Helical Piles Support Pedestrian Boardwalks and Bridges

Project

Johnson County Clear Creek Trail

Location

Tiffin, IA

CHALLENGE ▼

Two pedestrian bridges and two boardwalks were proposed along a new walking/bike trail. The bridges, 38 and 40 feet long, would span an existing creek while the boardwalks, 11 and 55 feet long, would extend the trail over low-lying, marshy areas. Test borings completed along the proposed 1 ½-mile trail generally encountered soft to stiff alluvial silty clays to depths of five to ten feet over very loose to medium dense sand to the explored depth of 11 feet. With weaker soils sampled within the upper several feet of the profile, the structures were designed with a deep foundation system consisting of helical piles. Helical piles were selected as the ideal foundation system given the limited access, the ability to utilize smaller installation equipment and minimize site disturbance, and the ability to correlate pile capacity to the installation torque.

SOLUTION ▼

The foundation design for the bridge abutments included 24 Model 150 (1.5-inch round-corner square-bar) helical piles with an 8”-10”-12” triple-helix lead section to support a design working load of ten kips per pile. Each abutment included six piles arranged in two rows. The three piles furthest from the top of the bank were battered at 14 degrees toward the creek. Standard extensions advanced the piles to depths of 14 to 17 feet below the bottoms of the abutments. The piles were fitted with new construction brackets to be cast into the concrete. The two boardwalks were designed with 16 vertical and eight battered piles with the same shaft size and lead configuration as the bridge abutment piles. A design working load of ten kips (compression only) was specified for the vertical piles and a design working load of five kips (tension and compression) was specified for the battered piles. The vertical piles were advanced to depths of 14 to 17 feet below

Advancing lead section at bridge abutment

Completed pile installation at abutment

Continue ►

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► *Continued*

grade. The battered piles were installed at 45-degree angles and to depths of 7.5 to 12.5 feet (lengths of 10.5 to 17.5 feet). The vertical piles were fitted with saddle brackets to capture the timber girders. Eight of the saddle brackets included a gusset plate to connect to the battered piles via a thread rod and clevis. The 48 helical piles were installed in just four days; four separate mobilizations, one day per structure. All piles were installed to torque-correlated ultimate capacities of at least twice the design working load (FOS ≥ 2).

Completed bridge

Completed boardwalk

Saddle bracket with connection to battered pile

PROJECT SUMMARY ▼

Architect/Engineer:	VJ Engineering
Geotechnical Engineer:	Braun Intertec
General Contractor:	Metro Paving
Helical Pile Installer:	MidAmerica Basement Systems
Products Installed	(48) Foundation Supportworks® Model 150 Helical Piles, 8”-10”-12” Lead Section, Installed to Depths of 7.5 to 17 feet, Design Working Loads of 10 kips (Compression) for Vertical Piles and 5 kips (Tension and Compression) for Battered Piles

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

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