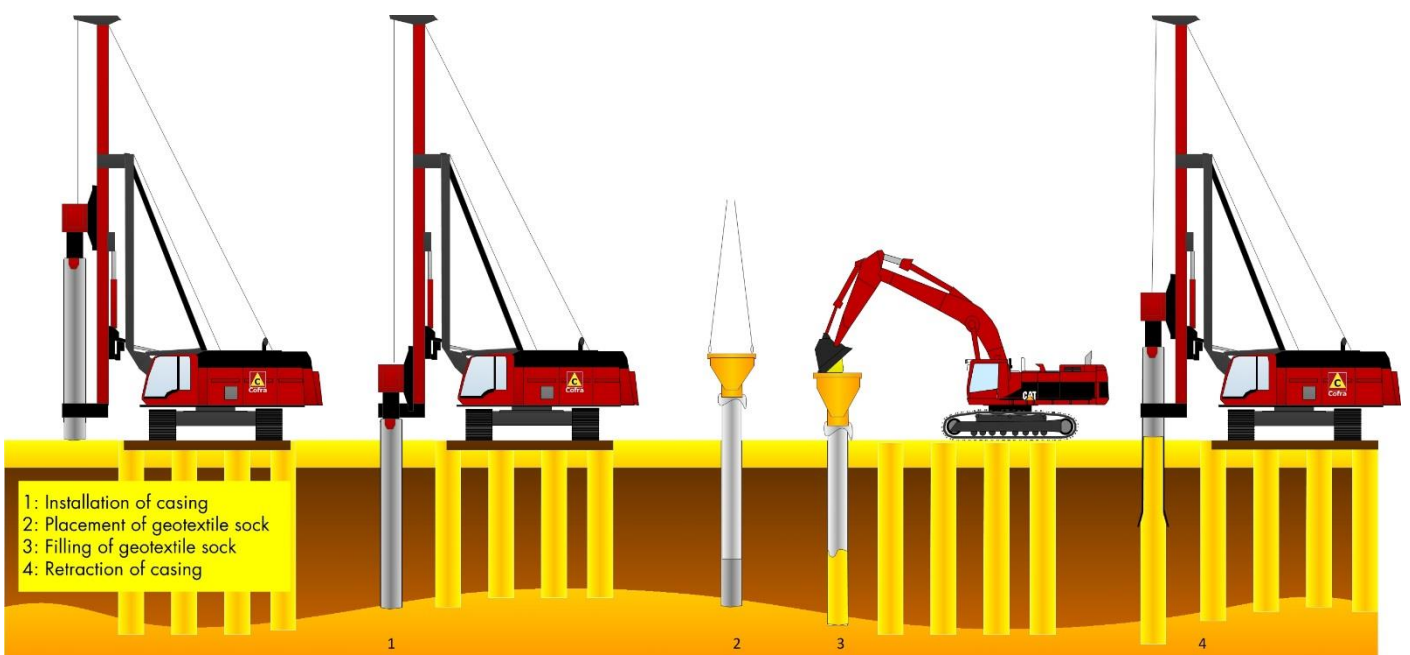




General

GEC (geotextile encased columns) are granular columns encased with a high strength geotextile used to transfer loads down to the bearing strata. The purpose of the geotextile is to ensure the integrity of the column and provide confinement in very weak soils up to an undrained shear strength of 15kPa. Above 15kPa the soil has enough confining pressure to assure the integrity of the columns and sand or stone can be placed without a geotextile.

A GEC pile installed by vibrating an 800mm steel casing into the soil and embedding it about 0.5m into the bearing strata. Once at depth the geotextile, custom made to the appropriate length, is lowered into the casing and filled with granular material. Once a column is full with sand the casing is retracted with vibrations to densify the sand and the GEC remains in place.





The system is used on location where very soft soil exist and a solution with PVD and surcharge is not capable to provide the required stability or residual settlement within the given construction period

Monitoring

The installation operation is controlled by the use of an advanced real-time monitoring system, measuring amongst others, the frequency, speed of penetration and force. This makes it able to adjust the effort to the local ground conditions and assures the GEC is founded in bearing soil. All is monitored using GIS software.

How it works

The key component in the Geotextile encased column is the casing of the column in the form of the geotextile. This geotextile provides support to the infilled material and creates a stiff flexible

casing that is tensioned by the outwards directed horizontal stresses. The system acts as a drain and as a pile. The pile transfers most of the load down to the bearing strata and creates an equilibrium with the surrounding soil, limiting the load on the soft material and thus the settlements and residual settlements. The system is often used in conjunction with a basal reinforcement on top of the piles to improve the spreading of the load.

Results

Applying GEC will result in the following effects:

- Reduction of residual settlement by 50 – 75% and can be mitigated by temporary surcharge
- Up to 90% of the consolidation takes place during construction
- Bearing capacity increase

- Loadable immediately after installation
- Liquefaction mitigation
- Limitation of (differential) settlement when applying load

Characteristics

We see the following specific GEC characteristics:

- Able to be used in extremely soft soil (e.g., undrained shear strength < 15 kPa)
- Creation of permeable columns to accelerate dissipation of excess pore pressures
- Preferred worldwide installer of Huesker
- Well documented technique
- Strengthens the soil during earthquakes
- Cofra has a long track record in the application of both ground improvement as well as geotextiles

