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Soil Nails

Applications

Slope stabilisation.

Vertical or battered cuttings.

Embankments.

Support to existing or new gravity walls.

Can be used for both permanent and temporary applications.

Advantages

- Cost effective.
- Quicker than alternative retention methods.
- Small rigs can achieve access to difficult and tight locations.
- Working space requirements are less than for normal piling rigs.
- Excavation and construction of wall progresses concurrently.
- Provides open excavation.
- Can be used in a variety of soil conditions.



Soil nailing forms part of the comprehensive range of ground engineering processes designed and constructed by Cementation Skanska. Developed in the late 1960's, nailing has since been widely used throughout the world. It is a slope stabilisation process that utilises arrays of fully bonded passive ties installed in the ground. These are usually grouted bars, made from steel, stainless steel or glass fibre.

The technique can be cost effectively employed to create both temporary and permanent cuttings. It can also be used to support slopes or to repair slipping embankments and gravity walls.

Soil nails tend to work best when installed in granular materials, but are also commonly employed in soft rocks and stiff clays.

The nails are installed using a variety of processes, including driving or drilling and grouting. Access requirements often dictate the method

and plant used. The most frequently used method is that of drilling and grouting, as it copes with a large variety of ground conditions. It also has the advantage of mobilising high bond stresses between the soil and nail, and facilitates the installation of corrosion protection measures.

For shallower slopes, vegetation is often adequate to stabilise the face. As the angle becomes progressively steeper, the use of a geogrid in combination with seeded mats or ultimately reinforced sprayed concrete is used. The facing is held in place by plates bolted onto the threaded ends of nails.

Drainage measures are also provided if deemed necessary to maintain long term stability and to reduce the potential for sloughing of the surfaces.

The process is designed to improve the strength and deformation characteristics of the existing ground. It is similar to reinforced fill techniques

in that the soil nails generate tensile forces in response to slope deformation. This is in contrast to ground anchors that are intentionally stressed to minimise ground deformations. Soil nails are normally designed to operate with working loads in the range 25kN to 100kN.

Long term monitoring of full-scale structures has increased Cementation Skanska's fundamental understanding of soil nail design. Load testing of soil nails is often a design requirement and the Company has the capability to carry out both manual and fully automated soil nail pullout tests.

