

Mooring and auto-mooring

Peace-of-mind mooring



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.

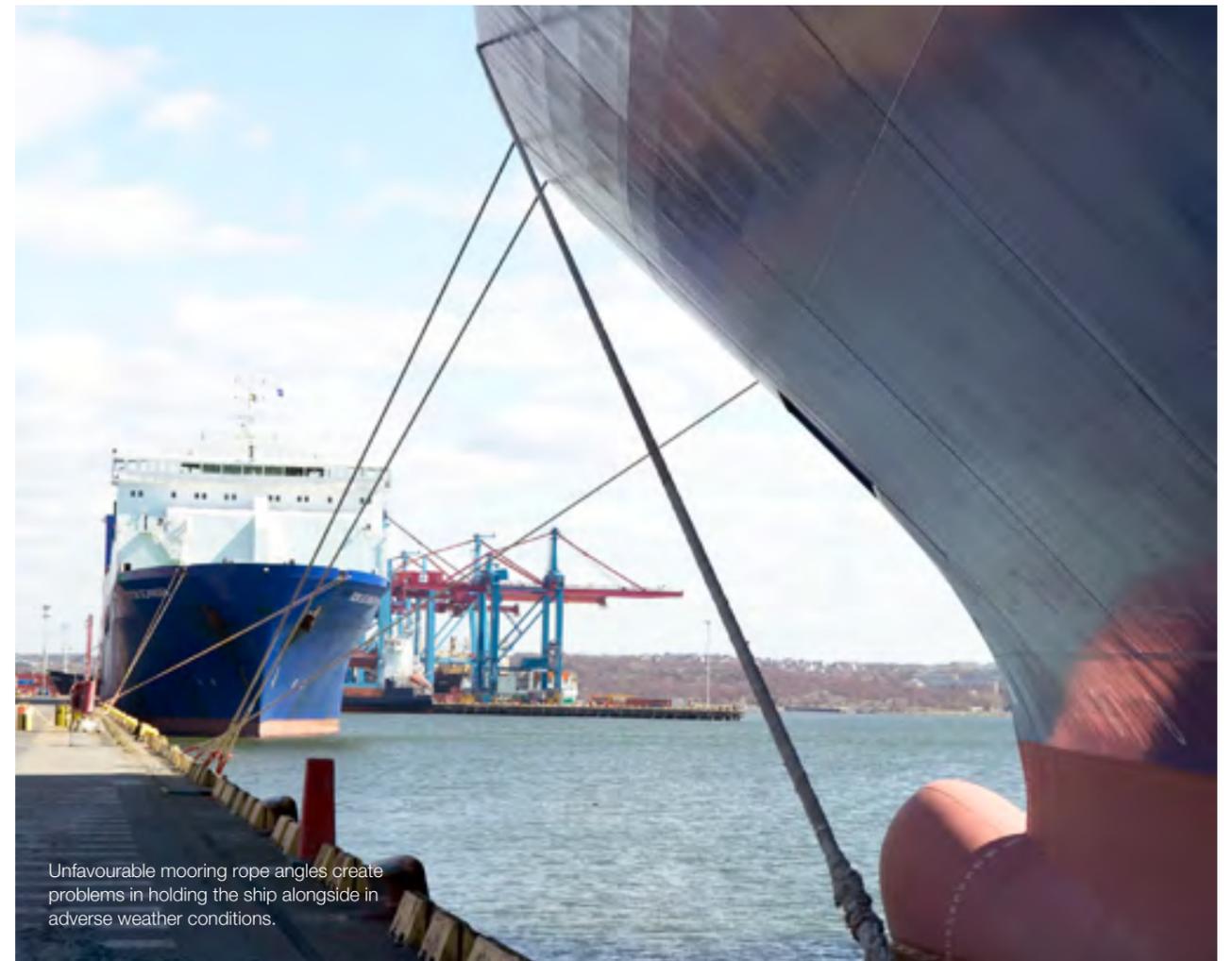
We are a global team of professionals, who create

value for you; the owners, operators, and ship builders 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.

MOOREX[®] mooring secures peace-of-mind

Secure mooring is essential for the safety of passengers, crew, cargo, ships and harbour constructions. Operators often face problems mooring their ships safely as ship sizes increase but berths and mooring arrangements remain the same as before. MacGregor mooring solutions will partly or completely eliminate these problems.



Unfavourable mooring rope angles create problems in holding the ship alongside in adverse weather conditions.

What's the problem?

Traditional mooring stations located on high decks and short berths lead to ineffective rope angles that are not always able to ensure that vessels are reliably moored to the quay.

Forces caused by passing ships, wind, current, suction and swell are complex and vary continually. They can cause damage to gangways, ramps, linkspans and other harbour structures. If the vessel moves in its berth, the ramp and gangway positioning can become unsafe.



Large movements of the ship may cause damage to passenger gangways, ramps, linkspans and harbour structures.

Problem

- Large windage causes high mooring forces
- To control and evenly distribute mooring load
- Quays are often too short
- Unfavourable/ineffective mooring rope angles
- Need for several auto-tensioning mooring winches
- Loss of mooring force
- Broken mooring ropes
- Unreliable use of passenger gangways, ramps and linkspans
- Many mooring ropes needed at bow and stern
- Risky working environment
- Adjustment of ropes according to changing quay heights and weather conditions

Reason

- > Size of the vessel
- > Mooring ropes with poor leads and angles
- > Length of the vessel
- > Height of the mooring decks
- > Number of mooring ropes
- > Friction in hawses and fairleads
- > Wear and tear, sharp rope angles in hawses, overloaded mooring ropes
- > Movements of the vessel
- > Manpower and time-consuming operations
- > Handling heavy ropes on open decks
- > Frequently changing mooring conditions

Solution

MacGregor mooring solutions will partly or completely eliminate these problems.

MOOREX® mooring secures peace-of-mind and increased safety

MOOREX® self-tensioning mooring arrangements are installed either on the quay or on board, providing the optimum rope angle and longitudinal position.

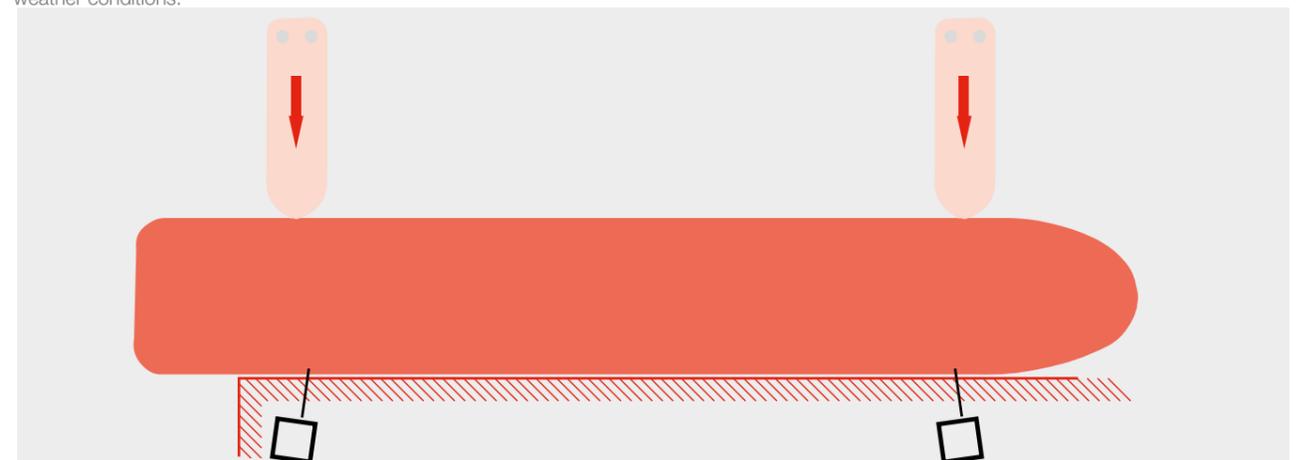
The ship remains safely moored alongside with full longitudinal and athwartships control even in difficult weather and tidal conditions. MOOREX® enables fast mooring operations even in short harbour stops and reduces the need for the crew to monitor possible movements of the moored ship.



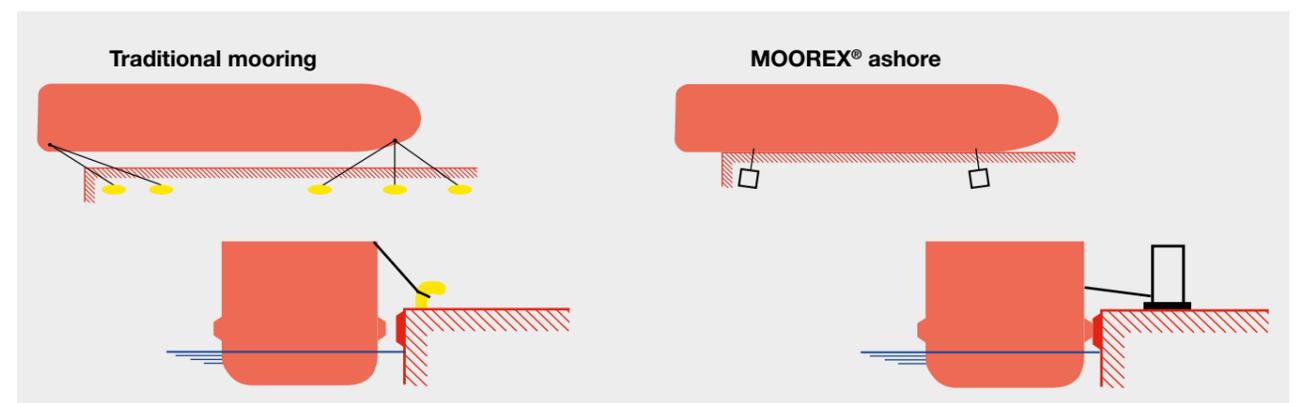
Peace-of-mind mooring secured by MacGregor MOOREX®



MOOREX® on the quay side provides accurate mooring even in short berths and allows safe utilisation of ramps and gangways even in difficult weather conditions.



The mooring power of MOOREX® ashore units can be compared to harbour tugs continuously pushing the ship against the quay fenders.



With MOOREX® ashore units, the mooring rope angles are always optimal, rope forces remain high, and the ship's position is accurately maintained.

MOOREX® ashore mooring system



MOOREX® mooring rope angles are always optimal, rope forces remain high, and the ship's position is accurately maintained. Compact MOOREX® ashore units save space onboard.

Benefits

- Increases mooring safety
- Sufficient self-tensioning mooring force for optimal rope angle and position
- Same device can serve many vessels, especially in liner traffic
- Fast, easy and reliable mooring operations
- Allows for the safe and precise operation of gangways and linkspans that are connected to the vessel
- Reduces wear and tear of side, bow and stern ramps
- Helps berthing in icy conditions
- Saves space on board
- Reduces the need to use traditional mooring ropes
- Reduces manpower needed in mooring operations
- Reduces damage to the quay
- Particularly useful for short harbour stops
- Reduced need for continuous surveillance and adjustment of mooring ropes

Typical main characteristics

- **Pulling force at self-tensioning:** specified between 100-600 kN/rope
- **Pulling length:** according to need
- **Safety:** In case of malfunction of the MOOREX® unit, information is transmitted to the ship's alarm system
- **Capacity:** MOOREX® is available in 10- to 60-tonne capacities when installed ashore.



A strong MOOREX® bollard is installed flush with the ship's side.

MOOREX® on board mooring system



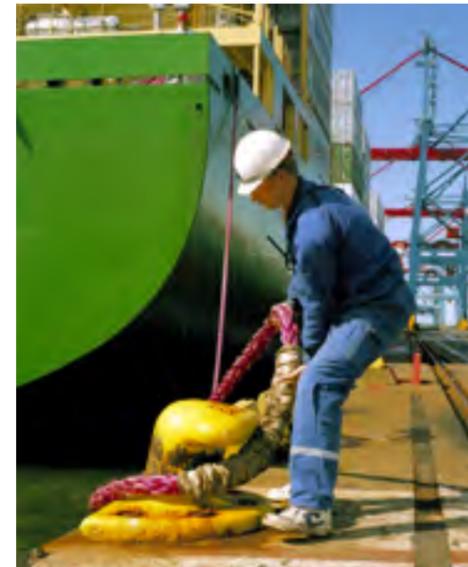
MOOREX® on board equipped with a weathertight side shell door, which can be opened inwards or outwards.

MOOREX® on board is the flexible option. If a vessel changes its route, the systems immediately become available as soon as shore bollards are installed at the new port of call. Two units are located within the hull structure.

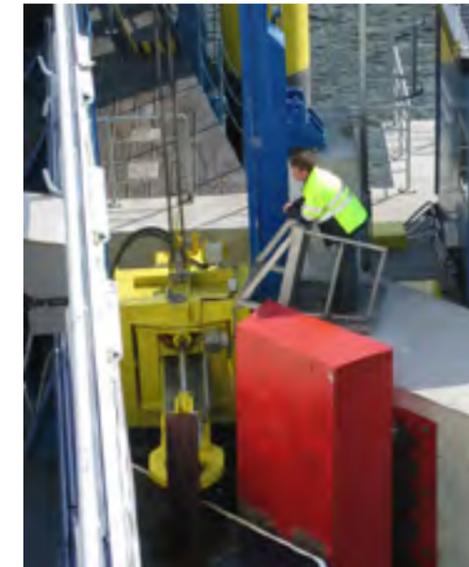
Prior to the mooring operation, wires are manoeuvred through small watertight openings in the hull and attached to shore bollards.

Once activated, the MOOREX® on board mooring system auto-adjusts to any ship movement, maintaining constant tension. Two units are normally sufficient to ensure the appropriate pulling force.

MacGregor auto-mooring system



Traditional mooring is risky and hard work.



MacGregor auto-mooring is fast, safe, easy to operate and reduces time in port.

Traditional mooring can be very time consuming. There is always a risk of injury to workers onboard the ship and on shore during the mooring process. Mooring lines led to bollards ashore at different angles from the ship's various fairleads have never been totally reliable. They wear out and sometimes a line parts which can result in damage to the ramps if the ship moves.

The design and installation of the first MacGregor auto-mooring units date back to the beginning of the 1990s. The main design criteria were to minimise the turnaround time for ferries in ports. Added values gained were the removal of the need for mooring ropes, which had reduced port stevedoring capacity, as well as enhancing the safety in the interface between the ship, shore ramps and the access gangways.

Key features

- Remote operation by radio control from the ship's wheelhouse
- Short operating times – less than one minute
- Independent of tidal variations
- Optimised mooring force – horizontally acting
- Simple bollard attachment on the ship
- Service-free installation onboard the ship
- About 20 berths in Northern Europe are currently using MacGregor auto-mooring units for their ferry operations
- Key to the functional superiority of the auto-mooring unit is the fact that the strain angle – the mooring force – is always kept horizontal, reducing the required force to hold the ship, and at the same time accurately maintaining its position.

Arrangement options

Most commonly, and particularly on ships without stern ramps and on train ferries, is the utilisation of a king pin function on the access ramps, adding an auto-mooring unit for purely transverse mooring to the quay.

A configuration where a stop fender arrangement is available allows two units to be installed along the quay, where one unit is radially installed to incur longitudinal strain against the stop fender. For light ships, in particular catamarans with dedicated linkspans, the auto-mooring can be entirely integrated in the linkspan function. The advantages of an automated mooring system are unquestionable.

Safe, fast and easy to operate

Ferry operators demand reduced times in ports and lower labour costs. A MacGregor auto-mooring system meets these needs. The system is fast and easy to operate and there is a reduced need for human resources.

Mooring takes time and if the ship is on a route where port calls are made several times a day, it is worthwhile considering the installation of an auto-mooring system in the harbour. Auto-mooring systems offer significant benefits in terms of safety. They are remotely operated from the ship, independent of tidal variations and provide an optimised mooring force.

References (extract)



MOOREX 22T/10T onboard unit

Completed: 2006/2010
Client: Bornholmstrafikken
Vessels: M/S Dueodde (2 pcs) and
M/S Hammerodde (2 pcs)



MOOREX 25T onboard unit

Completed: 2000-2006
Client: Finnlines
Vessel: M/S Finneagle (3 pcs),
M/S Finnclipper (4 pcs) and
M/S Finnfellow (2 pcs)



MOOREX 30T quay side unit

Completed: 2004
Client: Destination Gotland
Port: Visby (4 pcs),
Nynäshamn (2 pcs) and
Oskarshamn (2 pcs)



MOOREX 60T/30T quay side unit

Completed: 2007
Client: Finnlines
Port: Travemünde/Lübeck (2 pcs),
Helsinki (2 pcs) and
Malmö (1 pc)



MOOREX 35T quay side unit

Completed: 2009, 2010
Client: Marine Atlantic
Port: Port of Basques (4 pcs),
North Sydney (4 pcs)

Global service on local basis

Operative availability

MacGregor's ambition is to ensure the operative availability of your cargo flow systems. Our experts are on standby worldwide to provide a rapid response to your needs.

Global presence 24/7

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.

Planned maintenance

MacGregor's planned maintenance concept is supported by the solid foundation of our worldwide service network, and allows you to plan your operating budget.

On-demand service

Our service centres worldwide solve problems as they arise, helping to keep the ship up and running. We also provide a comprehensive damage assessment and repair service.

MacGregor Onboard Care (MOC) service contracts

An MOC service contract offers a modular service concept where you can choose the necessary modules to suit your individual needs in terms of operating security, budgets and comfort.

Crew training

Tailor-made theoretical and hands-on crew training in the maintenance and operation of MacGregor equipment and systems.

Drydockings

Let us know your schedule well in advance and we will plan drydocking services for you accordingly.

Modernisation

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

Conversion

Our conversion packages adapt, enhance or change the original functionality of the system, re-designing it to meet changing market requirements. Our solutions are built around expertise and long-lasting, reliable products, giving you the highest return possible on your investment.

MacGregor's conversion products include standardised as well as new products to facilitate your ship's new role and improve its competitiveness. MacGregor equipment are easily installed in all types of ships and ensure maximum levels of both security and quality.

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

