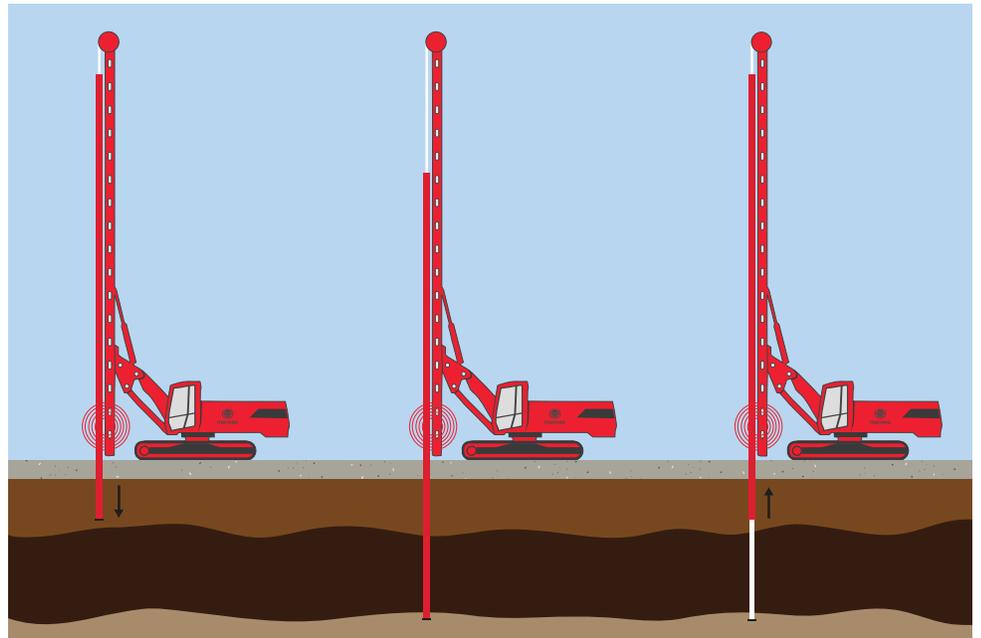


Wick Drains

Wick drains, also known as pre-fabricated vertical drains, are a cost-effective solution for accelerating the consolidation of fine-grained soils to expedite construction and limit long-term settlement. Used in combination with pre-loading, wick drains evacuate pore water from soft, compressible soils to induce consolidation and settlement. This allows construction to begin in as little as one to three months instead of up to 12 months or longer. The reduction of water content of the saturated layers allows the soils to better accommodate superimposed loads and minimizes future settlement.

Installation

Wick drains are comprised of a channelized plastic core that is encased by a geotextile fabric. The geotextile acts as a filter to minimize migration of fines into the channels as groundwater flows into the drain. The drains are typically installed in a grid pattern, with spacings most commonly in the range of 3- to 8- feet. Wick drains have been installed to depths of over 150 feet. Where thin, dense layers are present, vibratory assistance can be applied to enable penetration. To penetrate stiff or dense layers of appreciable thickness, it is usually necessary to pre-drill or pre-punch to allow for installation. Wick drains are installed by pushing and retracting a steel mandrel into the ground with the wick drain material housed inside – an anchor plate affixed to the bottom of the drain holds the drain in place as the mandrel is retracted.



Wick drains are installed within a steel mandrel that is pushed into the ground to the required depth. An anchor plate is used to prevent soil from entering the mandrel and to secure the drain in place as the mandrel is extracted.

Advantages and Applications

Wick drains are used to expedite consolidation drainage in clays, silts, tailings, and sludges by relieving pore pressure and reducing the time necessary for groundwater to be evacuated from the layer. They are very commonly used in conjunction with soil preloads for structures such as buildings and tanks, or with surcharges for earthen structures such as embankments, dams, levees and general fills. Because of the lightweight nature of the drains and the fast rates of installation, wick drains are an extremely economical method for improving soft compressible layers. As consolidation occurs, pore water is conveyed to the drains and is discharged to a granular drainage blanket at the top of the drains – in some cases, the water discharges from the drain into coarse-grained layers that intercept the drain.

As the drains are designed to convey groundwater flow, special care should be taken when contamination is present at the site, or if the drains penetrate layers that are under artesian pressure.

Advantages of Wick Drains Include:

- Virtually no spoil is created (unless predrilling is required)
- Simple installation process
- Fast rate of installation
- Economical method for expediting consolidation settlement
- Layers gain strength as they consolidate
- Allows for more rapid fill placement for embankments and fills constructed on compressible soils