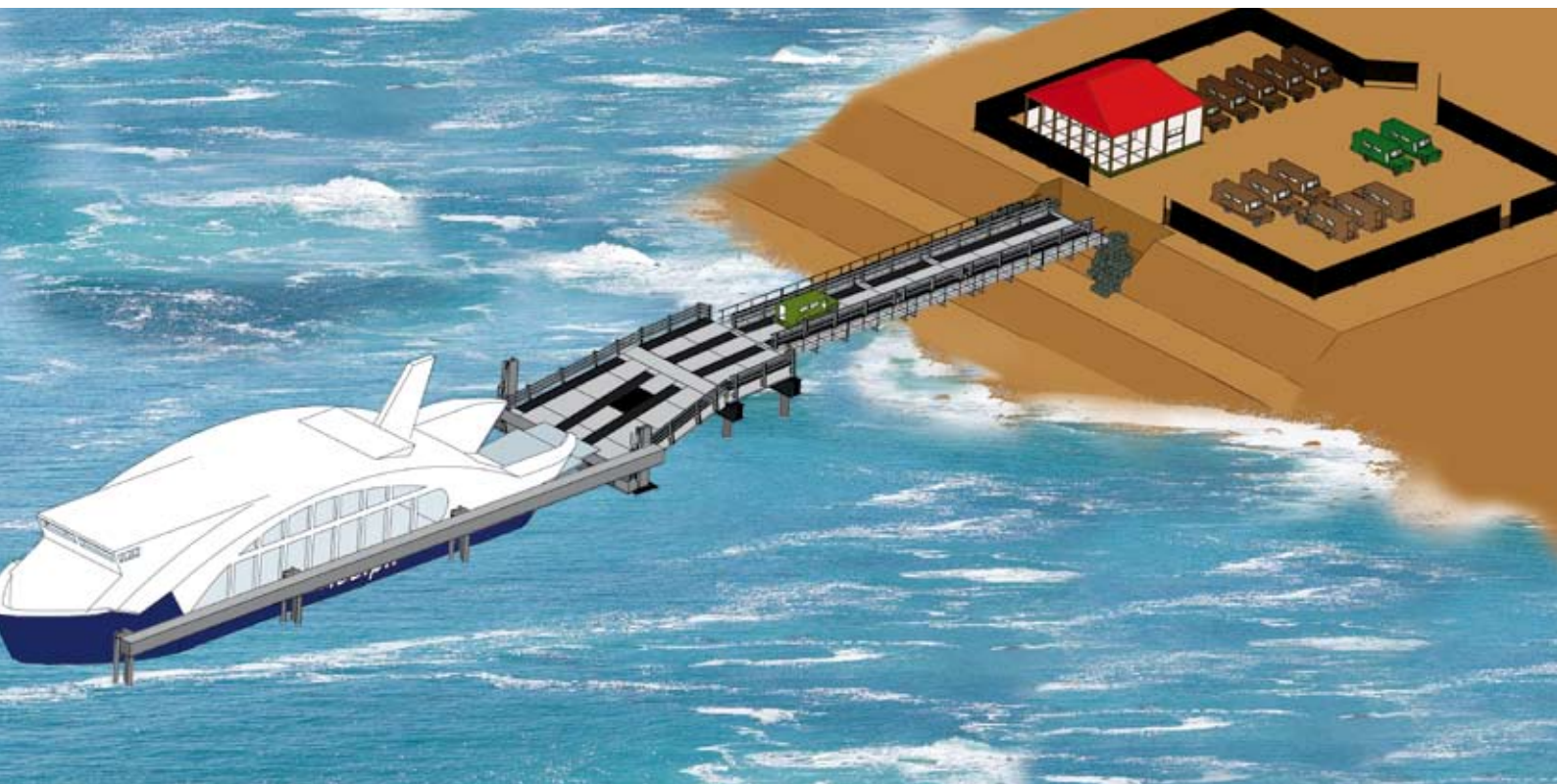


# UNIBRIDGE

Marine Applications™

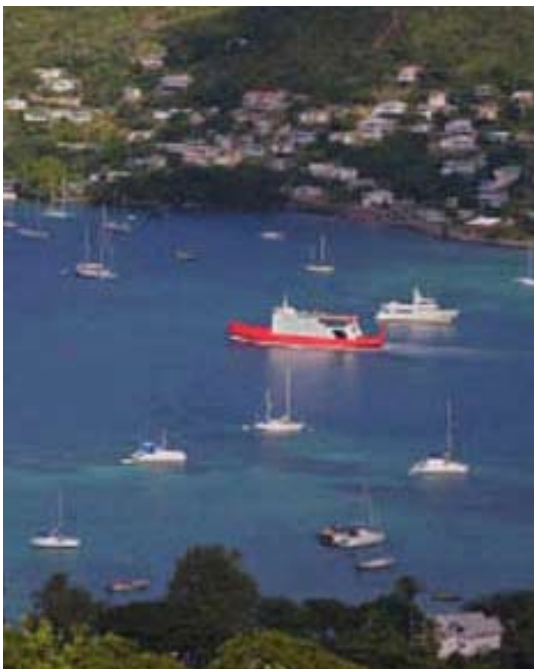
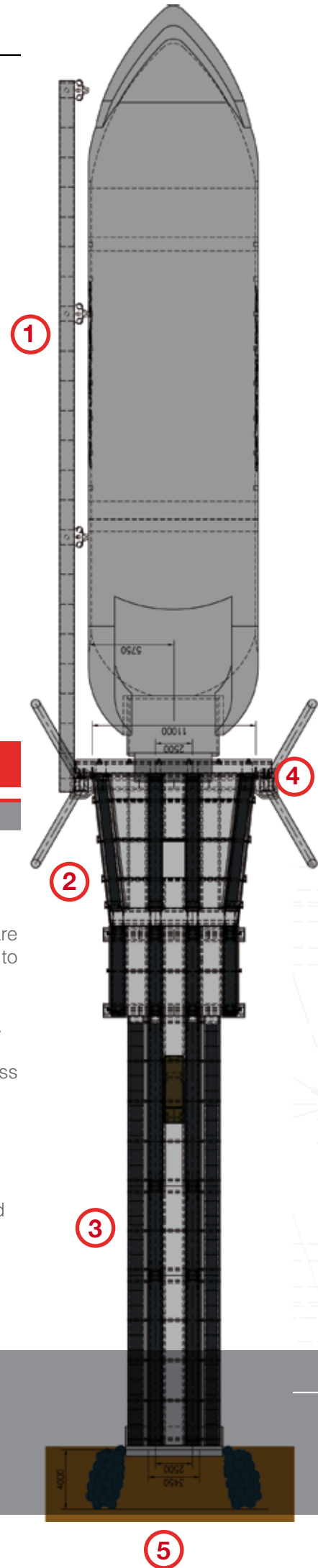


## UNIBRIDGE MARINE APPLICATIONS™

have been developed in response to the specific requirements of island groups and territories, where the movements of cars, buses, trucks and merchandise are almost exclusively by boat.

The generalisation of RO-RO (Roll-On, Roll-Off) over the last 30 years has greatly improved the links between islands and has even made possible the creation of virtual “road networks” between the different islands of an archipelago. This permits the development and economic integration of regions and populations that were previously isolated.

However, to be practical and efficient, all the port configurations must be compatible between themselves and must allow the adoption of standard systems of mooring and embarkation and disembarkation of vehicles. Security will also be enhanced by the use of standard systems. This uniformity of sites at different locations will allow an optimisation of vessel turnaround and overall productivity. It will also improve safety and security for personnel and users or customers during the critical operations of loading and unloading.



### What are UNIBRIDGE MARINE APPLICATIONS™?

UNIBRIDGE MARINE APPLICATIONS™ are the combination of several modular units, to create a modular RO-RO port.

- 1 • The berthing dolphin and its walkway.
- 2 • A lifting bridge/ramp to provide access between the access pier and the vessel.
- 3 • The access pier itself.
- 4 • The piling system which carries the structural elements of the lifting ramp and the access pier.
- 5 • The terminal building and a parking area with an exit to the land based road network.

## UNIBRIDGE MARINE APPLICATIONS™

### Berthing dolphins

Dimensions are standardised to give identical mooring procedures for every site, thereby optimising safety and security while improving the efficiency of operations.

### Lifting Bridge

This is one of the key components of the system as it provides the access between RO-RO vessels and the access pier. The lifting bridge/ramp must carry the vehicle loads - cars, buses and trucks - and must be able to be raised and lowered using a simple and robust mechanical system. Its working angle to the horizontal can be up to  $\pm 15$  degrees. It is possible to manually carry out the operations of raising and lowering the lift bridge with the help of a robust manual hydraulic pump.

### Access pier

This is the other key component of the UNIBRIDGE MARINE APPLICATIONS™ concept. The access pier is made up from UNIBRIDGE® elements which are compatible with and complementary to the UNIBRIDGE MARINE APPLICATIONS™. The modular design allows the access pier to be adapted to individual sites, with spans of up to 45 m between rows of piles.

For example, if an embarkation wharf is 90 m offshore in order to provide sufficient water depth, then, depending on loadings, only one intermediate row of piles may be necessary. This row of piles would be 45 m from land and from the wharf, which would have its own piling system. The span of 45 m could be made up of 6 m or 12 m modules, providing length flexibility for the installation of the integrated system.

The specificities of UNIBRIDGE® system also permit to have a width flexibility including walkways.

### Piling

The pile loadings from the dead loads (i.e. the self weight of the structures), the live loads (i.e. vehicle loadings, pedestrian loadings, stacking/stockpiling of merchandise etc) and the wind or seismic loads have to be considered.

A geotechnical survey is to be carried out at each site by independent geotechnical engineers. The piles will be designed to take into account the geotechnical characteristics of the site. The UNIBRIDGE® structure and the piling equipment available in the region.

The piling operations are relatively straightforward to organise and shall be undertaken by local reputable piling contractors exist in most regions.

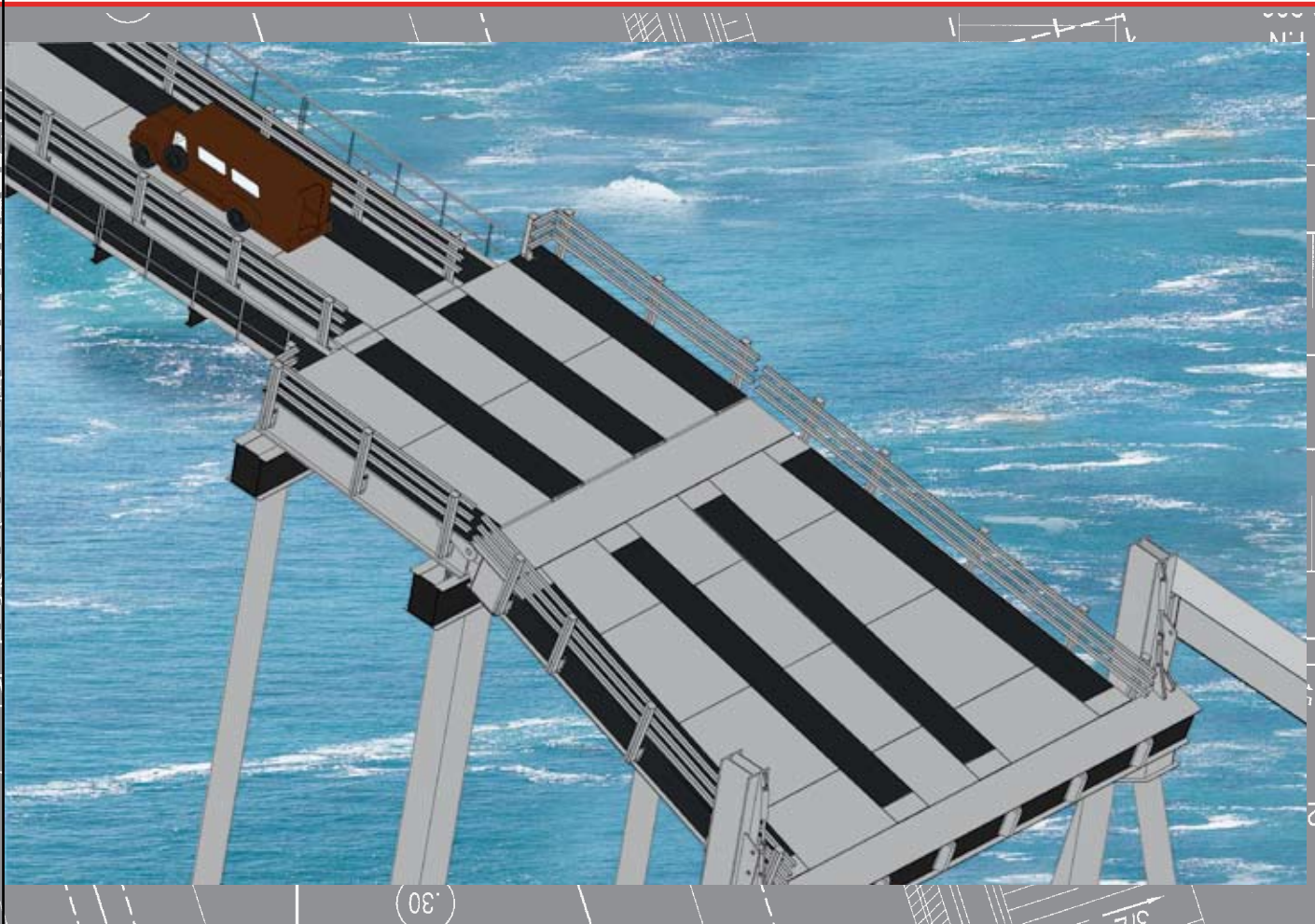
### Terminal Building and Parking

The terminal building is a standard prefabricated building.

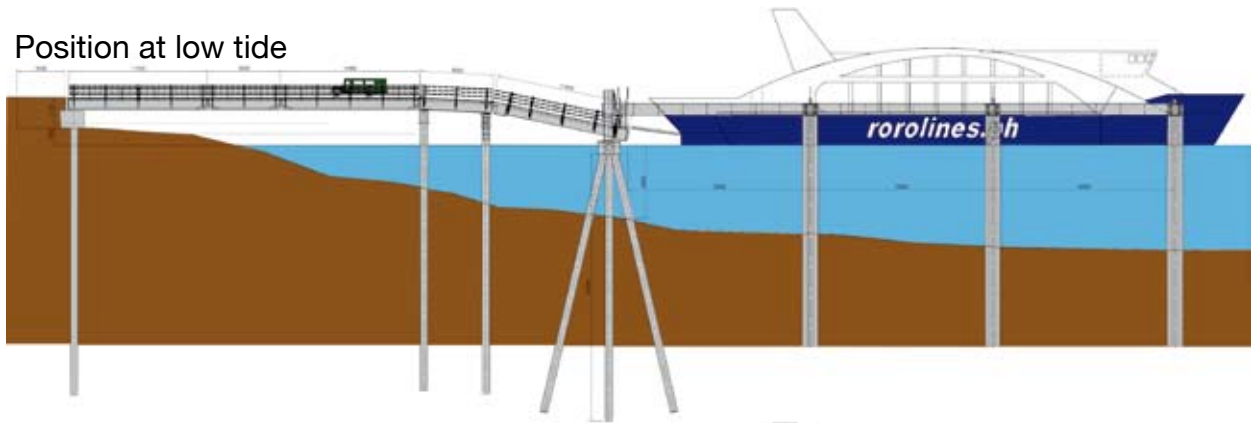
The enclosed parking area is designed for simplicity and ease of construction.

### Installation Time

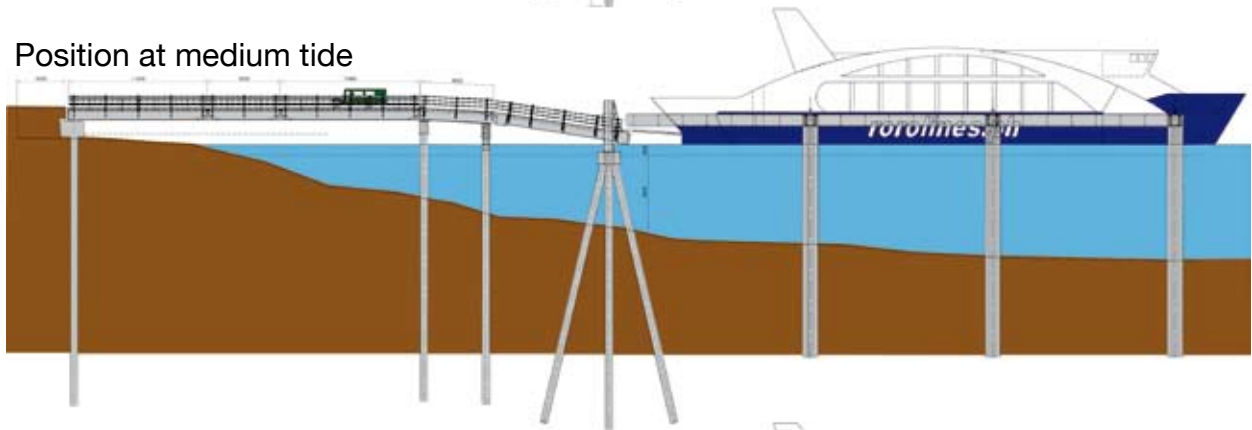
The installation of UNIBRIDGE MARINE APPLICATIONS™ made up of the components described above should be able to be completed in 6 to 8 weeks maximum, providing that the geotechnical studies/testing, the piling and the general site preparation have all been completed in advance.



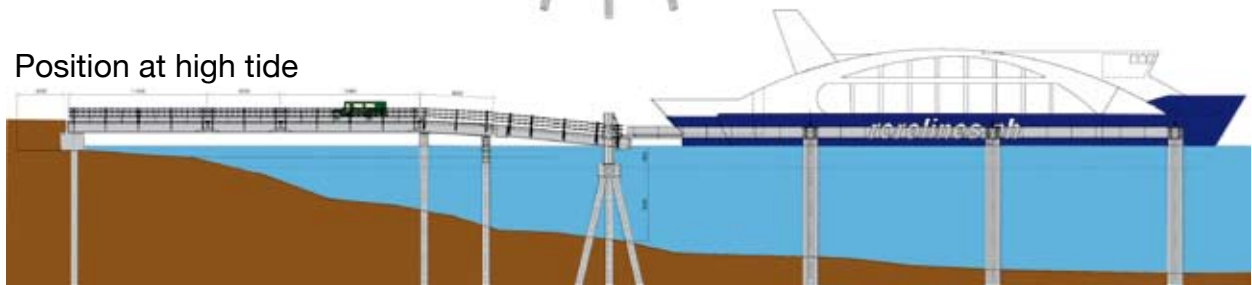
Position at low tide



Position at medium tide



Position at high tide



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