Offshore AHC cranes

MACGREGOR

Equipped to succeed

Expert solutions for your offshore vessels

Extreme challenges require extreme expertise, reliability and performance. It is our strategic aim to benefit our customers by driving innovation to meet any challenge.

MacGregor knows offshore. We've spent over 35 years together with our customers in the harshest environments, helping them conduct complex offshore load handling operations with the utmost precision, safety and care.

Today we continue to take the lead to give you the edge – providing lifelong sustainable solutions and services that enable you to enhance reach, efficiency and results.

Each MacGregor product is as specialised as the industry and vessels we serve. Crafted to allow your vessel to excel in environments where only the best obtain licence to operate, our portfolio adds value to every assignment through optimum uptime, quality and the ability to push performance to meet the most exacting operational envelopes.

From our base in Southern Norway, backed by our solid experience and expertise, we're perfectly positioned to deliver tailored solutions, service and support, giving you a genuine advantage in an increasingly demanding industry.

We work closely with shipowners, shipyards, classification societies and consultants; all our systems are designed, manufactured, tested and certified in accordance with classification requirements and applicable international standards and regulations.

For excellence in every extreme, look no further.

AHC subsea cranes

MacGregor range of active boost or semi-active type active heave compensated subsea cranes is designed for safe and accurate offshore and deepwater subsea lifting operations, including offshore construction and subsea installation, deck- and ship-to-ship lifts in most severe offshore environments.

General description

Utilizing the finest and most reliable MRU (Motion Reference Unit), position sensors and control system, MacGregor cranes provide top-precision active heave compensation for the vertical heave motion of the vessel directly through the crane's winch. AHC directly on crane's winch vs. traditional AHC cylinder compensation allows for most accurate lifts without the limitation of cylinder stroke assures more accurate wave stroke compensation vs. traditional AHC cylinder compensation. MacGregor cranes are delivered with a complete electro-hydraulic power unit (HPU) fully enclosed and mounted in the cranes' king structure. AHC, auto-tension and auxiliary winch and tugger winch functions are integrated within a powerful and intuitive control system, assuring precision and safety of critical operations.

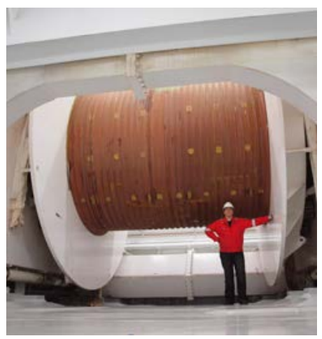
State-of-the-art, in-house developed, large screen-based PLC system (Programmable Logic Controller) allows crane operator to have full control of crane's functions, ensuring total safety of critical lifting operations at different sea states and operating positions, reducing the possibility of overloading the crane at any given radius. MacGregor subsea cranes deliver this safety feature in accordance with all the latest class requirements for MOPS (Manuel Overload Protection System) and AOPS (Automatic Overload Protection System).

Standard features

- Lifting capacity range from 15t and up to 600t single line / 900t double fall
- Cranes can be delivered as fixed-boom or knuckle-jib type
- AHC direct on winch
- In-house developed control system
- Prepared for ROV monitoring
- Main winch wire capacity up to 4000m
- Main winch may be mounted on crane or below deck
- Auxiliary winches with up to 40t SWL and 3000m wire capacity
- Tugger winches are a standard feature on larger cranes
- Fully-equipped, spacious, air-conditioned, ergonomically designed operator cabin

Optional features

- Special high-lift mode for knuckle-jib cranes
- Wire rope integrity monitoring system
- Certified for ship-to-ship operations
- Constant tension for increased lifting height
- Certified for personnel lift
- Winterization package
- Dynamic load calculator / Planning tool integrated with crane's control system
- C-HOW simulation platform
- MacGregor OnWatch – satellite-based online support system with remote diagnostics



We have delivered close to 3000 offshore and marine cranes; here are some of our references:

- 900t AHC subsea crane to Toisa Ltd / Sealion Shipping Ltd
- 400t AHC subsea crane, 25t and 10t offshore cranes to Toisa Ltd / Sealion Shipping Ltd
- 400t AHC subsea crane and 50t AHC subsea crane to North Sea Shipping AS
- 400t AHC subsea crane and 100t AHC offshore crane to Eidesvik Offshore ASA
- 4 x 250t subsea cranes to Hornbeck Offshore Services Inc
- 250t AHC subsea crane and 15t offshore crane to Volstad Shipping AS
- 200t AHC subsea crane and 100t offshore crane to MAC for Nautilus Minerals Inc
- 150t AHC subsea crane to Tasik Subsea
- 3 x 100t AHC cranes to Subsea 7
- 14 x 100t AHC subsea cranes to Coastal Contracts BHD

Technical information for small AHC cranes

Crane type	1891	2806	2400	3293	3293
Shipboard capacity	LKO 10T-15m (20T-8m)	LKO 15T-32m (25T-15m)	LKO 20T-22m (40T-12m)	LKO 23T-35m (50T-18m)	LKO 25T-30m (70T-16m)
Offshore capacity	LKO 10T-15m (20T-8m)	LKO 8T-32m (25T-13m)	LKO 15T-22m (40T-10m)	LKO 20T-35m (50T-15m)	LKO 20T-30m (70T-13m)
Lifting capacity	20T	25T	40T	50T	70T
List/Trim	5/2	5/2	5/2	5/2	5/2
Outreach	15m	32m	22m	35m	30m
Wire diameter	32mm	36mm	44mm	56mm	56mm
Power consumption	2x165Kw	2x265Kw	2x280Kw	3x270Kw	3x315Kw
Fundation height	2,5m	4m	2,5m	5m	5m
Total weight	~50T	~125T	~100T	~190T	~190T

Winch

Winch type	On crane	On crane	On crane	On crane	On crane
Hook travel	1500m	3000m	2000m	3000m	3000m
Hoisting speed 1 stepless on middle layer	0-10T, 0-60m/min	0-12,5T, 0-60m/min	0-20T, 0-60m/min	0-25T, 0-50m/min	0-35T, 0-60m/min
Hoisting speed 2 stepless on middle layer	0-20T, 0-30m/min	12,5-25T, 0-60m/min	0-40T, 0-30m/min	25-50T, 0-25m/min	35-70T, 0-30m/min
Hoisting speed 3	N/A	N/A	N/A	N/A	N/A

Technical information for medium AHC cranes

Crane type	3293	3568	3568	3568
Shipboard capacity	LKO 25T-30m (100T-12m)	LKO 25T-32m (100T-15m)	LKO 30T-35m (150T-15m)	LKO 25T-31m (150T-10m)
Offshore capacity	LKO 20T-30m (100T-9m)	LKO 25T-32m (100T-15m)	LKO 25T-35m (150T-11m)	LKO 25T-31m (150T-10m)
Lifting capacity	100T	100T	150T	150T
List/Trim	5/2	5/2	5/2	5/2
Outreach	30m	32m	35m	35m
Wire diameter	64mm	64mm	77mm	77mm
Power consumption	3x300Kw +1x550Kw	3x300Kw +1x550Kw	4x550Kw	6x310Kw
Fundation height	5m	5m	5m	3m
Total weight	~240T	~310T	~370T	~445T

Winch

Winch type	On crane	On crane	On crane	Under deck
Hook travel	3000m	3000m	3000m	3000m
Hoisting speed 1 stepless on middle layer	0-33T, 0-60m/min	0-33T, 0-60m/min	0-50T, 0-80m/min	0-50T, 0-80m/min
Hoisting speed 2 stepless on middle layer	33-66T, 0-60-30m/min	33-66T, 0-60-30m/min	50-100T, 0-80-40m/min	50-100T, 0-80-40m/min
Hoisting speed 3 stepless on middle layer	66-100T, 0-30-20m/min	66-100T, 0-30-20m/min	100-150T, 0-40-20m/min	100-150T, 0-40-20m/min

Technical information for large AHC cranes

Crane type	4320	4841	4841	5150	6800
Shipboard capacity	LKO 82TT-36m (270T-14m)	LKO 100T-34m (250T-19m)	LKO 100T-34m (400T-13m)	LKO 163T-40m (400T-20m)	LO 280T-40m (600T-25m)
Offshore capacity	LKO 70T-36m (270T-12.5m)	LKO 90T-34m (250T-17m)	LKO 75T-34m (400T-12m)	LKO 130T-40m (400T-18m)	LO 280T-40m (600T-25m)
Lifting capacity	270T	250T	400T	400T	600T
2-Part		300T, 2-Part			900T, 2-Part
List/Trim	5/2	5/2	5/2	5/2	5/2
Outreach	36m	34m	34m	40m	40m
Wire diameter	100mm	100mm	126mm	126mm	156mm
Power consumption	3x1020Kw	6x485Kw	6x485kW +2x350kW	8x485Kw	10x485Kw
Fundation height	5m	10m	10m	10m	10m
Total weight	~605T	~780T	~975T	~1050T	~1570T

Winch

Winch type	On crane	Under deck	Under deck	Under deck	Under deck
Hook travel	3000m	3000m	3000m	3000m	3000m
Hoisting speed 1 stepless on middle layer	0-67,5T, 0-80m/min	0-62,5T, 0-80m/min	0-100T, 0-50m/min	0-100T, 0-80m/min	0-150T, 0-60m/min
Hoisting speed 2 stepless on middle layer	67,5-135T, 0-80-40m/min	62,5-125T, 0-80-40m/min	100-200T, 0-50-20m/min	100-200T, 0-80-40m/min	150-300T, 0-60-30m/min
Hoisting speed 3 stepless on middle layer	135-270T, 0-40-20m/min	125-250T, 0-40-20m/min	200-400T, 0-20-10m/min	200-400T, 0-40-20m/min	300-600T, 0-30-15m/min

C-HOW Explore the possibilities

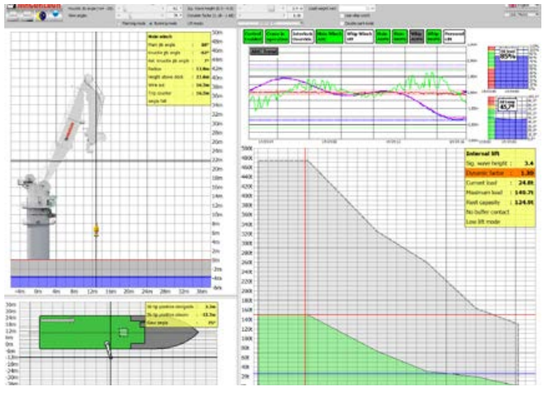
Simulation technologies are becoming standard in the offshore industry. At MacGregor, we rewrite the standards to take into account your needs and to offer a range of simulation packages that can optimise your equipment effectiveness, while enhancing safety and operational efficiency.

C-How is a simulation platform that allows users to run their equipment through various simulated conditions and operations. The tool provides relevant data for a wide range of conditions or design setups when physical systems cannot, giving you better information earlier in a project, along with the ability to explore numerous possibilities from any location and without risk.

Benefits at every stage in a project

The software is extremely flexible and simulation detail can be varied and upgraded depending on the level of functionality required.

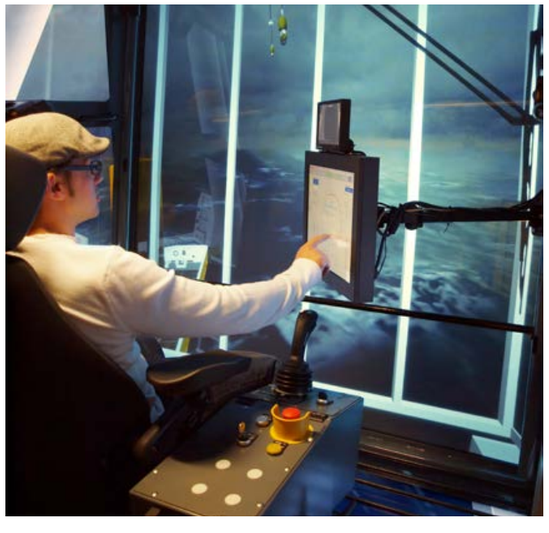
Its multi-purpose applications offer numerous benefits; from concept studies, design and operational planning to crew training, and for modifications and upgrades. C-How can be your presentation tool that will allows you to demonstrate your vessel's operational functionality and capabilities.



Scale your C-How simulator package to suit your needs

C-How can be tailored to specific customer requirements. This tool is modular and scalable, and all packages are configured for further vessel layout, additional equipment and new operational scenario development. It is not limited for use with MacGregor equipment and can be tailored for use with products from other manufacturers.

C-How can be installed to run on different hardware setups and is designed for easy upgrade packages that offer the user possibilities ranging from a basic planning and testing tool to a full-scale operational training experience.



Semi-electric offshore cranes

MacGregor semi-electric active heave compensated cranes retain the superior operational performance of our traditional offshore cranes, while introducing substantial environmental, functional and commercial benefits.

General description

MacGregor semi-electric active heave compensation offshore knuckle-jib cranes are delivered as self-contained units with complete electro-hydraulic drive systems. They have electric drive on the main and whip winches, while the crane functions like knuckle jib, main jib and slew are hydraulically operated. The control system ensures safe, reliable and highly accurate offshore lifting and subsea load handling operations.

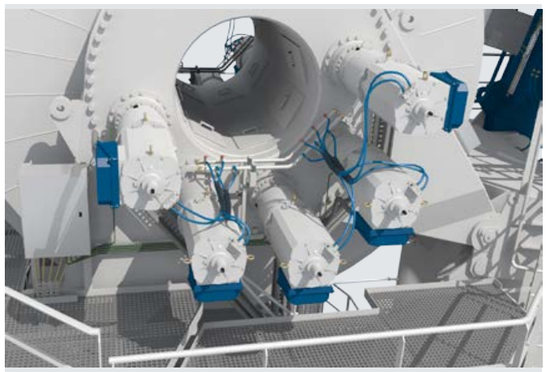
The cranes offer substantial structural and mechanical capacity margin for heavy offshore and subsea operations, and for secure parking when not in use. They are also designed for use in severe weather and corrosive offshore environments.

Crane's main and whip winches are fitted with compact high precision water-cooled permanent magnet electric motors, which are controlled using variable frequency drives. Crane's electric power unit includes frequency converter power units, drives control system and a PLC control system, to ensure a precise and safe control of winches. All motor control and cooling systems are housed in dedicated container units on the crane.

The remaining hydraulic crane functions have an improved design which greatly reduces the risk of oil spills from the crane, and it will be run on biodegradable oil. Cylinders will be equipped with improved double seals and the HPU and slew system is completely enclosed inside the crane's king.

Cranes are delivered as self-contained units with complete electro-hydraulic power unit (HPU) built for independent hydraulic operation of crane functions. The improved design offers a smaller HPU unit that uses biodegradable oil for all crane's hydraulic functions, and is completely enclosed in the crane's king.

The crane can be delivered with various features including ship-to-ship mode, personnel lift, cold climate package for operations in extremely low temperatures, and numerous others.



Perfect fit for new generation of vessels

Perfect integration to the most modern ship power systems with variable speed diesel generators and energy storage systems, will benefit owners, operators and the environment.

Environmental benefits

Electric drive with power-return offer:

- reduced emissions
- energy savings through reduced fuel usage and reduced demand on power system
- power-return to storage benefits peak users like DP
- power-return can benefit crane operations for vessels not equipped with power storage

Smaller HPU with biodegradable oil, improved gaskets, and fewer lines & connections offer:

- more energy savings and reduced emissions
- reduced risk of spills occurring
- biodegradable oil greatly reduces risks associated with spills
- auto start/stop further reduces energy requirements when HPU functions are not in use

Functional benefits

- Increased winch accuracy in all operating modes
- Reduced downtime due to increased reliability and reduced maintenance requirements
- Simplified and faster installation and commissioning
- Better winch drive motor redundancy
- Power regeneration and feed back to vessel
- Better integration in modern ship power management systems where all power users share a common energy storage and retrieval system
- Reduced operational cost

A better subsea tool with smaller environmental footprint

3-axis motion compensation cranes

MacGregor offshore three-axis motion compensation cranes of telescoping or knuckle-jib types are designed for extremely precise load handling during offshore windmill and rig supply maintenance operations.

Tradition of innovation

Utilizing the finest and most reliable motion sensors, position sensors and control system, MacGregor cranes provide top-precision active heave compensation for the vertical heave motion of the vessel directly through the crane's winch. MacGregor's recently developed multi-directional compensation technology compensates for vessel's movements in the horizontal plane (pitch and roll) by tilting of the crane foundation, ensuring that the crane remains vertical in relation to the seabed, and therefore parallel to the windmill's structure.

General description

The outer crane foundation is connected to two internal combined foundations, which again are fixed to a hydraulic actuated 2-directional motion compensation system. The movement is actuated and controlled by robust, high speed hydraulic cylinders designed with a redundant configuration. The crane is delivered and mounted on a square shaped foundation welded to deck of the vessel. The crane is fitted with a complete electro hydraulic power unit (HPU) for operation of all of the crane's hydraulic functions. All main operational functions are controlled from the operator cabin.

Multi-directional compensation

State-of-the-art control system will compensate for the ship's movements in 2 directions (X,Y). Together with the winch built-in AHC system, full 3 directional (X,Y,Z) compensation for the ships movements is then achieved, keeping the suspended load fixed in a selected position within the range of the crane system. A MRU is the primary sensor for calculating heave motion. When AHC and multi-directional compensation is activated, the jib and slew motions are fully functional. This allows for precise load positioning without shutting down the AHC mode or moving the vessel.

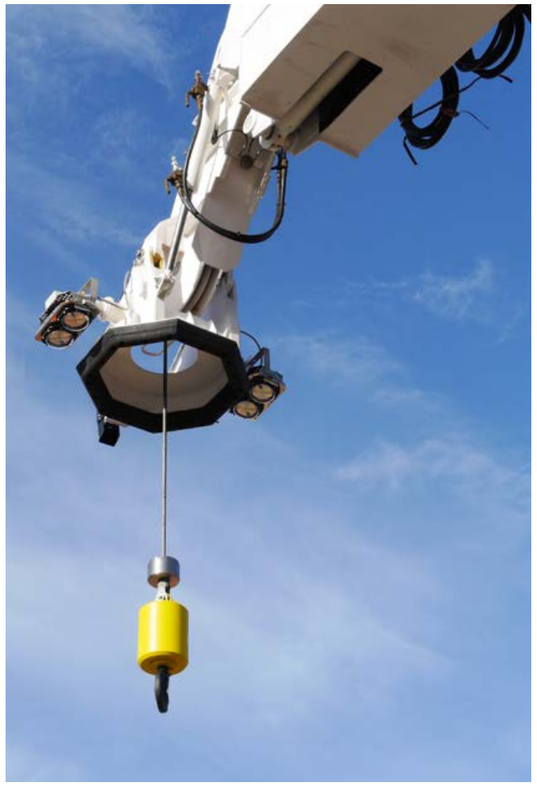
The crane may also be used for normal lifting operations without use of the heave compensating system. During normal mode operations, the crane's foundation would be mechanically locked in parked/stored position. The crane's jib tip is fitted with a snubber, a specially designed circular docking head for stabilization of the load when lowering it onto a monopile platform or deck.

First-of its-kind delivery to the offshore market:
5t Luffing Telescoping AHC offshore crane with 3-axis motion compensation and 1,5t shipboard crane to Siem Offshore AS.

Typical features

- Specially designed for offshore windmill and rig supply and maintenance operations
- Accurate active heave compensation for vessel's vertical movement through crane's winch
- Top-precision motion compensation for pitch and roll movement of the vessel through crane's hydraulic cylinder compensation
- Can be operated in normal lifting mode without use of AHC
- Can be delivered as either telescopic or knuckle-jib type
- Equipped with a damped docking unit (snubber) on the jib to stabilize and reduce the pendulum of the load
- Electro-hydraulic HPU for crane's functions is built-in inside crane's king structure
- Separate HPU for pedestal motion cylinders is mounted onto the pedestal
- Can be certified for ship-to-ship operations
- Can be certified for personnel lift and supplied with personnel lift basket

Winner of the Innovation of the Year award at OSJ Conference 2014



Full service portfolio

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 on board load handling systems and helping you achieve optimum operational availability.

Global presence, local service 24/7
MacGregor's load handling experts are on standby worldwide and around the clock 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.

Full service portfolio
Our service portfolio covers the following areas: spare parts, planned and on-demand service, repairs, modernisations, conversions, inspections and certifications, installations, dry-docking, consultancy services, project support and 24/7 support services.

These services are designed to improve overall performance, enhance features, extend operational lifetimes and to give existing equipment a new life along with a new warranty and guaranteed reliability.

Training ensures your crew and equipment safety and efficiency of operations
We provide operator and maintainer full theory training courses; standard, refresher or customised programs, as well as full simulator training. Providing your crew with theory and practical training courses means you can rest assured that your equipment and systems are properly cared for and utilized to their full potential.

MacGregor OnWatch remote diagnostics will protect your business and your people. Over a secure satellite link, our team of world-leading crane specialists will analyse your system to troubleshoot problems – without sailing to port.

Direct costs of delays quickly add up; indirect costs of a damaged reputation can be even higher. Combining MacGregor OnWatch service with a strategic spare parts kit that covers your most likely repair needs will get you on time, on budget and on to the next job.

Calculate how much a delay could cost your business at **www.macgregoronwatch.com**

Prevent hazards and reduce risks

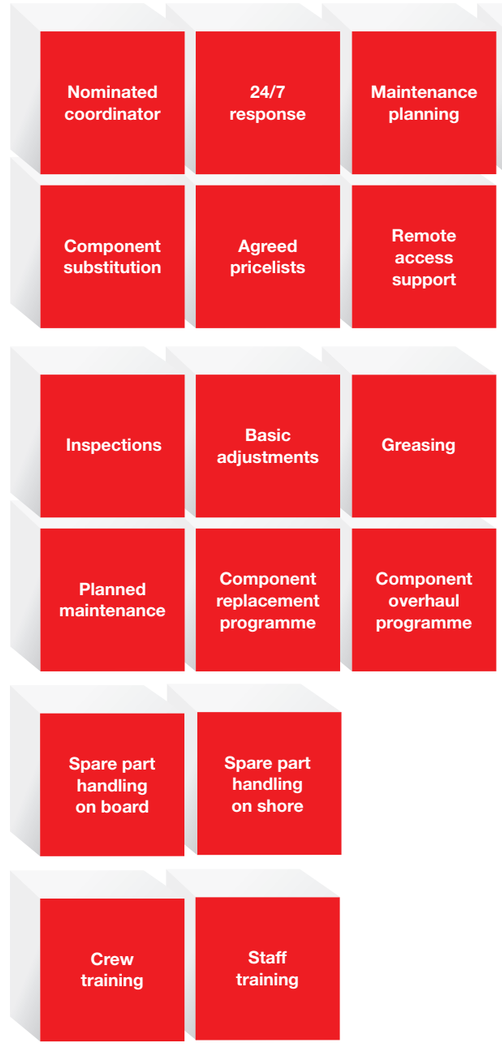
A MacGregor Onboard Care (MOC) contract offers you sustainable ship operations and revenue earning capabilities by ensuring the operative availability of equipment through planned maintenance solutions and our global service network. After identifying your unique needs, we can offer you a combination 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.



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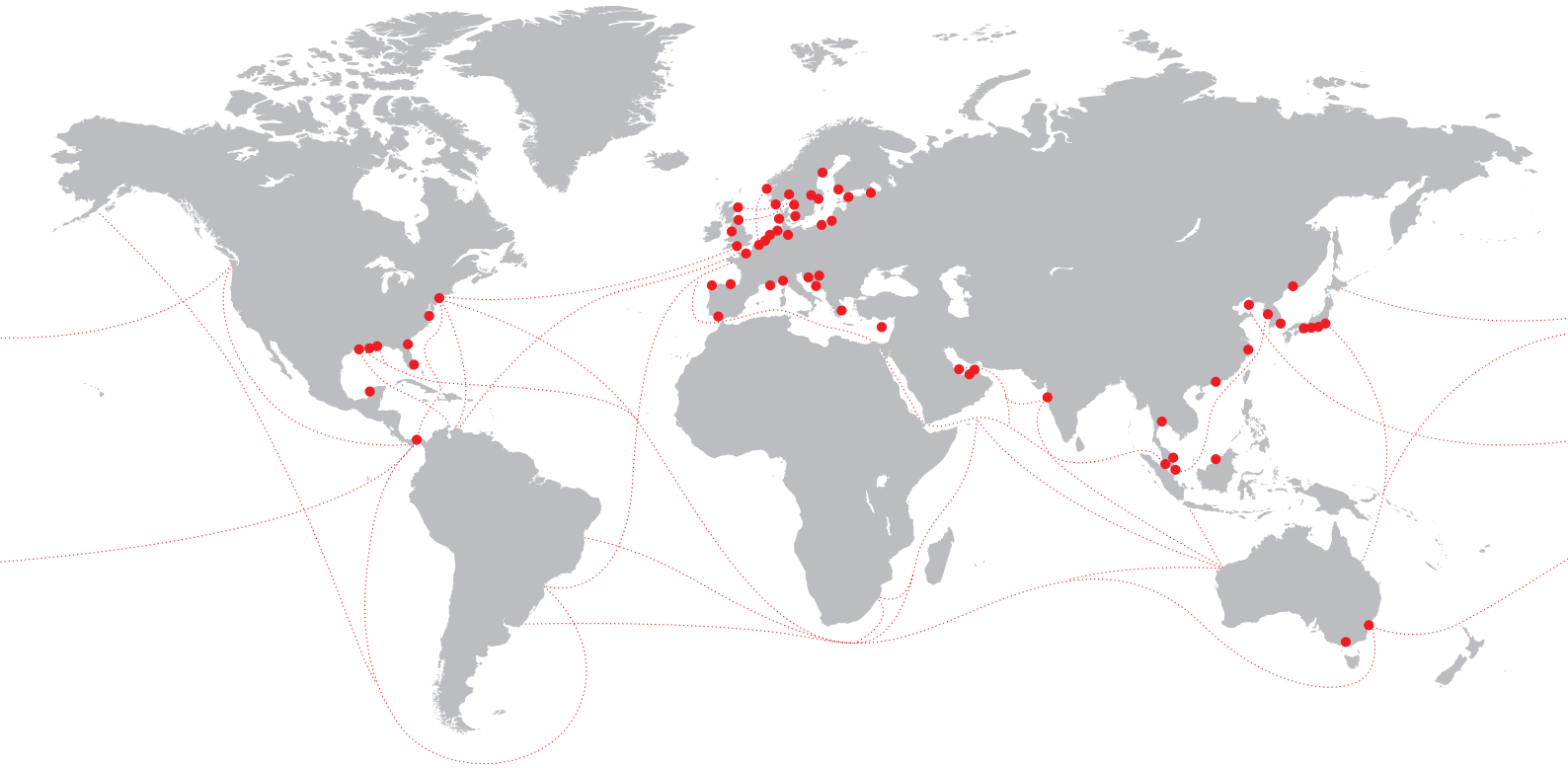

MacGregor offers world leading engineering solutions and services for handling marine cargoes and offshore loads. The scope of our integrated packages is growing and now also includes Hatlapa, Porsgrunn, Pusnes and Triplex products. MacGregor solutions combine load and cargo access, stowage, care and handling functions to optimise lifetime profitability, productivity and environmental sustainability.

MacGregor is part of Cargotec. Cargotec's class B shares are quoted on NASDAQ OMX Helsinki under symbol CGCBV.

www.macgregor.com

Lloyd's Register Quality Assurance certifies that the Quality Management System for MacGregor is ISO 9001:2008 compliant.