

Model 350 Helical Piles

Project: Shaare Emeth Renovation

Location: St. Louis, MO

Date: April 2017

Challenge:

Renovation plans for the existing facility included the removal and relocation of an existing interior column. The new column location would be only a few feet from the existing column, but near the exterior wall line of the original building, which was expanded sometime in the past. The new column would be positioned immediately adjacent to a known below ground tunnel, but it was unclear what other old foundation remnants existed in the area. A design concept was proposed to support the new column with a pile cap incorporating both underpinned existing (old) footings and new construction helical piles. A soil profile of stiff clay soil over weathered shale bedrock at about 30 feet was anticipated at the new column location.

Floor slab removal at the new column location uncovered the exterior wall of the tunnel, old footings, and a poured concrete deadman measuring approximately 24 inches wide by 32 inches long by as much as 52 inches thick. The deadman was cast integral with the tunnel wall and was reportedly once used to resist shear forces from one of the original building's exterior columns. That column was removed when the previous addition was built.

Solution:

The proposed pile cap detail could not be constructed with the encountered conditions. Foundation Supportworks® by Woods consulted with the design team and general contractor to fit a smaller pile cap in the limited space. The existing deadman block was cut off flush with the tunnel wall using a diamond tipped band saw. A line of three helical piles were then installed to support a seven feet long by two feet wide pile cap sandwiched between the tunnel wall and an old footing.

The helical pile design consisted of the Model 350 (3.50-inch OD by 0.340-inch wall) hollow round shaft with 8"-10"-12" triple-helix lead sections. The piles were installed to lengths of 22 to 26 feet to achieve torque-correlated ultimate capacities exceeding twice the design working load of 40 kips (FOS > 2). The tops of the piles were approximately five feet below the concrete floor elevation. The piles were fitted with new construction brackets and cast into the concrete pile cap. The three helical piles were installed within a few hours following two days to saw cut and remove the concrete deadman.

Project Summary

Architect: TR, i Architects

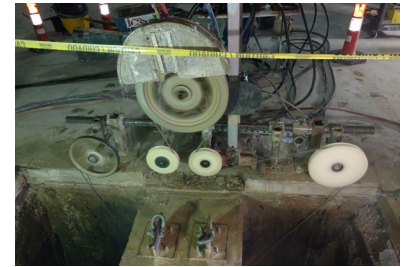
Structural Engineer: KJWW Engineering; Wm. Tao & Assoc. Consulting Engineers

Geotechnical Engineer: SCI Engineering, Inc.

General Contractor: ICS Construction

Pile Installer: Foundation Supportworks® by Woods

Products Installed: (3) Supportworks® Model 350 Helical Piles, Installed Lengths of 22 to 26 feet; Design Working Compression Load of 40 kips



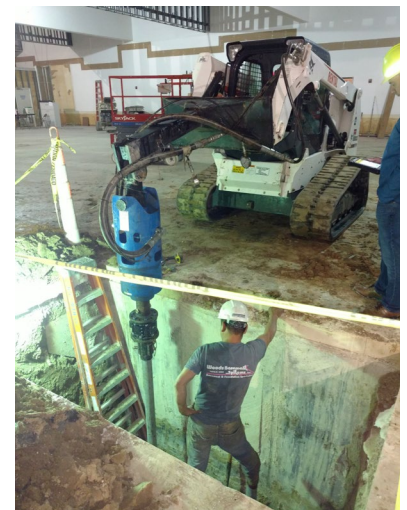
Cutting concrete deadman free from tunnel wall



Skid steer with drive head entering building



Calibrated torque transducer used to measure and record torque



Installing helical pile