

## Automated Mooring Systems



Manufactured by **Cavotec MoorMaster**

# Automated Mooring Systems

## Who we are

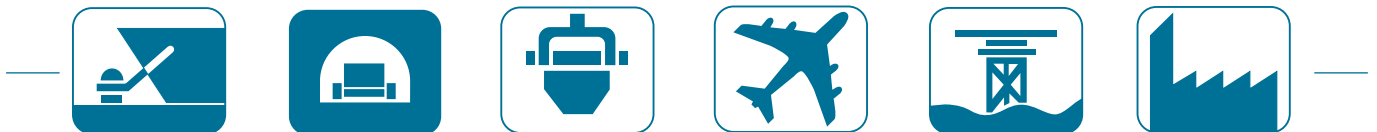
Cavotec is a multi-national group of companies serving the following industries: mining and tunnelling, ports and maritime, steel and aluminium, energy and offshore, airports, general industry and automation. In the early 1960's our main focus was the design and production of motorised cable reels primarily for manufacturers of tower cranes, harbour cranes and mining equipment. Today, Cavotec is connecting mobile equipment around the world in many diverse applications.

## Where we are

The Cavotec Group consists of 7 manufacturing "Centres of Excellence" located in Canada, France, Germany, Italy, Norway, New Zealand and Sweden and by 5 local manufacturing units located in Australia, China, Germany and the USA. For the distribution of products and providing support to customers Cavotec has 27 sales companies which, together with a network of distributors, serve more than 30 countries in five continents. The ultimate objective is to be perceived as "local everywhere".

## How we work

Our aim is to work closely with our customers in order to build long-term partnerships. To achieve this aim we have created a working environment that attracts the best people, encourages them to stay and brings out their best qualities. By producing totally reliable systems and backing them with efficient service, we strive to create true customer satisfaction.



## Cavotec MoorMaster

Cavotec MoorMaster is an engineering Centre of Excellence within the internationally operating Cavotec Group. Specialised in the design and development of an innovative range of automated mooring systems, Cavotec MoorMaster is at the forefront of innovation within the Group. The automated mooring systems have been adopted by important shipping and port companies, including well-known industry operators such as APMT (Port of Salalah), Searoad Shipping Australia, Port of Dover (UK), Toll New Zealand and the St. Lawrence Seaway in Canada. Together these systems have performed tens of thousands of mooring operations, without any ropes or intervention from mooring teams.

Cavotec MoorMaster continuously looks to make mooring safer, more reliable and secure while at the same time improving general port and cargo handling efficiencies.

# Cavotec Group Organization

As shown here the Cavotec Group is organized to support its customers around the world through its manufacturing units and sales companies. Each Cavotec manufacturing company, no matter where it is located, aims at being a market leader in its field by providing innovative and reliable products to Group customers. Each Cavotec sales company, in the 27 countries where they operate, aims at better serving its local market following the Group philosophy "to be local everywhere".

## Manufacturing network

### Centres of Excellence

#### France

##### Cavotec RMS

Spring Driven Reels

#### Germany

##### Cavotec Alfo

Spring Driven Reels

Slipring Columns

##### Cavotec Fladung

Aircraft Support Systems

Security Systems

#### Italy

##### Cavotec Specimas

Motorized Cable Reels

Panzerbelt Cable Protection

Slipring Columns

#### Norway

##### Cavotec Micro-control

Radio Remote Controls

#### Sweden

##### Cavotec Connectors

Electrical Plugs & Sockets

#### New Zealand

##### Cavotec MoorMaster

Automated Mooring Systems

### Local Manufacturing

#### Australia

##### Cavotec Australia

Motorized Cable Reels

#### China

##### Cavotec China

Product Assembly

#### Germany

##### Cavotec Micro-control

Radio Remote Controls

#### Sweden

##### Cavotec Sweden

Product Assembly

#### USA

##### Cavotec USA

Product Assembly

### Group Partners

#### Belgium

##### Gantry

Crane Rail Systems

#### Italy

##### Brevetti Stendalto

Cable Chains

##### Prysmian (Pirelli)

Flexible Cables

##### Tratos Cavi

Flexible Cables

## Sales network

### Cavotec Sales Companies

Cavotec Australia

Cavotec Belgium\*

Cavotec BeNeLux

Cavotec Brazil\*

Cavotec Canada

Cavotec Chile

Cavotec China

Cavotec Denmark

Cavotec Finland

Cavotec France

Cavotec Germany

Cavotec Hong Kong

Cavotec India

Cavotec Italy

Cavotec Korea

Cavotec Latin America

Cavotec Mexico

Cavotec Middle East

Cavotec Norway

Cavotec Russia\*

Cavotec Singapore

Cavotec South Africa

Cavotec Sweden

Cavotec Turkey

Cavotec UK & Ireland

Cavotec USA

\* Branch Office

## General Information

Traditionally mooring ships has always been done by using ropes. This practice has remained unchanged despite strong technical developments within ports and shipping over recent decades.

The automated mooring solutions developed by Cavotec MoorMaster now bring mooring up to speed with the pace of the modern shipping industry.

By using vacuum and hydraulic based technology instead of ropes the whole operation of mooring a ship is reduced to a simple press of a button.

Average time for a ship to be secured is reduced to within 12 seconds and is completely automatic.

Ships can moor almost immediately without the need for mooring gangs, meaning cargo operations can commence sooner and the vessel will enjoy a faster turnaround.

MoorMaster introduces enhanced safety for ship and shore personnel as the hazards associated with mooring lines are no longer present.

MoorMaster has advanced real time monitoring features ensuring the

mooring operator, ship captain and port authority are constantly well informed of the status of the mooring.

Once the system is activated, the vacuum pads extend and secure the ship. The units are designed to allow for the majority of hull types easily accommodating typical surface irregularities. The units connect close to the waterline and counteract ship movements at the berth providing a significant improvement over mooring lines in surge affected ports.

Cavotec MoorMaster - safe, reliable and efficient.



*Thanks to the innovative MoorMaster design the mooring of a ship can be done in a fraction of the time and cost compared to mooring with ropes.*

# The main advantages

## Safety

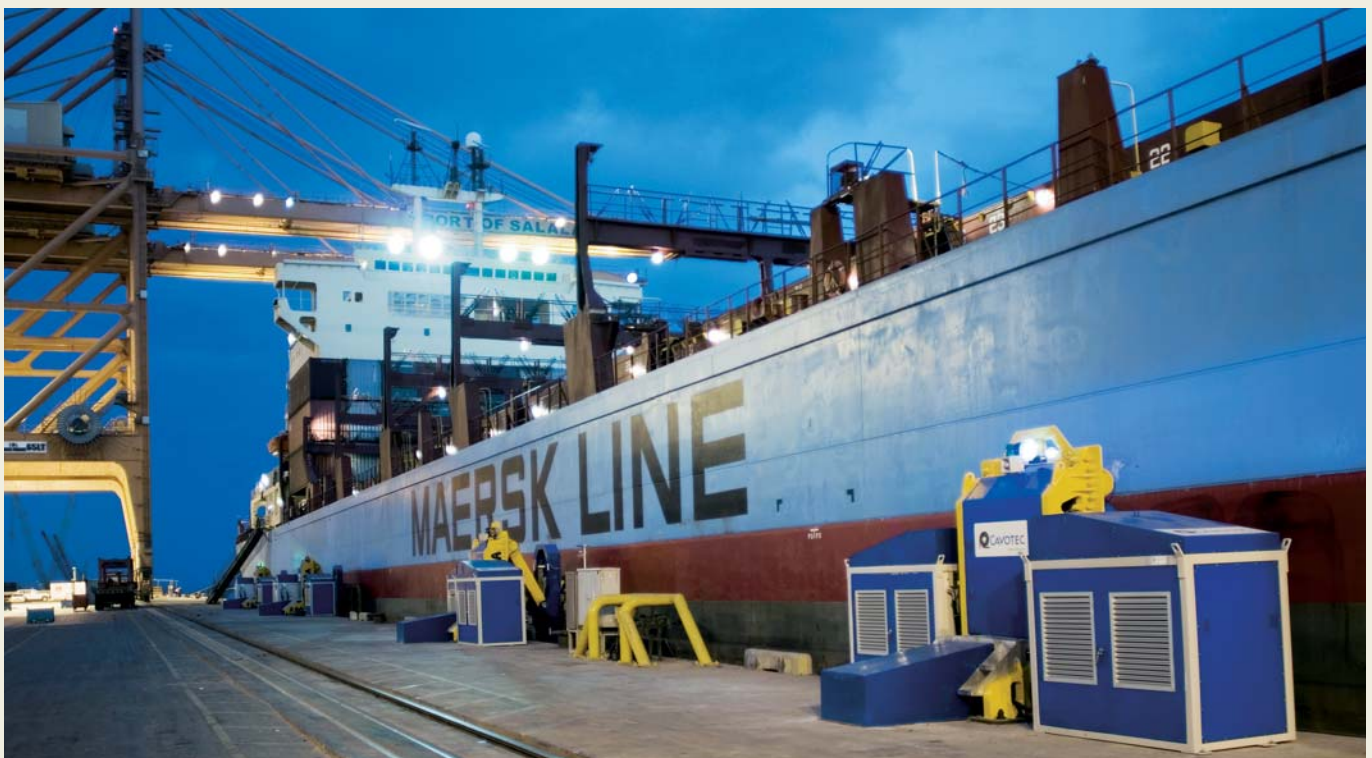
- Risk of injury to shore and ship personnel by mooring ropes eliminated.
- Continuous load monitoring and sophisticated alarm functions, relayed in real time to operations personnel.
- Multiple redundancies of vacuum pads and inherent fail safe features ensure a secure mooring even during power cuts or loss of control signals.
- Robust mechanical design using only top-rated components, ensuring reliable performance.

## Economy

- Fast attachment (typically > 12 sec) and quick release.
- Allows larger ships to use smaller structures without the need to add structure for line leads and bollards
- Avoids delays while waiting for mooring teams to become available.
- Only one operator required, based ashore or onboard, to activate and remotely monitor (if necessary) the mooring system.
- No more disruption of other duties or to mandatory rest hours of ship crews.
- Potential reduction of crew numbers on ships and pier on fixed-route operations.
- A shorter port stay may mean less speed is required at sea and can offer better ship and berth utilisation.

## Environment

- Fast mooring means less operation of the ship's propulsion, of tugs and lines' boats etc, and consequently diminishes emissions into the port environment.
- The mooring systems have low electric power demand and use minimal consumption once attachment has occurred.
- Lower speed requirement for sea voyage translates into fuel savings.
- Offers measurable reduction in rope costs, less abrasion to hull paintwork and reduces mechanical wear on shore fenders





# Solutions for container terminals

Container terminals have become a crucial link in today's global economy. Often they are the main logistics hub for a large geographical region ensuring the smooth exchange of consumer goods, commodities and industrial products. Gains in efficiency and productivity that can be made regarding the ship to shore interface is potentially significant further down the logistics chain and can have a profound impact on the commercial success of terminal operators, shipping lines and their customers.

Cavotec MoorMaster's automated mooring systems close the technological gap between container ships and today's highly automated terminal facilities.

Container ships are becoming larger and in many ports the mooring of these huge vessels with ropes can easily exceed 30 minutes. MoorMaster can secure these large ships in a matter of seconds, allowing shore personnel faster access to the vessel to begin cargo operations.

In surge affected ports, MoorMaster holds ships steady providing a stable platform for faster crane and cargo movements.

## Advantages

### Infrastructure

- Improved pier utilisation through closer spacing of ships
- Quay length can be 'virtually extended' as the ship's bow can overhang the end of the quay.
- MoorMaster may reduce a requirement for an expanding port to extend breakwater protection

### Safety

- Reduced risk of mooring accidents
- Real-time monitoring of actual mooring process and forces during the port stay

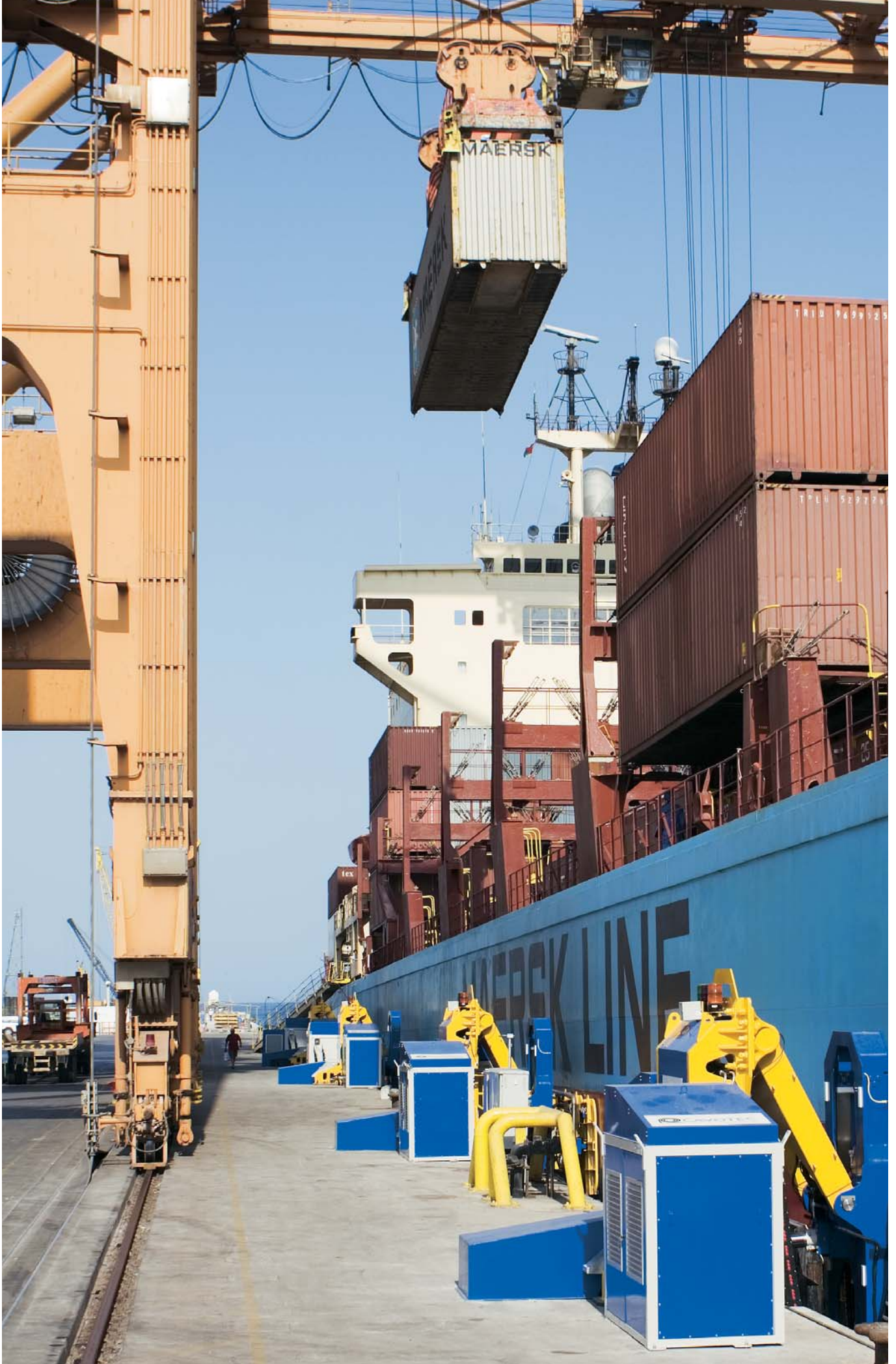
### Environment

- Reduced emissions
- Quicker connection to shore power

### Efficiency

- Higher container transfer rates  
Ship is held very steady alongside, which may in future allow for the automation of shore cranes  
Improved turn-around time, allowing for better berth utilisation
- Improved continuity of work processes
- Shorter operating times for harbour tugs
- No mooring teams needed  
Faster access for lashing gangs  
Harbour Pilots can depart a moored vessel faster







# Solutions for RoRo and Ferry Terminals

Transport of RoRo cargo by sea plays an increasingly important role in reducing road congestion. Good examples are the specialised pure car carriers (PCC) which form an integral part of the logistics chain within global car manufacturing, and passenger ferries which are mostly employed on short sea routes where reliability of schedule and quick crossing times are of vital importance.

While many RoRo ships and ferries trade on fixed routes, adaptability to different ports remains important to ship owners and terminal operators. With increasing ship sizes, the challenge is often to safely moor in adverse environmental conditions, especially where pier space for ropes is restricted. The Cavotec MoorMaster is very effective in shortening the time in port, and allows terminals to operate in adverse environmental conditions that are incompatible with traditional rope mooring. Retrofitting existing terminals with Cavotec MoorMaster allows usage by vessel sizes beyond the original design envelope, without the need for costly pier extensions.

## Advantages

### Infrastructure

- Improved pier utilisation with to closer spacing of ships
- Quay length can be minimised as ship's bow and/or stern can overhang the end of the quay
- Ideal for combination with simple pile-based berths
- MoorMaster may reduce a requirement for an expanding port to extend breakwater protection

### Safety

- Reduced risk of mooring accidents
- Reduced risk of linkspan damage with automatic guidance
- Real-time monitoring of actual mooring process

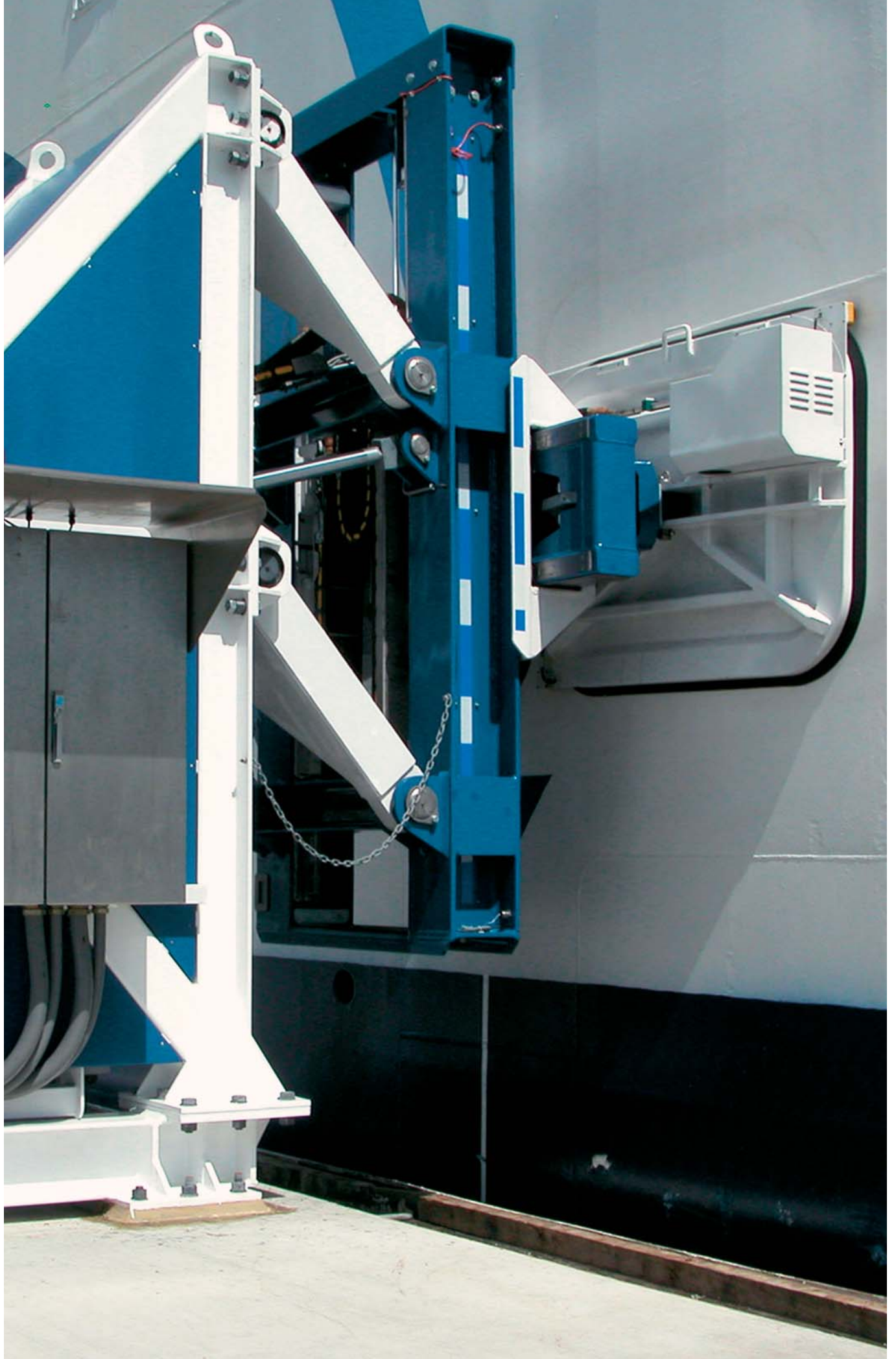
- Shorter, more predictable turn-around times, allowing for better berth utilisation
- Improved continuity of work processes
- Reduced risk of cargo and passenger link disruption in adverse conditions
- Reduced risk of schedule disruption due to industrial action

### Environment

- Reduced emissions thanks to faster mooring process
- Less pier and breakwater structures required







# Solutions for Dry Bulk and Tanker terminals

Bulk cargoes represent the largest proportion of global trade categories by volume and transporting these by sea remains the most effective option. These specialised ships are categorised according to their size, and vessels within one class share similar hull shapes and dimensions.

The ships are not usually operated on fixed routes, but chartered for single voyages. Terminal operators typically have to compensate the ship owner for lost time if undue delays are incurred at loading or unloading terminals.

The Cavotec MoorMaster makes the ship interface more predictable and stable, thus reducing downtime due to adverse conditions in port. By significantly reducing ship turn-around time, ships and terminals can be utilised more efficiently.

## Advantages

### Infrastructure

- Improved pier utilisation thanks to closer spacing of ships
- Quay length can be limited as ship's bow and stern can be extend beyond the quay
- Cavotec MoorMaster systems absorb motion, leading to possible reduction in breakwater requirements

### Safety

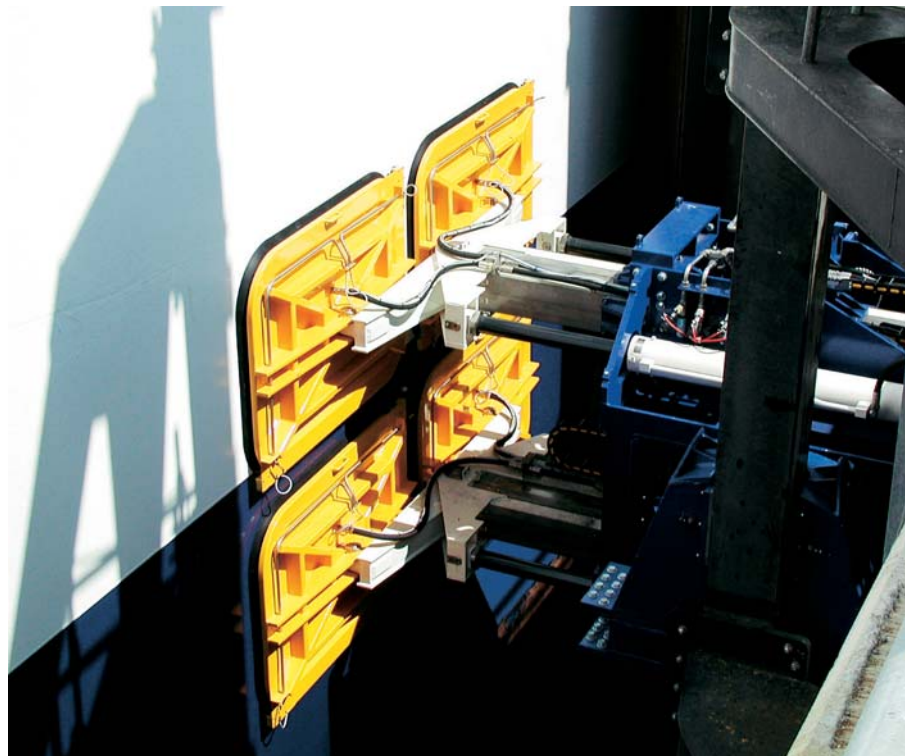
- Reduced risk of mooring accidents
- Reduced risk of linkspan damage thanks to automatic guidance
- Real-time monitoring of actual mooring process

### Efficiency

- Improved turn-around time, allowing for better berth utilisation
- Improved continuity of work processes
- Improved cargo transfer rates, even in locations with swell or surge motion
- Increased cargo throughput at existing terminals.

### Environment

- Reduced emissions thanks to faster mooring process
- Less pier and breakwater structures required









Head Office

**Cavotec MSL Holdings Ltd.**

Cavotec MSL is listed on the **NZX**

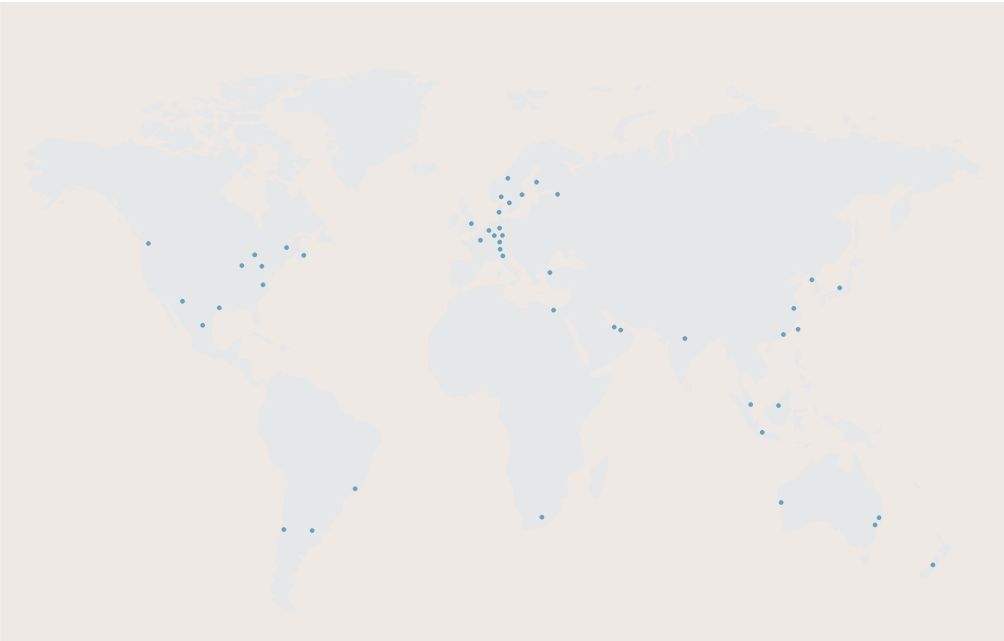
Corporate Office

**Cavotec (Swiss) SA**

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*We are present in*

Argentina	Luxemburg
Australia	Malaysia
Belgium	Mexico
Brazil	The Netherlands
Canada	New Zealand
Chile	Norway
China	Russia
Denmark	Saudi Arabia
Egypt	Singapore
Finland	South Africa
France	Sweden
Germany	Switzerland
Hong Kong	Taiwan
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Japan	U.S.A.
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