

Model 350 Helical Piers

Project: STEAM Elementary School

Location: Hazlewood, MO

Date: April 2017

Challenge:

The STEAM (Science, Technology, Engineering, Art and Math) Elementary School building, originally built in 1967, was planned to receive upgrades and renovations. This work would transfer an additional 103 kips of load to two interior column locations. Deep foundations were then considered to support this load and prevent removal of large areas of floor slabs around the columns in order to extend the existing spread footings. However, the school was originally constructed over an infilled lake, requiring that the deep foundations extend well below the old lake bottom to reach highly competent soils.

Solution:

Helical piers with side-load retrofit brackets were selected to support the additional column loads. The helical piers consisted of the Model 350 (3.5-inch OD by 0.340-inch wall) round shaft with an 8"-10"-12" helix plate configuration. The piers were installed in a near-vertical orientation on opposing sides of each of the two columns (four piers total). The helical piers were advanced to depths from 77 to 84 feet below the footing to bear the helix plates below the old lake bottom elevation and to achieve torque-correlated ultimate capacities of at least 103 kips ($FOS \geq 2$). The retrofit brackets were set against the footing and the piers were loaded to the design working load of 51.5 kips and locked-off. Special care was taken to verify that no movement occurred at the columns during the loading process. The pier sections and bracket components were hot-dip galvanized for corrosion protection. The retrofit brackets and the top several inches of the piers were also cast in concrete. The four retrofit helical piers were installed in one day.

Project Summary

Structural Engineer: Kreher Engineering, Inc.

Geotechnical Engineer: Geotechnology, Inc.

General Contractor: R.G. Ross Construction Company

Helical Pier Installer: Foundation Supportworks® by Woods

Products Installed: (4) Supportworks® HP350 Helical Piers with an 8"-10"-12" Lead Section; Installed Depths from 77 to 84 feet; Design Working Compression Load of 51.5 kips



Limited interior access and working space



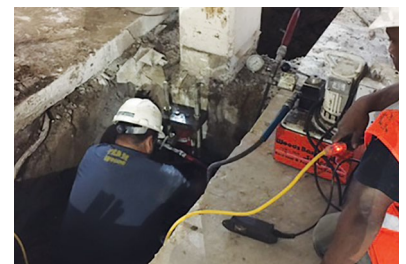
Advancing lead section



Connecting blank extension to lead section



Pier advanced adjacent to column



Bracket installed. Pier loaded with hydraulic pump and cylinder