**Tensar case study** Ref 046

**Track settlement - Wallyford, near Edinburgh, East Coast Main Line**

Project Date: 2000

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**BENEFITS TO CLIENT**

Permanent solution to track settlement with line speed restored to 200km/hr. Low track maintenance over concrete slab and transition zones to existing formation.

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**THE PROBLEM**

Track settlement, speed restrictions and associated risks caused by mining subsidence below a 350m length of ECML track.

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**THE SOLUTION**

A temporary diversion and permanent works both consisting of a mini piled reinforced concrete slab covered with ballast and transition zones onto existing formation which included Tensar geogrid layers and vibro treatment.
PROJECT DESCRIPTION

The ECML at Wallyford had been constructed over unrecorded shallow pillar and stall mine workings in the Great Seam Coal and has been affected by track settlement for over 100 years. Despite grout injection treatment in 1994 further ground movement occurred after completion. This lead to the imposition of speed limited of 60km/hr for passenger trains and 30km/hr for freight which caused significant delays. Railtrack commissioned further investigation and a feasibility study in 1999 by Donaldson Associates.

After evaluation, the structural solution of a 600mm thick reinforced concrete slab deck to support the track over the mine workings was chosen by Railtrack’s partnering contractor Skanska. The slab itself is supported on a total of 330 steel cased concrete mini piles from 9.5m to 27m length through the collapsed strata and into solid rock. To enable construction of the piles and concrete slab, a 300m long temporary diversion was built in fields adjacent to the main line. Construction of the diversion was a major operation in itself as the track also had to be supported by a piled ground slab designed to span subsidence crown holes upto 2m in diameter and 5m deep.

Differential settlement had to be avoided on the transition zones onto and off both temporary and permanent slabs. A zone was designed to support the track for 35m either side of the concrete slabs. This zone included a tapered thickness of stone reinforced with various layers of Tensar geogrid and a short length with vibro replacement.

Client: Railtrack Scotland
Partnering Contractor: Skanska Construction Ltd
Contractor’s Novated Designer: Donaldson Associates Limited