

Proven performance

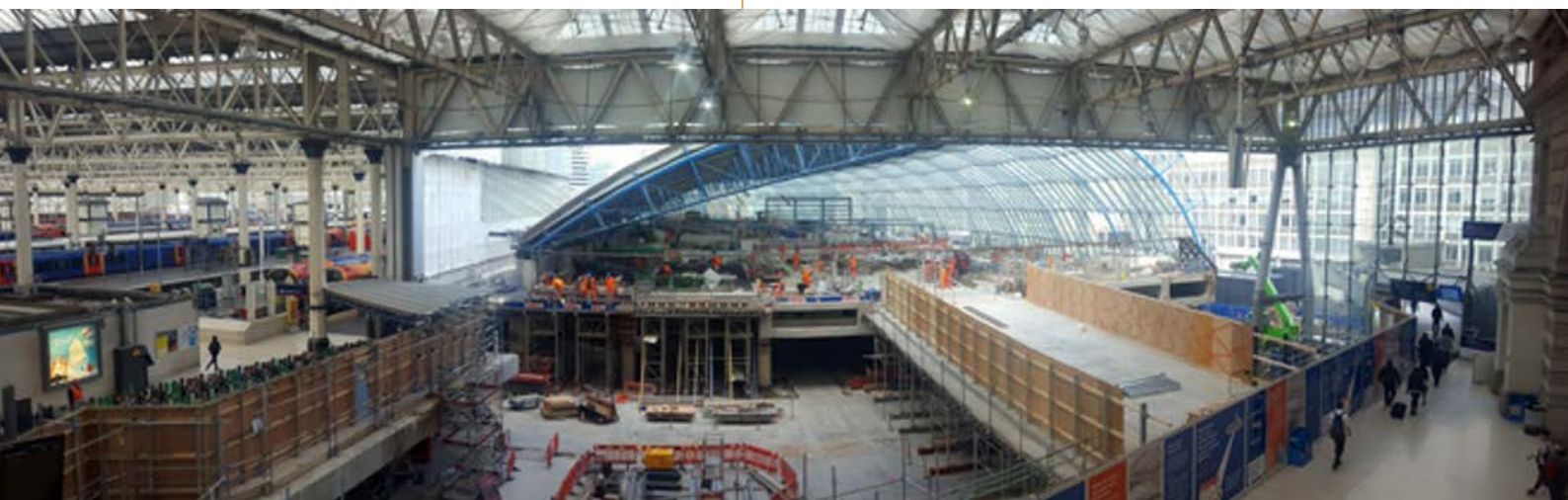
Waterloo Station Upgrade - Toproc rapid mix concrete

Overview

High early strength concrete was integral to the redevelopment of Waterloo Station, calling for expert product design and close collaboration between all stakeholders involved with the execution of the works.

Network Rail has invested £800 million to increase rail capacity by 30% and deliver a better passenger experience for the station's 500,000 daily users. The works were so significant that 10 platforms were closed to passengers for 24 days and it was vital that the work was completed within this time period.

In total, 114m³ of Toproc Rapid concrete was placed over a 72 hour period with no delays and the station reopened on schedule



The challenge

The biggest challenge for the site team was posed during the upgrade of platforms one to eight, to lengthen the platforms to receive 10 car trains instead of the current 8 cars. The WCA members enlisted our assistance in order to complete the critical path concrete works as part of the closure. The existing platforms and their foundations needed to be excavated and replaced with new concrete foundations before being loaded with two tonne precast sections that would form the new platform slabs.

The solution

In order to take the load and keep with the programme requirements, the new foundation concrete was required to achieve a compressive strength of 20N/mm² in just eight hours using a blended cement with no more than 40% CEM I. In addition, access to the platforms was from outside the station itself so it was imperative that the material could be pumped up to 200m.

Working together, Tarmac, BASF and the WCA member's technical teams, designed a bespoke Toproc Rapid mix to achieve the required strength. Extensive plant trials were then completed at Tarmac's Kings Cross concrete plant, including a full scale pumping trial to optimise the mix design and simulate placement. Prior to the closing of the station, a live site trial was also completed with the site team in temporary works in order to test the complete operation.

The rapid accelerating admixtures required to meet the early strength requirements meant the concrete sets within 1 hour of them being added to the mix. Concrete technicians from Tarmac added the rapid accelerating admixture on-site before the site team pumped the material up to 200m for placement. Final placing and compaction was achieved without the use of poker vibrators.

The results

Meticulous delivery planning between the site team and Tarmac's operational team was essential to avoid cold joints and ensure there were no delays or issues with the pumping equipment or concrete delivery wagons. Technicians with stop watches on a countdown tracked the time taken to add the admixture and then pour the concrete. Full technical support provided both at plant and on-site by Tarmac for the complete 72 hour operation.

