

The Sheikh Jaber Al-Ahmad Al-Sabah Causeway in Kuwait City

A look at the part played by the local Trevi subsidiary in the construction of the Sheikh Jaber Al-Ahmad Al-Sabah Causeway in Kuwait City, which crosses Kuwait Bay, linking the Port of Shuwaikh with the town of Subiya

Trevi Foundations Kuwait, the region's local Trevi Group company was involved in the construction of the Sheikh Jaber Al-Ahmad Al-Sabah Causeway in Kuwait City, named after the late Emir of Kuwait.

The project, worth around US\$3.7 billion, involved the construction of a 37km long causeway across Kuwait Bay, linking the Port of Shuwaikh with the town of Subiya, and was the first phase of a larger investment programme within the framework of the new Silk City.

In addition to the causeway, the project also included a bridge with a 200m span, an elevated road, a total of 5km of access roads to the Subiya area and two artificial islands, both extending to around 30 hectares.

The main objectives of the project were to cut the travel time across the bay to less

than 30 minutes (today it takes around 90 minutes to cross the bay, following the coast road); to create new motorway routes to enhance the development planned to the north of Kuwait City; to encourage greater integration between the northern areas of the country and the central and southern districts which are densely populated; and to reduce traffic congestion in the surrounding major roads.

The Combined Group Contracting Company, a Kuwaiti contractor specialising in oil and gas pipeline installation and in road and tunnel construction, and the Hyundai Engineering and Construction Company Ltd. from Korea, were the two project contractors.

The project, which began in November 2013, was scheduled to take 1,827 days, approximately five years, and was completed in 2018.

Trevi Foundations Kuwait was awarded a contract from the two main contractors for the execution of 760 piles, both onshore and offshore, out of a total number of 1,200.

The piles, bored with stabilising fluid to support the excavation, had a diameter of 2,500mm onshore and 3,000mm offshore, with depths ranging from 30m to 84m. Due to environmental restrictions, biodegradable polymers were used in the stabilising fluid.

The soils along the causeway axis consisted mainly of sand (ranging from loose to very dense) and clay (ranging from very soft to soft), even though shallow layers of caprock with fossils, cemented sands or

cemented quartzitic gravel could be found at times in the stratigraphic cross-sections.

Several unusual and interesting solutions were arranged for this specific project.

To install the offshore piles, a pontoon, approximately 20m wide and 74m long was set up. After being positioned by tugs, it anchored to dead weights which had been placed on the seabed. Four steel spuds were lowered onto the seabed to stabilise the pontoon once it had been manoeuvred into position.

The debris produced during the excavation was discharged directly into watertight caissons and then removed from the job site without polluting the water in the bay. A tank was mounted underneath the working platform set on top of the pile casing to catch any possible leakage of stabilising fluid which might overflow when the excavation tools were manoeuvred when the reinforcement cage was installed and the concrete poured.

The vertical bars had to be connected by means of threaded couplers so that the cage sections were constructed using special tools to ensure the correct positioning of all the bars.

When casting a pile in water at a maximum depth of 84m, 594m³ of concrete were needed. The solution chosen was to use two pontoons, each with a batching plant; both pontoons also had a concrete pump whose spraying arm was long enough to reach the pile. To speed up the casting process, an oversized tremie pipe (343mm in diameter) and a funnel with a capacity of 1.6m³ were used, guaranteeing a capacity of up to 80m³/h. ▼

The offshore portion of the piling work was done with the rigs based on pontoons

