

# Deepsea RoRo ships

Integrated solutions to improve cargo handling efficiency



**MACGREGOR**

Designed to perform with the sea

# Passion for performance – united by the sea

MacGregor is a family of innovators. By engineering solutions that make the sea more accessible, safe and reliable, we support you whose livelihood depends on the changing conditions of the sea. To enable that we have a variety of strong product brands and committed experts with a passion for solving challenges – and the power of the sea is sure to provide those.

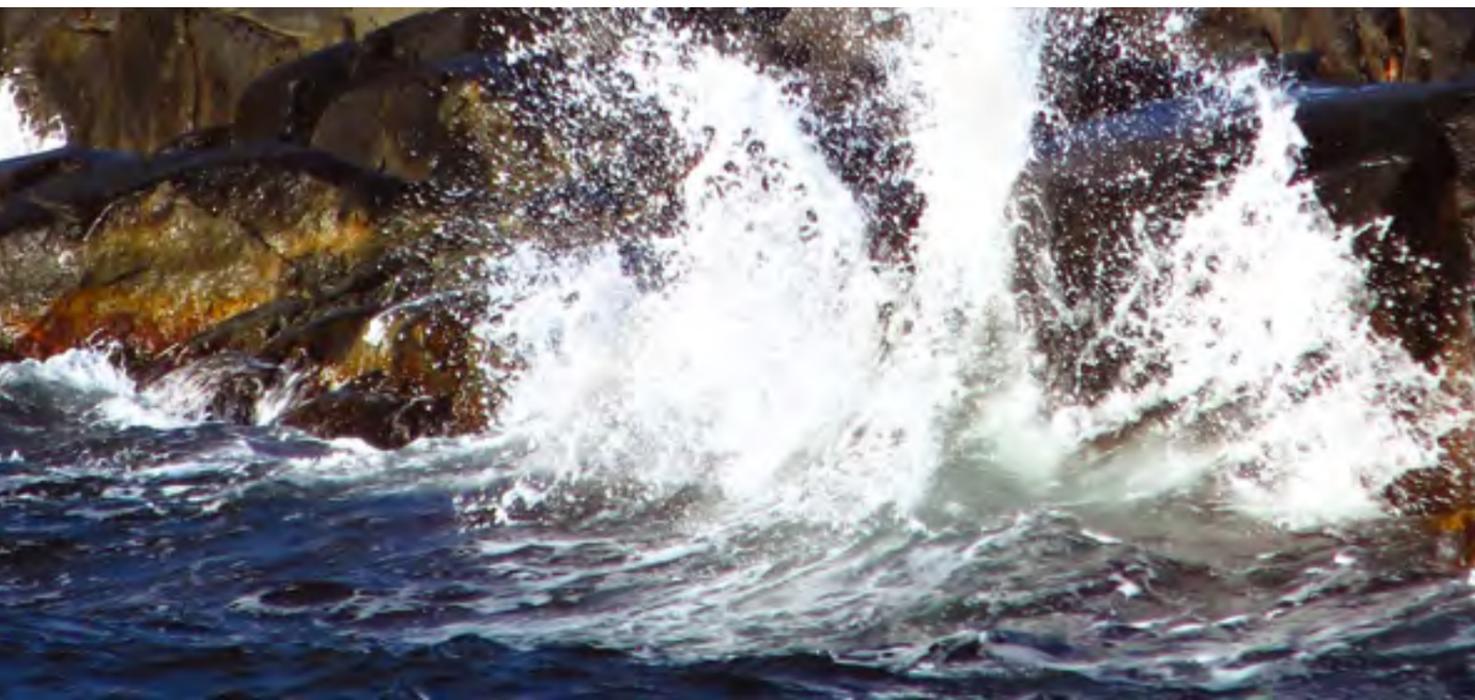
Our founders braved new frontiers in different times and places. Those origins merge at today's MacGregor, inspiring us to continue the stories, and create new ones. The spirit of our founders lives on in the pride we have for what we do, and our determination to find new solutions for the people we work with. Together with you we will write the next chapters.

We are a global team of professionals, who create value for you; the shipbuilders, owners and operators,

in the offshore and marine industries. Understanding your business and way of life is key to our work. It is the foundation to addressing your needs with tailored solutions for load handling, cargo handling, mooring or essential auxiliary equipment. Your productivity, sustainability, and equipment lifetime benefit from our combination of expertise and technology. As innovators, we work together with you to set benchmarks in innovative solutions and value creation. Our deep respect for and experience of the sea lays the foundation for adapting to its challenging conditions. Wherever we work around the world, we work together with a passion for performance and a love of challenges – united by the sea. Our shared values - integrity, quality and safety - propel us forward, and are an important factor in our ability to continue to deliver what our customers need to succeed; solutions that are *designed to perform with the sea*.



Photo: Fotoflite.co.uk



# Throughout the ship's lifetime

There are good reasons why purpose-built MacGregor cargo access equipment is installed on the majority of the world's deepsea RoRo vessel fleet, including car and vehicle carriers (PCCs and PCTCs), Container RoRo and Roll-On/Lift-Off vessels.

You need partners who understand your business and provide solutions which maximise the safety, efficiency and reliability of the equipment throughout its lifetime.

## Streamlining cargo and passenger flows

MacGregor's aim is to add value to your business throughout the ship's lifecycle and provide solutions which maximise the safety, efficiency and reliability of the equipment throughout its lifetime.

Our in-depth understanding, close customer cooperation, more than 55 years of experience and continuous development of the RoRo concept means that we can deliver the most flexible and efficient cargo flow solutions possible, adapted to your ship's cargo profile and the logistics chain.

MacGregor's ship experts and technical teams work closely with shipowners, shipyards, classification societies and consultants on cargo flow issues.

Early in the design process, before the final ship plans have been decided, we offer preliminary studies and engineering services. MacGregor RoRo cargo access equipment is then supplied as an integrated solution

based on cargo type, loadings, space limitations, shipping routes, logistic factors and environmental conditions. New environmental regulations make greener options, such as MacGregor's environmentally-friendly electric drive solutions, ideal for this purpose.

We are a global company with facilities located near shipyards and ports worldwide. MacGregor equipment has a long record of operational availability and reliability.

Efficient operations depend on good service. You can rely on our global network for maintenance and repair resources as well as fast supply of original MacGregor spare parts, that ensure the operative availability of your MacGregor equipment.

Later in the ship's life-cycle, our capability to modernise and convert the original solution help you get even more from your investment by optimising performance to match new market needs.

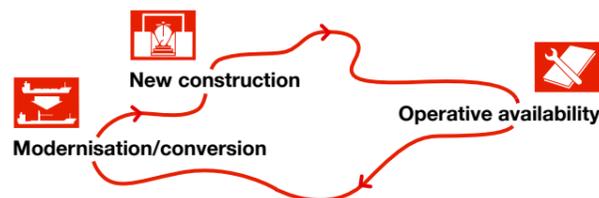


Photo: Wilh. Wilhelmsen ASA

More than half of the world's ships have MacGregor equipment on board, including products from its Hatlapa, Triplex, Pusnes and Porsgrunn brands.



Electrically-driven top-hinged ramp cover

# Flexibility means profitability

Port turnaround times are getting shorter and it is crucial to be prepared for changes in the cargo mix and port calls. The flexibility of MacGregor RoRo cargo handling solutions will make a vital contribution to the success of your operations.

## Setting the standard

As a pioneer in the field, MacGregor has continuously developed the RoRo cargo handling concept. In the late 60s we developed the RoRo equipment for Paralla, the world's first deepsea RoRo vessel, with a quarter ramp.

The vessel's quarter ramp set the standard for the rapid spread of the RoRo concept. Since then, focusing on flexible usage of cargo space, MacGregor has developed the cargo access equipment that is the key to efficient handling of rolling cargoes.

## MacGregor solutions optimise the cargo flow

The quarter stern ramp will give your vessel the potential to load and discharge at most quays. The hoistable decks allows you to adjust the deck height in sections, enabling the vessel to handle virtually any mixture of vehicles and cargo. The internal ramp system will cater for a smooth and efficient cargo flow during the port call.

## Reducing weight for improved economy

Our product development programme is focused on minimising equipment weight in relation to loading capacity, optimising the use of steel and other materials such as lightweight plywood, providing:

- Lower fuel costs per tonne of freight
- Greater cargo carrying capacity
- Improved vessel stability
- Efficient and flexible cargo handling

## Know-how based on experience

Newbuilding? Consult us at an early planning stage and profit from our know-how and experience throughout the process. Our customised technical solutions are designed to create smooth traffic flow through the cargo decks and incorporate the necessary watertight closures for damage stability requirements.

Factors such as vehicle envelopes, quay conditions, clear height and drive way, turning radius and surrounding equipment all have an important bearing on the overall situation.



# Benefit from our turnkey deliveries

Complete deliveries on a turnkey basis are the most cost-efficient and time saving solution. Contact us regarding the entire scope of your project — the benefits are considerable.

## Complete turnkey deliveries

We can take overall responsibility and deliver purpose-built solutions, from the design to the integration, of a complete access system.

Our solutions offer one main partner, one responsible party for the customer's project, a modular solution for shipbuilding, and accountability for the function of the whole MacGregor system during the ship's lifetime. All products and equipment are ready-built, tested and integrated with the ship, thus simplifying the shipbuilding process for the shipowner and shipyard.

A complete delivery includes:

- design and planning
- manufacturing of steel structures and coaming
- quality control
- factory acceptance tests (FAT)
- installation (a complete installation includes all cylinders, winches, wires, safety and loading systems, indicators and control cabinets)
- commissioning
- after sales services, spare parts and crew training

## Overall project responsibility

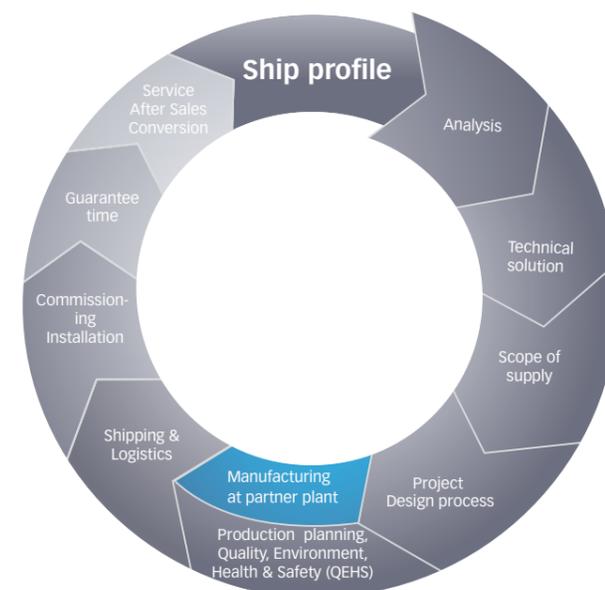
We are experts at overall project management, covering technical and commercial issues, sourcing, logistics and just-in-time (JIT) delivery. We take responsibility for your project during manufacturing and manage the whole supplier and logistics network.

## Global manufacturing partner network

MacGregor is working with manufacturing partners around the world for the production of hatch covers, cranes and RoRo passenger access and cargo handling equipment. We have a dedicated organisation whose

task is to ensure compliance with high level standards. Our own quality control personnel and production personnel are there on site to ensure superior quality and constant development to best meet the needs of our customers.

Our Hatlapa, Pusnes and Porsgrunn operations have their own production sites in South Korea and Germany as well as our partners' production plants.



# Quality, environment, health and safety

MacGregor is actively engaged in considering all safety issues, liaising closely with the classification societies and authorities.

Product quality is ensured by our skilled engineers working in close cooperation with our own QEHS departments together with selected qualified long-term sub-contractors.

Our role includes conceptual know-how and drawings, instructions, production supervision, quality control and installations.

## Production supervision and quality validation

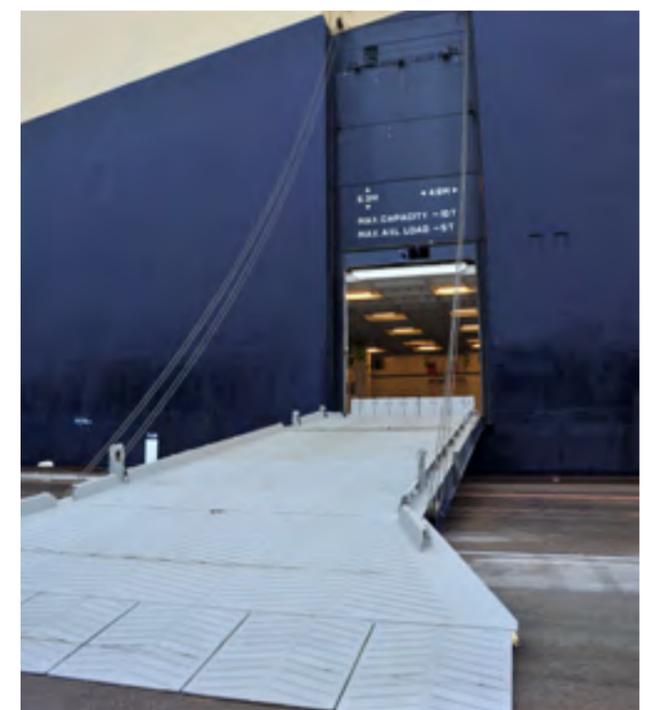
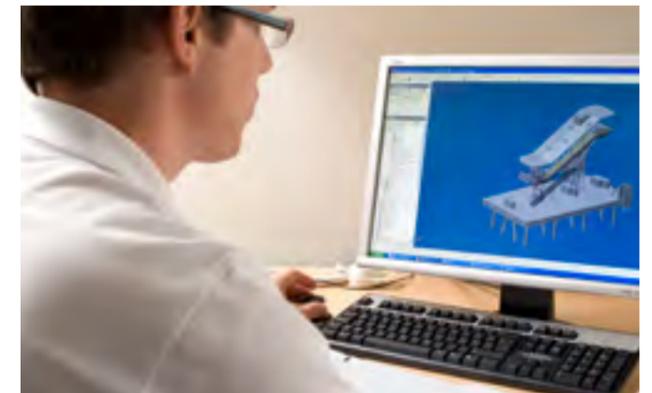
We have state-of-the-art production arrangements for steel structures. Systematic quality validation processes for the manufacturing are made at pre-defined key stages. All production lines are supervised on a permanent basis and are regularly audited by class surveyors.

## Quality assurance, environment, health and safety systems (QEHS)

With regard to quality assurance, MacGregor's in-house processes are certified to ISO 9001:2008 standards worldwide in every location, including all product lines and service centres.

MacGregor is also certified to ISO 14000:2004 environmental and OHSAS 18001:2007 occupational health and safety standards in Sweden, Finland, at our offshore facilities in Norway, China and Singapore as well as in the majority of MacGregor's service branch offices of the Global Lifecycle Support.

MacGregor's quality assurance, environmental and health and safety systems (QEHS) cover both in-house and sub-contractors' activities to the extent that they are acting on our behalf.



# Integrated cargo flow solutions for car carriers

Nowadays, the Pure Car Carrier (PCC) is being replaced by the Pure Car and Truck Carrier (PCTC).

PCTCs typically have a wide stern quarter ramp and a side ramp for dual loading and discharging of a combination of cars and high-and-heavy cargo units in a short time span. The required mixture can be accommodated by having a number of liftable or hoistable car decks to allow high vehicle clearance. The internal ramp system is usually arranged in succession to allow simultaneous cargo operations on all decks. Internal ramps can be fixed, with ramp covers, or hoistable.

## 1. Quarter ramp/door

The main ramp for loading and unloading. Allows your vessel to berth at practically any quay. Normally on the starboard side, but port-side installations are available. Strengthened for high and heavy cargoes.

The ramp should be of sufficient length to cope with all tidal conditions and is often divided into three articulated sections. Manoeuvred by wires and hydraulic or electric winches. When stowed, the quarter ramp also often functions as the watertight stern door.

## 2. Side ramp

Side ramps can be arranged to be hoistable between two or three deck levels. A side ramp increases the loading and discharging capability considerably, especially where several deck levels are incorporated higher up in the vessel.

## 3. Hoistable ramp

Hoistable ramps make more efficient use of the cargo space. Choose between ramps which, when closed, form a tightly sealed closure, and ramps without sealing. The hoistable ramp is installed between deck levels and the hoistable car deck. Tilting ramp versions are also available for increased flexibility. Locked in the raised position by hydraulically operated locking wedges, the ramps will form an integral part of the deck surface and can be of lightweight construction. Automated operation, either hydraulic or electric.

## 4. Ramp cover

The ramp cover fulfils the same requirements for load-carrying capacity and the same tightness as the surrounding fixed deck. Usually operated via direct-acting hydraulic cylinders or electric screw-jack.

## 5. Car decks - liftable and hoistable

Fixed decks means that deck panels are fixed at a certain level. The hoistable car deck is divided into sections which can be individually hoisted to the required height or stowed beneath the deckhead. Each section may have two decks that can be set at several alternative positions:

- three decks of equal headroom
- two decks with one higher and one lower headroom
- one deck with maximum headroom

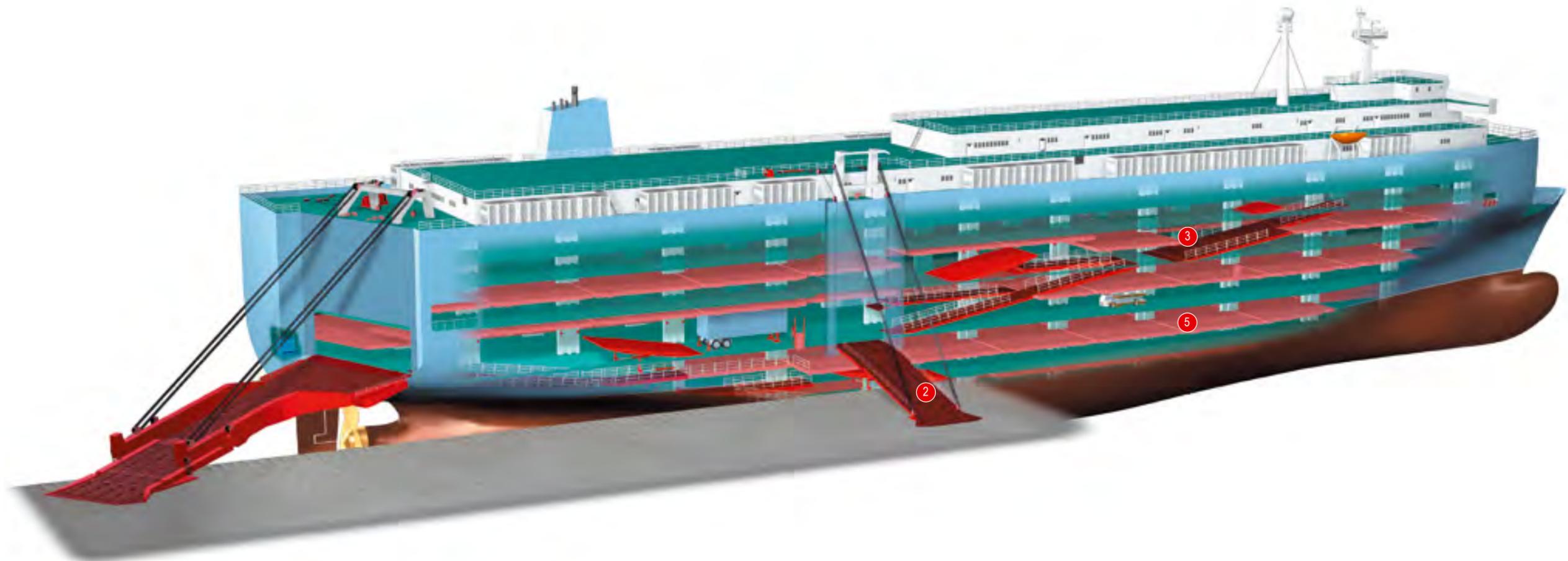
Two systems are available for hoisting/lowering the deck:

- Liftable decks means that the deck panels are lifted, hoisted and height-adjusted by a mobile deck lifter.
- Automated operation, either electric or hydraulic, is available where frequent adjustment is required or where time for adjustment is limited.

The deck surface can be of lightweight construction, with a plywood top plate, to save weight.

## 6. Shell door

Standard MacGregor doors, such as bunker doors and pilot doors, can be uplied with frames as an option. Framed doors can be welded as complete units directly into the hull, saving installation time.



### Bulkhead door

Various types of bulkhead doors are available. The choice is between top-hinged, side-hinged and sliding doors, and between gastight or watertight solutions.

### Rampway door

Top-hinged rampway doors are the best choice where there is plenty of room to stow the door up against the deck head. The door, which closes against the deck and bulkhead, is fitted with a rubber seal.

### 7. Hydraulic power pack

Supplies pressurised hydraulic oil to all MacGregor equipment installed on board. Comprises piston pumps connected to a common supply line as well as pumps for oil cooling and filtration. In some cases it may be necessary to install two units.

### Lashing pots, eyes, lashings, trailer trestles and supports

MacGregor has equipment for securing vehicles on board such as cars and trailers.

### Control systems for the RoRo equipment

The equipment is easily monitored and operated via user-friendly control panels. They have few buttons and switches which makes the equipment easy to control. The operational sequences of the RoRo equipment are switch-controlled via Programmable Logic Controllers (PLCs).

When Bus connections can be used, local Onboard System Monitoring (OSM) is possible. The user-friendly interface makes it easy to carry out diagnostic fault-finding and real time condition monitoring of the system. Option: Radio remote control and/or touchscreen interface.

### General purpose (service) cranes

GP electro-hydraulic general purpose cranes are robust and solid. All crane movements are smooth and fast, with stepless speed control. Components are chosen for their durability even in the most hostile marine environment. The standard range covers capacities up to 10 tonnes, with outreaches of up to 24m.

The crane is controlled from a platform above the slewing ring. A portable electric remote-control unit is available as an option. The equipment is easily monitored and operated via user-friendly control panels. They have few buttons and switches which makes the equipment easy to control.

### 8. Steering gear

The steering gear controls the rudder that turns the ship while in motion. Our Hatlapa and Porsgrunn steering gear is compact and suitable for the smallest compartments.

### Compressors

Our Hatlapa branded compressors are either air-cooled, water-cooled or screw compressors. They can be

used for starting air, service air and control air. Every compressor is put through its paces on a modern test bench and all well-known classification societies are present on a regular basis to carry out testing procedures.

### Deck machinery

Winches hold the ship in position berthed at pier and windlasses secure it while anchored at sea. Our Hatlapa and Pusnes branded deck machinery serves the needs of any deepsea RoRo ship perfectly. MacGregor offers both electric and hydraulic drives.

Our environmentally-friendly electric deck machinery is easy to install and no piping is required. We can provide Variable frequency drive (VFD) and Pole changing types. The hydraulically-driven versions are either with high or low pressure drive and can be integrated with any RoRo equipment.



Steering gear



Compressor



Winch



Rampway door

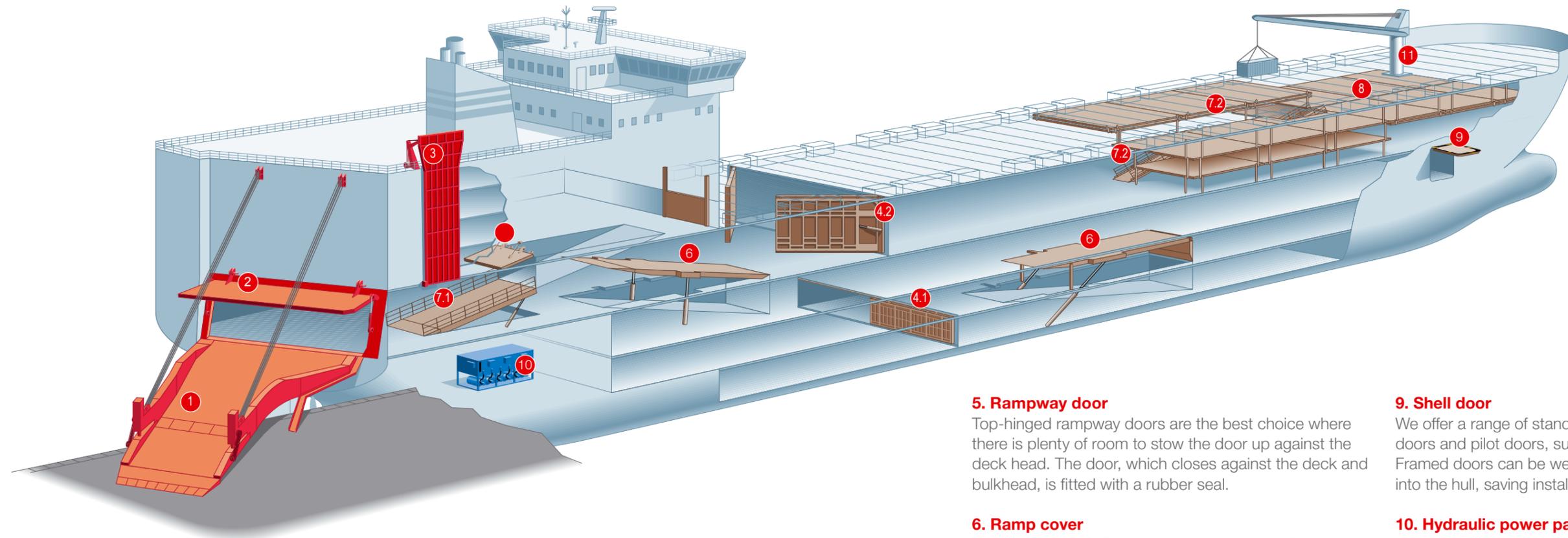


General purpose (service) crane

# Cargo flow solutions for deepsea RoRos

Deepsea RoRos are designed to carry a mixture of rolling cargoes, for example cars, lorries, high-and-heavy or special project cargo and heavy-duty transport of steel or paper.

Container RoRo (ConRo) vessels can carry a full weather-deck load with stacked containers which are lifted off/loaded by cranes. Roll-On/Lift-Off (RoLo) vessels need to be flexible, both when it comes to access from the quay and the internal arrangements, as they can call at ports having different quay conditions.



## 1. Quarter ramp/door

The quarter ramp allows your vessel to berth at practically any quay. The ramp should be of sufficient length to cope with all tidal conditions and is usually divided into three articulated sections. The quarter ramp is manoeuvred by wires and hydraulic or electric winches.

## 2. Stern door

RoRo vessels for deepsea use have a very wide quarter ramp, usually incorporating a separate stern door, that closes the hull opening. The door is fitted with a rubber seal in contact with the upper deck and coaming. For operation in association with a quarter ramp, a top-hinged upward pivoting door is most suitable, situated immediately forward to the ramp. It opens to permit access following the ramp being lowered from stowage.

## 3. Side ramp

Side ramps can be arranged to be hoistable between two or three deck levels. A side ramp increases the loading and discharging capacity considerably, especially where several deck levels are incorporated higher up in the ship.

## 4. Bulkhead door

Our range of bulkhead doors includes sliding (4.1) or side-hinged (4.2) door types to ensure that the cargo space is used as efficiently as possible. The doors fulfil all necessary requirements for tightness.

## 5. Rampway door

Top-hinged rampway doors are the best choice where there is plenty of room to stow the door up against the deck head. The door, which closes against the deck and bulkhead, is fitted with a rubber seal.

## 6. Ramp cover

The ramp cover fulfils the same requirements for load-carrying capacity and the same tightness as the surrounding fixed deck. Usually operated via direct-acting hydraulic cylinders or electric screw-jack.

## 7. Hoistable ramp

Hoistable ramps make efficient use of the cargo space. It can be installed between deck levels (7.1) and between the hoistable car deck (7.2). Choose between ramps which, when closed, form a tightly sealed closure, and ramps without sealing. Tilting ramp versions, adjustable at both ends, are also available for increased flexibility. Locked in the raised position by locking wedges, the ramps form an integral part of the deck surface.

## 8. Car decks

Fixed decks means that deck panels are fixed at a certain level. The hoistable car deck is divided into sections which can be individually hoisted to the required height or stowed beneath the deckhead. Each section may have two decks that can be set at several alternative positions:

- three decks of equal headroom
- two decks with one higher and one lower headroom
- one deck with maximum headroom

Two systems are available for hoisting/lowering the deck:

- Liftable decks means that the deck panels are height-adjusted by a mobile deck lifter.
- Automated operation, either electric or hydraulic, is available where frequent adjustment is required or where time for adjustment is limited.

The deck surface can be of lightweight construction, with a plywood top plate.

## 9. Shell door

We offer a range of standard doors, such as bunker doors and pilot doors, supplied with frames as an option. Framed doors can be welded as complete units directly into the hull, saving installation time.

## 10. Hydraulic power pack

Supplies pressurised hydraulic oil to all MacGregor equipment installed onboard. Comprises piston pumps connected to a common supply line as well as pumps for oil cooling and filtration. In some cases it may be necessary to install two units.

### Control systems for RoRo equipment

The equipment is easily monitored and operated via user-friendly control panels. They have few buttons and switches which makes the equipment easy to control. The operational sequences are switch-controlled via Programmable Logic Controllers (PLCs). When Bus connections can be used, local Onboard System Monitoring (OSM) is possible. The user-friendly interface makes it easy to carry out diagnostic fault-finding and real time condition monitoring of the system. Option: Radio remote control and/or touchscreen interface.

### 11. Cargo cranes

We offer standard cranes with safe working loads from 3 to 100 tonnes and heavy lift cranes up to 1000 tonnes, complying with international standards and regulations. Connected in twin and/or team modes, they can handle two/four times the safe working load of a single crane.

The crane housings are totally enclosed, providing protection from the weather, corrosion and damage. Modular designs enable us to provide the shortest possible lead times as well as top-of-the-line quality. The cranes can easily be furnished with a variety of extra equipment to improve overall visibility, reliability and performance.

The micro-computer-based crane control system offers programmed crane control, load statistics, remote communication to portable PC, remote control and a range of other features.

### Folding hatch covers

The folding hatch cover panels are hydraulically operated (no need for auxiliary equipment). The panels can be designed for various deck loads and are stowed vertically. There is no need for stacking.

### Lift-away hatch covers

Lift-away panels are operated with a spreader using either shore side container cranes or vessel's own cranes. The hatch cover panels can be stowed on top of adjacent covers which are placed on the quay or the ship's deck.



Lashing bridge

Lift-away hatch covers can be either weathertight or non-tight hatch covers. Depending on the ship's width, there are three to five panels abreast, the weight of an individual panel typically can be up to 45 tons.

### Piggy-back hatch covers

Piggy-back panels stack on each other. The operation is safe and easy as there is no need to lift the panels away. The panels are driven longitudinally either by electric motors or chain. Hydraulic high lifters lift the panel and the next panel is driven below it. Up to three panels can be stacked in one stack.

### Tween decks

Tween deck hatch covers increase flexibility and efficiency of cargo placement in the cargo hold. Tween deck hatch covers can be of lift-away or folding type.

### Lashing

MacGregor has equipment for securing vehicles on board, for example lashing pots and eyes, lashings, trailer trestles and supports.

### Lashing bridges

Lashing bridges fix the containers to higher stacks allowing the ship to take more containers safely. The height of the lashing bridges vary from 1-container to 4-container height.

### Cell guides in holds and on deck

Cell guide profiles guide the containers to their slots in the cargo hold. Deck cell guides guide the containers to their slots.

### Loose container fittings

Loose container fittings keep the containers in place during voyage and transfer the forces to the ship's hull. Individual components may look simple but different design of the system may have huge impact.

An optimised system can improve the vessel's payload capacity remarkably.



Cargo crane

### Fixed container fittings

Fixed container fittings transfer the forces from the containers to vessel's hull (via hatch covers, lashing bridges or deck stanchions).

### Steering gears

The steering gear controls the rudder that turns the ship while in motion. Our Hatlapa and Porsgrunn steering gears are compact and suitable for the smallest compartments.

### Compressors

Our Hatlapa branded compressors are either air-cooled, water-cooled or screw compressors. They can be used for starting air, service air and control air. We take the extra steps necessary to insure product quality and reliability by testing every single compressor. They are put through its paces on a modern test bench. All well-known classification societies are present on a regular basis to carry out testing procedures.

### Deck machinery

Winches hold the ship in position berthed at pier and windlasses secure it while anchored at sea. Our Hatlapa and Pusnes branded deck machinery serve the needs of any deepsea RoRo ship perfectly.

Winches can be electrically or hydraulically-driven. Our environmentally-friendly electric deck machinery is easy to install and no piping is required. We can provide Variable frequency drive (VFD) and Pole changing types.

Our hydraulic drive is either with high or low pressure drive and can be integrated with any RoRo equipment.



Piggy-back type hatch covers



Car decks



Photo: Ignazio Messina & C.

50m-long angled stern quarter ramp of jumbo size with a capacity to carry up to 350 tonnes

# Electric drives minimise environmental impact

Electrically-driven RoRo cargo access equipment is a result of intensive R&D work, responding to customers requesting products that improve the performance and protect the environment.



Electrically-driven cargo access solutions are environmentally-friendly, cargo safe, energy efficient and easy to service.

Electric actuators replace the direct acting hydraulic cylinders used for operating smaller items and in cleating and locking devices.

Electrically-driven MacGregor solutions minimise the environmental impact and reduce the amount of hydraulic oil carried onboard, minimising the risk of cargo damage by hydraulic oil.

## Energy savings

Compared with a hydraulic system, electric operation saves energy! Electric drives run only when the equipment is manoeuvred, whereas hydraulic drives require continuous pump operation.

Energy losses are much lower than with a hydraulic system. Electrically-driven systems are not affected by pressure drops within the piping system. In addition, it is also possible to feed power back into the ship's power supply when larger winches, such as those found on quarter ramps, lower heavy loads.

## Electric control system

All equipments are operated by control panels. The operation sequences are controlled by Programmable Logic Controllers (PLCs) via push-buttons, joysticks or switches. Lamps indicate the status of cleats and whether they are locked or unlocked.

## Easy to monitor and service

Electric drives are easy to monitor and service. When using all electric components, onboard monitoring systems (OMS) make diagnostic fault-finding easy.

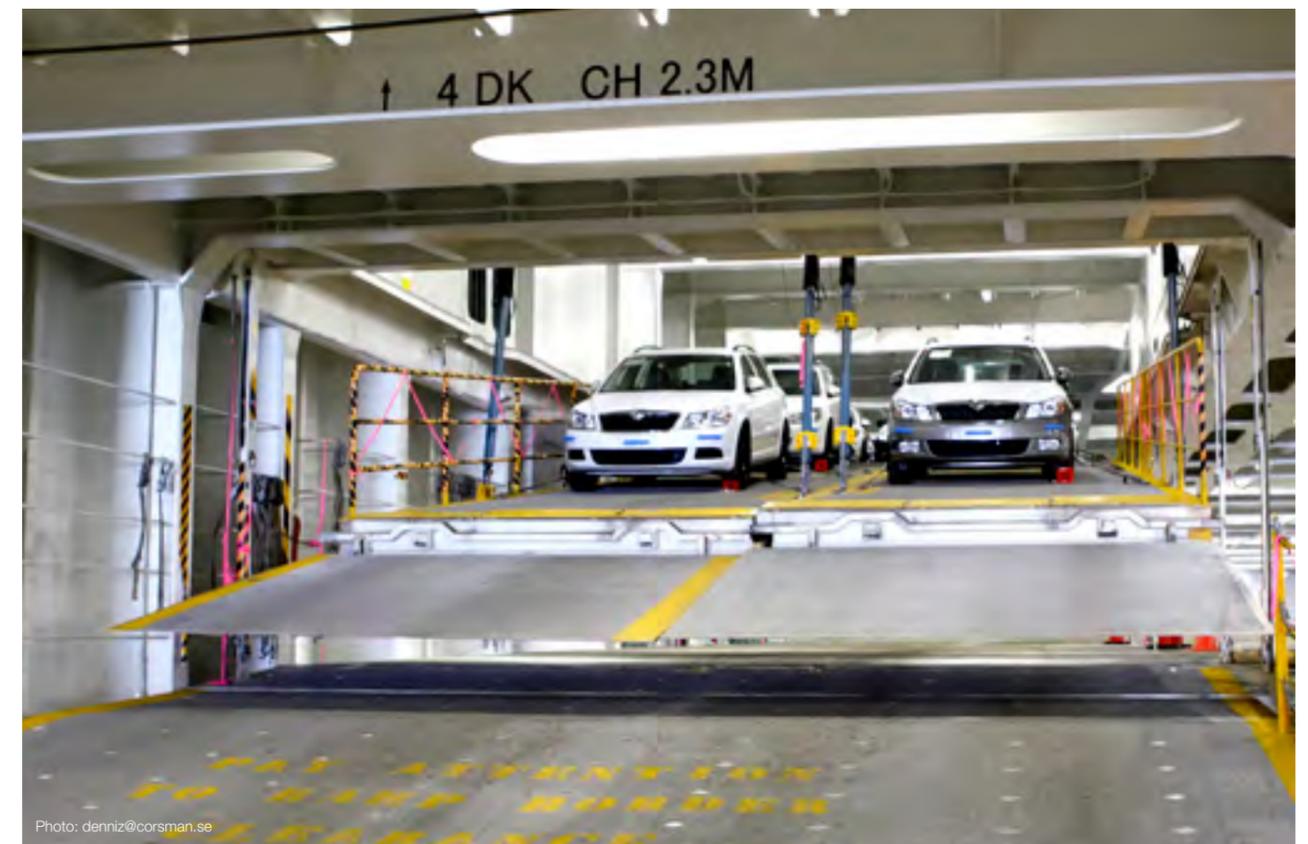
The equipment can be linked to remote diagnostic systems (RDS) to provide continuous data input for round

the clock analysis. The health of a piece of equipment can be assessed at any time.

Automated speed up and slow down functions make electric drives easier to operate than hydraulically driven equipment.

## Electrically-operated equipment

- Stern quarter, stern, side and internal ramps
- Ramp covers
- Car deck systems
- Lifting platforms
- Shell doors
- Linkspans



Electrically-driven car ramp (split type)

## Advantages of electric drives compared with hydraulic drives

### For the shipowner:

- No oil pollution or damage to cargo by hydraulic oil
- Energy saving as no continuous running is needed
- No change in operating time in cold conditions
- Maintenance friendly
- Easy to monitor

### For the shipbuilder:

- Cable wiring is easier than piping
- No flushing work required
- No need for high pressure hydraulic skills
- No pump unit needed

# Customer cases



## Wallenius chooses MacGregor access solutions for thirteen vessels

MacGregor's ability to supply efficient, flexible deck arrangements and RoRo cargo access solutions with electric drives makes the company a popular choice as equipment supplier for PCTC, and deepsea RoRo contracts.

One example is a series of thirteen vessels that were built by Daewoo Shipbuilding & Marine Engineering in Korea for Wallenius Lines, Sweden.

MacGregor was chosen to design and deliver RoRo equipment, including electrically operated components such as car deck panels, internal ramps and flaps. The ships were delivered in 2006-2011.

### Benefits with electric drives for the shipowner:

- No hydraulic oil pollution or damage to cargo
- Energy savings
- Maintenance friendly
- Easy to operate and monitor
- Reduced operating noise



## Package supply for ACLs five new G4 ConRos

In 2012, MacGregor secured a prestigious contract for the design and hardware delivery of RoRo cargo access equipment, hatch covers, cell guides and container lashings for five giant Container RoRo vessels for Atlantic Container Line (ACL), part of Grimaldi Group.

The five new G4 ConRos are being built at Hudong Zhonghua Shipbuilding in China and will be the largest ConRos in the world. The ships will be delivered in 2015 and will replace ACLs existing fleet of G3 ConRos.

### Scope of supply for each shipset

- Ramps: One 50m-long jumbo stern quarter ramp with a capacity to carry up to 420 tonnes, one electrically-driven movable ramp hinged to the fixed ramp and one ramp cover/movable ramp
- Doors (electrically-driven): two bunker, two pilot, two rampway and two division doors. One hydraulically-driven stern door and one division door.
- Car decks: four electrically-driven hoistable decks
- One power pack and one mobile power pack
- Hatch covers
- Cell guides
- Container lashing

We have a long and close relationship with ACL and by having a continuous creative dialogue during the whole design phase, we could offer the best technical solution including electrically-driven internal access equipment. All the RoRo cargo is stowed midships and the containers are stowed in cells fore and aft of the RoRo section and on deck.

# Peace of mind for shipowners



## Grimaldi chooses MacGregor for service

Among owners benefiting from the MacGregor Onboard Care service is the Grimaldi Group, which signed up for a Total Onboard Care package in 2006 which has been renewed and extended until 2015. It covers all the RoRo access equipment.

### Uninterrupted operation

The agreement continues to ensure the uninterrupted operation of cargo access equipment on 27 multipurpose ro-ro ships in the Grimaldi Repubblica and Grande series.

MacGregor has worked with the Grimaldi Group for a number of years, supplying maintenance services as well as new equipment.

This type of contract reflects the tendency of the Grimaldi Group to entrust the maintenance of essential equipment to carefully selected specialists capable of ensuring worldwide operative availability of such equipment and thus uninterrupted operation of ships that is vital for the company's revenue-earning ability.

Another contract, signed in 2010, covers any service issues on board nine vessels owned by a Grimaldi Group

subsidiary, Atlantic Container Lines (ACL). The scope of the contract includes full responsibility for the vessels' stern ramps and stern doors. The contract has been renewed for four vessels until 2015.

### Confidence in MacGregor

By awarding us this latest contract, the Grimaldi Group has expressed confidence in MacGregor's ability to manage and deliver a total of 93 shipset maintenance-years, which are designed to ensure the performance of cargo flow equipment to rated parameters through the implementation of a process of planned and corrective maintenance.

### Mix of equipment

One of the key advantages of Total Onboard Care is that we can take responsibility for a mix of non-MacGregor equipment as well as its own. In this way we can provide our clients with a service that can be applied across their fleets irrespective of original equipment sources.

We can provide peace of mind for shipowners with a 'one-stop shop' service. This way owners benefit from predictable operating costs.

# Global presence, local service

MacGregor has the expertise and global resources to help you increase the earning potential of your fleet throughout its lifetime. We add value to your business by taking responsibility for your onboard cargo flow systems and helping you achieve optimum operational availability.

## Cargo flow experts

MacGregor's cargo flow experts are on standby world-wide to provide a rapid response to your needs. We operate in approximately 50 countries and we are constantly strengthening our local presence to meet changing market needs.

MacGregor's service network consists of more than 60 service centres in major ports around the globe, staffed by specialists. We supply original MacGregor spare parts and repair services on a planned schedule, on demand or on an emergency basis.

## Global presence, 24/7

Our service portfolio covers all cargo handling equipment on board, offshore and in port. Armed with our world-class expertise in cargo and load handling, we can provide service to our customers all over the world. Our worldwide service network means that we are able to respond rapidly to our customer's needs.



## Economy and ecology go hand-in-hand

MacGregor continues to develop environmentally-friendly cranes, hatch covers, RoRo cargo handling solutions on board and in port, winches and other equipment with electric drives, as well as dust-free conveying systems with totally enclosed loading and unloading equipment for dry bulk materials.

We can supply bio-oil for our hydraulic systems and we are preparing to meet the upcoming standards for equipment recycling. We focus intensively on our environmental responsibilities, adapting our bulk handling systems for operation even in densely populated areas.

## Improving your fleet's efficiency

MacGregor offers integrated cargo flow solutions for maritime transportation and offshore industries. Our customer-driven engineering and service solutions support customers in their onboard, port and offshore operations worldwide.

## Operative availability

Today, half of the world's oceangoing ships are fitted with MacGregor equipment. Turn to us when you want a reliable partner to keep that equipment up and running throughout your ship's lifetime.

## Full service portfolio

MacGregor offers you lifecycle support for ships, ports and terminals, offshore and rigs. We complement our products with original spare parts and support services around the clock. We are only a phone call away, often just around the corner and we serve our customers in their own languages. Our goal is to provide top-of-the-line service and sustainability throughout the lifetime of our products. MacGregor's cargo and load handling product knowledge and expertise is unparalleled.

## Service portfolio

- Spare parts
- Service and maintenance, on-demand and planned Service agreements, e.g. MacGregor Onboard Care (MOC) contracts
- Damage repairs
- Modernisations and conversions
- Retrofit, overhaul and modification services
- Refurbishing of steering gear with new pump sets and control units (including class society test)
- Hydro check for steering gear
- Replacement of certain equipment
- Reconditioning of compressors
- Rental service of winches
- Remote control valve systems
- Remote diagnostics for cranes
- Inspections
- Installations
- Drydockings
- Training for crew and personnel
- 24/7-support services
- Consultancy services



MacGregor has the expertise and the resources to modernise and upgrade ageing cargo access equipment to the latest performance standards.

Our conversion packages adapt, enhance or change the original functionality of the system, re-designing it to facilitate the ship's new role and improve its competitiveness.

## Prevent hazards and reduce risks

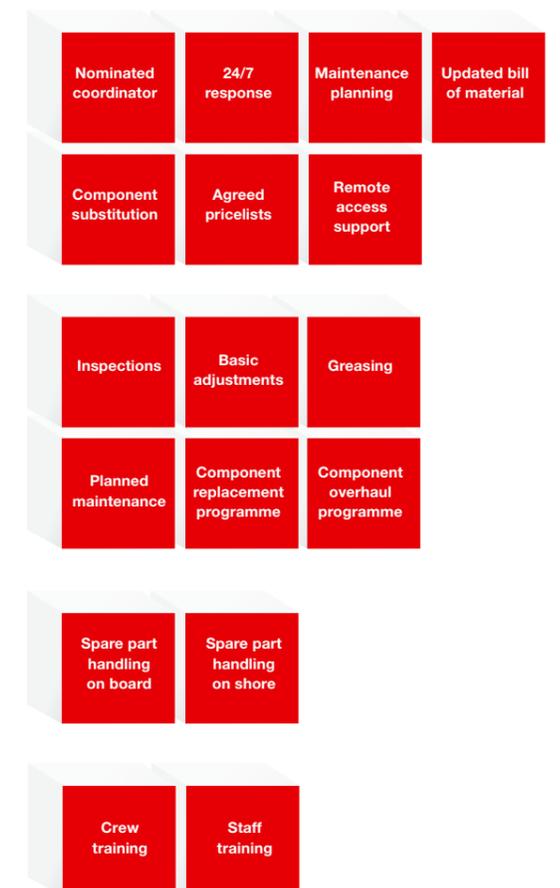
A MacGregor Onboard Care (MOC) contract offers you sustainable ship operations and revenue earning capabilities by ensuring the operative availability of equipment through planned maintenance solutions and our global service network. After identifying your unique needs, we can offer you a combination of services that best fits your requirements. MOC solutions are customised to your needs from the four main elements and the element modules.

**AVAILABILITY SUPPORT** assists the customer in maintaining optimum operation, while helping to reduce the administrative burden. All contracts are facilitated by the MOC coordinator, who acts as the single point of contact for technical, maintenance planning and budgeting support.

**ONBOARD MAINTENANCE** aims to keep the customer's equipment continuously available for its designed operation and to prolong its effective working life. This is achieved through condition monitoring along with preventative, corrective and condition-based maintenance.

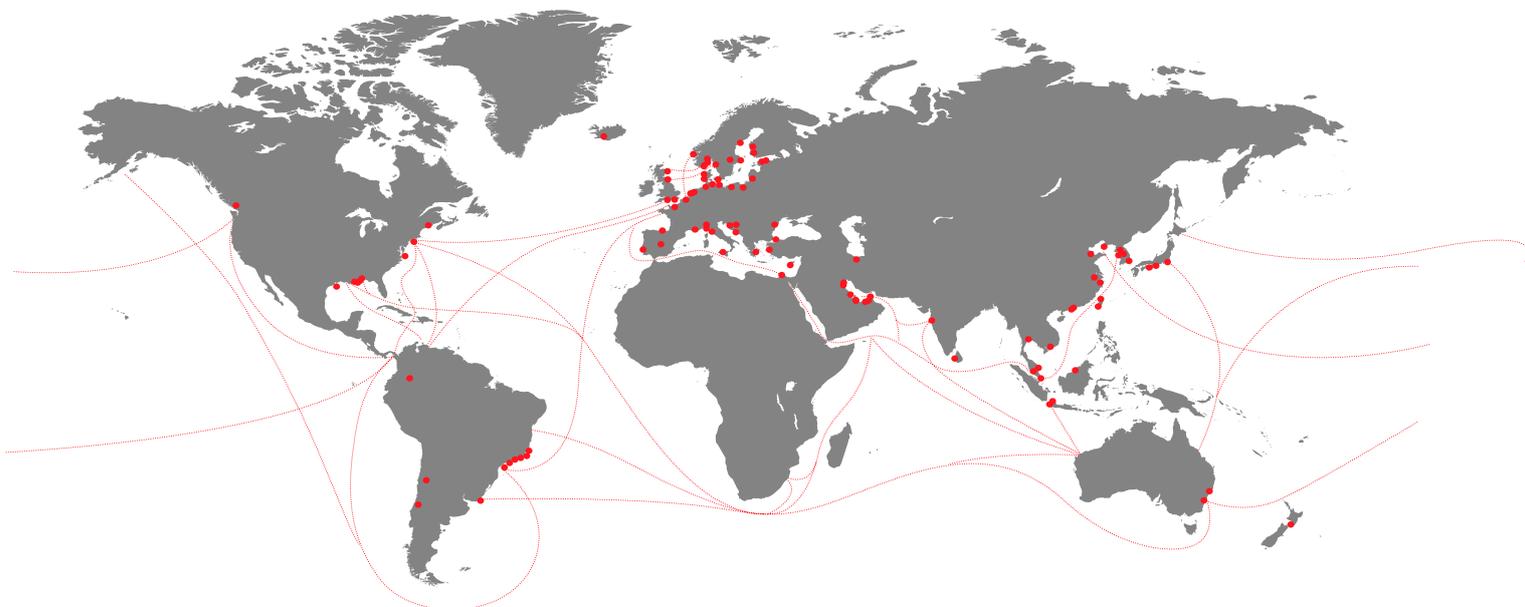
**SPARE PART MANAGEMENT** ensures guaranteed spare part availability. Spare part management can relieve the customer of the associated financial burden of asset management, releasing capital for other purposes.

**CUSTOMER TRAINING** provides personnel with the knowledge and skills to operate and maintain the equipment correctly, helping to improve safety and avoid unnecessary breakdowns. Training programmes can be delivered either on board or ashore and enable customers to utilise their investments to the maximum effect.



Wherever needed, you can rely on our support.  
We serve our brands globally:

- Ankerlökken Marine
- Allset
- ASCA
- Becker
- BMH
- Conver-OSR
- Grampian Hydraulics
- Flintstone
- Greer Marine
- Hamworthy
- Hatlapa
- Hydramarine
- Häggglunds
- Interschalt
- KGW
- KYB - ASCA
- KYB - Kayaba Industries / Navire Cargo Gear
- Luezhoe
- MacGregor
- MacGregor-Conver
- MacGregor-Häggglunds
- MacGregor-Kayaba
- MacGregor-Navire
- Navire Cargo Gear
- Nordströms
- Ozean Service & Reparatur
- Platform Crane Services (PCS)
- Plimsoll
- Pusnes
- Porsgrunn
- Rapp Marine
- Triplex
- Vestnorsk Hydraulikkservice (VNH)



MacGregor shapes the offshore and marine industries by offering world-leading engineering solutions and services with a strong portfolio of MacGregor, Hatlapa, Porsgrunn, Pusnes and Triplex brands. Shipbuilders, owners and operators are able to optimise the lifetime profitability, safety, reliability and environmental sustainability of their operations by working in close cooperation with MacGregor.

MacGregor solutions and services for handling marine cargoes, vessel operations, offshore loads, crude/LNG transfer and offshore mooring are all *designed to perform with the sea*.

MacGregor is part of Cargotec (Nasdaq Helsinki: CGCBV).

Published by MacGregor. Copyright © MacGregor March 2018. All rights reserved. No part of this publication may be reproduced, stored, photocopied, recorded or transmitted without permission of the copyright owner.

**MacGregor Sweden AB**

J A Wettergrensgata 5, SE-421 30 Västra Frölunda  
Tel. +46 31 85 07 00  
rorosales@macgregor.com ; roroconversion@macgregor.com  
[www.macgregor.com](http://www.macgregor.com)

