R·M·D KWIKFORM

Bringing structures to life

NDIA Taxiway Tunnels

Client: NDIA

Contractor: Consolidated Contractors Int'l Co. S.A.L

Location: Doha, Qatar

Products: Superslim Soldiers /Alshor Plus / Megashor / GTX Beams / Rapid Bar Tie

Case Study

RMD Kwikform delivered a unique formwork and shoring solutions for the vital 1,620-metre taxiway tunnel project at the New Doha International Airport in Qatar.

New Doha International Airport is the sort of ambitious construction project that comes along every now and again and completely redefines all concept of scale in the industry. So it's only natural that the expertise of RMD Kwikform Qatar would be involved in such a massive undertaking.

Construction began on the New Doha International Airport project in 2004, creating a construction site that is approximately a third the size of the city of Doha itself. For RMD Kwikform Qatar, the challenge was to provide a formwork and shoring solution to facilitate the construction of a 1,620 metre cross taxiway tunnel, 340 metres of which was to be covered to allow the construction above of the main runway. Split between east and west sections of 810 metres, the project called for a foundation, retaining walls and the 340 metres of covered section.

Before any of this construction work could begin, a staggering 11 square kilometres of the airport site had to be reclaimed from the sea. The resulting operation was a feat never before undertaken on such a scale, and resulted in a 13 kilometre armoured sea defence wall to prevent the sea ever reclaiming its land back.

Once the dredgers had done their work, and the site was well under way, RMD Kwikform Qatar moved in to design the formwork and shoring solution to meet the exacting and constantly evolving needs of this impressive project.

A unique traveller system specially designed and built for this project was used to create the retaining walls of the tunnels; the formwork was created using Superslim Soldiers and GTX crossbeams with a plywood face to the shuttering. Incorporated into the formwork was a set of wheels, counterbalanced by concrete blocks to offset the weight of the 9-metre high formwork.

Each section of the retaining wall was poured in alternate 10 and 12 metre sections, rather inspiringly coined hit and miss respectively. Each section would be tied in using high load Rapid Bar Ties and the concrete poured. Once set, the shuttering could then be untied, released, cleaned and easily wheeled on tracks to pour the next section of the wall in a continuous cycle.

All this meant the RMD Kwikform equipment and panels only had to be craned in once, constructed once and then craned off site when the tunnel was complete.

Ahmad Deeb, Project Engineer Civil at Consolidated Contractors Int'l Co. S.A.L. commented on the impact the traveller system had on the day to day running of the build. "The real benefit comes in the cycle time, on this project the cycle time has been reduced by almost a week by simply eliminating the need for a crane. Onsite safety is very important to us, the traveller system we've used on the retaining walls shows the ability of RMD Kwikform Qatar's designers to meet tough targets without compromising safety."

The challenges didn't end there. The curved section of the wall needed to be formed using the same shutter work used on the rest of the retaining walls. To achieve this, a specially made beam section was added to the GTX cross beams to create the correct curvature in the plywood face of the shuttering. This created a seamless finish to the 1,620-metre tunnel that will be used to transport vital equipment and service the runway of the airport itself.

As on any RMD Kwikform project, health and safety took number one priority when designing and developing the formwork and shoring solution for this site.

Izzet Ataol Business Development Manager at RMD Kwikform Qatar commented, “We have had to work to a very strict time programme on the construction of the taxiway tunnel, despite the ongoing changes and expectations to the project we always put the safety of the work force first. To meet our deadlines we had to innovate, and not compromise our core values to make this work. A great example of this is the traveller system we put in place to pour the retaining walls; it saved time with no compromise on safety. If anything the site was considerably safer than if cranes would have been used to move the shuttering into place.”

Once the retaining walls were in place the 340 metre covered tunnel section became an immediate priority, this needed to be in place to allow above ground building works to move at a pace that they would be completed on schedule. The nine-metre high reinforced concrete walls that made up either side of the tunnel had to be constructed with a covering that could be rapidly constructed to a high quality finish.

The solution lay primarily in the incredibly versatile Alshor Plus shoring system. An Alshor Plus table complete with quick release mechanism was used to form the soffit. The lightweight aluminium design of Alshor Plus meant that once an area of the cover section had been poured and cured it could be quickly and easily released and safely moved to pour the next section along. Any variation in height could also easily be accommodated by making to the millimetre adjustments to individual Alshor Plus jacks.

Another staple of this large scale construction environment; RMD Kwikform’s heavy duty Megashor, was used to support the roof structure while the Alshor Plus system was continually moved along the length of the tunnel. This combination of the two systems allowed the Alshor Plus tables to be moved every three days. The Megashor would then stay in place to support the slab in the final curing stages for a further eighteen days, representing a considerable time saving on this time sensitive aspect of the build.

Ahmed Deeb continues, “We needed a formwork and shoring supplier that could handle the constantly changing requirements of a project on this scale and still deliver through to completion on time. Given the importance of the

taxiway tunnel we are working on, any minor delays would have had a knock on effect later in the project. The fact RMD Kwikform Qatar’s dedicated onsite engineers were quick to react to changes in both the design and programme time means we ultimately made the right choice.”

With all works completed in 2015, the New Doha International Airport is the first airport in the world designed to specifically house the Airbus A380 passenger plane. It is projected to have an annual capacity of 50 million passengers, two million tonnes of cargo and parking for no less than 100 aircraft, making it one of the most advanced airports in the world.

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