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Acronyms in this issue

AASHTO	American Association of State Highway and Transportation Officials
CTRE	Center for Transportation Research and Education
FHWA	Federal Highway Administration

Iowa DOT	Iowa Department of Transportation
ISU	Iowa State University
LTAP	Local Technical Assistance Program
MUTCD	Manual on Uniform Traffic Control Devices

Soil nailing helps in a tight spot

BUILDING A RETAINING WALL close to busy streets and utilities can be a headache, especially when using conventional retaining wall construction methods, which require significant excavation. Soil nailing, a relatively new construction technique, reduces the amount of excavation for the wall because it uses top-down construction.

The wall is built in stair-stepped levels beginning at the top and working down. Nails (steel bars, the length measuring 60–80 percent of the wall height) are inserted into grouted holes drilled into the cut slope. The friction between the soil and the nail stabilizes the wall.

A soil nail wall was built for the first time in Iowa on a 63,000 square foot, two-tiered wall on I-235 in Des Moines.

Soil nailing isn't used only on retaining walls near highways and interstates, though. It should be considered any time construction has a limited right of way, such as when adding additional lanes underneath a bridge or working near a busy street close to utilities.

According to Curtis Monk, division bridge engineer with the Iowa Division of the FHWA, soil nailing competes with other cut slope methods, such as tie-back walls. Nationally, soil nailing costs \$29–40 per square foot, compared to tie-back walls at \$45–60 per square foot.

Along with reducing the cost of the project, soil nailing may reduce the following:

- noise and traffic obstruction from construction
- environmental impact on nearby properties
- manpower needed to complete the project

Soil nailing isn't appropriate for all projects, though. Sites must have cohesive and high shear strength soil, little groundwater, and good drainage, especially when building permanent structures in an environment with freezing and thawing cycles.

"If the site's conditions are right, consider soil nailing; it may save you time and money," says Monk.

For more information, check out the reference manuals on the FHWA website at www.fhwa.dot.gov/bridge/geopub.htm. Under "Reinforced Soil Structures," look for *Geotechnical Engineering Circular No. 7—Soil Nail Walls* and *Soil Nailing Field Inspectors Manual—Soil Nail Walls*. Or contact Curtis Monk, 515-233-7320, curtis.monk@fhwa.dot.gov.



Soil nails can help stabilize retaining walls.