

Arabian Ranches Interchange

Client: RTA
Contractor: Taisei Corporation
Location: Dubai, UAE
Products: Rapidshor / Superslim / GTX Beams / Alform Beams

Case Study

The construction of the Arabian Ranches Interchange represented one of the most significant infrastructure projects undertaken in Dubai. Constructed for the RTA by specialist contractor Taisei Corporation, the three-level interchange with no fewer than eleven insitu reinforced concrete structures is being built on the busy Emirates Road at the roundabout linking Dubailand, the Autodrome and Arabian Ranches.

The two year, \$111 million interchange construction programme was completed in 2008 and on completion was the largest interchange ever constructed in the UAE. The project is set to link up with the expansion of the Emirates Road to create the modern infrastructure needed to support the continuous development of the region. Due to the size and fast track nature of the project, Taisei Corporation called on RMD Kwikform Middle East to provide the formwork and shoring needed to construct the concrete elements of the superstructure for the project.

A total of eleven structures were required in less than six months to enable Taisei to construct the ten cast insitu reinforced concrete post tensioned box cell girder bridges and the wall formwork for the cast insitu reinforced concrete cut and cover tunnel. The wall formwork of the cut and cover tunnel will support the deck, which will be made up of precast beams. As an approved supplier to the Taisei Corporation, and due to the fast track nature

of the project, RMD Kwikform Middle East had to prove that it could both design and deliver the equipment needed to construct all eleven structures in a window of just six months.

In order to meet the tight programme schedule, the construction of all eleven structures had to run concurrently. This meant that the team at RMD Kwikform had to work in partnership with staff from the Taisei Corporation to design solutions that allowed each structure to be constructed quickly and efficiently with the available resources.

Commenting on the project, RMD Kwikform UAE's Engineering Manager, Anvar Sadat said: "With each bridge being between four to five spans long and some 150m to 240m in length, we had to design a solution that could be split into easy to assemble pieces. This was achieved by taking a modular approach to the solutions we provided, so that the major elements could be pre-assembled on the ground and then craned into position. We also tried to keep the designs uniform for each of the structures to eliminate the need for re-assembly, thus impacting favourably on cycle times and the overall construction program"

The bridge structures were all 2000mm deep box cell girders and were between three and five cells wide depending upon the number of traffic lanes on the deck. All the bridges had 1700mm cantilever walkways on either side of the decks.

Anvar: "The real challenge for the design of the formwork and shoring solutions for the project was that most of the structures were curved in plan. This meant that our engineers went away from the conventional birdcage falsework solution commonly used for such jobs and took a more innovative approach to the shoring design."

"This was made possible by using our Rapidshor modular shoring system. Rapidshor enabled us to use a shoring support system designed as 1800mm wide by 2400mm bay towers. Each tower consisted of six to eight bays depending upon the width of the decks," added Anvar.

Used to support primary Superslim Soldiers and secondary GTX timber beams, the Rapidshor towers were designed to be simply adjusted to deal with the varying radius of the structures and changing soffit and ground levels on the project. Simplicity also played a major role in the erection process, with teams able to erect a large number of Rapidshor towers simply and effectively in a fraction of the time, due to the reduced number of components required when compared against alternative methods.



In order to cut programme time down to a minimum, in addition to using the Rapidshor system, RMD Kwikform engineers also designed the cantilever footway sections of the bridges as standard units that could be pre-assembled on the ground prior to erection on site. Anvar: "By standardising the cantilever sections for all the varying super-elevations we were able to reduce the need for more complex assembly and ensure quality of construction and erection was maintained.

In considering logistics, site safety and the tight program, RMD Kwikform designed the cantilever formwork such that it could be assembled at ground level in gang-form type assemblies that could be lifted into place and secured quickly and safely." In addition to the shoring and bridge deck formwork systems, RMD Kwikform also supplied base formwork used to form the pile caps and Rapidshor stair towers for pier access and bridge deck access

which provided safe access throughout the project. The cut & cover tunnel double sided wall formwork consisted of RMD Kwikform Alform aluminium beams for the walings, which were supported by RMD Kwikform Superslim Soldiers. The walls were 8500mm high, 1500mm wide and poured in 10m lengths in one pour - the equipment used for the pilecaps was subsequently reused for the wall formwork. For the box cell design, the construction of the internal system used a combination of RMD Kwikform GTX timber beams and Superslim Soldiers. GTX timber beams also combined with Kwikstage falsework to support the construction of the top slab for the main bridge structures.

Finally completing the overall provision of equipment for the project, RMD Kwikform engineers designed special steel yokes for the GRP pier moulds, to simplify the equipment assembly process.



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