

New Construction & Retrofit Helical Piles

Project: School Addition and Renovation

Location: Nebraska City, NE

Challenge:

Plans for an addition and renovation to an existing school building included a new gymnasium, auditorium, classrooms and administrative offices. A review of pre-construction site conditions identified cracking in the exterior brick veneer, indicating that the existing structure was experiencing differential settlement. A geotechnical exploration for the proposed addition encountered fill soils to depths of ten feet, Peoria loess and Loveland loess to depths of 32 to 45 feet, and glacial till to the explored depth of 50 feet.

Solution:

Foundation recommendations included underpinning and widening sections of the existing exterior wall footings before starting the new construction and renovation phases of the project. These sections of existing foundations would receive additional load from the planned construction. New foundations placed within 15 feet of the existing building would also be supported by helical piles. A helical pile test probe was advanced to a depth of 100 feet to gather additional deep soil strength information. Soil parameters can be back-calculated by knowing the test probe configuration and monitoring torque in one-foot intervals during installation. Thirty-five retrofit helical piles and 55 new construction helical piles were proposed to support the existing structure and new addition, respectively.

For both applications, the helical pile design consisted of the Model 288 (2.875-inch OD by 0.276-inch wall) round shaft with 10"-12"-14" triple-helix lead sections and 14"-14" double-helix extensions. Prior to the retrofit pile installation, 16-inch diameter by eight-foot deep holes were augered next to the exterior wall to allow for the multi-helix plate configuration to pass by the bottom edge of footing. Retrofit foundation brackets were then placed on the tops of the piles and positioned below and against the existing footings. The pre-augered holes were backfilled with lean concrete to the bottoms of the retrofit brackets. After the concrete had cured, the retrofit piles were uniformly loaded with hydraulic cylinders to the recommended seating load. The retrofit and new construction helical piles were advanced to depths ranging from 45 to 65 feet and to torque-correlated ultimate capacities of at least two times the design working loads of 22.5 to 25 kips (FOS \geq 2).

Project Summary

Architect/Structural Engineer: DLR Group

General Contractor: Sampson Construction

Geotechnical Engineer: Olsson Associates

Pile Installer: Thrasher, Inc.

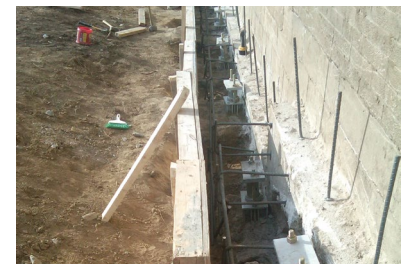
Products Installed: (90) Supportworks® HP288 Helical Piles (35 Retrofit, 55 New Construction), 10"-12"-14" Lead Section and 14"-14" Extension, Installed to Depths of 45 to 65 feet, Design Working Loads of 22.5 to 25 kips



Installing retrofit helical pile



Pile and retrofit bracket installed; backfilling hole with lean concrete



Retrofit pile installation complete; preparing widened footing/grade beam



Installing new construction helical piles



Lead section ready to advance