



Soil Nailing

Earth Retention Systems And
Specialized Foundations

Schnabel
FOUNDATION COMPANY

Definition and Application



*Permanent soil nails were used to construct this excavation support system in limited overhead conditions.
Houston, TX*

Soil Nailing

Soil nailing is an in-place reinforcement of the soil. It uses steel tendons grouted into pre-drilled holes to create a stable block in front of the soil that requires support.

Soil nails are used for the temporary support of excavations, construction of permanent retaining walls, construction or replacement of bridge abutments, and for the control of landslides. When used with other earth retaining techniques, such as micropiles, tiebacks and tiedback elements, they will stabilize large masses of soil.

Soil nail walls are usually built with smaller, easily mobilized equipment and without extensive steel fabrication. This minimizes the start-up time and makes soil nailing the

best application for congested sites. Schnabel Foundation Company's soil nail walls have been successfully installed in stiff clays and silts, some coarse grain soils, mixed soils with rock and weathered rock. The relatively short length of the nails makes soil nails ideal for tight sites and limited right-of-ways or property lines. In the right application, soil nailing is a rapid and economical way to build retaining walls.



*Soil nailing is an ideal system for constructing irregularly shaped walls.
Aptos, CA*

Soil Nailing Construction

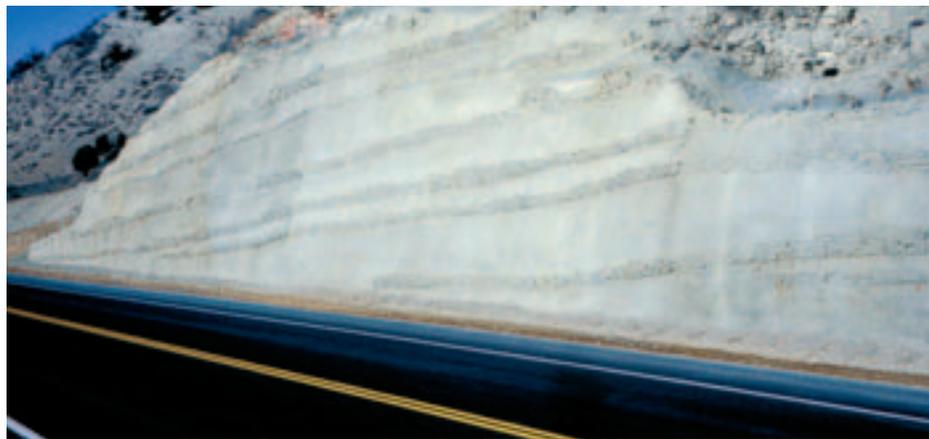


This Panel Clockwise from Top: Part of the 192,000 square feet of soil nailing constructed to depress the railroad tracks through the center of Reno, NV; Permanent soil nail wall just prior to casting the wall face, Glendale, AZ; Design-build soil nail wall supports an excavation and adjacent structures, Berkeley, CA.

The Process

Construction of a soil nailing wall begins with a shallow cut. The height of the cut is determined by the ability of the soil to temporarily stand unsupported. The soil nails are installed by grouting a bar into a hole drilled from the face of the cut. The grout completely fills the drill hole and bonds the bar to the ground over its entire length. Since a large number of nails are required, the ability to rapidly install the nails is key to the economy of soil nailing.

Shotcrete is applied to support the ground between the nails. The sequence of excavation, installation of soil nails and application of shotcrete is repeated in successive lifts until the excavation is completed.



Soil Nailing



Middle Panel Clockwise from Top: 55-foot deep soil nail wall, Atlanta, GA; Sculpted and colored soil nail wall supports a hillside cut along SR 6 – permanent soil nail wall, Spanish Forks Canyon, UT; Schnabel has designed and built its own soil nailing drills for fast installation, Roslyn, PA. This Panel Top: In some soil conditions, soil nailing is difficult to construct, and creating a smooth vertical face is not practical. Bottom: Soil nailing when combined with tiebacks, grade beams or other excavation support systems can stabilize large slopes. Permanent soil nail wall, Hickman, KY.

Soil Nail Wall Finishes



The Finishing Touch

Because of the top-down construction sequence, soil nail walls for permanent applications can be finished with a wide variety of construction materials. We have designed and built soil nail walls with faces constructed from gun-finished shotcrete, colored shotcrete, sculpted shotcrete, stone, cast-in-place concrete, pre-cast concrete and wood, providing a range of structural and aesthetic finishes.

*Sculpted shotcrete face.
Permanent soil nailed
wall. Reno, NV*

*Cast-in-place concrete
face, permanent soil nail
wall. Algonquin, IL*

*Gun-finished shotcrete.
Permanent soil nail wall.
Natchez, MS*

*Form liners can be used
to produce a wide variety
of attractive finishes on
permanent soil nail
walls. Ashville, NC*

Schnabel
FOUNDATION COMPANY

Schnabel Foundation Company has designed and built more than 440 soil nail projects for both temporary and permanent applications. We have designed and built some of the largest soil nail projects in the United States. The highest wall contracted to date is 150 feet and the deepest excavation project is 60 feet.

Corporate Office: 45240 Business Court, Suite 250 • Sterling, Virginia 20166 • www.schnabel.com

Atlanta
770-971-6455

Boston
508-303-3642

Chicago
847-639-8900

Denver
303-696-7268

Houston
281-531-1103

Orlando
407-566-0199

Philadelphia
610-277-2950

San Francisco
925-947-1881

Washington, D.C.
301-657-3060