GroundED

FSI NEWSLETTER FOR DESIGN PROFESSIONALS

HelixPro® 2.0 - Updates for 2015!

HelixPro®, FSI's web-based helical pile and tieback design software, was originally released in the fall of 2012. If you are not familiar with the software, Issue 13 of this newsletter provides an overview of the program with screen shots of a design example. The current issue and all previous issues of the newsletter can be viewed at www.OnStableGround.com/publications. Since the original release, the software has been used for thousands of projects throughout the United States and Canada.

With the software being web-based, minor updates and revisions are automatic. You never have to worry about having the current version. In 2014, a noteworthy update included video tutorials made for each step of the design process to provide design professionals with additional assistance, when needed. These tutorials can be accessed by clicking on the red "Watch A Tutorial" button in the upper left of every screen.

The 2015 updates include a "Search For Piles" module. Users now have the option of using the original, more iterative process to pile design, or allowing the program to do most of the heavy lifting. With a few basic input values, the program will determine the appropriate shaft size for the design load, the helix plate configuration, and the minimum depth at which the required capacity is achieved. Pile configurations determined from the "Search For Piles" module can still be saved and further refined, if desired.

When your pile or tieback design is complete, you continue through the program to generate a final report. On this "Summary of Results" screen, you now have the option of viewing that specific pile or tieback detail (in .pdf format) and including that detail in the final report. Generic details are available when the designer selects a custom or uncommon configuration. Links have also been provided on this final screen for the user to access all of our online resources, including the FSI technical manual, sample product specifications, and our new product drawing library where both .pdf and .dwg files are available.

Various other improvements/updates have also been made to improve functionality and ease of use. I invite existing users to log in to check out all the new features. New users can type the following URL into the web browser: www.helixpro.foundationsupportworks.com and click on the "Register Now" link. The software will walk you through the simple registration steps. Within two days, you should receive an email stating that your account has been activated.

We are excited to offer HelixPro® 2.0 to the design community. Please let us know if you have any questions about the software, or if we can be of assistance on your next helical pile or tieback application.

JEFF KORTAN, P.E., DIRECTOR OF ENGINEERING

Aligning drive head and pile for installation

Monitoring torque during installation

Jet bridge at adjacent gate

Project: Jet Bridge Support – Reagan National Airport
Location: Arlington, VA
Pile Installer: JES Construction, Inc.

Challenge: Renovations to Terminal A at Ronald Reagan Washington National Airport included a new jet bridge at Gate 8, a gate utilized by JetBlue Airways. The jet bridge would include a main column next to the terminal building and wheel-mounted column supports toward the end of the bridge. The jet bridge would have the ability to extend and swing radially from the main column, creating relatively high overturning moments on the proposed spread footing. A soil boring completed at the location of the proposed column encountered approximately ten feet of old fill over a layer of native organic soils over lowland terrace deposits consisting of gravel, sand, silt and clay. The shallow fill soils and underlying organics were determined not to be acceptable for direct support of the concrete foundation. Any deep foundation option considered for the project had to be installed with minimal vibrations and with smaller equipment to prevent disruption to airport operations. The adjacent gates along Terminal A would remain in service during the jet bridge construction.

Solution: Helical piles were considered as an ideal deep foundation system for the project. The original pile cap design included six helical piles to support design working loads per pile of 55 kips in compression and 46 kips in tension. The pile configuration consisted of the Model 350 (3.50-inch OD by 0.313-inch wall) hollow round shaft with a 10"-12"-14" triple-helix lead section and a single 14" helix plate on the first extension. A calibrated electronic torque transducer was utilized for direct measurement of pile installation torque. The piles were installed to torque-correlated ultimate capacities exceeding the design working loads by a factor of safety of at least two. Pile installation depths varied widely from about 22 to 45 feet below the bottom of pile cap elevation (average of 33 feet). Two of the piles refused abruptly within the dense bearing soils, raising some concern about whether the tension capacity was achieved. With the tight construction schedule, the design team decided to install two additional piles in lieu of performing pile load tests. New construction brackets were bolted to the tops of the pile shafts and cast into the concrete foundation.

Upcoming Webinar Opportunities

- **An Introduction to Helical Foundation Systems**
  1st Wednesday of every month 11:30 am (CT) and 1:30 pm (CT)
- **An Introduction to Polyurethane Foam Injection**
  2nd Wednesday of every month 11:30 am (CT) and 1:30 pm (CT)
- **An Introduction to Hydraulically Driven Push Pier Systems**
  3rd Wednesday of every month 11:30 am (CT) and 1:30 pm (CT)

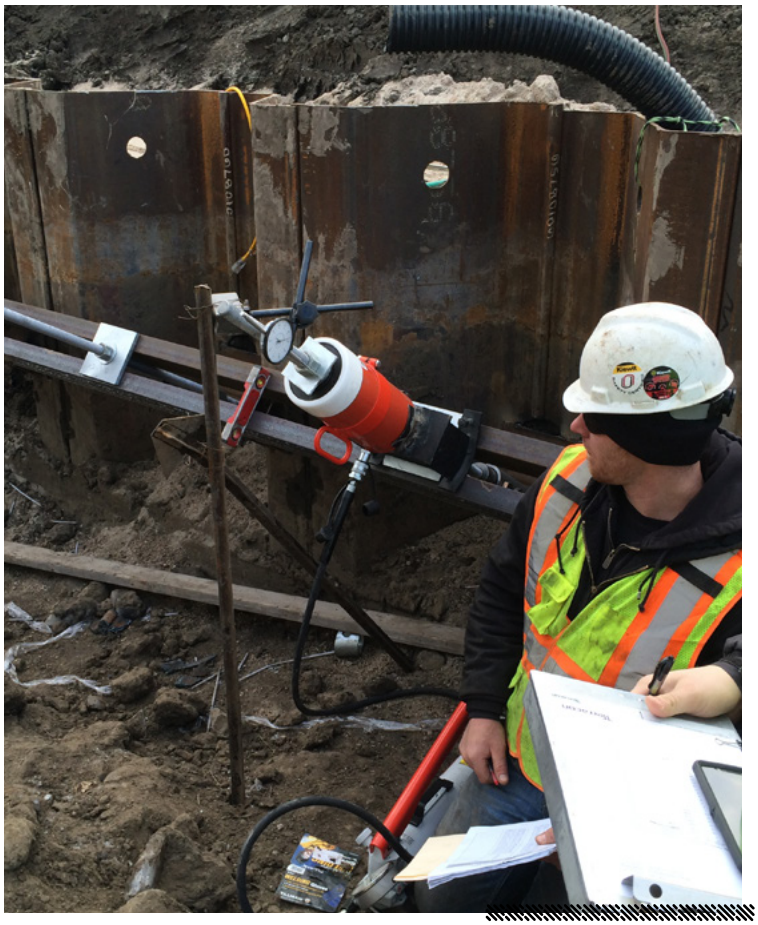
Project: Pedestrian Bridge – Slope Stabilization
Location: Omaha, NE
Pile Installer: Thrasher, Inc.

Challenge: A bridge was proposed to span over the Little Papillion Creek and allow pedestrian access to a new community sports arena. Temporary sheet pile walls were installed to construct the bridge bents, which would be supported by deep foundations. However, when the sheet piles were removed, one of the bridge bents began to translate and lean toward the creek, indicating a global slope failure and halting construction. The project designers proposed installing a permanent, 67-feet-long sheet pile wall upslope from the leaning bent. A tieback system would need to be installed through the sheet pile wall to bear beyond the failure plane of the slide mass.

Solution: Helical tiebacks were chosen due to the limited access and working area. The helical tieback configuration consisted of a square-bar "stinger" lead section, Model 200 (2.00-inch round corner square bar) with an 8"-10"-12" triple-helix arrangement, transitioning (via a special welded coupler) to a Model 350 (3.50-inch OD by 0.313-inch wall) hollow round shaft extension with two additional 14" helix plates. The remaining lengths of the tiebacks consisted of blank Model 350 extensions. The square-to-round "stinger" lead section was used to better penetrate sand and gravel layers to bear the helix plates within the underlying hard clay sampled at a depth of 55 feet. The 8" helix plate was 0.5-inch-thick and utilized a V-style cut on the leading edge to also help the tiebacks advance through the gravel. The tiebacks were positioned 5.3 feet down from the top of the wall, spaced at four feet two inches, and installed at downward angles from 35 to 40 degrees. The tiebacks were advanced to lengths from 84 to 105 feet behind the wall and to installation torque values correlating to ultimate capacities of at least two times the design working load of 67 kips (FOS≥2).

Twenty (20) helical tiebacks were installed to anchor the sheet pile wall. The continuous waler consisted of two C7x14.75 steel channels with welded cleats. Performance tests were performed on two of the production tiebacks, while standard proof tests were performed on all of the remaining tiebacks.

Leaning bridge bent on the right



Performing proof test

To sign up, email us at training@foundationsupportworks.com with the following information:

- Name of the firm
- Location of firm
- Approximate number of engineers/architects/GCs that will be in attendance

FSI is an approved provider of continuing education credits through the AIA, RCEP and the Florida State Board of Engineers.

HelixPro® 2.0 Design Software

is a state-of-the-art program that allows you to calculate bearing and uplift capacities of FSI helical piles as well as tension capacities of FSI helical tiebacks as they pertain to specific site and soil parameters.

Register today to use this FREE state-of-the-art software program: www.helixpro.foundationsupportworks.com

YOUR LOCAL DEALER

For more information about Foundation Supportworks or to locate a Foundation Supportworks dealer in your area, please visit our website at foundationsupportworks.com or call 800.281.8545

FOUNDATION SUPPORTWORKS

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