

Model 288 Helical Piles

Project: Jib Crane at Water Survival Training Center

Location: Pensacola, FL

Date: December 2012

Challenge:

The Naval Air Station Pensacola planned to install a new jib crane for an existing indoor pool facility. The foundation design for the jib crane consisted of a four-foot thick pile cap with plan dimensions of 15 feet by 23 feet. The pile cap would be supported on a helical pile system. A nine-foot by nine-foot roll-up door provided the only access for equipment to the proposed jib crane site. A fixed construction schedule dictated that the installation equipment be mobilized quickly and the helical piles be installed within three days. A soil exploration was performed at the proposed jib crane location prior to excavating for the pile cap. The exploration identified medium dense sand to a depth of 22 feet underlain by loose sand to a depth of 28 feet. The loose sand was underlain by dense to very dense sand to the maximum depth explored of 40 feet. Groundwater was estimated to be on the order of two feet below the elevation of the pool deck.

Solution:

Helical piles were selected for this project due to the low relative cost compared to other deep foundation systems. Helical piles can also be installed with relatively small installation equipment without vibrations, and they can be installed through groundwater without the need for casing or pumping pre-drilled holes. The original foundation design included fourteen (14) Model 288 (2.875-inch OD by 0.276-inch wall) hollow round shaft piles with a 10"-12"-14"-14" helix plate configuration to support design working loads of 20 kips in both compression and tension. Prior to the installation of the production piles, four load tests (two compression and two tension) were performed to determine pile displacement versus load and to verify the helical pile configuration. The pile load tests met the specified deflection criteria with less than ¼-inch of movement at the design working load and less than 1-inch of movement at 3.5 times the design working load.

The soil strengths observed during the installation of the production piles were highly variable from one pile location to the next; therefore, in order to achieve the recommended bearing depth, the engineer of record revised the piles to a 10"-12"-14" triple-helix configuration. The piles were advanced to depths of 19 to 24 feet and to torque-correlated ultimate capacities of at least 70 kips (FOS ≥ 3.5). The four load tests and the installation of 14 helical piles were completed in just two days, one day ahead of a schedule.

Project Summary

Structural/Geotechnical

Engineer: AMEC Environment & Infrastructure, Inc.

General Contractor: Groundforce

Certified Pile Installer: Alpha Foundation Specialists, Inc.

Products Installed: (14) Foundation Supportworks® Model 288 Helical Piles, 10"-12"-14" Lead Section, Installed to Depths of 19 to 24 feet, Design Working Load of 20 kips (Compression and Tension).



Example of jib crane



Compression load test



Tension load test



Installing HP288 piles