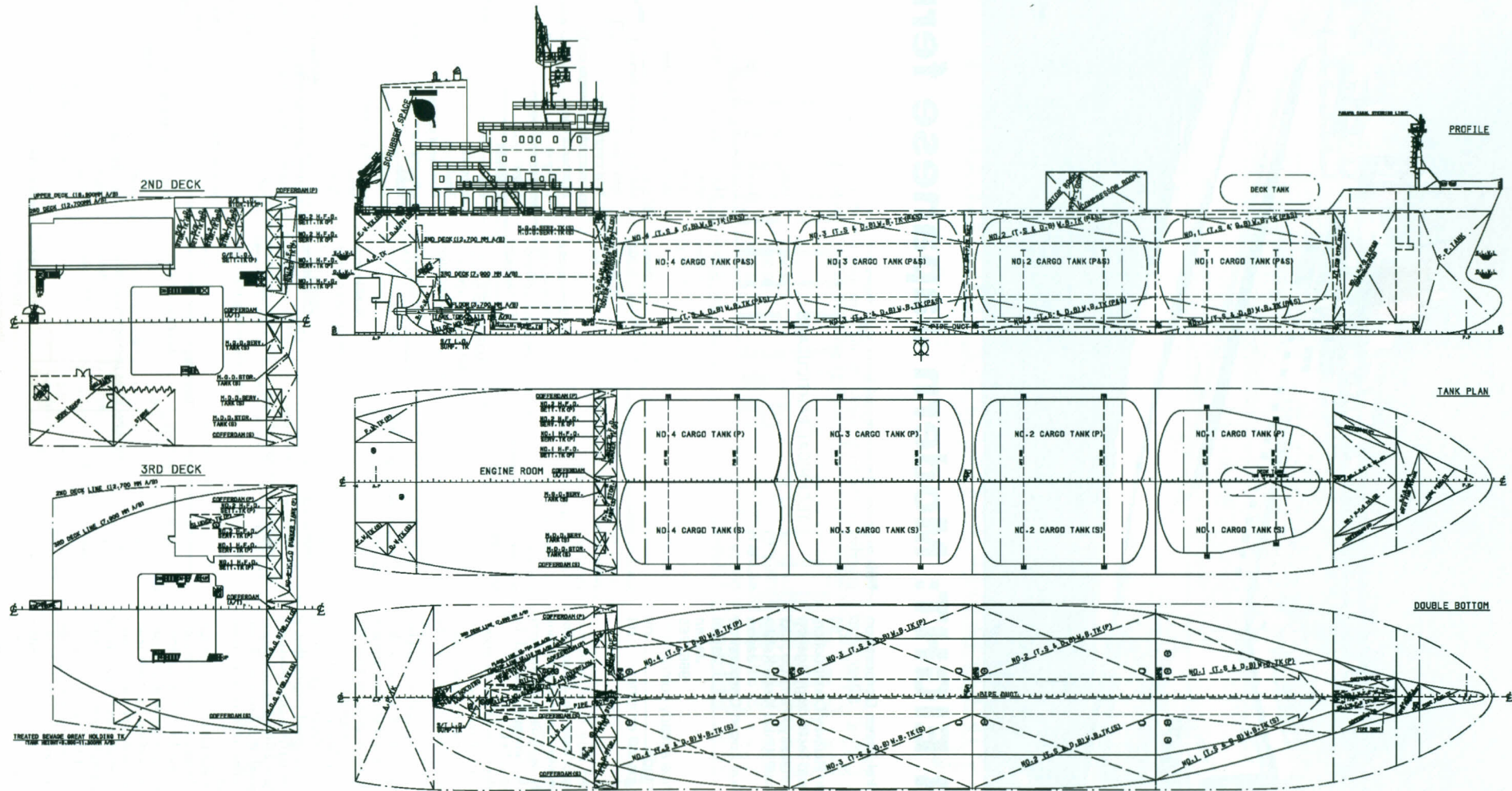
Waste disposal plant:
 Incinerator: Hyundai Marine Machinery/ MAXI NG100SL WS

Sewage plant: Il Seung/ ISS-60N

Contract date: 27 January 2012

Launch/float-out date: 4 May 2013

Delivery date: 29 July 2013





SILVER EIGHT: Modern Japanese ferry

Shipbuilder: **Naikai Zosen Corporation**
Vessel's name: **Silver Eight**
Hull No: **760**
Owner/operator: **Japan Railway Construction, Transport and Technology Agency/ Tsuarukaikyo Ferry Co., Ltd/ Kawasaki Kinkai Kisen Kaisha**
Country: **Japan**
Designer: **Naikai Zosen Corporation**
Country: **Japan**
Flag: **Japan**
IMO number: **9667265**
Total number of sister ships already completed (excluding ship presented): **nil**
Total number of sister ships still on order: **nil**

SILVER Eight is the latest ferry from Japan that serves a regular domestic route in Japan. The 9,450gt ferry was built by Naikai Zosen Corporation in Japan, and handed over to Tsugarukaikyo Ferry Co., Ltd. in June, and is currently operated by Kawasaki Kinkai Kisen Kaisha, Ltd.

The ferry operates a regular route of approximately 130 nautical miles in length, which the vessel navigates in around eight hours. Because of rough oceanographic conditions between Hachinohe and Tomakomai, the vessel is larger than its predecessor for improved stability and seaworthiness. Furthermore, two rudders with the maximum turning angle of 45deg at low speed are mounted together with a larger bow thruster, allowing better manoeuvrability at port entrance and departure in its daily round-trip navigation.

A Hitachi-MAN B&W 7L42MC6.1 2-cycle slow-speed engine was chosen for **Silver Eight's** main engine. Compared to the mid-speed engine that is often used for its class of ferries, the low-speed engine offers improved fuel efficiency and lower maintenance costs. At a speed of 20knots per hour, **Silver Eight** has achieved some 10% energy saving compared to its predecessor.

The route the vessel serves also functions as a freight route between Honshu and Hokkaido. For this reason, 68 large trucks can be loaded and drivers have exclusive access to the facilities such as private compartments, bathrooms and salons, so that they can get some rest.

Silver Eight is a ferry of the latest type with excellent navigation, safety and fuel efficiency. A variety of cabins are available to meet a wide range of passenger needs. The owner believes that the operation of this brand-new vessel will offer its passengers a reasonable and comfortable cruising experience.

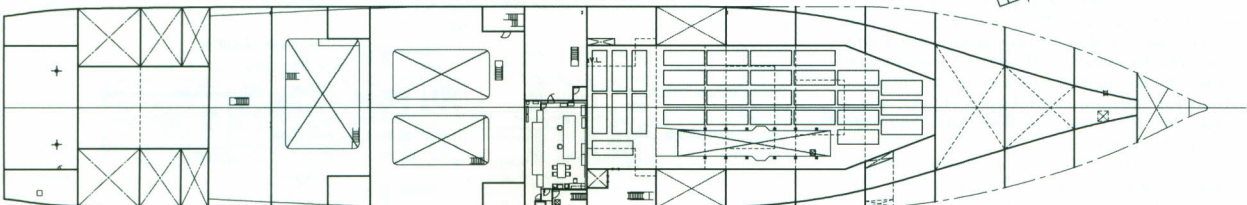
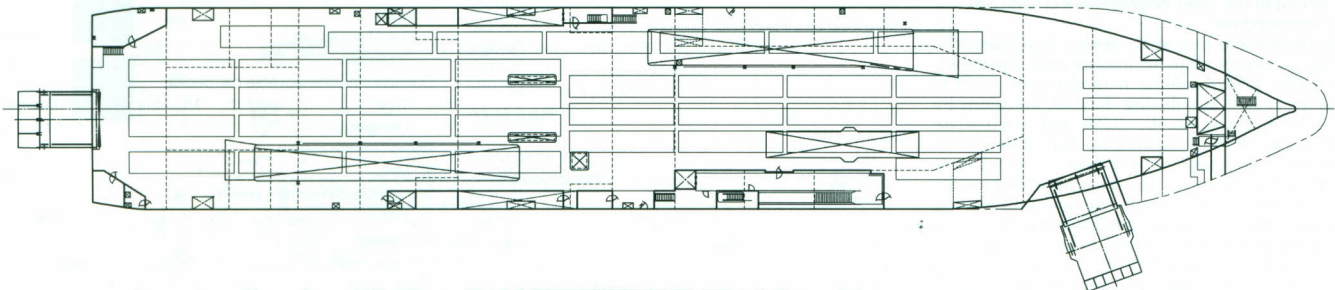
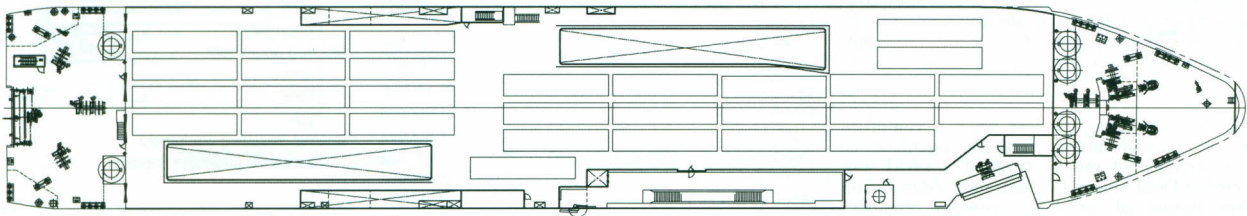
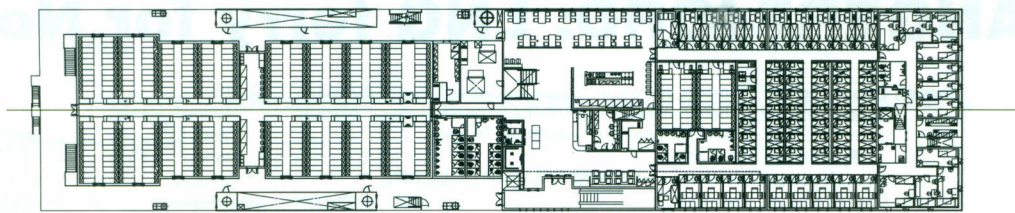
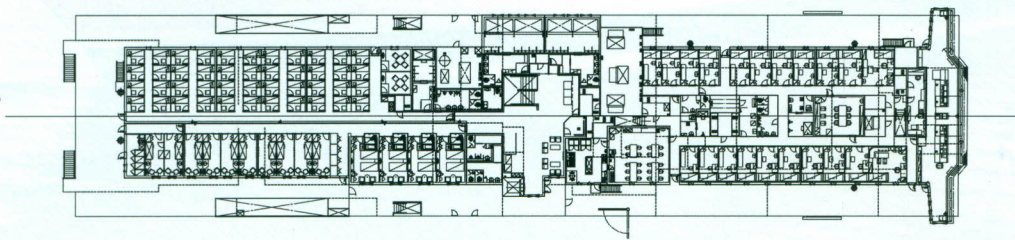
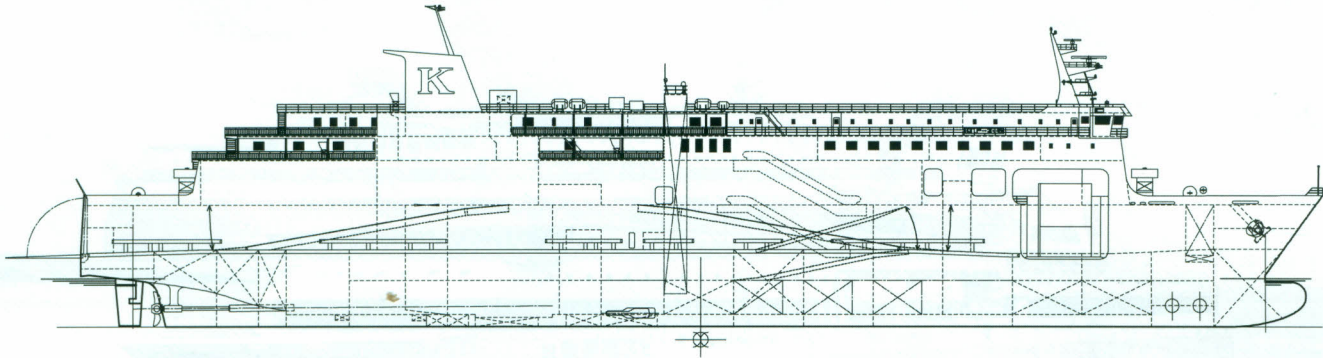
The design concept of the passenger's area is modern Japanese. The passenger cabins range from deluxe to second class and the passengers are allowed to choose

beds or seats. The communal baths with views are provided on the bridge deck, offering passengers a relaxing bath time while enjoying a panoramic view.

TECHNICAL PARTICULARS

Length oa: 142.59m
Length bp: 130.00m
Breadth moulded: 23.40m
Draught
Scantling: 5.90m
Design: 5.60m
Gross: 17,231gt
Deadweight
Scantling: 4,028dwt
Block co-efficient: 0.596
Speed, service: 20.5knots
Water ballast: 2,333.14m³
Daily fuel consumption
Main engine only: 46.8tonnes/day
Auxiliaries: 5.2tonnes/day
Classification society and notations: Japanese Governor
Roll stabilisation equipment: Fin stabiliser
Main engine
Design: MAN Diesel & Turbo
Model: Hitachi-MAN B&W 7L42MC6.1
Manufacturer: Hitachi Zosen Corporation
Number: 2
Type of fuel: HFO
Output of each engine: 6,965kW x 176rpm
Propeller
Material: Ni-Al-Bronze
Designer/manufacturer: Nakashima Propeller
Number: 2
Fixed/controllable pitch: Controllable
Diameter: 4.00m
Diesel-driven alternators
Number: 3
Engine make/type: Daihatsu Diesel Mfg/ 6DK-26e
Type of fuel: HFO
Output/speed of each set: 1,710kW x 720rpm
Alternator make/type: Taiyo Electric/ FEK 558C-10
Output/speed of each set: 1,600kW x 720rpm
Boilers
Number: 1
Type: Vertical water tubes package type, HB-25
Make: Miura
Output, each boiler: 2,500kg/h
Other cranes
Number: 1
Make: Kyoritsu Kikai
Type: 10-250673
Tasks: Provisions crane

Performance: 0.9tonnes x 3m
Mooring equipment
Number: 2 x Windlass/mooring winch
2 x mooring winch
2 x spring winch
Make: Kawasaki Heavy Industries
Precision Machinery Company
Type: Electro-hydraulic driven closed gear
Special lifesaving equipment
Number of each and capacity: 2 x 350 persons
Make: Fujikura Rubber
Type: FSMES-1800
Vertical or sloping chutes: Spiral type
Vehicles
Number of vehicle decks: 3 fixed decks
Total cars: 30
Total freight units: 68
Doors/ramps/lifts/movable car decks
Number of each: 3 hold ramps
Designer: Kyoritsu Kikai
Ballast control system
Make: Nakakita Seisakusho
Complement
Crew: 14
Passengers
Total: 600
Number of cabins: 136
Bow thruster
Make: Nakashima Propeller
Number: 2
Fire detection system
Make: Nippon Hakuyo electronics
Type: Analog heat detector/
Analog photoelectric smoke detector
Fire extinguishing systems
Engine room: Air Water Safety Service/
High pressure CO₂
Sanko Corporation/ Seawater,
portable fire extinguishers
Vehicle spaces: Kashiwa/ Sprinkler system
Sanko Corporation/ Seawater,
portable fire extinguisher
Cabins & public spaces: Sanko Corporation/
Seawater, portable fire extinguisher
Radars
Number: 2
Make: Japan Radio
Model: JMA-9100
Waste disposal system
Incinerator: Miura/ BGW-30N
Contract date: 30 March 2012
Launch/float-out date: 12 March 2013
Delivery date: 25 June 2013





STAVANGERFJORD: LNG ferry for Norway

Shipbuilder: **Bergen Group Fosen**
 Vessel's name: **Stavangerfjord**
 Hull No: **87**
 Owner/operator: **Fjord Line**
 Country: **Norway**
 Designer: **Bergen Group Fosen**
 Country: **Norway**
 Model test establishment used: **Marintek**
 Flag: **Denmark**
 IMO number: **9586605**
 Total number of sister ships already completed (excluding ship presented): **nil**
 Total number of sister ships still on order: **1**

NORWAY is taking the lead when it comes to environmental shipping and *Stavangerfjord*, is another example of this initiative. The vessel was delivered to Fjord Line in July after some delay due to further testing of its LNG powered engines. *Stavangerfjord* is the first of a series of two vessels constructed at Bergen Group, Norway with the initial steel work carried out at Stocznia Gdansk shipyard. The second in the series *Bergensfjord* was launched just after *Stavangerfjord*.

Stavangerfjord is one of the most environmentally friendly passenger ships in international operation, powered by LNG enabling it to eliminate its SOx emissions as well as reducing the CO₂ emissions by 23%, NOx emissions by 92% and particulate emissions by 98%, compared to ships powered by traditional heavy fuel oil. The waste heat recovery system (WHRS) that has also been installed provides both electricity from a steam generator and heating from warm water in the accommodation areas.

Both the vessels are powered by four Bergen gas engines individually rated at 5,600kW, driving Promas integrated rudder and propeller propulsion systems for optimal fuel efficiency. Originally the ferries were ordered with diesel engines, but Fjord Line made the decision to replace these with Bergen BV35:40P12G gas engines, to pre-empt the emission regulations for emission control areas (ECAs) when they come into effect that will limit NOx and SOx emissions in those areas.

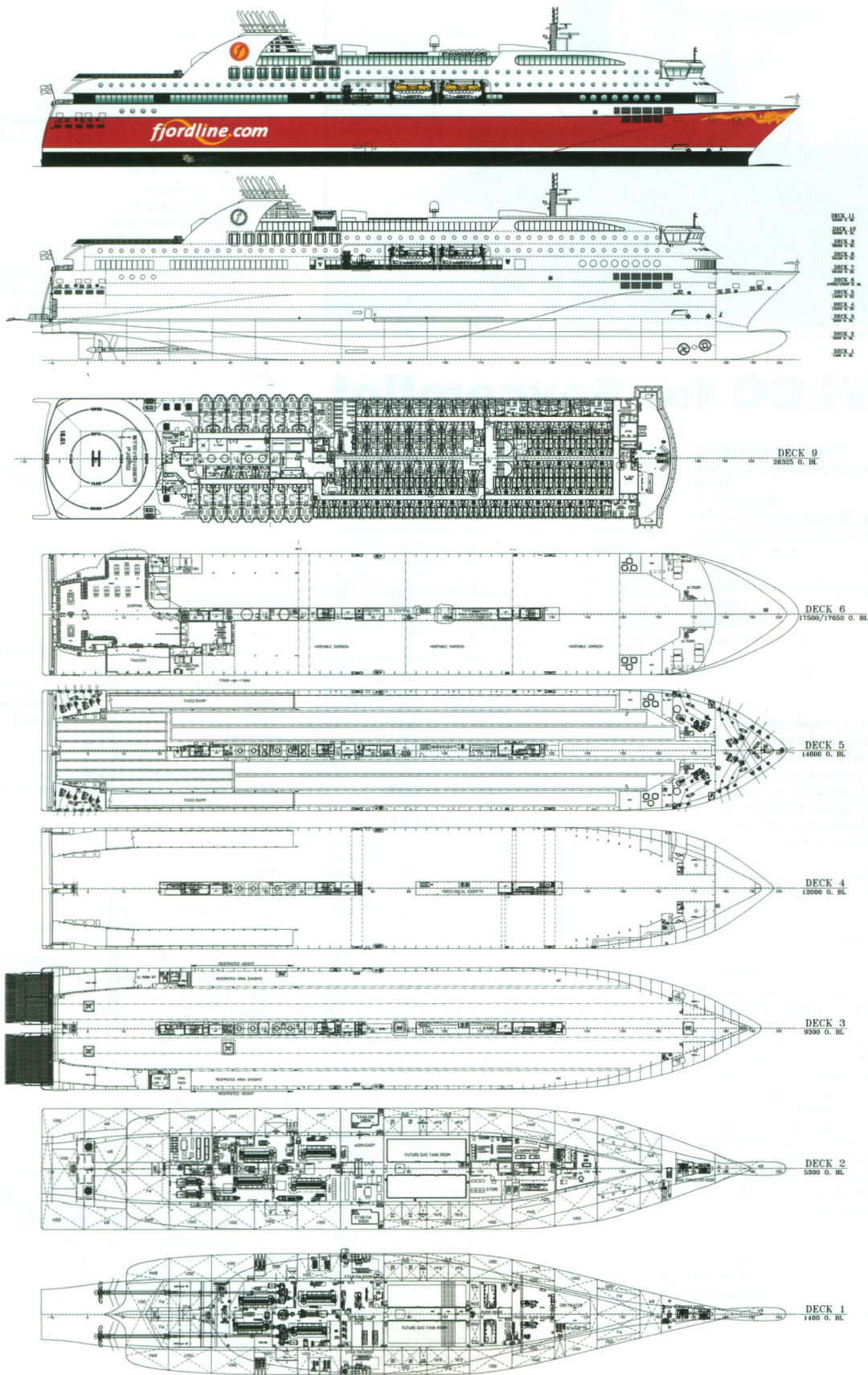
Each ship has 306 cabins, many of which will be suites, and can accommodate 1,500 passengers. The cargo decks have a total lane capacity of 1,350m², which has capacity for 600 vehicles or alternately a smaller number of vehicles in combination with larger

trucks and cargo. *Stavangerfjord* will service the routes between Hirtshal, Denmark and Stavanger, Norway and Hirtshal and Langesund, Norway.

TECHNICAL PARTICULARS

Length oa: 170.00m
 Length bp: 148.00m
 Breadth moulded: 27.50m
 Depth moulded
 To main deck: 9.30m
 Draught
 Scantling: 6.50m
 Design: 6.35m
 Gross: 31,678gt
 Displacement: 15,712tonnes
 Lightweight: 12,243tonnes
 Deadweight
 Design: 36,200dwt
 Block co-efficient: 0.5977
 Speed, service: 21.5knots
 Bunkers
 LNG: 600m³
 Water ballast: 1,508m³
 Classification society and notations: DNV *1A1, ICE 1B, Car Ferry A, E0, Gas Fuelled, CLEAN, NAUT-AW, WBR, MCDK, TMON, F-M, COMF V(2)
 Heel control equipment: Frank Mohn
 Main engine
 Model: B35: 4 OV 12 PG
 Manufacturer: Rolls-Royce Marine
 Number: 4
 Type of fuel: LNG
 Output of each engine: 6,400kW
 Gearboxes
 Make: MAN Diesel & Turbo
 Model: 888 783/100
 Number: 2
 Propeller
 Designer/manufacture: Rolls-Royce
 Number: 2
 Fixed/controllable pitch: Controllable
 Diameter: 4.7m
 Shaft generators
 Number: 2
 Make/type: Rolls-Royce/ Marelli
 Output/speed of each set: 1,850kW

Boilers
 Number: 1
 Type: Mission
 Make: Aalborg Industries
 Capacity: 3.8tonnes/h
 Other cranes
 Number: 1
 Make: Fuchs Fördertechnik
 Type: Telescopic
 Tasks: Provisions
 Performance: 7.5tonnes
 Mooring equipment
 Number: 8
 Make: Rolls-Royce Marine
 Type: MW160E
 Special lifesaving equipment
 Number of each and capacity: 4 x 151 persons
 6 x 153 persons
 4 x 51 persons
 Make: Fassmer/ Viking Lifesaving
 Hatch covers
 Manufacturer: TTS Marine
 Vehicles
 Total lane length: 1,350m
 Total cars: 600
 Doors/ramps/lifts/movable car decks
 Type: Movable car deck (Deck 6)
 Designer: TTS Marine
 Ballast control system
 Make: Panasia
 Water ballast treatment system
 Make: Panasia
 Complement
 Crew: approx. 100
 Passengers
 Total: 1,200/1,500
 Number of cabins: 303
 Bow thrusters
 Make: Rolls-Royce
 Number: 2
 Output: 1,600kW
 Fire detection system
 Make: Honeywell Life Safety
 Contract date: 16 March 2010
 Launch/float-out date: 12 April 2012
 Delivery date: 4 July 2013





SVET: VLCC for Sovcomflot

Shipbuilder: **Bohai Shipbuilding Heavy Industry Co., Ltd**
 Vessel's name: **Svet**
 Hull No: **BH518G1-7**
 Owner/operator: **Caldy Maritime Limited/SCF Novoship Technical Management**
 Country: **Liberia/Russia**
 Model test establishment used: **Shanghai Ship & Shipping Research Institute**
 Flag: **Liberia**
 IMO number: **9625956**
 Total number of sister ships already completed (excluding ships presented): **3**
 Total number of ships still on order: **5**

SVET is the first of two very large crude carriers (VLCC) ordered by Sovcomflot Group and delivered from Bohai Shipbuilding Heavy Industries in November. In line with the SCF development strategy, the construction of the two new tankers, *Svet* and *SCF Shanghai*, will allow the company to break into a new large tonnage segment employing VLCC tankers (over 300,000dwt). OAO Novoship (part of the SCF Group) will take charge of the tankers' technical management and oversee their construction.

The vessel has been designed and built as a single screw oil tanker, suitable for unrestricted ocean going service for carrying crude oil of a flash point below 60°C (Closed Cup Test). The vessel has a raked stem with a protruding bulbous bow, a mariner stem, a semi-balanced hanging type rudder with rudder horn and one continuous upper deck without a forecastle.

The accommodation is arranged for a total complement of 36 crew, and in compliance with ILO Conventions & Recommendations and Sovcomflot's standards regarding crew living and working conditions.

The main hull is divided into five centre cargo oil tanks and five pairs of cargo inner side tanks, plus one pair of slop tanks by the transverse bulkheads and four rows of longitudinal bulkheads. The five pairs of water ballast tanks are designed and arranged in accordance with MARPOL as a "Double Hull Segregated Ballast Tanker". The aft peak tank is used as a water ballast tank. The bunker tanks arranged by the engine room and pump room area have cofferdams at ship's side in order to comply with environmental protection requirements.

The fixed-pitch propeller is directly driven by the Wärtsilä 7RT-flex-84T-D type main engine, which is a two stroke, single acting, crosshead, direct reversible unit with a high efficiency turbocharger. Its operating MCR is 29,400kW x 76rpm and NCR (90% MCR) is 26,460kW x 73.4rpm.

The vessel can navigate at a speed of over 16knots at the designed operating draught. Except for the main engine mentioned above, the vessel has also been fitted with other pieces of eco-technology to make it more efficient and also comply with the latest International Environmental & Energy Regulations.

An Aalborg waste heat recovery (WHR) plant, which consists of one exhaust gas, two pressure boiler type Mission XW-TG (HP-LP), along with a Shinko Industries RG65M-2

two pressure steam turbines and a Hyundai HFS4-456-4P generator driven by the turbines. The Aalborg waste heat recovery system provides for operation of the generator turbine at full sea load + 10% reserve, which results in a fuel saving (and reduction of emissions) of about 4.5tonnes/day.

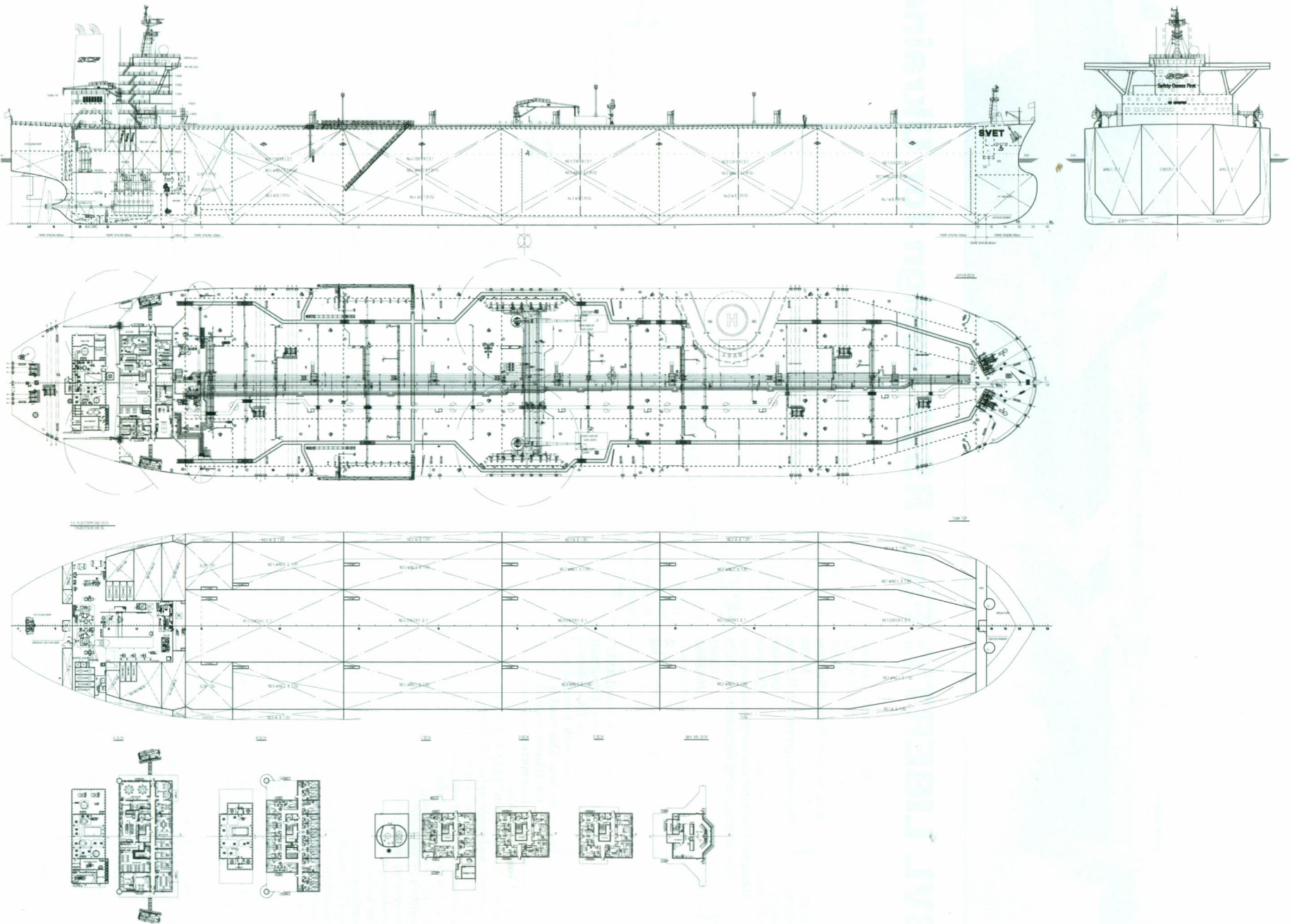
Svet also has a N.E.I. Ballast Water Treatment System, of the venturi oxygen stripping (VOS) type, used for treatment of the ballast water and providing inert gas for the ballast tanks, with a total gas capacity of 7,940m³/h at 0.1% oxygen with a total ballast water flow of 6,350m³/h. The Jowa ODME 2005 oil discharge monitoring system, which is installed has an additional sensor for measuring the oil content in the loaded and discharged ballast water.

The vessel also has a JETS Sewage Treatment Plant, with G/O Bioreactor BR-7400 BG-V which is connected with a vacuum pump unit that has a hydraulic capacity (load) of 7.4m³/day and a designed organic load of 3.0kg BOD5/day. The bioreactor enables daily treatment of the ship's sewage and total waste (grey) water and is equipped with UV lamp for disinfection of the outlet treated waters. The ship's is also provided with a collection tank with a capacity of 60m³ for storage of untreated/treated sewage and grey water.

TECHNICAL PARTICULARS

Length oa: 331.76m
 Length bp: 319.74m
 Breadth moulded: 59.99m
 Depth moulded
 To upper deck: 30.49m
 Width of double skin
 Side: 3.3m
 Bottom: 3.00m
 Draught
 Scantling: 22.60m
 Design: 21.00m
 Gross: 167,578gt
 Displacement: 36,943tonnes
 Lightweight: 48,396tonnes
 Deadweight
 Design: 29,196dwt
 Scantling: 32,103dwt
 Block co-efficient: 0.8222
 Speed, service: 16knots
 Cargo capacity
 Liquid volume: 36,035m³
 Bunkers
 Heavy oil: 8,691m³
 Diesel oil: 603m³
 Water ballast: 94,000m³
 Tankers percentage segregated ballast: 100%
 Daily fuel consumption
 Main engine only: 107tonnes/day
 Classification society and notations: DNV + 1A1, Tanker for Oil ESP, CSR, E0, VCS-2, BIS, TMON, CLEAN, SPM, COAT-PSPC(B), BWM-T
 % high-tensile steel used in construction: 35%
 Main engine
 Design: Wärtsilä

Model: 7RT-flex84T-D
 Manufacturer: QMD
 Number: 1
 Type of fuel: HFO
 Output of each engine: 29,400kW
 Propeller
 Material: Ni-Al-Bronze
 Designer/manufacturer: Nakashima Propeller/ Dalian Marine Propeller
 Number: 1
 Fixed/controllable pitch: Fixed
 Diameter: 10m
 Speed: 76rpm
 Diesel-driven alternators
 Number: 2
 Engine make/type: Wärtsilä Qiyao Diesel Company/ Wärtsilä Auxpac 1200W8L20
 Type of fuel: HFO
 Output/speed of each set: 1,260kW x 900rpm
 Alternator make/type: Wärtsilä/ Fenxi
 Output/speed of each set: 1,500kVA x 900rpm
 Steam turbine-driven alternators
 Number: 1
 Turbine make/type: Shinko Ind./ RG65M-2
 Output/speed of each set: 1,200kW x 800rpm
 Alternator make/type: Shinko Ind./ HFS4 456-4P
 Output/speed of each set: 1,500kW x 1,800rpm
 Boilers
 Number: 2
 Type: Mission D-type
 Make: Aalborg
 Output, each boiler: 45tonnes/h
 Cargo cranes/cargo gear
 Number: 2
 Make: TTS BoHai
 Type: GP 680-20-20
 Performance: 20m x 20tonnes
 Other cranes
 Number: 1 + 1
 Make: TTS BoHai
 Type: Gp 260-5-20.2/ GP 380-10-18
 Tasks: provisions
 Performance: 20.2/18m x 5/10tonnes
 Mooring equipment
 Number: 8 + 2
 Make: Aker
 Type: Electro-hydraulic
 Special lifesaving equipment
 Number of each and capacity: 2 x 42 persons
 Make: Haihong Boat Making
 Type: Lifeboat totally enclosed
 Cargo tanks
 Number: 15 + 2
 Grade of cargo carried: 3
 Product range: Crude oil of a flash point below 60°C
 Coated tanks make/type: KCC EH2350
 Cargo pumps
 Number: 3
 Type: Steam turbine
 Make: Shinko Ind.
 Capacity: 5,500m³/h
 Cargo control system
 Make: Nakita Seisakusho Co., Ltd
 Ballast control system
 Make: Nakita Seisakusho Co., Ltd
 Water ballast treatment system
 Make: NEI Treatment System
 Capacity: 6,350m³/h
 Complement
 Crew: 17
 Stern appendages/special rudders: semi-balanced hanged type rudder
 Bridge control system
 Make: Kongsberg Maritime AS
 Type: Autochief C20
 Fire detection system
 Make: Apollo
 Type: Syncro
 Fire extinguishing systems
 Engine room: Fixed total flooding high expansion foam
 Cabins/ public spaces: Sea water
 Radars
 Number: 2
 Make: Sperry Marine
 Model: Vision Master Ft 340
 Waste disposal plant
 Incinerator: Teamtec/ GS 900CX
 Sewage plant: Jets/ G70 BR7400 BG-V
 Contract date: 20 December 2010
 Launch/float-out date: 5 May 2013
 Delivery date: 18 November 2013





SVL LIBERTY: First RS27 design for Ukraine

Shipbuilder: **JSC, Kherson, Ukraine**
 Vessel's name: **SVL Liberty**
 Hull No.: **8001**
 Owner/operator: **SVL Marine Transit Service**
 Country: **Malta**
 Designer: **Marine Engineering Bureau**
 Country: **Ukraine**
 Model test establishment used: **Odessa National Maritime University basin and Krylov Shipbuilding Research Institute**
 Flag: **Russia**
 IMO number: **9645982**
 Total number of sister ships already completed (excluding ship presented): **2**
 Total number of sister ships still on order: **nil**

SVL Liberty is the first in a series of improved RST27 KhS vessels designed by the Marine Engineering Bureau (MEB) in Russia and built by JSC, Kherson, Ukraine and delivered in March with a second vessel being delivered later in the year. This vessel is the first completed tanker from the Ukraine since the Soviet Union's disintegration and can operate on the Volga-Don Canal and Volga-Baltic Way.

The latest ecological safety "ECO-S" class oil tanker has an increased deadweight up to 7,041dwt (the biggest among "Volgo-Don max" and first in "Dnieper max" class tankers) and is fitted with modern equipment.

SVL Liberty features a bulbous bow and transom aft with semi-tunnels and skeg. Two fully rotating rudder propellers with fixed-pitch propellers in the nozzles have been installed for propulsion, which act in unison for manoeuvring the vessel.

The hull's theoretical forms are a result of scientific research carried out by MEB in 2010, which was defined using CFD modelling. The results obtained in the tow tanks conform to CFD methodological predictions and ensured that there are no significant detached flows.

MEB has increased the trunk and used submersible cargo pumps for the cargo. The vessels have no longitudinal bulkhead in centreline (CL) and no framing in the cargo tanks. Also, to meet the special requirements of the Russian and world petroleum companies, additional ecological Russian Maritime Register (RS) limitations of 'ECO-S' ('Clean Design') class were taken into consideration during the design of the vessels.

The total capacity of the six cargo tanks and two slop tanks is 8,274m³, 7,041dwt at a sea draught of 4.20m (normal Caspian and Azov sea conditions) and 5,439dwt at river draught of 3.60m (Russian internal waterways).

The old style Russian river-sea vessels had hulls with a block coefficient of 0.84, 0.85. The new RST27 KhS project tanker design has an increased river function comparing with other MEB projects. The river deadweight of the vessel has been increased to 732dwt compared to the Armada type (RST22 project with a block co efficient of 0.90), while the hull's strength has been increased (vessel is of R2 sea navigation area); better practical keeping whilst keeping the same fuel consumption and also increasing the capacity of cargo tanks have also been the main features of the design.

The fully loaded vessel with a block coefficient of 0.93 has a towage power 4% higher than existing vessels that

have a block coefficient of 0.90 with the vessel's speed of 10.5knots, but the new vessel design with a block coefficient of 0.93 has a deadweight 15% greater than that of the vessel with a block coefficient of 0.90.

During sea trials **SVL Liberty** operated at a speed of 11.7knots with a main engine capacity of 2,100kW (87.5% MCR) and fore/aft draughts of 3.2/3.3m.

The RST27 KhS project vessels are assigned for transportation of crude oil and oil products, without flash point restrictions. The cargo system can provide simultaneously transportation of two cargoes.

TECHNICAL PARTICULARS

Length oa: 140.85m
 Length bp: 137.10m
 Breadth moulded: 16.70m
 Depth moulded
 To main deck: 6.00m
 Width of double skin
 Side: 1.85m
 Bottom: 1.20m
 Draught
 Design: 4.2m (at sea)
 3.6m (at river)
 Gross: 5,075gt
 Displacement: 9,483tonnes
 Lightweight: 2,442tonnes
 Deadweight
 Design: 7,041dwt (at sea)
 5,439dwt (at sea)
 Block co-efficient: 0.936
 Speed, service: 10.5knots
 Cargo capacity
 Liquid volume: 8,274m³
 Bunkers
 Heavy oil: 350m³
 Diesel oil: 59m³
 Water ballast: 4,650m³
 Daily fuel consumption
 Main engine only: 8tonnes/day
 Auxiliaries: 0.5tonnes/day
 Classification society and notations: RS KM*Ice 1 R2
 AUIT1-ICS OMBO VCS ECO-S Oil tanker (ESP)
 Main engine
 Model: 6L20
 Manufacturer: Wärtsilä
 Number: 2
 Type of fuel: HFO
 Output of each engine: 1,200kW
 Rudder propeller
 Make: Schottel
 Model: SRP1012FP
 Number: 2
 Output speed: 307rpm
 Propellers
 Material: cu3
 Designer/manufacturer: Schottel
 Number: 2
 Fixed/controllable pitch: Fixed
 Diameter: 1.9m
 Speed: 307rpm

Diesel-driven alternators

Number: 3
 Engine make/type: Volvo Penta D12 MG KC
 Type of fuel: MDO
 Output/speed of each set: 292kW

Boilers

Number: 2
 Type: CHB-3000
 Make: Aalborg
 Output each boiler: 2.5tonnes/h

Other cranes

Number: 1
 Make: Gurdesan
 Type: GD-HK 2/12
 Tasks: Manifold crane
 Performance: Flame-proof construction

Mooring equipment

Number: 2 x Anchor-mooring winch
 1 x Anchor-mooring capstan
 Make: Aria Winch
 Type: Electro-hydraulic

Special lifesaving equipment

Number of each and capacity: 1 x 16 persons
 Make: Davit International
 Type: JY-FF-4.90

Cargo tanks

Number: 6 + 2
 Product range: Crude oil and petroleum products

Cargo pumps

Number: 6
 Type: MDPD-150
 Make: Marflex
 Capacity: 200m³/h; 0.8MPa (water) 170m³/h;
 0.7 MPa (v= 600cSt; ρ= 1.0kg/m³)

Cargo control system

Make: Valcom
 Type: TSS/Control

Ballast control system

Make: Valcom
 Type: TSS/Control

Complement

Crew: 9

Stern appendages/special rudders: 2 full revolving rudder
 propellers with fixed pitch propellers in
 nozzles SRP-1012FP "Schottel"

Bow thrusters

Make: Schottel
 Number: 1
 Output: 230kW

Bridge control system

Make: Northrop Grumman Sperry Marine
 One-man operation: Yes

Fire detection system

Make: MRS Electronics
 Type: PS-220/127-5A

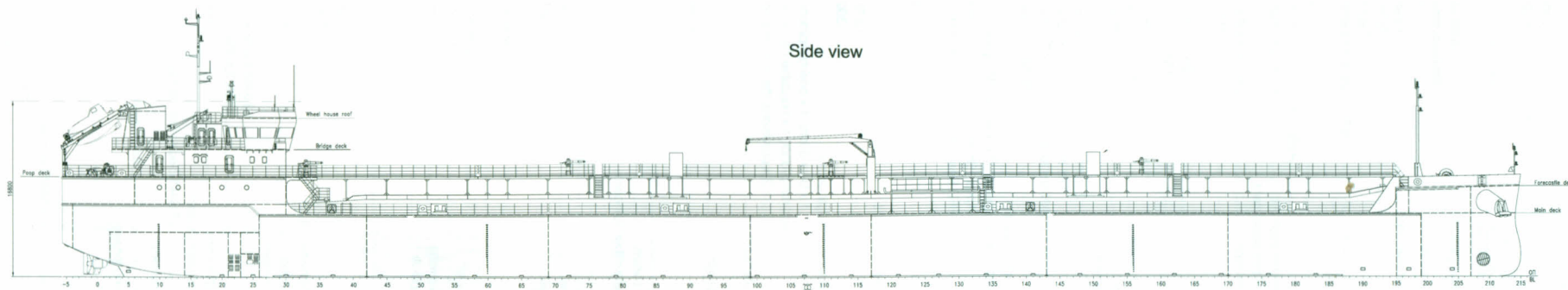
Radars

Number: 2
 Make: Northrop Grumman Sperry Marine
 Model: Visionmaster FT, ECAT2 25 - Radar Systems

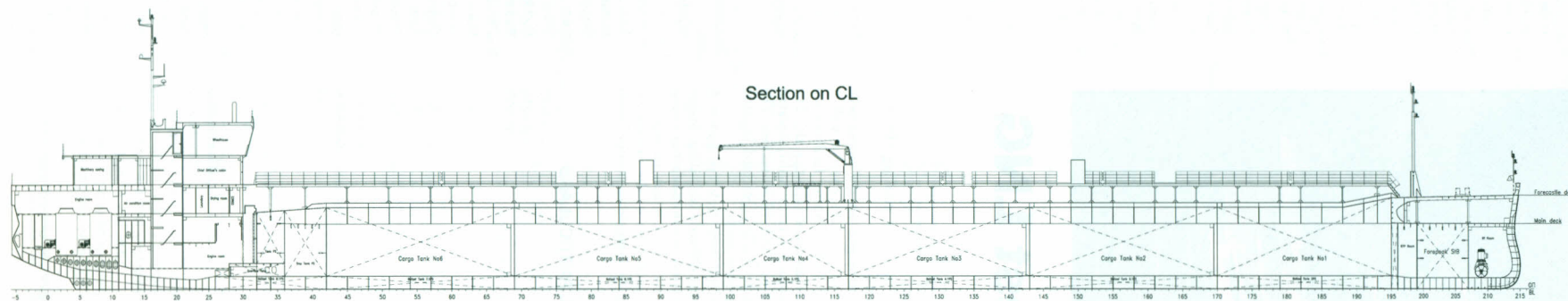
Launch/float-out date: 19 October 2012

Delivery date: 22 March 2013

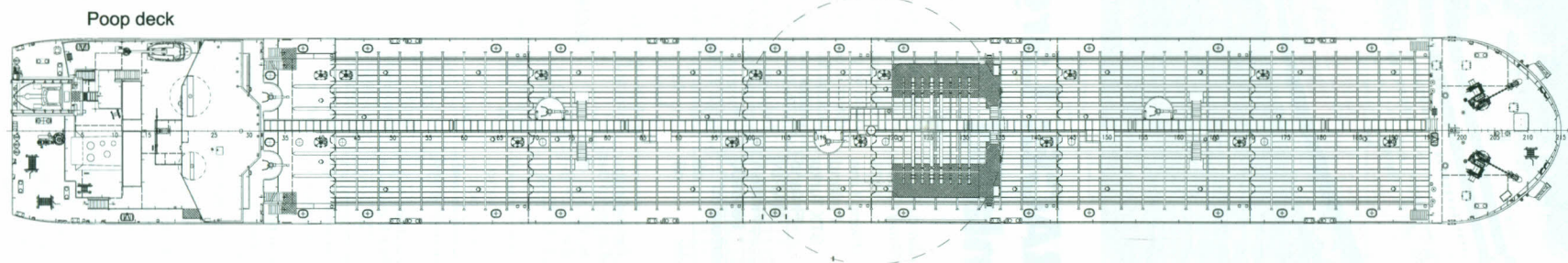
Side view



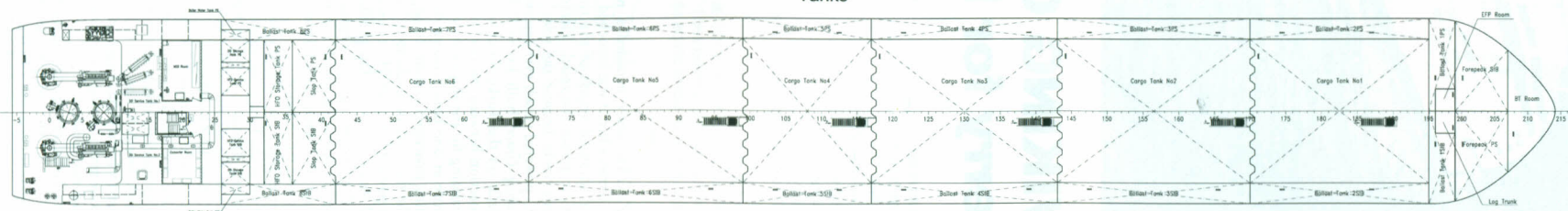
Section on CL



Top view



Tanks





VIKING GRACE: Largest LNG ferry for Finland

Shipbuilder:.....STX Finland, Turku
 Vessel's name:.....**Viking Grace**
 Hull No:.....**1376**
 Owner/operator:.....**Viking Line**
 Country:.....**Finland**
 Designer:.....**STX Turku**
 Country:.....**Finland**
 Model test establishment used:.....**MARIN**
 Flag:.....**Finnish**
 IMO number:.....**9606900**
 Total number of sister ships already completed (excluding ship presented):.....**nil**
 Total number of sister ships still on order:.....**nil**

VIKING Grace heralded a new era for passenger ferries when it was launched. Deemed as one of the most advanced vessels of the time due to the use of LNG to power the vessel, *Viking Grace* also made the record books because the vessel is one of the longest LNG powered vessels ever constructed.

Viking Grace, built by STX Finland, has replaced *Isabella* on the Turku-Stockholm route, the shortest connection between Sweden and Finland. The route is demanding for the ships due to the tight schedule with as little as one hour harbour time for unloading and loading passengers and ro-ro cargo.

The ferry's main machinery is based on a cruise ship-type power plant principle, consisting of four 8-cylinder dual fuel engines driving generating sets. The power plant's principle optimal engine load on its complex route has operating speeds varying from 8knots to 15 and up to 22knots in addition to the high degree of safety and redundancy.

The engine runs off LNG, which has been pitched as the fuel of the future due to its ability to reduce a ship's emissions dramatically. The fuel in *Viking Grace* is stored in the aft end of the ship, on the open deck in two 200m³ LNG-tanks.

The ship's propulsion consists of two five-bladed stainless steel fixed-pitch propellers with modern high-lift flap rudders, which also fulfils the requirements of Finnish-Swedish Ice class 1A Super and Lloyd's Register's highest passenger comfort rating. For better harbour manoeuvring three thrusters have installed, one aft and two forward.

The latest energy-saving technologies have been applied in the ship's design: various energy management systems, LEDs used in lighting, elevators with energy recovery, high efficiency pumps and fans, just to name a few. Excess heat produced by machinery during the voyage is stored in specific heat accumulator tanks and the stored heat is used during the time in port for pre-heating the air-conditioned air. The cold

from the LNG is also used for cooling the air-conditioned air in summertime.

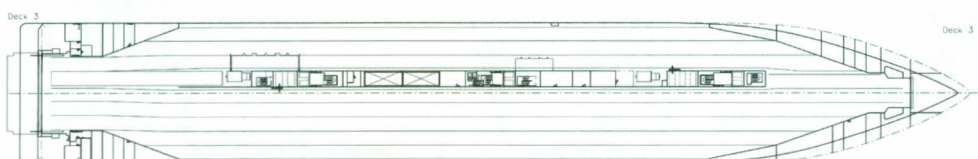
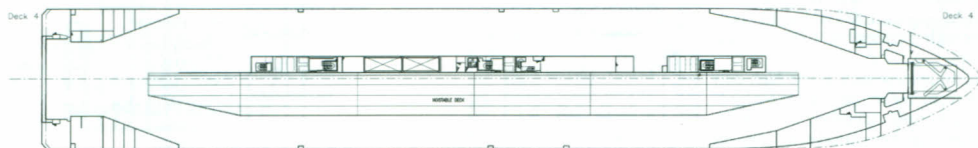
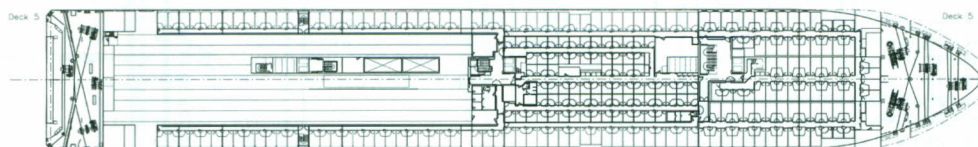
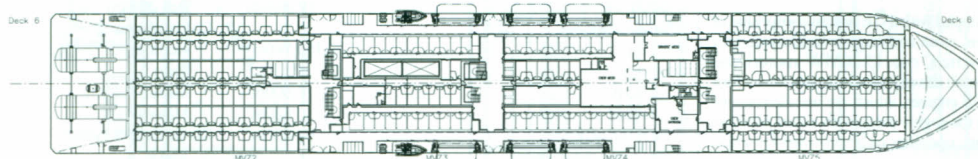
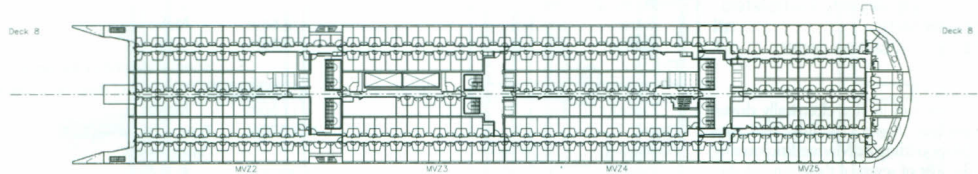
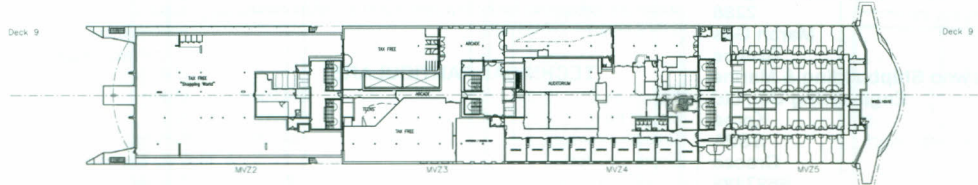
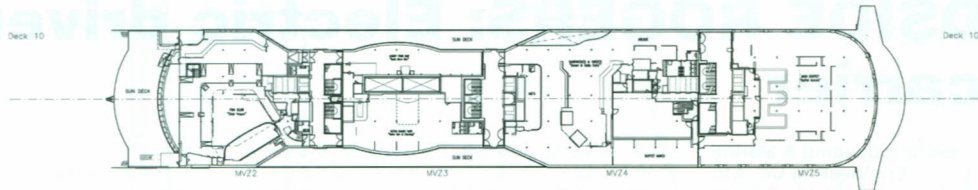
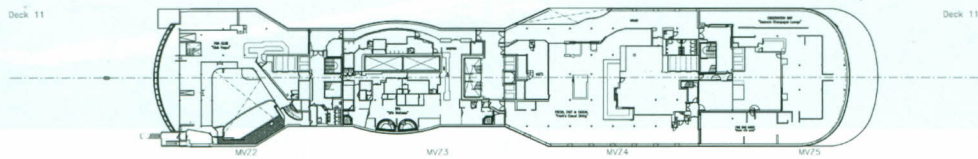
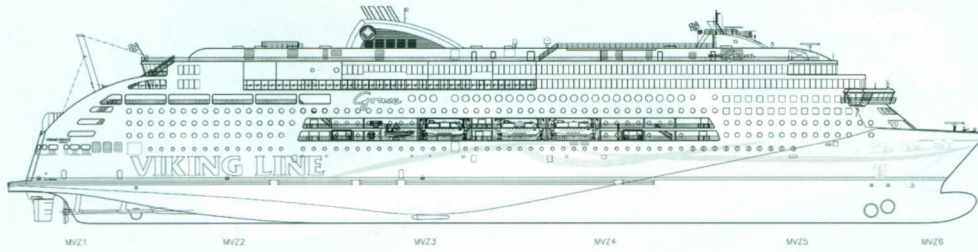
The public spaces are arranged on the uppermost decks to provide the most spectacular scenery as well as direct access to the outer decks. Dining facilities are located forward and entertainment facilities aft. The venues are organised around service hubs, located internally on each deck for easy and efficient access. The hubs are supported from vertically connected logistics centres, located below the ro-ro decks.

Passenger cabin areas extend from deck 5 to deck 9. A large variety of cabins are offered, including bigger cabins in the forward section accommodating cruise ship-like double beds. Crew cabins, which are required to have windows, are located sides of the private car garage on deck 5 and on life boat decks 6 and 7 with restricted view.

TECHNICAL PARTICULARS

Length oa:.....218.50m
 Length bp:.....200.00m
 Breadth moulded:.....31.80m
 Depth moulded
 To main deck:.....9.80m
 Draught
 Scantling:.....7.00m
 Design:.....6.80m
 Gross:.....57,565gt
 Deadweight
 Design:.....50,300dwt
 Scantling:.....60,800dwt
 Speed, service:.....22knots
 Bunkers
 LNG:.....2 x 200m³
 Diesel oil:.....MGO: 178m³ HFO: 470m³
 Water ballast:.....1,450m³ + heeling 670m³
 Daily fuel consumption
 LNG:.....45-48tonnes/day
 Pilot fuel (MGO):.....0.5tonnes/day
 Classification society and notations:.....Lloyd's Register of Shipping + 100A1 Passenger and vehicle ferry, IWS, ICE, 1AS, +LMC, UMS, IBS, PCAC12, PSMR*, Green passport, Movable car decks, GF
 Heel control equipment:.....Hoppe Bordmesstechnik GmbH
 Roll stabilisation equipment:.....Blohm & Voss, fin stabilisers, Simplex-compact s600-9m²
 Main engines
 Model:.....8L50DF
 Manufacturer:.....Wärtsilä
 Number:.....4
 Type of fuel:.....LNG/NG backup fuel MGO
 Output of each engine:.....7,400kW

Exhaust gas system
 Manufacturer:.....Wärtsilä
 Model:.....Compact silencer system (CSS)
 Number:.....4
 Type:.....Optimal noise attenuation, less than 50dB at 100m
 Propulsion motors
 Make:.....ABB
 Model:.....AMZ 1600 2XW 12LSB
 Number:.....2
 Output speed:.....10.5MW x 128rpm
 Propellers
 Designer/manufacturer:.....Wärtsilä
 Material:.....Stainless steel
 Number:.....2
 Fixed/controllable pitch:.....Fixed
 Diameter:.....5.2m
 Speed:.....130rpm
 Special adaptations:.....5 bladed built up propeller
 Main generators
 Number:.....4
 Make/type:.....ABB/AMG 1120 ME 12LSE
 Output/speed of each set:.....8.191 x 500rpm
 LNG tanks & related equipment
 Manufacturer/type:.....Wärtsilä LNGPac
 Capacity:.....2 x 200m³
 Boilers
 Number:.....2 x dual fuel
 Type:.....FMB-VM-7/7
 Make:.....Saacke
 Output, each boiler:.....7,000kg/h at 7bar
 Type of fuel:.....LNG/NG/MGO
 Mooring equipment
 Number:.....2 x combined anchor windlasses/ self tensioning mooring winches
 6 x 250kN self tensioning mooring winches
 Make/type:.....NDM/Electrical
 Special lifesaving equipment
 Number of each and capacity: 2 x 316, 2 x 237, spare rafts
 4pcs 158 persons, 4 for 50 persons
 Make/type:.....RFD Beaufort/Marine Ark MK 2 MES
 Hatch covers
 Manufacturer/type:.....TTS/2 x on deck 3
 Vehicles
 Number of vehicle decks:.....2 x fixed, 1 x movable
 Total lane length:.....1,275
 Total cars:.....300
 Doors/ramps/lifts/movable car decks
 Number of each: 1 x Bow doors, 1 x bow ramp/door, 1 x stern ramp/door, 1 x hoistable car deck, 2 x provisions lifts, 1 x cargo lift
 Designer/manufacturer:.....TTS
 Lifts
 Number of each:.....14
 Manufacturer:.....Kone
 Passengers
 Total:.....2,800
 Number of cabins:.....880
 Percentage/number onboard:.....34%
 Rudders
 Make:.....Van der Velden Barkemeyer
 Rudder type:.....TTA 35057-23/20
 Rudder area:.....20m²
 Bow thruster
 Make:.....Wärtsilä
 Number:.....2
 Output:.....2,300kW
 Type:.....CT2755H
 Propeller diameter:.....2.75m
 Propeller speed:.....243rpm
 Stern thruster
 Make:.....Wärtsilä
 Number:.....1
 Output:.....1,500kW
 Type:.....CT225H
 Propeller Diameter:.....2.25m
 Propeller speed:.....243rpm
 Bridge control system
 Make:.....L3 SAM Electronics
 Type:.....NACOS Platinum
 One-man operation:.....Yes
 Integrated automation system
 Make/type:.....L3 SAM Electronics Valmatic Platinum
 Fire detection system
 Make/type:.....Autronica Autromaster 5000
 Fire extinguishing system
 Make/Type:.....Marioff/Hi-Fog
 Radar
 Number:.....4
 Make/model:.....L3 SAM Electronics NACOS Platinum
 Contract date:.....25 November 2010
 Launch/float-out date:.....17 August 2012
 Delivery date:.....10 January 2013





WOODSIDE ROGERS: Electric driven LNG carrier

Shipbuilder: **Daewoo Shipbuilding & Marine Engineering Co., Ltd**
 Vessel's name: **Woodside Rogers**
 Hull No: **2288**
 Owner/operator: **Maran Gas**
 Country: **Greece**
 Designer: **Daewoo Shipbuilding & Marine Engineering Co., Ltd**
 Country: **Korea**
 Model test establishment used: **SSPA**
 Flag: **Greece**
 IMO number: **9627485**
 Total number of sister ships already completed (excluding ship presented): **nil**
 Total number of sister ships still on order: **7**

MARAN Gas took delivery of its first electrically driven LNG carrier, *Woodside Rogers*, in July that was constructed by Daewoo Shipbuilding & Marine Engineering Co. Ltd. (DSME). It is the first of seven of these state-of-the-art LNG carriers that are scheduled for delivery between 2013 and 2015.

Woodside Rogers is equipped with a GE system comprising of four 9.85Mva generators, main and cargo switchboards, four transformers, two converters, two 13.26MW motors and remote control. The electric drive system is supported by four tri-fuel Wärtsilä 9L50DF engines, which are installed in two dedicated spaces within the engine room with a steel partition wall and, where necessary, openings to be provided for access and maintenance.

The four centre cargo tanks have a total capacity of 159,760m³ and were designed by Gaz Transport & Technigaz (GTT)-membrane system ("GT NO 96-GW"). The tanks will keep the LNG at a temperature of -163°C and have a daily boil-off rate of less than 0.125% of the fully loaded cargo volume.

The vessel has a continuous upper deck with an aft sunken deck, a raked stem with bulbous bow, a transom stern with open water type stern frame, one semi spade type rudder and one fixed-pitch propeller driven by electric propulsion motors through reduction gears.

The cargo handling systems have been designed to be capable of loading or discharging the LNG within 13 hours, using eight cargo pumps with a capacity of 1,850m³/h and four stripping/spray pumps.

Vapour cargo handling equipment such as two high duty compressors, two low duty compressors (i.e., one for 2-stage & the other for 4-stage), one main vaporiser, one forcing vaporiser and one gas heater have been installed in cargo the machinery room.

The design fatigue life of the longitudinal stiffener connections to the transverse webs/bulkheads and critical details in cargo area have been designed to meet with the Rule requirement or the DNV PLUS notation for a minimum of 40 years on the basis of worldwide wave environment.

A six tiers deckhouse is located at the aft providing accommodation for 51 persons including Suez crews. Special attention has been paid to the vibration levels in living areas, which have been minimised at normal operating condition.

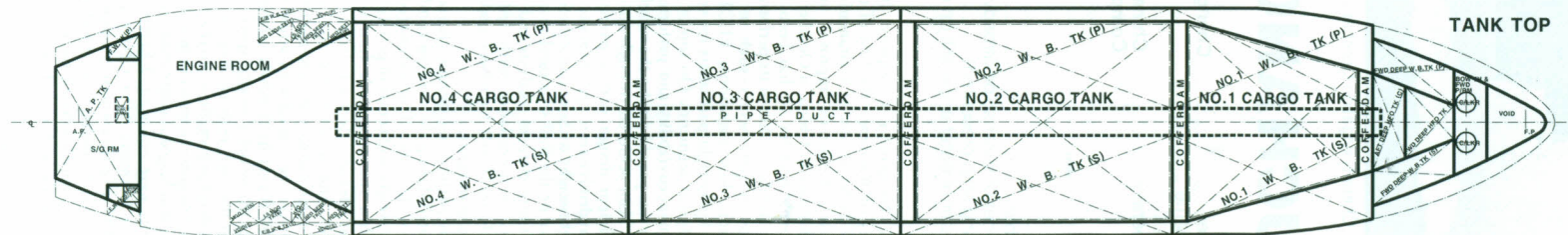
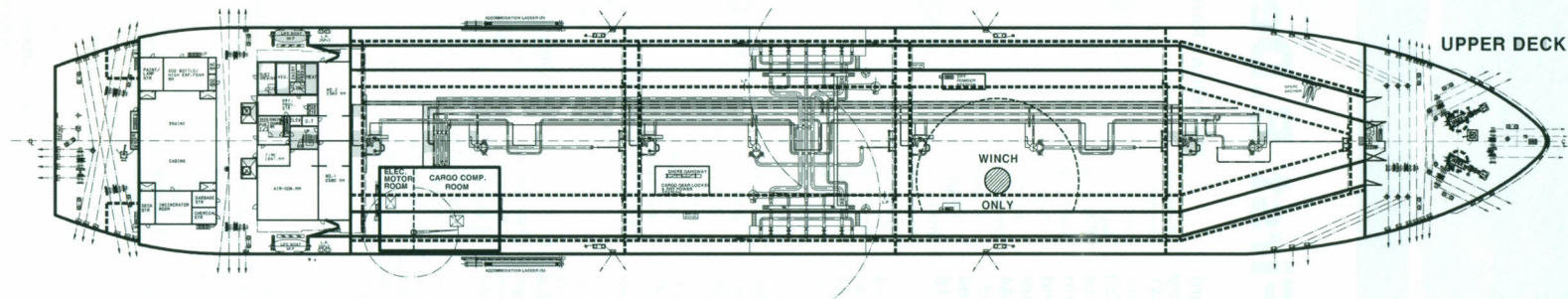
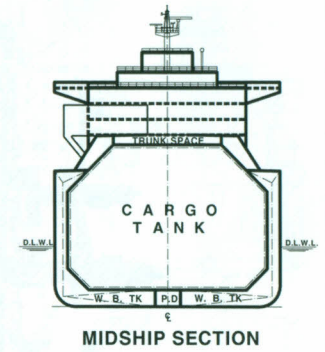
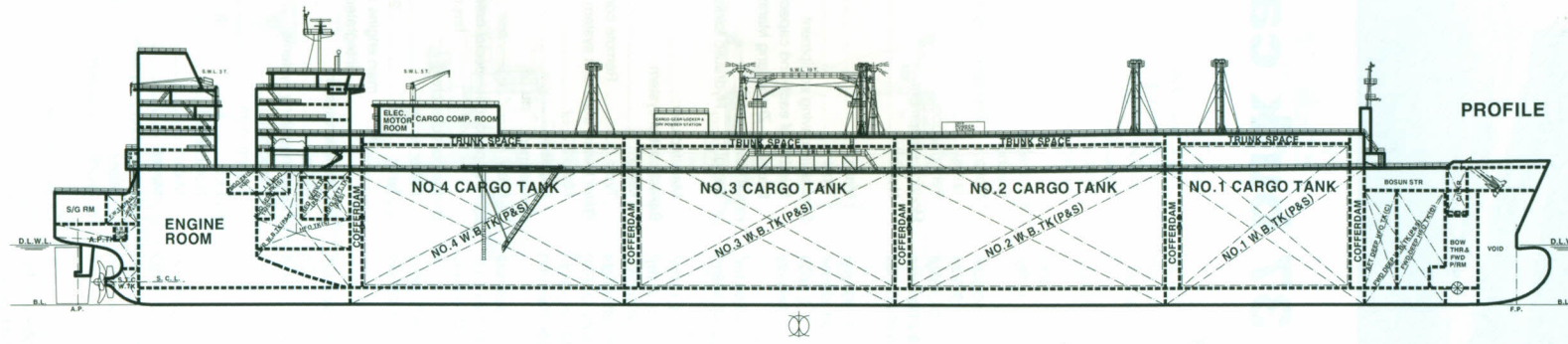
The bridge is designed for optimum operational safety and efficiency, taking advantages of current technology and

rational navigational methods. The bridge can be operated under normal conditions by one person and the system comprises a modular workstation arrangement, meeting all design and equipment layout requirements in accordance with DNV notation NAUT-OC.

TECHNICAL PARTICULARS

Length oa: 294.20m
 Length bp: 283.20m
 Breadth moulded: 44.00m
 Depth moulded
 To main deck: 26.00m
 Width of double skin
 Side: 2.51m
 Bottom: 3.20m
 Draught
 Scantling: 12.50m
 Design: 11.50m
 Gross: 103,670gt
 Deadweight
 Design: 78,000dwt
 Scantling: 89,000dwt
 Speed, service: 19.9knots
 Cargo capacity
 Liquid volume: 159,760m³
 Bunkers
 Heavy oil: 5,000m³
 Diesel oil: 520m³
 Water ballast: 56,800m³
 Daily fuel consumption
 Main engine & auxiliaries: 140.2tonnes/day
 Classification society and notations: DNV +1A1,
 Tanker for Liquefied Gas Ship type 2G 9-163°C,
 500kg/m³, 0.25bar, Nauticus (Newbuilding),
 Plus, COAT-2, E0, NAUT-OC, F-AMC, TMON,
 CLEAN, OPP-F, Gas Fuelled, BIS
 Main engine
 Design: Wärtsilä
 Model: 9L50DF
 Manufacturer: HHI-Wärtsilä
 Number: 4
 Type of fuel: HFO, MDO, Gas
 Output of each engine: 8,865kW
 Gearbox
 Make: Renk
 Model: NDSH-4060
 Number: 1
 Propeller
 Material: Ni-Al-Bronze
 Designer/manufacturer: DSME-Samwoo
 Number: 1
 Fixed/controllable pitch: Fixed
 Diameter: 8.6m
 Speed: 19.9knots
 Boilers
 Number: 2
 Type: Vertical, water drum
 Make: Alfa Laval- Aalborg
 Output, each boiler: 6,500kg/h at 7bar

Cargo cranes/cargo gear
 Number: 2
 Make: Oriental
 Type: Electro-hydraulic luffing jib
 Performance: 10tonnes
 Other cranes
 Number: 2
 Make: Oriental
 Type: Electro-hydraulic, luffing jib
 Performance: 10tonnes
 Mooring equipment
 Number: 2 x windlass
 8 x mooring winches
 Make: Fukushima
 Type: Electro-hydraulic, low pressure
 Special lifesaving equipment
 Number of each and capacity: 2 x 40 persons
 Make: Hyundai Lifeboat
 Type: Conventional totally enclosed
 Cargo tanks
 Number: 4
 Cargo containment system: GTT NO 96-GW
 Boil off rate: 0.125% per day
 Cargo pumps
 Number: 8
 Type: Centrifugal
 Make: Shinko
 Material: Aluminium
 Cargo control system
 Make: Kongsberg
 Type: IAS
 Ballast control system
 Make: Kongsberg
 Type: IAS
 Water ballast treatment system
 Make: NK
 Capacity: 6,000m³/h
 Complement
 Crew: 19
 Bow thruster
 Make: Kawasaki Heavy Industries
 Number: 1
 Output: 2,200kW
 Bridge control system
 Make: GE
 One-man operation: Yes
 Fire detection system
 Make: Consilium
 Type: Smoke detection type
 Fire extinguishing system
 Engine room: Kashiwa/ High expansion foam
 Radars
 Number: 2
 Make: JRC
 Integrated bridge system
 Make: JRC
 Model: JAN-901
 Contract date: 24 June 2008
 Launch/float-out date: 2 Sept 2012
 Delivery date: 1 July 2013





Copyright: China Navigation Company

WUCHANG: First B.Delta 37 bulk carrier

Shipbuilder: **Chengxi Shipyard**
 Vessel's name: **Wuchang**
 Hull No: **CX0341**
 Owner/operator: **China Navigation Company (CNC)**
 Country: **Singapore**
 Designer: **Deltamarin**
 Country: **Finland**
 Flag: **Singapore**
 IMO number: **9657844**
 Total number of sister ships already completed (excluding ship presented): **nil**
 Total number of sister ships still on order: **16**

TECHNICAL PARTICULARS

Length oa: 179.99m
 Length bp: 176.65m
 Breadth moulded: 30.00m
 Depth moulded
 To main deck: 15.00m
 Width of double skin
 Side: 1.40m
 Bottom: 1.70m
 Draught
 Scantling: 10.50m
 Design: 9.50m
 Gross: 24,785gt
 Displacement: 49,219tonnes
 Lightweight: 10,091tonnes
 Deadweight
 Design: 33,994dwt
 Scantling: 39,128dwt
 Block co-efficient: 0.8609
 Speed, service: 14knots
 Cargo capacity
 Bale: 43,991m³
 Grain: 48,908m³
 Bunkers
 Heavy oil: 1,197m³
 Auxiliaries: 3.1m³
 Classification society and notations: LR 100A1, Bulk Carrier, CSR, BC-A, GRAB[25], ShipRight (ACS(B,D), CM), *IWS, LI, ESP +LMC, UMS, CM, ShipRight (BWMP(S+F, T), SCM), Green Passport
 Main engines
 Design: Wärtsilä
 Model: 5RT Flex 50-B
 Manufacturer: Hudong Heavy Machinery
 Number: 1
 Type of fuel: HFO, MGO
 Output of each engine: 6,050kW
 Propeller
 Material: CU3
 Designer/manufacturer: Deltamarin/ Wärtsilä
 Number: 1
 Fixed/controllable pitch: Fixed
 Diameter: 6.00m
 Speed: 99rpm
 Diesel-driven alternators
 Number: 3
 Engine make/type: MAN 6L23/30H
 Type of fuel: HFO, MDO, MGO
 Output/speed of each set: 780kW x 720rpm
 Alternator make/type: CM-Hyundai/ HFC6
 Output/speed of each set: 700kW x 720rpm
 Boilers
 Number: 1
 Type: MC composite smoke tube boiler with ME + 2/D/G sections + oil fired sections

Make: SPP
 Output, each boiler: 1,500/660/210/210 °7bar
 Cargo cranes/cargo gear
 Number: 4
 Make: MacGregor
 Type: Electric deck cranes/ GLBE3026-2/2426grab
 Performance: Hoist 25-45rpm, luff 40/58sec, slew 1.0/0.7rpm
 Other cranes
 Number: 1
 Make: Zhengjiang Marine Auxiliary Machinery Works
 Tasks: Stores crane
 Performance: 3tonnes
 Mooring equipment
 Number: 2 x Windlass/winch
 2 x Winches
 Make: Hatlapa/ Luzhou
 Type: Electric
 Special lifesaving equipment
 Number of each and capacity: 1 x 30 persons
 Make: Zhengjiang Marine Auxiliary Machinery Works
 Hatch covers
 Design: Hydraulic folding double skin type on upper deck only
 Manufacturer: TTS/ Chengxi shipyard
 Ballast control system
 Make: Pleiger
 Type: Remote control ballasting and tank level
 Water ballast treatment system
 Make: Techcross
 Capacity: 2 x 800m³/h
 Complement
 Crew: 12
 Stern appendages/special rudders: 2 reaction fins on hull, Costa bulb on rudder
 Bridge control system
 Make: Sperry/Maroka/Kongsberg
 Type: 2 x Sperry ECDIS, Kongsberg main engine controls, Marorka/Kongsberg integrated vessel performance system
 Fire detection system
 Make: Consilium
 Fire extinguishing systems
 Cargo holds: NK/CO₂
 Engine room: NK/CO₂, water mist
 Radars
 Number: 3
 Make: Sperry
 Model: Bridge Master
 Integrated bridge system
 Make: Imtech design/Sperry system
 Waste disposal system
 Incinerator: Detagasa/ IRLA-18/50E
 Sewage plant: Tecnicomar/ ECOMAR 50-STP
 Contract date: 17 February 2012
 Delivery date: 18 October 2013

CHINA Navigation Company (CNC) took delivery of *Wuchang*, the first of the 39,000dwt B.Delta 37 bulk carriers of Deltamarin design built under Lloyd's Register's approval and survey at Chengxi Shipyard in China in October.

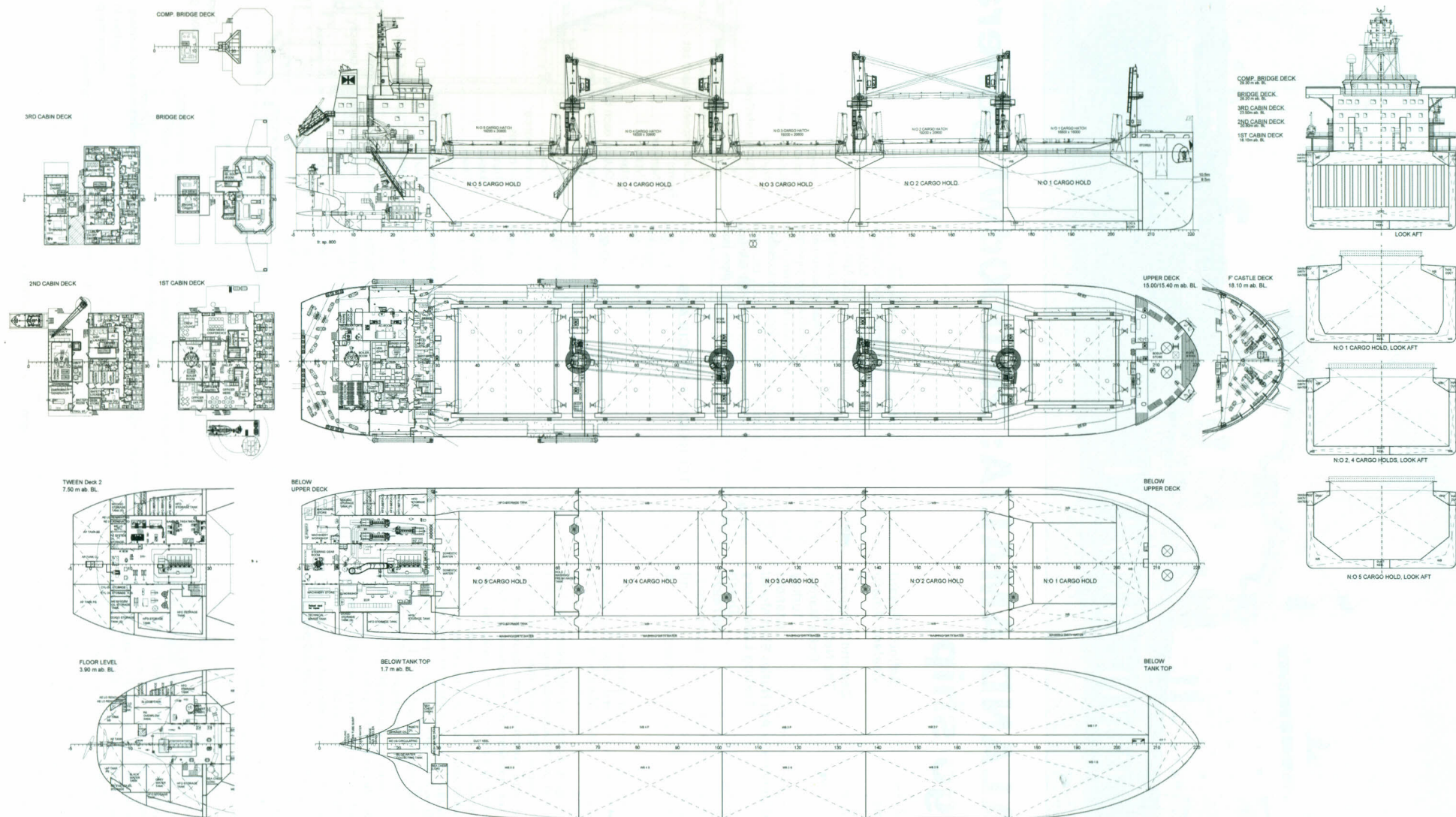
Deltamarin's B.Delta 37 has been heralded as a design that stands out due to its performance in terms of a range of parameters such as low fuel oil consumption, low emissions, EEDI, deadweight intake and lightweight particulars for vessel type of its class (handymax segment). On top of this the vessel has good manoeuvrability and performance in heavy seas, which was proved during the vessel's sea trials.

This has been achieved through an optimised and energy efficient design with a particular focus on optimal hydrodynamic performance and lowest possible lightweight without compromising either the cargo intake or the hull structural integrity. Detailed structural finite element analysis and fatigue design assessments in accordance with IACS' Common Structural Rules (CSR) have been used to verify the hull structural integrity.

The high performing design characteristics have been validated during the sea-trial conducted prior to the vessel's delivery. The estimated lightweight particulars (weight and centre of gravity) are confirmed to be within the acceptable limits of the actual lightweight details derived from the inclining experiment, and accordingly the corresponding contracted cargo capacity are also confirmed.

Wuchang has been fitted with a low-speed Wärtsilä 5RT Flex 50-B that has a power output of 6,050kW, which gives the vessel a service speed of 14knots. In addition to this two reaction fins on the hull and a Costa bulb that has been fitted on the rudder have also been applied to give the vessel better propulsion.

Although *Wuchang* was contracted prior to the EEDI requirements were enforced, EEDI rules have been applied since 1 January 2013, CNC and Deltamarin requested EEDI verification on a voluntary basis from Lloyd's Register. Accordingly the EEDI value has been calculated and verified based on model testing and during sea trials and the derived EEDI value is confirmed to be well over 20% below the applicable baseline for bulk carriers.





ZEALAND AMALIA: 26,000dwt general cargo ship

Shipbuilder: **Sefine Shipyard**
 Vessel's name: **Zealand Amalia**
 Hull No.: **10**
 Owner/operator: **Zealand Shipping**
 Country: **The Netherlands**
 Designer: **Delta Marine**
 Country: **Turkey**
 Model test establishment used: **Istanbul Technical University Ata Nutku Ship Model Testing Laboratory**
 Flag: **Dutch**
 IMO number: **9674921**
 Total number of sister ships already completed (excluding ship presented): **nil**
 Total number of sister ships still on order: **1**

ZEALAND Amalia is the first reference of the new Zgeneration 26,000dwt general cargo ship design that was designed by Delta Marine in Turkey for Zealand Shipping.

From an ecological perspective, the vessel has been designed to improve its environmental footprint. *Zealand Amalia's* EEDI value is 22% lower than present IMO baseline curve, and complies with requirements of "Cleanship" class notation and regulations for NOx emissions, double hull structure for fuel tanks and cargo holds. Additionally, the design allows space for the installation of ballast water treatment solutions in the future.

The hull structure has been analysed by finite element method (FEM) tools for safety, weight optimisation and vibration. The hull form, optimised with CFD analysis, is designed for minimum resistance, minimum fuel consumption, ensuring maximum efficiency and performance with the optimised propeller.

A bulb is fitted on the rudder to optimise the interaction between the propeller, hull and rudder.

The vessel is built with a double hull structure, single screw propulsion, unrestricted navigation and provides the ability to carry general cargoes, steel coil, coal, grain and dangerous goods.

The cargo area is divided into four box shaped cargo holds by means of transverse corrugated bulkheads. The cleaning time has been dramatically reduced thanks to the absence of structural elements in the cargo holds. Clear hatch coamings of 26.07 x 22.50m in size, provide more flexibility for the loading and unloading operations. The cargo hold tank top has been reinforced against loads of up to 20t/m², while the holds' bottom are strengthened for heavy cargoes and protected against grab operations.

The ship has double hull construction along the cargo area and this provides the advantage making room to place all the structural elements on the side parts by removing them from the holds and ensuring easy access for inspection. The double hull structure also improves the ship's capacity for ballasting, which is useful when carrying light goods, since it may be needed to increase the draught for better stability or sea keeping.

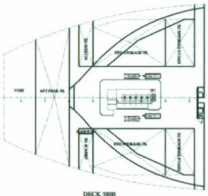
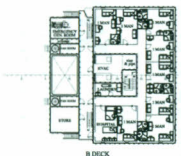
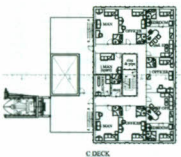
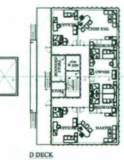
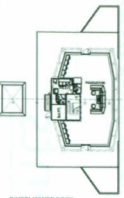
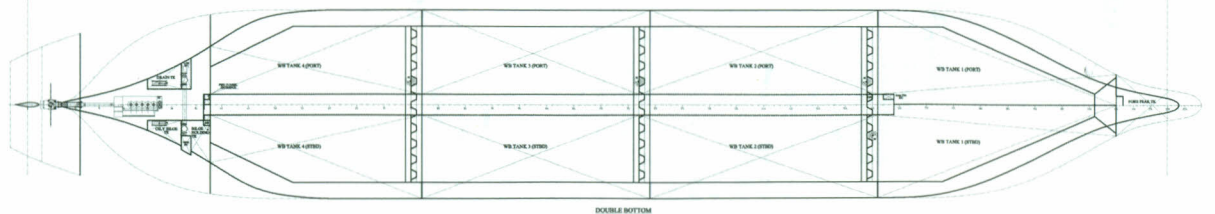
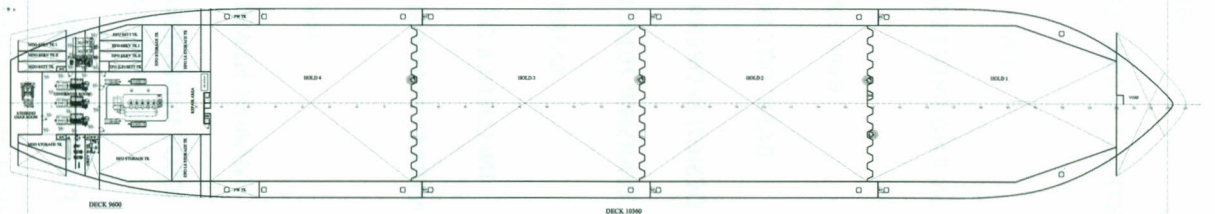
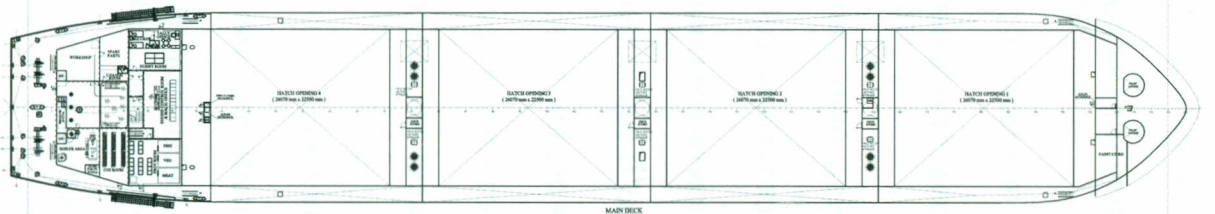
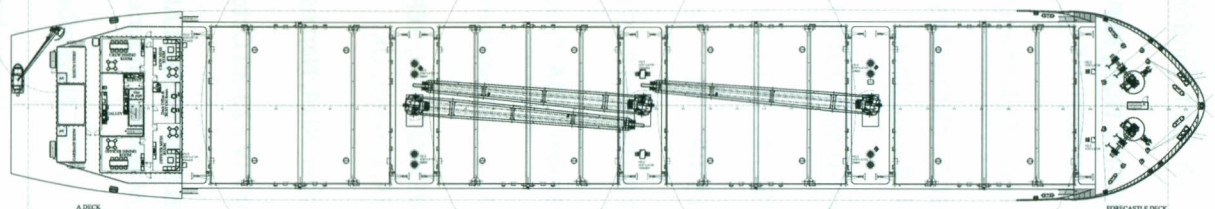
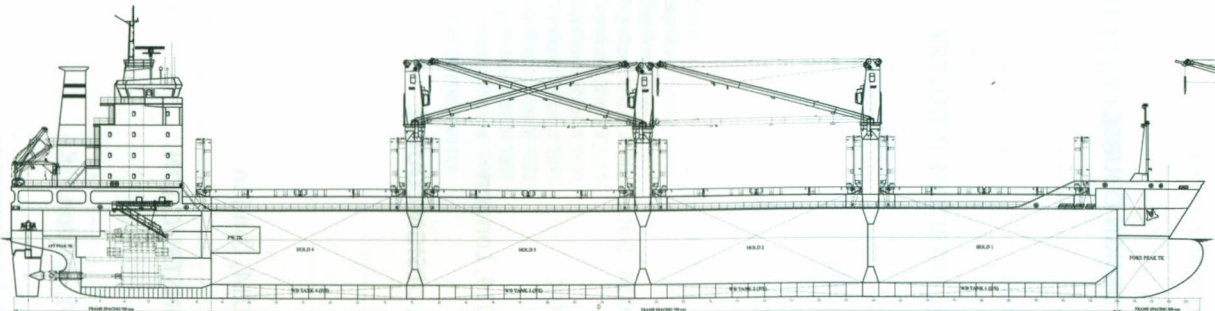
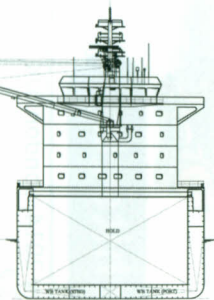
For increasing the carriage capacity of dangerous cargo, cargo holds are fitted with CO₂ fire-fighting and redundant mechanical upper/lower ventilation systems. An Additional separate bilge discharging point for cargo area and A60-rated fire insulation at the fore of the engine room bulkhead have also been fitted. Four pairs of "L" type ballast tanks surround the cargo holds. A tunnel structure for ballast/bilge pipelines/valves arranged at the centre of the double bottom in the cargo area to keep the pipes and valves inside and accessible.

All deck pipes (hydraulic, electric, fire, CO₂ etc.) and cables are installed in void spaces under main deck side (top sides) to prevent oil pollution and to protect the pipes from harsh sea conditions.

TECHNICAL PARTICULARS

Length oa: 173.75m
 Length bp: 166.00m
 Breadth moulded: 27.20m
 Depth moulded
 To main deck: 12.60m
 Width of double skin
 Side: 2.35m
 Bottom: 2.00m
 Draught
 Scantling: 8.79m
 Design: 8.50m
 Gross: 18,036gt
 Displacement: 33,005tonnes
 Lightweight: 6,954tonnes
 Deadweight
 Design: 24,850dwt
 Scantling: 26,051dwt
 Speed, service: 14knots
 Cargo capacity
 Bale: 34,348m³
 Grain: 34,348m³
 Bunkers
 Heavy oil: 1,022m³
 Diesel oil: 163m³
 Water ballast: 10,929m³
 Daily fuel consumption
 Design speed: 17.3tonnes/day
 Eco speed: 13.2tonnes/day
 Classification society and notations: RINA C, *Hull, *Mach, General Cargo, Unrestricted Navigation, Green Star Design, HC (20tonnes/m²), Occasional Dry Bulk Cargo, Dangerous Goods, Brabloading, Ice Class IC, Aut-UMS, SYS-NEQ-1, IWS, Mon-Shaft
 % high-tensile steel used in construction: 54%
 Main engine
 Design: MAN
 Model: G45 ME-B9
 Manufacturer: MAN
 Number: 1
 Type of fuel: HFO
 Output of each engine: 4,300kW x 94rpm

Propeller
 Material: Ni-Al-Bronze
 Number: 1
 Fixed/controllable pitch: Fixed
 Diameter: 6.00m
 Speed: 94rpm
 Special adaptations: Rudder bulb as retrofit
 Diesel-driven alternators
 Number: 3
 Engine make/type: MAN D 2840 LE 301
 Type of fuel: MDO
 Output/ Speed of each set: 515kW x 1,800rpm
 Alternator make/type: Leroy Somer LSA 49.1 S4
 Output/speed of each set: 485kW x 1,800rpm
 Boilers
 Number: 1
 Type: Thermal oil heater
 Make: Garioni Naval
 Output, each boiler: 600kW
 Cargo cranes/cargo gear
 Number: 3
 Make: NMF
 Type: DK Vs 35031
 Performance: 35tonnes x 31m
 Other cranes
 Number: 1
 Make: Gurdesan
 Tasks: Provisions
 Performance: 2tonnes x 9m
 Mooring equipment
 Number: 4
 Make: Gurdesan
 Type: Electro-hydraulic
 Special lifesaving equipment
 Number of each and capacity: 1 x 27 persons
 Make: Gepa fibreglass lifeboat
 Type: Freefall lifeboat
 Hatch covers
 Design: Gurdesan
 Manufacturer: Gurdesan
 Type: Hydraulic folding
 Holds
 Number: 4
 Product range: General cargoes, steel coil, coal, grain, dangerous goods
 Coated tanks: Jotun
 Complement
 Crew: 11
 Stern appendages/special rudders: A bulb is fitted on rudder to optimise the interaction between the propeller, hull and rudder
 Fire extinguishing systems
 Cargo hold: Polimar
 Contract date: 2011
 Launch/float-out date: 12 February 2013
 Delivery date: 2013



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