

Maritime Holland

Special

Offshore Energy
Exhibition &
Conference 2016

Eeva VG
Plug-in Hybrid Watertaxi
Terra Plana

Ronald Vogelsang
The master of
the Aeolus

Decommissioning:
just round the corner

Eeva VG

© Reprinted from Maritime Holland | No. 6 October-November 2016
www.maritimeholland.com | Publisher: Navingo BV | www.navigo.com



Photo by Frits Olinga

Signed in Turku in December 2014, the Finnish Meriaura Group entered into a contract with Dutch shipyard Royal Bodewes for the construction of two 4700DWT VG EcoCoaster™ general cargo vessels. The delivery of both vessels was scheduled for autumn 2016: first *Eeva VG*, and, approximately three months later, the second vessel, to be named *Mirva VG*.

Construction of the hull of both EcoCoasters was outsourced to the Partner Stocznia shipyard, near Stettin in Poland, where the keel laying ceremony was held on the first of June 2015. In doing so, an old maritime tradition of placing a newly minted coin under the keel for good luck was honoured. For this occasion, both a Finnish and a Polish coin were used: a Zloty to the bow side, and a Euro to the stern. On the last weekend of January 2016, Bodewes yardnumber 742 was skidded from the building

quay onto a pontoon, then transported to a dock in the first week of February. By floating the vessel on Friday the fifth of February 2016, *MV Eeva VG* was officially launched and on her way to the Bodewes outfitting quay in Papenburg, Germany.

In mid-September 2016, *Eeva VG* left the Eems harbour between The Netherlands and Germany for her sea trials. After successful completion of the sea trials, she was handed

over to her new owners, AB Gaiamare Oy of the Meriaura Group, and ship management company VG-Shipping, both of Finland.

Commitments to the environment

The Meriaura Group operate in a number of renewable energy and energy efficiency-related projects, both onshore and offshore. In doing so they have high aspirations to increase the use of renewable energy and decrease carbon dioxide emissions in their own operations. Developing and implementing new sustainable forms of energy are amongst their ambitions.

To achieve these ambitions Meriaura and its partners, Foreship Ltd, and Aker Arctic Technology Inc, set out to develop a new concept for a general cargo vessel. The

Royal Bodewes' EcoCoaster - Developing sustainable shipping

new design had to meet all the maritime environmental regulations coming into force in the next few years, and preferably even exceed many of them. The result was the VG EcoCoaster™, a fuel-efficient dry cargo carrier, capable of using alternative fuels. Implementing the chosen path, they contracted Dutch shipyard Royal Bodewes to build the first two 4700DWT-versions of this concept.

The ambitions of the Finnish ship-owner do not stop here, as Meriaura is determined to further expand, regenerate and rejuvenate their fleet. The regeneration aims to lower fuel consumption and GHG emissions. "Our goal is, that in five years' time at least 50% of the fleet consists of fuel efficient and low emission EcoCoasters, that run on biofuel produced of recycled oils. Designing of larger EcoCoasters is under development", says Jussi Mälkiä, President of Meriaura Group. To date Meriaura's fleet consists of 20 vessels, and special purpose vessel, *Meri*, built in 2012, was reported to be the first cargo ship ever allowing the use of biofuel.

Alternative food for marine propulsion

Besides being a ship-management company,

VG-Shipping also produce environmentally sustainable and climate-friendly alternative fuels, suitable for the maritime industry. VG Marine EcoFuel™ is made out of biological and recycled oils.

Bio fuels are often considered to be ethically debatable, as rain forests are exterminated in order to cultivate commodities needed for the production, and these commodities are also competing with foodstuff in terms of land acreage. However, the commodities of VG Marine EcoFuel™ are completely derived from industrial side streams and recycled materials, exploiting side streams of the foodstuff industry in the production

line, along with already once-utilised vegetable oils.

So far, all marine fuel produced will be solely used on the vessels in Meriaura Group's fleet,

but, in the future, this particular VG Marine EcoFuel™ may also be available to other shipping companies.

A split personality at the heart

The vessels propulsion arrangement has been optimised for slow steaming operations at speeds between 8 and 9kts, although a top speed of 11.5kts in open water conditions can be attained.

CLEANSHIP
EVERY WAY
YOU LOOK



Handling of hatch and grain bulkhead panels is done with a gantry crane on coaming rails

A multi-fuel 8-cylinder ABC main engine, type 8DZC-900, is the heart of the Bodewes EcoCoaster, providing 1650kW at 900rpm. The medium speed, turbocharged and inter-cooled engine is outfitted to run on a dual fuel system. Complying with all environmental requirements, according to IMO TIER-2, CCNR-2 and EU3A, the ABC is suitable for MGO (Marine Gas Oil) as well as biofuel (vegetable or animal oil). In this case, this is particularly appealing, because the biofuel for the vessel can be produced by VG-Shipping's own refinery, as described above, in Uusikaupunki, a town in the Southwest region of Finland.

The power is transferred through a single gearbox and a relatively long shaft, to a high-skew propeller. The gearbox, a Renk, has a Power Take Off (PTO) of 650 kW to a shaft alternator, as well as a Power Take In (PTI) and Power Take Home (PTH), both rated at 834 kW. Power required for Ice Class 1A is achieved by engaging a diesel electric driven booster, being a diesel-generator driven e-motor on the PTI/PTH intake of the gearbox, increasing the total shaft power to 2484kW. With the gearbox's multiple-disc clutch system, various configurations are possible: the main engine drives an alternator for onboard power (PTO-mode), additional booster power from a generator is provided to the propeller shaft through an e-motor (PTI-mode) and the generator in combination with an e-motor provides a redundant propeller drive system in case of main engine black-out.

thruster of 500kW, driven by a B&P electric motor, further contributes to improved manoeuvrability.

Besides the shaft generator, the auxiliary equipment consists of two 560 kW generator sets and an emergency generator set of 146 kW. The main sets are Mitsubishi diesel engines driving a Stamford alternator, supplied by Koedood Dieselservice, The emergency / harbour set, by contrast, is a combination of a Sisu diesel engine with a Stamford alternator, a contribution of Veth Propulsion.

Wolfard & Wessels Werktuigbouw provided the engine room systems design, including delivery and installation of the engine room piping, auxiliary engine room equipment, and bilge/ballast equipment. Hoogendijk Electric designed, delivered and installed the Alarm and Monitoring System (AMS), Power Management System (PMS), switchboards, wheelhouse and engine control room consoles, electrical installation, shaft generator and variable frequency drives. The latter give the electrical installation on board an unprecedented flexibility.

The Controllable Pitch Propeller (CPP), designed and delivered by Berg / Caterpillar Propulsion, is optimised for efficient propulsion at a low rpm with minimisation of pressure pulses. For steering and manoeuvring, a Benes spade rudder, operated by Van Der Velden steering gear, is fitted. To further reduce drag and optimise the propulsive efficiency, the propeller is equipped with a custom designed hubcap, mounted in line with a streamline body on the rudder. The Verhaar Omega OFP 1250 (fixed pitch) bow

The tween deck panels can be positioned at a horizontal level or vertically, as bulkheads



The wheelhouse forward area contains the T-shaped navigation console



All navigation, communication and ship control facilities are in compliance with Bureau Veritas SYSNEQ-1 notation



A multi-fuel medium speed 8-cylinder main engine is the heart of the EcoCoaster



Besides the shaft generator, the auxiliary equipment consists of two main and one emergency generator sets

Cleanship every way you look

Building to Bureau Veritas (BV) CLEANSHIP notation does not only have implications for the propulsion systems, but also for other machinery in the engine room. The wastewater streams aboard the EcoCoaster will be managed by a bespoke treatment system, designed by ACO Marine. Delivered and installed by De Haan Hoogezand, ACO Marine's Dutch distributor, the ACO Clarimar MF-1 sewage treatment plant is fully certified by BV to IMO MEPC.227(64). The biological sewage treatment plant incorporates the ACO-MF filtration technology, eliminating the requirement for settling and chlorination stages. Disinfection of the treat-

ed effluent is by in-line mounted UV lamp with no requirement for chemicals in any part of the process. This technology allows operating with bio-mass concentrations in the activation chamber, which can be up to four times higher than those of conventional settling type sewage treatment plants. By operating at such high concentrations, a reduced activation tank volume can be applied, resulting in a significant reduction in both the footprint and maintenance requirements. As such, the system is the most suitable wastewater solution for operations in ecologically sensitive areas, as it is proven to treat wastewater streams well below the mandatory requirements.

In combination with the vacuum toilet system, the water usage is further minimised.

Wanting to produce the cleanest, most environmentally efficient coasters in its class, more 'green' solutions were specified, including a Selective Catalytic Reduction (SCR) system for the main engine exhaust line, provided by Axces. The SCR system converts nitrogen oxides, also referred to as NOx, with the aid of a catalyst, into the less harmful diatomic nitrogen (N₂), and water (H₂O). A gaseous reductant, typically ammonia or urea, is added to a stream of exhaust gas and is absorbed onto a catalyst. As such, the emission of harmful exhaust gasses (NOx) is reduced to a minimum.

To further enhance the environmentally clean status of *Eeva VG*, the EcoCoaster will feature an extensive ballast water treatment system. This Oceanguard system, supplied by Reikon, kills microbes, bacteria and viruses in ballast water, using an electro-chemical excitation system.

NON-BIocide-CONTAINING ANTIFOULING BIOLOGICAL SEWAGE TREATMENT ECOFUEL FROM USED OIL

When looking at the exterior hull, the Meriaura Group selected Subsea Industries' non-toxic Ecospeed coating for hull preservation. As the ship-owners did not want to use a traditional antifouling system, because of the chemicals it contains, they concluded the Ecospeed solution was the most effective coating system combining reduced hull resistance with optimised durability in ice conditions. This coating is a non-biocide-containing antifouling, with a hardwearing performance suitable for withstanding the ice impacts and highly abrasive surroundings of the Baltic waters. With this hard coating, it is also permitted to clean the underwater hull in the ports where they operate, without the risk of damaging the surrounding environment. Furthermore, the underwater hull and topsides of *Eeva VG* will not have to be coated again during the vessels first 10 years of operational lifetime, saving paint costs and dry-docking fees. As a result, the EcoCoaster is coated with the game-changing Ecospeed hard coating above and below the water line in VG-Shipping's red and blue livery.

Supplementary clean features of *Eeva VG* include all-LED-lighting, an extensive heat-recovery system including the provisions for a cargo hold heating system and exhaust gas heat recovery from the emergency / harbour generator set. Also, in the selection of the lubricants for all components, the environment was taken into consideration, as the vessel features a water lubricated propeller shaft and rudder bearing, whilst in other applications on board the use of biodegradable oils and greases is extensive.

4700DWT cargo logistics

The EcoCoaster series are a new, jointly developed concept, for a general cargo vessel with a double hull featuring one box-shaped hold with a capacity of 6157cu.m (217400cuft). The hold has main dimensions of 64.80 x 11.20 x 8.65 metres and features a partial tween deck. The tween deck panels can be positioned at a horizontal level, or vertically, as (grain) bulkheads, using recesses in the cargo hold sides; hence the hold can be divided into versatile compartments to provide flexibility in cargo storage. The tank top in the hold is reinforced



The anchoring and forward mooring equipment is on the enclosed forecastle deck

for 15t/m² uniform load, while the tween deck hatch covers are designed for a maximum load of 1.5 t/m². The cargo hold lower sides and bottom are reinforced with thicker steel plating, to offer additional margin for wear due to clamshell grabs.

The hull form is characterised by the special bulbless straight bow, with an almost vertical stem profile. The bow design, in combination with the sharp entrance angles of the waterlines, and the optimised hull shape, has the advantage of improved seagoing characteristics. While the bow is almost vertical, and the waterline shape remains nearly identical between the light and loaded draught, the ship's performance and behaviour are optimised for the complete range of loading conditions and draughts. To further enhance the stability and trim, a number of ballast tanks in the double hull in the sides and the bottom, have been made available for use as passive anti-heel tanks.

Outdoor logistics

Ten pontoon type hatch covers at upper deck level close off the cargo hold. To accommodate the ventilation of the hold, provisions are made against the superstructure bulkhead, aft of the hold, and at the far forward end on the forecastle deck.

The hatch covers are designed for a maximum load of 2t/m² plus the regulatory weather load, and are outfitted with an ample amount of grain holes. Furthermore, the pontoons are fitted with lashing

points and fittings to accommodate 92 TEU (Twenty-foot Equivalent Unit) containers. When the cargo hold needs to be accessible, the hatch covers can be stowed in two stacks on the forward and aft part of the cargo hold opening, or anywhere else where desired. Handling of all hatch panels and grain bulkheads panels is done with a gantry crane on coaming rails. For storage, the hatch crane can also be positioned aft, against the superstructure. Hatch covers, tween deck panels and gantry crane are supplied by Coops & Nieborg. The main deck, in way of the cargo holds, consists of side decks (gangways) only, which are fitted with guardrails on the ship's sides.

The aft main deck, behind the superstructure, is home to the aft mooring equipment. Portside, aft of the superstructure, accommodates the Hatecke free-fall lifeboat in a matching launch and recovery system. Starboard is home to the M.O.B. (Man Overboard Boat) with its dedicated Global Davit crane, which can also be used for retrieving the life rafts, stored on both sides of the superstructure. The anchoring and forward mooring equipment is on the enclosed forecastle deck. All mooring equipment is supplied by C-Nautical from Sappemeer, The Netherlands.

Board and Lodging

The superstructure is located aft, and facilitates a modern, spacious and comfortable accommodation for ten persons. All cabins are air-conditioned and equipped with private sanitary units.



Photo by Frits Olinga

Principal particulars

Builder	Royal Bodewes, Hoogezand, The Netherlands
Owner	AB Gaia mare Oy, Turku, Finland
Operator	Meriaura Ltd, Turku, Finland
Ship Management	VG-Shipping, Turku, Finland
Length oa	103.00 m
Length pp	101.20 m
Breadth mld	13.60 m
Depth	7.80 m
Draught, scantling	6.13 m
Draught, design	6.13 m
Air draught (in ballast/loaded)	21.9 - 24 m
Speed service	11.5 knots
Cargo capacities	
Deadweight	5,019 DWAT
Gross Tonnage	3,405 GT
Nett Tonnage	1,636 NT
Cargo hold volume	6,157 m ³
Cargo hold dimensions	64.80 x 11.20 x 8.65 m
Tank capacities	
MGO	113 m ³
BioFuel	63m ³
Lubrication oil	17 m ³
Fresh water	30 m ³
Ballast capacity	2,267 m ³

The wheelhouse forward area contains the navigation console, with all the required navigation, communication and ship control facilities. The SB aft corner is home to the radio desk, safety station and chart table respectively. The enclosed bridge wings each have a small control desk with relevant control facilities. All bridge equipment was delivered and installed by Radio Holland, in compliance with Bureau Veritas SYSNEQ-1 notation.

The three superstructure decks below the wheelhouse accommodate the crew cabins, an office and a changing room. The changing room further contains a sanitary unit and a drying cabinet for working cloths.

The public spaces are situated on the tween deck, and include a spacious galley, mess room with a dining table seating 10 persons,

provision store, laundry, fitness room and sauna. The switchboard room and engine room workshop are located on the same deck, with the engine room below.

Conclusion

The VG EcoCoasterTM is designed to cause considerably less environmental impact than conventional dry cargo vessels. MS *Eeva VG* is a well-designed general cargo vessel, suitable for the transport of demanding project cargo and industrial bulk and raw materials, specifically for the Baltic region. This generation EcoCoasters sets a new standard in sustainable general cargo shipping, and showcases the technological possibilities for dry cargo vessels.

Tom Oomkens

Subcontractors and suppliers of equipment fitted on board the *Eeva VG*, YN 742;

Anglo Belgian Corporation, Gent België: main engine; Alfa Laval, Breda: separators; Axces, Schiedam: exhaust gas after treatment systems, katalysators, ; Bendit, Groningen: isolation; Benes Machinefabriek, Hoogezand: rudder and rudder stock; Bureau Veritas, Groningen: classification; C-Nautical, Sappemeer: anchor and chains, anchor and mooring winch; Caldic Technics, Rotterdam: Stamford alternators for generator sets; shaft alternator on PTO of gearbox; diesel-generator driven e-motor on PTI/PTH of gearbox; power management components and instruments; Caterpillar Propulsion Singapore Pte Ltd., Singapore: controllable pitch propeller; stern tube seals; Coops & Nieborg, Hoogezand: gantry crane and hatch covers; Corrosion & Water-Control, Moerkapelle: ICCP system and anodes; Econosto Nederland, Rotterdam: valves; Fassmer, Germany: gangway; Gebr De Haan, Hoogezand: heating Ventilation cooling and sanitary installation; Global Davit GmbH, Bassum: mob crane and life raft crane; Groot Ship Design, Leek: detail engineering; Güzel GmbH, Papenburg: paint works hatch covers an gantry crane; Hatecke GmbH, Germany: lifeboat; Helder & May, Rotterdam: floating floors; Hoogendijk Electric, Krimpen aan den IJssel: AMS, PMS, switchboards, wheelhouse and ECR consoles, electrical installation, shaft generator; Huizing Scheepstoffering, Hoogezand: furnishing; Heatmaster, Hendrik-Ido-Ambacht: boosterunit; Koedood Dieselservice, Hendrik-Ido-Ambacht: Mitsubishi generators sets; Kostabo Products, Harlingen: safety equipment; Minimax Brandbeveiliging, Almere: CO, plant and watermist fire extinguisher; Noordhof Schilderwerker, Kropswolde: paint works at outfitting quay; NRF, Mill: box coolers, heat exchanger; Partner Stocznia Sp.z o.o, Police, Poland: construction hull; Pronomar, Hendrik-Ido-Ambacht: material drying racks; Reikon, Spijkenisse: Oceanguard ballast water treatment unit, Azcue pumps; Radio Holland, Delfzijl: communication and navigation systems; Renk Aktiengesellschaft, Rheine Germany: reduction gearboxes; Subsea Industries, Antwerpen, België: Ecospeed, Ecoshield; Trinox, Hardinxveld-Giessendam: wall- and ceiling panels, WT doors, windows and portholes; Van der Velden Marine Systems, Krimpen aan de Lek: steering gear; Verhaar Omega, Sassenheim: tunnel thruster; Veth Propulsion, Papendrecht: Sisu emergency generator; Viking Life Saving Equipment, Zwijndrecht: life rafts; Winteb, Winschoten: WIN2000 HIAS air pipe head; Wolfard & Wessels Werktuigbouw, Hoogezand: design, delivery and installation of engine room piping; delivery of auxiliary engine room equipment and bilge/ballast equipment.