

# Electrically driven RoRo equipment

Innovative solutions for cleaner ships



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Electrically-driven MacGregor RoRo access equipment is a result of intensive R&D work, responding to customers requesting products that improve performance and protect the environment. Our growing electric-drive RoRo reference portfolio includes electrically-operated stern quarter ramps as well as hoistable ramps, covers and car decks.

## Innovations for eco-friendlier, cleaner and more efficient ships

As a pioneer in the field, we have continuously developed and improved the RoRo cargo handling concept since we delivered the first MacGregor RoRo stern quarter ramp in the late 1960s. We work closely with shipyards and shipowners and look at each customer's specific needs.

A few years ago our shiptype experts identified the need in the market for environmentally-friendly solutions. MacGregor's R&D experts focused on developing products that were environmentally-friendly, cargo safe, and more energy efficient.

## Environmental benefits

Electrically-driven equipment reduce the amount of hydraulic oil carried onboard and minimise the environmental impact. The Japanese car-carrying industry has been instrumental in driving the demand for, and adopting, this technology as there was a demand for clean and green vessels. Car manufacturers have been putting pressure on ship owners to come up with a solution to reduce the risk of cargo damage by hydraulic oil.

The first ships of the new generation of eco-friendly efficient PCTCs, designed with all electrically-driven RoRo cargo access equipment, are now entering service. All equipment is operated by electric winches and actuators.

## Technical benefits

One technical reason is the availability of improved electric drives in form of electric actuators, to replace the

direct-acting hydraulic cylinders used for operating smaller items or in cleating and locking devices.



## Energy savings

- Energy is saved because electric drives run only when manoeuvring equipment. Energy losses are also much smaller, because electrically-driven systems are not affected by pressure drops within the piping system.
- Electric drives are easy to monitor and service, enabling peak efficiency.
- Time, money and energy are saved while shipbuilding; it is easier to install electrical cables than hydraulic pipes and no pump units are needed.
- Lower power consumption enables a ship to be designed with reduced power generation needs.

## Electric versus hydraulic drive

Electric motors and gears replace the hydraulic motors, electric actuators replace the cleat cylinders, electric

winches or actuators replace the operating cylinders, for car decks and ramps for example, electric actuators replace the operating cylinders, for ramp way doors and ramp covers.

Electric winches with power feedback system replace the hydraulic winches for the side and stern ramp.

## Electric control system

The equipment is operated by control panels with a user-friendly interface. The operation sequences are easily controlled by PLC's (Programmable Logic Controllers) via push-buttons, joysticks or switches. Lamps indicate the status of cleats and whether they are locked or unlocked.

## Electric drives are easy to service

Electric drives are energy efficient, maintenance friendly and easily monitored.

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 contribute to easy operation.

Routine inspections are simplified. Our service concept MacGregor Onboard Care (MOC) offers different levels of service. If required, condition monitoring can form an integral part of an MOC Planned Maintenance Agreement.



Electrically-driven car ramp with cargo.



Electrically-driven MacGregor stern quarter ramps and side ramps are operated by electric winches with power feedback system.



Push-buttons make the equipment easy to control. The user-friendly interface makes fault-finding and monitoring of the system easy.

## Advantages of electric drives compared with hydraulic drives

### For the shipowner:

- No hydraulic oil pollution or damage to cargo
- Same operating time in cold weather conditions
- Reduced onboard maintenance
- Energy savings by no continuous running plus possibility for power feedback
- Reduced noise level
- Easy to monitor

### For the shipbuilder:

- Time, money and energy saved while shipbuilding
- Cable wiring is easier than piping
- No need for high pressure hydraulic skills
- No flushing work

## Recent references

The most recent references, delivered and secured orders to be delivered, include:

### Newbuildings

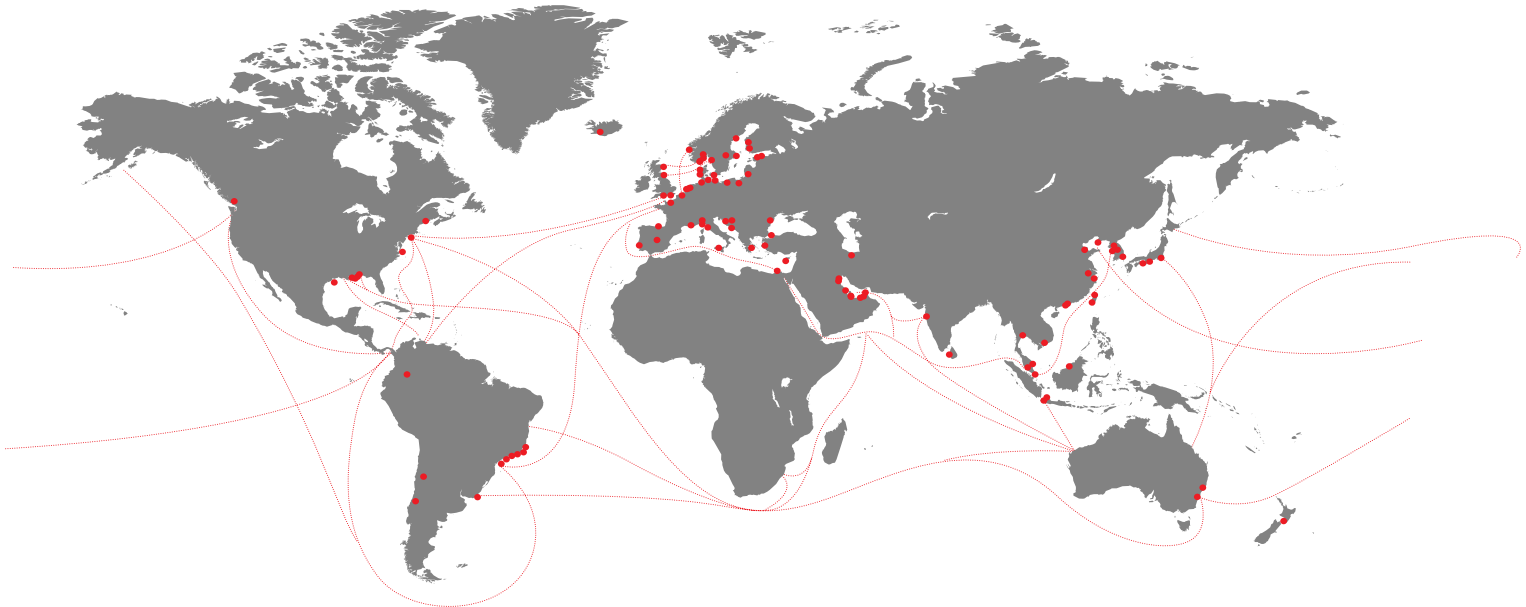
- **Shin-Kurushima Dockyard**  
**Two 7,000-unit PCTC's for NYK:** stern ramps, side ramps, moveable ramps, ramp covers and hoistable panels
- **Shin-Kurushima Toyohashi**  
**Two 6,400-unit PCTC's for MOL:** stern quarter ramp/door, side ramp and six moveable ramps
- **Shin-Kurushima Dockyard**  
**Two 11,400 dwt RoRo's for a Japanese owner:** stern quarter ramp/door and one moveable ramp
- **Shin-Kurushima Toyohashi**  
**Two 6,400-unit PCTC's for Japanese owners:** stern quarter ramp/door, side ramp and six moveable ramps
- **Daewoo Shipbuilding & Marine Engineering (DSME)**  
**Eleven 8,000-unit LCTC's for Wallenius:** three hoistable car decks, seven moveable ramps and one big flap
- **Shin-Kurushima Dockyard**  
**One 4,000-unit PCC for MOL:** stern quarter ramp/door, side ramp and two moveable ramps
- **Hyundai Heavy Industries (HHI)**  
**Two 8,000-unit LCTC's for Wilhelmsen:** six moveable ramps and one hoistable plywood car deck panel
- **Mitsubishi Heavy Industries (MHI)**  
**Four 2,000-unit PCTC's for Toyofuji:** bulkhead door
- **Kyokuyo Shipyard**  
**Four 2,000-unit PCC's for PD Gram & Co:** ten hoistable car deck panels, one access ramp, four moveable ramps and two ramp covers
- **Jinling Shipyard**  
**Six 10,500 dwt RoRo's for Finnlines:** 2x2900 m<sup>2</sup> car decks, 44 electric panels and two access ramps
- **Daewoo Shipbuilding & Marine Engineering (DSME)**  
**Two 6,700-unit PCTC's for Wallenius:** four car deck panels, five to seven internal ramps and one big flap
- **Uljanic Shipyard**  
**Four rail ferries for MIR:** stern doors
- **Estaleiro Ilha SA (EISA) yard**  
**Four tug barges for Norsul:** side ramps

### Conversion projects

- **Jinling shipyard**  
**Two RoRo's for Finnlines:** hoistable plywood car deck, 11 panels and 1 access ramp
- **Mitsubishi Shimonseki**  
**One 3,900-unit PCTC for MOL:** six hoistable car deck panels

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- 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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**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)

