Portsmouth International Port extended to meet demand

Portsmouth International Port, Hampshire, UK

Portsmouth International Port has seen some big changes over the last year. Not only has the name changed (it is no longer known as the Continental Ferry Port - a move designed to reflect an increasing number of cruise ship visits), but its new terminal is now fully finished and operational - a very public statement of the port's positive view of the future.

The case for investment

Unlike the gleaming new terminal, passengers are unlikely to pay much attention to another key piece of new infrastructure at the port - an extension to one of its oldest berths. Berth two was last extended in 1994 to accommodate P&O's Pride of Bilbao. Since then of course, ships have grown quite considerably in length. It was decided that the berth needed to be extended by 50 meters to allow much longer vessels to tie up safely. Before the extension, a ship using berth two could have a maximum length of up to 205 meters, now vessels of up to 240 meters can easily use it.

The port is owned and operated by Portsmouth City Council. Managers successfully made a case for the multi million pound investment in the extension project, arguing that it would help secure current customers and attract additional trade as ships continue to grow in size. It was agreed that by making berth two longer, the port would be able to have a greater number of larger vessels docking at any one time, improving flexibility for operators.

Plans and providers in place

Once given permission to proceed with the project, management at the port obtained the necessary harbour revision order and other consents and then went out to tender for the design and build contract. Using a standard Portsmouth City Council pre-qualification questionnaire, modified to suit the particular requirements for this scheme, six companies were chosen to bid. To make the process fair and transparent each submitted tender was then judged against set criteria. The company with the highest score was chosen. This was TRANT, a Southampton-based firm that has worked at the port before. Structural design was carried out by CSC Engineers of Southampton. Fender design was by the manufacturer QuayQuip Ltd and the Galvanic Anode Cathodic Protection System was designed by Impalloy Ltd UK. The aim for managers at Portsmouth International Port and TRANT was to get the work done as efficiently as possible, without interfering unduly with day-to-day operations at the port. With five berths available for use it was possible to close berth two for the four month duration of the work, allowing clear access for construction.

Constructing dolphin structures

The berth was extended by constructing two new dolphins seaward of the existing berth with interlinking access footbridges, while still allowing port operations to function normally. The form of construction, size, shape, position and fenders were part of the design to achieve a 50 year life, together with a specified automated mooring (and quick release hook) system.

Figure 1: Portsmouth International Port.

Figure 2: The modern new terminal.


Figure 3: Manufacturing the new dolphins.

Figure 4: The structures come together in the port.

Figure 5: The dolphins are put into place.

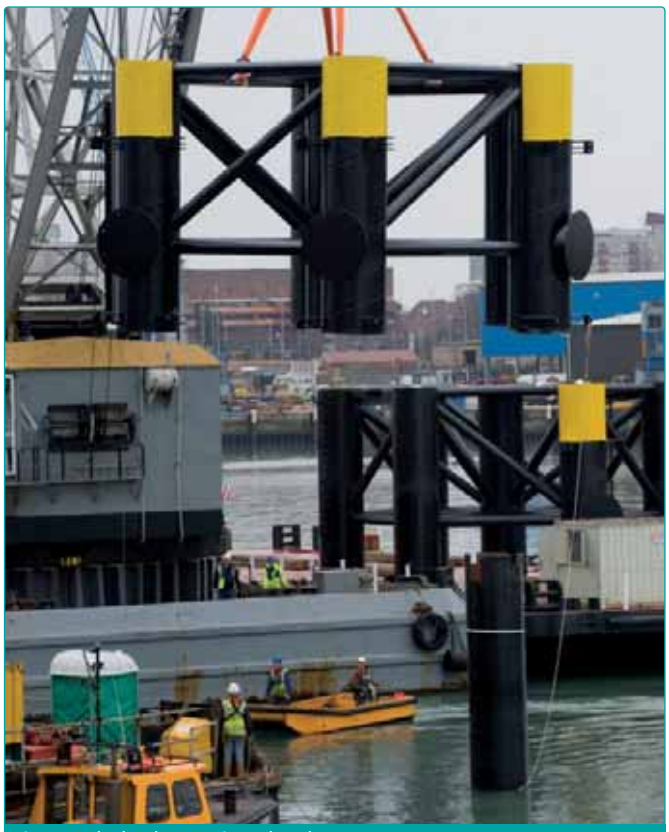

Figure 6: The berth extension takes shape.

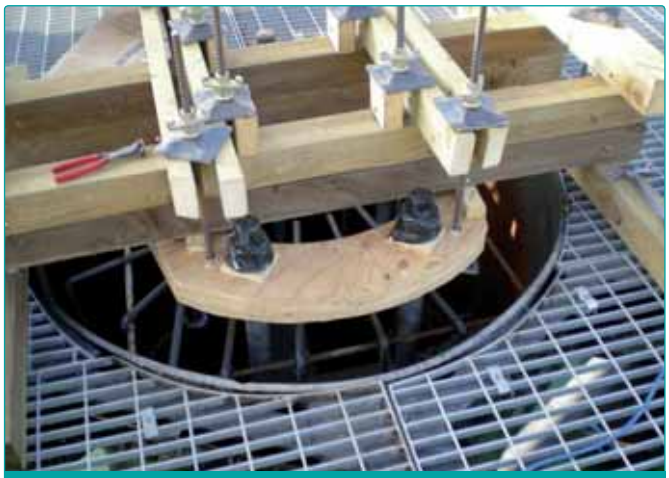

Figure 7: Steel reinforcement structures for concrete.

The fender panels were positioned and sized with regard to the belting arrangement of the various vessels expected to utilize the berth. The reaction loads from the fenders were transferred to the supporting dolphin structure and piles designed to resist the expected loads from mooring and accidental impact.

Each dolphin sits on seven piles made of steel. The tubes are each 30 meters long, with a diameter of 1.2 meters and a weight of 17 tonnes. The 14 piles were delivered on the back of flatbed lorries and craned off next to berth one, before being transferred to a barge. The dolphin platforms were fabricated by Testbank Ltd in Portchester, and were too big to be moved by road. These were brought in by barge.

It is normal practice for each pile to be sunk in place before the dolphin platform is assembled on top. However, in 2009 staff at the port developed an innovative new method which was used again for the extension of berth two. The central pile was driven about 14 meters into the sea bed. The completed steel platform was then lifted from a pontoon and lowered over the central pile, to rest on a support. The steel platform was then used as a guide for the remaining six piles. Each was inserted through sleeves in the deck and driven into the seabed. Once all the piles were correctly located the dolphin platform was welded in place. Any remaining steel above deck level was removed.

A steel soffit form was then installed inside the piles, to enable concrete to be placed in the top five meters of the tube. The top of each pile was then connected to the platform using a shear connector cross brace and steel reinforcement was installed. Concrete was then poured into a tremie tube placed inside the piles, pumped fifty metres from the dock side by a lorry parked on the jetty of berth two. The dolphin closest to berth two was constructed first, followed by the outer dolphin.

The finishing touches

Once the dolphin platforms had been fully constructed, the connecting foot bridges were craned into position. These were also fabricated by Testbank Ltd in Portchester. Each is 16 meters in


Figure 8: Concrete is pumped in.


Figure 9: The first vessel to use the extended berth.


Figure 10: A successful result.

length, and effectively 'clips' to the dolphin before being securely bolted in place. Three new mooring machines were also installed as part of the extension project. One sits on the existing jetty, the other two are bolted to each of the new dolphins. The Trelleborg Easymoor system has quick release hooks and brings numerous advantages to port operations. Heavy ropes are brought ashore using a gantline around the capstan through a set of leads which self-tail the eye onto the hook. This is a one man operation. The release of lines is achieved by the push of just one button and all three machines can be operated from a single control panel, dock crew don't need to access the dolphins to let go the lines of a ship. This increases the safety of the workforce, and with no heavy ropes to handle reduces instances of back injuries.

Successful outcome

Work started on the extension project in February and finished at the end of May. With almost perfect weather for the duration of construction, it was completed on schedule. The first vessel to use the extended facility was MS Marco Polo. She arrived on 31 May, a first time visitor to Portsmouth with 700 passengers on board keen to explore the city. It was also completed in time for one of the busiest cruise weeks in the port's history. Eight cruise ships visited in a seven day period, the added flexibility offered by berth two was crucial in delivering a seamless service for ferry and cruise ships alike.

Phil Gadd, Ferry Port Manager of Portsmouth International Port, says, "We can never afford to rest on our laurels, and must continue to develop our facilities. Doing nothing was not a viable option as it has become clear that ferry and cruise ship operators are keen to bring bigger ships to Portsmouth. The newly extended berth offers them a chance to grow their business, and help us sustain jobs in the city. This project has already proven itself as successful, coming into full use within days of completion. We would like to thank TRANT and its subcontractors for delivering the extension on time and on budget."

ABOUT THE AUTHOR

Phil Gadd joined Portsmouth International Port, formerly Portsmouth Commercial Port in 1986. Responsible for the overall management and operation of the cruise and ferry terminal and its operational staff as well as being deputy to the Port Manager. Plays a key role in the development of Port infrastructure, appointment of main contractors and strategic development.

ABOUT THE PORT

Portsmouth International Port is the UK's premier Port for the western channel and second-busiest cross-Channel ferry port overall, including Brittany Ferries, LD Lines and Condor Ferries with sailings to France, Spain and the Channel Islands. A new terminal for cruise and ferry customers opened in April 2011 as part of a £16.5 million investment to improve passenger facilities. Prestigious cruise operators including Swan Hellenic, Fred. Olsen and Silversea have luxury cruise ships serving a wide range of destinations. Portsmouth City Council has owned the Port since 1839. It is the most successful municipal port in the UK.

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