

Model 350 Helical Piles

Project: Central States Manufacturing

Location: St. Peters, MO

Date: January 2020

Challenge

A 53,600 square-foot structure, for the manufacture of metal roofing and siding, was planned for construction in St. Peters, Missouri. Approximately 18,000 square feet would be dedicated for movement and storage of steel coils used in the manufacturing process. The original foundation design included shallow spread footings for all areas of the plant. However, during construction it was determined that the coil rack storage areas could not be supported with shallow footings given the near-surface soil conditions. The construction of the building progressed while alternative deep foundation solutions were considered for the coil rack slab areas. These deep foundations would be installed after most of the building had been constructed, requiring smaller installation equipment for the limited access conditions. The deep foundations would also have to be installed with care around new interior column footings and shallow utilities. The final design called for five coil rack systems, with support slab areas ranging from 162 to 696 square feet. The slabs included a total of 110 piles with service compression loads of 60 kips/pile. The deepest boring advanced in the area showed stiff to hard fat clay to a depth of about 18 feet where it became very soft clay to the termination depth of boring at 40 feet. Based on local experience, a competent bedrock bearing stratum was believed to be present at a depth of about 60 feet, which served as the basis for the pile design.

Solution:

Helical piles were selected as the preferred deep foundation alternative since the piles could be installed in the limited access areas, near existing foundations and utilities, and without concern of damage to the existing structure due to vibration. The helical piles could also be installed with smaller equipment than what would have been required for other deep foundation systems. Foundation Supportworks® by Woods was contracted to install 110 helical piles for the five rack slab foundations. The helical pile design consisted of the Model 350 (3.5-inch OD by 0.340-inch wall) hollow round shaft with a 10"-12"-14" helix plate configuration. The helical piles were installed to lengths ranging from 52 to 57 feet after achieving torque-correlated ultimate capacities of at least 2 times the design working load of 60 kips. Phase 1 included the installation of 10 piles for the smallest of the coil rack slab areas. This work was completed as the design for the other areas was being finalized. The remaining 100 piles were installed in Phase 2 over a period of 10 days.

Project Summary

Architect:	Baalman Architects
Geotechnical Engineer:	SCI Engineering
General Contractor:	Paric
Helical Pile Designer:	Case Engineering
Pile Installer:	Foundation Supportworks® by Woods
Products Installed:	(110) Supportworks® Model 350 Helical Piers, 10"-12"-14" Plate Configuration, Design Working Compression Load of 60 kips, Installed Lengths of 52 to 57 feet



Building shell erected



Phase 1 helical piles being installed



Phase 2 area prepared for pile installation around spread footings



Installing helical piles around existing utilities (Phase 2)



Phase 1 coil rack foundation in service