

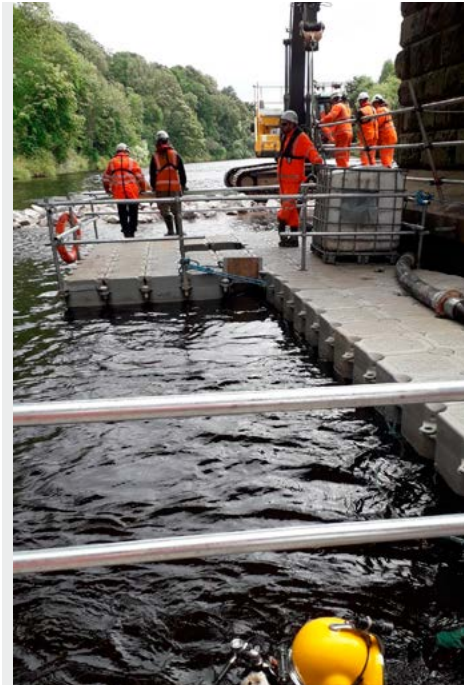


SIKA AT WORK

RIVER EDEN PROJECT, CARLISLE, CUMBRIA

CONCRETE: Sika® UCS Pak, Sika® ViscoFlow® 3000 and Sika® ViscoCrete® HE 200

RIVER EDEN PROJECT CARLISLE, CUMBRIA



The Project

To repair the deteriorating riverbed was a specialist one which made both local and national news.

Situated in Carlisle, Cumbria, the River Eden railway viaduct recently required an urgent repair solution to the deteriorating riverbed condition, where trains were having to operate at reduced speeds of 20mph over the Victorian and 1940s-built structures.

Detailed laser surveys carried out by Network Rail showed fast-flowing water on the River Eden had caused parts of the riverbed to wash away, posing a risk to the viaduct foundations.

The Requirements

Specialist divers were subsequently employed for the pouring of underwater concrete to protect the two major railway viaducts carrying the West Coast main line in Carlisle.

Working with Network Rail, WSP and Travis Perkins, Sika products were chosen by Hanson Concrete in order to complete the project in a timely and effective manner, despite the challenges which were apparent.

The Solution

Hanson Concrete took ownership for the concrete design with the project team to develop the mix parameters and select suitable products to fulfil the brief. R&D work was carried out in Hanson's Carlisle laboratory within a 48-hour timescale, to ensure the works were undertaken on schedule.

Sika UCS Pak – a powdered underwater/anti-washout admixture – was packaged in water soluble bags, which helped with the ease of handling and addition to the concrete. A combination of Sika ViscoFlow 3000 – a liquid admixture based on polycarboxylate polymers, and ViscoCrete HE 200 – an accelerating high-range water reducer, was incorporated for consistence and set control.

Some 400m³ of concrete was necessary for the stabilisation of the foundations of the viaducts' columns or piers and had to be pumped 100m while retaining an F4 consistence. The specified 28-day strength was 30MPa with a minimum three-day strength of 15MPa. In the event the three-day strength was 25MPa.

The concrete was placed by specialist diving teams. The underwater visibility was poor, with significant work needing to be done by touch. To achieve this safely, the river flow was temporarily diverted and calmed by placing more than 2200 tonnes of rock. This not only aided the divers but also contributed towards reducing washout as the concrete was pumped into position.

Terry Balmer, technical manager at Hanson Concrete, says, "We engaged with the Network Rail engineering team to develop a bespoke solution to overcome complex placing difficulties and strict environmental controls.

"In less than 48 hours, the technical team had designed and tested an anti-washout, self-compacting concrete ready for the remedial works. The success of the material relied on concrete admixture technology to overcome the challenging engineering requirements."

Craig Jackson, works delivery manager at Network Rail, adds, "These vital repairs have helped to make the viaduct safe to keep passenger and freight trains moving on the West Coast main line over the River Eden in Carlisle."

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