The TriAx® was laid quickly and easily by hand, helping ensure bridge construction was completed over the Easter weekend track possession.

TriAx® ensures a smooth transition

Track ballast mechanically-stabilised with Tensar TriAx geogrid mitigated the risk of differential settlement within the track in the transition between a new railway bridge and an embankment, enabling construction to be completed over an Easter weekend.

Crewe Green Link Road

Ballast stabilisation

Cheshire, UK

CLIENT'S CHALLENGE

Construction of a bridge in an existing railway embankment, to enable trains to pass over the new Crewe Green Road Link, created the potential for longitudinal differential settlement of the track where it passed between the relatively softer embankment soils and harder bridge deck.

TENSAR SOLUTION

Tensar TriAx geogrids were used to mechanically-stabilise the track ballast at either end of the bridge. This gave additional foundation stiffness in these areas, smoothing the transition between deck and the embankment and mitigating differential settlement. Maintenance requirements were also reduced, as track geometry was maintained for longer.

BENEFITS

Mitigating differential settlement
in the transition zone between a bridge deck and embankment

Maintaining track geometry for longer,
maintaining operating speeds and reducing maintenance

Fast installation
helping construction to be completed within a 54-hour possession

REF TEN379

TriAx integrated with unbound track ballast created a mechanically stabilised layer that mitigated overall settlement of the track and differential settlement in the transition zone where the embankment and the bridge deck met.

PROJECT BACKGROUND

The Crewe Green Link Road is a dual carriageway built to open up development areas in support of Cheshire East Council's plans for economic growth around Crewe.

The 1.1km road, between the A500 and the A5020, opened in 2015. Near its northern end, the route passes under the Crewe-Derby railway line, which runs on an embankment. This meant main contractor Morgan Sindall had to build a new bridge on the line of the track, while constructing the road in a cutting to provide the necessary headroom.

The 30m long, 2,000t bridge deck and sill beams were built offline and positioned during a 54-hour track possession over Easter 2015. A key challenge was how to deal with the potential for longitudinal differential settlement of the track at the points where the bridge deck and the embankment met, due to the different strengths of the bridge deck material and the embankment soils.

Main contractor Morgan Sindall included a layer of Tensar TriAx geogrid at the base of the track ballast in the transition zones at either end of the deck. This created a mechanically stabilised layer, with ballast particles confined by the grid, that would resist lateral movement under cyclic loading from trains.

As a result, the trackbed was more resistant to settlement, ensuring vertical and horizontal alignment of the track would be maintained for longer, and the transition between the bridge and the embankment was smoother, mitigating the risk of differential settlement. The solution also ensured that track maintenance requirements were reduced significantly.

Additionally, installing the TriAx was straightforward and quick – which was critical for Morgan Sindall, considering the short time window available for construction of the bridge deck.

Main Contractor:
Morgan Sindall

Subcontractor:
Owen Pugh

Consultant:
Morgan Sindall Professional Services

Client:
Network Rail

"The Tensar solution was ideal: not only did it reduce the risk of track settlement near the ends bridge but it was also fast and easy to install, so maintenance requirements will be reduced significantly."

Craig Roberts

Senior Engineer at Morgan Sindall Professional Services

Tensar International Limited
Units 2-4 Cunningham Court Shadsworth Business Park
Blackburn. United Kingdom BB1 2QX

T. +44(0)1254 262431 | Visit: tensarinternational.com

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