CHANCE®

A CASE HISTORY

HELICAL PULLDOWN™ Micropiles Report

Project:	Geotechnical Engineer:	Structural Engineer:	Pile Sub-Contractor:
U.S. Navy Building Remodeling Virginia Beach, VA	GET Solutions, Inc. 757-518-1703	McPherson & Broyles 757-965-2000	Walder Foundation Products Ashland, VA 804-798-3605

Description:
The U.S. Navy was remodeling a building at its Little Creek Amphibious Base in Virginia Beach, Virginia. Deep foundations were required to support the proposed design load of 50 tons in 77 locations. Site access, noise and vibration were all concerns as adjacent offices and buildings were to remain in operation throughout the construction process. In addition, the piles had to be installed from inside the building with limited headroom.

The specified deep foundation was an Auger-Cast Pile (ACP). Specifically, the pile was to be a 16-inch diameter ACP installed to a depth of 70 feet. Technical Foundations, the design-build contractor from Richmond, VA, provided budget pricing on the piles without the benefit of soil boring information and ultimately won the bid. Geotechnical engineering company, GET Solutions, Inc., was contracted to determine soil strength parameters for the project site utilizing Standard Penetration Tests. These borings revealed variable soil conditions with a very soft clay zone ranging in thickness up to 30 feet and generally at depths from 15 to 45 feet. This very soft clay was described in the soil boring log as "WOH" or Weight of Hammer. Underlying the very soft clay was medium dense fine sand. The very soft clay zone was not conducive to ACP; consequently, Technical Foundations searched for an alternate pile system. The local Chance® distributor, Walder Foundation Products, was contacted regarding the possible use of helical piles for this application. Walder recommended a Chance SS175 helical pier in conjunction with a Helical Pulldown™ Micropile (HPM). This system could provide capacity from both end bearing and side friction. In addition, this pile system would work well in the project soils.

Proposed Pile System:
The screw pile system consisted of an SS175 with 1¾-inch solid steel square shaft to which helical bearing plates were welded. The first section or lead section contained the helices. In this case, the

lead section consisted of three helical plates: 10-, 12- and 14-inch diameters. Extension sections were added until the helices reached competent load-bearing soil. All square-shaft helical pier components were hot-dip galvanized.

An HPM provides a grout column around the shaft of a standard helical pier. During the installation

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A. B. CHANCE COMPANY,
HUBBELL POWER SYSTEMS
Certificate Number 001136
SIC Numbers 3499, 3429, 5063
Original Registration: July 1, 1992
Current Registration: Oct. 23, 2003
This product was manufactured in a plant whose Quality Management System is certified/registered as being in conformity with ISO 9001:2000.

of the HPM, soil is displaced to create a void around the square shaft. Flowable grout immediately fills this void from a reservoir at the surface.

In this case, a 5-inch diameter grout column surrounded the 1¾-inch square shaft. The design-build contractor and engineer team decided to install a test pile. This test pile was installed using a 12,500 ft-lb hydraulic torque motor. The final installation torque was 8,100 ft-lb at a total depth of 70 feet.

Pre-Production Performance Test:
A full-scale load test meeting ASTM D1143, Standard Test Method for Piles Under Static Axial Compressive Load, was performed on the test pile. At the maximum compression load of 80 tons and after being held for a 12-hour interval, total deflection was 0.9 inches. After the load was completely removed, net deflection (after rebound) was 0.6 inches. This performance was sufficient to start the installation of the production piles.

Advantages of the System:
- The Helical Pulldown™ Micropile is a displacement pile system so there were no spoils to remove. This type of pile system is generally installed with smaller equipment and less manpower that an ACP. In addition, the pile was installed easily through the "weight of hammer" soft clay zone.
- The deep foundation was installed during regular business hours with a hydraulic torque motor that did not cause vibration or excessive noise. This torque motor was powered by electric equipment to minimize fumes in the building.
- The Chance Quality Management System is compliant with ISO9001:2000.
- The pile sub-contractor, Walder Foundation Products, was Chance® certified to perform the work.
- Both method and apparatus of the Helical Pulldown Micropile is patented.

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