

Model 350 Helical Piles

Project: Former Oil Facility Warehouse Stabilization

Location: Pompano Beach, FL

Challenge:

An environmental study discovered contaminated soils to depths of 20 feet and extending beneath one end of an existing warehouse. The 10,000 square-foot warehouse, constructed in 1968, is typical high bay warehouse construction with perimeter strip footings 30 inches wide by 12 inches thick, 18 feet high masonry block walls, and bar joists supporting a flat roof. In order to remove the contaminated soil, the entire length of one of the exterior walls would have to be supported with a deep foundation that extends below the proposed excavation depths. Test borings identified a general subsurface profile consisting of loose to medium dense fine sand from the surface to a depth of about 38 feet, over medium dense to dense sand from 38 feet to the completed depths of the borings at 50 feet. Groundwater was encountered at a depth of 16 feet.

Solution:

Several deep foundation options were considered, but helical piers appeared to be the most feasible and economical. Helical piers can be installed within sand and below groundwater without the need for casing, they can be installed with smaller equipment inside the building, and the installation does not generate spoils that would have to be contained for proper treatment and/or disposal. The foundation support detail included 34 Model 350 (3.5-inch OD by 0.340-inch wall) retrofit helical piers with 10"-12"-14" triple-helix lead sections. The piers were designed and installed in order to support the design working load of 12 kips even after removal of the 20 feet of overburden soils. The piers were installed in a vertical orientation and to depths up to 45 feet. The piers were installed in 17 pairs across the inside and outside edges of the wall footing to allow steel beams to be placed on and welded to the retrofit brackets, spanning the footing width. Hydraulic cylinders were used to uniformly preload the piers prior to excavation. As the excavations were made, steel cross-bracing was field-welded to the piers to minimize unsupported lengths and prevent buckling. The pier installation, with welding of the cross-bracing, was coordinated with the excavation to remove the contaminated soil and completed within four days.

Project Summary

- Structural Engineer:** Forge Engineering, Inc.
- Geotechnical Engineer:** Dunkelberger Engineering & Testing
- General Contractor:** Environmental Consulting & Technology
- Pile Installer:** N Square, Inc.
- Products Installed:** (34) Supportworks® Model 350 Helical Piers, 10"-12"-14" Lead Section, Pier Depths up to 45 feet, 12 kip Design Working Load



Vertical piers installed inside warehouse



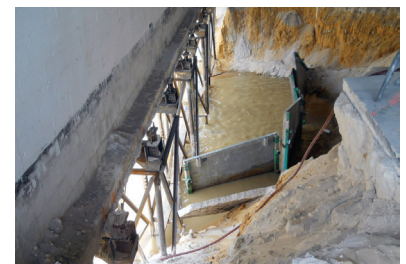
Hydraulic cylinders preload piers before excavation



Steel beams welded to retrofit brackets



Excavation of contaminated soil. Building stabilized with helical piers.



Interior view of excavation and wall support