



The difference in the application for soft soil stabilization

7 simple principles were realized in a standard application

1. The flushing and supporting fluid is simple cement grout with a water to cement ration (W/C) of 0,4 to 0,7 (40 to 70 litres of water to 2 sacks = 100 kg of cement). Under a flushing pressure of 5 to 20 Bars the water is quickly absorbed by noncohesive soils leaving a cementitious surface which cures and stabilizes the annulus. This method is also known when using supporting fluids for bored piles to DIN 4014.

2. Controlled bulb and infiltration dowelling

All TITAN drill bits have a radial flushing hole, which can be used to control the size of the bulb of the grout body. Excavated grout bodies having an average diameter of 1,5 to 2,5 times the drill bit diameter confirm that radial flushing at 5 to 20 Bars pressure-reams the soil and also causes the grout to penetrate into the grain structure of the soil.

3. Grouting pressures up to 60 bars

In an open bore hole, a grout pressure of up to 60 Bars can be achieved, because cementitious grout with a W/C ratio of 0,4 is pumped while the pile/anchor is constantly rotated with slowly increased grouting pressure.

As with postgrouting the cured grout is cracked again by the rotation and the partly cured cement blocks move outwards and are wedged between

the cured annulus and the rotating anchor/pile tube resulting in a natural packer.

Since the TITAN method includes a similar effect to post grouting it eliminates this labor intensive portion of the job.

4. Improved anchoring capacity and reduced settlement

Anchors, piles and soil nails are evaluated on their load and settlement characteristics taken from the load/settlements diagram. The calculated constant settlements are much less with the TITAN piles than with traditional bored piles or minipiles for identical soils under the same loads.

The TITAN method grouted piles have much less settlements than traditionally installed ones (see load/settlement diagram).

Shear deformations (soil friction) between soil and the grout body are important factors for uniform settlements.

5. The vibrating TITAN hollow anchor acts like a concrete vibrator during the drilling and grouting process

and consequently results in a homogeneous and compacted grout body.

6. Minimum grout cover, maximum corrosion protection

The down-the-hole circular centralizers, which are attached prior to each coupling along with the soft soil drill bit incl. guide tube, maintain directional stability during the drilling process, and centralize the TITAN anchors in the bore holes, thus achieving a minimum grout cover of 20mm around the pile/anchor.

7. A hollow soil nail creates a much higher shear resistance in the soil than a solid rod of the same cross sectional area

The stiffer a nail is, the smaller the required shear movements need to be to activate the normal force in the nail.

TITAN Injection Anchors are 2 to 3 times stiffer than high tensile strands or bars under the same loads, since its cross section is larger. Prestressed TITAN anchors create much less movement in the soil than strands or bars under the same load conditions.

