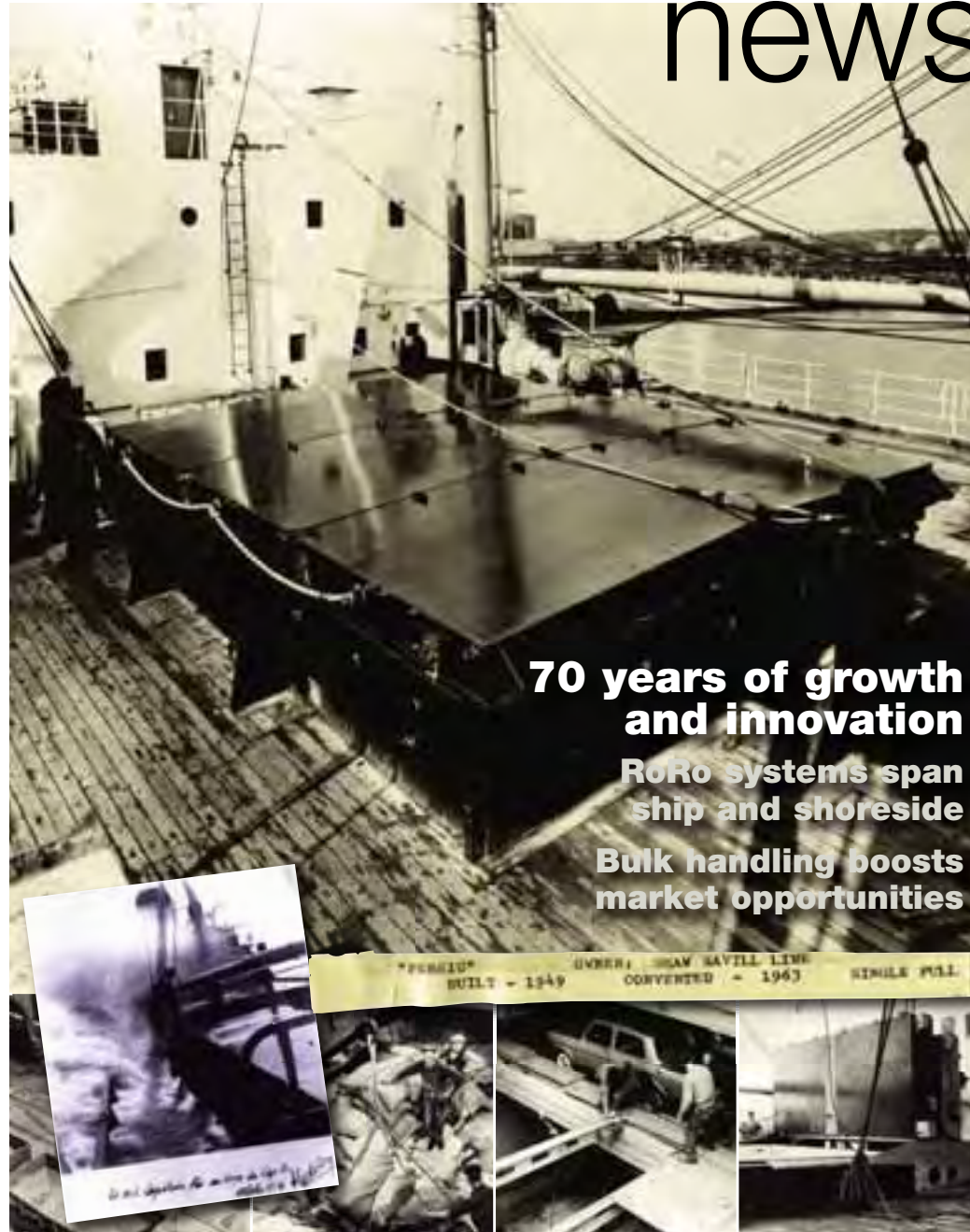


# MacGREGOR

## news



**70 years of growth  
and innovation**

**RoRo systems span  
ship and shoreside**

**Bulk handling boosts  
market opportunities**



# Commitment and capability undimmed after 70 years

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**MacGREGOR**

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"Our future lies in life-cycle management"



Surviving in the maritime industries requires continual assessment of markets and customer demands, with responses that position a shipowner or yard alongside – or ideally ahead of – the competition

Any specialist engineering supplier to shipping and shipbuilding seeking to maintain a leading status in the market has had to demonstrate consistent commitment and capability, and a shrewd awareness of industry trends. Throughout 70 years of activity – celebrated in this issue – MacGREGOR has provided innovative solutions to cargo handling challenges.

Common to all our developments – from the original steel hatch cover concept to the latest electric drive technology for cranes, covers and RoRo systems – has been the pursuit of improvements in efficiency, safety and reliability.

Complementing technical advances in products and systems, our organisation and strategy have been continually reshaped and refocused to better serve shipowners and shipbuilders in a changing environment.

MacGREGOR aims to be a partner in the early stages of a project, contributing to the design and hopefully being rewarded with the responsibility of ensuring operational success. We have learned how to take full responsibility, not least from acting as a leading supplier of logistics systems to the world's major navies.

Experience has shown that our involvement as early as possible in the process – preferably at the conceptual stage with owner and yard staff – yields the most rewarding system solutions in terms of fitness for purpose, cost effectiveness and compatibility with the hull structure.

Our capability to assume total responsibility for the cargo flow solution of a project on a turn-key delivery basis allows partner yards to focus on their prime role: to build quality ships on time and at the lowest possible cost.

Over the years MacGREGOR has evolved from being a product-oriented company to a true partner to its customers, which calls for ongoing investment in developing our human resources. Personnel skills have had to be broadened and complemented by an overall appreciation of our goals and the industry's business direction.

A commitment to total support for yards and operators is reflected in continuing investment in training personnel for our installation and service teams. It is even more important now that MacGREGOR service engineers have the experience and expertise to anticipate and avoid downtime.

We will achieve further growth by being more proactive, moving with the market and supplying the systems and services to match the economic

conditions. Growth will also be pursued by strengthening our existing capabilities organically and by acquiring suitable companies in promising sectors and regional areas as opportunities arise.

As an example, our thrust into the buoyant offshore market was maintained by the recent acquisition of Singapore-based Plimsoll Corporation, which will provide a perfect match for our Norway-based Hydramarine acquisition.

Combining Plimsoll's expertise in winches and cranes with that of Hydramarine enables us to offer a complete package of proven deck machinery for offshore industry handling solutions in the strategic North Sea, Mexican Gulf, south east Asia and Middle East arenas.

With terminal and shipboard bulk cargo handling systems now also part of our portfolio we are well primed to serve customers across a wider range of industry sectors than ever before.

Meeting the most demanding design criteria as well as tight schedules has sharpened our competitiveness which, apart from price, reflects availability, reliability and professional capability.

We have a clear target for continued growth in the service sector. Our capabilities will be developed by taking advantage of the synergies between the different divisions of MacGREGOR and between the business areas within our parent Cargotec Corporation.

Seventy years on, then, MacGREGOR remains totally committed to maintaining its status as an innovative partner for the maritime industries in cargo handling solutions through organic development as well as through new mergers and acquisitions. Our future lies in life-cycle management, offering the industries we serve innovative products and systems supported by a through-life service commitment.

With a production platform based on manufacturing partners close to customers and the dedicated collaboration of key sub-suppliers, we are well placed to maintain our leading position in a highly competitive market. We are nevertheless well aware that our hard-won status will only be secured by continually improving co-operation with customers and the industry as a whole. ■

Olli Isotalo, President, The MacGREGOR Group





Hydramarine's specialities include large active heave-compensated cranes

## Acquisitions drive MacGREGOR's expansion into offshore sector

MacGREGOR has acquired two specialist equipment companies as part of its strategy of developing cargo handling solutions for the offshore and marine industry. The first company is Hydramarine, based in Norway, whose key products are large active heave-compensated cranes for the offshore industry. It offers a complete range of high-end handling systems such as cranes, davits, winches and subsea load handling solutions. The other company is Plimsoll Corporation Pte Ltd, based in Singapore, which is a leader in deck machinery for the offshore oil and gas and marine industry in the Asia-Pacific region.

"We are now well positioned in the strongly growing offshore sector," said MacGREGOR's president, Olli Isotalo. "Combining Hydramarine's and Plimsoll's expertise provides us with a complete package of winching and handling solutions for our offshore customers. We now have within MacGREGOR a strong setup in offshore, which we intend to build on organically". MacGREGOR's offshore expansion will be detailed in the next issue of *MacGREGOR News* (see also page 16 of this issue).

## Cranes and Bulk combine in self-unloading conversions for Panamax pair

Two Panamax bulk carriers will be deployed as iron ore transloading stations outside Bahrain by Dubai-based Emirates Trading Agency (ETA) after conversion projects in China based on heavy-duty grab cranes and self-unloaders supplied by MacGREGOR.

The projects will see the Group's Cranes and Bulk divisions co-operate for the first time to provide the customer with a single-point contact for major transloading systems. The first of the converted bulkers, *Star of Nippon*, is scheduled for delivery in the middle of May 2008.

Each self-unloading system from MacGREGOR Bulk is designed to handle 2,500 tonnes/hour of iron ore, the main elements comprising two double-deck hoppers with belt feeders, a 132m-long longitudinal conveyor, a 25m cross-conveyor and a 67m hoisting boom conveyor. MacGREGOR will also supply the associated hydraulic and electrical equipment, and supervise the installation work.

An outfit of four K3028-4 heavy duty grab cranes with 9m eccentric platforms will be supplied by MacGREGOR Cranes for each ship. Emerging as the standard specification for such projects, similar sets have been delivered by MacGREGOR for four other transloading stations, including a recent installation for the Venezuelan shipping and logistics specialist Cargoport.

With a proven track record in meeting the exacting demands of transloading operations, the K-4 cranes for ETA will have a lifting capacity of 30 tonnes at 28m outreach and will be configured for heavy duty operations.

## PCTC contract specifies electric drives

Four new PCTCs being built at Kyokuyo Shipyard Corporation, Japan, for Norwegian owner Gram will be fitted with MacGREGOR RoRo equipment. This comprises a stern ramp, a quarter ramp, two ramp covers, three internal ramps and 10 hoistable car deck panels. All the internal equipment will be operated by electric drives – an environmental friendly solution for operation and one that also avoids oil leakage and damage to cargo. The vessels will be delivered in 2009 and onwards.

There are several reasons behind MacGREGOR'S latest developments in electric drive for RoRo cargo access equipment, but they are mainly: environmental considerations, easier installation, power saving, reduced onboard maintenance, and less cargo damage (*News* 154). One other technical reason for this development is also the availability of new improved electric drives, in the form of screwjacks drives, to replace the hydraulic cylinders used for operating smaller items or in cleating and locking devices. Additional factors include improved electric contactors for the replacement of valves as well as improved electric motor protection.



Spirit of Tasmania

## Bass Strait RoPaxes benefit from new deck arrangement

Designed to smooth the flow of cars between the decks, the MacGREGOR Group's RoRo division has received a new car deck arrangement order from TT-Line in Australia. The company's conversion unit will design and deliver a new car deck arrangement between deck 5 and 7 on the starboard side of the operator's two 29,338gt sisterships *Spirit of Tasmania I* and *Spirit of Tasmania II*. Both vessels have a 2,300 lane-metre capacity and operate between Melbourne and Devonport in Tasmania. They will each be fitted with three hoistable car deck panels and one hoistable car ramp.

## Arctic cranes handle hoses and provisions in extreme conditions

MacGREGOR's Crane division will deliver the first Arctic crane for a 70,000 dwt shuttle tanker in May. The ship's owner is Sovcomflot and the tanker will operate in the Barents Sea. The cranes will be able to operate in temperatures down to -40°C, and in extreme cases down to -45°C.

There will be three cranes on board, one hose handling and two provisions cranes, and all will fulfil these very demanding operating conditions.

MacGREGOR won this project after tough competition with another international crane supplier. Samsung Heavy Industries finally opted for MacGREGOR's know-how and technical solution to comply with the extreme low temperatures.

Nine cranes will be delivered to three Arctic shuttle tankers at first, but more orders are anticipated now that a reference contract has been placed.

## Intership orders three cement-handling systems

Intership Navigation Co Ltd Cyprus has ordered Nordströms self-loading and unloading cement-handling systems for a series of three bulk carriers of 7,500-9,000 dwt. The vessels will be built at Shandong Huanghai Shipbuilding in China and are scheduled to go into operation during 2008 and 2009.

This is Intership Navigation's first order for cement-handling systems from MacGREGOR Bulk, extending a long relationship as the company has been a customer for cranes and hatch covers from other MacGREGOR divisions for many years.

The rated capacity of the Nordströms equipment is 1,000 tonnes/hour for mechanical loading and 2 x 300 tonnes/hour for pneumatic loading. Discharging rate is 2 x 300 tonnes/hour pneumatically.

Preparations are also being incorporated for a 300-tonnes/hour mechanical discharge arrangement to be installed later.



## Operating base opened in Brazil

At the beginning of this year, MacGREGOR opened an operating base in Rio de Janeiro, Brazil, mainly to support Grimaldi Naples, a VIP customer of the Italian office. A service station has been needed for a long time in the South American country and the realisation of this project will give MacGREGOR the opportunity to expand business in this region, and give significant service support to Grimaldi, further improving the partnership.

## Service academies secure recruitment

With a growing worldwide service network, MacGREGOR has challenging targets to meet and therefore needs to significantly increase its quota of service staff. To meet this demand for well-trained and qualified engineers, MacGREGOR's Service division has decided to set up three service training academies. The first group of trainees will graduate some time after summer 2007.

The mission for the academies is to ensure recruitment and training of new service engineers and to cover the training needs of existing personnel. They will be located in three major centres: Shanghai in China, Manila in the Philippines, and Gothenburg in Sweden.

## Hamburg hub can pick, pack and ship parts in under half an hour

MacGREGOR's warehousing and logistic activities for the Crane division's newbuilding department and the Service division's cranes, hatch covers and RoRo equipment departments have been concentrated in Hamburg, Germany since 2004.

The centre is operated by Supply Chain & STS (spares and technical service), a support function within

## MacGREGOR strengthens presence in Vietnam

MacGREGOR has established a new joint venture with Vinashin, which will further strengthen its co-operation with one of the world's fastest emerging shipbuilding players. The joint venture has been established as part of Vinashin's plan to have approximately 60-70 per cent of ships' main equipment localised by 2010, creating a good platform for development of Vietnam's shipbuilding industry.

MacGREGOR-Vinashin (MacGREGOR Vinashin Marine Equipment Co Ltd), is located in Haiphong. Vinashin – a key player in the Vietnamese shipbuilding industry – has a 51 per cent shareholding in the new production company, with MacGREGOR's stake standing at 49 per cent. The signing ceremony took place in March in Hanoi, Vietnam.

Preparatory work for designing and building a new joint venture factory has been going on for some time. Lay-out of the area and the main principles for the workshops have been agreed, as well as main equipment required for the factory. Construction is expected to start later in 2007 and the factory is scheduled to be up-and-running about a year later.

Initially, the new MacGREGOR-Vinashin plant will be a purpose-built hatch cover factory focusing on cost-efficient manufacture of hatch covers to shipyards within Vietnam. The next phase of investment will include building-up the facilities to cater for the production and assembly of marine cranes, as well as the production of RoRo equipment.



The Vinashin joint venture signing ceremony took place in March this year



Over 3,000 items are kept in the 2,500m² warehouse

MacGREGOR's Service division. From a logistics point of view, Hamburg is ideal for MacGREGOR's needs because of its existing infrastructure and proximity to some of the company's major customers, highways and international airport.

MacGREGOR runs the warehouse with one of the world's biggest logistic service providers, Kühne+

Nagel. Over 3,000 different items are kept in the high-rack warehouse in an area of more than 2,500m² and can be picked, packed, and shipped in less than 30 minutes, if required. A quick information flow between MacGREGOR's worldwide linked ERP system SAP R/3 and Kühne+Nagel's warehouse management system is ensured by electronic interfaces.

All MacGREGOR service stations are electronically linked to the Hamburg logistic centre and can monitor the spares stock levels 24 hours a day. With this set-up, MacGREGOR ensures a high level of spares availability to serve its customers' worldwide fleets.

In addition to this centre, MacGREGOR maintains smaller service stocks in all the important ports worldwide. The logistic centre's team in Hamburg also manages the worldwide lashing stock and logistic activities.

Annually about 6,100 service orders and 150 full container load shipments of crane newbuilding components are completed from the centre using road, air and sea transport modes.



# 70 years of growth & innovation

Now entering its seventieth year, the MacGREGOR Group continues to trail-blaze its way through the marine market with an unrivalled service record and innovative engineering that meets the needs of the most demanding environment

During the 1920s, in Whitley Bay in the North of England, engineer brothers Joseph and Robert MacGregor developed the first steel hatch cover. This was the starting point of MacGREGOR & Company, which was officially founded in 1937, and concentrated on promoting and selling the steel hatch covers, patented in 1929.

The brothers' belief in the need for steel hatch covers stemmed from what they saw as the unnecessary losses of colliers in the North Sea. The design was deceptively simple: it consisted of five articulated leaves that stowed neatly at the end of each hatch. It was revolutionary, but persuading shipbuilders and owners to change from the tried and tested wooden covers proved surprisingly difficult.

This changed in December 1945, when Henri Kummerman was officially appointed as the agent for MacGREGOR & Co (Naval Architects) Ltd in France. In 1949 the energetic entrepreneur formed MacGREGOR-Comarain, which was granted the licensing rights for the whole world with the exception of the UK and the British Commonwealth. This was the start of the

International MacGREGOR Organisation.

Since then, MacGREGOR has grown both organically and through acquiring new companies within the marine industry. In 2004 it was bought by the Cargotec Corporation, which is world's leading provider of cargo handling solutions and now comprises three business areas: Hiab, Kalmar and MacGREGOR. At the end of 2006 MacGREGOR's net sales totalled €482 million and it employed 1,117 people.

Today, MacGREGOR is the global market leader in creating seamless engineering and service solutions for the maritime transportation industry. Its customers are primarily ship owners, ship and port operators and shipyards. Following a focus in 2005 to concentrate on marine cargo handling, and through Cargotec's expansion into dry bulk handling by acquiring BMH Marine (now MacGREGOR Bulk) in 2006, its product portfolio includes hatch covers, cranes, RoRo equipment, port equipment, cargo lashing systems, bulk-handling systems and their service.

The MacGREGOR Group's operative organisation is now divided into five divisions spread over geographic borders in different continents: Cranes, Dry Cargo, RoRo, Bulk Handling and Service. MacGREGOR Group AB is registered in Gothenburg, Sweden, but its headquarter functions are practically divided into three Nordic countries: Sweden, Denmark and Finland.

Its long-standing and focused expertise affords MacGREGOR an enviable reputation in cargo flow solutions. It provides an innovative approach at the early planning stage of a vessel or a terminal. Loading, discharging and securing systems are offered as a whole and take into account the cargo to be transported, the restricted cargo space on board, routes and other factors relating to the ship's or terminal's business.

MacGREGOR concentrates on the design, engineering and service of marine cargo flow systems, and because of this approach it has chosen partner plants located close to the market in China, Korea, Japan, Croatia and Poland, to concentrate on manufacturing its products. All of its production units have been designed in co-operation with the partners to meet MacGREGOR's quality and productivity standards, with the Group's personnel participating in continuous on-site quality control activities. Its most recent joint ventures, this year, include a hatch cover production plant in Vietnam with Vinashin.

MacGREGOR offers global services including proactive maintenance programmes, repair and

MacGREGOR's original spare parts services. The global network serves customers through approximately 60 service stations at major ports around the world. In 2004 the company launched its MacGREGOR Onboard Care service concept, where MacGREGOR provides service packages that consist of pre-agreed service measures and regular inspections. Furthermore, MacGREGOR can monitor equipment function through remote diagnostics and on-hand inspections. The MacGREGOR Onboard Care concept consists of four service level options, from basic maintenance to Total Onboard Care. MacGREGOR Onboard Care presently covers more than 350 vessels.

To maintain and develop its market-leading position, MacGREGOR has to adapt to the shipping industry trends. It will continue to push life-cycle management concepts and progress from its previous 'product-centric' position to a more customer-focused organisation. Additionally, it will strengthen its qualified customer interface and structured service and maintenance concepts, and at the same time increase its resources through continuous investment in research and development.

As for the next few years, MacGREGOR aims to achieve aggressive growth in service through organic and geographical expansion, as well as through service-related acquisitions. It will maintain a focus on planned maintenance, defined by its advanced service concept, MacGREGOR Onboard Care. ■

## Key MacGREGOR dates

**1929** First MacGREGOR steel hatch cover patent accepted  
**1937** MacGREGOR & Company formed  
**1945** Henri Kummerman appointed agent in France  
**1949** MacGREGOR-Comarain formed  
**1949** First single-pull hatch cover installed  
**1952** First flush tweendeck hatch cover developed  
**1954** First flush weatherdeck hatch cover developed  
**1957** Navire company formed  
**1958** First purpose-designed RoRo, enters service.  
**1958** First hatch cover/ramp designed.  
**1959** First hydraulically-operated stern door marks beginning of short-sea ferry RoRo  
**1961** Mechanised portable decks for ferries introduced  
**1967** Mechanised lift and roll covers for cellular container ships installed

**1968** first quarter ramp fitted  
**1969** Navire Cargo Gear AB formed  
**1973** Slewing ramps introduced  
**1983** MacGREGOR merged with Navire to form MacGREGOR-NAVIRE, and also became part of the KONE Corporation.  
**1989** MacGREGOR-NAVIRE acquired Dan-Elevator  
**1993** MacGREGOR-NAVIRE acquired Conver-OSR  
**1993** INCENTIVE acquired MacGREGOR-NAVIRE's shares from the KONE Corporation. INCENTIVE already owned HÄGGLUNDS Marine. Company now called the MacGREGOR Group  
**1995** The MacGREGOR Group developed a partnership with YORK International  
**1997** Hatch cover production co-operation with Nantong Ocean Iron & Steel Co (OISCO) in China  
**1997** MacGREGOR wins first order for StackBeam

container concept  
**1998** MacGREGOR Flexipads win prestigious Innovation award  
**1998** Incentive sells MacGREGOR to Industri Kapital  
**2000** MacGREGOR acquires linkspan specialist NORENT  
**2000** MacGREGOR acquires US galley specialist Atlas Marine Services  
**2001** MacGREGOR centres crane production in China with Nanjing-based Lüzhou Machine Works  
**2001** MacGREGOR acquires Otecon and expands business activities in the Middle East  
**2002** MacGREGOR Group AB becomes majority owner in MacGREGOR-Kayaba Ltd  
**2003** MacGREGOR undergoes restructuring plan  
**2004** MacGREGOR signs a co-operation agreement with Iran Shipbuilding & Offshore Industries Complex  
**2004** KONE Cargotec Corporation buys

MacGREGOR Group  
**2004** MacGREGOR adds fire-extinguishing systems to its portfolio with Softonex  
**2005** MacGREGOR's marine elevator business is transferred to KONE  
**2005** MacGREGOR's acquisition of All Set Marine Lashing approved  
**2006** Cargotec expands into dry bulk handling by acquiring BMH Marine, now known as MacGREGOR Bulk  
**2006** MacGREGOR acquires ship hydraulics service company Grampian Hydraulics  
**2007** New joint venture production partnership with Vinashin  
**2007** MacGREGOR expands into offshore sector through acquisitions of companies Hydramarine and Pimssoll



## Bulk handling systems boost market opportunities

Parent group Cargotec's acquisition last year of the Swedish company BMH Marine added a leading programme of dry bulk terminal handling and shipboard self-unloading systems to the diverse MacGREGOR portfolio



Sweden-based MacGREGOR Bulk AB inherits a pedigree stretching back to 1949 and customers in over 55 countries, its brand names Nordströms (shipboard self-unloading systems) and Siwertell (bulk terminal handling systems) enjoying enviable reputations in port and shipping sectors.

Engineering solutions, equipment and after-sales support worldwide are offered for a broad range of dry bulk materials handling and processing applications, the scope of services and supply including:

- ship unloaders
- mobile ship unloaders
- ship loaders
- self-unloading/loading systems for dry bulk carriers
- mechanical and pneumatic conveying systems
- plant and terminal design
- storage systems.

Sustained demand for Nordströms self-unloading systems for bulk carriers and Siwertell pneumatic and mechanical ship unloaders/loaders is reflected in a steady stream of orders secured this year by MacGREGOR Bulk, to be installed in all corners of the world.

### Siwertell new orders

• A Siwertell ship loader for loading alumina at a rated capacity of 2,500 tonnes/hour to Panamax-size ships. The contract also calls for MacGREGOR to supervise the assembly and commissioning of the system. The Siwertell will be built in Europe and delivered in April 2008. This order represents a

breakthrough for the company into a new medium: alumina handling for the aluminium production industry. "The client is increasing its alumina production capacity and therefore needs additional loading capabilities, which MacGREGOR can supply," said Jonas Fack, sales director at MacGREGOR Bulk.

• A Siwertell ship unloader for unloading cement, with a capacity of 900 tonnes/hour from Panamax-size ships, to be built in China. The system will be delivered in October, and the contract also calls for MacGREGOR to supervise assembly and commissioning.

• A Siwertell 700-L continuous screw-type loader for loading cement at a rated capacity of 800 tonnes/hour to Panamax-size ships for Titan Cement, a Greek operator. "This order maintains the company's position as a leader in supplying continuous, efficient and environmentally friendly loaders for dusty and difficult materials," Mr Fack said. The system will be built in Europe and delivered in August.

• For US company Southern Star Shipping, for operation by Nigerian Flour Mills in Nigeria, MacGREGOR Bulk will supply a Siwertell ship unloader for unloading grain at a rated capacity of 600 tonnes/hour from ships of up to 70,000 dwt. The Siwertell 490-M continuous screw type ship unloader will be delivered in October.

• In December MacGREGOR Bulk will supply a turn-key Siwertell 640-M continuous screw type ship unloader to Formosa Plastic Corporation, Taiwan, for the Ningbo Plant in China. It will be used to unload coal at a rated capacity of 1,000 tonnes/hour from 50,000 dwt ships. The contract also calls for MacGREGOR Bulk to supervise the assembly and commissioning of the system, and spare parts.

• Another breakthrough for MacGREGOR Bulk is its contract for a Siwertell 790-D continuous screw type ship unloader to discharge coal for Mirant Mid-Atlantic LLC, which will be delivered in July 2008. "This order – together with an order for a limestone/gypsum unloader/loader in 2005 – are significant for our breakthrough in the US coal and limestone-handling markets," Jonas Fack highlighted. "We are strong in cement-handling in the US, but have historically not been quite so successful in other segments, which is why this is significant. The new system has a rated capacity of 1,530 tonnes/hour from 20,000 dwt barges. MacGREGOR Bulk will also supervise the assembly and commissioning of the system, and be responsible for spare parts.

### Nordströms new orders

• A cement handling system will be installed on a 4,000 dwt self-unloading carrier under construction at the ABG Shipyard in India for Gujarat Ambuja Cements. Two identical cement carriers delivered to the same owner in 2001 are operating between terminals on the Indian west coast. A system based on mechanical loading with a rated capacity of 700 tonnes/hour and unloading at 675 tonnes/hour is specified for the newbuilding, the equipment due for delivery in September.

• A self-unloading Cargo Scooper conveyor system scheduled for service in mid-2008 on a 40,000 dwt bulk carrier will be based on reclaiming scraper conveyors in each of the four cargo holds, feeding into bucket elevators. The elevators lift the cargo on to a longitudinal belt conveyor, located in an enclosed tunnel above deck, which transports the product to a slewable and hoistable boom conveyor installed in the ship's bow. Gypsum or similar cargo will be discharged by the boom conveyor into shoreside receiving hoppers or other receptacles at a capacity of 2,000 tonnes/hour. Unloading is fully automatic.

• Conversion projects are also in demand. SMT Shipmanagement of Poland, for example, recently placed an order for a Nordströms self-unloading system to be delivered in mid-2007 for installation at the Chengxi Shipyard in China. This is the second such contract from SMT, the result of the first – the 23,000 dwt *Somerset* – now transporting cement between the US east coast and Colombia. The equipment has rated capacities of 1,000 tonnes/hour (mechanical loading) and 2 x 300 tonnes/hour (pneumatic unloading).

• Another repeat contract has come from KC Maritime, which is converting an 18,000 dwt bulker into a self-unloading cement carrier. The mechanical-type cement handling system, with vertical and horizontal screw conveyors, will be similar to those installed earlier on the customer's *Darya Shaan* and *Darya Jaan*. The system will be prepared for pneumatic unloading.

• Nordströms bulk handling systems for offshore supply vessels are another MacGREGOR Bulk speciality. Five recent orders covering tonnage destined for Europe, Asia and the Middle East take the total backlog to 25 shipsets of equipment for anchor-handling tug/supply vessels. The systems include bulk tanks, maintenance-free valves, pollution-free venting, compressors and control panels.

• Intership Navigation Co Ltd Cyprus has ordered Nordströms self-loading and discharging cement-handling systems for a series of three 7,500-9,000 dwt bulkers to be built at Shandong Huanghai Shipbuilding in China and scheduled to enter service in 2008 and 2009. The rated capacity is 1,000 tonnes/hour for mechanical loading and 2 x 300 tonnes/hour for pneumatic loading. Discharging rate is 2 x 300 tonnes/hour pneumatically. Preparations are also being incorporated for a 300-tonnes/hour mechanical discharge arrangement to be installed later. ■

# A new and better way of unloading alumina

Reduced handling costs with minimal cargo degradation are among the merits of Siwertell screw-type unloaders, explains MacGREGOR Bulk sales director Jonas Fack

Global demand for aluminium is growing constantly and rapidly. World production in 1950 amounted to 2 million tonnes but output in 1970 was 9.5 million tonnes; production rose to 15 million tonnes in 1990 and to 23 million tonnes in 2005. Demand is still rising and production capacity increasing by extending existing plants and building new aluminium smelters.

Producing one tonne of aluminium requires an

input of two tonnes of alumina, which results from processing four tonnes of bauxite. Aluminium manufacture is highly energy intense, most production facilities thus being located in areas of the world where power is comparatively cheap but not always close to raw material sources.

A large proportion of the bauxite and alumina for processing is thus transported by sea and requires loading and unloading from bulk carriers.

Increasing demand dictates improvements in shipping and handling these raw materials, the pattern of alumina transport changing from carrying smaller volumes in Handymax-size ships to larger volumes in Panamax tonnage.



The greater ship sizes and total volumes involved call for higher capacities and efficiency in unloading to reduce handling costs.

Alumina is both extremely dusty and expensive, ruling out the use of grab cranes for ship unloading. The traditional way of overcoming the dust and spillage issues has been – and remains – pneumatic unloaders; being continuous and enclosed, these take care of the environmental concerns.

As the volumes handled have historically been modest, with shipping undertaken in smaller tonnage, two of the main drawbacks inherent with pneumatic unloader technology – low rated capacity and low through-the-ship efficiency – have been left unconsidered. Again, as a consequence of rising demand, these factors must now be addressed and resolved.

Another disadvantage of the pneumatic-type unloader is the high velocity inside the conveying tubes, which not only creates high wear on the conveying line but – more devastating – causes degradation of some 5-6 per cent of the alumina being handled.

Increased fines in the alumina have a negative impact on processing in the aluminium smelter since such alumina requires more energy to process. Discharging alumina from ships using pneumatic unloaders therefore involves unnecessarily high amounts of power not just for the unloading procedure but for processing in the smelter.

Like many others, the aluminium industry is conservative in choosing new technologies and unloading operations have not been high priority because of low demands. No real improvements have therefore emerged over the past few decades.

Pneumatic unloaders with a quite sophisticated airlock design have recently been complemented by unloaders using airlocks of a design similar to those for grain handling. Only a few operators, however, have made the technology leap and started using mechanical unloaders.

Alumina product degradation measured over a 10-year period at the port of Ploce in Croatia with a Siwertell 5000 S-GT unloader handling imports for Aluminij Mostar provided clear evidence of less than 0.2 per cent degradation; and a full-scale test controlled by SGS with a Siwertell 640-D unloader at Fremantle in Australia in December 2006 confirmed a negligible degradation of 0.1 per cent.

SIWERTELL UNLOADER COST EFFICIENCY			
<b>example:</b>			
annual intake	1 million tonnes		
operating hours	20 hours/day		
ship size	65,000 dwt		
ship cost	US\$25,000/day		
	<b>pneumatic</b>		<b>Siwertell</b>
rated capacity	600 tonnes/hour		1,000 tonnes/hour
efficiency	55%		70%
unloading days	152 days		72 days
ship cost	US\$3.8 million/year		US\$1.8 million/year

An annual saving of US\$2 million is thus possible in shipping costs alone by using a highly efficient Siwertell unloader rather than a pneumatic unloader

SIWERTELL v TRADITIONAL PNEUMATIC UNLOADING			
<b>problem area</b>	<b>traditional pneumatic solution</b>	<b>Siwertell solution</b>	
product degradation	the high conveying velocity gives a degradation of around 5-6 per cent	degradation is close to zero	
power consumption	significant; the installed power makes it costly in consumption side and also on the peak load installation side	measured as kWh/tonne is around one-third of the consumption of a pneumatic unloader	
rated capacity	traditionally, pneumatic towers for alumina handling are built with two conveying pipes and potentially with total unloading capacities of 300-500 tonnes/hour, although design capacities that reach 1,000 tonnes/hour have been mooted recently	Siwertell unloaders can be provided in all capacity ranges from 150 to over 2,000 tonnes/hour	
through-the-ship efficiency	as pneumatic unloaders work straight under the hatch opening only, and also use only the free flow of the alumina towards the intake nozzle, average through-the-ship capacities can only reach around 50-55 per cent of the rated capacity	with its unique reach inside the cargo hold and its digging operation, the Siwertell unloader easily reaches 65-75 per cent of the rated capacity	
noise emission	not only high but also difficult to reduce	Siwertell unloaders are designed without natural noise emitters, and most of the noise level can be easily sound insulated to avoid disturbing noise emissions	
dust emission	a cargo pick-up method based on cargo avalanches generates a fair amount of dust inside the hold	a layer-by-layer method picks up cargo below the surface, with no dust emitted by avalanches	
unloader weight	very high for high capacity	comparatively low for high capacity	

In contrast, product degradation experienced by operators using pneumatic unloaders amounts to 5-6 per cent. Switching to a Siwertell unloading system thus makes possible a significant reduction in degradation. In addition, for an annual intake of one million tonnes of alumina, the power consumption savings could amount to 2 million kWh a year.

Substantial savings are thus facilitated by Siwertell unloaders compared with pneumatic unloaders: apart from power cost savings and lower product degradation, major savings in shipping

costs are promised. Siwertell unloaders are useful for unloading alumina but equally beneficial in handling pet coke. Another important area where they could provide even higher cost savings is unloading the raw material bauxite, which today is generally handled by grab cranes.

Grab crane efficiency is even lower than that of pneumatic unloaders, and savings on shipping costs will be higher still. Significant benefits can therefore be realised by the aluminium industry in selecting Siwertell unloaders.

With external factors and demands changing, aluminium producers need to take a fresh look at the shipping and handling of input materials such as alumina and pet coke. Higher volumes mean that such factors as power consumption and unloading efficiency are gradually becoming increasingly important in the supply chain costs.

Along with avoiding the degree of product degradation associated with pneumatic systems, a clear stimulus to adopt Siwertell screw-type unloaders for alumina handling is therefore indicated. ■



# Trade trends dictate new thinking in shoreside cement handling

Traditional cement shipping in recent years has suffered from market disturbances, sometimes resulting in a shortage of tonnage but primarily in increased freight rates, explains Peter Göransson, MacGREGOR Bulk sales manager

Different terminals adopt different solutions but the common questions for all are: what can be achieved to reduce shipping costs; is there a relationship between those costs and the type of equipment deployed at cement terminals; and how can a terminal be optimised to minimise shipping costs?

- Three main elements are of high importance in influencing the total cost excluding freight:
- the rated unloading capacity of the ship unloading system
  - the efficiency of the ship unloading system
  - the transfer arrangement to shore.

It is obvious that the higher the ship unloading capacity, the faster the ship can be unloaded, thereby reducing the total number of unloading days. But there is little or no point in having a high capacity unloader unless the unloader and the unloading system are designed to operate efficiently.

The basis of an efficient ship unloader is a rail-mounted installation that can travel freely along the quay during operation, with sufficient rail length to

cover all the ship's holds. The unloader arm system must be configured to allow operation in all angles and directions, with arm lengths reaching to the outer side of the ship as well as down to the tanktop, including at low tide.

Unlike pneumatic unloaders, the unloading capacity of a screw-type ship unloader does not vary with the cargo level in the ship's hold. A fully loaded cement carrier typically has only two-thirds of each hold filled, due to stress limitations in the ship's hull. A screw-type unloader can thus maintain its rated capacity from the start of unloading until the hold clean-up stage is reached, while a pneumatic unloader's capacity decreases as the vertical lifting height increases when getting closer to the tanktop.

A key element of an efficient unloading system is the transfer arrangement between the unloader and the downstream conveyor, which has to be able to transfer materials under environmentally acceptable conditions at all times that the unloader is operating.

MacGREGOR Bulk developed the movable transfer trolley to transfer material from the unloader





to the downstream conveyor. Currently unmatched on the market, the technology is the only way of achieving high ship unloading efficiency with sustained environmental friendliness.

Of all elements having an impact on the total cost, however, the freight cost alone is most crucial. Reducing the total shipping cost therefore demands that the number of days spent in port is minimised. It is thus not enough merely to have a high capacity unloading system: the system must also be designed for high efficiency and hence a high through-the-ship capacity.

Initial investment for a typical cement unloading system increases with increased capacity. Selecting a 1,500 tonnes/hour rated unloading capacity rather than an 800 tonnes/hour capacity raises the investment for a ship unloading and conveying system by approximately 20 per cent. Can this higher investment be justified and turned into a profitable decision?

Surprisingly, the answer is yes. This is because the number of days the ship is in port is dramatically reduced by increased ship unloader capacity and efficiency. Based on the assumptions in the table, the annual cost reduction is close to US\$1 million, which means that the additional cost for the high capacity ship unloader and its conveying system is paid off during the first or second year of operation.

Additionally, but not accounted for in the table, the berth occupancy will decrease: an often neglected factor and also a potential extra cost-saving aspect. Instead of costly investments in new berths, faster and more efficient ship unloading systems should be exploited on existing berths.

A summary of investment costs for a 1,500 tonnes/hour rated ship unloading capacity compared with an 800 tonnes/hour system shows that focusing only on the equipment cost is not to be recommended. Investment cost is only one of a number of factors, each being of equal importance.

A new cement terminal which entered commercial service in mid-2006 in Houston (see separate article) was designed in accordance with the guidelines described above. It provides a good example of how increasing the initial investment can create future savings and higher profits than are possible with traditional terminal design philosophies. ■

#### INVESTMENT COST COMPARISON

	<b>Siwertell 800 t/h</b>	<b>Siwertell 1,500 t/h</b>
ship unloader	1,000,000 tonnes	1,000,000 tonnes
annual throughput	60,000 dwt	60,000 dwt
ship size	800 tonnes/hour	1,500 tonnes/hour
rated unloading capacity	560 tonnes/hour	1,050 tonnes/hour
through-ship capacity	US\$20,000	US\$20,000
ship cost per day	89 days	48 days
number of unloading days	US\$3,489,604	US\$2,481,549
total ship cost at quay		<b>US\$1,008,055</b>
<b>annual cost saving</b>		

# Houston terminal sets new benchmark in cement handling

High efficiency and handling capacity were sought by The Houston Cement Company when planning an advanced new import terminal for unloading and storing cement on the Houston Ship Channel in Texas. Discussions in early 2005 led to a contract with MacGREGOR Bulk AB and the installation last year of a heavy duty D-type Siwertell ship unloader with a capacity of 1,500 tonnes/hour.

Commissioned in July 2006, the rail-mounted unloader entered commercial service the following month and by December it had already handled over 500,000 tonnes of cement. The terminal's storage facilities include 100,000-tonne capacity silos.

A high annual throughput with low power consumption and maintenance costs underwrites profitable operations at the terminal as well as environment-friendliness.

Thanks to a modular design principle, the Siwertell ST 640-D ship unloader can be customised to match all ship sizes but for the Houston project it was optimised for Panamax tonnage. Despite inheriting its structural design from the Siwertell heavy duty ship unloader series, the installation has a total weight of 415 tonnes and a rail span of 12m.

High speed screw conveyors carry cargo from the ship's hold to the shoreside receiving installation within a totally enclosed system. All arm motions are hydraulically operated, the remaining drives and functions being electrically operated.

The vertical arm has a length of 22m and its associated high speed screw conveyor has a diameter of 640mm; the horizontal arm is 25.25m long and its associated high speed screw conveyor is 1,000mm in diameter. The conveyor on the gantry is similar in size to the horizontal conveyor.

A key element contributing to the development of higher unloading rates from Siwertell unloaders is the counter-rotating inlet feeder, a device with digging blades that increases the efficiency of the traditional vertical screw conveyor by around 400 per cent. An environment-friendly working principle is also valued: the inlet feeder picks up the material below the cargo surface, significantly minimising dust emissions.

Equally important for a higher unloading rate and efficiency is the sophisticated control system for the inlet feeder. The automatic motor load sensing system generates a steady unloading rate, pre-selected by the operator, in all operating positions.



For a high capacity cement unloader the original control system must also interact with the other motions of the unloader, such as the slewing and long travel motions. The inlet, slewing and long travel drives are therefore electrified and actively interact with the control system via automatic speed control of the motions, ensuring a high and steady capacity with minimal surges.

A movable trolley, which transfers the unloaded material from the unloader onto a downstream belt conveyor, was part of the scope of supply to Houston Cement. Travelling on its own set of rails on the belt conveyor, this separate unit allows the unloader to operate freely in the ship's hold as well as between

holds, transferring the cement to the shore conveyor free of dust and spillage.

Such uninterrupted operation enables a Siwertell ship unloader to achieve high through-the-ship capacities under safe environmental conditions. The movable transfer trolley allows the use of a fully enclosed belt conveyor while fostering an unmatched material transfer flexibility.

A user-friendly interface between the operator and the advanced ship unloader control system is provided by the Siwertell monitoring system (SIMON). This keeps track of preventative maintenance, acting as a logbook as well as a database for automatic storage of historical data.

A built-in remote access system allows MacGREGOR Bulk engineers to access SIMON for function control, trouble shooting and general assistance. The unloader is part of a larger network system, also included in the delivery, which communicates with the existing terminal control system as well as offering status views of the operation from outside.

Operating a ship unloader is not the easiest of tasks, and the operator is responsible for maximising the performance of the plant. A MacGREGOR Bulk study on how an unloader is operated has led to equipment now being delivered with a new function: Auto level.

Auto level's aim is to secure and maintain a steady operating depth on the inlet device in the cargo hold, independently of how the vertical arm is positioned. The operator thus has one less motion function to handle, resulting in shorter unloading times and higher efficiency.

Under a three-year service agreement MacGREGOR Bulk will maintain the efficiency of the equipment and the operating crew to secure sustained economical and reliable operation.

Performance tests were carried out to demonstrate the ability of the unloader to function as guaranteed. MacGREGOR Bulk guaranteed that the unloading rate would not be less than 70 per cent of the rated capacity; equivalent, in this case, to 1,050 tonnes/hour. During the rated capacity test the average capacity was measured at 1,643 tonnes/hour as an average over two hours' operation. The test to offload the fully loaded ship yielded an average capacity of 1,063 tonnes/hour, including clean-up in all holds. In all, some 43,450 tonnes were unloaded in 40 hours and 52 minutes. ■



# A fresh approach benefits bulk handling offshore



## Blow-pump pressure vessels

The well-known brand name Nordströms is recognised for its reliability and innovation, especially in the field of pneumatic conveying of cement using pressure vessels as blow-pumps. Ever since 1947, when the first totally enclosed self-loading/unloading cement carrier with highly automated cargo handling gear was commissioned, Nordströms has been dedicated to developing energy efficient pneumatic conveying systems with high pumping rates.

Over the past 50 years, Nordströms pneumatic conveying systems have been installed on board more than 60 cement carriers sized between

1,000 dwt and 40,000 dwt and at more than 15 marine cement terminals. The conveying rates in excess of 650 tonnes/hour of cement through a single line have been achieved. The technology has basically been used for transferring huge quantities of bulk cement from ship to shore silos and vice versa.



MacGREGOR has tailored its Nordströms technology to suit the dry bulk-handling needs of the expanding offshore oil and gas market and its first system ordered recently entered service

During the past decade the offshore oil and gas industry has expanded tremendously, which has led to ever increasing demand for support vessels, catering to various needs such as transporting supplies to offshore rigs. The main deck of these vessels is used for carrying unit cargoes and the space below deck is dedicated to carry liquid cargoes and dry bulk cargoes (in powder form) such as cement, barite and bentonite in huge tanks.

Since the beginning of 2000, MacGREGOR has observed the significant growth in this segment and in September 2004 decided to take a closer look. Market analyst Fairplay was hired to provide data and forecasting for the next five years.

Figures showed that, between 1998 and 2004, on average 100 vessels were added every year. In 2004, the total fleet size was about 3,000 vessels – the oil price was US\$40 per barrel – and the forecast for up to 2010 was this sustained rate of growth of 100 vessels added each year. As a result, in May 2005, MacGREGOR Bulk entered the dry-bulk handling sector of the offshore supply vessel market and tailored its Nordströms technology to meet the needs of this demanding environment.

In August 2005, MacGREGOR Bulk won its first order from Qatar Shipping Company for dry bulk handling systems to be installed on two anchor-handling tug/supply vessels for Halul Offshore Services. The first of these two ships was commissioned in March 2007, and today the total number of systems on order has grown to 31.

"The demand for energy is enormous and growing each year," said Pankaj Thakker, sales manager at MacGREGOR Bulk. "Oil and gas fields that were not viable to exploit a few years back are being opened up. New offshore rigs are added constantly and demand for supply vessels is strong and still growing. At the same time more and more operators are asking for systems that can do more with less and remain environmentally sound."

"Right from the beginning when MacGREGOR Bulk decided to enter this segment, the vision to start introducing improvements to the existing practices and ultimately to replace them with new ones has been consistent."

"We have already introduced dust handling systems for pollution-free handling and two-way and three-way valves for trouble-free operation. An alternative bulk-handling system that will use the space much more efficiently and allow the ship designers to think outside the box will be introduced in the near future". ■

## Nordströms: tailored for offshore support

The main specifications for dry bulk handling system required for the offshore supply vessels, such as anchor-handling tug/supply vessels and platform supply vessels, primarily consist of:

- bulk tanks designed for max operating pressure 5.6 bar g; V: 30-80m<sup>3</sup>; Ø: 4-5m; H: 5-6m
- bottom part of each tank is covered with aeration panels to fluidise the cargo when discharging to rig
- each tank is equipped with a level indicator, a pressure indicator and a safety valve
- the tanks are designed in Enköping, Sweden but manufactured either in China or India, and are provided with relevant class certificates
- valves for selecting a tank to be filled or emptied: these are usually butterfly valves constructed in carefully selected materials for a long service life; MacGREGOR Bulk also offers alternative designs, such as Nordströms two-way and three-way valves
- remotely-controlled valves are equipped with either pneumatic or electric actuators
- quick couplings for connecting the onboard piping system to the shore or rig piping through flexible hoses
- ejectors, for vacuum cleaning bulk tanks before switching cargo type
- dust-handling system for pollution-free operation.

At the base centre, where cargo is loaded into the bulk tanks, the cement is conveyed pneumatically from the shore storage tanks. This conveying air has to be evacuated from the tanks and normal practice today is to discharge this dusty air into the sea. MacGREGOR Bulk introduced the concept of cleaning the air to such a degree that it can be released directly into the atmosphere. The dust that is separated is collected and returned to a bulk tank.

The system also requires compressor technology to provide conveying air during the discharge operation. Each unit is mounted on a solid welded heavy-duty frame, fully interconnected, including oil and after cooler and water separator. They are equipped with a dedicated electrical cubicle with star-delta or soft starter, main circuit breaker and a control module, and have a maximum operating pressure of 5.6



Nordströms three-way valve



Filter for cleaning dusty air



Compressor

bar g and free air delivery ranges from 15 to 30 m<sup>3</sup>/min.

Normally the compressors are delivered with refrigerant air dryers to minimise the risk of water condensing in the system, and they are sourced from reputed makers with world wide service network such as BOGE & Atlas Copco.

For operating and monitoring the dry bulk-handling system a control panel is normally located in the bridge control console. The system is designed in-house and consists of:

- programmable logic controller mounted in a cabinet for control and supervision of the loading/unloading processes
- a graphic operator interface with one graphic display (a TFT screen with function buttons or touch-screen type) suitable for mounting in the ship's bridge control console
- special software for the PLC unit and operator panel developed by MacGREGOR Bulk. ■



# Acquisitions extend portfolio offshore in Europe...



MacGREGOR has acquired Hydramarine AS, based in Norway, a world leader in load handling systems for the offshore support vessel industry

**M**acGREGOR has acquired Hydramarine AS. The company is based in Norway and is a leader in offshore and subsea load handling systems for the offshore vessel industry.

MacGREGOR acquired 90 per cent of Hydramarine with the remaining shares being owned by employees.

Hydramarine focuses on the development of hydraulic and electrical deck machinery and its products are installed on all kinds of offshore

supply vessels and platforms. The company's key products include active heave-compensated cranes, winches, subsea module handling systems, ROV handling systems and davit systems. Hydramarine has an assembly plant in Kristiansand, Norway, but outsources the manufacturing of components.

"Hydramarine is an attractive extension to MacGREGOR's current offering, and the business fits well with our strategy to develop cargo handling

solutions towards the offshore and marine industry," said MacGREGOR's president, Olli Isotalo. "The acquisition widens our offering in the growing offshore vessel segment. The move towards deepwater in offshore is creating new opportunities for Hydramarine's technology.

"Furthermore, with MacGREGOR's know-how and existing services network, Hydramarine's service business can be developed to the benefit of Hydramarine's customers".

Hydramarine was established in 1977 as a supplier of hydraulic components and systems. The company had net sales of €63 million in 2006 and employs 150 people.

## Key Hydramarine products

**Cranes** Hydramarine's standard cranes cover most applications between 1 tonne and 200 tonnes SWL, with outreaches from 5m to 40m. The company also designs and manufactures special-purpose cranes, telescopic and knuckle-jib versions, gantry cranes, overhead cranes, monorail cranes and A-frames. **A-frames** Capacities range from 1 tonne to 500 tonnes. Hydramarine also delivers small A-frames for hydrographic and subsea use.

**Rescue equipment** The Hydramarine range of rescue equipment covers many types of rescue cranes, combined cranes and single-point rescue davits.

**Winches** A range of standard and tailor-made winches include optional functions such as wire spooling, grooved drums, auto variable winch speed, constant tension, wave compensation, emergency lowering/release, control systems and wire guide systems.

**Subsea** Hydramarine is one of the world's leading suppliers of subsea cranes and load-handling systems. Most are tailor-made.

**Moonpool load handling** A range of flexible moonpool based module handling systems includes deck skid systems with pallets and push/pull units, cursor system and moonpool doors.

**Active heave-compensated winches** A complete range of active heave-compensated winches is available, with drum capacities of up to 10,000m and safe working load of up to 100 tonnes.

**Overside load-handling** A range of oversee systems includes A-frames and standard/special cranes. Combined with Hydramarine active heave-compensated winches and pendulum dampened systems, these are standard for many ROV/ROT operations.

## ...and in Asia

MacGREGOR has also acquired Plimsoll Corporation Pte Ltd, based in Singapore, which is a leader in deck machinery for the offshore oil & gas and marine industries in the Asia-Pacific region

**T**hrough its parent company Cargotec Corporation, MacGREGOR acquired 90 per cent of Plimsoll Corporation Pte Ltd, with the remaining shares being owned by employees.

Plimsoll focuses on the development of hydraulic deck machinery equipment, and its key products are a comprehensive range of winches and cranes for offshore and marine applications. These are installed on offshore support vessels, oil rigs, tugs and commercial ships.

The company also offers a wide range of services, and its service business share of net sales is comparable to MacGREGOR's. Plimsoll has assembly plants in Singapore and Indonesia but outsources the manufacturing of components. A new assembly plant is under construction in China.

"With the acquisition of Plimsoll, MacGREGOR has further expanded into the offshore industry," said MacGREGOR's president, Olli Isotalo. "We now are well positioned in the strongly growing offshore sector. Combining Plimsoll's expertise in winches and Hydramarine's expertise in cranes provides us with a complete package of winching and handling solutions for our offshore customers.

"The two businesses also complement each other geographically. Plimsoll provides us with a strong base in the important Asia-Pacific region. We now have within MacGREGOR a strong set-up in offshore, which we intend to build on organically".

Plimsoll's founder and managing director, Henry Yap, said: "With the global recognition of MacGREGOR as the market leader in marine cargo handling solutions, Plimsoll will be able to tap into its technological expertise, market presence and global service network to expand further and provide better solutions to our customers".

Plimsoll was established in 1974 to provide marine engineering and equipment installation services. The company had net sales of €43 million in 2006 and employs about 500 people.

Over the years, Plimsoll has developed an enviable reputation in the Asia-Pacific region not only as a hydraulic specialist but also as a leading winch manufacturer. The range of deck machinery manufactured by Plimsoll includes anchor-handling/towing winches, mooring winches, windlasses, capstans, cargo derricks, rescue davits and cranes for harbour tugs and offshore support vessels. In addition, offshore mooring winches/ systems, riser

pull-in/tensioning winches and offshore cranes are manufactured for FPSO/FSOs, offshore fixed and floating structures.

Plimsoll prides itself on growing into one of Asia's largest manufacturers of hydraulic and electric deck equipment for the increasing marine and offshore industry worldwide. Within the past three years the company has established itself as a single-source manufacturer able to deliver complete shipsets of hydraulic and electric deck equipment for ship types including:

- anchor handling and towing vessels (winches and cranes)
- diving support vessels (winches, cranes and A-frames)
- FPSO/FSOs (mooring systems).

In recent years, Plimsoll has expanded its business by establishing engineering offices in the UK and in Norway, to enable the further development of heavier equipment within its anchor-handling range, and a new series of offshore cranes. ■

### Key Plimsoll products

#### Cranes

Offshore, rescue and hose-handling cranes  
hydraulic service cranes  
hydraulic hose-handling cranes  
hydraulic telescopic cranes  
hydraulic knuckleboom cranes  
offshore cranes

#### A-frames

#### Winches

Anchor-handling/towing winches  
capstans  
mooring winches  
ramp winches  
riser pull in/chain tensioning winches  
storage reels  
towing winches  
tugger winches anchor windlasses

#### Power packs & control systems

#### Under licence

Plimsoll has representative and manufacturing agreements for: Fairleads; sheaves; shark jaws; tow pins (Smith Berger Co)  
Offshore offloading systems (Techflow Marine)

(Pictured from top) anchor handling towing winch, anchor winch and riser, mooring winch, general purpose crane, and chain tensioning winch





# Bigger ships, more boxes



As container ships grow, so too must the world's ports and terminals to accommodate them, and with port congestion forecast for the future, developments are needed now to avoid unnecessary downtime when alongside

A wealth of factors influence port development and it is often difficult to distinguish whether ports are adapting to ship type design changes, or if – in co-operation – they are themselves also developing to meet the growing demands of a booming marine market. In terms of increasing capacity, port and ship operators are both left with two options: improve their efficiency and/or build bigger.

According to UK-based Drewry Shipping Consultants, the capital costs of providing new port capacity are rising, especially if planning inquiries, dredging and environmental issues are involved. Drewry noted that labour costs rise over time, and with this standing as the biggest single operating cost element to any business, labour is certainly a contributing factor to rising port costs.

The company highlighted that for the foreseeable future the supply/demand balance will remain tight in most locations, and that the downward pressure on tariffs that has been the norm until recently – with privatisation, labour and rationalisation savings – is

set to change, with the trend now towards increasing prices in many locations.

Drewry has also revealed that there is an unprecedented level of interest in the port sector, and cited the following as evidence for this trend:

- record multiples being paid for certain acquisitions
- competition to invest in many cases
- finance is seeking projects as much as projects are seeking finance
- private equity and infrastructure funds have large amounts of cash to find homes for
- replacement of debt by equity due to low interest rates.

In line with this level of port interest it therefore comes as no surprise that Kalmar, a global provider of container and heavy-duty handling equipment, is also experiencing a buoyant orderbook. "Demand was strong for Kalmar's container handling equipment in 2006," said Jari Pirhonen, Kalmar's general manager for terminal development.

"In Europe and Asia, demand was high

throughout the year and began to strengthen in South America towards the end of the year. Services provided by Kalmar were in brisk demand in all markets thanks to high port and terminal utilisation rates and customers continuing to outsource their service activities.

"Every fourth container or trailer transfer at terminals around the world is handled by a Kalmar machine. Today's container handling industry is driven by demands for greater productivity, reduced costs and environmentally responsible operations. With relentless growth in global containerised trade, ports and terminals around the world are under pressure from their customers, the container shipping lines, to lift increasing numbers of boxes from bigger ships while at the same time ensuring ever faster turnaround times and cost-competitiveness. To meet such demands, terminals – many of which are constrained by limited space – are looking to their equipment providers to come up with innovative solutions.

"This is where Kalmar comes in. Incorporating the latest technology and modern design, Kalmar's container handling products guarantee greater uptime and productivity, unbeatable driver safety and comfort and, consequently, more efficient operations at optimised costs," Mr Pirhonen said.

While there are generally three widely adopted systems for container handling – the straddle carrier; the RTG and terminal tractor; and the reach-stacker –

Kalmar recognises that every terminal is different and that a predetermined handling solution does not necessarily fit every operation. Kalmar's experience in the sector gives it the invaluable advantage of being able to work hand-in-hand with terminal operators to establish the best handling equipment combination for each individual facility.

No matter how efficient a port's cargo-handling system is, ultimately, the interface between the ship and this equipment is a dictating factor in port competence and vessel turnaround times. As vessels have grown, this interface has become increasingly scrutinised, both in terms of the vessel's design and shore-based equipment. Changes and improvements to design in either area are always worth considering.

According to German classification society Germanischer Lloyd (GL), container ships have undergone a 290 per cent change from Panamax to 14,500 TEU post-Panamax size, equating to a length difference of 112m and beam difference of 22m, all of which have fundamental implications for port capacity and future development.

In Future ship design and impact on terminals – a paper given at TOC in Hamburg 2006 – GL highlighted that:

- the operation of feeder vessels at the terminal could be improved
- at present, the trend is for large container ships to be equipped with hatch covers and lashing bridges

- the amount of reefer units per cargo hold will increase for large container vessels and electrical supply for reefer units is needed.

Terminals and ports need to accommodate these vessel design changes and an expanding market, with that comes a global market potential. For Kalmar's products, this is estimated to be over €6 billion. The main growth potential for the heavy industrial sector is in the US, while Asia represents the strongest growth area in terms of port operations.

The global service market for Kalmar port equipment is estimated at €700 million. While the service market is still handled primarily by customers' own service operations, the situation is changing rapidly. More and more of Kalmar's equipment sales are now accompanied by a contract for maintenance and service. For example, P&O Ports has a full service contract with Kalmar for the provision of preventative and breakdown maintenance, engineering support and spare parts supply for the 20 straddle carriers operating at its Antwerp Gateway terminal, while Gateway Terminals in India has taken out a service contract to include both maintenance and operations of the 29 Kalmar RTGs operating at its Nhava Sheva container terminal. This development offers significant potential.

Other positive growth areas include automation, as customers increasingly look for greater operational efficiency and performance. Automation

enables 24/7 services and, through more accurate operations that reduce fuel consumption and wear and tear on equipment, has a positive impact on operating costs. Safety and environmental issues can also be constructively addressed through automation.

Drewry has also noted growth potential in the market and forecasts: longer waits for greenfield developments; more consolidation of terminal ownership; and more shipping line involvement in terminal ownership, but for it to be possible need to sell if financial pressures become extreme.

Appreciating the increasing size of container ships, the company predicts that it will be harder to fit volumes into individual terminals; that port charges will rise; that congestion will be an issue in a number of regions unless more projects are confirmed; and that valuations appear to have increased significantly, but there are exceptional reasons in many cases. ■

## Cargotec colleagues

Like the MacGREGOR Group, Kalmar – which also supplies automation applications and related services – is part of the Cargotec Corporation. Cargotec is one of the world's leading providers of cargo-handling solutions used in local transportation, terminals, ports, distribution centres and on board ships. In 2006, Cargotec's net sales were €2.5 billion.





# Aker quartet to expand Arctic container ship fleet



Aker Yards

Four more 648 TEU icebreaking vessels ordered by Russian owner MMC Norilsk Nickel for Arctic service are specified with folding hatch cover sets designed to operate in temperatures down to -50°C

Following the successful introduction into service last year of the 14,500 dwt *Norilskiy Nickel* from Aker Finnyards' Helsinki facility, MMC Norilsk Nickel has commissioned another four of the class from Aker Germany.

Significant investment is committed by the company in developing a fleet for transporting nickel exports year-round from Northern Siberia and returning with various cargoes to Dudinka, Igarka and surrounding areas. The Norilsk Nickel group has hitherto been a major customer of Russia's state-owned icebreaker fleet in moving its cargoes but aims to reduce this dependence and the substantial annual fees with tonnage designed for icebreaking.

Contrasting with traditional icebreaker practice, the hull of the Arctic container ship class has a bulbous bow for efficient open sea navigation and a stern designed for icebreaking in conjunction with an ABB Azipod electric propulsor. In icebreaking mode the vessel proceeds stern first, using much less power than conventional icebreakers. The pod drive creates a favourable undersert, with its propeller mashing up the broken ice.

Exploiting this 'double-acting' icebreaking principle, *Norilskiy Nickel* exceeded expectations on trials and demonstrated a capability to break solid 1.5m-thick ice at a speed of almost 4 knots. It also penetrated, without charging, rubble ice fields with a ridge height of 3m (indicating a depth of 30m) at an average speed of 2 knots.

Complete hatch cover sets will again be

supplied for the latest newbuildings by MacGREGOR, which will also install the associated hydraulic piping and the tweendeck covers.

A container capacity of 648 TEU is arranged in three holds (389 TEU) and on deck (259 TEU), the holds served by an outfit of high-stowing folding hatch covers on the weatherdeck and tweendeck.

The 13-panel weatherdeck shipset comprises these covers:

hatch no	panels aft/forward	clear opening (LxB)
1	0+2	10.4 x 11.8m
2	2+1	19.2 x 18.1m
3	2+2	25.6 x 18.1m
4	2+2	25.6 x 18.1m

For hatches No 2-4 the hatch covers are designed to accept container stack loads of 28 tonnes/20ft units and 40 tonnes/40ft units in three layers. The panels are folded by external hydraulic cylinders located at the hinge arms; weather-tightness is secured by rubber packing sealing between cover and coaming, and between the panels.

The 22-panel Foldtite hatch cover shipset for the tweendecks comprises:

hatch no	panels	clear opening (LxB)
2	6	19.2 x 17.3m
3	8	25.6 x 17.3m
4	8	25.6 x 17.3m

Container loads similar to those of the weatherdeck covers can be accepted by the tweendeck covers but they have a higher uniformly distributed load rating (4.5 tonnes/m<sup>2</sup> compared with 1.75 tonnes/m<sup>2</sup>).

Leading panel-pairs are folded by external hydraulic cylinders, while the trailing panel-pairs are operated by hydraulic cylinders connected to bell crank arms located at the transversal end coaming, near the corner of the hatch opening.

An ice and cold regime has a profound impact on the design and operation of a ship for Arctic service, particularly challenging deck systems.

Operation of the hatch covers in very severe Arctic conditions (down to -50°C) was addressed by MacGREGOR in designing the equipment and hydraulic system and in specifying the materials, including the rubber packing. ■



Aker Yards

# Hatch covers booked across the bulk shipping sector

Cargo access sets will be supplied for bulkers ranging in tonnage from Handysize to very large ore carriers

Demand for raw materials such as coal, iron ore and copper has risen substantially since the turn of the millennium, a key driver being globalisation and the economic growth of China. Enormous quantities of ore and other bulk cargoes are shipped in carriers which also transport grain, scrap and finished steel products over long ocean routes.

Bulk carriers range in size from around 20,000 dwt Handysize vessels through Panamax and Capesize tonnage to ultra-large ships whose capacity may exceed 300,000 tonnes. Among the special sub-classes are:

**Kamsarmax:** around 82,000 dwt Panamax with an increased overall length of 229m – the biggest size able to load at the world's largest bauxite port, Port Kamsar in Equatorial Guinea

**Dunkirkmax:** around 175,000 dwt Capesize with maximum overall length of 289m and maximum beam of 45m suitable for the eastern harbour lock at the French port of Dunkirk

**Newcastlemax:** around 185,000 dwt Capesize with a maximum beam of 47m for the Australian port of Newcastle

**Setouchimax:** around 205,000 dwt Capesize with a low design draft of 16.10m and maximum overall length of 299.9m for ports in the Setouchi Sea of Japan.

Common to all bulkers – the heavy workhorses of the world fleet – are intensive deployment and aggressive environmental conditions and port handling procedures. Hatch cover design contributes significantly to operational efficiency and safety, MacGREGOR maintaining a high reputation across the size spectrum of this demanding sector.

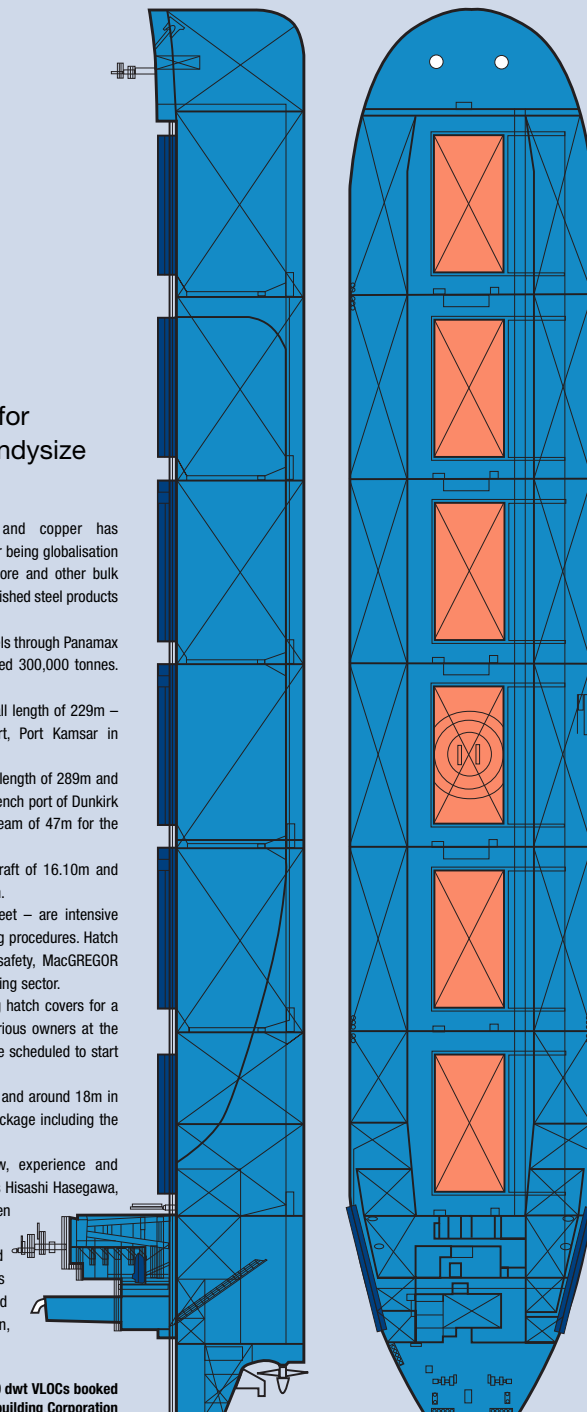
Recent contracts call for the supply of five shipsets of side-rolling hatch covers for a series of 297,000 dwt very large ore carriers (VLOCs) booked by various owners at the Universal Shipbuilding Corporation in Japan. Hatch cover deliveries are scheduled to start from end-2007 and extend through to August 2011.

Each shipset will comprise six panels up to around 33m in length and around 18m in breadth, MacGREGOR being contracted to supply a comprehensive package including the design, key components and structure.

"Huge panels require the highest level of design know-how, experience and manufacturing skill, as well as controlled delivery schedules," explains Hisashi Hasegawa, MacGREGOR's general manager for bulk ships in Japan. "We were chosen for this task because we can deliver on these requirements."

A number of other shipyards have plans to build VLOCs, he adds, and MacGREGOR also has an order to supply four hatch cover shipsets to Nantong Cosco Kawasaki Shipyard (NACKS) in China. Both NACKS and the Universal Shipbuilding Corporation rate MacGREGOR's design, manufacturing and delivery reliability highly. ■

Side-rolling hatch covers have been ordered for a series of 297,000 dwt VLOCs booked by various owners at the Universal Shipbuilding Corporation



# Combined strengths reinforce lashing services

Enhanced service networks, planned maintenance agreements and a broadened portfolio are giving MacGREGOR an enviable market-leading position in the container ship lashing business

For many years MacGREGOR has pioneered container securing systems – which are a natural and important part of its container ship solutions, but its lashings portfolio was greatly enhanced when the Group acquired the Swedish lashing specialist All Set Marine Lashings in 2005. All Set brought with it 15 years' experience during which time the company had created a global market reputation from designing advanced lashing systems for many of the major container carriers.

"With the strength and core values of each of the two previously competing brands as a base, MacGREGOR is strengthening its operation by gradually creating a combined product and services portfolio, and a common worldwide lashing concern," said Bernt Gunnarson, MacGREGOR's general manager, lashings.

"In this the products and services of both brands and teams are highly recognised, and existing customers and partner relationships will be maintained throughout this integration process. However, existing and new customers enjoy a stronger organisation, united R&D resources and a wider product and service platform". In addition, MacGREGOR can offer the container ship market the benefits of being a world-leading supplier of hatch covers and deck cranes as well as its strong global sales and service organisation.

"For newbuildings, shipowners and shipyards need a strong and reliable partner who can design and deliver innovative and efficient cargo flow concepts," said Esko Karvonen, general manager, container ships. Services offered by MacGREGOR often also include: lashing software; overall ship design support through MacGREGOR's naval architects; full co-ordination with hatch cover and crane supplies; stability and lashing calculations; quality and safety documentation; training; and long-term service agreements. The company plans to develop all these services further.

"As important as the supply of equipment to newbuilding projects, shipowners and operators also need a reliable partner for running supplies once the ships are in commercial operation," said Pär Dehlin, unit manager in Stockholm. Support services may include lashing spare parts, boarding services, maintenance, safety and documentation inspections

and eventually system upgrades. These services can be offered during normal port calls, at pre-docking inspections and at dry dockings. "Lack of such support can prove to be extremely problematic for the operator and owner, and also means a loss of potential revenue for the company. It is therefore in the interest of all parties to have this aspect of a business working effectively for the customer.

"Today, many lashing suppliers basically operate from central organisations. Even though local services in some regions are provided by the supplier's own offices, or partners or agents, it is difficult for a supplier to offer a global network of local service offices at every container port. Therefore customers may face problems with the late arrival or lack of supplies, and have to face the use of many different supply sources. Apart from all the work and problems associated with this, the ship may eventually be equipped with many different brands. This may also result in out-dated onboard manuals and certificates, jeopardising safety as well as longer turnaround times in port," said Jens Fuge, sales manager in Asia.

Already more global than other major lashing suppliers, MacGREGOR has now decided to take the lead in the lashing business and develop the running sales supply further. The Group's own service network comprises facilities and staff in more than 60 locations worldwide. In addition, there are also highly professional agents, distributors and partners.

Every year MacGREGOR boards thousands of ships in hundreds of locations and services thousands of customers. Today, MacGREGOR operates four major logistic centres and about 30 local warehouses around the world, which is also unique in the lashing business. MacGREGOR will, together with its clients, go through individual maintenance needs and develop the local lashing services accordingly. Local staff will be trained in the lashing business and inventories reviewed as necessary. ■

## MacGREGOR to launch new lashing twistlock

MacGREGOR will shortly unveil its new C8A, the world's first completely automatic, true Twistlock, which finally opens the door to auto-coning and certified vertical tandem lifting. For more information, follow the product launch of the C8A on its dedicated website at: [www.macgregor-group.com/new/C8A](http://www.macgregor-group.com/new/C8A)

Onboard Care eliminates the need for emergency spare parts

For the past three years MacGREGOR has been developing its MacGREGOR Onboard Care (MOC) service concept. The MOC approach has been very successful and now includes over 350 vessels. An MOC agreement means that MacGREGOR can take overall responsibility for the systems installed on board. It is available in several levels, starting with firm spare part prices up to fixed total maintenance costs.

The MOC approach will now be adopted and introduced to the lashing business. The fundamental goal is to release the owner and operator from the burden of lashing system maintenance and running supply. MacGREGOR will ensure that the systems are maintained and that lost parts are replaced before a shortage occurs on board, which in turn means that no urgent port supply is needed.

MacGREGOR experts board customers' ships regularly to make a general check of the equipment status and to make sure manuals and certificates match the physical inventory on board. Drydocking is also monitored by MacGREGOR and pre-docking inspections of the lashing systems will be done automatically.

"In other words, the need for the emergency supply of parts is removed, along with the problems associated with faulty safety documentation and multi-brand systems on board," Björn Stenwall, sales director, Service division said. "It drastically reduces an owner's administration duties and offers the customer fixed costs per year and the elimination of port delays due to the lack of spare parts". ■



# Infra-red inspections detect machinery 'hotspots'



Infra-red thermography – a new part of MacGREGOR's service portfolio – allows otherwise invisible thermal signatures of impending machinery damage to be seen before this causes breakdown

**F**riktion is a machine's nightmare," says Per-Olof Eliasson, MacGREGOR's regional service manager for the North Sea region, who is an engineer trained in thermal camera inspections. "As equipment such as bearings wear with time, they begin to create unnecessary heat. Monitoring changes over time can help predict when maintenance work needs to be carried out, saving the costs of unnecessary maintenance or replacement".

Thermography is the use of an infra-red imaging and measurement camera to detect and measure these machinery 'hotspots'. MacGREGOR has added this detecting ability to its service portfolio in a number of regions.

In 2006, MacGREGOR started to look at the possibility of using thermographic cameras – cameras that can read infra-red radiation 'heat' – as part of a routine service inspection. "This instrument is a valuable tool for inspections and trouble-shooting in our normal daily business for newbuildings, service and MacGREGOR Onboard Care (MOC) inspections," Mr Eliasson says.

"It is critical to know the status of equipment before entering into any MOC agreements, and also to secure a piece of equipment's reliability and life-

**Per-Olof Eliasson: "Infra-red thermography allows us to see thermal signatures of impending damage before it causes a breakdown"; (above) Magnus Göransson works with a thermal camera**

expectancy when running an MOC contract. Thermal cameras will help us to identify problems before they become a problem".

Qualification for using the camera as part of a maintenance regime can be achieved relatively quickly, and after four months Mr Eliasson was trained and certified to Level 1 thermography, by the Infra-red Training Centre (ITC), which is a global training centre run by the camera's manufacturer, FLIR.

The ITC has headquarters in Boston and Stockholm, and regional training facilities around the globe. It offers a wide variety of infra-red training courses and it is possible to choose from certification courses for Level 1, Level 2, and Level 3 thermography, as well as specific software and/or application training.

"The goal for MacGREGOR North Sea region in 2007 was to have a minimum of two more engineers to be trained in the use of the thermal camera for inspections," Mr Eliasson says. "As I am now certified and familiar with handling the equipment, such

training within MacGREGOR can be set up and performed by me".

The first six engineers in the North Sea region have now passed the training needed for thermal inspections. This training took place in MacGREGOR's Bergen office over four days, with practical training on board the Color Line ferry *Kronprinsessan Ragnhild*. The group looked at 14 hydraulic locking cylinders for stern ramps and the inner bow door, and seven cylinders were detected as being faulty from internal leakage.

"Internal leakage problems in hydraulic cylinders can be easily detected, as can electrical equipment faults," Mr Eliasson says. "Loose connections, earth/grounding problems and high resistance can be detected in electrical equipment before problems and fire occur.

"Equipment that can be successfully inspected using infra-red thermography on board ships is diverse. It is important that when inspecting the equipment to have previous specific knowledge and experience of the systems.

"One should know the basic operation and characteristics of the machinery and understand related failure mechanisms. It is very helpful, but not a must, to have past experience and records of the equipment during normal operation.

"Heating associated with high resistance or excessive flow, is the result and sign of many problems in hydraulic and electrical systems. Infra-red thermography allows us to see these invisible thermal signatures of impending damage before the damage causes a breakdown.

"Also, if there is an abnormality in an electrical circuit or a hydraulic circuit, heat is generated and visible with the thermal camera. When carrying out an inspection, it is important that the system is under load. Heat generated rises as the square of the load; the higher the load, the easier it is to find the problems." ■



Thermal image of forward divider leaking before repair; thermal image of forward divider leaking after repair

## Making hot and cold visible

Thermal, or infra-red, energy is not readily visible because its wavelength is too long to be detected by the human eye, but it is part of the electromagnetic spectrum perceived as heat. Everything with a temperature above absolute zero emits heat. Even very cold objects, like ice cubes, emit infra-red. The higher the object's temperature, the greater the infra-red radiation emitted.

Infra-red thermography cameras produce images of invisible infra-red or 'heat' radiation and provide precise non-contact temperature measurement capabilities. Nearly everything gets hot before it fails, making infra-red cameras extremely cost-effective, valuable diagnostic tools in many diverse applications.

FLIR's infra-red cameras capture and record thermal distribution in real time helping engineers visualise and quantify heat patterns in the devices they create and events they monitor. They can distinguish temperature changes as subtle as 0.02°C even while evaluating wide temperature ranges.



View of dividers seen with normal camera

### Field inspection case

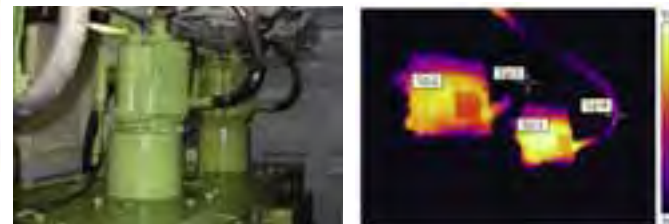
Date: 09/02/2007

Engineer: Per-Olof Eliasson

Machinery inspected: 40-tonne cargo elevator

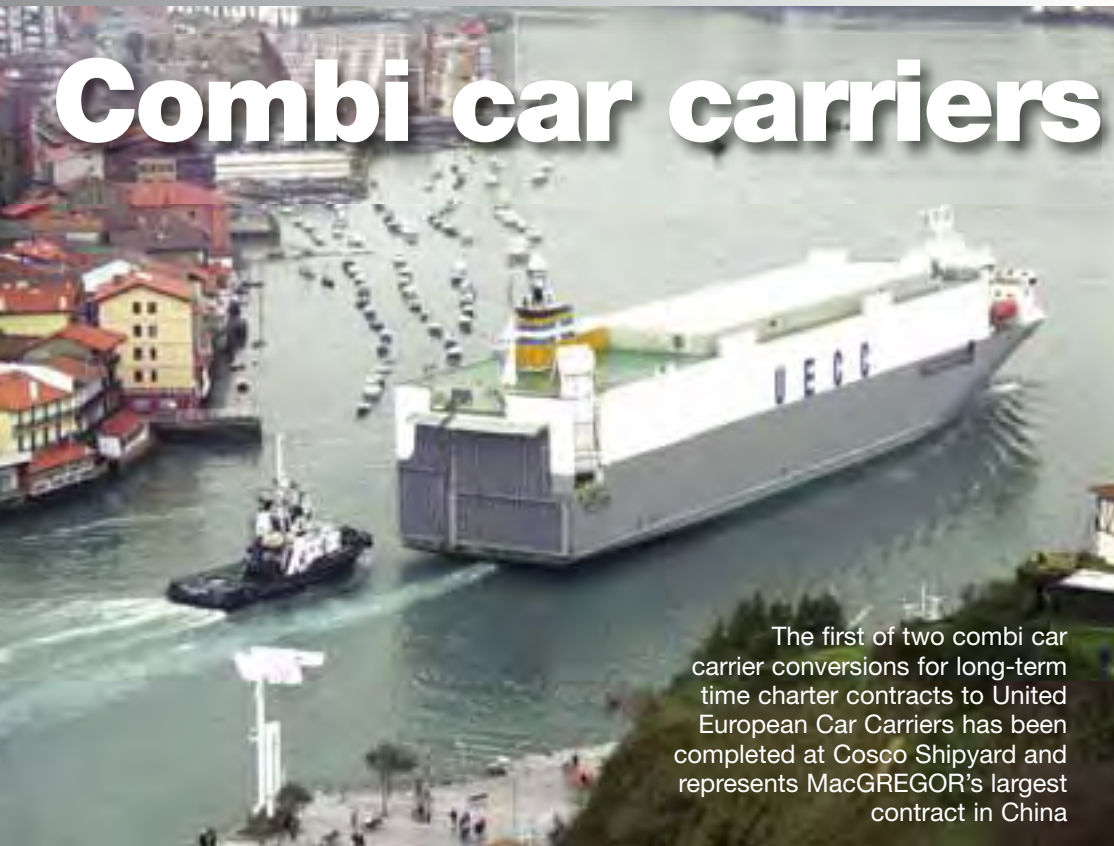
MacGREGOR has recently carried out a machinery inspection of a 40-tonne cargo elevator using a FLIR thermal camera, as part of a routine service. During the service an internal leak was detected in a flow divider, along with some loose electrical wiring connections in relays, and internal leakage in a hydraulic pump. It was also clearly visible when using the camera that there was internal heat radiation from one directional valve and one pressure valve that were not supposed to have any radiation because of a flow/pressure drop.

View of hydraulic pumps No 1, No 2 and No 3 with normal camera (below left). The thermal image (below right) is from pumps No 2 and No 3 (pump No 1 is not in operation). The thermal picture shows internal leakage in pump No 3, indicated by the white colour in the pump. Also the light-blue colour that is shown on the drain hose from the right-hand pump indicates heat due to internal leakage in the pump.





# Combi car carriers converted in China



The first of two combi car carrier conversions for long-term time charter contracts to United European Car Carriers has been completed at Cosco Shipyard and represents MacGREGOR's largest contract in China

January saw the first of two newly converted combi car carriers delivered from Cosco Shipyard in Nantong, China, for long-term time charter contracts to United European Car Carriers (UECC). The conversion of *Serenaden* and *Heralden* from RoRo ships to combi car carriers is the largest contact yet for MacGREGOR in China. "It is also the first ever performed out here," explained Lars-Göran Jansson, installation supervisor with MacGREGOR's RoRo Ships division.

*Serenaden*, now named *Auto Bank*, carries cars on three decks and high and heavy cargo on the main deck. The conversion of *Heralden* is now almost

complete, when it is, the vessel will be renamed *Auto Bay* and will sail with cargo from the Shanghai area back to Europe.

## A four-year saving

Although the contract for the conversions from the vessels' Finnish owner Bore Lines, was placed with MacGREGOR in 2005, it was then that negotiations with several shipyards began before Cosco Shipyard in Nantong won the order. *Serenaden* arrived in China in October and *Heralden* in November 2006. "As soon as it was decided that Cosco would carry out the work, we placed the order for local manufacturing of

most of the plates and steel structures in the Nantong area, after including an addendum to the contract," Mr Jansson said.

"Bore will save at least four years compared with ordering new vessels," he said. "The yards here and elsewhere are really choked-up!"

"This project is unique for us and so far the most extensive conversion we have conducted here in China. It is also the first project of its kind for Cosco here in Nantong, but in the future we will certainly see more of these types of conversion in China. Even if the time needed here is longer than in Europe – at least for the first vessel – it

will be profitable. The Chinese adapt quickly and in the not-too-distant future, they will be hard to beat".

## MacGREGOR's role

The vessels' conversions were completed by adding a garage superstructure on top of the existing hullframe, starting just behind the bridge and continuing all the way back to the stern. Inside this new garage superstructure – work carried out by Cosco – MacGREGOR delivered and installed:

- removable car deck panels and fixed car ramps on former weather deck and on the new car deck no 4
- hoistable car deck panels on the main deck
- hoistable car ramp on the main deck
- a new weathertight and hydraulically-driven quarter ramp, with anti-slip flat bars in a herringbone pattern on its driveway; the ramp is installed on frames -2 to 4 on the starboard side, 17.2m above the baseline, and hinged at the new car deck No 2 with bridge plates between the ramp and hull
- modification of existing port and starboard stern ramps.

Each ship's new arrangement now provides capacity to carry 1,610 cars compared with a 96-trailer capacity before the conversion, because of an almost 75 per cent increase in the deck area, now amounting to 13,315m<sup>2</sup>. The project also has been carried out in such a way that both vessels maintain their original paper and trailer carrier capabilities.

"The work on these conversions is like a big

puzzle with numerous pieces of steel plates and other items, and my job is to support the Chinese workers at Cosco with advice and supervision," Mr Jansson said. "The more of these projects we do the easier it will become, because everyone is more familiar with the procedures. I believe that – to a certain extent – there is learning money being spent here, which will eventually pay off as there is an increasing trend to carry out more of these conversions here in China, mainly thanks to lower labour costs".

In 2005, MacGREGOR also carried out a part of a conversion project onboard Bore Line's sistership the 18,979gt *Transgard*, which underwent a similar conversion at Nauta Shipyard in Poland (*MacGREGOR News* 154). This vessel will also change its name to *Auto Baltic* in due course.

## Returning to service

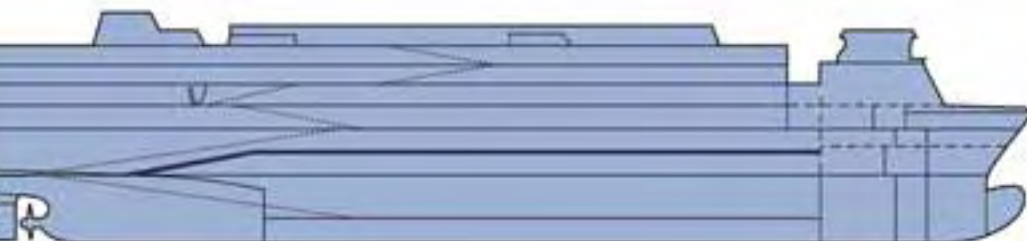
The conversions of the car carriers *Auto Bank* and *Auto Bay* have been completed in close co-operation

with United European Car Carriers (UECC), which will employ both ships on its network under long-term time charter contracts.

Thomas Franck, senior executive vice president for Bore, said that: "It has been a challenging and good project with intensive project site management from both UECC and us and headed by technical superintendent Stig Dahlén. The shipyard has done a good job. The capacities and dimensions of the converted car carriers are now in tune with requirements from the charterer – UECC. The transformed carriers will fit well into our fleet of high-quality and well-maintained vessels designed for the year-round service."

UECC operates a fleet of 27 vessels, which are designed or adapted to operate on European short-sea routes with a variety of cargo ranging from factory new cars to commercial vehicles and RoRo cargo, said the company. Sixteen vessels are owned by UECC, the rest are operated under time charter contracts. ■

	before conversion	after conversion
<b>name</b>	Serenaden & Heralden	Auto Bank & Auto Bay
<b>gross tonnage</b>	10,570gt	18,979gt
<b>deadweight</b>	7,629 tonnes	6,165 tonnes
<b>deck area</b>	7,629m <sup>2</sup>	13,315m <sup>2</sup>
<b>vehicle capacity</b>	96 x 40ft trailers	1,610 cars



Profile of *Heralden* and *Serenaden* post-conversion



# RoRo contracts encompass large and small ferries

New ferry equipment orders received recently by MacGREGOR's RoRo division include access and transfer equipment for domestic double-enders as well as the largest of all RoPax ships

MacGREGOR's RoRo division has signed a contract with Aker Yards for delivery of cargo access equipment to the world's largest RoPax ferries. Gothenburg-based Stena Rederi AB has ordered two 62,000gt ships, which will be built in Germany by Aker MTW, and there is an option for two additional vessels. MacGREGOR's order includes design, fabrication and installation of 800 tonnes of RoRo equipment.

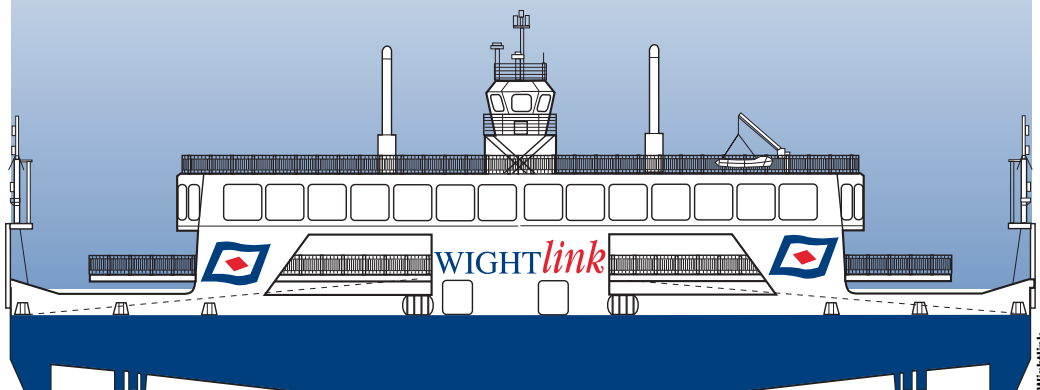
The 240m-long, 32m-wide ships will be delivered in 2010. Each will accommodate vehicle space comprising 5,500m of trailer lanes and 700m of car lanes, and passenger capacity will be 1,200.

For efficient cargo flow, the RoRo equipment enables two-tier cargo loading/discharge. MacGREGOR's package includes bow door, bow ramp/door, stern ramp/door for access to main deck and also stern platform, front door and bulwark for access to weather deck, plus internal equipment such as two tiltable ramps, 1,800m<sup>2</sup> hoistable car decks with two hoistable access ramps, two hoistable ramps to tank top deck with ramp covers above. The company is also supplying two passenger doors and two bunker doors.

Equally demanding RoRo efficiency but on a smaller scale was required by UK operator Wightlink, which has placed a newbuilding order at Croatian yard Brodogradilište Kraljevica for two (plus one) 62.4m-long symmetrical double-ended ferries. These will carry up to 360 passengers and 65 cars at 10-12 knots.

Wightlink operates ferries across the Solent between the Isle of Wight and the English south coast, and the new ships will replace two older versions on its Lymington/Yarmouth route, after being delivered in mid-2008 and onwards. In a joint co-operation, MacGREGOR and steel equipment manufacturer Radez received the contract for delivery (including design and fabrication) of MacGREGOR cargo access equipment to the vessels.

The RoRo equipment includes ramp/doors at each end of the vessel for vehicle access, and two car deck access ramps. There will be room for full-height road trailers and buses to be parked underneath a hoistable platform accommodating 15 cars. Three passenger access ramps/doors at different heights allowing smooth passenger boarding and disembarkation throughout the full range of tidal levels. ■



Aker Yards

## MOOREX makes fast big ships to short quays

MOOREX makes mooring a safe, quick, easy and reliable operation, and needs less manpower than conventional lines; it also reduces the wear of ramps, and reduces quay damage



Traditional mooring systems, applied on high decks on relatively short berths, can lead to ineffective rope angles that are not always able to ensure that hulls are effectively secured to the quay. This situation was the driving force behind MacGREGOR's decision to develop its MOOREX system, which was first unveiled in 2005.

A standard MOOREX system features a 30-tonne pulling force. However, over the past year MacGREGOR has developed and delivered enhanced MOOREX systems with a 60-tonne force. Units of this type have been delivered recently to the ports of Malmö in Sweden and Travemünde in Germany for RoRo terminals used by Finnlines.

"When some vessels are too big for a quay, tying up in the normal way will not be completely safe," says Kim Langelund, director of the conversion business unit at MacGREGOR. "MOOREX offers an effective solution to this problem, and our customers, who include Gotlandsbolaget as well as Finnlines, are all very satisfied with the performance of this new technology". There is, Mr Langelund indicates, considerable interest from other potential customers, and this is expected to be translated into further orders over the coming months.

MOOREX comprises a self-tensioning mooring winch arrangement that can be positioned anywhere on the quay. A strong MOOREX bollard is installed on board, flush with the ship's side. In this way the direction of pull can be optimised, and the mooring line acts as a breast-line. "The mooring power of MOOREX can be compared to harbour tugs continuously pushing a vessel against the quay's fender," says Mr Langelund.

"The forces caused by passing ships, wind, suction and swell are complex and continuously varying, and on a traditional berth these movements can cause the ramp and gangway positioning to become unsafe. MOOREX makes mooring safer – it is quick, easy and reliable and needs less manpower; it also reduces the wear of side and bow ramps, and reduces quay damage".

As well as being served by MacGREGOR's mooring systems, Finnlines' 42,000gt RoPax *Finnstar* also has freight handling efficiency smoothed by a comprehensive hydraulically-operated RoRo equipment package from MacGREGOR based on twin-level access aft, and twin-level access forward arranged via the bow door/ramp at maindeck level and via the bow bulwark visor at deck 5.

*Finnstar* has record rolling freight capacities for this type of ship and can carry up to 300 trucks in stowage spaces totalling 4,200 lane-m. Accommodation in 225 cabins and diverse amenities provided for up to 500 passengers. ■

# RoRo systems span ship and shoreside



A new MacGREGOR linkspan allowing unrestricted RoRo access to the UK port of Immingham can accommodate up to three ships side-by-side with various stern ramp configurations, all loading and discharging simultaneously

## New linkspan on Scottish west coast



Port Askaig linkspan being installed

A MacGREGOR linkspan installation in Oban, Scotland, has been completed as part of a major modernisation and expansion of the Oban terminal for ferry services to the Islands of Coll, Tiree and Southern Hebrides. It will come into operation this summer.

Oban's new ferry terminal was officially opened in August 2005 with just one old linkspan. The new linkspan is closer to the terminal and passengers will be able to use walkways that lead directly from the terminal on to the ferries.

Scottish operator Caledonian MacBrayne, which uses the terminal, said that it would not achieve its full potential until the new linkspan was built.

Also coming into operation this summer is a MacGREGOR linkspan for Port Askaig. MacGREGOR has recently completed the installation for the Scottish port on the island of Islay. The hydraulically-operated unit is designed for the ferries to Kennacraig, on the Scottish mainland, as well as for the Jura shuttle ferries. ■



A two-level linkspan will serve Color Line's port facilities in Kristiansand

## Color Line calls for ship and shore-based expertise

A substantial order from Color Line for MacGREGOR to supply linkspans and passenger gangways will further enhance the efficiency of the operator's SuperSpeed service between Norway and Denmark.

MacGREGOR will deliver two-level linkspans and passenger gangways for Color Line's port facilities in Kristiansand and Larvik, in Norway. For Color Line's services in Hirtshals in Denmark, MacGREGOR will provide two upper-level linkspans.

Delivery of the equipment will start at the end of this year and is scheduled to be completed within the first quarter of 2008. High efficiency and safety in handling freight vehicles and cars at the terminals is also sought from the supply of RoRo cargo access/transfer systems on board, which will serve the two new 211m SuperSpeed RoPax ferries being built by Aker Yard's Rauma facility for handover in 2007 and 2008.

## Third MacGREGOR linkspan supports Norfolkline's RoRo operations

Designed to support Norfolkline's daily ferry service between Vlaardingen in Holland and Killingholme in the UK, MacGREGOR has now completed its third linkspan installation for the operator's new RoRo terminal in the Vulcaanhaven, Vlaardingen, The Netherlands. The hydraulically-operated unit is in addition to the two earlier linkspans delivered last autumn (MacGREGOR News 153).

Each of the three 29m-wide x 20m-long linkspan – designed to the Dutch Bridge code – is suitable for berthing ships with lengths up to 220m and widths up to 30m. Operation will be effected by twin hydraulic cylinder arrangements from towers on each side of the linkspan.

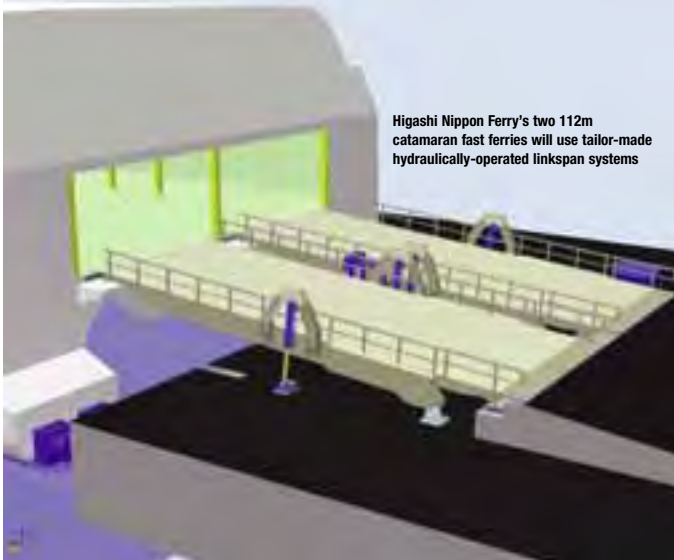


## Japanese fast ferries need quick turnaround

MacGREGOR's shore-to-ship expertise has been called upon for a pioneering new domestic ferry service in Japan. Following the introduction of two 112m catamaran fast ferries – currently under construction at Incat Australia's shipyard in Hobart – Higashi Nippon Ferry will introduce a high speed RoRo ferry services between Hakodate on Hokkaido and Aomori on Honshu.

As for most high speed ferry services, success lies not only on the speed of the ferries but is also highly dependent on efficient and swift turnaround times in ports. For both Hakodate and Aomori, MacGREGOR has developed tailor-made hydraulically-operated linkspan systems specifically designed for the ramp-less vessels. These allow for a fast operation and smooth vehicle transfer for the full breadth of the catamarans.

The linkspans are now in production and will come into use upon delivery of the first catamaran from Incat in around July this year.



Higashi Nippon Ferry's two 112m catamaran fast ferries will use tailor-made hydraulically-operated linkspan systems



# Chinese projects boost deck crane business

Over eighty GL and GLB cranes will secure safe and efficient cargo handling for container feeder and multi-purpose tonnage building in China



**D**emand for container feeder ships is driven by the surge in size of longhaul tonnage and associated transshipment requirements, which have accelerated since the early 1990s.

Analysis of predicted regional trading requirements for feeder and intra-regional shipping operations indicates an 84 per cent increase in trade volume during the period 2004-2015, Lloyd's Register reported last year. Such a substantial rise cannot be met by the current fleet, even allowing for some larger ships cascading down into the feeder trades.

If factors such as ship size and speed were to remain equal, LR suggests, the feeder fleet would have to nearly double in capacity simply to maintain the current market balance. In addition to the expected rise in trade volumes, however, a significant replacement demand is dictated: up to 40 per cent of the world feeder fleet last year were at least 15 years old, many of which will be removed from the market by 2012.

The lack of efficient modern feeder tonnage is a major threat to the container shipping sector which could potentially compromise the industry's investment in new large post-Panamax tonnage, LR warns.

A number of leading owners and operators are addressing the shortage, however, with German principals maintaining their traditional dominance in the sector. Some 15 container feeder ships booked by the following owners from Guangzhou Wenchong

Shipyard in China will each be geared with two cargo handling cranes from MacGREGOR:

Leonhardt & Blumberg	2 x 1,400 TEU ships
Reederei Gebr. Winter	2 x 1,700 TEU ships
Norwest Management, Singapore	3 x 1,700 TEU ships
Schoeller Holdings	4 x 1,700 TEU ships
Thien+Heyenga	2 x 1,700 TEU ships
Bernhard Schulte	2 x 1,700 TEU ships

MacGREGOR shipsets for the 1,400 TEU tonnage will comprise one GL4030/3338.5/2641.3-2 crane and one GL4028/3628.8-2 crane; while the 1,700 TEU vessels will be equipped with one GL4528/3237.2/2541.5-2 crane and one GL4528.8-2 crane.

Another German owner, Reederei Eugen Friedrich, has ordered four multi-purpose cargo ships from China's Jiangxin Shipyard, each specified with a MacGREGOR outfit comprising one GL 45-tonne and two GL 80-tonne capacity cranes.

Triple-crane sets will also serve four ships booked by the Greek owner Navarone from the Shan Hai Guan yard, each installation based on GLB3024.5-2/2424.5gr units. Two similar GLB crane outfits are required by the same owner for two ships ordered at the Jiangsu Eastern yard.

Six vessels contracted by the UK's Carisbrooke Shipping from the Yangzijiang Shipyard will each be equipped with two GLB2526-2 cranes, while six 7,600 dwt multi-purpose newbuildings from the Nanjing Huatai yard for German owner Hartmann Logistik will feature twin GL3626-

2/2826gr cranes.

All the above cranes will benefit from MacGREGOR's CC2000 system to provide excellent control and optimisation of cargo handling operations, with smooth and fast movements secured through stepless speed control. The control system can be easily adjusted for different parameters, such as speed and ramp times, via a laptop computer. ■

## Triple-GL crane sets for Seaspan feeders

Eight 2,500 TEU geared container feeder ships (plus four options) on order at China's Yangzijiang Shipyard will strengthen the fleet of Seaspan Container Lines, the Vancouver-based operator which has invested heavily in larger MacGREGOR-equipped Panamax and post-Panamax tonnage since 2000.

MacGREGOR will supply, in addition to lift-away hatch cover sets, each ship with three cranes of the well-known GL-type with lifting capacities up to 45 tonnes at an outreach of 25m: two GL4525/4028/3629.6-2 units and a GL4525/4028/3630.3-2 unit.

Swift and smooth crane movements will be assured by stepless speed control and MacGREGOR's CC2000 control system, with hoisting, luffing and slewing executed at full speed and safe working load capacity at the same time.

## Next generation crane-control system: under development

MacGREGOR's research and development experts are continuously developing new solutions based on its renowned CC2000 platform. However, the next generation of crane control system, the CC3000, is now under development. "The know-how and experience of more than 45 years will create the new platform," said Jonas Renlund, project leader for the new system.

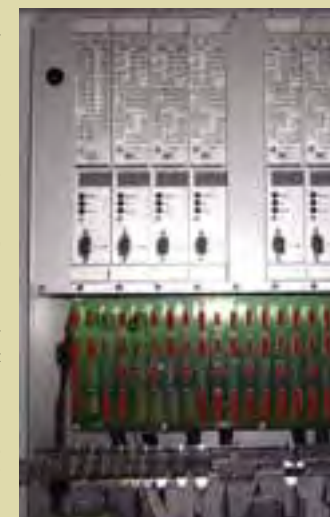
Today MacGREGOR has more than 1,500 cranes sailing with its CC2000 system installed and has developed cargo handling cranes for ships since 1961.

"Requirements of cargo handling itself have continuously become more and more complex and sophisticated. Safety, positioning, monitoring and availability have been the main areas in focus through the whole development phase. A giant step was taken in 1972, when twin cranes were introduced, as the control system changed from direct hydraulic to electric controlled valves," Mr Renlund said.

The next significant change was in 1985, when requirements on acceleration limits made it necessary to launch an electronic control system. The new system made it possible to integrate even more sophisticated functions, but at the time export restrictions prevented microprocessors being used.

In 1997 it was essential to introduce them because of the demands from naval customers and other hi-tech consumers, and as a result the CC2000 was introduced. The most important result of this new system was higher flexibility and the possibility to tailor features between crane types. One system can, with different preset parameters, fit all crane types and deployments. Having only one platform shortened production lead time as well as the ability to adjust parameters after installation. An improved safety level was also reached by using parallel safety functions in software as well as in hardware.

"The continuous demand for increased functionality, improved safety, positioning algorithms, electric cranes, operator information, as well as monitoring possibilities, has made it necessary to further increase the investments in research and development related to control systems," he added.



# Crane sales keep pace with worldwide demand

MacGREGOR's strong first quarter for crane sales gave it a considerable increase in market share

During the first quarter of 2007 MacGREGOR secured crane orders totalling €63 million. "At the end of last year the signs were that the market for cargo handling cranes and cranes for tankers was shrinking," said Erik Hägglund, general manager of MacGREGOR's Crane division. "The reality, however, is a completely different scenario, with significant orders for most ship types.

"MacGREGOR's Crane division has had the presence and skill to overcome great competition as well as to control supply of important components. We have managed to keep up the pace and respond to the demand from the market worldwide. Our orderbook is stronger than ever. With all the work we have done in the past on modularisation, standardisation and an extended product portfolio, we are well prepared to grow with the market.

"What we have seen in the last quarter will of course not last forever," Mr Hägglund said. "However, as MacGREGOR's set-up today includes mature and well established local manufacturing, proven and reliable design, as well as our worldwide service network, we shall defend our territory even when the market environment is less comfortable".

## Bulkers

"MacGREGOR's strong foothold in China with local manufacturing and part sourcing has made it possible to secure long series of bulk carriers, the most competitive segment," Mr Hägglund said.

Weihai Ship Yard has ordered 24 cranes to be installed on eight bulk carriers for Greek owner Navarone. The GLB cranes will be manufactured at MacGREGOR's long-term partner Nanjing Lüzhou Machine Company Ltd (LMC).

Sinopacific yards (Dazhou, Dayang and Zhejiang) have ordered shipsets of four GLB cranes for 13 vessels.

## General cargo ships

"General cargo ships have always been the most stable segment with a relatively constant demand. MacGREGOR has a long history in the sector and has been able to secure some strategic orders". The three examples mentioned below will all feature cranes manufactured by LMC.

Hanjin Heavy Industries shipyard in Korea has ordered cranes for two general cargo ships for its own shipping line. Each ship will carry two sets of GL cranes.

PACC Ship Managers Pte Ltd of Singapore has acknowledged MacGREGOR with further crane contracts for its lively newbuilding scheme in China. Two ships to be built at Zhejiang Hongguan Shipbuilding Co Ltd, China, will each be geared with a single GL crane and a twin unit.

Kouan Shipyard, China, has signed orders for four general cargo ships for COSCO Guangzhou, China. Each vessel will carry one twin and two single GL cranes.

## Container ships

"The future volume for container carriers has provoked lively discussion in the market, and volumes are expected to decrease," Mr Hägglund said. "However, with the increasing number of 'jumbo' carriers entering the market the need for feeder tonnage is necessary".

In Poland MacGREGOR has secured orders at Gdansk SY and Gdynia SY. Rickmers Reederei GmbH & Cie KG, Germany, has signed up for one ship with three GL units and Projex Schiffahrtsgesellschaft GmbH & Co, Germany, has signed for one ship carrying three GL cranes. The cranes will be manufactured by MacGREGOR's European partner Remontowa in Poland.

The Chinese market has also been active in the container carrier segment. Long-term co-operation partner Wenchong Shipyard, China, has ordered another

four feeder ships each carrying two GL cranes.

Weihai Shipyard, China, has ordered cranes for one feeder contracted by Briese Schifffahrts GmbH & Co KG. Weihai has also decided to use MacGREGOR cranes on two sister ships to be delivered to Danish Marten Shipping.

China Shipbuilding Corporation has ordered cranes for three sets of feeders for Cido Shipping. Each vessel will carry two GL units.

## Trans-shipment

"MacGREGOR has been active in the transloading segment for about 10 years," Mr Hägglund said. Existing references have convinced Emirates Trading Agency, UAE, Dubai to install four K-4 heavy duty cranes on eccentric platforms on board each of two panamax transloading stations. The stations will operate in the Arabian Gulf, primarily handling iron ore. These orders are in combination with bulk handling systems from MacGREGOR's bulk division. The systems are to be delivered during 2008 to a Chinese shipyard. The complete installation will be able to handle 2,500 tonnes per hour.

## Tankers

"During the boom in the tanker business during the last four years, MacGREGOR has managed to establish itself as the leading supplier of hose handling and provisions cranes in hard competition with domestic suppliers," Mr Hägglund said. "The total concept with a reliable initial delivery and a worldwide service network has convinced both shipyards and owners".

The total of 156 hose and provisions cranes contracted between January and March are to be delivered during 2008-2010 on top of the existing orderbook. The cranes will be manufactured by MacGREGOR partners in China, Korea and Croatia. ■

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