

Southampton Tunnel gauge enhancement works

Carillion's Phil Sendall details one of the company's W10 gauge enhancement projects for Network Rail.

Southampton Tunnel is a 486 metre long, twin track railway tunnel located just north of Southampton Central Station on the main Bournemouth to Waterloo route. As part of the W10 gauge enhancement project to permit 9'6" containers to run between the port of Southampton and the West Coast Main Line, Carillion was engaged by Network Rail in June 2009 to complete the installation of concrete track slab, using the Rheda 2000 system, throughout the tunnel.

Carillion undertook to complete the works in a series of possessions and a 10-day blockade between 14th November 2009 and 11th January 2010. Previously, it had been believed that two Christmas blockades would be required, but the plan implemented by Carillion offered significant savings in construction costs and 'Schedule 4' payments for possessions. The work was delivered in conjunction with the French contractor TSO, a long-term Carillion partner. The relationship dates back to track laying in the Channel Tunnel and, more recently, the High Speed One (HS1) London Tunnels.

W10 gauge clearances were achieved both by reducing the track level, by up to 40mm, and the interval between the two tracks, the latter being permissible because of the high track fixity provided by slab track.

Work methods

The Rheda 2000 sleepers were pre-assembled into 18.3 metre track panels at Totton Yard, four miles from the tunnel, and transported to site on standard Salmon rail wagons. This technique, key to the accelerated delivery of the project, was a development, on a smaller scale, of the lessons learned from previous experience on the Channel Tunnel and HS1. Other work completed ahead of the main possessions included permanent diversion of both signalling and 33Kv power cables, sheet piling to support the tunnel wing walls, Palmerston Road bridge (which adjoins the tunnel at the London end) and the Up Line track for periods of reversible working.

The track installation programme was split into two main sections. The Down Line was completed in a combination of 52-hour weekend possessions and six-hour midweek night possessions with reversible working over the Up Line during the day, allowing limited work to take place behind protective fencing while trains were running. The Up Line was completed in a 10-day blockade with the exception of signalling and conductor rail commissioning. A six foot drain was also installed throughout the tunnel during the Up Line blockade. Construction tolerances of +/-2mm for track position were achieved throughout.

Planning was the key

Detailed planning of site logistics was absolutely key to the successful delivery of the project, a lesson learned from Carillion and TSO's experience on larger tunnel projects. Plant access was only available from the Southampton Central Station end of the site and headroom there was very limited in order to allow continuous operation of trains using the station as a terminus (see photo below).



Ballast trough and transition slab prior to track installation.



Down Line construction with train passing on Up Line.



Southampton Central Station throat showing worksite limits.



Completed track slab inside the tunnel prior to final cleaning.