

RoRo

Hoistable ramps

Planning the hoistable ramp

Our aim is to design a hoistable ramp 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.

Ramp length

In order to establish the length of the ramp, we need to know the height measurement between the two deck levels, maximum knuckle angle (point of interchange between straight lines), and whether you require a specific gradient of the ramp.

If the maximum knuckle angle is not known and/or gradient, please indicate the total vehicle height, height and ground clearances, wheelbase and overhang at front and rear. Where there is a need for higher vehicle speeds during loading and unloading a shallower ramp gradient is often called for. The length of the ramp will then be longer



than that calculated only on the basis of geometrical clearance at the knuckles. To minimize the ramp length, we often construct the ramp with an s-shaped profile, with a shallower gradient at each end of the ramp.

Ramp width

Describe the internal cargo flow onto and off the ramp. Indicate the required number and width of lanes on the ramp. Typical clear width values: 3,5 m for single-lane and 6,0 m for dual-lane trailer traffic and 3,0 m for single-car lane and 5,0 m for dual-car lane.

Loadings

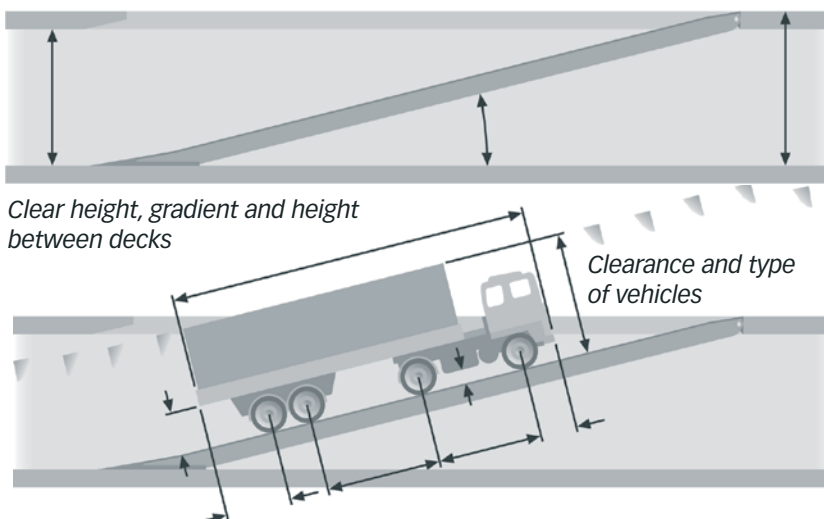
In order to dimension the steel structure with the required strength and minimum weight we need to know the following: What kind of vehicles will be driven over the ramp? What are the axle loading and wheel print area? How many axles are there and how far apart are they?

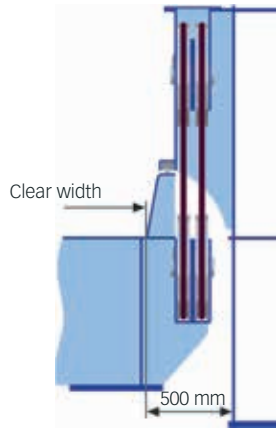
How much total simultaneous loading must the ramp withstand, i.e. what is the maximum number of vehicles likely to be found on the ramp at the same time during loading and unloading? What is the maximum total weight to be supported on the ramp when it is being raised?

Interface between ramp and ship

When you design the hull in the area of the ramp, adequate space must be reserved for the ramp and its associated equipment.

The ramp requires a longitudinal space approximately (as a rule of the thumb) eight times the height between the decks. The lateral space consists of the clear driveway plus up to 500 mm at each side of the ramp depending on size. This space is needed for railings, sealing system and operating equipment. Contact us early in the planning stages if you require a more precise estimate of the space.





Reserve space for ancillary ramp equipment



Hydraulic capacity

The determining factors in the dimensioning of the capacity of the hydraulic system are the size of the ramp, total load when raising, and the required speed of opening and closing.

A typical time for opening or closing is 2 to 5 minutes, excluding opening and closing of the securing devices. The shorter the time, the more costly the required hydraulics.

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

Normally, the ramp is classified as a part of the ship's deck. Let us know if you also require a lifting gear certificate.

Options

On the right we show the equipment or accessories which require your decision, 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.

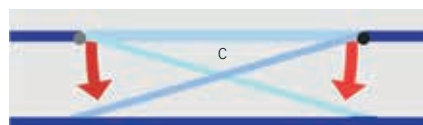
Ramp arrangement options

A one-piece ramp is the natural choice. Choose between three hinge locations: hinged at one end on the upper deck (a), or on the lower deck (b), or hinged at both ends on the upper deck where

you can easily switch between the two locations (c).

When the clear height on the ramp is less than that dictated for the lower deck, a two-piece ramp is often the best solution (d).

The opening is smaller and the support pillars may be omitted. The ramp may in all different configurations be equipped with or prepared for installation of drencher-piping and electric lightning.



Sealing options

There are three alternatives – no sealing, watertight sealings or gastight sealing. On request, the sealings can also be combined with fire protection; the seal will then be of fire-retardant material.

Control options

Two different systems are available, manual and automated.

Automated control system

Whereby pressing and holding a single button will 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 system automation, the easier and faster the operation. An automated system will be particularly cost effective on shorter runs where there is a need for faster loading and unloading. The manual control system is in practice restricted to simple ramps: non-tight and of low degree of complexity.

Operating options

Two different systems are available:

- Direct hydraulic/electric cylinders
- Wires by hydraulic/electric jigger-winch

The normal choice involves wire ropes anchored at the deck head and operated by hydraulic/electric jigger-winch mounted within the ramp structure.

To accommodate transverse forces during operation, the ramp is guided by ship-mounted guides. For a ramp less than around 30 meters in length, choose hydraulic/electric cylinders acting directly on the ramp. This is the most cost effective and reliable solution provided that there is sufficient space. When the ramp is longer than 30 m or so, choose wire ropes operated by jigger-winch.

The main section of the ramp

There are two types of steel structure. For short ramps and low loads you should choose a steel structure with girders below the top plate and separate railings. For long ramps and high loads, choose a steel structure with high side girders which also serve as railings.



Steel structure with high side girders



Steel structure with girders below the top plate

Handrail options

Handrails are available in three versions which can all be combined on the same ramp.

- Fixed to the ramp.
- Portable and stowed on board during the voyage.
- Automatically foldable into a recess alongside the ramp when it is in the closed position.

The simplest and most cost effective version is the fixed one.

However, if handrails might impede the cargo, equipment or gangways, the portable or automatically foldable version is the natural choice.

Automatically foldable handrails



Fixed handrails



Portable handrails



Anti-slip options

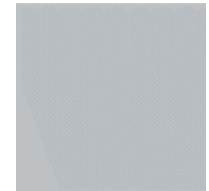
Three main anti-slip systems are available.

- 1) Welded square bars in a herringbone or straight pattern provide a robust skid-resistant but with an uneven surface.
- 2) The second alternative is polyurethane resin based anti-slip system dressed with high-grade abrasion resistant aggregates, which provides a high friction and an even surface.
- 3) The third alternative is anti-slip paint consisting of epoxy paint dressed with resistance friction material, which provides a surface suitable for light load such as private cars.
- 4) 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.
- 5) The design of Nelson studs is robust and the running surface is even although the friction is lower than with the other types.

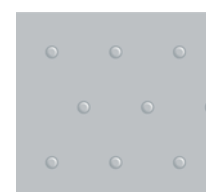
1 Herringbone



2-3 Anti-slip coating



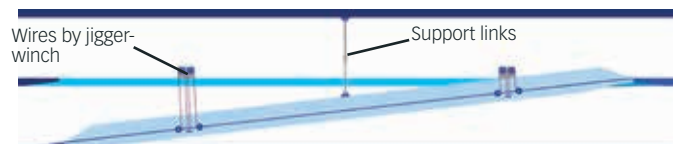
4 Expanded metal



5 Nelson studs

Support options

Supports are used for carrying the weight of the ramp plus load during loading and unloading. Two types are available. Fixed stools offer the simplest and best solution, provided that there is sufficient space and the cargo flow is not impeded. In all other cases, choose support links positioned at each side of the ramp, at mid-length and anchored to the deck head.



Flap options

Select one of the two flap designs. One is stowed horizontal in the raised position. The other is stowed upright, forming a barrier at right angles to the ramp with a free end.



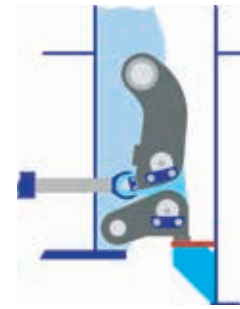
Non-foldable flap



Foldable flap



Open web construction



Cleat mechanism

Quality of fittings

Shafts and pins exposed to the weather are of stainless steel. Cylinders are fitted with spherical plain bearings.

Sealing and securing quality

The team of MacGregor engineers have spared no effort in developing 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 ramp is secured in the closed watertight position by hydraulically operated cleat mechanisms at each side of the ramp. They are well-proven MacGregor innovations which can be relied upon.

Safety quality

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

Your hoistable 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. Custom designed load control valves are normally fitted directly on the cylinders. This will prevent the ramp from falling down in the event of hydraulic or electrical failure.

Only high quality components of marine design from approved suppliers are used in MacGregor equipment.

The MacGregor standard for hoistable ramps

Over the years MacGregor has designed and manufactured a great variety of hoistable ramps for different types of ships. We therefore promise that your ramp will meet your needs in terms of quality, efficiency, security and overall economy.

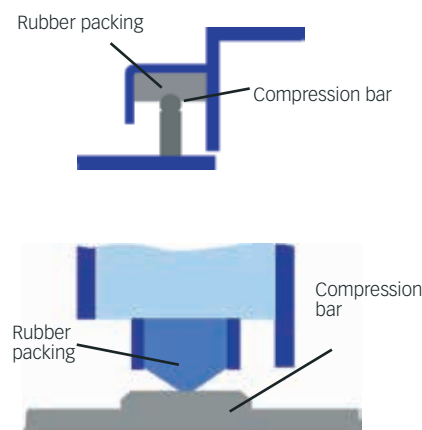
Yet it will be standardised in all major functions. In other words, you will be supplied with well-proven equipment which is easy to maintain for long-term trouble-free operation and easy to repair in the event of an accident.

We believe in high quality in every respect.

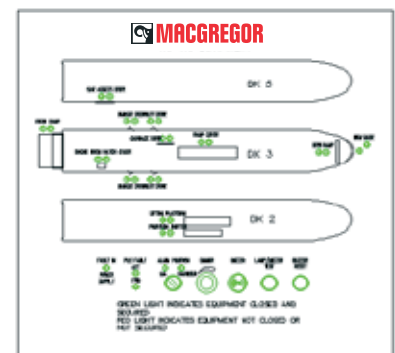
Steel structure quality

The 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 and fixed or foldable handrails wherever possible. Elsewhere, portable handrails are employed.



Sliding seal design



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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