MacGregor News

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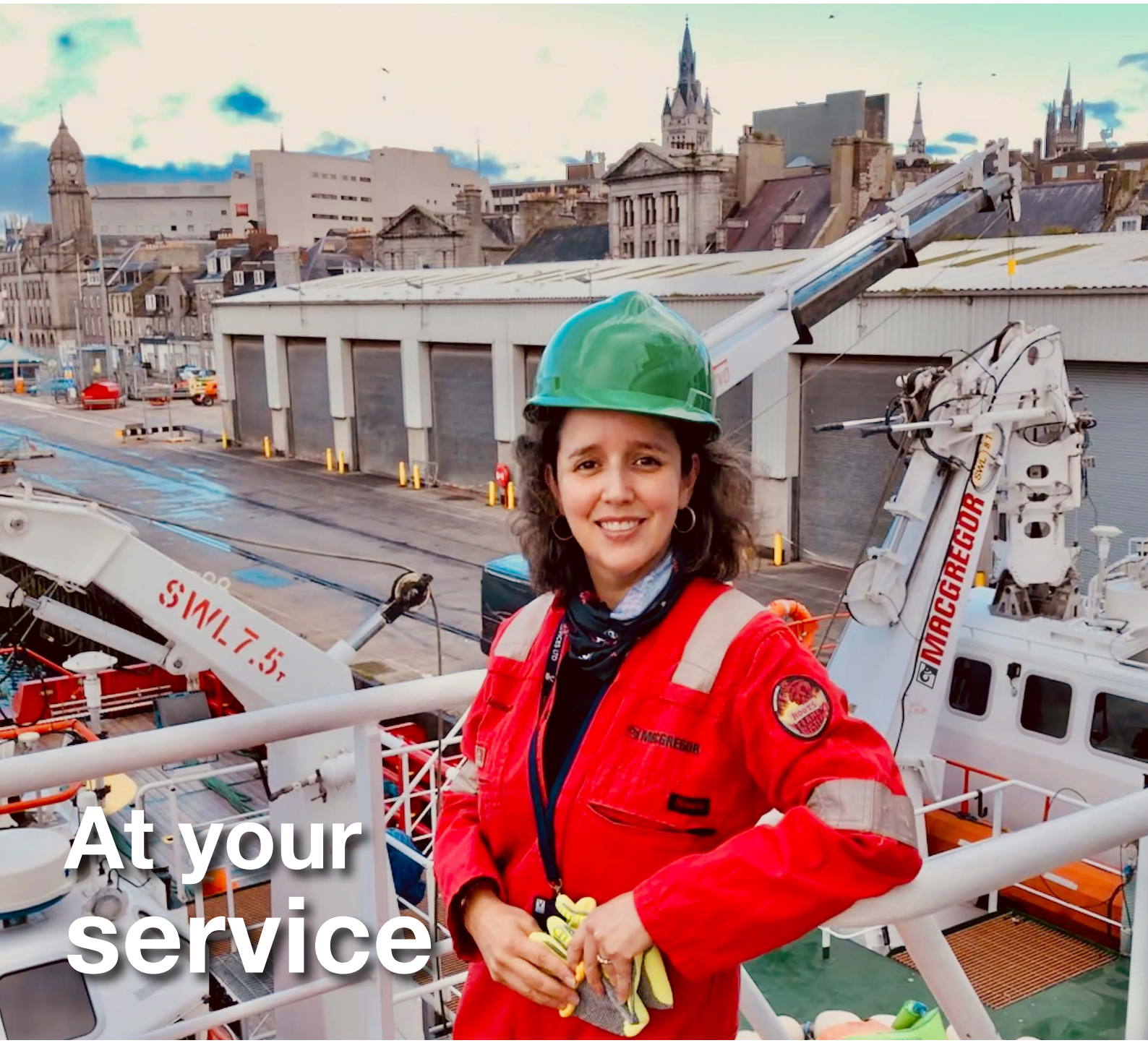
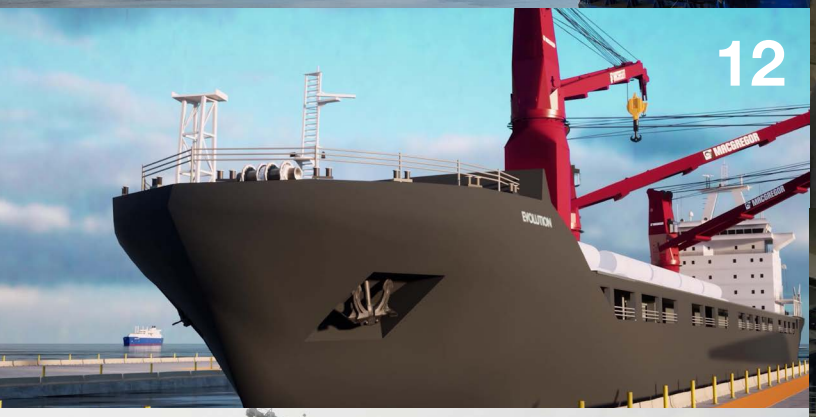
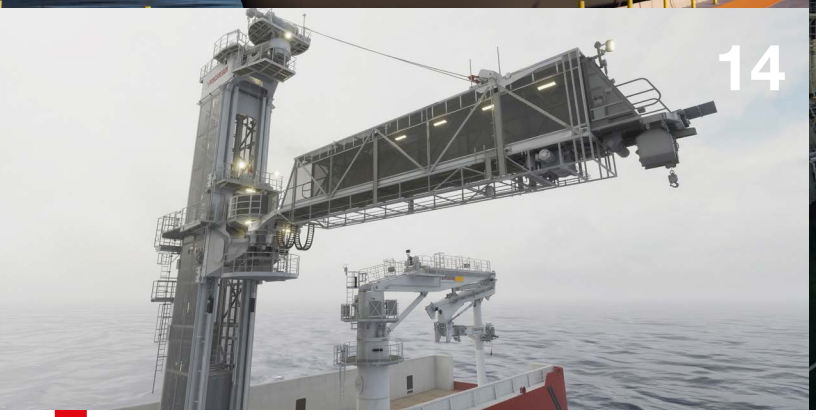


At your service





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In this issue

Welcome

A warm welcome to the latest edition of MacGregor News, which touches on topical themes such as sustainability, electrification, and digitalisation.

2022 has been another exciting year in maritime business. While the overall merchant ship new build investments are expected to decline somewhat from 2021, there has been an upward cycle in several vessel types and our orders have increased. In this issue, we take a look at one of the booming segments, Pure Car & Truck Carriers. In offshore business, the focus of new orders remains in vessels supporting wind energy. On the next spread, you can read about our first customer contract on equipment for a wind turbine installation vessel.

Reducing emissions in the maritime industry continues to be at the forefront of our strategy. We believe that development of sustainable solutions helps our customers to reduce emissions whilst also increasing their profits. One important contributor to this is the demand for energy saving solutions, which we can support with our products using electric drives. These cover a wide range of our portfolio, including our family of electric cranes, which recently got two new members, the fully electric heavy-duty and heavy-lift cranes. You can read more in the electrification article in this magazine.

Digitalisation continues to offer new opportunities for our industry, and we have developed our advanced solutions in close collaboration with our customers. In this issue, we discuss the OnWatch Scout predictive maintenance solution and digital twin simulation services. We also take different angles on our service business – depicting our global network with strong local implementation capabilities.

In November 2022, Cargotec's Board of Directors concluded that MacGregor will not be part of Cargotec's portfolio in the future but an active sales process will not be started, as the timing is not ideal. MacGregor's history goes far beyond the Cargotec ownership, and I have full confidence that MacGregor will have prosperous chapters ahead. Whatever the future holds for MacGregor, we will continue to be dedicated to serving our customers. We will keep our commitments and continue innovating sustainable solutions, and improving equipment and system performance for the benefit of our customers and the maritime industry in 2023 and beyond.

Yours sincerely,

Leif Byström
President, MacGregor

Latest News

Deck handling solutions for one of the world's largest wind turbine installation vessels

MacGregor will supply two auxiliary offshore telescopic cranes for Van Oord's new generation wind turbine installation vessel, which will mainly operate to support European wind farms. The vessel is being built by Yantai CIMC Raffles Offshore Ltd.

This 175-meter offshore installation vessel will be purpose-built for the transport and installation of foundations and turbines at offshore wind farms. The main crane lifting capacity will be more than 3,000 tonnes.

The vessel will have an advanced jacking system. Four giant legs, each measuring 126 meters in length, will allow the vessel to be jacked up and work in waters up to 70 meters deep.

MacGregor's scope of supply encompasses two auxiliary offshore telescopic cranes, which are used to support the cargo and load handling during the installation of wind turbines in the offshore environment, and are equipped with an anti-collision system. The systems and equipment have a long track record of reliability. These products are proven extensively in stringent offshore environments.

Image: Van Oord

All-electric RoRo equipment to four PCTC vessels

MacGregor supplies RoRo equipment for four RoRo vessels to be built by Guangzhou Shipyard International Co., Ltd for H-Line Shipping, Korea.

The vessels are scheduled to be delivered to the owner starting in the second quarter of 2024 and the deliveries are expected to be completed in the second quarter of 2025.

The order consists of all-electrically operated RoRo equipment: quarter ramps, side ramps, internal movable ramps, and rampway doors to each of the four vessels.

The order also consists of the patented Load Monitoring System, which can boost the load capacity of the ramp and thus provide more flexibility for heavier project cargo. MacGregor's scope of supply also encompasses design and key components including installation assistance.

Significant heavy-lift cranes orders

MacGregor has received two significant orders for heavy lift cranes. These orders include the supply of 56 heavy lift cranes for fourteen 62,000 dwt multipurpose vessels built at two shipyards in Asia. The vessels are scheduled to be delivered to the owners starting in the second quarter of 2023 and will be delivered until January 2026.

The order includes cranes with a size of 80t and 150t. All cranes are connected to the latest worldwide service support and equipped with an active safety system for the highest possible secure operation.

MacGregor was selected as the supplier of these cranes thanks to its well-known design capabilities and customers' trust in MacGregor's delivery capability based on its earlier successes with similar solutions.

Delivering a FibreTrac fibre-rope offshore crane

MacGregor will deliver an active heave compensated FibreTrac offshore crane to Otto Candies, LLC. Scope of supply encompasses full delivery of the 150t AHC crane, rated for the customer's needs at 100t lifting capacity, together with Lankhorst Lanko®Deep Dyneema DM20 fibre rope for 3400m operational depth. The crane is the first of its type and provides the ability to lift heavy loads at depths that normally require much larger cranes on larger vessels.

This highly innovative crane uses neutrally buoyant fibre rope with an Applied Fiber termination connecting directly to the hook allowing full payload at all depths.

The subsea AHC fibre-rope crane will have the world's first DNV-DRS class notation based on the DNV-ST-E407 standard. This new standard governs how such a crane and its rope system can remain continually certified based on real-time measurements of rope health and represents a significant departure from earlier certifications based on prescriptive rules and periodic inspections.

Owners and operators can now have an up-to-date health status of every portion of the lift-line and use it confidently and to its fullest potential, instead of guessing based on work hours since the last inspection and cutting back or replacing it.

Comprehensive RoRo equipment to three hybrid powered RoPax ferries

MacGregor will supply comprehensive packages of RoRo equipment for three pro-ecological, low-emission vessels powered by four LNG engines of dual-fuel type with battery assistance (hybrid).

These RoPax ferries will be built at Remontowa Shiprepair Yard S.A, the largest shipyard of Poland's shipbuilding group Remontowa Holding, for the Polish ferry company Polskie Promy, part of Polska Żegluga Morska (PŻM). Equipment for the first vessel will be delivered during the second half of 2023, with subsequent deliveries in 2024 and 2025.

MacGregor's 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 reduce the turn-around time in port.

Image: Remontowa Marine Design & Consulting

Container lashing systems for Hapag-Lloyd's 23,500+ TEU series container vessels

MacGregor will deliver container lashing systems for twelve 23,500+ TEU container vessels for Hapag-Lloyd. The vessels will be built at Daewoo Shipbuilding & Marine Engineering (DSME) in South Korea. The vessels are scheduled to be delivered to the owner between the second quarter of 2023 and the fourth quarter of 2024.

"Cargo system play a very important role in the efficient operation of the container ship. Hapag-Lloyd and MacGregor have worked together closely and developed the optimum cargo system for this vessel series to ensure the best cargo efficiency. Placing this order with MacGregor was the first choice for us," says Lutz-Michael Dyck, Senior Director, Strategic Asset Projects, Hapag-Lloyd.

Image: Hapag-Lloyd

Five-year service agreement with Color Line

Color Line has signed a five-year extension service agreement with MacGregor that includes all vessels in its fleet together with their Norwegian and Danish terminals.

In the scope of supply there are two annual inspections (the pre-dock and pre-season) of the RoRo equipment and steering gear on seven vessels and five linkspans for a period of five years. In addition, maintenance activities are specified for each vessel.

Through annual inspections, Color Line will get full knowledge of the technical status, an ability to plan for detailed maintenance over the next five years and a good overview of the maintenance cost of the equipment on board the entire fleet and the linkspans.

Two-year OnWatch Scout agreement signed

Maritime Construction Service has signed a two-year OnWatch Scout, spare parts and services agreement for the Offshore Support Vessel, MPV *Everest*, which is equipped with MacGregor AHC cranes.

The scope of supply encompasses DryDock Spares, services and the installation of OnWatch Scout, MacGregor's unique solution for analytics and preventative maintenance. It connects installed equipment to advanced monitoring systems that continuously analyse component conditions and predict maintenance needs.

The solution detects patterns and behaviour from equipment data to identify risk of failure followed by recommended actions, spare parts and documents to address the issues.

By increasing the flow of information from ship to shore and applying artificial intelligence and technical expertise to detect patterns that indicate a risk of failure, OnWatch Scout enables equipment availability to be maximised and maintenance activities to be more efficiently and cost-effectively planned.

KEY FACTS AND FIGURES

1,900+
experts around the world

Located in **31** countries

20,000
oceangoing merchant ships with MacGregor equipment

50%
equipment installed on every second ship at sea

90+
years of experience

5,000
mobile offshore vessels and structures with MacGregor equipment

Support ranging from initial design to shipbuilding and throughout the vessel life-cycle

42,000+
spare part deliveries per year

Supporting the growth of offshore wind energy by enabling installation time and costs to be reduced

24/7
global support

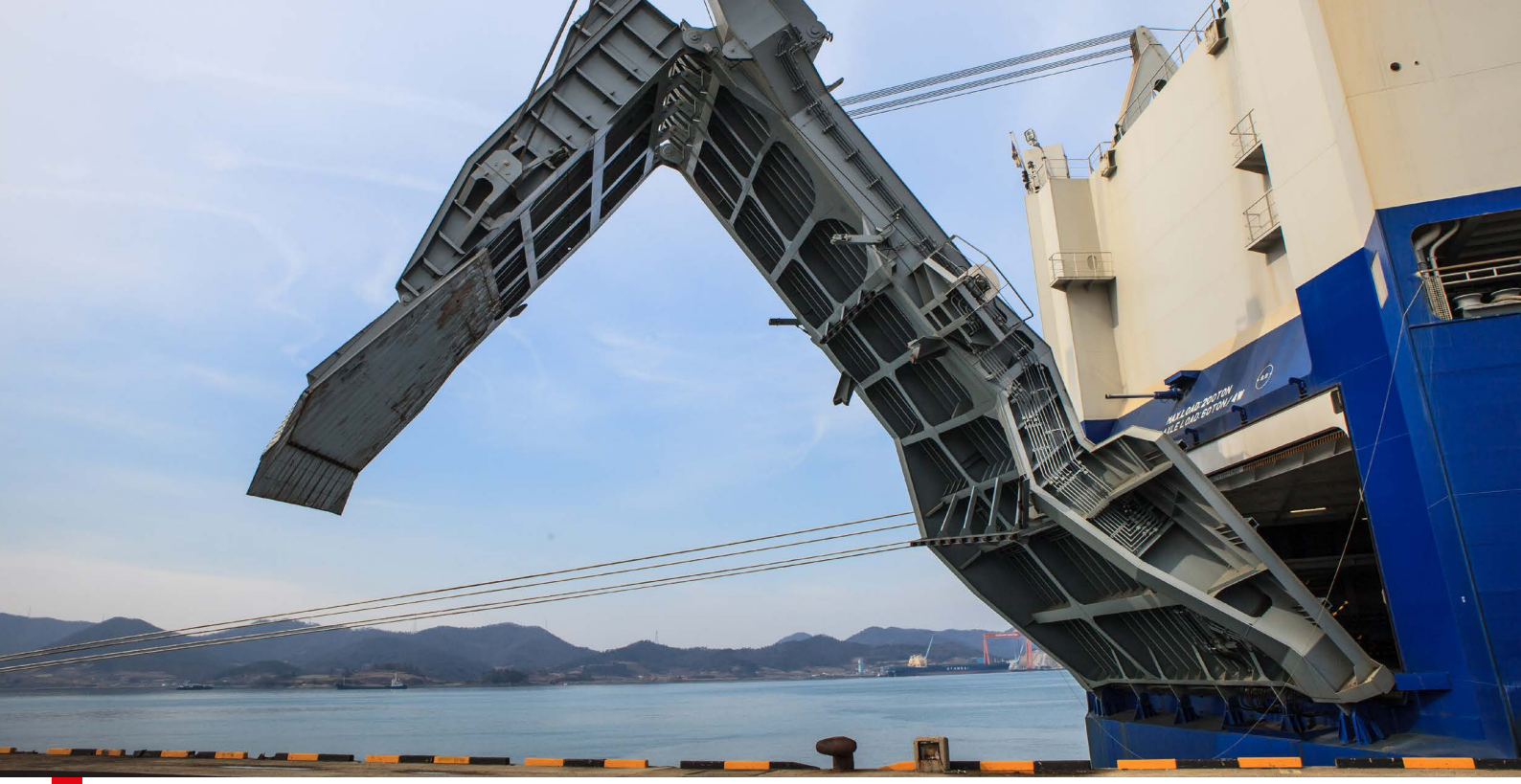
~900
service experts in **60** service centres

MacGregor Webinar: Customer Experience with OnWatch Scout

In 2022, MacGregor hosted an interesting OnWatch webinar that tunes in to the customer's voice. In the webinar, Glenn McPhee, Technology General Manager, MMA Offshore shares experiences on the use of this advanced solution and their ambitions going forward.

MMA Offshore is a global provider of high-specification vessels and a comprehensive suite of marine and subsea services to the offshore energy sector, government and defence and wider maritime industries.

MacGregor Webinars



Sustained demand for sustainable PCTC equipment

Efforts by car producers to sort out supply chain challenges, and rising demand for electric vehicles, are driving exceptional orders for Pure Car and Truck Carriers (PCTCs). Owners expect every last drop of efficiency from their sustainable cargo access solutions.

With a VesselsValue blog post logging earnings for the specialised ship type at $150,000 a day in August 2022 – 174% more than in January – the finished car logistics sector is "short of PCTC supply following years of underinvestment". Demand for ship space has been going "into overdrive", the analyst says. In September, shipping news source Lloyd's List reported the current PCTC orderbook as standing at an extraordinary 87 units.

Understandably, Björn Rosén, VP, Cargo Access Solutions, Merchant Solutions Division, MacGregor, describes market conditions as “highly positive”. A core market for MacGregor for over 40 years, around two thirds of existing PCTCs feature MacGregor cargo access equipment.

“With demand going through a major upswing, MacGregor is tasked with upholding its reputation as a partner which ensures shipbuilders meet delivery commitments and provides owners with safe, reliable and high performance cargo access equipment backed by global service,” says Rosén. “At the same time, however, this is a market which is prioritising sustainability in the ships it builds.”

Maritime regulators are now pressing hard for ships to cut 40% off their CO2 emissions by 2030, with every existing ship’s efficiency and carbon intensity to be measured from 2023 – under the Energy Efficiency Existing Ship Index (EEXI) and Carbon Intensity Indicator (CII) schemes.

Cars drive sustainability

If these provisions frame expectations for shipping as a whole, those serving the specialised car and truck transport sector must go further. Alongside pledges to switch to all-electric cars by a number of automakers, Ford Motor Company and Volvo Group are prominent members of the First Movers Coalition, for example. The World Economic Forum grouping “aims to use purchasing power to create early markets for innovative clean technologies” across hard to abate sectors.

“One reason for MacGregor’s continuing strength as a supplier of ramps, liftable decks and other RoRo access solutions for the PCTC segment has been its market-leading focus on electrically-driven equipment,” Rosén says. “As well as excluding the risk of hydraulic oil spillages, electric drives have proven their ability to save energy. Electrically-driven equipment has been in high demand in recent PCTC orders.”

Another strength is the company’s early involvement in the ship design, which has proved a distinct advantage in ensuring that MacGregor’s proven solutions and new innovations optimise new projects, he says.

“We have long and extensive technical experience from the design phase to delivery and throughout the vessel’s lifecycle. MacGregor doesn’t come with a fixed arrangement for its PCTC customers. We’re invited in the early stages as the cargo access partner, to offer guidance on minimising the risks of cargo damage, cargo hold arrangements, cargo flow simulations, ramp configurations and weight optimization. All of these are vital for ship efficiency.”

The role also provides early opportunities to propose innovations, such as the new MacGregor position indicator which shows whether the quarter ramp can land at a busy quay before the ship moors, says Rosén. Following its early commitment to electric lifting equipment, the company can also offer unrivalled and data-powered recommendations based on performance, power consumption and cost optimisation.

In 2022, one early engagement saw MacGregor secure orders covering eight new ‘zero-carbon ready’ Höegh Autoliners’ PCTCs, due delivery from China Merchant Heavy Industry in 2024-2025. Designed by Deltamarin, these 9,100-car capacity ships are trailed as “the world’s largest and most sustainable car carriers,” and will run on MGO/LNG while also attracting ammonia- and methanol-ready notation. MacGregor is providing design, supply and installation support for a large stern quarter ramp and door, side ramp and door, and liftable car decks.

“The vessels’ strengthened deck and internal ramps will enable carriage of electric vehicles throughout, while the tailor-made load monitoring system will allow ramp supports to adjust as load stresses change. This is a further example of innovation that advances sustainability and efficiency - the result will be lower weight, reduced fuel bills and emission savings,” says Rosén.

Electric solutions improve profitability and sustainability

MacGregor's commitment to providing cargo and load handling solutions that are increasingly environmentally sustainable extends across its product, service and support portfolio.

MacGregor's vision is to be the leader in maritime cargo and load handling by supporting customers through a comprehensive and environmentally sustainable portfolio of products, services and solutions.

Sustainability related work is focused in three primary areas:

- Customer emissions reduction achieved through improved asset utilisation and operational efficiencies
- Energy efficiency improvements in equipment during the use phase
- Sourcing and manufacturing emissions reduction

The company is committed to the provision of solutions that are increasingly environmentally sustainable through the electrification of our portfolio, responsive global services and the development of innovative digital services that support our customers' business activities and growth objectives.

Benefits of electrically-driven cranes

MacGregor has delivered more than 500 electric cranes since 2007, with electric motor and drive system technology evolving significantly during this time. These developments have enabled the winch design, motor efficiency and cooling system to be further improved.

As a result, the next generation electric crane is 15% more efficient than the first generation and up to 50% more efficient compared to the traditional closed-loop hydraulic design.

Variable Frequency Drive benefits for shipbuilders, owners and operators remain the same:

- Potential savings in capital expenditure through reduced generator size, smaller electric cables and no oil filling
- Superior cargo handling efficiency due to higher speeds and precision control, reducing time in port
- Increased operator & crew comfort though significantly reduced noise levels
- Lower maintenance costs without the need to change oil, oil filters, and hoses
- A sustainable choice that removes the risk of oil leakage

▸ VIDEO:
https://youtu.be/HpJZNlcNfxE

New electric transloading crane completes series

The new electric transloading crane is a result of combining decades of extensive customer experience. Launching this crane finally closes the gap in MacGregor's electric crane portfolio and enables offering the most efficient cranes up to SWL 50t in this demanding segment.

Transloading cranes are used for heavy duty work in areas with draft restrictions or limited infrastructure. Consequently, the cranes typically run 24/7 to ensure the most efficient handling of bulk material.

By electrifying the drive system, the new crane brings efficiency to the next level. It consumes some 60% less energy compared to a hydraulic drive system.

Electric drives are available for all merchant cranes in the MacGregor portfolio, including port, bulker, container, multi-purpose, and heavy lift cranes.

In addition, all-electric cranes can be connected to the MacGregor OnWatch Scout service.

Comprehensive global support

OnWatch Scout is a MacGregor service which connects installed equipment to advanced monitoring systems that continuously analyse component condition and predict maintenance needs. The system detects patterns in equipment behaviour which, through a combination of extensive experience, technical expertise and the application of artificial intelligence, can identify changes that indicate risk of failure.

The service is one component of the comprehensive global support that MacGregor provides through more than 800 specialists based in 60 service centres in 31 countries.

Locally-based support is integrated with remote technical advice and condition-based monitoring to maximise equipment availability and minimise unplanned downtime.

"The core of our business is to develop, deliver and support innovative solutions such as the range of fully electric cranes and OnWatch Scout. These contribute to the efficiency and profitability of our customers' business and enable progress towards more sustainable shipping," says Magnus Sjöberg, Senior Vice President, Merchant Solutions Division, MacGregor.

Make friends with your digital twin

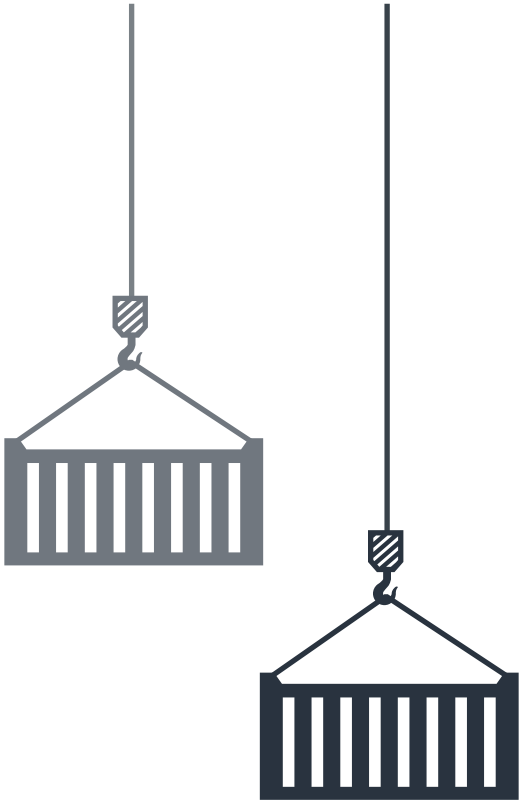
With equipment installed on the equivalent of every other ship at sea, MacGregor's marine and offshore ambitions to exploit digital twin technology at scale are as achievable as they are understandable.

Like many of the digital terms entering the marine and offshore lexicon, gains associated with the 'digital twin' have quickly become slippery due to multiple interpretations. But a technology with deep consequences for design, operations and maintenance cannot be allowed to slide into the shallows of the maritime buzzword, say Dennis Mol, Vice President, Technology & Sustainability, and Bhavik Thakker, Director, Digital Solutions, MacGregor.

This is one reason MacGregor recently formalised the Digital Twin part of its digital services offering. Another is that the group has already proved a front-runner in securing safety, productivity and sustainability gains by developing real-time digital processes to support the marine cargo and offshore load handling equipment it delivers.

“Rather than talking up potentials, we have evolved a set of cases to demonstrate the purpose of using a digital twin in different scenarios, and the benefits of calculating, simulating and analysing what is feasible for equipment based on data from the operating environment,” says Thakker.

MacGregor’s conclusion is that digital twin technology has value for marine and offshore customers at every stage of its product and service offering: from the product concept stage, to design and engineering verification, testing and sea trials, training, operations and maintenance.



Alternative realities

“Data that is ‘engineering-level’ accurate allows a digital twin to simulate the real time dynamics of an actual vessel in its environment,” explains Mol. “This creates analytical power that goes beyond theoretical modelling. A designer can evaluate the impact of an integrated equipment configuration at the pre-development stage, for example, and work to refine control systems in advance to benefit the whole.”

Allowing the user to try-out a new design is empowering for the customer and invaluable for the engineer – both as a way of exploring and predicting behaviour, and as a tool to get things right the first time and avoid cost overruns. For MacGregor, the benefits of using the digital twin are available from a product’s conception to the end of its operational life, Mol stresses.

“Working with accurate specifications and real data, we can use the digital twin for FEED studies and rapid prototyping in the idea development phase, and present the customer with interactive ‘almost-real’ experiences,” adds Thakker. “Later in the process, the technique allows us to optimise the general arrangement, choose the right equipment combinations, develop realistic structural analysis, verify the design, and simulate and analyse work processes.”

Behind every good twin – a better twin

“MacGregor has already used a digital twin in key product developments,” says Mol. “Its in-house developed ‘C-how’ simulation technology has been deployed to de-risk the engineering phase, verify the design in different on-deck scenarios and optimise operability.”

In one case, a shipyard used a digital twin to simulate control responsiveness of a MacGregor davit system during boat launch and recovery, in order to verify the maximum wave height limit. In another example, using the technique in the product test phase enabled dynamic vessel motion modelling so that an owner could verify that a gangway designed for the bow of a vessel would operate safely at greater wave heights.

For operational purposes, one MacGregor customer made use of a digital twin to maximise the weather window within which subsea equipment could operate, while another developed new subsea crane operating guidelines after an incident involving a mis-timed change in mode.

Data-driven lessons

Thakker explains that, once the equipment is built, a digital twin also proves invaluable for verifying safety, optimising control procedures and automation sequences, and for detecting failure root causes.

“The data analytics capabilities can be used for predictive maintenance planning and to anticipate failure and repair needs for critical equipment well in advance,” he says.

But the usefulness of the digital twin for worldwide maritime industries is not limited to machinery. “The experience of using the digital twin also takes training using simulation to a new level,” adds Thakker.

“In fact, the best point of delivery for the data-driven lessons that enhance equipment efficiency is to the people using it. Training needs to be delivered in the most effective

way, and e-learning, scenario-based simulations, analytics and immersive augmented reality-based methods create a powerful mix to get the message across on standards to office-based and shipboard personnel alike."

A digital twin-level of simulation accuracy makes high-fidelity training more affordable, based on MacGregor's heritage and continuing role as a global supplier of handling equipment.

In a fast-changing scenario, MacGregor is already trialling the use of the digital twin technique for an augmented reality-based pilot covering air compressor maintenance sequencing, says Thakker, but his preference is to focus on gains already won.

"Getting that real-time feel and having the ability to simulate how equipment actually responds in an emergency situation results in a much steeper learning curve for the user," he says. "If an incident has occurred in the past, we can just play it back using a rich visual format, see how the guys respond and then train them on what they could have done better or patterns to look out for."

MacGregor is on the verge of delivering a new portable simulation-based offshore active heave compensation crane training package, which uses digital twin capability to an offshore support vessel operator, he discloses, based on a rental and software licensing agreement.

"Our experiences with digital twin technology have allowed us to mature and formalise our approach across the entire scope of our activities - from design and engineering to testing, verification, training, operational support and maintenance," adds Thakker. "And the more we learn, the clearer the benefits for our customers become."

> *"Rather than talking up potentials, we have evolved a set of cases to demonstrate the purpose of using a digital twin in different scenarios"*

Images from a simulation utilising the digital twin technology

Introducing the new captain of MacGregor's service business

As of September 2022, MacGregor's Global Services Division has a new captain at the helm, Seppo Heino. We sat down with him for a conversation about his new role and how he sees the services business.

Seppo Heino notes that MacGregor's success depends solely on customers and understanding their needs. This means always keeping customers in mind and working together with them in everything we do, he says.

He emphasises the importance of an open dialogue with the customers, also during tough times: "We as a company need to listen to our customers' views and really understand their challenges and needs. Our task is to maximise the efficiency of our customers' operations and minimise unplanned downtime".

Seppo Heino, a naval architect by education, has experienced a home-coming - working in the maritime industry for the first time in his long career.

Continuous improvement is a must

Heino has worked in industrial companies since 1989. Prior to joining MacGregor, he worked the last ten years for Kalmar, a provider of cargo handling solutions and services to ports, terminals, distribution centres and heavy industry. His roles included heading sales, spare parts, logistics and a newbuilding division.

While a veteran in business leadership, Heino is a newcomer in the maritime industry, and it has been exciting for him to enter a completely new field. He has met many new people, made observations, asked questions and had a steep learning curve.

Maritime business never sleeps and every day comes with new situations to adjust to. “We need to continuously fine-tune our way of working. A very important priority for us is to streamline our spare parts related processes, find the right tools to increase efficiency to be able to respond even faster to our customers’ needs and requests,” Heino describes.

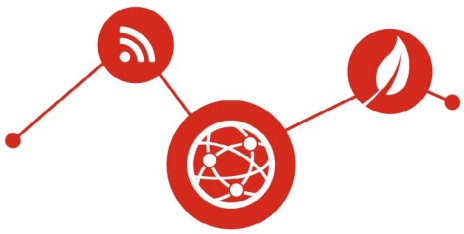
Digital and sustainable are the words for the future

Heino has a positive view of the future. MacGregor is an industry leader with resources and capabilities to develop and invest, especially when it comes to new areas such as automation and digitalisation.

“Digital offerings have already proven their value. For instance, OnWatch Scout can provide real time information and recommendations for mission critical equipment, helping shipowners and operators to make more precise predictions on maintenance and spare part needs, and help reduce downtime,” he says.

“MacGregor’s global service network extends to over 30 locations globally, with responsive local teams and 24/7 remote support. This combined with our digital capabilities and analytics give unparalleled possibilities to support our customers’ operations.”

Concern for climate and need to reduce emissions are quickly growing in importance in the maritime industry. This is key in MacGregor’s strategy. “When we succeed in serving the customer with sustainability in mind, we will not only become a better company but will also help our customers and the maritime industry improve,” says Heino.



Safety first!

Safety is key for all players in the maritime business, and Heino underlines the importance of safe working environments.

“MacGregor has a long tradition of high safety standards and has safety performance to be proud of. However, this is an area we can never stop working on – for the safety of our colleagues, customers and partners.”

In addition to physical safety, he lifts up the importance of building an open atmosphere where all can be their natural selves, dare to speak up, can enjoy working and feel inspired.

Service exceeds expectations for China's drilling rig HYSY 981

As part of the long-term service commitment between Original Equipment Manufacturer (OEM) MacGregor and its customers, effective professional maintenance ensures optimal reliability, timely response, cost savings and effective risk management.

The Hai Yang Shi You 981 (HYSY 981) repair and maintenance project showcased how MacGregor and its Shanghai-based service team successfully supported the customer despite unforeseen challenges.

HYSY 981 is the first sixth-generation deep-water semi-submersible drilling platform designed and built independently in China, with a length of 114 meters and a width of 89 meters. It weighs 30,670 tonnes and has a load capacity of 125,000 tonnes. MacGregor's scope of supply includes a pipe and riser handling crane and a position-mooring winch.

This platform is the world's first rig designed for the harsh conditions in the South China Sea, where it completed its first drilling in May 2012. After 10 years of operation, HYSY 981 went back to a shipyard in Shenzhen for its first dry-docking.

The customer had reported that the slewing bearing of the MacGregor pipe and riser handling crane had excessive wear on the tooth surface, which caused noise during operations. The slew bearing had to be replaced to prevent accidents.

Challenges and solutions

The structure of the pipe and riser handling crane is complex, and there was a limited set of spare parts on board. Therefore, the MacGregor Shanghai service team studied the crane drawings in detail, combining findings with the feedback received on a customer visit, and then proposed a detailed service plan to the customer.

Project execution started right after the Chinese New Year 2022, and the unexpected serious Covid rebound in Shanghai significantly impacted the supply chain. The first challenge the MacGregor service team faced was that the specific dismantling and installation tool required could not be delivered as planned. The team reached out to a domestic supplier, and together they found a solution to convert existing tools for the job so that the on-site work could continue.

Service teams often encounter unexpected mechanical problems that need to be resolved very quickly - this relies very much on engineers' personal technical and resilience skills. One example in this case was that the hinges of the crane boom were stuck due to corrosion. Given the travel restrictions and the need to keep up with the schedule, the MacGregor service engineers and the construction team chose to make the support frame needed for dismantling and repairing the structure on site. This meant a lot of extra work, but the delivery time would not have been guaranteed if the tools had been obtained from a third party.

Success thanks to close cooperation

Despite the unexpected mechanical problems, supply chain challenges and an engineer shortage caused by the Covid rebound, the MacGregor Shanghai service team worked closely with the customer and the local construction team, proactively seeking alternative solutions to minimise the negative impacts of external factors and to keep up with the plan. They completed the project with an outstanding performance, which was recognised by the customer with a feedback comment "Exceeds Expectations" in terms of quality of work, behaviour and attitude.

Key takeaways

In this case, OEM knowledge and experience, local specialists and site-based technical expertise played a key role in solving unforeseen challenges and resulted in high quality service and on-time delivery.

For complex repair and maintenance of large and mission critical equipment, it is highly recommended to involve the OEM at an early stage. This helps to provide a detailed service proposal with the sufficient and correct spare parts. This makes it possible to avoid economic losses caused by spare parts shortage and inability to execute maintenance work as planned due to unexpected challenges.

In order to strengthen service capabilities in Asia, MacGregor has accelerated the internal knowledge transfer from Europe to Asian markets since the Covid-19 outbreak. Local expertise with 24/7 global support ensures the service quality and delivery, which are the cornerstones that support MacGregor's customers' effective and efficient operations.

Specialist solutions for research vessels

MacGregor continues to rise to the challenges posed by evolving requirements for research vessels to undertake increasingly complex tasks within the confines of severely limited space on board. With research vessels often pre-booked for up to three years, it is essential that mission-critical systems operate reliably with maximum availability.

MacGregor has supplied deck machinery to thousands of vessels globally, earning a market-leading position thanks to its extensive knowledge, considerable experience and world-class capabilities. Its solutions cover deck machinery and deck handling equipment for the full range of oceanographic, polar and fishery research vessels. Systems include self-contained CTD winches as well as solutions for ROV deployment, coring and deep-sea towing.

Notable recent examples of innovation and collaborative development include the RSV *Nuyina*, an icebreaking research survey vessel designed and built to support and supply Australian bases in Antarctica. *Nuyina* was built by Damen Shipyards in Galati, Romania for the Australian Antarctic Division of the Australian Government and trialled at Damen Schelde Naval Shipbuilding in Vlissingen, the Netherlands. The vessel was designed by Danish ship designer KNUD E. HANSEN and classified by Lloyd's Register.

Delivered in 2021, *Nuyina* can deploy a wide range of vehicles, including helicopters, landing barges and amphibious trucks, to support supply operations. Pivotal in sustaining operations is a comprehensive range of solutions from MacGregor for the handling of scientific equipment including a winch package, cranes and deck handling machinery, hatch covers, hydraulic power units, davits and steering gear.

MACGREGOR
Designed to perform with the sea

Wherever needed, you can rely on our support

MacGregor's mission is to help customers avoid unplanned downtime whenever and wherever they are operating, either directly onboard or via remote support. Where this is not possible, our goal is to ensure that equipment is quickly back up and running.

MacGregor Global Services operates through a regional structure which places support activities as close as possible to our customers, speeding up response and resolution times.

Our three regions are:

- Americas & North Sea
- Europe
- Middle East & Asia

Combined with modern, interactive warehousing and logistics support for our spare parts, provided by our partner, DSV, MacGregor is able to provide fully customer centric services around the world.

MacGregor's global presence

MACGREGOR
Designed to perform with the sea

MacGregor is a leader in sustainable maritime cargo and load handling with a strong portfolio of products, services and solutions, all designed to perform with the sea.

Shipbuilders, shipowners and operators are able to optimise the lifetime profitability, safety, reliability and environmental sustainability of their operations by working in close cooperation with MacGregor.

MacGregor is part of Cargotec (Nasdaq Helsinki: CGCBV).

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