# Efficient gravity self-unloading systems for bulk carriers

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# MacGregor gravity systems for efficient discharge of coarse bulk materials handling for cement carriers

MacGregor self-unloading gravity systems have benefited from decades of development and service experience since the first delivery of a self-unloading ore carrier in 1956. To date over 40 self-unloading gravity installations, with capacities up to 6,000t/h, have been supplied to ships ranging in size from 3,500 dwt to 135,000 dwt.

A bulk carrier equipped with a MacGregor self-unloading gravity system offers fast, reliable and efficient deliveries of free-flowing bulk commodities. Based on six decades of experience, MacGregor technology for self-unloading dry bulk carriers has developed into advanced and well-proven systems that provide automatic and dust-free operations. Designed for both newbuildings and converted vessels, each system is tailor-made to suit the vessel for maximum performance and efficiency. They also have the ability to discharge on shore or offshore with either no, or minimal, capital investment at the receiving facility, and can be operative 24-hours a day, seven days a week.

## System description

Gravity discharge is arranged from the ship's V-shaped cargo holds via a number of gates located in the bottom of the holds. The cargo then falls, by gravity, through the hydraulically-operated basket gates onto conveyor belts located beneath the holds. The belts carry the cargo towards the stern or the stem of the ship where it is transferred to a loop-belt system or another type of elevating solution that lifts the material towards deck level. Once there, it is released onto the hoist- and slewable boom conveyor that discharges the material to shore, either directly onto a stockpile or into a receiving facility.

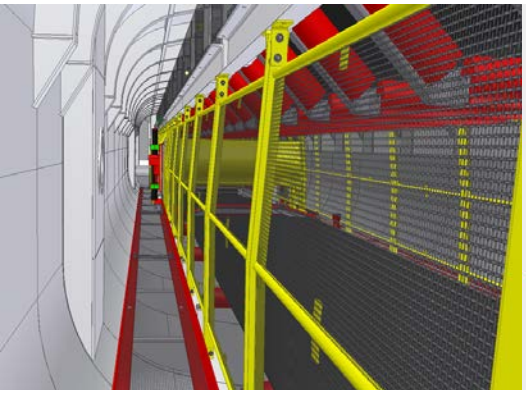
The conveyor system is operated either manually or fully automatically from a control room located on A-deck in the ship's superstructure. The conveyed materials are free-flowing bulk cargoes with a lump size of up to about 300mm (for example, iron ore, coal and aggregates).

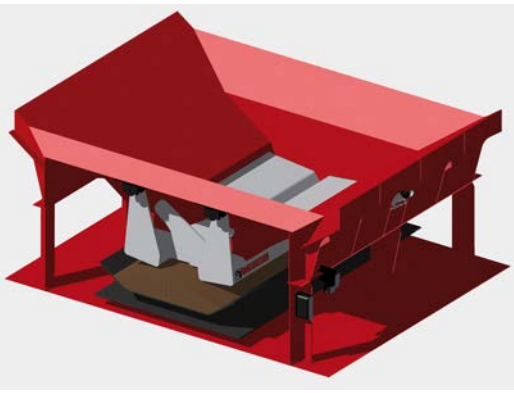
## Different elevating solutions

For elevating the bulk material from the bottom of the cargo holds to the main deck, three different solutions are available: the C-conveyor system, inclined conveyor system and vertical lifting systems. Once on the main deck it is released onto the hoist- and slewable boom conveyor for discharge.

### Key benefits

- **advanced and well-proven technology**
- **very high unloading rates**
- **designed for newbuildings as well as conversions**
- **tailored to suit each vessel for maximum performance and efficiency**
- **environmentally-friendly operation**
- **low energy consumption**
- **low maintenance costs**






# Key elements of MacGregor gravity self-unloading concept

### Boom conveyors

The new closed boom provides truly dust-free operations for the benefit of crew and the local environment. It has an optimal support structure and a smooth inner bottom surface to enable easy cleaning. There are walkways alongside the belt, allowing safe and easy access for crew and service engineers.

There are a variety of discharge boom conveyors available either of fixed length, telescopic, telescopic with reversible conveyors or articulated. The hoist- and slewable boom conveyor can be positioned for either port or starboard discharge to a shore conveyor or directly to a hopper or stockpile ashore.

### Fuil flow gate

The new full flow gate is designed for use in gravity self-unloading vessels to transfer free-flowing bulk material from the ship's cargo hold onto the hold conveyors. Its space saving design and wide gate opening deliver greater cargo capacity and increased discharge rates when compared with traditional gates, while minimising material flow disruptions. In association with belt conveyors of variable speed, basket gates ensure the perfect combination for selecting and varying the discharge capacity as required. Basket gates can be arranged in several rows, which enable high-handling capacities.

### Watertight bulkhead door

The patented watertight bulkhead door (WBD) is designed to meet the IMO regulations for self-unloading bulk carriers. Its purpose is to minimise water leakage through the conveyor tunnels between cargo holds in the event of an emergency. The WBD is positioned above the tank top at each bulkhead opening in the hold's conveyor tunnels. All the doors – which can be designed for remote-controlled operation from the bridge – are to be closed and secured when the ship is at sea. The need for these doors and the number of bulkheads that should be closed during a voyage, is dictated by the class society.

# With the environment in mind

### Dust-free ship unloading

A self-unloading gravity system ensures a virtually dust-free vessel discharge. The discharge of the vessel can be carried out with the hatch covers closed during the entire operation. The boom and deck conveyors that feed the material from the vessel to the shore can be equipped with conveyor covers, water spray nozzles and dust collectors at loading points to reduce spillage and dust emissions to a minimum.

This ensures a dust-free operation for the crew onboard and the stevedores ashore, as well as having minimal environmental impact on the surrounding area.

### Low power consumption

The conveyor technology ensures the lowest possible power consumption, saving both money and reducing emissions due to a reduced need for power generation.

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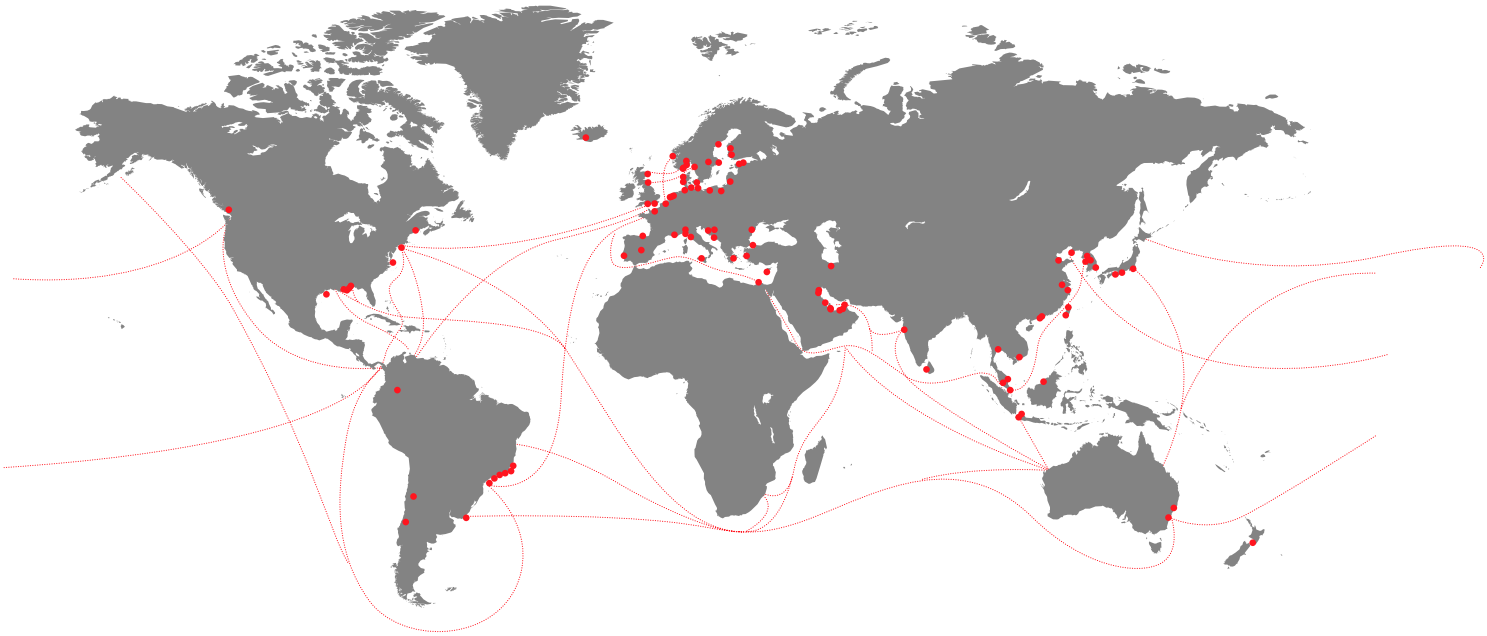

MacGregor shapes the offshore and marine industries by offering world-leading engineering solutions and services with a strong portfolio of MacGregor, Hatlapa, Porsgrunn, Pusnes and Triplex brands. Shipbuilders, owners and operators are able to optimise the lifetime profitability, safety, reliability 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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