

Marine Works

Large Diameter Bored Piling and Pre-cast concrete deck

ExCel, Victoria Dock

LONDON, U.K.

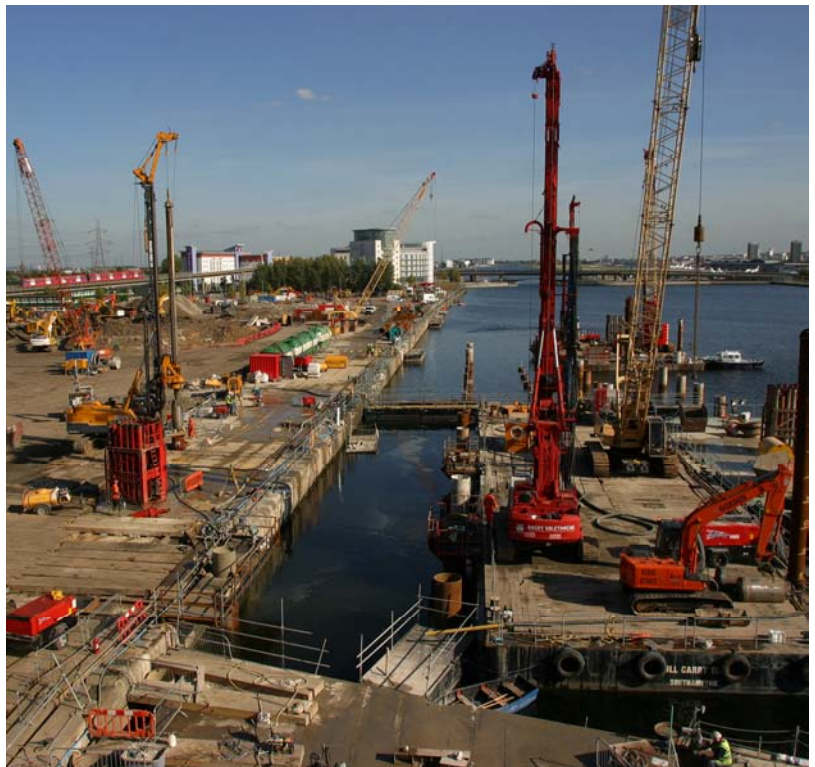


Large Diameter Rotary Bearing Marine Piles bored under polymer support with permanent casings .

Bachy Soletanche Limited's largest marine projects in the firm's UK history was the construction of a marine deck at ExCeL London, the International Exhibition and Conference Centre. The multi-million pound sub-contracted project is essential to the expansion plans of the Royal Victoria Dock based ExCeL London and will make it the largest exhibition and conference centre in London.

The substantial extension is approximately half the size of the current building (Phase 1), and will cover an area equivalent to 14 football pitches. Part of the extension, in line with Phase 1, will extend onto the constructed marine deck which hangs over the Royal Victoria Dock. The dock acts as part of the flood defences for the River Thames and hence must stay unaltered, the marine deck is therefore a necessary requirement to the project.

The Royal Docks have undergone major re-development in recent years including ExCeL and City Airport which all extend over the water, as the docks form part of the flood defences for London.



Three large diameter rotary rigs, two on barges and one on the quay, installing piles under polymer support with permanent casings.

CLIENT : London International Exhibition Centre Ltd

MAIN CONTRACTOR : Sir Robert McAlpine Ltd

CONSULTING ENGINEER : McAlpine Design Group

DURATION OF WORKS: 6 months

Scope of Works

148 no. marine piles, 63 no. from a barge and 85 no. from the quay. Of these 136 no. were 900mm dia. and 12 were 1050mm dia., ranging in length from 34-44m, with 20m permanent casings.

Plus pile breakdown, placing 88 no. precast concrete beams and 7000m² of precast concrete decking

Main Contractor, Sir Robert McAlpine awarded Bachy Soletanche the 24 week marine deck sub-contract which included the installation of 148no. marine piles and associated decking work. The pile installation took place from both the quayside of the Royal Victoria Dock and onboard two barges.



Piling rigs with support cranes

85no. piles were installed from the quay and 63no. from the two floating barges. The piles vary in diameter with 136no. at 900mm diameters and the remaining 12no. at a diameter of 1050mm. Pile depths ranged between 34m to 44m; 2m to 10m of this is through water.

Each barge was large enough to install 5 or 6 piles from each position. Specially built, in-house designed, movable 'gates' at the front of the barge, were used to hold the casings in place until they were vibrated into position. Support boats, crawlers cranes and a service barge assisted in the moving of the barges transportation to the rigs and provide access to the water's edge.



Piling from 2 barges and from the quay

To construct the piles, 20m steel casings were vibrated into the river with approximately 1.9m of the casing above water level. The water within the casing was pumped out and replaced with Super Mud Polymer, which acts as support fluid when piling begins. Large diameter rotary bore (LDA) technique rigs constructed the piles within the permanent casings. The cut-off level of piles is 200/300mm above the water level and equally spaced over six parallel rows.



Piling for Phase 2, next to Phase 1

The top of the pile was broken down and replaced with a mortar top, ready for the installation of the 88no. pre-cast beams. These beams lay across the piles which are flanked by pre-cast concrete planks to form the solid base of the deck. A topping slab then covers the planks to create the 7000m² decking area

In addition to the barge holes were cut in the existing, Phase 1 deck for the installation of 35no. marine piles. This enabled 200m² of the original deck to be demolished and replaced by a new concrete quay.

The logistics of piling from the barges was one of the most challenging aspects of the project. As was getting the rigs onboard and keeping the barges stable during piling, and this makes piling a slow and delicate process.



Placing of the precast concrete beams and planks

There is a great deal of preparation time to consider, especially when piling from the barges. Materials need to be delivered in a strict sequence and marine plant has a long lead-in time.

The newly extended ExCeL London will be ready in time to play its central role in hosting seven Olympic and five Paralympics events for the London 2012 Olympics.

All of this forward planning resulted in all the works being carried out to programme, on budget in a safe and high quality manner