

## Model 150 Helical Tiebacks

**Project:** Storage Facility Wall Stabilization

**Location:** Tallahassee, FL

### Challenge:

A 12 to 17-foot tall poured concrete cantilevered retaining wall provides grade separation near the property line of a storage facility. Over many years, the retaining wall continued to yield and rotate outward to more than 12 inches from vertical at the worst location. This movement caused thin diagonal cracks and one severe vertical crack to develop along the affected length. As a measure to prevent wall failure and subsequent damage to existing structures and adjacent properties, the wall was temporarily braced with steel tube anchored both to the wall and the pavement below. A tieback system was then proposed to permanently stabilize the failing retaining wall.

With the property line essentially along the top of the wall, a temporary easement had to be obtained from the adjacent property owner to complete a subsurface exploration through the retained soils. A permanent construction easement was then required to allow a tieback system to extend beyond the property line.

### Solution:

The wall stabilization detail included seventeen (17) Model 150 (1.5-inch round corner square bar) helical tiebacks. Helical tiebacks could be installed with a mini-excavator capable of maneuvering between the existing steel braces and within the limited space between the retaining wall and the existing buildings. An 8"-10"-10" triple-helix lead section was selected to pass through the maximum ten-inch diameter cores in the wall and support the design working tension load of 24 kips. Two rows of tiebacks, approximately three feet and ten feet up from the base, were installed to stabilize 70 feet of the failing retaining wall. The tiebacks were spaced eight to ten feet center to center. The tiebacks were installed at a downward angle of 15 degrees from horizontal and to lengths of about 25 feet. Each tieback was installed to a torque of at least 5,500 ft-lb, correlating to ultimate capacities exceeding the design working load by a factor of safety greater than two (FOS > 2). The tiebacks terminated with thread rod adaptors and high strength thread rod to connect to ten-inch steel channel walers. The tiebacks were then pretensioned and the core holes filled with concrete. The tieback installation and wall stabilization was completed in just four days. The steel tube bracing was later removed.

## Project Summary

**Geotechnical Engineer:** Ardaman & Associates

**Structural Engineer:** Rosenbaum Engineering

**Tieback Installer:** Alpha Foundation Specialists, Inc.

**Products Installed:** (17) Supportworks® Model 150 Helical Tiebacks, 8"-10"-10" Triple-Helix Lead Section, Installed to Approximate Lengths of 25 feet, Design Working Tension Load of 24 kips



Retaining wall temporarily stabilized with steel tube bracing



Bottom row of helical tiebacks being installed around bracing



Installing top row of tiebacks; bottom waler complete



Completed tieback and waler system



Completed tieback and waler system