

Stockley Viaduct Interchange

Location: London, UK

RMDK System: Travellers

Case Study

- Three different types of construction
- 18 piers and crossheads
- 6 precast beam sections
- One metre from the live railway
- Walls cast in one pour

The construction of Network Rail's £49 million Stockley Flyover is being constructed by Carillion, using RMD Kwikform's comprehensive range of formwork and shoring solutions, and specialist travelling formwork system.

The flyover is being constructed to facilitate Crossrail and Heathrow Express services between London and Heathrow Airport, whilst allowing trains to Reading and beyond to pass through the junction unhindered.

Situated next to four active train lines, the project is split into three different types of construction. For the first, which is a rising section from ground level, a special U trough is being constructed using two travelling formwork systems. This will link the new rail line to a second raised section, which involves the use of formwork and shoring to cast 18 piers and crossheads, to support precast beam sections that make up the composite section of the flyover.

As part of the construction process, heavy-duty shoring has also been used to support the placement of the beam sections before they are stitched together. The final section of the flyover consists of a steel framed bridge that is pushed into place.

Commenting on the project, Nicholas Caddy, Temporary Works Coordinator from Carillion said: "There were two main factors that Carillion were working towards on this project – safety and build ability. The U trough was a key part of the project where we needed both of these factors met; particularly as the east flyover wall was situated right next to the active train line.

"This was one of the key reasons we opted to use the traveller system developed by RMD Kwikform. It eliminated the need for craning, minimised the amount of possessions required to form the wall, and formed a fully hoarded barrier between the formwork and the train lines, preventing debris falling onto the track whilst also protecting the workforce."



RMD Kwikform provided the travelling formwork for two walls, forming a U-trough, which will be backfilled to form a solid, stable bed that the train lines can run on. To achieve this, less than one metre away from the railway, a number of special solutions had to be developed for the moving gantry.

Running on railway lines, movable wheels were built into the design to add flexibility, with a pulley system developed to strike the formwork and allow the traveller to be moved. To aid the speed and cycle time, captive nuts were incorporated into the traveller and access platforms were designed so the site team could safely operate the system.

As part of the design phase, Carillion specified that the wall had to be cast in one pour, despite the southern-most wall increasing in thickness at its top section to form a parapet, to securely take the load of the precast planks. To make this possible, RMD Kwikform devised a special kinked soldier system that would jut out to the desired thickness of the wall at the required point. This minimised the quantity of equipment-required onsite, as only a single system was needed. In total, three travellers were required for the project, two for the U Trough and one for a later part of the project that combined both U trough travellers into one, to create a wall between two rail lines.

Discussing the travelling formwork solution, Tom Day, Sales Representative from RMD Kwikform said: “A number of years ago we created a similar traveller system for the successful M6 Guardsmill project in Carlisle. This gave Carillion confidence in the solution and our engineering capabilities, but after detailed engineering discussions it became clear that the Stockley traveller would be quite different, requiring a completely bespoke design.

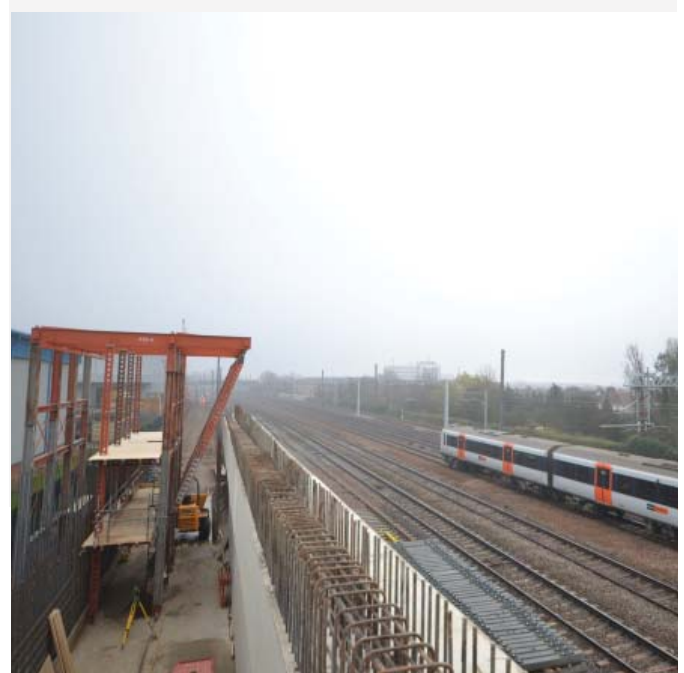
“One of these new design features was the dual purpose travelling gantry main header beams, which tied the travelling gantry structure together and provided a rail for the formwork trolley systems to run along. We designed the sophisticated trolley and pulley system because the distance from the south wall to the hoarding was minimal, so an alternative system for moving the trackside shutter was required.

“The solution we devised was to pivot the shutter away from the formwork, allowing the trolley system to move longitudinally through the travelling gantry, in order to enable cleaning. Again, this really helped maintain safety as a priority and eliminated the possibility of debris falling onto the active railway line.”

The northern viaduct section of the project consisted of 18 concrete piers and in-situ cast concrete crossheads. RMD Kwikform was responsible for designing and supplying the shoring for the crossheads, as well as the pier formwork.

Tom Day continued: “The special modular steel column system we designed for the piers was ideal because it can be reused, reducing the amount of equipment required to cast all the piers. They have also been modified to include a special liner that can be installed inside the formwork to achieve the required finish. To enhance the safety of this solution we developed curved walkways and handrails on top of each column form to allow for a safe and swift programme time.

“The crossheads for the piers were supported using a mixture of Alshor Plus and Rapidshor shoring, with Superslim Soldiers and aluminium beams used for the formwork. One of the key features of the cantilever frame is that it allowed all the legs from the Alshor Plus frame to sit directly on the smaller concrete base, whilst creating a safe platform around the whole pier. Again, this really minimised the need for any excess equipment on the site and helped speed the construction schedule.”



Column & Pier Challenges

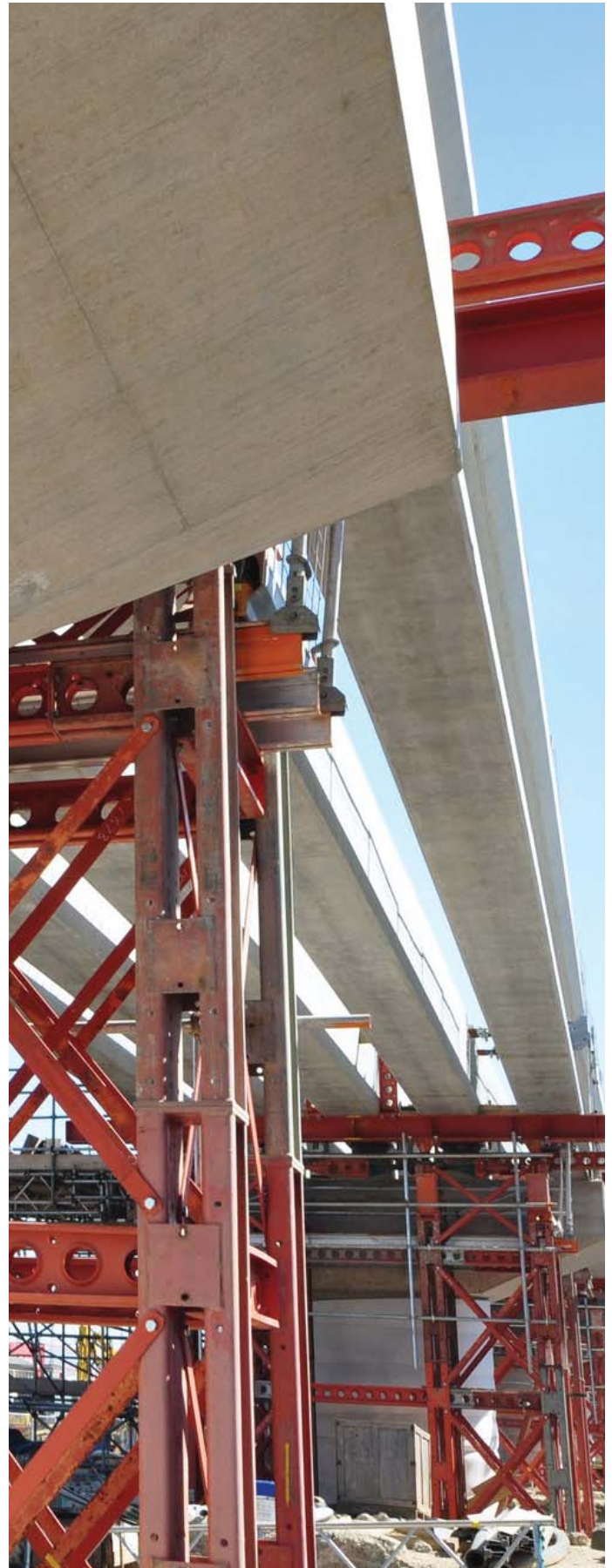
As part of the design plan Carillion and RMD Kwikform engineers looked at the challenges of each column and pier to devise the safest and most reliable approach. Carillion specified that it should be able to use the equipment repetitively, so working with RMD Kwikform for the designs of each of these aspects helped make the different elements more cost effective, without sacrificing speed of erection or disassembly.

Once the piers and crossheads were completed, heavy-duty Megashor tower arrangements were erected to support the placement of six precast beam sections between each pier. Placement of the precast sections required the use of specialist hydraulic Megashor jacks, braced with Superslim steel soldiers.

To complete the safety focused solutions for the project; Ultraguard edge protection was pre-mounted to the outside precast beams, ensuring the safety of site operatives working on top of the precast flyover section.

Nicholas Caddy concluded: “A civil engineering project of this size is always going to be complex due to its sheer scale and the number of different aspects there are. That’s why the collaborative approach we took with RMD Kwikform was so important in helping us meet the tight construction programme, whilst staying on budget and keeping our workforce and the public safe.

“With the support of RMD Kwikform we have instilled the right skills for the on-site operatives handling the equipment, and we have been able to work on the flyover walls throughout the whole working day, without affecting the daily operational running of the train lines. We are also making fantastic progress on the northern viaduct, and we are still on schedule to have this project completed on budget, and on time.”



Want to know more about
this project?

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