

Model 288 Helical Piles

Project: Gundersen Lutheran-Cogeneration System

Location: La Crosse, WI

Date: March 2009

Challenge:

The Gundersen Lutheran Medical Center owned land near a tributary of the Mississippi River where they planned to construct a cogeneration system, a system that simultaneously generates both electricity and useful heat. Two test borings were completed by Braun Intertec to depths of 31 feet. The test borings encountered up to 18 feet of loosely compacted silty sand fill with varying amounts of brick and wood pieces. The fill was 18 feet deep in the boring closest to the water's edge, but only 7 feet deep in the boring further upslope. The fill was underlain by very loose to medium dense alluvial sand. Two options were considered for the support of the proposed mat foundation for the generator. The first option was partial removal of the existing fill soils to a depth of five feet below the foundation, and replacement of this material with well-compacted sand fill. However, with the high variability of the fill soils to remain, there would still be a risk that differential settlements could occur. The second option was to support the mat foundation on helical piles penetrating the fill soils and bearing within the deeper alluvial sands.

Solution:

The foundation design included 18 helical piles sized accordingly to support a working load of 25 kips. A helical pile configuration consisting of a 2 7/8-inch outside diameter round shaft with a 10-12 double-helix lead section was selected. The density/strength of the alluvial sand also proved variable across the approximate 41-foot length of the foundation, with depths of the helical piles ranging from about 25 feet to 50 feet from one end to the other. Ultimate capacities of the production piles were estimated by correlation to installation torque and were at least twice the design working load (FOS ≥ 2). Installation of the 18 helical piles was completed in less than two days.



Installation of helical pile lead section



Installation of helical piles



Pile installation complete, placing fill



Foundation complete and generator installed

Project Summary

Geotechnical Engineer: Braun Intertec

Construction Manager: Staab Construction

Certified Installer: Foundation Supportworks of MN: American Waterworks/Blackburn Basement Systems

Products Installed: (18) Foundation Supportworks™ Model 288 Helical Piles, 10"-12" lead sections, 25 kip design load