

Continuous flight-auger Pile with temporary casing



System Characteristics

Cast-in-situ, restricted soil removing continuous flight auger pile. This system is extremely suitable for the manufacturing of piling walls. The installation of continuous flight auger piles takes place by cutting up in each other and because of this, a continuous wall arises.

Construction

Description:

1. An auger, consists of a hollow axle with a relatively large axis and around it a propeller blade, placed on the ground level. The bottom side is provided with a flexible seal. (cover flange). The auger is enclosed with a steel casing.
2. The auger is turning to the right, screwed on depth, while simultaneous the steel casing, provided with cutting teeth, left turn rotating in the soil. The tube tracks the auger in a as small as possible distance, as a rule about 0,15 m¹.
3. The required reinforcement is hanged in the hollow tube. It is possible to draw the auger later if heavy reinforcement has been used, as for example steel profiles.
4. The tube is filled with grout cement.
5. For the benefit of discharging the cover the auger is lifted about 0,10 m¹ and after this, the casing flight auger is stationary withdrawn out of the soil en the pile shaft builds up. It is necessary that during this process the total system has to be kept under continuous pressure.
6. The pile is completed and the pile-driving frame can be moved.

Materials

1. Details of the pile-driving frame.
 - a. Types used: IHC F3500 or Woltman 900 HPDR and Sennebogen S6100XLR..
 - b. Heaviest component: circa 0,6 à 1,5 MN.
 - c. Method of transport to site: low loader.
 - d. Additional equipment required: excavator and shovel for the horizontal transport on site.
 - e. Method of transport on site: self-propelled piling machine.
 - f. Maximal accessible gradient: 1:10.
2. Capacity of driving equipment

Drill head capacity:

 - Rotational moment: 1 x 450 kNm (drill motor casing).
 - Rotational moment: 1 x 250 kNm (drill motor auger).

As a rule the capacity of both the drill motors are aligned whereby of the mentioned values can be deviated.
3. Vibration levels

This pile system may be regarded as vibration free.
4. Nois levels

Around 80 to 85 dB(A) at 10 m¹.

Properties

 1. Diameters

External shaft diameter Internal axial tube
610 mm variable



2. Available pile length
Maximal pile length abt 30 m1.
3. Standard reinforcement
 - a. Main reinforcement: cage, assembly: 5 bars \varnothing 10 mm to 10 \varnothing 25 mm.
 - b. Spiral reinforcement: \varnothing 8 mm to \varnothing 16 mm with speed of minimal 300 to 1000 mm.
 - c. Steel profiles often have been used as application of pile walls.

Load bearing capacity/deformation behaviour

1. Geotechnical load bearing capacity.
 - a. This piling system is not explicitly described in the classification in NEN 9997-10. The piling classification factors below can be considered as an indication. The factors have been established by Terracon with the best possible application of this pile system in the system of the table 7 of NEN 9997-1.

Pile classification factors:

- Pile tip: $a_p = 0,56$, $\beta = 1,0$.
 - Skin friction: $a_s = 0,008$ (not augered tubular piles: $a_s = 0,006$).
- b. Supplementary requirements for load bearing calculations: the qc-III range beyond the pile tip, the cone resistance has to be reduced.
Sustained value of 75% applicable cone resistance.
 - c. Deformation under load: similar to type 2 of NEN 9997-1.
In practice this sort of pile system shows as a rule rather stiff deformation under load behaviour compared with traditional tubular piles, because a less of soil is removed and therefore a minor tension appears.
 - d. Spectrum of load: to maximal about 9.000 kN (calculation value).
2. What is regarded as the pile tip level?
The screw in level.
 3. Methods of increasing geotechnical bearing capacity.
Not applicable.
 4. Methods to reduce negative skin friction.
Not applicable.
Potential application
 - 1a. Application if there is a lot of variation in the soil conditions Possible adaptations by various pile lengths.
Inspection on the character and invariability of the foundation strata is only a limited possibility.
 - 1b. Application with weak soil strata
In case the soil strata are very weak, by Terracons mutual agreement, probably the advice will be recommended to apply this pile system, in connection with
 - 1c. Methods as pile wall
By drilling the piles join together with a certain extent of a lap a soil- and water retaining structure can be obtained.

2. Possible rakes
In common next rakes are possible:
 - Forward: maximal 8:1.
 - Backward: maximal 4:1.
3. Application in restricted space.
This system is not applicable in restricted spaces.
4. Minimum centres for insertion
In principle no limited when de adjacent piles are at least 4 hours. If a retarder is used, this period has to be proportionally be prolonged.
5. Minimal distance between adjacent piles for purposes of insertion.
Minimal abt. 0,8 m¹, the things mentioned are very dependent on the applicable material and the situation.
6. Possible installation from open water.
Only applicable by using a Terra-Son-pile (auger provided with a prefabricated concrete element).
7. Suitability for the use of tension piles
Suitable as tension pile, if the pile will be provided with sufficient reinforcement.
A cage can be attached in the axial tube of the auger. Steel profiles can also be applied later on, in the "fresh" pile.
8. Additional definitions/comments
 - By a continuous positioning of the screw piles, cutting, or with a space of 0 to 50 mm) a wall can build up and that wall can realize an earth-retaining position.
 - As a result of the big core, by auger piles is a matter of less out coming soil compared with the traditional augers.
 - According to the norm NVN 6724:2001 it is not allowed to complete the shaft of the pile beneath the work level in connection with the balance between the internal concrete pressure and the external soil pressure.

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 3".
No judgement guidelines are available of the KIWA. Terracon handles the internal guidelines.
The piles are manufactured in accordance with the project-specific quality and safety-plan, which includes an inspection plan.