

Mersey Loop, Liverpool

Project case study



Product

Concrete track slab

Volume

770 cubic metres

Client

Network Rail

Contractor

Story Contracting Ltd

Overview

The replacement of track slab in a tunnel more than 20 metres underground presented an engineering challenge for Hanson Concrete and specialist contractor Story Contracting. The six-month project involved the development of a complex concrete mix that provided the pumpability and strength gain characteristics required.



Project description

The Birkenhead to Liverpool 'loop' line carries rail traffic from the Wirral, beneath the River Mersey and loops below the streets of Liverpool taking in strategic

stations and joining the main line station at Liverpool Lime Street.

Between January and June 2017 the line was closed to allow the upgrading of several sections of track slab within the tunnel system (approx. 560 linear metres) and four platforms.

Working at over 20m underground in a tunnel with a diameter in the region of 4.7m presented a significant challenge to the supply of materials which had to be overcome.

In total 140 deliveries of concrete were supplied equating to approximately 770m³.

Hanson UK

14 Castle Hill, Maidenhead, Berkshire SL6 4JJ
T: 01628 774100

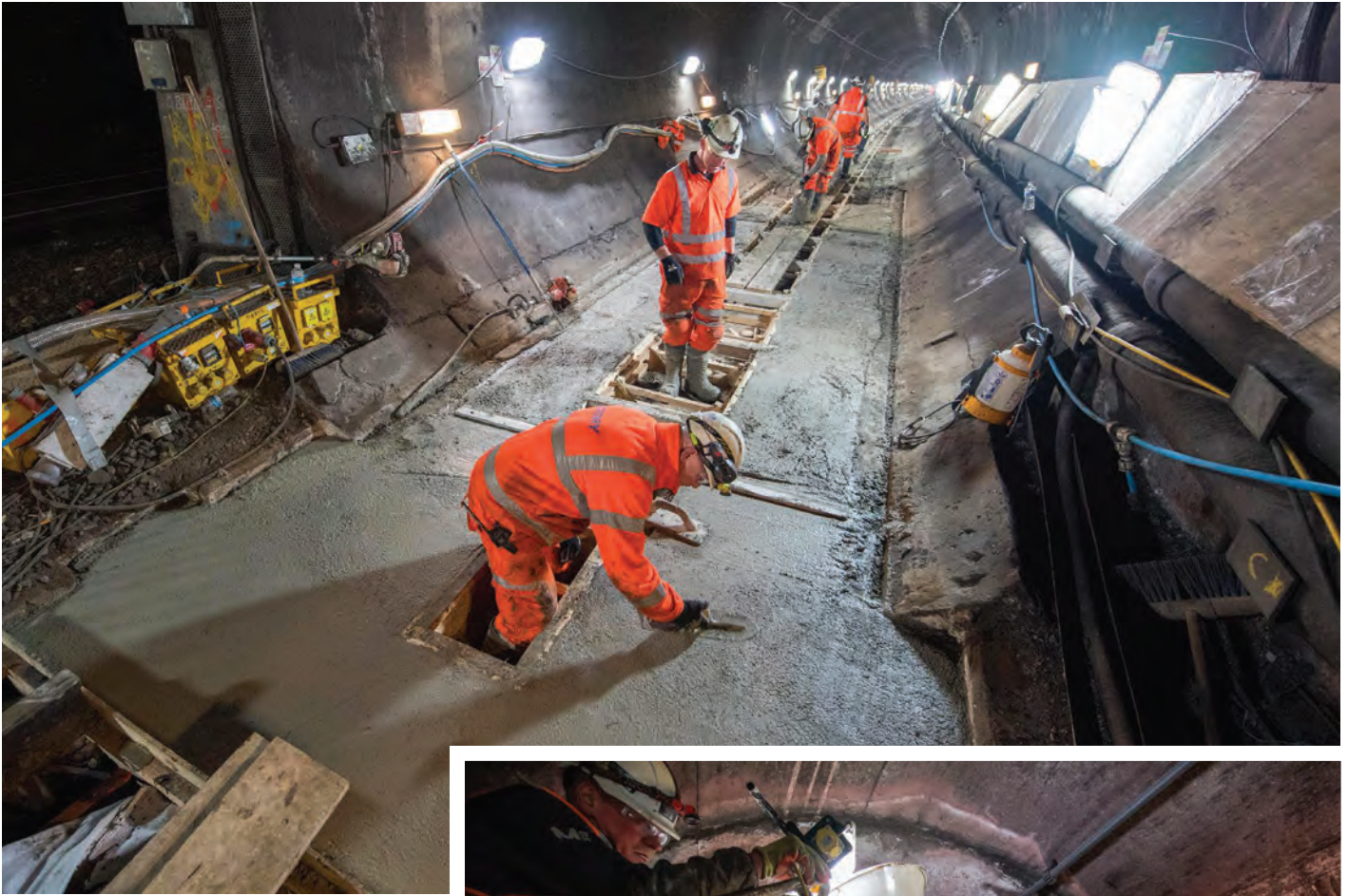
W: hanson.co.uk

E: enquiries@hanson.com

TW: [@Hanson_UK](https://twitter.com/Hanson_UK)

Mersey Loop, Liverpool

Rail infrastructure



The material had to be supplied at exact times to allow movement of vehicles in the tunnel and a contingency was designed to allow for any delays as the loop is only one way.

The concrete mix had to be of high consistency and be pumped from outside the tunnel into a rail mounted mixer that travelled along the track before being double-stage pumped into the works at a distance of 200m. After placement, the material had to lose workability rapidly in order to allow placement on an incline, as well as the horizontal track element. It then had to initiate early set to allow progression of the engineering works.

Laboratory and full site mock up trials resulted in a 10mm F5 concrete design grade C50. The concrete was initially retarded for five hours +/- 30 minutes,



although this contingency was never needed during the contract. Each load was accompanied by a Hanson quality control technician who added an accelerator just before placement into the second pump. Dosages and admixture combinations used were the subject of a series of laboratory investigations.

As the timing of deliveries was critical, site information was sent back to the batching plant and trucks were loaded on demand accounting for traffic movements throughout the city. This resulted in every load being on site within 10 minutes of when it was required.