

SOIL NAILS

SLOPE STABILISATION

Soil Nails are a versatile and cost-effective method for stabilising slopes, embankments and landslides across a wide range of ground conditions. They are commonly used with geotextiles and mesh systems to create an integrated retaining solution for both permanent and temporary applications.

Soil nailing reinforces in-situ soils using grouted tendons, creating a reinforced soil mass that increases the stability of the slope and allows it to support greater loads or steeper faces than would otherwise be possible.

We offer a range of hollow bar and self-drilling soil nails, with diameters from 32–52 mm and load capacities from 10–550 kN. Soil nails can be formed from steel, stainless steel or GFRP (glass fibre-reinforced polymer), depending on project requirements.

UNDERSTANDING SOIL NAILS



Soil nails are installed into the slope and grouted to transfer loads into the surrounding ground. Installation equipment can be selected to suit site access and working area constraints.

Soil nails can be installed by drilling into the slope with a grout flush, or by inserting tendons into pre-drilled holes and grouting them into place.

Hollow bar, self-drilling soil nails are advanced into the ground while grout is pumped through the centre of the bar, forming a grout body around the nail to transfer loads into the surrounding ground.

In harder ground conditions, holes may be pre-drilled before the soil nail is inserted and grouted into place. Spacers can be used to maintain the central position of the nail within the borehole.

A steel bearing plate is fixed to the exposed end of each nail, with mesh and/or matting applied to the slope face to provide surface retention and help control erosion.

Soil nails are best suited to cohesive soils but can also be effective in weak rock.

They are particularly suitable for restricted-access sites, where installation equipment can be selected to suit site constraints and may be smaller than that required for conventional retaining systems.



PROJECT ADVANTAGES

- Can be installed using relatively small, lightweight equipment, reducing temporary works requirements and enabling access to constrained locations
- Minimises ground disturbance, resulting in lower environmental impact compared with conventional methods
- Can progress concurrently with excavation
- Can be accurately tested to specified load capacities
- A range of corrosion protection options is available

EXAMPLE APPLICATIONS

- Stabilisation of failed or unstable slopes, including landslides
- Regrading of natural slopes to achieve steeper angles
- Strengthening of slopes in preparation for changes in loading conditions

TECHNIQUE CAPABILITIES

- **Specialist installation equipment** – Casagrande and Soilmec rotary-percussive drilling rigs, excavator-mounted drill masts and specialised access equipment can be used to install soil nails across a range of ground conditions, site access and working constraints.
- **Full package support** – providing a complete soil nailing solution, including nail installation, meshing, matting and associated slope face finishes.

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SLOPE STABILISATION

M1 NEAR SCHEME

Sector: Infrastructure

Client: National Highways - SMP Alliance

Van Elle were selected by Highways England's SMP Alliance to carry out enabling works for the construction of two new Emergency Areas (EA09 and EA14) on the M1, as part of the National Emergency Areas Retrofit (NEAR) Scheme.

The scope involved the design and installation of soil nails (approximately 6150 linear meters), together with the installation of MacMat-R Erosion Control Netting (approx 1000m²).

Additionally, we were responsible for all associated setting out, earthworks and temporary works designs required to stabilise the existing embankments.

The project was phased into segments to comply with imposed restrictions and the team had to ensure that temporary slope stability was maintained whilst the slope remained unprotected.

Soil nails were installed using excavator-mounted drill masts, with MEWPs providing access to the working areas, followed by installation of erosion control matting to provide surface protection and long-term slope stability.



STOKE ROAD SLOPE STABILISATION

Sector: Infrastructure

Client: PGR Construction Ltd

The Stoke Road Slope Stabilisation project in Blisworth involved soil nailing works to prevent landslides and improve the safety of the adjacent road and properties.

Our Specialist Piling team were appointed by PGR Construction Ltd to undertake the project in Blisworth, Northamptonshire. This essential work aimed to prevent landslides and enhance the safety of the surrounding area.

The solution involved installing 426 No. soil nails, comprising 320 No. at 9.5 m and 106 No. at 3.5 m, together with PVC double-twist rockfall protection netting and coir matting to provide slope face protection and erosion control.

Installation was carried out using a Ripamonti EX321 drill mast mounted on an excavator, with a 32-tonne, 19 m long-reach excavator used to install the lower rows.

The specialist equipment enabled the works to be delivered safely and efficiently despite restricted access, steep slopes and the proximity of residential properties.

