Nailing

Soil Nailing

SUNDERLAND, ENGLAND

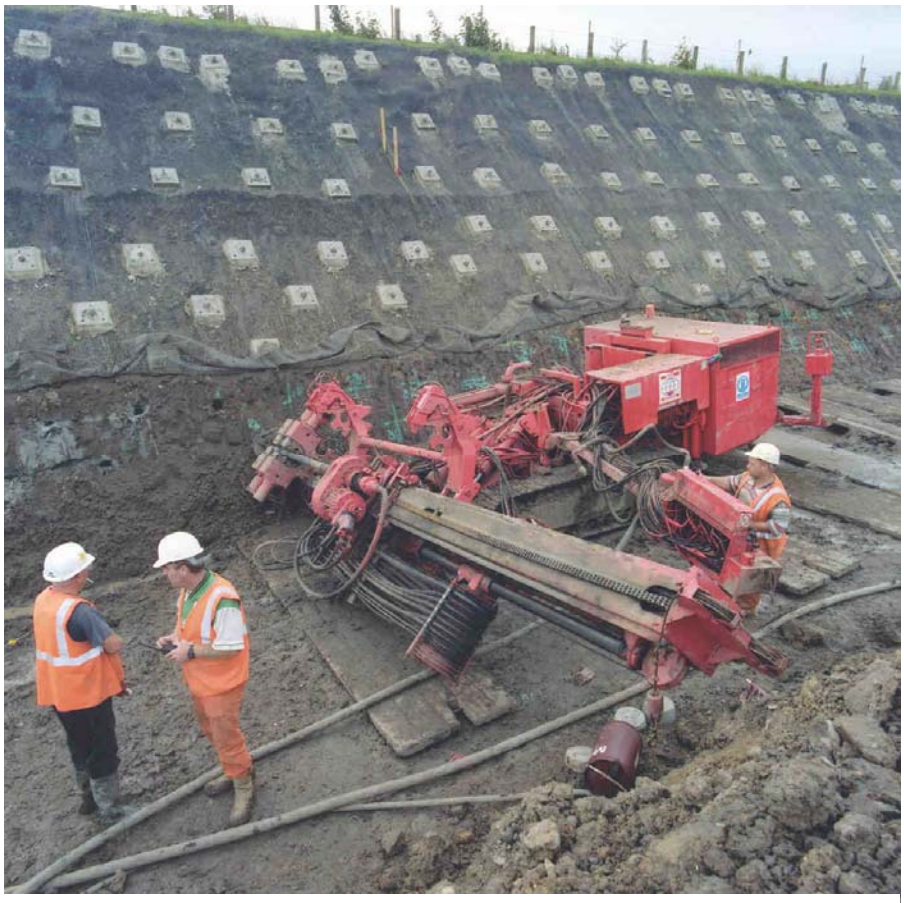
Carbon Fibre Soil Nails

Soil Nails provide a wealth of advantages over other slope stabilisation methods. Half the cost and twice as quick to install as concrete piled retaining walls, they can be used to form steeper slopes than an engineered embankment.

Value Engineering and innovative thinking led to carbon fibre reinforced soil nails being used on Britain's largest soil nailing operation, the £98M extension of the Tyne and Wear metro for the Railtrack-led consortium Sunderland Direct.

Bachy Soletanche, working within the design team with Corus and the Main Contractor, jointly devised the most economic method for stabilising the 6m high steep-sided slopes for the 5km of cutting through suburban Sunderland. As the design developed the balance of the chosen techniques swung away from a predominately piled retaining wall scheme to the use of soil nails.

The carbon fibre nails made in Italy by manufacturer and supplier Sireg, using raw material from Japan, are cheaper than steel, do not require corrosion protection and are light and easy to handle.



Up to 160 nails are installed every day by six machines

CLIENT:	Railtrack
MAIN CONTRACTOR:	Skanska
CONSULTING ENGINEER:	Corus Rail Consultancy
DURATION OF WORKS:	June 2000 - June 2001

WORKS QUANTITIES

45,000 linm of soil nails

10,000 m² Bored Pile Retaining Wall

Ground Anchors

Minipiles

A405

BACHY SOLETANCHE

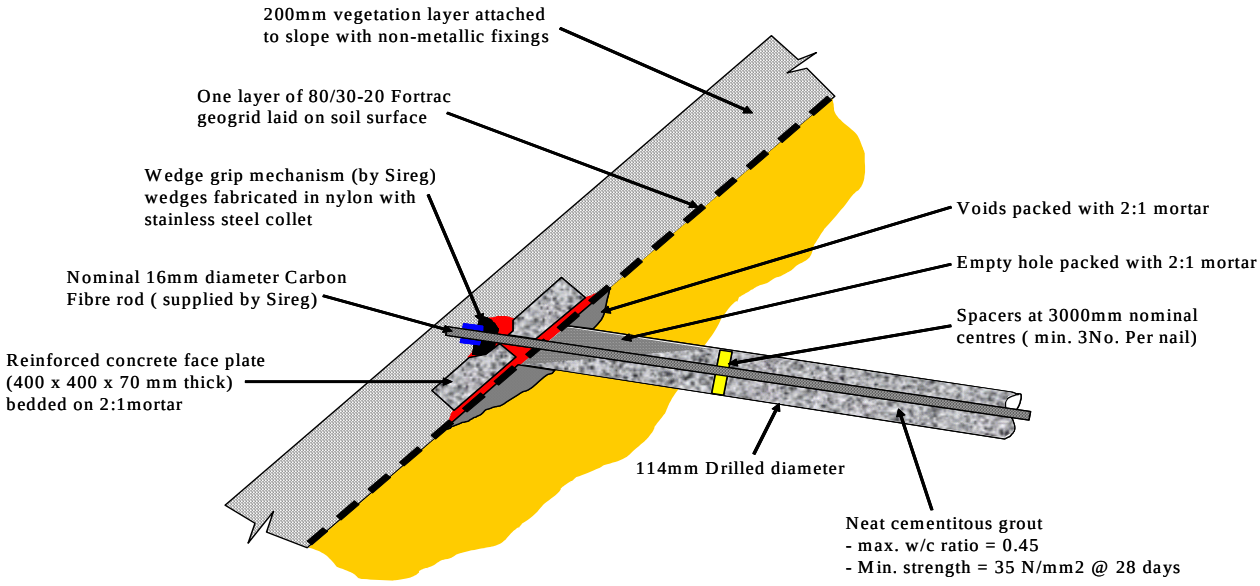
Rig drilling nails 3m above working level using carousel

Spacer detail on carbon fibre tendon bar.

The high 45° slope needs up to seven rows of nails inserted as the cutting is excavated in two 3m deep benches. Positioning an upper row of conventional steel nails would need not only lifting machinery but also a man rider and a total of three people. The carbon fibre version, five times lighter, requires one man.

The carbon fibre tendons are inserted into a 115mm diameter holed which is then tremie grouted. As the nails are designed to act as a composite system they are connected by a geogrid, which covers the entire slope, and fixed using concrete plates with the carbon fibre bar secured using a wedge grip mechanism. The geogrid is secured at the toe by lapping beneath the track ballast.

Soil Nailing - Head detail



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