

# Solutions for Floating Production Units

Proven technology and safe solutions provide efficient operations

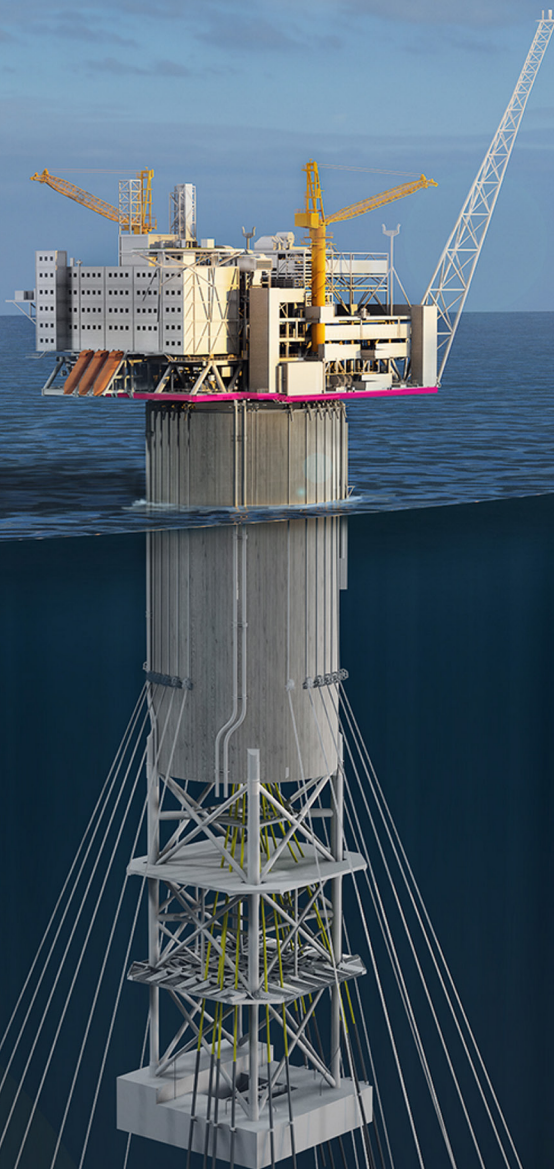


Photo: Statoil

 **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

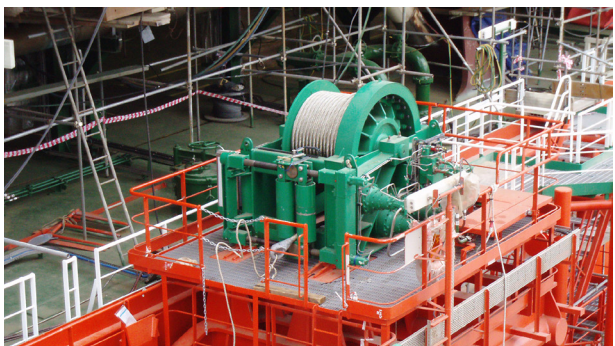
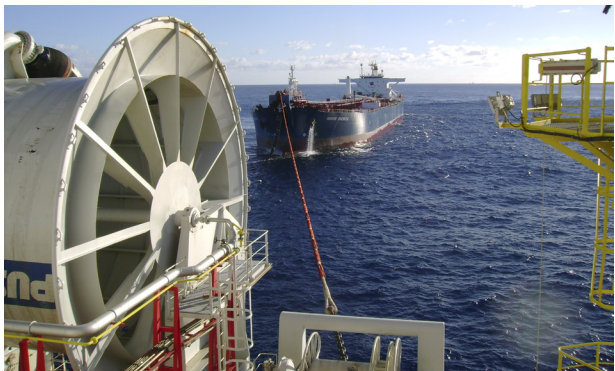
Pusnes mooring systems

Pusnes offloading systems

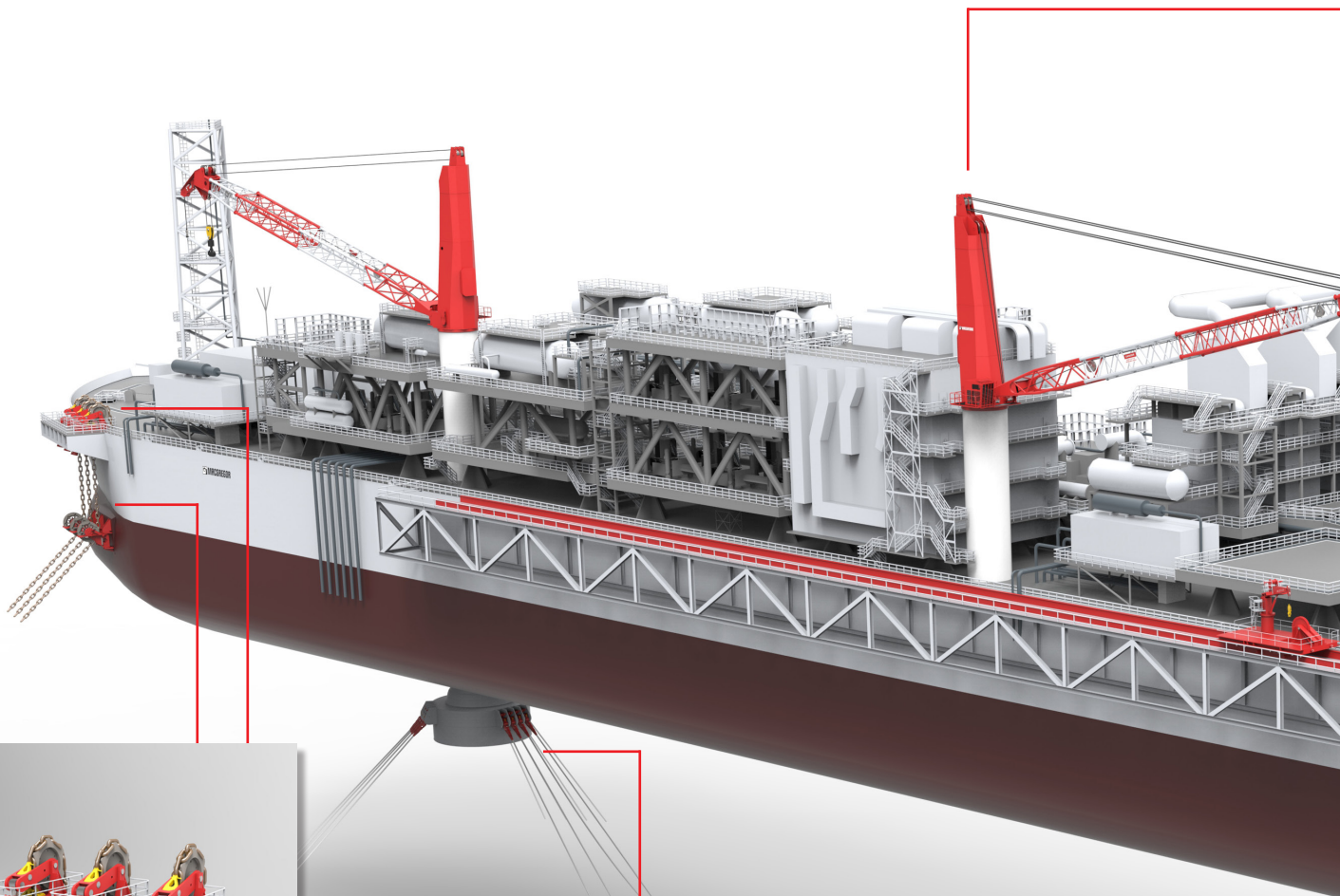
Pull-in systems

Lattice boom cranes

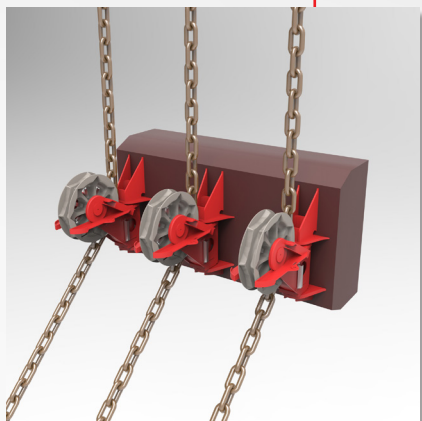
Global lifecycle services



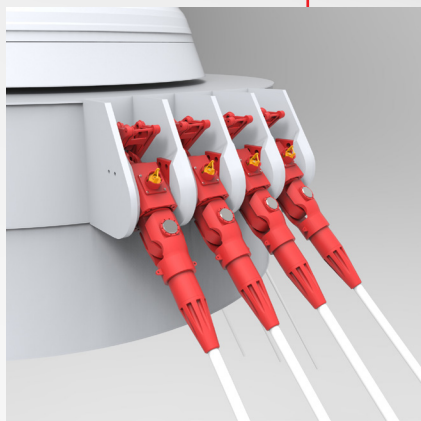
# FPSO solutions



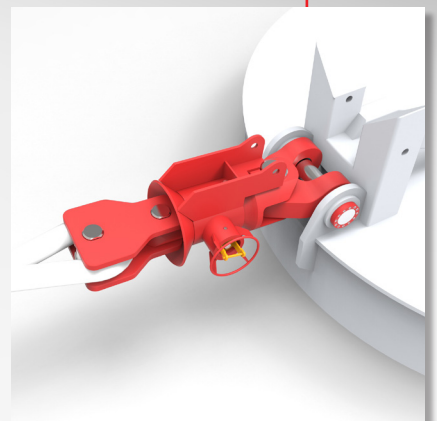
**Fixed and moveable mooring systems**



**Underwater fairlead**



**Buoy turret connector**



**Subsea mooring connector**

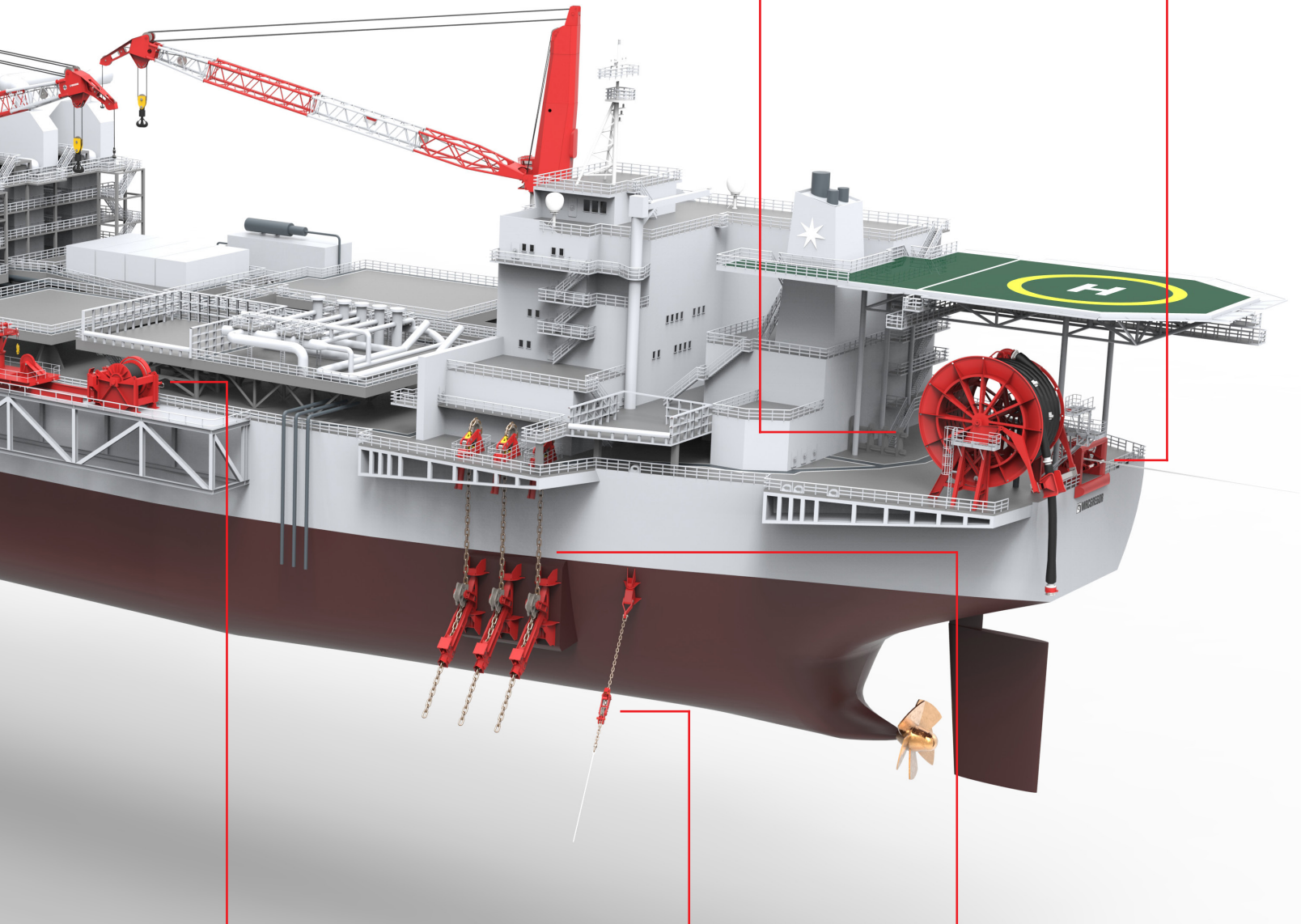
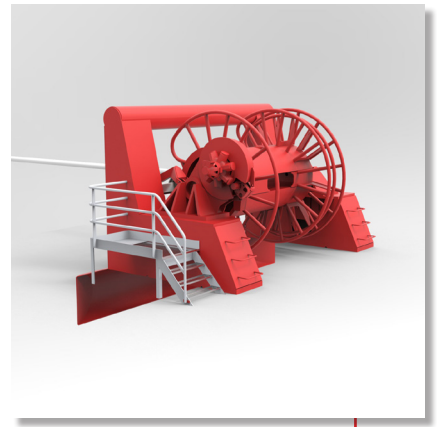
Lattice boom crane



Hose reel



Releasable hawser handling winch



Riser pull-in system



Inline tensioner



Fairlead chain stopper

# Pusnes mooring systems



Mooring cluster, *Snorre B*

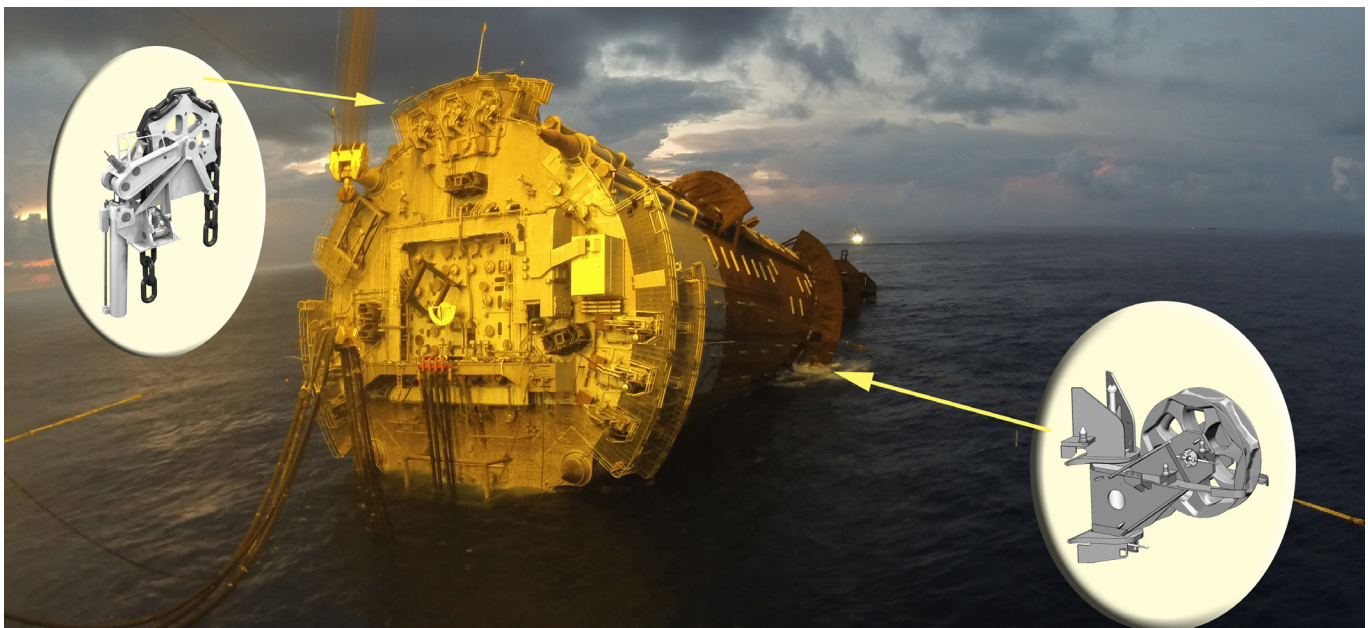
## Anchor windlass

These windlasses are generally used for production floaters with drilling capabilities located in mid water depths. The anchor windlass comes with emergency release arrangement and is also available as a movable version. The option of electric drive eliminates the need for an HPU and corresponding piping.

## Chain jack

The Pusnes RamWinch/Roller RamWinch is a compact and cost efficient solution when the projects don't require emergency release or high pull-in/pay-out speed. Unique by its simplicity and robustness the RamWinch becomes the preferred chain jack solution in the industry and it is available as movable solution.

For any choice of mooring winch MacGregor tailor the solution in accordance with your project requirements enabling a safe, efficient and trouble free offshore hook-up process.

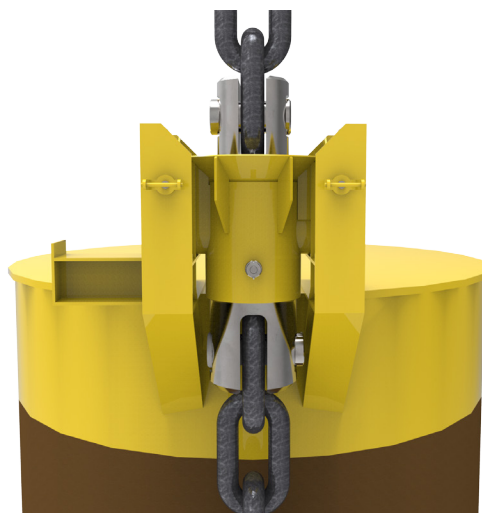


*Lucius* spar upending. Photo: Anadarko

### Subsea mooring connector (SMC)

The subsea mooring connector has been designed for connecting to anchor points on the seabed using a self-aligning male and female forging with simple load pin.

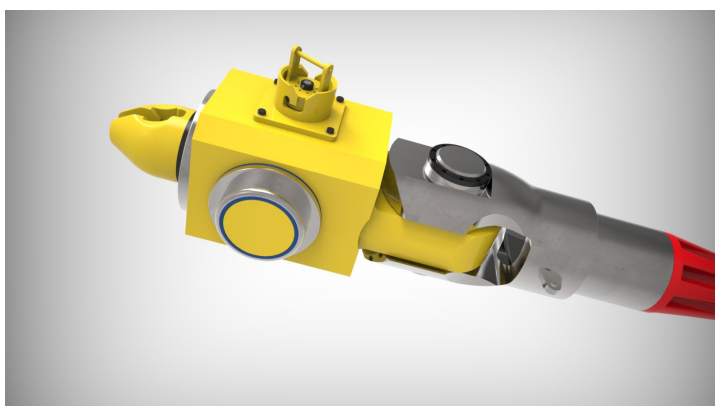
The subsea mooring connector (SMC) is designed to offer simple, efficient and strong anchor-point connections for mooring systems. It is an effective replacement for the more complex ball- and taper-based seabed connectors.



### Pull-through connector (BTC)

The pull-through connector system enables the connection and disconnection of mooring lines at the turret.

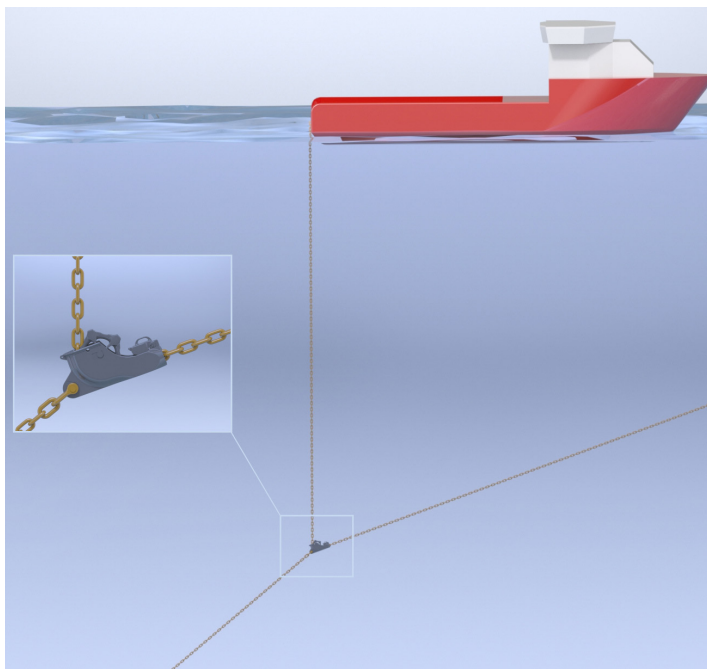
The increasing failure rate of mooring lines means that projects expect to have to change these lines during a project's life. A simple system that enables the disconnection of the line, laydown and reconnection of a new line, offered by the pull-through- connector, is therefore extremely cost beneficial.



### In line mooring tensioner (ILMT)

The In line mooring tensioner (ILMT) is designed to offer an efficient and cost-effective solution for subsea tensioning of a mooring line.

They are an innovative alternative to mooring winches installed on the floater.



# Pusnes offloading system

An offloading system enables an offshore unit to offload oil to a shuttle tanker. The offloading system consists of hose and hawser handling.

## The hose handling system

This system comprises various components that handle the hose during offloading and store the hose between offloadings. The hose can be stored on a reel on deck, or on a chute along the deck.

## The hawser handling system

The hawser handling system is a mooring system with the purpose of maintaining the tandem-moored vessel at a safe distance during offloading operations. The hawser is attached to a releasable hawser-handling winch which combines mooring, fairlead, handling, storage and emergency release functions into one single unit, which eliminates the need for manual handling.

## The valuable connection

Since 1986 MacGregor has developed and supplied Pusnes loading systems for both simple and sophisticated operations. The new range of products is based on innovative and proven technology and meets customers' and authorities' requirements for operational and environmental safety.

Our dedication to safety is verified by our long track record for the supply of systems with virtually no incidents leading to human injury. Various types of safety features are included in the equipment design and contribute to achieving the high level of safety, pollution avoidance.

MacGregor successfully provides functional and reliable Pusnes offloading systems for rough and extreme weather conditions.





# Lattice boom cranes

The perfect solution for a demanding cargo handling environment.

## General design

The Lattice Boom Crane (LBC) range is designed for installation on floating or fixed platforms. It has hoisting capacities from 50 to 300 tonnes SWL and outreaches up to 50m. The whip hoist has a capacity of up to 30 tonnes SWL. The crane is designed for worldwide cargo handling service in the tough and corrosive offshore environment, in climatic conditions ranging from the tropics to the Arctic.

The crane range is designed for heavy offshore operation, in compliance with the 7th edition of API-2C. Access to the driver's cabin is arranged internally through the deck mounting. Emergency exit is via an outside ladder.

All moving parts run in oil or grease, which ensures minimum wear and tear, with the added value of silent running. All machinery is located inside the enclosed crane housing well protected against the corrosive offshore environment.



# Mooring and Riser pull-in

## Pull-in systems

Pull-in winches are a general term used to describe the various types of winches involved in pull-in operations, such as the riser pull-in and mooring line pull-in. Various ancillary equipment, e.g. trolleys and turndown sheaves are often involved in operations such as the riser pull-in.

We have a broad range of pulling machines that together with trolleys and guide sheaves make up a tailored solution required by your project. MacGregor's extensive experience ensures the highest degree of liability.



## Ancillary systems Compressors

### Structural features

Two staged cylinders in 90° V-arrangement, with one-throw crankshaft, single acting trunk pistons

1st stage: 1 cylinder

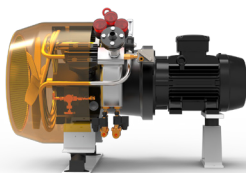
2nd stage: 1 cylinder

### Valves

- Combined suction and pressure valves for both stages

### Air cooling

- By radial fan directly driven by the crankshaft



### Intercooler and aftercooler

- Finned pipes

### Force feed lubrication

- Gear pump directly driven by the crankshaft
- Oil pressure control by means of pressure gauge and pressure switch
- Oil level inspection glass
- Crankcase venting from oil filter to air suction filter

### Bearings

- Crankshaft: slide bearings
- Connecting rod: slide bearings
- Wrist pin 1st stage: slide bearings
- Wrist pin 2nd stage: needle bearings

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

Our 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.



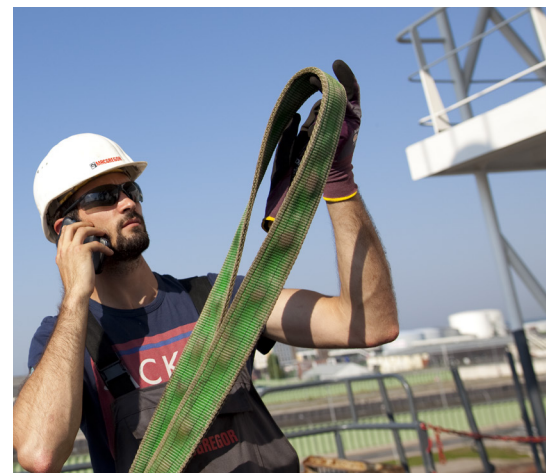
## Worldwide experts at your service 24/7

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 has approximately 50 service offices in 32 countries. Our services support your vessel's entire lifecycle.

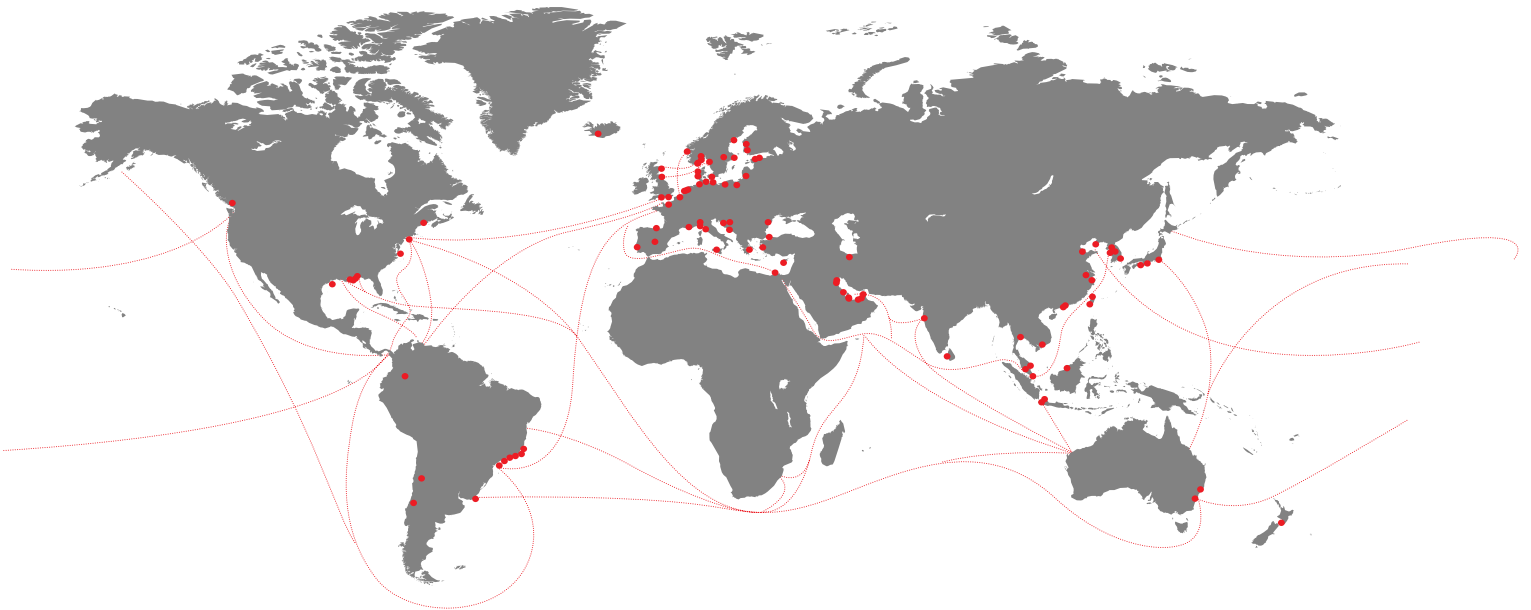
## MacGregor service portfolio

- Spare parts and logistics
- Maintenance and repairs
- Conversions
- Modernisations and upgrades
- Retrofits, overhauls, optional extras and replacement services
- Equipment inspections
- Drydocking services
- Service agreements
- MacGregor Training Academy
- OnWatch
- PlusPartner
- Global support services



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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