

Helical Pile and Tieback Installation with Hand-Held Equipment

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Helical piles and tiebacks are installed with hydraulic drive heads that rotate the product into the ground by the application of torque. These drive heads are generally designed with bail assemblies for mounting to machinery such as skid steers, mini-excavators, backhoes, and large track excavators. Smaller, lighter-weight drive heads may also be used with hand-held equipment for interior or limited access installations.

Machine-mounted drive head with bail assembly installing battered pile



Helical piles and tiebacks installed with portable hand-held equipment may be one of few deep foundation options available when access for machinery is not feasible. The bail assembly is removed and the drive head is mounted to the frame of the hand-held equipment so that it can be supported and operated by at least two technicians. To provide the reaction for the output torque, a telescoping torque arm is attached to the frame of the hand-held equipment and secured against the ground, a wall, a column, or other suitable structure or device capable of resisting the torsional forces transferred to the end of the torque arm by the drive head. Hand-held equipment is typically limited to a maximum installation torque of 6,000 ft-lb, with the rated capacity clearly specified by the manufacturer.

The drive heads are powered by the auxiliary hydraulics of gas and diesel machines or portable hydraulic power packs. A benefit for interior work, the power source can be located outside and connected to the drive head with long hydraulic hoses to prevent generation of exhaust gases within the building. A portable, remote valve assembly is then connected along the hydraulic lines in close proximity to the installation to allow for safe operation of the drive head.

Soil conditions aside, the size of helical pile installed and its corresponding capacity is limited by the size (torsional output) of the drive head, the physical size/weight of the machine and the hydraulic specifications of the machine. That said, hand-held equipment is generally best suited for the installation of 1.5-inch square shaft tiebacks and round shaft piles up to about 2.875 inches in diameter. Ultimate torque-correlated capacities on the order of 50 to 60 kips can be achieved in competent soils. An appropriate factor of safety is then applied to account for uncertainties and to reduce anticipated deflections to within structurally-tolerable limits. A factor of safety of 2.0 is typical for machine-installed helical piles and tiebacks where torque is monitored during installation. Higher factors

Helical pile installation with hand-held equipment



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Helical tieback installation; Remote valve assembly near end of torque arm



of safety are occasionally considered for a hand-held installation where there is generally less control over the pile during advancement and a greater risk of soil disturbance.

Helical piles and tiebacks installed with hand-held equipment have proven to be ideal deep foundation and anchoring solutions for interior work and sites with challenging access

conditions. Significant cost savings can be realized for a project when access does not have to be provided for larger installation equipment; e.g., removing sections of the building or constructing access ramps or working platforms. Therefore, even if more piles or tiebacks are needed due to the lower capacity hand-held equipment, it may still prove to be the more economical option.



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Jeff is involved in product design, product verification testing, preliminary design applications, project consulting, conducting installation, sales and marketing training, as well as developing and presenting education-based material. Jeff routinely travels throughout the United States and Canada to consult with local installing contractors about general or project-specific needs, and to present technical information to engineers, architects and general contractors.