SIKA AT WORK
WEST COAST RAIL VIADUCT, CARLISLE

CONCRETE: Sika® UCS Pak

BUILDING TRUST

WEST COAST RAIL VIADUCT CARLISLE

SIKA ADMIXTURES HOLD THE KEY TO WEST COAST MAINLINE VIADUCT REPAIRS

Faced with the challenge of underwater repairs to foundations and stone piers for a major viaduct on the West Coast mainline in Carlisle, Sika concrete admixtures played their part in the various specialist concrete mixes that were supplied by Hanson Concrete for the bridge strengthening works.

Spanning the River Eden between the Sheepmount area of Carlisle and Etterby, the 70 metre long rail viaduct comprises five stone piers and a concrete deck. Underwater surveys for client Network Rail Infrastructure Projects (Civils) confirmed that the viaduct substructure was being scoured requiring a long term solution which offered scour protection to the masonry and foundations.

To repair the stone piers, Story Contracting installed a total of 64 tonnes of permanent interlocking sheet piles around the piers. The piles were driven to refusal, toeing into the mudstone bedrock. Following this, 282m^3 of Hanson concrete containing Sika® UCS Pak, a specialist underwater admixture, was poured between the pier and the sheet piles, with a capping beam formed at cut-off level.

Andrew Stephenson, District Sales Manager at Hanson Concrete commented: "We worked with Story Contracting on a specialised concrete solution which would allow them to place concrete underwater without contaminating the river. A mix containing Sika® UCS Pak met these requirements and ensured the critical path of these foundations was a success."

Used for the production of underwater concrete and meeting the requirements of BS 8443, Sika® UCS Pak prevents the wash out of the cement paste and increases the cohesion of the concrete. Sika® UCS Pak is packaged in water soluble bags to enable ease of addition on site.

Another challenge for the project was installing a temporary causeway in order to gain sufficient access across the river, and to undertake the works. Stone filled gabion baskets were stacked upon the river bed, and 6m steel bridge plates used to span the gap. A stone piling platform was then installed between the piers, with large diameter pipes passing through the construction to maintain river flow.

The works were completed and implemented in controlled stages with the final design maintaining the river flow as well as meeting the strict environmental conditions surrounding fish migration.

The newly renovated and strengthened viaduct was put to the test in December 2015 when the River Eden encountered substantial flooding. Inspections to the structure in January 2016 showed no adverse effects on any of the bridge strengthening works.

With the viaduct foundation repairs now complete, the use of Sika Admixtures in the underwater concrete foundations has ensured the success of this important infrastructure project and the long term future of this important section of the West Coast Mainline.

Technical services manager, Terry Balmer adds that Hanson's expertise in "bespoke" concrete mix design is also being utilised to repair many of the damaged structures across Cumbria following the devastation storm Desmond brought to the area. The majority of contracts require a different approach and our products are at the forefront of delivering value added engineering to our customers.

For further information call 0800 292 2572.

bsi. ISO 9001 Quality Management FM 12504

bsi. ISO 14001 Environmental Management EMS 45308

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