

GeoDrilling International



Piling & foundations

As global decarbonisation continues apace, the spotlight is now being turned on the sustainability of the piling industry and its search for solutions

Infrastructure projects

Whether it is highway development, tunnelling for high-speed rail projects or port and marine developments, major infrastructure projects rely upon the drilling sector

North America

From infrastructure developments for the FIFA World Cup to the tri-annual construction industry trade show – CONExpo – it's a big year for the North American drilling market



The Connecticut WALK Bridge Programme

A look at the Connecticut Department of Transportation's (CTDOT) WALK Bridge Programme, a comprehensive infrastructure initiative aimed at delivering wholesale transportation upgrades throughout Norwalk, Connecticut

“Different drilling technologies have been required across the programme”

At the heart of the Connecticut Department of Transportation's (CTDOT) programme is the replacement of the WALK Bridge, the primary rail crossing of the Norwalk River on the New Haven Line. In addition to the main river crossing, the programme includes the replacement or rehabilitation of four additional railroad bridges within the city, upgrades to the East Norwalk Train Station, and associated track, catenary, roadway, and utility improvements.

These projects are intended to modernise a critical segment of the Northeast Corridor, one of the busiest passenger rail corridors in the US.

Construction activities commenced in 2023 and included extensive early enabling works, utility relocations, and foundation construction, all carried out in dense urban conditions adjacent to active rail infrastructure. The scale and complexity of the programme, combined with restricted access, overhead catenary systems, and limited staging areas, have required close coordination among CTDOT, designers, construction managers, and contractors.

The team from Phoenix Foundation Company Inc. has dealt with multiple challenges on the WALK Bridge Programme in Norwalk, Connecticut
Photo: Comacchio

FOUNDATION SCOPE

The foundation and earth support elements of the WALK Bridge Programme encompass a broad portfolio of deep foundation, earth retention, and ground improvement technologies. Due to the magnitude of the overall programme and the volume of work required within constrained schedule windows, this scope was released in a series of alphabetically designated bid packages.

Phoenix Foundation Company Inc., a New England-based specialty geotechnical contractor, was awarded the subcontract covering multiple scopes under Bid Package F. Phoenix's work has been performed across six distinct project locations and multiple mobilisations, reflecting the distributed nature of the overall programme.

The scope includes the installation of: 351 drilled micropiles, 114 temporary tiebacks and tierods, 272 permanent soil nails with shotcrete facing, and 24 permanent ground anchors.

In addition to installation activities, Phoenix's work includes a substantial testing programme consisting of three verification and 19 proof micropile load tests, as well as performance or proof testing of all temporary tiebacks, permanent ground anchors, and soil nails.

“Different drilling technologies have been required across the programme due to the wide range of soil and bedrock conditions encountered,” Robert F. Tinning, P.E., president of Phoenix Foundation Company Inc., explained. “These have included pneumatic drilling through overburden soils, boulders, and

bedrock, as well as wet rotary drilling, with and without polymers, to stabilise overburden soils. In some locations, deep and unstable soils caused casing to bind during extraction, which required modifications to both drilling methods and final pile design.”

Beyond subsurface challenges, Phoenix crews have worked in difficult access conditions, with restricted headroom beneath overhead catenary lines, and in close proximity to active railroad stations, existing bridge structures, and public ways. Work sequencing constraints, nighttime drilling and testing windows, limited onsite water supply, and constrained space for spoils handling and materials staging have further complicated operations.

“Successfully executing this work has required a high level of experience in both planning and field execution,” Tinning continued. “Much of the work has been performed day and night by highly experienced drilling, grouting, and testing crews, many of whom bring 20 to 30 years of industry experience to the project.”

THE RIGHT EQUIPMENT

To execute the most technically demanding micropile installations associated with the Programme, Phoenix evaluated multiple drilling platforms within its expanding equipment fleet. For the largest-diameter, deepest, and most geometrically constrained micropiles, Phoenix selected its custom-configured Comacchio MC 28 HD drill rig.

The MC 28 HD was selected for its combination of exceptional crowd force and retraction capacity,



high hydraulic power, torque and rotation output, and its adaptable mast configuration. These capabilities were critical for performing foundation work beneath active rail infrastructure while maintaining productivity and safety.

The MC 28 HD was required to safely handle drill strings consisting of up to 110ft (33.5m) of 13-3/8in casing, 8-5/8in drill rods, and, in certain applications, a down-the-hole hammer. These heavy and complex assemblies had to be installed and extracted under strict headroom limitations imposed by overhead catenary systems, as well as within narrow work windows dictated by rail operations.

Available working height was limited to just over 35ft (10.7m) at the East Avenue site and approximately 40ft (12m) at Fort Point. By removing the mast extension, Phoenix configured the MC 28 HD to operate efficiently within these tight vertical envelopes without sacrificing drilling performance or safety. This flexibility made the MC 28 HD particularly well-suited for the constrained geometry of the WALK Bridge Programme.

Phoenix's familiarity with the MC 28 HD from prior major infrastructure projects, including micropile installations exceeding 250ft (76m) in depth, further supported its selection. That experience allowed crews to fully leverage the rig's capabilities and confidently deploy it on some of the most demanding elements of the Norwalk work.

COMACCHIO MC 28 HD

The Comacchio MC 28 HD was used to install 13-3/8in outside-diameter permanent casing at the Fort Point and East Avenue bridge sites. At East Avenue, micropiles derived their axial capacity from bedrock encountered approximately 50 to 70ft (15 to 21m) below grade. Permanent casing was advanced and embedded into bedrock, followed by installation of an approximately 11ft uncased rock socket.

At Fort Point, micropiles were bonded within an underlying sand and gravel stratum. For these

installations, casing was advanced to depths approaching 110ft (33.5m) below existing grade, with approximately 40ft (12m) of casing subsequently extracted to expose the designed bond length. Across both locations, micropile depths typically ranged from approximately 70 to 110ft (21 to 33.5m).

"The most challenging aspect of the drilling programme was not any single condition, but the constant variability," Toning noted. "Ground conditions, access limitations, and work windows could change from one location to the next. The MC 28 HD gave our crews the flexibility to respond quickly, whether that meant switching drilling methods, managing casing bind-up during extraction, or maintaining production under severe geometric constraints."

The hydraulic power, torque output, and crowd force of the MC 28 HD allowed Phoenix to efficiently install micropiles despite the highly variable and unpredictable subsurface conditions encountered across the project locations. The rig enabled seamless transitions between pneumatic drilling and wet rotary drilling, with and without polymers, minimising downtime and allowing crews to adapt in real time as conditions evolved.

While production rates varied depending on location, depth, and subsurface conditions, the MC 28 HD routinely supported reliable daily output and enabled peak productivity during favourable conditions. At Fort Point, Phoenix consistently advanced permanent casing to depths of approximately 110ft (33.5m) in under two hours per pile, with drilling production reaching upwards of 250 linear ft (76m) per shift. Although Phoenix utilised multiple drilling platforms across the broader project, the MC 28 HD served as the primary rig for the most technically demanding micropile installations.

COLLABORATION AND EXECUTION

"The success of our work on the WALK Bridge Programme reflects

the strength of our experienced team, careful planning, and the use of equipment well matched to the project's demands," Toning explained. "Close coordination with CTDOT, construction managers, designers, and fellow contractors has been essential to maintaining progress while working within active rail corridors.

"For Phoenix, this project highlights our ability to take on technically challenging geotechnical scopes and deliver results under some of the most demanding conditions in the region. It also demonstrates how high-performance, adaptable drilling platforms can support complex foundation work in dense, constrained environments."

LOOKING AHEAD

Construction of the WALK Bridge Programme is expected to intensify through the latter half of the 2020s, with completion anticipated around 2029 and final site restoration extending into 2030. Once complete, the programme will deliver a modernised rail corridor through Norwalk, supporting improved operations along the New Haven Line and the broader Northeast Corridor.

The WALK Bridge Programme also serves as a reminder of the planning, coordination, and technical execution required to modernise legacy infrastructure while maintaining uninterrupted service. For specialty contractors and equipment manufacturers alike, it underscores the importance of pairing experienced crews with purpose-built drilling platforms capable of operating under extreme operational constraints.

On the Norwalk waterfront and beyond, the collaboration between Phoenix Foundation Company Inc. and Comacchio, supported locally by Comacchio dealers Hammer & Steel and ICE, illustrates how expertise, innovation, and the right equipment can come together to meet the challenges of today's most complex infrastructure projects. ▼

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