

Saadiyat Expressway

Client: Abi Dhabi Tourism Development & Investment Co
Contractor: Leightons Construction (Abu Dhabi)
Location: Abu Dhabi, UAE
Products: Alform Beams, Rapidshor, Superslim Soldiers

Case Study

RMD Kwikform Middle East was appointed to work with one of the region's most experienced civils contractors to construct the eight in-situ concrete box girder bridges and a tunnel required for the Saadiyat Island Expressway.

The \$550 million project involved Leighton Construction (Abu Dhabi), related to one of Australia's largest contracting groups, for the construction of a 10-lane, 6.5 kilometre long highway to link the United Arab Emirates' main city, with an exclusive island lying just offshore.

Conceived and driven by the Abu Dhabi Tourism Development and Investment Company, the arterial routeway – together with its interchanges, side roads and 1.6 kilometres of bridge decks - was completed in time for the inaugural Formula One Etihad Airways Abu Dhabi Grand Prix, in November 2009.

Leighton Construction (Abu Dhabi) decided to award RMD Kwikform the contract to supply the formwork and shoring for all of the structures on this critical project as a result of the company's reputation and its ability to respond to a complex series of requirements.

These included having the flexibility of service to not only undertake all of the logistical planning and detailed design for each of the different locations, but



also to offer the alternative of hire and purchase as appropriate to each application. While the vast majority of the equipment is being sold to Leighton Construction, the formwork for bridge B31 and all the top slab support along the 1.6 km of bridges will be rented.

At 180 metres in length and 80 metres wide, the Golf Land Bridge will not only be the biggest bridge on the Saadiyat Island Expressway, but also the largest bridge – in terms of area - built to date in the United Arab Emirates.

Andy Teesdale, RMD Kwikform's contract manager for the project remarks on the size of the project saying: "This was a massive undertaking, where we worked in partnership with Leighton Construction to offer the contractor the level of service essential to keep the reinforced concrete construction for all the structures on track.

"Aside from the fact that the work saw a staggering 215,000 cubic metres of our Rapidshor modular steel shoring either purchased or hired to the client, our involvement also involved responsibility for design detailing and site safety. The programming of the work was critical for a lot of reasons, not least the seasonal variation in temperature: because it has such a dramatic effect on the rate at which the concrete cures and gains strength.

"We normally design for an ambient temperature of 25 degrees, but this can drop to around 15 degrees in winter in the UAE, which slows the cure and could have potentially disastrous implications if we do not take account of the fact for the formwork design."

The decks to the bridges were all designed as concrete box girders, with the two metre deep section being divided into a series of cells. The formwork was planned and detailed so that the main elements could be pre-assembled on the ground, lifted into positions and then moved again with as little adjustment as possible.

The most technically challenging requirement for RMD Kwikform on the project was the design and manufacture of special steel forms to cast the complex geometric shapes to a number of the pier heads.

These were fabricated from steel, not to enable high repetitions, but to cope with the very high concrete pressures and variations in profile. Square on plan, the special shutters measure 2,800mm by 2,600mm and have a double curvature.

For the 870 metre long tunnel that traverses the line of the main highway, once the base slab is laid, RMD Kwikform supplied its Alform beams and Superslim Soldiers to cast the walls. Then for the roof to the tunnel, the method of construction switched to the use of the specialist's table-forms. These were assembled using RMD Kwikform's Alshor Plus aluminium shoring system, making up 30 metre long sections, which can be struck and advanced as a single unit as soon as the concrete has gained sufficient strength. The cut-and-cover structure was then backfilled.

Although at 27 square kilometres, it is only half the size of Bermuda, Saadiyat Island is considered to represent one of the most important development opportunities in Abu Dhabi's history. The completion of the new Expressway has helped open up this natural idyll as an international tourism destination and residential centre.



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