

RoRo

# Bow access solutions

## Planning the bow access

Cargotec's aim is to design a bow opening which is efficient, economic and safe, while fully meeting the specific operating requirements.

The more information that can be given on these prerequisites, the greater the chance to find the optimum solution. Under the following headings information requirements can be found before commencing the project. If these answers are available at the earliest stage possible, work will be saved during the later stages, gaining valuable time by shortening the lead time between initial contact and delivery.

## Bow opening types

There are two major types of bow access:

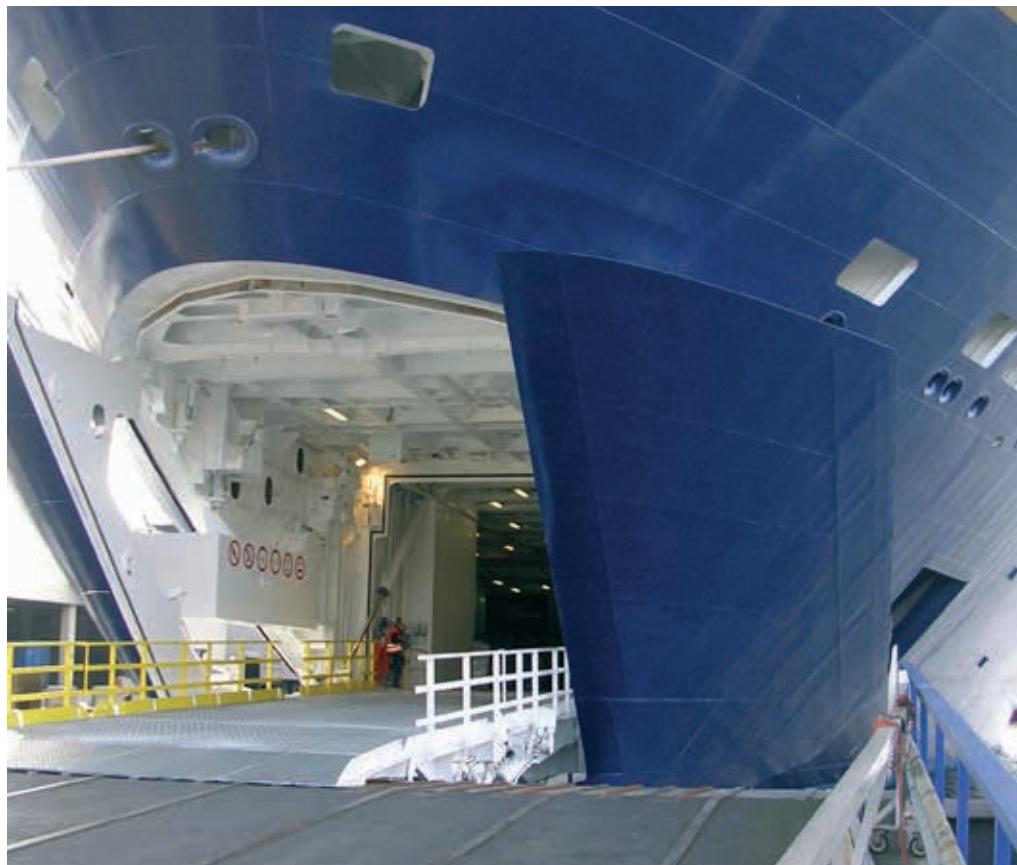
- Bow visors
- Bow doors

## Interface between ship and quay/land installation

In order to establish the length of the ramp, we require certain important dimensions as well as information on the maximum angles at the knuckles (point of interchange between straight lines), also the maximum gradient.

Essential measurements are the height of the threshold deck above the water level under ballast or full load, together with the quay edge height above water level at both high and low tide. If either the knuckle angles or the gradient are not known, please indicate the types of vehicles, clear height, ground clearance and wheelbase. Where there is a need for high vehicle speeds during loading or unloading, a shallower gradient of the ramp will be needed.

The ramp will then be longer than if consideration is given only to the geometrical clearance at the knuckles. Based on this input we calculate the requisite length of the ramp to suit the various operating conditions.

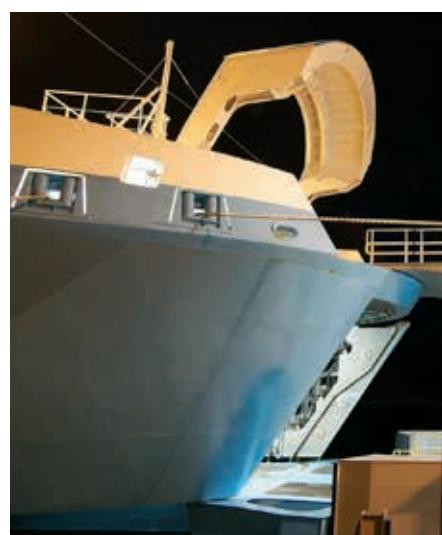


MacGregor side-swinging bow doors and bow ramp

The longest calculated requisite length represents the minimum ramp length. In order to dimension the ramp we must know whether the quayside is horizontal, of a sloping design for RoRo ships or a linkspan.



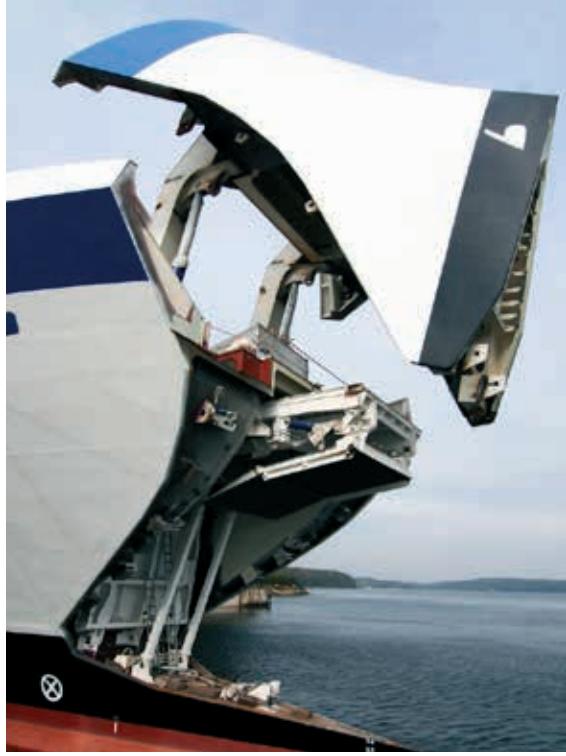
MacGregor bow visor (bulwark visor)



Liftable bulwark for two-tier loading



Bow doors and bow ramp



Bow visor and bow ramp

### Ramp width

Describe the internal cargo flow adjacent to the bow ramp. Indicate the required number of driving lanes and any pedestrian gangways. Specify the width clearance of the lanes and height clearance.

### Loading

To arrive at correct dimensioning of the steel structure and achieve an acceptable strength to weight ratio, we need to know the following:

What kind of vehicles will drive over the ramp? How much is the axle loading and the print area of the wheels? How many axles are there and how far apart are they?

What will be the required total load carrying capacity of the ramp, based on the maximum number of vehicles expected to be on the ramp at the same time?

### Interface between ramp and ship

When designing the bow section of the ship, sufficient room should be reserved for the ramp and its associated equipment.

A space of 600 to 900 mm should be allowed at each side of the ramp, depending on size. This space is required for the kerb, railings, sealing system and operating equipment. If gangways are to be provided extra width should be allowed. Contact us early in the design stage if you require a more accurate estimate of the space requirement.

### Operating system

The main operating system for a bow door and bow ramp is hydraulic power pack.

The governing factors in dimensioning the operating system capacity are the size of the ramp, time requirements for raising and lowering of the ramp and for a hydraulic system the outside temperatures to be encountered during operation.

For opening and closing, 4 to 6 minutes are required, excluding opening and closing of the securing devices, for an average size door and ramp. The shorter the time, the greater will be the size and cost of the operating system.

Clearly, there is also a limit to the technical feasibility. An indication should be given of the maximum and minimum ambient temperatures in which a hydraulic system is to operate.

### Regulatory bodies

Please specify which demands are to be met by the equipment. In other words, which classification societies, national authorities and other regulations (e.g. IMO) are to be satisfied.

### Options

Below we show equipment or accessories which require your choice, also optional equipment which may be added to the ramp. These should be studied point by point when making an initial evaluation, based upon the particular operating conditions.

### Control options

Two different systems are available:

- **Automated control system**

Press one button to initiate and complete the whole opening or closing sequence.

- **Manual control system**

Each step in the operation is controlled by hand-operated hydraulic valves. The greater the degree of automation of the system, the easier and faster the operation.

A fully automated system will be particularly cost effective on shorter runs where there is a need for fast loading and unloading.

The manual control system is in practice restricted to simple ramps, non-tight, in locations on the ship which are not critical for the safety of the ship.



Photo: ShipPax Information

### Side-swinging MacGregor bow doors

#### Anti-slip options

Four different anti-slip devices are available.

Welded square bars in a herringbone pattern provide a robust skid-resistant but uneven surface with a high degree of friction.

Expanded metal provides an even running surface with high friction at lower cost but the design is more prone to mechanical damage and wear, all of which may lead to higher maintenance costs.

The design of Nelson studs is robust and the running surface is even although the friction is lower than with the other types.

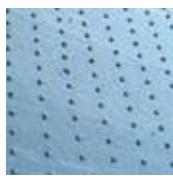
The fourth alternative is anti-slip coating consisting of epoxy mastic dressed with resistance friction material, which provides a high friction and an even surface.



Herringbone



Expanded metal



Nelson studs



Anti-slip coating

#### Cargotec's standard for MacGregor bow door and bow ramp

Over the years Cargotec has designed and manufactured a great variety of MacGregor bow access arrangements for different types of ships.

We therefore promise that your bow door and ramp will meet your needs in terms of quality, efficiency, security and overall economy.

#### Steel structure quality

The MacGregor ramp is designed as a flat top plate with an open web construction to meet the demands for torsional strength due to the movements of the hull or heel of the ship.

High tensile steel is used throughout the ramp as standard. Fixed wheel kerbs are fitted at each side of the driveway when needed and portable and/or automatic handrails are employed if necessary.



Open web construction

#### Sealing and securing quality

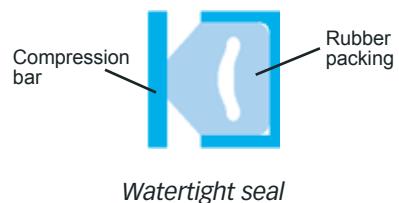
The team of Cargotec's engineers have developed an efficient and secure watertight seal. The result is a simple but high-performance design.

A rubber packing is placed in and around the perimeter of the opening of the hull. When closing the ramp the rubber is pressed against compression bars made of stainless steel.

These have a very smooth surface to guard against any penetration of water. The packing is of the sliding type which allows relatively large racking deflection of the stern opening.

The ramp is secured in the closed watertight position by hydraulically operated hook cleats and bolts. They are well-proven Cargotec innovations which can be relied upon in all weathers. The hooks are placed above the stern opening and the bolt cleats at each side of the opening.

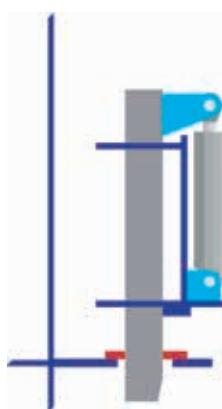
Only high quality components from approved suppliers, suitable for marine environment, are used in MacGregor equipment.



Watertight seal



Hook cleat

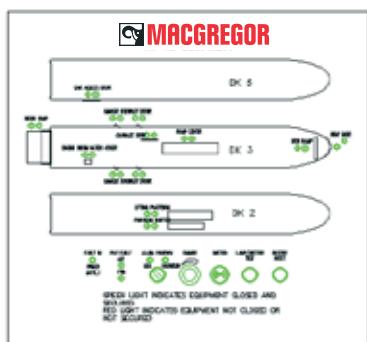


Bolt cleat

## Safety quality

Being the market leader, Cargotec's ship experts are invited by national authorities and classification societies to use its expertise and experience, gained from numerous MacGregor installations, to help develop and evaluate new rules and regulations.

Your MacGregor ramp will incorporate a number of items of safety equipment regulated by classification societies and authorities. When the ramp is closed and cleated, the true status is confirmed by the indicator lamps both at the operating panel and the bridge panel. Only high quality components from approved suppliers, suitable for marine environment, are used in MacGregor equipment.



Bridge panel



Lloyd's Register Quality Assurance certifies that the Quality Management System for MacGregor is ISO 9001:2008 compliant.

**MacGregor** is the world's leading brand of engineering solutions and services for handling marine cargoes and offshore loads. MacGregor products serve the maritime transportation, offshore and naval logistics markets, in ports and terminals as well as on board ships. Our cargo flow solutions integrate cargo access, stowage, care and handling functions to suit a particular ship's cargo profile. This benefits its productivity, environmental impact and profitable service lifetime.

MacGregor is part of Cargotec. Cargotec's class B shares are quoted on NASDAQ OMX Helsinki.

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