FOUNDATION SUPPORTWORKS™

CASE STUDY Commercial

Model 288 Helical Piles

Project: Central Decatur School Renovation Project
Location: Leon, IA
Date: June 2009

Challenge:

The Central Decatur Community High School underwent a renovation project to repair distress in the building caused by settlement. Differential cracking in the floor slabs and cracked and settled partition walls were observed. A geotechnical investigation determined probable cause of the settlement to be wetting and subsequent collapse of fill soils as well as consolidation of buried topsoil beneath the weight of fill. Several repair options were considered, including helical piles, jacked pipe piles, bored micropiles and an over-excavation and structural backfill replacement of the soil. Over-excavation and replacement of the fill were ruled out due to expense, access limitations and vibration caused by compaction. Penetrating through hard, dry to damp fill soils at the site was also a concern, as reaching the suitable bearing stratum could be difficult. Pile depths of at least 15 feet were required in order to reach the underlying native sandy clay (glacial till) and provide adequate support for the 20 kip design load per pile.

Solution:

A helical pile configuration consisting of a 2-7/8 inch outside diameter round shaft with an 8”-10”-12” triple-helix lead section was selected. Extensions would advance the piles to minimum depths so the top helix blade was at least 15 feet below top of pile elevation. Helical piles were the ideal solution for this project because of limited access adjacent and within the existing building. Load tests were completed to verify performance (settlement) under load and confirm the initial calculated design capacities. Once the load tests were completed, sixty-six (66) helical piles were installed to support the new concrete masonry partition walls and a structural floor system. Ultimate capacities of the production piles, determined by correlation to installation torque, were at least twice the design load. The installation of 66 helical piles took less than four days to complete and the project continued to move forward on schedule.

Load test set up prior to installation of performance piles

Load test completed and design capacities confirmed

Helix lead sections are advanced through hard, dry to damp fill soil layers

Piles are installed in limited access areas within the building using small construction equipment

Project Summary

Architect: ORIS, PLC
Structural Engineer: Raker Rhodes Engineering
Geotechnical Engineer: Geotechnical Services, Inc. (GSI)
Construction Manager: CPMI
Certified Installer: Midwest Basement Systems, Inc., Des Moines, IA
Products Installed: (66) Model 288 Helical Piles, 8”-10”12” lead section, installed to depths of at least 20 feet, 20 kip design load.