

## Linkspans

The function of linkspans is to level the height difference between the quay and the cargo deck of the vessel in order to provide smoother, safer and faster access for loading and unloading. Innovative designs are able to accommodate changes in both ship design and berth use, effectively extending the service life of the port.



Linkspans act as a bridge linking ship to shore, providing the access way for transferring cargo and passengers on and off RoRo vessels in port. The TTS range of linkspans includes fully mobile, integral tank, submerged tank, pontoon and mechanical support varieties, all offering flexible, reliable, safe and economic means for this transfer. Smooth cargo handling is thus possible in any weather.

## Mechanical support linkspans

The TTS mechanical support linkspan is operated by lifting equipment, for example hydraulic cylinders, and provides an access way to the main deck or the upper deck of the vessel. When linking to the main deck, it is usually positioned to accommodate the vessel's ramp, but it can also be rested on the vessel's ledge.

The mechanical support linkspan is suitable for use across different ranges of tidal variation. Where variation is small, the linkspan is usually operated at a fixed level, specified according to average water levels and vessel type.

The operator activates the linkspan to a preselected level, the parking cleat automatically unlocks, the linkspan then manoeuvres and locks at the correct level.

With greater tidal variation, the linkspan is able to follow the tide while being used to support the vessel's ramp.

The operating panel can be programmed to accommodate various types of vessel such that the linkspan is levelled to fit the ship's deck when it arrives in port.

If a vessel has no ramp, the operator can manoeuvre the linkspan onto the vessel's ledge. It can then be switched to 'floating' mode in order to follow both the vessel's movement and the tidal variations.

Extended access ramps can be provided to ensure a smooth flow of traffic when the linkspan is used for access to the upper deck.

The mechanical support linkspan enables more efficient loading and unloading of two-deck vessels, and helps reduce the turnaround time of cargo vessels in port.



# Integral tank linkspans

The integral tank linkspan offers the greatest stability and flexibility in accommodating vessels that are unrestricted in their beam, freeboard and ramp configuration. With the use of a TTS integral tank linkspan structure the revenue generated by a RoRo berth can be maximised and the need for the involvement of port management reduced.

Both the gradient and the transition angles can be specifically designed for any location, enabling the structure to be tailored to significantly reduce turnaround times.

The integral tank linkspan, with no permanent support structure or portal at its outer end provides a clear, safe and smooth transition between quay and ship. It is supported at its widened outer end by a floating section that is part of the bridge structure. This section is deep enough to float at a level to match the freeboard of the vessel using it.

The level is adjusted by a simple but rapid ballast system. The floating section also has a large water-plane area that limits the immersion due to traffic load to within manageable

proportions. The increase in the width of the outer end also creates a large landing area onto which the ship's ramps, unrestricted in width or length, may be lowered.

There are only two managed articulated junctions one at the hinge and one at the ship's ramp – allowing the transition angles to be optimised.

Integral tank linkspans can be supplied with upper decks and in skewed configuration. Extendable flaps may also be supplied to allow use by ships without ramps. These flaps stow flush with the deck so as not to interfere with the ramp of any other ship using the berth.



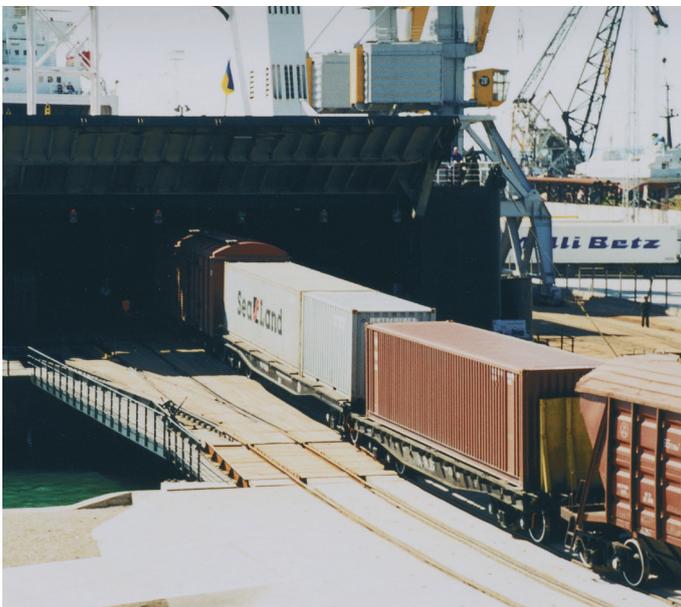
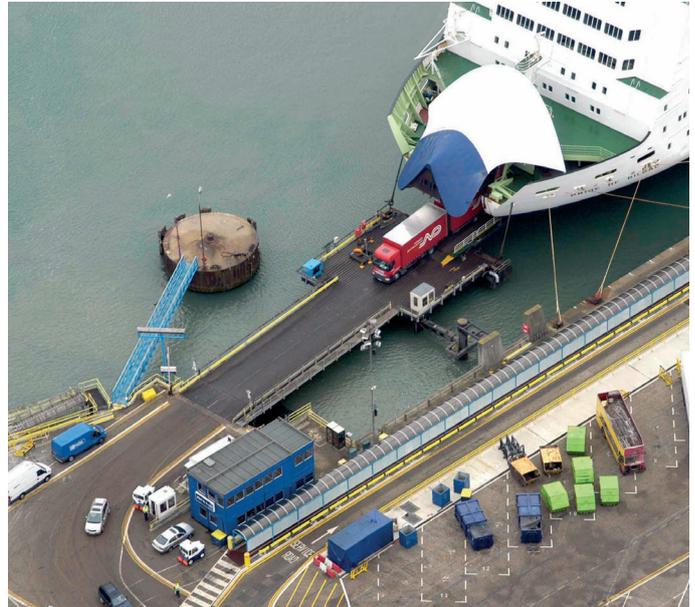
## Submerged tank linkspans

The submerged tank itself acts as a counterweight to support the weight of the outer end of the bridge that spans from vehicle ferry to quay. But, unlike a conventional counterweight system, it requires no supporting civil works and has no wires or mechanism to maintain.

The outer end of the linkspan is attached to the ferry and is usually done by resting it on a ledge at the vessel's vehicle deck threshold at either bow or stern.

This type of linkspan is mainly used for ferries on fixed routes such as inter-island and railway routes and those across estuaries and fjords. The linkspan follows the movements of the vessel caused by waves, swell or the transit of vehicles, making this type ideal for small vessels, exposed berths and train ferries.

Submerged tank linkspans can be designed either with upper decks or in a skewed configuration. These linkspan types are used in conjunction with a pinned or climbing support, thus rendering a safe solution for all types of ferry.



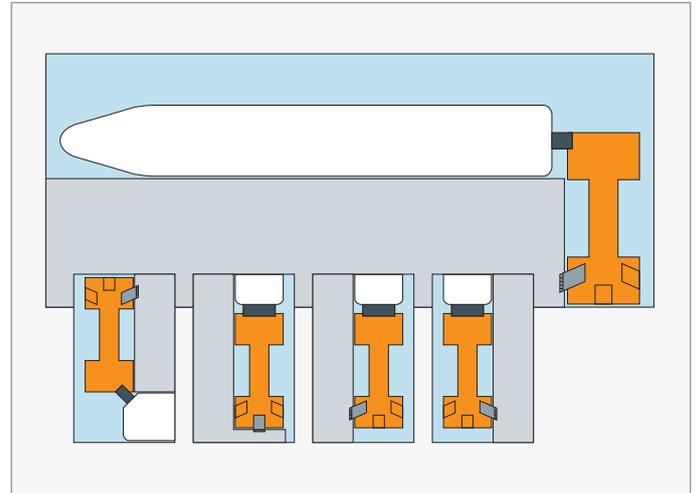
## Fully mobile linkspans

The fully mobile linkspan is a fast, efficient, economic and flexible structure designed to provide mobile berthing. In ports where the development of a berth needs to be unrestricted by a permanently fixed structure the fully mobile linkspan provides a powerful solution.

The fully mobile linkspan can be quickly moved into position along any length of quay, converting it into a RoRo berth and thus maximising quay space.

The fully mobile linkspan requires no civil works and is fully buoyant. It is moored to the quay using conventional ropes and chains and existing bollards. The height of the end at which the vessel berths is adjusted by ballasting to achieve a freeboard similar to that of the vessel.

This type of linkspan is able to facilitate a temporary RoRo berth adjacent to the freight shed, simplifying traffic management, increasing the speed of loading and so reducing congestion.



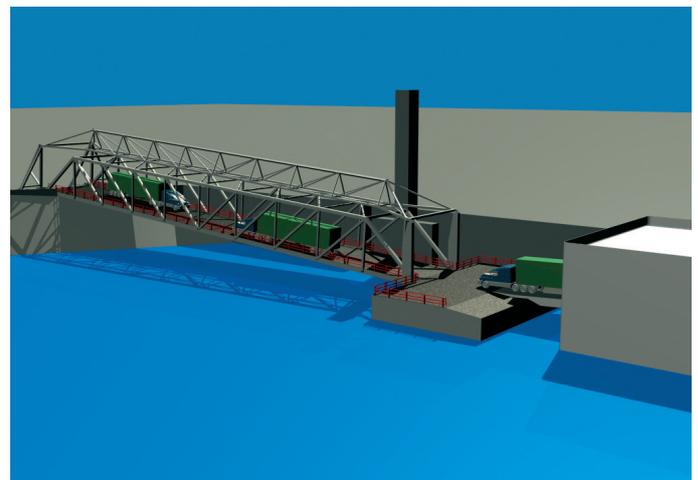
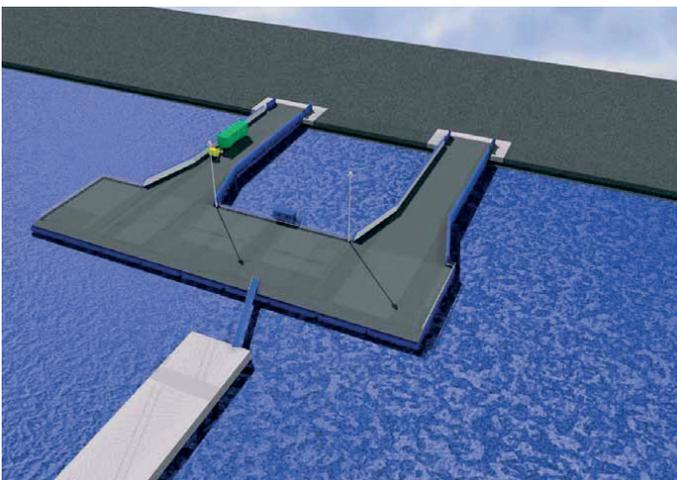
## Floating linkspans

The installation of a floating linkspan is preferable where high tidal variations occur in order to ensure the efficiency of loading and unloading under these conditions.

The TTS floating linkspan is attached to the dock, with its access ramp resting on a pontoon to act as a level bridge between the quay and the vessel.

The floating linkspan transfers the force of the berthing vessel or its ramp to fenders which absorb the impact at the shore end. It also follows tidal variations and water levels in order to provide a smooth path for efficient loading and unloading.

The floating linkspan can be equipped with hydraulically-operated ramps to enable it to function with a variety of vessels.



*Competence, reliability and trust are the hallmarks of our business, and we work hard with customers to ensure the effectiveness of equipment throughout the ship's life cycle.*

*We understand that expensive assets cannot be allowed to lie idle, and that onboard space must be used to the maximum.*

*So, from RoRo equipment such as ramps, car decks and linkspans, through hatch covers to cranes, winches and equipment for cruise ships and shipyards, our focus is on creating and delivering products and tailor-made service solutions that allow vessels to operate to their full capacity at all times.*



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