

# CHANCE Civil Construction

## A CASE HISTORY

# SOIL SCREW® RETENTION WALL SYSTEM REPORT

**Project:**  
Freightliner Truck Co.  
paint center expansion

**Contractor:**  
AME Construction Co. of Rock Hill, SC

**Structural Engineering:**  
Perigon PA of Matthews, NC

### Job Description:

Freightliner needed to lower the slab of an existing building 22 feet to install a new paint booth. The time frame was critical so as not to shut down this portion of the plant for an extended period. This was to be the first of three identical paint booth installation jobs.

Two issues needed to be addressed. First, the existing columns would need to be underpinned during excavation. For this purpose, Perigon selected the Chance® Helical Pier Foundation System. Discussions with Perigon noted that screw anchors also could address the second issue of a need to construct retaining walls during excavation. For this retention application, the Chance® Soil Screw® Retention Wall System, which uses screw anchors as an alternative to more traditional

grouted soil nails, was investigated and selected.

### Design:

Jeff Larson, PE, the structural engineer for Perigon, coordinated his design of the wall with Don Bobbitt, PE, A. B. Chance geotechnical engineer/project manager, and Brent Chisholm, A. B. Chance district manager.

Key factors affecting the design were:

- Need to minimize dust and exhaust fumes during installation,
- Limited space and access,
- Need to minimize installation time.

To meet the rigid criteria for this soil nailing job, the screw anchor selected was 15 feet long with 8-inch diameter helices and a threaded stud at the



termination. A 4 x 5 ft. grid was determined for use on this 100 x 50 x 21 ft. excavation. Boring logs showed the screw anchors were installed in firm and very firm, silty coarse-to-fine sand with Standard Penetration Test results typically from 10 to 20 blows per foot. Preloads of 20,000 lb. tension were selected for one to two tests per site.

### Construction:

Construction equipment consisted of Caterpillar Trac Hoe and Case 580 backhoe with a Chance® 10,000 ft.-lb. drive head. A two man crew installed the screw anchors on the 6-foot benches excavated by the contractor.

A rebar grillage was installed and shotcreted. Bearing plates were placed over the threaded termination. Field testing proved the 2,000 ft.-lb. installing torque resulted in screw anchors' capacities in excess of 20,000 lb. tensile.

### Advantages vs. Grouted Nails:

Although there was only 10 ft. additional workspace on both short ends and 5 ft. on each long side, this



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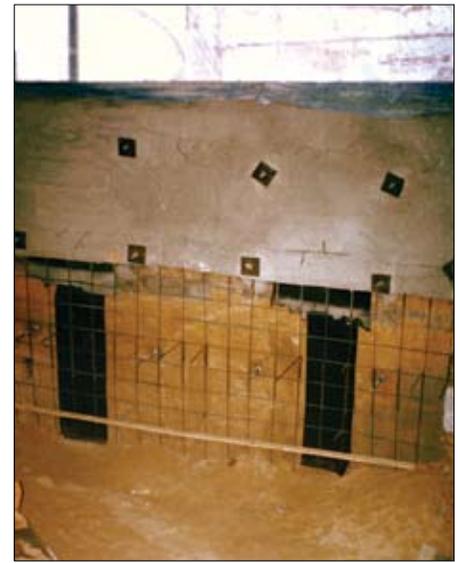
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restricted footprint was accessible with extendable sections of the Soil Screw® Retention Wall System. As little as 1 foot of freeboarding space was available in some zones.

It also had negligible impact on the plant's painting and assembly operations. There were no fumes since no gasoline-powered equipment was required. Nor was there the significant dust and noise caused by drilling for grouted tendons.

Besides the ease of installation, these factors did not interfere with the customer's painted product. In fact, the painting system was replaced with upgraded equipment only 15 ft. from the ongoing soil-nailing operation.

### Summary:

This segment of the construction site was five weeks behind schedule when the excavating/screw anchor portion was selected. The soil nail wall and excavation began on Dec. 14, 1996, and finished in four weeks (including the finished floor slab and sprayed-on finish wall), which put the project back on schedule.

By both using the Soil Screw® Retention Wall System (versus conventional grouted soil nails) and doing their own excavation, AME got the project back on track. The remaining sections of the Freightliner construction used this same approach with continued superior performance.



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