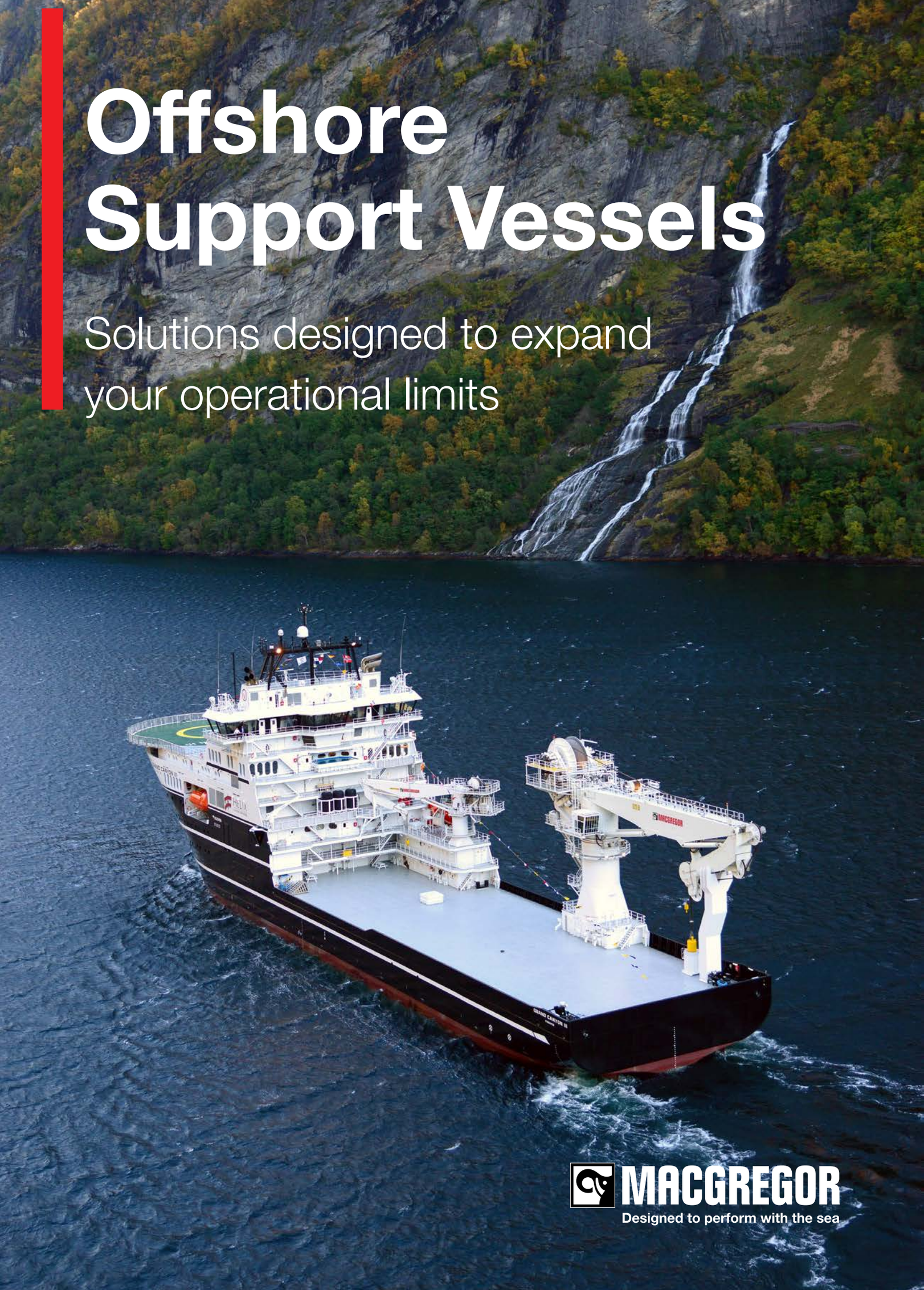
Offshore Support Vessels

Solutions designed to expand your operational limits



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.

Our portfolio

Fibre-rope cranes with retrofit option
Offshore and shipboard load handling
Motion compensated gangways
C-How simulation tools
Module handling systems
Launch and recovery systems
Davits
Deck machinery
Compressors
Steering gear
Global lifecycle support

FibreTrac cranes

Proven fibre-rope handling technology, enabling operators to use the full lifting potential of their cranes, regardless of water depth

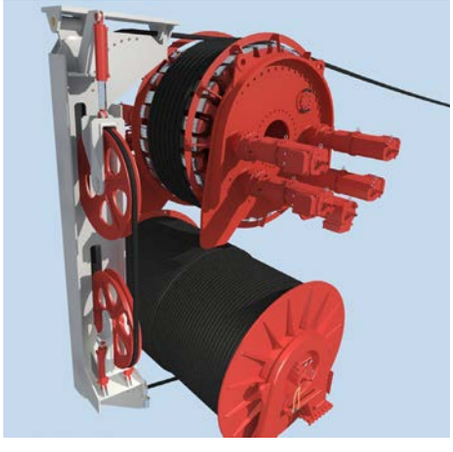
Full capacity to max depth

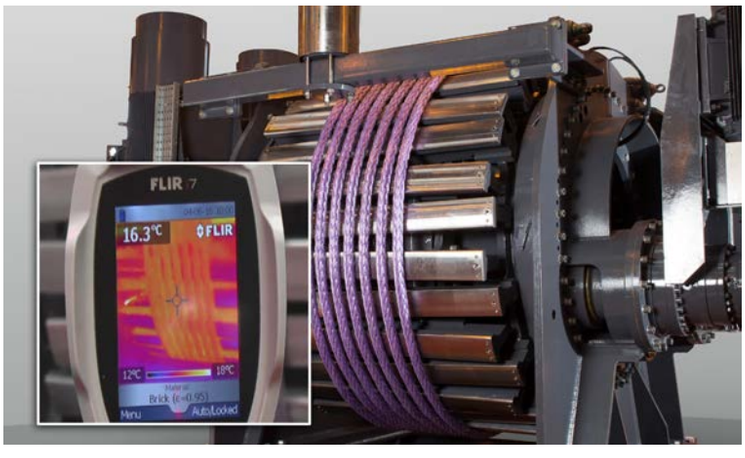
MacGregor has overcome the limitations of handling heavy loads at depths using traditional steel wire-ropes by introducing a fibre-rope crane, FibreTrac. The greatest advantage of fibre rope when handling loads in ultra-deepwater is that it weighs virtually nothing in water. This neutral buoyancy means that, regardless of the length of rope paid out, the fibre rope does not add anything to the load experienced by the crane. Cranes can therefore retain their full lifting capacity all the way down to maximum depth. This is in complete contrast to using wire rope, where the ever increasing weight of wire paid out limits the load permissible in relation to depth.

Gentle rope handling with integrated management system

Gentle rope handling, and a controlled environment, safeguard the condition of the fibre rope, guaranteeing a long lifetime.

MacGregor fibre-rope cranes use a novel capstan, developed by Parkburn, as a traction winch. The Parkburn capstan consists of two interlocking drums that gently de-tension the rope. The drums are slightly angled and offset in relation to each other, which creates a natural and stable helix without generating any fleeting forces so the rope does not twist on the drum. Its open design also assists with rope cooling.





- Load capacity not limited by depth
- Low number of high-tension bends
- Large capstan contact area ensures gentle rope handling
- Capstan design minimises heat build-up and rope fatigue
- Design allows for twin ropes and on-board splicing
- Gentle rope spooling with regulated low-tension on storage drum
- Integrated rope management system with 3D monitoring
- Proven MacGregor and Parkburn technologies
- Retrofit option available for existing cranes or foundations
- Highly-efficient electric or hydraulic drives

Fibre-rope retrofit solution

MacGregor has developed a modular fibre-rope retrofit solution based on the same technology. This allows customers to convert their existing wire-rope cranes, unlocking their full lifting potential with our exciting fibre-rope technology.


0
(surface)
1000
2000
3000
4000
5000
6000
Depth
(m)
SWL
150t
SWL
200t
SWL
250t
SWL
400t
SWL
250t
SWL
150t
SWL
100t
steel wire
fibre-rope
0
50
100
150
200
250
300
350
400
Install Capacity (tonnes)
MACGREGOR
Fibre Tork 1500

Offshore and shipboard load handling

Photo: Harald M. Valderhaug

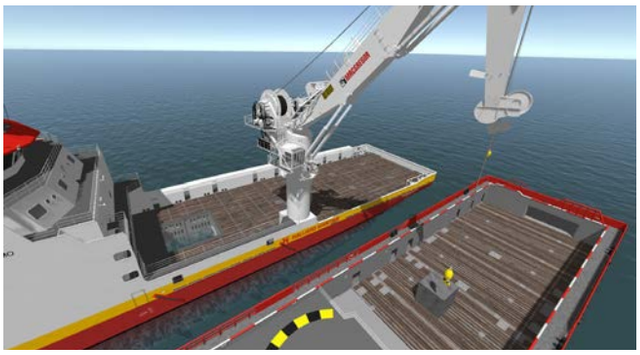
AHC subsea cranes

MacGregor's range of active heave-compensated (AHC) subsea cranes are designed for accurate lifts in all conditions, including extremely cold environments with temperatures down to -40°C. They can be delivered with hydraulic or electric winch drives and the hydraulic power unit (HPU) and winch can be located either on the crane or below deck.

All motions including active heave-compensation, tension-modes and auxiliary and tugger winch functions are integrated within a powerful and intuitive in-house designed control system. This assures precision and safety during critical operations.

The cranes range in safe working load capacity up to 600 tonnes (single line) and can work at depths beyond 4,000m. Fibre-rope solutions enable operations at extreme depths.

All MacGregor knuckle-jib cranes are specially-designed to provide extra high lift heights for very tall loads. This feature offers operators greater flexibility during lift planning operations. MacGregor subsea cranes can be delivered with a range of options including a motion-compensated ship-to-ship load transfer system and personnel lift.



Ship-to-ship motion-compensation system

- Safe transfer of loads between vessels
- Widened operational envelope
- Time-savings for complete lift operations
- Precise and accurate motion-compensation
- Maximum use of load capacity

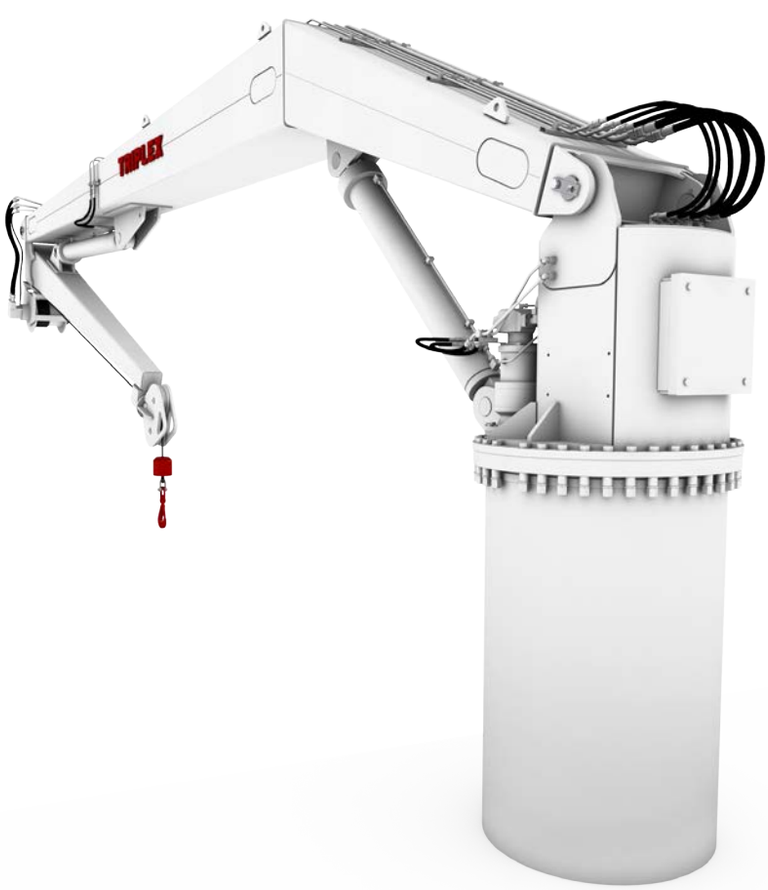
For offshore vessels, the ship-to-ship motion-compensation system offers enormous safety and commercial advantages, providing a real-world increase in weather windows for ship-to-ship load transfers.

When operating in this mode, the crane compensates for relative vertical movement between the crane vessel and secondary vessel regardless of where the crane or load is positioned. A motion reference unit placed on the secondary vessel transmits movement data to the crane's control system via a high-speed redundant wireless radio link.

The system calculates the necessary winch compensation to minimise hook movement in relation to the load or landing zone on the secondary vessel.

It features precise tension and position control for stable hook-on, hook-off, pickup and landing activities.

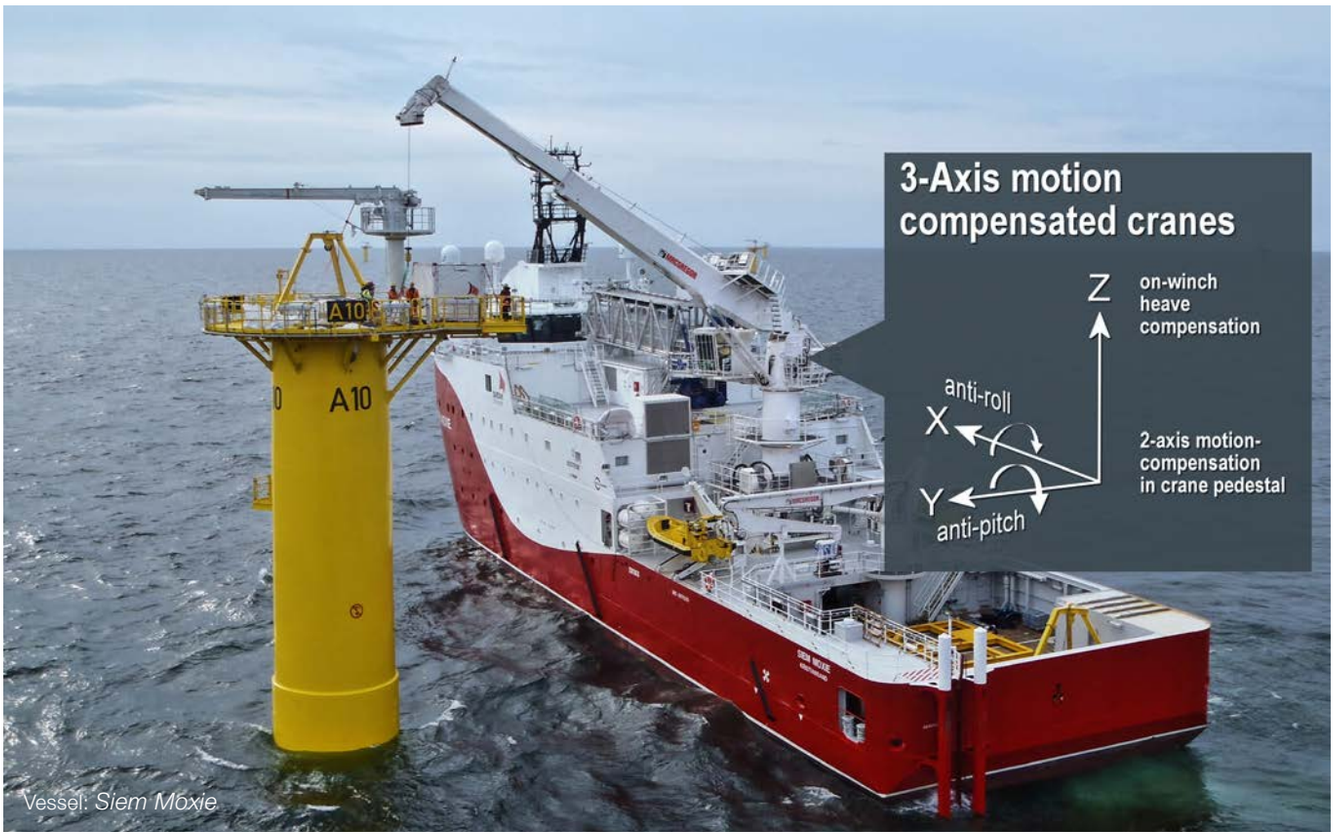
Ship-to-ship motion-compensation improves safety for deck crew working directly with the hook and load, tasks which are traditionally very hazardous. Pick-up and landing of the load is also much smoother and faster and can be precisely-controlled for a wide range of loads.



Shipboard cranes

MacGregor and Triplex shipboard cranes are designed for safe, accurate deck lifts onboard ships and offshore installations, as well as cargo handling within harbours.

These cranes are designed to accommodate the customer's operational requirements and relevant industry regulations. Numerous design parameters are available from a full range of safe working loads and lifting radii to slew-bearing dimension and pedestal height.



3-Axis motion compensated cranes

MacGregor's 3-axis motion compensation technology for cranes was recognised with a prestigious industry innovation award in 2014. Telescoping or knuckle-jib cranes with this motion compensation technology are designed for extremely accurate load positioning during offshore wind turbine, rig supply and maintenance operations.

MacGregor multi-dimensional compensation technology compensates for a vessel's movements in the horizontal axes (pitch and roll) as well as along the vertical axis. Standard AHC technology uses the crane's winch to compensate for all vertical movements. The recently-developed horizontal compensation technology adds to this, ensuring that the crane can securely keep a suspended load in a fixed position regardless of sea conditions.

The crane may also be used for non-compensated general lifting operations and ship-to-ship operations, and can be certified for personnel lifts with a specially-designed basket.

3D Motion compensator

The 3D Motion Compensator (3DMC) is a flexible retrofit device designed to enhance the load-handling precision of an offshore crane, enabling very accurate load positioning.

It is ideal for landing loads on small fixed platforms and can be fitted to the knuckle jib of a broad spectrum of MacGregor subsea/offshore cranes. The 3DMC compensates for the roll, pitch and heave motions of the vessel to minimise any movement of the load in relation to a fixed point in space.

The operator can opt to use the 3DMC during operations that require a greater degree of precision than that available from the standard crane, such as transferring equipment to or from offshore wind turbine structures or any fixed platform. When not required, the 3DMC simply remains fixed to the side of the crane's knuckle jib allowing normal lifting operations.

Winterisation

MacGregor offshore cranes deliver excellent performance even in the toughest environmental conditions. For operating in extremely cold climates, we have developed innovations such as:
such as:

- Fully insulated and heated, lightweight housing that protects sensitive components
- Heat-tracing for components located in exposed areas
- Specially-designed heated operator cabin with extra insulation
- Heated gangways, stairs, ladders and railings
- Special hydraulic oil and grease adapted for cold climates
- Heavy duty components designed to withstand ice removal
- Designs that prevent excessive ice build-up

These features ensure safe and reliable cold climate operation in temperatures down to -40°C and are designed in accordance with DNV GL, BV, LRS, RMRS, ABS and other relevant class societies' regulations.

A-frames

A-frames are designed to perform a broad range of operations, such as offshore load handling (plough deployment), subsea load handling (anchor handling) and the launch and recovery of special tools and equipment. MacGregor A-frames are designed for heavy subsea operations in corrosive offshore environments. A-frame lifting capacities range from 1 to 350 tonnes. They can be delivered as self-contained, self-erecting units for mounting at the stern or either side of a vessel.

Motion-compensated gangways

Motion-compensated gangways

Motion-compensated gangways are designed for the safe, efficient transfer of personnel and cargo to fixed offshore installations. Standard gangways compensate motions, however the system can be upgraded to include active-heave compensation on the gangway's pedestal for extreme motions. These gangways are based on our award-winning three-axis motion crane technology. Compensation systems include active, passive or combined control methods and the gangway can be delivered with or without an operator cabin, with pedestal height adjustment and an elevator.

The system has a small footprint. Its unique design allows personnel to access the gangway during all compensation movements and in all positions. Multiple redundant, real-time sensors work together with the control system to guarantee safety. This sophisticated system makes operation simple and clear, giving the operator deviation feedback with warnings that prompt the appropriate action.

C-How simulation tools

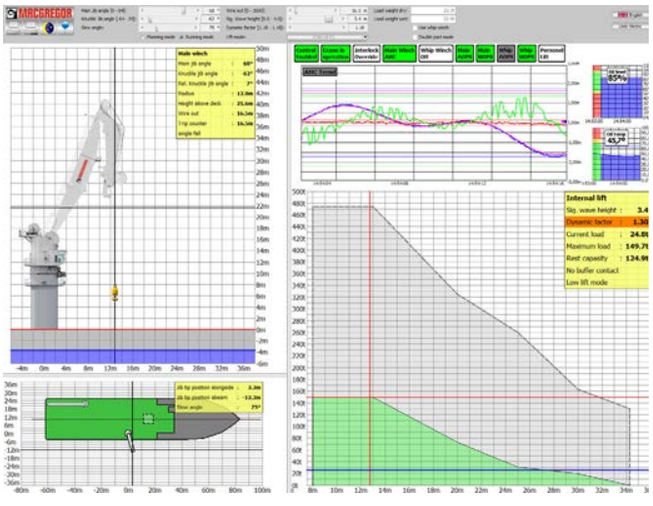
C-How is MacGregor's flexible simulation platform that enhances safety and efficiency by allowing users to run equipment through various simulated conditions and operations

Features:

- Flexible simulation and virtual prototyping tools developed and owned by MacGregor
- Simulate a wide range of equipment
- High quality real-time dynamics with accurately simulated measurements and forces
- High quality 3D visualisation with virtual reality support
- User friendly interface for designing and running simulations

Examples of use:

- Testing and verifying a new design
- Control system hardware-in-the-loop
- Safety and stress testing
- Planning tool for complicated operations
- Marketing visualisation tool
- Equipment training



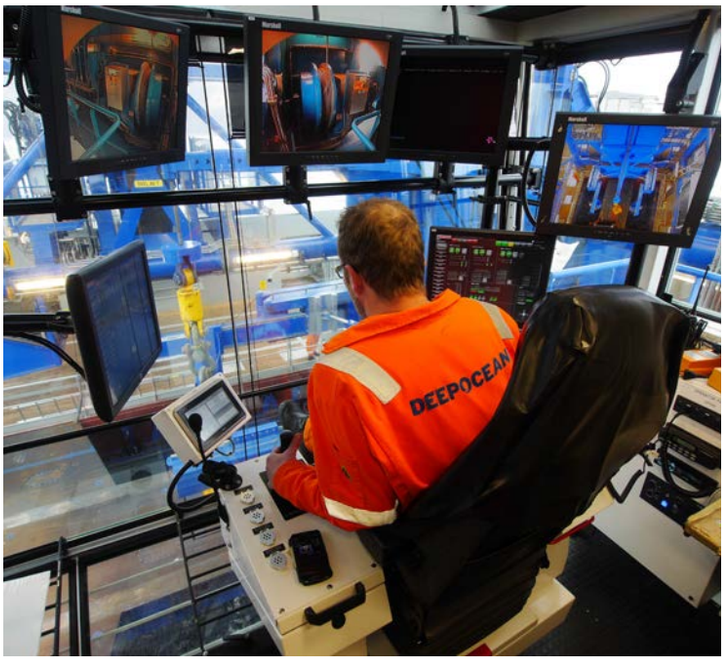
C-How

Simulation tools can be installed to run on different hardware setups and are designed for easy upgrade packages. These offer the user possibilities ranging from basic planning and testing tools to a full-scale operational training experience.

Scale your C-How simulator package to suit your needs

C-How can be tailored to meet specific customer requirements. This technology is modular and scalable, and all packages are configured to manage changes including vessel layouts, additional equipment and the new operational scenarios. C-How is not limited for use with MacGregor equipment and can be tailored for use with products from other manufacturers.

Module handling



Module handling systems

Our module handling solutions are fully-customised to comply with a vessel's layout and its specific operational requirements. They can be supplied as hangar-integrated solutions which provide a safer, more comfortable working environment or as free-standing tower systems that offer greater flexibility.

MacGregor module handling systems are fully vessel-integrated and are delivered with guidewire and cursor systems, multiple moonpool doors, heave compensated winches, personnel lift and more.

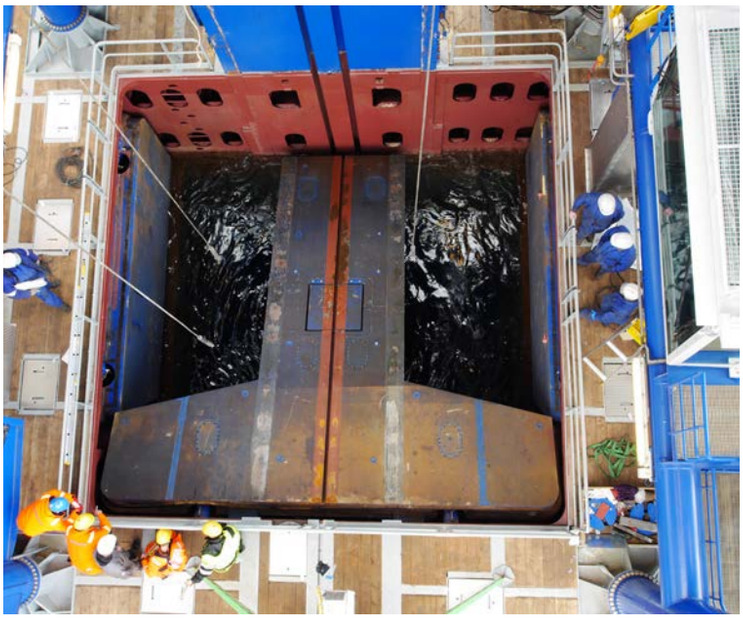
An integrated control system provides a powerful centre for control and monitoring of all aspects of the equipment. It is ideally suited to enable extremely precise handling of modules of all designs and sizes. MacGregor module handling winches can make use of electric, hydraulic or combined drive systems.

Vessel: *Rem Ocean*

Deck-skid systems

Deck-skid solutions include hydraulically-driven tractor units, pallets and full deck rail arrangement, enabling safe, controlled shuttling of loads of up to 120 tonnes, across open deck, into multiple ship hangars and across moonpools, even while underway.

These systems ensure complete load security and may be operated locally or via a remote control panel. Quick connections of the tractors to a ringline hydraulic system provide enhanced flexibility and mobility.

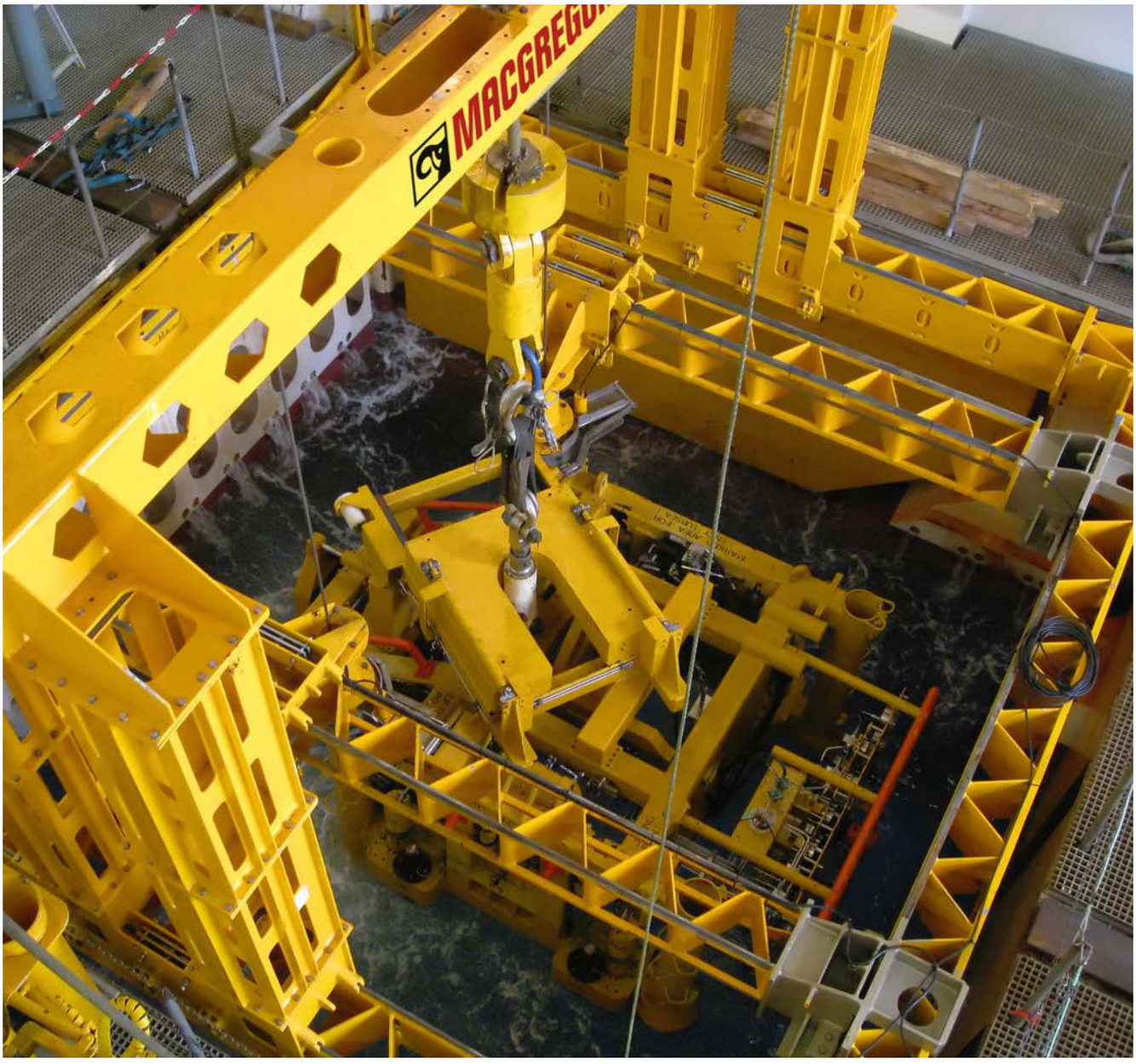


Moonpool door systems

Moonpool doors can be delivered for moonpools of all types and sizes, for deck-level and for the moonpool bottom.

Single, double or multiple door designs are specifically adapted for the moonpool lift equipment and can be fully integrated with a deck-skid system and vertical rail and cursor system.

Door controls may be integrated with lifting equipment controls and benefit from failsafe locks that ensure equipment and personnel safety.



Launch-and-recovery systems

MacGregor LARS are exceptionally reliable, precise and designed to withstand extreme dynamic forces. These robust systems enable the safe operation of heavy payloads in adverse weather conditions and sea states.

Moonpool LARS

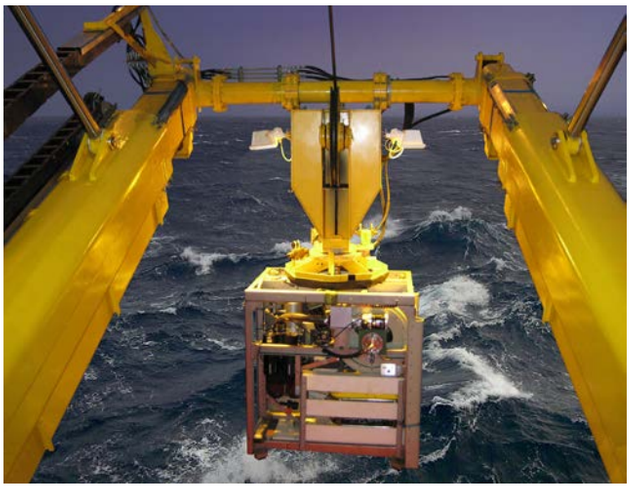
Vertical LARS are delivered with a vessel-integrated, rail-mounted guide cursor and a highly accurate hydraulic or electric winch, a large screen-based control panel and moonpool door system. Cursor locks allow secure and convenient parking at heights ideally suited to maintenance operations or traffic around or under the remotely operated vehicle (ROV).

Overhead-mounted overside LARS

These utilise an extremely precise, electrically-driven, heave-compensated umbilical winch for the safe launch-and-recovery of various types of ROVs. An extendible, telescoping snubber reduces pendulum motions and allows locking and rotation of the load. The compact telescoping design and overhead placement of the LARS ensures safety and offers considerable free work space in the ROV hangar. Crew safety and comfort can be further enhanced by placing the side-hangar door tops below the LARS. This allows the hangar doors to be closed even when the ROV is deployed.

Deck/skid-mounted overside LARS

This is a flexible and compact modular A-frame-based system for precise ROV control during launch-and-recovery operations. An articulated and fully dampened snubber allows increased security and full rotation of the load while additional snubber sheaves allow for offlead umbilical angles during surveys. A hydraulic shock-absorber dampens any snatch loads, enhancing load and umbilical safety. The A-frame can be retracted to free the maintenance area around the ROV when parked.



Portable container LARS

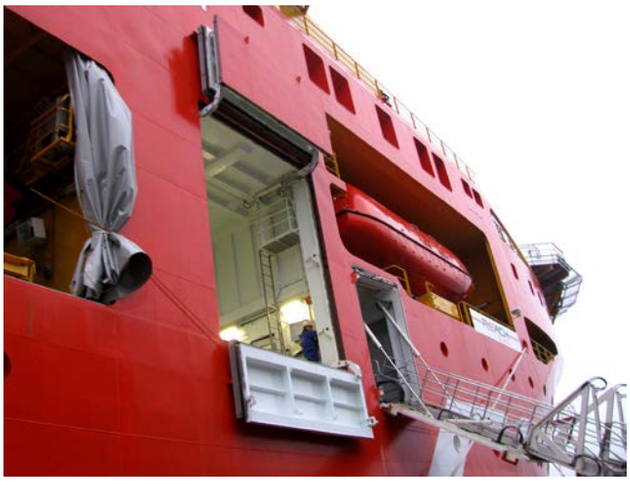
Portable container LARS can be designed and delivered for handling various types of unmanned underwater vehicles and subsea survey equipment such as ROVs, AUVs and seismic nodes. Portable MacGregor LARS offers valuable benefits including ease of transportation and mobilisation, while maintaining uncompromised precision and performance.

Umbilical winches and sheave systems

These systems are designed for ROV of all types and use direct on-winch active heave-compensation technology that provides extremely precise position and speed control over a long lifetime. Winches are supplied as compact, electrically driven units with precise full radius spooling systems. Sheave systems allow for flexible placement of the winch onboard while maintaining umbilical integrity.

ROV side-hangar doors

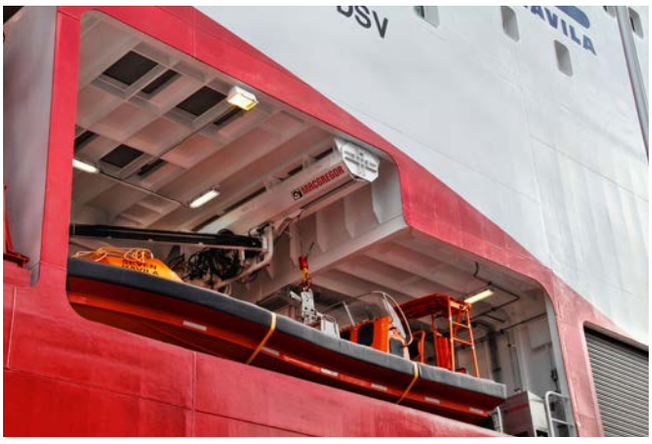
These doors are designed to function in adverse weather and heavy seas whilst ensuring continuity of ship operations. Design options are available to cater for a variety of operator needs. Door selection takes into consideration ship design, method of ROV launch and sea state. Controls can be integrated into the LARS' control system for simplified operation.



Davits

Rescue and work-boat davits

MacGregor pivoting- and telescoping-type davits are available for handling small or large daughter crafts including man overboard boats (MOB) and other rescue boats. The SOLAS-approved davits incorporate emergency backup power systems for guaranteed operation even during dead-ship conditions. Davits can make use of optional shock-absorbers, heave compensation and/or constant tension features for safer handling in severe weather conditions and for heavy boats. An associated towing boom (slewing, luffing or telescoping) with optional jigger winch keeps the boat under control during launch and recovery.

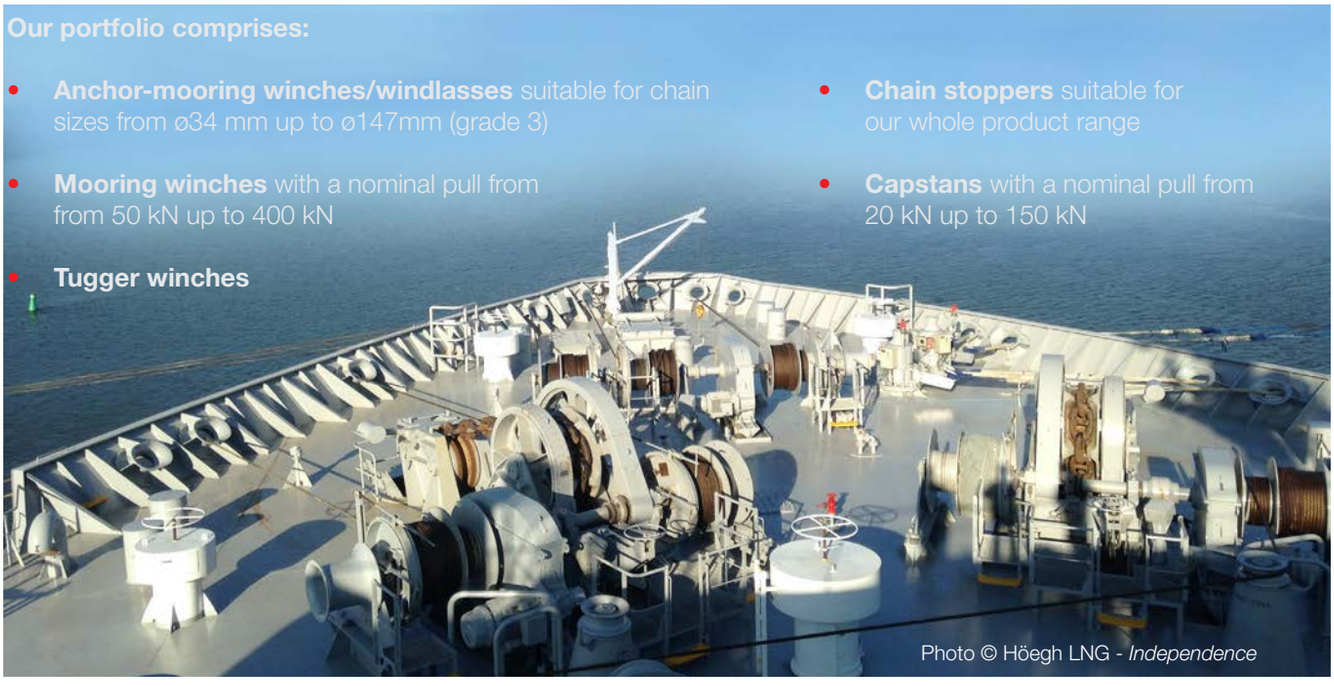


We can deliver an extremely robust G-type davit, specially-designed for operations in rough conditions. Our G-type davits are also suitable for technician transfer boats for offshore windfarm service. Our T-type davit has a compact design which allows for installation in a hangar with limited height and/or depth. The space-saving design of this telescoping davit leaves the vessel deck and bulkhead clear, supporting the davit only by the overhead ship's structure. MacGregor's A-type davit is a cost-efficient alternative that offers proven performance and reliability. All MacGregor davits are type approved by DNV GL.

With more than 1,000 MacGregor davits delivered worldwide, we know what is important to our customers.

Deck machinery

Mooring and anchoring a vessel not only requires a knowledgeable crew, it also demands reliable, high quality deck machinery. MacGregor offers Hatlapa and Pusnes deck machinery, which has served the marine market since 1875.



Electric drives

With the increase in environmental awareness, more and more shipowners are choosing electrically-operated deck machinery for their vessels. MacGregor can offer two different types of electric drives:

Pole changing-type drive

Pole changing-type drives use a programmable logic controller (PLC) and a three-speed IP56 electric motor, which provide high-tension and high-slack rope speeds whilst ensuring safe operation.

Variable frequency drive (VFD)

VFDs utilises stepless speed control from zero to nominal speed, which ensures smooth, accurate and safe operation.

Hydraulic drives

For many years, hydraulic drives have proven their reliability, high capacities and flexibility for tanker vessels and gas carriers. MacGregor can offer two different types of hydraulic drives:

High-pressure drive (ring-main system)

Off-the-shelf hydraulic motors connected to a compact piping in a ring-main, which enables all units to be operated simultaneously.

Low-pressure drive

Specially-designed high-capacity hydraulic motors ensure a very reliable anchoring operation.

MacGregor's deck machinery is designed in Germany and Norway and meets the requirements of all IACS classification societies, ISO and OCIMF MEG3. MacGregor's commitment to providing high-quality products and worldwide service ensure safe and reliable operations for our customers.

Steering gear and compressors

Expert rudder control delivered with our steering gear.

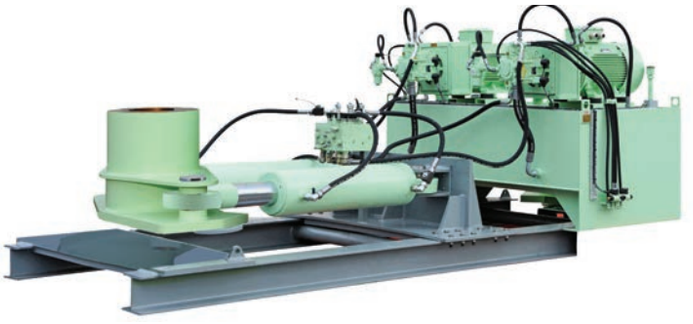
Hatlapa “Triton” rotary-vane steering gear can be used for all vessel sizes from around 5,000 dwt.l It is compact, making it suitable for the smallest compartments.

Maximum torque can be applied at all angles. This increases safety, particularly when sailing in narrow straights and enhances maneuverability during berthing.

Rotary-vane steering gear can offer full redundancy and rudder angles up to 2 x 70^0.

Hatlapa “Neptune” piston-type steering gear is suitable for all vessel sizes from around 500 dwt up to 30,000 dwt.

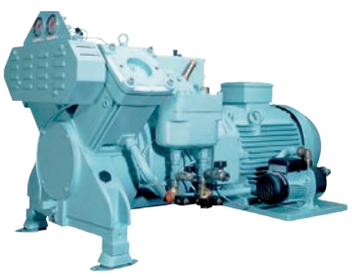
The piston-type steering gear offers rudder angles up to 2 x 60^0.



MacGregor offers piston- or screw-type Hatlapa compressors that are either air- or water-cooled. They can be used for different services including starting air, service air, working air and control air.

compressor L 270

Two or three stage air-cooled piston compressors with a capacity of up to 411 m^3/h at pressures from 7 to 40 bar.



compressor V150

Two stage, water-cooled piston compressors with a capacity between 105 and 375 m^3/h at pressures from 7 to 30 bar.

compressor HSC22kw

Air- or water-cooled screw compressors with capacities from 25 to over 666m^3/h at pressures from 7 to 10 bar.

The right parts and services in the right place at the right time

MacGregor's mission is to safely provide the fastest possible supply of spare parts, maintenance services and technical support for all customers, wherever in the world they operate.

Spare parts and logistics

Using the wrong spare parts, or ignoring the need to replace worn parts in time, can lead to equipment malfunction and other serious problems.

MacGregor supplies original spare parts and components (hydraulic, electronic and mechanical) to any worldwide destination from its logistics centres located in Germany and Singapore.

Maintenance and damage repairs

MacGregor can undertake any minor or major repair work, conversion or modernisation of cargo handling equipment. Work starts with a consultation process where a thorough inspection of equipment is carried out. Through MacGregor's lifetime analysis, it can determine whether equipment can be repaired, converted or modified, therefore extending its productivity.

MacGregor supplies repair services on a planned schedule, on demand or on an emergency basis.

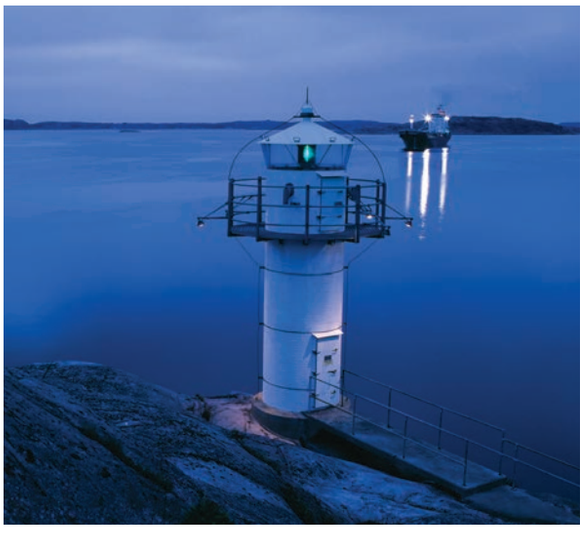
Worldwide experts at your service 24/7

Close and continuous collaboration between MacGregor's network of field services, product competence centres and new sales units ensures precise, quick and efficient support for all customers.

MacGregor operates in around 50 countries and its service network consists of service centres in major ports around the globe, staffed by specialists.

MacGregor service portfolio

- Spare parts and logistics
- Maintenance and repairs
- Conversions and modernisations
- Inspections
- Drydocking
- Service contracts
- Training for crew and personnel
- Remote diagnostics
- Support services

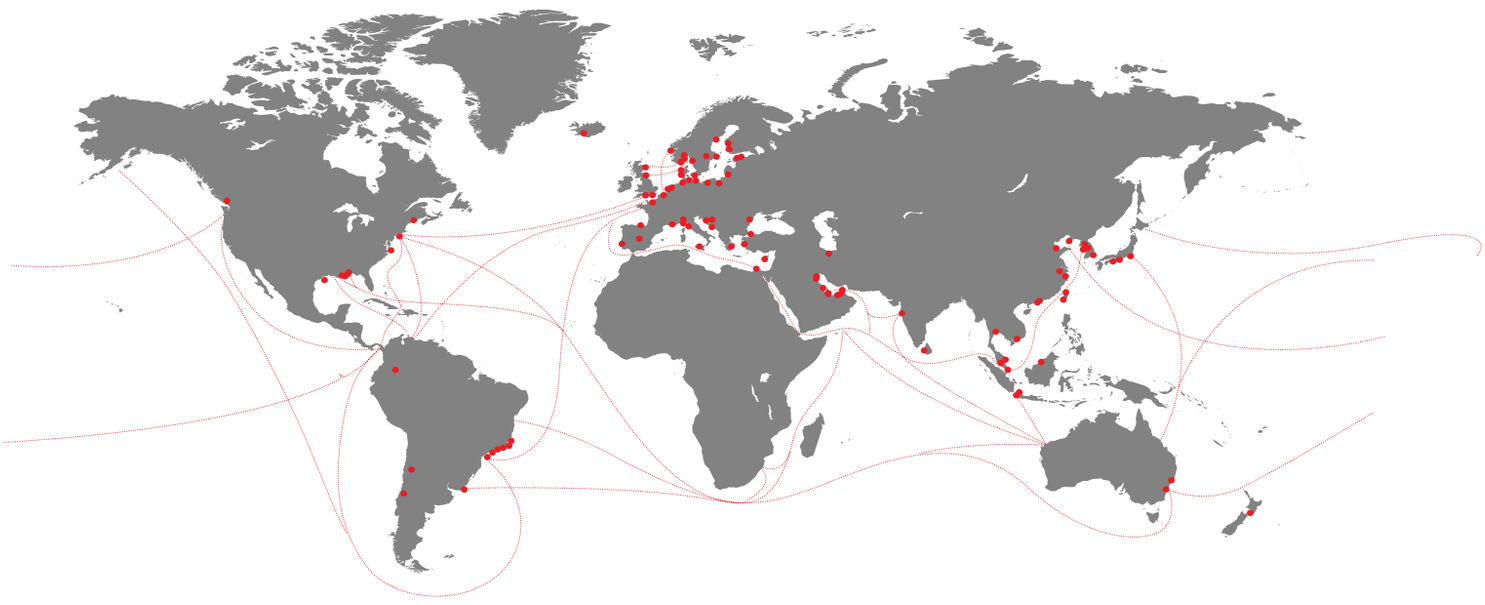


MACGREGOR

Designed to perform with the sea

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
- Hägglunds
- Interschalt
- KGW
- KYB - ASCA
- KYB - Kayaba Industries / Navire Cargo Gear
- Luezhoe
- MacGregor
- MacGregor-Conver
- MacGregor-Hägglunds
- 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).

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LLOYD'S REGISTER · LRQA
ISO 9001 · ISO 14001
OHSAS 18001
UKAS MANAGEMENT SYSTEMS
001

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