

MacGregor News

ISSUE 160
SPRING 2010

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planned maintenance

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customers' competitiveness

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to transfer vehicles at sea

Offshore technology

Multi-disciplinary
expertise combined
in complete
solutions **10**

Innovative designs, guaranteed service



CARGOTEC – In Brief

CARGOTEC IMPROVES the efficiency of cargo flows on land and at sea – wherever cargo is on the move. Cargotec's daughter brands, Hiab, Kalmar and MacGregor 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.

Having operations in more than 120 countries and located in all major service hubs worldwide, Cargotec is well-placed to maintain its own as well as other-branded equipment. Maximising machinery uptime and improving the lifecycle costs of its customers' equipment remains Cargotec's top priority as the industry's leading solutions provider. Cargotec's sales totalled EUR 2.6 billion in 2009 and it employs more than 9,500 people.

MACGREGOR

MACGREGOR is the global market-leading brand in marine cargo handling and offshore load-handling solutions. Customer-driven MacGregor engineering and service solutions for the maritime transportation industry, and the offshore load-handling and naval logistics markets are used onboard merchant ships, offshore support vessels, and in ports and terminals.

The maritime industry has benefited from innovative MacGregor products for over 70 years. MacGregor cargo and offshore load handling solutions are both economical and competitive. Equipment includes cranes, hatch covers, RoRo and cargo lashing equipment, bulk handling and offshore load handling systems and solutions for naval logistics. Our global network of skilled service specialists can assure your equipment's availability and peak operating condition.

HIAB

CUSTOMER-DRIVEN HIAB on-road load handling solutions and products move goods and materials in various industries, such as construction, forestry, industrial, waste handling, recycling and the defence forces. The Hiab brand is the global market leader in on-road load handling solutions. The offering includes loader cranes, forestry and recycling cranes, demountable systems, tail lifts and truck-mounted forklifts. Our service network ensures the safe functioning of equipment throughout its long life cycle.

KALMAR

KALMAR solutions handle containers and heavy materials in ports, terminals, distribution centres and in heavy industry worldwide. Kalmar equipment is market leader in ports and terminals where containers are handled by ship-to-shore cranes, yard cranes, shuttle and straddle carriers, reachstackers and empty container handlers. Moreover, Kalmar forklift trucks are used by heavy industry, Kalmar log stackers by the wood and paper industry, and Kalmar terminal tractors by distribution and logistics centres.

SERVICES

LOCATED IN ALL MAJOR SERVICE HUBS worldwide, Cargotec is well-placed to maintain its own as well as other-branded equipment. Maximising machine uptime and improving the lifecycle costs of its customers' equipment remains Cargotec's top priority as the industry's leading solutions provider.



Cargotec offers
a 'one-stop-shop'
service for its
offshore
customers **10**

COVER STORY

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Investment in the future continues in all market conditions

GLOBAL ECONOMIC fluctuation tests companies' ability to tailor their reserves, but a long-term focus must always be kept in mind while making short-term adjustments. Successful companies are careful about where they direct their resources. For a market leader it is always crucial to make investments that will secure future growth. Cargotec understands that to achieve a sustainable future, organisations need to allocate significant resources for areas such as service and product R&D.

Our clear intention is to be as close to our customers as possible. For after sales this means understanding a customer's business as well as having skilled engineers nearby. The recent merger of Cargotec's Hiab and Kalmar business areas and starting to form a common service organisation for all Cargotec's customers, give us an opportunity to provide a broader based approach to service, and greater competitiveness. Our customers will benefit from these changes by having rapid response times delivered by a bigger pool of qualified service personnel.

WORKING CLOSELY together with our customers enables us to introduce innovations that improve the safety, efficiency and sustainability of their operations – innovative service as well as innovative products. A service area gaining in popularity is planned maintenance; owners appreciate the security of knowing that service providers

can take care of their vessels to whatever extent suits their operation or preference. A good example is provided by our recent contracts with Grimaldi, one of which is a continuation of a three-year agreement, emphasising how important the company believes this cover to be.

RECENT PRODUCT INNOVATIONS include offshore technology that can tap into increasingly challenging sectors, such as ultra-deep waters. Cargotec can also combine multidisciplinary expertise and experience from various parts of the company to come up with solutions that would be beyond the scope of a niche specialist. This emphasises our ability to be a supplier of complete offshore solutions. A recent example is a package of MacGregor systems for a deepsea research vessel: we are supplying most of the offshore load handling equipment onboard, while other suppliers could only offer either winches or a module-handling system, but not both.

"This emphasises
our ability to be
a supplier of complete
offshore solutions"

LAST YEAR saw the launch of our second-generation electric-drive technology for side-rolling hatch covers, MacRack, building on the proven technology of the first generation in service. We now have references for our electric-drive technology across virtually all ship types, meeting customer demands and also presenting an economical environmentally-friendly option for operators wanting to move away from dependency on hydraulic equipment.

We are also preparing to launch several other new products, including a grain bulkhead sealing system, and will reveal more details about these later in the year.

TO PROVIDE CUSTOMERS with solutions that will benefit their businesses, we must continue to develop, introduce and refine new technology and services. This cycle needs constant attention and our commitment to investing resources in it will make sure that we can come up with answers to tomorrow's cargo and load handling needs.



OLLI ISOTALO
Executive Vice President, Marine





Cargotec develops services for all customer segments

Newly appointed to develop Cargotec's services globally for all customer segments, Stefan Gleuel is concentrating on creating an operation model to benefit customers' operations; this will enable the transfer of best practices and identify the synergies of different service operations, while respecting the different business models that exist in Cargotec businesses

CARGOTEC IS DEVELOPING its service business even further. Merging Hiab and Kalmar recently to form the Industrial & Terminal business area has demonstrated the benefits to customers when the transfer of best practices and identification of synergies produced a broader and more competitive service offering.

"Customers will benefit from rapid response times delivered by a bigger pool of qualified service people," Stefan Gleuel says. "Frontline engineers will enjoy the increased responsibility and job diversity provided by their new skills, along with enhanced job satisfaction and greater security of employment. We have started to cross-train our service personnel, especially service engineers, and the results have been very good and positive.

"We already have established common business development and lifecycle services, and spare parts and logistics development is under way. Cargotec's regional spare parts distribution centres offer availability, speed and cost-efficiency in spares logistics which will benefit all customer segments. The next step is to harmonise centralised service where this is beneficial".

For example, there is an ongoing programme mapping delivery times for more



"Customers will benefit from rapid response times delivered by a bigger pool of qualified service people"

STEFAN GLEUEL

than 650,000 parts by air and sea freight via the existing spare parts hub infrastructure. This will provide vital data for the development of 'time zone distribution centres', leading ultimately to a single, unified spare parts distribution system.

Mr Gleuel and his team have access to records of customers' spare parts requirements and regional demand, and this information is being analysed and the results factored in when determining the optimum location for spare parts hubs and satellite distribution centres, along with the necessary stocking levels.

An integrated approach helps Cargotec's service network when expanding into new markets – now this can be done more efficiently from the whole Cargotec's perspective when, for example, focusing on emerging markets such as Latin America and Africa.

"To succeed, we must win business by being better and more competitive than the opposition," Mr Gleuel maintains. "In addition, it is important to customise services to reflect local cultures and practices, not only on a regional level but also country by country, and sometimes even company by company".

Tough conditions need an experienced hand on the helm

A GLOBAL ECONOMIC RECESSION challenges a company, and this was the backdrop that met Erik Hägglund, senior vice president of Cargotec marine division, as he entered the role a year ago. With over 30 years experience in the company, in its different forms, Mr Hägglund started as a hydraulic engineer and has faced ups and downs before. "Last year was a very challenging year with heavy increases in volumes to be delivered, but at the same time managing the threats of cancellations and postponements," he says.

"With the extraordinary performance and achievements of all personnel in the company, we succeeded in not only meeting but exceeding our tough targets for the year. Cancellations and postponements were handled professionally, with very limited negative effect. We also took positive steps and looked to the future, launching a number of new products, including the expansion of our electric drive portfolio."



ERIK HÄGGLUND:
"Our focus is on our customers and delivering products according to schedules"

Having an experienced person leading the division this year has provided a sense of stability and trust. Mr Hägglund's aim was to offer this platform and get the best from people's experience, whilst also using best practice guidelines for the company.

"For 2010 we are continuing with the same spirit based on our mission: to make use of the valuable resources within the division as well as the whole of Cargotec. We think that this is possible by transferring best practice initiatives, making use of common resources, being close to the market and offering our customers the best products and service available.

"Our focus is on our customers and delivering products according to schedules from our healthy order backlog. As market leader, we are also heavily focusing on R&D so that we develop new innovations and increase our product portfolio for the years ahead."



THE NEW MACGREGOR bulkhead sealing system

New MacGregor bulkhead sealing system enters type-approval phase

RECOGNISING a major gap in the market, Cargotec is preparing to launch its solution to the problem of grain bulkhead tightening. "Lately we have received several contacts from customers needing a solution to replace commonly-used, time-consuming and messy polyurethane/rag/tape bulkhead sealing arrangements," says Cargotec's R&D director, Ari Nousiainen.

"Partly these requirements are based on tightening legislation related to food transportation and partly they are related to this common customer request. We took on the challenge and are now close to having a type approval for our solution, the new

MacGregor Bulkhead Sealing system, which will be available on the market before this summer. The product will be suitable not only for newbuildings, but especially existing vessels will benefit from an easy transfer to this new sealing solution.

"We are currently undertaking the last challenge of product development, the type approval procedure. This is underway and therefore, the new system will be compliant for a grain tightness certificate. Furthermore, the system will be based on a modular structure and be reusable and hygienic, as well as easy to assemble, disassemble, clean and store," highlights Mr Nousiainen.

Next-generation cargo cranes use electric drives

CARGOTEC HAS LAUNCHED its effective and environmentally-friendly range of electrically-driven cranes. The MacGregor GLBE crane series is built upon a variable frequency drive and inherits the proven characteristics of the previous generation of wire-luffing cranes. All machinery is enclosed within the crane housing, ensuring safe operation and ease of maintenance.

MacGregor electric cranes are accurate, and they eliminate the need for hydraulic oil. They are also energy efficient in operation and have lower power consumption, translating to lower running costs and ultimately a lower environmental impact. They also offer shorter operation times, allowing full speed/full load in all modes.

Each crane is delivered as a complete unit tested electrically and mechanically before delivery, ready for installation on board. Access to the driver's cab follows the proven internal route through the deck mounting and base of the crane.

Stena RoPax conversions secured

IN SPRING, CARGOTEC secured conversion contracts for three Stena Line RoPax vessels: the 39,169gt *Stena Germanica* and *Stena Scandinavica* and the 44,327gt ex-*Stena Hollandica*. The conversion work will ensure that the vessels are better suited to their new trading routes and will be carried out in three separate stages, starting in June 2010 and finishing at the beginning of 2011.

In a separate contract for Stena RoRo, Cargotec has now completed

a conversion project on the 25,000gt RoPax *Borja*. The project started onboard the vessel during a voyage from Barcelona and was finished alongside in the Rotterdam.

"These new orders show that our customers appreciate our ability to provide solutions for their vessels not only at the newbuilding stage but also when the vessels are in operation," says Jonas Nordström, director of RoRo conversion at Cargotec.



A 150-TONNE MACGREGOR active heave-compensated subsea crane

Cargotec benefits from buoyant offshore load-handling business

WHILST MANY AREAS of the marine industry are slowly recovering from the recent global economic crises, the offshore load-handling sector is buoyant. "We are prepared to meet the demand from the industry by providing complete offshore load handling solutions for our customers, offering both innovative and dependable technology, and global service," says Øystein Bondevik, sales director for offshore load handling.

Cargotec has several major new contracts, including orders for:

- a 200-tonne MacGregor subsea active heave-compensated (AHC) knuckle-jib crane with a 2,000m wire capacity. The crane is destined for a Toisa-owned vessel, which is operated by leading offshore vessel specialist, UK-based Sealion Shipping Ltd, and will be manufactured at Cargotec's offshore load handling site in Kristiansand, Norway. It will be delivered in the second half of 2010.
- two large AHC MacGregor subsea knuckle-jib cranes for Singapore-based Ezra Marine Service Pte Ltd. The first is for an ultra-deepwater AHTS. This 150-tonne SWL crane has an under-deck mounted winch with a 3,000m wire. The second crane is a 150-tonne SWL version being installed on a DP self-propelled accommodation barge. Cargotec will manufacture key components for the cranes at its state-of-the-art unit in Kristiansand, Norway, and at its recently modernised manufacturing, assembly and testing plant for offshore load handling solutions in Singapore.
- a range of advanced MacGregor offshore and subsea load handling systems for a deepsea research vessel which will be built at Mitsubishi Heavy Industries Shimonoseki shipyard in Japan. The order is significant for a number of reasons: it not only serves as recognition of Cargotec's capacity and technological expertise in the offshore load-handling segment, but also that the company is able to supply a comprehensive package of offshore load handling equipment on board.

Vietnamese partner plants follow proven production concept

CARGOTEC'S MARINE DRY CARGO BUSINESS has a long history of expertise in hatch cover fabrication, and its latest achievement is the near completion of two new purpose-built hatch cover manufacturing partner plants in Vietnam. These have been mainly designed to serve Vietnamese shipbuilding customers, but can also provide export deliveries to other countries.

The plants follow the same well proven concept as Cargotec's partner facilities in China (five plants) and Japan (three plants): partners invest in the site, buildings and machinery, and Cargotec provides the production layout and specification, and tailors an optimised production flow. "Our role is to be responsible for the production development, supervision and quality development at the plant," says Olli Dahl, procurement director for Cargotec's marine dry cargo business.

Production capacity is approximately 10,000 tonnes/year at the first plant and around 20,000 tonnes/year at the second. The plants are equipped to fabricate all types of MacGregor hatch covers and production at the first plant will start with folding hatch covers for bulk carriers.

Loose container lashing contracts secured for 'mega' sized ships

CARGOTEC HAS SIGNED CONTRACTS worth €11 million for loose container lashings for two series of mega-sized container ships on order at Samsung Heavy Industries in Korea.

The first contract, in February, came from United Arab Shipping Company (S.A.G.), Gulf Co-operation Councils, for its new building order of nine 13,100 TEU container vessels.

The second contract came in March from China Shipping Container Line, and requires Cargotec to supply eight shipsets of loose container fittings for a CSCs series of 14,100 TEU container ships.

"Both of these are extremely important orders for us and I believe that the CSCS order is the biggest single deal we have won so far in the China area for our lashings business," says Tommi Keskilohko, Cargotec sales manager for container ships.

The company also secured a new 13-vessel lashing order from container shipping specialist, Seaspac. Five 4,500 TEU vessels are under construction at Samsung Heavy Industries and will be delivered from this year to 2012. The remaining eight 13,100 TEU ships are scheduled for delivery from 2011 to 2012 and are being built at Hyundai Heavy Industries and Hyundai Samho Heavy Industries shipyards.

MacGregor access equipment serves 18 Xiamen-built PCTCs

AT THE BEGINNING of 2010 German shipowners Rickmers and Lauterjung took delivery of the 4,900-car capacity PCTC newbuildings *Vany Rickmers* and *Mediterranean Sea*, respectively, from Xiamen Shipbuilding. Within the next few months they will be followed by sisterships *Cary Rickmers* and *Arabian Sea*, which are being finalised at the Chinese yard. Xiamen Shipbuilding also expects to deliver another four PCTCs to Høegh Shipping over the next 18-months.

When completed, Cargotec will have delivered the design and key components for total of 18 similar vessels at the yard. All vessels feature MacGregor RoRo access equipment including quarter ramp, side ramp, hoistable ramp, rampway doors and liftable car decks on deck 4, 6 and 8.

Grimaldi renews and extends RoRo maintenance contracts

The Grimaldi Group intends to extend planned maintenance contracts to all vessels belonging to the group and its controlled companies, and the Italian shipping giant has started by renewing and extending its maintenance contract with Cargotec

MACGREGOR ONBOARD CARE

Further strengthening its long-standing relationship with Grimaldi Group, Cargotec has secured two more all-inclusive MacGregor Onboard Care (MOC) contracts from the Naples-based RoRo ship-owner. One is a continuation of a three-year agreement signed at the end of 2009 for a total of 27 vessels, which includes an option for a further two-year extension. The other contract, signed in January this year, covers any service issues on board nine vessels owned by a Grimaldi Group subsidiary, Atlantic Container Lines (ACL), and managed by ACL Ship Management (ASM).

"The renewal and extension of the maintenance agreement with Cargotec is proof of the confidence that the Grimaldi Group has gained in applying a preventive maintenance programme to vessels in its fleet," says the Grimaldi Group's corporate purchase director, Giancarlo Coletta. "This is a prelude to the wider extension of these concepts to all vessels and controlled companies of the Group.

"It also demonstrates how a partnership approach is paying back in terms of a customer-supplier relationship," Dr Coletta says.

"The continuation of the contract shows the fruitful co-operation and partnership with our VIP customer," says Roberto De Gioia, Cargotec's Marine Service regional manager for the Mediterranean. It covers all the RoRo access equipment – of which, a significant proportion are MacGregor

"The maintenance agreement with Cargotec is proof of the confidence that the Grimaldi Group has gained in applying a preventive maintenance programme to vessels in its fleet"

GIANCARLO COLETTA

Purchase Director
Grimaldi Group



products – for a total of 27 vessels and is valid for three years, with an option for a further two.

"Our commitment is to provide operative availability of equipment and ensure

sustainable ship operations and earning capabilities," Mr De Gioia explains. "And the highest level of cover agreement demonstrates the best value for the Grimaldi Group.

The MacGregor Onboard Care concept

CARGOTEC'S INNOVATIVE MACGREGOR ONBOARD CARE service concept offers customers sustainable ship operations and revenue earning capabilities by ensuring that equipment works when it is needed through flexible planned maintenance. The MOC concept was originally launched in 2004 to meet these requirements and, six years later, over 430 vessels are now protected by MacGregor Onboard Care agreements that take care of hatch covers, cranes, RoRo equipment, offshore devices, bulk selfunloaders and linkspans.

Understanding equipment servicing and the importance of planned regular maintenance is essential in ensuring that equipment on board a ship is available and working when it is needed. However to achieve this, Cargotec recognises that different shipowners – and indeed individual ships – have differing service requirements.

MACGREGOR ONBOARD CARE is a modular service concept; each module can be chosen to meet an individual need, and the desired level of interaction can be adjusted. Modules are grouped under four main categories:



GRIMALDI GROUP'S MOC contract covers a total of 27 vessels; one of which is Grimaldi Lines' Repubblica Di Roma

"The experience achieved from the past three years, and the real partnership acquired from working with our customer, was invaluable during the process of considering the large number of ships involved. It is vital to listen to customers' needs and communication is a key factor to success. Also, being close to our customers makes it possible for us to respond quickly and offer our expertise and technical know-how."

The ACL Ship Management contract also calls for the care of Grimaldi vessels. ACL Ship Management is totally owned by Swedish company Rederi AB

Transatlantic, which takes care of ship management and crewing for Grimaldi Group subsidiary, ACL. The three-year contract (with an option for a further two) will cover nine Grimaldi Group-owned vessels. Five 58,000 dwt G3 series vessels trade between Sweden, Europe and the US/Canadian East Coast. The remaining four Grande series ships trade between North Europe and West Africa.

The scope of contract includes full responsibility for the vessels' MacGregor stern ramps and stern doors. The G3 series' Jumbo-class stern ramp has a design load of 420 tonnes and the

"Our commitment is to provide operative availability of equipment and ensure sustainable ship operations and earning capabilities"



ROBERTO DE GIOIA
Regional Manager
Cargotec's Marine Service

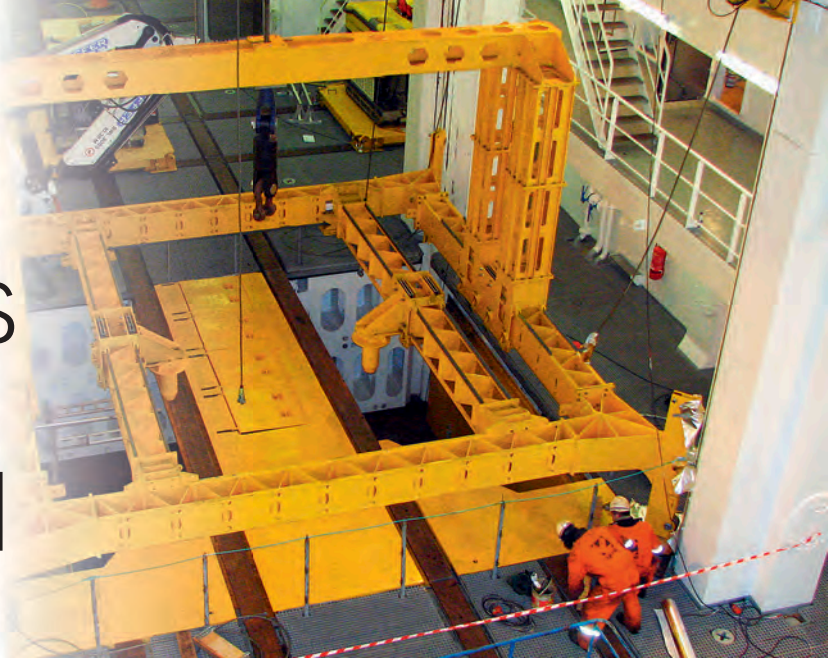
quarter-type Grande series' ramp is designed for a 150-tonne load.

- availability support services are designed to assure technical and commercial support on 24/7 basis and to benefit from long term maintenance planning.
- onboard maintenance includes different modules for service activities including, but not limited to, inspections, routine maintenance, preventive maintenance and also condition-based maintenance.
- spare part management in which the customer is relieved from the management of spare parts, allowing it to release capital for other purposes, but still maintaining guaranteed spare part availability.
- customer training services combine training programmes both ashore and onboard; trained and competent crew and staff allow the customer to use its investments to maximum effect.

Despite the economic recession, the number of ships covered by MOC agreements has increased by about 40 per cent over the past twelve months. Many new customers are high-quality marine transportation companies that consider it an essential requirement to have all of their cargo handling, cargo access and cargo care equipment up-and-running all of the time.

THE GRIMALDI GROUP (Naples) operates a fleet of about 95 owned and chartered vessels and through its various services carries two million vehicles a year. It runs regular liner services covering North Europe, the Mediterranean, West/Central Africa and South America for the transport of cars, vans, trucks and other commercial vehicles, all types of containers, general cargo (including paper and forestry products) and project cargo. The group includes several subsidiary companies: Atlantica SpA di Navigazione, Grimaldi Compagnia di Navigazione SpA, Industria Armamento Meridionale SpA, Atlantic Container Lines and Malta Motorways of the Sea Ltd.

Pooled resources produce packaged expertise



A unique pool of talent within Cargotec affords each of its specialist business areas 'finger-tip' access to expertise in all types of disciplines; offshore load handling is no exception

CARGOTEC CAN SUPPLY a broad range of advanced MacGregor offshore and subsea load handling systems

CARGOTEC'S OFFSHORE load handling business has a valuable ability to act as a 'one-stop-shop' for its customers. The value is twofold: as well supplying and subsequently servicing equipment systems as complete packages, Cargotec can also combine multidisciplinary expertise and experience from various parts of the company to come up with solutions that would be beyond the scope of a niche specialist.

A recent example of this is a contract to deliver a range of advanced MacGregor offshore and subsea load handling systems to a deep-sea research vessel which will be built at Mitsubishi Heavy Industries Shimonoseki shipyard in Japan.

"What make this order special is that we are supplying most of the offshore load handling equipment onboard, while other suppliers could only offer either winches or a module-handling system, but not both," says Øystein Bondevik, sales director for offshore load handling at Cargotec. "This emphasises Cargotec's ability to be a supplier of complete offshore solutions. The vessel is also going to be one of the most advanced oceanographic research ships in the world; being a key equipment supplier onboard is very significant for us."

THE CONTRACT COVERS some of the major MacGregor products for ultra deepwater operations and deck handling machinery, and will be manufactured at Cargotec's offshore production centre in Kristiansand, Norway. The terms include an extensive engineering package and customisation of solutions for special operations and the distinctive design of the vessel.

Systems ordered include a large knuckle-jib crane; an advanced moonpool-based module handling system, deck-skid system and several deepsea AHC winches with a capacity down to 10,000m. All winches in this series are fitted with a proven MacGregor electric drive system introduced three years ago. "The winch performance, compact design, power efficiency and low noise level of this system makes it a superior solution to any alternative," Mr Bondevik notes.

R&D ADDRESSES A GREAT VARIETY OF CHALLENGES and is enhanced within Cargotec because of its unique pool of talent. This multidisciplinary talent comes from decades of experience and innovations and every contract that the company secures benefits from this resource.

This includes applications such as the contract that was awarded for the development of a US Navy ship-to-ship vehicle transfer system (see page 20). Cargotec drew on the experience of its offshore and its RoRo access experts, which enabled the company to design, build and test a Test Article Vehicle Transfer System (TAVTS) as part of the US Navy's 'Sea Base' plan supporting Army and Marine Corps land forces.

TAVTS is intended to allow large vehicles to pass from a Large Medium-Speed Roll-on/Roll-off (LMSR) ship to a Mobile Landing Platform (MLP) ship. The delivery included a self-deploying ramp system on the MLP surrogate and a self-deploying side port platform on the LMSR ship.

ANOTHER EXAMPLE of combining offshore and RoRo expertise as complete packages includes launch-and-recovery systems (LARS) for ROV/Ts coupled with watertight access doors. Previously, for deliveries such as overside LARS and hangar doors, the units were considered as separate installations. Now it is possible to supply them as an integrated system, with main and remotely-operated controls that operate both the opening/closing of the doors and the moving in/out of the LARS.

Deeper understanding builds better business offshore

Understanding the offshore support vessel business means that Cargotec is able to provide operators with what they need, which is not just efficient equipment and system solutions but also includes maintenance to assure operational availability, and operator training

CARGOTEC'S EXPERTISE and know-how deliver value to customers' businesses, but deliver the most value only once those businesses and customers' ways of working are understood. This value is delivered in a sustainable and mutually profitable way, so the better the understanding, the more both parties benefit.

Knowing about a customer's business starts with understanding what the business is intended to achieve. The supplier must learn about the tasks involved in each customer's business process, and how they are accomplished. Analysing these tasks shows a supplier that these affect processes in different ways and to different degrees, and so solutions are not of equal value to the customer's efforts to achieve its business goal.

A supplier can rank its know-how, technology and products/systems in the order of the value they contribute to the customer's business goal. This strategy should define the way the supplier wishes to be perceived by the customer – clearly showing how it can help him achieve his business goal. A supplier's offering should thus integrate all of its abilities to deliver to the customer what its business needs, including complete solutions.

IN THE OFFSHORE BUSINESS segments targeted by Cargotec, the importance of integrated marketing and delivery of complete solutions is well understood. To achieve the highest degree of integration Cargotec not only offers complete engineering solutions



CARGOTEC'S COMPLETE solutions include advanced operator training

for offshore support vessel functions but also distinct service products such as maintenance and advanced training of operators – in response to customers' needs.

OSV OPERATORS' PRIORITY is to make sure that their ships are available for work at all times, because any operational downtime would be a high cost to them, both in terms of money and loss of reputation in the market. The quality and performance of equipment and systems is still important, but equally so is the operational availability that enables an OSV to accomplish its essential functions, and is therefore regarded as one of the most crucial features that deliver value to customers.

Cargotec understands the offshore business because it has worked with offshore operators for years, and is intimately familiar with the goals that need to be achieved.




The company then draws on its unique experience to provide solutions where innovation, advanced technology and experience are required. It can call on experts from other sectors, for example combining offshore and RoRo technology expertise to produce ROV launch-and-recovery systems coupled with water-tight access doors as complete packages. Cargotec also has a worldwide service network which is close to its customers.

BRAZIL'S GROWING POSITION in the offshore market is a good example of Cargotec's strategy of assuring a sustainable share by implementing integrated marketing. Once the service branch was established, its capacity and competences were developed further, not just servicing equipment installed on merchant ships but also on the fleet of offshore vessels. Further additions to Cargotec's presence in the Brazilian market include a local team of competent offshore new sales personnel who will manage relationships with Brazilian customers in the offshore segment, offering integrated comprehensive new sales solutions and service products adapted to specific market needs.

Integrated marketing of comprehensive MacGregor equipment and system solutions and adapted service products distinguish Cargotec as the outstanding provider of value to offshore customers that it is.

ARCTIC

Perfectly packaged for the cold



Cargotec can deliver its MacGregor products with an 'Arctic package', which ensures the safe, reliable function of equipment and a more comfortable work environment for personnel in extreme weather conditions

EXTREME ENVIRONMENTS, such as the Arctic and North Sea, demand absolute equipment reliability and function. This not only ensures operational performance, but more importantly, safety.

"We are an experienced supplier of equipment specifically designed to meet the challenges of extreme environments," says Øystein Bondevik, Cargotec's sales director for offshore load handling. "And the Arctic is one of the most challenging on the planet!"

"Over the past few years we have seen an increase in offshore activity in this region and to support this we have sales and service offices in St Petersburg, Russia and other areas in the region.

"When conquering the Arctic, there are several critical factors to consider: of course the extreme temperatures, but also the icing and mechanical breakages, electrical components and systems, hydraulic fluids, design temperatures of the structures, changes in temperature, and the generally difficult and dangerous work environment for the personnel.

"As a result of actively seeking product improvements we now use what we call the 'Arctic package'. Several years ago we expected an increase in numbers of Arctic projects coming up and

prepared for them in our design work.

"Well-engineered products are key to preventing ice-related problems during operation. This means that the product must be designed to prevent ice build up on critical elements; have ice removers or scrapers installed on critical motion elements; be able to heat gearboxes and hydraulic equipment like oil reservoirs and pipelines; and reduce humidity in oil reservoirs," he says.

EXAMPLES OF EQUIPMENT designed for extreme temperatures include two large offshore cranes and two oil-offloading systems delivered to Russian company Sevmorneftegaz for use in the Prirazlomnaya field – a forerunner to the Shtokman project – in the Barents Sea. All systems were designed according to Det Norske Veritas (DNV) and Russian Maritime Register of Shipping (RMRS) specifications.

The cranes were delivered in 2005 with a design temperature of -40°C and operation temperature of -46°C, with the possibility of lower ambient temperatures. All load bearing parts were designed for considerable ice build up to several centimetres all over.

WELL-ENGINEERED PRODUCTS are key to preventing ice-related problems during operation

"During the early design phase we evaluated the available component technology that was on the market and discovered that some components were not developed or could not perform at extremely low temperatures, for example, viscosity versus pumps and capacity, brittle gaskets, and electrical components," says Mr Bondevik.

"We therefore decided that the cranes should be delivered with the ability to heat the hydraulic pipelines and reservoirs. And we carefully selected hydraulic fluids and lubricants. It is important to keep moving parts moving!"

LAST YEAR Cargotec secured further orders for cranes that are specifically designed to operate in severe climatic conditions and extreme air temperatures, including an order for six MacGregor knuckle-jib crane units. They will be installed on three icebreaker tugs, designed by Aker Arctic Technology Inc. The units are scheduled for delivery to STX Europe throughout the period between June 2010 and January 2011.

In position to meet Asia-Pacific's offshore needs

With new and refurbished factories and an expanded service base, Cargotec is strengthening its position to meet the needs of the Asia-Pacific region's maturing offshore market



CARGOTEC'S MODERNISED PLANT in Singapore is equipped to manufacture, assemble, test, repair and service advanced offshore load handling equipment

THERE IS A GROWING TREND in the Asia-Pacific to replace the region's characteristic elderly tonnage with high quality advanced offshore technology. This is one of the reasons why the region is an important strategic market for Cargotec.

"The Asia-Pacific region has been identified as our key growth area, accounting already for more than one-third of our total sales last year," said Mikael Mäkinen, Cargotec Corporation's president and CEO, while opening new premises in Singapore in February. "As a global business hub Singapore is perfectly located for growing our presence in the Asia-Pacific region further, and in strengthening partnerships with our customers throughout the whole cargo handling process."

Cargotec has invested in building up its presence in the Asia-Pacific since establishing an office in Singapore in the 1980s. Most recently, it opened up an office, warehouse and workshop facility in Western Singapore, to provide a convenient 'one-stop' sales and service centre for customers in and around the region.

ALSO IN SINGAPORE, Cargotec's recently modernised manufacturing, assembly and testing plant for offshore load handling

solutions delivered its first 150-tonne capacity MacGregor offshore active heave-compensated (AHC) knuckle-jib crane in January. The crane was manufactured on site and fully tested at the Cargotec facility before delivery to a customer in Asia.

The completely revamped factory is equipped to manufacture, assemble, test, repair and service advanced offshore load handling equipment, such as large AHC offshore cranes and other subsea load handling systems. Cargotec is scheduled to deliver a significant proportion of its advanced MacGregor offshore load handling equipment to vessels being built in the Far East over the next two years.

One of these deliveries, scheduled for the end of the year, is the first of two large AHC subsea knuckle-jib cranes for an Ezra Marine Service ultra-deepwater anchor-handling towing/supply vessel (AHTS). Ezra's second AHC crane unit is being delivered in the summer from Cargotec's factory in Kristiansand, Norway, and will be fitted onboard a DP self-propelled accommodation barge being built in Indonesia for the Singapore owner.

ALSO DESIGNED TO SUPPORT Cargotec's growth in Asia is the company's newly-

commissioned 180-employee offshore load handling factory in Tianjin, in China. "The Tianjin factory is a purpose-built assembly factory for offshore deck machinery," says Ilpo Heikkilä, Cargotec's director of global production, offshore load handling. "It has optimal processes in place to efficiently manufacture high quality offshore equipment. And its testing stations and painting facilities are integrated as part of a streamlined manufacturing method. In fact, it is one of the first factories in China with a fully-equipped facility to cater for our own in-house equipment washing and painting instead of outsourcing these tasks to other factory."

"For every project, customers are invited to witness the testing of their equipment. This factory-wide testing programme also shortens commissioning time at customer yards."

Heavy winches are the main part of the factory's production portfolio. Its total production area is 8,000m² and has a lifting capacity of up to 100 tonnes. When fully operating, the factory can produce over 1,000 sets of deck equipment including anchor-handling towing winches, anchor windlasses, mooring winches, power packs and control panels. Half of its production is destined for shipyards in China.

Innovative technology gives customers competitive advantage

Offshore operators such as Solstad Offshore are looking for the right reliable equipment, excellent after sales service, and for technology that will meet future demands without being too complex and costly



"OUR AIM IS TO UNDERSTAND the requirements of our customers and work with them on finding the right product to suit their operations," says Øystein Bondevik, Cargotec's sales director for offshore load handling. "We don't want to just sell a product, we want to build a reliable partnership that benefits from co-operation and joint expertise. Customers know their business best and we know what our products can do."

Cargotec has co-operated with Norwegian operator Solstad Offshore on numerous projects, including the design of a customised crane cabin. "We also have MacGregor active heave-compensated cranes onboard several of Solstad's new-builds in Norway and crane-replacement contracts, where old vessels with old cranes have been replaced with ours," Mr Bondevik says.

Solstad aims to equip its vessels with the most suitable systems available on the market. "Requirements are constantly increasing in the offshore segment: operations in deeper and deeper waters

Geir-Inge Haugeberg at the recent launch in Gdansk of Normand Pacific, a customised Skipsteknisk ST256 LCD design for diving and ROV operations being delivered by Bergen Group in the autumn this year, featuring a 200-tonne MacGregor offshore crane

"When it comes to equipment, innovative solutions from suppliers – developed together with us and our customers – enable us to achieve better procedures and safer, more cost-efficient operations."

GEIR-INGE HAUGEBERG

Fleet Director, Solstad Offshore ASA

and operations carried out with fewer costs and better efficiencies," says Geir-Inge Haugeberg, fleet director from Solstad Offshore ASA. "When it comes to equipment, innovative solutions from suppliers – developed together with us and our customers – enable us to achieve better procedures and safer, more cost-efficient operations."

"Innovative technology can be used to gain a competitive advantage. Leading the market, developing better, easier and more cost-efficient equipment and procedures for the operations will always benefit both supplier and customers."

"The trend has always been that any improvement you make to size, capacity



A 250-TONNE MacGregor AHC sub-sea crane onboard *Rem Clough*, which is now operating under its new name, *Normand Clough*, for Solstad Shipping

and complexity is swallowed-up by the demand in the market so fast that you are constantly facing even steeper requirements. This has made much of today's technology and equipment very complex, expensive and specialised. This creates a real challenge for the owner with regard to operator training and service and spare parts, as well as investment costs. In my opinion, this will result in a change in attitude in the industry in the near future and we will see calls for less complex equipment, which is more versatile and easier to operate and maintain.

"I also think that we will see a trend from *all* parties for safer, more versatile, simpler and more cost-effective and reliable solutions. Down-time and costs for keeping all this highly specialised equipment in operation are very high, and this will have to be improved. The consequences of a central piece of equipment breaking down whilst involved in an offshore project are huge, not only in economical sense, but, worse still, also from safety and environmental aspects.

"It is a really difficult balance, because at the same time we are facing ever increasing

demands for deepwater operations, at depths that exceed 3,000m. These demands will have to be solved with better solutions than steel ropes and larger capacity equipment.

"BUILDING A CLOSE RELATIONSHIP between operator and equipment supplier is very important. It establishes both a good personal and professional relationship, which enable good after sales service and helps you find the right reliable products that are 'fit for purpose'.

"After-sales service and service in general are the most important concerns of all for our business. Fast and reliable after sales and service are critical to our operations, therefore any supplier not taking this seriously will end up on the 'no' side of a maker's list in our company.

"An equipment supplier's experience and knowledge of our business is also of critical importance; if a supplier does not know our business, it will not be able to produce the equipment we need, and also will not understand the background for our requirements when after sales support and service are necessary.

"Also, a close and good relationship will enable product development, which is directed towards the specific needs that a customer has. The MacGregor equipment onboard our vessels has made numerous operational contributions. Most importantly, by supplying safe and reliable equipment, Cargotec is helping us to undertake safe and reliable operations for our customers."

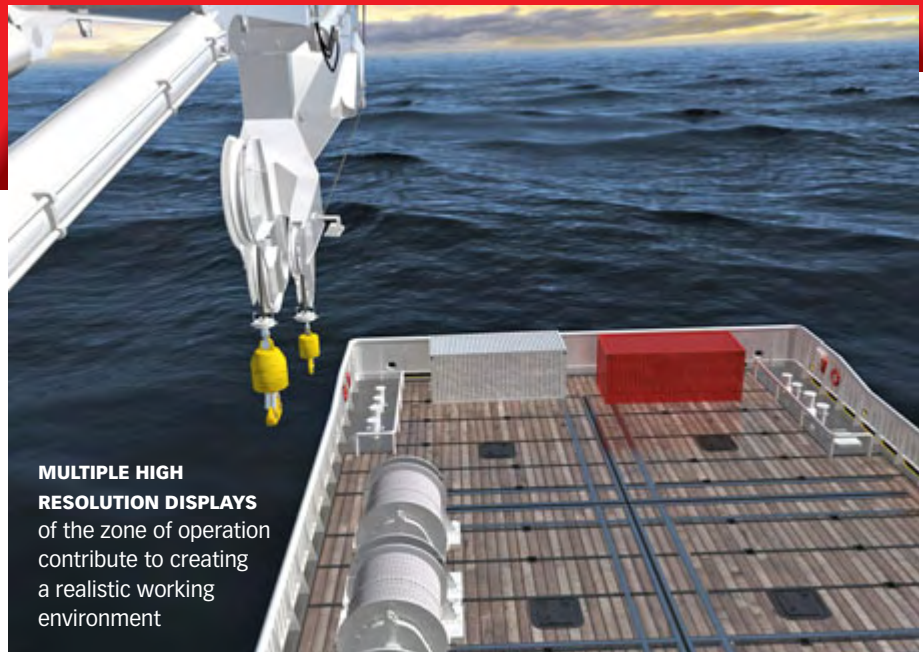
A modern growing fleet

Solstad Offshore's activities are focused on the offshore petroleum industry and most of its fleet is equipped to carry out projects well above traditional supply and anchor-handling services. In addition to strong international growth, the company has concentrated on offering construction service vessels (CSV) and equipment for use in connection with offshore installations, including installing, monitoring and maintaining subsea systems. Simultaneously, Solstad has expanded and modernised its anchor-handling towing/supply (AHTS) tonnage, particularly for use in deep waters. At present, the company employs around 1,300 people.

Solstad's fleet consists of 45 fully-owned/jointly-owned and leased vessels plus five under construction in Norway: an AHTS, a large platform supply/ROV, and three CSVs. Thirty-four of the vessels are operated from the company's offices in Norway and the UK, and six newbuilding projects and ten other vessels are operated from Solstad Offshore's 50 per cent-owned company, Nor Offshore in Singapore.

TECHNOLOGY

Cargotec's first AHC offshore crane simulator allows crane operators to gain more varied experience in a few days than they would encounter in weeks of 'live action' training, and paves the way for other types of equipment simulators



MULTIPLE HIGH RESOLUTION DISPLAYS of the zone of operation contribute to creating a realistic working environment

Concentrated experience prepares crane operators for reality

TRAINING CREWS to use equipment correctly not only benefits safety and operational efficiency but also minimises downtime and repair costs caused by mishandling it. Renowned for developing and implementing new technologies that contribute added value to a customer's business, Cargotec is introducing a simulator that is the cornerstone of structured training for operators of advanced MacGregor offshore load handling equipment and systems. The company's offshore hub in Kristiansand, Norway, not only has a training centre for crews and company personnel, but can now also include exercises on a full active heave-compensated crane simulator in its training.

"The rapidly expanding base of active heave-compensated cranes on offshore ships utilised in sub-sea load handling and their operational complexity were decisive factors in selecting this type of equipment for training by simulator," says Eldri Nærum, project manager. "In addition to training, the simulator also enables us to demonstrate the function of our products and assess elements such as anti-collision ability, plan marine operations, and also log data for playback to evaluate and improve future operations, and to design and test new concepts more quickly.

"Future generations of simulators will enable us to assess elements such as strength, calculations, movement,

accelerations and force. We will also be able to verify designs and use programs to simulate individual systems such as hydraulic piping".

OVER THE PAST FEW YEARS simulators have taken impressive leaps forward made possible by improvements in hardware and software that paved the way for new opportunities in simulator use. The simulator for training operators of active heave-compensated cranes was conceived, built and tested by a team of system engineers at Cargotec's offshore load handling site in Kristiansand.



CRANE CABIN: the operator's vantage point has been recreated in a 20ft container

A 20ft container houses a replica of a fully equipped crane cabin, in which the trainee can see multiple high resolution displays of the zone of operation. Being transportable and autonomous, the simulator can be taken to the customer, for training to take place on his doorstep.

"Creating a realistic crane cabin inside a container was a major challenge for the project, with mounted simulated cabin windows and limited available space for all the necessary hardware and HVAC systems," Ms Nærum says. "However, we succeeded to the extent that we expect a crane operator in this simulator will forget that he is not in an actual crane cabin. Realistic sounds enhance the experience even further. And a head tracking feature is also available which allows the seated operator to actually look out the window and have the view change according to the movement of his head!"

THE SIMULATOR PROJECT has drawn upon expertise from across the company, from physical layout and construction work to system programming. "We have focused on developing our in-house expertise through this project," Ms Nærum says. "Our aim is to be the competence centre for simulators in Cargotec". The simulator software is module based, which ensures flexibility for implementing simulators for all kinds of PLC-based equipment and with different levels of operator inputs.

Crane innovation gets to the bottom of the deepwater challenge

Access to the ultra-deepwater sector is simplified by Cargotec's subsea load-handling system which uses multi-component fibre ropes that are weight neutral in water



CARGOTEC'S MACGREGOR UDLS uses a side-mounted frame which allows the crane to lower a load 1,000m, transfer it to a fibre rope, and then repeat the process until the load is lowered to the desired depth

"THE FUTURE OF THE OIL INDUSTRY lies in the deepwater subsea market," says Øystein Bondevik, Cargotec's sales director for offshore load handling. "This sector is much less likely to see over-capacity than relatively shallow waters. There are currently only six vessels being built for construction activity in 2,500m-plus water depths, and just 25 per cent of existing fleets are capable of laying pipe in water more than 2,000m deep. Around 60 per cent of existing fleets are not capable of working at water depths beyond 1,000m.

"A deepwater lift is a complex operation and creates a number of challenges. Cranes are near their size and operational depth limits, and giant cranes are difficult to manufacture. All of this dramatically adds huge increases in costs as large cranes require large vessels."

Traditional offshore cranes are limited, in part, by the weight of the steel lifting wire itself, which reduces the net hook capacity as more and more wire is deployed to reach greater depths. A 150-tonne single-line crane effectively 'loses' 25 tonnes capacity for every 1,000m of wire deployed. At a depth of 3,000m, for example, it will only be able to lift 75 tonnes, although the crane winch is handling the full 150 tonnes and the power requirements for active heave-compensation are substantial.

"We can combat this problem with our MacGregor ultra-deepwater lifting system (UDLS) which uses new multi-component fibre ropes that are weight neutral in water," Mr Bondevik says. "By using this system, the 150-tonne capacity crane would be able to deploy its full load of 150 tonnes down to a depth of 5,000m, for example.

The weight of thousands of metres of submerged rope does not have to be subtracted from the crane's total load capacity, and the UDLS can access unlimited depths."

THE UDLS HAS BEEN DEVELOPED from existing field-proven solutions and employs the crane's existing steel wire winch to make active heave-compensated seabed landings. Handling landing heave-compensation with a winch operation using traditional steel cable eliminates wear and tear on the fibre rope during this critical phase, and spooling and bending the critical fibre rope is avoided. Eliminating these strains on a fibre rope is essential as it is much more fragile and vulnerable to mechanical stress than traditional steel cable.

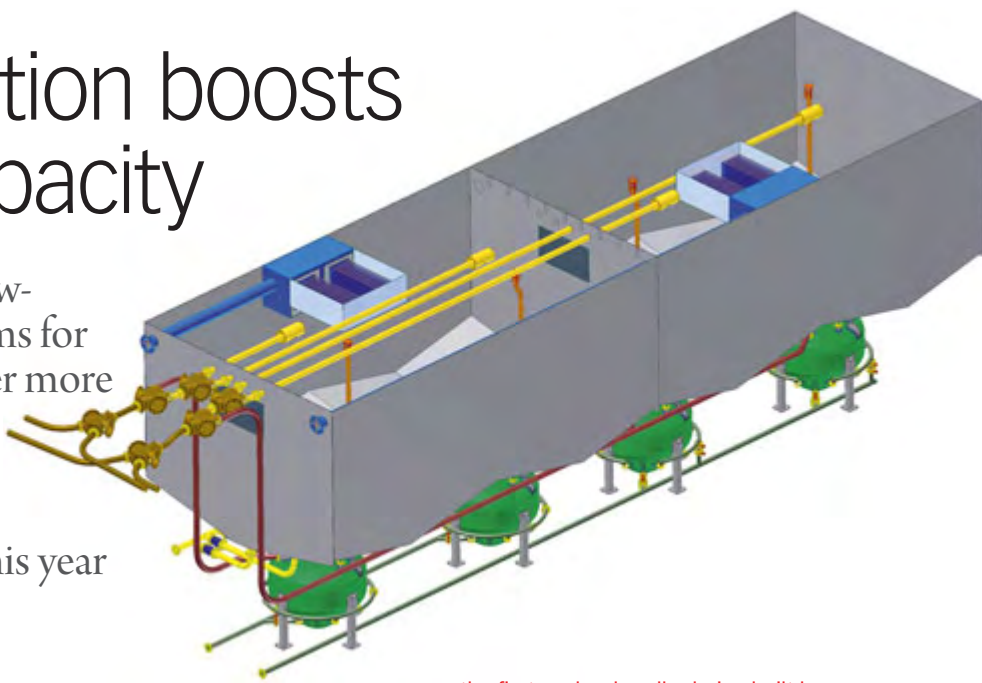
The multi-component fibre ropes are prepared and spooled in required lengths. The UDLS uses a side-mounted frame fixed to a vessel which allows the crane to lower a load to a depth of 1,000m using a steel wire. The load is then transferred to fibre rope, the crane hook is returned to the surface and reattached to the upper end of the fibre rope, and a new length of rope is deployed. This hook-moving sequence is repeated until the desired depth is reached.

THE UDLS IS AVAILABLE as a 150-tonne capacity or 250-tonne capacity system and can be supplied ready for various lengths of fibre rope. It can also be offered as a reduced version, prepared for future upgrades for even deeper locations.

"The UDLS is ideally suited to crane applications in ultra deepwater locations, such as Brazil's Campos Basin, for example," explains Mr Bondevik, "as it enables much easier access to extreme depths in this relatively-untapped sector." A range of specialist deepwater technology is showcased in Brazil. Key equipment from Cargotec includes MacGregor AHC offshore and subsea cranes, launch-and-recovery systems for remotely-operated vehicles (ROVs) and remotely-operated tools (ROTs), module-handling systems, and advanced rescue and deck-handling equipment. It also offers towing winches, anchor-handling winches, mooring systems and winches for other applications.

Refined solution boosts OSV bulk capacity

Cargotec's hopper and blow-pump bulk handling systems for offshore supply vessels offer more than double the capacity of conventional units and the first system is due to be commissioned in Spring this year



BLOW-PUMP LAYOUT ONBOARD the first anchor-handler being built by Batamec; it will have a bulk capacity of 500m³, almost 67 per cent higher than the conventional bulk tank type system originally planned

THE FIRST OFFSHORE SUPPORT VESSEL fitted with a MacGregor hopper and blow-pump self-unloading bulk handling system from Cargotec is due to be commissioned this Spring. It is one of 10 vessels on order that will feature the innovative new system and all will have a bulk-carrying capacity of about 500m³.

Debuting the hopper and blow-pump system is the first of four anchor-handling tug/supply (AHTS) vessels under construction at Otto Marine-owned shipyard, Batamec, in Indonesia, for Mosvold Supply.

They will be followed by six AHTS vessels for Whitesea Shipping & Supply based in Sharjah, United Arab Emirates.

"The first anchor-handler, being built by Batamec (VS491 CD) will have a bulk capacity of 500m³," says Pankaj Thakker, Cargotec's senior sales manager for selfunloaders in Sweden. "This is almost 67 per cent higher than the originally-planned conventional bulk tank type system comprising four 75m³ tanks with a total capacity of 300m³.

"The major disadvantage with conventional bulk handling systems in OSVs is that they rely on pressurised storage tanks," explains Mr Thakker. "During discharge, it is the pressure differential between the tank and the discharge line which, with the aid of compressed air, conveys the bulk material out of the tank. Because they are pressurised, the tanks have to be circular, which is not an optimal shape when it comes to utilising the storage space in a vessel's hull."

THE CARGOTEC SOLUTION eliminates the need for large pressurised tanks. It is based on the company's highly-successful pneumatic conveying system for loading and unloading cement carriers. This was first introduced in 1947 and has been further refined over the years.

Instead of the pressurised tanks, the cargo is stored in hoppers, which have floors covered with aeration panels. The floors are tilted at an angle of 12 degrees in the direction of the outlet, below which is situated a blow-pump. Discharge is achieved by passing air through the aeration panels. This fluidises the cargo which, under the influence of gravity, flows to the outlet and drops into the blow-pump. When the chamber of the blow-pump is full, aeration stops, the outlet valve is closed and compressed

air is used to convey the bulk material from the pump through the discharge line.

"In this system, only the blow-pumps are pressurised. As the hoppers are not, they can be designed to make optimal use of the space available in the ship's hull, effectively taking a rectangular shape," Mr Thakker says.

"Moreover, they can normally be formed using the existing structure of the ship – the longitudinal and transversal bulkheads for the walls and the underside of the main deck for the roof. Only the floor needs to be added.

"As a result, the hopper's capacity is significantly greater than that of pressurised circular tanks fitted into the same space – from 50 per cent to 75 per cent greater".

"There are other advantages to the system," Mr Thakker points out. "A reduced volume of steel is needed to form the hopper, as it makes use of existing bulkheads and deck.

"To fully realise the benefits of a MacGregor self-unloading system, it should be taken on board at the project's design stage," Mr Thakker explains.

"It should be emphasised that the hopper and blow-pump system is integrated within the structural design of the vessel, and early discussions between ship designer and system designer are therefore crucial for successful implementation."

"As a result, the hopper's capacity is significantly greater than that of pressurised circular tanks fitted into the same space – from 50 per cent to 75 per cent greater"

ROV hangar doors designed for dependable operation

High sea states demand special design considerations and to support the offshore sector MacGregor ROV hangar doors have been specifically developed to fulfil rigorous operational requirements

DRAWING ON EXPERTISE from watertight door designs for the marine industry, Cargotec has developed technology to support the offshore sector. This includes watertight access doors for remotely operated vehicles (ROVs) and offshore service vessels (OSV). These vessels regularly operate in extreme environments such as the North Sea, where heavy weather is common and operational continuity essential. As a result, door design must be safe, secure and well-proven.

“ROV hangar doors must be able to operate in high sea-states such as the North Sea and cope with the effects of wind and wave slamming. Door design is therefore absolutely critical to ensure sustained functionality,” says Paul Simmons,

technical sales manager for Cargotec’s RoRo Conversion Unit.

“MacGregor ROV doors are of well-proven structural integrity and design, particularly in respect to high sea loads. They retain weathertightness when closed and secured, and a combination of operating systems are available using hydraulic cylinders or hydraulic motors.

“Hangar doors can be partially opened, to provide operator protection, or fully opened depending upon the end users’ operational requirements.

“Special attention is also paid to ROV door seals,” he notes. Cargotec engineers have developed an efficient high-performance watertight design. Rubber packing is placed in and around the perimeter of

the opening of the hull and pressed against compression bars made of stainless steel. These have a very smooth surface and guard against any penetration of water.

CARGOTEC OFFERS TWO TYPES of seal design as standard. When the door requires sealing without a sill, a sliding packing design is chosen. This allows relatively large racking deflection of the opening. In all other cases a conventional design is used.

Numerous offshore vessels have benefited from MacGregor hangar doors, and the most recent contract will see one large top-hinged MacGregor ROV hangar door (P&S) and two top hangar hatches fitted to a new 115m riserless drilling vessel (RDV), *Norshore Atlantic*. The MT 6022 XL-design vessel was commissioned by Norwegian company Norshore and is being built by Otto Marine Ltd, Singapore at its shipyard in Batam, Indonesia. The MacGregor equipment will be supplied to the shipyard in the fourth quarter of this year and the vessel is planned for delivery in the second quarter of 2011.

The top-hinged door will be foldable in two sections, constructed from high-tensile steel and designed with flat top plate and open web construction. The door will be opened and closed via hydraulic cylinders fitted above the 10.5m-high opening.

In the closed position, the door is weathertight and secured by hydraulically-operated cleat bolts located on the door. In the open position, the door is secured by hydraulic bolts that lock into the operating mechanism.

FUGRO SALTIRE FEATURES both an overside MacGregor launch-and-recovery system and MacGregor ROV hangar doors; these can now be supplied as an integrated unit



Complete package delivery

IT IS NOW POSSIBLE FOR CARGOTEC to deliver some systems as complete packages, which can enhance their operation and efficiency. An example is its launch-and-recovery systems (LARS) for ROV/Ts coupled with watertight access doors. Previously, for deliveries such as the overside LARS and hangar doors for Norwegian/Dutch company Fugro Geoteam’s *Fugro Saltire*, the units were considered as separate installations. Now, it is possible to supply them as an integrated system with main and remotely-operated controls that operate both the opening/closing of the doors and the moving in/out of the LARS.

Cargotec offers a full range of overside, moonpool-based or telescopic launch-and-recovery systems.

TECHNOLOGY

An innovative ship-to-ship vehicle transfer system developed from combined Cargotec resources successfully completed US Navy sea trials in February



Vehicles as big as battle tanks can be transferred between ships at sea

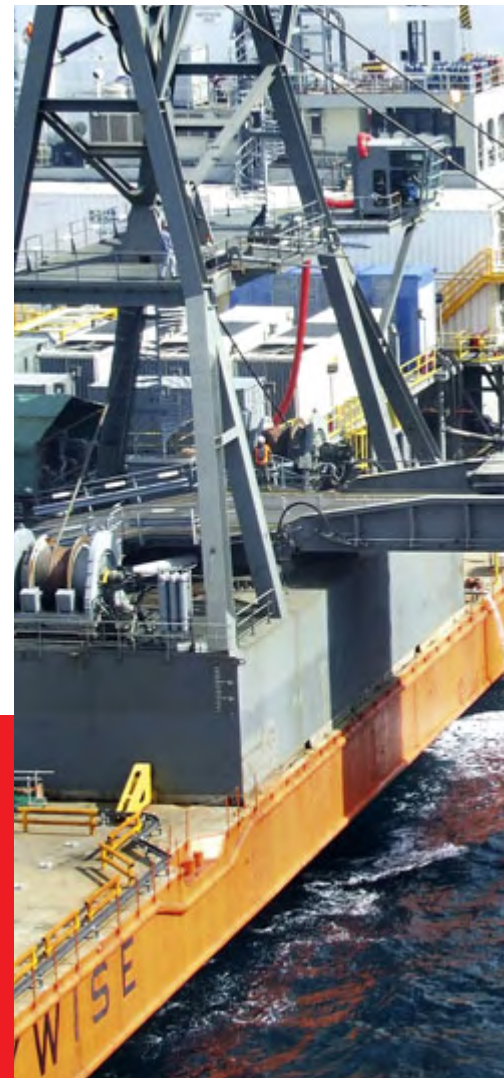
CARGOTEC'S INNOVATIVE 'test article vehicle transfer system' (TAVTS) was designed to transfer military vehicles between ships at sea to support US Army and Marine Corps land forces as part of the US Navy's 'Sea Base' strategy. The transfer system has now successfully completed sea trials carried out by the US Navy's Strategic and Theatre Sealift Program Office (PMS 385) which is part of Program Executive Office Ships (PEO Ships). According to Capt. George M. Sutton, program manager for PMS 385, "this landmark capability will be a significant enhancement for future sea-basing logistics operations".

TAVTS is part of a risk-reduction effort by the US Department of Defense Maritime Prepositioning Force (Future) when transferring military vehicles between ships at sea. The aim of the tests and the programme is to provide the US military with the capability for large-scale logistics movements from sea to shore without dependency on foreign ports.

DURING THE TRIALS, THE US NAVY demonstrated the transfer of vehicles between the surrogate mobile landing platform (MLP) *Mighty Servant 3* and the large medium-speed roll-on/roll-off (LMSR) ship, *USNS Soderman*. The test demonstrated a self-deploying ramp system installed on the MLP and a new self-deploying sideport platform installed on the LMSR vessel. Deployment and retrieval of the ramp is controllable by one person. In case of failure, the system can safely continue to support vertical and horizontal design loads and allow emergency ship separation while carrying a vehicle weighing up to 72.5 tonnes (160,000 lb) anywhere along the length of the ramp.

DURING PEO SHIPS' FULL-SCALE TRIALS, personnel and vehicles were successfully transferred between the ships in high Sea State 3 and low Sea State 4 during multiple days of testing in the Gulf of Mexico

THE TAVTS is designed to allow emergency ship separation while carrying a 72.5-tonne vehicle anywhere on the 30m-long ramp





THE TAVTS-RAMP DURING OPERATION.

Cargotec performed rigorous harbour tests, at its facilities in Norway, before the delivery

THE TRANSFER SYSTEM has now successfully completed sea trials carried out by the US Navy's Strategic and Theatre Sealift Program Office (PMS 385) which is part of Program Executive Office Ships (PEO Ships)



"We have a long history of deliveries to PEO Ships, and this latest system is a good example of the innovative technological solutions that Cargotec can offer by drawing on the diverse range of expertise within the company," says Jeffrey Siegel, regional marine service sales manager. "TAVTS resulted from close co-operation between our ramp technology experts and our offshore specialists, who contributed in-depth knowledge of heave-compensation technologies."

CARGOTEC CONDUCTED rigorous harbour trials in Norway in November 2009, and PEO Ships' full-scale testing conducted was successfully completed in February this year. All test procedures were performed using the graduated 'crawl, walk, run' approach: starting with demonstrations alongside and at anchor, progressing to low sea state conditions in open water, and finishing with increasing sea states in open water.

Personnel and vehicles were successfully transferred between the ships in high Sea State 3 and low Sea State 4 during multiple days of testing in the Gulf of Mexico. Vehicles transferred included high-mobility multi-purpose wheeled vehicles (HMMWVs), HMMWVs with trailers, medium tactical vehicle replacements, logistics vehicle system wreckers, amphibious assault vehicles, M88 tank recovery vehicles, and M1A1 main battle tanks.

In line with Cargotec's sustainable technology philosophy, the company has made substantial investments in its electric drive developments, of which, a significant proportion has been directed towards application in car-carrying vessels



Clean and green: new generation car carriers showcase electric-drive advances

THIS IS A PIVOTAL TIME for electric-drive technology onboard car carrying vessels, as the first ever ships with all electrically-driven internal RoRo equipment begin to enter service. Leading the way is *Viking Odessa*, the first of four 2,000-unit pure car truck carriers (PCTCs) for privately-owned Norwegian company P.D. Gram & Co AS, which was delivered from Kyokuyo Shipyard in Japan last year.

Viking Odessa has now entered service and was followed in January this year with the completion of the second in

the series, *Höegh Caribia*. All the ships will be registered in Singapore and the remaining two vessels – No 487 (*City of Oslo*) which is currently being commissioned at the yard, and No 488 (*Viking Constanza*) which is in production at the yard – will be delivered by June this year.

Each of the vessels features a comprehensive set of MacGregor cargo access outfits, which were developed through a co-operative design process between the shipyard, P.D. Gram & Co and MacGregor-Kayaba in Japan.

Magnus Sjöberg, sales director for RoRo ships at Cargotec, says that: "These first PCTCs with complete electric-drive operation of the internal RoRo equipment are a breakthrough and the result of the company's intensive R&D work responding to customers wanting to move away from the use of hydraulic oil completely." Externally, the vessels also feature MacGregor hydraulically-operated stern and side ramps.

EACH OF THE NEW PCTCs will be commercially managed by Gram Car Carriers AS (GCC), which is a subsidiary of P.D. Gram & Co.

According to P.D. Gram & Co, GCC is rapidly developing its position as a substantial tonnage supplier to the major car operators. "It is expanding its role mainly by providing modern and flexible fuel efficient newbuildings," says P.D. Gram & Co.

Mr Sjöberg explains that: "The increase in uptake of electric drives on board RoRo ships has been due to numerous factors including an environmental one, but one other technical reason for this development is the availability of improved electric drives, in the form of electric actuators or 'screwjack' drives, to replace the direct-acting hydraulic cylinders used for operating smaller items or in cleating and locking devices. Also, car manufacturers are putting pressure on owners to reduce the level of damage to cargo; Japanese companies like Toyota are leading this improvement."

Electric drives offer many advantages to shipowners and shipbuilders compared with hydraulic versions.

The main advantages with electric drives are:

- hydraulic oil leakages are eliminated
- no need to fit hydraulic pipework on board
- easy to monitor and maintain
- energy savings.

They can also be monitored easily and by using all electric components it is possible to provide continual diagnostic data input for analysis round the clock, predicting the 'health' of a piece of equipment at any



VIKING ODESSA features a comprehensive outfit of MacGregor cargo access equipment. The car ramps and car deck are all electrically-operated



VIKING ODESSA IS THE FIRST OF FOUR 2,000-unit pure car truck carriers to enter service with all electrically-driven internal RoRo equipment

RoRo conversion ensures environmental and efficiency benefits

Key components for *Celestial Wing's* conversion have been supplied by Cargotec and include six electrically-operated car deck panels that will afford Act Maritime Company's pure car truck carrier (PCTC) greater flexibility

time – if required, this condition monitoring can form an integral part of a MacGregor Onboard Care planned maintenance agreement (page 8).

“Over the last few years we have seen a marked increase in the uptake of this type of equipment and expect to see more as other operators switch to electric drive operation as this technology matures,” he notes. “As with all new technology, we anticipate having to make some refinements, but feel that electric drives are particularly well-suited to the car-carrying market, as there is a need for these vessels to be as ‘clean’ as possible internally, and as ‘green’ as possible from an environmental perspective.”

Also scheduled for delivery this year are shipsets of equipment for two 4,000-unit PCTCs being built at Japanese shipyard Shin Kurushima Dockyard Co Ltd. One vessel is for Japanese shipowner Mitsui OSK Lines Ltd (MOL) and the other is for an undisclosed Korean owner. Each will be equipped with a stern quarter ramp, a side ramp and two internal hoistable ramps, all of which will be operated and secured by electric winches and actuators.

REACHING FRUITION NEXT YEAR is Cargotec's order for electrically-driven MacGregor RoRo equipment for two 6,400-unit PCCs that are also under construction at Shin Kurushima for MOL. MacGregor equipment for each ship includes a quarter ramp, a side ramp, and six internal ramps (including two watertight ramps). All equipment will be operated by electric winches and actuators, eliminating the use of hydraulic oil in the operating system. “All these orders show that our customers appreciate the advantages that electrically-driven RoRo equipment offers,” adds Mr Sjöberg.

SCHEDULED FOR RE-DELIVERY in spring this year is the 2005-built pure car truck carrier (PCTC) *Celestial Wing*. It is being converted at Universal Shipbuilding Corporation's Innoshima shipyard, in Japan, where it will be fitted with six electrically-operated MacGregor car deck panels from Cargotec.

The shipyard will manufacture the car deck panels, totalling approximately 1,150m² and will also fit the MacGregor components. It will then install the electrically-operated car deck panels at the same time as installing and building a new fixed deck.

“We have been promoting electric-drive operation of our cargo access equipment in Japan for a number of years, especially targeting PCTC owners and shipyards building these vessels,” notes Jonas Nordström, director of the RoRo conversion unit at Cargotec. “In 2008, Universal Shipbuilding Corporation's Innoshima shipyard was awarded a contract to install an additional fixed deck

on *Celestial Wing*, which is owned by Act Maritime Company – a subsidiary company to MOL, a leading operator in Japan.

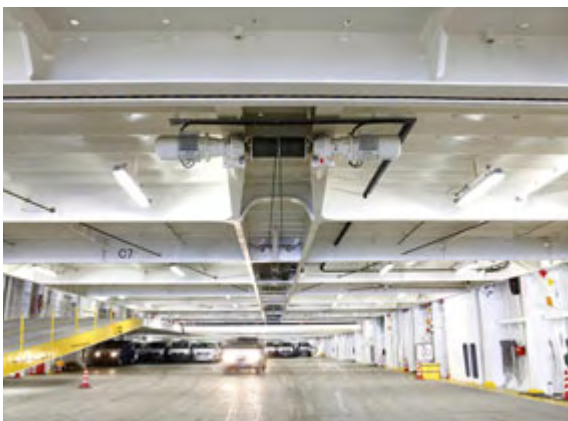
“During discussions with the Innoshima shipyard, we identified a need to increase the clear height for vehicles in the stern ramp and side ramp regions of the vessel. In addressing this issue, high and heavy cargo could access the upper decks via a ramp inside the vessel.

“This work ensures that the vessel will now not only benefit from environmentally-friendly MacGregor electric drive technology, but will also have a more flexible internal cargo access arrangement provided by the increase in clear height in some areas and the hoistable car decks,” says Mr Nordström.

ELECTRIC DRIVE TECHNOLOGY has a number of additional advantages. It is installation friendly, as there is no need to fit hydraulic pipes onboard and generally has a reduced set-up time. “Both of these lead to costs benefits,” he notes.

Mr Nordström adds that: “In terms of technology, electric drives are also fast and easy to operate with automatic speed up and slow down functions; maintenance friendly with simplified inspections; and have a high reliability and are easy to monitor.”

The main contract for the work was secured with MacGregor-Kayaba, in Japan, which placed a design and key component order to the Cargotec RoRo conversion unit in Gothenburg, Sweden, for the car decks.



ELECTRIC DRIVE TECHNOLOGY is installation friendly as there is no need to fit hydraulic pipes onboard

RoRo SOLUTIONS

Versatile ship-to-shore solutions serve a range of port requirements

Operational availability and redundancy have brought about the most significant changes in linkspan technology in recent years; Cargotec incorporates this matured technology in all of its linkspan deliveries

LINKSPANS ARE AN EFFICIENT ship-to-shore port solution and are available in a wide range of models. Through its MacGregor brand, Cargotec has a wealth of linkspan technology that can be tailored to suit a range of port requirements.

All MacGregor designs provide smooth cargo flow, independent of tidal variations and vessel trim. Commonly employed units are floating linkspans: these allow RoRo and passenger ferry traffic to berth at quays that are unsuitable because of size or shape, or create berths at sites without regular quay facilities.

A VARIETY OF ARTICULATED SHORE RAMPS are also available – they can be permanent or mobile and can be designed to provide direct access to all RoRo decks. It is possible for the entire docking procedure to be automated and remotely-controlled.

“It is important for the port and ferry operator to avoid any ship impact or damage to the linkspan and therefore a risk assessment is the foundation for the final choice of design concept for the facility,” explains Clas Hedelin, Cargotec sales manager for MacGregor land and port systems. “This is often discussed in the design process between the supplier, the operator and authorising parties.”

“In terms of operational availability and redundancy, all hydraulic hoisting machinery on MacGregor linkspans is always designed to incorporate pairs – or even trios – of parallel acting cylinders at each side of the linkspan. Furthermore, each cylinder is equipped with approved load holding valves and redundant positioning sensors to control the motion

of the overall facility,” says Mr Hedelin.

“It is this redundancy thinking and the Machinery Directive that has brought about the most significant changes in linkspan technology in recent years. The technology has matured into a few technical concept solutions that are recognised, appreciated and accepted by competent bodies and authorities. These solutions are now implemented on all new deliveries, as well as on modernisations for existing facilities,” he adds.

OVER THE PAST FEW YEARS, the company has won numerous contracts that have posed different design challenges. These range from a substantial delivery in 2008 for Color Line’s SuperSpeed service between Norway and Denmark to the most recently completed contract, which was an order received from BAM

Contractors in Ireland last year. It called for Cargotec to supply a replacement linkspan in October 2009 for the Rosslare ferry port, which is owned by Irish Rail.

Mr Hedelin points out that: “The new facility, located in ferry berth No 2, will improve operating logistics for any size of conventional and future RoRo ferry and is attracting major domestic ferry operators as well as operators from UK, France and the Benelux countries.

“Irish Rail had set particular conditions as to the safety machinery and integrity of the overall facility that are also worth highlighting,” he says. “First of all, the hydraulically-operated linkspan is extremely big for an articulated ramp; it has a seaward ramp interface of 34m in width and is 20m-wide at the shoreside end. It is 30m long to cater for the tidal conditions at the site, as

COLOR LINE’S PORT facilities in Hirtshals in Denmark feature two upper-level MacGregor linkspans



"The new facility, located in ferry berth No 2, will improve operating logistics for any size of conventional and future RoRo ferry."



THE 30M-LONG LINKSPAN for the Rosslare ferry port is big for an articulated ramp: its ramp interface is 34m wide at the seaward end and 20m wide at the shoreside end



LOAD-TESTING one of the two new RoRo berths delivered by Cargotec at the new Tanger Mediterranean Ferry port

well as most vessels' thresholds.

"There are also fender systems installed at both ends of the ramp: a minor front fendering to reduce the occurrence of local structural damage on impact, and large energy-absorbing fenders at the shoreside

end of the ramp. These safeguard the continuous operability and integrity of the entire linkspan, and its machinery, in the event of an emergency impact from a vessel of a displacement above 23,000 tonnes.

"The hoisting hydraulic machinery

consists of three cylinders installed in parallel at each side of the linkspan. Thus, the system has full redundancy and unrestricted operability in the event of one cylinder failing on either side," says Mr Hedelin.

THE CONTRACT from BAM Contractors for the Rosslare ferry port was one of several linkspan orders, totalling around €10 million, which were received by the company last year. The linkspan was handed over to the owner in October 2009.

"All the ports had differing requirements and each posed a separate challenge. Rather than experiencing cancellations or delays to planned projects, as a result of the global economic downturn, Cargotec has experienced a worldwide increase in project realisation," Mr Hedelin says.

One of the orders, which was completed in February this year, involved the delivery of two hydraulically-operated linkspans to Morocco for SRPTM (Société de Réalisation du Port de Tanger Méditerranée). It contracted Cargotec to supply two, out of the eight RoRo berths being built, to the new Tanger Mediterranean Ferry port, which is scheduled to start operating in April 2010. The linkspans are 15m-long by 18m-wide at the seaward end.

Two-tier access optimises turnaround times

Stena's need for greater freight capacity on its two new North Sea 'superferries' will not compromise turnaround times thanks to sophisticated two-tier loading arrangements from Cargotec

STENA LINE'S two new 'superferries' will increase capacity for passengers and cars by 30 per cent and freight capacity by 25 per cent on its Harwich-Hook of Holland service. The 62,000gt *Stena Hollandica*, from Wadan's shipyard in Wismar, Germany, will be followed into service by sistership *Stena Britannica* later this year, replacing two ships currently bearing these names.

The 240m-long, 32m-wide *Stena Hollandica* (Dutch flag) and *Stena Britannica* (British flag) each accommodate vehicle space comprising 5,500m of trailer lanes and 700m of car lanes, and can carry up to 1,200 passengers. Each ship features 800 tonnes of MacGregor RoRo access and transfer equipment, and when this was ordered in 2007 it was one of the largest MacGregor RoRo system contracts ever placed.

Stena Hollandica and *Stena Britannica* each has four cargo decks and can discharge and load simultaneously over two decks from both the bow and stern. "This is a complex and highly-sophisticated RoRo access system," says Göran Hugon, RoRo sales manager at Cargotec. "In Hook of Holland the vessel will be simultaneously loaded aft over two decks. In Harwich, it will be loaded via the bow with a drive-through configuration, again, simultaneously over two decks. This allows for extremely efficient turnaround times in port, which is why this particular design was chosen.

"For these new vessels, we worked closely with Stena on the design of the RoRo outfit and had to give careful consideration to the turning circle for the large freight vehicles that will be carried onboard.

"This contract extends Cargotec's close relationship with Stena, and we have delivered RoRo equipment to numerous Stena vessels. For example, based upon our original supplier status, we handled the conversion of the cargo access equipment onboard the existing 44,200gt *Stena Britannica*, which was originally completed at the end of 2002 by Hyundai Heavy Industries, and the 33,769gt *Stena Hollandica*, built in 2001 by Astilleros Españoles." Both vessels underwent a major lengthening project at German shipyard Lloyd Werft in 2007. *Stena Britannica* was lengthened by 28m and *Stena Hollandica* was lengthened by 52m.

UPON THE ARRIVAL OF THE TWO new Superferries, the existing *Stena Britannica* and *Stena Hollandica* are planned to be transferred to the Stena Line's Gothenburg to Kiel route between Sweden and Germany.



THE 62,000GT STENA HOLLANDICA, from Wadan's shipyard in Wismar, Germany, will be followed into service by sistership *Stena Britannica*

© Stena Line

Freight handling experience

"Previous examples of the RoRo access and transfer system design have proven to be effective in operation and allow for very smooth loading and unloading," says Göran Hugon. These include the series of five 42,000gt RoPax sisterships that were delivered to Finnlines by Italian shipbuilder Fincantieri. The first in the series was *Finnstar*, handed over in 2006; at the time, it had record rolling freight capacities for this type of ship, carrying up to 300 trucks in stowage spaces totalling 4,200 lane-m. Freight handling efficiency onboard all the Finnlines vessels is smoothed by a comprehensive hydraulically-operated MacGregor RoRo equipment package based on twin-level access aft, and twin-level access forward arranged via the bow door/ramp at main deck level and via the bow bulwark visor at deck 5.

CRANE TECHNOLOGY



**FOUR-WIRE ROPE
HEAVY-DUTY**
bulk-handling
cranes can be
expected to work
up to 5,000 hours
every year

Heavy-duty bulk workhorse joins crane portfolio

Cargotec's new 50-tonne four-wire rope MacGregor crane offers greater capacity and operational speeds to the bulk-handling market, whilst ensuring reliability through proven design characteristics

CARGOTEC HAS INTRODUCED a new four-wire rope heavy-duty bulk-handling MacGregor crane, the 50-tonne K4. "Market demand for more and more handling capacity from bulk cranes has asked for this new workhorse," says Anders Berencsy, Cargotec cranes sales manager. "Indonesia and India are two growing markets that are asking for increases in capacities. When it comes to both barge cranes and transfer terminals, this crane will be useful."

"A capacity of 50 tonnes, including grab, was defined, along with a SWL of 52.5 tonnes in general cargo operation, after feed-back was received from leading operators with heavy-duty cranes," he explains.

K4-cranes are outfitted with a mechanical grab for handling iron ore, coal, grain and all other kinds of bulk material. The mechanical grab, coupled with effective crane speeds, provide efficient tools for moving bulk material.

They will be available in jib outreaches from 26m to 36m.

FOR MANY YEARS, MacGregor cranes have used a proven design module for construction. "This design forms the basis of the new 50-tonne K4-crane," explains Mr Berencsy. "We know this design works, and understand that this is particularly important when you have a crane that can be expected to work up to 5,000 hours every year."

"Our philosophy to have all machinery well weather-protected in the crane house will also be used for this crane. This has been proven with excellent results, as both iron ore and coal can create a lot of dust that can get into vital machinery parts if they are outside the crane."

TO IMPROVE THE AVAILABILITY of the crane, two pump units have been installed. "If

one pump stops, the driver can easily disconnect the failed unit and still run the crane with the other one. However, the speed will be reduced but the crane is operational! As an option, the hoisting speed can be increased up to 20 per cent with an extra pump for each pump unit".

THE DRIVER'S CABIN is extended from the crane house to give the driver a better overview of the whole operation. As an optional extra, cameras can be mounted on the jib top with displays in the cabin to increase the driver's visibility even further. "Two air-conditioning units and an extra-comfortable seat will give the driver an excellent working environment when operating the crane," says Mr Berencsy.

Other possible options are automatic greasing of the slewing bearing and for an operational log to be stored on the crane computer.

Electric drive technology is making its mark in service and can meet the marine industry's growing need for a reliable 'green' alternative to hydraulic systems



THE DEVELOPMENT of new technology and the refinement of existing products give technologically-oriented companies the ability to compete in tomorrow's markets

R&D secures a sustainable future

ONLY THE DEVELOPMENT of new technology and the refinement of existing products will give a technologically-oriented company the ability to compete in tomorrow's markets. The marine and offshore industries have showcased a wealth of innovative products over the years that have not only had far-reaching effects within those sectors, but also translate to benefits within others.

This drive for innovative product development is coupled with a global shift towards environmental protection and increased awareness of industrial impact. The maritime industry's sense of responsibility for developing sustainable products for the future is in line with this. One product that meets these criteria is the electric drive, which provides shipowners with a reliable and environmentally-

friendly alternative to hydraulic systems.

CARGOTEC IDENTIFIED A NEED in the market for electric-drive products several years ago, and created a development policy focused around three main aims: compared with hydraulic versions, electric-drive systems had to be environmentally-friendly, they had to provide equal or better performance, and they had to cost the same. Many ideas were created and considered through combining this policy and technical feasibility. Development work on the electric-drive side-rolling hatch cover, for example, started as a three-year project in 2001.

ELECTRIC DRIVES OFFER many advantages to shipowners and shipbuilders compared with hydraulic versions. The main

advantages are that hydraulic oil leakages are eliminated, there is no need to fit hydraulic pipework on board, electric drives are easy to maintain, and they offer energy savings. It is also relatively easy to condition-monitor electric drives through the use of all electric components and this data can be used as part of a MacGregor Onboard Care maintenance agreement.

This is a maturing technology which is now being proven in service. Cargotec has numerous references and is seeing pivotal moments such as *Viking Odessa* entering service, the first ever ship with all electrically-driven internal RoRo equipment – including hoistable car decks, access and hoistable ramps – and the launch of the company's new second-generation electric drive for side-rolling hatch covers, MacRack.

Cargotec can offer electrically-driven:

- RoRo equipment including stern and side ramp/doors, hoistable car decks with access ramps internal ramps and doors (page 22)
- GLE electric cranes, which are based on proven designs but combine improved operability with a lower environmental impact (page 30)
- a new economical, competitive and environmentally-friendly drive system, MacRack, that combines drive and lift operations for side-rolling hatch covers
- MacPiler, which is an innovative gantry crane developed to handle lift-away hatch covers that can hoist, carry and stack lift-away hatch cover panels (two at a time) both on the weatherdeck and tweendeck
- active heave-compensated (AHC) winches for both umbilical and wire that sets new standards for performance, noise levels, reliability and power consumption; this critical equipment intended for remotely-operated vehicles (ROVs) and deep sea load handling
- bulk-handling equipment.

Feedback from first generation used to fine-tune MacRack

Fifteen ships using first-generation electric drive technology for side-rolling hatch covers are in service, another 14 shipsets of equipment are on order and 23 more are in the pipeline; and the second generation technology is now entering the market



MACRACK is a second-generation electric drive system for side-rolling hatch covers

ACTUATORS ARE INSTALLED on the hatch sides only, ensuring that the drive unit is well protected from cargo spills during loading and discharging

Traditionally, large bulk carrier side-rolling hatch covers use two types of drive for opening/closing operations: chain or rack-and-pinion drive. For both options there are two ways of lifting the panels up into the position at which they can be opened or closed: pot lifts (which can also be described as hydraulic jacks, or wheel lifters), or 'Roll-up-Roll' lifters, which enable automatic cleating to be adopted.

MacRack unites these lift and drive operations and so makes separate hatch cover lifters obsolete. This reduces maintenance work for the shipowner, and the shipyard's installation work is also simpler because fewer components need to be installed on the coaming.



ANOTHER SIGNIFICANT FEATURE is that the actuators are installed on the hatch sides only, which ensures that the drive unit is well protected from cargo spills during

loading and discharging. Detailed technical checks as well as prototype tests have been carried out, and a patent is pending.

The panels are kept in the closed position by an automatic lock (with a manual release). For intermediate stops the panels are held by the built-in brake on the motors. During the opening/closing procedure, auto-cleats are activated in the same way as for the Roll-up-Roll system.

"Reliability of these systems has been a key focus," notes Mr Dahl. "Some redundancy has been enabled in the control system design. For instance, if one of the deck PLCs is broken, the panel can be driven directly from the variable frequency drive (VFD) operating panel. It is also possible to manually cross-connect motors between VFDs. Also, if a problem in position control arises, the system goes into 'safety mode', which allows a panel to be driven, but only at low speed. If electrical power cannot be used, panels can be operated with the same emergency equipment usually used in all MacGregor hatch cover systems.

"Electric drives are also ideal for remote diagnostics technology, and by using the latest diagnostics tools it is now possible to offer real-time equipment condition analysis and reporting via telephone or satellite communication media".

TECHNOLOGY

REFINING ITS ELECTRIC DRIVE TECHNOLOGY for side-rolling hatch covers has resulted in the launch of MacRack, a second-generation system that offers shipowners an economical, competitive and environmentally-friendly electric-drive system.

"Development work is a continuous process and, as with all first-generation technology, improvements were needed," says Torbjörn Dahl, senior naval architect for bulk ships at Cargotec. "These focused on safety, technical issues and the cost of electric drives."

The first-generation technology, E-Roll, was developed in co-operation with world-leading Capesize building specialist, Universal Shipbuilding Corporation, and was destined for a new design of 207,000 dwt double-hull Capesize bulk carriers.

Since the first installation four years ago, E-Roll hatch covers have so far been installed on 14 of these bulk carriers being built at Universal Shipbuilding's Tsu works in Japan. This particular ship design uses electrically-driven deck machinery as well as electrically-driven hatch covers, which means that no hydraulic oil piping/components are required, eliminating oil leakages on deck.

Kawasaki and NACKS have also contracted vessels with E-Roll hatch covers, bringing the total number of ships to be delivered with this system to over 50.

MacRack incorporates a number of mechanical as well as electrical innovations:

- drive and lift systems are combined
- automatic cleating (as in Roll-up-Roll) is foreseen
- initial lifting is practically straight up enabling the use of a standard seal all around the hatch cover panel
- the motor and its mounting are disconnected from the panel when the hatch covers are closed at sea, allowing free relative movements between ship's hull and hatch covers
- the modular configuration means that installation and repairs can be done independently and replacements are easy
- automatic locking when closed, but with a manual release
- a standard interface speeding up the ship design process.

CUSTOMER

It is essential that an equipment supplier is close to customers and understands their business, according to Polsteam, which also values advanced technology solutions designed to operate efficiently throughout a ship's lifetime

Polsteam's fleet comprises 71 ships, mostly bulk carriers, varying in size from 11,000 dwt to 74,000 dwt



A fleet built for the future needs modern equipment that lasts a lifetime

TOWARDS THE END OF LAST YEAR Cargotec confirmed a contract for 24 bulk cargo versions of its MacGregor range of electric-drive cranes. "This is a breakthrough in the bulk carrier market as it is important recognition of our new environmentally-friendly GLBE electric crane, which is based on proven MacGregor designs offering improved overall efficiency and low power consumption," says Paul Söderstedt, Cargotec sales manager for bulk ships.

"The order was secured when Polish shipowner Polsteam, one of the world's biggest dry bulk shipowners and operators, ordered eight bulk carriers from Taizhou Sanfu Ship Engineering in China". Polsteam, otherwise known as Polska Żegluga Morska (PZM), specified three 30-tonne SWL cranes for each of the 16,900 dwt bulkers, to be installed from the end of 2010 to 2012.

"Our fleet is built for the future, and the equipment onboard is expected to meet the requirements that have been set for the future," says Władysław Oziewicz, manager of Polsteam's investment trade department. "Polsteam wants to invest in the latest technology onboard its fleet, and these electric cranes are the modern option on the market at the moment".

Polsteam's business adviser, Janusz Litwicki, says: "We opted for MacGregor

cranes for a number of reasons. The lifetime of the vessels in our fleet is approximately 25 to 30 years, and we are looking for solutions offering technical innovations that take into consideration the whole lifetime of our fleet and equipment onboard. The operating costs in the longer run are more economical, and as an investment the cranes proved to be competitive too".

Mr Oziewicz has driven an electric-drive MacGregor test crane. "We chose

electrically-driven cranes because of their technical characteristics and advantages compared to traditional cranes," he says. "Their competitive price also played a role, but so did the fact that the cranes are precise and have quick response time, and so they are easy to operate.

"We were shown a presentation about electric cranes around a year and a half ago, and liked what we saw. Our company is very much focused on having modern



"People are important. Being close to customers, understanding their business, and the business environment, as well as 'speaking the same language' are essential," says Władysław Oziewicz. (from left) Andrzej Krzeminskiy (Cargotec), Władysław Oziewicz and Captain Jerzy Niemiec (Polsteam), Janusz Litwicki (Polsteam) and Paul Söderstedt (Cargotec)

technology onboard, and also on supporting 'green ship' thinking. MacGregor electric cranes are accurate, and they eliminate the need for hydraulic oil. They are also energy efficient in operation; and offer shorter operation times allowing full speed/full load in all modes.

"During the crane tests, we could see that their design is based on proven and reliable technology and on the lengthy experience that Cargotec has in its MacGregor crane solutions". Cargotec's range of electric-drive cranes inherit the familiar characteristics of several generations of MacGregor wire-luffing cranes; all machinery is enclosed within the crane housing, ensuring safe operation and ease of maintenance.

"Also, when we consider selling-on a ship, there is certain extra value for the shipowner having quality equipment onboard that is proven and provided by suppliers that are considered to be the best in the business and who will still be there in 20 to 30 years time," Mr Oziewicz says. "This particularly applies to spare parts availability and possible modernisations".

"We expect reliability from MacGregor cranes," Mr Litwicki adds. "The cranes are key equipment onboard the vessel and their safe and reliable operation is very important to us. In case of any

failure or malfunction, it is imperative to have a quick response and access to spare parts. The worldwide service network that MacGregor products have is very much appreciated.

Mr Oziewicz says "MacGregor cranes are safe, they are built on modules, and



STATE-OWNED POLSTEAM'S
head office in Szczecin:
the company operates one of the
largest dry bulk fleets in Europe

all use components that have proven track records for reliable and sustainable operation. They are also backed-up with good spare parts availability when you need to replace parts from wear and tear.

"Normally there are three to four companies on a makers list that we consider for an order, and this was also the case this time. We were looking for reputable partner, and the MacGregor crane parameters were close to our expectations when also thinking about the lifetime of the cranes and vessels.

"Cargotec aims to listen to its customer and is very committed to finding the best solution for customers. We value our good and open long-term co-operation with Cargotec. To listen very carefully to the customer and get feedback from operational experience leads to a situation where a customer's experiences and opinions are taken into consideration, and to the development of equipment, if needed.

"People are important. Being close to customers, understanding their business, and the business environment, as well as 'speaking the same language' are essential. Having a long, open relationship with an equipment provider is a key to fruitful business relationships where the aim is a win-win situation for both parties, each helping the other to be successful."

STATE-OWNED POLSTEAM (or Polska Żegluga Morska) is the biggest shipowner in Poland and one of the largest fleet operators of dry bulk cargo in Europe. The company's fleet comprises 71 ships, mostly bulk carriers, varying in size from 11,000 dwt to 74,000 dwt. It specialises in the handymax sector (56 vessels) with some participation in the panamax sector (seven vessels).

Four freight/passenger ferries are operated by Unity Line, which is 100 per cent owned by Polsteam. Polsteam also plays a major role in the liquid sulphur niche market, using three of its own chemical carriers and one managed vessel.

ANNUALLY, POLSTEAM SHIPS TRANSPORT over 20 million tonnes of cargo, on average making about 1,500 calls in ports all over the world. Its main cargoes are grains, coal, coke, and phosphorites, and about 98 per cent of these are cross-traded between foreign ports.

POLSTEAM IS ABOUT HALF-WAY through a fleet renewal programme. Once this is complete, the fleet will comprise some 80 ships and the average age of all company's vessels will fall to below 10 years. Today its average ship age is about 16 years.

The company focuses on vessels working in strategic markets, for example, it wants to build eight lakers to

maintain its strong position in the American Great Lakes. It also intends to build 34 bulk carriers between 2005 and 2015 at a cost of around US\$1 billion.

POLSTEAM EMPLOYS around 2,500 Polish mariners and about 200 shore-based personnel. The investment programme will create new jobs and Polsteam intends to employ an additional 300 to 500 seafarers over the next three years. It has signed co-operative agreements with two Polish maritime academies (in Gdynia and Szczecin) and Westpomeranian University of Technology (Szczecin).

POLSTEAM FLEET RENEWAL PROGRAMME:

- ten 37,700 dwt bulkers from Xingang Shipyard, China: four have been delivered in 2008, five delivered in 2009, and the last vessel is expected to enter service in March 2010.
- eight laker-type 30,000 dwt bulkers from Mingde Shipyard, China: six to be delivered in 2010 and two in 2011.
- four 80,000 dwt bulkers from New Times Shipyard, China: first (*Giewont*) delivered in January 2010, and next three are expected in May, August and November 2010.
- eight 16,900 dwt bulkers from Taizhou Shipyard, China: seven planned for delivery in 2011, and one in 2012.
- four kamsarmax-type 82,000 dwt bulkers from Tsuneishi Shipyard, Japan: deliveries planned between 2012 and 2013.

Quality production on a

Superior quality and reliable deliveries achieved by dedicated processes are



As shipbuilding activity increased in Asia over the past decade it became necessary to move equipment production facilities to follow suit. Today Cargotec's marine business area has partner plants in China, Japan and – most recently – Vietnam, all producing the same quality MacGregor products wherever they are manufactured.

Cargotec's two new plants in Vietnam follow the same well-proven concept as Cargotec's partner facilities in China and Japan. Partners invest in the site, buildings and machinery and Cargotec provides the production layout and specification, and tailors an optimised production flow. "Our role is to be responsible for the production development, supervision and quality development at the plant," says Olli Dahl, Cargotec's Dry Cargo procurement director.

"The new plants are built to the latest standards and incorporate our most recent knowledge and expertise, gathered over the years from all our plants. Our aim is to provide an ideal production setting, for example, with state-of-the-art surface treatment facilities. All machinery comes from selected global suppliers and fulfils the highest international requirements.

"Working with manufacturing partners around the world and maintaining a global standard has only been achieved by establishing a dedicated organisation whose task it is to ensure compliance with rigorous standards," he says. "Our complete MacGregor hatch cover production takes place at dedicated partner plants. Our own quality control personnel and production development personnel are there permanently to ensure superior quality and constant development to best meet the needs of our customers.

SUPERIOR QUALITY

"We don't just offer products of a consistently high quality, we offer superior quality products and reliable deliveries by dedicated processes, which are unique to us," he highlights. "Over the years, the close co-operation and development work with our customers – both with shipowners and shipyards – has resulted, for example, in defining painting specifications that work best in tough marine conditions.

"These specifications require special conditions for surface treatments and one of the starting points for our hatch cover production processes was to establish the

best possible conditions to fulfil them in terms of factors such as ambient temperature and humidity. As a result of this co-operation, we now have in place a process, facilities and methods for even the most demanding painting requirements.

"The facilities that we have for MacGregor hatch cover production are highly specialised and differ significantly from normal steel structure factories in terms of quality, production, and product protection against ambient conditions. These are key issues that are monitored and constantly adjusted," says Mr Dahl. "For example, the whole production process is carried out indoors. No production phases are carried out outdoors. Dedicated facilities also account for increased productivity, which, in turn, obviously has an effect on overall cost-efficiency."

To meet the recent emerging trend for very large side-rolling hatch cover panels, weighing about 150 tonnes, and with dimensions of around 20m x 30m (600m²), Cargotec partner plants are able to manufacture very large panels in one piece with no welding or adjustments needed at the shipyard.

global scale

the mainstays of Cargotec hatch cover production facilities



“Our ability to produce very large panels emerged from customer demand, which, without delay, we converted into action and in a short time had the facilities in place to be able to produce them. This is a great example of our willingness to anticipate and respond to our customers’ needs and we have been pleased to receive very positive feedback from them”.

Large hatch cover panels also require safe and dedicated transport systems. Therefore, Cargotec employs the use of specialised lashings, re-useable steel transport supports, and professional logistics partners for the transport of MacGregor hatch covers.

OPTIMISED DELIVERIES

“There is an ever increasing demand for efficiency, and Cargotec’s sustainable approach means that it is constantly striving to find best practices for supporting the ‘value-chain’ in hatch cover production and for providing cost-efficient solutions to stakeholders,” Mr Dahl says. “Our objective is to: minimise capital involvement by reaching shorter lead times; focus on process

quality for on-time deliveries, improve information flow, reduce mistakes and hassle; reduce rework and guarantee costs by constant product quality improvements. Furthermore, our design office turns the constant flow of feedback from manufacturing into improved technical solutions.

“Shorter hatch cover process lead times provide more flexibility in the ship design process, as we can wait longer to receive the final or almost final parameters. One way of doing this is by exploiting existing similarities between projects as efficiently as possible and still maintain the flexibility to respond to various customer needs and demands. The aim is to develop a configurable product platform for each hatch cover type, with optimised modular structure.

Mr Dahl adds that: “a key point for our customers is the interface between subcontracting, where to draw the line, what should be done in-house by the shipyard, what is reasonable to outsource? It should be noted that resources and premises also cost money, although they are not always considered when conducting comparison studies between

in-house and outsourcing projects. Further, could the shipyard’s resources and premises be better used for the core business of shipbuilding, and not diverted for creating favourable conditions and expertise for hatch cover manufacturing?”

“Our solutions offer one main partner, one responsible party for the customer’s project, a modular solution for shipbuilding, and accountability for the function of the whole MacGregor hatch cover system during the ship’s lifetime.”

DEDICATED NEW PARTNERS IN VIETNAM

Cargotec has two new purpose-built hatch cover fabrication partnerplants in Vietnam. Both plants have broadly been designed to serve Vietnamese shipbuilding customers with smooth hatch cover deliveries, but can also provide export deliveries to other countries from these plants.

Production capacity at the first plant is approximately 10,000 tonnes/year and will be around 20,000 tonnes/year at the second facility. The plants are equipped to fabricate all types of MacGregor hatch covers and production at the first plant will start with folding hatch covers for bulk carriers.

Gypsum self-unloader joins sister system

Following the successful introduction of *Gypsum Centennial* in 2001, Gypsum Transportation Ltd's second vessel with a custom-designed marine self-unloading system is now fully operational

GYPSUM TRANSPORTATION'S second marine self-unloading system from Cargotec is now fully operational onboard the US operator's new 47,800 dwt vessel *Gypsum Integrity*. The vessel, which was built at Brazilian shipyard, Estaleiro Ilha SA (EISA), joins the 39,000 dwt self-unloading bulk carrier *Gypsum Centennial*, which was built in South Korea by Hyundai Mipo Dockyard and introduced in 2001. Since then it has been mainly operating along the US East Coast carrying gypsum rock but also coal and other coarse materials.

Both ships feature a similar custom-designed self-unloading conveyor system from Cargotec and have a discharge rate that is variable to a maximum of 3,000t/h or 2,500m³/h. Apart from free flowing bulk materials like gypsum rock, coal, gravel, grain and iron ore, more difficult commodities like synthetic gypsum can also be handled.

"The new vessel made its first discharge, with gypsum, in Jacksonville in Florida last year," says Björn Berglind, product manager in Cargotec. "At the same time the commissioning of the self-unloading system was carried out to the owner's satisfaction."

Each vessel has four cargo holds that are loaded through eight hatch covers. The holds have sloping bases, providing a gravity flow for material down to two parallel longitudinal slots in the bottom. Attached to each of these slots are nine hydraulically-operated moving hole feeders, supplied by Kamengo Technology Inc. in Canada.

COMPARED TO CONVENTIONAL GATES, the main feature of the moving hole feeder is the elimination of 'hogbacks' – which are protective covering structures for supports that are traditionally used in the bottom of cargo holds between the gates. The absence of hogbacks, in

combination with the moving hole feeder design, creates an uninterrupted gravity flow of the material from the cargo holds and increases cargo hold volume.

Material is fed at a constant rate to two hold conveyors, which discharge bulk onto the cross conveyors. From here, the material is transferred to a C-conveyor located on the ship's centreline, just in front of the engine room bulkhead.

The C-conveyor elevates the material to main deck and discharges it onto a slewable and hoistable boom conveyor. A travelling telescopic discharge chute is attached to the discharge end of the shuttle conveyor to reduce dust and avoid spillage during transfer to shore receiving facilities. "The telescoping boom is designed for easy positioning and transferring of the material to the receiving arrangement ashore," Mr Berglind explains.

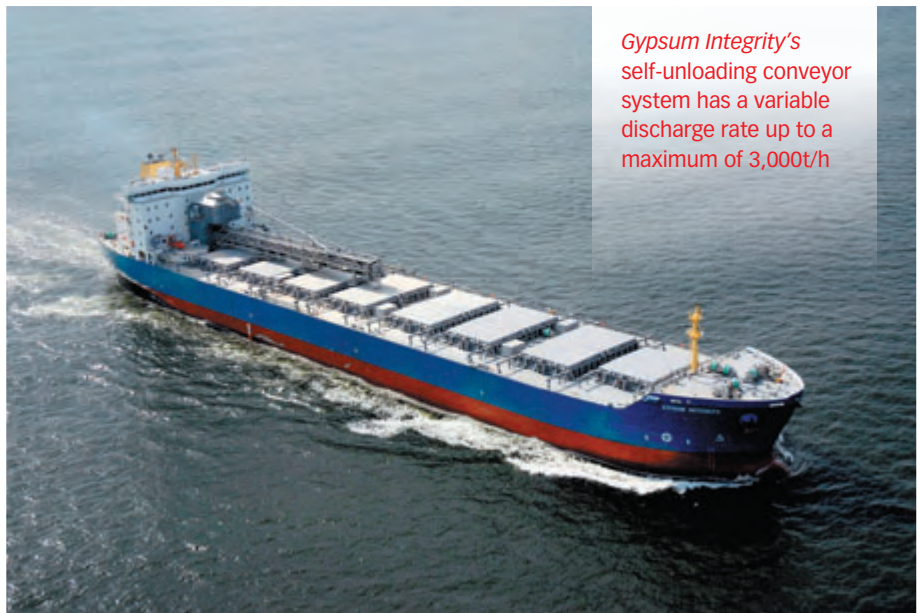
"For this application, the telescoping boom has a travelling length of 36m, which is exceptional considering that the maximum boom length is 76m and the minimum length in retracted position is only 40m," highlights Mr Berglind. "Thanks to the shuttling conveyor, it is easy to position the boom conveyor in

order to distribute the material directly to stockpiles onshore or to transfer to other receiving arrangements, such as hoppers and conveying systems."

A specially-designed hydraulic slewing actuator and integrated hydraulic power pack ensure the required high torque and maximum slewing angle. "They also provide a smooth and even slewing action, which is essential when positioning the boom conveyor during the discharge operation," he notes.

To meet the latest IMO regulations for maximum security and water integrity during a voyage, the vessels are also fitted with MacGregor watertight bulkhead doors from Cargotec. These have been installed where each hold conveyor penetrates a bulkhead.

THE OPERATION AND CONTROL of the whole conveyor system is undertaken from a terminal located in the ship's accommodation. The entire unloading operation can be supervised from a local PC terminal and an extensive alarm system gives instant information of all components, conveyors and units of the self-unloading system in case of malfunction.



Gypsum Integrity's self-unloading conveyor system has a variable discharge rate up to a maximum of 3,000t/h

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Note •
= 24-hour service numbers



We deliver uptime. MacGregor Onboard Care

MacGregor Onboard Care service concept offers our customers sustainable ship operations and revenue earning capabilities by ensuring that equipment works when it is needed thanks to flexible planned maintenance. This concept was originally launched in 2004 and now over 430 vessels are protected by MacGregor Onboard Care agreements that take care of hatch covers, cranes, RoRo equipment, offshore devices, bulk cargo selfunloaders and linkspans.

***Cargotec** improves the efficiency of cargo flows on land and at sea – wherever cargo is on the move. Cargotec's daughter brands, Hiab, Kalmar and MacGregor are recognised leaders in cargo and load handling solutions around the world.*