

SIGNIFICANT SHIPS OF 2013

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 HANJIN HEAVY INDUSTRIES & CONSTRUCTION CO., LTD.



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

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

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

In this years' publication we see the launch of two LNG ferries for this region *Viking Grace* and *Stavangerfjord*. *Viking Grace* is the largest LNG passenger ferry to be launched and is also aimed at showing how LNG can be applied to larger vessels. *Viking Grace* uses four 8-cylinder dual fuel engines that are supplied with LNG from two 200m² fuel tanks located at the aft of the vessel on the open deck. The vessel operates on a route from Stockholm, Sweden to Turku, Finland and is bunkered in Stockholm by the bunker ferry *Seagas*.

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

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

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still matter, last year we featured the *CMG CMA Marco Polo* that at the time was the largest vessel, but it has been superceded by the Triple E ships.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

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

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

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

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

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

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

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

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

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

Samantha Fisk
Associate Editor
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Notes:

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

Further information on certain vessels included in *Significant Ships of 2013* can be found in the following editions of The Royal Institution of Naval Architects' publication, *The Naval Architect*:

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



CLIPPER QUITO: Eco LPG carrier

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

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

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

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

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

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

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

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

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

TECHNICAL PARTICULARS

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

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

