



## ■ Excavations



### Reference Details:

**Client** Railtrack, UK  
**+++ Main Contractor** Edmund Nuttall Ltd., Camberley, England  
**+++ Joint Venture Contractor** Ritches, Kilsyth, Scotland  
**+++ Consulting Engineers** Donaldson Associates, Glasgow, Scotland  
**+++ Geological Analyst** Dalgleish Associates, Scotland

**DSI Services** Supply of 39 km of 40 mm dia. *GEWI*® Threadbar System for mini piles as well as 6,600 cylindrical couplers and 25,000 lantern type spacers; Supply of a series S.03 1,100 kN Hydraulic Jack and Power Pump for stressing test piles 36.



## DYWIDAG *GEWI*® Piles stabilize major Scottish railway realignment

### East Coast Main Line, Dolphingstone, Scotland

The East Coast Main Line, which runs from London, England, to Edinburgh, Scotland, is one of the busiest and most important rail routes in the UK. At Dolphingstone, 20 km south of Edinburgh, major emergency ground works were required in an area riddled with old coal mining shafts and tunnels, criss-crossing each other at different levels. In January 2002, crown holes up to 2 m in diameter appeared near the track and a subsequent test borehole found a 3 m void just 7 m below the track. The ground conditions were considered to be unique in complexity and more difficult than any found worldwide by the internationally experienced engineers responsible for the project.

The massive amount of remedial work required meant that the track could not be repaired while the trains were rushing through at up to 190 km per hour every 2 minutes and equally impossible to close the line for works which could last for a year. Accordingly, the owner, Railtrack, decided to

realign the 1.6 km of affected track, keeping the old track live, whilst constantly monitoring for movement, and imposing a speed limit of just 32 km per hour.

Mini piles were chosen over larger diameter piles because of the poor ground conditions and also to minimize noise during construction for local residents. 40 mm diameter *GEWI*® Threadbar was selected for the central reinforcement in each mini pile and 1,850 mini piles were installed over a four month period. This was achieved by up to 12 drilling rigs working 24 hours a day, on a three shift pattern, finishing only a day or two before Christmas 2002. The efficiency of the construction method and of the concentrated working had enabled the mini piling works to be completed several weeks early saving valuable time on the crucial main contract.

Pile lengths varied between 6 and 35 m with an approximate average length of 22 m. A total of 39,000 m of 40 mm *GEWI*® Threadbar was utilized, together with 6,600 cylindrical couplers and 25,000 lantern type plastic spacers, all supplied by DSI UK in close cooperation with the management team.

The realigned track will run in reinforced concrete troughs tied into the mini pile heads over the complete 1.6 km length between the small towns of Prestonpans and Wallyford. Trains have run over the new track realignment from Easter 2003.

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