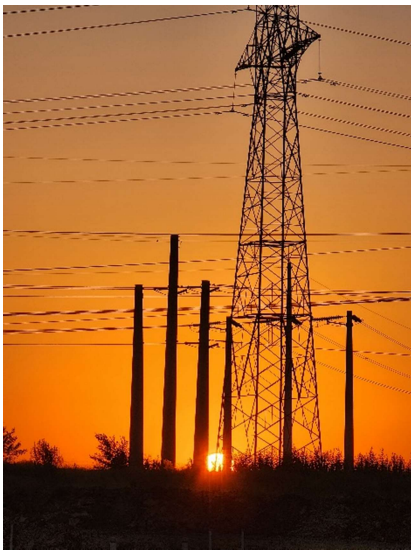
1600 Helical Piles Installed in the Lone Star State



In Rogers, Texas, the Five Wells Battery Energy Storage System (BESS) is a facility owned by ENGIE and constructed to support a nearby solar farm. The project called for 134 battery storage units and 67 PCS units along with associated equipment, all supported by 1601 helical piles. To achieve this, Specialty Foundation Systems (SFS) was subcontracted in conjunction with ECI Electrical, Inc. to install the helical piles. The piles, provided by Earth Contact Products (ECP), were a combination of (596) 2-7/8" and (1005) 3-1/2" round shaft piles, 15 feet in length with an 8/10/12 helix configuration. Pile installation began in July and ended in August of 2023.

The soil profile consisted of 2 different clay layers. The upper 10ft of the soil profile was a soft expansive clay which overlaid a stiffer clay. As a result, the piles needed to transfer vertical loads up to 33 kips and lateral loads up to 2.8 kips down into the stiff clay layer. The Geotechnical Report recommended a 12-foot helical pile length with an 8/10" helical configuration to accomplish this feat. Due to the expansive nature of

Project Overview

General Contractor – Specialty Foundation Systems

Electrical Contractor – ECI Electrical, Inc.

Helical Piles – Mfg. by Earth Contact Products

Products Installed – ECP Helical Piles

- (536) TAF-288-180 8-10-12
- (1005) TAF-350-180 8-10-12
- (84) TAF-288-84 8-10-12
- (670) TAB-350- 16x16x3/4
- (536) TAB-288-NC 14x14x3/4
- (84) TAB-288-NC 6x6x1/2 w/ Rebar
- (355) TAB-350-NC 16x18x3/4

Target Depth – 15 feet

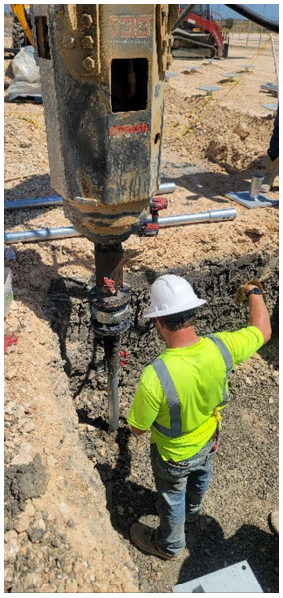
Working Load – 33 kips compression and tension

Ultimate Load – tested to 66 kips per pile

Installation Torque – 8,250 ft-lb / 7,350 ft-lb

the two different clay layers, the piles were subjected to significant shrink and swell from moisture changes (i.e., wetting/drying cycles). This could cause soil to shrink away from the piles and create an annular space around the upper 10ft of the shaft. To account for this within the design, the confinements of the upper 10ft of the soil-pile profile were neglected when calculating the axial and uplift load capacity calculations. Additionally, the Geotechnical Report indicated the piles may encounter early spinout due to stiff clays, and depths beyond 10ft may require pre-drilling.

Another significant challenge was the severe weather of the Texas summer. The average temperature exceeded 100 degrees daily, often reaching 110 degrees Fahrenheit. Such extreme conditions made staying on schedule difficult because the jobsite did not offer any respite or shade.



To determine if the layer of stiff clay at the bottom of the soil profile could cause the pile to spin out, SFS proposed installing 10 test piles at different locations throughout the site before finalizing design and ordering production materials. This proved to be critical, because they found that not only was early refusal unlikely but torque results from testing showed the clays were not as stiff as anticipated. Pile lengths were increased in length to 15ft, and a third helix was added to ensure target torque was achieved without requiring additional depth. This prevented a significant delay and a costly change order during pile installation.

The team completed pile installation with one crew in 34 days of work, averaging 700 linear feet of pipe installed per day. They accomplished this all while maintaining stringent pile tolerance to support the specialty battery structures. Those in charge took extra care of the crew to maintain readiness and prevent heat related injuries. SFS utilized extra laborers, periodic breaks, and cooling equipment to deal with the significant weather challenges. Additionally, SFS installed the 15ft pile sections using a DV-30 auger motor mounted on a Komatsu PC240, allowing the entire pile to be installed without the need for extensions. This greatly increased production and reduced labor requirements on the project.