GroundED

FSI NEWSLETTER FOR DESIGN PROFESSIONALS

Back-to-School: Educate Yourself with Our Online Resources

Here at FSI, we continually strive to better educate engineers and design professionals on the unique foundation stabilization solutions we offer. You may have participated in one of our monthly webinars or attended one of the five-hour presentations we give throughout our dealer network in the U.S. and Canada.

But have you taken advantage of our most comprehensive and accessible educational resource, the FSI commercial website, *OnStableGround.com*?

In the spirit of fall, let's go back-to-school to take a crash course on some of the valuable information and materials we've made readily available to you.

The Basics: Products 101

The *Product Information* section of the site provides a general overview of our many product lines. From helical piles to polyurethane grouting, you can learn the fundamental concepts of these systems, including common applications, design considerations, and some of the innovative product features that set us apart from other manufacturers.

Get Ready for Tech School

The *Technical Information* section gives you access to the interactive, electronic version of our 363-page technical manual. The manual itself is a tremendous resource. (See the Fall 2014 issue of this newsletter for more information on the technical manual.)

This section also includes downloadable copies of our evaluation reports, technical specifications of specialized systems, editable model product specifications, and design examples for helical pile and tieback capacity calculations. You'll also find an extensive assembly drawing archive that includes nearly 150 drawings for six different product lines, available as both .pdf and CAD files!

Take Some Lessons from History

If you prefer to see real-world applications, the commercial website has over 160 case studies for past projects utilizing our systems throughout North America. There is also a handy filtering feature which allows you to sort by product or application.

Explore the Library

If you're the studious type and would rather peruse formally-written articles, look no further than the *Publications* section. There, you'll find over a dozen informative white papers authored by FSI's in-house experts. Speaking of informative articles, this section also contains the previous editions of this very newsletter.

Extracurricular Activities

The commercial website also provides links to other online resources, such as our free, web-based helical pile and tieback design software, HelixPro®, and our residential foundation repair website.

Your Homework

Don't worry, your assignment is easy – check out *OnStableGround.com*! But don't just go to the site once; we are continually adding/updating the available information. Frequently visit our commercial website to take advantage of this valuable resource. And the best part of this education… it's 100% tuition-free!

JAKE BLESSEN, E.I.T., APPLICATION ENGINEER

Science Museum of Virginia

Completed Exhibit

Installing helical piles within basement

Advancing helical pile

Installed piles capped and rebar placed to pour footing

Project: **Science Museum of Virginia**
Location: **Richmond, VA**
Pile Installer: **JES Construction, Inc**

Challenge: The Science Museum of Virginia planned to open a new permanent exhibit called "Speed". The centerpiece of this exhibit would be a full-size SR-17 Blackbird spy plane. The 107-feet-long, 43,000-pound jet would be suspended from steel framework extending through the first floor to the basement level. The columns of the frame would be supported by deep foundations. A subsurface investigation identified a soil profile generally consisting of very loose to medium dense clayey sand to a depth of 15 feet below the basement floor elevation, underlain by medium dense to dense sand with gravel to a depth of 28 feet, over medium dense to very loose clayey sand.

Solution: Helical piles were selected as the ideal deep foundation solution since they could be installed quickly and easily within the confined indoor space. Concrete pile caps supporting the steel columns included three, six, eight, or ten helical piles. Thirty-five (35) Model 288 (2.875-inch OD by 0.276-inch wall) hollow round shaft helical piles with an 8"-10"-12" triple-helix plate lead section were installed to support a design working compression load of 25 kips and a design working tension load of 10 kips. Twenty-two (22) Model 350 (3.50-inch OD by 0.313- inch wall) hollow round shaft helical piles with an 8"-10"-12"-14" helix plate configuration were installed to support a design working compression load of 40 kips and a design working tension load of 20 kips. Standard extensions advanced the Model 288 piles to depths from 13 to 16 feet and the Model 350 piles to depths from 23 to 25 feet to bear the helix plates in competent material above the very loose clayey sands. The piles were installed to achieve torque-correlated ultimate capacities of at least twice the design working loads (FOS ≥ 2). Installation torque was monitored with a calibrated torque transducer. The helical piles were hot-dip galvanized for corrosion protection. The piles were fitted with standard new construction brackets and cast into the pile caps.

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: UMKC - Oak Hall
Location: Kansas City, MO
Pier Installer: Foundation Recovery Systems

Challenge: Oak Hall is a five-story building on the University of Missouri-Kansas City (UMKC) campus. Up to three inches of differential settlement was observed between the building's western exterior walls and their adjoining interior corridor walls. UMKC wished to stabilize and potentially lift the settled portion of the structure, which would include underpinning 160 feet of the west side of the building, as well as 50 to 80 feet of the north and south wall returns.

The ground surface around Oak Hall slopes downward from east to west. The east foundation wall, retaining about 12 feet of soil, had leaned inward due to the unbalanced lateral earth pressure. The structural engineer evaluating the building settlement was concerned that stabilizing and lifting the west side of the building could exacerbate the inward lean of the wall section on the opposite side of the structure. Therefore, laterally stabilizing the eastern wall section was specified to coincide with the underpinning operations.

The geotechnical investigation identified a soil profile consisting of six to 17.5 feet of medium stiff to stiff residual clay with shale and limestone fragments, over interlayered, weathered shale and limestone. Auger refusal on hard limestone was observed at depths from 9.5 to 30 feet.

Solution: A system of hydraulically-driven push piers was selected as the ideal method to stabilize and potentially lift the settled portion of the building. Forty-one (41) Model 288 (2.875-inch O.D. by 0.165-inch wall) push piers were installed to support design working loads up to 25 kips and sixty-two (62) Model 350 (3.50-inch O.D. by 0.165-inch wall) push piers were installed to support design working loads up to 28 kips. A pair of either Model 288 or 350 push piers was installed where design loads at specified pier locations exceeded 28 kips. The piers were installed to depths from 20 to 24 feet below the existing footing and at an eight-foot maximum center-to-center spacing. Due to the presence of "floating" shale and limestone observed in the upper soil profile, the structural engineer specified pre-drilling at each pier location to ensure the piers would bear on competent bedrock. Hydraulic cylinders were then utilized to load the piers to at least 1.5 times the design load. The piers were grout filled and the upper several feet of the piers below the bracket encased in concrete. Hydraulic lift cylinders were fitted to the installed pier assemblies and connected in series to uniformly reload the piers and lift the exterior wall approximately 0.5 inch back toward its original elevation. Two full-scale compression load tests (one for each shaft size) were performed prior to production pier installation to verify the deflection-to-load response. Load tests were completed away from the building using a typical load frame anchored with helical piles.

Lateral stabilization of the eastern wall section included a deadman-type wall system utilizing GeoLock® earth anchors. Twenty-six anchor (26) locations were spaced up to six feet on-center to resist a design working tension load of 9.3 kips. The anchors were installed by driving 0.75-inch-diameter threaded rod through holes drilled five feet below the top of the wall. The threaded rods were connected to earth anchor plates located within continuous trenches 25 to 42 feet from the building. The trenches were then filled with concrete. The interior connection detail included continuous, steel channel walers.

Predrilling at production pier location

Lift cylinders fitted to installed piers

Pouring deadman wall to encase GeoLock® earth anchor plates

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

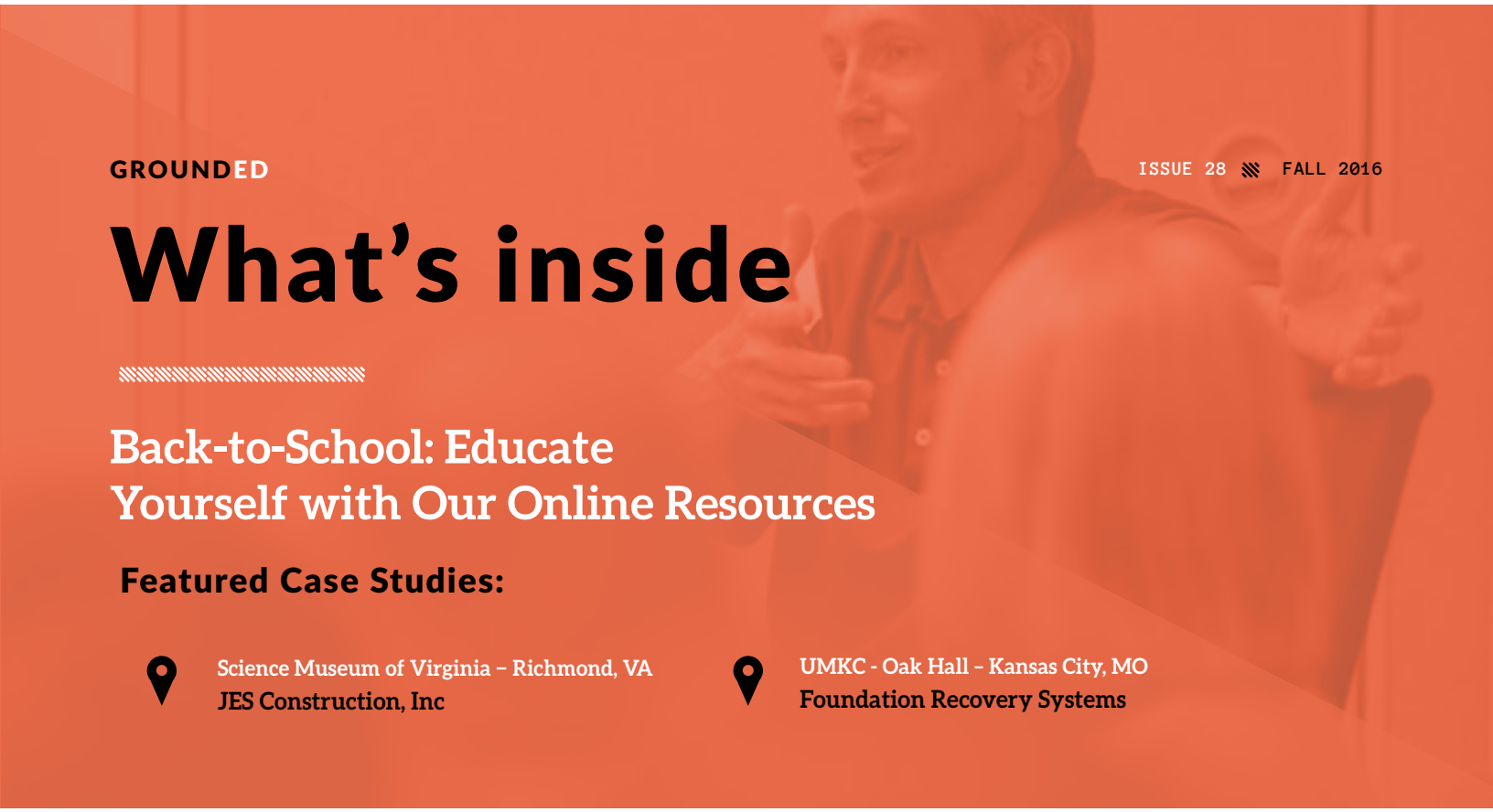
is a state-of-the-art program that allows you to calculate bearing and uplift capacities of FSI helical piles as well as tension capacities of FSI helical tiebacks as they pertain to specific site and soil parameters.

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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DISTRIBUTION CHECKLIST

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