

Helical Piers for Elevator Wall Underpinning

Project

Davenport Storage
Elevator Wall Underpinning

Location

Davenport, FL

CHALLENGE ▼

During construction of the Davenport Storage facility, it was observed that two elevator shafts had the concrete floors poured slightly higher than needed for the elevator equipment to fit properly. As a result, the elevator floors would need to be removed and reconstructed at the correct depth. The inside plan dimension of the elevator pits were 7.8 feet wide by 9.7 feet long and could only be accessed through a ground level 8-foot-wide by 9-foot-tall opening. To perform the work, the elevator walls would need to be temporarily underpinned at the bottom of the elevator shafts which would then allow removal of the existing floors, excavation below the elevator walls, and placement of new floor systems at the proper elevation. The underpinning solution would be limited by the narrow access to the elevator shafts and the small footprint of the elevator floors.

SOLUTION ▼

Helical piers were chosen as the preferred deep foundation alternative given the low mobilization costs, the ability to work in confined locations and the verification of capacity during installation by monitoring torque. A soil boring advanced at the elevator area showed loose sand below the elevator floors to a depth of about 15 feet where it transitioned to medium dense sand to the termination of boring about 40 feet below the floor elevations. At each elevator location, the design included eight underpinning locations with ultimate compression loads of 40.4 kips. Two-foot square access areas were sawcut in the existing floor at the eight underpinning locations. The helical pier design included the Model HP288 (2.875-inch O.D. by 0.276-inch wall thickness) shaft with a 10"-12" helix plate configuration. The helical piers were installed to depths of 19 to 23 feet below the bottom of each elevator floor



Ground level access to the elevator shaft



Elevator shaft with floor removed at underpinning locations



Installing helical piers from above at underpinning locations

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with final installation torques of at least 4,500 ft-lb. LRE was able to install the piers from the ground surface by reaching into the access opening with a small excavator and drive head. After the underpinning piers and brackets were installed, the wall loads were transferred to the piers. With the underpinning complete, the remainder of the existing floors were removed, and excavation was performed to facilitate pouring the new concrete floor systems at the proper elevation. The underpinning at both elevator locations was completed over a period of 4 days.



Retrofit piers and brackets installed with floor removed



Reinforcement installed in new floor location



New concrete floor poured

PROJECT SUMMARY ▼

Structural Engineer:	O'Donnell & Naccarato Structural Engineers
Architect:	SSA Architects
Geotechnical Engineer:	Cavin Geotechnical & Environmental, LLC
General Contractor:	Ajax Construction
Helical Pier Installer:	LRE Foundation Repair
Products Installed:	Products Installed: (16) Foundation Supportworks® Model 288 Helical Piers, Ultimate Compression Loads of 40.4 kips, Installation depths of 19 to 23 feet

For additional case study and technical information please visit Commercial.Supportworks.com.