

Soil Nails and Anchored Tie Backs



Soil nails are grouted anchors installed in unstable material for the purpose of stabilizing a cut slope. These tendons are typically installed at a low angle just off of horizontal. They are grouted the full length of the bar allowing the entire bar to develop a bond with the surrounding soil or rock matrix. As they are grouted the full length of the bar they develop load distribution along the length of the bar, with most of the load focused on the middle third of the bar. Because the bars are grouted the full length of the bar they are a passive anchor system, meaning that there must be a small amount of movement in the anchor in order to mobilize resistance.

A soil nail wall is constructed by first installing a single row of soil nails in an excavated surface. After a number of soil nails are installed the retaining wall is built. A geotextile drain matting is placed on the soil surface, followed by welded wire mesh and rebar walers. The rebar is used to reinforce the shotcrete facing around the anchors to increase resistance to punching shear forces. After application of the designed shotcrete facing, steel bearing plates with beveled washers and nuts are installed on the surface of the face.

Soil nail walls can be used for temporary or permanent excavation support. A temporary wall will differ from a permanent wall in the lengths of anchor tendons, corrosion protection, and often the thickness of shotcrete facing.

Anchored Tie Backs differ from soil nails in the grouting of the anchor, loading and subsequent load distribution along the tendon. Tensioned Tie Backs are only grouted along a portion of their length, providing for a free stressing zone. This zone is tensioned after the grout cures to pre-load the anchor. This creates an active anchor system that immediately mobilizes resistance to movement.

