

RoRo

Hoistable decks

Planning the MacGregor hoistable deck

Our aim is to design hoistable decks which are 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.

We define hoistable decks as any type of non-integrated decks that can be quickly moved to alternative working levels and stowed beneath the deckhead when not in use. Decks that are height-adjusted by a *mobile deck lifter*, are also called *liftable decks*.

Hoistable decks consists of a number of panels that can be separately operated. This system makes it possible to efficiently stow vehicles with different headroom requirements. In order to establish the configuration of the hoistable deck we need to know the following data.

Size of the hoistable deck

What is the total required useful area for vehicle loading? How many deck levels are needed between the integrated decks? Shall the deck cover the full width between bulkheads or steel structure boundaries, or just a part of it? This is common on ferries where one lane is reserved for higher vehicles, such as lorries and coaches.

Panel arrangement and size

We need drawings of the ship to investigate the hull restrictions. It could be the location of support pillars, girders and bulkheads or any other item that may influence the function of the deck,



such as personnel access doors, sloping decks etc. In those areas panels may be supported or divided.

For decks partly covering the width we require the minimum clear width. A normal value is 2,2 m for each car lane plus 0,6 m. With mobile deck lifter operation the size of the panels will be restricted to maximum around 14x14 m to avoid excessive deflection.

If you require two levels of hoistable decks the size of the panels may be further restricted, because the total lifting capacity of the scissors lift is about 40 tonnes.

Access ramp

How many access ramps are needed for each level of hoistable car decks? Indicate where they should be placed to optimise the cargo flow.

Should the access be from the integral deck below or from a fixed ramp?

To establish the length, width and other data of the ramp please study our datasheet *Hoistable ramps*.

In RoRo passenger ships the width of the ramp is equal to the width of the panels, so the cars can be driven straight on and off the panels to meet the demands for swift loading and unloading.

Clear height

What is the required clear headroom on each working level? Furthermore, what is the clear height below the hoistable decks in stowed position?

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 loaded? What are the axle loading and wheel print area? How many axles are there and what is the distance between them? What is the maximum uniformly distributed loading on the panels?

We will also include the ship's acceleration factors at sea in our calculations, if these are known.





Interface between hoistable deck and ship

The operating and securing equipment is never allowed to intrude into the cargo space. The operating equipment is either located in the deck panel or in the hull between girders or in the deck head. It is important that you reserve space for the decks in stowed position. A thickness of approximately 300–450 mm for each level of decks is required, depending on the size of and loading on the largest panel. Also reserve space for the operating equipment for the access ramp.

Operating system capacity

The determining factors in dimensioning the capacity of the operating system are the size of the panel, total load when raising the access ramp, and the required speed.

A typical time for lifting one panel is about 1 minute, excluding operation of the securing devices. The shorter the time, the more costly the required operating system. 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 hoistable deck 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 that may be added to the hoistable deck.

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: manual, where each step in the operation is controlled by hand levers; and automated whereby pressing and holding a single button will initiate and complete the whole opening and closing sequence.

- Manual control system
- Automated control system

The greater the degree of automation of the system, the easier and faster the operation.

An automated system will be particularly cost effective on shorter runs where fast loading and unloading is needed.

Operating options

There are three ways of operating the panels: by hydraulic jigger-winch with wire ropes, electric jigger-winch with wire ropes or by moveable deck lifter.

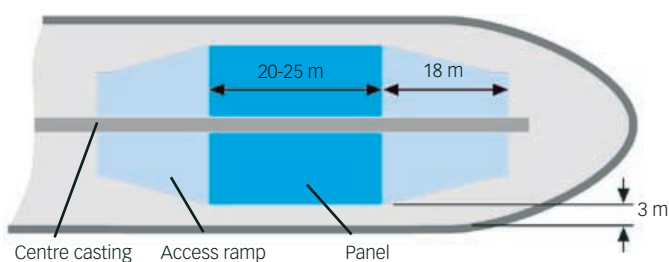
- Wires by hydraulic jigger winch
- Wires by electric jigger winch
- Moveable deck lifter

When you require swift operation, as in passenger ships, the jigger-winch is the obvious choice. If the decks are seldom height adjusted, as in pure car carriers (PCC's), the mobile deck lifter is the most effective solution. One mobile deck lifter is needed on each deck and can serve up to 45 panels.

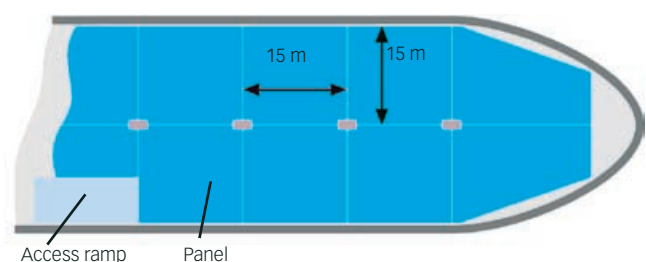
The lift is mounted on a chassis either self propelled or towable. The typical operating time for one panel is approximately 6–10 minutes.

If there is a more frequent need for adjustment, you should choose the jigger-winch system when benefits of the time savings justify the extra costs.

Where there are car deck panels above a fixed/moveable ramp, hydraulically- or electrically-operated panels are recommended, as the mobile deck lifter can not operate on an inclined deck surface.



PASSENGER RORO



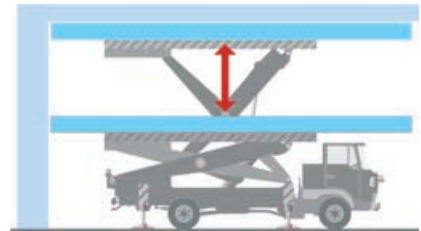
CARGO VESSEL



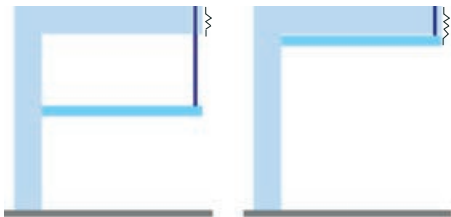
Jigger-winch mounted in the side shell structure



Pulling cylinder/electrical winch in the panel



Option 1



Option 2



Option 3



Car lashing options

The most cost-effective solution is 45–60 mm holes in the top plate, but it can only be used on the open web steel structure with steel top plate. Plywood top solutions use stiffeners with holes in the top flange. The plywood is supported on the stiffeners, thereby avoiding lashing holes in the plywood top.

Handrails

Sockets for handrails are provided at each joint between the panels and a number of stanchions and guard rope are supplied for use on partly deployed panels. On passenger ships folding handrails are provided along the free edges on both hoistable decks and access ramps.



Working level options

You can choose between several configurations giving different working level combinations.

The first configuration with one deck offers two alternative arrangements: two working levels with equal height of the headroom, or one working level with the hoistable deck in stowed position.

The second configuration with one deck offers three alternative arrangements: two working levels with equal height of the headroom, or two working levels with different height of headroom, or one working level with the hoistable deck in stowed position.

The third configuration with two decks offers three alternative arrangements: three working levels with equal height of the headroom, or two working levels with the lower deck stowed under the upper deck, or one working level with both decks in stowed position under the deck head.

Structure options

The structure of the panels is available in mainly two different designs. The choice is mainly a compromise between low weight and low cost.

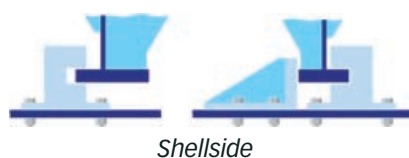
Open web steel structure with steel top plate offers the largest free span without support links, giving free space for loading and unloading. It is also the heaviest alternative.

A lighter and less costly solution is the open framework of rolled profiles, in steel with plywood top plate.

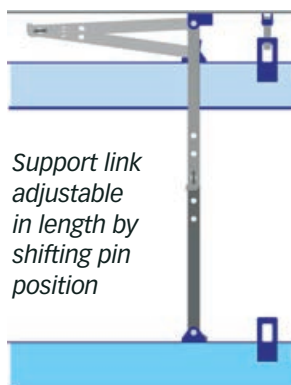
Guiding and supporting options

At least two corners of each deck panel must be connected to pillars or bulkheads, where guides and support pads can be fitted. The support pads transmit the lateral forces when the deck is carrying cargo. The guides are guiding the panels during lifting and lowering but they also transmit the horizontal forces from the sea. The free corners of the panels are supported by foldable support links. When there is only one working level all support pads are fixed and the support links are not adjustable.

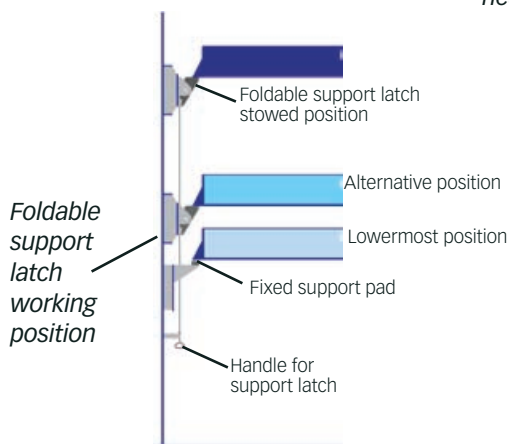
For configurations with alternative working levels the support pads in the lowermost position are fixed and all others adjustable: the support links are of course adjustable in length.



Shellside



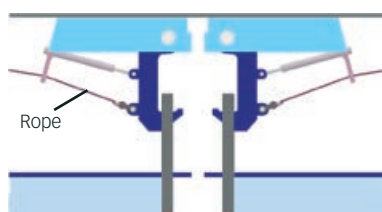
Support link adjustable in length by shifting pin position



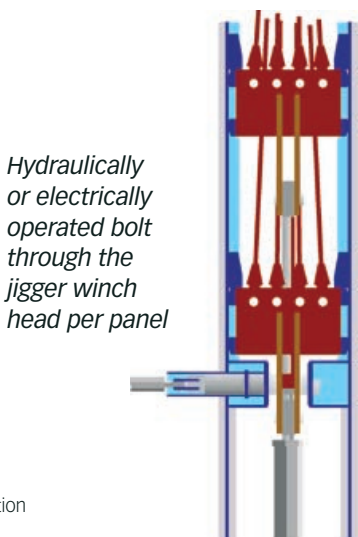
Options for securing in stowed position

Two different methods are available – manual, hydraulic or electric operation. The manual operation is carried out by a handle connected to the hooks or support latch by ropes.

The hydraulic or electric operation is by means of a bolt pushed through the jigger winch head by a hydraulic or electric cylinder; the panels are then hanging in the hoisting wires in the stowed position. When the decks are operated by mobile deck lifter, manual operation is the only choice. In all other cases the choice depends on the frequency of securing in stowed position and the demand for swift loading and unloading.



Manually operated securing hooks



Hydraulically or electrically operated bolt through the jigger winch head per panel



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