

Avenue 105 / Shaikh Isa Bin Salman Causeway

Manama, Bahrain

Foundation of dual carriageway bridge comprising of 58 no. bored piles for the abutments and pier, to a depth of 26m. The scope included pile testing to ensure structural integrity.



The project

Construction of new dual carriageway flyover which connects Manama Sheikh Isa causeway with avenue 105 Muharraq.

The challenge

The site was located adjacent to live continuous traffic, presenting significant challenges in the fabrication, handling, and installation of densely reinforced steel cages. Each cage weighed approximately 7 tons for the pier piles and 11 tons for the abutment piles.

Additional measures, including detailed welding for each cage, were implemented to ensure the stability and safe lifting during cage installation.

The solution

Due to heavy steel cage, it was lowered in two segments.

Cage Lifting:

The first cage segment had a weight of 7.7 ton, including lifting accessories. The cage was lifted 1.2m from the top (below the cut off level) using two wire rope slings with a capacity of 16.6 ton and bow shackles of 12-ton capacity. The lifting beam and top ring were utilized to maintain the cage in a vertical position during lifting operations. According to the lifting plan calculation 53% of the crane capacity was utilized which is below the allowable limit of 75%, confirming that the lifting operation was conducted safely.

Supply of Complex Cage:

During the fabrication of test pile cage, it was observed that due to the complexity of the steel cage design, each cage required approximately one day for the fabrication at the steel factory. To meet the project schedule and required production, the fabrication was distributed among the four different suppliers, with allocation based on pile types and individual supplier fabrication capacities.

Welding Procedure:

Each cage required approximately 5 hours of welding, involving four welders per cage. To achieve the targeted production rate, additional welding teams and welding machines were mobilized.

Project facts

Owner(s)

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Keller business unit(s)

Middle East

Main contractor(s)

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Engineer(s)

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Solutions

Deep foundations

Markets

Infrastructure

Techniques

Bored piles