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Polish shipyard builds RoPaxes

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POLAND @ SEA

MARITIME MAGAZINE



Photo: Sławomir Lewandowski

Cable Vigilance after conversion

Platform Supply Vessels transformed into ships operating in the subsea works sector

Submarine cable specialists

The world's fleet of cable vessels has recently expanded by two more. Both were adapted for their new role at the Polish shipyard, which they had called at as Platform Supply Vessels.

According to the ICPC (International Cable Protection Committee), there are around 60 cable ships worldwide. However, no new-built cable ships were delivered between 2004 and 2010, and only five new ships of this type were delivered between 2011 and 2020.

In June 2021, Alcatel Submarine Networks (ASN) announced the acquisition of two vessels: the *Ile de Molène* and the *Ile d'Yeu*. That purchase was part of a strategy to modernize and expand installation capacities in the context of the submarine telecommunications market growth.

In turn, the Malaysian company Optic Marine Service (OMS) acquired another vessel at that time – the *Cable Vigilance*. Both were Platform Supply Vessels and were entrusted to Louis Dreyfus Armateurs (LDA) for their transformation and management under the French flag.

To achieve this goal, LDA contracted the conversion of the *Ile de Molène* and *Cable Vigilance* vessels to Remontowa Shiprepair Yard, which had already converted large RoRo ships into cable-laying vessels for this French shipowner, among others, and had also carried out mobilizations of

such vessels for the subsea optical fibre cable sector.

Both ships have undergone a complete metamorphosis at this Polish shipyard. The former Platform Supply Vessels have been transformed into specialist ships to lay, repair and maintenance telecommunications cables on the seabed.

Once converted, both vessels have become state-of-the-art cable-laying vessels as they were fitted with the latest generation of systems, equipment and facilities to tackle the most difficult challenges. On each vessel, the total weight of the new, prefabricated and installed structures exceeded 600 tonnes, and over 50 km of new cables were laid.

Remontowa built and mounted a 200-tonne structure, the so-called hangar, on each ship to house the specialist equipment necessary to carry out all the operations involved in handling the cables. The hangar comprises a new deck and new technical rooms located on several floors.

The vessels have been fitted with two powerful stern sheaves to lower or raise the cable from the ocean floor. Together with the real attachment to the hull, this equipment weighs around 90 tonnes. The sheaves extend beyond the transom, lengthening the ship by several metres.

The shipyard built a cable tank on board. A new accommodation module,



Photo: Sławomir Lewandowski



Photo: Sławomir Lewandowski

Cable Vigilance before conversion

Ile de Molène Platform Supply Vessel

weighing more than 80 tonnes, has also been built between the hangar of the main superstructure. One floor, with cabins, is used for accommodation, while the remaining rooms are used for offices and technical workshops.

A deck was added between the new accommodation module and the hangar to park a Remotely Operated Vehicle (ROV). Retractable gantries were also installed on the vessels, creating a launch and recovery system (ALARS) for the ROV.

Remontowa also rebuilt the superstructure. Several cabins were added, and double cabins were changed to single ones. In addition, foundations and installations were prepared for the new deck cranes, which will be installed later. To enable the ship to work, Remontowa adapted and installed a crane from another shipowner's vessel, *Ile D'Yeu*.

Virtually all work was carried out above the main deck. Below, the ships' structure interventions mainly involved

installing an HPR (Hydroacoustic Position Reference) system. The system measures the relative position between a fixed underwater transmitter and a mobile underwater vehicle (ROV). Remontowa also installed the PFE (Power Feed Equipment) system used to power the cable operations whilst keeping the control of the HV on the ship so the safety of the crew can be maintained.

The shipowner provided the technical design for the conversion, while the working documentation was carried out by Remontowa Marine Design & Consulting of the Remontowa Holding group.

On June 24, 2022, *Ile de Molène* - the six cable ship managed and operated by LDA for ASN, was inaugurated in Calais and joined the ASN's fleet. She was assigned for the maintenance of telecommunications cables in the Atlantic and the North Sea and was expected to begin operation in the first half of 2022.

The *Cable Vigilance*, on the other hand, left Gdansk on July 21 2022, after conversion. In Dunkirk, OMS launched the fifth cable ship in its fleet, managed by LDA and expected to be used to repair cable systems in the Atlantic.

Built for working in harsh conditions, the *Cable Vigilance* has been fully equipped with integrated cable tanks, cable machinery, and jointing and testing rooms. In addition, it has its own dedicated ROV and plough capabilities.

It's worth adding that along with the *Ile de Molène* and *Cable Vigilance*, the *Ile d'Yeu* has also been undergoing a heavy engineering and upgrade program at Remontowa. Once converted, the ship is expected to join the ASN's installation fleet at the end of 2022 and will be immediately assigned to installing a trans-oceanic telecommunication system.

Ile de Molène cable ship after conversion



Photo: Maciej Bielez

Metamorphosis of the *Esvagt Dana* Service Operation Vessel



Photo: Maciej Bielecki

The converted *Esvagt Dana* leaving Gdańsk

It's virtually a newly built ship!

In 2022 Remontowa Shiprepair Yard converted the *Esvagt Dana* Service Operation Vessel (SOV) for the offshore wind sector.

As the shipowner, Esvagt A/S emphasizes: „It is virtually a newly built *Esvagt Dana*, which in April begins a long-term contract with TotalEnergies in the Danish part of the North Sea. The *Esvagt Dana* assists with the transfers and supply at TotalEnergies' platforms and other North Sea operations; for this purpose, the ship has been in the dock for six months for a major rebuild”.

- The tasks that *Esvagt Dana* is to assist TotalEnergies with, in the North Sea are different from the work tasks the vessel has had so far. It requires some-

thing else from the vessel - says Kristian Ole Jakobsen, Deputy CEO at ESVAGT A/S, quoted in the shipowner's release.

In 2022 Remontowa Shiprepair Yard converted the vessel and got her ready to meet new requirements.

The most important shipyard task was the prefabrication and installation of sponsons on both sides to increase the ship's buoyancy and improve her stability. In addition, almost all the ship's systems have been modified. The shipyard also installed an SMST's Access & Cargo Tower on the *Esvagt Dana* and fitted her with a new azimuth thruster.

The conversion project also included replacement of the bow thruster electric motors with new, larger ones, rearrangement of the living quarters and office area (including delivery and installation of new furniture), preparation from scratch of the Battery Room and Hydraulic Power Unit Room, built after the existing fuel tanks (including room furnishing and equipment installation).

According to the shipowner's statement, as a result of the conversion: „First and foremost, *Esvagt Dana* has become four metres wider to ensure optimized stability, and that the vessel remains a safe and comfortable workplace in the North Sea, where weather and sea can be challenging”.

- A new retractable thruster in front and optimization of the existing bow thrusters have contributed to an improved DP performance. In addition, the vessel's power system has been increased with a larger battery system; a complete stepless gangway system has been implemented with a build-in elevator that can work at the height of 26 m, and the aft deck has been expanded

Photo: Maciej Bielez



Once the tower had been installed, the next step was to mount a gangway

Photo: Maciej Bielez



Installation of the SMST's Access & Cargo Tower on the ship's deck

Photo: Sławomir Lewandowski



Esvagt Dana fitted with sponsons, during undocking in Remontowa

to more than 420 quarter metres of deck area - Kristian Ole Jakobsen adds.

- After the conversion, *Esvagt Dana* is still a beautiful vessel - Captain Viggo Hvidberg confirms.

- Our sea trials have shown that the vessel has retained its original virtues and added some new ones. We have a bigger gangway, more power and better stability. Particularly, the stability has been important, as the vessel will be home to 40 technicians and ESVAGT's crew. We tested the vessel at 3.5 metres of sea state, with a crosswind of 15 m/s and a side current of 1.7 knots. *Esvagt Dana* managed it without any problems; we stayed within half a metre of the position – points out the ship's master Viggo Hvidberg.

In addition to the two Esvagt FRB lifeboats, *Esvagt Dana* also has a daughter craft attached, enabling *Esvagt Dana* to solve a larger group of tasks for TotalEnergies with one ship. Furthermore, the rebuilt *Esvagt Dana* has a rescue capacity for between 110 and 140 survivors.



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Luxury cruise vessels gain new functions and cut harmful emissions

Silver Wind in the final stage of the refit project

Sailing North

Poland's largest ship repair yard converts expedition cruise vessels operating in Arctic regions, making them safer for navigation and more environmentally friendly.

After years of stagnation in cruise shipping caused by the Covid-19 pandemic, shipowners operating luxury ferries and passenger ships navigating the environmentally sensitive waters have embarked on projects to enhance passenger comfort and minimize the negative environmental impact of these vessels.

In effect, these ships gain new functions, while the new pro-environmental technologies used on them reduce emissions of harmful compounds into the atmosphere.

Examples of such investments are the Project Invictus of the shipowner Silversea and the environmental programme of the Norwegian Group Hurtigruten.

Silversea entrusted Remontowa Shiprepair Yard in Gdansk with the co-

nversion of the *Silver Wind* cruise ship to an expedition vessel.

The *Silver Wind* entered Remontowa in June 2021 for a major refit and upgrade. It was the first cruise ship of this class and size to be overhauled in the history of Polish shipyards.

The refurbishment scope was a challenge mainly due to the need to dismantle and reassemble huge amounts of equipment in the accommodation areas, the passenger area and the engine room. The work was time-consuming and required extraordinary precision.

The shipyard's most important task was to adapt the ship to ice class for navigation in the harsh waters of the Arctic and Greenland. As a result, many modifications to the ship's hull were made.

The Polish yard reinforced the ship's ice belt along the ship's entire length. At the stern, Remontowa installed a duck tail extension weighing 150 tonnes. The basic idea of this design concept is to lengthen the effective waterline and make the wetted transom smaller, which positively affects the ship's resistance. In addition, this technology is also aimed at cutting operating costs while at the same time reducing ship emissions.

The installation of this additional large-scale structural component required the prior removal of the shaft line, two rudder blades, and the propellers. Once the ducktail was installed, and the measurements were taken, the shaft line and the remaining propulsion system components returned to their place.

PROJECT INVICTUS

As Silversea announced, the *Silver Wind* refit was aimed at conversion into a proper Ice Class expedition vessel during a scheduled drydock as part of Silversea's Project Invictus. Once the project had been completed, the *Silver Wind* was supposed to join her sister-ship *Silver Cloud* in offering dedicated luxury expedition cruises to the world's Polar Regions, including the Arctic and Antarctic, as well as itineraries around the globe. Accommodating fewer guests (just 254) and retaining her characteristic sense of small-ship intimacy, *Silver Wind* offers higher space ratios, a higher crew-to-guest ratio, and more upper suites, among other enhancements.

Apart from protecting the propulsion system from ice, the ducktail improved the ship's stability once the Polish yard added two decks at levels 5 and 6 at the stern. As the *Silver Wind* refit was to extend her function as an expedition vessel, Remontowa installed three cranes on the new decks to service 20 rigid inflatable boats of the „Zodiac” type. New specially manufactured side doors also had to be mounted on the ship for this purpose.

The new reinforced bulbous bow with a centrally mounted sonar for ice floe detection was also installed to make the ship suitable for safe navigation through ice-bound waters.

Shipyard workers replaced over 580 tonnes of steel in various areas of the ship, mainly in ballast tanks, tank tops and hull plating. The steel replacement included the swimming pool on deck 8 and the accommodation area on decks 6 and 7. In addition, a large part of the pipelines was dismantled and replaced.

Two main engines and two generating sets underwent overhauls, which required them to be dismantled and reassembled when the work was completed. The cruise ship has also received new

equipment at Remontowa, including two auxiliary boilers, a waste treatment plant, an oil separator and a reverse osmosis system to purify the fresh water.

The deck equipment, including anchor windlasses - mooring winches, was also overhauled and repaired.

Remontowa also cooperated with the shipowner's teams, performing various tasks on the ship. The shipyard workers carried out a huge amount of access work, especially in the hotel and passenger areas, the crew cabins, the theatre and the restaurant, allowing them to get to the ship's areas that needed refurbishing or modernization. One example was the dismantling of formwork, without which it wouldn't have been possible to replace steel or pipelines.

While drydocked, the *Silver Wind* underwent hull maintenance, including replacing the paint system. On the underwater part of the hull, an epoxy-silicone antifouling coating (Nanto Paint) was applied, which gave the hull a very smooth and, at the same time, hard surface with a low hydrodynamic resistance coefficient of 1.7.

The application of the new Nanto Paint coating, specially made for the moderniza-



At the stern, Remontowa installed a duck tail extension weighing 150 tonnes



Photo: Sławomir Lewandowski



Photo: Sławomir Lewandowski

As a result of the conversion, the comfort and functionality of nearly 100 cabins and passenger spaces have been increased, with furniture, wallpaper, lighting, flooring, and carpeting replaced or renewed

tion of the *Silver Wind* at Remontowa, was expected to reduce fuel consumption significantly. This was the first application of this paint in a Polish shipyard. In addition, the ship, whose colour livery was white, received new colours with a dominant grey, in line with the shipowner's new policy.

In May 2022, Remontowa Shiprepair Yard completed the conversion of the passenger-car ferry *Nordnorge*, owned by the Hurtigruten Group.

The Norwegian shipowner Hurtigruten modernizes its fleet with an environ-

mental protection programme. As a result, the carbon dioxide emissions from its Norwegian Coastal Express ships will be reduced by 25 per cent and nitrogen oxide by 80 per cent. The conversion in Remontowa Shiprepair Yard was part of this pro-ecological programme.

- This is the largest environmental upgrade in Hurtigruten's history and one of its kind in Europe - said Hedda Felin, Hurtigruten Norway CEO. - This will make a real impact in reducing emissions in Norwegian waters. Furthermore,

the fact that such an investment also leads to ripple effects in the local communities along the coast is something we are very proud of – she emphasized.

According to the shipowner's explanation, three of the seven ships will be converted to hybrid power to meet these new emission levels. In contrast, three others will have SCR emissions control systems installed on board (one ship from those seven was already upgraded with brand new engines and SCR in 2019).

The *Nordnorge* ferry at the final stage of the project, moored at the quay





Photo: Sławomir Lewandowski



Photo: Sławomir Lewandowski

In the case of *Nordnorge*, Remontowa has implemented three solutions on board to achieve this goal. The first has been a Selective Catalytic Reduction (SCR) system installed at Remontowa to reduce the nitrogen oxides in the exhaust gases. The second step was installing a new waste treatment plant with settling tanks, while the third step was mounting a new bulbous bow section into the ship to reduce fuel consumption.

Implementing these solutions allows *Nordnorge* to continue operating in polar

regions. In addition, Hurtigruten has also announced the large-scale use of certified biofuels to reduce CO2 emissions further.

As a result of the conversion of the ferry *Nordnorge*, the comfort and functionality of nearly 100 cabins on three decks have also been increased, with furniture, wallpaper, lighting, flooring, and carpeting replaced, among other things.

Remontowa also carried out the ferry's class renewal and took care of the propulsion system by, among other

things, overhauling the three bow thrusters and replacing the seals on both shafts.

- Our goal is zero emissions, but the technology is not mature enough yet. So we must do what we can to cut emissions with the best technology available today and extend the service life of the iconic ships we have in our fleet – Hurtigruten's CEO Hedda Felin pointed out.



Photo: Sławomir Lewandowski



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BOTA TECHNIK provides modern solutions created and performed by a highly qualified and certified team of over 100 specialists, who gain their experience not only in Poland, but mainly in foreign shipyards all around the world. We provide a worldwide comprehensive service, starting with the necessary analysis of customer needs, through creation of the best solution and its further delivery, ending with commissioning and service after assembly. We specialize in propulsion,

supplementing our offer with four other areas: power hydraulics, marine engines, automation and design services. As the authorized dealer of world leading manufacturers, we also sell products and spare parts.

At work we apply the highest international standards and care about constant development of our skills and offer. Among the latest improvements of our offer a major development towards renewable energy market should be particularly emphasized. In June 2022



took place the establishment of two new companies dedicated to Offshore Wind Energy sector. **BOTA GREEN OFFSHORE**, provider of shipowner's services for CTV (crew transfer vessels) and **BOTA WIND ENERGY**, provider of wind turbine service with its own team of highly qualified engineers and service technicians. Together with the new companies, **BOTA TECHNIK** now is able to deliver comprehensive service for both, Maritime and Offshore industries.

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COMPREHENSIVE DESIGN & ENGINEERING SERVICES

Remontowa Marine Design & Consulting (RMDC), member of Remontowa Holding capital group, is highly experienced marine and offshore design office. The company provides comprehensive design & engineering services to shipyards and shipowners, including newbuilding and conversion projects.

Our reference list contains more than 100 projects of various types, including new built vessels and large conversions, not counting minor upgrades and conversions. Among them: Newbuildings - LNG Salish Class ferries (BC Ferries), Multi-purpose vessels (Maritime Authority in Szczecin), Minehunters (Polish Navy), Hybrid ferries (Transport of London), Cable Layer (Siem Offshore).

Conversions - LNG propulsion for Spirit Class ferries (BC Ferries), Lengthen-

ing of Cargo RoRo vessels (Finnlines), Hybridization of Dive Support vessel (TechnipFMC), PSV to Cable Vessel Upgrade (LDA).

Today, we employ about 100 engineers, offering services at all design disciplines:

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- Deck Outfitting & Interior Department
- Machinery & Piping Department
- Electric Department

We cover all design stages: 3D Scanning/Concept Design/Class Design/Detail Design/As Built/At-site supervision.

We work using NAPA (for Stability analysis), ANSYS (FEM calculations), CADMATIC (3D modelling), ETAP (for electrical Power System) and AutoCad (2d drawings).

We have extensive experience in LNG and Battery/Hybrid propelled vessels. We are part of green revolution focusing on innovative solutions (participant of Digital Twin for Green Shipping Project funded by European Commission). Day-to-day on-site cooperation with newbuilding and conversion shipyards gives us real knowledge of production standards and requirements to meet shipyards' and shipowners' expectations. This is our great competitive advantage.



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Remontowa is building
new ferries for Polish owners

LNG – powered hybrid RoPaxes

On November 26 2021, Remontowa Shiprepair Yard signed a contract to build brand new Ro-Pax ferries for Polskie Promy (eng. Polish Ferries), the company established by the State Treasury and the Polish Steamship Company (Polsteam).

Within the long-term agreement framework, Remontowa will build three ferries, two of which will sail in the colours of Unity Line, a subsidiary of Polsteam. In contrast, another one is destined for Poland's operator Polferries. In addition, part of the contract is a letter of intent, which includes an option to build a fourth ferry.

The new Ro-Paxes from Poland are modern, environmentally friendly and low-emission vessels tailored to market expectations, competition requirements, and new, more and more restrictive IMO and E.U. regulations.

Each will be powered by four Dual-Fuel engines with battery assistance (hybrid), fed by LNG. Diesel fuel will be used only for initial ignition. In addition,

instead of conventional propellers, each ferry will be equipped with two azimuth thrusters at the stern and two bow thrusters, which will significantly improve manoeuvring in ports.

The LNG propulsion used on the new ferries will reduce CO2 emissions by around 25 per cent compared to the traditional propulsion currently used in shipping.

Each ferry will feature 195.6m in length, 31.6m in breadth and 4100 lane metres. They will sail at a maximum of 19 knots, carrying 400 passengers and manned by 50 crew members.

- The construction of new RoPax ferries to be operated on Polish-Scandinavian routes is important news for Poland's economy and the economies of all countries along the Baltic-Adriatic transport corridor. Over 75 per cent of goods transported by Unity Line ferries come from central and southern Europe - said Infrastructure Vice-Minister Marek Gróbarczyk.

The new ferries will have a total cargo lane of over 8,000 metres, corresponding to the entire line of the four ferries currently operated by Unity Line: *Polonia*, *Skania*, *Wolin* and *Gryf*. Following delivery by Remontowa Shiprepair Yard, the existing ferries sailing on this route will be phased out. The transfer of cargo from four ships to two benefits the environment and significantly enhances price competitiveness for the shipowner.

As the Ministry of Infrastructure emphasizes in its communication, the entry into service of the new RoPaxes from Remontowa will mark a new chapter in the activity of Polish ferry shipping. However, for the domestic shipbuilding industry, modern and ecological ferries of this type will be an excellent product that can attract the interest of shipowners from all over the world and become a future specialization of Polish shipyards.



Image: RMDC

Visualization of the RoPax ferry under construction at Remontowa for Polish owners

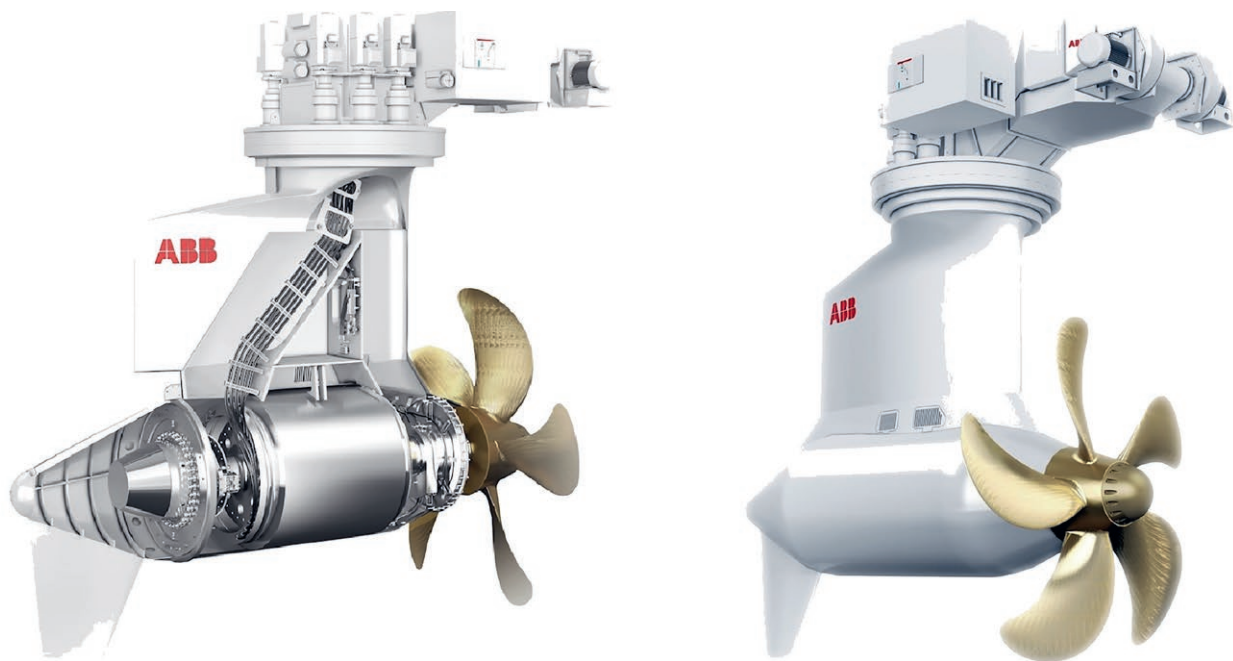


Image: ABB

The ferries will have two 7.5 megawatts Azipod® electric propulsion units

The conceptual design of the ferry was carried out by Remontowa Marine Design & Consulting of the Remontowa Holding group. The office employs nearly 100 engineers and designers, a significant number of whom are involved in this project.

The main part of the theoretical calculations has already been completed, and model tests of the ship have been carried out in the basin of Maritime Advanced Research Centre (CTO S.A.) in Gdansk, confirming the ferry's basic parameters such as stability, hull shape, draught, deadweight, cargo lane and speed, among others.

Ship strength calculations have also been completed, and detailed technical requirements for most of the ship's equipment have been developed, enabling their selection and purchase.

Approval of the hull design documentation by the classification society and the shipowner is currently underway. Engineers are also developing detailed hull execution documentation for the shipbuilding process at the shipyard.

Remontowa has already got performance bonds and payment guarantees and has also agreed with a consortium of banks for guarantees and letters of credit to secure deliveries related to the project, indispensable for operating contracts with suppliers and subcontractors.

Furthermore, Remontowa has already contracted the supplies of key

equipment for the new RoPaxes. The suppliers are leading European equipment manufacturers.

MacGregor, part of Cargotec, has been selected to supply the ferries with comprehensive packages of RoRo equipment. The scope of supply encompasses design, manufacturing, transport and installation assistance for the bow and stern equipment together with internal ramps and doors. The bow ramp folding frame solution and mooring rope self-tension system increase efficiency by enabling loading at two levels and reducing port turnaround time.

– Remontowa is known for its professionalism, high quality, and long-term environmental efforts, and we are delighted that our know-how and long experience have led them to choose us to deliver this comprehensive set of RoRo equipment for these three RoPax vessels – said Magnus Sjöberg, Senior Vice President, Merchant Solutions Division, MacGregor. – I'm also satisfied to see that we can support our customer's focus on sustainability, as in this case, reducing the fuel consumption by enabling shorter turnaround time in the ports – he added.

In turn, ABB will supply integrated power, automation and propulsion solutions. The order was booked in the first quarter of 2022. The financial details of the contract were not disclosed.

Each ferry will be equipped with two 7.5 megawatts Azipod® electric propul-

sion units to help achieve a high degree of manoeuvrability and efficiency in harbour operations. Azipod® technology has proven to cut fuel consumption by up to 20 per cent compared to traditional propulsion. In addition, independent research indicates that Azipod® propulsion offers fuel and emissions savings for ferries which could amount to nearly \$1.7 million and 10,000 tons of CO₂ per ship per year.

By integrating multi-fuel engines with battery power, ABB's Power and Energy Management System (PEMS™) balances the use of the different energy sources onboard, enabling further gains in operational efficiency and reducing emissions.

Conventionally, a ship approaching a port engages an extra engine as a failsafe backup, which is sub-optimal in terms of fuel efficiency. The hybrid solution uses batteries to provide this redundancy. In addition, integrated power is so responsive that larger ferries can achieve equivalent performance using lower installed power than that required by comparable ships, ensuring reduced emissions in any circumstances.

The three ferries will also utilize ABB's shipside shore connection to access plug-in shore power, enabling further emission reductions and benefitting from remote equipment monitoring and diagnostics for enhanced passenger and ship safety.

– With ABB, we are confident that all systems will be seamlessly integrated for maximum operational efficiency and sustainability – said Bartosz Znyk, Project Director, Remontowa Shiprepair Yard. – In addition, the ease of installing Azipod® units increases build efficiency and flexibility in project scheduling, supporting our shipbuilding process.

Demand for Azipod® propulsion continues to grow in the global ferry industry, which carries around 4 billion passengers and 370 million vehicles annually. Shipowners are increasingly choosing Azipod® technology which offers a 360-degree rotation of podded propulsors, increased reliability, reduced vibrations and more lane meters for vehicles onboard due to the system's location outside the hull.

– We take great pride in our collaboration with Remontowa and are delighted to support them in their strategy for environmentally friendly ferries – said Juha Koskela, Division President, ABB Marine & Ports. – This project presented us with an excellent opportunity to

showcase our abilities as a single system, bridge-to-propeller integration provider.

Last but not least, Wärtsilä has been contracted to supply engines, fuel storage and supply systems for these first LNG-fuelled RoPax vessels built for the Polish maritime sector.

Each of the vessels will have Wärtsilä 31DF dual-fuel engines. The LNG-fuelled engines can use bio-LNG, either on its own or blended with conventional LNG, to further reduce their carbon footprint. The operators intend to run the vessels entirely on bio-LNG by 2025.

The efficiency of the Wärtsilä 31DF engine was a key consideration in the award of this contract. Guinness World Records have recognized the diesel version of the engine as being the world's most efficient 4-stroke diesel engine. Wärtsilä will also deliver its LNGPac fuel storage, supply, and control system.

– High efficiency and sustainability are essential in today's operating environment, especially in the Baltic Sea, an Emissions Control Area. The Wärtsilä 31 engine represents the latest engine

technology available, and this, coupled with Wärtsilä's vast experience in LNG solutions, made that choice easy for us – emphasized Grzegorz Wardzyński, Technical Director of Polsteam, the parent company of Unity Line.

– Decarbonization is a front and centre issue for the maritime sector, and this focus is reflected in the choice of the Wärtsilä engines for these ferries. Optimal engine performance is essential in maximizing fuel efficiency and minimizing exhaust emissions. These new vessels will become an important part of Poland's transport infrastructure, and we are proud to partner with this project – says Matthias Becker, General Manager, Sales, Wärtsilä Marine Power.

Furthermore, Teknotherm Marine HVAC, a Polish company of the Norwegian Teknotherm Group, was awarded a contract (disclosed on April 13) to supply HVAC (heating and ventilation) systems for the RoPaxes. The contract includes equipment kits for three vessels and one as an option.

Image: Wärtsilä



Each of the ferries will be equipped with Wärtsilä 31DF dual-fuel engines

ANTI-HEELING requirements for service operation vessels

Nowadays there is a growing demand for offshore wind power, with a trend for increasing turbine sizes. Service Operation Vessels ensure the safe operation of wind turbines at sea and offer the staff on board a comfortable accommodation. One of the main challenges for the operators is the dynamic working environment. The roll motion of the vessel for instance does not allow an automatic operation of a standard anti-heeling system.

Service Operation Vessels:

- Comfortable working environment for service technicians
- Fast and flexible operation of the crane, gangway or davit, with variable loads and motions
- Anti-Heeling System Requirements:
- High compensation rates
- Fast and flexible reaction

HOW TO MEET THE OPERATIONAL REQUIREMENTS

Challenge:

- Service Operation Vessels usually require high compensation rates,

while having only moderately sized Anti-Heeling tanks. This leads to relatively short running sequences of the AH-pump.

- The closing time of the control valves are triggered by the recommendation of 1sec / 1cm diameter to avoid the water hammer effect (40sec for DN400).
- The valve opening/closing time is conflict with the tank size.

Solution:

- Hoppe has developed a standalone anti-heeling system that is designed to overcome the challenges in order

to offer the best technical solution increasing the safety and efficiency of each offshore crane operation.

- Flow Control (FC) Anti-heeling system with flexible flow from “zero-flow” to maximum available flow using VFDs and certain control functionalities in combination with standard reversible propeller pumps.

Benefits:

- Fast, flexible and accurate flow creation
- Less maintenance due to VFD operation
- No risk of motor overheating due to repeating start/ stop sequences

FLOW CONTROL SYSTEM

The basis of the Flow Control System is a reversible propeller pump operation with a variable, positive or negative pump rotation speed. The system precision required is ensured by a “Four Quadrat” operation of the pump based on known performance curves in all possible operation scenarios. The major features of the system are:

- Continuously running pump with variable RPMs
- Pump flow, gravity flow & turbine mode
- Flow duty point: $RPM = F(MWC)$
- Zero-Flow = System Standby
- Reduction of start-stop sequences
- Fast, flexible and accurate flow creation

Flow Control thus provides a safe and stable basis for the various possible uses of a Service Operation Vessel. Manual and automatic modes can be complemented by the use of joystick operation, which gives the operator direct and flexible control.

Upgrading to Load Moment Control also extends the SOV's range of applications, as it can be linked to the crane and/or gangway controls, and even enables automatic anti-heeling system operation at sea.



More at:
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The last ferry in the series left the Polish yard on 22 December 2021, without artwork on the sides, sailing a distance of more than 10,400 nautical miles en route to Canada.

Photo: Marcin Koszalka

Four LNG fuelled Salish Class double-ended ferries built for Canada

Quiet ride with orcas

In March 2022, the *Salish Heron* double-ended car passenger ferry arrived in Canada. It is the fourth, low-emission LNG-powered vessel of the Salish Class series built in the Polish, Gdansk-based yard Remontowa Shipbuilding for British Columbia Ferries.

The *Salish Heron* is identical to the other three ferries earlier designed and built by the same Polish shipyard. The vessel was built under the contract signed on November 1, 2019. The Canadian shipowner BC Ferries, continuing its fleet development program “Clean Futures Plan”, entrusted Remontowa Shipbuilding SA again with the construction of another fully equipped “Salish Class” ferry powered by liquefied natural gas.

The return of this shipowner with another order confirmed the quality of the design and construction of the previously delivered ferries, verified in operation.

The *Salish Heron* left Remontowa Shipbuilding on December 22 2021,

sailing a distance of more than 10,400 nautical miles en route to Canada, where the ferry arrived on March 4, 2022. The voyage route took her through the Atlantic Ocean, the Panama Canal and along the western Pacific Coast of North America to Victoria’s Ogden Point. She replaced the *Mayne Queen* ferry and is operated, together with the *Queen of Cumberland*, on the Swartz Bay – Southern Gulf Islands line in the province of British Columbia in western Canada.

Remember that Remontowa Shipbuilding in 2016-2017 delivered the vessels: *Salish Orca* in November 2016, *Salish Eagle* in February 2017 and *Salish Raven* in April 2017. The first arrived in Canada

in January 2017 and began to sail on the Comox-Powell River route in May. Then, in March, the *Salish Eagle* arrived and entered service on the Tsawwassen-Southern Gulf Islands route in June. In the same month, the *Salish Raven* arrived and started operation between the Southern Gulf Islands in August.

Another benefit is that standardized operations allow the crew and vessels to be interchangeable within the routes.

They were the first ferries in the BC Ferries fleet to be LNG-powered and among the first of their kind in North America. Thanks to the innovative propulsion, the Salish Class ferries emit up to 25 per cent less carbon dioxide, more than 85 per cent fewer sulphur oxides, 50 per cent fewer nitrogen oxides and 99 per cent fewer particulates than the propulsion fed by conventional marine fuel. In addition, the hull shape and electrically controlled propellers ensure low hydrodynamic resistance and quiet, fuel-optimized navigation.

PRINCIPAL PARTICULARS	
Length overall approx.	107,20 m
Length b.p.p. approx.	103,20 m
Breadth moulded	23,50 m
Breadth maximum	24,00 m
Height to main deck	6,60 m
Design draught approx.	4,65 m
Service speed	15,5 kn
Passengers (incl. crew)	600 persons
Crew	16 persons
Personal cars	150 PCU
Combined:	
Personal cars	100 PCU
Commercial vehicles	10 pcs
Tractor trailers	4 pcs
Deck load total approx.	390 t
Deadweight approx.	619 t

PROPULSION
Gas/Diesel-Electric type;
Three (3) Dual Fuel engines/gensets (3 x 1350 kWe @1200 RPM);
Two (2) azimuth thrusters (2 x 1400 kW @ 207 RPM).
EMERGENCY GENERATING SET
One (1) emergency generating set (1 x 350 kWe @ 1800 RPM).
DECK EQUIPMENT
One (1) bow and one (1) stern hydraulically operated visor;
Two (2) hydraulic anchor winches;
Two (2) hydraulic mooring winches.
LIFESA VING EQUIPMENT
Two (2) complete Marine Evacuation Systems for 600 PAX + 20% margin;
Two (2) 5-metre long Rescue Boats;
Life jackets, life buoys – according to rules.
CLASS
+100A1 Passenger and Vehicle Ferry, 'Strait of Georgia Service', +LMC, GF, CCS Environmental Protection: ECO, A, GW, NOx, P, R, DIST, SOx Descriptive note: IHM/Green Passport, PCAC(33)

The ferries are designed with a hull symmetrical to the main deck level, two continuous car decks, a passenger deck, two crew decks, a bridge deck and bow/stern visors intended for loading and unloading. Four deck ramps enclose the lower car deck, opening the upper car deck.

The propulsion consists of three dual fuel main engines/generating sets powering two azimuth thrusters (one on each end). The ferry can take on board up to 150 cars and 600 passengers.

Wärtsilä provided an integrated system consisting of the LNG plant, dual-fuel engines, and an electric propulsion system.

The scope of supply included three Wärtsilä 20DF dual-fuel engines operating on LNG fuel, a Wärtsilä LNGPac fuel storage, supply and control system, and the Wärtsilä Low Loss Concept (LLC). The LLC is a power distribution system that delivers higher efficiency, less weight and volume, and high system redundancy.



Visualization of the RMDC 2990 Design ferry

Image: RMDC

These are some of the most innovative ferries in the world in this class, entirely designed by Remontowa Marine Design & Consulting and built with the contribution of the Remontowa Holding Group companies. These ferries can be bunkered directly from a wheeled LNG road tanker, entering the vessel's internal closed deck. This solution allows for this operation in harbours with no land infrastructure for storing and bunkering LNG.

The Salish Class vessels can run as dual-fuel on either natural gas or ultra-low Sulphur diesel. BC Ferries' use of natural gas for the Salish Class vessels reduces an estimated 9,000 metric tonnes of carbon dioxide equivalent per year, the same as taking 1,900 passenger vehicles off the road annually.

The Indigenous artwork on each vessel acknowledges the Coast Salish sailors as original navigators of these coastal waters.



Photo: Wikimedia Commons

The *Salish Heron* departing Galiano Island, decorated with a heron artwork by Penelakut First Nation artist Maynard Johnny Jr.

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Newly built all-purpose versatile vessels perform a variety of tasks in the Baltic

Guardians of safe navigation

In 2020 the Polish maritime administration in Gdynia and Szczecin took delivery of two new multipurpose vessels in a series designed by Remontowa Marine Design and Consulting and built by Remontowa Shipbuilding under a project co-financed by the EU Cohesion Fund.

The contract for constructing two multipurpose ships was signed on 5 March 2018 at the Maritime Office in Szczecin. The new ships, built under the supervision of the Polish Register of Shipping classification society, replaced two 38 years old *Planet* and *Zodiak* vessels, which had been built in 1982 by the same shipyard.

The ships named *Zodiak II* and *Planeta I* are built as part of the “Nostri Maris – construction of two multipurpose vessels” project, conducted by the Maritime Office in Szczecin, co-financed by the European Union from the Cohesion Fund, under the “Infrastructure and Environment” Operational Programme 2014-2020.

Both were handed over to the Maritime Offices in Gdynia and Szczecin in 2020, the centenary of the Polish Maritime Administration.

– Four years ago, when the Ministry of Maritime Economy and Inland Navigation was established, we set ourselves one goal: that Poland, just as it married the sea 100 years ago, really must be equipped with equipment and competencies and restore its rightful place on the maritime map of the world, and today is one of many that prove it – said Grzegorz Witkowski, Deputy Minister of Maritime Economy and Inland Navigation, during the handing over ceremony in 2020.

The *Zodiak II* and *Planeta I* IDP-equipped vessels, operated by the Maritime Offices in Gdynia and Szczecin, perform a broad array of duties, including buoy maintenance, icebreaking, hydrographic research and surveys, search and rescue, firefighting, oil spill response, towing of disabled vessels, remotely operated vehicle (ROV) support, and limited cargo and personnel transport.

The new vessels have responded to the operators’ need for platforms that could perform different functions without relying on multiple specialized craft. The



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shipowner – Maritime Office in Szczecin had decided that having a smaller fleet of vessels that could be adapted to a wider range of duties offered significant economic gains compared to the alternative of renting single-purpose-only craft on a pure ad hoc basis.

Zodiak II and *Planeta I* each have an LOA of 60.1 metres, a beam of 13.4 metres, a design draught of 3.5 metres, a deadweight of approximately 350 tonnes, a working deck area of 310 square metres, and space for six crewmembers

and 65 other personnel, such as technicians and rescued incident survivors.

A diesel-electric propulsion system drives a pair of Steerprop 1,400kW azimuth thrusters to deliver a bollard pull of 40 tonnes, a free running speed of 15 knots, and an icebreaking speed of five knots. The DP system allows for precise manoeuvring with the aid of a simple joystick, while a Cummins selective catalytic reduction (SCR) system helps in reducing harmful emissions generated by diesel engines and generators.

The vessels are designed primarily for operation in the Baltic Sea out to 200 nautical miles from their respective homeports but are also equally capable in inland waterways.

As Remontowa Shipbuilding emphasizes, designing vessels that would perform a wide range of diverse tasks while having the most up-to-date electronics and propulsion systems proved challenging.

- Specifically, we had to find a way to optimize the hull structure to ensure improved operating efficiency without sacrificing the strength necessary for sailing on ice or the ability to carry all the equipment that the vessels would need to carry out their intended roles – the shipyard pointed out.

Adequate space needed to be allotted for engine room systems, individual HVAC units in the various onboard compartments, the SCR system, the comprehensive electronics and deck equipment suites and their associated cable work.

The design work on these particular vessels gave the yard new insights into buoy maintenance, oil spill recovery, hydrographic operations, SCR, and ballast tank aeration systems. These insights could be applied in many of our future newbuilding projects.

The *Zodiak II* and *Planeta I* vessels boast impressive deck equipment. A Protea electro-hydraulic deck crane would be used for loading and unloading cargo, while an auxiliary crane from Hydromega would be used primarily for maintenance work on each vessel, such as in lifting engines or thrusters that require servicing. There are also towing hooks and bollards, mooring bollards, electric anchors, and smaller cranes for use in conjunction with the onboard sonar and depth sounder.

A small moonpool measuring one by 0.60 metres installed amidships serves mainly for housing a multibeam echosounder but is also adaptable for other uses.

For oil recovery work, both ships have been fitted with two onboard containers for storing recovered oil, a positive pressure ventilation system to help eliminate harmful fumes onboard, and a pump for transferring the recovered oil to other vessels for proper disposal. In addition, the installation of separate HVAC units in the different onboard compartments had also been deliberate

MAIN PARTICULARS

Length overall	60,10 m
Length between perpendiculars	53,63 m
Beam moulded	13,4 m
Depth to main deck	6 m
Design draught	3,5 m
Speed	13 kn
Crew	21 persons
Deadweight	350 T
Bollard pull	40,0 T

PROPULSION

Azimuth Thrusters	2x 1400 kW
Bow Thruster	1x 850 kW

GENERATING SETS

Main Generating	3x 1590 kW (at 1800 RPM)
Emergency Generator	1x 220 kW (at 1800 RPM)

DECK EQUIPMENT

System for operating navigation buoys which contains: - Deck Crane 17 meters outreach at 10 tons SWL - Roller ramp for dropping buoy anchors
Hydrographic equipment which contains: - Moon pool with multibeam echosounder - Single beam echosounder - Hydrographic boat - Underwater robot
Towing hook 400 kN towing capacity
Oil Recovery System
Firefighting 1 class system

CLASS

Class notation of ship according to PRS Rules: *KM OIL RECOVERY / TUG / FIRE FIGHTING 1 / SPECIAL PURPOSE SHIP I L1 IWS AUT NAV1 DP1 ECO REC *PRM EMP

to limit the risk of fumes in one area being circulated in another.

Augmenting the vessels' already impressive capabilities are a pair of small tenders. One is an anti-pollution and hydrographic boat supplied by Danish company Desmi while the other is an eight-person fast SAR boat from Polish builder Sportis.

The vessels also each come with four 20-person life rafts for use in picking up adrift survivors or for the crew and other occupants in the event of an evacuation. For firefighting, the vessels are equipped with two main-engine-driven water/foam monitors fitted on the superstructure, sprinkler systems throughout the superstructure and the working deck and a Novec firefighting system in the engine room.

In December 2020, the *Zodiak II* and *Planeta I* were awarded the World's Best Multipurpose Vessels by Baird Maritime, the Australian publisher of maritime professional magazines and portals.

„Completing these highly versatile vessels and putting them into service was quite a challenge for the Polish yard,



Photo: Marcin Koszalka

Thanks to powerful water monitors, the ships can participate in firefighting operations at sea

which like other companies around the world, had to make significant changes to its day-to-day operations to minimize the impact of the Covid-19 pandemic” – reported Baird Maritime.

„Despite the disruption caused by the coronavirus pandemic, it has been a very creative and productive year for shipbuilders and manufacturers worldwide, particularly in the fishing, passenger and

maritime safety sectors” - Neil Baird, co-founder and former editor-in-chief of Baird Maritime and Work Boat World magazine wrote in his commentary.

„Importantly, the innovation demonstrated in vessel design and equipment, and the quality of construction and finish, overall, was unprecedented and impressive” – he added.



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The *Festøya* – one of the four ferries built for Norled at Remontowa Shipbuilding in 2021, received the prestigious Shippax Award

The most energy-efficient in their class hybrid ferries operated in Norway

In tune with the environment

In 2020 – 2021 the Remontowa Shipbuilding yard in Gdańsk built and delivered to Norled four hybrid, battery-powered double-ended car-passenger ferries. In 2021 the series was awarded by SHIPPAX for its environmental impact and innovation.

The ferries (*Festøya*, *Solvågen*, *Mannbeller*, *Fodnes*) represent a new generation of battery-powered hybrid vessels that meet stringent international regulations for harmful emissions and greenhouse gases. The most energy-efficient ferries in their class are equipped with an innovative Diesel-Electric Hybrid system.

In normal operation, all required power is drawn from two battery packs. These are recharged from the onshore grid while the vessel is stationary at the quay, which typically takes about 11 minutes. A fast charging solution is therefore used to ensure that the batteries maintain their required state of charge.

The shore-side charging system is integrated with the automatic mooring

system that holds the ferry to the berth and, when activated, gives the „green light” to start the charging process.

It is anticipated that the generating sets the vessel is equipped with (running on 100 per cent Biodiesel) are used only in case of emergency. However, the ship’s electrical power system is prepared to operate them simultaneously with the batteries, e.g. in energy-saving mode during peak shaving.

The equipment on board has been selected based on maximum efficiency criteria. Examples are the pull-type thrusters with integrated permanent magnet electric motors ensuring high efficiency even at very low loads or the modern heating and ventilation (HVAC) system.

It is also worth mentioning the solution in which the passenger rooms are located under the car deck, which significantly improves the flow of people

and increases the overall accessibility of the vessel.

The ferries sail in the area of Norwegian fjords serving the connection between Festøya – Solavågen and Mannheller – Fodnes. They comply with the regulations of the classification society DNV and the Norwegian Maritime Administration.

Remontowa Shipbuilding has built the vessels to the LMG 120-DEH design developed by LMG Marin and detailed documentation prepared by Remontowa Marine Design & Consulting of the Remontowa Holding Group. In addition, other companies of this Polish group were also involved in their construction (Remontowa Electrical Solutions, Remontowa Hydroster Systems, Remontowa Coating & Equipment and Remontowa Lighting Technologies).

Norled is one of the largest ferry operators in Norway. Its fleet comprises about

80 ferries, six of which were earlier built at Remontowa Shipbuilding SA. After delivery of the four newly built ferries mentioned above, the number increased to ten.

In 2021 Remontowa Shipbuilding won the SHIPPAX Award for the battery-powered hybrid ferry Festøya. As usual, the award ceremony was held during the Shippax Ferry Conference organized between August 31st and September 2nd on the *Pearl Seaways*, a car-passenger ferry sailing between Copenhagen, Frederikshavn, and Oslo.

Shippax Awards have been granted since 1999 by an independent jury in several categories. These awards are meant to reward creativity and innovation or extraordinary results in the design, construction and conversion of cruise ships, ferries and RoRo vessels.

PRINCIPAL PARTICULARS

LOA	114,40 m
Breadth max	17,70 m
Hull depth to main deck	4,30 m
Passengers	299 persons / 399 persons
Personal cars	120 PCU
Deadweight	590 t / 599 t

Propulsion

Diesel Electric Hybrid type;
Two (2) generating sets (100% Biodiesel compatible);
Two (2) pulling-type azimuth thrusters with vertically mounted PM motors;
Air-cooled battery pack.

Deck equipment

Two (2) hydraulically operated flaps;
One (1) hydraulic anchor winch;
Two (2) hydraulic capstans;
Integrating with a shore-based battery charging solution;
Integrating with a shore-based automatic mooring solution.

Lifesaving equipment

One (1) MOB Boat;
Three (3) / Four (4) Marine Evacuation Systems for 550 / 800 persons.

Class

DNVGL +1A1 LC FERRY B E0 R4 BATTERY(POWER)
--



H-3 Leszko. The ice class of the tugs allows them to operate in heavy ice conditions

New auxiliary ships for the Polish Navy

Tugboats with great capabilities

In May 2021, the sixth tugboat and last in the series built to support the Polish military fleet left Remontowa Shipbuilding.

Therefore, the entire contract for constructing six auxiliary vessels for the Polish Navy within the programme: „Technical support and rescue operations at sea, code-named HOLOWNIK [TUG]”, signed in June 2017 by the Armaments Inspectorate and Remontowa Shipbuilding, was successfully completed.

The tug *H-13 Przemko* was the last in the series built and delivered to the Navy in 2020-2021. Like her predecessors, *H-11 Bolko* and *H-12 Semko*, she joined the 12th minesweeper squadron and is on duty in the 8th Coastal Defence Flotilla in Świnoujście.

Three other tugboats built within the programme mentioned above: *H-1*

Gniewko, *H-2 Mieszko* and *H-3 Leszko* have been assigned to serve in the Squadron of Support Ships belonging to the 3rd Flotilla named after Cmdr. Bolesław Szymon Romanowski in Gdynia.

The tugboats of the B860 project are intended to perform logistic support tasks at sea, towage, manoeuvres in port, and carrying out activities related to the

technical evacuation, support of rescue operations, transport of persons and supplies, fire-fighting, pollution neutralization, taking hazardous materials out of the water, and other auxiliary duties defined by the Polish Ministry of Defense. The vessels comply with the rules of the Polish Registry of Shipping.

The ice class of the tugs will allow them to operate in heavy ice conditions with the assistance of icebreakers. The vessels can transport general cargo of up to 4.0 tonnes on the open deck. The displacement is defined as 490 tonnes, with a pulling strength of 35 tonnes at least. Two 1200 kW diesel engines with two azimuth thrusters of the same power serve as propulsion.

The vessels are manned by a crew of ten and carry seven days' worth of fuel, with a capacity to operate autonomously (carrying out the tasks relevant for the class and type, without a need to return to base for the sake of recovery) for five days. In addition, I-1 ice class reinforcements will make it possible for the vessel to operate on the Baltic Sea all year long.



Photo: Marcin Koszalka

H-1 Gniewko auxiliary ship – one of the six built at Remontowa Shipbuilding

MAIN PARTICULARS

Length overall	29,20 m
Breadth max.	10,40 m
Height (midship)	4,95 m
Displacement (full)	490 t
Crew	10 persons
Bollard pull	no less than 35 t

PROPULSION

Main Engines 2 x 1380 kW

Thrusters 2 x 1193 kW, FP azimuth propellers

GENERATING SETS

Gen sets 2 x type C4.4 DITA – 86 ekW

DECK EQUIPMENT

Two (2) Anchor and mooring winches

Two (2) Stern & Fore Towing winches

Towing hook - nominal pull: 50 t

Deck crane type 1,2t @ max reach 11,0 m

Fi-Fi System Class I

2x Fi-Fi monitors - nozzle for jet/fog type, 1200/300 m³/h,

Deck load 4,0 t/m²

The capability of short-distance transport of 50 seamen. Oil spill response equipment – dispersant spray unit with spray arms and 300 m oil containment boom.



Photo: Marcin Koszalka

The tugs are equipped with two monitors (water cannons) with a capacity of 2,700 cubic metres of water per hour with a jet range of 120 metres.



ORP Albatros (602) at sea

Series of modern MCMVs of Polish production extended to six ships

Mine killers

A consortium of Polish shipyards has been building modern mine countermeasure vessels for the Polish Navy. Two of them have been handed over, the third one is about to be delivered, and the three subsequent ships have recently been ordered.

The ships in question are minehunters of the 258 Kormoran II (eng. Cormorant) Project, entirely designed in Poland, made of a non-magnetic steel and built by the consortium led by Remontowa Shipbuilding and members - Ośrodek Badawczo-Rozwojowy Centrum Techniki Morskiej S.A. (OBR CTM S.A.) and PGZ Stocznia Wojenna (Naval Shipyard in Gdynia).

The Kormoran II type vessels are designed with great care to achieve low signature and high manoeuvrability, owing to the use of cycloid propellers driven by diesel engines.

The ships search for, identify and combat sea mines, conduct waterways surveillance, guide other vessels through mine threat areas, lay mines and remo-

tely operate self-propelled anti-mine platforms. This applies to operations in the Polish Economic Zone and missions in tactical groups in the Baltic and North Sea (teams of NATO, EU or multinational coalition forces).

Kormoran II constitutes a comprehensive platform for various mine-hunting systems, including Autonomous Underwater Vehicles, Remotely Operated Vehicles and sonars. In addition, she can lay mines and perform other complementary tasks assigned by national forces or allied commands.

She is capable of vertical replenishment (VERTREP) and dry and fuel replenishment at sea (RAS), which makes KORMORAN II ready for a set of missions out of the northern part of Europe.

The first model laboratory tests of the prototype *ORP Kormoran* minehunter began a few weeks after the contract had been concluded, in September 2013. Then, in April 2014, Remontowa Shipbuilding cut the first steel for the minesweeper, and on September 15 2014, the keel-laying ceremony was held. Finally, on May 3, 2015, the hull left the assembly hall and on September 4, 2015 – the ship was named and launched.

The flag-raising on the *ORP Kormoran* MCMV (601) took place on November 28 2017. She is the first new purpose-built combat vessel for the Polish Navy in 20 years, constructed entirely by the Polish industry.

In December 2017, the contract for building two serial minehunters – *ORP Albatros* (602) and *ORP Mewa* (603) – was signed in Warsaw. The last two ships were launched successively in October 2019 and December 2020.

In August 2022, the *ORP Albatros* was handed over to the 13th minesweeper squadron in Gdynia, part of the 8th Coastal Defence Flotilla, while the third MCMV – *ORP Mewa* – was undergoing acceptance tests, and in autumn this year, she will join the Navy.

In February 2022, the Polish Armed Forces announced the completion of the prototype MCMV *ORP Kormoran* operational and evaluation tests. The tests helped develop the most effective use of the vessel in service and supported the construction of subsequent serial minehunters of the 258 Kormoran II Project. Once the military tests are completed, the ship can attend regular training and perform combat duty.



ORP *Mewa* (603) during sea trials

The ship's relevant operational and military tests were already completed in December 2020. Afterwards, the army commission worked on the documentation, and the *ORP Kormoran* crew prepared for the O2 program task, whose deadline was March. As a result, the ship passed the exam, which confirmed her readiness to perform tasks at sea.

Throughout that time – from the prototype minehunter delivery at the end of 2017 until the beginning of 2022 – operational tests were conducted. The crew integrated, familiarizing themselves with the ship and practising their skills. In addition, the minehunter attended several naval operations, such as the “Northern Coasts” manoeuvres off the coast of Sweden and “Solid Belona” in Polish waters.

The Navy used conclusions from the tests to introduce numerous modifications to the equipment and systems on the two serial vessels – *ORP Albatros* (602) and *ORP Mewa* (603) – mentioned above when they were still under construction.

The changes included communications and navigation systems, the ship's combat tactical system (SCOT) and mine countermeasure systems, and modifications to the ship's engine room and emergency response. Additionally, changes were made to the functionality of the SHL-101T under-keel sonar. A different set of underwater vehicles has also been used.

The minehunters 602 and 603 have been equipped with GAVIA, Saab DE

SAROV, and Hugin Kongsberg UAVs. In addition, Kraken KATFISH 180 side observation towed sonar with an autonomous launch and recovery system (ALARS) was added. In place of the 23mm calibre Wróbel cannon on the prototype ship, an OSU-35K artillery system was installed on both vessels.

In addition, those modifications also involved partial structural changes to the ship (e.g. rearrangement of the aft deck, rebuilding of the transom, etc.).

On June 26, 2022, in Świnoujście, on the day of the Navy holiday, Polish Minister of National Defence Mariusz Błaszczak approved a contract extending the Kormoran II series to six ships. The subject is the acquisition of the next three (604, 605 and 606) Kormoran II-type minehunters with logistic support packages. According to the Ministry of Defence, together with the *ORP Kormoran* prototype MCMV and the *ORP Albatros* and *Mewa*, they will form part of the Polish Navy's mine defence system.

The parties to the agreement are the State Treasury – Armaments Agency and the Consortium composed of Remontowa Shipbuilding as the leader, PGZ Stocznia Wojenna and OBR CTM.

MOD announced that the vessels will be delivered between 2026 and 2027 and join the 12th Wolin minesweeper squadron, a tactical division of the 8th Coastal Defence Flotilla in Świnoujście. As the head of MOD stressed, the Polish Navy needs to have the most modern equipment, which guarantees that well-

-trained Polish seamen can effectively guard the Polish coast.

– Our basic task is to create conditions for the Polish Army – including the Navy – to develop, to defend our homeland – said the Minister of Defence.

Remontowa Shipbuilding, formerly known as Northern Shipyard, enjoys a rich track record in military production since the company, in its history, has built over 600 military ships, with the majority delivered to the Polish Navy.

Side view of the 258
Kormoran II minehunter



Image: RMDC

PRINCIPAL PARTICULARS

Length overall	58,50 m
Breadth max.	10,30 m
Height (main deck)	6,40 m
Height (aft deck)	4,70 m
Displacement	up to 850 t
Crew	45 persons (plus 6 divers)

PROPULSION

Main Engines	2 x 1000 kW
Propulsor	2 x 1000 kW, cycloidal propellers
Bow Thruster	1 x 100 kW (601) 1 x 200 kW (602, 603)

Generating sets

Main Generating Sets 3 x 323 kW/1800 rpm

Special equipment

Combat Management System SCOT;

Non-magnetic hull minimizing the vessel's physical field signatures;

Triple frequency wideband, high resolution hull mounted MCM sonar (SHL-101/TM);

Self-propelled variable depth sonar (SPVDS) SHL-300 mounted on SAAB Double Eagle Mk III (601);

Remotely-controlled AUV SAAB SAROV (602, 603)

KATFISH 180 Towed SAS Sonar System with ALARS topside set (602, 603)

AUV Hugin 1000;

Remotely-controlled reusable underwater vehicle Morświn (601);

Remotely launched explosive charges for sea mine countermeasure "Toczek A, B, C";

Remotely-controlled disposable underwater vehicles mine hunting system Gluptak;

One (1) 23 mm double barrel "Wróbel-II" (601), 35 mm marine gun system OSU-35K (602, 603);

Three (3) 12,7 mm machine guns;

Four (4) man-portable air-defence systems "Grom";

Two (2) type RIB;

Integrated Bridge System;

IFF transponder;

Surveillance system;

Degaussing system;

Cathodic protection system;

NBC system.

ORP *Kormoran* (601) and ORP *Mewa* (603) – meeting at sea



Photo: 8th Coastal Defence Flotilla



Preparations for the construction of new combat ships for the Polish Navy

AH140-Miecznik-BW-070422

Swordfish - type frigates

A consortium of Polish shipyards and British companies are progressively preparing the production process of the state-of-the-art frigates within the Miecznik (eng. Swordfish) programme.

The agreement between the State Treasury - Armaments Inspectorate of Poland's Ministry of Defence, whose legal successor is the Armaments Agency, and the PGZ-Miecznik Consortium was concluded on July 27, 2021. The consortium to build new missile frigates for the Polish Navy comprises the state-owned companies PGZ S.A. (Polska Grupa Zbrojeniowa – Polish Armaments Group) as the leader and its subsidiary - PGZ Stocznia Wojenna (Naval Shipyard Gdynia), and a private shipyard Remontowa Shipbuilding S.A., member of Remontowa Holding.

The subject of the agreement is the delivery of one prototype frigate and two further in the series, together with combat assets with a training and logistics package for the three ships.

The Miecznik type frigates will be equipped with anti-aircraft and anti-missile systems, surface-to-surface and

surface-to-ground missile systems, and torpedoes designed to combat submarines. These vessels will increase the capabilities of the Polish Navy in observation and control of sea areas, protection of naval bases, fighting against surface, underwater and land targets in the coastal zone, and conducting naval air defence.

The Miecznik multipurpose ships of this class will increase the fleet's capabilities and allow the implementation of a wide range of tasks at sea, including protecting shipping routes and critical infrastructure. Moreover, the ships will increase the combat potential of the Polish Armed Forces. Still, they will also constitute a significant contribution of the Republic of Poland within the North Atlantic Alliance, e.g. by performing tasks within the NATO Standing Groups of Ships framework.

In March 2022, the Armaments Agency selected a British bid from among

the three initially proposed by the PGZ-Miecznik Consortium in July 2021 to deliver the ship platform design.

The choice was the Babcock's Arrowhead 140 (AH140), a variant of the Type 31 frigate and is also responsible for technology transfer. In addition, the consortium concluded agreements on strategic cooperation with Babcock and British subsidiaries of Thales Group, which will supply the combat management system, and MBDA responsible for delivery of an anti-aircraft armament.

Germany's ThyssenKrupp Marine Systems competed with the British, offering the MEKO A-300PL project and Spanish shipbuilding group Navantia, with the F100 design integrated with the Aegis air defence system.

The chosen ship's platform is 138.7m long, 19.7m wide and 5.5m draft, with a maximum displacement of 7,000 tonnes. Autonomy is expected to be 30 days

without replenishment at sea, with a maximum speed of 28 knots and a sailing range of more than 6,000 nautical miles at 18 knots. About 160 people will be able to embark on board, with between 100-120 crew and additional personnel.

The new frigates will be equipped with four CODAD diesel engines, the Tacticos Integrated Combat System, MU-90 torpedo system, 76 and 35 mm calibre artillery systems, CAMM air defence missile system, sea-to-sea and sea-to-ground fire system based on RBS missiles, airspace and sea surface observation radars, weapons control radar, under-keel and towed sonars, a helipad and a hangar.

The Thales' Tacticos is a naval combat system's central command and decision-making element. Its function and performance – supporting sensor control, picture compilation, situation assessment, action support and weapon control – are critical to the operational effectiveness of a naval vessel. In service on more than 200 naval platforms in 25 navies, Tacticos has an unrivalled record of proven equipment integrations.

The CAMM missiles developed by MBDA UK are surface-to-air missiles. The basic version can combat air targets at a distance of more than 25 km, while the enhanced CAMM-ER version operates at a distance of more than 45 km.

Poland's selection of Babcock as the platform design provider for its frigate programme follows decisions by the U.K. and Indonesia to select the AH140 platform as the basis of their new frigate programmes in 2019 and 2021, respectively.

Babcock has been working alongside the U.K. Government to promote the export variant AH140 frigate and its interoperability across navies in the global market, with its baseline design

configurable to meet a broad range of naval requirements no matter where in the world it operates.

– I'm delighted that Babcock has been selected as a platform design provider and technology partner for Poland and that our Arrowhead 140 frigate has been chosen for Poland's Miecznik programme. Its adaptability and capability mean we can tailor the design to suit the needs of the Polish Navy. Driven by innovation and backed by heritage, the Arrowhead 140 frigate has British ingenuity and engineering at its core – said David Lockwood, CEO of Babcock.

According to Babcock, the Miecznik frigate programme is an important point of industrial cooperation, and the experience gained in one project can be used in constructing other ships. Furthermore, the modular construction of the ship and the automation of production contribute to creating sustainable jobs, while the cooperation will also bring social benefits.

- This is a real industry-to-industry, government-to-government relationship. Our prime ministers have stressed that the U.K. wants to be a strong partner for Poland; the Miecznik programme is one of the focal points of this cooperation –David Lockwood said during a visit of Polish Consortium members at the shipyard in Rosyth, Scotland, in June 2022.

Babcock will share its knowledge and experience to help create Poland's future shipyards. This will be possible thanks to the company's track record in building warships, investing in the modernization of shipbuilding facilities and introducing advanced production methods. An example is the Rosyth shipyard, upgraded to build Type 31 Inspiration Class frigates for the UK Royal Navy, on which the Arrowhead 140 frigate project is based.

PGZ Stocznia Wojenna and Remontowa Shipbuilding S.A., where the frigates will be built, are solid foundations on which Babcock and the PGZ-Miecznik Consortium will construct a modern infrastructure adapted to current requirements and those of the future.

Miecznik Program is not only a shipbuilding project – but is also a strategic partnership between Poland and Great Britain in the defence sector and an opportunity for industrial cooperation and modernization of the shipbuilding industry in Poland through an extensive transfer of knowledge and technology. Furthermore, it aims to guarantee the security and defence of Poland and the entire Baltic region and provide strategic defence capabilities for the Polish Navy integrated with the country's central air defence system.

According to the schedule, by March next year, a Preliminary Design will be developed with the Integrated Combat System, and updates to the technical and economic analyses will be carried out, including management plans, programme schedules and cost estimates, as well as work on the 3D model. In addition, this phase will complete, among other things, the procurement of equipment such as the main propulsion for the construction of all three craft.

Once the design phase is completed, Babcock will support the Miecznik frigate construction in Poland through a design licensing agreement, transferring knowledge and technologies to optimize Poland's shipbuilding and industrial capabilities.

The construction will start in 2023, and the first unit is to be ready by June 2028, while the deliveries of subsequent units have been scheduled until 2034.

AH140, Arrowhead 140 project to be carried out for the Polish Navy



Image: PGZ MIECZNIK Consortium

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