MacGregor News

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MACGREGOR

Sustainable Future

MACGREGOR

In this issue

Welcome

A warm welcome to the latest edition of MacGregor News which I trust our customers, business partners and colleagues will find interesting and informative.

I am very proud to be writing this introduction as the new President of MacGregor, having gained my passion for the maritime industry and this company more than 35 years ago.

As part of Cargotec and a leader in cargo and load handling, MacGregor is committed to the development of sustainable solutions that help our customers to reduce emissions whilst also increasing their profits. In this respect, we have made further progress during 2021 and achieved some notable successes that demonstrate this undertaking.

Within the merchant shipping environment, our Cargo Boost upgrade service continues to prove its capability to increase containership carrying capacity whilst reducing emissions per unit of cargo transported, and we have secured important orders in both the passenger and cargo transport sectors for electrically-operated equipment.

With the demand for more sustainable sources of energy increasing significantly, we are supporting growth of the offshore wind energy market through motion compensated crane and gangway solutions, combined with the application of digital twins that optimise system design and enhance operational performance through simulator-based training.

Continuing with digitally-enabled services, our ability to integrate comprehensive locally-based support with remote technical advice and condition-based monitoring is enabling shipowners and operators to maximise critical equipment availability and minimise unplanned downtime.

With a number of these topics covered in more detail in this edition of MacGregor News, I look forward positively to 2022 and further opportunities to support the growth of our customers' businesses in parallel with our own.

Leif Byström
President, MacGregor

Latest News

Further two Offshore Wind Service Vessels for Edda Wind

Following the receipt of equipment orders for four offshore wind service vessels in May 2020, MacGregor received an order to supply another two Commissioning Service Operation Vessels (CSOV) that will further expand the Østensjø Rederi Edda Wind fleet.

The vessels will be built at the Astilleros Gondán shipyard in Asturias, Spain and are sisters of the two CSOVs currently under construction. Each identical equipment package consists of one electrical gangway system, one 3D compensated Colibri crane and a remote control station located on the vessel bridge.

Both will be delivered with technology installed that reduces greenhouse gas emissions by a minimum of 30%, and will also be prepared for the future installation of zero emission hydrogen technology.

They will operate as mother vessels for wind turbine technicians as they perform commissioning and maintenance work on the offshore turbines, and will have the capacity to accommodate up to 120 personnel in high standard cabins and common areas.

Two Offshore Wind Service Vessels for Awind

MacGregor received orders from Awind AS, a subsidiary of Integrated Wind Solutions, to supply equipment packages for two new “walk-to-work” Commissioning Service Operation Vessels (CSOV).

The vessels will be built at the China Merchants Heavy Industry (CMHI) shipyard in Nantong, with each equipment package consisting of a 3D motion compensated electrical gangway system, Colibri crane and a remote control station located on the vessel bridge.

Both will be prepared for continuous zero-emission operations, and will operate as mother vessels for turbine technicians as they perform safe and efficient work during the offshore wind farm installation, commissioning, operations and maintenance phases.

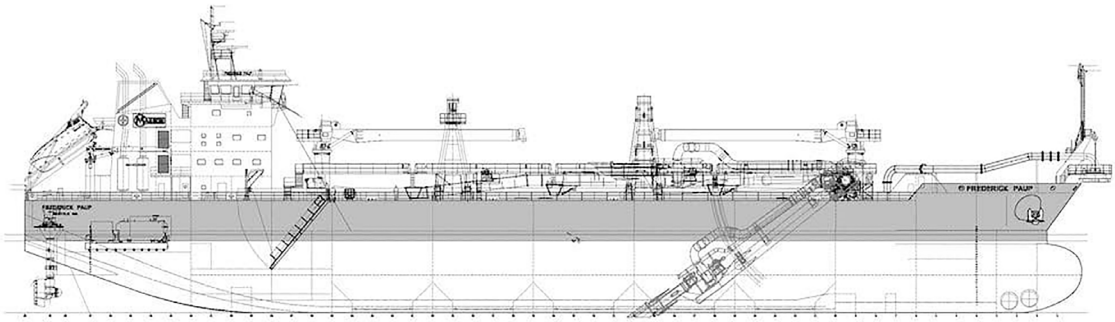
Delivery to the largest USA built self-propelled hopper dredge

MacGregor will deliver two 120 ft double telescopic service cranes and one 50 ft telescopic stores crane to the self-propelled hopper dredge, *Frederick Paup*.

The vessel, which is being built for Manson Construction Co., will be the largest ever self-propelled trailing suction hopper dredge built in the USA and operate all over the country.

The larger service cranes are double telescopic cranes that are 80 ft in length when stored and extend out to 120 ft. The Safe Working Load (SWL) will be circa 3,900 lbs at 120 ft and 108,000 lbs at minimum reach. The aft stores crane is a single telescopic crane that is 32 ft in length extending out to 50 ft.

The cranes are being built at MacGregor’s facility in Seattle with delivery to be completed in beginning 2022, followed by commissioning and testing during 2022 prior to delivery of the dredge in spring 2023.



Supply of environmentally sustainable PCTC solutions to NYK Line

MacGregor secured an equipment order for 4 PCTC vessels to be built at the China Merchants Jinling Shipyard (Nanjing) Co. Ltd for Nippon Yusen Kaisha (NYK Line). Deliveries are planned to commence during Q4 2022 and be completed in Q4 2023.

The contract is the result of a longstanding and successful collaboration between MacGregor and NYK Line, where MacGregor`s expertise and ability to support NYK Line in both the early phase of projects and throughout the lifecycle is fully recognised.

Scope of supply includes a wide range of electrically operated equipment and encompasses quarter stern ramps and doors, side ramps and doors, internal ramps and covers, internal doors, and liftable car deck. The MacGregor patented Load Monitoring System, which is also included, increases safe working load of the quarter-ramp by up to 50% without adding weight.

Long-standing relationship with Rauma Marine Constructions secures RoPax order

MacGregor secured a cargo access equipment order for two RoPax vessels to be built by Rauma Marine Constructions (RMC) for Spirit of Tasmania (TT-Line Company Pty Ltd). Deliveries are planned to commence during Q3 2022 and be completed in Q1 2023.

The contract is a result of the long-standing relationship between MacGregor, RMC Finland and TT-Line, with scope of supply encompassing bow and stern access equipment, internal ramps, car decks, provision trailer lift and cover, shell doors and dedicated hydraulic/electric systems.

Intelligent solutions for unmanned harbour tugs

The international shipping industry is facing significant challenges with the need to increase safety, efficiency and sustainability. Remote controlled and autonomous electrified tug operations can materially reduce costs for shipping companies and port operators, increase the safety of manoeuvres in narrow harbour basins and reduce emissions.

As a partner in the FernSAMS Joint Industry research project, MacGregor has met the challenge of developing an unmanned robotic handover system that enables a safe towing connection to be established. In addition, the project has demonstrated the value of our Marine Data Engine in managing bi-directional data flow to enable remote control of the entire towing process.

Two year OnWatch Scout agreement signed

Load Line Marine SA has signed a two year OnWatch Scout Predict agreement to enhance operation of its fleet equipped with MacGregor merchant cranes.

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.

Significant hatch cover order

MacGregor secured a significant hatch cover order for twelve 3,055 TEU containerships to be built by Japan Marine United (JMU) for the Taiwanese shipping company, Wan Hai Lines.

The new containerships are part of Wan Hai Lines' wider fleet renewal plan to meet growing market demand and increase efficiency. At present, Wan Hai Lines is the 10th largest container liner company with a total fleet capacity of 424,000 TEU.

Scope of supply includes design & key components, fabrication and delivery of hatch covers to JMU. Delivery is planned to commence during Q4 2022 and completed in Q1 2024.

Advanced oceanographic overboard handling systems

MacGregor will deliver a suite of advanced overboard handling systems for the new oceanographic research vessel, *David Packard*, owned by the Monterey Bay Aquarium Research Institute (MBARI) and currently under construction at Freire Shipyard in Vigo, Spain. Founded in 1987 by David Packard, MBARI's mission is to advance marine science and technology to understand a changing ocean.

Scope of supply encompasses a traction winch system and overhead crane that will constitute the ROV Launch & Recovery System (LARS), a deck mounted davit and winch that will constitute the CTD LARS, a stern A-frame and a main crane with an integrated AUV docking head.

The LARS system will include integrated control systems to facilitate smooth operation between the winch and handling system, and Active Heave Compensation on the winches will allow for operations in higher sea states.

Digital solutions webinar series

MacGregor hosted an informative series of digital services focused webinars during 2021.

Interest in the ways in which digitalisation can support business continuity and performance improvement has accelerated throughout the Covid-19 pandemic, with shipowners and operators recognising that connected ships are vital during constrained conditions.

Digital customer experience
Real-time and actionable operational information enables effective planning and decision making, with a resultant increase in the expectations of digital support capabilities.

MacGregor is collaboratively developing digital solutions that are improving cargo & load handling operations and optimising customer experience.

OnWatch Scout:
The holistic response to your changing needs
Business needs change and technologies evolve, with the demand for more efficient and predictable operations being driven by increasing financial, regulatory and Covid related pressures and constraints.

OnWatch Scout:
How does it work?
OnWatch Scout (OWS) is a condition monitoring and predictive maintenance application developed in collaboration with customers and partners. OWS improves the uptime of MacGregor equipment and, at the same time, is opening new possibilities in the provision of remote services & support.

Intelligent solutions for unmanned harbour tugs
The international shipping industry is facing significant challenges with the need to increase safety, efficiency and sustainability. Remote controlled and autonomous electrified tug operations reduce costs for shipping companies and port operators, increase the safety of manoeuvres in narrow harbour basins and reduce emissions.

MacGregor Webinars

Ship emissions message needs to carry the full load

Ambitions to lower the environmental impact of shipping make more sense if all of the ways ships can reduce greenhouse gas emissions are fully recognised.

A global force in cargo flow, Cargotec is led by Chairman Ilkka Herlin, whose advocacy for businesses that are sustainable as well as profitable is widely acknowledged. A founder of the Baltic Sea Action Group, Herlin's personal interests include biomethanisation – a pioneering way of combining hydrogen and captured CO2 to produce synthetic methane.

For Cargotec, becoming the global leader in sustainable cargo flow is therefore a core objective. At all levels, the goal is to squeeze inefficiencies out of the logistics chain wherever they are encountered through its cargo handling and shipboard technologies.

Päivi Koivisto, Cargotec's Vice President - Sustainability, was appointed in 2019 to drive group commitments to the United Nations Global Compact Business Ambition for science-based measures to limit global temperature rise to 1.5°C above pre-industrial levels. Cargotec aims to reduce CO2 emissions in its value chain by 1 million tons by 2024.

"It's ambitious and on a different scale to what we see elsewhere," says Koivisto. "When a lot of companies make carbon neutrality statements, they are focusing on their own operations," she says. "Our target combines raw materials, our own operations and customer use of our products. A target for change of this kind demands close cooperation all along the value chain."

Handling the sustainability issue

All Cargotec sustainability initiatives must deliver measurable results, Koivisto says, but contributions by individual business units demand different emphases. While all contribute to an 'eco-portfolio' of products, subsidiaries Kalmar and Hiab are manufacturers whose production 'footprints' merit specific attention.

By contrast, MacGregor subcontracts its manufacturing and focuses on the design, development and through-life support of its cargo and load handling systems. Here, sustainability gains are available through 'handprint' focused initiatives where the 'green' choice must make the best business sense for customers.

"As 65% of manufacturing for MacGregor involves steel, we influence sustainability on the procurement side, but our focus is on developing sustainable solutions to create new value for shipbuilders, owners and operators," says Leif Byström, MacGregor President.

"Positive" contributions from greater cargo handling and operational efficiency should be considered as relevant to the IMO target to halve greenhouse gas emissions from ships by 2050, against a 2008 baseline, Byström asserts.

"It is inevitable that regulators focus on the connection between engines and emissions, but MacGregor systems are actually the most closely connected to the reasons why a ship is sailing. More efficient cargo and load handling cuts unnecessary moves, with direct consequences for emissions."

Collaboration is needed to ensure that business and sustainability motives are served at the same time, the MacGregor President says. "Intelligent solutions that improve sustainability and offer clarity on payback are desirable from both sides."

Environment plus

Byström picks out MacGregor's Cargo Boost upgrade service for containerships as a prime example of an innovative concept that demonstrably benefits earning potential and fuel efficiency, emissions and CO2 per TEU miles in a single solution.

Cargo Boost is a MacGregor PlusPartner solution that is 'green by design' and increases the carrying capacity of existing containerships.

Focusing on gains available for specific routes, a Cargo Boost project involves MacGregor evaluating container stowage arrangements, structural checks and class approvals, and then collaboratively developing an upgrade and installation plan to boost capacity as a whole.

The scope of a Cargo Boost upgrade can range from documentation updates and/or minor mechanical upgrades to changing lashing gaps, refining mixed stowage or more significant reconfigurations. Services will also include cargo securing manual and loading computer updates, as well as crew and back-office training. Owners considering lengthening a vessel would also be candidates for the Cargo Boost service, says Byström.

"Whether it's seen as an economy of scale, lower emissions per tonne, an emissions-free ride for extra containers or an opportunity to reduce the number of ships in a rotation, it's a gain for sustainability. To date, efficiency gains have been the primary benefits sought by shipowners, but more recently we're seeing owners driven by climate-related goals."

Measurable gains

MacGregor has already delivered Cargo Boost to some of the largest container shipping lines in the world. Magnus Sjöberg, Senior Vice President Merchant Solutions, says a simulation of the impact of Cargo Boost on a fully laden 13,000TEU container ship operating on a transpacific route calculated 10% savings in CO2 emissions (460 tonnes).

"It's worth comparing that to liquefied natural gas as a marine fuel - routinely mentioned as the bridging fuel to a more sustainable future," comments Sjöberg. "Actually, LNG only achieves a 20% reduction for GHGs. In ROI terms, the Cargo Boost numbers speak for themselves."

Sjöberg says that MacGregor proposals for greater sustainability in the supply chain are based on full transparency. MacGregor's Breakbulk Optimiser, for example, is an automated, cloud-based application whose ROI is based on using cargo booking and routing data to optimise cargo stowage and utilisation rates continuously, including for multiport calls. He says MacGregor simulations of a specific vessel type demonstrate the availability of annual CO2 emissions savings of 1,800 tonnes.

A greener business

Other vessel types are benefiting from the MacGregor strategy to develop solutions that meet the twin imperatives of sustainability and profitability, according to Sjöberg.

“We have worked with one of the world’s leading car carriers on a suite of electrically-operated ramps, doors and covers, and an electric liftable car deck,” he says. “The principal objective was to eradicate hydraulic oil spills, but electrical systems also enable automation and more predictable simulations. This was also the first time we supplied our new Load Monitoring System, which increases ramp safe working load by 50% without adding weight.”

MacGregor is also deploying its extensive oil & gas experience to support the growth of the offshore wind and renewable energy industries, and recently secured its largest ever contract with the wind energy sector owner OHT.

MacGregor’s contribution to the Alpha Lift foundation vessel, which will also be the largest ship of its type in the sector, will be a new motion-compensated pile gripper developed jointly with Kongsberg Maritime for integration with dynamic positioning and control.

Dennis Mol, Vice President Digitalisation & Business Transformation, says that the inclusion of advanced automation technology has resulted in a capability that eliminates unnecessary mooring, offering time and cost savings. “Simulations have been a key part of this project, and part of the product development with our customer,” he says.

▸ ANIMATION: SUSTAINABILITY
https://youtu.be/AhDuk07tfN0

Wind of change offshore

If the modelling is complex, the potential gains for efficiency, sustainability and business are straightforward, Mol explains, and they apply to existing as well as new offshore vessels.

“The transformative role digital technologies are playing in enhancing efficiency in the installed base of equipment through monitoring, condition-based maintenance and remote support is immense, he says. “In the offshore segment the stakes are high, with a single vessel capable of losing an owner $40,000-50,000 in earnings for each idle day.”

For MacGregor one positive outcome of the Covid-19 pandemic has been a greater willingness of customers to engage with “the digital conversation about sustainability and efficiency goals,” says Mol.

“It’s become a two way conversation, with some large companies that passed six months ago now asking us to go over it again with a greater emphasis on actionable insights. There is a tailwind behind the problem-solving potential of information that is readily available, covers global assets and is digitised to provide real ‘fix me’ advice onboard.”

Time-efficient analysis

“Diagnostics, spare parts logistics and service visits – all of these steps speed up tremendously if you have the right information at your fingertips. Our customers estimate that this type of digital analysis can cut the time needed for evaluation alone by 50%.”

Mol says MacGregor seeks to monetise this aspect of its strategy for more sustainable operations using insights taken from the insurance sector, where end-users share in the benefits of added value.

As part of the Rainmaking start-up programme, MacGregor brought its load handling expertise together with machine learning specialist Arundo Analytics to develop the condition-based monitoring and predictive maintenance service, OnWatch Scout. Gathering data from installed sensors, the solution offers onboard performance analysis via the MacGregor marine data engine and can upload information to the cloud at the most cost effective opportunity for deeper analysis ashore.

Mol is convinced that the technologies being developed to enable autonomous ships will play a full role in the progression of more sustainable shipping, as more accurate analytics and greater electrification overcome human errors. MacGregor is a member of the ONE SEA autonomous ship consortium and has direct involvement in a number of collaborative programmes, including Germany’s ‘ROBOTUG’ project.

“Our experience is that the most effective drivers for digital change so far are the people working on board ships,” he says. “Unless crews realise safety, efficiency and sustainability benefits, implementing digital change can be dead in the water. We can all see machine learning experts taking algorithms to the next level, but the digital priority for sustainability and efficiency today is getting platforms up and running.”

TOWARDS A SUSTAINABLE FUTURE

MACGREGOR

THE IMO AIMS TO HALVE GHG EMISSIONS FROM INTERNATIONAL SHIPPING BY 2050

80% of world trade is carried by sea

In 2018 shipping's share of global CO_2 emissions was **2.89%**

The Energy Efficiency Design Index aims to encourage more energy efficient equipment on ships. EEDI standards will be tightened every **5 years**

98% of shipping containers are recyclable

Since 2008, the carbon intensity of global shipping has improved by more than **20%**

55,000 ships in the global fleet

The IMO predicts that by 2025 new ships will be **30%** more energy efficient than those built in 2014

Shipping is significantly more carbon-efficient per tonne carried than air, road and rail

13% of EU GHG emissions in the transport sector come from shipping

CARGOTEC'S OWN OPERATIONS WILL BE CARBON NEUTRAL BY 2030

Cargotec is a **1.5°C** company

This means that our climate ambitions are consistent with emission reductions required to limit global warming to **1.5°C**

By 2030, intelligent cargo handling will cut emissions in the Cargotec value chain by **50%**

MacGregor is part of **Cargotec** and a global leader in sustainable maritime cargo and load handling

By 2024, Cargotec aims to reduce the CO_2e emissions of its value chain by **1,000,000 tons**

Halving Cargotec emissions is equal to taking over **1,000,000** cars off the road for a year

MACGREGOR IS DEVELOPING SUSTAINABLE SOLUTIONS THAT CREATE NEW VALUE FOR CUSTOMERS

Cargo Boost reduces the environmental footprint of container transport by **10%**

140+ containerships upgraded since 2015

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

MacGregor introduced the world's first fully electric merchant cargo crane in **2005**

MacGregor's portfolio of all-electric equipment contributes to improving overall energy efficiency and future zero emission ships

By 2024, MacGregor aims to reduce the CO_2e emissions of its value chain by **150,000 tons**

50% of the world's fleet has MacGregor equipment installed

65% of MacGregor product and manufacture related emissions in 2019 came from steel, a circular and recyclable material

Digital difference

MacGregor's digital services strategy has matured at start-up pace over the last three years, with the added benefit of drawing on almost a century of maritime and offshore engineering heritage.

After 36-months of fast-track developments, MacGregor's digital services team is convinced that its open dialogue with customers has proved pivotal in a profound period of transition for the maritime and offshore industries.

"We learn from each other by sharing our experiences – sometimes the hard way," observes says Dennis Mol, Vice President Digitalisation & Business Transformation, MacGregor. His team has evaluated no fewer than 70 promising ideas. If successes have been hard won, they are now proving their worth, with MacGregor making first deliveries of new digital solutions to enhance equipment design, training, operations and maintenance.

"Customers now fully appreciate that safety, productivity and sustainability benefits come when it is possible to calculate, simulate and analyse how equipment performs in the operating environment," says Mol, adding that business wins in 2021 are starting to feel transformative.

Offshore rewards

The use of a ‘digital twin’ to simulate operating conditions for many projects can save “thousands of hours” at the design stage, for example.

Offshore wind energy has been a clear beneficiary, where MacGregor has been making significant headway in recent months. Transparency between equipment suppliers, installers and customers has been especially critical for safe and productive operations at a time when offshore turbine capacities are growing fast and tower heights rising accordingly.

“This is a very dynamic market and robustness is as critical in the design process as much as speed is in the operational phase,” says Mol. Digital modelling has been key for the motion-compensated pile gripper MacGregor is now offering in combination with dynamic positioning technology from Kongsberg. “Being able to drive higher construction pace safely and without jack-up time is of real value, while simulation tooling also supports higher levels of automation.”

MacGregor used in-house developed ‘C-how’ simulation technology to verify the design in different on-deck scenarios, to optimize operability and to de-risk the engineering phase.

Data driven lessons

The digitalised service offer is also proving crucial for enhancements in personnel and asset management. Training needs for MacGregor’s motion-compensated ‘walk-to-work’ gangways for transferring personnel and supplies between support vessels and offshore installations have also been a topic for open dialogue between the supplier and its customers.

MacGregor is on the verge of delivering a first simulation-based training package to an offshore wind support vessel operator, Mol discloses.

“Training needs to be delivered in the most effective way, and e-learning, scenario-based tuition, analytics and immersive augmented reality-based methods to simulate the operating environment create a powerful mix for impressing standards on office-based and shipboard personnel. The user experiences a realistic environment, with training delivered time and costeffectively to his/her location.”

Analytics covering the real-life performance of the huge number of cranes MacGregor has supplied into merchant shipping are also feeding back into the offshore segment to underpin the datasets supporting OnWatch Scout. The predictive maintenance tool has already been specified for use on almost 40 vessels and Mol suggests that number could double in 2022.

“Here, too, digitalisation is a differentiator,” says Mol. “We have amassed data covering mission-critical equipment which allows machine learning to be part of predictive maintenance planning so that repairs or failures are anticipated well in advance and don’t cause delays: that’s a real cost saving.”

Efficient, safe and sustainable operations

MacGregor has a long and established history in the development, production, delivery and support of deck machinery to the global fishery and research markets.

The goal has always been to develop advanced deck handling systems and winches that enable fishing and research fleets to maximise catch and undertake research operations as safely and effectively as possible.

Fishing vessels are often family-owned, with the captain having a strong influence on the selection of equipment that will deliver the required functionality. Within this market, the focus has been maintained on providing systems that are safe, efficient and sustainably support the catching process by enabling short fishing times, high fish quality and reduced fuel consumption.

Research vessels are different, with operational management typically making the key decisions in combination with vessel designers who are seeking to include as much functionality as possible within a limited space to support science-focused operations.

Close cooperation with customers

One of MacGregor's strengths has been the way in which we closely cooperate with customers to develop innovative new solutions that support the progression of the fishing and research industries, and the vessels which operate within it.

The development of electric-powered winches, the electric fish pump and other electric deck handling systems has been driven by a focus on increasing efficiency, reducing fuel consumption and CO2 emissions. These new motor technologies, including patented fluid cooled electric motors, have now proven their reliability in heavy-duty operations.

One important aspect inherent in the equipment and system design is the need for redundancy in winches that are supporting fishing operations. Drives built with several smaller motors, instead of one large motor, provide effective redundancy in addition

to decreasing weight, reducing inertia and delivering more responsive control.

For example, the redundancy for a four motor trawl winch will be as high as 70-80% should one of the motors fail.

Electrically driven deck machinery delivers the benefits of reduced energy consumption and lower maintenance requirements, significantly less noise, more precise control, while also removing the risk of leakage from high-pressure hydraulic drive systems.

Research vessels

MacGregor has been a reliable partner within the research vessel market for a long time. The vessels are often 'one-off' designs and the onboard solutions need to be tailor-made and developed together with the designer and operator.

With these types of vessels pre-booked for up to three years, it is of paramount importance that the mission-critical work systems operate reliably with maximum availability which is achieved through effective design and responsive service support.

A good example of innovation and collaborative development that has enabled one of MacGregor's customers to enhance its operations is the icebreaking research survey vessel (RSV) *Nuyina*, which was designed and built to support & supply Australian bases in Antarctica.

She can deploy a wide range of vehicles, including helicopters, landing barges and amphibious trucks, to support supply operations. MacGregor delivered a comprehensive range of solutions for the handling of scientific equipment including a winch package, cranes and deck handling equipment, hatch covers, HPU, davits and steering gear.

Nuyina was built by DAMEN shipyards in Galati, Romania for the Australian Antarctic Division of the Australian Government and tested out from Damen Schelde Naval shipyards in Vlissingen, Holland. She is designed by Danish ship designer Knud E. Hansen and classified by Lloyd's Register.

The project was finalised through the signing of contracts with Damen Schelde Naval Shipbuilding in 2016-2017, with sea trials being successfully completed in February 2021.

Extensive knowledge, experience and capabilities

Thanks to the fishing and research vessel owners who have demanded the best solutions possible, MacGregor has delivered deck machinery to thousands of vessels and become a market leader through extensive knowledge, experience and world-class capabilities.

More sustainability for 50% less energy

Practical experience demonstrates that the gains electric cranes achieve in cargo handling efficiency, emissions and maintenance costs can be given specific values.

In MacGregor we design, develop and provide through-life support for maritime cargo and load handling systems and solutions. Through these systems and solutions, we help our customers to reduce emissions and increase their profits.

We do this by providing environmentally sustainable electric solutions that also improve operating efficiency. In addition, by enabling customers to carry more cargo or reduce unnecessary moves, emissions are lowered and efficiency increases further.

The Breakbulk Optimiser and Cargo Boost services are two great examples of this:

- Breakbulk Optimiser optimises cargo stowage and utilisation rates in a multiport set-up
- Cargo Boost increases cargo carrying capacity by up to 15% while reducing CO2 emissions by up to 10%

How to reduce emissions through electrification

Emissions are reduced through increased electrification and our electric cranes are a good example of this.

Variable frequency drive (VFD) technology improves efficiency as the motor is driving the winch directly, and there is consequently no loss of energy due to energy transfer. This means that energy consumption can be reduced by up to 50% compared to closed-loop hydraulic cranes, and fuel consumption significantly reduced.

Additionally, the power consumption of electric cranes during standby is approximately 80% lower than hydraulic cranes, which is a major benefit for project cargo with prolonged lashing and securing times. Electric solutions can also eliminate the risk of hydraulic oil leakage.

How to improve profitability through electrification

Profitability can be improved as electrically driven solutions deliver improved control precision and higher performance.

Electric solutions also yield capital investment and operational cost savings:

- Potential savings in capital expenditure. For example, when considering electric cranes early in the design phase, the size of the generator can be changed to a smaller one and the total vessel cost can be reduced.
- Lower maintenance and service costs. We have calculated that over 15 years the average service cost for electric cranes is 22% lower than for hydraulic cranes.
- Superior cargo handling efficiency. Loading and unloading, especially in bulk and container handling, can be 50% more efficient as the electric cranes operate at higher speeds and with improved precision. Less time is needed in port and money can be saved on fuel and port fees.

The preferred choice for sustainable cargo handling

Electric solutions are the direction in which the world and maritime industry are going.

There are also other advantages related to electrification in the form of data and additional functionalities. For example, electric cranes can be connected to the OnWatch Scout condition-based monitoring and predictive maintenance service, which increases the flow of information and moves from the reactive support mode to proactive mode. We can monitor, analyse and provide guidance about performance by streaming operational data from the vessel to shore and a remote support centre.

There is also the ability to include several automation functionalities such as Auto-Drive and Auto-Tandem, which will improve efficiency even further.

Electric solutions offer a wide range of benefits for shipbuilders, owners and operators that are good for business, and the environment.

Containers on bulk carriers - the MacGregor solution

Deploying bulk carriers for container transport creates challenges for ship safety, cargo planning and handling efficiency - all of which are dealt with by Stack Beam.

Improve bulk carrier utilisation rates

There have been various attempts made to carry containers on bulk carriers, mainly in the 35-58,000 dwt handy size. Interest in this capability has risen recently because of the strong container shipping market.

With extensive industry experience, MacGregor recognises the potential for bulk carriers to carry containers where there is a quick change in transportation needs and:

- The securing of containers is safe and efficient
- The solution is suitable for both empty and fully loaded containers
- Professional cargo planning and stability calculation tools are used

A safe, flexible and efficient solution

The concept was originally introduced in the late 1990s for the containerisation of pure reefer carriers and has subsequently been further developed for modern bulk carriers.

The Stack Beam provides the flexibility and efficiency that is needed when changing from bulk mode to container mode, and back. Assembly and disassembly of the beams is undertaken quickly and without hot work. Once the stack beams are installed, containers are secured by conventional twist locks and lashing bars following standard container terminal procedures. Stevedores have everything at hand to complete their work without delays.

MacGregor can provide engineering and approval of the supporting structure interface, together with required updates to the Cargo Securing Manual and complete loose lashing equipment.

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 wherever and whenever 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.

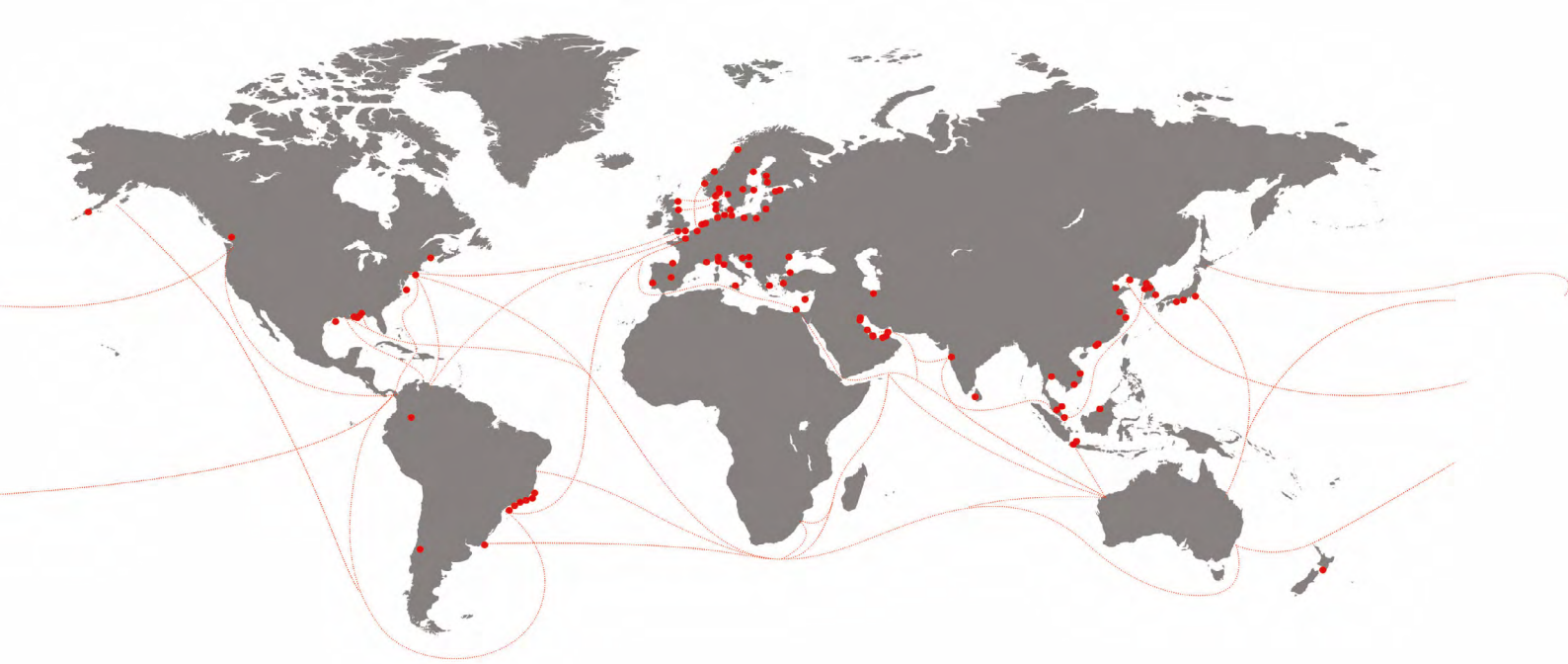
During the Coronavirus pandemic, we have found new ways of applying our expertise to support customers through a combination of global tools and local resources.

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.

The 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 new partner, DSV, MacGregor is able to provide fully customer-centric services around the world.



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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