MacGregor news

CUSTOMER MAGAZINE ISSUE 167 AUTUMN 2013

MACGREGOR

Tailor-made solutions preserve commercial advantages

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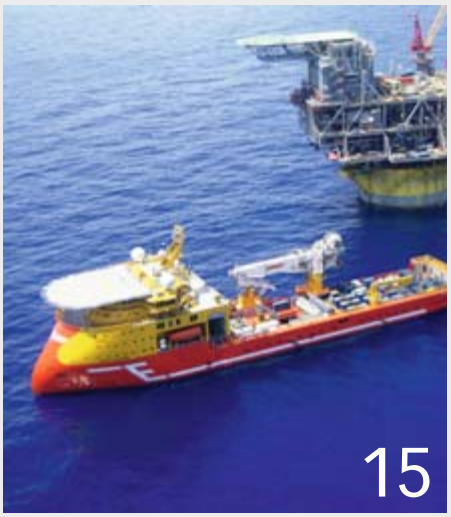

Efficient cargo systems can significantly increase a ship's revenue

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MacGregor news

MacGregor News is MacGregor's customer magazine with distribution of approx. 15,000 copies. **Publisher:** MacGregor, part of Cargotec, Porkkalankatu 5, FI-00180 Helsinki, Finland. **Editor-in-Chief:** Heli Malkavaara **Layout:** Maggie/Zeeland **Printed** by Punamusta, Joensuu, Finland. The opinions expressed by the authors or individuals interviewed do not necessarily represent the views of MacGregor.

Proactive means offering customers opportunities for better business

I am pleased to introduce myself as the new head of MacGregor, a true leader in the marine equipment world. These are very demanding times for our sea transport and offshore customers but also times filled with great potential for MacGregor. I am very excited to be joining the MacGregor team and working with the talented and dedicated members of our global organisation. I strongly believe that there are opportunities and innovations that will take our performance to an even higher level.

Every global business is facing the challenge of growth in a fiercely competitive market. At MacGregor we believe that there are still plenty of opportunities for new developments that will allow us to better serve our demanding customers and continue to distinguish us from our competitors. Traditionally these developments have either originated within MacGregor as part of our general continuous improvement efforts or from ship operators approaching the company with specific problems to solve.

Increasingly, however, our new developments stem from completely new ways of thinking. For example, we are regularly reviewing ideas from other industries, especially in projects set up to share academic, industrial and business knowledge, or simply approaching a problem from a different direction, such as using a ship's earning potential as the starting point for its design. Shifting the emphasis from cost-cutting to increased income by involving a cargo handling system supplier early in the planning process could add millions of dollars to a ship's annual earnings compared with merely accepting a shipyard's 'economical' standard offering.

At the heart of our development efforts will be our continued focus on increasing our customers' profitability. We are ready for the demands of the challenging environment in front of all of us and look forward to serving our customers with the best combination of technology, products and services.

Eric A. Nielsen
President, MacGregor

Eric Nielsen, 54, took up his position as President of Cargotec's MacGregor business area in September. He was born in the US and graduated with a BSc in mechanical engineering and an MBA in Finance & International Business.

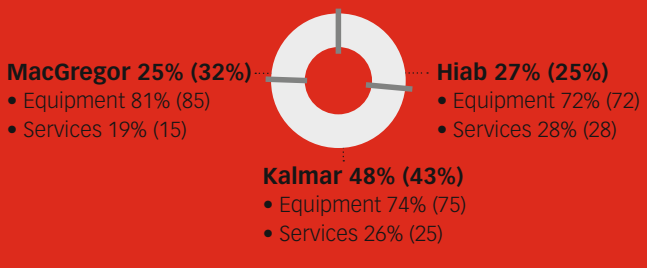
Since joining the family firm of Nielsen Tool Works, aged 16, as a machine designer and toolmaker, Mr Nielsen has held different senior executive positions in Terex Corporation, Volvo Construction Equipment and, most recently, Joy Global Inc, a leading supplier of large scale mining equipment, where he was Executive Vice President, Corporate Development.

"Eric's international background and experience in Scandinavian and Asian business worlds demonstrate his excellent capabilities to respond to changing customer demands," said Cargotec's President and CEO, Mika Vehviläinen.

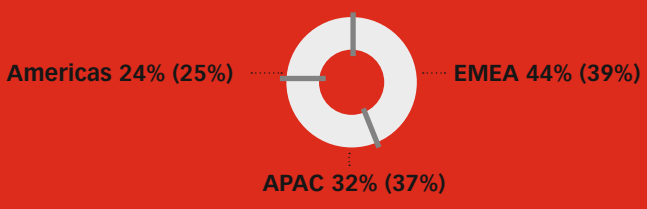
About Cargotec

Cargotec improves the efficiency of cargo flows on land and at sea - wherever cargo is on the move. Cargotec's brands MacGregor, Kalmar and Hiab are recognised leaders in cargo and load handling solutions around the world. Cargotec's global network is positioned close to customers and offers extensive services that ensure the continuous, reliable and sustainable performance of equipment. Cargotec's sales totalled EUR 3.3 billion in 2012 and it employs approximately 10,000 people.

Sales by reporting segment 1-6/2013, %



Sales by geographical segment 1-6/2013, %



MEUR	Q1-Q2/2013	Q1-Q2/2012	Change
Orders received	**1,624**	**1,629**	0%
Order book	**2,147**	**2,413**	-11%
Sales	**1,515**	**1,643**	-8%
Operating profit*	**52.5**	**78.7**	-33%
Operating profit margin, % *	**3.5**	**4.8**	
Cash flow from operations	**8.8**	**-27.8**	
Earnings per share, EUR	**0.46**	**0.90**	

**excluding restructuring costs*

MACGREGOR

MacGregor is the world's leading brand of engineering solutions and services for handling marine cargoes and offshore loads. MacGregor products serve the maritime transportation, offshore and naval logistics markets, in ports and terminals as well as on board ships. Our cargo flow solutions integrate cargo access, stowage, care and handling functions to suit a particular ship's cargo profile. This benefits its productivity, environmental impact and profitable service lifetime. **www.macgregor-group.com**

360°

Japanese bulker features flexible cement handling system

A MacGregor cement handling system designed to carry three grades of cement at a rated capacity of 1,000t/h will benefit a new 8,700 dwt self-loading/unloading bulk carrier for Japanese corporation Taiheiyo Engineering. "The totally enclosed cement handling arrangements will ensure flexible, efficient and clean cargo operations," says **Per-Erik Nilsson**, Marketing and Sales Director for MacGregor Cranes.

"An additional benefit is that the computer-controlled systems are programmed for automatic operation by just one person." The 109m vessel will have four cargo holds, each divided into two compartments.

Maximum level indicators will indicate when the holds are full, while pneumatically-operated shut-off valves avoid contamination between different grades of cement. Dust collectors will be installed on deck.

Seminars demonstrate MacRack innovation in action

Seminars continue to be useful opportunities for MacGregor to explain and promote new technologies and services. A subject that is gaining increasing interest is MacGregor's MacRack system that combines 'lift' and 'drive' operations for MacGregor side-rolling hatch covers (page 10).

The company's latest MacRack seminar was held towards the end of August in Nantong, China. The purpose of the seminar was to explain the operating principles of MacRack and provide the opportunity to see a full-size MacRack unit in action. The seminar was attended by members of Nantong Cosco Kawasaki Shipyard's purchasing, installation and design departments.

If you are interested in seeing MacRack in action, MacGregor would be happy to arrange a demonstration and seminar. Contact **Jari Nieminen**, Sales Director, Dry Cargo at jari.e.nieminen@cargotec.com for further information.

Nantong Cosco Kawasaki Shipyard staff see MacRack for themselves

MacGregor portfolio strengthened with Hatlapa acquisition

MacGregor has entered into an agreement to acquire the long-established and privately-owned deck equipment supplier, Hatlapa Group. The move benefits both companies' worldwide customers through having an expanded equipment portfolio and the availability of a larger delivery scope from one dedicated partner. It is also an important step in executing MacGregor's growth strategy and providing customer-focused solutions in both the merchant shipping and offshore segments.

Hatlapa complements MacGregor's present offering and its strong position in winches will make MacGregor a leading player in global winch markets. MacGregor sees significant growth potential in the offshore market and is now better equipped to seize these opportunities.

Hatlapa is headquartered in Uetersen, Germany and its main products include a wide range of winches, steering gear, compressors, multi-deck-handler cranes, and other winch-related deck handling equipment for both merchant and offshore vessels. The company's service business includes spare parts, maintenance, refurbishment and training. Hatlapa will be fully integrated into MacGregor's operating structure and will continue its business as a new business line within MacGregor. The acquisition is subject to regulatory approvals from competition authorities, which are expected to be received during the second half of 2013.

360°

First planned maintenance contract secured for selfunloaders

In July, MacGregor Italy signed a MacGregor Onboard Care (MOC) planned maintenance contract with Italian bulk specialist, Coeclerici. The agreement represents the first MOC contract signed to cover selfunloader equipment. "Thanks to our strong relationship with the shipowner and the support given by MacGregor over the years, it was possible to reach such an important milestone," says **Corrado Tabaton**, Branch Manager for MacGregor Service in Italy.

The contract will cover two selfunloader vessels based in Mozambique and will include remote diagnostics support to assist the crew in fault-finding analysis. The agreement will be managed by the Italian branch, with resources and support from MacGregor's service network in the Middle East region.

MacGregor's CFO, Declan Guerin ACMA, GCMA

Chief Financial Officer appointed

Declan Guerin has been appointed as MacGregor's Chief Financial Officer. He has worked for Cargotec since 2007 and previously held the position of Vice President, Mergers & Acquisitions. He is responsible for accounting and finance as well as MacGregor's mergers and acquisitions, and continues to be a member of the MacGregor's Executive Committee.

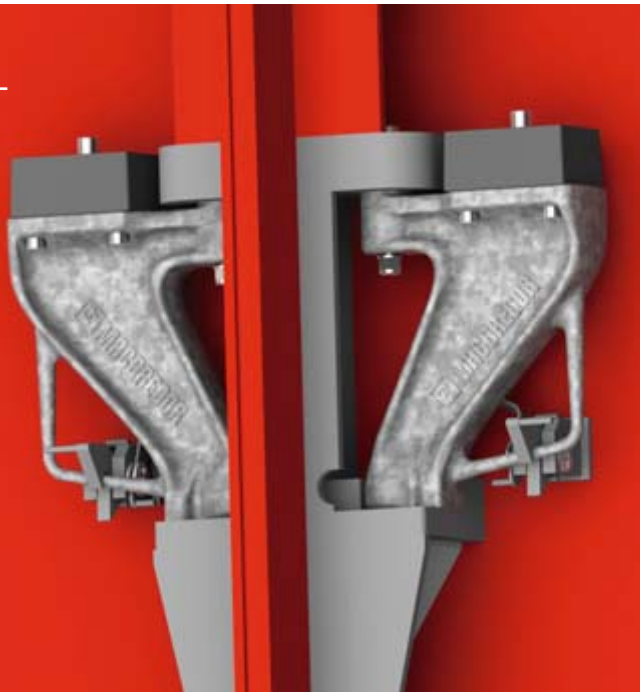
Mr Guerin is 43 and gained his extensive financial and commercial experience over more than 20 years with global organisations including Caterpillar, Chevron, DHL and EMI as well as Cargotec.

Dry cargo hold devices enhance handling efficiency

MacGregor has introduced two new devices designed to maximise cargo carrying capability and loading flexibility in the holds of dry cargo vessels. The MacGregor stack splitter is a device used for supporting containers in a cargo hold when special cargo is carried beneath them, and a new range of tweendeck supports has been developed for smooth port operations and to accommodate the movements of modern hull structures at sea.

MacGregor stack splitters are integrated into cell guides at pre-designated heights when the cargo hold is being built. They are hinged so that they can be swung out into use when needed. When not required, they can be pushed back and neatly stowed along the bulkhead, allowing containers and any other cargo to slide along the cell guides into the hold.

MacGregor's new tweendeck pockets and foldable consoles ensure smooth tweendeck loading preparations in port and are designed with optimised clearances for hull movements at sea, making them ideally suited to general cargo ships. With one installation tool for all sizes, the new tweendeck supports are fast and easy to install by the shipyard and need considerably less welding compared with traditional solutions. When not in use they are stowed flush in their pockets. A composite lightweight cover is designed for the pocket to prevent any cargo ingress and to save subsequent cleaning time of the pockets.




HAMBURG SUD
MAERSK
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KOLMAR
G7

Cost cuts can hurt, higher earnings can heal

An efficient cargo system can significantly increase a ship's revenue compared with a standard ship concept, so increasing earnings should take priority over cutting costs to maximise profitability

A ship's income depends on how efficiently it loads, stows and discharges cargo. "Maximise the earning ability of a ship's cargo handling system, and you maximise your profits," says **Ari Viitanen**, Director for MacGregor Solutions Sales.

"An efficient cargo system can increase a ship's profit by several million dollars per year compared with a shipyard's standard offering. This knowledge is not new, but it has been a challenge to quantify the magnitude of these higher earnings. And now that we can do so, it is increasingly apparent that they are substantial.

"Combining high quality products with tailormade services is fundamental to attaining these earnings. With these in place, we are able to offer customers the productivity improvements which are so important in today's challenging economic environment. You can only cut costs so much before you starve, but increasing your income can heal a business."

"MacGregor's business is to make a ship's earning curve steeper and make it last longer!"
– Ari Viitanen

The potential of these productivity improvements has been on MacGregor's agenda for several years, and led the company to establish a project at the beginning of 2013 to systematically develop its services and product portfolio in a way that brought the maximum cumulative cash flow to its customers. "We realised that we can help our customers to improve their ships' productivity as a system supplier because we already have an invaluable resource: our in-house knowledge.

"However, we do not know everything, so we also enlisted the help of project partners". These included several Finnish institutes: PBI Institute; Åbo Akademi; the Turku School of Economics; and also Safety at Sea, in Glasgow, Scotland.

Cargotec is a shareholder in FIMECC, the Finnish Metals & Engineering Competence Cluster, which aims to increase research cooperation between companies, universities and institutes. Last winter FIMECC had a technology and innovations project under way, in which Åbo Akademi University was also participating. Synergies were identified right away in the first discussions between Åbo Akademi University and MacGregor, and the timing was perfect for MacGregor to join this project.

"We believe that an integrated approach delivers maximum efficiency, so we offer cargo system solutions as well as stand-alone deliveries," Mr Viitanen says. "A system solution is essentially a package of related products and services that are considered as a whole over the lifetime of the vessel, so that they are inherently designed to work most efficiently together. This efficiency improves the cargo system's profitability and a ship operator's cash flow.

"For this to happen to maximum effect, we need to be involved when the cargo system requirements are specified. It is helpful to think of the process as a curve. The beginning of the curve is the point at which the shipowner decides to order a ship. Costs start to accumulate during ship planning, design and construction, and the curve starts to 'dive'. When the ship is delivered the curve starts to 'rise'. At this point the ship starts making money, but when is payback? This depends on how much profit the customer will make, and how soon. We are now talking about the steepness of an 'earning curve'. The steeper the upward curve and the longer it lasts, the better. So our business is to make the curve steeper and make it last longer!

"A system solution is essentially a package of related products and services that are considered as a whole, so that they are inherently designed to work most efficiently together. This efficiency improves the cargo system's profitability and a ship operator's cash flow"
– Ari Viitanen

"We can influence the earning curve in several ways, but two are particularly significant: first, by using our existing product portfolio and R&D to improving the lifetime earning potential of a MacGregor system; and second, through the services that we offer. Furthermore, we have to consider how to make the system benefits work in reality, and how to get the most out of a particular cargo system. This is achieved through smart concept design, matching the ship's cargo profile and through a process called 'productivity care."

"Productivity care means that after we have delivered the hardware we are still there for customers, providing support such as training and productivity gap analysis, and we spend the next five years working hand-in-hand with owners to utilise the full earning potential of their new ships.

"Once the ship has made some voyages it is possible to undertake a 'gap analysis' comparing the actual cargo capacity utilisation with what it should have been. We can help bridge any gaps between theory and practice, and advise the team operating the ship about corrective steps.

"Creating the potential is one thing," Mr Viitanen says. "But a proper analysis of use and improvements based on the results of such an analysis, and guidance on how to operate the cargo system, is what brings the additional earnings."

There is more to business than costs – there are also the revenues

Shipowners should talk to cargo system suppliers who have the expertise to increase earnings, and the ship owners' purchasing organisations should challenge shipyards for improved solutions, Dr Magnus Gustafsson, PBI Research Institute, explains

MacGregor's approach to developing new business and better customer solutions is an ideal example of the way this should be done. The merit of the multi-disciplinary technology and innovations project that studied MacGregor's approach to business development has been the wider understanding that there is more to business than costs – there are also the revenues.

The newbuilding (Fig. 1) and docking business cases (Fig. 2) both show clearly why we should focus on a customer's earnings and business environment from a practical point of view. The figures are also a good example of why a shipowner considering a newbuilding should start concentrating on a ship's earning ability, productivity and ability to influence the profitability of his investment instead of the price of a tonne of steel.

An extra million spent on a ship being built is a relatively small sum compared with the total newbuilding cost, but the impact on the ship's earning ability can be huge – so huge that the earnings improvement figures could actually seem absurd if seen without the calculations to support them. I must admit that I have made many similar case studies in other industries, but seldom have I come across a solution that is this good and that can bring so much profitability.

This is why shipowners should talk to cargo system suppliers, who have the understanding and the expertise to increase these earnings. Secondly, the shipowners' purchasing organisations should challenge the shipyards for improved solutions. With MacGregor solutions you can't reduce the system building costs drastically. But the more containers the ship is able to carry, the lower the costs and emissions per container carried. So it is not only a way to increase revenues but, better still, a way to do it in a sustainable manner.

The docking case makes this exceptionally clear for a certain size of vessels, especially in cases where the shipowner is deciding whether to order a newbuilding or to increase the capacity of an existing vessel. It is much more profitable to increase the capacity of the existing vessel, assuming that the ship has a reasonable number of years of operation ahead.

From PBI's studies we have noticed that across all industries the emphasis is more often on cost savings rather than reasonable and efficient operation. There is nothing wrong with cost savings, but it is not the only solution. And the path of savings can only be taken for so long.

But thinking outside the box, about earnings, brings more productive results. However, it has been noticed during this project that the benefits in shipbuilding and subsequently in shipping are exceptionally clear. Purely for this reason it is important to see this way of thinking enter the market.

One could say that this approach combines the strong technical expertise of product thinking and a strong customer focus of services thinking. This is characteristic for this solution – the benefits cannot be reached by inventing and selling new products, nor by blindly following the customer's desires. The key is to combine two strengths: the customer's expertise and knowledge of their own business, and the system supplier's understanding of solution sales.

Solutions are not made by sitting behind an office door and inventing them, and they are not made by blindly following all customers' every wish. Solutions are made by intelligent conversations with the customer.

This way of working is a challenge both for the system supplier and for the customer, and a big step because they both have to challenge themselves and their ways of working as well as each other – and be prepared to be challenged. Sometimes it can be a big step for a customer to accept that the system supplier can actually turn the customer's earnings policy from cost cutting to revenue generation and suggest something new.

Dr Magnus Gustafsson is a partner in PBI Research, an independent institute that focuses on heavy industries, founded in 1993. It favours long-term customer and cooperation relationships with companies.

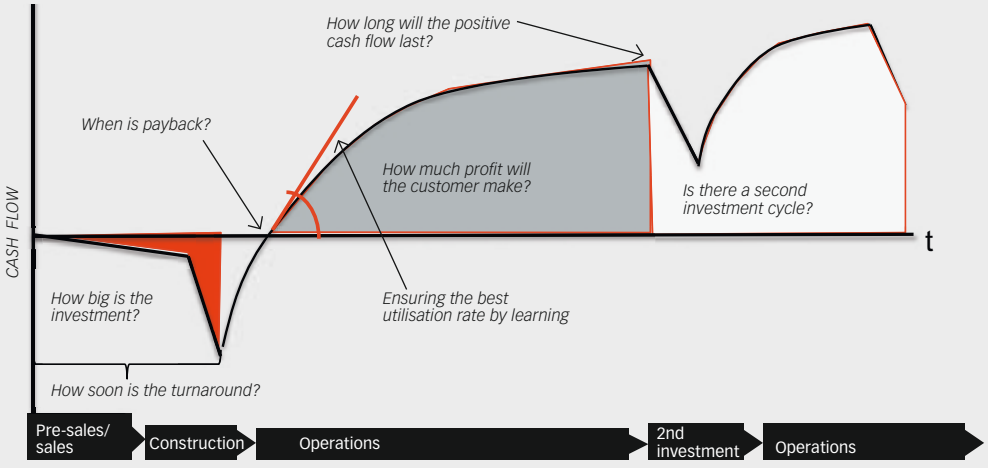
"Solutions are made by intelligent conversations with the customer"

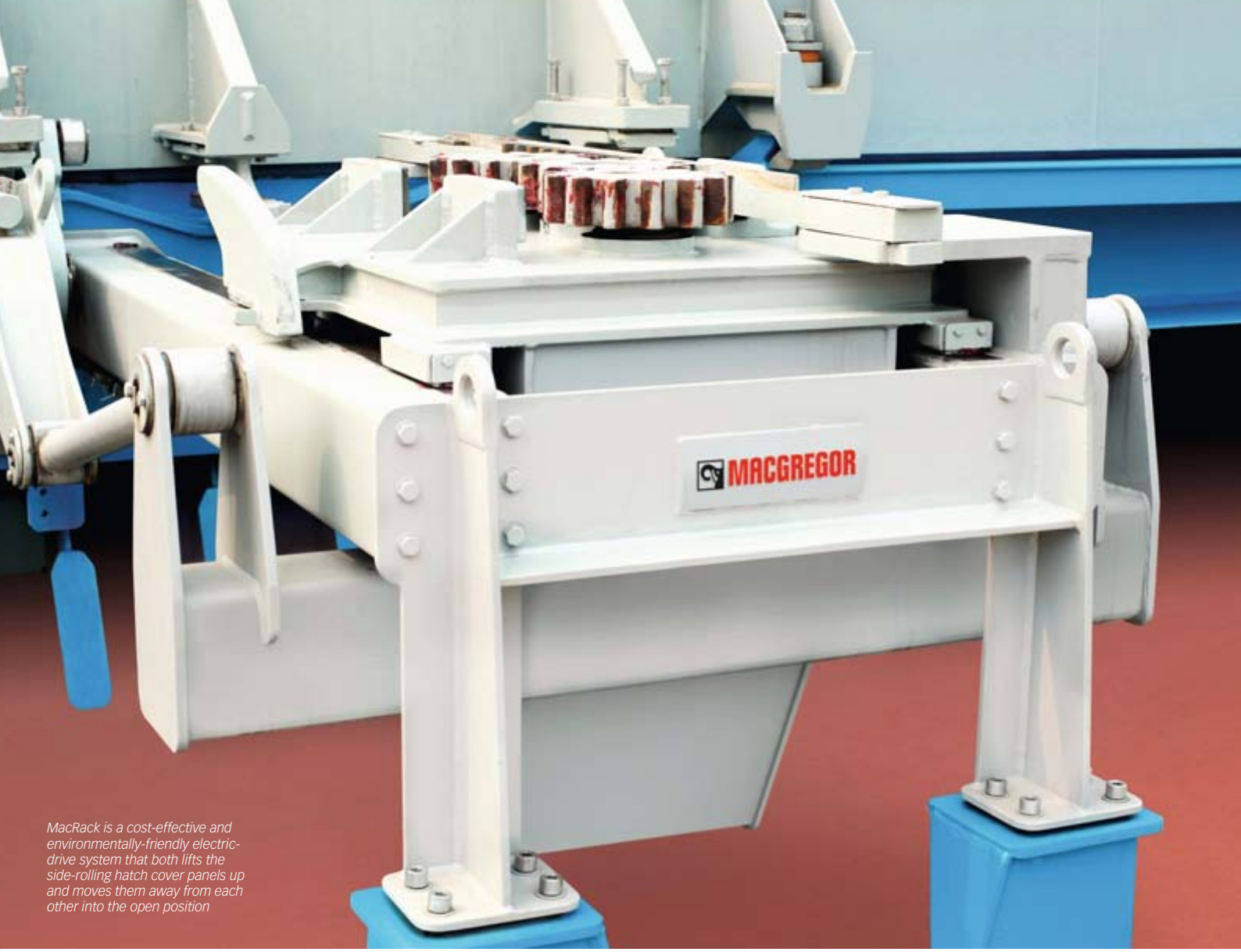
– Dr Magnus Gustafsson

THE CUSTOMER'S INVESTMENT LOGIC

FIG 1: 1st cycle CAPEX investment

FIG 2: 2nd cycle CAPEX investment





MacRack is a cost-effective and environmentally-friendly electric-drive system that both lifts the side-rolling hatch cover panels up and moves them away from each other into the open position

Successful shipowners
are the first to trust new technologies

Two new series of Greek bulkers being built by the Sungdong shipyard will feature economical and environmentally-friendly MacRack systems that combine 'lift' and 'drive' operations for MacGregor side-rolling hatch covers

Five vessels in a series of 180,000 dwt bulk carriers being built by Sungdong Shipbuilding & Marine Engineering in Korea for two Greek shipowners will feature MacGregor side-rolling hatch covers operated by innovative MacRack technology. The first two ships are destined for Quintana Shipping Ltd and the other three for Alcyon Shipping. The first vessel is scheduled for delivery at the end of 2014.

Each hatch cover panel will be operated by an electrically-driven MacRack unit, which is a cost-effective and environmentally-friendly electric-drive system that both lifts the side-rolling hatch cover panels up and moves them away from each other into the open position, making separate hatch cover lifters obsolete.

"Technology that drives new standards of efficiency and minimises environmental

impact are essential elements of today's market," says **Torbjörn Dahl**, Senior Naval Architect for Bulk Ships at MacGregor. "These new orders highlight shipowners' willingness to invest in this type of technology, and are testament to the belief that these particular owners have in MacGregor's ability to deliver this type of solution. We anticipate that MacRack will become the standard system for side-rolling hatch covers."

Gurpal Grewal, Newbuilding Manager for Quintana Shipping and a member of its board of directors has had a long and varied career in shipping. He has used MacGregor equipment many times. "MacGregor is a leading company using innovative technologies, producing a high-quality final product, which is good value for money," Mr Grewal says. "And as for its aftersales service, they do not let you down."

"Technology that drives new standards of efficiency and minimises environmental impact are essential elements of today's market"

– Torbjörn Dahl

Mr Grewal notes that Quintana's motto is 'quality'. He says that he is impressed with the MacRack technology and the design of the unit. "Even though it is a new technology, I believe that it is the right solution for Quintana. We are a company that invests in 'eco-ships', therefore new technologies based on electric platforms have been adopted. Of course new technologies always have a risk, however leading manufacturers are the only ones who can limit these risks".

MacRack has many elements to make it a success, Mr Grewal says. "It demands less power than hydraulically-operated hatch covers, installation is much easier, and – very importantly – there are no hydraulic oil leaks, so there is no oil on the deck. As Quintana is going to be listed on the US stock market, there is no tolerance for any environmental issues. Amongst MacRack's other attributes, its environmental credentials are the most important.

"Furthermore Quintana is a company which operates its vessels in US waters, where there are very strict environmental rules. Therefore, all the company's decisions related to the protection of the environment and compliance with these regulations are of outmost importance to its daily operations."

Quintana Shipping currently has six vessels on order in Japan and Korea, all of which are destined for worldwide service.

"There are market opportunities currently, which is why the company has chosen to invest in new tonnage now," says Mr Grewal. "More specifically, as shipbuilding prices have reached the bottom level, from now on yards are expected to raise their prices. On the other hand,

Gurpal Grewal has had a long and varied career in shipping and has used MacGregor equipment many times

during 2014, chartering prices are also expected to increase."

Concerning the bulk markets globally, Mr Grewal believes that over the next few years slow steaming will create the necessity for more ships, which will lead to an increase in prices, particularly for container carriers. "Greece will maintain its leading position in the global shipping market due to the fact that decision makers trust new technologies, take risks and make quick decisions," he says.

"MacGregor is a leading company using innovative technologies, producing a high-quality final product, which is good value for money"

– Gurpal Grewal, Quintana Shipping

2.5 minutes of innovative operation

MacRack is an electrically-operated opening and closing system for side-rolling hatch covers; each hatch cover panel has a drive unit actuated by an electric motor. The drive unit is located close to the hold's mid-line and both lifts up and rolls open the panel, which makes separate hatch cover lifters obsolete.

The covers are freed from the cleats as they are lifted. The operating time for one hatch is approximately 2.5 minutes, which includes time for the lifting and cleating operation.

The MacRack units are mounted at the longitudinal coamings and engaged via a pinion to a rack, which is fitted underneath the hatch cover panel. In the open position, panels are stowed on transverse ramps and when closed, the hatch covers are automatically cleated and weathertight.

MacRack uses variable frequency drive (VFD) technology, optimising the use of electric power. The operating speed is slow at the start of the opening process, when power is needed to lift the panel. Rolling takes place at full speed and slows down again when the panel is close to the end stops.

In the fully open position, as well as intermediate positions, automatic motor brakes prevent the panels from unintentional rolling. At the extreme end positions, eye plates with locking pins are fitted to enhance safety and to keep the panels in position.

The first of CNCo's eight 31,000 dwt multi-purpose vessels, Shansi, features electric cranes, hatch covers and fixed fittings from MacGregor

Experience of enhanced efficiency **drives electric crane sales**

More and more operators appreciate the benefits delivered by electric-drive cranes and nearly 400 have been ordered from MacGregor, including 92 by the China Navigation Company, which pioneered the use of modern MacGregor VFD electric-drive cranes

Continuing its commitment to variable frequency drive (VFD) MacGregor cranes, China Navigation Company (CNCo) has ordered eight more, taking the total number of electric cranes contracted by the company to 92. The latest order calls for 60-tonne SWL units for CNCo's four new 'Chief Class' 22,000dwt multi-purpose vessels.

Of the 92 cranes for CNCO, 48 are electrically-driven bulker cranes, both GLBE 30-tonne and GLBE 36-tonne versions, all ordered at Chengxi shipyard in China, and the remaining 44 are 60-tonne SWL general cargo cranes.

"CNCo pioneered the use of our electric cranes," says **Svante Lundberg**, Sales Manager, Cranes. "This order is the result of many years of close collaboration with MacGregor which started in 2006. As part of a drive to increase its environmental initiatives, CNCo decided to evaluate the benefits of a MacGregor electrically-driven crane.

The electric crane trial was part of a major upgrade of existing 20-year-old MacGregor electro-hydraulic cranes on CNCo's 41,500 dwt D-class multi-purpose ships. In March 2007 a VFD electric crane was installed on *Pacific Flores*, replacing the vessel's existing No 2 crane. At the time of fitting, CNCo said that if the trial proved successful, electric cranes would be considered for future newbuilds and conversions. "The company has been true to its word," notes Mr Lundberg. "In 2008 CNCo specified VFD MacGregor cranes for six 40,000 dwt multi-purpose vessels on order at Nantong Mingde Heavy Industry shipyard in China. These orders have been built on over subsequent years."

This latest series of ships is under construction at Zhejiang Ouhua Shipbuilding Co Ltd (Ouhua), on Zhoushan Island in China, scheduled for delivery in 2015. They will also feature hydraulically-operated MacGregor hatch covers. The contract includes options for an additional 'two-plus-two' more vessels.

As part of a drive to increase its environmental initiatives, CNCo decided to evaluate the benefits of a MacGregor electrically-driven crane

CNCo is part of the Swire group of companies and specialises in deep sea shipping. It is wholly-owned by the group's parent company, John Swire & Sons. The new vessels will operate for Swire Shipping's liner division, trading between Australia and Papua New Guinea; they have been specifically designed to meet the particular demands of this trading route.

The ships' design focuses on cargo handling speed and fuel efficiency, says CNCo; they will offer maximum versatility, with the capability to carry a wide range of cargo including breakbulk, over-dimensional and heavy-lift project cargoes up to 160 tonnes, in addition to meeting the route's general cargo requirements.

CNCo has a series four 39,500 dwt bulk carriers under construction at Chengxi, in China. These vessels are being equipped with 16 electrically-driven bulk versions of MacGregor VFD cranes. In 2011, MacGregor received orders from CNCo for electric cranes, hatch covers and fixed fittings for eight multi-purpose (S31 Class) 31,000 dwt vessels from Zhejiang Ouhua Shipbuilding. The first of which, *Shansi*, was delivered earlier this year and was shortly followed by the second sistership, *Shantung*. The remaining S Class vessels were launched at monthly intervals with the eighth and final vessel, *Szechuen*, scheduled for delivery by the end of 2013.

Mr Lundberg says that it is simple to see the attraction of the electric crane. "VFD MacGregor cranes offer many advantages," he explains. "Most essentially, they deliver enhanced efficiency. This is mainly attributable to faster and more accurate load positioning which reduces the time spent in port, along with a 30 to 35 percent reduction in power consumption compared to electro-hydraulic cranes.

"They also eliminate the need for hydraulic oil and have fewer moving parts, therefore maintenance and repair is much easier. The life expectancy of the components is greater than with electro-hydraulic systems."

VFD MacGregor cranes offer a 30 to 35 percent reduction in power consumption compared to electro-hydraulic cranes

VFD cranes were developed in two stages. The first concentrated on a new technique for powering all motions of the shipboard cranes. The second was the significant improvements in environmental impact. "Together these deliver a high-performance cargo handling tool, coupled with the benefit that, in comparison to an electric-hydraulic crane, they reduce the environmental burden of a ship. This is a significant advantage in the environmentally-friendly setting that today's ships operate in and adds to its second-hand tonnage value."

General cargo needs **specialist solutions**

Four new 38,000 dwt general cargo ships joining Nanjing King Ship Management's fleet need cargo handling and stowage arrangements that are flexible, reliable and efficient

Ask someone being shown around a cargo ship for the first time to describe what they saw in the holds and on deck, and they would be unlikely to answer: "lots of cargo, looks fairly general". Most general cargo might well look mundane to the visitor, but a closer look would reveal that the stow included awkward shapes, fragile goods, and heavy pieces of cargo. A 50-tonne crane adds a clue that these might be *very* heavy. A bulk carrier needs a 'general' cargo solution, while a general cargo ship needs to be flexible enough to provide many cargo loading, stowage and discharge solutions.

Designing a cargo handling system that can meet this type of challenge requires a multi-discipline skill-set coupled with a great deal of experience, says **Svante Lundberg**, Sales Manager, Cranes. "The system should be designed for maximum efficiency, optimised cargo space flexibility, absolute weathertightness for sensitive cargoes, fast and reliable port operations as well as for safety and reliability at sea. These factors cannot be compromised.

"Working together achieves the most productive outcome," he says. "It guarantees the optimum placing and integration of all equipment with a flexible and efficient cargo system, eliminates the possibility of costly calculation errors and provides substantial savings in time and administration. This is exactly the approach that MacGregor has taken with its order to supply 20 cranes to four 38,000 dwt general cargo ship newbuildings."

> "The system should be designed for maximum efficiency, optimised cargo space flexibility, absolute weathertightness for sensitive cargoes, fast and reliable port operations as well as for safety and reliability at sea. These factors cannot be compromised"
> – Svante Lundberg

The vessels are under construction at Taizhou Kouan Shipbuilding Co Ltd in China for the Chinese shipping company Nanjing King Ship Management Co Ltd, which specialises in dry general cargo, with a focus on heavy cargo. The new vessels have been ordered to add to this capability and are planned for delivery from the end of 2014 until the beginning of 2015.

"For their part the cranes will provide high levels of cargo handling efficiency," notes Mr Lundberg. "We have worked closely with all parties to develop the best configuration possible and the highest flexibility and lifting capabilities."

The MacGregor crane outfit comprises one 36-tonne SWL crane, located forward and with an outreach of 26m, and two twin-GL cranes, each with a 2 x 50-tonne SWL capacity and an outreach of 26m. The cranes are planned for delivery from 2014.

Telescopic cranes: a compact solution

Adding to MacGregor's broad portfolio of lift capabilities is its telescopic shipboard crane range. The telescopic jib ensures that the crane can serve a large working area on the vessel and is able to perform numerous load handling tasks safely and reliably in the challenging marine environment.

Their compact design ensures that when deck space is limited telescopic cranes are an ideal solution. Standard cranes have 360-degree continuous slewing and lifting capabilities ranging from two to ten tonnes, with outreaches of up to 20m. Higher capacities are also available.

The crane is controlled from an operator platform above the slewing ring, with remote control available as an option. The crane controls provide smooth, stepless and precise movements of all crane speeds and motions. Two motions can be performed simultaneously, but at reduced speeds.

20m OUTREACH

offers unique load handling flexibility

A 400-tonne SWL MacGregor subsea crane for Eidesvik Offshore's new construction vessel has an outreach of 20m, which will deliver flexibility and manoeuvrability when handling large and heavy loads

Eidesvik Offshore's new 145m offshore construction vessel will feature a 400-tonne SWL MacGregor subsea crane with an outreach of 20m

A 'first of its kind' large crane contract in MacGregor's orderbook includes an active heave-compensated (AHC) knuckle jib subsea crane with the capacity to lift 400 tonnes at an outreach of 20m, which is a unique offshore capability. It has been ordered for an advanced 145m SALT 301-design subsea offshore construction vessel for Eidesvik Offshore and is being built by Norwegian shipyard Kleven Verft; an option remains for a sistership delivery in spring 2015.

The vessel will also feature a second smaller crane, which will have a safe working load of 100 tonnes. Both units will be equipped for subsea operations down to 3,000m. As with other large subsea MacGregor crane installations, the 400-tonne unit will have its winch installed below the working deck. The cranes will be equipped with a MacGregor 'Arctic package' for cold climate operations and are scheduled for delivery around mid-2014.

"In terms of operational advantages the 400-tonne crane is fitted with a 'high lift' mode and will therefore be more useful for lifting tall structures than most of the other cranes in the same range," says Eidesvik Offshore Project Manager, **Ellen Sofie Ottesen**.

The vessel is intended for standard subsea operations, but will have combined capability for cable-laying operations with an underdeck carousel and vertical lay tower.

"We are always looking for operationally-stable equipment that will work when we need it," says Ms Ottesen. "Therefore, we evaluate (if available) experience from similar equipment and suppliers to ensure that the equipment meets the expectations for our operations. This information, along with all our design requirements, in combination with the investment cost, enables us to make our final choice of crane.

"We feel that we have good cooperation with MacGregor, and have experienced prompt responses to our requests, both operationally and with regard to the new project"

– Ellen Sofie Ottesen, Eidesvik Offshore

"The cranes we normally need are often available from several suppliers and we therefore often have a choice, which more or less fulfils the defined requirements from different suppliers. When comparing the alternatives, the evaluation of the best possible delivery time is also of significant importance. The MacGregor cranes were within our technical requirements and were also competitive regarding delivery time and cost.

"We also considered a higher SWL," says Ms Ottesen. "We consider all the options available, and the ones that will soon be available, and try to find the right choice for each project. For this vessel, where the client was not already determined at the decision-point, it was even more important than for other projects to be able to have the best future choices. Therefore we settled on 400 tonnes at 20m outreach as the best choice for this vessel.

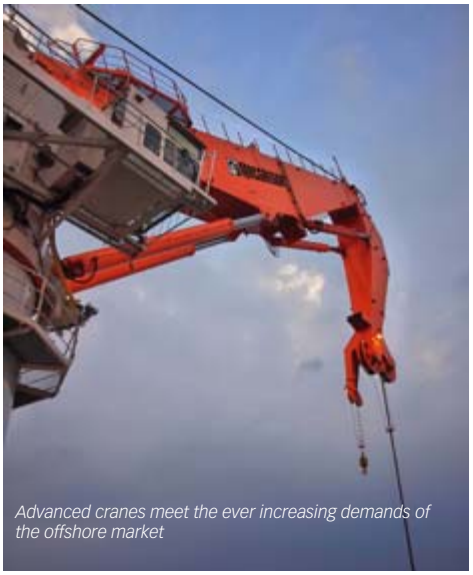
"In terms of operational advantages the 400-tonne crane is fitted with a 'high lift' mode and will therefore be more useful for lifting tall structures than most of the other cranes in the same range"

– Ellen Sofie Ottesen, Eidesvik Offshore

"We hope and believe that they will serve us well, both Eidesvik and MacGregor will gain from having the cranes operating as we expect. We have experience of several cranes from MacGregor, the largest until now is *Viking Poseidon*'s 250-tonne unit that was delivered in 2008.

"We feel that we have good cooperation with MacGregor, and have experienced prompt responses to our requests, both operationally and with regard to the new project," says Ms Ottesen. "We expect, and are dependent on, getting support from MacGregor as and when we need it, and feel that it is important for us to continue to receive this focus. We are very dependent on MacGregor's services to have our vessels in operation, and we know that the company understands this.

"It is of utmost importance that we get skilled personnel with expert knowledge and experience on board when we have



Advanced cranes meet the ever increasing demands of the offshore market

challenges," she notes. "Challenges often occur rapidly and unexpectedly, and therefore also require a rapid response. Vessels with these kinds of cranes will be totally out of operation when there are problems with them. The vessel will most probably be performing work that includes lifting appliances and a delay or unscheduled stop to operations is extremely expensive both for us as a shipowner and thereafter our customers. So a quick response is very important.

"In addition, we also assume that we will need spare parts quickly after an incident and the limited availability of repair parts for cranes can be a challenge. Therefore, when all these factors are combined, the availability of experienced and knowledgeable personnel will be more and more important in the future."

"We believe there is a strong need for vessels of this size and capacity for the jobs that are known and the jobs that will come in the time ahead," says Ms Ottesen. "The vessel fits with Eidesvik's philosophy of finding and then building the best vessels for our customers with a strong focus on making a good working platform for their activities.

"We are very much looking forward to its delivery in August 2014. We know that it will be hard work both for MacGregor, the yard and the other suppliers to get it all sewn together, but we have belief in the success of the project and are sure the vessel will serve us well."

Super-sized crane contracts

In addition to MacGregor's other large crane contracts, its orderbook includes four 250-tonne active heave-compensated (AHC) subsea MacGregor cranes for US operator Hornbeck Offshore Services Inc's four new multi-purpose supply vessels (MPSV) and three MacGregor offshore cranes specified for a new 123m dive support vessel for UK-based Subsea 7.

Hornbeck Offshore Services Inc will benefit from the load-handling capabilities of four 250-tonne AHC subsea MacGregor cranes. One of each unit will be installed on the operator's four new MPSVs, specialised vessels that are principally used to support complex deepwater subsea construction, installation, maintenance, repair and other sophisticated operations.

Subsea 7's newbuilding, under construction at Hyundai Heavy Industries in South Korea, will feature one 120-tonne AHC subsea MacGregor crane and two 10-tonne offshore cranes.

The larger crane is designed for operating at depths of around 500m at an outreach of 12m; the two smaller auxiliary cranes will operate at depths of 350m at 15m outreach. The vessel will be delivered at the end of 2015.

"This is not the first time Subsea 7 has turned to us for a major crane contract," says **Frode Grøvan**, Director, Sales and Marketing for Advanced Load Handling. "We fitted 250-tonne and 200-tonne AHC MacGregor cranes to its advanced diving vessel Seven Havila, which was delivered in 2011."

900-tonne capacity enhances subsea construction capabilities

Toisa's new multi-purpose offshore construction vessel is being built for maximum flexibility and capability; it will feature a 900-tonne SWL MacGregor cylinder-luffing box-boom active heave-compensated subsea crane, the largest of its kind on the market so far

Ten years ago it would have been hard to imagine a subsea crane capable of lifting 900 tonnes subsea, and operating in depths down to 3,500m, but by combining technological advances with intelligent use of materials and state-of-the-art technology and components, MacGregor has made this a reality.

The crane will be installed on a 150m multi-purpose offshore construction vessel (MOCV) ordered by Sealion Shipping, the UK-based offshore support company that manages and operates offshore support vessels for Toisa Ltd. The vessel is being built at the South Korean shipyard, Hyundai Heavy Industries Co Ltd. The 900-tonne SWL crane delivery is planned for the beginning of 2015, shortly before the MOCV is handed over in July. In addition to the 900-tonne crane, MacGregor is also delivering a 200-tonne SWL AHC offshore crane with a 2,000m subsea capability.

"At a time when subsea modules are getting larger and heavier and operations are being conducted at ever greater depths, a sophisticated crane on this scale equips the new vessel to meet the ever increasing demands of the offshore construction market," says **Frode Grøvan**, Director, Sales and Marketing for Advanced Load Handling.

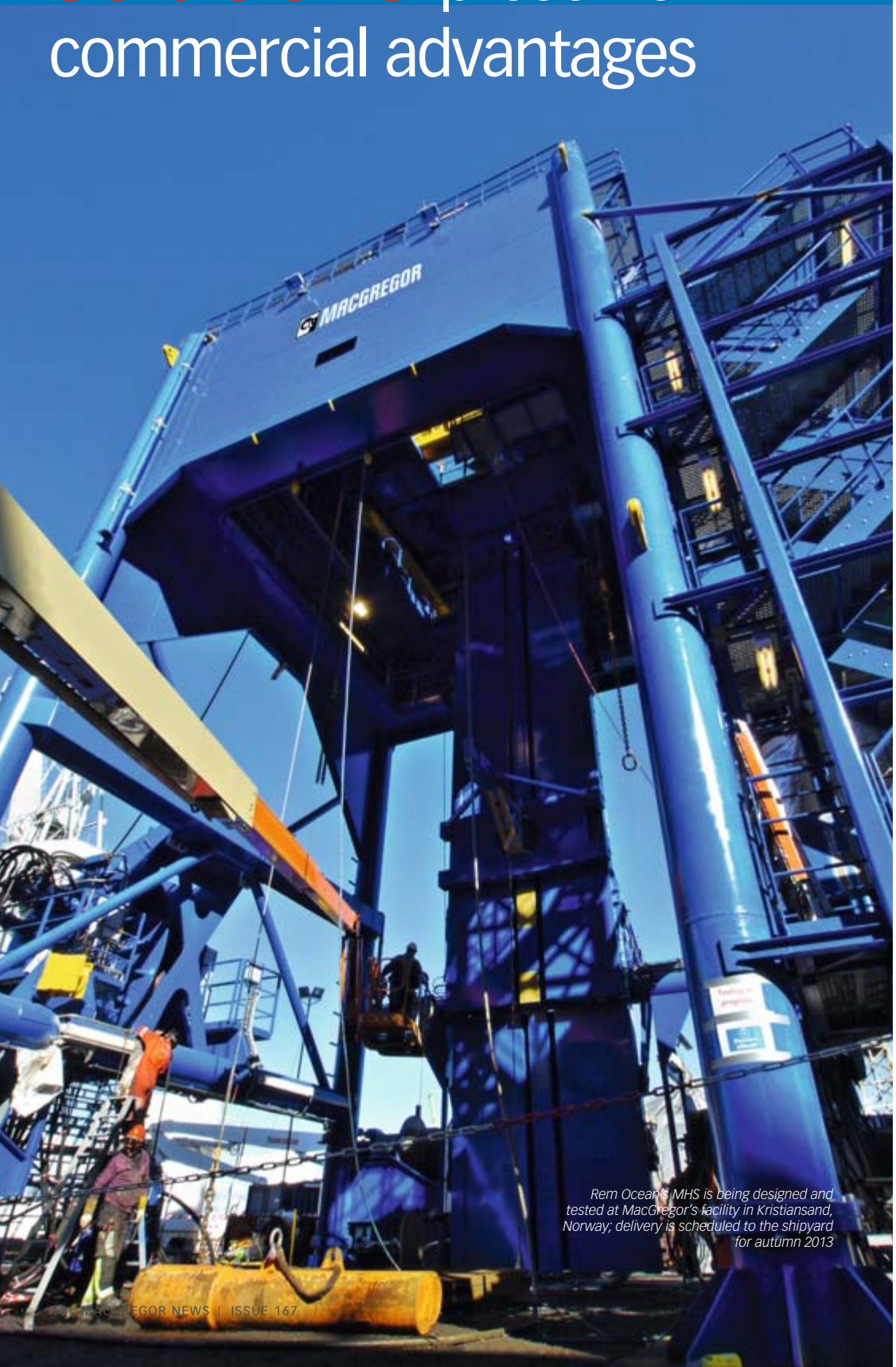
Sealion Shipping describes the MOCV as a customised version of an Ulstein Deepwater Enabler design. "The DP 3 vessel is designed and equipped for worldwide operations in the oil and gas sector, ultra deepwater installation and construction, flexible lay, pipe lay, cable lay and topside construction support," the company says, "and will be built to the highest standards and with maximum flexibility and capability prioritised".

The new vessel will have a deck area of approximately 2,900m2, with a deck strength of up to 50-tonnes/m2.

"This order further demonstrates Toisa's commitment to the future of the deepwater construction markets," Toisa says. "These are markets in which we already operate a number of modern vessels but where we recognise that the future needs of the offshore industry cannot be fully met from the existing, and ageing, world fleet."

Tailor-made subsea solutions preserve commercial advantages

MacGregor's deep understanding of clients' operational demands has resulted in a second module handling system delivery linked to a repeat inspection, maintenance and repair services contract for DeepOcean from Statoil



Rem Ocean's MHS is being designed and tested at MacGregor's facility in Kristiansand, Norway; delivery is scheduled to the shipyard for autumn 2013

On delivery, the 108m offshore vessel *Rem Ocean* will start work on a long-term charter to DeepOcean, carrying out inspection, maintenance and repair (IMR) services for oil and gas installations owned and operated by Statoil on the Norwegian shelf. DeepOcean was awarded its first IMR services contract to Statoil in 2006, and the latest contract continuation is the largest in the history of the Norwegian subsea specialist since it was founded in 1999.

Rem Ocean is under construction at the Kleven Verft shipyard in Norway for Rem Offshore. The charter to DeepOcean is scheduled to commence in March 2014 with an initial period of five years and options to extend it by three years.

"DeepOcean is a leading IMR service provider and securing a repeat award of IMR work from Statoil recognises the reliable services that we have already provided through operational efficiency and high-quality technological solutions," says **Jørn Åsgeir Døving**, DeepOcean's Module Handling System's Supervisor, and Technical Superintendent for *Rem Ocean*.

MacGregor will supply a 40-tonne SWL subsea module handling package (MHS), including a stand-alone tower, hydraulic active heave-compensated (AHC) lift line winch, supported by a guide-wire and cursor system. The vessel will also be equipped with MacGregor moonpool doors, five hydraulically-operated skidding tractors, tugger winches and two telescopic shipboard cranes.

The choice of a MacGregor module handling system for the new vessel was influenced by DeepOcean's satisfaction with its first ever fully-integrated module handling system delivered by MacGregor for the 109m IMR vessel *Edda Fauna* in 2008, says Mr Døving.

""The choice of a MacGregor module handling system was influenced by DeepOcean's satisfaction with their first ever fully-integrated module handling system, delivered by MacGregor to Edda Fauna in 2008""

– Jørn Åsgeir Døving, DeepOcean

In October 2012, *Edda Fauna* carried out a ground-breaking manoeuvre: the first ever Statoil 'X-mas tree' (XMT) installation from a vessel. This process delivered significant time savings compared with the same operation usually carried out from a drilling rig and was made possible by the combination of MacGregor module handling technology and DeepOcean's operational experience, says Mr Døving. "Field proven technology through previous MacGregor handling systems deliveries offers DeepOcean reliability and safety."

Following the success of this pioneering process, DeepOcean has carried out several more XMT installations.

Module handling systems are used for precise deployment and retrieval of subsea modules, explains **Frode Grøvan**, MacGregor's Sales & Marketing Director for Advanced Load Handling. "They are designed to extend the operational weather windows for offshore vessels engaged in these critical launch and recovery processes. Our systems ensure that these complex tasks are performed safely and efficiently in challenging environments with millimetre precision. Our extensive experience with subsea load handling in the harsh North Sea environment has given us a unique ability to understand our customers' needs."

MacGregor offers two distinct types of module handling systems; both can be customised to suit a vessel's layout and its specific operational requirements. A tower integrated into a vessel's hangar provides a superior working environment, well protected from the elements. On the other hand, a stand-alone tower installed on the aft deck is a more adaptable solution.

Mr Døving explained the appeal of the stand alone tower. "The choice of a stand-alone MHS aft deck tower structure for *Rem Ocean* provides the flexibility of transferring the system to another vessel when required."

MacGregor has worked closely with DeepOcean, involving the company right from the start of the design process. This allowed for a rapid decision making process when design adjustments were needed. "By this, DeepOcean receives a tailor-made solution," says Mr Døving.

"Our extensive experience with subsea load handling in the harsh North Sea environment has given us a unique ability to understand our customers' needs"

– Frode Grøvan

As is invariably the case, there are a number of factors at play in the choice of specialised equipment for use in a hostile environment; aftersales and a global service network come high on the list for complex machinery performing critical operations. "DeepOcean operates in time-critical projects, therefore it is extremely important that we are given priority and support whenever it is needed," he stresses.

Rem Ocean's MHS is being designed, assembled and tested at MacGregor's facility in Kristiansand, Norway and is scheduled for delivery to the shipyard in autumn 2013.

The choice of a MacGregor module handling system was influenced by DeepOcean's satisfaction with its first ever fully-integrated MHS delivered by MacGregor for the 109m IMR vessel Edda Fauna in 2008

Secure online diagnostics

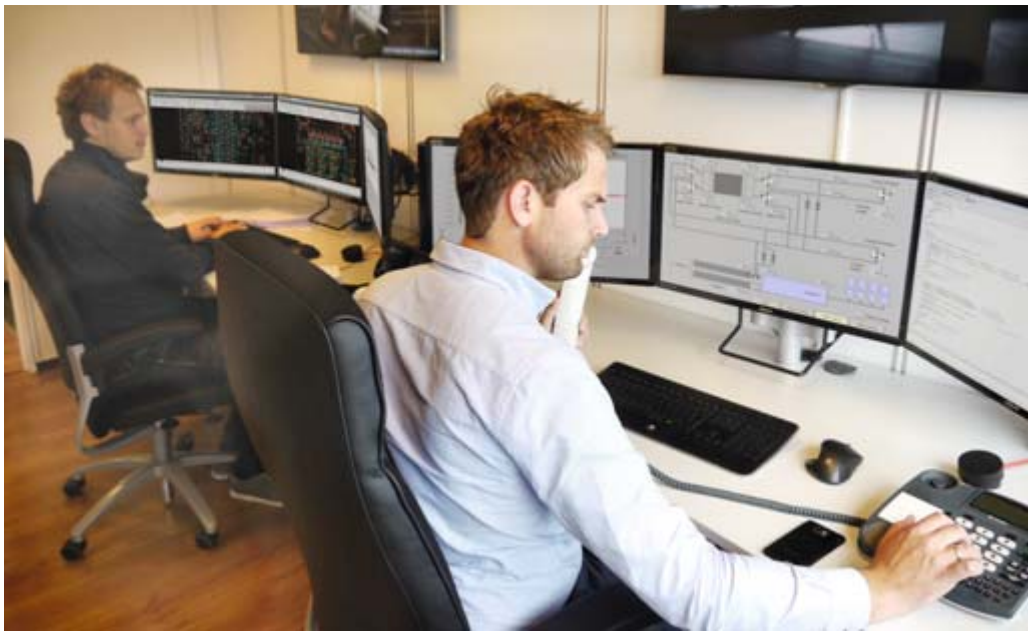
can save you millions and protect your hard won reputation

When equipment fails in remote high value offshore operations, MacGregor's new 24/7 service – OnWatch – restores normal service as quickly as possible

MacGregor's new OnWatch service is designed specifically to provide operational peace of mind for customers with advanced MacGregor offshore equipment.

Building on the success of MacGregor's earlier remote support services, OnWatch offers immediate operational technical support via a new secure online remote diagnostic solution.

"We chose the name 'OnWatch' because it perfectly describes the level of round the clock vigilance and responsiveness that the service offers," says **Trond Karlsen**, Director, Offshore Competence Centre. "By their very nature offshore operations are remote and should this service be needed by customers operating advanced offshore products, such as our active heave-compensated cranes, LARS systems and module handling systems, it can prove invaluable."



OnWatch calls on the services of specialists in hydraulic, mechanical, electrical and automation engineering; they are on call 24/7

"For preventive and predictive maintenance, MacGregor customers normally take advantage of our MacGregor Onboard Care (MOC) service to ensure that their equipment is maintained in good order, minimising the risk of accidents and downtime.

"However, it is impossible to entirely eliminate the chance of a breakdown, which might be the result of human error, environmental conditions or component failure. On the rare occasions when this happens, it is vital to restore normal service as quickly as possible. A prolonged malfunction of a subsea crane could cost the owner or the end customer millions.

"While the direct costs of a high profile delay quickly add up and can be easily quantified, the longer term damage to a company's reputation may be even more serious," notes Mr Karlsen.

"MacGregor OnWatch is the latest addition to our support portfolio, initially introduced to our offshore customers operating subsea cranes. Although the basic remote support service has been available for several years, it is now updated and offered in a new package. There are a number of telling case studies that leave no doubt about the value of this highly effective service. Even the most well-regulated operation has no real defence against, for example, a lightning strike.

"In the event of a failure, OnWatch calls on the services of specialists in hydraulic, mechanical, electrical and automation engineering; they are on call 24/7. Using a secure satellite connection, the team downloads comprehensive historic and on-line data about your crane, including operational history, alarm logs, hydraulic pressure and flow logs. They guide the ship's crew in determining the source of the problem and then identify the action required and the necessary parts. If, as recommended, the vessel carries a strategic spare parts kit, most problems can be addressed immediately by the vessel's crew, in consultation with the OnWatch specialists.

If the required parts are not onboard, MacGregor will dispatch an engineer with the correct parts to rendezvous with the vessel at sea or in port, where the engineer will rapidly install the new parts and complete the repair without having to spend any time on fault-finding."

Even the most well-regulated operation has no real defence against, for example, a lightning strike

Lightning does not discriminate

A large AHC sub-sea crane disabled by a lightning strike was back in operation in only two hours thanks to the combination of MacGregor's OnWatch service and the onboard strategic spare parts kit

While carrying out a critical subsea lifting operation in the Gulf of Mexico, a vessel's large MacGregor AHC crane was struck by lightning. The crane ceased to function, leaving its load suspended in mid-air in deteriorating weather conditions.

In this critical situation the ship contacted a MacGregor OnWatch engineer by phone at 03:30 central European time. The engineer immediately called in software and hydraulic engineers; within 30 minutes the team was analysing log data and testing internal signals.

The specialists quickly discovered that a particular signal was missing and this indicated that a specific card had probably been damaged. Through their guidance, the crew were able to identify a faulty input/output (I/O) card in the PLC. With the diagnostics complete, the crew rapidly replaced the damaged card. This was possible because the vessel was carrying the critical spare parts recommended by MacGregor. The crane was repaired, tested and back in normal operations within two hours of the lightning strike.

It is easy to see that without MacGregor OnWatch and the strategic spare parts outfit, the outcome would have been very different. The mission would have been aborted and the crew would have had to minimise the risk of damage from the suspended load while a MacGregor engineer was flown in from Norway, via New Orleans and a shuttle helicopter.

On arrival, the engineer would have located the problem and then arranged to have the necessary spares sent from Norway unless he had managed to bring along the correct parts just based on experience. This would have taken between two and five days, depending on the solution. The costs and operational risks would have been significant, and there would inevitably be further repercussions in terms of the lost goodwill.

Other compelling case studies are available to read on the OnWatch website **www.macgregoronwatch.com**

A-frame further enhances trenching capability

Existing onboard equipment was exploited in the installation of an A-frame to launch and recover 210-tonne trenching tractor in challenging sea conditions

MacGregor has won a major role in a conversion project that will see a lengthened *Havila Phoenix* firmly established in its position as one of the world's most advanced trenching vessels. The conversion, scheduled for completion in the first quarter of 2014, will allow the 2009-built multi-role construction and intervention vessel to play a vital role in dynamic trenching and product lay systems within the DeepOcean fleet.

"We will design, construct and install a 250-tonne SWL A-frame to deploy and recover a 210-tonne T3200 trenching tractor. The system will use the winch and wire of the vessel's existing 250-tonne SWL MacGregor active heave-compensated (AHC) offshore knuckle-boom crane," says **Gaute Sjusdal**, Vice President, Offshore Service.

"MacGregor is well known for its ability to design and deliver conversions and aftermarket engineering solutions. We are equally happy working with equipment which we originally supplied, as in this case, or with existing equipment from other manufacturers."

The A-frame will be located at the after end of the extended working deck and will pivot to allow the large trenching tractor to be safely launched and recovered over the vessel's stern. While the frame will have its own hydraulic power unit and controls, the design uses the winch and wire of the vessel's MacGregor offshore crane to lower and recover the tractor to and from the sea bed.

"MacGregor is well known for its ability to design and deliver conversions and aftermarket engineering solutions"
– Gaute Sjusdal

A system of sheaves will provide the necessary leads for the wire, and a hoist will be used to transfer the wire to and from the A-frame.

Announcing the long-term charter of *Havila Phoenix* earlier this year, DeepOcean UK's Managing Director **Tony Inglis**, said: "We are delighted to be chartering this high specification vessel from Havila. The trenching systems on board will offer unparalleled performance to our customers in the oil and gas and renewable markets. This announcement heralds the return of DeepOcean as the world's leading seabed intervention contractor." DeepOcean UK is a subsidiary of DeepOcean Group Holding BV.

Havila Phoenix will be lengthened by 17.4m to 127.4m. The advanced, 2,354kW (3,200hp) T3200 tracked trenching machine carried on deck will be equipped with a high sea state handling system designed and constructed by MacGregor.

This subsea vehicle will be capable of working in a combination of mechanical cutting and jetting modes, offering a step-change in burying capability for all sectors of the subsea energy industry. The vessel will also be fitted with a high power, neutrally buoyant ROV jet trenching system; a 2,000-tonne capacity carousel; and two DeepOcean owned and operated ROVs.

"This project further demonstrates our ability to design and deliver efficient, safe, cost effective solutions to the changing operational demands of specialised vessels"
– Gaute Sjusdal

"MacGregor's Offshore division has established a market-leading global reputation for its subsea load-handling technology applied to launch-and-recovery systems (LARS) for remotely operated vehicles (ROVs), subsea module-handling and AHC offshore/subsea cranes," says Mr Sjusdal. "This project further demonstrates our ability to design and deliver efficient, safe, cost effective solutions to the changing operational demands of specialised vessels."

In addition to the A-frame, its hydraulic power unit and associated systems, MacGregor's scope of supply includes:

- 15-tonne SWL hoist system located on the port side leg. This is not part of the trenching ROV LARS; it will be used to lift the ends of pipes and cables over the vessel's mooring equipment into the water astern of the vessel.
- Hoist system of suitable size and design to facilitate offshore installation and removal of the crane wire through the sheaves.
- Integration of the T3200 stabilisation system (including hydraulic and electrical supplies).
- Integration of the umbilical over boarding sheave on to the A-frame.
- Supply of flood lighting system from A-frame.
- Load and functional testing of system at MacGregor Norway.
- Supply of the A-frame control system panel and bridge station.
- Supply of a dedicated lifting set for a single point lift.
- Documentation

The system, which is to be DNV design approved, is intended for operations in conditions up to Sea State 5 (3.5m significant wave height and a wave period of 9.9 seconds).

MAIN PARTICULARS

Built	**2009**
Design	**Havyard 858**
Classification	**DNV + IAI, EO, DYNPOS AUTR, CLEAN DESIGN, SF, NAUT AW, HELDK SH, ICE C, COMF-V(3), DK(+)**
Length OA	**127.4m**

MacGregor will design, construct and install a 250-tonne SWL A-frame to deploy and recover a 210-tonne T3200 trenching tractor on board Havila Phoenix, which is scheduled to be lengthened for a new charter to DeepOcean

Offshore personnel basket replaces out of date lifters

MacGregor's highly manoeuvrable 'cherry picker' style personnel lifter ensures safe access for moonpool service and maintenance

Offshore rigs and platforms are complex structures and this inevitably causes access problems for maintenance, service and testing activities in their moonpool areas. To address these issues, it is normal practice to provide some form of dedicated personnel lifting equipment to allow safe and effective access for maintenance staff.

MacGregor has introduced its new cherry-picker style Personnel Lift Basket primarily to meet the demands of the offshore retrofit market, replacing older equipment that fails to satisfy the latest relevant rules and regulations, says Project Manager for MacGregor Offshore Service, **Arve Plassen**. There is also a newbuilding market, which is currently normally satisfied by personnel access equipment included in bigger machinery packages from drilling equipment suppliers.

As a result of a contract signed by Italian oil and gas company Saipem and Cargotec Norway in February this year, the first unit was installed on the Saipem rig, *Scarabeo 5*, during its class survey at the Keppel Verolme yard in Rotterdam, in September.

"Our initial study process included a survey conducted offshore to establish a three-dimensional model of the moonpool area and the surrounding deck structure," says Mr Plassen. "This allowed us to identify the location and requirements for the foundation structure, and, in conjunction with our lift model, it allowed us to check that the installed basket would be able to provide safe access to all the required areas, avoiding any collisions with other equipment and structures."

MacGregor's new cherry-picker style Personnel Lift Basket is designed to meet the demands of the offshore retrofit market

Following class approval of the design, in this case by ABS, the unit was fabricated and tested at one of MacGregor's cooperating companies in Gdansk, Poland.

The final elements in MacGregor's scope of delivery were installation and commissioning supervision in Rotterdam.

With a 'cherry picker' type design, the hydraulically-powered 300kg SWL MacGregor Personnel Lift Basket is controlled by an operator panel in the basket. It has a telescopic jib, which, along with the basket, has a wide range of movement to permit the best possible range of access.

The ABS rules require a high level of redundancy along with safety features, such as an integrated emergency stop and basket load sensing. In the event of a total power failure, an accumulator back-up system will bring the basket to a position for safe evacuation of the personnel.

Should the personnel in the basket become incapacitated; the unit can be manoeuvred using a back-up control position located at the personnel lifter pedestal.

"We are already seeing interest from other operators needing similar upgrades because of revised, more stringent regulations, or simply because their original equipment is worn out," says Mr Plassen. "In addition to the service and maintenance considerations, the Personnel Lift Basket fits well into MacGregor's BOP (blow-out preventer) handling equipment services."

MAIN PARTICULARS

Jib maximum operating length
- **17.2m**

Jib elevation
- **+ 42 degrees/ - 30 degrees**

Jib slewing
- **+/- 90 degrees**

Basket slewing
- **+/- 90 degrees**

Wind farms require specialist support

Experience in delivering shore link systems has enabled MacGregor to deliver a pontoon terminal that allows service vessels to transfer crew and supplies to and from offshore wind farms

"New offshore wind farms are appearing almost everywhere these days," says **Per Blad**, Sales Manager, Port and Terminal solutions. "Although people often wonder how the generated electricity is transferred ashore to the consumer, they don't usually think about how an infrastructure is developed to maintain and service the windmills. This requires its own expertise.

"A good example of this was a pontoon terminal contract that MacGregor won in January 2013 and completed at the end of July this year," Mr Blad explains. MacGregor designed and supplied a terminal to support the transfer of crew, workmen and supplies to and from an offshore wind farm. The delivery included a 110m-long floating pontoon, connected to the shore by two bridges, each 54m-long by 1.85m-wide. The width of the structure ranges from 6m to 12m at the bridge interface. "The pontoon end is locally wider at the approach to the bridges to ensure the required operational stability.

"The tidal range in the area is nearly 10m, so any shore-based supporting hubs or bases needed to be floating to ensure access at all times and tidal states," he adds. "The pontoon can now accommodate eight service vessels; although in extreme cases up to 16 can be moored in two rows."

Other contractors installed and equipped the terminal with pipelines and cabling to provide lighting, electricity, fresh water and fuel to stations. MacGregor's sister company, Hiab, also supplied a marine crane for the pontoon to enable provisions to be lifted on and off the vessels.

"Although people often wonder how the generated electricity is transferred ashore to the consumer, they don't usually think about how an infrastructure is developed to maintain and service the windmills. This requires its own expertise."
– Per Blad

A recent delivery included a 110m-long floating pontoon, which can now accommodate eight service vessels; although in extreme cases up to 16 can be moored in two rows

A recent large cruise ship delivery from Meyer Werft has 230 tonnes of MacGregor equipment installed, located at 47 positions on board, including tailor-made passenger and crew access doors and numerous side shell doors for luggage and provisions handling,bunkering, taking on fresh water, connection to electrical shore power and waste disposal

Technical advances strengthen **cruise sector return**

MacGregor offers new generations of cruise ships a range of benefits from the efficient integration of complex systems to, for instance, environmentally-friendly equipment featuring modern electric drives

In 2011, MacGregor refocused its attention on the cruise ship segment. "Our ambition is for growth in this sector," explains **Göran Hugon**, Area Sales Manager, RoRo Ships. "Through research, development and prototype production, MacGregor continuously refines all of its equipment, so that it delivers on both an efficiency and performance basis. We have also focused on integrating the complex systems that are found on cruise ships, which further enhances operational efficiency."

MacGregor has an extensive history of supplying cargo and passenger access equipment to the market and has had long relationships with a number of key players, including Meyer Werft. "The German shipyard has achieved an excellent worldwide reputation over the last decades," Mr Hugon says. "The company is especially known for the construction of super-sized, sophisticated cruise ships and has one of the most modern production premises in the shipbuilding industry.

"A recent large cruise ship delivery from the yard has 230 tonnes of our equipment installed, located at 47 positions on board," he notes. "In addition to providing tailor-made passenger and crew access doors, numerous side shell doors were also installed to allow a range of services and operations to be carried out safely and efficiently. These include luggage and provisions handling, bunkering, taking on fresh water, connection to electrical shore power and waste disposal. The same package of equipment will be

installed on a sistership in 2014. All the systems meet the owner's specific operating requirements and strict passenger safety regulations.

"Cruise ships operate in some of the world's most fragile ecosystems and a rising demand from both authorities and operators requires that onboard systems are as environmentally-friendly as possible; they also need to be efficient, cost-effective and quiet to succeed in this application," notes Mr Hugon.

"Through research, development and prototype production, MacGregor continuously refines all of its equipment, so that it delivers on both an efficiency and performance basis"

– Göran Hugon

"Our extensive portfolio of electrically-driven equipment suits this ship-type," he says. "They reduce the environmental impact of ships as they are energy and cost efficient and, with an impressive reference list and a decade of proven reliability and performance, there is a growing recognition of electric-drive system benefits from the industry."

Compared to traditional hydraulic systems, MacGregor's electrically-driven versions consume less energy; they are also quieter, with no noisy powerpacks required, and need less maintenance. Their control systems have user-friendly operating panels, making them simple to operate and monitor via a touch-screen interface.

"It is also easier to install electrical cables compared to hydraulic pipes, no flushing is required and it is easy to change an electric cylinder – if needed. Additionally, pollution from hydraulic oil is eliminated," he says. "As well as their operational and environmental credentials, our electrically-driven shell doors, tender platforms and lifting and loading platforms all have a sleek and streamlined design."

Typical MacGregor scope of supply for a large cruise ship

- Passenger entrance doors
- Tender access doors
- Provisions handling doors
- Luggage/store handling doors
- Theatre platform door
- Shore connection door
- Waste disposal door
- Bunkering doors
- Lifting/loading platforms
- Tender platforms
- Mooring platforms
- Water connection hatches
- Mooring doors
- Power packs

Cruise ship crane gives passengers a crow's nest view

Royal Caribbean International's Quantum class cruise ships, *Quantum of the Seas and Anthem of the Seas*, will feature a unique crane and viewing gondola supplied by MacGregor. The 'North Star' experience will lift guests 91m above sea level to give them panoramic views of the sea and surrounding ports of call.

MacGregor won the contract earlier this year to deliver 'North Star' to the 16-deck ship. It is under construction at German shipyard, Meyer Werft and is planned for delivery towards the end of 2014. *Quantum of the Seas* will be followed by two sisterships, *Anthem of the Seas* in spring 2015 and a third, which is yet to be named, in mid-2016. All will feature the 'North Star' experience.

The electro/hydraulically-driven crane will have an outreach of 41m, and the 7.1-tonne viewing gondola will be able to accommodate 14 guests and one crew member. The gondola will be fitted with a stabilising system to ensure that it remains level with respect to the vessel's deck. It will also damp gondola movements, providing a comfortable ride for the guests.

"We are the first crane supplier involved in anything like this type for a cruise ship," says **Jonas Hägglund**, MacGregor Sales Manager. "Safety is paramount, and the operator needed a crane supplier that would not only deliver the highest safety standards, but also proven, reliable technology for the North Star guest experience."

The system is designed for 100 percent redundancy with two separate power units, each large enough to drive the crane in reduced speed mode; it will also be provided with a diesel-driven emergency power pack. Additional safety features include automatic cut outs and safety valve overload protection on all crane motions.

North Star will be controlled using a separate PLC safety system in addition to a MacGregor CC3000 crane control system. "All crane movements will be smooth and immediate, with stepless speed control, essential for this type of guest experience. It is also important that the experience is as quiet as possible, so the main power pack will be rubber-suspended to minimise vibrations and noise transmission; the crane housing will also be insulated to minimise noise," he adds.

The MacGregor solution included reinforcing the upper deck by installing beams in the existing ship structure so that it was possible to fit foldable suspensions and wires

Increasing car capacity benefits bottom line

The ability to carry more cars in a flexible configuration can increase operating profits; MacGregor proves that making the most of even the most restricted spaces can bring greater rewards

To increase capacity on its service between the Norwegian islands of Bodø, Værøy, Røst and Moskenes, in February this year Torghatten Nord contracted MacGregor to modernise the car deck arrangement on its 4,000gt RoPax ferry *Bodø*. The ship can now accommodate around 100 cars, 22 more than before.

As well as a hydraulically-operated hoistable car deck, the contract also included the supply and installation of two hoistable access ramps from the main deck and a compact power pack positioned below the main deck. "The car deck arrangement also allows the owner greater flexibility when combining different loads," explains **StefanWide** Director, MacGregor RoRo Conversions. "As well as carrying more cars than before, *Bodø* can also still accommodate trucks when the hoistable deck is stowed.

"It was a challenge to strengthen the ship's structure to enable it to carry the load from the new equipment," says Mr Wide. "The nature of the superstructure, and the fact that the main passenger deck was covered by parquet flooring, meant that it was not possible to weld on to the top plate above the main car deck where the MacGregor equipment needed to be installed. It was also important to keep the weight of the new arrangement down to a minimum, as this would have implications for the vessel's speed and fuel consumption. "Our solution included installing beams in the existing ship structure, so that it was possible to fit foldable suspensions and wires."

The installation of the MacGregor equipment at Remontowa Shipbuilding SA, Gdansk, in Poland, started at the beginning of May and was completed at the beginning of June. "Once we had received the order we had four months for equipment delivery, start up and commissioning," Mr Wide says. "It was a tight schedule, which we met. In another project for Torghatten Nord in 2012, MacGregor supplied cargo access equipment for its four new liquid natural gas-powered ferries *Landegode, Værøy, Barøy* and *Lødingen*.

Each of the four ferries, built at Remontowa, feature a bow visor and bow door with folding ramp, a stern door, a stern ramp and two ramp covers, a gas engine service hatch and two power packs. We were able to meet Torghatten's need for a shorter delivery time than was contracted."

Torghatten Nord AS is part of the privately-owned corporation Torghatten ASA and operates a complex network of conventional and fast ferries in the Norwegian counties of Nordland and Troms. At the beginning of 2009, the operator acquired 45 vessels from Hurtigruten ASA, and is now running scheduled traffic on routes from Brønnøysund in the south of Nordland up to the northern parts of Troms.

CalMac's new low-emission ferries call for **efficiency and reliability**

Efficient MacGregor RoRo outfits contribute to the environmental credentials of two electric hybrid ferries that will shortly run low-emission life-line ferry services between Scotland's island communities

Scottish operator CalMac Ferries Ltd (CFL) will shortly take delivery of two new ferries with diesel-electric hybrid propulsion systems designed to minimise their environmental impact. They will use some of the most innovative new 'green' technology, CalMac says, including battery banks supplying a minimum of 20 percent of the energy consumed on board.

"When this is combined with a RoRo access equipment outfit that delivers highly efficient port-turnarounds, the new ferries will provide truly sustainable life-line services in the area," says **Lars Öberg**, Sales Manager RoRo ships, at MacGregor.

MacGregor supplied the bow and stern ramps, power pack and a portable power pack. "CalMac has a long history of operating MacGregor RoRo equipment," says Mr Öberg. "The new 44m ferries will feature a ramp design based on a proven ramp delivery to the 54m double-ended ferry Loch Shira, also built by Ferguson Shipyard. Loch Shira entered service in 2007 and by 2012 its MacGregor ramps had logged more than 40,000 operation cycles – and CalMac is very satisfied with their reliability".

"The new 44m ferries will feature a ramp design based on a proven ramp installation on Loch Shira which entered service in 2007 and by 2012 its MacGregor ramps had logged more than 40,000 operation cycles – and CalMac is very satisfied with their reliability"

– Lars Öberg

CalMac is owned by the Scottish Government and operates in some of the most isolated areas of the UK. The company is part of Caledonian Maritime Assets Limited (CMAL), which owns 30 ferries. The new ships have been funded by the Scottish Government and the European Regional Development Fund (ERDF).

Hallaig and *Lochinvar* are a product of a CMAL low emission hybrid ferries project and will have a service speed of 9 knots maintained by small diesel generator sets. The benefits of the hybrid ferries include reduced fuel consumption and impact of CO_2 emissions and other pollutants, noise reduction and lower maintenance requirements. They will recharge overnight at the islands they will serve. It is anticipated that energy from local wind, wave or solar systems will be used in the future to charge the batteries, reducing further the carbon footprint.

Each ship can carry 150 passengers, 23 cars or two large trucks (HGVs).

The new ferries are designed to operate on the many short crossings around the River Clyde and Hebrides. *Hallaig* will enter service first, serving communities on the Isles of Skye and Raasay, and *Lochinvar* will follow by the end of the year and serve the Tarbert to Portavadie route. CMAL says that all of its ferries are specially built for the ports they serve yet are still interchangeable and able to serve other crossings.

Hallaig and Lochinvar will feature a ramp design that is based on a previous successful ramp delivery to CMAL

Upgrading controls modernises mechanically-sound equipment

While the stern ramp and electric cranes on the first deepsea RoRo ship remained in good condition after 43 years, their electrical control systems had to be brought up to date

Modernising cargo systems to extend a ship's working life or improve its profitability has long been a MacGregor speciality. "We have the experience to find a solution for any type of ship, of any age," says **Dave Drenon**, Service Operations Manager with MacGregor USA, "regardless of whether or not the original equipment was ours".

The world's first deepsea RoRo ship has recently undergone modernisation work. The 1971-built *Paralla* features an angled electro-hydraulic MacGregor stern ramp allowing it to carry out loading and discharging operations from a quay parallel to the vessel's starboard side. *Paralla* is equipped with twin tandem 18-tonne SWL electric cranes.

In 1986, reflagged and renamed *Cape Edmont*, the ship took on the new role as a vessel in the Maritime Administration's (MARAD) Ready Reserve Force (RRF). "RRF ships are expected to be fully operational within their assigned readiness status, so the installation and final testing had to be accomplished on board while *Cape Edmont* remained on five-day readiness," Mr Drenon says. "Therefore all onboard work had to be carefully planned."

While the vessel's stern ramp remained in a good, serviceable condition, its electrical control systems had become obsolete and this had the potential to present problems when sourcing spare parts. Consequently, the vessel's manager, Marine Transport Lines, commissioned the MacGregor Service office in Portsmouth, Virginia, to design, build and install a programmable logic controller (PLC) control system to replace the existing relay logic systems for *Cape Edmont*'s stern ramp.

"The design and build had to respect Marine Transport Lines' desire to use domestically produced components for the upgrade work," Mr Drenon says. "So, for the ramp, we selected a GE Fanuc VersaMax PLC and used GE Proficy Machine Edition Software Version 7 to develop a program that replicates the functions of the original relay logic system."

The design called for the retention of the existing relay cabinet, so a new cabinet back

"We have the experience to find a solution for any type of ship, of any age"

– Dave Drenon

"*Cape Edmont's* cranes demonstrate the robust reliability of electric machinery in the marine environment. Although they are 43 years old, they have performed perfectly throughout their working lives, according to Marine Transport Lines"

– Dave Drenon

panel was constructed with the wiring pre-installed, together with a new operator panel. A 12inch HMI was provided for mounting in the cabinet door, along with an emergency stop, alarm buzzer and reset button.

The HMI was programmed with five screen options:

- Main screen to monitor system status, operator inputs and switch settings
- Set-up screen to view critical limits, controls, pumps, filters, circuit breakers and power supply and system status
- Fault screen to view system problems
- Password protected by-pass Screen to override or adjust controls
- Hydraulic screen to view all hydraulic controls and operation

Final on-board testing was carried out to the complete satisfaction of Marine Transport Lines and ABS, the ship's classification society.

Cape Edmont is the only vessel in the RFF's Cape Ducato class equipped with heavy cargo cranes. Its ASEA electric cranes can operate independently or in tandem mode, controlled from either cabin.

Following an inspection carried out by its service engineers to evaluate the parts and work needed to replace the old controls with modern, supportable hardware, MacGregor

To enhance reliability, Cape Edmont's angled electro-hydraulic MacGregor stern ramp has had its electrical control systems upgraded

(USA) received an order to proceed with the control system upgrade.

The new control system was designed, constructed and a complete simulation of the system accomplished prior to delivery to the ship.

Installation and final onboard testing of new electrical control system panels, new joystick controls and motor starter cabinet followed initial repair and replacement of the existing hard wiring.

"While electric cranes are now commonly specified for newbuildings, it is not always appreciated that electric cranes, windlasses, capstans and other deck machinery were widely used in the middle and latter parts of the twentieth century, particularly once steam power had largely given way to motor vessels," Mr Drenon says. "Electric machinery was well developed and reliable, but it went out of fashion simply due to its cost. Electro-hydraulic alternatives were a lot cheaper to manufacture. However, with modern advances in technology – in particular the development of variable frequency drives – and in the light of the environmental problems associated with hydraulic leaks, electric machinery is making a strong comeback, and MacGregor is leading the way.

"*Cape Edmont*'s cranes demonstrate the robust reliability of electric machinery in the marine environment. Although they are 43 years old, they have performed perfectly throughout their working lives, according to Marine Transport Lines. With their upgraded control systems there is every reason to suppose that they will continue to provide reliable service."

VESSEL PARTICULARS:
Cape Edmont
- **Length: 199m (652ft)**
- **Beam: 29m (94ft)**
- **Draft: 9m (31ft)**
- **Displacement: 30,421 tonnes**
- **Speed: 16.2 knots**

Customer service
support strengthened

Whatever the current economic climate, shipowners appreciate planned maintenance contracts which add long-term value and offer sustainable lifetime support

A MacGregor Onboard Care (MOC) contract extends the service lives of cargo ships and offshore vessels. "Proper care increases both the working life of any equipment and its second-hand value," says **Tommi Keskilohko**, Director of Service Contracts.

"We are increasing 'MOC awareness', and our MOC strategies and ways of working have been receiving a lot of attention recently. As well as simplifying MOC specifications and service agreements, we are also speeding up response times even more, and raising the level of all aspects of customer service. We are also strengthening our involvement in the newbuilding sector to get MOC contracts included in new projects at the earliest stage possible.

"Regardless of the current weak marine market, we believe that customers are not just making 'quick-fix' decisions, but are also making long-term plans based on proper care for their ships. This is where MOC adds value for them".

One owner taking this approach is the Grimaldi Group. For the past ten years the Italian shipping company has held MOC contracts. Its current full maintenance package includes preventive and condition-based maintenance programmes. "The new technology provides even more features for Grimaldi, ensuring better equipment utilisation and life-cycle analysis," says **Roberto De Gioia**, MacGregor's Regional Manager for the Mediterranean who is responsible for the Grimaldi account.

"The continuation of Grimaldi's agreement with MacGregor shows the confidence that the owners have acquired over the years," Mr De Gioia says. "At the same time, MacGregor has proved its commitment to maintaining the operation of Grimaldi's fleet equipment, ensuring the full sustainability and earning capabilities of its ships".

For customers, the reliability of a product and the support available in terms of after-sales and a global service network, are, in many cases, key factors that influence a company's purchasing decisions.

"Innovative engineering, combined with global service has been a MacGregor cornerstone since the foundation of the company in 1937," says **Björn Stenwall**, Vice President, MacGregor Merchant Ship Service. "We believe that once equipment is in service, it should have lifetime support in the form of maintenance and service solutions. Later in its lifetime – whether it is on board a ship, offshore, or in a port – we can offer modernisation and conversion programmes to help customers get even more from their investments.

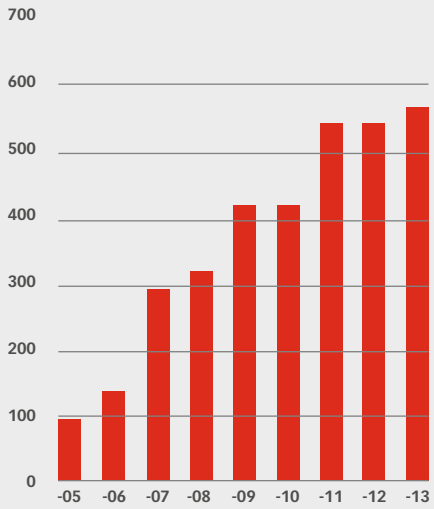
"While ships and shipping undergoes continuous change, the MacGregor principles remain the same: we provide our customers with the best products that technology can offer and the best service that a company can deliver, all at a competitive price. As part of our commitment to these principles, we are continuously looking for opportunities to improve our service availability for customers by expanding our capabilities and our global presence.

"We are also better defining the role of our service competence centres, so that they can support our worldwide service network as efficiently and quickly as possible".

"Proper care increases both the working life of any equipment and its second-hand value"

– Tommi Keskilohko

Vessels covered by MOC agreements



MacGregor's service portfolio includes:

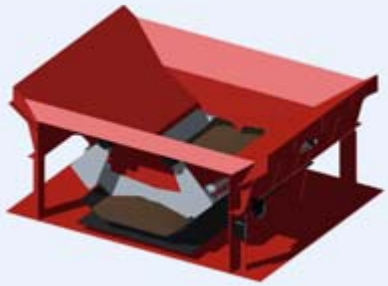
- Maintenance, repairs and installations
- MacGregor Onboard Care (MOC) service contracts
- Spare parts
- Inspections
- Training for crew and personnel
- Modernisations and conversions
- Drydockings
- 24/7 support
- Consultancy, commissioning and warranty handling services

Selfunloader systems benefit from continuous development

Four 30,000 dwt bulk carriers destined for the North American Great Lakes will be the first vessels to benefit from MacGregor's full flow gates and fully enclosed booms, designed to deliver new levels of environmental protection and efficiency

MacGregor has commenced its first gravity selfunloader deliveries to incorporate two major new developments: a totally enclosed discharge boom and a full flow cargo gate.

Four new 30,000dwt Great Lakes vessels under construction at Nantong Mingde Heavy Industry Stock Co Ltd in China will be the first to reap the benefits offered by these improved system elements. The first MacGregor deliveries will be completed before the end of 2013 and the first vessel is expected to be delivered from the shipyard by mid-2014. The Canadian owners already have one of the world's largest fleets of gravity selfunloaders. They are convinced that the MacGregor selfunloading system is cost and time effective, delivering high discharge capacities and high standards of environmental protection.



"Along with minimising material flow disruptions and raising the discharge capacity, the MacGregor Full Flow Gate also increases the amount of cargo a ship of a given size can carry"
– Thomas Wallin

MacGregor's gravity selfunloading systems first appeared in 1956 and are currently in service with ships ranging from 4,500 dwt to 135,000 dwt, with discharge capacities of up to 6,000tph.

"Regardless of its current success and market share, MacGregor is always looking for ways to refine and improve its products across a wide spectrum of considerations, including operational efficiency, safety, reliability and minimised environmental impact," says **Tomas Wallin**, Technical Manager for MacGregor Selfunloaders. "This pro-active >

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– Thomas Wallin

>> attitude is well demonstrated in its gravity selfunloader range which won *International Bulk Journal*'s environment protection award in 2009 and 2010. These latest developments take the overall system to new levels of efficiency, safety and clean bulk cargo handling.

"Although the primary aim of the new totally enclosed boom is to reduce the environmental impact of discharge operations to an absolute minimum, the carefully considered design and development work has delivered a number of other significant benefits that increase efficiency and safety."

The MacGregor closed boom incorporates some smart features in the design of its optimal support structure. The smooth upper, outer surface prevents ice accretion that might otherwise hamper operations in severe weather conditions. The smooth inner bottom surface facilitates easy cleaning operations. Total enclosure also means that there is no need for any extra installation to provide overflow protection.

Personnel access for service and inspection purposes is much improved. In the past, access to boom conveyors has not always been easy, often involving handling large, unwieldy cover plates. In the new boom, walkways alongside the belt allow safe and easy access to the equipment. This ensures that service and inspection can be performed safely in any weather conditions.

Total enclosure also has a positive impact on the boom's useful working life, as its mechanical and electrical components are well protected from the harsh external elements.

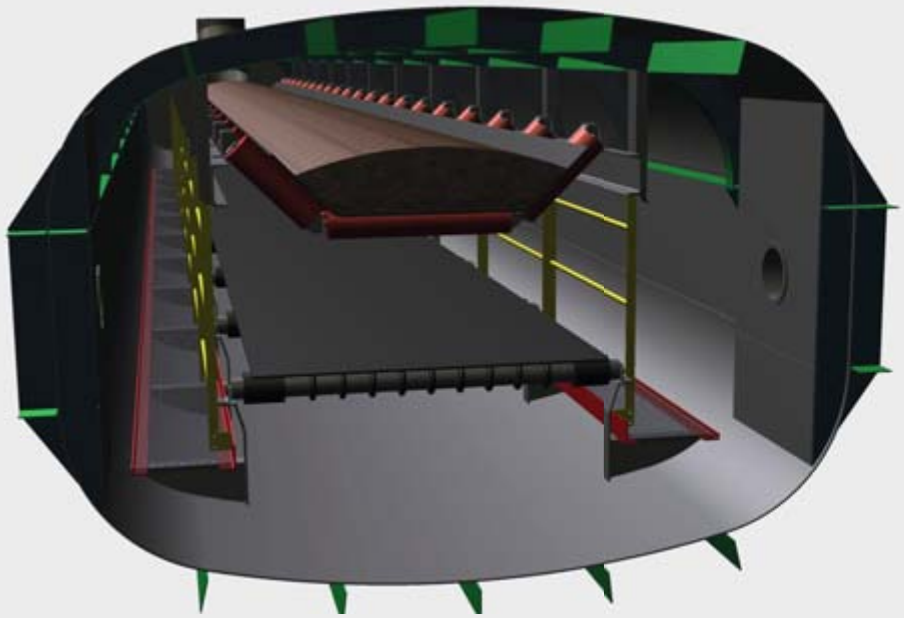
"Although the primary aim of the new totally enclosed boom is to reduce the environmental impact, the carefully considered design and development work has delivered a number of other significant benefits that increase efficiency and safety"

– Thomas Wallin

Basket gates are key elements in MacGregor gravity selfunloading systems; they transfer bulk material from the ship's cargo holds down onto the belt conveyor.

"Here again, careful design has delivered a number of separate, important advantages," says Mr Wallin. "Customer input and consideration of cargo characteristics including particle size, bulk density and moisture content, have delivered a gate with a wider opening for the same belt width as used with a traditional gate. Overflow protection and shear plates help to create an optimal material profile on the conveyor. The system can be stopped and restarted without changing the flow and the shape of the material

"Along with minimising material flow disruptions and raising the discharge capacity, the MacGregor Full Flow Gate also increases the amount of cargo a ship of a given size can carry. Careful positioning of the gate operating cylinders has resulted in a design that actually takes up less space within the vessel parameters that the traditional design. The less space occupied by the gates and conveyors, the more there is available for the revenue earning cargo."



Scope of delivery

The gravity selfunloading systems will have a rated capacity of 4,360tph for coal and 5,450tph for aggregates. The new vessels will be able to handle cargoes including coal, aggregates, iron ore pellets, coarse and fine salt, grain, potash, clinker, ilmenite, bentonite, gypsum and coke.

Each vessel system comprises:
100 MacGregor full flow gates
2 hold conveyors
2 cross conveyors
1 C-conveyor lifting arrangement
1 MacGregor enclosed boom

MACGREGOR

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Note
• = 24-hour service numbers

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