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Screw Piles Support Bank

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Helical Piers® counter soil problems at branch addition under construction in Nashua

By Paul Fournier

Screw pile foundations were recently installed to overcome soil problems at a bank addition being built by Baybutt Construction in Nashua, N.H.

The Keene, N.H., firm is constructing an addition to a Bank of New Hampshire branch located at a former shopping center that was reportedly built on filled-in land. An engineering consultant recommended the installation of a deep foundation system to support the single-story addition.

According to Joe Moyer, Baybutt project manager, the emplacement of the foundation system was required to be quiet and vibration-free, since the bank branch was to remain open during construction.

Solid Earth Technologies met this requirement with the installation of the Chance® Helical Pier® screw pile foundation system. The Amherst, N.H., company set 26 of the patented piers to bolster the bank addition.

Matt Stacy, president of the company, described the subsurface materials encountered at the site:

"There was a mixture of concrete, ash, organic, and other materials down to 18 feet and deeper, then a layer of medium dense to dense sandy soil," he said. "The foundation system had to reach the sandy soil layer to achieve stability."

Far Left: Solid Earth Technologies installs Helical Pier foundation at bank addition under way by Baybutt Construction in Nashua. (Photos courtesy of Jill Bramblett)

Above: Trench shield protects worker as an extension is added to a lead section in deeper area of site.

The plan was to install the Helical Piers then encase them in concrete. These concrete "caps" would then serve as piers for cast-in-place concrete grade beams that would support the building superstructure.

Left: Worker attaches 5-foot Helical Pier lead section to Eskridge digger motor held by Cat 416C backhoe loader.

Below: Due to bank proximity, traditional pile driving was ruled out in favor of quiet, vibration-free installation of screw piles.

Right: Reinforcing steel cage for 4-foot-tall grade beam/foundation wall takes shape over cured concrete pier caps.

> "Screw pile foundations have been employed worldwide for a number of years."

Screw pile foundations have been employed worldwide for a number of years, said Stacy. In the 1950s, the A.B Chance Co. of Centralia, Mo., introduced the Power-Installed Screw Anchor for resisting tension loads. Later, screw anchors were used to resist compression loads.

Simple in design, today's Chance Helical Pier consists of a plate or plates, formed into the shape of a helix (one pitch of a screw thread), attached to a central shaft. Piers are made of hot-dipped galvanized steel to resist corrosion. Helixes are arranged in increasing diameters from the foundation tip (the bottom) to the top helix, with nominal spacing between helixes equal to three times the diameter of the next lower helix.

Crews install a pier by applying torque to the shaft and screwing it into the earth. As the lead section enters the earth they add extensions until the lead section reaches the desired depth. Usually, only the lead section contains helixes, but extensions may also have helixes. However, no more than eight helixes are used on each Helical Pier.

Technical literature describing the piers states that over the past 40 years many projects have used screw pile foundations including electric utility transmission structures, FAA flight guidance

Below:
Left: Helical Piers topped by flat-plate bearing brackets await placement of reinforcing steel for concrete cap pour.

Center: Rebars are placed on top of pier brackets; three piers, on average, support each cap.

Right: Forms are in place for grade beam pour.

Left: Nashua Redimix *Concrete's Oshkosh* arrives at job with a load of concrete for grade beam.

Right: Bank of New Hampshire branch remains open during construction of addition.

structures, pipeline supports, building foundations, remedial underpinnings, and streetlights and walkways in environmentally sensitive areas.

Solid Earth Technologies has installed the system for many projects throughout New England over the past 10 years, according to Stacy, who points out that they are ideal for locations where unsuitable soils threaten foundation stability.

For the Nashua application, the company employed a three-man crew consisting of Dennis Dumas, Rick D'Eramo and job superintendent Mike Parkhurst. This project called for 5-foot-long lead sections with 1-3/4-inch square shafts. Three helixes with diameters of 8 inches, 10 inches and 12 inches, respectively, are attached to each lead section. They added plain extensions as necessary – in some places piers were screwed into the ground up to 34 feet deep.

Easy to install, the anchors generally do not require removal of any soil. A rotary tool mounted on a piece of equipment is all that is needed for installation. At the Nashua job, the crew used the company's Cat 416C backhoe loader equipped with an Eskridge digger motor. This hydraulic rotary tool develops a torque of 10,000 foot-pounds, Stacy said. He noted that each Helical Pier installed for the bank addition is designed to support 55,000 pounds.

Once piers had been screwed to specified depths they were topped with flat-plate bearing brackets. A concrete crew installed rebars over the brackets, set up forms around the piers and poured the caps. Three piers, on average, support each cap. Finally, crews formed and poured concrete for grade beams on top of the caps, readying the foundation for building construction. ■

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