

Terr-econ-pile



Characteristics of the piling system

Cast-in-situ, soil displacing, vibration free concrete piles installed with the aid of a screwed steel auxiliary tube.

Construction

Description:

1. A steel auxiliary tube with a separate cast iron drill point is installed at ground level.
2. The tube is screwed to depth through the application of axial pressure and rotational moment.
3. When the desired level is reached the reinforcement is suspended in the tube, after checking that the tube is dry and free of soil.
4. The tube is filled with concrete grout.
5. The tube is then withdrawn by simple traction or with rightward rotation.
6. The pile is finished and the pile-driving frame can move on.

Materials

1. Details of pile-driving frame
 - a. Types used: Junttan PM 30, Hitachi CX 700 GLS, IHC F3500, Woltman 900HPDR and Sennebogen S6100XLR.
 - b. Heaviest component Junttan PM 30:0.60 MN, Woltman900 HPDR: 1.50 MN.
 - c. Method of transport to site: low loader.
 - d. Additional equipment required: shovel for horizontal transport on site, an auxiliary crane or concrete pump is sometimes used with difficult to access pile locations.
 - e. Method of transport on site: self-propelled piling machine.
 - f. Maximal accessible gradient: 1:7 to 1:10.

2. Capacity of driving equipment

Drilling motor capacity:

- Rotational moment: 400 to 450 kNm.
 - Axial force: 300 to 500 kN, depending on frame type.
3. Vibration levels

This system may be regarded as vibration free.

4. Noise levels

Around 80 to 85 dB(A) at 10 m¹.

Properties

1. Diameters

External shaft diameter Screw point diameter

- ø 380 mm ø 470 mm
- ø 460 mm ø 560 mm
- ø 560 mm ø 670 mm

2. Available pile lengths

Up to 40 to 45 m¹.



3. Standard reinforcement

- a. Main reinforcement: 5 \varnothing 12 mm to 10 \varnothing 25 mm; heavy reinforcement up to \varnothing 32 mm. Steel profiles or pre-stressed rods may be used if necessary.
- b. Spiral reinforcement: \varnothing 8 mm to \varnothing 16 mm with a pitch from a minimum of 300 up to 1000 mm.

Load bearing capacity/deformation behaviour

2. Geotechnical load bearing capacity

- a. Piling classification factors in accordance with NEN 9997-1:
 - Pile tip

$a_p = 0,63$ β -factor to be calculated in accordance with NEN 9997-1, depending on the ratio between external tube diameter and screw point diameter; at the specified dimensions: $\beta = 1,0$.

- Skin friction $a_s = 0,009$.
 - b. Deformation under load: similar to type 1 in NEN 9997-1
 - c. Loading spectrum: up to around 3000 kN pressure (calculated value).
3. What is regarded as the pile tip level?
Maximal diameter of drill point.
 4. Methods of increasing geotechnical load bearing capacity
The use of grout in the load bearing sand strata.
 5. Methods to reduce negative skin friction
Possible through use of combination piling (prefabricated concrete core with bentonite casing: see also Terra-Son Pile information sheet).

Potential applications

- 1a. Application with large variation in ground conditions
Adaptation is possible using variable pile length. Information on the solidity of the foundation strata may be obtained from records of the rotational moment, axial pressure and drilling time.
 - 1b. Application with weak soil strata
Supplementary measures may be taken where necessary if very weak soil strata are present, including a modified grout mix with additional fine particles or plastic fibres.
Alternatively the Terr-Econ tubular pile with permanent casing may be selected.
2. Possible rake
 - Forward: up to 3:1.
 - Backward: up to 4:1.
 3. Application in restricted space
 - Possible with limited headroom in certain circumstances (including Terr-Econ tubular pile).
 - On small sites where manoeuvring standard equipment is impossible a compact piling machine may be used, following discussion.

4. Minimum centres for insertion

Around twice the diameter of the screw tip where the adjacent piles are at least one day old (BRL-2356 (237/01): 20 hours).

5. Minimal distance between adjacent piles for purposes of insertion 0.8 to 0.9 m¹ as a minimum.
6. Installation in open water
Only possible when used as combination piling.
7. Suitability for use as tension piles
Good: piles may be fully reinforced with the reinforcement dimensions specified above. Increased skin friction can be achieved by means of injection with grout. (Terr-Econ tubular pile).
8. Supplementary requirements/observations
Standard NVN 6724:2001 does not permit the pile shaft to be terminated beneath the working level, in consideration of the equilibrium between the internal grout pressure and the external ground pressure. If the working level is well above the cut-off level for the piles the use of a combination piling (Terra-Son pile) should be considered.

Quality and safety

Terracon have in place a certificated quality and safety system to NEN-EN-ISO 9001:2015 and SCC Petrochemical and Safety Awareness Certificate 3rd.

The piles are manufactured in accordance with the project-specific quality and safety plan, which includes an inspection plan.



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