

MacGregor news

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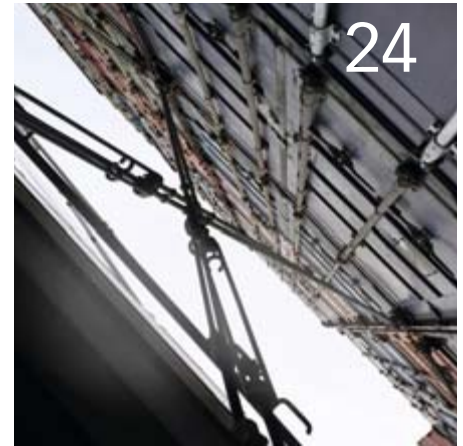
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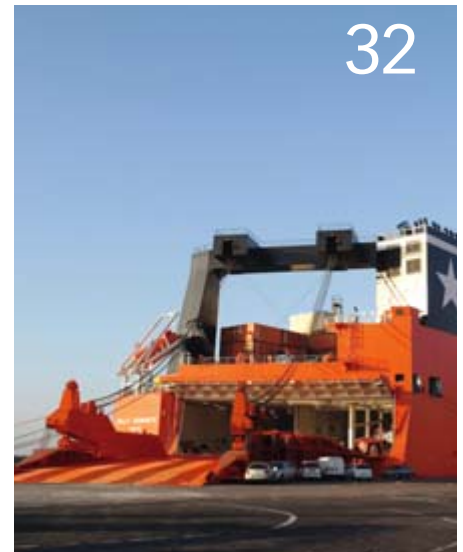
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One main production base
for standard knuckleboom
offshore cranes centralises
7 our expertise



Partnerships produce the best ship-type solutions



The offshore industry continues to grow, and in the next few years will enjoy better prospects than it has for some time. We have therefore further strengthened our management structure to focus on this sector and invested in expanding our service centres in Houston and Brazil to serve customers in the US and Gulf of Mexico areas.

We are also establishing a joint venture with Jiangsu Rainbow Heavy Industries which will bring our combined influence and expertise to the Asian offshore market. Rainbow-Cargotec Industries Co Ltd will develop new offshore products and produce high quality knuckleboom cranes at competitive prices.

As operations move into areas with more and more demanding conditions, operators need to know their ships are performing as expected. Therefore they choose the best solutions available, and Cargotec's continuous product development is crucial to our customers' businesses as well as ours, enabling us to offer the high-end and integrated solutions that are essential to stay competitive. Developing complete solutions by ship type has proved to be highly successful, and is ideal for offshore vessels.

Ship-type solutions are also a perfect fit for our marine business model, which is based on strong partnerships – both in manufacturing and with customers – and benefits all parties. This is being extended to early involvement in newbuild projects, giving us the opportunity to help operators plan the most efficient ship for their needs, starting from a ship's cargo profile.

We have continued to gain market share during the past few years and our marine business grew in 2011, despite the challenging market. This was mainly achieved by orders for merchant ship cargo systems, particularly bulk carriers. As this market levels off, we believe that there are good prospects in some ship types that have larger MacGregor-equipment content. Thanks to strong Cargotec ownership we are willing and ready to participate in industry consolidation.

Olli Isotalo

Executive Vice President, Marine

About Cargotec

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. The company employs approximately 11,000 people.

www.cargotec.com

Key figures, MEUR	Q4/11	Q4/10	Change	2011	2010	Change
Orders received	842	716	18%	3,233	2,729	18%
Order book	2,426	2,356	3%	2,426	2,356	3%
Sales	828	747	11%	3,139	2,575	22%
Operating profit	48.0	38.5	25%	207.0	131.4	58%
Operating profit margin, %	5.8	5.2		6.6	5.1	
Cash flow from operations	88.3	99.5		166.3	292.9	
Interest-bearing net debt	299	171		299	171	
Earnings per share, EUR	0.56	0.39		2.42	1.21	

Sales by reporting segment 2011, %

Marine 39% (41%)

- Equipment 85% (84%)
- Services 15% (16%)



Industrial & Terminal 61% (59%)

- Equipment 71% (67%)
- Services 29% (33%)

Sales by geographical segment 2011, %

Americas 21% (18%)

EMEA 40% (42%)



APAC 39% (40%)



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 on board merchant ships, offshore support vessels, and in ports and terminals.



Chain Wheel Manipulator wins offshore innovation award

Cargotec's MacGregor Chain Wheel Manipulator has won *Offshore Support Journal's* Innovation of the Year award. The award was presented to Cargotec's sales team for Advanced Load Handling in front of an audience of over 400 people at the Annual *Offshore Support Journal* Conference gala dinner in London in February.

The *Offshore Support Journal* innovation award recognises a product, system or service which is considered to have made a significant impact on the design, build and/or operational aspects of offshore

support vessels in service during the previous calendar year. "We are delighted to have won such a prestigious award, particularly in the face of strong competition from a shortlist representing the best in innovative design from across the industry," said **Frode Grovan**, Director, Sales and Marketing, Advanced Load Handling.

The MacGregor Chain Wheel Manipulator enables an anchor handler to safely change chain wheels at sea, an operation which until now usually meant returning to port (see page 14).

Offshore crane contracts followed by new winch orders

Cargotec has won a contract for two active heave-compensated (AHC) offshore cranes from the privately-owned Norwegian specialist operator, Volstad Maritime. It has also secured new orders for two 100-tonne active heave-compensated offshore cranes from the wholly-owned subsidiaries of a Malaysian shipbuilding and vessel chartering group, Coastal Contracts Bhd.

The two Volstad cranes, a 250-tonne MacGregor AHC subsea crane and a 15-tonne MacGregor AHC offshore crane, will be fitted to the operator's new offshore construction vessel (OCV) on order at Bergen Group Fosen shipyard in Norway and scheduled for

delivery in August 2013.

The Coastal Contracts' cranes are destined for two 85m newbuild offshore support vessels currently under construction within the group.

Cargotec is also supplying two 10-point MacGregor mooring systems for two offshore pipe-laying heavy-lift offshore construction vessels. The vessels are on order at Cosco (Nantong) Shipyard Co Ltd in China for a Malaysian offshore installation and maintenance specialist, TL Offshore Sdn Bhd, a wholly-owned subsidiary of SapuraCrest Petroleum.

Cargotec is scheduled to deliver the mooring systems in the first quarter of 2013.

New senior vice president strengthens offshore business growth strategy



Pasi Lehtonen was appointed Senior Vice President of Cargotec's Offshore business segment at the beginning of the year to further strengthen the management of one of Cargotec's main growth areas. He joined Cargotec in 1995, and was previously Cargotec Marine's Senior Vice President of Finance and is already a member of Marine's management group.

"Pasi Lehtonen brings vast management experience which will help us to speed up our growth in the offshore industry," says **Olli Isotalo**, Executive Vice President, Marine.

360°

Readers are most interested in industry trends and developments

A recent online readership survey to find out what readers think of Cargotec customer magazines, and to collect ideas for development, reveals that customers were most interested in reading about cargo and load handling trends and Cargotec's view on the development of cargo handling. Readers were also willing to learn about the company's new solutions as well as research and development projects.

Most of the respondents found the magazines useful



and the majority would prefer to read the magazines as PDFs or printed versions. Some would like to read the magazines as a version optimised for tablet devices, but the least preferred option was a browsable e-magazine. The respondents' most common sources of business information were printed industry magazines, industry websites and events such as trade fairs.

Over 140 people from 37 different countries participated in the survey, most were from Europe and Asia and 69 respondents evaluated *Kalmar Around the World*, 40 chose *MacGregor News* and 35 respondents gave feedback about *Hiab Method*.

Thank you to everyone who took part in the survey, and the lucky winner of the iPad2 was **Mie Lund** of BHS Service Centre, in Denmark.

Owners opt for proven bulk systems for OSVs on order in Spain and the UAE

MacGregor bulk handling systems are being installed on four new offshore support vessels (OSV) belonging to owners in the United Arab Emirates and Spain.

In the UAE, Grandworld Shipyards ordered MacGregor bulk handling systems for two anchor-handling tug/supply vessels. They will handle cement, barite and bentonite for their owner Halul Offshore Services Company, in Doha, Qatar.

North Star Shipping's two platform supply vessels under construction at Astilleros Balenciaga in Spain will each use a MacGregor bulk handling system to handle cement, barite and bentonite in the North Sea.

"In both cases the owners wanted simple and well proven bulk handling technology, with a solid track record," says **Pankaj Thakker**, Cargotec Sales Manager, Marine Selfunloaders. "Dust-free operation and low power consumption also make them environmentally-friendly."

More naval and ferry RoRo equipment outfits ordered by regular customers

Cargotec will supply and install MacGregor RoRo equipment for two 199m Mistral-class naval ships and for two new hybrid-propulsion ferries on order for Caledonian Maritime Assets Limited (CMAL).

Cargotec signed the naval contract with STX France, which will build the ships at its Saint-Nazaire shipyard under a subcontract with fellow French yard, DCNS. Cargotec's delivery will include the design, hardware and installation of MacGregor RoRo equipment. The first ship will be delivered in 2014 and the second in 2015.

Cargotec has previously delivered similar

MacGregor RoRo access equipment to three Mistral-type vessels. *Mistral* and *Tonnerre*, the first two, were built by DCNS and STX France and delivered in 2006 and 2007 and the third vessel, *Dixmude*, was delivered in early 2012.

For the CMAL vessels on order at Ferguson Shipbuilders, in Scotland, Cargotec will supply a bow ramp/door, a stern ramp/door and a power pack. The ferries will accommodate 150 passengers, 23 cars or two large trucks and will be run by the operator of the Clyde & Hebrides Ferry services, currently CalMac Ferries Ltd.

"CalMac has a long history of operating MacGregor RoRo equipment," says **Lars Öberg**, Sales Manager for RoRo ships at Cargotec.

The new vessels will feature a ramp design that is based on the previous successful delivery of MacGregor ramps that were supplied to the 54m double-ender *Loch Shira* ferry, also built at the Ferguson yard. "*Loch Shira* started service in 2007 and since then its MacGregor ramps have logged more than 40,000 operation cycles; the operator, CalMac Ferries, is very satisfied with their good reliability."

Joint venture in China

increases focus on offshore sector



Aiming for growth in the offshore sector, long-term partners Cargotec and Jiangsu Rainbow Heavy Industries have joined forces to form a joint venture company, Rainbow-Cargotec Industries Co Ltd, which promises innovation on an affordable scale

For 30 years Cargotec has made its presence known in Asia and as much as 40 percent of the company's global business now comes from this region. Over the years Cargotec has established a series of successful long-term production partnerships, including one with Jiangsu Rainbow Heavy Industries Co Ltd (RHI).

Further cementing this partnership is the recent announcement that Cargotec and RHI plan to establish a new joint venture company, Rainbow-Cargotec Industries Co Ltd (RCI). RCI is scheduled to be operational as soon as possible. The new factory and office building will be in Taicang, Jiangsu Province, which is approximately 60km northwest of Shanghai. RHI will own 51 percent of the company, and Cargotec 49 percent. Both parties will nominate members for the joint venture's management team, which will report to RCI's board of directors. The general manager will be nominated by RHI and the chairman of the board will be nominated by Cargotec.

Combined experience

"From our point-of-view the aim of the joint venture is to increase our focus on the offshore sector and our business in this area," says **Pasi Lehtonen**, Senior Vice President of Cargotec's Offshore business segment.

"RCI will support our ambition in two

ways. Firstly, RHI has created some offshore lifting solutions of its own and these will be moved to the joint venture business. When combining RHI's and Cargotec's experience in certain offshore heavy lift solutions, we can create something that is new, with greater capabilities and gain a stronger position in the market. This will open doors in both the Chinese offshore market and enhance competitiveness in the global arena.

"Secondly, we will make RCI our main offshore crane production base for our standard knuckle jib offshore cranes. This centralises our expertise and will ensure that we can offer customers high-quality products at competitive prices."

Like Cargotec, RHI is no stranger to the offshore market, and in January 2011

it established a wholly-owned offshore subsidiary, Nantong Rainbow Offshore & Engineering Equipments Co Ltd (ROC). ROC is situated in the Qidong shipping industry area of the Jiangsu province, at the estuary of the Yangtze River.

"ROC focuses on offshore business and is actively exploring new market opportunities," says **Wu Jian**, Chairman of RHI. "With

its strong sales team, offering professional sales and marketing skills, and correct positioning, the company made a quick entry into the offshore market, improving awareness of our capabilities, as well as our influence in the industry.

Advantages for customers

"The unit value of each offshore product is often high, and therefore the company must pay a lot of attention to a client's order fulfilment capability, and conduct risk assessments from different angles," he explains.

"In terms of the joint venture's benefits for RHI's and Cargotec's customers, it is obvious that the new company will offer advantages and a competitive edge in terms of product quality, price, and aftersales service, because of the combined resources and strengths from both RHI and Cargotec.

"Our planned focus on cranes for specialised vessels and platforms will also offer customers some advantages. With synergies from both sides, the joint venture will provide the highest-quality cranes on a professional, efficient, customer-focused basis, and will offer expertise for applications for specialised vessels and platforms as well."

A look to the future

"Based on today's global economic situation, I have a conservative view on the outlook of the merchant marine market over the coming several years.

China has taken a large market share of this business, especially in the bulk carrier segment, thanks to cost advantages, as well as building size capabilities. To improve the current situation, which is too reliant on the bulkier market, China is actively adjusting its development strategy. The government's 12th five-year-plan has given specified targets, which will support the long-term development of China's shipbuilding industry; offshore growth is a part of this.

"The new joint venture company will prepare for these developments firstly with human resources. RCI will need lots of talents specialised in areas such as management, technology, and production. It will then need to form an R&D team as soon as possible to enhance innovation and lift the joint venture's growth capabilities. This will also fulfil and exceed customer expectations with new product development for each market niche. Last but not least, the new site will speed up the joint venture's production capabilities.

"Combining our strengths and merging corporate cultures from both parties will also be essential for the joint venture's fast development and high operational efficiency, however, at the same time, it will also be our biggest challenge. Both sides have already, during the start-up period, found ways to work with each other and built a good foundation for the future, I hope that this will continue and the team will strive for the best.

"I am confident, that with efforts from both sides, RCI will bring positive surprises for our clients, and I am looking forward to the moment of our first delivery!"



— Wu Jian, Chairman of RHI

Saipem's first Frigstad D90 ultra deepwater semi-submersible drilling rig, Scarabeo 9, has an operational water depth of 12,000ft (3,660m) and a drilling depth of 50,000ft (15,240m)

Offshore technology marches ahead

at a quickening pace

Oil majors are developing the design, installation, maintenance and repair of subsea production systems for even deeper and more remote applications; Jeremy Cresswell outlines the huge progress now being made in the name of deepwater subsea



Ever since the modern offshore industry was initiated in the US Gulf of Mexico during 1949, there has been a need for more and more technology to bust the next frontier envelope. Right now, in deepwater terms, that frontier sits around the 3,500m (12,000ft) mark: essentially the current limit of drilling rigs/drill-ships and production systems.

However, the world's longest and deepest

extended-reach wells have been drilled using land rigs, and seven of the 10 longest so far have been drilled using the Yastreb rig at Sakhalin Island in the Russian Far East for ExxonMobil. The record is 12.4km (7.7 miles) total vertical depth and 11.4km (7.1 miles) extended reach.

There was an especially big push in the mid 1990s through the early 2000s with a

large number of ultra-deepwater capability rigs built to hunt out presumed new hydrocarbon prizes, such as pre-salt reservoirs offshore Brazil.

As for extracting those prizes, the march towards basing offshore oil & gas production on subsea technologies may only be eight years away, if Norwegian oil company Statoil's dream is fully realised.

Around 50 percent of the company's current output from the Norwegian Continental Shelf is handled by subsea infrastructure and the two most advanced examples are the Ormen Lange gas and Snøhvit gas/condensate developments, both of which produce and deliver their hydrocarbons via subsea infrastructure, but which is tied back directly to processing facilities 'on the beach'.

In the southern hemisphere, Petrobras of Brazil is engaged on an equally ambitious mission, but here the established model is to make heavy use of subsea infrastructure linked to floating production, storage and offloading vessels variously exporting via shuttle tankers and pipelines depending on location.

Like Statoil, Petrobras has a long established reputation for being technologically bold and being willing to invest in the research and development necessary to deliver its business ambition of making Brazil not just self-sufficient in oil (and gas), but also a significant exporter.

Most oil majors have deepwater R&D programmes, and among the best examples are Chevron with its ground-breaking Jack/St Malo development in the US Gulf of Mexico, and Total with a succession of deepwater developments like Pazflor offshore Angola. But their budgets and scope pale when compared with Statoil and Petrobras, both of which are semi-state owned.

The offshore industry has a reputation for being technologically bold and willing to invest in R&D

The dream of such companies is to further develop and adapt the design, installation, maintenance and repair of subsea production systems already in use for deepwater (to 3,000m depth) and remote (up to 500km) applications; eventually including sub-ice solutions as the Arctic hydrocarbons resources quest advances.

As for the offshore industry supply chain, there are certain brands that figure time and again as subsea technology leaders, not just contractors, such as Subsea 7, Technip, Saipem and DOF Subsea, but major subsea equipment manufacturers such as Aker

Solutions, Duco, Framo and GE, not forgetting myriad technology-led boutique providers and, from time to time, classification societies such as Det Norske Veritas (DNV), which only recently took the wraps off a highly significant deepwater gas pipeline-concept that has been offered free to the industry to develop.

The DNV approach is to take existing, proven technologies and put them together in ways not hitherto tried. Basically, it will be possible to significantly reduce the wall-thickness of deepwater/ ultra-deepwater gas pipelines – through the use of high-integrity pressure protection system (HIPPS) regulation valves – and potentially save huge sums of money and enable trunkline projects that might otherwise not go ahead.

Statoil's subsea journey has taken 25 years so far and this best exemplifies the march of technology that quickens year-by-year. Piecing together the recently coined 'Subsea Factory' is a key element of the company's drive to raise domestic oil and gas production to 2.5 million barrels equivalent by 2020 compared with about 2 million barrels equivalent today.

Subsea Factory succeeds Statoil's previous MMX subsea programme and, this year alone, it will attract a budget of some EUR300 million, 27 percent more than for 2011.

A particular current priority is developing efficient subsea compression systems to boost output from three fields in particular: Asgard, the veteran Gullfaks field and Ormen Lange. Each field has different reservoir characteristics but all are accorded high priority.

Another priority is subsea well intervention; little wonder given that the company currently has around 480 wells classed as subsea and which account for 50 percent of the company's NCS output and a sizeable percentage of the global population of such wells.

Statoil has played a major role in the development of well intervention technologies that can be deployed by ships. Another company that has ploughed a huge effort into this area is Aberdeen's Expro Group, with active help from BP. Expro has invested more than \$100 million on its AX-S system remote well intervention package.

Today, Statoil has three light well-intervention vessels on charter from Norway's Island Offshore; however, it is also tendering for a new class of mobile offshore drilling unit (a 'Category B' rig) that will also be capable of subsea well intervention, presumably at lower cost than traditional rigs. The oil company is also working on the use of through tubing rotary drilling (TTRD) to reduce well costs.

The objective is simple; for every one percent increase in field recovery rates, oil companies active in Norwegian waters can together generate an additional revenue of NOK270 billion (EUR35 billion). And that's just one of the world's now mature offshore provinces of which others could similarly benefit with the right fiscal stimuli and corporate interest.


Whether in the North Sea or elsewhere such as the Gulf of Mexico and offshore Brazil, seabed separation will be key to success, which is why the CompactSep joint industry project is so important.

There are certain brands that figure time and again as subsea technology leaders

The CompactSep JIP is led by Chevron, Petrobras and Statoil. It was launched in 2008 and was due to complete in 2011 though details of the outcomes have yet to be disclosed publicly. The objective was to develop subsea separation systems capable of operating reliably in water depths to 3,000m.

Long-distance multiphase transport of hydrocarbons from subsea satellite fields up to 500km from production hubs is another challenge that occupies minds. A critical element of this is ensuring that transported hydrocarbons are carried efficiently and with minimal interference from hydrates formation and waxing. This requires effective pipeline insulation and heating.

For example, Total is working with trace-heating technology on its Islay satellite project in the UK North Sea, a pioneering solution that is said to be dramatically less energy hungry than other approaches.



Full MacGregor package chosen for innovative semi-sub

Developed for subsea services and well intervention, Hallin's new compact semi-submersible is designed to have the capacity of a 120m vessel, but not the cost – either initially or operationally

An innovative, twin-hulled compact semi-submersible (CSS) vessel now under construction is designed to operate as a lower cost alternative to large dive support vessels and traditional semi-submersibles, providing cost-effective solutions in both subsea services and well intervention. The multi-hull form has been developed to enhance sea keeping capabilities when in DP mode, providing a stable platform that increases the vessel's flexibility.

CSS Derwent is scheduled for delivery to Hallin Marine, a Superior Energy Services company, in December 2012, and to go operational in the first quarter of 2013. It is being built by Drydocks World's Nanindah yard in Batam, Indonesia.

The vessel is the culmination of a five-year design project, and the basic design has two variants: the offshore construction support unit and an accommodation unit with berths for about 500 people. The design is owned by CSS Design Ltd, which is a joint venture between Hallin Marine, STX Marine Canada and Minnow Marine, brokered by M3 Marine.

Hallin has always followed the philosophy of maximising capability while reflecting the pricing demands of its customers, says Group Business Development Director **John Payne**.



"CSS Derwent is our largest vessel design and build to date, and it employs innovative and advanced technology"

– John Payne

"CSS Derwent's design follows this philosophy and has been developed to provide flexibility in the vessel's type of operations, offering a larger and more stable platform in comparison with other 85m vessels."

Hallin takes the view that there is continuing market demand for multi-service vessels, with a need to manage – and provide support for – the more intensive risk management requirements in place post-Macondo, John Payne says. "The embryonic intervention market continues to be present but we see the need for a flexible marine solution capable of handling a multitude of infield roles while a field is in its development phase, as well as IMR (inspection, maintenance and repair) support services once the build out is completed."

CSS Derwent is primarily being marketed in three key developing subsea markets, John Payne says, Brazil, West Africa and Australia, where substantially increased capital expenditure and build programmes in the subsea sector have already been approved, and spend sanctioned for the near future. "We have already experienced significant interest in these regions and we are looking to commence commercial discussions within the next few months as contract awards and requirements become clearer".

"CSS Derwent is our largest vessel design and build to date, and it employs innovative and advanced technology. With two built-in 3,000m ROVs and accommodation for 152 people, it offers levels of flexibility and capability that are hard to find in ships of this length. The vessel offers construction and umbilical installation capabilities. The working deck is designed to give a single length run of 60m within easy access of the subsea crane. The combination of tower and crane provides a versatile, twin deployment capability."

CSS Derwent is a DP3 diesel-electric vessel with a 1,300m² working deck, comparable to

"The concept of installing modules and other subsea equipment – along with the need for flexibility in handling intervention equipment – is a developing field"

the deck area found on 120m-plus vessels. An equipment package from Cargotec includes a 3,000m working depth MacGregor modular handling system (MHS) incorporating a 160-tonne active heave-compensated (AHC) winch, along with a 150-tonne 3,000m working depth crane.

The module handling system includes a four pallet tractor unit with recessed track-ways to manage the movement of deck cargoes without the use of the crane when working at sea.

CSS Derwent features two moonpools: a 7.5m x 7.8m working moonpool and 4.2m x 4.2m ROV moonpool. A fully tracked deployment system allows the launch and recovery of units weighing up to 160 tonnes through the splash zone with limited transverse and longitudinal movement. Furthermore, the twin hull design will significantly reduce the platform's motion resulting from wave and swell patterns. Computer modelling and tank testing show that heave will be less than 2m

MacGregor equipment supplied by Cargotec

deck crane

150 tonnes SWL active heave-compensated knuckleboom subsea crane (3,000m working depth)

deck crane

5 tonnes at 10m electro-hydraulic subsea deployment (300m working depth) and cargo crane

module handling system

160 tonnes SWL active heave-compensated main winch (3,000m working depth)

deck skid system

with three tractors and four pallets

ROV A-frame LARS

15 tonnes SWL

Moonpool ROV LARS

15 tonnes SWL

in a 4m sea, while roll will be less than 4 degrees in a 6m beam sea.

“Hallin has followed the principle of developing technology within the new hull design that is recognised as ‘best in class’ by its customers, so that there is confidence in the systems and their tried and tested technology”. The challenge has been to find providers who understand the technology and the budgetary constraints in a relatively challenging market, with the ability to deliver on time at the agreed price and commercial terms and to specification,” John Payne says. “We evaluated a number of suppliers. Cargotec responded to our needs for creative engineering solutions, understanding the economic and technical considerations when building the systems, as well as providing a high-quality engineering solution that is recognised by our customers who are tier-one contractors

and oil field developers and operators.

“MacGregor is a leading brand in lifting and deployment equipment and so provides confidence that the cranes, MHS and the ROV deployment units will be using recognised, proven systems. This, in turn, inspires confidence in the vessel’s operational capabilities. Other project technology providers include Kongsberg, ABB and Rolls-Royce.

“During the supplier evaluation process, Cargotec’s sales and engineering teams were proactive in meeting our needs. They understood and clearly articulated our requirements and have delivered a solution that meets our budgetary and technical needs.

“The concept of installing modules and other subsea equipment – along with the need for flexibility in handling intervention equipment – is a developing field. Cargotec offered us the engineering and design knowledge to provide a package that included a traditional crane, tried and tested lifting systems and ROV launch and recovery equipment as well as the deck handling

equipment, hatches and modular handling system as a single package, which included full commissioning of the equipment.”

Cargotec’s design team for the 160-tonne MacGregor AHC modular handling system has worked closely with Hallin’s marine operations team and designed an industry-leading MHS, John Payne says. “We have a good working relationship with Cargotec, which has allowed for timely development of the systems despite initial challenges in the management of the design for the MHS.

“To date, Cargotec equipment has been supplied on time and we look forward to achieving the installation and commissioning on schedule. The company’s level of understanding and willingness to listen, design and evaluate customer requirements has been a benchmark in the success of the project and this helps Cargotec to stand out from its competitors.”

Cargotec is pleased to be employing its proven technologies and design expertise in such an innovative project, says **Frode Grovan**, Director, Sales and Marketing, Advanced Load Handling. “Hallin Marine is building an exceptional vessel that will

benefit from the full package of integrated solutions and comprehensive systems that we can provide. It makes good sense on many levels to source a full equipment package from one supplier, but there are very few who can match Cargotec’s capabilities in this respect.”



“Hallin has followed the principle of developing technology within the new hull design that is recognised as ‘best in class’ by its customers”

CSS Derwent features a MacGregor module handling system as part of its Cargotec equipment package

CSS Derwent

Length	85.00m	Flag	Marshall Islands
Beam	32.00m	Speed	10.5 knots at 8.20m draft in calm seas
Lightship draft	4.80m	Deadweight	3,200 tonnes at 8.2m draft
Operation draft	8.20m	Deck Cargo	1,500 tonnes at 10 tonnes/m ²
Heavy Lift draft	14.60m	Cargo deck free area	1,300m ²
Class	ABS	Work moonpool	7.5m x 7.8m
Notation	+A1 Column Stabilised Drilling Unit +AMS (E) DPS-3 UWILD Helidk	ROV moonpool	4.2m x 4.2m



A 400-tonne AHC MacGregor crane on North Sea Giant

Joint effort reduces risk in subsea lifting operations

Cargotec is participating in a joint project organised by DNV to develop a unified approach to subsea lifting equipment, increasing its efficiency and safety during the design, operation and maintenance phases

The challenges involved in subsea lifting operations are not adequately covered by the current rules, regulations and standards, which mainly address moderate capacity cranes used for lifting operations to and

from supply vessels, according to DNV. Risks for modern subsea cranes with extensive lifting capacity and motion compensation systems operating in deep water are not so well covered, the classification society says.

One of the most effective measures for reducing the risks involved in offshore operations is the implementation of standards and regulatory requirements, DNV says. Standards and regulations covering subsea lifting have not followed the steep curve of technological progress, therefore improved and additional requirements are needed to fill the gaps.

DNV has organised and coordinated a joint industry group to develop recommended practices for cranes and lifting appliances intended for subsea lifting operations. Representatives from Cargotec attended the inaugural meeting in January.

Fourteen key industry players have joined the project and will present their conclusions within a year. “We were invited to participate because of Cargotec’s expertise and experience with lifting equipment, and the position and reputation of our MacGregor brand in the offshore market,” says **Sjur Vidar Brekke**, Discipline Lead, Mechanical, for Advanced Load Handling. From the operators and owners side of the project, participants include Statoil, Petrobras, Heerema Marine Contractors, Saipem, Technip and Subsea 7.

Launching one unified document concerning important aspects of subsea lifting will be appreciated and acknowledged by all the stakeholders involved, both during the design and installation phases and for operation and maintenance throughout the lifetime of the equipment, DNV says. The industry’s mutual ambition is to ensure safe and reliable subsea lifting operations to prevent incidents and accidents. To this end, cranes and lifting appliances must be properly designed, operated, inspected and maintained to make sure that they are reliable and safe in use, deploying and recovering objects on the seabed.

“The risk level involved in subsea lifting operations is steadily rising. This is because the growing activity in deepwater fields involves increased payloads and complex lifted equipment. Furthermore, lifting operations take place over critical subsea infrastructure,” says Mr Brekke.



The manipulator is stowed in a vessel's winch hangar

Innovation improves productivity, efficiency and safety

A new MacGregor chain wheel manipulator is a good example of the trend to introduce remote controlled devices that keep crew members clear of potentially hazardous operations while at the same time improving an offshore vessel's profitability

Cargotec's new MacGregor chain wheel manipulator (CWM) received the prestigious *Offshore Support Journal* Innovation of the Year award at the Annual *Offshore Support Journal* Conference, held in London in February. The award recognises an innovative product, system or service which is considered to have made a significant impact on the design, build and/or operational aspects of offshore support vessels in service during the previous calendar year.

"It's an honour to be recognised in this way

by our industry peers, and to have won the award in the face of a strong shortlist representing the best in innovative design across the industry," said **Frode Grovan**, Cargotec's Director, Sales and Marketing, for Advanced Load Handling, accepting the award at the conference gala dinner.

"We are pleased to be able to offer a new product that simultaneously improves productivity, efficiency and safety."

The Annual *Offshore Support Journal* Conference is the premier international forum

for senior players in the offshore support industry, bringing together shipowners, shipbuilders, oil majors, financiers, designers, equipment manufacturers, suppliers and OEMs, along with class and industry associations.

“Cargotec is always exploring safer, more efficient and more cost-effective ways of working, which can only be based on the experience that comes from working closely with customers over a long period,” says Mr Grovan. “Sometimes innovations are developed in response to a request from an owner, in which case Cargotec produces a tailor-made, bespoke solution. In other cases, Cargotec devises a solution to a perceived need, and then offers the market an off-the-peg product. The chain wheel manipulator is an example of a product developed in direct response to a customer’s specifications, but which will benefit many others.

“STX approached us for a solution required for five STX OSV design AHTS vessels under construction for DOF by STX Norway Offshore’s subsidiary STX Offshore Brazil, and scheduled for delivery between December 2011 and December 2013. These vessels were wanted for offshore operations some distance off the Brazilian coast under long-term contracts from Petrobras, which specified that it should be possible to change chain wheels at sea.

“Otherwise, each time one of the vessels needed to change a chain wheel, it would take a day’s steaming to return to port and another day to get back to the operation area, which would obviously be extremely inefficient. In response to this challenge, our engineers devised the

MacGregor chain wheel manipulator.”

Although the driver for development was the request from STX, the first vessel to take advantage of the retrofit potential of the new product was Siem Offshore’s AHTS *Siem Ruby* which was fitted with a chain wheel manipulator at the Orskov Yard in Fredrikshavn in March.

Terje Eikeland, Vessel Manager with Siem Offshore, says that without CWM, an AHTS needs to go alongside to keep the vessel steady without any rolling.

“The equipment is heavy and it is dangerous for the crew as long as we are using an ordinary crane for the operation.” With CWM fitted, he says, chain wheel changes can be carried out at sea even in severe environmental conditions. On each occasion the vessel and charterer can save one or two days. The frequency of changes depends on the particular job.

Mr Eikeland said the necessary structural modification to *Siem Ruby* took about two and a half weeks. Depending on the company’s experience with this first installation, it will decide whether to install CWM on its existing AHTS fleet and as standard equipment on new buildings.

Mr Grovan notes that this was the first CWM retrofit operation and says the process is likely to become more streamlined with experience. “It naturally makes sense to schedule a CWM retrofit to coincide with other vessel maintenance requirements,” he says. “However, if a shipowner specifies CWM for a new building, there should be no significant installation time, as the vessel’s initial design will cater for CWM.”

Safety system saves time and money

To handle the variety of chain sizes employed in subsea mooring operations, anchor-handling tug/supply vessels carry a range of interchangeable chain wheels, which can weigh up to 12 tonnes. Without the benefit of the MacGregor Chain Wheel Manipulator, changing a chain wheel is complicated and labour intensive. Furthermore, any significant movement of the vessel in a sea makes the operation unacceptably hazardous and so the vessel has to return to port to change the wheel.

This is how the MacGregor Chain Wheel Manipulator works:

- The remotely controlled manipulator unit is suspended from two overhead beams in a vessel’s winch hangar; a hydraulic system secures it to the beams at all times.
- The equipment removes the chain wheel currently in use from the winch shaft in a safe and controlled manner, with minimal need for manual intervention.
- It then transports the wheel to the storage area and stows it safely.
- The chain wheel selected for the next subsea operation is picked up from the storage area and transported to the winch, where it is guided on to the winch shaft and secured in position.

The MacGregor Chain Wheel Manipulator is designed in accordance with Det Norske Veritas’s rules for the certification of lifting appliances and can handle chain wheels covering all anchor handling demands likely to be made of any AHTS.



Remote control trend keeps crew members clear

The MacGregor Deck Handling Manipulator System (DHMS) offers safety benefits similar to those delivered by the chain wheel manipulator. Available as an upgrade feature for new or existing shipboard and cargo rail cranes, the remotely operated DHMS is designed to reduce manual tasks and assure better crew safety during anchor handling and deck handling operations.

“The crane’s standard winch functions remain fully operational, while the gripper provides the additional capability to hold and move heavy loads to appropriate working positions,” says Mr Grovan. “This ability to eliminate potentially dangerous movements of suspended loads represents a major advance in crew safety and significantly enhances the efficiency of deck handling operations. The MacGregor DHMS is a fine example of the trend to introduce remote controlled devices that keep crew members clear of potentially hazardous operations while at the same time improving a vessel’s profitability.”

The MacGregor Deck Handling Manipulator System (DHMS)

Deepwater lift system

eliminates the need for larger and more complex cranes

As subsea operations migrate into deeper and deeper water, Cargotec's new MacGregor Ultra Deepwater Lifting System (UDLS) has no theoretical depth limit, and the solution is already designed to handle loads at 6,000m down

"The MacGregor Ultra Deepwater Lifting System is a 'game changer' for deepwater operations," says **Trygve J Økland**, Fleet Manager for Oceanteam Shipping ASA. "Our vessels already have the necessary topside crane capacity, and the UDLS adds the capability to undertake operations at almost any depth. We believe it will provide a serious operational and commercial edge for users of our North Ocean series of construction support vessels (CSV)."

"It is important to note that UDLS does not just upgrade the crane, it upgrades the entire vessel"

– Frode Grovan

Oceanteam plans to commission a UDLS onboard the CSV *Southern Ocean* during a convenient operational window in 2012. If, as anticipated, it is successful and appreciated by Oceanteam's clients, Mr Økland envisages acquiring a small pool of the systems. Ultimately, he says, the MacGregor UDLS will probably become standard equipment on the company's vessels.

Ultra deep water can be defined as 2,000m and more. The weight of the crane wire is the main problem when handling loads in such depths, says **Gordon Murray**, Operations Director at subsea contractor

Fugro-TSM, which has signed a charter for *Southern Ocean*. "Significant lengths of heavy steel wire are paid out, and the weight of this wire effectively becomes part of the load. Every metre of wire wound off the drum reduces the useful lifting capacity of the crane".

The traditional approach to handling heavier loads in deeper water has simply been to use longer, heavier wires. "These need bigger cranes and, therefore, larger vessels," says **Frode Grovan**, Cargotec's Director, Sales and Marketing for Advanced Load Handling. "Our UDLS breaks this cycle of diminishing returns and escalating costs. The main purpose of the UDLS is to upgrade existing offshore crane vessels to be able to operate in deeper water with heavier loads. Typically, you could say that a 150-tonne crane with UDLS can do the same job as a 250-tonne crane at 2,500m and below, while a 250-tonne crane with UDLS can do the same job as a 400-tonne crane at 2,300m and below."

"With this new development we can continue to standardise our crane portfolio with modules to extend their capabilities as and when required"

– Trygve J Økland

The UDLS can be used in conjunction with any active heave-compensated (AHC) subsea crane. "The neutral-buoyancy fibre rope eliminates the wire weight penalty for the vast majority of the depth, so that an existing offshore crane can operate at virtually its full load capacity at previously impossible depths, at the same time keeping the load safely under control. Full video monitoring of the UDLS crane/vessel hand-over system along with anti-twist control provides the safest way to handle ultra-deep heavy loads, and there is no need to use an ROV.

"It is important to note that UDLS does not just upgrade the crane; it upgrades the entire vessel, greatly expanding its operational capabilities and commercial potential. There is no theoretical limit in how deep this system can operate; today's solution is designed for depths down to 6,000m."

"A 250-tonne crane with UDLS can do the same job as a 400-tonne crane at depths of 2,300m and beyond"

– Frode Grovan

Mr Økland agrees. "This is why we, along with our partner Bourbon and our clients like Fugro-TSM, support developments which combine crane capacity and smart solutions like the MacGregor Ultra Deep Water Lifting System. Otherwise you will end up with oversized cranes, which are both unmanageable and extremely costly to operate and maintain. The norm in this industry has been to build larger and more complex

Ultra-Deepwater Lifting System



UDLS
connection tool 4.5t

1000m
fibre-rope 0t

connector 1.3t

1000m
fibre-rope 0t

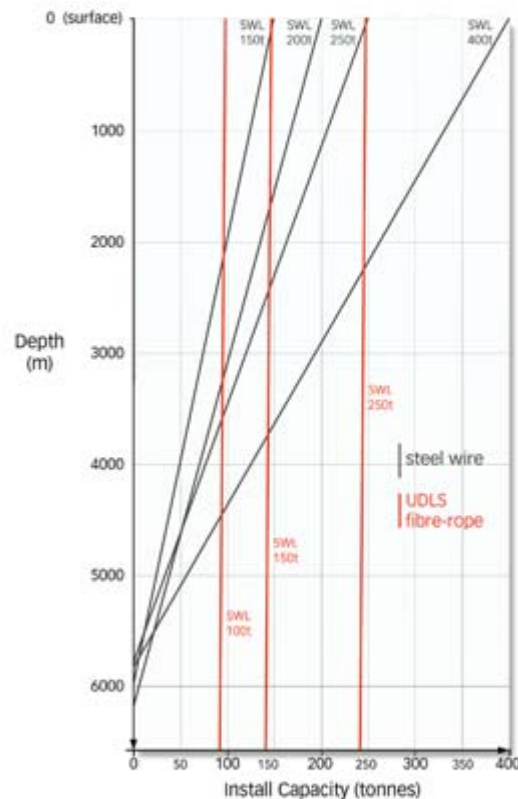
connector 1.3t

1000m
fibre-rope 0t

sling rig 1.5t

heave compensated load at depth

*Effect of depth on capacity
for wire and fibre-rope*



**Disarming depth
through
innovation**

cranes to increase the capacity at deeper depths. With this new development we can continue to standardise our crane portfolio with modules to extend their capabilities as and when required.

“There are several good reasons for us to go for the MacGregor system from Cargotec. Key for us is to have a modular solution which can be used on owned and third-party vessels in an effective and economic way.

“While the idea itself may not be unique to Cargotec, we all know just how hard it is to get this type of equipment off the drawing board and translated into reality. This is what we believe we have now found after following this type of development for years.”

Oceanteam has a large range of MacGregor AHC offshore cranes from Cargotec, Mr Økland says. “Over the years we have been impressed by the quality of cranes delivered by Cargotec’s factory for offshore equipment in Kristiansand. The same goes for the performance and reliability of the cranes. However, with complicated equipment like this there can always be issues and, for us, support and service is key for such vital pieces of equipment. And, like Cargotec, we maintain long term relations.

UDLS operating sequence

- Connect crane hook to connection tool
- Manoeuvre the crane above the load and connect fibre rope to lift rigging
- Deploy the load
- Lower to 1,000m with crane wire taking the load, while fibre rope pays out from its drum with no load.
- Hang-off first fibre rope connection
- Disconnect connection tool
- Recover connection tool (and crane wire) to surface. Load is now supported by first section of fibre rope
- Connect connection tool to next length of fibre rope
- Crane lowers connection tool (and consequently the load) while the next fibre rope length is simultaneously paid out from the winch drum
- Repeat process until load is on the seabed
- Disconnect lift rigging from load and recover to deck

Keeping research behind closed doors can be counter-productive

Dependence on exclusive in-house R&D is being challenged by the concept of 'Open Innovation' achieved by networking and collaborating with partners, research institutes, universities and other companies; Matti Sommarberg, Chief Technology Officer, explains the relevance to Cargotec

In today's world of widely distributed knowledge, companies cannot rely entirely on their own research, but should acquire inventions or intellectual property from elsewhere when it advances their business model, according to a concept called 'Open Innovation'. This is in complete contrast to the established approach to R&D – now called 'closed innovation' – which concentrates on generating and developing ideas privately in-house, and guarding the resulting intellectual property.

"In this new 'flat' world, even individual professionals can compete and sell their expertise on the global market via the Internet," **Matti Sommarberg** says. "Along with every other global company, we now have a choice: do we close our eyes and ignore this trend, or do something about it?"

"We are in the midst of a huge transformation in how knowledge, expertise and innovation flow globally. I believe we have seen only glimpses of the full consequences of this change."

Open innovation is a more profitable way for business to innovate because it can reduce costs, accelerate time to market, increase differentiation in the market, and create new revenue streams for the company, according to **Henry Chesbrough**, Executive Director of the Program in Open Innovation at the University of California, Berkeley.

Companies wishing to advance their technology can and should combine external and internal ideas, as well as internal and external paths to market, says Dr Chesbrough,

who coined the expression 'Open Innovation' in 2003.

"Cargotec is a great company, but even we don't have all the business or technology expertise in our field," Mr Sommarberg says. "To succeed, we need to bring together people with existing knowledge that can be combined and utilised in new ways. It's nothing more exotic than that."

Cargotec is a shareholder in FIMECC, the Finnish Metals and Engineering Competence Cluster, which aims to increase research cooperation between companies, universities and institutes. A two-year FIMECC programme has recently produced a 3D CAD product model that enabled design lead times for MacGregor side-rolling covers to be cut to a fraction of the eight weeks it took previously, on average.



"Hatch covers are weight-sensitive products and their designs are determined by various requirements from shipyards and shipowners," explains **Henri Paukku**, Dry Cargo Project Manager.

"We are in the midst of a huge transformation in how knowledge, expertise and innovation flow globally"

– Matti Sommarberg

"Variations in the particulars of each delivery require individual specifications despite products that look similar. The 150 to 200 drawings and documents required can create a huge amount of work that is nevertheless uniform from project to project."

Standardising essential structural elements led to the development of a modular product architecture. "In hindsight, quite a few of the solutions seem almost self-evident. But none of them would have been developed alongside the customer projects that are the predominant way of conducting R&D in most companies".

Traditionally companies nurture a range of research projects. Some eventually become development projects, and a few ultimately reach the market as products or services. In the Open Innovation model, companies also embrace research from outside, while some projects may find a new life in a totally different market – perhaps under another company.

"Finding the best balance between innovation and product development is an interesting challenge," Mr Sommarberg says.

"Existing organisations and established companies are incredibly good at developing products and bringing them to market. However, at the earlier stages of research, they are generally less flexible and less likely to come up with something totally new.

"Sometimes companies can be too good at endlessly refining a winning product. We can all think of well-known examples of how industry leaders are overtaken without warning.

"Cargotec's Port 2060 initiative also incorporated Open Innovation elements. Roughly 50 years after containerisation began, the project looked another 50 years ahead. Ideas included mega ports on offshore artificial

islands; floating feeder terminals; foldable smart containers; automatic lashing systems that would package up to 64 containers

in a single moveable unit; and underground solar-power silos for large-scale container storage.

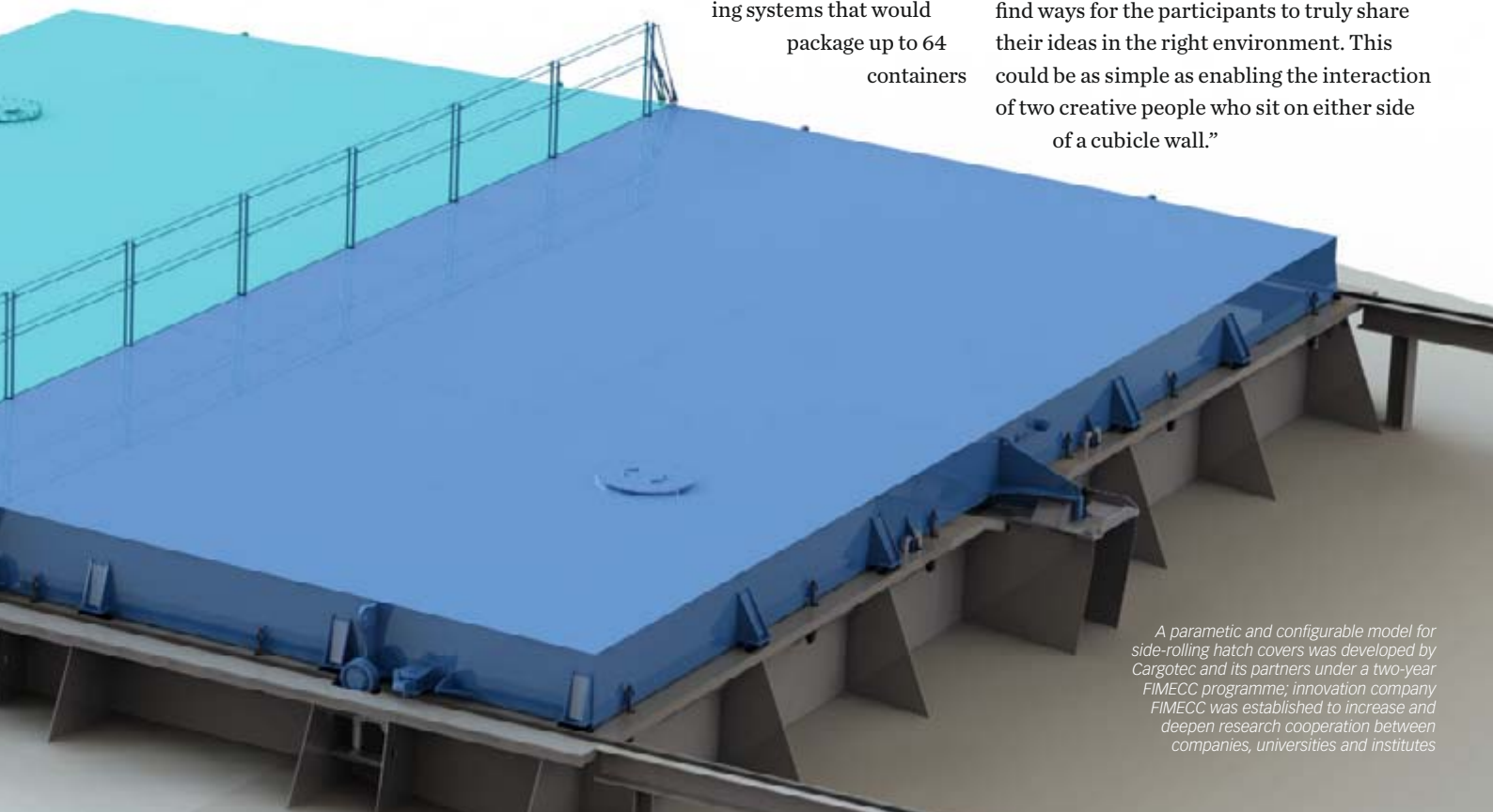
"One of the trends that is beginning to impact the global economy is that of 'crowdsourcing', which allows work to be decentralised and distributed worldwide," Mr Sommarberg says. "Few people realise it, but Port 2060 was actually also a crowdsourcing project within Cargotec."

Companies benefit from Open Innovation by aligning themselves with others sharing similar interests. "In any innovation programme – whether within or between companies – it's essential to get the basic philosophy right," Mr Sommarberg says.

"In hindsight, quite a few of the solutions seem almost self-evident."

– Henri Paukku

High-level innovation platforms and research programmes are essential for finding the tools for future success. But equally important are innovations that have to do with one's own processes and work. "Just investing in an R&D park next to a university won't automatically lead to innovation. You have to find ways for the participants to truly share their ideas in the right environment. This could be as simple as enabling the interaction of two creative people who sit on either side of a cubicle wall."



A parametric and configurable model for side-rolling hatch covers was developed by Cargotec and its partners under a two-year FIMECC programme; innovation company FIMECC was established to increase and deepen research cooperation between companies, universities and institutes

Singapore winch centre supports frontline operations offshore

A ‘combined service’ mentality provides customers with prompt deliveries, readily available spares, dedicated engineers and unrivalled know-how; Cargotec’s Singapore service centre shows how it is done

Just over a year ago Cargotec’s new winch service competence centre opened in Singapore to support the company’s service branches worldwide. The centre has predominantly been designed to assist direct spare parts sales and services for all types of winches in frontline operations. The centre comprises a spares parts sales team and a logistics and purchasing team. It has 130m² of covered storage holding labelled, sealed and categorised spare parts.

“Many changes have been undertaken in the past year to better support the frontline,” says **Adrian Ang**, Winch Service Competence Centre Manager in Singapore. “Being nearer to customers has enabled us to respond faster, and we are not restricted by time zone differences. Cultural and language barriers are removed, and it also supports our ‘global presence, local service’ approach. Our operations have become more efficient after valuable feedback from customers.

This has meant that we can achieve better customer care, a reduction in downtime, and a happier workforce.”

“Feedback is one of the most valuable factors for continual product improvement. Being a long-term partner and solutions provider, we grew hand-in-hand with our clients in the marine offshore industry. We are able to offer reliable services and products, and are constantly able to update clients about our latest technologies.



Cargotec's new Singapore winch service competence centre undertakes direct spare parts sales and services for all types of winches employed in frontline operations; it now has numerous maintenance project references under its belt

“For existing deck machinery, Cargotec offers modernisation proposals designed to keep equipment and vessel ready for the next mission. Each proposal considers the opinions of clients and operators. These interactions and proposals enable refinements to system elements and improve the operational experience overall. It also further secures our relationship with clients and strengthens our position as a solutions provider”.

Key parts of modernisation packages for operators using Cargotec winches include Maclinear line-tension meters, and spooling devices. Maclinear is a rugged machine that provides winch data including line tension and payout length, enabling users to make real-time judgments on their operations. A recording function also provides data for the vessel or platform. Maclinear comes in standard sizes for a wide range of wire rope diameters.

“Nowadays, vessels employed in mooring operations must have their line tension and payout length on display,” Mr Ang explains. “There is also an increasing expectation from charterers and class societies for such equipment to be available for use on board, which is why we offer Maclinear as a key element in modernisation packages.

“The spooling device works with existing systems to enable operators and users to manoeuvre the wire rope. For most vessel operations, charterer and class societies encourage the use of spooling devices. Not only can they provide guidance in heave-in/pay-out operations, but they also minimise the risk of the rope cutting into the lower

layers, which will, in turn, hinder a vessel’s operations and safety.”

The design flexibility of modernisation packages allows the spooling device to be mechanically, hydraulically, or electrically driven. It can also be applicable to Cargotec winches or other winch makes.

“Line tension meters work on existing Cargotec winches for accurate line tension and payout length measurements. This assists operators in crucial and timely decisions for assignments to be carried out.”

Being a long-term partner and solutions provider, we grew hand-in-hand with our clients in the marine offshore industry”

– Adrian Ang

Once offshore equipment is deployed into service it could be in operation for a long time. To help prepare for emergencies, Cargotec therefore recommends keeping a list of critical spare parts. The recommended onboard spares package includes hydraulic, electrical and mechanical items for keeping deck equipment operational in emergencies. “This package provides benefits for anchor-handlers including peace of mind, immediate spare parts availability, optimised equipment productivity, and cost savings. It also avoids fire-fighting and the additional costs incurred from urgently freighted spare parts and, most importantly, maximises equipment availability and improves the vessel’s return-on-investment. The spares package was introduced in 2008, and now close to 100 vessels have one on board.

“While there are several units within the Singapore offshore service team, it takes the combined efforts of everyone to maintain our high level of competency and our customers’ satisfaction,” continues Mr Ang. A prime example was the overhaul of six deck cranes on board North West Shelf Shipping’s 127,500m³ LNG carrier, *Northwest Shearwater*. The 1991-built vessel is operated by BP Shipping, and when it was docked in Sembawang shipyard for servicing in the Cargotec workshop, BP specifically appointed the Cargotec Singapore service team to refurbish the deck cranes.

“Some of the cranes looked like they had seen some heavy usage,” said **Lee Chong Heng**, Project Leader for Cargotec Singapore. “The job ran very smoothly; we have done this many times and are used to any hiccups that might occur in a big job like this.”

Cargotec was also selected as the main contractor to overhaul eight fairleads and mooring winches in eight weeks on the *Kan Tan IV* drilling rig. The refurbishment job was carried out at Keppel FELS in Singapore. *Kan Tan IV* was delivered by FELS in Singapore in 1983 and is operated by Frigstad Offshore. It is currently completing a maintenance programme and periodic survey at Keppel FELS. Significant investments have been made over the last five years to refurbish and upgrade the rig with, for example, new accommodation, new deck cranes, new shale shakers and new lifeboats.

“Cargotec Singapore Offshore Service was selected as the main contractor because of its capability and safety record,” says Mr Ang. “And for its ability to carry out the overhauls





of the rig's mooring winches, underwater fairleads, drag brakes and pneumatic control valves to a tight deadline.

"We were first invited by Frigstad Offshore to come on board for an inspection, followed by many Cargotec workshop visits, and technical discussions. Our professionalism and experience make the customer very

comfortable with our solution."

Another recent project included the replacement of an anchor-handling hydraulic winch motor on board Regulus Ship Services' anchor-handling vessel, *Melody 5*, in 2011. The vessel arrived for emergency repairs after the vessel's anchor handling hydraulic winch motor was found to be

badly damaged and metal debris had contaminated the whole hydraulic system. This meant that the entire hydraulic system also needed to be flushed.

"With the vessel on our doorstep, we were efficient in managing the repair schedule and could save money and time for our customer. The work took ten days."

Understanding equipment is key to its long, safe, efficient lifetime

Training and maintenance are crucial elements in Cargotec's aftersales service strategies; opportunities to share their benefits with customers have seen the company participate at maritime events such as the 10th Navigator Maritime Conference in Greece

A key element of Cargotec's aftersales services is its focus on training and maintenance. As part of its commitment to these services, Cargotec has invested in specialist centres, including a cargo crane competence centre in Sweden and an offshore advanced load handling competence centre in Norway. In both locations Cargotec offers focused equipment courses, both theoretical and practical, for operators, maintenance personnel, ships' officers and other technical staff.

In 2010, Cargotec advanced crane operator training by introducing its first fully immersive active heave-compensated (AHC) crane simulator, allowing trainees to gain more experience in a few days than they would encounter in weeks of 'live action' training, including a range of operating scenarios.

"It is important that the ship's crew understands how to operate and maintain

the equipment installed on the ship," says **Bengt Sjölin**, Cargotec's Manager of Technical Services at the cargo crane competence centre. "It maximises the product's lifetime, reduces wear and improves its operating efficiency and safety".

"We offer worldwide training courses for offshore, merchant and naval crews. Tuition sessions are arranged at our training centres or on board customer vessels; we can also customise a training programme according to specific needs."

Mr Sjölin was able to showcase Cargotec's maintenance and training capabilities, including the opportunity to present its full range of MacGregor Onboard Care (MOC) planned maintenance contracts, at the 10th Navigator Maritime Conference in Glyfada, Greece. The conference in November was attended by 63 companies and provided Cargotec with a base to promote its local service branch, Cargotec Greece, which has widened its work capabilities since May last year.

"MacGregor marine cargo handling equipment is extremely well-known in the Greek shipping community and the success of the conference gave us the chance to meet face-to-face and discuss issues with representatives from over 60 shipping companies that



During the 10th Navigator Maritime Conference, Bengt Sjölin underlined the importance of training, maintenance and planned maintenance agreements

attended the event," says **Roberto De Gioia**, manager of Cargotec's Marine Service Mediterranean region. "It also provided the opportunity to outline our capabilities in the offshore market as well.

"The great interest in MacGregor products and services, new trends, rules and customer needs, combined with recommended Cargotec solutions, formed the main topics of our various discussions. MOC products are still rather new to the Greek market, but we can see that there is growing interest in companies to try these flexible and efficient services."

Service commitment strengthened to serve tougher challenges offshore

Cargotec's new offshore service centre in Houston, Texas, strengthens its position as a proven and reliable crane, winch and load testing service provider for the offshore oil & gas industry in the Gulf of Mexico and other key areas in the Americas

To support crane operations on drilling rigs, production facilities and special purpose service vessels, Cargotec has developed regional resources and gained the necessary experience. "Our offshore service staff in the US Gulf of Mexico, Brazil and Mexico have the experience needed to satisfy the most demanding of service requirements," says **Pat Drake**, Regional Manager, Offshore Services in the Americas. "Cargotec's service management is committed to grow with additional industry developments, as exploration moves further offshore, in deeper water depths and in more challenging operating environments."

Cargotec has established a new offshore service centre in Houston, which provides repair, upgrades and systems modernisations for rigs, vessels and platform operators. The centre has a hydraulic test bed, which enables the repair of winches, hydraulic cylinders, hydraulic pumps and motors, valves and swing drive units. It can support blow out preventer (BOP) crane upgrades, pipe handling cranes and racking systems, tensioning cylinders, as well as active heave-compensated knuckle boom cranes, davits and module handling systems.

Cargotec USA and Water Weights have an agreement that appoints Cargotec to represent and distribute Water Weight products and services in the Bay of Campeche, Mexico, Panama and Brazil. "This association provides customers not only with competent crane inspection, but with cost effective load test services, from a single source of supply," says Mr Drake.

Offshore service locations in the Gulf of Mexico, Brazil and Mexico are part of Cargotec's global network of around 60 marine service stations. "These are staffed with technicians and service engineers trained to perform crane inspections and repair services on drilling rigs and production platform cranes. Although this global service presence is important to support an ever expanding multi-national customer base, of equal importance is the development of a trained and qualified technical service staff with field-earned experience, necessary to service the local market's needs," stresses Mr Drake.

The Cargotec offshore service group specialises in inspecting, maintaining and repairing offshore cranes, winches, davits, launch and recovery systems and offers preventative maintenance programmes and

service agreements that are cost-effective in optimising equipment performance and minimising downtime. The service locations in the Gulf of Mexico also offer API-TPCP certified training courses.

Crane mechanics and technicians are trained in inspection, repair and maintenance of hydraulic and electrical systems that are common to most offshore cranes. Software technicians, tasked with supporting PLC systems on active heave-compensated cranes, are supported from Cargotec's Offshore Competence Centres in Norway

and Singapore. "This advanced product support and engineering service is available to ensure equipment upgrades and modifications are implemented to manufacturers' specifications and to class requirements, as well as to ensure maintenance and field repairs are performed to support the customer's operational needs.

"The company's reputation for competent and reliable service was first established on production platform cranes, in the shallow waters of the Gulf of Mexico. This service resource has developed over the years to enable crane support, not only for early generations of offshore cranes, but also now for today's more sophisticated technology and the latest generations of subsea load-handling cranes, winches and A-frame davits".



"Cargotec's offshore service staff in the US Gulf of Mexico, Brazil and Mexico have the experience needed to satisfy the most demanding of service requirements"

– Pat Drake

Design should be defined by cargo not by default

By starting from an understanding of a ship's cargo profile, a container ship's utilisation rates can be maximised and its environmental impact minimised, according to Cargotec's Dry Cargo business line Sales Director Ari Viitanen and Senior Naval Architect Kari Tirkkonen

Traditionally, important factors when designing a container carrier are its hull dimensions, fuel efficiency and visibility from the bridge. The decisions made about these factors at the beginning of the ship building process pre-define the framework for the cargo handling system, and this can mean that the resulting features of the cargo handling system are determined by default rather than by design.

However, this approach underestimates the vital role that the cargo handling system plays in the environmental impact of a container ship and its cargo. The more efficient the cargo handling system, the greater the number of TEUs a ship can carry, which in turn reduces the emissions per carried TEU, and subsequently per transported commodity. Therefore, we believe that the traditional design process effectively starts from the 'wrong end'.

Cargotec defines cargo profile as the distribution of containers onboard a ship in terms of container sizes and container weights on a certain route. Our proposal takes a whole-ship approach and works forward from the cargo profile. But this must happen at an early stage of the ship project, before any restrictive decisions have been made. As a result of this forward-thinking approach, it is possible to improve the specified loading ability and the efficiency of the entire cargo handling system.

A tool for cargo profile analysis

Practical experience from existing ships already supports our approach, but it is Cargotec's wish to establish evidence that proves that an efficient cargo system really counts. To establish a statistical method and tools for analysing the cargo profiles of our customers' newbuildings, and to use these profiles to define the cargo handling system requirements, Cargotec has signed



a co-operation agreement with the ship design evaluation specialist, Safety at Sea, based in Glasgow, Scotland.

In practice, the analysis tools are aimed to provide the means to produce the optimal container stack arrangement and optimal stack container weight distributions for each cargo profile. They also enable concept and system comparisons with a ship's life-time in mind.

Efficient use of space is efficient use of energy

Productivity of container ships can be measured using several indicators, such as maximum capacity and utilisation rate, fleet utilisation, and operating cost per TEU.

Traditionally, vessels are designed to carry a maximum number of containers loaded in the holds and on deck, and usually the method for deciding this figure is based on two considerations: the total number of boxes allowed by visibility rules from the bridge, and the homogeneous loading limited by the displacement of the hull.

These considerations can lead to an arrangement where the utilisation rate of the vessel's cargo space can vary significantly, depending on the actual cargo mix. Additionally, if designers do not have information about the intended cargo profile, they are forced to undertake several calculations of different homogeneous loadings for GM (metacentric height) and ballast scenarios to keep hull stability satisfactory. And this is done without being able to take into account the specification for, or the actual capability of, the cargo handling system.

From a ship's productivity perspective, we believe that it is important to be able to design a cargo handling system which is fully aligned with the ship's hull design. The vessel's hull properties must not set restrictions on the loading and operating of the intended container stacks, and while operating with the intended container stacks, the ballast could be adjusted to its minimum.

Why are some ships not optimised for their cargo?

With the current way of conducting ship concept design, it is often not possible to obtain the best possible results. This is because the ship's hull and its cargo handling system are treated as separate blocks, and not optimised as one entity. Furthermore, parts of the cargo handling system such as hatch covers, lashing bridges, fixed container fittings and loose container lashings are often not considered from an overall cargo handling system point of view, but also as separate products.



MacGregor cargo handling systems optimise use of space, improving a ship's earning capability while promoting environmental efficiency

This leads to the sub-optimisation of separate parts of the system, and subsequently to an underachievement from a cargo handling system productivity perspective. This is the reason why many container ships with a high nominal capacity (over 6,000 TEU) are operated with reduced utilisation rates.

The cargo profile should, in part, dictate the basic parameters of the ship's hull design. However, it plays its most important role in the definition of the basic solutions for the cargo handling system, such as the arrangements for lashings, hatch covers and cargo holds. In itself, this system should be of minimum weight and therefore optimised in terms of cost and material use. It should be noted that by optimising the weight of

the cargo system, the 'saved' weight can be used for the benefit of payload. The effect is marginal, but it exists.

What if the cargo profile changes?

We also need to consider that optimising a system for one cargo profile can have its drawbacks when it comes to cargo handling system flexibility, which in turn could lower productivity and therefore increase emissions per TEU if and when the cargo profile significantly changes. Change is inevitable and can happen if a vessel is re-located to operate on another route or when the charter period ends and a new charterer takes up the operation. Therefore, while designing the ship, both the current cargo profile and future flexibility to accommodate possible cargo profile changes must be taken into account.

Built-in environmental efficiency

It is clear that the future will bring ever stricter measures to protect the environment, which the shipping and shipbuilding industries will have to comply with. However, 'green' solutions are not just ways of conforming to legislation, or improving a company's image, they make economic sense – especially in today's turbulent economy and shipping business.

The shipbuilding process needs to be made more effective and it must serve its final purpose of optimising the cargo capacity for each vessel. This can only be done by bringing in the cargo handling system design at an earlier stage.

As a built-in feature, MacGregor cargo handling systems optimise use of space, which improves the ship's earning ability while promoting environmental efficiency.

*Based on the paper, Assessment of container ship utilisation rates vs. the environmental impact of different cargo handling systems, given by Ari Viitanen and Kari Tirkkonen, at RINA's Environmentally Friendly Ship conference, 28-29 February 2012, London, UK

MacRack is ready for delivery

MacGregor News is tracking the development of MacRack, which Cargotec anticipates will become the standard system for side-rolling hatch covers, and the first example is ready for installation onboard a new 47,500 dwt bulk carrier due for delivery this year

Cargotec is completing deliveries of its first MacRack hatch cover operating system. With hardware now on its way to Zhejiang Zhenghe Shipbuilding Co Ltd, in China, Cargotec will start installing the MacRack system on the first vessel – a 47,500 dwt bulk carrier scheduled for delivery to a Chinese owner in autumn this year.

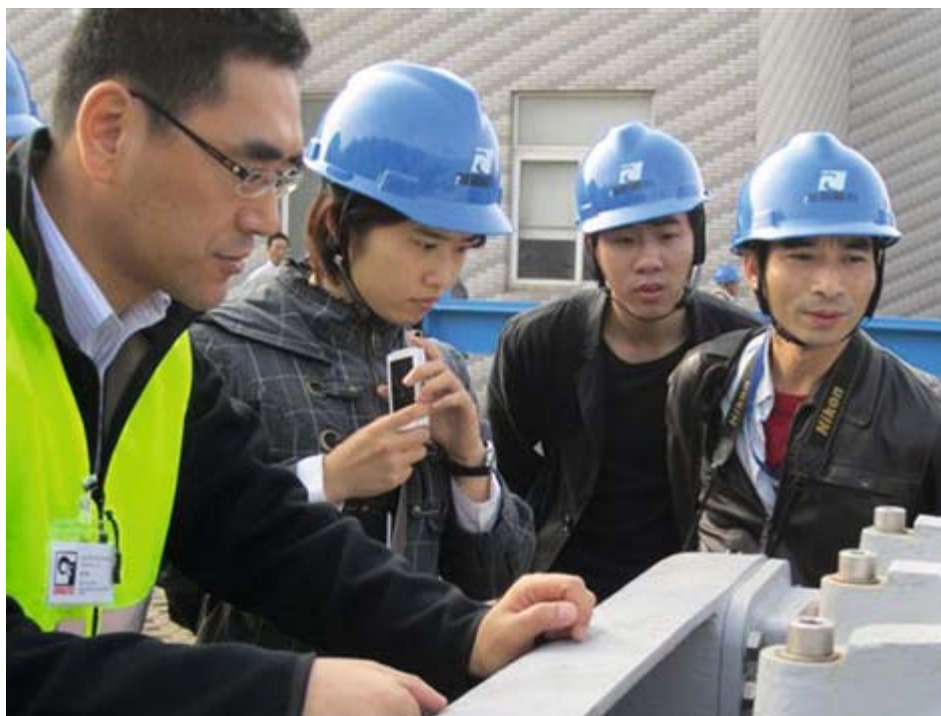
“Cargotec anticipates that MacRack will become the standard system for side-rolling hatch covers,” said **Esko Karvonen**, Vice President of Cargotec’s Marine Dry Cargo business line. “It is inspired by a commitment to the environment and improving overall cargo system performance. The initiative for this development came from shipyards and shipowners.

“And it certainly attracted a lot of interest at Marintec at the end of last year. Close to 150 customers from Chinese and Japanese shipyards took the opportunity to attend the first full-scale demonstration of MacRack, which took place in Nantong during the week before the show.”

“MacRack is one of the many ongoing initiatives at Cargotec. We have always been the forerunner in the industry and are constantly looking for and developing new solutions for the benefit of our customers, both from environmental and economical points of view. Finding the right solutions for such initiatives is the essence of the way we work”.

“Whatever the solution, an integral part of all our product development work is product verification,” said **Ilkka Kukko-Liedes**, MacRack R&D Project Manager. “The verification process is decisive when developing an idea into a working product. Today, computer simulation can be used in the initial stage of the process for defining rough parameters and in the latter stages for fine-tuning details.

Close to 150 customers from Chinese and Japanese shipyards watched MacRack being demonstrated before Marintec



MacRack

1. How does MacRack save energy?

There is no continuous running as with a hydraulic pump unit. There is no need to warm the oil in advance, so MacRack is also not as sensitive to a cold climate as hydraulic systems.

2. Is class approval required for the electrical components?

So far, classification societies have not made any such demands, though it is possible that some may appear in time. Basically, hatch cover operating systems are not covered by class rules.

3. How does heel/trim affect MacRack's operation?

Cargotec uses variable frequency drives (vfd), which deliver high torque with low speed, and so trim/heel are not significant factors. Naturally, a little more motor torque is required, but this can be easily be compensated for by a lower speed.

4. How much power is required to operate the system?

Between 2kw and 6kw, depending on the weight of the panels.

5. How does the cost of MacRack compare with conventional hydraulic systems?

MacRack technology is relatively new and production volumes reflect this. Consequently, the cost of the new equipment is higher than conventional hydraulic systems, but the situation should change as production increases.

6. What is the lifetime of MacRack?

The mechanical components are designed to last for the ship's lifetime, but this naturally depends on how well the MacRack unit is

Q&A

maintained. The various electrical components have differing lifetime expectations, but generally speaking very few replacements should be anticipated.

7. How much space is required for a MacRack unit?

Overall dimensions are approximately 1,700mm x 3,000mm x 1,300mm

8. Does intermediate stopping present a problem?

No, because the brake is always closed when the system is stopped and no voltage is applied. This contrasts with hydraulic systems where extended stoppages are not recommended because of internal leaks.

9. What are the arrangements for emergency operation?

Emergency arrangements are provided for a variety of situations:

- A separate emergency operation unit is provided that can be connected directly to the MacRack junction box unit.
- If the motor is damaged it should first be replaced with the spare motor kept onboard (as recommended), and a replacement motor should be ordered at the first possible port of call.
- If there is an electrical malfunction it is possible to drive the MacRack unit directly from the main PLC or deck PLC.
- In the event of major mechanical failure such as a broken arm, the component will need to be changed in the same way as a broken wheel would have to be replaced in a conventional system.

"For example, in MacRack's case, it is essential that all dimensions and kinematics are precise. Through computer simulation it was possible to detect the locations where fine-tuning was needed, change these components accordingly, and carry out new test cycles until all issues were dealt with.

"Computer simulation significantly speeds up the development process, but of course we cannot rely on computers alone. As part of Cargotec's focus on ease-of-use, redundancy and reliability being integral elements of MacRack, it has built a custom-made 1:1 size test bench for verifying the final product, which can simulate different panel weights using a hydraulic pressure system. Now, each and every MacRack unit produced is tested by a similar device for 80-tonne loads before delivery to the customer – the recommended maximum hatch cover weight is 70 tonnes," Mr Kukko-Liedes concluded.

MacRack in brief

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

MacRack uses variable frequency drive (VFD) technology, which allows for the optimised use of electric power. The operating speed is slow at the start of the opening process, when power is needed to lift the panel. Rolling takes place at full speed and slows down again when the panel is close to the end stops. Slow and medium speeds are used for one-side operation.



Pin-point positioning improves cargo handling productivity

Cargotec's new cargo handling tool, the MacGregor Active Rotation Control (ARC) is designed to assist crane operators by enabling around 20 to 30 percent faster cargo cycle times, as well as improving safety standards

In line with Cargotec's drive to develop new products that improve operational efficiency, the company has introduced a new cargo handling tool, the MacGregor Active Rotation Control (ARC), designed to assist crane operators when positioning cargo. As well as faster cargo positioning times, the device improves safety and reduces the risk of cargo, gear and ship damage.

"Cargo positioning or spotting may easily account for as much as 40 per cent of the total crane cycle time, especially when slotting unit loads such as containers and pulp spreaders," explains **Magnus Södersten**, Sales & Technical Support Manager for Cargotec marine cranes.

"Anything which helps to reduce the spotting time can therefore yield a big gain in productivity and energy savings.

"High performance, high precision cranes are the basic requirement for fast, effective cargo handling. However, the attainment of maximum output also depends on the use of suitable cargo handling tools for the type of goods and units concerned. Also, the skills of the crane driver are an important factor, which are reflected not least in the speed with which the cargo is spotted when slotting it in the ship or landing it on the quay."

Traditionally, power swivels have been used to assist crane cargo alignment. These do not require manual intervention and therefore can reduce labour demands and improve safety, but they do require considerable skill on the part of the driver, especially when manoeuvring at speed. "Torque introduced into the crane wire during slewing compensation requires hard-to-judge counter

The new MacGregor Active Rotation Control (ARC) provides around 20 to 30 percent faster cargo cycle times

correction,” says Mr Södersten. “Added to which are unpredictable movements of the load caused by wind, heel and/or knocks against other cargo or ship structures.

“With the MacGregor ARC system, when picking-up a cargo unit, the crane driver sets the ARC control to the required final alignment relative to the ship. The ARC then speedily adjusts the units to this alignment and maintains it regardless of crane movement and external disturbance.”



“Cargo positioning or spotting may easily account for as much as 40 per cent of the total crane cycle time”

– Magnus Södersten

The ARC consists of an electrically-driven power swivel with the latest frequency control system. A motion reference sensor in the power swivel continuously measures the relative position between the cargo unit and the crane. Based on this information, the ARC system calculates and transmits a signal to the power swivel, which then adjusts the electrical motor to the new position. It is also possible to manually adjust the power swivel if necessary.

“With today’s drive to improve efficiencies, the ARC system provides operators with a smart device that can easily be retrofitted to new modern MacGregor cranes and immediately demonstrates tangible cargo-handling benefits,” he concludes.

K50 bulk crane raises expectations

Offering a long service life and higher capacities for the bulk handling and transloading market is Cargotec’s new MacGregor K5032-4HD four-wire crane, and the first unit has been delivered to Indonesian owner, PT J&Y Transshipment

The first 50-tonne SWL four-wire MacGregor K5032-4HD crane has been delivered to its new owner, PT J&Y Transshipment. It will be operated exclusively by PT Armada Rock Karunia Transshipment on the Indonesian islands of Bunyu and Tarakan, in the East Kalimantan province.

The K5032-4HD was introduced in 2010 and now forms an important part of Cargotec’s MacGregor four-wire rope (K4) crane portfolio. “We have high expectations for this new crane model,” says **Anders Berencsy**, Sales Manager for MacGregor cargo cranes. “The market is looking for this type of high-performance heavy-duty grab crane.

“Our first unit is being delivered for operations in Indonesia. The whole of southeast Asia is a very important market for these kinds of cranes, which is demonstrated by recent orders for both our K50 and K30 cranes from Thailand, India and Indonesia,” he says.

The continued demand for coal-powered energy production and the increased coal production in Indonesia makes the country a major market for these types of cranes. To strengthen its position there, Cargotec is preparing to open up a service station in the Kalimantan region. “It is important to show our customers that Cargotec is a serious supplier for this kind of equipment and likes to stay close to its customers as well.

“There is also increasing interest in our K4

cranes in India, for use in both its bulk import and export markets, mainly handling iron ore and coal,” highlights Mr Berencsy.

“With a capacity of 50-tonnes in grab operation and an outreach of 32m, the K50 crane is at the upper performance level in this segment and offers a very high capacity to load both Capesize and Panamax bulk carriers.

“Different outreaches give the customer the opportunity to optimise load cycles for specific operations,” Mr Berencsy says. “If you want to load or unload Panamax or Capesize bulk carriers, outreaches from 32m to 36m are perfect. And our model with a 28m outreach is ideal for use on transfer terminals and unloading barges discharging to hoppers.

“All our K4 cranes are designed to have a long service life, with an estimated usage of around 5,000 hours per year. And they all fulfil FEM U7-Q3-A8 classification standards. We believe that this is vitally important when selecting a crane and its manufacturer for these types of tough operations.

“The market is looking for this type of high-performance heavy-duty grab crane.”

– Anders Berencsy

“With all components located inside the crane housing, our cranes also benefit from an extended service life, as the winches and all drive systems are well-protected from dust, sunlight and the weather in general. This protection is particularly important for bulk operations, which are naturally quite dusty.”

K50 and its smaller predecessor, K30, heavy-duty four-wire rope cranes are designed to operate in open sea conditions with a dynamic hoisting factor of 2.1.

The K50 can also be delivered with an eccentric platform. “A combination of a K5036-4HD and 9.0m eccentric platform provides a high capacity solution with a 45m-long outreach that will cover the biggest bulk carriers on the market,” notes Mr Berencsy.

Transloading technology suits India's booming bulk markets

Growing coal import and iron ore export industries in India are benefiting from Cargotec's ability to provide efficient, reliable and flexible transloading system solutions

From a technical perspective, the keys to a successful bulk handling operation are flexibility, reliability and continuity. Combining these efficiently ensures not only the profitability of an operation, but also limits its environmental impact.

To achieve the highest efficiency rates it is important to tailor the technology to an operation, although this has historically been limited by available port facilities

accommodating either an operator's desired size of vessel or the self-unloading installation. Transloading is a particularly effective way around this problem.

For transloading dry bulk materials, Cargotec offers complete solutions for floating cranes, transfer terminals, transloading ships and self-unloading barges. Currently benefiting from these are the growing Indian coal import and iron ore export industries. "Whether feeding India's supply and demand markets or exporting iron ore, the whole supply chain has to be an efficient operation," says **Ajay Jalali**, Cargotec's Marine Marketing Manager in India. "This starts from mining, to loading mother vessels, and unloading on the East and West coast of India. Due to limited port facilities there is an increasing move to unload imported coal into smaller barges using transloading terminals, transloading ships and floating cranes."

Coal is a difficult commodity to handle and requires tailored technology to overcome issues such as the oxidation of coal at storage yards, flow problems during rainy seasons, blockages at chutes and bunkers, spillages, the problems associated with having combined mixes of differently-sized and different quality coals, and the abrasion of coal handling equipment. "Cargotec is able to overcome all of these issues," Mr Jalali says.

In terms of deliveries to India, last year Cargotec's Cranes and Marine Selfunloaders business lines delivered its first order for a complete transloading system. The combined transfer terminal, for a leading Indian iron ore exporter, M/s. VM Salgaocar & Bros. Pvt. Ltd., is designed for transloading iron ore into Panamax-sized vessels.

Cargotec's scope of supply comprised: two K3028 heavy-duty grab cranes; two hoppers; a belt conveyor system, with a rated

The Magdragon I transloading terminal is fitted with MacGregor deck conveyor equipment for handling iron ore



capacity of 2,000t/h; and a telescopic reversible ship loader. The transfer terminal is currently under construction at Nantong Tongmao Shipbuilding Co, Ltd, in China. It is destined for the company's new terminal in Goa and will be operational by April this year.

"The system will be tailor-made for the customer to suit its intended operations in Goa," notes **Mats Sjöstedt**, Cargotec's Sales Manager for Marine Selfunloaders. "Our customer wanted a solution with the responsibility for the main functions of the systems from one supplier. Cargotec is the only company able to supply cranes, hoppers, a conveyor system and a ship loading boom for the transloading system. This is essentially all the equipment that is needed to handle the bulk cargo throughout the entire transloading process."

Also, earlier this year, Cargotec delivered its first MacGregor K3035 heavy duty crane to an Indian owner. M/s. Ahiliabai Sardesai Mining & Earthmoving will install the crane on a floating barge designed to handle coal and iron ore. It will be located in Goa and will be operational by March.

India's crucial commodities

India is the world's third largest producer of coal, and also the third largest importer of coal, according to Ministry of Coal figures. With proven reserves of around 257 billion tonnes, coal is India's most abundant source of energy and accounts for more than 70 percent of primary energy consumed in the country. However, there is growing disparity between India's coal supply and demand.

"Industry figures suggest that the shortfall for this year is in the region of

"Imported coal is therefore for closing the demand gap and meeting the quality standards"

– Ajay Jalali



105 million tonnes," says **Ajay Jalali**, Cargotec's Marine Marketing Manager in India. "Imported coal is therefore for closing this demand gap and meeting the quality standards for both steel production and power generation, which is not available from lower-quality domestic coal. This demand is highlighted by companies such as, Tata Power, NTPC, Coal India, Reliance Power, Lanco Infratec, GVK Power, Goodearth, Essar and Mercator, which are planning to, or have already, picked up equity stakes in coal assets in Indonesia, Australia and Africa.

"India is seeing this huge rise in demand for thermal coal due to the country's rapid growth in energy generation. Currently, the Indian Government is actively pursuing the development of between five to seven Ultra Mega Power Plants (UMPP), each capable of generating around 4,000 MW, and between 2013 and 2017 a number of private companies will have a combined capacity of 48 GW; all of which will partly run on imported coal.

"The exportation of iron ore is also big business," he notes. Annually, India exports around 100 million tonnes of iron ore to China and Japan; and these figures are expected to rise over the next few years."

Transloaders top up deepsea ships with iron ore and coal cargo exports

• *Magdragon I* is the first of two identical transloading terminals to be fitted with MacGregor deck conveyor equipment for Singaporean owner, Loreto Maritime Pte Ltd. The terminals are intended for transloading iron ore from smaller feeder barges to ocean-going vessels at Cape Preston in Western Australia. Cargotec has supplied a range of MacGregor equipment including transfer hoppers, a conveyor system and a telescopic

boom conveyor/ship loader. Both barges were built at Nantong Tongmao Shipbuilding Co, Ltd in China. *Magdragon I* was delivered to the owner in August 2011 and *Magdragon II* was delivered earlier this year. The unloading capacity for both barges is 4,500t/h.

• *Bulk Zambesi* and *Bulk Limpopo* are two 55,000 dwt Supramax ships designed for cargo transloading operations off Beira in Mozambique. The vessels were constructed by Jiangsu

Hantong Heavy Industry in China, for Italian owner, Coeclerici Logistics SpA. Both ships are equipped with MacGregor bulk handling equipment, which will be used to transload coal, at a rated capacity of 5,500t/h into larger ocean-going vessels, up to Capesize. The equipment comprises a conveyor system, five hoppers with belt feeders and a 37m-long travelling boom conveyor for loading coal into the ocean-going vessels.

RoRo deliveries keep cargo rolling

RoRo equipment for newbuildings and conversions delivered by Cargotec last year included one of the largest stern ramps built so far

The 45,200 dwt multi-purpose RoRo vessel, *Jolly Diamante*, is one of the largest RoRo container vessels in the world, and can carry up to 2,273 cars and 3,000 TEU. Its suite of MacGregor RoRo cargo access equipment includes one of the largest stern quarter ramps yet: 49.9m-long and with a driveway breadth of 27.8m at the ship end and 12.5m at the shore end. It can carry a maximum of 350 tonnes.

Cargotec is also supplying the 240m vessel with a MacGregor stern door, rampway

doors, ramp covers, division doors, power packs and electrical systems.

Jolly Diamante is owned by Italian group Ignazio Messina, and is the largest RoRo container vessel in its fleet. It is the first in a series of four ships to be operated by Messina Line and was delivered by Daewoo Shipbuilding & Marine Engineering Company (DSME), in South Korea, at the end of last year. During 2012 *Jolly Diamante* will be followed into service by *Jolly Perla*, *Jolly Cristallo*, and *Jolly Quarzo*, all featuring MacGregor RoRo access equipment.

Among various recognitions from the Italian Naval Register (RINA) classification society and the American Bureau of Shipping (ABS), *Jolly Diamante* has also received a prestigious 'Green Plus' award from RINA, certifying the ship's high safety levels and environmentally-responsible systems.

Another significant order that the company completed last year was on the

8,000-unit large car and truck carrier (LCTC), *Tugela*, which is the first of two 28,837 dwt LCTCs destined to start service for Wallenius Wilhelmsen Logistics from Korean yard, Hyundai Heavy Industries. *Tugela* will be followed into service by *Tulane* by mid 2012.

Tugela features a comprehensive suite of MacGregor RoRo access equipment including a stern quarter ramp, movable ramps, ramp covers, electrically-driven hoistable ramps, and lightweight plywood car deck panels.

The MacGregor car deck panels feature a lightweight open beam construction with a plywood top plate, minimising their impact on ship stability by reducing weight higher up in the vessel's structure.

Lashings are not attached to the plywood panel itself, but to the steel secondary stiffeners by a newly developed profile, which also act as support for the plywood panels.

Jolly Diamante features a 49.9m-long MacGregor stern quarter ramp, one of the largest of its kind
(PHOTO: Ignazio Messina & C.)



Cargotec delivers on its eco-friendly credentials



MacGregor lightweight plywood car decks with integrated lashing profiles



Nichioh Maru features two electrically-driven MacGregor stern quarter ramps

Shipowners switch to electric drives

Electrically-driven equipment minimises environmental impact by eliminating the risk of hydraulic oil leaks, which can pollute surrounding water and can also damage cargo.

There are also good commercial reasons for shipowners to switch to electric drives, for example:

- Energy is saved: electric drives run only when manoeuvring equipment; power can also be fed back into the ship's supply when larger winches are in lowering mode.
- Energy losses are much smaller, because electrically-driven systems are not affected by pressure drops.
- Electric drives are easy to monitor and service, maintaining peak efficiency.
- Time, money and energy are saved while ship-building; it is easier to install electrical cable than piping and no pump units are needed.
- Lower power consumption reduces power generation needs.

Cargotec has delivered complete electrically-driven MacGregor RoRo cargo access equipment for Nissan's new eco-friendly coastal car carrier, *Nichioh Maru*, built at the Shin-Kurushima Dockyard in Japan. The ship can carry up to 1,380 cars.

Cargotec deliveries include two stern quarter ramps (one on each side) and an internal movable ramp. "Cargotec, Shin-Kurushima and Nissan are all committed to clean seas" says **Magnus Sjöberg**, Sales Director for RoRo ships at Cargotec. "Nissan is aiming for a leading low corporate carbon footprint and *Nichioh Maru* is part of its 'green fleet' of car carriers. Our systems and a range of other features, such as an energy efficient electronically-controlled diesel engine; a low friction hull coating; and 281 photovoltaic solar panels used to power LED lightning throughout sections of the vessel, will combine to make this possible."

New stern ramps give FRS ferries flexibility

Cargotec has delivered and installed two stern ramps onboard FRS Group's 2011-acquired 14,379gt RoPax vessel, *Tanger Express* (ex *Mette Mols*). The ship has been converted to run on the operator's main Gibraltar Strait service between Tarifa in Spain and Tangiers in Morocco. Cargotec has also delivered new ramps for its sister-

ship *Kattegat* (ex *Maren Mols*), which will be installed at a later date.

"An essential element of FRS's plans for both of these vessels involved new stern ramps," says Jonas Nordström, Director RoRo conversions. "With newly-designed ramps, the vessels are able to operate in almost all European ports and Mediterranean countries."

Cargotec's contract with Scandlines for the Port of Gedser called for double-deck loading ramps



Linkspans ordered to support new and upgraded ferry services

A busy year for Cargotec's linkspan specialists has seen the company win several new orders in Norway, Denmark and Germany

Throughout 2011 Cargotec secured new linkspan contracts to support various RoRo and passenger ferry services in Norway, Denmark and Germany. Notably, at the end of last year, it won a contract to supply the Norwegian Port of Grenland with a linkspan to accommodate the new Fjordline ferry service to Hirtshals in Denmark. Delivery of the equipment is due in August this year.

"This order is an extension of a series of deliveries to the Norwegian Ports of

Larvik, Kristiansand and Stavanger that we have undertaken since 2007," explains **Clas Hedelin**, Cargotec Sales Manager for MacGregor port and terminal solutions.

"Almost at the same time as the Grenland order, we secured a contract to supply and install four floating taxi terminals to the municipalities of Vikna, Naeroy and Leka in Norway. All facilities are based on the use of modular pontoon sections, which form an L-shaped berthing dock for the ferry. A bridge-ramp from the pontoon landing face ensures tidal independence for the facility and direct passenger access to shore. We plan to deliver all the terminals by mid-May."

Earlier in 2011, Cargotec won a turn-key contract with Scandlines in Denmark for the Port of Gedser. The contract called for double-deck loading ramps, a passenger gangway, a provisions handling elevator and an auto-mooring unit linked with a storm mooring

device. Delivery of the equipment was completed in early April this year and supports a new ferry service between Gedser (Denmark) and Rostock (Germany), which will be run by two new 170m Scandlines' ferries, *Berlin* and *Copenhagen*.

To meet the requirements for this expanded service, both ports required some upgrades and as a result, in mid-2011, the Port of Rostock also signed a contract with Cargotec for one auto-mooring unit for berth 54, and subsequently added upgrade work to an existing auto-mooring unit, which was delivered in 2007, to the contract. "This work was required as the unit had to be moved from its present quay to a new position as a complimentary unit for berth 54. The delivery and commissioning of both units are to be aligned with the deliveries in Gedser, as they are tailor-made for the same vessels," notes Mr Hedelin.

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