

SIGNIFICANT SHIPS OF 2017

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



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SIGNIFICANT SHIPS of 2017

Much of the maritime industry's design effort continues to be driven by the environment and efficiency.

The two are very closely related, albeit with different prime drivers. The pushes for better environmental performance are mainly political and social, whereas efficiency is very heavily influenced by cost but has the useful by-product of reducing energy consumption and carbon emissions.

CO₂ is not the end of the story, however, and although conveyance by sea has long been accepted as the most efficient way of moving goods in bulk, it is recognised that maritime operations must get cleaner. This requires reductions in nitrogen and sulphur oxides, as well as particulates, and has a bearing on the amounts and types of fuels used.

The standards that the shipping industry is held to are tight, and universal. Outside the world's more-stringent Sulphur Emission Control Areas, the global sulphur cap will fall to 0.5% m/m (mass/mass) from 2020.

The International Maritime Organization (IMO) has taken an active lead in emissions regulation and developing and promoting enabling technologies. This results in implementation of 'must-meet' standards, as well as facilitation of technology development and transfer.

The IMO has set a series of fuel burn baselines for different ship types which will be ratcheted down over time. For example, ships built in 2025 will have to be 30 percent more energy-efficient than those built in 2014. Existing ships must have energy-efficiency management plans which include better voyage planning, more regular cleaning regimes, and technology retrofits.

MARPOL Annex VI, which limits the main air pollutants in ships' exhaust gases, was first adopted in 1997. Energy-efficiency requirements were adopted in 2011 and make the Energy Efficiency Design Index (EEDI) mandatory for new ships. Ship Energy Efficiency Management Plans are a requirement (SEEMP) for all ships, as is collection of data on the types of fuels used by vessels of 5,000 gross tonnage and above; this will influence future standards.

The EEDI is intended to stimulate technological developments, maintains a distinction between those and operational/commercial ones, and enables comparisons of ship performance. It sets but does not dictate how to achieve targets. It is also pragmatic, recognising that minimum levels of

installed power are necessary to maintain safe navigation, and the reducing gains relating to steaming at lower speeds.

The larger the ship, operating at a given speed, the lower the fuel consumption per unit of cargo. How much so is borne out by service entry this last year of the 20,170TEU *MOL Triumph*. The world's largest container vessel, it achieves per-container reductions in fuel consumption and CO₂ emissions of 25-30 percent when compared with earlier 14,000TEU-class ships. It does not do this by size alone. Design features include low-friction paint, a high-efficiency propeller and rudder, and a stator system to reduce water resistance. The *MOL Triumph* has also been designed to be retrofittable for LNG use.

'Bigger and better' nevertheless defines many of the most notable recent launches.

Cruise ship *MSC Seaside* is the largest ship built in Italy to date. At 323m long, and with a gross tonnage of 154,000t, it carries 5,179 passengers. A design ambition was to increase the amount of open space per passenger and there is a novel 7m-wide lower deck extending all around the ship. The result is that almost every space on the inside has an adjacent space on the outside. The benefits are more than cosmetic; the design allows direct embarkation onto lifeboats, which are better protected from the weather.

The 28,000dwt, nine-deck *Celine* is currently the world's largest Ro-Ro carrier. Reflecting developments in emissions regulations, it boasts an LNG-ready notation from DNV-GL and features an in-line hybrid-electric shaft generator.

The growing embrace of LNG is perhaps best exemplified by *Christophe de Margerie*. The Russian vessel is the first in a series of 15 icebreaking LNG carriers ordered for the Yamal LNG project. Built to transport LNG year-round in the challenging conditions of the Kara Sea and Gulf of Ob, their appearance signals the market debut of a new class of vessel – the Yamalmax. Capable of independent operation in ice up to 2.1m thick, it has been designated Arc7, the highest ice class amongst existing merchant vessels, and is the first such vessel to utilise three Azipod thrusters.

Demonstrating the benefits of technology in securing efficiency improvements is the Handysize worldwide bulk carrier *Great Intelligence*, which is the first commercial vessel with Lloyd's Register's latest notations for cyber-enabled autonomous ship

and CCS notations for intelligent ship. The design focuses on environmental and energy performance, safety, operational flexibility and ease of maintenance. An integrated information platform utilises performance monitoring to realise smart sense, analysis and decision support for operations and maintenance as well as energy management.

In their widespread efforts to meet regulatory requirements and furnish customers with a competitive advantage, designers are employing many of the same tools – such as CFD modelling and in-tank testing – and coming up with analogous, albeit trade-named solutions. These include highly optimised hull forms, alternatives to the traditional bulbous bow, more efficient propeller and rudder designs (along with bulbs and caps), sophisticated stator solutions, and streamlining of ships' upper surfaces to reduce wind resistance. Notable is architects' keenness to highlight that their latest designs meet or exceed the relevant EEDI figures.

The changes are subtle but appreciable. Single-figure percentage improvements in performance can make a major difference to the efficiency of a single vessel but when extrapolated across the global fleet the results become rather more dramatic. The result is an overall reduction in commercial maritime's ecological footprint – proof positive that the efforts of the IMO and its partners are succeeding.

Jason Barnes

Associate Editor, February 2018

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 2017 can be found in the following editions of *The Royal Institution of Naval Architects' publication, The Naval Architect*:

Great Intelligence - February 2018
MSC Seaside - February 2018



AMJAD: Very large crude carrier

Shipbuilder: **Hyundai Samho Heavy Industries Co. Ltd**
 Vessel's name: **Amjad**
 Hull No: **S842**
 Owner/Operator: **The National Shipping Company of Saudi Arabia Bahri Ship Management. Amjad - which means 'Glory' in Arabic - is 333 metres long and 60 metres wide. It is capable of carrying 300,000 tons of oil. Each of the vessels in the class is worth an estimated US\$85-95 million and they are being delivered to the Saudi company under a contract signed in 2015. Delivery of all vessels is due by the end of 2018.**
 Country: **Republic of Korea**
 Model test establishment used: **SSPA**
 Flag: **Saudi Arabia**
 IMO number: **9779800**
 Total number of sister ships already completed (excluding ship presented): **4**

AMJAD is the first in class of a total of 10 Very Large Crude Carriers (VLCCs) which are being built by Hyundai Samho Heavy Industries (HHI) and are to be owned by Saudi Arabia's state-run shipping company, Bahri Ship Management. Amjad - which means 'Glory' in Arabic - is 333 metres long and 60 metres wide. It is capable of carrying 300,000 tons of oil. Each of the vessels in the class is worth an estimated US\$85-95 million and they are being delivered to the Saudi company under a contract signed in 2015. Delivery of all vessels is due by the end of 2018.

These VLCCs will boast a number of devices designed to save energy and improve performance. These include a HHI pre-swirl duct and a Hyundai end-plated cap fin (Hi-Fin), which saves fuel by breaking up the hub vortex generated behind the rotating propeller, resulting in improved hydrodynamic performance. A full-spade rudder with Hyundai X-twisted leading edge also features, and all will be fitted with a Hyundai Ballast Water Treatment System which is stated to offer economy of operation.

TECHNICAL PARTICULARS

Length oa: 332.97m
 Length bp: 322m
 Breadth moulded: 60.00m
 Depth moulded
 To upper deck: 29.4m
 Width of double skin
 Side: 3.0m
 Bottom: 2.9m
 Draught
 Scantling: 21.6m
 Design: 20.5m
 Gross: 154,252t
 Displacement: 132,524t
 Lightweight: 43,756t

Deadweight
 Design: 279,405dwt
 Scantling: 298,886dwt
 Block co-efficient (please state relevant draught): 0.7208
 Speed, service: .. 14.72knots at design draught
 Liquid volume: 342,059.6
 Bunkers (m³)
 Heavy oil: 7401.8
 Diesel oil: 1,033.9
 Water ballast (m³): 91,421.7
 Daily fuel consumption (tonnes/day)
 Main engine only: 169.17 g/kW-hr (MCR)

Classification society and notations: LR +100A1 Double Hull Oil Tanker, CSR, ESP, ShipRight (CM, FDA plus (40, WW), ACS (B,C)), *IWS, LI, DSPM4, ECO (BWT, IHM, P, SEEMP) +LMC, IGS, UMS, NAV1, Descriptive Note: ShipRight (BWMP (S, T), SCM, SERS, VECS)

% high-tensile steel used in construction: .. 49.7

Main engine
 Design: Hyundai-Wärtsilä
 Model: W7X82
 Manufacturer: Hyundai Heavy Industries Co., Ltd, Engine & Machinery Division
 Number: 1
 Type of fuel: HFO
 Output: 24,000kW
 Propeller
 Material: Ni-Al-Bronze
 Designer/Manufacturer: Hyundai Heavy Industries Co., Ltd, Engine & Machinery Division
 Number: 1
 Fixed/Controllable pitch: Fixed
 Diameter: 10,300mm
 Diesel-driven alternators
 Number: 3
 Engine make/type: Hyundai Heavy Industries Co., Ltd, Engine & Machinery Division/Himsen 7H21/32
 Type of fuel: HFO
 Output/speed of each set: 1,490kW / 900rpm
 Alternator make/type: Hyundai Electric & Energy Systems Co., Ltd / HFC7 632-08P
 Output/speed of each set: 1,400kW / 900rpm
 Boilers
 Number: 3
 Type: MAC-50B x 2 / Aalborg OS-TCi x 1

Make: Mitsubishi Heavy Industries Co., Ltd / Alfa Laval
 Output, each boiler: 50,000kg/h x 2 / 2,400kg/h x 1
 Cargo cranes/cargo gear
 Number: 2
 Make: Oriental Precision & Engineering Co., Ltd.
 Type: Electro-Hydraulic type
 Performance: SWL 20t
 Other cranes
 Number: 2
 Make: Oriental Precision & Engineering Co., Ltd.
 Type: Electro-hydraulic type
 Tasks: Provisions crane
 Performance: SWL 9.5t, 3t
 Other cranes
 Number: 1
 Make: Dongnam Marine Crane Co., Ltd.
 Type: Magnetic disc brake
 Tasks: Engine room crane
 Performance: SWL 9.5t
 Mooring equipment
 Number: 9
 Make: Macgregor
 Type (electric/hydraulic/steam): Hydraulic
 Special lifesaving equipment
 Number of each and capacity: 2 / 36 persons
 Make: Hyundai Lifeboats Co., Ltd
 Type: Totally enclosed lifeboat

Cargo tanks
 Number: 17
 Grades of cargo carried: Crude oil
 Coated tanks - make and type of coating: Jotun / Jotacote Universal N10

Cargo pumps
 Number: 3
 Type: KV450-4
 Make: Shinko Industries Ltd.
 Capacity (each): 5,000m³/h

Cargo control system
 Make: VAF Instruments
 Type: OILCON MARK 6M

Ballast control system
 Make: Nakakita Seisakusho Co., Ltd
 Type: Hydraulic and remote control

Water ballast treatment system
 Make: Hyundai Heavy Industries Co., Ltd, Engine & Machinery Division
 Capacity: 6,000m³/h

Complement
 Officers: 17
 Crew: 19

Bridge control system
 Make: Hyundai Electric & Energy Systems Co., Ltd.

Type: Console
 Is bridge fitted for one-man operation? ...Yes

Fire detection system
 Make: Consilium Marine AB
 Type: Unit of control panel

Fire extinguishing systems
 Cargo holds: Fixed Foam
 Make/Type: NK Co., Ltd. / foam

Engine room: CO₂
 Make/Type: .. NK Co., Ltd. / high-pressure
 Cabins: Water spray system

Radars
 Number: 2
 Make: JRC
 Model: JMR-9225-6X/S

Waste disposal plant
 Incinerator
 Make: Hyundai Marine Machinery Co., Ltd
 Model: MAXI 1500SL WS

Sewage plant
 Make: Il Seung Co., Ltd.
 Model: ISB-06

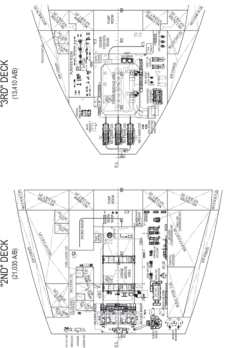
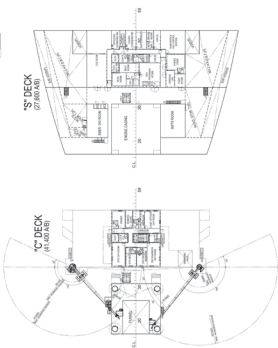
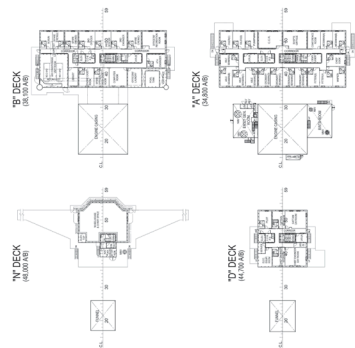
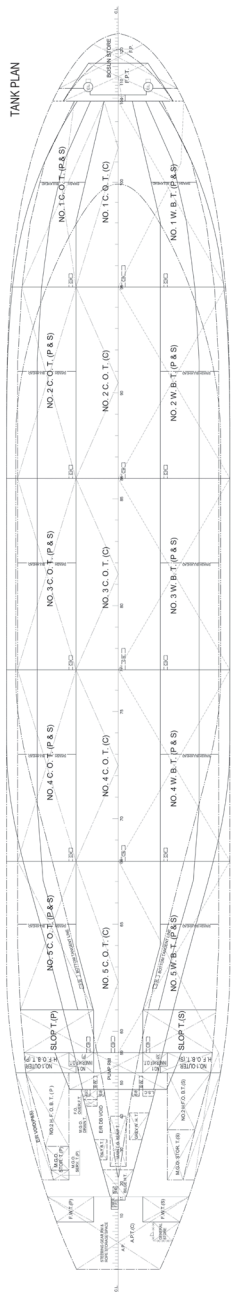
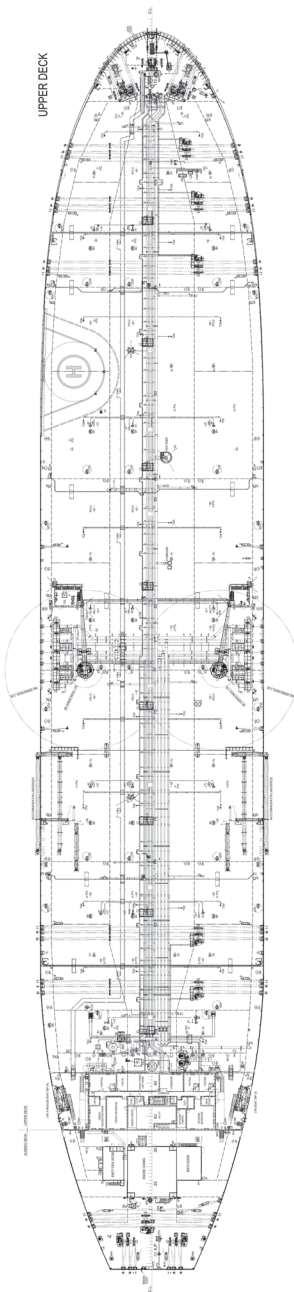
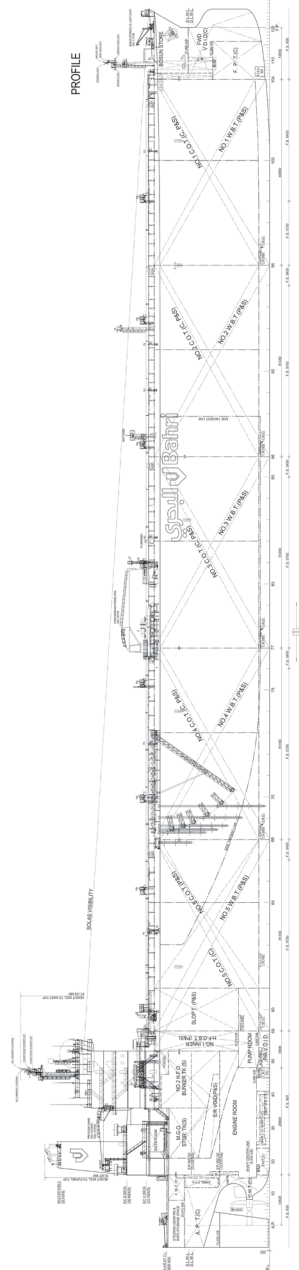
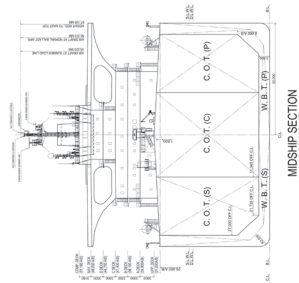
Contract date: 21 May 2015
 Launch/float-out date: 16 December 2016
 Delivery date: 7 February 2017



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AN JI 23: Pure car and truck carrier

Shipbuilder: **Sinotrans & CSC Jinling Shipyard**
 Vessel's name: **An Ji 23**
 Hull No: **JLZ9150404**
 Owner/Operator: **An Ji Shipping Co/ Shanghai Ansheng Automotive Shipping**
 Country: **PRC**
 Designer: **Shanghai Merchant Ship Design & Research Institute, CSSC (SDARI)**
 Country: **PRC**
 Model test establishment used: **China Ship Scientific Research Center (CSSRC) and HSVA (Germany)**
 Flag: **PRC**
 IMO number: **9776858**
 Total number of sister ships already completed (excluding ship presented): **0**

AN JI 23 is a new mid-sized worldwide-trade Pure Car and Truck Carrier (PCTC). Developed and designed by SDARI, it is the first mid-sized PCTC (between 3,000 and 6,700) delivered by Jinling shipyard. It is also the first car carrier to be assigned Green Ship II, EEDI (●+) and EOM classification notations by CCS. The vessel is suitable for carrying various wheeled and tracked vehicles including cars, trucks, buses and construction, agricultural and mining machinery. There are 10 car decks – eight fixed and two hoistable. These are connected by movable and fixed ramps. The maximum clear height of the main deck cargo space is 5.3m when the hoistable decks are lifted. The maximum design load is 80t for the main deck. All the hoistable car deck panels are electrically powered. This series of vessels was designed to save energy and reduce emissions and to be safe, economic and smart. To improve propulsion efficiency, a high-efficiency fixed-pitch propeller and a hub vortex absorbed fin are installed. Sailing at a service speed of 16kt, the daily fuel oil consumption of the main engine is decreased to 21.1t/day. The attained EEDI is 30.5% lower than the baseline, according to CCS's rules.

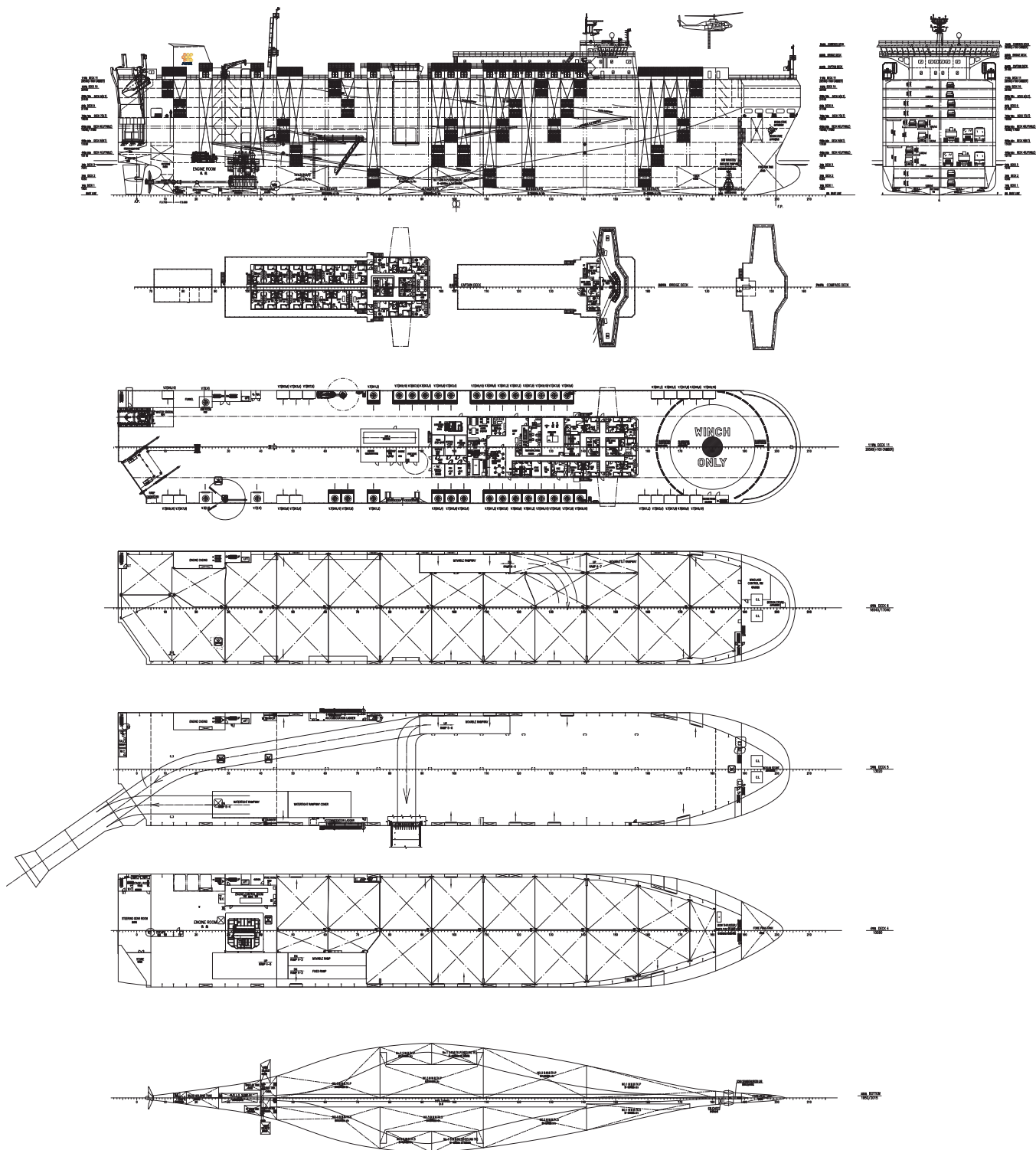
TECHNICAL PARTICULARS

Length oa: 169.1m
 Length bp: 158.4m
 Breadth moulded: 28.0m
 Depth moulded
 To main deck: 13.02m (Freeboard deck/No.5 deck)
 To upper deck: 28.59m
 Width of double skin
 Side: 2.75m
 Bottom: 1.95m
 Draught
 Scantling: 8.50m
 Design: 7.60m
 Gross: 35,477t
 Displacement: 23,323t
 Lightweight: 11,653t

Deadweight
 Design: 8,235dwt
 Scantling: 11,670dwt
 Block co-efficient: 0.5739 (design draught); 0.6019 (scantling draught)
 Speed, service (70% SMCR output, with 15% SM): 16.0kt
 Cargo capacity
 Car deck area: 31,370m²
 Bunkers (m³)
 Heavy oil: 1,245m³
 Diesel oil: 218m³
 Water ballast (m³): 3,625m³
 Daily fuel consumption (tonnes/day)
 Main engine only: 20.17t/day
 Auxiliaries: 3.82t/day

Classification society and notations: CCS
 ★ CSA Car Carrier; Ice Class B; PSPC(B); In-Water Survey; FTP; BWMP; Green Ship II
 ★ CSM, AUT-0, BWMS, EEDI(II+); EOM
 % high-tensile steel used in construction: .. 33.4
 Main engine(s)
 Design: MAN B&W
 Model: 6S50ME-C8.5 Tier II
 Manufacturer: Hudong Heavy Machinery
 Number: 1
 Type of fuel: HFO, MDO, MGO
 Output of engine: 7,550kW x 120rpm
 Propeller(s)
 Material: Ni-Al-Bronze
 Designer/Manufacturer: .. SDARI/Changzhou Zhonghai Marine Propeller Co
 Number: 1
 Fixed/Controllable pitch: Fixed
 Diameter: 5.6m
 Speed: 120r/min
 Special adaptations: Fan Cap
 Diesel-driven alternators
 Number: 3
 Engine make/type: CSSC Marine Power Co./6L23/30H
 Type of fuel: HFO, MDO, MGO
 Output/speed of each set: . 888kW x 750rpm
 Alternator make/type: . CMXD/HFC6 564-84K
 Output/speed of each set: 830kW x 750rpm
 Boilers
 Number: 2
 Type: 1 x auxiliary boiler, 1 x exhaust gas boiler
 Make: Greens Shazhou, China
 Output, each boiler: 1,500kg/h (auxiliary boiler), 520kg/h (exhaust gas boiler)
 Cargo cranes/cargo gear: Nil
 Other cranes
 Number: 1
 Make: Jiangsu Masada Heavy Industries
 Type: Hydraulic

Tasks: Provision crane
 Performance: 4t x 5m
 Mooring equipment
 Number: Fore: 2 x windlass-mooring winches + 1 mooring winch, Aft: 3 mooring winches
 Make: Jiangsu Masada Heavy Industries
 Type: Hydraulic
 Special lifesaving equipment (eg MES, free-fall lifeboats)
 Number of each and capacity: 28-person
 Make: Jiangyin Beihai, China
 Type: free-fall type
 Vehicles
 Number of vehicle decks (fixed/moveable): . 10 (8/2)
 Total cars: 3,800 (RT43)
 Doors/ramps/lifts/moveable car decks
 Number of each:
 Quarter stern ramp/door (1, starboard)
 Mid-side ramp/door (1, starboard)
 Liftable car decks (no.4 deck and no.6 deck)
 Movable ramps (3, one each on no.4, no.6 deck and no.7 deck)
 Watertight/gas-tight cover (1, on no.5 deck)
 Gas-tight door (1, on no.8 deck)
 Type:
 Quarter stern ramp/door (hydraulic)
 Mid side ramp/door (hydraulic)
 Liftable car deck (electric)
 Movable ramp (hydraulic)
 Water-tight/gas-tight cover (hydraulic)
 Gas-tight door (hydraulic)
 Designer: TTS HuaHai
 Ballast control system
 Make: BloomFoss
 Type: Hydraulic oil-driven
 Water ballast treatment system
 Make: Cyeco BWTS
 Capacity: 300m³/h
 Complement
 Officers: 9
 Crew: 14
 Supernumeraries/Spare: 5 Suez/6 Repair
 Single/double/other rooms: 28 single rooms + 1 room for Suez
 Stern appendages/special rudders: 1 semi-balanced rudder
 Bow thruster
 Make: Wuhan Kawasaki Marine
 Number: 1
 Output: 1,000kW
 Bridge control system
 Make: Kongsberg
 Type: AutoChief 600
 Fire detection system
 Make: Consilium
 Type: Salwico Cargo
 Fire extinguishing systems
 Engine room:
 Make/Type: Sea hydrant, CO₂ spray water system, portable extinguishers
 Vehicle spaces:
 Make/Type: DANFOSS/lower-pressure CO₂; sea hydrant; portable extinguishers
 Cabins:
 Make/Type: Sea hydrant, portable
 Public spaces:
 Make/Type: Sea hydrant, portable
 Radars
 Number: 2
 Make: JRC
 Model(s): JMR-9230-SN/JMR-9225-9XN
 Integrated bridge system: No
 Waste disposal plant
 Incinerator
 Make: HANSUN
 Model: HSINC-50
 Waste shredder/crusher
 Make: DAM MARINE
 Model: LC-50
 Sewage plant
 Make: HANSUN
 Model: ST-20U
 Contract date: 9 April 2015
 Launch/float-out date: 16 December 2016
 Delivery date: 25 April 2017



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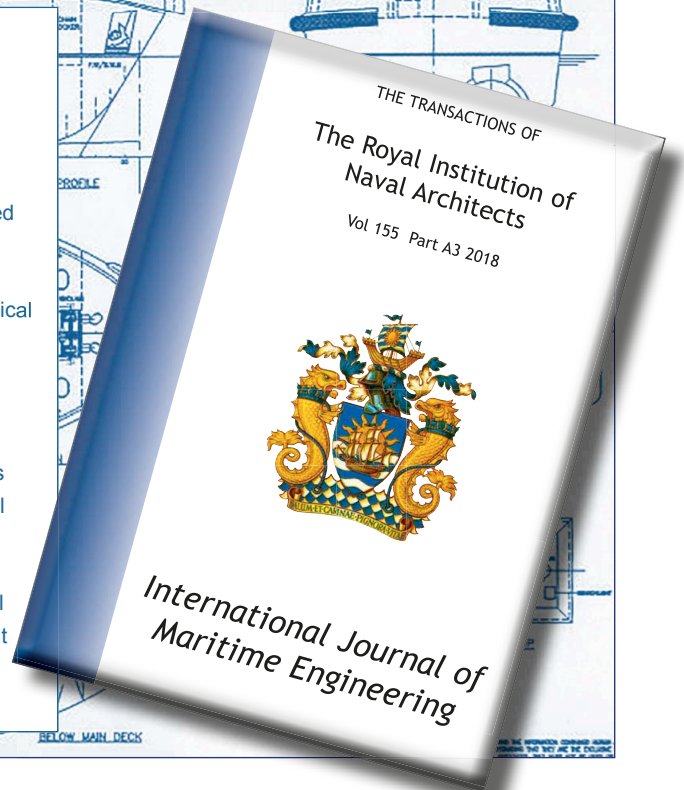
International Journal of Maritime Engineering 2018

RINA published the first part of the International Journal of Maritime Engineering (IJME) in March 2018, subsequent parts will be published in June, September and December.

The IJME provides a forum for the reporting and discussion on technical and scientific issues associated with the design and construction of marine vessels and offshore structures.

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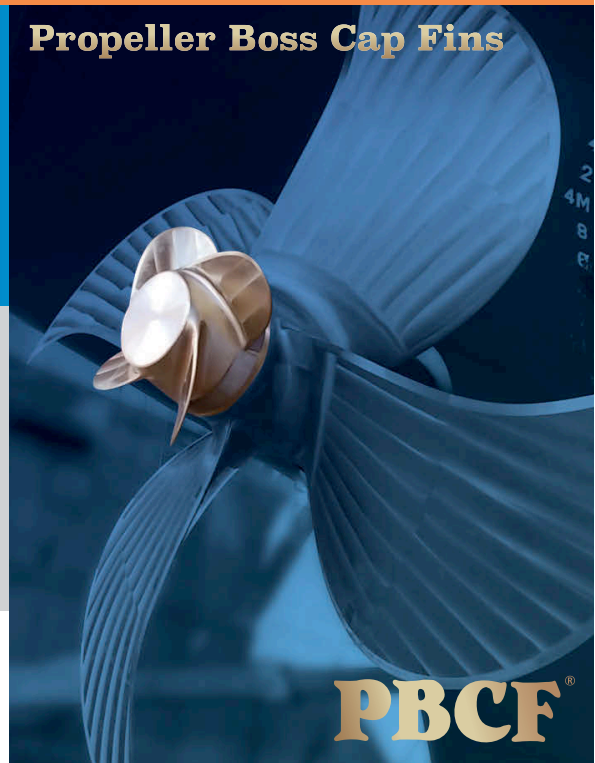
- ▶ Installed on more than 3,200 vessels all over the world.
- ▶ Selected as a technology to reduce underwater noise by the port of Vancouver, Canada.
- ▶ Received 2017 Nikkei Global Environmental Technology Award.

MOL MOL Techno-Trade, Ltd.

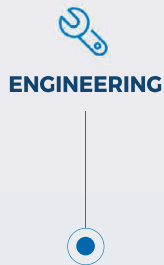
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ANDERIDA: LPG carrier

Builder **Hyundai Samho Heavy Industries Co. Ltd**
 Vessel's name **Anderida**
 Hull No: **S881**
 Owner/operator **TMS Cardiff Gas Ltd**
 Country **Greece**
 Designer **Hyundai Samho Heavy Industries Co. Ltd**
 Country: **Republic of Korea**
 Model test establishment used: **Hyundai Advanced Research Institute**
 Flag: **Malta**
 IMO number: **9793234**
 Total number of sister ships already completed (excluding ship presented): **2**

Deadweight
 Design: 47,981dwt
 Scantling: 50,591dwt
 Block co-efficient: 0.7284
 Speed, service: 16.63kt at design draught

Cargo capacity (m³)
 Refrigerated cargo: 78,100
 Bunkers (m³)
 Heavy oil: 2268.7
 Diesel oil: 367.2
 Water ballast (m³): 18,629.2

Daily fuel consumption (tonnes/day)
 Main engine only: 169.63g/kW-hr (MCR)

Classification society and notations: DNVGL +1A1 Tanker for liquefied gas BIS BWM(T) COAT-PSPC(B) EO NAUTICUS (Newbuilding) Recyclable TMON
 % high-tensile steel used in construction: 74.61

Main engine
 Design: Hyundai-B&W
 Model: 6G60ME-C9.5
 Manufacturer: Hyundai Heavy Industries Co., Ltd, Engine & Machinery Division
 Number: 1
 Type of fuel: HFO
 Output: 12,020kW
 Propeller(s)
 Material: Ni-Al-Bronze
 Designer/Manufacturer: Hyundai Heavy Industries Co., Ltd, Engine & Machinery Division
 Number: 1
 Fixed/Controllable pitch: Fixed
 Diameter: 7,000mm
 Diesel-driven alternators
 Number: 3
 Engine make/type: Yanmar Co., Ltd / 6EY22ALW
 Type of fuel: HFO
 Output/speed of each set: 1,300 kW / 900 rpm
 Alternator make/type: Hyundai Electric & Energy Systems Co., Ltd / HFC7 568-08P
 Output/speed of each set: .. 1,140kW/900rpm

TECHNICAL PARTICULARS

Length oa: 230.1m
 Length bp: 225m
 Breadth moulded: 32.25m
 Depth moulded
 To upper deck: 23.2m
 Width of double skin
 Side: 1.68m
 Bottom: 1.85m
 Draught
 Scantling: 12m
 Design: 11.6m
 Gross: 46,250t
 Displacement: 35,426t
 Lightweight: 19,066t

Boiler
 Number: 1
 Type: PA0101P32
 Make: Kangrim Heavy Industries Co., Ltd.
 Output: 3,000kg/h

Cargo cranes/cargo gear
 Number: 2
 Make: Dongnam Marine Crane Co., Ltd.
 Type: Electro-hydraulic
 Performance: SWL 10t

Other cranes
 Number: 2
 Make: Dongnam Marine Crane Co., Ltd.
 Type: Electro-hydraulic
 Tasks: Provisions crane
 Performance: SWL 4t, 2t

Other cranes
 Number: 1 off
 Make: Oriental Precision & Engineering
 Type: Normal head type
 Tasks: Engine room crane
 Performance: SWL 4t

Mooring equipment
 Number: 8
 Make: MacGregor
 Type: Hydraulic

Special lifesaving equipment
 Number and capacity: 1 / 28 persons
 Make: Norsafe
 Type: Free-fall lifeboat

Cargo tanks
 Number: 8
 Grades of cargo carried: Liquefied gas
 Product range: butane (all isomers), commercial propane, propane, propylene

Cargo pumps
 Number: 8
 Type: DW 250/200-3-K+I
 Make: Wärtsilä Svanehøj A/S
 Capacity (each): 600m³/h

Cargo control system
 Make: Kongsberg Maritime AS
 Type: K-Chief 600 CCS

Ballast control system
 Make: Scana Korea Hydraulic Ltd
 Type: Hydraulic and remote control

Water ballast treatment system
 Make: Hyundai Heavy Industries Co., Ltd, Engine & Machinery Division
 Capacity: 800m³/h

Complement
 Officers: 13
 Crew: 13

Bridge control system
 Make: Hyundai Electric & Energy Systems Co., Ltd
 Type: Console
 Is bridge fitted for one-man operation? ... Yes

Fire detection system
 Make: Consilium Marine AB
 Type: Unit of control panel

Fire extinguishing systems
 Cargo holds: Dry powder
 Make/Type: NK Co., Ltd / chemical
 Engine room: CO₂
 Make/Type: NK Co., Ltd / high-pressure

Radar
 Number: 2
 Make: Furuno Electric Co., Ltd
 Model: FAR-2837S/27

Waste disposal plant
 Incinerator
 Make: Hyundai Marine Machinery Co., Ltd
 Model: MAXI NG150SL WS

Sewage plant
 Make: Il Seung Co., Ltd
 Model: ISB-03

Contract date: 10 September 2015
 Launch/float-out date: 1 April 2017
 Delivery date: 28 June 2017



CADMATIC

SOFTWARE SOLUTIONS

Marine Design Software



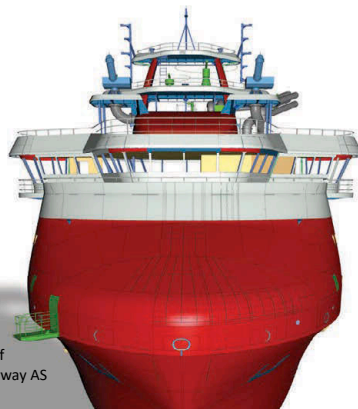
Increase Quality of Design & Production

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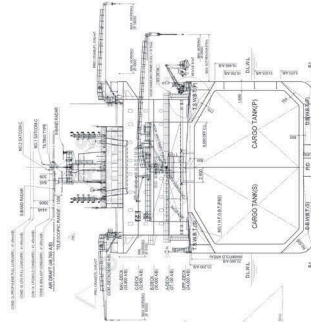
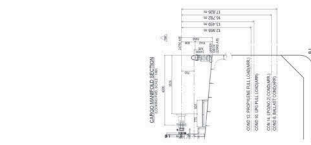
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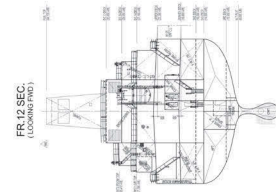


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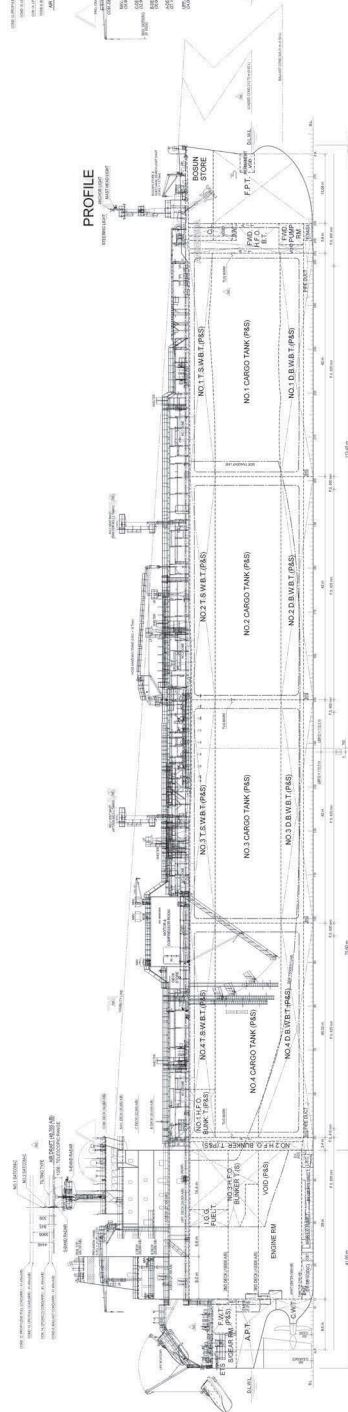
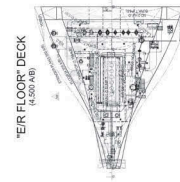
Project courtesy of
Wärtsilä Ship Design Norway AS



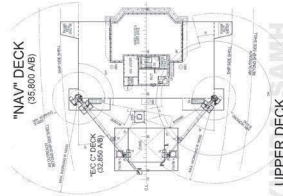
MIDSHIP SECTION



"BOSUN STORE" DECK (LOOKING FWD)



PROFILE



"NAV" DECK (32,800 AB)

"C" DECK (32,800 AB)



"B" DECK (30,000 AB)



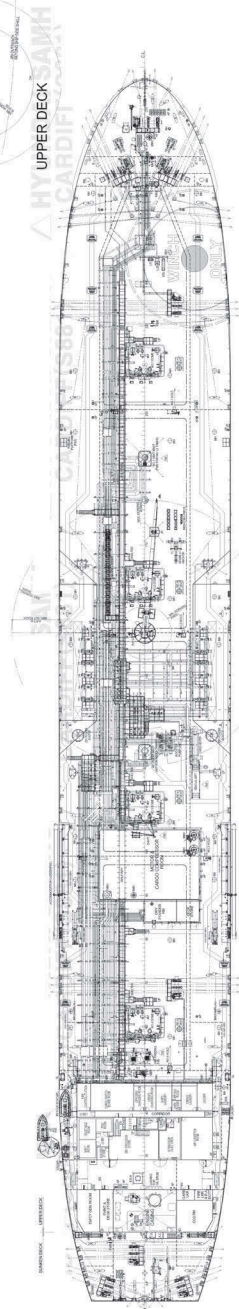
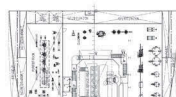
"A" DECK (27,100 AB)



"EIR 2ND" DECK (18,000 AB)

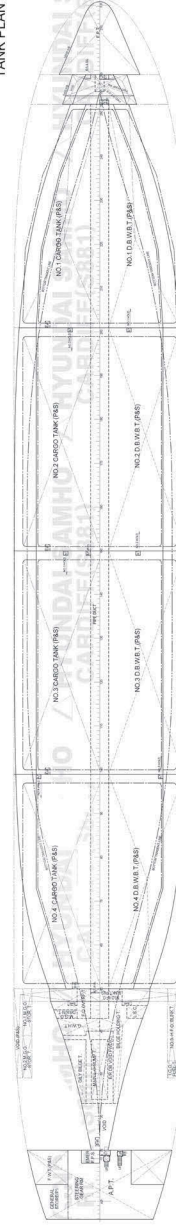


"EIR 3RD" DECK (10,300 AB)



UPPER DECK

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AQUAPAMPERO: Ecuador-max cargo oil tanker

Shipbuilder: **Samsung Heavy Industries Co., Ltd**
 Vessel's name: **Aquapampero**
 Hull No: **SN2178**
 Owner/Operator: **Unisea Shipping Ltd**
 Country: **Greece**
 Designer: **Samsung Heavy Industries Co., Ltd**
 Country: **Republic of Korea**
 Model test establishment used: **SSMB (Samsung Ship Model Basin)**
 Flag: **Liberia**
 IMO number: **9778674**
 Total number of sister ships already completed (excluding ship presented): **4**

AQUAPAMPERO is a 113,000dwt Ecuador-max cargo oil tanker. The first of a series of four, it was built for UNISEA Shipping Ltd by Samsung Heavy Industries Co., Ltd and is suitable for worldwide operation.

A series of targets were set for effective, efficient and environmentally sustainable vessel operation. Fuel consumption will be drastically improved by comparison with previous Ecuador-max tankers. The vessel therefore uses a MAN D&T G-type engine and its EEDI index distinguishes it from other tanker designs. Environmental features include the use of low-sulphur fuel oil (MDO DMA), a ballast water treatment system, and EPA (Environmental Protection Agency), VGP (Vessel General Permit) and EAL (Environmentally Acceptable Lubricants) stern-tube compliance.

In operation, Panama Canal requirements will be fulfilled without restrictions and cargo-loading capacity will be greater than previous generations of Aframax tankers.

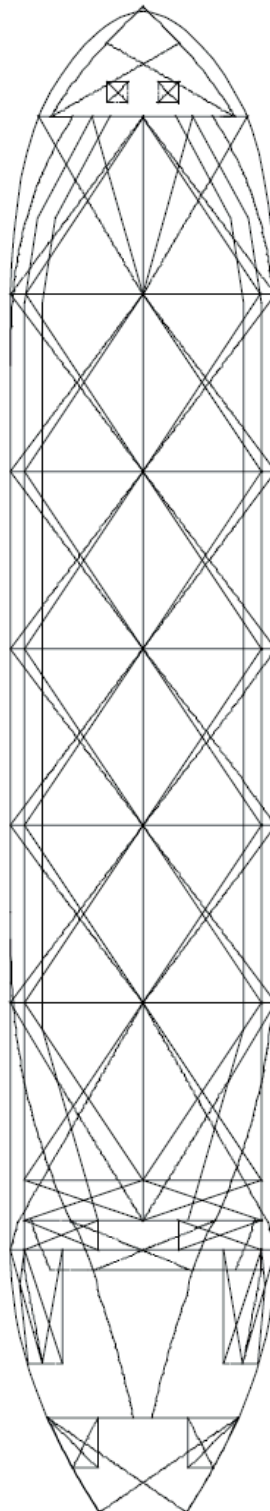
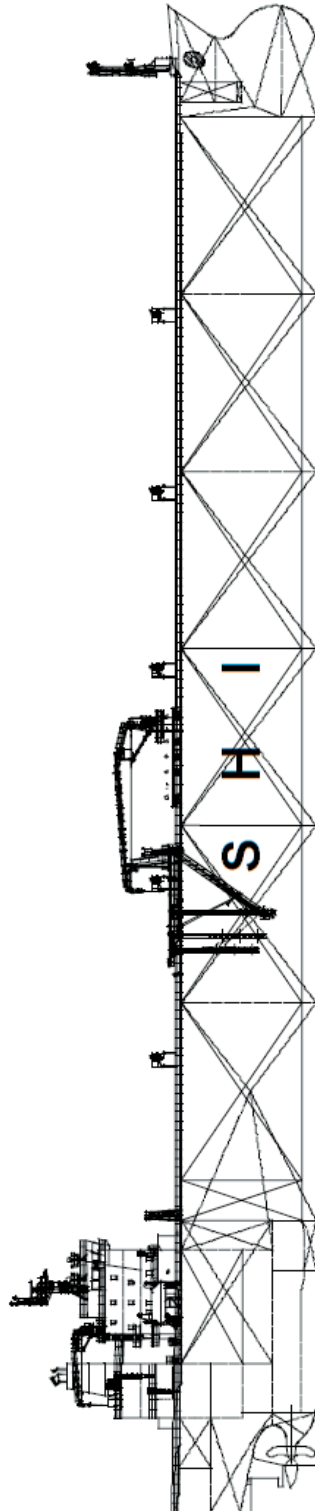
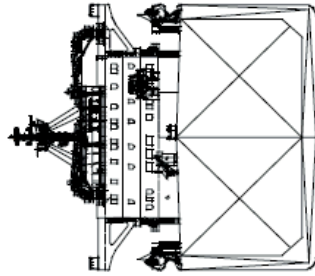
Robustness and reliability were further aims. The hull structural design has a 30-year fatigue life and there are PSPC coatings for the cargo and ballast tanks.

TECHNICAL PARTICULARS

Length oa: 244m
 Length bp: 234.0m
 Breadth moulded: 43.0m
 Depth moulded
 To main deck: 21.8m
 To upper deck: 21.8m
 Width of double skin
 Side: 2.35m
 Bottom: 2.4m

Draught
 Scantling: 15.2m
 Design: 15.2m
 Gross: 61,888gt
 Deadweight
 Design: 113,000dwt
 Scantling: 113,000dwt
 Speed, service (85 %MCR output): 14.5knots
 Cargo capacity (m³)
 Liquid volume: 126,000
 Bunkers (m³)
 Heavy oil: 2,700
 Diesel oil: 500
 Water ballast (m³): 38,000
 Daily fuel consumption (tonnes/day)
 Main engine only: 41.1
 Classification society and notations: ABS
 *A1(E), "Oil Tanker", CSR, AB-CM, *AMS, *ACCU, ESP, VEC, TCM, SPMA, POT, PMA, CPS, ENVIRO, UWILD (no sea chest blanking device), BWT, BWE, GP, RRDA, CRC, RW, SEC*, CPP
 Main engine
 Design: MAN B&W
 Model: 6G60ME-C9.5
 Manufacturer: Doosan Engine
 Number: 1
 Type of fuel: HFO and MGO
 Output of each engine: 12,420kW
 Propeller
 Material: Ni-Al-Bronze
 Designer/Manufacturer: Silla Metal
 Number: 1
 Fixed/Controllable pitch: Fixed
 Diameter: 8,000mm
 Speed: 79.9rpm
 Diesel-driven alternators
 Number: 3
 Engine make/type: Yanmar
 Type of fuel: HFO and MGO
 Output/speed of each set: 1,020kW at 900rpm
 Boilers
 Number: 3
 Type: Oil-fired

Make: Kangrim Heavy Industries
 Output, each boiler: 25,000kg/h x 2sets + 1,000/700kg/h x 1set
 Cargo cranes/cargo gear
 Number: 2
 Make: DMC
 Type: Jib-type, electro-hydraulic driven
 Performance: SWL 15t
 Other cranes
 Number: 2
 Make: DMC
 Type: Jib-type, electro-hydraulic driven
 Tasks: Provision-handling cranes
 Performance: SWL 4t
 Mooring equipment
 Number: 8 sets
 Make: Flutek
 Type: Electro-hydraulic driven (high-pressure)
 Special lifesaving equipment
 Number of each and capacity: . 2, 30 people
 Make: HLB
 Type: Gravity-type
 Cargo tanks
 Number: 12 cargo tanks and two 2 slop tanks
 Product range: Crude oil
 Cargo pumps
 Number: 3
 Type: Vertical, single-stage, centrifugal, steam turbine-driven
 Make: Shinko
 Stainless steel: Impeller shaft, etc.
 Capacity (each): 3,200 m³/h x 130 mic
 Cargo control system
 Make: SCANA
 Type: Electro-hydraulic system
 Ballast control system
 Make: SCANA
 Type: Electro-hydraulic system
 Water ballast Treatment System
 Make: Samsung Heavy Industries
 Capacity: 4,000m³/h
 Complement
 Officers: 15
 Crew: 13
 Suez/Repair Crew: 6
 Single/double/other rooms: 4 day/bedrooms, 24 single rooms, 1 Suez crew room
 Bridge control system
 Make: NABTESCO
 Type: M-800 V
 Is bridge fitted for one-man operation?No
 Fire detection system
 Make: TYCO SEAPLUS
 Type: Addressable type
 Fire extinguishing systems
 Engine room:
 Make/Type: KASHIWA/High expansion foam system
 Cabins:
 Make/Type: ... Sea water fire extinguishing system
 Public spaces:
 Make/Type: ... Sea water fire extinguishing system
 Radars
 Number: 2
 Make: JRC
 Model(s): S-Band: JMR-9282-S / X-Band: JMR-9225-6X
 Waste disposal plant
 Incinerator
 Make: Hyundai Marine Machinery
 Model: MAXI NG 150SL WS
 Waste shredder/crusher
 Make: Samjoo Engineering
 Model: BS510
 Sewage plant
 Make: Il Seung
 Model: ISB-03
 Contract date: 26 March 2015
 Launch/float-out date: 17 December 2016
 Delivery date: 22 March 2017





BALT FLOT 16: Chemical tanker

Shipbuilder: **OJSC, Shipyard Krasnoye Sormovo**
 Vessel's name: **Balt Flot 16**
 Hull No: **02022**
 Owner/Operator: **BF Tanker**
 Country: **Russian Federation**
 Designer: **Marine Engineering Bureau**
 Country: **Ukraine**
 Flag: **Russian Federation**
 IMO number: **9829069**
 Total number of sister ships already completed (excluding ship presented): **1**
 Total number of sister ships still on order: **3**

This oil/chemical tanker, which can operate either at sea or inland, has increased capabilities by comparison with other Marine Engineering Bureau Project RST27 vessels. Deadweight in at-sea conditions is 7,902t, or 880t greater than the previous record for RST27 vessels with a 'super full' hull form. This is fundamentally important for operation in Caspian Sea shallow waters.

RST27 vessels satisfy the dimensions of the Volga-Don Canal and Volga-Baltic Way. They feature a record block coefficient 0.94 (at a draught of 4.60m) as well as a bulb-type fore end and transom aft end, and use semi-tunnels and skegs. Two fully rotating rudder propellers, with fixed-pitch propellers in nozzles, provide both propulsion and manoeuvring capabilities.

A raised trunk deck means that the total capacity of the six cargo and two slop tanks is 8,970cbm, 870cbm greater than previous Project RST27 vessels. The range of possible cargoes has also increased – *Balt Flot 16* can simultaneously carry three sorts of cargo including crude oil, petroleum products and a wide range of chemical cargoes with densities of 0.7-1.015 t/m³ without flash point restrictions.

The ecological requirements of the RS 'ECO-S' ('Clean Design') class were a design consideration and special attention was also given to the cargo vapour discharge system. *Balt Flot 16*'s ballast water treatment system, as well as all associated control/monitoring equipment and sampling facilities, fully comply with the International Convention for the Control and Management of Ship's Ballast Water and Sediments, 2004.

TECHNICAL PARTICULARS

Length oa: 140.85m
 Length bp: 137.10m
 Breadth moulded: 16.70 m
 Depth moulded
 To main deck: 6.00m
 Width of double skin
 Side: 1.85m
 Bottom: 1.20 m
 Draught
 Scantling: 4.60m (at sea)

Design: 3.60m (in river)
 Gross: 5,352gt
 Displacement: 10,422t
 Lightweight: 2,520t
 Deadweight
 Design: 5,363dwt
 (in river at a draught of 3.60m)
 Scantling: 7.902dwt (at sea)
 Block co-efficient: 0.940 (draught 4.60m)
 Speed, service (85%MCR output): 10knots
 Cargo capacity (m³)
 Liquid volume: 8,970
 Bunkers (m³)
 Heavy oil: 361.6
 Diesel oil: 59.0
 Water ballast (m³): 4,560
 Percentage segregated ballast: 100%
 Daily fuel consumption (tonnes/day)
 Main engine only: 8.0
 Auxiliaries: 0.5
 Classification society and notations: Russian Maritime Register of Shipping (RS) ●●(*) Ice1 1 R2 • UT1-ICS OMBO VCS ECO-S Oil tanker/Chemical tanker type 2 (ESP) % high-tensile steel used in construction: approx. 80 (hull, 100)

Main engines
 Design: diesel
 Model: 6L20
 Manufacturer: Wärtsilä
 Number: 2
 Type of fuel: HFO
 Output of each engine: 1,200kW

Propeller(s)
 Designer/Manufacturer: Rudder-propeller/ Schottel SRP1012FP
 Number: 2
 Fixed/Controllable pitch: Fixed
 Diameter: 1,900mm
 Speed: 307rpm

Diesel-driven alternators
 Number: 3
 Engine make/type: Volvo Penta / D13 MG HE
 Type of fuel: MDO
 Output/speed of each set: 296kW / 1,500rpm

Boilers
 Number: 2
 Type: Steam
 Make: Aalborg CHB-3000
 Output, each boiler: 2.5t/h

Cargo cranes/cargo gear
 Number: 1 + 1
 Make: Davit International + Palfinger
 Type: ... C-SH.30/2.5-12 + PTM 400 hydraulic cranes for cargo hoses
 Performance: 3.0t / 12m + 3.0t / 10m

Other cranes
 Number: 1
 Make: Davit International
 Type: D.CRM.R.S. 14/3.5-9.9/2.7
 Tasks: Rescue Boat / life-raft
 Performance: SWL 16 kN 3.5m
 Mooring equipment
 Number: 2 anchor-mooring bow winches, aft anchor-mooring capstan
 Make: Adria Winch
 Type (electric/hydraulic/steam): electro-hydraulic

Special lifesaving equipment
 Number of each and capacity: 1 x 16 persons
 Make: Davit International
 Type: Free-fall lifeboat JY-FF-4.90

Cargo tanks
 Number: 6 cargo tanks + 2 slop tanks
 Grades of cargo carried: 3 sorts of cargo density from 0.7 up to 1.015t/m³
 Product range: petroleum products and chemicals without restrictions of temperature of flash-point

Coated tanks:
 Make and type of coating: epoxy
 Stainless steel – structure/piping: heating system pipes

Cargo pumps
 Number: 6 cargo + 1 slop
 Type: electric deepwell MDPD-150 (cargo) and MDPD-80 (slop)
 Make: Marflex
 Stainless steel: AISI 316L
 Capacity (each): 200m³/h (cargo) and 80m³/h (slop)

Cargo control system
 Make: Valcom
 Type: TSS/Control

Ballast control system
 Make: Valcom
 Type: TSS/Control

Water ballast treatment system
 Make: Pan Asia 620 En-P900-Ex TRC
 Capacity: 90 - 900m³/h

Complement
 Officers: 6
 Crew: 6
 Supernumeraries/Spare: 2
 Single/double/other rooms: 10/2/pilot
 Stern appendages/special rudders: 2
 Schottel SRP-1012FP full-revolving rudder propellers with fixed-pitch propellers in nozzles

Bow thruster
 Make: Schottel STT 0170 FP
 Output: 230 kW

Bridge control system
 Make: Valcom
 Type: TSS/Cargo
 Is bridge fitted for one-man operation? ..Yes, Transas TSS/Bridge alarm

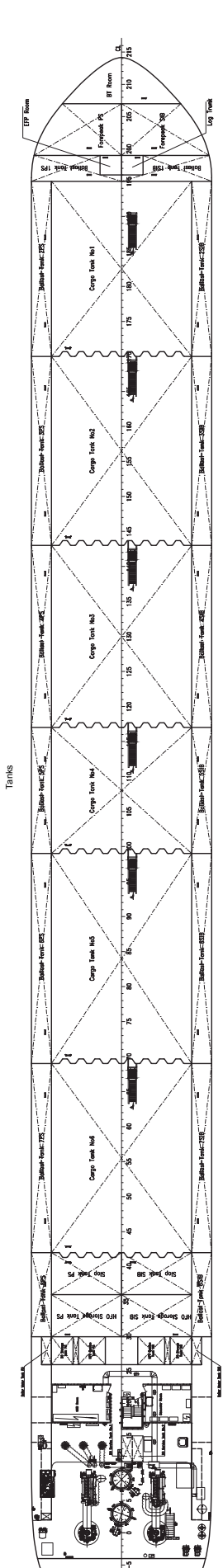
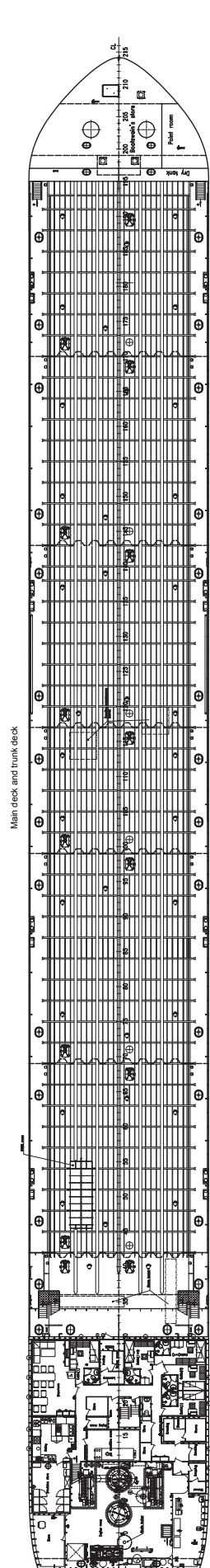
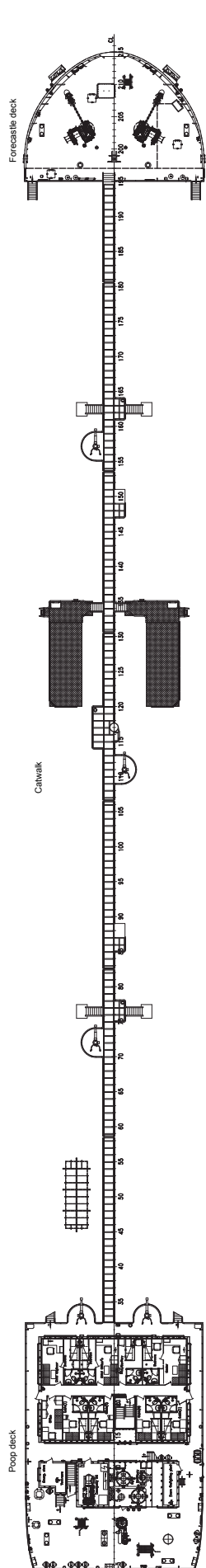
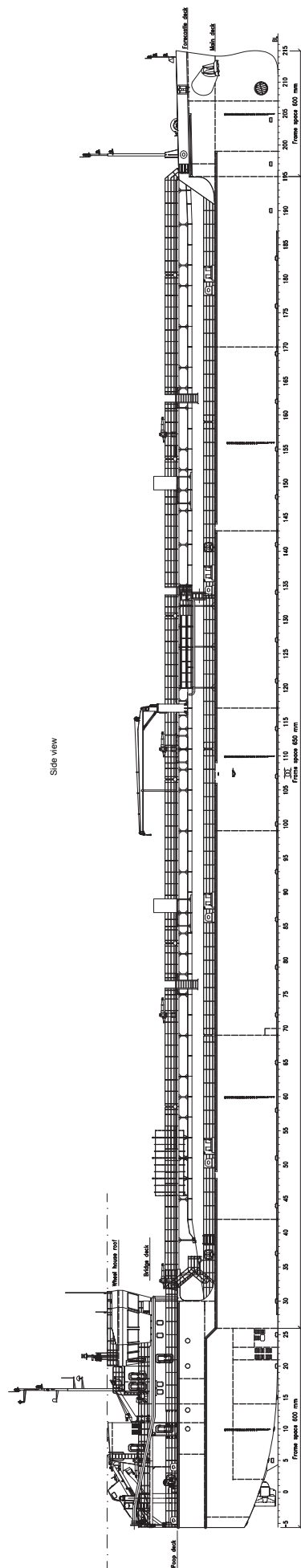
Fire detection system
 Make: MRS Electronics
 Type: PS-220-5

Fire extinguishing systems
 Cargo tanks: Foam
 Make/Type: Wilhelmsen
 Engine room: aerosol
 Make/Type: Kaskad
 Cabins: water
 Public spaces: water

Radars
 Number: 2
 Make: Transas
 Model: JMA-5300 MKII
 Integrated bridge system: Yes
 Make: Valcom
 Model: TSS/Bridge alarm

Waste disposal plant
 Waste shredder/crusher
 Make: JSC 'B Spektr'
 Model: Spektr 3 NP
 Sewage plant
 Make: EVAC

Contract date: 25 January 2017
 Launch/float-out date: 21 July 2017
 Delivery date: 6 September 2017





BEOTHUK SPIRIT: Shuttle tanker

Shipbuilder: **Samsung Heavy Industries Co., Ltd**
 Vessel's name: **Beothuk Spirit**
 Hull No: **SN2184**
 Owner/Operator: **Teekay**
 Country: **Canada**
 Designer: **Samsung Heavy Industries Co., Ltd**
 Country: **Republic of Korea**
 Model test establishment used: **SSMB (Samsung Ship Model Basin), Kriso, Force Bahamas**
 Flag: **Bahamas**
 IMO number: **9780768**
 Total number of ships already completed **1**

This DP2-Class 145,000dwt shuttle tanker has been built for Teekay Offshore Partners by Samsung Heavy Industries. It is intended for worldwide operation, and especially for the cold-weather conditions encountered in the East Coast Canada and North Sea regions. Pictured above is *Norse Spirit*, the vessel's sister ship.

To enable effective, efficient and environmentally sustainable operation a series of 'game-changing' (according to the manufacturer) KPIs has been adopted. These include a high level of winterisation – enclosed bridge wings, increased insulation and de-icing/de-misting devices for safe offshore logistics and operation. Energy-saving features intended to improve fuel-consumption figures include variable speed control of cargo pumps, thrusters and cooling sea water pumps. In environmental terms, a ballast water treatment system, the use of low-sulphur MGO main fuel and a better EEDI index figure distinguish *Beothuk Spirit* from other shuttle tankers.

To ensure the vessel's safe and uninterrupted 24-hour operation in the trying conditions which can be encountered in the East Coast Canada and Northern European areas, a high level of design and material robustness have been prioritised. The result is a vessel with a hull structural design that has a 30-year fatigue lifetime and a dynamic positioning system which provides a higher level of redundancy.

TECHNICAL PARTICULARS

Length oa: 279.5m
 Length bp: 264.5m
 Breadth moulded: 49.0m
 Depth moulded
 To main deck: 24.5m
 To upper deck: 24.5m
 Width of double skin
 Side: 2.45m
 Bottom: 2.75m
 Draught
 Scantling: 17.2m
 Design: 17.0m
 Gross: 85,762gt
 Deadweight
 Design: 144,700dwt
 Scantling: 147,000dwt
 Speed, service (90 %MCR output): 14.5knots

Cargo capacity (m³)
 Liquid volume: 158,000
 Bunkers (m³)
 Diesel oil: 2,900
 Water ballast (m³): 55,300
 Daily fuel consumption (tonnes/day)
 Main engine only: 50.0
 Classification society and notations: DNV GL
 *1A1, Tanker for Oil, ESP, CSR, E0, BIS, TMON, DYNPOS-AUTR(A), BWM-T, CLEAN DESIGN, HELIDK-SH, NAUT-AW(ICS), BOW LOADING, VCS-2B, F-AMC, PLUS, CSA-FLS2, OPP-F, COMFV(3)C(3), CCO, ESV-DP(HIL-IS), ESV-PMS(HIL-IS), ESV-SPT(HIL-IS), ECA(SOxA), COAT-PSPC(B, C)

Main engine
 Design: MAN Diesel & Turbo Licensee
 Model: 6G70ME-C9.5
 Number: 1
 Output: 14,600kW
 Propeller
 Material: Ni-Al-Bronze
 Designer/Manufacturer: Rolls-Royce
 Number: 1
 Fixed/Controllable pitch: Controllable
 Diameter: 8,700mm
 Speed: 71.9rpm
 Diesel-driven alternators
 Number: 4
 Engine make/type: Hyundai 8H32/40 x 1, 6H32/40 x 3
 Type of fuel: MGO
 Output/speed of each set: 4,000kW at 720rpm, 3,000kW at 720rpm

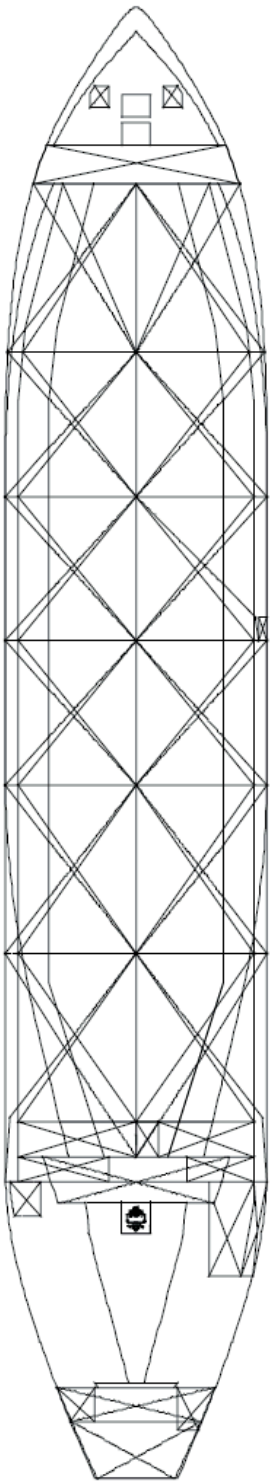
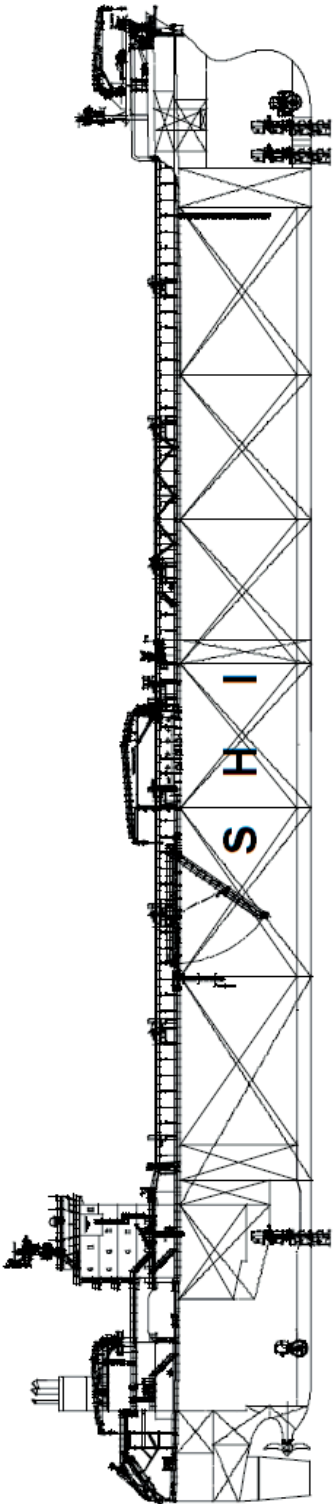
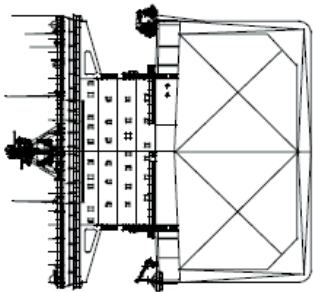
Boilers
 Number: 3
 Type: OL and XW
 Make: Aalborg
 Output: 35,000kg/h x 2, 1,200kg/h x 1
 Cargo cranes/cargo gear
 Number: 2
 Make: DMC
 Type: Jib type, electro-hydraulic
 Performance: SWL 15tons

Other cranes
 Number: 2 / 1
 Make: DMC
 Type: Jib type, electro-hydraulic
 Tasks: Provision-handling cranes / BLS service crane
 Performance: SWL 2.0 tons and SWL 8tons / SWL 5tons

Mooring equipment
 Number: 8
 Make: Flutek
 Type: Electro-hydraulic (high-pressure)

Special lifesaving equipment
 Number of each and capacity: 1, 38 persons
 Make: Norsafe
 Type: Freefall type

Cargo tanks
 Number: 12 cargo tanks and 2 slop tanks
 Product range: Crude oil
 Cargo pumps
 Number: 3
 Type: Vertical, single-stage, centrifugal, electric motor-driven
 Make: Hyundai
 Stainless steel: Impeller shaft, etc.
 Capacity (each): 4,000 m³/h x 145mlc
 Cargo control system
 Make: Emerson
 Type: Electro-hydraulic
 Ballast control system
 Make: Emerson
 Type: Electro-hydraulic
 Complement
 Officers: 17
 Crew: 14
 Suez/Repair Crew: 6
 Single/double/other rooms: 4 day / bedrooms, 27 single rooms, 1 Suez crew room
 Bow thruster
 Make: Brunvoll
 Number: 1 tunnel thruster, 2 retractable azimuth
 Output (each): 2,200kW
 Stern thruster(s)
 Make: Brunvoll
 Number: 1 tunnel thruster, 2 retractable azimuth
 Output (each): 2,200kW
 Bridge control system
 Make: Kongsberg
 Type: K-Bridge
 Is bridge fitted for one-man operation? ...Yes
 Fire detection system
 Make: Consilium
 Type: Salwico FDS
 Fire extinguishing systems
 Engine room:
 Make/Type: Wilhelmsen/high-expansion foam
 Cabins:
 Make/Type: ... Sea water fire extinguishing
 Public spaces:
 Make/Type: ... Sea water fire extinguishing
 Radars
 Number: 3
 Make: Kongsberg
 Models: X-band x 2, S-band x 1
 Integrated bridge system: Yes
 Model: K-Bridge
 Waste disposal plant
 Waste compactor
 Make: Uson
 Model: UMCC-4
 Waste shredder/crusher
 Make: Metos
 Model: MJWD-441
 Contract date: 3 June 2015
 Launch/float-out date: 11 February 2017
 Delivery date: 31 July 2017





BLACK DUCK: Small asphalt tanker

Shipbuilder: **Chengxi Shipyard Co., Ltd CSSC**
 Vessel's name: **Black Duck**
 Hull No: **CX5401**
 Owner/Operator: **Southern Pacific Holding Corporation, Kumiai Senpaku, Co. Ltd**
 Country: **Japan**
 Designer: **Shanghai Merchant Ship Design & Research Institute, CSSC (SDARI)**
 Country: **China**
 Model test establishment used: **CSSRC, SSSRI**
 Flag: **Marshall Islands**
 IMO number: **9799109**
 Total number of sister ships already completed (excluding ship presented): **0**

The 7,800dwt *Black Duck* is the first of a new generation of small asphalt tankers designed for worldwide operations. Designed and developed by SDARI for Kumiai Senpaku Co., it is also the first asphalt tanker to be delivered by the Chengxi Shipyard.

The vessel complies with OCIMF, MESQAC, Panama Canal and Suez Canal navigation rules, St. Lawrence Seaway regulations, and is also suitable for navigating in restricted waters with low air draught.

Black Duck is designed to carry bitumen and oil products with flash points greater than 60°C and cargoes with temperatures of up to 200°C. The cargo tanks are of independent type and well insulated. They are divided into two blocks with each block subdivided into four watertight compartments. Efficient cargo handling is achieved with two frequency-controlled cargo pumps, which are also used as stripping pumps. Up to three different kinds of liquid cargo can be carried simultaneously.

This vessel has been designed with energy savings, environmental awareness and safe, economic operation in mind. The hull lines have been optimised using CFD calculation to obtain better power performance in operational profile condition, while rudder lines and aft appendages have been optimised to achieve a short vessel with a good balance of power and manoeuvring performance. The results have been verified by model testing by both the Chinese Ship Scientific Research Center and the Shanghai Ship and Shipping Research Institute. The daily fuel oil consumption of the main engine is 10.4 tonnes/day at a service speed of 13.24knots and a 6.7m draft and the EEDI Index figure achieved is below that required by EEDI Phase 2. *Black Duck* features vibration characteristics far below the ISO standard value for Slight. The vessel's noise levels meet Resolution MSC.337(91), which provides a new code for noise levels onboard ships.

TECHNICAL PARTICULARS

Length oa: 119m
 Length bp: 112m
 Breadth moulded: 20.4m

Depth moulded
 To upper deck: 10.65m
 Width of double skin: 1.5m
 Draught
 Scantling: 6.7m
 Design: 6.7m

Gross: 7,538gt
 Deadweight:
 Design: 7,894.8dwt
 Speed, service (75% MCR output): .. 13.24knots

Cargo capacity (m³)
 Liquid volume: 8,072.8m³
 Bunkers (m³)
 Heavy oil: 521
 Diesel oil: 248
 Water ballast (m³): 3,057
 Percentage segregated ballast: 100%

Daily fuel consumption (tonnes/day)
 Main engine only: 10.5
 Auxiliaries: 2.45

Classification society and notations:
 ABS + A1, (E), Fuel Oil Carrier (Asphalt Carrier with Independent Tanks), BWT, UWILD+AMS, +ACCU, VEC, CPS, TCM, GP, RRDA, CRC 2

% high-tensile steel used in construction: ~70%

Main engines
 Design: MAN B&W
 Model: 6S35ME-B9.5 -TII
 Manufacturer: Hudong Heavy Machinery Co. Ltd
 Number: 1
 Type of fuel: HFO/LSMGO
 Output: 3,400kW x 127rpm

Propeller
 Material: Ni-Al-Bronze
 Designer/manufacturer: SDARI / Changzhou Zhonghai Marine Propeller Co., Ltd
 Fixed/controllable pitch: Fixed
 Diameter: 4.5m
 Speed: 127rpm

Diesel-driven alternators
 Number: 3
 Engine make/type: Yanmar Co., Ltd / 6EY18LW
 Type of fuel: HFO / LSMGO
 Output/speed of each set: .. 560kW x 720rpm
 Alternator make / type: ... Hansin Electric Mfg *FE 5478-10

Boilers
 Number: 2

Type: Vertical, cylindrical, shell-and-tube type with full automation and pressure atomising burner
 Make:C&S GESAB (Shanghai) Boiler Co., Ltd
 Output: 1,800kW each
 Other cranes
 Number: 1
 Make: South China Marine Machinery Co., Ltd
 Type: Electro-hydraulic
 Tasks: Cargo hose crane
 Performance: 5t - 15m
 Mooring equipment
 Number: 4
 Make: Jiang su Masada Heavy Industries Co, Ltd
 Type: Hydraulic
 Special lifesaving equipment
 Number of each and capacity: ... 20 persons
 Make: .. CSSC Nanjing Luzhou Machine Co., Ltd
 Type: free-fall lifeboat

Cargo tanks
 Number: 8
 Grades of cargo carried: Asphalt and product oil (flash point >60°C)

Cargo pumps
 Number: 2
 Type: Screw pump
 Make: Bornemann
 Capacity (each): 500m³/h
 Cargo control system
 Make: Danfoss

Water ballast treatment system
 Make: ... Sunrui Marine Engineering Co., Ltd
 Capacity: 500m³/h

Complement
 Officers: 11
 Crew: 9
 Suez repair crew: 6
 Single/double/other rooms: ... All single-room

Stern appendages / special rudders: ... Skeg, 1 semi-spade rudder

Bow thrusters
 Make: ... Wuhan Kawasaki Marine Machinery Co., Ltd
 Number: 1
 Output: 400kW

Bridge control system
 Make: Eletek

Fire detection system
 Make: Consilium
 Type: Salwico CCP

Fire extinguishing systems
 Deck area make / type: Tyco / fixed deck foam fire-extinguishing system, and sea water Engine room make / type: Tyco fixed high-pressure CO₂, Tyco fixed water mist fire-fighting system and sea water
 Cabins: Sea water and portable fire extinguisher
 Public spaces: ... Sea water and portable fire extinguisher

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

Waste disposal plant
 Incinerator
 Make: Nanjing Luzhou
 Model: OG120C

Waste compactor
 Make: Kang Li Far East Pte., Ltd
 Model: TGSS15EX

Sewage plant
 Make: Wärtsilä
 Model: STC02-13

Contract date: 30 November 2015
 Launch/float-out date: 22 January 2017
 Delivery date: 1 June 2017



CAPE HAYATOMO: Very large ore carrier

Shipbuilder: **Namura Shipbuilding Co., Ltd**
 Vessel's name: **Cape Hayatomo**
 Hull No: **310**
 Owner/Operator: **Kaisho Marine S.A./
 Kawasaki Kisen Kaisha Ltd**
 Country: **Japan**
 Designer: **Namura Shipbuilding Co., Ltd**
 Country: **Japan**
 Flag: **Panama**
 IMO number: **9749879**
 Total number of sister ships already completed
 (excluding ship presented): **0**

CAPE HAYATOMO is a 250,460dwt Very Large Ore Carrier (VLOC) built by Namura Shipbuilding Co, Ltd for Kawasaki Kisen Kaisha 'K' Line. The Panamanian-flagged vessel is the first of a second generation of 'Wozmax' VLOCs.

Wozmax (a compound name derived from 'West, 'Oz' and 'Max') describes a vessel which is of the maximum size for accessing Western Australia's iron ore outlets, such as those at Port Hedland, Dampier and Port Walcott, which between them account for more than half of the world's global iron ore exports. However, the vessel can also be used in other places around the world, such as at Ponta da Madeira in northern Brazil, which has become an important source of iron ore for Japan's steel industry.

Impressively *Cape Hayatomo* achieves its maximum deadweight at a draught of just 18m, to improve the efficiency of cargo loading and unloading. The vessel's design has been optimised to meet K-Line's customers' needs. For example, seven holds optimise cargo loading and discharging operations. The earlier generations of Wozmax VLOCs had eight or nine holds.

Significant effort has also gone into improving energy efficiency and reducing operating costs. A straighter bow stem reduces wave resistance and improves propulsion performance in all sea conditions. Power is supplied by a MAN two-stroke 6G80ME-C9.5 engine with an output of 20,270kW. This gives a laden service speed of 14.3knots. Both the main engine and the generator engine are compliant with Annex VI of the MARPOL 73/78 regulations for NOx emissions.

Two significant Namura-branded energy saving solutions have been adopted: the Namura flow Control Fin (NCF) – which consists of a pair of fins fitted at the stern with an inclination to the shaftline, improving water flow to, and reducing turbulence around, the propeller – and a Namura Rudder-Fin.

A ballast water treatment system manufactured by Techcross is fitted in order to facilitate international operations in anticipation of the entry into force of the Ballast Water Management Convention in September 2017. The ballast tanks themselves are certified by ClassNK for compliance with IMO's Performance Standard for Protective Coatings for corrosion protection.

There is also an air seal type stern tube sealing device which has been adopted to reduce the risk of oil leakage. A low sulphur fuel oil tank has been provided to satisfy SOx limits.

A grey water holding tank has been arranged in the double bottom of the engine room to allow for the collection of waste water when the vessel comes into port. A centralised freshwater cooling system has been adopted to facilitate the easy maintenance of the machinery space equipment.

TECHNICAL PARTICULARS

Length oa: 329.95m
 Breadth moulded: 57.00m
 Depth moulded
 To upper deck: 25.60m
 Draught
 Scantling: 18.00m
 Gross: 135,933gt
 Deadweight
 Scantling: 250,460dwt
 Speed, service: 14.3knots
 Classification society and notations Nippon
 Kaiji Kyokai
 NS* (OC, BC-XII, GRAB,
 PSPC-WBT) (ESP) (IWS) (BWS) (IHM),
 MNS* (M0)
 Roll-stabilisation equipment: Bilge keels
 Main engine
 Model: MAN B&W 6G80ME-C9.5
 Manufacturer: Mitsui Engineering &
 Shipbuilding Co., Ltd
 Number: 1
 Type of fuel: HFO / MDO
 Propeller
 Designer/Manufacturer: Nakashima Propeller
 Co., Ltd
 Number: 1

Diesel-driven alternators
 Number: 3
 Engine make/type: Yanmar Co., Ltd /
 6EY22ALW
 Type of fuel: HFO / MDO
 Alternator make/type: Taiyo Electric Co., Ltd /
 FE 547C-8

Boiler
 Number: 1
 Type: OVS2-160/120-31
 Make: Osaka Boiler MFG. Co., Ltd

Other cranes
 Number: 2
 Make: Koei Sangyo Co., Ltd
 Type: Electro-motor driven
 Tasks: Provisions handling

Mooring equipment
 Number: 10
 Make: Kawasaki Heavy Industries, Ltd
 Type: Hydraulic oil motor-driven

Special lifesaving equipment
 Number of each and capacity: 1 free-fall
 lifeboat 28 persons / 1 rescue boat 6 persons
 Make: Shigi Shipbuilding Co., Ltd
 Type: FRP enclosed / FRP open

Hatch covers
 Manufacturer: Namura Shipbuilding Co., Ltd
 Type: upper deck

Ballast control system
 Make: Nakakita Seisakusho Co., Ltd
 Type: Electric motor-driven remotely
 operated valve system

Water ballast treatment system
 Make: Techcross

Complement
 Officers: 12
 Crew: 16

Bridge control system
 Make: Mitsui Engineering & Shipbuilding
 Co., Ltd
 Type: BMS-2000 III

Fire detection system
 Make: Nippon Hakuyo Electronics, Ltd
 Type: Addressable type

Fire extinguishing systems
 Cargo holds:
 Make/Type: Sea water hydrants

Engine room:
 Make/Type: Foam-type fixed fire
 extinguishing system

Cabins:
 Make/Type: Portable fire extinguisher

Public spaces:
 Make/Type: Portable fire extinguisher

Radars
 Number: 2
 Make: Furuno Electric Co., Ltd
 Model(s): FAR-2837S / FAR-2827

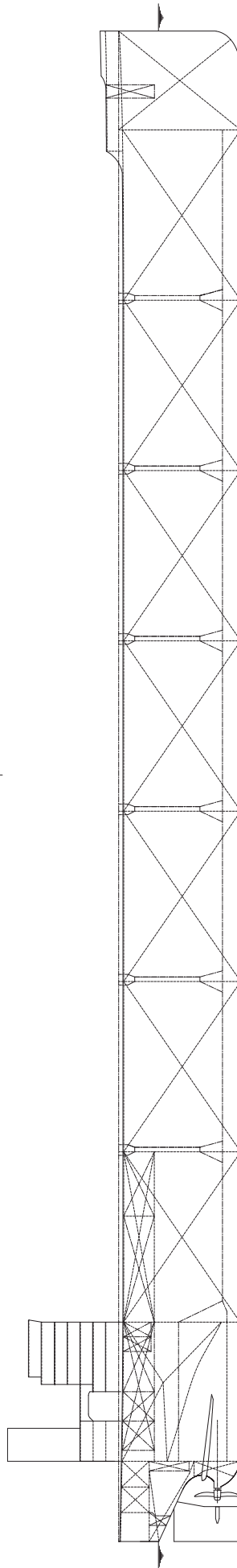
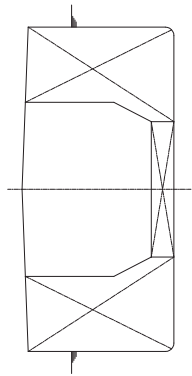
Waste disposal plant
 Incinerator
 Make: Sunflame Co., Ltd
 Model: OSV-900SAI

Waste shredder/crusher
 Make: Sanwa Churi Industry Co., Ltd
 Model: SD-15BS

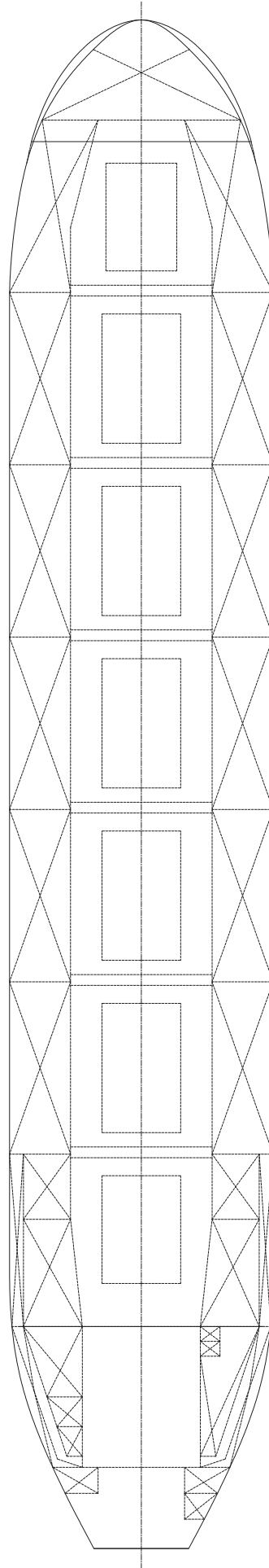
Sewage plant
 Make: Evac Oy
 Model: EVAC MBR 2K C

Launch/float-out date: 8 February 2017
 Delivery date: 11 May 2017

MIDSHIP SECTION



10





CARDISSA: Type 2G LNG bunker vessel

Shipbuilder: **STX O&S**
 Vessel's name: **Cardissa**
 Hull No: **S4080**
 Owner/Operator: **Shell Western LNG BV**
 Country: **UK**
 Flag: **Netherlands**
 IMO number: **9765079**
 Total number of sister ships already completed (excluding ship presented): **0**

CARDISSA is a Type 2G LNG bunker vessel for the handling and transportation of cryogenic liquids. It has been built by STX Offshore & Shipbuilding for Shell Western.

With a capacity of 6,500m³, Cardissa has two independent, cylindrical IMO Type C cargo tanks. These are designed to cope with a maximum density of 0.5 t/m³, a maximum vapour pressure of 3.5 bar and a lowest temperature of -163° C.

The cargo area consists of two cargo tanks, seven pairs of side water ballast tanks, six pairs of void space, one pair of freshwater tanks and three pairs of marine gas oil tanks.

The propulsion machinery consists of twin screws and two sets of electric motors. The electric generating plant consists of three sets of dual-fuel main generator engines and an emergency diesel generator engine.

The wheelhouse is equipped with a console incorporating navigation, control and alarm systems. Cargo loading is monitored to ensure the ship's condition is within strength and stability limits.

TECHNICAL PARTICULARS

Length oa: 119.9m
 Length bp: 113.1m
 Breadth moulded: 19.4m
 Depth moulded
 To trunk deck: 15.3m
 To upper deck: 10.9m
 Width
 Side : 19.4m
 Draught
 Scantling: 6.2m
 Design: 5.8m
 Gross: 9,816gt
 Displacement:
 Design load: >9,756.0t
 Scantling load: >10,578.3t
 Lightweight: 4498.2t
 Deadweight
 Design: 4498.2dwt
 Scantling: 5320.5dwt

Block co-efficient:
 Design load: >0.7450
 Scantling load: >0.7558
 Speed, service (100 %MCR output): 13knots
 Cargo capacity (m³)
 Liquid volume: 6600.6
 Bunkers (m³)
 Marine Gas Oil: 414.5
 Water ballast (m³): 3042.8

Classification society and notations: LR +100A1 Liquefied Gas Tanker, Ship Type 2G, Methane (LNG) in independent tanks Type C, Maximum vapour pressure 3.5BAR, Minimum cargo temperature -163C, Shipright (ACS(B), MSDA), *IWS, LI, ECO (BIO, BWT, GW, IBTS, IHM, OW, P, SOX) +LMC, UMS, ICC, CCS, NAV1, IBS, RMC, PMRL Descriptive Note of Shipright (CM, BWMP(T), SERS)

Main engine
 Design: Wärtsilä dual-fuel diesel electric (DFDE) power system
 Model: 8L20DF
 Manufacturer: Wärtsilä
 Number: 3
 Type of fuel: Boil-off gas / MGO
 Output of each engine: 1,480kW

Gearboxes
 Make: Renk
 Model: RSH-900
 Number: 2
 Output speed: 138.1rpm

Propellers
 Material: Ni-Al-Bronze
 Designer/Manufacturer: Silla metal
 Number: 2
 Fixed/Controllable pitch: Fixed
 Diameter: ca. 3.6m
 Speed: 138.1rpm

Alternators
 Number: 3
 Make: ABB
 Output: 1,420kW each

Propulsion motors
 Number: 2
 Make: ABB
 Output: 1,420kW each

Diesel-driven alternators
 Number: 3
 Alternator make/type: ABB AMG 0500LM06 LSA

Output/speed of each set: 1420kW / 1,200rpm

Boilers
 Number: 1
 Type: Water tube, oil-fired
 Make: Kangrim Heavy Industries
 Output: 1,000kg/h

Cargo cranes/cargo gear
 Number: 1
 Make: Oriental Precision & Engineering Co.,Ltd
 Type: Self-contained electro-hydraulic, cylinder luffing, single jib
 Performance: 5t SWL

Other cranes
 Number: 2
 Make: Oriental Precision & Engineering Co.,Ltd
 Type: Self-contained electro-hydraulic, cylinder luffing, single jib
 Tasks: Provision crane
 Performance: 3t SWL

Mooring equipment
 Number: 2 sets of windlasses combined with mooring winch (fore), 2 mooring winches (aft)
 Make: Flutek Ltd
 Type: Hydraulic motor driven (high-pressure)

Special lifesaving equipment
 Number of each and capacity: 1 lifeboat and davit

Make: Oriental Precision & Engineering Co., Ltd
 Type: Free-fall

Cargo tanks
 Number: 2
 Grades of cargo carried: No segregation
 Product range: LNG
 Stainless steel – structure/piping: ... Stainless steel (AISI 321 or equivalent)

Cargo pumps
 Number: 2 (one set per cargo tank)
 Type: 4-stage, vertical, deep-well, centrifugal type
 Make and model: Wärtsilä-Svanehøj DW 250/200-4-K+1
 Capacity (each): 550m³/h @ 270mLc

Cargo control system
 Make: TGE
 Type: PLC

Ballast control system
 Make: Scana
 Type: Hydraulically operated actuator

Water ballast treatment system
 Make: Panasia
 Capacity: 380m³/h (UV + filter type)

Complement
 Officers: 8
 Crew: 11
 Suez/Repair Crew: 4
 Single/double/other rooms: 19/2/0

Bow thruster
 Make: Kawasaki Heavy Industries
 Number: 1
 Output: 650kW

Bridge control system
 Make: KTE
 Type: T-Type console
 Is bridge fitted for one-man operation? ..Yes, for one-man watch

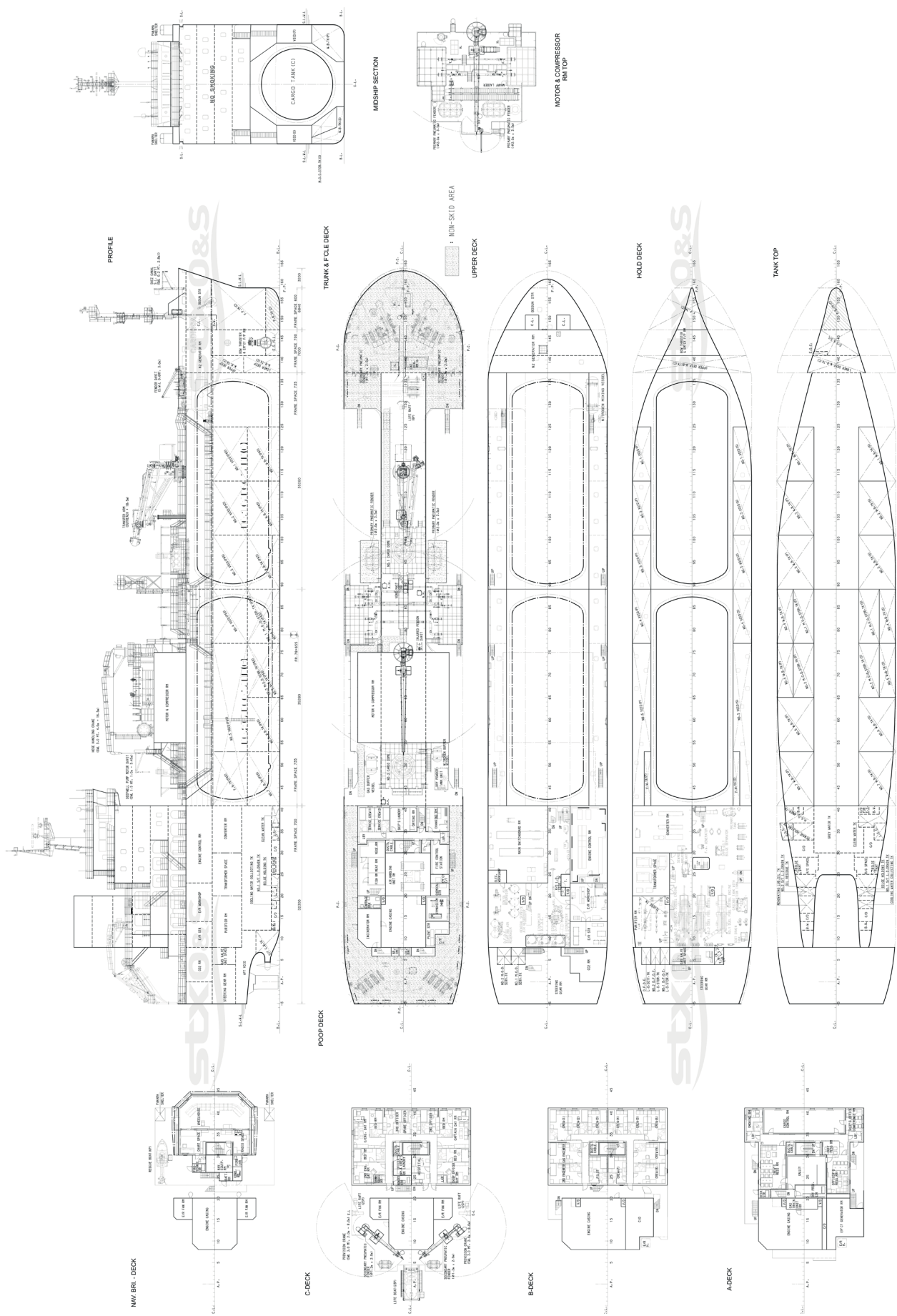
Fire detection system
 Make: Consilium
 Type: Salwico Cargo

Radars
 Number: 2
 Make: Furuno
 Models: FAR-2827 (X-band), FAR-2837S (S-band)

Integrated bridge system: Yes
 Make: Furuno
 Model: FMD-3300

Waste disposal plant
 Waste compactor
 Make: Hodu
 Model: TT100

Launch/float-out date: 19 October 2016
 Delivery date: 5 June 2017





CELINE: Roll-on/roll-off carrier

Shipbuilder: **Hyundai Mipo Dockyard Co., Ltd**
 Vessel's name: **Celine**
 Hull No: **8205**
 Owner/Operator: **CLdN Shipping**
 Country: **Luxembourg**
 Designer: **Hyundai Mipo Dockyard Co., Ltd**
 Country: **Republic of Korea**
 Model test establishment used: **SSPA (Sweden)**
 Flag: **Malta**
 IMO number: **9789233**
 Total number of sister ships already completed (excluding ship presented): **0**

CELINE is 28,000dwt roll-on/roll-off carrier that was delivered to CLdN in September 2017 by Hyundai Mipo Dockyard (HMD). The vessel was designed by HMD in line with DNV GL Class Rules and is registered under the Maltese flag.

An ocean-going vessel, Celine has a bulbous bow, transom stern, two bow thrusters and three stern thrusters, an open water-type stern frame, a single rudder and a single-screw controllable-pitch propeller driven by a slow-speed diesel engine. Gas-ready notation has been reflected (DNV-GL "Gas ready (D,S,MEC)") and there is an in-line PTO/PTH shaft generator.

The engine room is located in the aft part of the vessel and living quarters, including the navigation bridge, are located forward.

The vessel has the nine decks including four hoistable decks, as shown on the General Arrangement Plan. A hinged, watertight division door is installed between No.2 and No.3 decks and there is a stern ramp at the level of No. 2 deck.

This is the biggest roll-on/roll-off vessel in the world which is suitable for carrying cars, trucks, trailers, MAFI rolltrailers with double-stacked containers, and cassettes with double-stacked containers.

Motor vehicles with compressed hydrogen or natural gas in their tanks for their own propulsion can be carried as cargo on No.5 deck in accordance with IMO resolution MSC.365(93).

TECHNICAL PARTICULARS

Length oa: ca. 234m
 Length bp: 226m
 Breadth moulded: 35m
 Depth moulded
 To main deck: 11.050m
 To upper deck: 31.90m
 Width of double skin
 Side: 3.7m
 Bottom: 1.8m
 Draught
 Scantling: 8.10m (A/B mld)

Design: 7.50m (A/B mld)
 Gross: 74,273gt
 Deadweight: 27,687dwt

Speed, service (85.7% MCR output, with shaft engages): 17.5knots

Bunkers (m³)
 Heavy oil: 1,870
 Diesel oil: 340
 Water ballast (m³): 12,600
 Daily fuel consumption (tonnes/day)
 Main engine only: 72.4

Classification society and notations: DNV GL +1A1, General Cargo Carrier RO/RO Container, EO, DG-P, NAUT-AW, CLEAN, BIS, TMON, Gas ready(D,S,MEC)

Heel control equipment: No. 5, 6 SWB tank(P/S) – anti-heeling tanks

Main engine
 Design:Hyundai-MAN-B&W
 Model: 9L60ME-C8.5 (TIER II)
 Manufacturer: HHI
 Number: 1
 Type of fuel: HFO, MDO
 Output: 21,060kW

Propeller
 Material: Ni-Al-Bronze
 Designer/Manufacturer: Rolls-Royce
 Number: 1
 Fixed/Controllable pitch: Controllable
 Diameter: 6.3m
 Speed: 123 rpm at MCR
 Special adaptations: ..Promas-type propeller hub cap

Main-engine driven alternators
 Number: 1
 Make/type: Nishishiba / Shaft generator
 Output/speed: 2,000kW x 66.8rpm

Diesel-driven alternators
 Number: 3
 Engine make/type: ...HHI-EMD (3 x 7H32/40 & 7H25/33)
 Type of fuel: HFO, MDO
 Output/speed of each set: 7H32/40 x 720rpm, 7H25/33 x 720rpm
 Alternator make/type: HHI-EES / three-phase synchronous
 Output/speed of each set: 720rpm x 4,200kVA

Other cranes
 Number: 1
 Make: Dongnam Marine Crane
 Type: Electro-hydraulic
 Tasks: Provisions handling
 Performance: 4t x 11.5m
 Mooring equipment
 Number: 8 (winch-windlass)
 Make: MacGregor
 Type: Electric

Special lifesaving equipment
 Number of each and capacity: 1 and 40 persons
 Make: Norsafe
 Type: Free-fall

Vehicles
 Number of vehicle decks: 9 fixed / 4 hoist-able
 Total lane length: 7,970m
 Total cars: 1,370
 Total freight units (specify size): . 470 (13.6m) + 12 (14.63m)

Doors/ramps/lifts/moveable car decks
 Number of each:6 doors, 4 hoist-able ramps, 4 movable (hoist-able) decks
 Type: ...Hydro-type (door), hoist-able (ramps, decks)
 Designer:Macgregor

Ballast control system
 Make: Kongsberg
 Type: Integrated alarm monitoring system
 Water ballast treatment system
 Make: Techcross
 Capacity: 600m³/h x 2

Complement
 Officers: 12
 Crew: 16
 Supernumeraries/Spare: 12
 Suez/Repair Crew: 6

Stern appendages/special rudders: Becker (flap) rudder

Bow thrusters
 Make: Kawasaki Heavy industry
 Number: 2
 Output: 2,500kW each

Stern thrusters
 Make: Kawasaki Heavy industry
 Number: 3
 Output: 2,000kW, 1,500kW

Fire detection system
 Make: Consilium
 Type: Salwico RO-RO

Fire extinguishing systems
 Cargo holds: Sea water spray system (No.4 deck) / CO₂ extinguisher system
 Make/Type: Tanktech (water spray system) / Danfoss Semco (CO₂ extinguisher system)

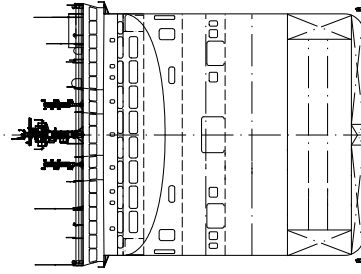
Engine room: CO₂ flooding
 Make/Type: Danfoss Semco (CO₂ extinguisher system)

Cabins: Portable fire extinguisher system
 Make/Type: Fain
 Public spaces: Portable fire extinguisher system
 Make/Type: Fain

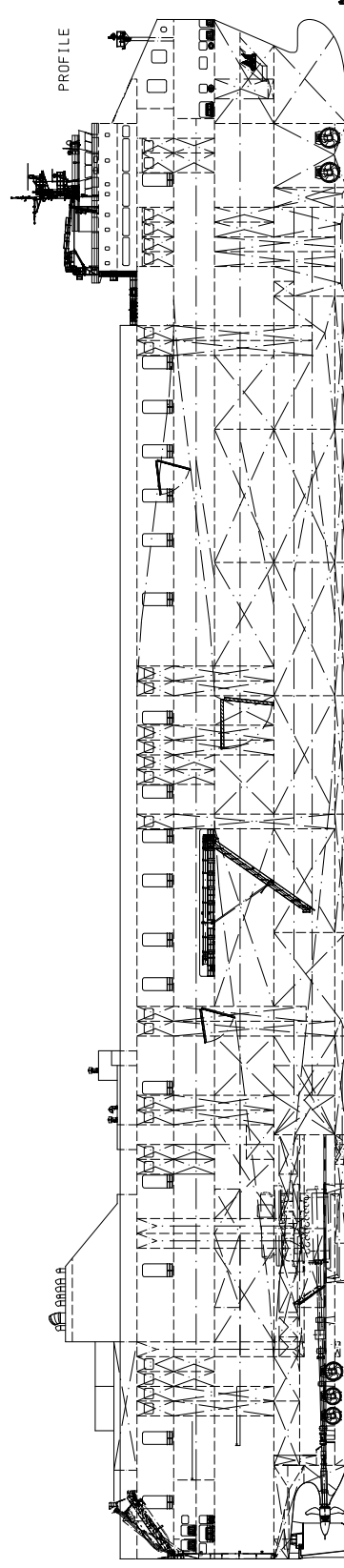
Radars
 Number: 2
 Make: JRC
 Models: JMR-9272-S (S-band), JMR-9225-9X (X-band)

Waste disposal plant
 Incinerator
 Make: HMMCO
 Model: MAXI NG150SL WS
 Sewage plant
 Make: Il-Seung
 Model: ISB-03

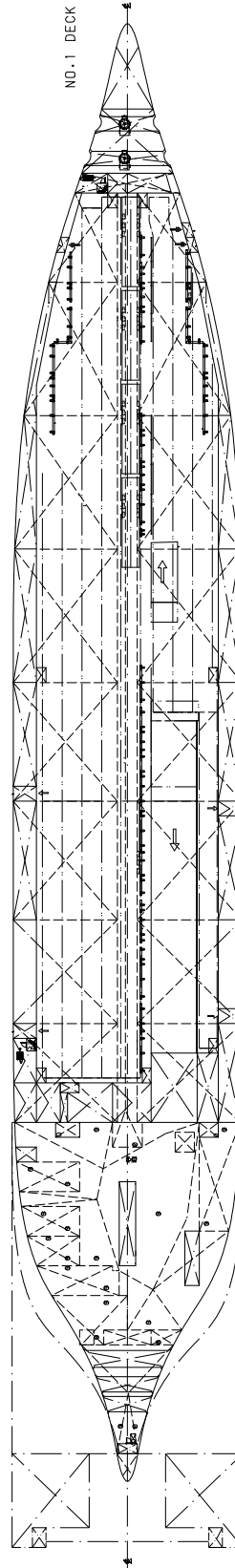
Contract date: 31 August 2015
 Launch/float-out date: 19 December 2016
 Delivery date: 8 September 2017



MIDSHIP SECTION



PROFILE



NO. 1 DECK



CHRISTOPHE DE MARGERIE: Icebreaking LNG carrier

Shipbuilder: ... **Daewoo Shipbuilding & Marine Engineering Co., Ltd**
 Vessel's name: **Christophe de Margerie**
 Hull No: **2418**
 Owner/Operator: **SCF**
 Country: **Russia**
 Designer: **Daewoo Shipbuilding & Marine Engineering Co., Ltd**
 Country: **Republic of Korea**
 Model test establishment used: **AARC, SSPA**
 Flag: **Cyprus**
 IMO number: **9737187**
 Total number of sister ships already completed (excluding ship presented): **0**

CHRISTOPHE DE MARGERIE is the first in a series of 15 icebreaking LNG carriers ordered for the Yamal LNG project. These are intended to transport LNG year-round in the challenging ice conditions of the Kara Sea and Gulf of Ob and their appearance signalled the market debut of a new class of vessel – the Yamalmax.

On 7 December 2017, the vessel was declared Engineering Project of the Year at the 2017 Platts Global Energy Awards. The vessel is designated Arc7, the highest ice class amongst existing merchant vessels, and is capable of sailing independently through ice up to 2.1m thick.

Christophe de Margerie's propulsion system is rated at 45MW, a capacity comparable to that of modern nuclear icebreakers. It is the world's first merchant vessel of high ice class to have three Azipods, which provide a high ice-breaking capability and manoeuvrability.

TECHNICAL PARTICULARS

Length oa: 299m
 Length bp: 283.1m
 Breadth moulded: 50.0m
 Depth moulded
 To upper deck: 26.5m
 Width of double skin
 Side: 3.581m
 Bottom: 3.2m
 Draught
 Scantling: 13.0m
 Design: 11.7m
 Gross Int'l Tonnage: 128,806gt
 Displacement at design draft: 126,690t
 Lightweight: 46,560t
 Deadweight
 Design: 80,000dwt
 Scantling: 98,000dwt
 Speed, service (82.6% MCR output): 19.5knots
 in open water

Cargo capacity (m³)
 Liquid volume: 172,600
 Bunkers (m³)
 Heavy oil: 5,500
 Diesel oil: 600
 Water ballast (m³): 74,000
 Daily fuel consumption (tonnes/day)
 Main engine only: 208.1

Classification society and notations: RS / BV
 (Dual Class): RMRS KM Arc7 (Arc7 at d≤12.0m) AUT1-ICS OMBO EPP ANTI-ICE LI CCO ECO-S Gas carrier type 2G (methane) Winterisation(-50) BWE(E-S);
 BV I, XHULL, XMACH, Liquefied Gas Carrier / LNG, unrestricted navigation, IN WATER SURVEY, VeriSTAR Hull DFL(40), spectral fatigue (North Atlantic) XAUT-IMS, SYS-NEQ-1, SYS-IBS, MONSHAFT, BWE, BWT, CLEAN-SHIP, LI, AVM-IPS, ERS-S, GREEN PASSPORT, COMF-NOISE-2, COMF-VIB-2
 % high-tensile steel used in construction: 47

Main engines
 Design: Wärtsilä
 Model: 12V50DF x 4 + 9L50DF x 2
 Manufacturer: Wärtsilä Hyundai Engine Company

Number: 6
 Type of fuel: HFO, MDO, LSMGO and fuel gas
 Output of each engine: 11,700kW at 514rpm (12V50DF), 8,775kW at 514rpm (9L50DF)

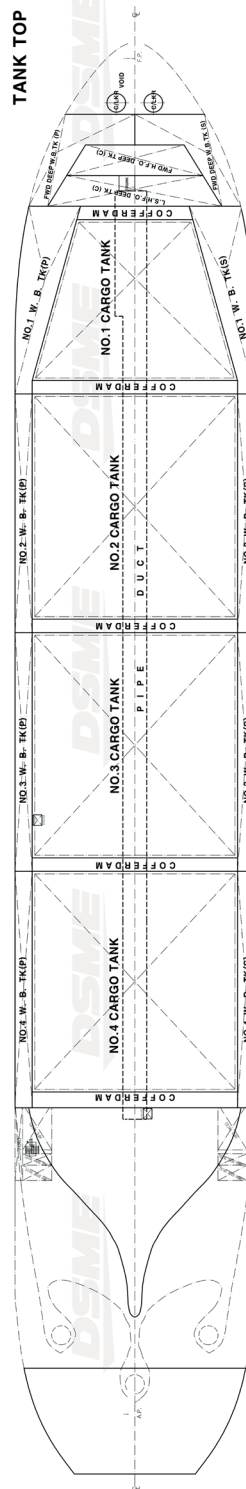
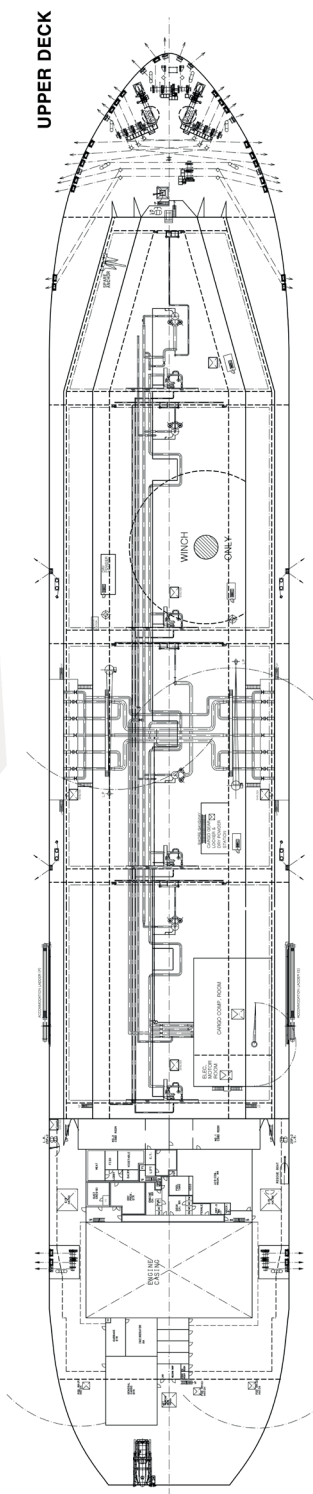
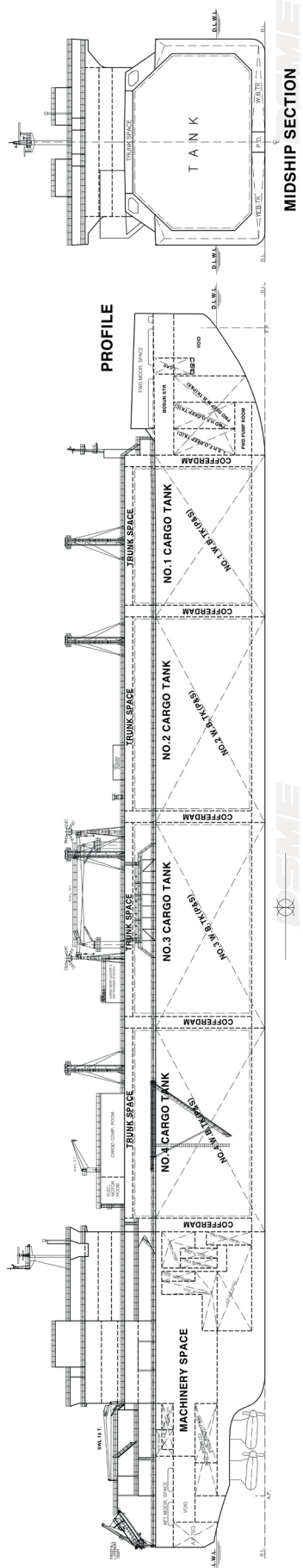
Pod propulsion system
 Number: 3
 Designer/Manufacturer: ABB
 Number of blades: 4 for each Pod
 Fixed/Controllable pitch: Fixed
 Diameter: About 6,000 mm
 Speed: 0–150 rpm

Main diesel-driven alternators
 Number: 6
 Alternator make/type: ABB / Self-excited, Brushless
 Output/speed of each set: 11.25MW / 514 rpm x 4, 8.45MW/514 rpm x 2

Boilers
 Number: 2
 Type: Vertical, water tube
 Make: AlfaLaval Aalborg
 Output, each boiler: 35,000kg/h x 7bar g, saturated steam

Exhaust gas economizer
 Number: 6

Type: Vertical smoke tube
 Make: Alfa Laval Aalborg
 Output, each: 3,000kg/h for 12V50DF x 4, 2,000kg/h for 9L50DF x 2
 Thermal oil heating systems
 Number: 2
 Type: Horizontal plain tube
 Make: Alfa Laval Industries (Busan)
 Output: 5,500kW each
 Cargo cranes/cargo gear
 Number: 2
 Maker: Liebherr
 Type: Jib
 Performance: 15t SWL
 Other cranes
 Number: 2
 Make: Liebherr
 Type: Jib
 Tasks: Provisions handling
 Performance: 15t SWL
 Mooring equipment
 Number: 9
 Make: MacGregor
 Type: Electric
 Special lifesaving equipment
 Number of each and capacity: 1 x 50 persons
 Make: Davit International
 Type: Free-fall lifeboat
 Cargo tanks
 Number: 4
 Grades of cargo carried: LNG
 Stainless steel – structure/piping: Piping
 Cargo pumps
 Number: 8
 Type: Centrifugal, submerged, integrated electric motor-driven
 Make: Shinko Ind. Ltd
 Material, casing, impeller & inducer: Aluminum alloy
 Capacity: 2,050m³/h each
 Cargo control system
 Make: Honeywell
 Type: Integrated Automation System
 Ballast control system
 Type: Integrated with IAS
 Water ballast treatment system
 Make: Techcross
 Capacity: Total 7,200 m³/h
 Complement
 Officers: 26
 Crew: 12
 Supernumeraries/Spare: 12
 Suez/Repair Crew: 6
 Single/double/other rooms: 45
 Stern appendages/special rudders: 3 PODs
 Bridge control system
 Make: ABB
 Type: Propulsion control system
 Is bridge fitted for one-man operation? ...Yes
 Fire detection system
 Make: Consilium
 Type: Addressable
 Fire extinguishing systems
 Cargo deck area:
 Make/Type: Wilhelmsen / dry powder
 Engine room:
 Make/Type: Wilhelmsen/high-pressure CO₂
 Make/Type: Wilhelmsen / Clean Agent
 Radars
 Number: 3
 Make: Transas
 Model: Navi-Radar 4000 MFD
 Waste disposal plant
 Incinerator
 Make: Hyundai-Atlas
 Model: Maxi 1200SL WS
 Waste compactor
 Make: Uson
 Model: UBP-30S
 Sewage plant
 Make: Il Seong
 Model: ISS-160N
 Contract date: 14 February 2014
 Launch/float-out date: 18 January 2016
 Delivery date: 27 March 2017





CIELO BIANCO: Product tanker

Shipbuilder: **Hyundai Vinashin Shipyard (subsidiary of Hyundai Mipo Dockyard Co., Ltd)**
 Hull No: **S249**
 Vessel's name: **Cielo Bianco**
 Owner/Operator: **D'Amico Tankers DAC**
 Country: **Italy**
 Designer: **Hyundai Mipo Dockyard Co., Ltd Republic of Korea**
 Model test establishment used: **KRISO**
 Flag: **Liberia**
 IMO number: **9778296**
 Total number of sister ships already completed (excluding ship presented): **1**

Speed, service (NCR with 15% sea margin): ca. 14.5knots
 Cargo capacity (m³)
 Liquid volume: 89,800
 Bunkers (m³)
 Heavy oil: 1,560
 Diesel oil: 480
 Water ballast (m³): 29,860
 Daily fuel consumption (tonnes/day)
 Main engine only: 27.76

Classification society and notations: ABS +A1(E), +AMS, Oil Carrier, ESP, CSR, AB-CM, +ACCU, TCM, CPS, UWILD, BWE, BWT, SPMA, ENVIRO, VEC, PORT, GP, RRDA, RW, CRC

Main engine
 Design:Hyundai-MAN-B&W
 Model: 6G60ME-C9.5 (Tier II)
 Manufacturer: HHI
 Number: 1
 Type of fuel: HFO, MDO
 Output of each engine: 10,100kW x 80.9 rpm

Propeller
 Material: Ni-Al-Bronze
 Designer/Manufacturer: HMD / HHI-EMD
 Number: 1
 Fixed/Controllable pitch: Fixed
 Diameter: 7.6m
 Speed: 10,100kW x 80.9rpm (MCR)

Diesel-driven alternators
 Number: 3
 Engine make/type: STX, 7L23/30
 Type of fuel : HFO, MDO
 Output/speed of each set: 1,225kW/900 rpm
 Alternator make/type: HHI-EES, HFC7 508 – 08P
 Output/speed of each set: 1,100 kW/900 rpm

Boiler
 Number: 1
 Type: Composite
 Make: Kangrim
 Output: 2,000 / 1,063 kg/hr (oil-fired / exhaust gas)

Cargo cranes/cargo gear
 Number: 1
 Make: Dongnam Marine Crane
 Type: Electro-hydraulic
 Performance: 15t x 24.5m

Other cranes
 Number: 1
 Make: Dongnam Marine Crane
 Type: Electro-hydraulic
 Tasks: Provisions handling
 Performance: 4t x 12.5m

Mooring equipment
 Number: 8

Make: DMC MacGregor
 Type: Hydraulic high-pressure
 Special lifesaving equipment
 Number of each and capacity: 1 and 28 persons
 Make: Jiangyinshi Beihai LSA Co
 Type: Free-fall lifeboats

Cargo tanks
 Number: 12 + 2 slop tanks + 1 res. tank
 Product range: Product Ship type 3
 Coated tanks – make and type of coating : ... EPICON T-500 pure epoxy coating

Cargo pumps
 Number: 15
 Type: Submerged, Centrifugal
 Make: Framo
 Capacity (each): .900m³/h x 12, 300m³/h x 2, 75m³/h x 1

Cargo control system
 Make: Framo
 Type: Remotely controlled

Ballast control system
 Make: Pansasia
 Type: Remotely controlled

Water ballast treatment system
 Make: Pansasia
 Capacity: 1,000m³/h x 2, 280m³/h

Complement
 Officers: 12
 Crew: 13
 Suez/Repair Crew: 6
 Single/other rooms: 25 / 1

Bridge control system
 Make: Hyundai Electro Electric System
 Type: Normal

Fire detection system
 Make: Consilium
 Type: Addressable

Fire extinguishing systems
 Cargo deck: Foam
 Make: NK
 Engine room: CO₂
 Make: NK

Radars
 Number: 2
 Make: Furuno
 Models: FAR-3330S

Integrated bridge system (yes/no?): N/A
 Waste disposal plant
 Incinerator
 Make: Kangrim
 Model: KFB-73S

Sewage plant
 Make: Il Seung Co., Ltd
 Model: ISB-02

Contract date: 22 April 2015
 Launch/float-out date: 11 January 2017
 Delivery date: 31 October 2017

CIELO BIANCO is a 74,999dwt product tanker delivered to d'Amico Tankers in October 2017. The vessel was built by the Hyundai Vinashin Shipyard in Vietnam, which is a subsidiary of Hyundai Mipo Dockyard (HMD). The vessel was designed by HMD in accordance with ABS Class Rules and is registered under the Liberian flag.

This ocean-going vessel has a bulbous bow, transom stern, single semi-balanced rudder and single-screw propeller driven by a slow-speed diesel engine. The propulsion machinery and living quarters including the navigation bridge are all located aft.

Cielo Bianco's cargo space is divided into six pairs of cargo oil tanks and one pair of slop tanks. There is an additional residual oil tank inside the starboard slop tank.

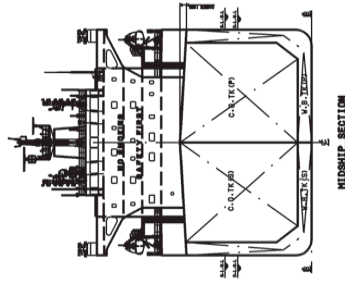
Six pairs of water ballast tanks and a fore peak tank with two access trunks are included. There is also a void space, chain lockers and bosun's store. Deck stores and cargo gear lockers are situated near to the mid-ship's cargo manifold, one of each on the port and starboard sides.

Four heavy fuel oil storage tanks are arranged between the cargo space and engine room, with a double hull structure. Three marine gas oil storage tanks are arranged in the steering gear room, again with a double hull structure.

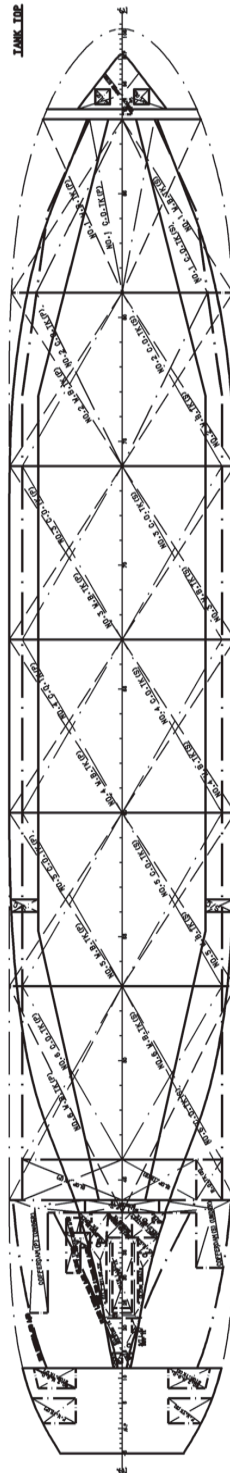
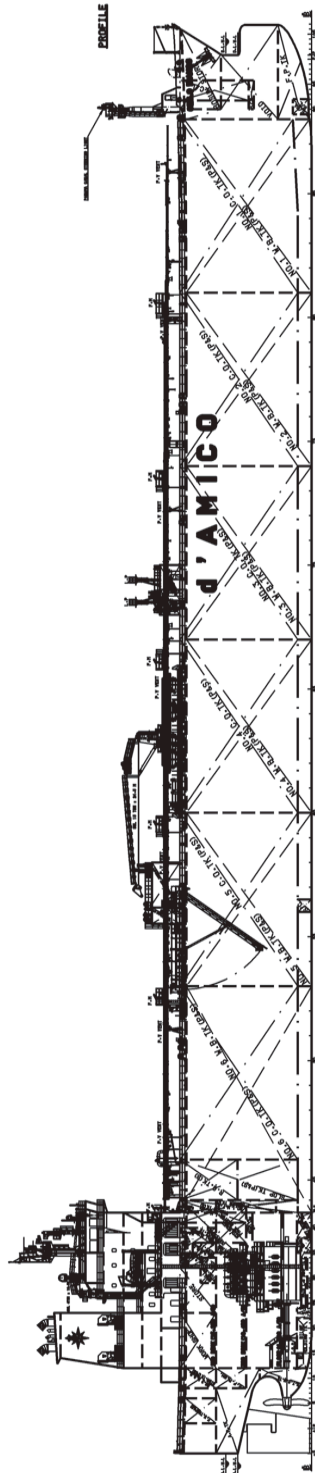
A UV and filter IMO D2 standard ballast water treatment system is fitted, and there are two ballast pumps in the No.5 water ballast tank.

TECHNICAL PARTICULARS

Length oa: 228m
 Length bp: 219m
 Breadth moulded: 36m
 Depth moulded
 To main deck: 20.00m
 Width of double skin
 Side: 2.1m
 Bottom: 2.2m
 Draught
 Design: 11.80m
 Scantling: 13.717m
 Gross: 43,984gt
 Deadweight
 Design: ca. 60,700dwt
 Scantling: ca. 74,999dwt



MIDSHIP SECTION





CMA CGM G. WASHINGTON: Container vessel

Shipbuilder: **Hyundai Heavy Industries**
 Vessel's name: **CMA CGM G. Washington**
 Hull No: **2855**
 Owner/Operator: **CMA CGM**
 Country: **France**
 Designer: **Hyundai Heavy Industries**
 Country: **Republic of Korea**
 Model test establishment used: **Hyundai Maritime Research Institute (HMRI)**
 Flag: **UK**
 IMO number: **9780847**
 Total number of sister ships already completed (excluding ship presented): **4**

The first in a series six container vessels named after US presidents, *CMA CGM G. Washington* was built by Hyundai Heavy Industries to conform specifically with the owner's requirements. In particular, the hull form has been optimised to provide efficient fuel consumption when at the intended operating profile.

At 14,414TEU, the 149,000dwt vessel and its sisters (such as *CMA CGM T. Jefferson*, pictured) have nominally more capacity than the neo-Panamax container ships of previous generations, which typically offered around 13,000TEUs. In September 2017, *CMA CGM Theodore Roosevelt* became the largest vessel to date to traverse the Panama Canal. *CMA CGM G. Washington* is UK registered and built under the auspices of Bureau Veritas.

TECHNICAL PARTICULARS

Length oa: 366m
 Length bp: 350m
 Breadth moulded: 48.2m
 Depth moulded
 To main deck: 29.85m
 Draught
 Scantling: 16m
 Design: 14.5m
 Gross: 140,830gt
 Deadweight
 Design:
 Scantling: abt. 148,000t
 Speed, service: 21.7knots
 Bunkers (m³)
 Heavy oil: ca. 9,200
 Diesel oil: ca. 1,500
 Water ballast (m³): ca. 32,900
 Classification society and notations: BV
 I, +HULL, +MACH, Container ship, ESA, WhiSp2, Unrestricted navigation, ALP, +AUT-UMS, +AUT-PORT, +VeriSTAR-HULL DFL 25 years, CLEANSHIP, CPS(WBT), FORS, GREEN

PASSPORT, INWATERSURVEY, LASHING-WW, LI-HG-S2, MON-SHAFT, SDS.

Main engine
 Design: Hyundai-WinGD
 Model: 10X92
 Manufacturer: Hyundai Heavy Industries
 Number: 1
 Type of fuel: HFO, ULSFO and MGO
 Output of each engine: 50,190 kW (MCR)

Propeller(s)
 Designer/Manufacturer: Hyundai Heavy Industries
 Number: 1
 Fixed/Controllable pitch: Fixed
 Diesel-driven alternators
 Number: 4 (3 + 1)
 Engine make/type: Hyundai, 9H32/40 and 6H32/40
 Type of fuel: HFO or ULSFO or MGO
 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 / 2,880kW x 720rpm

Boiler
 Number: 1
 Type: Automatic, forced draft, marine
 Make: Kangrim
 Output: 4,500kg/h
 Cargo cranes/cargo gear: Hose-handling crane / Provision crane

Number: 2
 Make: DMC
 Type: Electro-hydraulic
 Performance: 4t SWL
 Other cranes
 Number: 1
 Make: Oriental Precision
 Type: Electric motor-driven
 Tasks: Monorail hoist
 Performance: 12.5t SWL

Mooring equipment
 Number: 2 windlass, 10 mooring winch
 Make: NOV-BLM
 Type: Electric
 Special lifesaving equipment
 Number of each and capacity: 2, 35 persons each

Make: Hatecke
 Type: Conventional
 Hatch covers
 Design: SMS

Manufacturer: Marintech
 Type (upper deck/other decks): Pontoon, non-sequential operation type

Containers
 Total TEU capacity: 14,414
 On deck: 8,420
 In holds: 5,994
 Reefer plugs: 1,400TEU
 Tiers/rows (maximum)
 On deck: 11 / 19
 In holds: 11 / 17

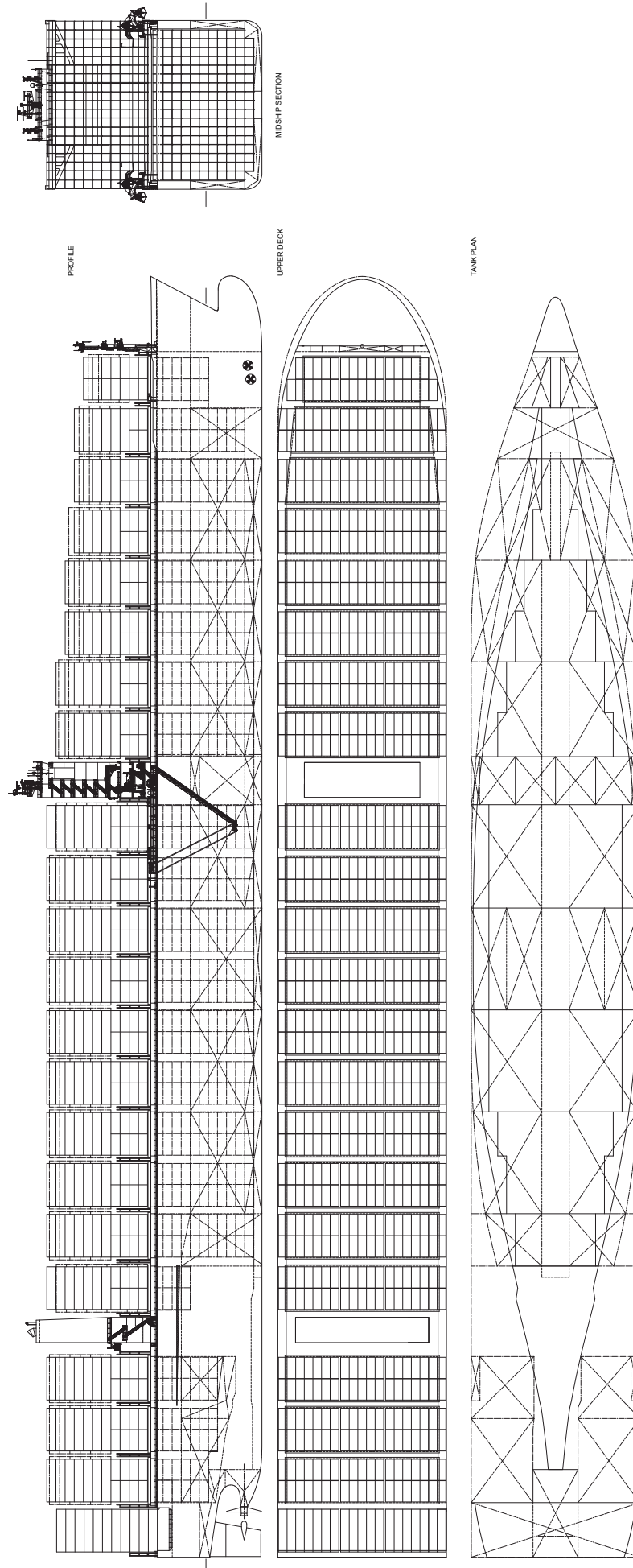
Ballast control system
 Make: Kongsberg
 Type: K-Chief 600 (PC type)
 Water ballast treatment system
 Make: BIO-UV
 Capacity: 2,000m³/hr
 Complement
 Officers: 19
 Crew: 16
 Suez/Repair Crew: ... 1 cabin for 6 Suez crew and 1 cabin for Suez electrician

Bow thrusters:
 Make: Kawasaki
 Number: 2
 Output: 2,500kW each
 Bridge control system
 Make: Kongsberg
 Type: Auto Chief 600
 Is bridge fitted for one-man operation? ...Yes

Fire detection system
 Make: Consilium
 Type: Salwico Cargo (Addressable type)
 Fire extinguishing systems
 Cargo holds:
 Make/Type: NK / CO₂
 Engine room:
 Make/Type: NK / CO₂

Radars
 Number: 3 (one for S-band and two for X-band)
 Make: Sperry
 Models: Visionmaster FT
 Integrated bridge system: Yes
 Make: Sperry
 Model: Visionmaster FT ECDIS

Waste disposal plant
 Sewage plant
 Make: Il Seung (Biological type)
 Model: ISB-11
 Contract date: 29 May 2015
 Launch/float-out date: 7 October 2016
 Delivery date: 20 April 2017





DA JI: General cargo ship

Shipbuilder: **Shanghai Shipyard Co., Ltd**
 Vessel's name: **Da Ji**
 Hull No: **S1238**
 Owner/Operator: **COSCO Shipping Co., Ltd**
 Country: **China**
 Designer: **Shanghai Merchant Ship Design & Research Institute, CSSC**
 Country: **China**
 Model test establishment used: **China Ship Scientific Research Center**
 Flag: **China**
 IMO number: **9768538**
 Total number of sister ships already completed (excluding ship presented): **1**

DA JI is a 28,000dwt general-cargo ship which was tailor-built for COSCO Shipping Co.Ltd. It was delivered in January 2017. In total four ships of this series have been ordered. They have been designed by SDARI, constructed by Shanghai Shipyard Co. Ltd. and registered under CCS Class Rules. This series is the latest heavy-crane general-cargo ship type in COSCO Shipping's fleet.

Perhaps the vessel's most significant feature is its optimised fuel efficiency. The hull form was developed based on organic integration of SDARI's empirical method and numerical towing tank technology. An innovative bow is used to ensure better sea-keeping performance and reduce speed loss in rough seas. Following comprehensive model testing and verification by China Ship Scientific Research Center, the hull form has been optimised to achieve maximum energy efficiency over the range of speeds and draughts anticipated whilst in service. Energy-saving Hub Vortex Absorbed Fins (HVAFs) are installed to further improve efficiency.

The main Wärtsilä 6RT-flex50-D engine with much-derated CMCR and Delta Tuning brings greater fuel savings at economical operating speeds. The vessel's accommodation and wheelhouse are located forward and the cranes and funnels are situated on the port side. The area of the weather deck is 3,595m² (153 x 23.5m). The ship is equipped with three sets of cranes and the capacity for tandem lifting without pontoon is up to 700 tons. The 54m-long single cargo hold contributes to the flexible loading of super-large, long and heavy project cargoes, such as eight sets of RTG container cranes, without any support from the ports.

The vessel has been designed to improve its environmental footprint. *Da Ji*'s EEDI value satisfies Phase III of IMO regulations. A water-lubricated shaft bearing system is used to avoid potential oil leakage.

A package solution to anti-piracy includes thick bulwarks instead of traditional rails along the ship sides. These are intended to shield against stray bullets, knife nets and knife stabs. The anti-piracy citadel is equipped with specially made doors, hatches and also steam nozzles around stairways to stop pirates if necessary.

According to SDARI, the successful delivery of the *Da Ji* results in an energy-saving and reliable logistics platform which brings greater economic benefits to the

owner. Three sister ships are to be delivered in 2018 and they will serve as the main force of China's 'Belt and Road' development strategy.

TECHNICAL PARTICULARS

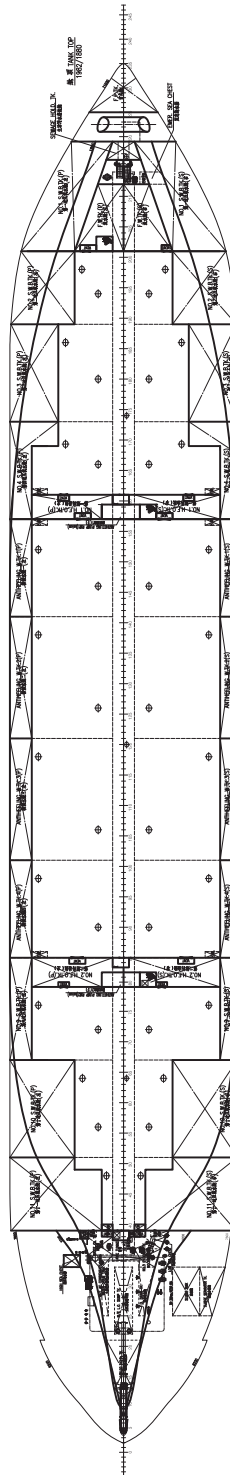
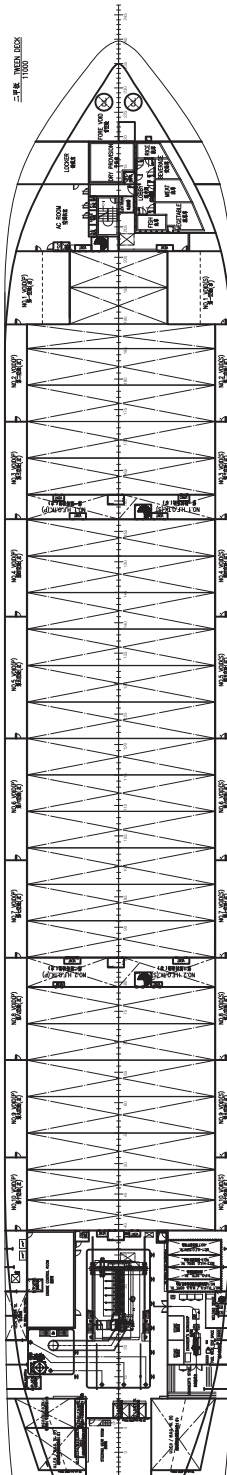
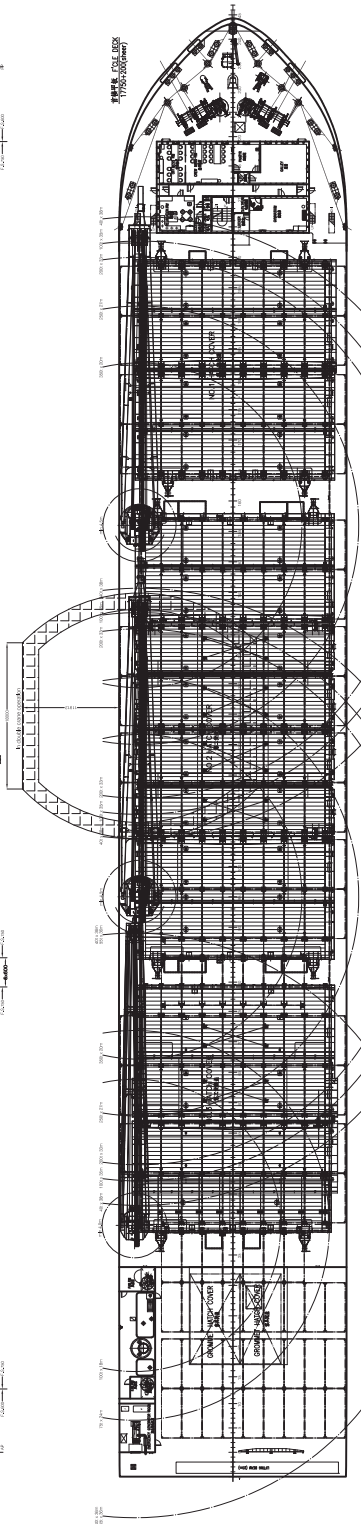
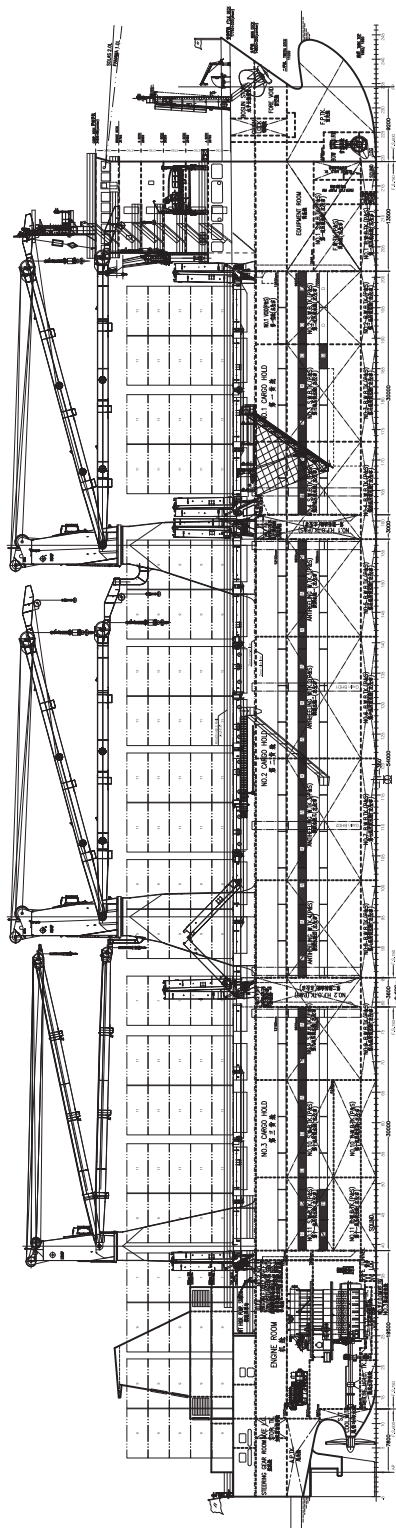
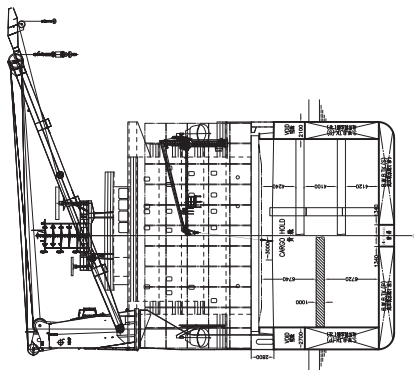
Length oa: 179.67m
 Length bp: 170.6m
 Breadth moulded: 28.00m
 Depth moulded
 To main deck: 14.80 m
 To upper deck: 14.80 m
 Width of double skin
 Side: 2.7m port side; 2.1m starboard side
 Bottom: 1.88m
 Draught
 Scantling: 10.50m
 Design: 9.20m
 Gross: 21,992gt
 Displacement: 40,508.2t
 Lightweight: 10,983.1t
 Deadweight
 Design: 23772.5dwt
 Scantling: 29525.1dwt
 Block co-efficient: 0.769 at design draught, 0.786 at scantling draught
 Speed, service: ... 15.50kt at design draught, at 0.85CMCR

Cargo capacity (m³)
 Bale: 35,684
 Grain: 35,684
 Bunkers (m³)
 Heavy oil: 1,702
 Diesel oil: 373
 Water ballast (m³): 10,619
 Daily fuel consumption (tonnes/day)
 Main engine only: 23.1
 Auxiliaries: 3.3

Classification society and notations CCS
 ★ CSA General dry Cargo Ship; Equipped with Container Securing Arrangement; Ice Class B; BWMS; In-Water Survey; Loading Computer (S,I,G,D); Grab(20); PSPC(B,D);GPR; EEDI; ERS★ CSM AUT-0;SCM

% high-tensile steel used in construction: ca.30
 Heel control equipment:Anti-heeling system
 Main engine
 Design: Wärtsilä
 Model: 6RT-Flex50D
 Manufacturer: HHM Hudong Heavy Machinery Co., Ltd
 Number: 1
 Type of fuel: HFO & MDO & MGO
 Output: 7000kW x 95rpm
 Propeller
 Material: Ni-Al-Bronze
 Designer/Manufacturer: CSSRC
 Number: 1
 Fixed/Controllable pitch: Fixed

Diameter: 6.20m
 Speed: 15.50knots
 Diesel-driven alternators
 Number: 3
 Engine make/type: CSSC Marine Power Co., Ltd / 6L23/30H
 Type of fuel: HFO & MDO & MGO
 Output/speed of each set: .. 780kW x 720rpm
 Alternator make/type: CSSC Marine Power Co., Ltd / HFC6 504-14E
 Output/speed of each set: .. 780kW x 720rpm
 Boilers
 Number: 2
 Type: LSH1.5-0.7+GFL221-0.7
 Make:ZhangJiaGang Greens Shazhou Boiler Co., Ltd
 Output: 1,500kg/h / ~700kg/h+ ~2 x 188kg/h
 Cargo cranes/cargo gear
 Number: 3
 Make: TTS NMF
 Type: DK II 350020/100035-Crane No.s 1&2 / DK II 100018/55036-Crane No. 3
 Performance: SWL 350/200/40t x 20/33/36m (2); SWL 100/40t x 18/36m (1)
 Mooring equipment
 Number: 4
 Make: TTS
 Type: Electric
 Special lifesaving equipment
 Number of each and capacity: 2 totally enclosed lifeboats 30 persons
 Make: ... Jiangyin Neptune Marine Appliance Co., Ltd
 Type: Gravity luffing
 Hatch covers
 Design: TTS
 Manufacturer: TTS HuaHai
 Type (upper deck/other decks): Upper deck & tween deck
 Containers
 Lengths: 6,058mm
 Heights: 2,591mm
 Total TEU capacity: 1,035 TEU
 On deck: 1,035 TEU
 Homogeneously loaded to 14t: 427 TEU
 Tiers/rows (maximum):
 On deck: 5/11
 Water ballast treatment system
 Make:COSCO (WeiHai) Shipbuilding Marine Technology Co., Ltd
 Capacity:500m³h x 2
 Complement
 Officers: 14
 Crew: 13
 Suez/Repair Crew: 6
 Bow thruster
 Make: Kawasaki-KWJ
 Number: 1
 Output: 900kW
 Bridge control system
 Is bridge fitted for one-man operation?No
 Fire detection system
 Make: Consilium
 Type:Salwico Cargo
 Fire extinguishing systems
 Cargo holds:CO₂
 Make: NK Co., Ltd
 Engine room:CO₂
 Make: NK Co., Ltd
 Radars
 Number: 2
 Make: JRC
 Models: JMR-9230-S3 /JMR-9225-9X3
 Integrated bridge system:No
 Waste disposal plant
 Incinerator
 Make:Hansun(Shanghai) Marine Technology Co. Ltd.
 Model:HSINC-50A
 Sewage plant
 Make:Hansun (Shanghai) Marine Technology Co. Ltd
 Model:ST-30U
 Contract date: September 2013
 Launch/float-out date: 18 July 2016
 Delivery date: January 2017





ELANDRA EAGLE: Suezmax crude oil tanker

Shipbuilder: **Sungdong Shipbuilding & Marine Engineering Co., Ltd**
 Vessel's name: **Elandra Eagle**
 Hull No: **S2053**
 Owner/Operator: **Elandra Holdings Ltd**
 Country: **British Virgin Islands**
 Designer: ... **Sungdong Shipbuilding & Marine Engineering Co., Ltd**

Country: **Republic of Korea**
 Model test establishment used: **KRISO**
 Flag: **Marshall Islands**
 IMO number: **9792474**
 Total number of sister ships already completed (excluding ship presented): **0**

ELANDRA EAGLE is the first vessel in a series of two Suezmax crude oil tankers built by Sungdong Shipbuilding & Marine Engineering for Elandra Holdings Ltd.

The vessel is built under the survey of Lloyd's Register of Shipping and designed in accordance with IACS Common Structure Rules. The vessel features a double side-skin and has a flush deck, bulbous bow, transom stern, open water-type stern frame, full-spade rudder and single propeller driven by a slow-speed diesel engine.

The main MAN 6G70ME-C9.5 Tier II engine is derated to 15,088kW at 71.8rpm for economy of fuel oil consumption. The speed of the vessel at scantling draft (17.15m) is 14.2knots at 71.7 percent of MCR (10,818kW), with a 15 percent sea margin based on a well-optimised hull form and propeller design which have been analysed using CFD. Electric power is generated from three diesel generators driven by a 1,050kW alternator and steam is generated by two auxiliary boilers of water tube type with a capacity of 35,000kg/h and an exhaust gas economiser with a capacity of 500kg/h.

Elandra Eagle has six pairs of cargo oil tanks, two slop tanks, fore and aft peak tanks, segregated water ballast tanks, fuel oil tanks and freshwater tanks. Cargo tanks are divided by plane-type transverse and longitudinal bulkheads. Cargo handling is performed by three steam turbine-driven cargo oil pumps capable of 4,000m³/h. Water ballast is handled by two ballast pumps which are driven by steam turbine and electric motor. The water ballast treatment system is of the ozone type and has a capacity of 3,000 m³/h.

The vessel takes full consideration of the latest environmental guidelines such as for fuel oil protection, Inventory of Hazardous Materials for

ship's recycling, Performance Standards for Protective Coatings (PSPC) and IMO Tier II NOx requirements. The vessel also has a low-sulphur fuel oil tank to satisfy emission requirements in Sulphur Emission Control Areas (SECAs), and has an emergency response system.

TECHNICAL PARTICULARS

Length oa: ca. 277.0m
 Length bp: 267.0m
 Breadth moulded: 48.0m
 Depth moulded
 To main deck: 23.1m
 Width of double skin
 Side: 2.5m
 Bottom: 2.8m
 Draught
 Scantling: 17.15m
 Design: 16.0m

Deadweight
 Design: 144,300dwt
 Scantling: 157,300dwt
 Speed, service (71.7% MCR output): 14.2knots
 Cargo capacity (m³)
 Liquid volume: 174,000
 Bunkers (m³)
 Heavy oil: 3,700
 Diesel oil: 1,000
 Water ballast (m³): 53,000
 Daily fuel consumption (tonnes/day)
 Main engine only: 38.6

Classification society and notations: LR +100A1 Double Hull Oil Tanker, CSR, ESP, ShipRight(CM, ACS(B,C)), *IWS, LI, +LMC, IGS, UMS, with descriptive notes ETA, COW(LR), ShipRight (BWMP(S,T), SERS, SCM), ECO(BWT, IHM, VECS-L, IBTS), DSPM4

Main engine
 Design: MAN B&W
 Model: 6G70ME-C9.5
 Manufacturer: STX
 Number: 1
 Type of fuel: HFO, MDO, MGO
 Output of each engine: 15,088kW x 71.8rpm

Propeller
 Material: Ni-Al-Bronze
 Designer/Manufacturer: Silla Metal
 Number: 1

Fixed/Controllable pitch: Fixed
 Diameter: 9.0m
 Speed: 71.8rpm
 Diesel-driven alternators
 Number: 3
 Engine make/type: STX, 6L23/30H-MK2
 Type of fuel: HFO, MDO, MGO
 Output/speed of each set: 1,050kW, 900rpm
 Boilers
 Number: 2 + 1
 Type: PB0601AS18 / PC09AAP001
 Make: Kangrim
 Output, each boiler: 35,000kg/h / 1,800/500kg/h (oil fire/ exhaust gas)
 Cargo cranes/cargo gear
 Number: 2
 Make: DMC
 Type: Electro-hydraulic
 Performance: 20t SWL
 Other cranes
 Number: 1 + 2
 Make: DMC
 Type: electro-hydraulic
 Tasks: Provisions handling
 Performance: 8t at 7.3m SWL (port) / 2t SWL (starboard)

Mooring equipment
 Number: 9
 Make: MacGregor Pusnes
 Type: Electro-hydraulic

Special lifesaving equipment
 Number of each and capacity: 2 x 30 persons
 Make: HLB
 Type: Gravity-type

Cargo pumps
 Number: 3
 Type: Centrifugal, vertical, single-stage
 Make: Shinko
 Capacity: 4,000m³/h each

Cargo control system
 Make: Emerson
 Type: Piano console
 Ballast control system
 Make: Emerson
 Type: Piano console

Water ballast treatment system
 Make: Hyundai Heavy Industry
 Capacity: ..4,000m³/h (For W.B.TK. & F.P.TK.) + 250m³/h (For A.P.TK.)

Complement
 Officers: 18
 Crew: 10
 Suez/Repair Crew: 6
 Bridge control system
 Make: KTE
 Type: Piano
 Is bridge fitted for one-man operation? ...Yes

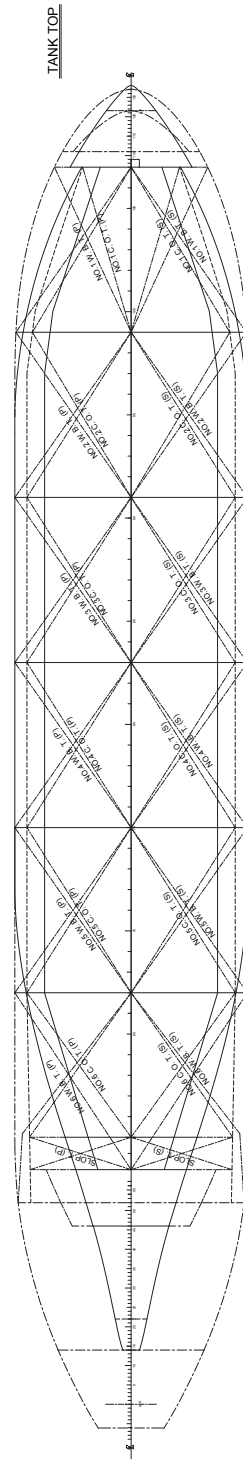
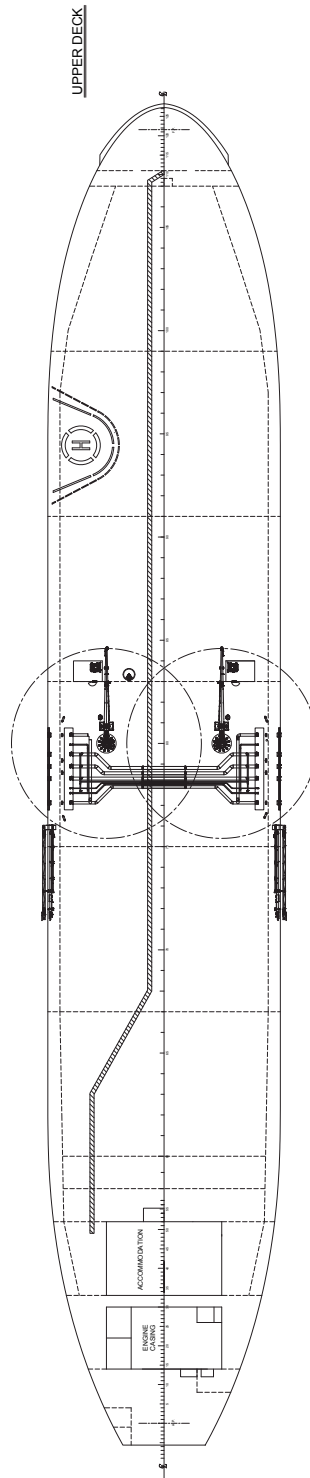
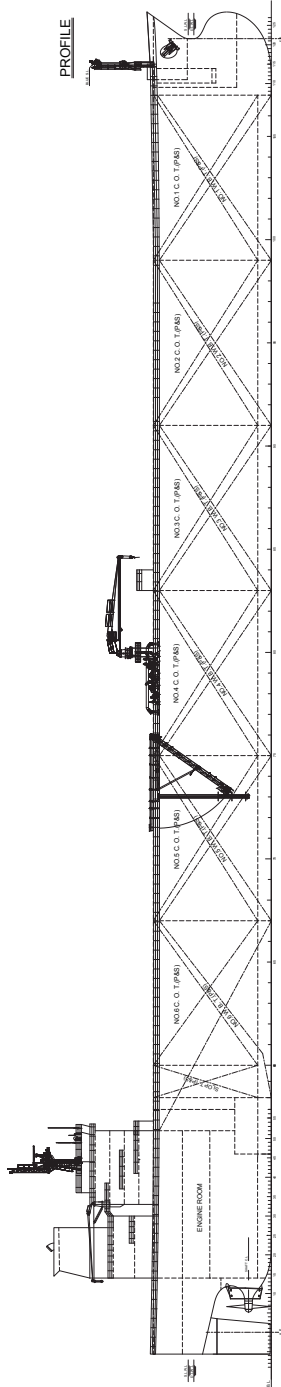
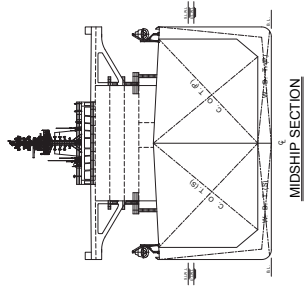
Fire detection system
 Make: Autronica
 Type: Address

Fire extinguishing systems
 Cargo holds:
 Make/Type: Tyco Sea Plus fixed-deck foam
 Engine room:
 Make/Type: NK/Water mist & Tyco Sea Plus high-expansion foam

Radars
 Number: 2
 Make: JRC
 Model(s): JMR-9282-S (S-band) x 1 / JMR-9225-6X (X-band) x 1

Integrated bridge system:No
 Waste disposal plant
 Incinerator
 Make: HMMC
 Model: Maxi NG100SL WS
 Waste shredder/crusher
 Make: Samjoo
 Model: BS515
 Sewage plant
 Make: Il Seung
 Model: ISB-03

Contract date: June 2015
 Launch/float-out date: December 2016
 Delivery date: April 2017





EVER BLISS: Container vessel

Shipbuilder: **CSBC Corporation**
 Vessel's name: **Ever Bliss**
 Hull No: **1065**
 Owner/Operator: **Greencompass Marine SA**
 Country: **Panama**
 Designer: **CSBC Corporation**
 Country: **China**
 Model test establishment used: **HSVA**
 Flag: **Panama**
 IMO number: **9786932**
 Total number of sister ships already completed (excluding ship presented): **1**

TECHNICAL PARTICULARS

Length oa: 211.9m
 Length bp: 206.90m
 Breadth moulded: 32.80m
 Depth moulded
 To upper deck: 16.8m
 Draught
 Scantling: 11.2m
 Design: 10.0m
 Gross: 32,546dwt
 Deadweight
 Design: 30,597dwt
 Scantling: 37,546dwt
 Speed, service (90% MCR): 21.8knots
 Bunkers (m³)
 Heavy oil: ca. 2,350
 Diesel oil: ca. 620
 Water ballast (m³): 12,910
 Daily fuel consumption (tonnes/day)
 Main engine only: 87.1
 Classification society and notations ABS
 +A1(E), "Container Carrier", SH, SHCM, FL(25),
 IHM, CPS, UWILD, +AMS, ENVIRO, +ACCU,
 BWT, BWE, TCM, CSC, CLP-V, RW, CGMV,
 SElev
 Main engine
 Design: MAN B&W
 Model: 8S70ME-C8.5
 Manufacturer: Hitachi Zosen Corp.
 Number: 1
 Type of fuel: HFO
 Output: 24,260kW x 91rpm
 Propeller(s)
 Material: Ni-Al-Bronze
 Designer/Manufacturer: ..CSBC / Nakashima
 Propeller Co., Ltd
 Number: 1
 Fixed/Controllable pitch: Fixed
 Diesel-driven alternators
 Number: 4
 Engine make/type: Daihatsu/ 6DK-26e
 Type of fuel: HFO, MGO
 Output/speed: 1,500kW x 720rpm each
 Boiler
 Number: 1
 Type: Vertical, oil-fired
 Make: Kangrim Heavy Industries Co., Ltd
 Output: 185kg/h x 3.0bar

Mooring equipment
 Number: ...2 x mooring winch/windlass + 6 x
 mooring winch
 Make: Manabe Zoki
 Type: Electric
 Special lifesaving equipment
 Number of each and capacity: 2 x 26
 persons
 Make: Fassmer-Marland Ltd
 Type: F.R.P. Totally Enclosed Lifeboat
 Hatch covers
 Manufacturer: SMS
 Type: Weather-tight (upper deck)
 Containers
 Lengths: 20ft / 40ft
 Heights: 8.6ft & 9.6ft
 Total TEU capacity: 2,926
 On deck: 1,918
 In holds: 1,008
 Homogeneously loaded to 14tonnes: .. 2,200
 TEU
 Reefer plugs: 342 sets
 Tiers/rows (maximum):
 Above coaming: 7/13
 In holds: 6/11
 Water ballast treatment system
 Make: Alfa Laval
 Capacity: 500 m³/hr
 Complement
 Officers: 15
 Crew: 11
 Bow thruster
 Make: Nakashima Propeller Co., Ltd
 Number: 1
 Output: 1,500kW
 Fire extinguishing systems
 Cargo holds:
 Make/Type: Air Water Safety Service Inc. /
 CO₂
 Public spaces:
 Make/Type: Fain/Portable fire extinguisher
 Radars
 Number: 3
 Make: JRC Radio Co., Ltd
 Contract date: 10 August 2015
 Launch/float-out date: 30 April 2017
 Delivery date: 3 September 2017

EVER BLISS is a 2,926 TEU container vessel which is the first of a series of 10. It was delivered in September 2017 and is owned by Greencompass Marine SA.

According to its builder, Taiwan's CSBC Corporation, *Ever Bliss* has a number of features which confer outstanding performance. Energy-saving technologies include a twisted rudder, a rudder bulb, a highly efficient propeller design and CSBC's unique Sea Sword Bow (SSB).

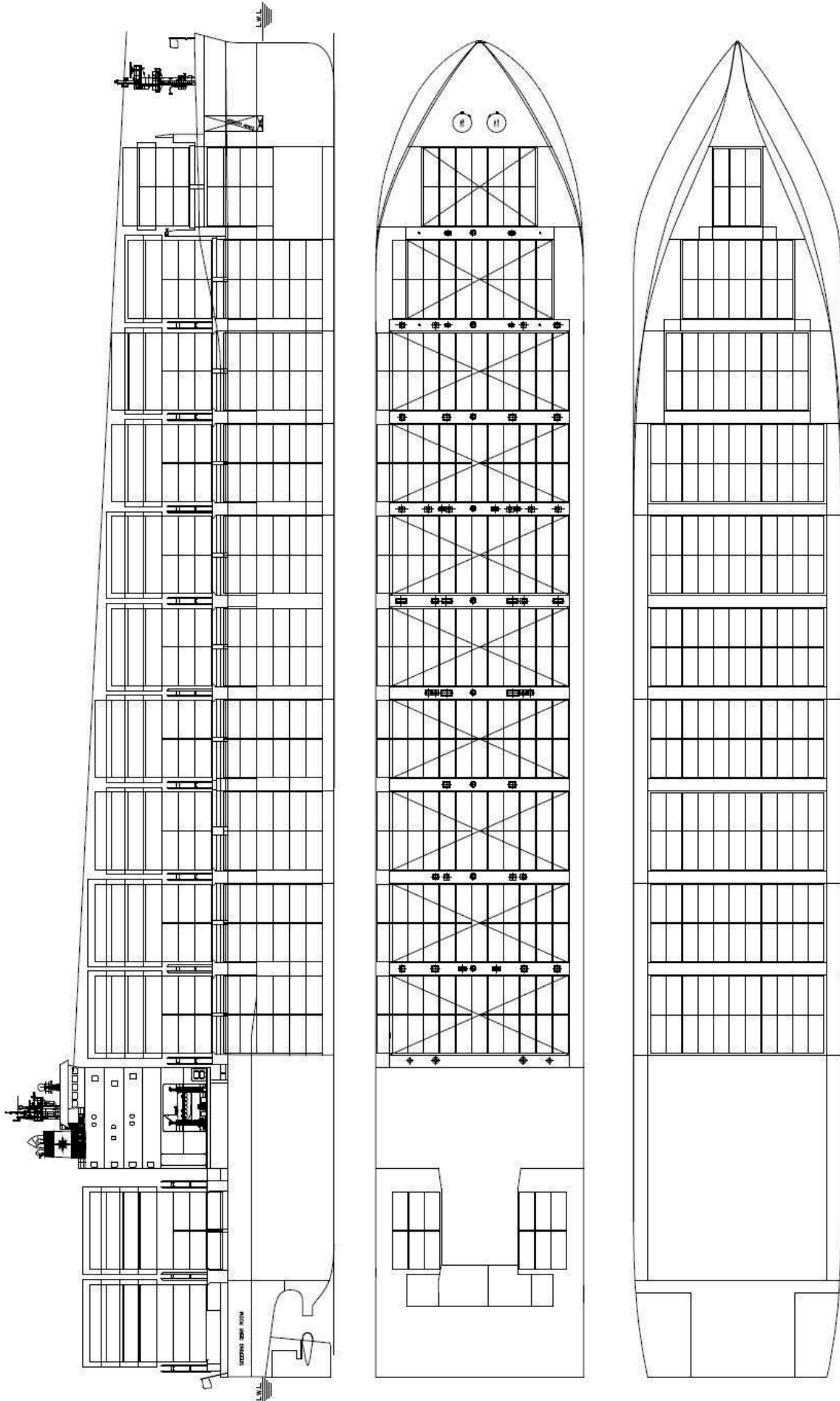
The SSB's design is said to be less sensitive to trim and draft and its speed loss and the probability of deck wetness are less than with a bulbous bow. Using SSB-equipped vessels, owners can reduce operating costs in a variety of sea conditions, and across a wide range of operating profiles.

Ever Bliss is also a wide-beam design. This provides sufficient stability requiring minimum water ballast. In turn, this results in less of a propulsive power requirement and lower pollution emissions.

A Russian Stowed-type deck container system is used. This allows container arrangement to be more flexible and improves loading/unloading operations. The vessel complies with ABS CSC and CLP-V notation and this makes it possible to load more cargo in light of different weather and trading routes.

The vessel is equipped with an MGO cooler, a ballast water treatment system and further energy-saving countermeasures and environmental protection equipment.

Spaces are reserved to permit installation of an AMP system which would allow the vessel to shut down its generator engines and reduce emissions while docked. To enable compliance with stricter air emission regulations in the future, spaces have also been put aside to allow installation of an SOx scrubber. This would allow compliance with ABS's SOx Scrubber Ready (Level 1) notation.





GREAT INTELLIGENCE: Bulk carrier

Shipbuilder: **CSSC Huangpu Wenchong Shipbuilding Company Limited**
 Vessel's name: **Great Intelligence**
 Hull No: **H5493**
 Owner/Operator: **China State Shipbuilding Corporation Limited / Sinotrans Ship Management Ltd**
 Country: **China**
 Designer: **Shanghai Merchant Ship Design & Research Institute**
 Country: **China**
 Flag: **Hong Kong, China**
 IMO number: **9800623**
 Total number of sister ships already completed (excluding ship presented): **0**

GREAT INTELLIGENCE is a handy-sized worldwide-trade bulk carrier which has been designed and developed by the Shanghai Merchant Ship Design & Research Institute, CSSC (SDARI).

The Intelligent Dolphin 38 design is a reimagining of SDARI's earlier Green Dolphin 38, which emphasised fuel and energy efficiency, environmental friendliness, safety, operational flexibility and ease of maintenance. *Great Intelligence* has an integrated information platform, customised applications and a redundant cyber system to realise smart sense, smart analysis and smart decision support for navigation, operations and maintenance as well as energy management. A number of smart data analysis models with self-learning capabilities can automatically offer model training and optimise the ship sailing process. The data acquired and processed onboard can be transmitted to shore-based workstations via the V-sat system.

Great Intelligence is the first commercial vessel with Lloyd's Register's latest notations for cyber-enabled autonomous ship and CCS notations for intelligent ship.

The vessel is designed to carry solid bulk cargoes and timber may be carried on hatch covers. The vessel has five cargo holds, of which Nos.2, 3 and 4 are box-type. The daily fuel oil consumption of the main engine is 16.9t/day at a service speed of 13.9kt and a 9.5m draft. The attained EEDI is below that required by EEDI phase 2. The noise level meets the new MSC.337 (91) Resolution for noise levels onboard ships.

TECHNICAL PARTICULARS

Length oa: 179.95m
 Length bp: 177.00m
 Breadth moulded: 32.00m
 Depth moulded
 To main deck: 15.00m
 Width of double skin
 Side: 2.50m
 Bottom: 1.78m

Draught
 Scantling: 10.50m
 Design: 9.50m
 Gross: 25,561gt
 Deadweight
 Design: 33,440dwt
 Scantling: 38,797dwt
 Speed, service: 13.9knots
 Cargo capacity (m³)
 Grain: 50,906
 Bunkers (m³)
 Heavy oil: 1000
 Diesel oil: 350
 Water ballast (m³): 16770
 Daily fuel consumption (tonnes/day)
 Main engine only: 16.9

Classification society and notations: LR
 +100A1 Bulk Carrier, ESP, CSR, BC-A,
 Holds Nos.2,4 may be Empty, Grab[20],
 Shipright(CM,ACS(B,D)), *IWS, LI,
 ECO(BWT,EEDI,IHM,P)
 +LMC, UMS, With the descriptive notes:
 ShipRight(BWMP(F,T), SCM, SERS, Cyber AL2
 SAFE (Navigation, Propulsion, Steering), Cyber
 AL2 MAINTAIN (M/E, A/E, Boiler, Shaft), Cyber
 AL2 PERFORM (Energy Management))
 CCS
 CSA Bulk Carrier; CSR; BC-A; Holds Nos. 2 &
 4 may be Empty; Grab(20); CM; PSPC(B,D);
 Loading Compute(S,I,G); ESP; In-Water Survey;
 EEDI(II); GPR
 CSM AUT-O; SCM; BWMP; BWMS, I-SHIP(N,
 E, M, I)

Main engine
 Design: WinGD
 Model: W5X52
 Manufacturer: Hudong Heavy Machinery Co., Ltd
 Type of fuel: HFO/LSMGO
 Output: 6,408kW x 99rpm

Propellers
 Material: Ni-Al-Bronze
 Designer/Manufacturer: SDARI/Wärtsilä - CME
 Number: 3
 Fixed/Controllable pitch: Fixed
 Diameter: 6.4m

Diesel-driven alternators
 Number: 3
 Engine make/type: Anqing CSSC Diesel Engine Co.,Ltd / 6DE-18
 Type of fuel: HFO/LSMGO
 Output/speed of each set: 660kW x 720rpm
 Alternator make/type: ZhenJiang

China Marine-XianDai Generating Co., Ltd /
 HFC6 504-14K
 Output/speed of each set: 600 kW x 720rpm
 Boiler
 Number: 1
 Type: Composite
 Make: Jiu Jiang Hai Tian Equipment Manufacture Co., Ltd
 Output: ca.1,500kg/h (oil-fired section) /
 ca. 550kg/h (M/E exh. gas section) /
 ca.140kg/h (A/E exh. gas section)

Cargo cranes/cargo gear
 Number: 4
 Make: TTS Bohai Machinery (Dalian) Co., Ltd
 Type: Electro-hydraulic wire rope luffing jib crane
 Performance: 30t x 26m

Other cranes
 Number: 1
 Make: Zhenjiang Marine Auxiliary Machinery Works
 Type Monorail
 Tasks: Single-beam provisions crane
 Performance: 4t SWL

Mooring Equipment
 Number: 2
 Make: South China Marine Machinery Co., Ltd
 Type: Hydraulic

Special lifesaving equipment
 Number of each and capacity: 1 x 25 persons
 Make: Zhenjiang Marine Auxiliary Machinery Works
 Type: Free-fall

Hatch covers
 Design: TTS Hua Hai Ships Equipment Co., Ltd
 Manufacturer: TTS/shipyard
 Type: Upper deck

Ballast control system
 Make: Nordic Flow Control Pte Ltd
 Type: Electric-hydraulic, with common power unit for hydraulic actuators

Water ballast treatment system
 Make: JiuJiang Precision Measuring Technology Research Institute
 Capacity: 800m³/h x 2 sets

Complement
 Officers: 13
 Crew: 12
 Suez/Repair Crew: 1
 Stern appendages/special rudders: ... Fan duct

Bridge control system
 Make:CSSC System Engineering Research Institute
 Is bridge fitted for one-man operation?No

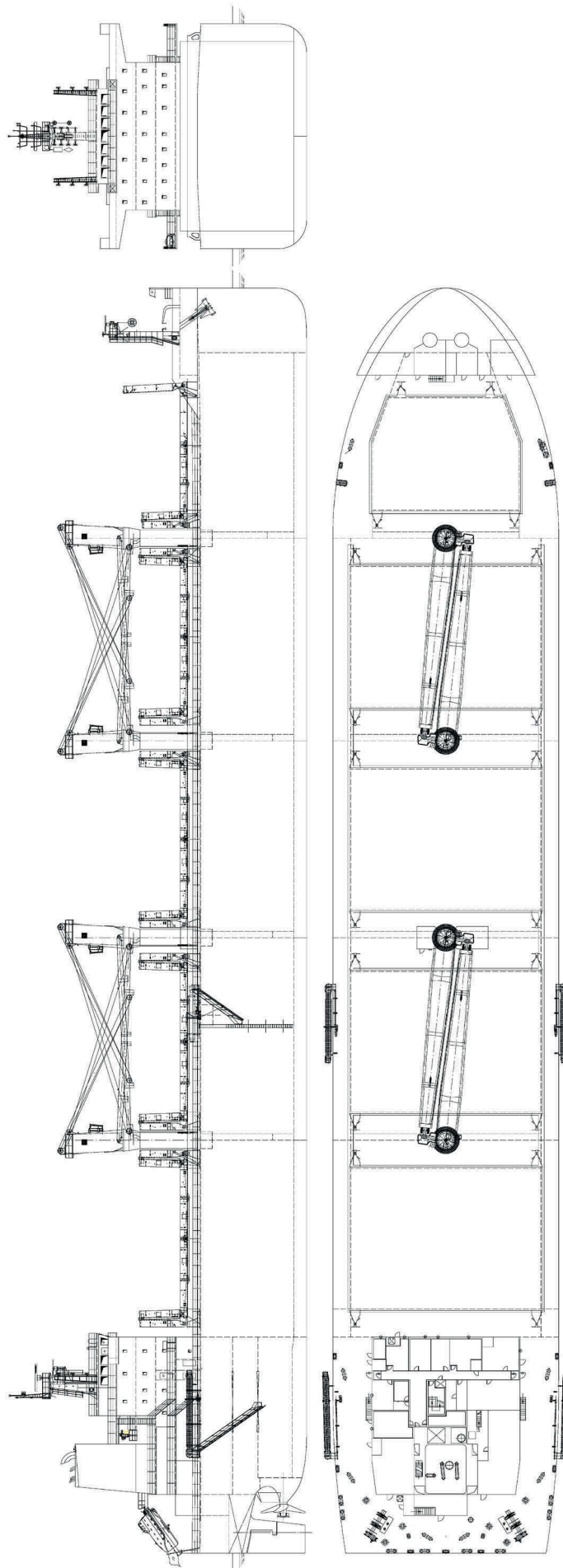
Fire detection system
 Make: Consilium
 Type: Salwico Cargo

Fire extinguishing systems
 Cargo holds no.s 1-5
 Make/Type: ZheJiang YaNing Fire Fighting Equipment Co., Ltd/ CO₂
 Engine room (E/R and purifier room)
 Make/Type: ZheJiang YaNing Fire Fighting Equipment Co., Ltd/ CO₂
 Engine room: E/R
 Make/Type: Tyco & Seaplus Co., Ltd/ water mist

Cabins
 Type: Portable fire extinguisher
 Public spaces
 Type: Portable fire extinguisher

Radars
 Number: 3
 Make:CSSC Marine Technology Co., Ltd
 Model: XTZN01

Waste disposal plant
 Incinerator
 Make: Nanjing Luzhou
 Model: OG120C
 Contract date: 2015
 Delivery date: 6 December 2017





GUANG ZHOU WAN: Asphalt / oil tanker

Shipbuilder: **Qing Dao Wu Han Heavy Industry Co., Ltd**
 Vessel's name: **Guang Zhou Wan**
 Hull No: **AH0002AL**
 Owner/Operator: **China COSCO Shipping Corp. Ltd**
 Country: **China**
 Designer: **Shanghai Merchant Ship Design & Research Institute, CSSC**
 Country: **China**
 Model test establishment used: **China Ship Scientific Research Centre**
 Flag: **China**
 IMO number: **980578**
 Total number of sister ships already completed (excluding ship presented): **1**

TECHNICAL PARTICULARS

Length oa: 145.9m
 Length bp: 138.0m
 Breadth moulded: 22.6 m
 Depth moulded
 To main deck: 11.80m
 To upper deck: 11.80m
 Width of double skin
 Side: 1.70m
 Draught
 Scantling: 7.90m
 Gross: 11,081t
 Displacement: 19,800gt
 Lightweight: 6,500t
 Deadweight
 Scantling: 13,300dwt
 Block co-efficient (please state relevant draught): 0.7837 at scantling draught
 Speed, service: 14.0knots at design draught, at 0.85 CMCR

Cargo capacity (m³)
 Liquid volume: 12,800
 Bunkers (m³)
 Heavy oil: 900
 Diesel oil: 270
 Water ballast (m³): 4,900
 Daily fuel consumption (tonnes/day)
 Main engine only: 14.8
 Classification society and notations: CCS
 ★ CSA Asphalt Carrier / Oil Tanker, Independent tank Maximum Cargo Temperature
 • 200 C, F.P.>60 C, Double Hull; PSPC(B); Loading Computer(S,I,D); In-Water Survey; BWMP(MEPC.127(53))
 ★ CSM AUT-0, SCM; VCS; Clean, GPR, FTP

% high-tensile steel used in construction: ca. 30

Heel control equipment: Anti-heeling system
 Main engine
 Design: MAN B&W
 Model: 6S40ME-B9.5
 Manufacturer: Dalian Marine Diesel Co., Ltd
 Number: 1
 Type of fuel: HFO & MDO & MGO
 Output of each engine: 4,320kW x 111r/min
 Propeller
 Material: Ni-Al-Bronze
 Designer/Manufacturer: Shanghai Marine Propeller Design Co., Ltd

Number: 1
 Fixed/Controllable pitch: Fixed
 Diameter: 5.20m
 Speed: 14.0kt

Diesel-driven alternators
 Number: 3
 Engine make/type: Wärtsilä Qiyao Diesel Company Ltd / 645W4L20
 Type of fuel: HFO & ULSFO & MDO & MGO
 Output/speed of each set: 680kW x 900rpm
 Alternator make/type: CSIC / 1FC6 506-8SA83
 Output/speed of each set: 645kW x 900rpm

Boilers
 Number: 2+1+2
 Type: RMS 8/2Z x2 + EXV5-40-60-57-800DD x1 + EXV3-25-29-33.7-500DD x2
 Make: Alfa-Laval
 Output, each boiler: 2000kW x 2 + 550kW x 1 + 140kW x 2

Cargo cranes/cargo gear
 Number: 1
 Make: Shanghai Hengyuan
 Type: Single-jib, cylinder-luffing and slewing crane
 Performance: 5t x 16m SWL

Other cranes
 Number: 1
 Type: gravity single-arm, electric-hydraulic driven, explosion-proof auxiliary
 Tasks: lifting engine room parts
 Performance: 2t x 4m SWL

Mooring equipment
 Number: 4
 Make: Wuhan Marine Machinery
 Type: Electric

Special lifesaving equipment
 Number of each and capacity: 1 x 23 persons
 Make: Jiangyin Neptune Marine Appliance Co., Ltd
 Type: Fully enclosed free-fall

Hatch covers
 Design: Nanjing Haixu
 Manufacturer: Nanjing Haixu
 Type: Upper deck

Water ballast treatment system
 Make: COSCO (WeiHai) Shipbuilding Marine Technology Co. Ltd
 Capacity: 500m³/h x 2

Complement
 Officers: 14
 Crew: 13
 Suez/Repair Crew: 6

Bow thruster(s)
 Make: Schottel
 Number: 1
 Output: 550kW

Bridge control system
 Make: Furuno
 Is bridge fitted for one-man operation? No

Fire detection system
 Make: Consilium
 Type: Salwico Cargo

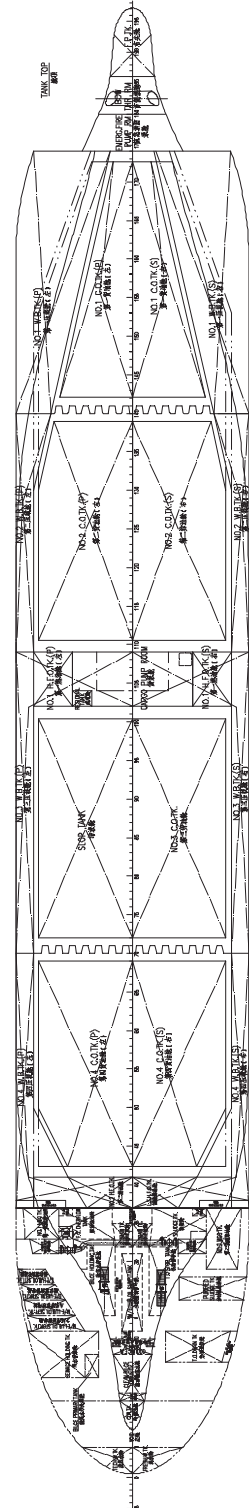
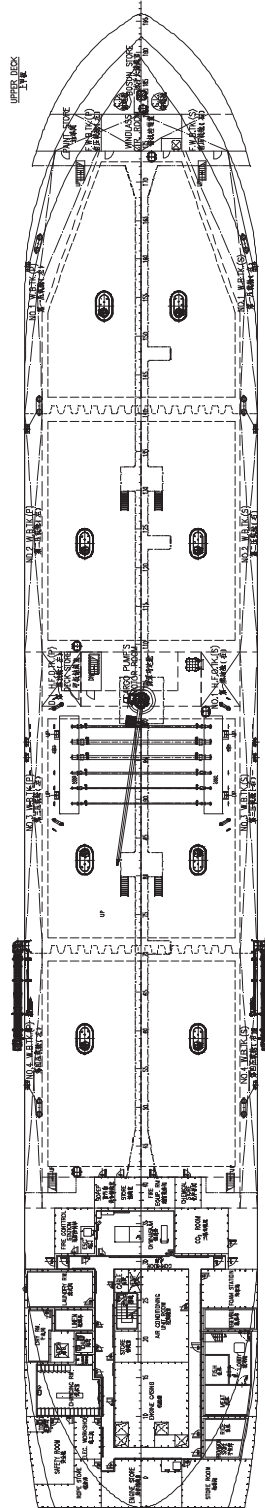
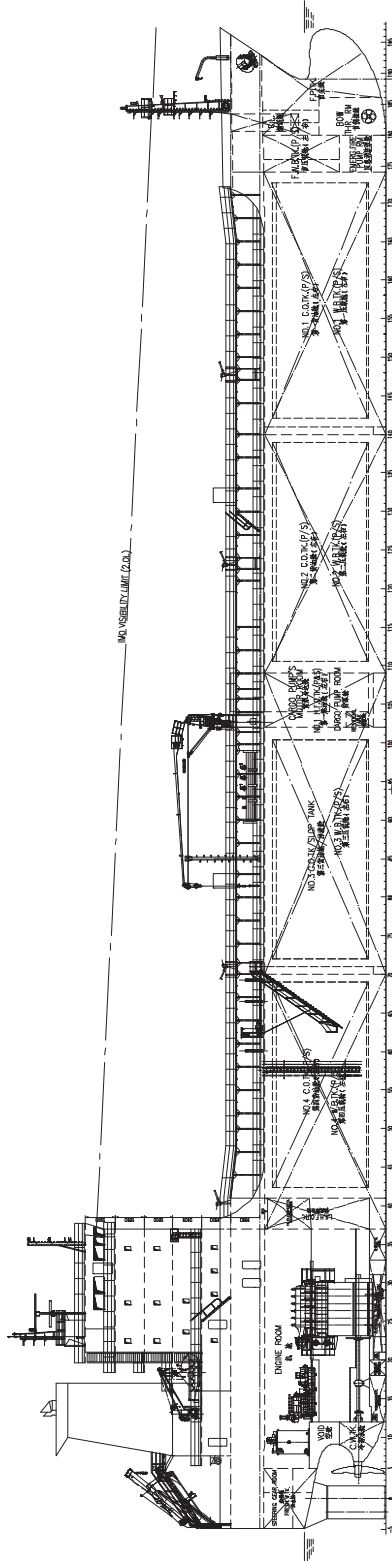
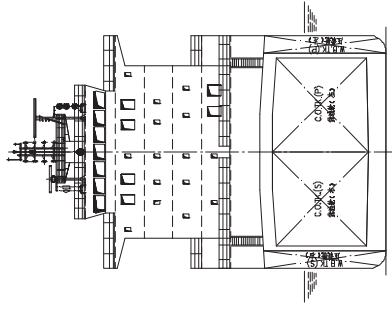
Fire extinguishing systems
 Cargo holds: CO₂
 Make: NK (NK Co., Ltd)
 Engine room: CO₂
 Make: NK (NK Co., Ltd)

Radars
 Number: 2
 Make: JRC
 Models: JMR-9230-S3 / JMR-9225-9X3

Waste disposal plant
 Incinerator
 Make: Hansun(Shanghai) Marine Technology Co. Ltd
 Model: HSINC-50A

Sewage plant
 Make: Hansun(Shanghai) Marine Technology Co. Ltd
 Model: ST-30U

Contract date: December 2014
 Launch/float-out date: 29 December 2015
 Delivery date: 20 March 2017





ILSHIN GREEN IRIS: Bulk carrier

Shipbuilder: **Hyundai Mipo Dockyard Co., Ltd**
 Vessel's name: **Ilshin Green Iris**
 Hull No: **6156**
 Owner/Operator: **Ilshin Shipping**
 Country: **Republic of Korea**
 Designer: **Hyundai Mipo Dockyard Co., Ltd**
 Country: **Republic of Korea**
 Model test establishment used: **KRISO**
 Flag: **Republic of Korea**
 IMO number: **9812602**
 Total number of sister ships already completed (excluding ship presented): **0**

ILSHIN GREEN IRIS is a 50,000dwt bulk carrier that Hyundai Mipo Dockyard (HMD) delivered to Ilshin Shipping in November 2017. The vessel was designed by HMD and it is registered under the Korean flag with KR Class Rules.

The vessel is an ocean-going bulk carrier with a bulbous bow, transom stern, flush deck with forecastle and an open water-type stern frame. It has a single rudder and a single-screw propeller driven by a slow-speed dual-fuel engine.

The propulsion machinery and living quarters including the navigation bridge are located aft. The vessel has a continuous deck from stem to stern, transverse bulkheads and a double bottom to the cargo hold and engine room.

The vessel has a dual-fuel main engine. An LNG fuel tank is located on the aft deck and the fuel gas supply system is located in a room next to it.

There is a fore peak tank, void space, chain lockers and paint and bosun stores. The cargo space consists of five holds and five pairs of water ballast tanks. The top side and double bottom ballast tanks are interconnected. The No.3 cargo hold can be used as a water ballast tank at heavy ballast condition and, when full, Panama transit condition.

The heavy fuel oil and marine diesel oil storage tanks are topside wing tanks, both with double hulls.

Finally, there are an aft peak tank, steering gear compartment, freshwater tanks and stern tube cooling.

TECHNICAL PARTICULARS

Length oa: ca. 190.6m
 Length bp: 184.0m
 Breadth moulded: 32.26m
 Depth moulded
 To main deck: 17.30m
 To upper deck: 17.30m
 Width of double skin
 Side: Single-hull
 Bottom: 1.8m

Draught
 Scantling: 12.00m
 Design: 10.15m

Deadweight
 Design: abt. 39,600dwt
 Scantling: abt.50,000dwt

Speed, service (NCR with 10% sea margin): ca. 14knots

Cargo capacity (m³)
 Bale: ca. 61,750
 Grain: 64,000

Bunkers (m³)
 Heavy oil: ca. 480
 Diesel oil: ca. 440
 Water ballast (m³): ca. 17,750

Daily fuel consumption (tonnes/day)
 Main engine only: 17.0 (gas mode), 21.3 (diesel mode)

Auxiliaries:
 No.1: 2.6 (diesel mode)
 No.s 2, 3: 5.1 (diesel mode, each engine), 4.6 (gas mode, each engine)

Classification society and notations: KR +KRS 1 -Bulk Carrier 'ESP'(CSR), BC-A(Hold No.2&4 may be empty), GRAB[20], LI, BWE, IWS, PSPC, CLEAN1, Seatrust(HCM) +KRM1 - UMA GFS(dual fuel)

LR +100A1 Bulk Carrier, CSR, ESP, BC-A(Holds no.2 and 4 may be empty) GRAB[20], LI, *IWS, +LMC, LFPF(GF,NG), ShipRight(ACS(B),CM), with descriptive notes ShipRight(SCM,BWMP(S+F))

Main engine
 Design: Hyundai-MAN-B&W
 Model: 6G50ME-C9.5-GI (TIER II)
 Manufacturer: HHI
 Number: 1
 Type of fuel: HFO, MDO, LNG
 Output: 7,250kW (SMCR) / 5,597 (NCR)

Propeller
 Material: Ni-Al-Bronze
 Designer/Manufacturer: HMD/HHI-EMD
 Number: 1

Fixed/Controllable pitch: Fixed
 Diameter: 6.8m
 Speed: 88.7rpm at MCR

Diesel-driven alternators (no.1)
 Number: 1
 Engine make/type: HHI-EMD (HIMSEN/5H17/28)
 Type of fuel: HFO, MDO
 Output/speed of each set: 556kW at 900rpm
 Alternator make/type: HHI-EES/HFC7 456-08P
 Output/speed of each set: 560kW/60Hz /450VAC

Diesel-driven alternators (no.s 2&3)
 Number: 2
 Engine make/type: Wärtsilä/6L20DF
 Type of fuel: HFO, MDO, LNG
 Output/speed of each set: 1,110kW / 1200rpm
 Alternator make/type: HHI-EES/HFC7 50FR
 Output/speed of each set: 1300kW/ 60Hz/450VAC

Boiler
 Number: 1
 Type: Composite boiler
 Make: Kangrim Heavy Industry
 Output: 1,500 x 400kg/hr

Other cranes
 Number: 1
 Make: Dongnam Marine Crane
 Type: Electro-hydraulic
 Tasks: Provision handling
 Performance: 4t x 10.5m

Mooring equipment
 Number: 4 sets
 Make: Fluteck Ltd
 Type: Electro-hydraulic

Special lifesaving equipment
 Number of each and capacity: 20 persons
 Make: HLB
 Type: Free-fall

Hatch covers
 Design: SMS Marine System
 Manufacturer: SMS Marine System
 Type: Hydraulic folding (upper deck)

Cargo tanks
 Number: 5
 Product range: Grain, iron ore, coal, limestone

Ballast control system
 Make: Hanla IMS
 Type: Pneumatic valve remote control system

Complement
 Officers: 12
 Crew: 8
 Suez/Repair Crew: 6
 Single/other rooms: 20 / 1

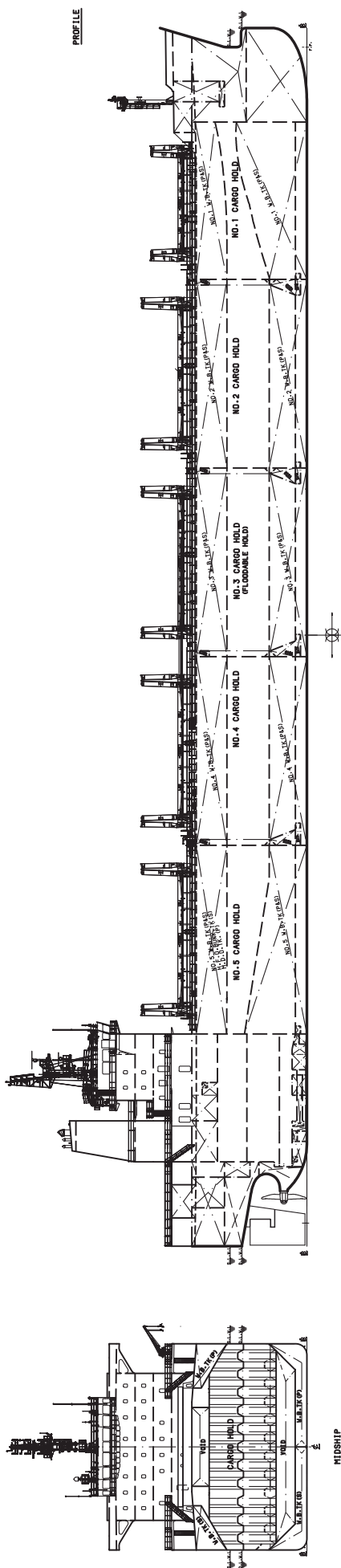
Fire detection system
 Make: B-I industrial Co., Ltd
 Type: BDS-4000

Fire extinguishing systems
 Cargo holds: Sea water
 Type: Hydrant valve with hose
 Engine room: CO₂
 Make/Type: Fain / High-pressure fixed

Radars
 Number: 2
 Make: JRC
 Models: JMR-9282-S, JMR-9225-6X

Waste disposal plant
 Incinerator
 Make: HMMCO
 Model: MAXI NG25SL WS
 Sewage plant
 Make: Jonghap
 Model: JMC-BIO AEROB-12N(A)

Contract date: 13 June 2016
 Launch/float-out date: 15 September 2015
 Delivery date: 19 December 2017





KOKAKO: Bitumen/product/chemical tanker

Shipbuilder: **Hyundai Mipo Dockyard Co., Ltd**
 Vessel's name: **Kokako**
 Hull No: **2561**
 Owner/Operator: **ASP Ship Management**
 Country: **Australia**
 Designer: **Hyundai Mipo Dockyard Co., Ltd**
 Country: **Republic of Korea**
 Model test establishment used: **Bulgarian Ship Dynamics Centre**
 Flag: **New Zealand**
 IMO number: **9804124**
 Total number of sister ships already completed (excluding ship presented): **0**

KOKAKO is a 49,000dwt ocean-going bitumen/product/chemical tanker. In November 2017, it was delivered to ASP Ship Management by Hyundai Mipo Dockyard (HMD). The vessel was designed by HMD, conforms to BV Class Rules and is registered under the New Zealand flag.

It has a bulbous bow, transom stern, flush deck with forecabin and an open water-type stern frame. There is a Promas rudder and a single-screw propeller driven by a slow-speed diesel engine.

The propulsion machinery, living quarters and navigation bridge are located aft.

The vessel has five pairs of cargo tanks, one pair of slop tanks, six pairs of water ballast tanks and two pairs of independent bitumen tanks in the No.3 cargo hold.

The main engine, diesel generator engines and hydraulic powerpack engines are designed to IMO Tier II NOx emission limits and provided with high-pressure SCR to comply with the IMO Tier III NOx emission limit according to NTC 2008.

The IMO-approved ballast water treatment system is based on electro-chlorination. It is installed in a dedicated ballast water treatment room situated on the upper deck and enables the vessel to comply with the Regulation D2 Standard.

TECHNICAL PARTICULARS

Length oa: ca. 183m
 Length bp: 174m
 Breadth moulded: 32.2m
 Depth moulded
 To main deck: 19.1m
 Draught
 Scantling: 13.3m
 Design: 11.0m
 Gross: ca. 29,700gt
 Deadweight
 Design: 37,000dwt
 Scantling: 48,900dwt

Speed, service (NCR with 15% sea margin): ca. 14.4knots
 Cargo capacity (m³)
 Liquid volume: 49,100
 Bunkers (m³)
 Heavy oil: 1,360
 Diesel oil: 210
 Water ballast (m³): 21,600
 Daily fuel consumption (tonnes/day)
 Main engine only: 21.4
 Classification society and notations: BV I, +HULL, +MACH, Asphalt carrier (220C) -Oil Tanker CSR CPS(WBT), ESP, Chemical Tanker ESP (Ship type 3), Unrestricted navigation, +AUT-UMS, VCS, MON-SHAFT, IN WATER SURVEY, SPM, IG, ALP

Main engine
 Design:Hyundai-MAN-B&W
 Model: 6G50ME-C9.5-HPSCR
 Manufacturer: HHI
 Number: 1
 Type of fuel: HFO, MDO
 Output: 8,630kW x 92.4rpm

Propeller
 Material: Ni-Al-Bronze
 Designer/Manufacturer:HMD / HHI-EMD
 Number: 1
 Fixed/Controllable pitch: Fixed
 Diameter: 6.8m
 Speed:8630kW x 92.4 rpm (MCR)

Diesel-driven alternators
 Number: 3
 Engine make/type: HHI-EMD / HIMSEN 6H21/32
 Type of fuel: HFO, MDO
 Output/speed of each set: 1,170kW x 900rpm
 Alternator make/type:HHI-EES / HFCT508-8P
 Output/speed of each set: 1,100kW x 900rpm

Boilers
 Number: 2
 Type:Auxiliary boiler (oil-fired), Comp. boiler (oil-fired + exhaust gas)
 Make:Kangrim
 Output, each boiler: 18,000kg/h & 2,500 kg/h (2000 + 500)

Cargo cranes/cargo gear
 Number: 1
 Make: Dongnam Marine Crane
 Type: Electro-hydraulic
 Performance: 10 x 23m

Other cranes
 Number: 1
 Make: Dongnam Marine Crane
 Type: Electro-hydraulic
 Tasks: Provision handling
 Performance: 4t x 9m

Mooring equipment
 Number: 6
 Make: Flutek Ltd
 Type: Electro-hydraulic

Special lifesaving equipment
 Number of each and capacity: 2 x 24 persons
 Make:Jiangyinshi Beiahi Lsa Co., Ltd
 Type:Totally enclosed, Davit launching

Cargo tanks
 Number: 10 + 2 (slop tanks) + 4 (independent bitumen tanks)
 Grades of cargo carried: ...Bitumen/product/chemical
 Product range: Ship type 3
 Coated tanks – Chokwang Jotun Ltd
 Stainless steel – structure/piping: ... N/A / JIS G3459

Cargo pumps
 Number: 14 (10 for cargo tanks, 2 for slop tanks, 2 for bitumen tanks)
 Type:Centrifugal, hydraulically driven, submergible-type for cargo and slop tanks / dry-mounted, hydraulically driven, screw-type for bitumen tanks
 Make:FRAMO
 Capacity (each): 600m³/h x 125m (cargo tanks), 300m³/h x 125m (slop tanks), 400m³/h x 125m (bitumen tanks)

Cargo control system
 Make: Framo
 Type: Remotely controlled

Ballast control system
 Make: Aconis
 Type: Remotely controlled

Water ballast treatment system
 Make: Techcross
 Capacity: 2,000m³/h x 2

Complement
 Officers: 13
 Crew: 11
 Suez/Repair Crew: 6
 Single/double/other rooms: 24
 Stern appendages/special rudders:Promass rudder

Bow thrusters
 Make:Kawasaki
 Number: 1
 Output: 1300kW x 1160 rpm

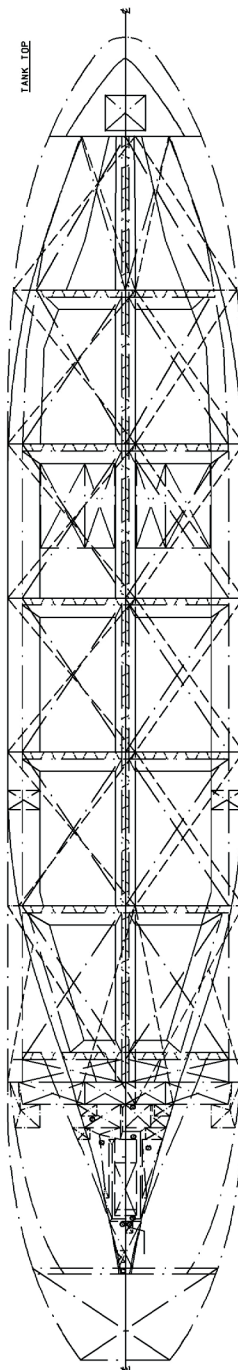
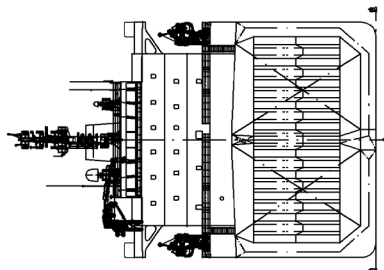
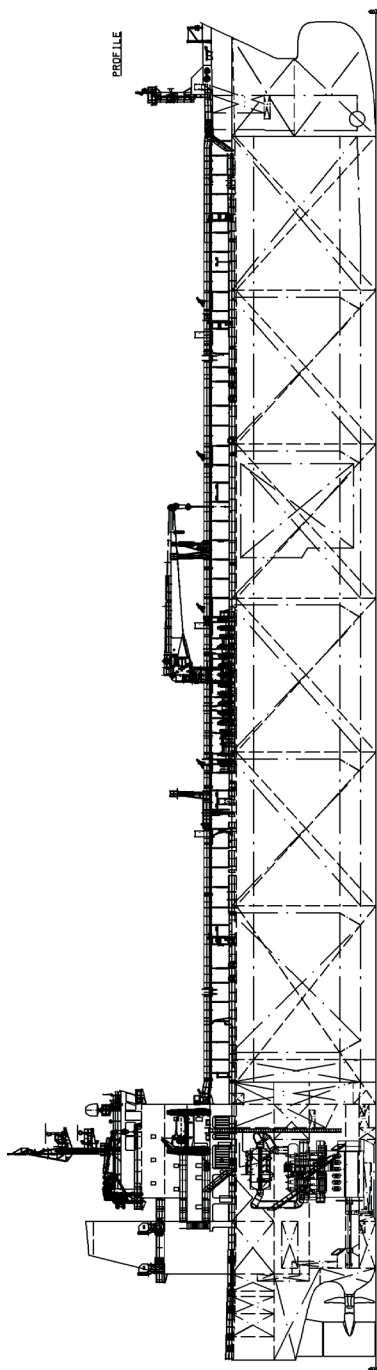
Bridge control system
 Make: HHI-EES
 Type: Floor-mounting and self-standing
 Is bridge fitted for one-man operation? ...Yes

Fire extinguishing systems
 Cargo holds: Inert gas
 Make/Type: Maritime Protection
 Engine room: CO₂
 Make/Type: NK

Radars
 Number: 2
 Make: Furuno
 Models: FAR-2837S (S-band), FAR-2827 (X-band)

Waste disposal plant
 Incinerator
 Make:Hyundai-Atlas
 Model: MAXI IG50SL WS

Sewage plant
 Make: Il Seung Co., Ltd
 Model: ISB-02
 Contract date: 28 January 2018
 Launch/float-out date: 25 August 2017
 Delivery date: 29 November 2017





LAVENDER: Car and truck ferry

Shipbuilder: **Mitsubishi Heavy Industries**
 Vessel's name: **Lavender**
 Hull No: **1196**
 Owner/Operator: **Shin Nihonkai Ferry Co., Ltd**
 Country: **Japan**
 Designer: **Mitsubishi Heavy Industries**
 Country: **Japan**
 Model test establishment used: **MHI Nagasaki R&D Centre**
 Flag: **Japan (Otaru)**
 IMO number: **9810824**
 Total number of sister ships already completed (excluding ship presented): **1**

LAVENDER is a 6,177dwt, 197m-long ferry which was built by Mitsubishi Heavy Industries and delivered to Shin Nihonkai Ferry Co., Ltd in February 2017. The ro-pax, which operates on a regular route between Niigata and Otaru in the Sea of Japan, has capacity for 150 trucks and 22 cars on three fixed decks, and 600 passengers in 137 cabins. Stern side and stern centre doors, a side door and a turntable facilitate embarkation/disembarkation.

Lavender and its sister ship, *Azalea*, employ a newly-developed hull design, the Vertical Stem Form, which increases the waterline length and is said to reduce resistance. Hydrodynamic performance is further enhanced by a Mitsubishi Air Lubrication System (MALS).

Main power is provided by two Wärtsilä 16V38C dual-fuel (HFO and MMDO) engines, each 11,000kW, and these each drive a 5.4m Kawasaki Heavy Industries controllable pitch propeller. There is a bulb-equipped reaction rudder, and to assist with sea-keeping there is an auto-heeling system and fin stabiliser. Manoeuvrability is assisted by two bow and two stern thrusters, all of which are provided by Kawasaki Heavy Industries.

TECHNICAL PARTICULARS

Length oa: 197.45m
 Length bp: 188.00m
 Breadth moulded: 26.60m
 Depth moulded
 To main deck: 9.90m
 To upper deck: 20.30m
 Draught
 Scantling: 7.20m
 Design: 7.20m
 Gross: 31,389gt
 Deadweight
 Design: 6,177dwt
 Scantling: 6,177dwt

Speed, service: 25knots
 Bunkers (m³)
 Heavy oil: 771
 Diesel oil: 138
 Water ballast (m³): 3,402

Daily fuel consumption (tonnes/day)
 Main engine only: 87.3
 Heel control equipment: Auto-heeling system
 Roll-stabilisation equipment: Fin stabiliser

Main engines
 Design: Wärtsilä
 Model: 16V38C
 Manufacturer: Wärtsilä
 Number: 2
 Type of fuel: HFO & MDO
 Output of each engine: 11,000kW

Gearboxes
 Make: Wärtsilä
 Model: SH116-P67
 Number: 2

Propellers
 Material: CAC703
 Designer/Manufacturer: Kawasaki Heavy Industries, Ltd
 Number: 2
 Fixed/Controllable pitch: Controllable
 Diameter: 5.4m

Main-engine driven alternators
 Number: 2
 Make/type: Nishisiba Electric Co., Ltd

Diesel-driven alternators
 Number: 3
 Engine make/type: Daihatsu Diesel Mfg Co., Ltd / 6DK-26e
 Type of fuel: HFD & MDO
 Output/speed of each set: 720min-1

Boiler
 Number: 1
 Make: Miura Co., Ltd
 Output: 3,000kg/h

Mooring equipment
 Number: 5 x mooring winch, 2 x windlass
 Make: Manabe Zoki Co., Ltd
 Type: Electro-hydraulic

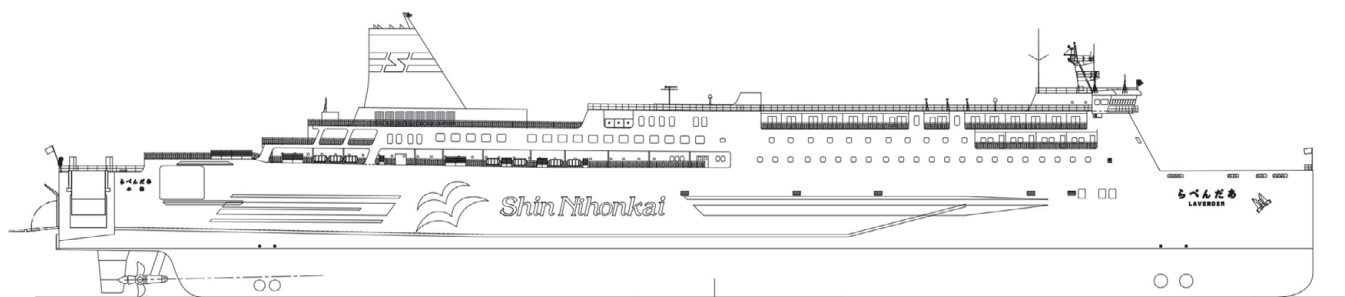
Special lifesaving equipment
 Number of each and capacity: MES-2
 Make: Fujikura Rubber Ltd
 Type: FSMES-180 • N
 If MES, vertical or sloping chutes?: Vertical

Vehicles
 Number of vehicle decks: 3 fixed
 Total cars: Truck 150, car 22
 Doors/ramps/lifts/moveable car decks
 Number of each: 4
 Type: 1 x stern side ramp, 1 x stern centre ramp, 1 x side door, 1 x turntable
 Designer: Kyoritsu Kikai Co., Ltd
 Ballast control system
 Make: Nyk Trading Corp.
 Complement
 Officers: 10
 Crew: 32
 Supernumeraries/Spare: 12
 Passengers
 Total: 600
 Number of cabins: 137
 Stern appendages/special rudders: ... Reaction rudder with bulb

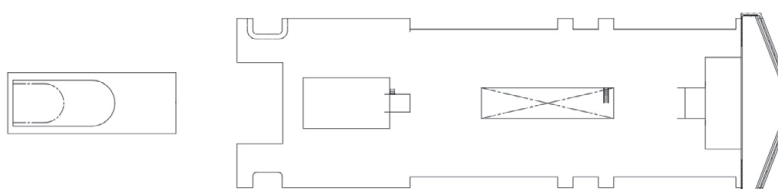
Bow thrusters
 Make: Kawasaki Heavy Industries, Ltd
 Number: 2
 Output (each): 17.5t
 Stern thrusters
 Make: Kawasaki Heavy Industries, Ltd
 Number: 2
 Output (each): 12.5t
 Bridge control system
 Make: Nabtesco
 Type: Electric

Fire detection system
 Make: Consilium Niitan Marine, Ltd
 Type: Smoke detector and temperature
 Fire extinguishing systems
 Engine room:
 Make/Type: Kashiwa Co., Ltd / Inside air
 Vehicle spaces:
 Make/Type: Nohmi Bosai Ltd / Fixed
 Cabins:
 Make/Type: Yamato Protec / Portable
 Public spaces:
 Make/Type: Kashiwa Co., Ltd / Sprinkler

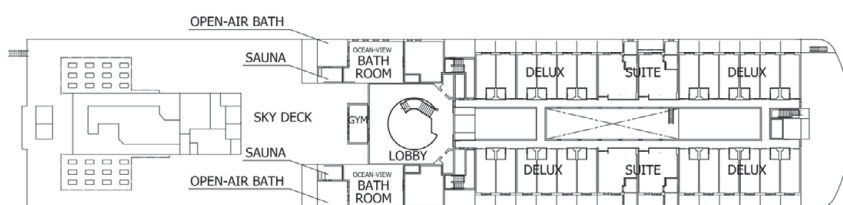
Radars
 Number: 2
 Make: JRC
 Models: JMR-9230-S, JMR-9225-9X
 Contract date: 10 May 2016
 Launch/float-out date: 6 September 2016
 Delivery date: 28 February 2017



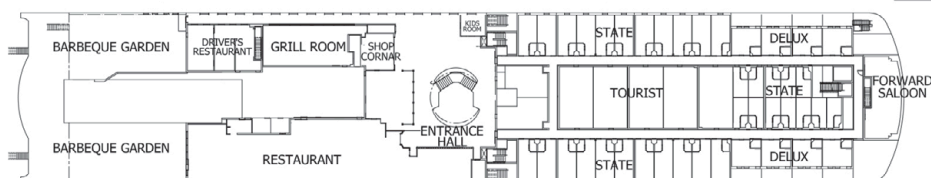
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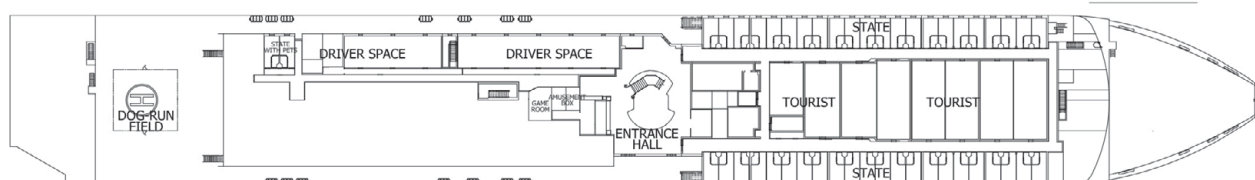
6 DECK



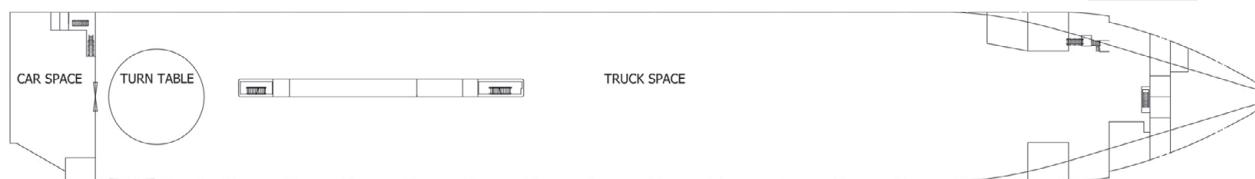
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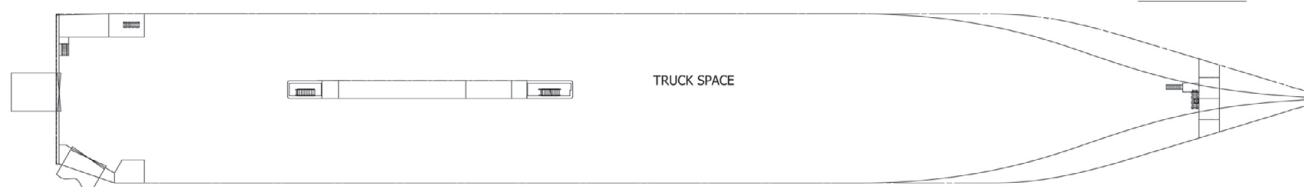
4 DECK



3 DECK



2 DECK





LISBOA: Shuttle tanker

Shipbuilder: **Sungdong Shipbuilding & Marine Engineering Co. Ltd**
 Vessel's name: **Lisboa**
 Hull No: **S7004**
 Owner/Operator: **Tsakos Energy Navigation Ltd**
 Country: **Greece**
 Designer: ... **Sungdong Shipbuilding & Marine Engineering Co. Ltd**
 Country: **Republic of Korea**
 Model test establishment used: **KRISO**
 Flag: **Malta**
 IMO number: **9730933**
 Total number of sister ships already completed (excluding ship presented): **0**

LISBOA is an IMO DP Class 2, 157,000dwt shuttle tanker made for Greek owner Tsakos Energy Navigation and designed by Sungdong Shipbuilding & Marine Engineering.

The vessel was built under the survey of DNV GL and designed in accordance with the IACS Common Structure Rules (CSR). 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 freshwater tanks. The cargo tanks are divided by plane-type transverse and longitudinal bulkheads. The engine room and living quarters, including the enclosed-type navigation bridge, are located aft.

Lisboa has a slow-speed diesel engine, a controllable pitch propeller, one stern and two bow tunnel thrusters (2,200kW each), one bow and one stern retractable azimuth thruster (2,500kW each), and a bow loading system suitable for tandem loading operations in the Campos Basin. It has a flush deck with forecastle for bow loading. A full-spade rudder with flap system provides good manoeuvring and positioning capabilities.

Full consideration was given to the latest environmental guidelines such as the inventory of hazardous materials, OPP-F, CLEAN notation, the Performance Standard for Protective Coatings (PSPC) and EU Directive 2005/33/EC.

The main MAN 6S70ME-C8.5 Tier II engine is derated to 15,200kW of MCR at 82rpm for fuel economy and flexible operation at part load. The speed of the vessel at a draft of 16m is 14.7kt at 90 percent MCR (13,680kW) with a 15 percent sea margin. The EEDI is in accordance with Regulations 5, 6, 7, 8 and 9 of MARPOL Annex VI Resolution MEPC, and 214(63) is satisfied up to phase 1.

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

TECHNICAL PARTICULARS

Length oa: abt. 278.5m
 Length bp: 264.0m
 Breadth moulded: 48.0m
 Depth moulded
 To main deck: 23.1m
 Width of double skin
 Side: 2.5m
 Bottom: 2.8m
 Draught
 Scantling: 17.15m
 Design: 16.0m
 Gross: 83,143gt
 Deadweight
 Design: 142,900t
 Scantling: 156,500t
 Speed, service (90 % MCR output): ... 14.7knots
 Cargo capacity (m³)
 Liquid volume: 167,900
 Bunkers (m³)
 Heavy oil: 3,500
 Diesel oil: 500
 Water ballast (m³): 54,000
 Daily fuel consumption (tonnes/day)
 Main engine only: 53.4 t/d

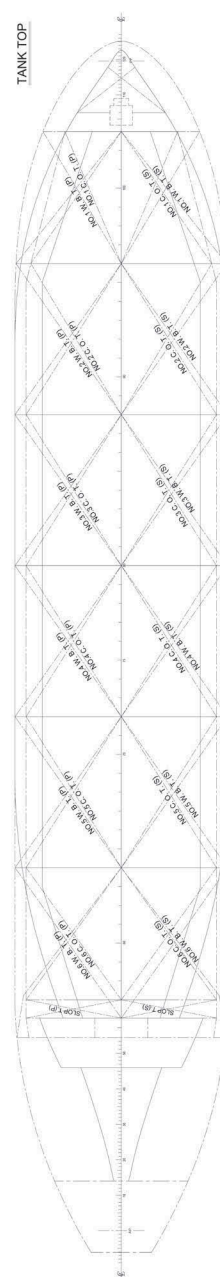
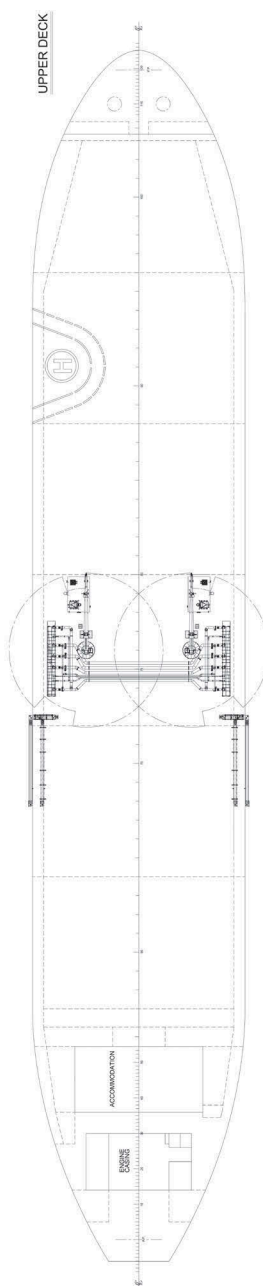
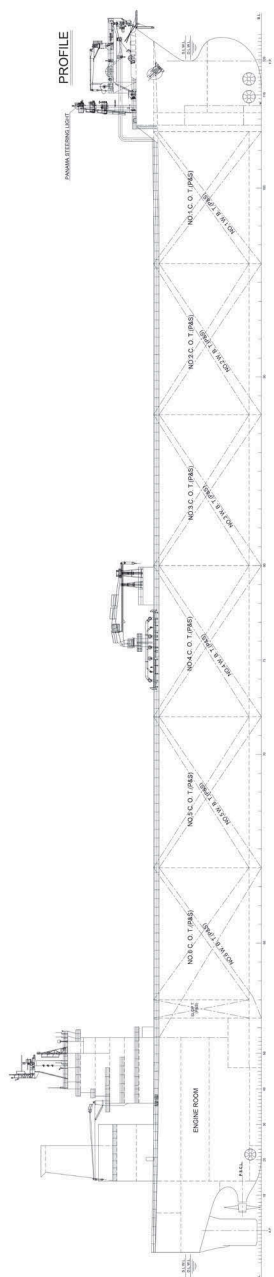
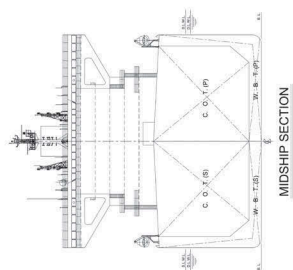
Classification society and notations: DNV GL
 +1A1, Tanker for oil, ESP, CSR, E0, DYNPOS-AUTR, OPP-F, BOW LOADING, TMON, NATU-OC, BIS, BWM-T, BWM-E(S), SPM, VCS-2, COAT-PSPC(B), CLEAN

Main engine
 Design: MAN B&W
 Model: 6S70ME-C.85
 Manufacturer: HHI
 Number: 1
 Type of fuel: HFO, MDO, MGO
 Output of each engine: .. 15,200kW x 82rpm
 Propeller

Material: Ni-Al-Bronze
 Designer/Manufacturer: Caterpillar Propulsion
 Number: 1
 Fixed/Controllable pitch: Controllable
 Diameter: 8.3m
 Speed: 81.9rpm

Diesel-driven alternators
 Number: 4
 Engine make/type: Hyundai Heavy Industries Co., Ltd / 7H32/40, 9H32/40
 Type of fuel: MDO
 Output/speed of each set: 3,500kW x 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: OL / XW
 Make: Alfa Laval
 Output, each: 27,000kg/h / 1,400kg/h
 Cargo cranes/cargo gear
 Number: 2
 Make: Oriental
 Type: electro-hydraulic
 Performance: 15t SWL
 Other cranes
 Number: 1 + 2
 Make: Oriental
 Type: NHD / electro-hydraulic
 Tasks: E/R / Engine part & Provision handling
 Performance: ... 6.3t x 7.4m / 6.3t SWL (port), 2t SWL (stb'd)
 Mooring equipment
 Number: ... 8 (2 windlass + 6 mooring winch)
 Make: Macgregor Pusnes
 Type: Electro-hydraulic (high-pressure)
 Special lifesaving equipment
 Number of each and capacity: 2 x 40 pax
 Make: HLB
 Type: Totally enclosed type
 Cargo tanks
 Number: 12 cargo + 2 slop
 Grades of cargo carried: . Crude oil having a flash point below 60°C
 Product range: Crude oil
 Coated tanks: Epoxy
 Cargo pumps
 Number: 3
 Type: Centrifugal, vertical, single-stage steam turbine (2), two pole-type electric motor (1)
 Make: Shinko
 Capacity (each): 4,000 m³/h
 Cargo control system
 Make: Kongsberg
 Type: VDU monitor with keyboard
 Ballast control system
 Make: Kongsberg
 Type: VDU monitor with keyboard
 Complement
 Officers: 20
 Crew: 11
 Suez/Repair Crew: 6
 Bow thrusters
 Make: Brunvoll
 Number: 3 (1 azimuth, 2 tunnel)
 Output (each): Azimuth 2,500kW, tunnel 2200kW
 Stern thrusters
 Make: Brunvoll
 Number: 2, tunnel type
 Output (each): 2200kW
 Bridge control system
 Make: HHI
 Type: Piano
 Is bridge fitted for one-man operation? ... Yes
 Fire detection system
 Make: Autronica
 Type: Address
 Radars
 Number: 2 S-band, 1 X-Band
 Make: Kongsberg
 Models: ... S-band: 703041, X-band: 703038
 Integrated bridge system: Yes
 Make: Kongsberg
 Model: K-Bridge
 Waste disposal plant
 Incinerator
 Make: HMMC
 Model: MAXI NG150SL WS
 Waste compactor
 Make: Samjoo
 Model: TT160
 Waste shredder/crusher
 Make: Samjoo
 Model: BS515
 Sewage plant
 Make: Jonghap
 Model: JMC-BIO AEROB-18N
 Contract date: November 2014
 Launch/float-out date: November 2016
 Delivery date: March 2017





MOL TRIUMPH: Container ship

Shipbuilder: **Samsung Heavy Industries Co., Ltd**
 Vessel's name: **MOL Triumph**
 Hull No: **2167**
 Owner/Operator: **Mitsui & Co.**
 Country: **Japan**
 Designer: **Samsung Heavy Industries Co., Ltd**
 Country: **Republic of Korea**
 Model test establishment used: **Samsung Heavy Industries**
 Flag: **Panama**
 IMO number: **9769271**
 Total number of sister ships already completed (excluding ship presented): **3**

MOL TRIUMPH is the first of a class of six 20,000 TEU-class container ships. Some 400m long and 58.8m wide, the vessel has an actual total capacity of 20,170TEU and at the time of entering service became the largest container ship in the world. It is used on its owner's FE2 Asia to Europe service. The other vessels of the class will be phased in along Mitsui OSK Line's (MOL's) other trade routes.

In order to maximise the sustainability of such a large vessel, its design incorporates various features intended to improve fuel consumption and environmental performance.

These include low-friction underwater paint, and a high-efficiency propeller and rudder. The propeller's performance is further enhanced through use of the SHI-developed SAVER Stator, which generates a circular stream in the opposite direction to propeller rotation. These features, together with an optimised hull form, are said by MOL to reduce fuel consumption and CO₂ emissions per container by 25-30 percent when compared with 14,000TEU-class container ships.

The vessel has also been designed to be retrofittable for LNG use. This takes account of the IMO's new regulations, which will come into effect in 2020, to limit marine fuel-related SOx emissions.

TECHNICAL PARTICULARS

Length oa: ca. 400.0m
 Length bp: ca. 383.0m
 Breadth moulded: ca. 58.8m
 Depth moulded
 To upper deck: 32.8m
 Width of double skin
 Side: 2.55m
 Bottom: 2.6m
 Draught
 Scantling: 16.0m
 Design: 14.5m
 Gross: ca. 210,600gt
 Deadweight
 Design: ca. 163,300dwt
 Scantling: ca. 192,700dwt

Speed, service: 22.5knots
 Bunkers (m³)
 Heavy oil: ca. 15,000
 Diesel oil: ca. 800
 Water ballast (m³):
 Tankers - percentage segregated ballast: ca. 65,000

Daily fuel consumption (tonnes/day)
 Main engine only: 190.5

Classification society and notations: LR, ✱100A1 "Container Ship", ShipRight (SDA, FDA plus(25,WW), FDA SPR, WDA CM, ACS(B)), LI, ✱IWS, ✱LMC, UMS, BoxMax, ECO(IHM), SCM, with descriptive notes ShipRight (BWMP(T))

Main engine
 Design: MAN Diesel & Turbo
 Model: 11G95ME-C9.5
 Manufacturer: Doosan Engine
 Number: 1
 Type of fuel: HFO, MDO
 Output: 59,250kW

Propeller
 Material: Ni-Al-Bronze
 Designer/Manufacturer: SHI / Nakashima
 Number: 1
 Fixed/Controllable pitch: Fixed
 Diameter: 10,400mm
 Speed: 80rpm

Diesel-driven alternators
 Number: 4
 Engine make/type:
 Type of fuel: HFO, MGO
 Alternator make/type: Nishishiba / NTAKL
 Output/speed of each set: 4,300kW / 720rpm

Boilers
 Number: 2
 Type: 1 oil-fired/ 1 exhaust gas
 Make: Kangrim
 Output, each boiler: 5,000/4,000 kg/h

Other cranes
 Number: 2 / 1
 Make:
 Type: Electro-hydraulic cylinder luffing-jib / monorail

Tasks: Provision and Suez-mooring boat-handling / ER equipment-handling
 Performance: ... 4.0t, 7 m/min / 13.0t, 7 m/min

Mooring equipment
 Number: 22 drums
 Make: Towimor
 Type: Electric

Special lifesaving equipment
 Number of each and capacity: 2, 35 persons each

Make: Jiaoyan
 Type: Totally enclosed
 Hatch covers
 Design: 90/210 MT for 20ft/40ft
 Manufacturer: SMS-SME
 Type: Steel pontoon
 Containers
 Total TEU capacity: 20,146
 On deck: 11,080
 In holds: 9,066

Water ballast treatment system
 Make: Alfa Laval
 Capacity: 1,000 m³/h

Complement
 Officers: 17
 Crew: 18
 Suez/Repair Crew: 6
 Single/double/other rooms: Single

Bow thrusters
 Make: Kawasaki
 Number: 2
 Output (each): 2,500kW

Bridge control system (Main engine remote control system)
 Make: Nabtesco
 Type: M-800-V
 Is bridge fitted for one-man operation? UMS

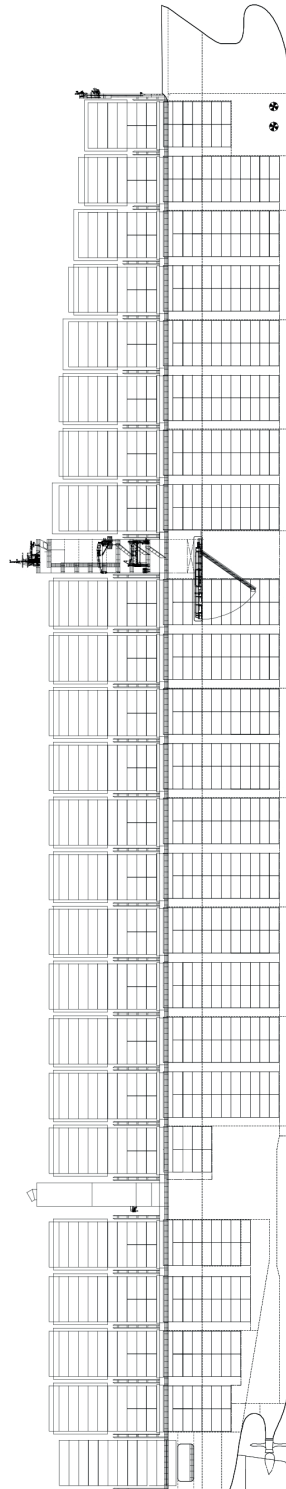
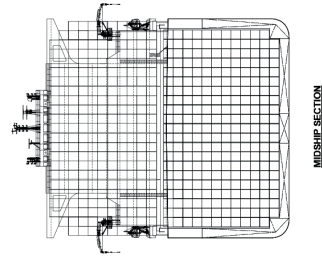
Fire detection system
 Make: Consilium
 Type: Salwico Fire Alarm System CCP (CS5000)

Fire extinguishing systems
 Cargo holds: CO₂
 Make/Type: NK Fire Protection
 Engine room: High-expansion foam
 Make/Type: NK Fire Protection

Radars
 Number: 2
 Make: Furuno
 Models: FAR-3330S-SSD / FAR-3320
 Integrated bridge system: Yes
 Make: Furuno
 Model: FMD-3300 (ECDIS) etc.

Waste disposal plant
 Incinerator
 Make: Sunflame
 Model: OSV-2400SDAI
 Sewage plant
 Make: Il Seung
 Model: ISB-01

Contract date: February 2015
 Launch/float-out date: November 2016
 Delivery date: March 2017





MSC SEASIDE: Cruise ship

Shipbuilder: **Fincantieri SPA**
 Vessel's name: **MSC Seaside**
 Hull No: **6256**
 Owner/Operator: **MSC Cruises**
 Country: **Switzerland**
 Designer: **Fincantieri**
 Country: **Italy**
 Model test establishment used: **Marin, SVA Wien**
 Flag: **Malta**
 IMO number: **9745366**
 Total number of sister ships already completed (excluding ship presented): **0**

MSC SEASIDE is the largest ship built in Italy to date. At 323m long, and with a gross tonnage of 154,000t, it has a capacity of 5,179 passengers and was delivered at the end of November 2017 from Fincantieri's shipyard in Monfalcone.

MSC Seaside, as well as its sister ship *MSC Seaview*, which is due to be delivered in Spring 2018, is described as a cutting-edge design by Fincantieri but one in which the design influences of the old Transatlantic liners have been revisited.

In order to achieve a well-balanced distribution of weight, the engine rooms and funnel are placed at the centre of the ship. The result is that the centres of gravity and buoyancy are in an ideal configuration for hydrodynamics. There are spaces for tanks both fore and aft, enabling the ship to maintain trim even as bunkers or water tanks are depleted. This type of design reduces the bending moment, making the steel structure more efficient with less weight.

With this kind of configuration, it was necessary to redesign all the of the ship's public areas, passenger flows and top open deck functions. Usually, large cruise ships tend to take passengers away from the sea, with the majority of the open decks on the top. On *MSC Seaside*, a 7m-wide lower deck was developed which extends all around the ship and substantially increases the amount of open space per passenger. Open spaces are close to inside spaces: this means that almost every space in the inside has an adjacent space on the outside.

One of the most evident innovations is the architecture of the aft, which is very individual, vertical, and designed to give a condo-like feeling. Two panoramic glass elevators directly connect the lower and upper open decks and a skywalk on the top of the ship. The design also allows direct embarkation onto lifeboats, which are also better protected from the weather.

TECHNICAL PARTICULARS

Length oa: 323m
 Length bp: 296m
 Breadth moulded: 41.00m
 Depth moulded
 To main deck: 12.10m (Deck 4, bulkhead deck)
 To upper deck: 53.39m (Deck 19, upper public space deck)
 To other decks: 64.50m (Deck 23)
 Draught
 Scantling: 8.80m
 Design: 8.55m
 Gross: 153,516gt
 Speed, service (87% MCR output): 22knots

Bunkers (m³)
 Heavy oil: ca. 3,500
 Diesel oil: ca. 1,200
 Water ballast (m³): ca. 2,300

Classification society and notations: RINA
 C, + HULL, + MACH, PASSENGER SHIP,
 UNRESTRICTED NAVIGATION, AUT-CCS,
 AUT-PORT, DMS, REF-STORE, SYS-NEQ, MON-SHAFT, GREEN STAR 3, INWATER SURVEY,
 COMF-VIB A PAX, COMF-NOISE A PAX,
 COMF-VIB B CREW, COMF-NOISE B CREW,
 HVSC

Heel control equipment: A heeling system is used for wind stability control. A pair of forward and a pair of aft heeling tanks are each served by a single propeller pump.

Roll-stabilisation equipment: Fin stabiliser, bilge keels

Main engines
 Model: 2xW14V46F + 2xW16V46F
 Manufacturer: Wärtsilä
 Number: 4
 Type of fuel: HFO/MGO
 Output of each engine: 2 x 14,400kW + 2 x 16,800kW

Propellers
 Material: Bronze
 Designer/Manufacturer: MMG
 Number: 2
 Fixed/Controllable pitch: Fixed
 Diameter: ca. 6m

Main-engine driven alternators
 Number: 4
 Make/type: Nidec ASI
 Output/speed of each set: 18,810kVA/
 600rpm

Exhaust-gas scrubbing equipment
 Manufacturer: Wärtsilä
 Type: Hybrid

Boilers
 Number: 6
 Type: 2 x oil-fired / 4 x exhaust gas
 Make: Saacke GmbH / Alfa Laval
 Output, each boiler: 2 x 12,500kg/h, 2 x 4.500kg/h, 2 x 3,900kg/h

Mooring equipment
 Forward
 2 x combined windlass/mooring winch
 3 x mooring winch
 Aft
 4 x double drum mooring winches
 Make: Rolls-Royce
 Type: Electric

Special lifesaving equipment
 Number of each and capacity: 2 x 1,648
 persons

Make: RFD Beaufort Ltd
 Type: MES, vertical chutes

Water ballast treatment system
 Make: GEA
 Capacity: 500 m³/h

Complement
 Crew: 759 cabins – 1,532 persons
 Passengers
 Total: 5,179
 Number of cabins: 2,067

Stern appendages/special rudders: ..2 rudders
 Bow thrusters

Make: Wärtsilä (propellers) ATI-GE
 (electric motors)
 Number: 4
 Output (each): 3,100kW

Stern thrusters
 Make: Wärtsilä (propellers) ATI-GE
 (electric motors)
 Number: 3
 Output (each): 3,100kW

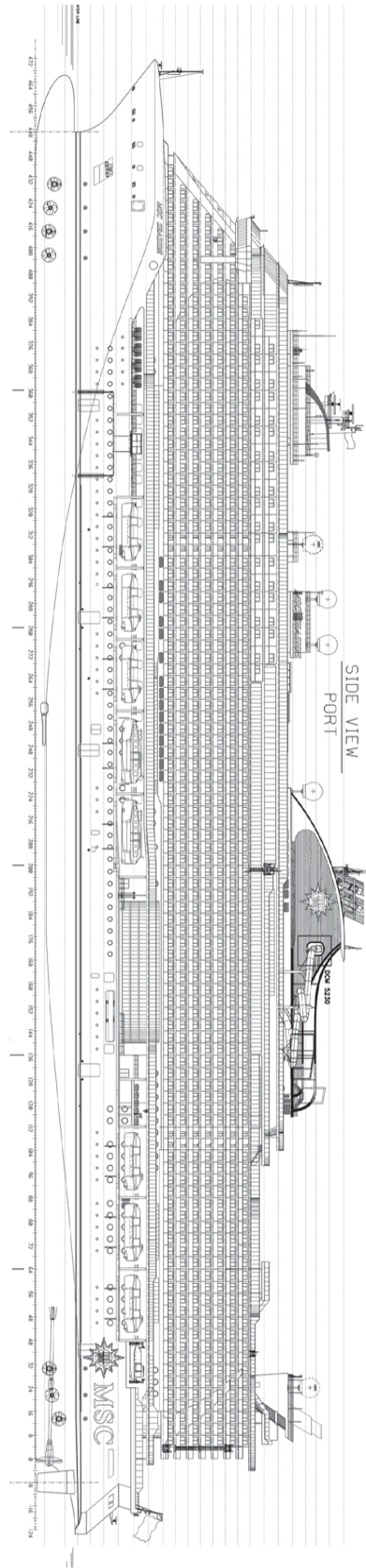
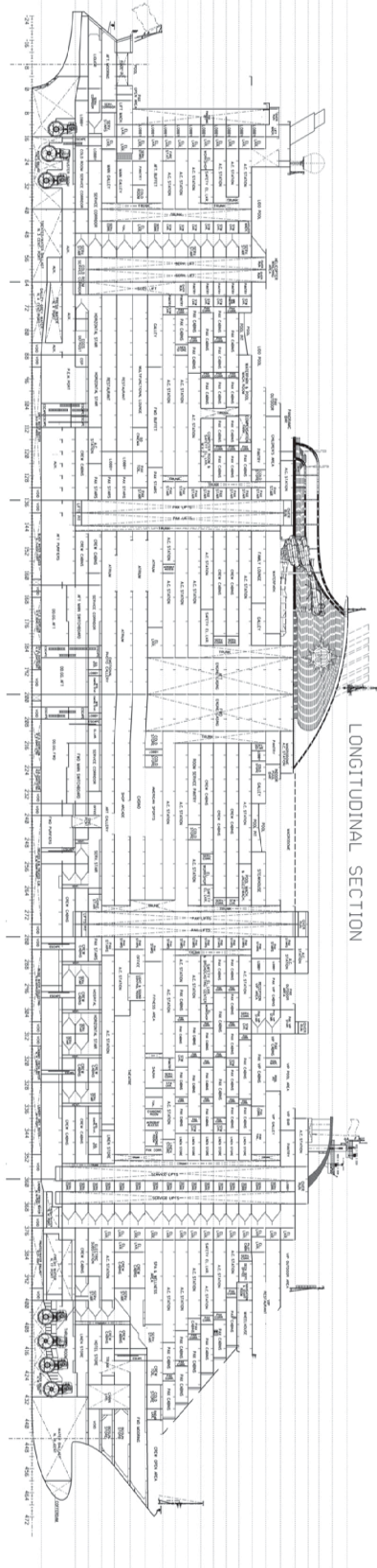
Fire detection system
 Make: Martec
 Type: Various (flame infrared, heat, smoke, optical)

Fire extinguishing systems
 Engine room: CO₂, WaterMist, Drencher
 Make: Minimax, Marioff, Fincantieri
 Cabins: Water mist
 Make: Marioff
 Public spaces: Water mist
 Make: Marioff

Radars
 Number: 5
 Make: Wärtsilä-APSS
 Model(s): NACOS Platinum
 Integrated bridge system: Integrated
 navigation system
 Make: ATI Wärtsilä-APSS
 Model: Valmatic Platinum

Waste disposal plant
 Waste handled: Deerberg
 Incinerator
 Make: Deerberg
 Model: DI-2000
 Waste compactor
 Make: Deerberg
 Model: DBP V 610
 Waste shredder/crusher
 Make: Deerberg
 Model: DS 4 Long
 Sewage plant
 Make: Wärtsilä
 Model: MBR24-MSC

Contract date: May 2014
 Launch/float-out date: November 2016
 Delivery date: November 2017





OCEAN BLUE WHALE: Container-passenger vessel

Shipbuilder: **Shandong Huanghai Shipbuilding Co., Ltd**
Ocean Blue Whale
 Vessel's name:
 Hull No: **K28**
 Owner/Operator: **Bohai International Ferry (Hong Kong) Co., Ltd**
 Country: **China**
 Designer: **Shanghai Merchant Ship Design & Research Institute, CSSC**
 Country: **China**
 Model test establishment used: **MARIN**
 Flag: **Liberia**
 IMO number: **9790139**
 Total number of sister ships already completed (excluding ship presented): **0**

OCEAN BLUE WHALE is a container-passenger vessel tailor-made for Bohai International Ferry (Hong Kong) Co., Ltd and delivered in May 2017. This unique vessel was designed by SDARI, constructed by Shandong Huanghai Shipbuilding Co and registered under CCS Class Rules. It is the first hybrid container-passenger vessel of its kind to be constructed at a Chinese shipyard.

Ocean Blue Whale features two main engines, two propellers and two shaft generators. The controllable pitch propellers are driven by low-speed diesel engines with gearboxes and there are twin flap-type rudders and a V-bracket tailshaft, all of which contribute to the vessel's outstanding manoeuvrability.

Hull form optimisation introduced several innovative features such as a trim wedge and a centre skeg, resulting in a good wave pattern, low overall resistance and good power performance. The accommodation and wheelhouse are located semi-aft in order to reduce cavitation and hull pressure fluctuations. The Kappel blade design of the MAN Diesel propellers is known to give higher efficiency, and lower levels of noise and vibration excitation.

Ocean Blue Whale is capable of carrying containers and also passengers for short international voyages. The graceful appearance of the vessel is the result of a raked stem, the straight profile in the cargo space and a gentle, streamlined contour in the living space.

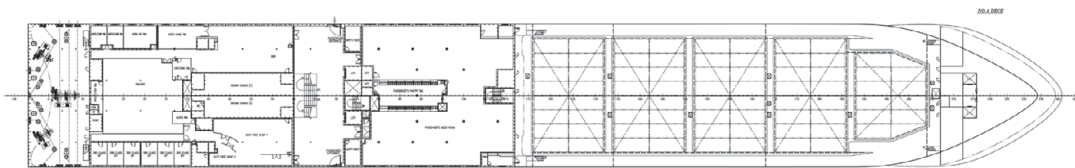
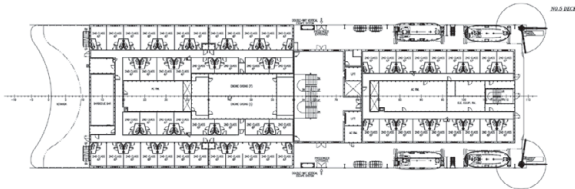
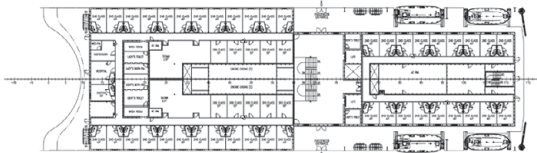
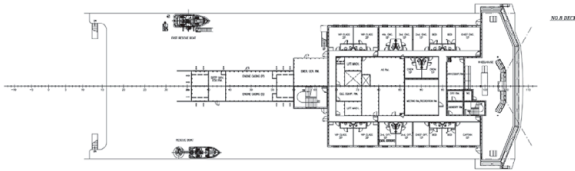
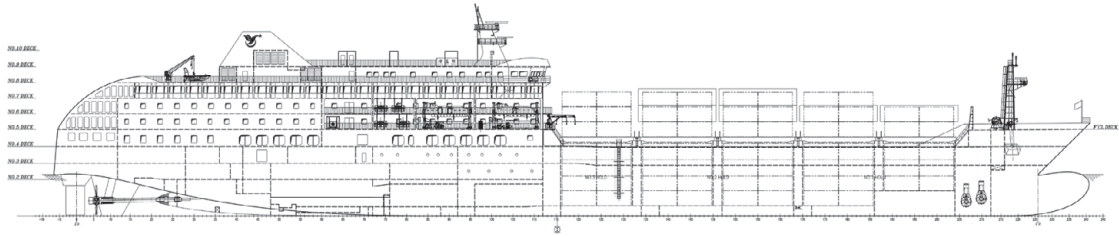
TECHNICAL PARTICULARS

Length oa: 182.72m
 Length bp: 169.50m
 Breadth moulded: 25.20m
 Depth moulded
 To main deck: 8.928 / 9.25m
 To upper deck: 12.10m
 Width of double skin
 Side: 2.54m
 Bottom: 1.80m
 Draught
 Scantling: 7.35m
 Design: 7.20m
 Gross: 19,480gt

Displacement: 21,023.7t
 Lightweight: 10,041.4t
 Deadweight
 Design: 10,982.3dwt
 Scantling: 11,553.5dwt
 Block co-efficient: 0.664 at design draught,
 0.668 at scantling draught
 Speed, service (0.90 MCR with 10% S.M.):
 22.5knots at design draught
 Cargo capacity (m³)
 Bale: 12,613
 Bunkers (m³)
 Heavy oil: 825
 Diesel oil: 212
 Water ballast (m³): 7,131
 Container ships – water ballast in loaded condition (tonnes): 1,633
 Daily fuel consumption (tonnes/day)
 Main engine only: 109.3
 Auxiliaries: ... 9.36 when one PTO out of work
 Classification society and notations: CCS
 *CSA Passenger Ship/Container Ship; ERS; PSPC(B); SOLAS II-2 Reg.19; Ice Class B; Loading Computer (S, I, D)
 *CSM MCC; SCM; Clean; FTP; AFS; BWMP; GPR; BWMS
 % high-tensile steel used in construction: .. 41%
 Roll-stabilisation equipment: 2 fin stabilisers
 Main engines
 Design: MAN
 Model: 9S50ME-C8.5
 Manufacturer: Doosan
 Number: 2
 Type of fuel: HFO and MDO
 Output of each engine: 14,940kW
 Gearboxes
 Make: Siemens
 Model: GUG 1400
 Number: 2
 Output speed: 122.6
 Propellers
 Material: Ni-Al-Bronze
 Designer/Manufacturer: MAN KAPPEL
 Number: 2
 Fixed/Controllable pitch: Controllable
 Diameter: 5,300mm
 Speed: 127rpm
 Main-engine driven alternators
 Number: 2
 Make/type: Nanchang Kangfu / SB-HW4-1600-6P
 Output/speed of each set: 1600kW / 1,200rpm
 Diesel-driven alternators
 Number: 3
 Engine make/type: Yanmar/ 6EY22ALW
 Type of fuel: HFO and MDO

Output/speed of each set: 1,100kW / 900rpm
 Alternator make/type: Nishishiba
 Output/speed of each set: . 1000kW / 900rpm
 Boilers
 Number: 3
 Type: 1 oil-fired steam and 2 exhaust gas
 Make: Greens-Shazhou
 Output, each boiler: 4,000kg/h for oil-fired boiler, 800kg/h for exhaust gas boiler
 Other cranes
 Number: 2
 Type: Hydraulic
 Tasks: Provision davit
 Performance: 0.98t x 4.5m
 Mooring equipment
 Number: 6
 Make: Rolls-Royce
 Type: Hydraulic
 Special lifesaving equipment
 Number of each and capacity: 2 x 85-person and 2 x 65-person fully enclosed lifeboats, 1 FRP rescue boat, 1 fast rescue boat, 2 x 500-person vertical MES
 Make: Jianguyinshi Beihai LSA Co., Ltd (boats), Shanghai Youlong Rubber Products Co.,Ltd (MES)
 Hatch covers
 Design: TTS HuaHai
 Manufacturer: TTS HuaHai
 Type (upper deck/other decks): .upper deck
 Containers
 Lengths: 6,058mm
 Heights: 2,591mm
 Cell guides:
 Total TEU capacity: 462 TEU
 On deck: 212 TEU
 In holds: 250 TEU
 Homogeneously loaded to 14t: ... 462 TEU
 Reefer plugs: 72
 Tiers/rows (maximum)
 On deck: 3/8
 In holds: 4/8
 Water ballast treatment system
 Make: .SunRui Marine Environment Engineering
 Capacity: 500m³/h
 Complement
 Officers: 8
 Crew: 63
 Passengers
 Total: 810
 Number of cabins: 211
 Percentage/number outboard: 67.3%
 Stern appendages/special rudders: ... Twin-flap type rudders
 Bow thruster
 Make: Wuhan Kawasaki
 Number: 1
 Output: 900kW
 Bridge control system
 Make: Furuno
 Is bridge fitted for one-man operation? no
 Fire detection system
 Make: Apollo
 Type: Addressable
 Fire extinguishing systems
 Cargo holds:
 Make/Type: Shanghai Sure-Safe Fire Equipment Co., Ltd / CO₂
 Engine room:
 Make/Type: Shanghai Sure-Safe Fire Equipment Co., Ltd / CO₂
 Cabins:
 Make/Type: Shanghai Sure-Safe Fire Equipment Co., Ltd / Water sprinkler system
 Public spaces:
 Make/Type: Shanghai Sure-Safe Fire Equipment Co., Ltd / Water sprinkler System
 Radars
 Number: 3
 Make: Furuno
 Models: FAR-2837SW, FAR-2827W, FAR-2827
 Waste disposal plant
 Sewage plant
 Make: . NanJing LuZhou Machine Co., Ltd
 Contract date: September 2015
 Launch/float-out date: December 2016
 Delivery date: May 2017

OCEAN BLUE WHALE





OOCL HONG KONG: Container ship

Shipbuilder: **Samsung Heavy Industries Co., Ltd**
 Vessel's name: **OOCL Hong Kong**
 Hull No: **2172**
 Owner/Operator: ... **Orient Overseas Container Lines Ltd**
 Country: **Hong Kong, China**
 Designer: **Samsung Heavy Industries Co., Ltd**
 Country: **Republic of Korea**
 Model test establishment used: **Samsung Heavy Industries**
 Flag: **Republic of Korea**
 IMO number: **9776171**
 Total number of sister ships already completed (excluding ship presented): **5**

OOCL HONG KONG was built by Samsung Heavy Industries Co., Ltd (SHI) for Orient Overseas Container Lines Ltd. Delivered in May 2017, this 21,413 TEU container ship is, according to SHI, the largest-capacity, most space-efficient vessel ever built.

One of the most significant aspects of this vessel is its G-type main engine – MAN Diesel & Turbo's two-stroke, 11-cylinder 11G95ME-C9.5. This engine, rated at 75,570kW, produces 102,750hp.

The vessel features SHI's patented SAVER Stator. This is designed to increase propeller efficiency and thereby saves fuel by around 2 percent. Also, it is equipped a full spade rudder, STAR (Samsung Tip Advanced Rake) propeller and SARB (Samsung Asymmetric Rudder Bulb) which improve fuel efficiency by around 3-4 percent.

OOCL Hong Kong is equipped with a shaft generator which generates electricity from the movement of the main engine's shaft, thereby reducing the amount of fuel needed for that task. This also reduces the emissions from fuel burning, making the ship more environmentally friendly.

The vessel has hull stress-monitoring sensors to aid safe navigation and an advanced cargo-securing system with optimal lashing bridge.

TECHNICAL PARTICULARS

Length oa: approx. 400m
 Length bp: 383.0m
 Breadth moulded: 58.8m
 Depth moulded
 To upper deck: 32.5m

Width of double skin
 Side: 2.55m
 Bottom: 2.6m
 Draught
 Scantling: 16.0m
 Design: 14.5m
 Gross: ca. 210,890gt
 Displacement: ca. 253,100t
 Deadweight
 Design: ca. 162,400dwt
 Scantling: ca. 191,400dwt
 Speed, service (90% MCR output): 23knots
 Bunkers (m³)
 Heavy oil: ca. 13,600
 Diesel oil: ca. 1,250
 Water ballast (m³): ca. 63,600
 Daily fuel consumption (tonnes/day)
 Main engine only: 212.9

Classification society and notations: ABS
 ✱A1(E), Container Carrier, ✱AMS, ✱ACCU, SH, SHCM, SH-DLA, SFA25, FL(25), UWILD, ENVIRO, BWT+, BWE, NIBS, RW, CRC, CSC, GP, CPS, POT, HVSC, SElev, SLAM-B/S, TCM, CLP-V, IHM
 Heel control equipment: Anti-Heeling tanks

Main engine
 Design: MAN Diesel & Turbo
 Model: 11G95ME-C9.5
 Manufacturer: Doosan Engine
 Number: 1
 Type of fuel: HFO, MGO
 Output of each engine: 61,530kW
 Propeller
 Material: Ni-Al-Bronze
 Designer/Manufacturer: SHI/Nakashima
 Number: 1
 Fixed/Controllable pitch: Fixed
 Diameter: 10,500mm
 Speed: 78.5rpm

Main-engine driven alternators (Shaft Generator)
 Number: 1
 Make/type: Nishishiba
 Output/speed: 4,300kW
 Diesel-driven alternators
 Number: 4
 Engine make/type: Daihatsu/8DE-33

Type of fuel: HFO, MGO
 Output/speed of each set: 4,500kW / 720rpm
 Alternator make/type: ... Nishishiba/NTAKL-RCP
 Output/speed of each set: 4,300kW / 720rpm

Boilers
 Number: 2
 Type: 1 oil-fired / 1 exhaust gas boiler
 Make: Kangrim
 Output, each boiler: 5,000kg/h

Other cranes
 Number: 2 / 1
 Make: Oriental
 Type: Fixed jib / monorail
 Tasks: Provision and Suez mooring
 boat-handling / ER equipment handling
 Performance: ..4.0t, 10 m/min / 13t, 10 m/min

Mooring equipment
 Number: 16 drums
 Make: Towimor
 Type: Electric

Special lifesaving equipment
 Number of each and capacity: 2 x 36 persons
 Make: Jiaoyan
 Type: Conventional lifeboat

Hatch covers
 Design: ...120/220/300 MT for 20ft/40ft/mixed stack
 Manufacturer: SMS-SME
 Type (upper deck/other decks): Steel pontoon

Containers
 Cell guides:
 Total TEU capacity: 21,413
 On deck: 12,323
 In holds: 9,090

Ballast control system
 Make: KSB
 Type: Hydraulic
 Water ballast treatment system
 Make: Headway
 Capacity: 3,000m³/h

Complement
 Officers: 24
 Crew: 12
 Suez/Repair Crew: 6
 Stern appendages/special rudders: ..Full spade rudder with bulb

Bow thrusters
 Make: KTE
 Number: 2
 Output (each): 2,500kW
 Bridge control system
 Make: Japan Radio Co., Ltd
 Is bridge fitted for one-man operation? : ..Yes

Fire extinguishing systems
 Cargo holds: CO₂ system
 Make/Type: FAIN
 Engine room: CO₂ system
 Make/Type: FAIN

Radars
 Number: 3 sets (1 x S-band, 2 x X-band)
 Make: Japan Radio Co., Ltd
 Models : JMR-9230 / JMR-9225

Integrated bridge system?:Yes
 Make: Japan Radio Co., Ltd

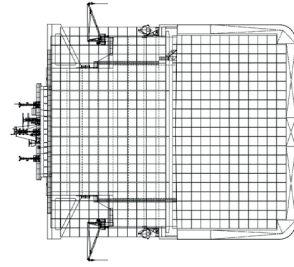
Waste disposal plant
 Waste handled: Waste oil, garbage, black water and hospital grey water

Incinerator
 Make: HMMCO
 Model: MAXI 1200 SL WS

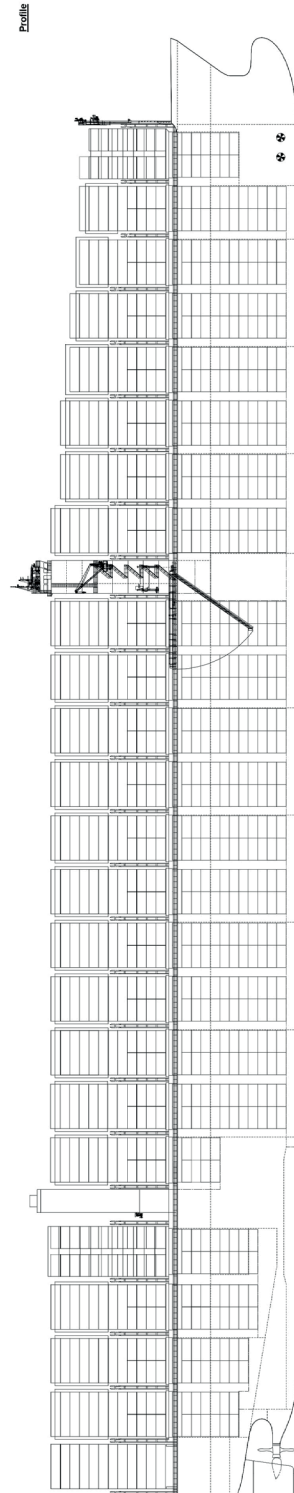
Waste compactor
 Make: Loipart
 Model: 5030C

Sewage plant
 Make: RWO
 Model: CS-BIO 2/CS-BIO 3

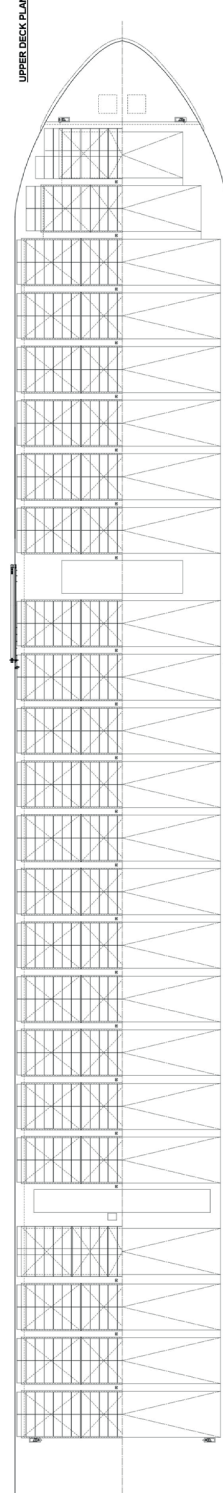
Contract date: 31 March 2015
 Launch/float-out date: 31 December 2016
 Delivery date: 18 May 2017



MIDSHIP SECTION



Profile



UPPER DECK PLAN



OTTOMAN COURTESY: Crude oil tanker

Shipbuilder: **Hyundai Heavy Industries**
 Vessel's name: **Ottoman Courtesy**
 Hull No: **2886**
 Owner/Operator: **Gungen**
 Country: **Turkey**
 Designer: **Hyundai Heavy Industries**
 Country: **Republic of Korea**
 Model test establishment used: **Hyundai Maritime Research Institute (HMRI)**
 Flag: **Turkey**
 IMO number: **9788710**
 Total number of sister ships already completed (excluding ship presented): **0**

OTTOMAN COURTESY is a 153,000dwt crude oil carrier. Built by Hyundai Heavy Industries for Gungen, the vessel was delivered in August 2017.

The design is intended to reduce energy requirements and emissions, having been fitted with the latest in energy-saving features. For instance, the boiler's fuel consumption is minimised by applying Economiser Energy Control (EEC), which can increase steam production in with only small amounts of additional fuel.

The vessel has an overall length of 269m, a width of 46m and a depth 25.1m, with a design draft of 16.2m. It has six pairs of cargo oil tanks and one pair of slop tanks. To handle the cargo the vessel is fitted with three vertical, centrifugal, single stage-type HHI pumps of 4,000m³/h capacity each. There are six pairs of water ballast tanks with a double hull structure combined with a double bottom. The ballast water treatment system is of the electrolysis type and is supplied by Hyundai.

Ottoman Courtesy is propelled by one main engine with an MCR of 13,900kW, which enables it to sail at a service speed of 13.5kt at design draft. When running at normal continuous rating with a 15 percent sea margin, the vessel burns less fuel at around 34.7 ton per day.

The vessel has been built according to the latest SOLAS/MARPOL requirements, is EEDI Tier II compliant and CSR harmonised.

TECHNICAL PARTICULARS

Length oa: 269.08m
 Length bp: 258m
 Breadth moulded: 46m

Depth moulded
 To main deck: 25.1m

Draught
 Scantling: 17.8m
 Design: 16.2m

Gross: 83,537gt
 Deadweight
 Scantling: 149,999dwt

Speed, service: 13knots

Cargo capacity (m³)
 Liquid volume: ca. 178,500

Bunkers (m³)
 Heavy oil: ca. 3,250
 Diesel oil: ca. 600

Water ballast (m³): ca. 50,000

Classification society and notations: DNV GL +1A1, Tanker for Oil ESP, CSR, E0, SPM, VCS-2B, BIS, CCO, TMON, CLEAN, OPP-F, BWM-E(s,f), BWM-T, COAT-PSPC(B,C), ECA(SOx-A), Recyclable

Main engine
 Design: Two-stroke marine diesel
 Model: 5G70ME-C9.5
 Manufacturer: Hyundai-MAN B&W
 Number: 1
 Type of fuel: HFO or MGO
 Output: 13,900kW (MCR)

Propeller
 Material: Ni-Al-Bronze
 Designer/Manufacturer: HHI
 Number: 1
 Fixed/Controllable pitch: Fixed
 Diameter: 8.6 m
 Speed: 75.3 rpm

Diesel-driven alternators
 Number: 3
 Engine make/type: Hyundai 7H21/32
 Type of fuel: HFO or MGO
 Output/speed of each set: 1,520kW x 90 rpm

Alternator make/type: Hyundai
 Output/speed of each set: 1,420kW x 900rpm

Boilers
 Number: 2
 Type: ...Automatic, forced draft, heavy fuel oil burning, marine
 Make: Alfa Laval
 Output, each: 35,000 kg/h

Cargo cranes/cargo gear: Hose handling crane
 Number: 2
 Make: Oriental Precision
 Type: Electro-hydraulic
 Performance: 20t SWL

Other cranes
 Number: 2
 Make: Oriental Precision
 Type: Electro-hydraulic
 Tasks: Provision crane
 Performance: 8t SWL (port) / 2t SWL (s'bd)

Mooring equipment
 Number: 2 windlass, 7 mooring winch
 Make: Rolls Royce Marine (Korea)
 Type: Electro-hydraulic

Special lifesaving equipment
 Number of each and capacity: 2 x 33 persons
 Make: Norsafe (China)
 Type: Conventional

Cargo pumps
 Number: 3
 Type: Vertical centrifugal, steam turbine-driven
 Make: Shinko
 Capacity (each): 4,000 m³/h x 135mTH

Cargo control system
 Make: Kongsberg
 Type: Computerised control and monitoring system

Ballast control system
 Make: Kongsberg
 Type: Computerised control and monitoring system

Water ballast treatment system
 Make: Hyundai HiBallast
 Capacity: 5,740 m³/h

Complement
 Officers: 13
 Crew: 20
 Suez/Repair Crew: 1 cabin for 6 Suez crew

Bridge control system
 Make: Kongsberg
 Type: Auto Chief 600
 Is bridge fitted for one-man operation? ...Yes

Fire detection system
 Make: Consilium
 Type: Salwico Cargo (Addressable)

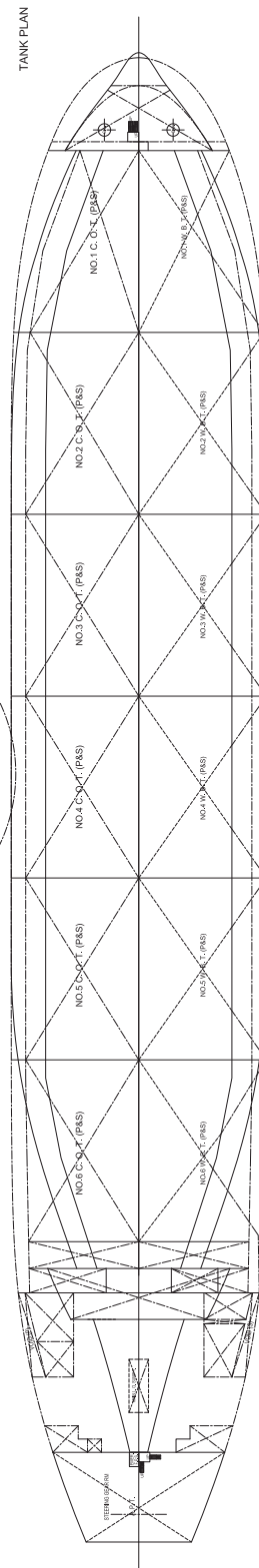
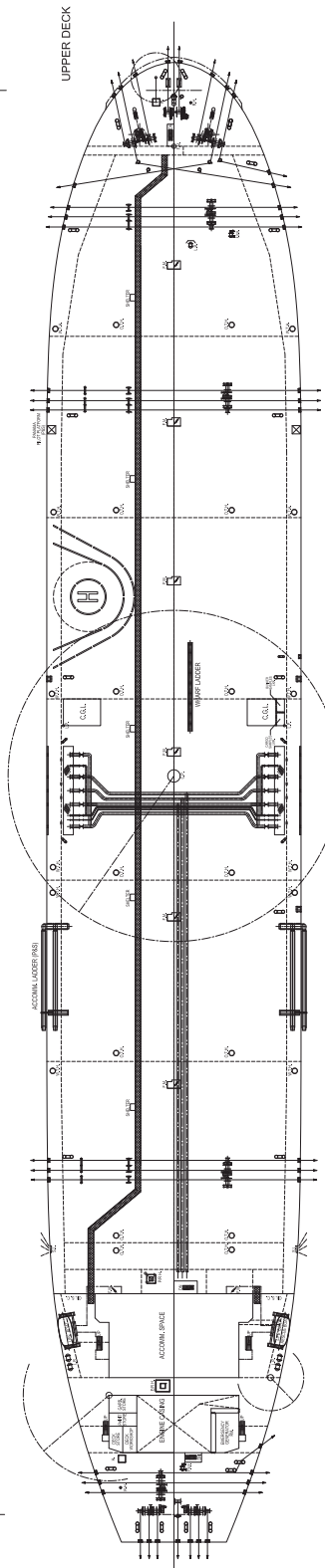
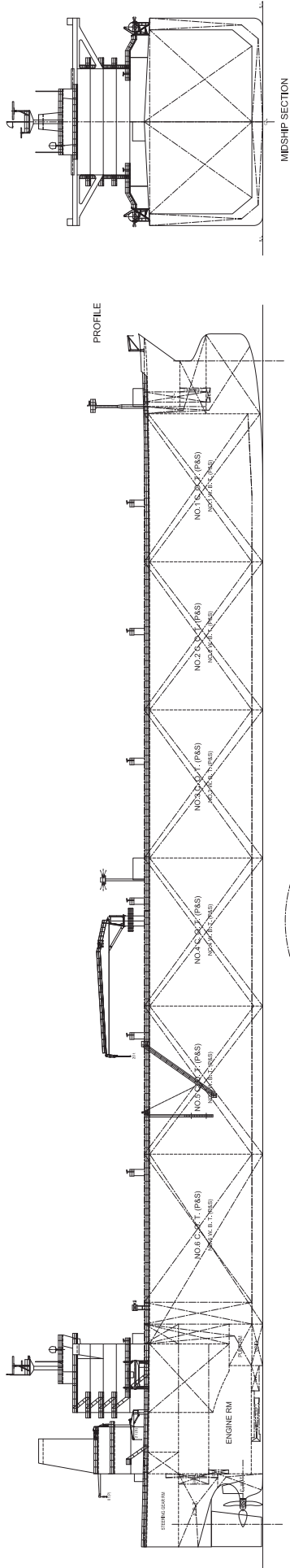
Fire extinguishing systems
 Cargo holds: Deck foam
 Make/Type: NK

Engine room: High-pressure CO₂
 Make: NK

Radars
 Number: 2 (1 x S-band, 1 x X-band)
 Make: JRC
 Models: JMR-9282-S (S-band) / JMR-9225-6X (X-band)

Integrated bridge system: Yes
 Make: JRC
 Model: JAN-9201

Contract date: September 2015
 Delivery date: 16 August 2017





OUGARTA: LNG carrier

Shipbuilder: **Hyundai Heavy Industries**
 Vessel's name: **Ougarta**
 Hull No: **2814**
 Owner/Operator: **Hyproc**
 Country: **Algeria**
 Designer: **Hyundai Heavy Industries**
 Country: **Republic of Korea**
 Model test establishment used: **Hyundai Maritime Research Institute (HMRI)**
 Flag: **Algeria**
 IMO number: **9761267**
 Total number of sister ships already completed (excluding ship presented): **1**

OUGARTA is a 171,800cbm LNG carrier owned by Hyproc and built by Hyundai Heavy Industries (HHI).

One of the principal design goals was to reduce emissions and fuel consumption by improving propulsion efficiency. The propulsion system allows for redundancy – even if one of the main generator engines fails, vessel speed can be maintained above 18.5kts.

Ougarta is fitted with a range of additional technologies developed by HHI. These include Hi-Fin propeller boss cap fins and Hi-Rudder flow-adopted twisted rudders.

There are four cargo tanks of 171,800 m³ capacity. These are of the GTT MARK III Flex type with double bottoms and double side structures. There are two cargo pumps, each of 2,350 m³/h capacity, and a spray pump that is capable of 50 m³/h. The submerged-type pumps are electric motor-driven.

The dual-fuel diesel-electric propulsion systems – two Wärtsilä 12V50DF, two Wärtsilä 8L50DF – generate 27,780kW, enabling the vessel to sail at a service speed of 20.8kt at a design draught with 21 percent sea margin and burning around 148.2 ton per day in diesel mode.

Ougarta has four pairs of water ballast tanks, one forward water ballast tank, one pair of engine room water ballast tanks and an aft peak tank.

FDA Plus notation (40 years, North Atlantic) was applied to this vessel – the first time for a vessel built by HHI. Build is according to the latest SOLAS / MARPOL requirements.

TECHNICAL PARTICULARS

Length oa: 291.5m
 Length bp: 284m
 Breadth moulded: 46.4m
 Depth moulded
 To main deck: 26.4m

Draught
 Scantling: 12.6m
 Design: 11.77m

Gross: 112,867gt

Deadweight
 Scantling: 94,600dwt

Speed, service: 20.8knots

Cargo capacity (m³)
 Liquid volume: abt. 171,800

Bunkers (m³)
 Heavy oil: ca. 5,200
 Diesel oil: ca. 950

Water ballast (m³): ca. 60,000

Classification society and notations: LR:
 +100A1, Liquefied Gas Tanker, Ship Type
 2G, Methane (LNG) in membrane tanks,
 Maximum S.G.0.5, Maximum vapour pressure
 0.25 bar, Minimum cargo temperature -163°C,
 ShipRight(SDA, FDA Plus(40, NA), ACS(B),
 CM, ETA), *IWS, LI, ECO(BWT, IHM), +LMC,
 UMS, NAV1, CAC3, with the Descriptive Notes
 "ShipRight(BWMP(T), SERS, SCM)"

Main engines
 Design: V-type generator engine + L-type
 generator engine
 Model: 12V50DF x 2 + 8L50DF x 2
 Manufacturer: Wärtsilä Hyundai
 Number: 2 + 2
 Type of fuel: HFO, MDO, MGO
 Output of each engine: 11,700kW x
 514 rpm + 7,800kW x 514 rpm

Gearboxes
 Make: Renk
 Model: RSH-2050
 Number: 2
 Output speed: 13,910kW x 72.9rpm (99%
 of Input power: 14,050kW x 580rpm)

Propellers
 Material: Ni-Al-Bronze (propeller),
 Manganese Bronze (cap)
 Designer/Manufacturer: Hyundai
 Number: 2
 Fixed/Controllable pitch: Fixed

Diesel-driven alternators
 Number: 2 + 2
 Engine make/type: Wärtsilä Hyundai /
 V-type + L-type generator engine
 Type of fuel: HFO, MDO, MGO
 Output/speed of each set: 11,700kW x
 514rpm + 7,800kW x 514rpm
 Alternator make/type: ABB/Synchronous
 Output/speed of each set: 12,700kVA/
 514rpm, 5,433kVA/514rpm

Boilers
 Number: 2
 Type: Automatic, forced draft, marine
 Make: Alfa Laval
 Output, each boiler: 7,500kg/h x 7kg/cm²G

Cargo cranes/cargo gear: Hose handling
 crane
 Number: 2
 Make: DMC
 Type: Electro-hydraulic
 Performance: 10t SWL, 5m outboard from
 vessel's side at midship

Other cranes
 Number: 3
 Make: DMC
 Type: Electro-hydraulic
 Tasks: 2 provision cranes and 1
 compressor room crane

Performance: (Provision crane) 4t SWL,
 ca. 5m outreach from vessel's parallel body
 at crane position;

(Compressor room crane) 6t SWL, ca. 5m
 outreach from vessel's parallel body at
 crane position

Mooring equipment
 Number: 20
 Make: Rolls-Royce
 Type: Electric

Special lifesaving equipment
 Number of each and capacity: 2 sets of
 lifeboats
 Make: Norsafe
 Type: Conventional

Cargo pumps
 Number: 8 sets, 2 per tank
 Type: Vertical centrifugal, submerged
 Make: Ebara
 Capacity (each): 2,350 m³/h x 185 mic

Fire extinguishing systems
 Cargo holds:
 Make/Type: NK / Dry chemical powder

Engine room:
 Make/Type: NK / High expansion foam

Cargo compressor room:
 Make/Type: NK / High pressure CO₂

Cabins:
 Make/Type: NK / Sea water hydrant

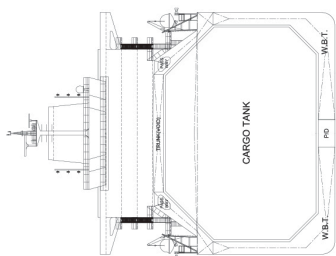
Public spaces:
 Make/Type: NK / Sea water hydrant

Radars
 Number: 2
 Make: Furuno
 Model: FAR-2837S (S-band) / FAR-2827
 (X-band)

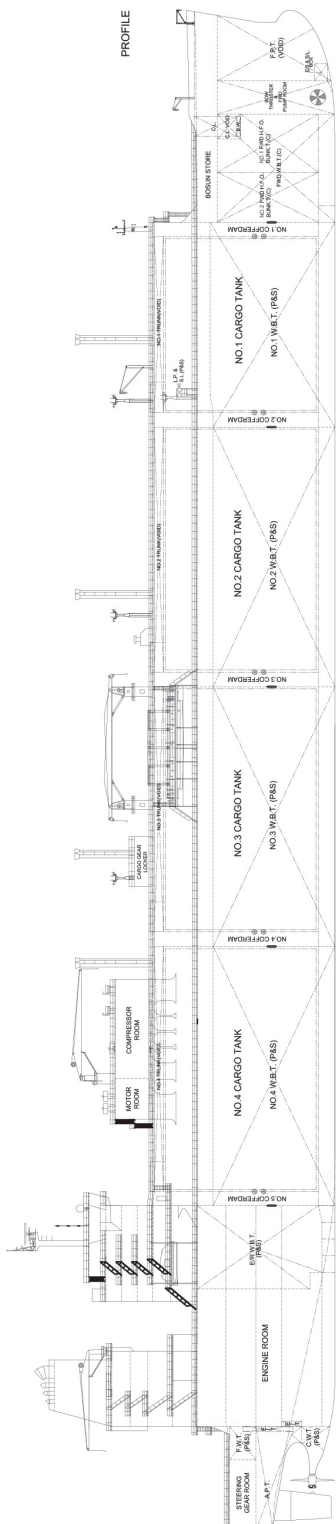
Integrated bridge system: Yes
 Make: Furuno
 Model: FMD-3300

Waste disposal plant
 Waste compactor
 Make: Usun Marine
 Model: UBP-30S

Contract date: September 2014
 Delivery date: March 2017

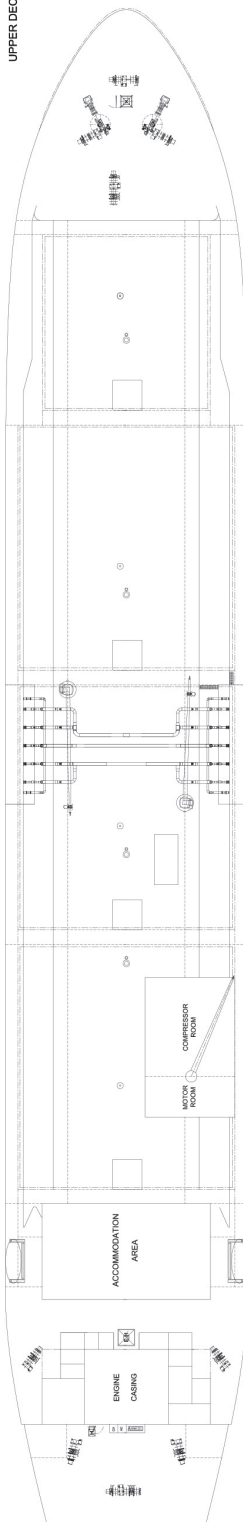


MIDSHIP SECTION

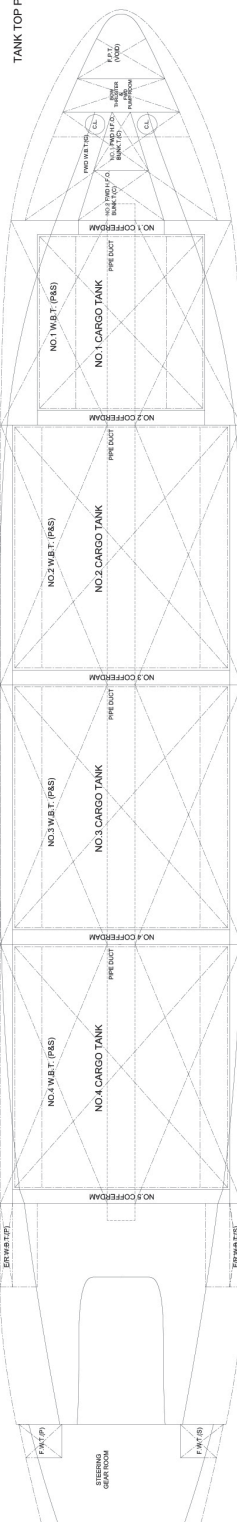


PROFILE

UPPER DECK



TANK TOP PLAN





POLAR MEXICO: Container vessel

Shipbuilder: **Jiangsu New Yangzi Shipbuilding Co., Ltd**
 Vessel's name: **Polar Mexico**
 Hull No: **YZJ2015-1200**
 Owner/Operator: **Hamburg SÜD**
 Country: **Germany**
 Designer: **Shanghai Merchant Ship Design & Research Institute, CSSC**
 Country: **China**
 Model test establishment used: **HSVA**
 Flag: **Portugal**
 IMO number: **9786750**
 Total number of sister ships already completed (excluding ship presented): **3**

POLAR MEXICO is an ECO-type 3,800TEU baby post-Panamax container vessel. Delivered to German owner Hamburg SÜD in August 2017, it is one of series of seven developed and designed by SDARI, constructed by Jiangsu New Yangzi Shipbuilding Co., Ltd and registered under ABS Class Rating.

Polar Mexico's fuel efficiency is the result of a major simulation effort. The hull form has been optimised through large-scale Computational Fluid Dynamics (CFD) calculation, as well as tank testing which was carried out by HSVA Germany. Energy-saving measures include a rudder bulb, Becker Twisted Fins and a highly efficient propeller.

The main engine is a super long-stroke MAN B&W 6S70ME-C8.5. This has an exhaust gas bypass with low load tuning, achieving greater fuel savings at the economical speeds at which the vessel is often operating. The power consumptions of the auxiliary engines have been significantly reduced through the installation of frequency-controlled sea water pumps, engine room fans and cargo hold fans serving the 429FEU reefers under deck.

Polar Mexico is able to carry 740TEU and 260TEU reefers at the same time, with 1,000 pieces of socket on-board. The system and arrangement for stowage of reefer containers complies with the requirements of ABS Class Notation IRCC-SP.

The ventilation system for the reefer containers in the cargo hold has also been simulated and optimised using CFD calculation. A frequency-converting control central system, which uses temperature monitoring and CO₂ detection, can automatically adjust the the speed and running of the cargo holds 55 vent fans.

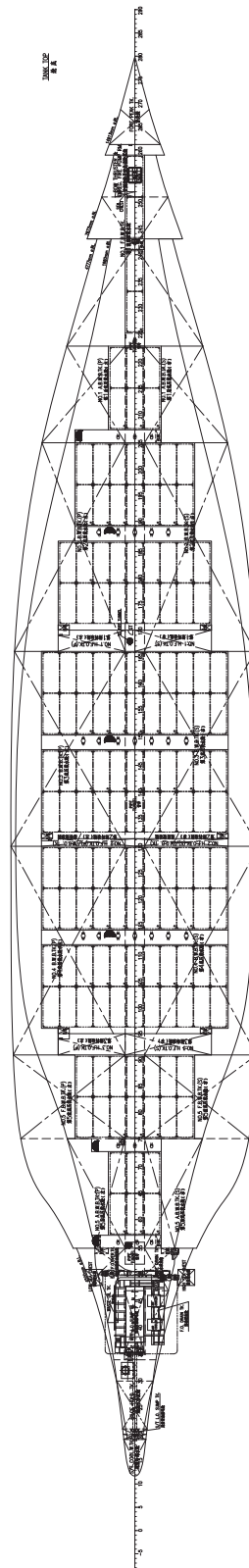
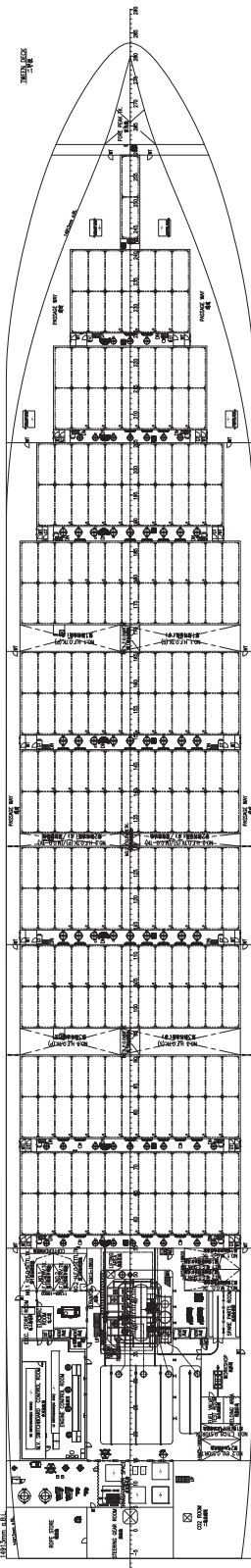
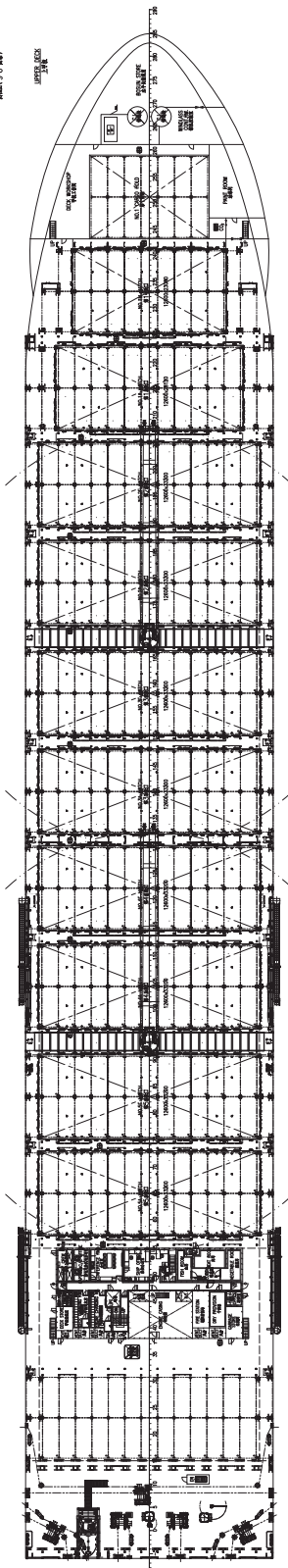
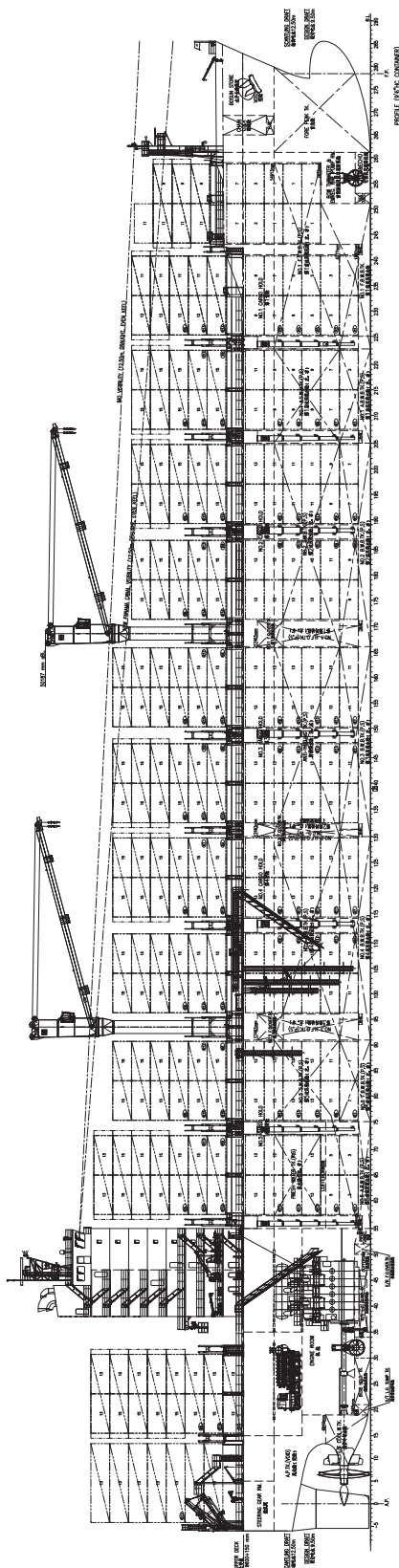
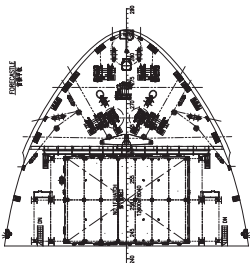
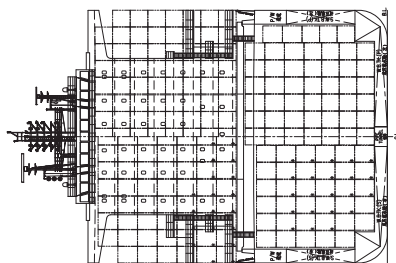
Application of various energy-saving technologies brings the design up to EEDI IMO Phase III standard. This is 42 percent lower than baseline, with much lower CO₂ emissions than most similar baby post-Panamax designs currently on the market.

Polar Mexico also has other environmentally friendly features. A ballast water treatment plant is installed and, as an alternative, ballast water exchange can be accomplished using the sequential method. There is a hull-monitoring system used for motion, stress and sea state monitoring, and there is also a ship performance management system which can provide significant information and assistance to operation.

TECHNICAL PARTICULARS

Length oa: 230m
 Length bp: 220.8m
 Breadth moulded: 37.3m
 Depth moulded
 To main deck: 19.6m
 To upper deck: 19.6m
 Width of double skin
 Side: 2.05m
 Bottom: 1.88m
 Draught
 Scantling: 12.50m
 Design: 9.50m
 Gross: 43,628gt
 Displacement: 69,815.1t
 Lightweight: 17,712.2t
 Deadweight
 Design: 31,749.9dwt
 Scantling: 52,102.9dwt
 Block co-efficient: 0.615 at design draught, 0.660 at scantling draught
 Speed, service (0.85CMCR): 19.4knots at scantling draught
 Bunkers (m³)
 Heavy oil: 4,658.6
 Diesel oil: 434.7
 Water ballast (m³): 20,191.4
 Container ships – water ballast in loaded condition (tonnes): 3,778.1
 Daily fuel consumption (tonnes/day)
 Main engine only: 66.8
 Auxiliaries: 6.3 (1 G/E) / 57.4 (3 G/E)
 Classification society and notations: ABS
 ABS X ✱A1, °E, RW, Container Carrier, ICE Class E0, CSC, CLP-V, SH, SHCM, HM1+R (Slam Warning: ACS1, Ship Motion: MOT1, Sea State: ST1), HM2+R (Hull Girder Stress: HS4, Fatigue Monitor, LC), RRDA, BWT, NBLES, UWILD, HM3+R (Shaft Monitoring: TM and RC, Navigation, Wind: WD1), ✱AMS, ✱ACCU, ✱IRCC-SP 870/100, TCM, CRC, ENVIRO, GP
 Heel control equipment: Anti-heeling system
 Main engine
 Design: MAN
 Model: MAN 6S70ME-C8.5 TII
 Manufacturer: Hyundai Heavy Industries Co., Ltd
 Number: 1
 Type of fuel: HFO, MDO, MGO
 Output of each engine: 19620kW x 91rpm
 Propeller
 Material: G-CuAl10NiF650
 Designer/Manufacturer: MMG
 Number: 1
 Fixed/Controllable pitch: Fixed

Diameter: 7.90m
 Speed: 19.4kt
 Diesel-driven alternators
 Number: 4
 Engine make/type: Daihatsu Diesel Mfg Co, Ltd / 3 x 8DE-33 & 1 x 6DE-33
 Type of fuel: HFO, MDO, MGO
 Output/speed of each set: 3 x 4,710kW x 720rpm & 1 x 3,240kW x 720rpm
 Alternator make/type: Hyundai Heavy Industries Co., Ltd / 3 x HSJ7 915-10P & 1 x HSJ7 805-10P
 Output/speed of each set: 3 x 4,520kW x 720rpm & 1 x 3,080kW x 720rpm
 Boilers
 Number: 2
 Type: CMB-VS-3.0+3.84/7 + EMB-VST-2.5/7
 Make: Saacke Marine Systems
 Output, each: 3,000kg/h / ~2,010kg/h+ 780kg/h + 1050kg/h x 0.7MPa + ~2 x 1,250kg/h x 0.7MPa
 Cargo cranes/cargo gear
 Number: 2
 Make: TTS Bohai
 Type: Electro-hydraulic
 Performance: KS 44/30, 5T-31/31,6M
 Mooring equipment
 Number: 10
 Make: TTS
 Type: Electric
 Special lifesaving equipment
 Number of each and capacity: 1, 36 persons
 Make: Hatecke
 Type: Free-fall
 Hatch covers
 Design: Macgregor
 Manufacturer: Yard
 Type: Upper deck
 Containers
 Lengths: 6,058mm
 Heights: 2,591mm
 Cell guides:
 Total TEU capacity: 3,947TEU
 On deck: 2,395TEU
 In holds: 1,552TEU
 Homogeneously loaded to 14t: 3,086TEU
 Reefer plugs: 1,000
 Tiers/rows (maximum)
 On deck: 8/15
 In holds: 7/13
 Hold refrigeration system: Air-cold
 Water ballast treatment system
 Make: GEA Trojan Marinex
 Capacity: 500m³/h
 Complement
 Officers: 12
 Crew: 20
 Suez/Repair Crew: 6
 Bow thruster
 Make: Nakashima
 Number: 1
 Output: 2,000kW
 Stern thruster
 Make: Nakashima
 Number: 1
 Output: 1,500kW
 Fire detection system
 Make: Tyco
 Type: T2000
 Fire extinguishing systems
 Cargo holds: CO₂
 Make/Type: NK Co., Ltd, NK
 Engine room: CO₂
 Make/Type: NK Co., Ltd, NK
 Radars
 Number: 3
 Make: SAM
 Model: Multipilot Platinum
 Integrated bridge system: No
 Waste disposal plant
 Sewage plant
 Make: DVZ Services GmbH / Willtrust Ltd
 Model: DVZ-SKA-40
 Contract date: July 2015
 Launch/float-out date: April 2017
 Delivery date: August 2017





REN JIAN TANG SHAN: Container ship

Shipbuilder: **Xiamen Shipbuilding Industry Co**
 Vessel's name: **Ren Jian Tang Shan**
 Hull No: **SC4710G1**
 Owner/Operator: **Ren Jian Group Co**
 Country: **China**
 Designer: **Shanghai Merchant Ship Design & Research Institute, CSSC (SDARI)**
 Country: **China**
 Model test establishment used: **CSSRC**
 Flag: **China**
 IMO number: **CN20161999292 (Chinese Reg. Number)**

Total number of sister ships already completed (excluding ship presented): **1**

REN JIAN TANG SHAN is the first in a series of eight second-generation 2,400 TEU container ships designed by the Shanghai Merchant Ship Design and Research Institute (SDARI). These comply with the CCS Class rule for green ship class notation and the design's excellent manoeuvrability means that it is also suitable for operations in the restricted waters of China's Yangtze River. The vessel is primarily designed for domestic service in China's coastal waters.

A single four-blade, high-skew, low-fluctuation pressure and low-cavitation propeller is driven by a two-stroke engine MAN B&W 6S50ME-C8.5 engine with a total output of 6,732kW. The daily fuel oil consumption of the main engine is 23.8t/day based on a calorific value of 42,700kJ/kg under ISO conditions. The service speed is 14.5kt at CSR with a 15 percent sea margin at a design draft of 10.7m and energy-saving equipment HVAE.

The design aims of the series were energy saving, good environmental performance, economy and high efficiency, as well as operation flexibility.

In order to achieve the 40,602dwt figure, which is far greater than that for the present generation of similar container ships, the hull line was designed with big block coefficients in mind. It was optimised using CFD calculation to obtain better power performance, and verified by model testing at CSSRC. It has no bulbous bow, a vertical stem, transom stern, flush deck and forecandle.

In order to achieve excellent manoeuvrability, a new kind of high-efficiency low-resistance rudder, which suits the needs of navigation in restricted waters, was designed and installed. The 14t/TEU loading is 2,307TEU or 94.4 percent of total container capacity. This is far greater than for existing similar domestic service container ships. The attained EEDI is below required EEDI -32.9 percent. The vessel's excellent vibration performance is far below the ISO standard value and is a product of the steel design of the superstructure. The noise level meets the MSC.337(91) Resolution noise level.

TECHNICAL PARTICULARS

Length oa: 180.00m
 Length bp: 177.00m
 Breadth moulded: 32.20m

Depth moulded
 To upper deck: 16.20m
 Width of double skin
 Side: 2.00m
 Bottom: 1.58m
 Draught
 Design: 10.70m
 Gross: 28,221gt
 Displacement: 50,189t
 Deadweight
 Design: 40,602dwt

Speed, service (90% SMCR with 15% sea margin): 14.5knots

Bunkers (m³)
 Heavy oil: 790
 Diesel oil: 168

Water ballast (m³): 12,233
 Water ballast in loaded condition: 6,900t
 ballast water (14t/TEU loading condition)
 0 ballast water (22t/TEU loading condition)

Daily fuel consumption (tonnes/day)
 Main engine only: 23.8

Classification society and notations: CCS
 ★CSAD Container Ship; Greater Coastal Service; Ice Class B; Loading Computer(S,I)
 ★CSMD MCC; BRC; FTP; Green Ship 1

% high-tensile steel used in construction: ..50%

Heel control equipment: Ballast water pump

Main engine
 Design: MAN B&W
 Model: 6S50ME-C8.5 Tier II
 Manufacturer: Hudong Heavy Machinery Co., Ltd

Number: 1
 Type of fuel: HFO or MDO
 Output of each engine: 6,732kW x 107.0rpm

Propeller
 Material: Ni-Al-Bronze
 Number: 1
 Fixed/Controllable pitch: Fixed
 Diameter: 6.2m
 Speed: 107rpm

Diesel-driven alternators
 Number: 3
 Engine make/type: . CSSC Marine / 7L23/30H
 Output/speed of each set: 970 kW x 750 rpm

Boiler
 Number: 1
 Type: Composite smoke tube
 Make: Qingdao Marine Boiler Ltd
 Output: ..Oil-fired section 1,500kg/h, exhaust section 900kg/h

Crane
 Number: 1
 Make: Wuxi Huahai
 Type: Electric monorail crane
 Tasks: For lifting provisions and engine parts
 Performance: 5t

Mooring equipment
 Number: 4
 Make:CSSC Nanjing Lvzhou
 Type:Hydraulic

Special lifesaving equipment
 Number of each and capacity: 2
 Make:Wuxi Wenjiao G.F.R.P
 Type: Gravity luffing

Hatch covers
 Design: TTS Hua Hai
 Manufacturer: TTS Hua Hai
 Type:Lift on/off hatch cover (upper deck)

Containers
 Lengths:20'/40'/45'
 Heights: 8'6"/9'6"
 Cell guides: No.1~No.5 Hold
 Total TEU capacity: 2,444 TEU
 On deck: 1,264 TEU
 In holds: 1,180 TEU
 Homogeneously loaded to 14t: 2,307TEU
 Reefer plugs: 160
 Tiers/rows (maximum)
 On deck: 7/13
 In holds: 6/11

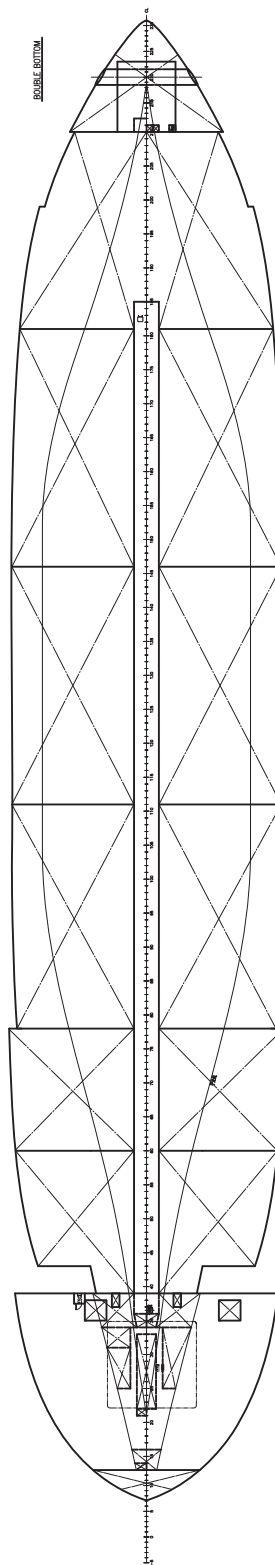
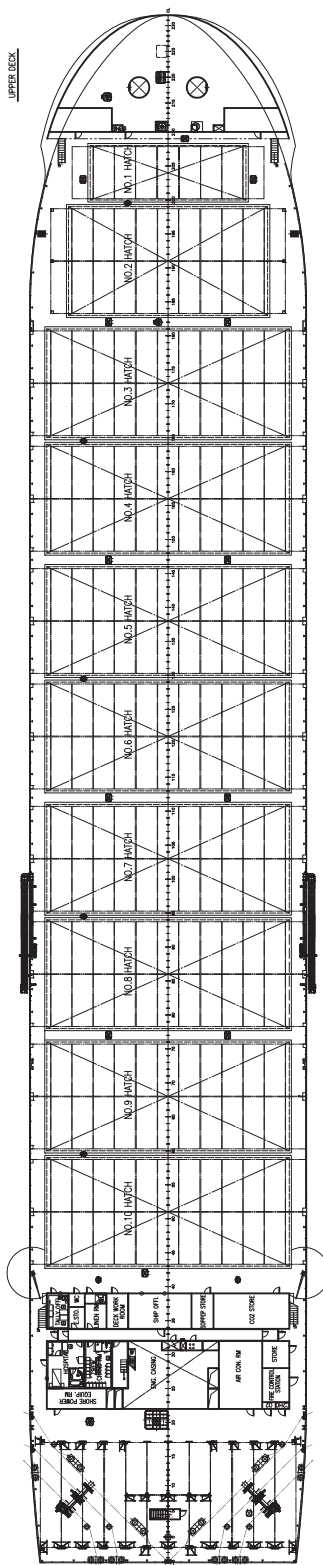
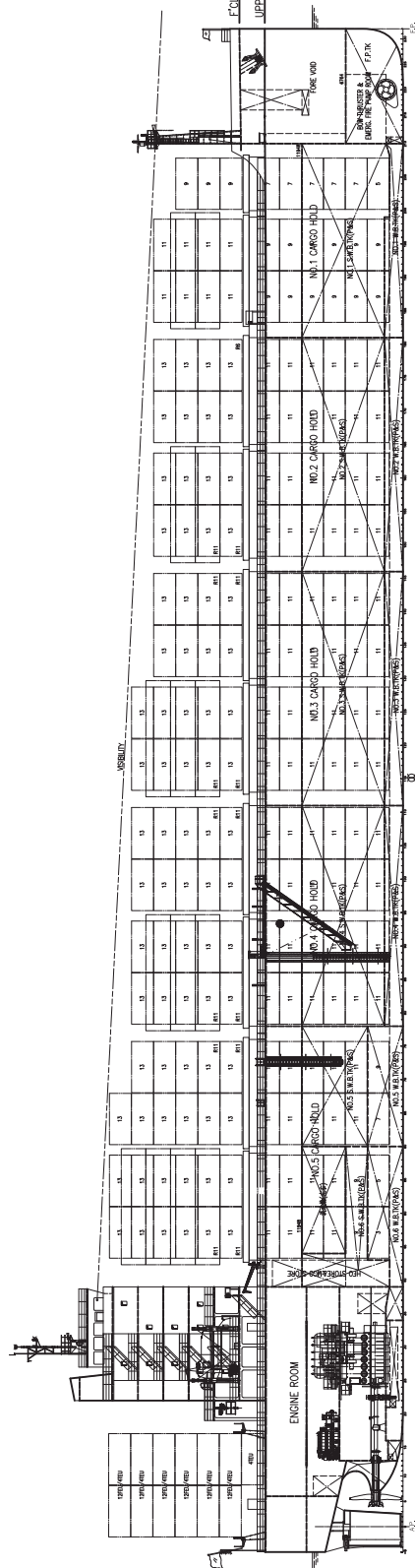
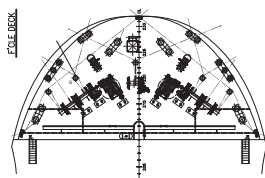
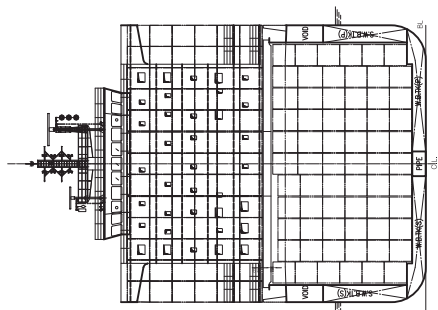
Complement
 Officers: 10
 Crew: 15
 Single/double/other rooms:All single room

Bow thruster
 Make: WuHan Kawasaki
 Number: 1
 Output (each): 1,100kW

Fire extinguishing systems
 Cargo holds:
 Make/Type: Wuhan Weili /CO₂
 Engine room:
 Make/Type: Wuhan Weili /CO₂

Waste disposal plant
 Incinerator
 Make: TeamTec
 Model: OG120C
 Waste compactor
 Make: Shanghai Shijiu
 Model: CSWE-30

Delivery date: October 2017





RPG STUTT GART: Inland dual-fuel barge

Shipbuilder: **VeKa Group**
 Vessel's name: **RPG Stuttgart**
 Hull No: **B2/096**
 Owner/Operator: **INTERSHIP/Plouvier Gr.**
 Country: **Switzerland/Belgium**
 Designer: **VeKa Group**
 Country: **The Netherlands**
 Model test establishment used: **DST**
 Flag: **Switzerland**
 IMO number: **9800910**
 Total number of sister ships already completed (excluding ship presented): **1**

RPG STUTT GART is one of a class of 15 inland dual-fuel barges. Built by Dutch shipyard VeKa Shipbuilding, it will predominantly run on Liquefied Natural Gas (LNG). Their main engines, provided by Wärtsilä, will run on 95-98% LNG fuel with a small proportion of diesel used for ignition.

The vessel will be operated under a time-charter agreement between Shell Trading Rotterdam BV and Plouvier Transport NV, which was announced in December 2015. It will support Shell's growing business in trading and transporting refined oil products in the ARA (Amsterdam-Rotterdam-Antwerp) and Rhinetrack (Germany/Switzerland) regions.

The 110m barges in the class will refuel with LNG from infrastructure in Rotterdam and along the Rhine. They have been designed for improved environmental and safety performance, and optimal cargo-carrying capacity in a variety of water conditions.

Delivery of the 15 vessels will be staggered, with the final one expected to be handed over in mid-2019.

TECHNICAL PARTICULARS

Length oa: 110m
 Length bp: 108.4m
 Breadth moulded: 11.4m
 Depth moulded
 To main deck: 4.9m
 Width of double skin
 Side: 1.0m
 Bottom: 0.7m
 Draught
 Scantling: 3.3m
 Design: 3.2m
 Displacement: 3,563m³
 Lightweight: 887t
 Deadweight
 Design: 2,672dwt
 Scantling: 2,792dwt

Block co-efficient: 0.89 at design draught
 Speed, service (85 %MCR output): 10knots
 Cargo capacity (m³)
 Liquid volume: 3,028
 Bunkers (m³)
 LNG: 58
 Diesel oil: 48
 Water ballast (m³)
 Tankers - percentage segregated ballast: 1,425
 Classification society and notations: LR
 ✖ A1 I.W.W. Tanker Type C L.S. 'T' / p.v. + 50kPa / s.g. 1.0

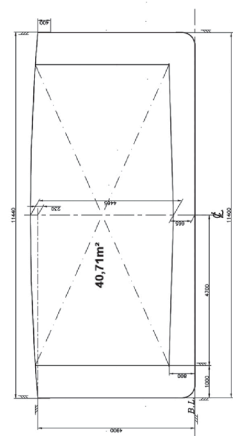
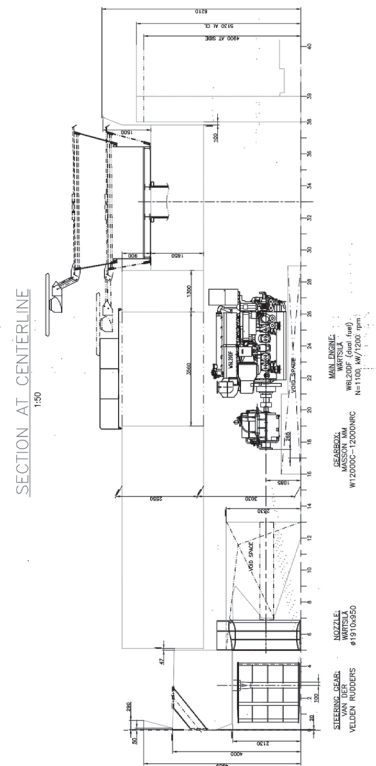
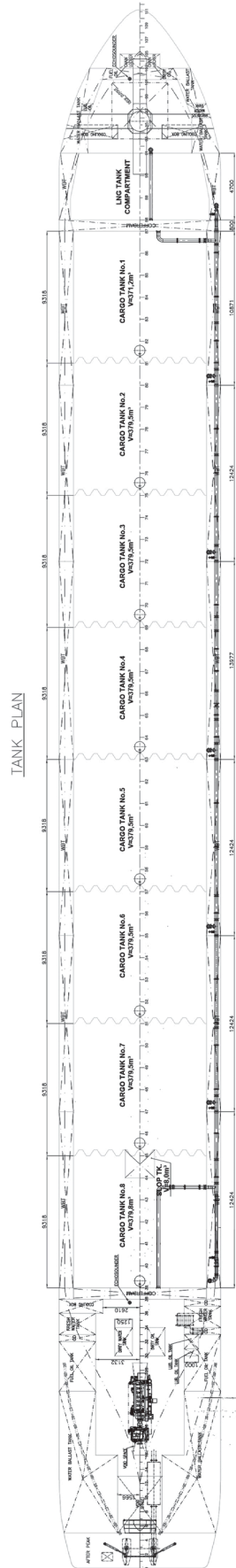
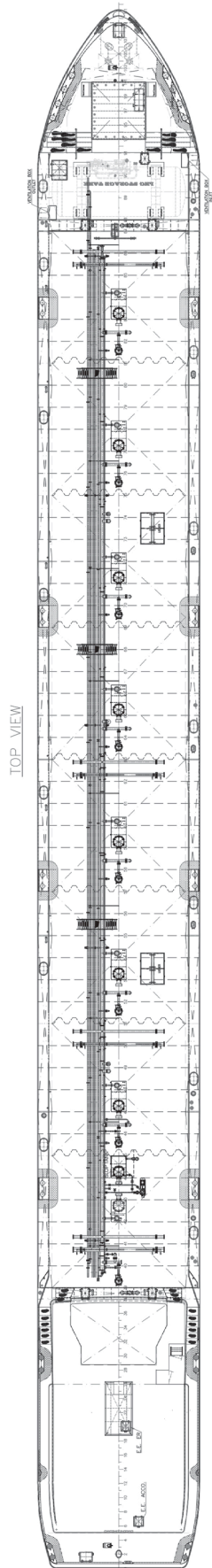
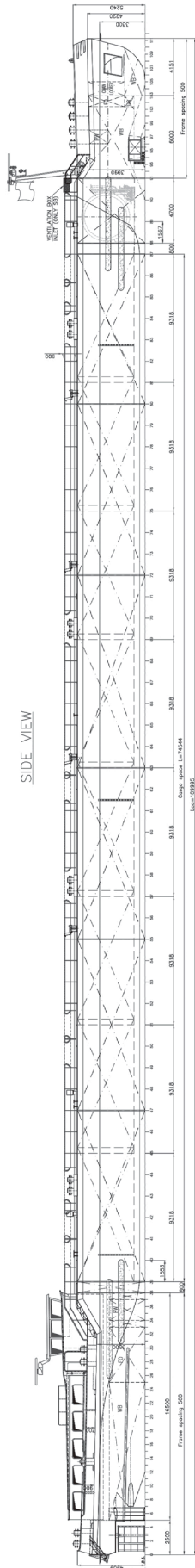
Main engine
 Design: 6 cylinder, inline
 Model: 6L20DF
 Manufacturer: Wärtsilä
 Number: 1
 Type of fuel: NG (natural gas) + gasoil (pilot fuel)
 Output: 1,110kW
 Gearbox
 Make: Masson
 Model: W1200C
 Number: 1
 Output speed: 273rpm

Propeller
 Material: Ni-Al-Bronze
 Designer/Manufacturer: Wärtsilä
 Number: 1
 Fixed/Controllable pitch: Fixed
 Diameter: 1,900mm
 Speed: 273rpm

Diesel-driven alternators
 Number: 3
 Engine make/type: Caterpillar C18, John-Deere 6068HF and 4045TF
 Type of fuel: gasoil
 Output/speed of each set: 447kW @ 1,500rpm, 139kW @ 1,500rpm and 55kW @ 1,500rpm
 Alternator make/type: Stamford
 Output/speed of each set: 420kW @ 1,800rpm, 155kVA @ 1,500rpm and 62.5kVA @ 1,500rpm

Other cranes
 Number: 1
 Make: Van Wijk
 Tasks: Car handling
 Performance: 2t @ 17m

Mooring equipment
 Number: 2
 Make: Dijkstra
 Type: Electric
 Special lifesaving equipment
 Number of each and capacity: 1 x 5 persons
 Make: Riwa
 Type: 3500
 Cargo tanks
 Number: 8
 Product range: mineral oils
 Stainless steel – structure/piping: galvanised
 Cargo pumps
 Number: 8
 Type: MDPD-80
 Make: Marflex
 Stainless steel: yes
 Capacity (each): 100 m³/h @ 6 bar, s.g. 1
 Cargo control system
 Make: Berg Maritieme Meetsystemen
 Type: Vegaflex 81
 Complement
 Officers: 2
 Crew: 3
 Single/double/other rooms: 5 single
 Stern appendages/special rudders: V/d Velden double rudder system
 Bow thruster
 Make: Verhaar
 Number: 1
 Output: 375kW
 Bridge control system
 Make: Werkina
 Is bridge fitted for one-man operation? ...Yes
 Fire detection system
 Make: Thorn Security
 Type: T1204A2
 Fire extinguishing systems
 Engine room:
 Make/Type: Minimax FM200
 Radars
 Number: 2
 Make: Furuno
 Model: RHRS 2014 TFT
 Integrated bridge system: Yes
 Make: Werkina
 Model: DBS
 Contract date: 17 December 2015
 Launch/float-out date: 04 November 2016
 Delivery date: 07 June 2017





SINOTRANS KAOHSIUNG: Container ship

Builder **Guangzhou Wenchong Shipyard Co**
 Vessel's name **Sinotrans Kaohsiung**
 Hull No: **H5489**
 Owner/operator **Sinotrans**
 Country **China**
 Designer ... **Shanghai Merchant Ship Design & Research Institute, CSSC**
 Flag **Hong Kong, China**
 IMO number: **9792620**
 Total number of ships already completed **2**
 Total number of sister ships still on order **1**

SINOTRANS KAOHSIUNG is a 1,946TEU container vessel tailor-made for Chinese owner Sinotrans and delivered in May 2017. A total of four ships have been ordered in this series, designed by SDARI, constructed by Guangzhou Wenchong Shipyard and registered under CCS class respectively. This series becomes the latest feeder vessel in Sinotrans's fleet.

Optimal fuel efficiency is the most significant feature of this vessel. The hull form was developed based on organic integration of SDARI's empirical method and numerical towing tank technology. An efficient bow is applied to ensure better sea-keeping performance and reduce speed loss in rough seas. Through verification by numerous model tests in the basin of HSVA, the hull form has been optimised to achieve maximum energy efficiency over the range of speeds and draughts anticipated to operate in service.

The main engine a MAN B&W 6S60ME-C8.5 with much derated S.M.C.R brings greater fuel savings at economical speed. From an ecological perspective, the vessel has been designed to improve its environmental footprint – *Sinotrans Kaohsiung's* EEDI value satisfies Phase III of IMO regulations.

Sinotrans Kaohsiung is designed to take various types of container, including refrigeration containers, 45' container, etc. The vessel is optimised for the greatest possible container intake. She has about 100TEU greater intake than other similar sized container vessels.

The successful delivery of *Sinotrans Kaohsiung* makes a contribution to a more energy saving and reliable logistics platform, bringing economic benefits to the owner.

TECHNICAL PARTICULARS

Length oa: 171.99m
 Length bp: 164.00m
 Breadth moulded: 28.40m

Depth moulded
 To main deck: 14.50m
 To upper deck: 14.50m
 Width of double skin
 Side: 1.60m
 Bottom: 1.50m
 Draught
 Scantling: 9.75 m
 Design: 8.5m

Gross: 19,070gt
 Displacement: 32,800t
 Lightweight: 8,000t
 Deadweight
 Scantling: 24,800dwt

Block co-efficient: 0.7024 at 9.75m draught
 Speed, service (0.9CMCR): 18.50knots at design draught

Cargo capacity (m³)
 Bale: 33,200
 Bunkers (m³)
 Heavy oil: 1,400
 Diesel oil: 250
 Water ballast (m³): 8,700

Daily fuel consumption (tonnes/day)
 Main engine only: 39.9

Classification society and notations: CCS
 ★ CSA General Dry Cargo Ship, Double Side Skin, Equipped with container securing arrangements, Strengthened for heavy cargoes, Grab*(20), ERS, PSPC(B), Loading Computer(S,I,D,G), In-Water Survey, PMS★CSM, AUT-0, SCM, GRP, Green Ship I, EEDI(II+), FTP, BWMP, BWMS, EAL, NEC(III)

Heel control equipment: Anti-heeling system
 Main engine
 Design: MAN B&W
 Model: 6S60ME-C8.5
 Manufacturer: Hudong Heavy Machinery Co., Ltd
 Number: 1
 Type of fuel: HFO, MDO, MGO
 Output of each engine: 14,280kW x 105rpm

Propeller
 Material: Ni-Al-Bronze
 Designer/Manufacturer: Changzhou Zhonghai Marin Propeller Co., Ltd

Number: 1
 Fixed/Controllable pitch: Fixed
 Diameter: 6.60m
 Speed: 13.50kt

Diesel-driven alternators
 Number: 3
 Engine make/type: Anqing CSSC Diesel Engine Co., Ltd 8DK-20e
 Type of fuel: HFO, MDO, MGO
 Output/speed of each set: 1,360kW x 900rpm

Boilers
 Number: 1
 Type: CMB-VS-1,8+1,3/7
 Make: Saacke VKK Marine Boilers GmbH
 Output: 1,800kg/h / ~1,300kg/h

Mooring equipment
 Number: 4
 Make: Masada Jiangsu
 Type: Electric-hydraulic

Special lifesaving equipment
 Number of each and capacity: 2 sets totally enclosed lifeboat 30 persons
 Make: Jiangyin Neptune Marine Appliance Co., Ltd
 Type: Gravity-luffing

Hatch covers
 Design: TTS
 Manufacturer: TTS HuaHai
 Type: Upper deck, lift-away

Containers
 Lengths: 6,058mm
 Heights: 2,591mm
 Cell guides:
 Total TEU capacity: 1,946 TEU
 On deck: 1,286 TEU
 Homogeneously loaded to 14t: 1,375 TEU
 Reefer plugs: 350 TEU
 Tiers/rows (maximum)
 On deck: 7/11
 In holds: 5/10

Water ballast treatment system
 Make: COSCO (WeiHai) Shipbuilding Marine Technology Co., Ltd
 Capacity: 500m³ x 2

Complement
 Officers: 13
 Crew: 12
 Suez/Repair Crew: 6

Bow thruster
 Make: ... Wuhan Kawasaki Marine Machinery Co., Ltd (WKM)
 Number: 1
 Output: 1,000kW

Bridge control system
 Make: Furuno
 Type: MU-231
 Is bridge fitted for one-man operation? ...Yes

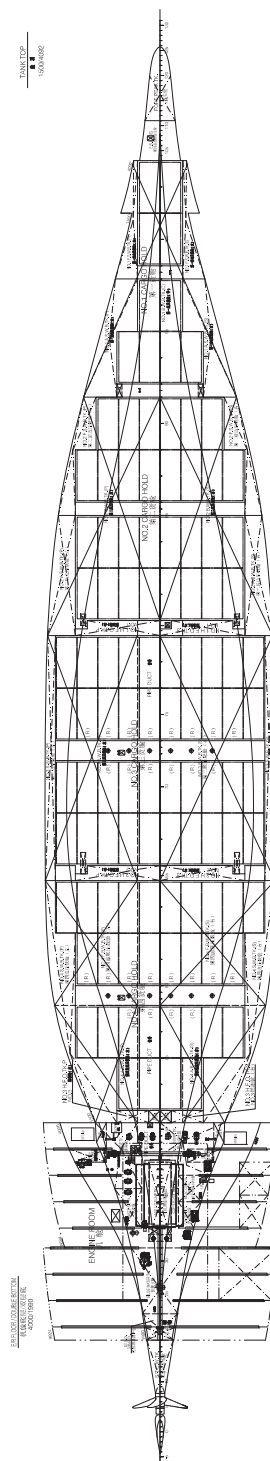
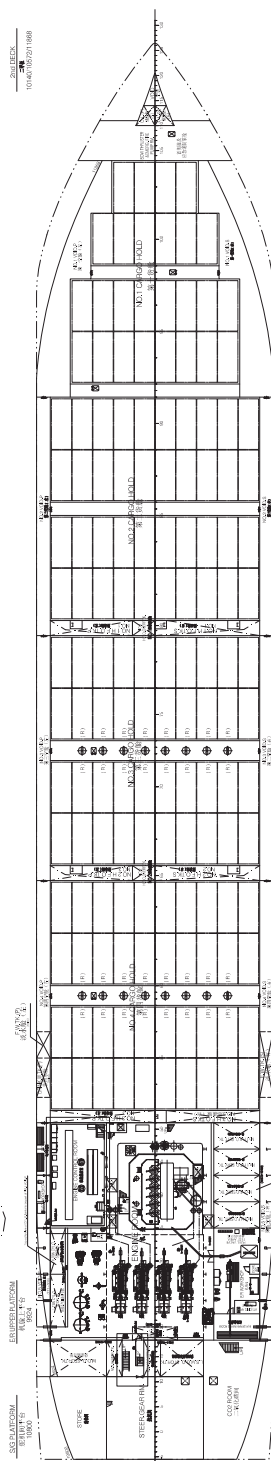
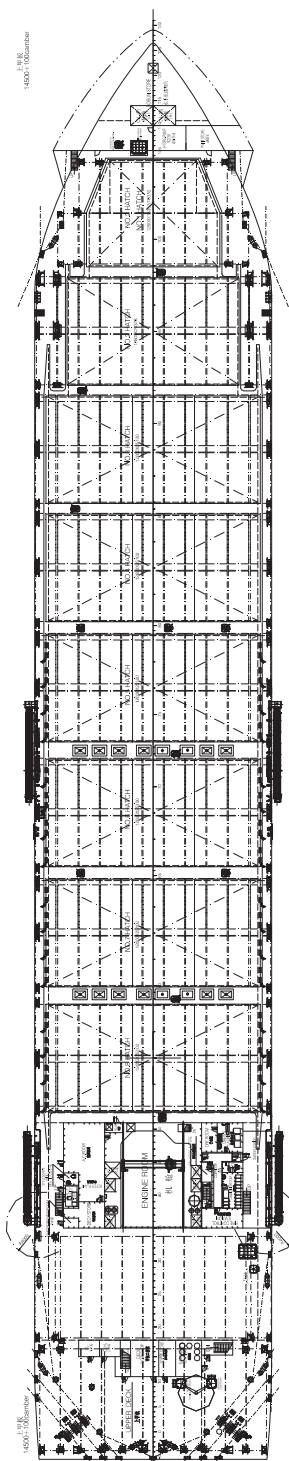
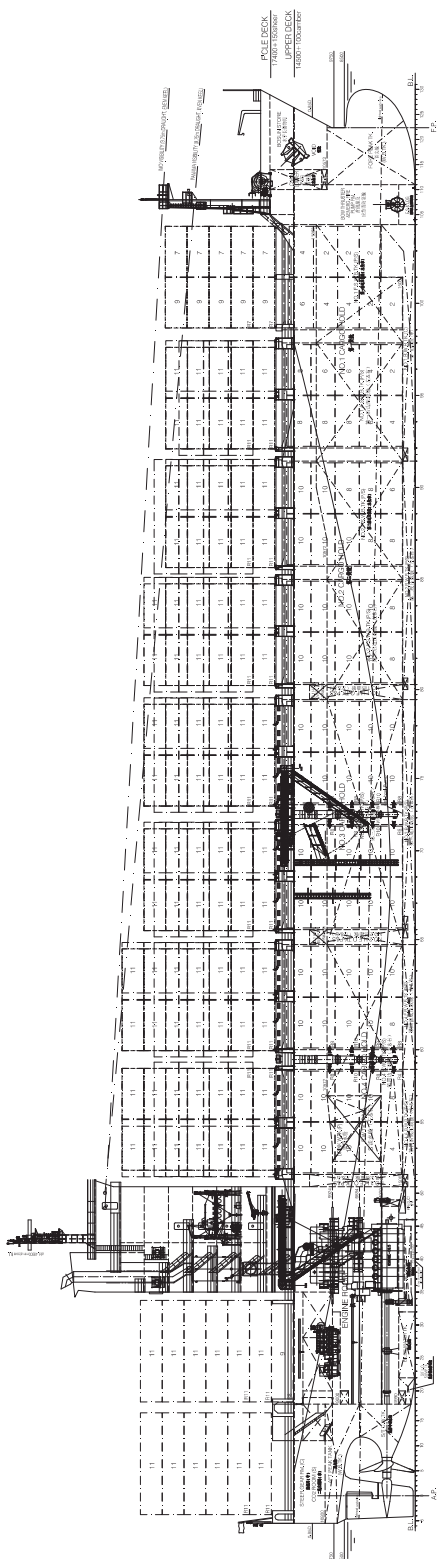
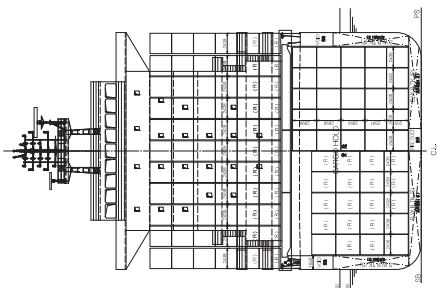
Fire detection system
 Make: Autronicafire
 Type: BS-200M

Fire extinguishing systems
 Cargo holds: CO₂
 Make/Type: Tyco Seaplus
 Engine room: CO₂
 Make/Type: Tyco Seaplus

Radars
 Number: 2
 Make: Furuno
 Models: XN24AF, SN36AF

Integrated bridge system: No

Contract date: June 2015
 Launch/float-out date: 16 December 2015
 Delivery date: May 2017





SUNFLOWER FURANO: Passenger/car ferry

Shipbuilder: ... **Japan Marine United Corporation**
 Vessel's name: **Sunflower Furano**
 Hull No: **5094**
 Owner/operator **MOL Ferry Co., Ltd.**
 Country **Japan**
 Designer **Japan Marine United Corporation**
 Flag **Japan**
 IMO number **9761542**
 Total number of ships already completed **1**
 Total number of sister ships still on order **0**

Japan Marine United Corporation (JMU) delivered *Sunflower Furano*, an 14,000 GT domestic passenger/car ferry, to MOL Ferry Co., Ltd. on 27 April 2017. The vessel was built at Yokohama Shipyard Isogo Works of JMU and is entering service between Oarai in Ibaraki and Tomakomai in Hokkaido.

The vessel achieves higher propulsive performance with a newly developed hull form and energy saving technologies such as Contra-rotating propellers (CRP).

The vessel has a hybrid propulsion system that drives the CRP using the main engines and/or electric motors. At normal sea going, the CRP are driven by the two main engines that have the feature of lower fuel consumption. When manoeuvring in the harbour, the CRP are driven by two electric motors and the side thrusters are driven by power feeding from shaft generators driven by the two main engines. This hybrid propulsion system is suitable for passenger/car ferries which have priority not only in sea going operation but also in harbour manoeuvring operations.

The accommodation of the vessel is well designed for a comfortable voyage for the ship's passengers. The vessel has a great variety of cabins such as a suite room, premium rooms with a balcony, a barrier-free room, and private rooms that permit staying with pets. In public spaces, facilities are available such as a promenade with a partially open deck, grand bathrooms with a sauna, dog run spaces, etc.

TECHNICAL PARTICULARS

Length oa: 199.70m
 Breadth moulded: 27.20m

Depth moulded
 To main deck: 14.65m
 Draught
 Scantling: 6.85m
 Gross: 13,806gt
 Deadweight
 Scantling: 6,964dwt
 Speed, service: 24knots
 Heel control equipment: Auto heeling system
 Roll-stabilisation equipment: Fin stabiliser

Main engine
 Design: SEMT-Pielstick
 Model: 14PC2.6B
 Manufacturer: JFE Engineering Corporation
 Number: 2
 Type of fuel: HFO or MDO
 Output of each engine: 10,500kW

Propeller
 Material: Ni-Al-Bronze
 Designer/Manufacturer: Japan Marine United Corporation / Nakashima Propeller Co., Ltd
 Number: 1 x Contra-Rotating Propeller
 Fixed/Controllable pitch: Fixed pitch
 Propulsive motors
 Number: 2
 Make/type: Nishishiba Electric Co., Ltd.

Main-engine driven alternators
 Number: 2
 Make/type: Nishishiba Electric Co., Ltd.

Diesel-driven alternators
 Number: 4
 Make/type: Daihatsu Diesel MFG Co., Ltd.
 Type of fuel: HFO or MDO
 Make/type: Nishishiba Electric Co., Ltd.

Mooring equipment
 Number: 2 x Windlass & mooring winch,
 4 x Mooring winch

Make: Manabe Zoki Co., Ltd.
 Type: Electro-hydraulic driven

Vehicles
 Total cars: Trucks 160, Private cars 100

Doors/ramps/lifts/moveable car decks
 Number of each: 1 x Fore side ramp, 1 x
 Stern side ramp, 1 x Stern ramp, 3 x
 Removable ramp, 2 x fixed ramp

Complement
 Officers: 11
 Crew: 22
 Supernumeraries/Spare: 13
 Passengers
 Total: 590
 Number of cabins: 170

Bow thruster(s)
 Make: Kawasaki Heavy Industries, Ltd.
 Number: 2

Bow thruster(s)
 Make: Kawasaki Heavy Industries, Ltd.
 Number: 2

Fire detection system
 Make: Consilium Nittan Marine Ltd.

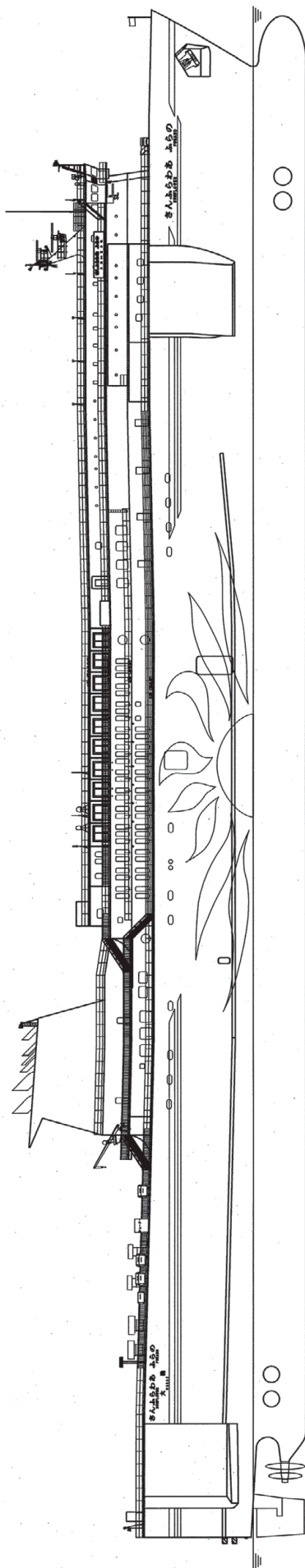
Fire extinguishing systems
 Engine room
 Make/Type: Kashiwa Co Ltd/
 High expansion foam

Vehicle spaces
 Make/Type: Kashiwa Co Ltd/Sprinkler

Cabins
 Make/Type: Sea water and portable
 Public spaces
 Make/Type: Sea water and portable

Radars
 Number: 2
 Make: Furuno Electric Co., Ltd

Contract date: 2014
 Delivery date: 27 April 2017





TRAMMO DIETLIN: LPG carrier

Shipbuilder: **Hanjin Heavy Industry & Construction Co**
 Vessel's name: **Trammo Dietlin**
 Hull No: **SN00270**
 Owner/Operator: ... **Global United Gas Carriers Pte Ltd**
 Country: **Singapore**
 Designer: **Hanjin Heavy Industry & Construction Co**
 Country: **Republic of Korea**
 Model test establishment used: **KRISO**
 Flag: **Singapore**
 IMO number: **9543079**
 Total number of sister ships already completed (excluding ship presented): **1**

TRAMMO DIETLIN is a 38,000m³ LPG carrier which has three IMO Type A independent self-supporting prismatic cargo tanks. These can be used for the transportation of liquefied gases such as propane, butane, and ammonia.

The cargo tanks are designed to provide optimal thermal insulation and absorb low-temperature contraction. Two tanks (one for LPG, one for ammonia) installed on deck enable gassing-up for two grades of cargoes simultaneously before loading at sea.

By adopting EDD (Extended Dry Docking) notation, Global United Gas Carriers Pte Ltd will be able to extend the vessel's dry docking period from 5 to 7.5 years and realise benefits in maintenance planning and operating costs.

The vessel's autonomous systems have been awarded Cyber (AL-SAFE) notation. Elements of the navigation, cargo and machinery systems have been certified AL2 and the air-handling unit has been certified AL3 by Lloyd's Register.

The vessel also has a Mewis duct in order to improve propulsive efficiency and reduce vibration.

TECHNICAL PARTICULARS

Length oa: ca. 180m
 Length bp: 172.2m
 Breadth moulded: 28.8m
 Depth moulded
 To main deck: 18.2m
 To upper deck: 18.2m
 Width of double skin
 Bottom: 1.8m
 Draught
 Scantling: 10.4m
 Design: 9.5m
 Gross: 25,600gt
 Deadweight
 Design: 24,100dwt
 Scantling: 28,100dwt

Speed, service: 16.2knots
 Cargo capacity (m³)
 Liquid volume: 38,000
 Bunkers (m³)
 Heavy oil: 1,800
 Diesel oil (MGO): 400
 Water ballast (m³): 12,500
 Daily fuel consumption (tonnes/day)
 Main engine only: 30.22
 Auxiliaries: Each 5.96 (G/E) / 7.99 (Boiler)
 Classification society and notations: LR +100A1, Liquefied Gas Carrier, Ship Type 2G, Anhydrous Ammonia, Butadiene, Butane Butane-Propane mixture, Butylenes, Propane, Propylene in Independent tanks, Maximum Specific Gravity 0.7, Partial loading Vinyl Chloride Monomer with Maximum Specific Gravity 0.97, Maximum Vapour Pressure 0.25 bar (0.45 bar in harbour), Minimum Cargo Temperature Minus 48 deg. C, ShipRight (ACS(B), CM, SDA), *IWS, LI, +LMC, UMS, + Lloyd's RMC (LG), Descriptive Notes : ShipRight (BWM(P(S, T), IHM, SCM)
 Heel control equipment: None
 Roll-stabilisation equipment: Bilge keel
 Main engine
 Design: MAN Diesel Turbo
 Model: 6G50ME-B9.5
 Manufacturer: STX Heavy Industries Co., Ltd
 Number: 1
 Type of fuel: HFO or MGO
 Output of each engine: 7,820kW x 95 rpm
 Propeller
 Material: Ni-Al-Bronze
 Designer/Manufacturer: Hyundai Heavy Industries
 Number: 1
 Fixed/Controllable pitch: Fixed
 Speed: 95rpm
 Diesel-driven alternators
 Number: 3
 Engine make/type: Yanmar 6EY22ALW
 Type of fuel: HFO or MGO
 Output/speed of each set: 1,300kW / 900rpm
 Alternator make/type: Hyundai / HFC7 568-8P
 Output/speed of each set: 1,200kW / 900rpm

Boilers
 Number: 2
 Type: Vertical smoke tube
 Make: Aalborg
 Output, each boiler: EGB – 700kg/h, auxiliary boiler – 4,000kg/h

Cargo cranes/cargo gear
 Number: 1
 Make: DMC
 Type: Electro-hydraulic-driven cylinder-luffing
 Performance: 10.0t SWL

Other cranes
 Number: 2
 Make: DMC
 Type: Hydraulic-driven cylinder-luffing
 Tasks: Provision & engine part handling
 Performance: ... 2.0t SWL port side, 4.0t SWL stb'd side

Mooring equipment
 Number: 7
 Make: Flutek
 Type: Electro-hydraulic

Special lifesaving equipment
 Number of each and capacity: 2 x 31 persons
 Make: Fassmer
 Type: Hinged gravity

Cargo tanks
 Number: 3
 Cargo pumps
 Number: 3
 Type: Vertical deepwell centrifugal
 Make: Wärtsilä
 Capacity (each): 465m³/h x 130mLC
 Cargo control system
 Make: Wärtsilä
 Type: Remote control and monitoring

Ballast control system
 Make: Emerson
 Type: Electro-hydraulic
 Water ballast treatment system
 Make: Techcross
 Capacity: Electrolysis

Complement
 Officers: 13
 Crew: 11
 Suez/Repair Crew: 6
 Single/double/other rooms: 24 (Single)

Stern appendages/special rudders: Mewis Duct

Bridge control system
 Make: Hyundai Heavy Industry Co., Ltd
 Type: Bridge control console
 Is bridge fitted for one-man operation? No

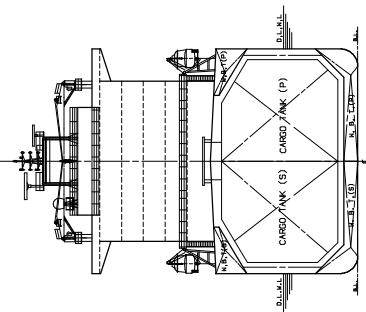
Fire detection system
 Make: Autronica Fire and Security AS
 Type: Autroprime
 Fire extinguishing systems
 Engine room: CO₂
 Make/Type: NK / fixed high-pressure

Radars
 Number: 2
 Make: Japan Radio Co., Ltd
 Models: JMR-9282-S / JMR-9225-9X

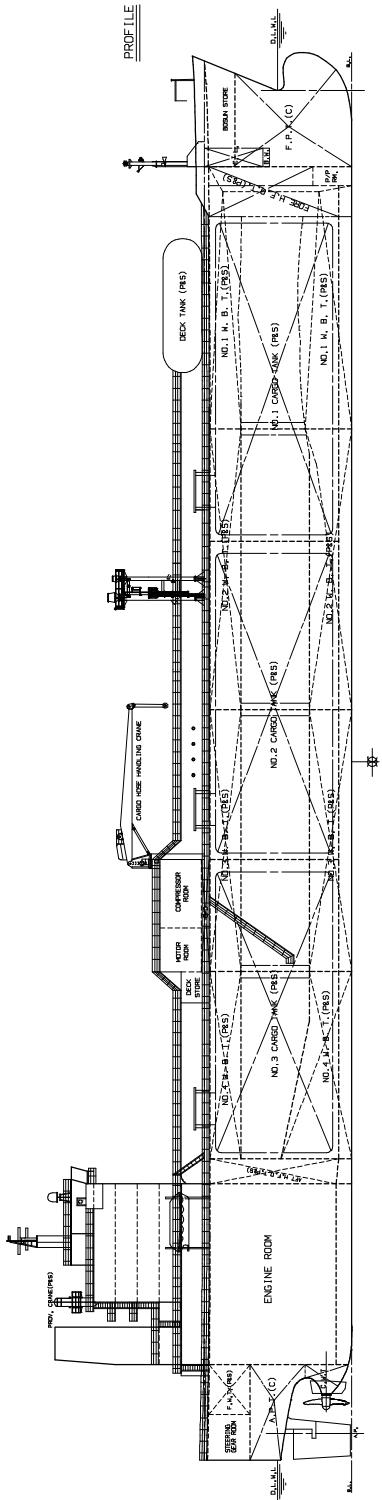
Integrated bridge system: Yes
 Make: Japan Radio Co., Ltd
 Model: JAN-7202

Waste disposal plant
 Incinerator
 Make: Miura
 Model: BGW-30N
 Sewage plant
 Make: Il Seung
 Model: ISB-03

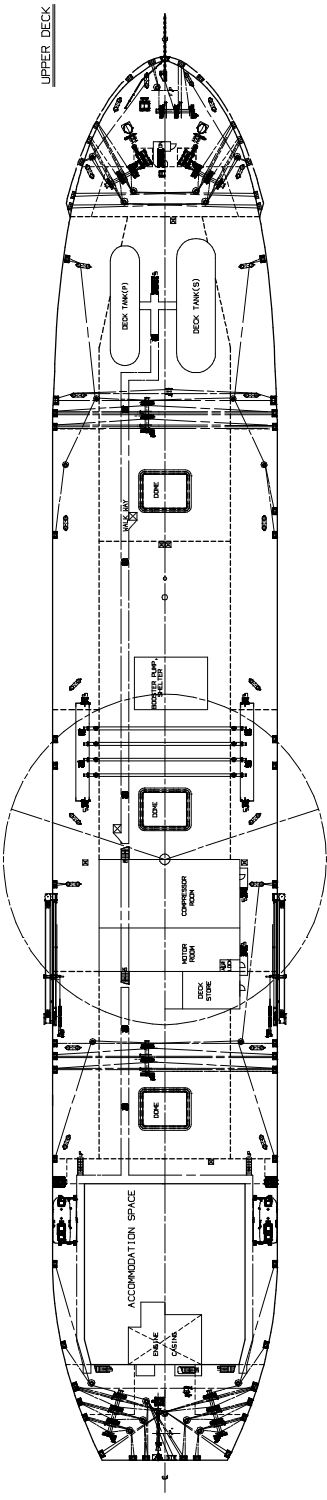
Contract date: 11 February 2015
 Launch/float-out date: 5 November 2016
 Delivery date: 15 March 2017



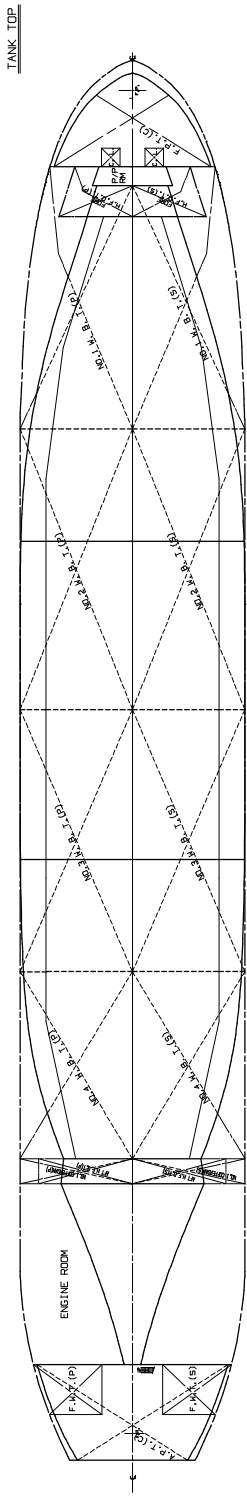
MIDSHIP SECTION



PROFILE



UPPER DECK



TANK TOP



V.TRUST: Crude oil tanker

Shipbuilder: **Hyundai Heavy Industries**
 Vessel's name: **V.Trust**
 Hull No: **2910**
 Owner/Operator: **Oriental Shipping**
 Country: **Hong Kong, China**
 Designer: **Hyundai Heavy Industries**
 Country: **Republic of Korea**
 Flag: **Panama**
 IMO number: **9794812**
 Total number of sister ships already completed (excluding ship presented): **1**

V.TRUST is a 300,000dwt crude oil tanker. Built by Hyundai Heavy Industries Co., Ltd (HHI), it was delivered to Oriental Shipping in August 2017.

The vessel has an overall length of 336m, a width of 60m, a depth of 29.4m and a design draught of 21.7m. There are 17 cargo oil tanks, including two slop tanks, with total capacity of 345,000m³. Five pairs of water ballast tanks combine with a double bottom to form a double hull structure. *V.Trust* has been built according to the latest SOLAS/MARPOL requirements and also meets the IACS's new harmonised Common Structural Rules (New CSR) and enhanced EEDI minimum power requirements.

The design maximises efficiency by reducing fuel consumption. HHI used a Hi-PSD (Hyundai Preswirl Duct) and the newly developed Hi-Bow bow shape. The Hi-Bow has a sharpened bow shape above the waterline. By comparison with a conventional blunt bulbous bow it reduces the added wave resistance in rough seas. Sea-keeping performance in heavy weather conditions is improved without degrading calm sea performance.

TECHNICAL PARTICULARS

Length oa: abt.336m
 Length bp: 330m
 Breadth moulded: 60m
 Depth moulded
 To main deck: 29.4m
 Draught
 Scantling: 21.7m
 Design: 20.5m
 Deadweight
 Scantling: 301,100dwt
 Speed, service: 15.8knots
 Cargo capacity (m³)
 Liquid volume: ca. 345,000
 Bunkers (m³)
 Heavy oil: ca. 5,750
 Diesel oil: ca. 450
 Water ballast (m³): ca. 90,000

Classification society and notations KR:
 +KRS1-Oil Tanker (Double Hull) 'ESP',
 (FBC), (CSR), Crude Seatruster(HCM), VEC-2,
 IGS, COW, CLEAN1, IWS, BWT, LI, EQ-SPM,
 +KRM1-UMA, STCM, PSPC, ERS
 LR:
 +100A1 Double hull oil tanker, CSR, ESP,
 ShipRight (CM, ACS(B,C)), *IWS, LI, DSPM4,
 +LMC, UMS, IGS, ShipRight
 (SCM, BWMP(T))

Main engine
 Model: 7X82
 Manufacturer: Hyundai-Wärtsilä
 Number: 1
 Type of fuel: HFO or MGO
 Output of each engine: .. 25,600 kW x 67rpm

Propeller
 Material: Ni-Al-Bronze
 Designer/Manufacturer: Hyundai
 Number: 1
 Fixed/Controllable pitch: Fixed
 Diameter: 10.6 m

Diesel-driven alternators
 Number: 3
 Engine make/type: Hyundai, Himsen
 6H21/32
 Type of fuel: HFO or MGO
 Output/speed of each set: 1,280kW x 90 rpm
 Alternator make/type: Hyundai
 Output/speed of each set: 1,200kW x
 900rpm

Boilers
 Number: 2
 Type: Cylindrical
 Make: Alfa Laval
 Output, each boiler: 40,000kg/h

Cargo cranes/cargo gear: Hose-handling crane
 Number: 2
 Make: Oriental Precision
 Type: Electro-hydraulic
 Performance: 25t SWL
 Other cranes
 Number: 2
 Make: Oriental Precision
 Type: Electro-hydraulic
 Tasks: Provision crane
 Performance: 10t SWL (port) / 3t SWL
 (starboard)

Mooring equipment
 Number: ... 2 windlasses, 8 mooring winches
 Make: Flutek
 Type: Electro-hydraulic

Special lifesaving equipment
 Number of each and capacity: 2, 35
 persons each
 Make: HLB (Hyundai Lifeboat)
 Type: Conventional

Cargo tanks
 Number: 15 + 2 slop
 Grades of cargo carried: 3
 Product range: Crude oil
 Cargo pumps
 Number: 3
 Type: Vertical centrifugal, steam
 turbine-driven
 Make: Shinko
 Capacity (each): 5,000m³/h x 150mTH
 Cargo control system
 Make: Emerson Marine
 Type: Conventional console control

Ballast control system
 Make: Emerson Marine
 Type: Conventional console control
 Water ballast treatment system
 Make: Techcross
 Capacity: 6,360 m³/h

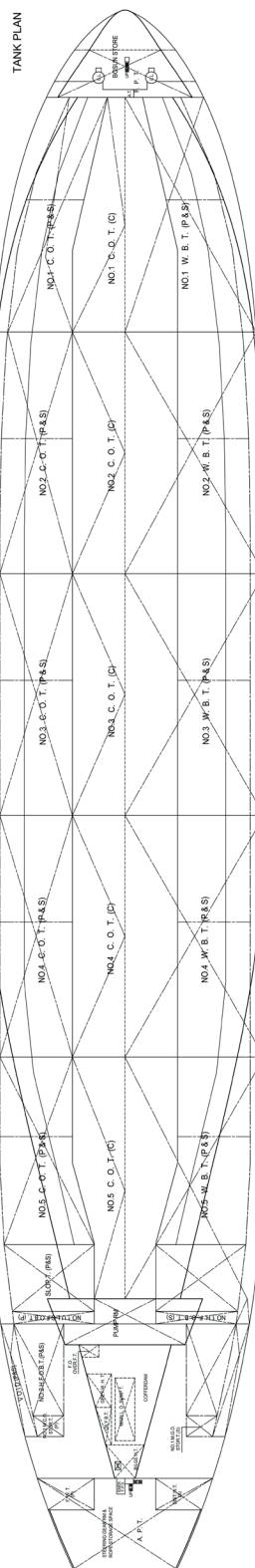
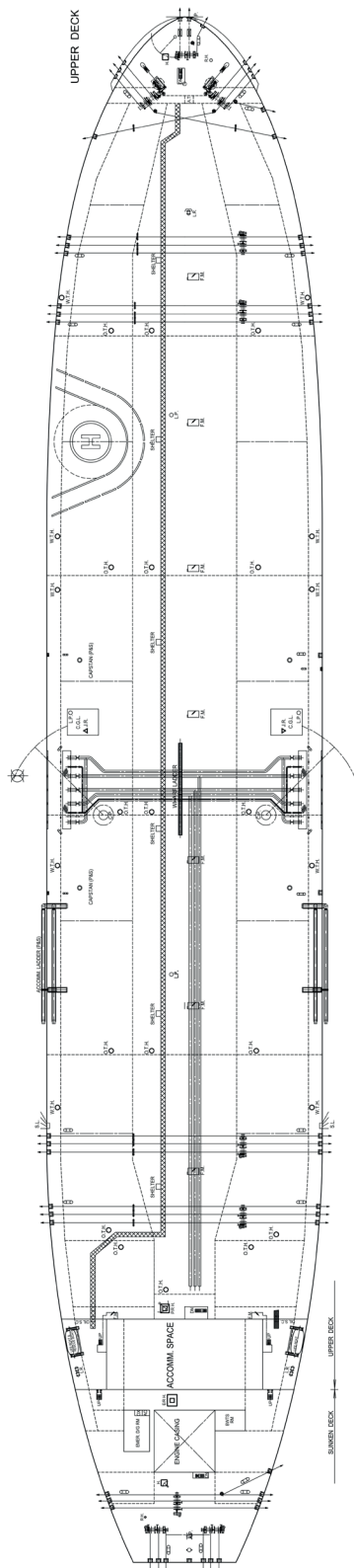
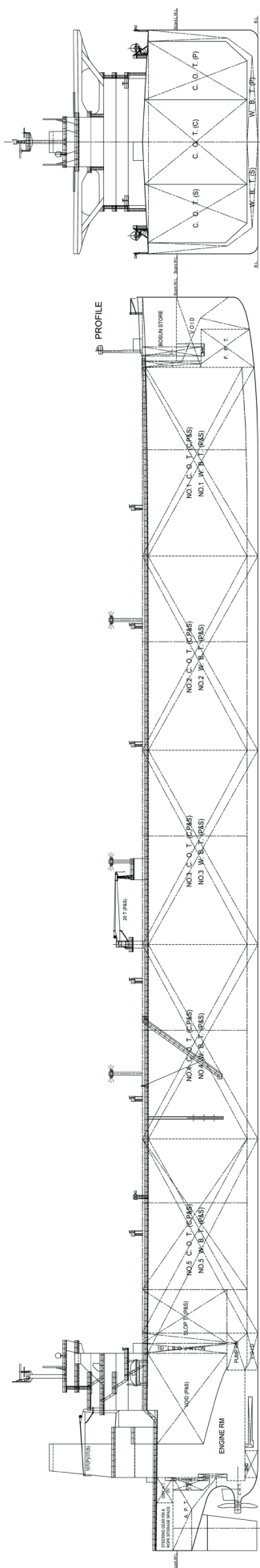
Complement
 Officers: 12
 Crew: 18
 Suez/Repair Crew: ... 1 cabin for 6 Suez crew

Bridge control system
 Make: Nabtesco
 Type: M-800-V
 Is bridge fitted for one-man operation? ...Yes

Fire detection system
 Make: AUTRONICA
 Type: AutoSafe (Addressable)
 Fire extinguishing systems
 Cargo holds: Deck foam
 Make/Type: NK
 Engine room: High-pressure CO₂
 Make/Type: NK

Radars
 Number: 2
 Make: JRC
 Models: JMR-9282-S for S-band /
 JMR-9225-6X for X-band

Integrated bridge system: Yes
 Make: JRC
 Model: JAN-9201
 Delivery date: 31 August 2017



SIGNIFICANT SHIPS OF 2018

A publication of The Royal Institution of Naval Architects

The twenty ninth edition of our annual Significant Ships series, *Significant Ships of 2018*, will be published in February 2019. As in previous editions we shall be including up to 50 of the most innovative and interesting commercial ship designs (of mostly 100m length and above) which will be delivered during the forthcoming year.

The Editor invites shipbuilders, designers and owners to submit details of vessels for possible inclusion in *Significant Ships of 2018*. Presentation will follow on the established two-page format, with a colour photograph, descriptive text and tabular details (including major equipment suppliers) on the first page, followed by a full page of technical general arrangement plans. Initial potential entries should comprise a short technical description (100 words) of the proposed vessel highlighting the special features and the delivery date.

All entries should be addressed to:

Editor, *Significant Ships of 2018*,
8-9 Northumberland Street, London, WC2N 5DA, UK
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<input type="checkbox"/> Significant Ships of 1995	£20	£17		£	<input type="checkbox"/> Printed format only
<input type="checkbox"/> Significant Ships of 1994	£20	£17		£	<input type="checkbox"/> Printed format only
<input type="checkbox"/> Significant Ships of 1993	£15	£13		£	<input type="checkbox"/> Printed format only
<input type="checkbox"/> Significant Ships of 1992	SOLD OUT				
<input type="checkbox"/> Significant Ships of 1991	£12	£10		£	<input type="checkbox"/> Printed format only
<input type="checkbox"/> Significant Ships of 1990	SOLD OUT				
<input type="checkbox"/> Set of 23 (1993-2016)	£972	40% discount		£583	please tick above boxes as to which format is required if ordering the set
			Total	£	

Name: _____
 Company: _____
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Payment Instructions: Payment must be in pounds sterling to RINA by bank transfer (bank details on request), credit card we accept Visa, Mastercard, Amex or sterling cheque drawn on a UK bank.

I enclose a cheque for £ _____
 Please charge £ _____ to my credit card Visa/Mastercard/Amex _____

Number: _____ Expiry Date: _____ Security code: _____

Signature: _____ Print Name: _____



Yeongdo Shipyard



Subic Shipyard



**HANJIN HEAVY INDUSTRIES
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