

Model 288 Helical Piles

Project: Hickey Elementary School Elevator Addition
Location: St. Louis, Missouri
Date: August 2016

Challenge:

The Hickey Elementary School building was constructed in 1965. An elevator addition was planned for the school to comply with ADA requirements. The soil profile at the proposed elevator location generally consisted of uncontrolled fill with rubble and debris underlain by competent clay. A deep foundation system was therefore needed to transfer the new loads of the elevator addition below the fill to the competent bearing soils. The deep foundation system would also minimize the influence of the elevator loads on the existing shallow footings. The deep foundations would also have to be installed within the tight working space of the elevator pit excavation, which included low overhead conditions due to an eight-foot high ceiling.

Solution:

Helical piles were selected as the ideal deep foundation solution for this project given their ability to be installed with relatively small equipment within the confined space of the existing building. The design engineers required three (3) Model 288 (2.875-inch OD by 0.276-inch wall) hollow round shaft helical piles with a 10"-12" double-helix lead section be installed to support a total service load of 80 kips (27 kips per pile) in compression. A hand held drive unit, powered by a remote hydraulic source, was used to install the helical piles to torque-correlated ultimate pile capacities of at least 54 kips (FOS ≥ 2). The limited overhead clearance prompted shorter (5-foot) extensions to advance the piles to depths from 21 to 31 feet below the bottom of the excavation. New construction brackets were fitted to the tops of the helical piles to be cast into the poured mat foundation of the elevator shaft.

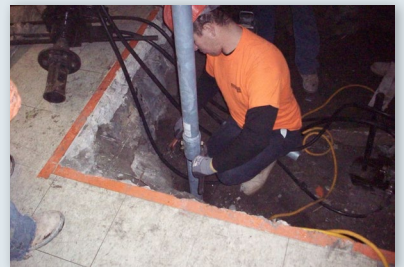
During installation, old concrete foundations were encountered below the pit excavation. While the helical piles effectively "churned" through most of the surficial rubble and debris, they could not penetrate this large obstruction. A mini drill rig was brought in to core through the existing footing and allow for the helical pile installation.

Project Summary

Architect: Grice Group Architects
Structural Engineer: Summit Engineering Group, LLC
Geotechnical Engineer: SCI Engineering, Inc.
General Contractor: Raineri Construction, LLC
Certified Pile Installer: Foundation Supportworks® by Woods
Products Installed: (3) Supportworks® HP288 Helical Piles, 10"-12" Lead Section, Installed to Depths from 25-31 feet, Design Working Load of 27 kips



Installing helical piles with hand held equipment within proposed elevator pit



Coupling blank extension



Advancing helical pile within pit excavation



Cutting installed pile to specified elevation



Helical pile installed and fitted with new construction cap