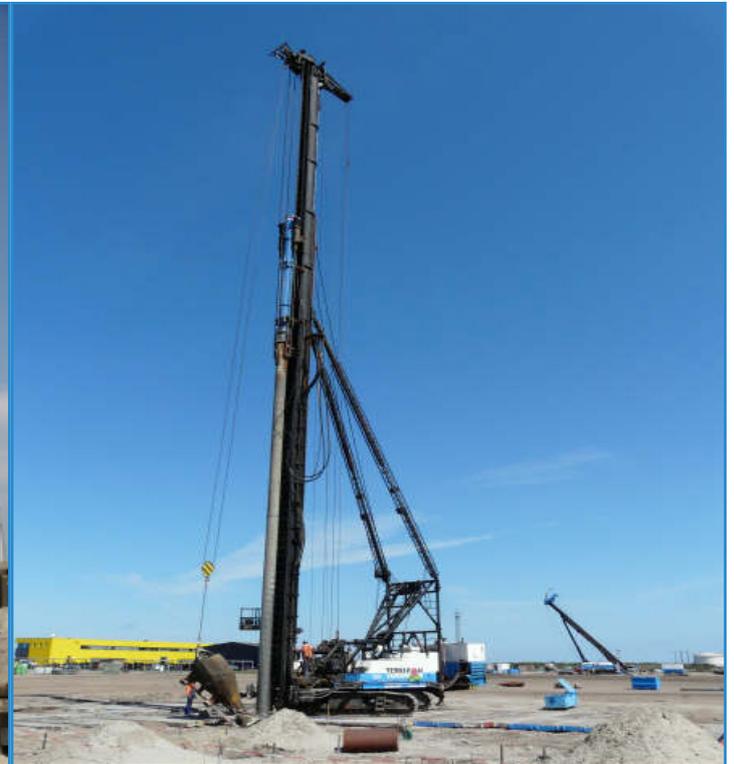
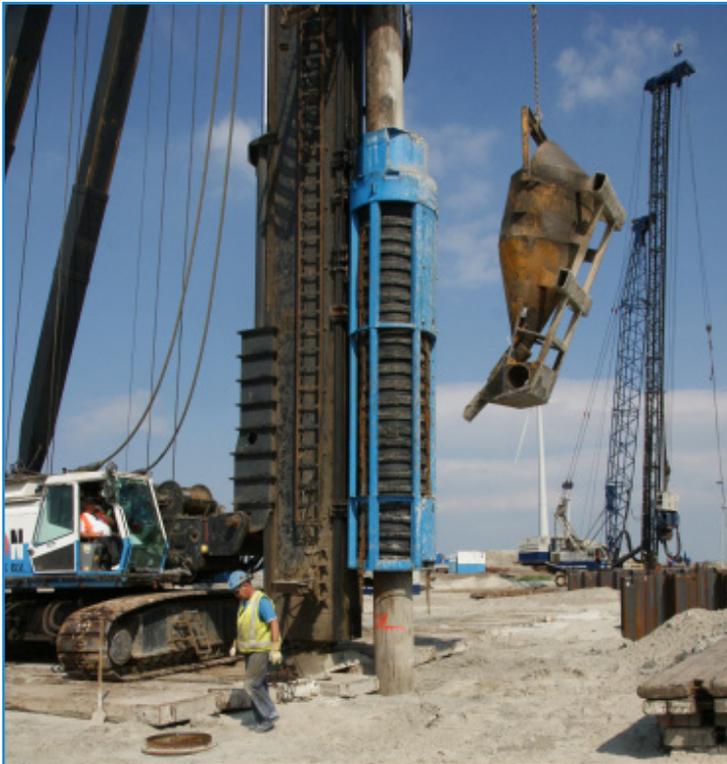


Vibro-Pile



System characteristics

Cast-in-situ, soil displacing, concrete pile installed with the aid of a driven steel auxiliary tube.

Construction

Description:

1. A steel auxiliary tube with a footplate is installed at ground level.
2. The tube is installed by driving from the top.
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 cement grout.
5. The tube is withdrawn by means of driving out with a piling hammer (Terracon's standard method), or, for heavy work, using a vibratory block or (ring) vibrator.
6. The pile is finished and the pile-driving frame can move on.

Materials

1. Details of pile-driving frame
 - a. Junttan PM25, PM30, IHC F3500, CX 700 GLS, Woltman 900 HPDR or Sennebogen S6100 XLR.
 - b. Heaviest component: from around 0.30 to 1.5 MN, depending on frame type.
 - 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.
2. Capacity of driving equipment Hydraulic drop hammer (Junttan HHK 5A, 6A and 9A) and hydro hammers (IHC S35, S70 or S90) with driving energy up to around 100 to 120 kNm.

3. Vibration level

This system cannot be regarded as vibration free.

4. Noise level

Maximum around 105 to 107 dB(A) at 10m¹.

The frequency of the noise is relatively high.

Properties

1. Diameters

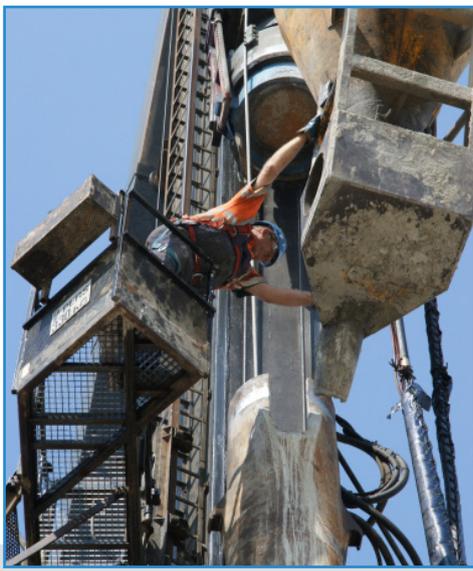
The following dimensions for the external shaft diameter are more or less standard: Ø 273 mm, 305 mm, 324 mm, 356 mm, 406 mm, 457 mm, 508 mm, 559 mm and 609mm. The footplate dimension is generally 40 to 50 mm larger than the measurements above, but they are available in virtually any size required.

2. Available pile lengths

Up to a maximum of around 42 m¹.

3. Standard reinforcement

- a. Main reinforcement: 4 Ø 10 mm to 10 Ø 25 mm; heavy reinforcement up to ø 32 mm. Steel profiles or pre-stressed rods may be used if necessary.
 - b. Spiral reinforcement: ø 8 mm to ø 16 mm with a pitch from a minimum of 300 up to 1000 mm.
 - c. In situ suspension of reinforcement cages is possible.
- Load bearing capacity/deformation behaviour



1. Geotechnical load bearing capacity

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

- Pile tip $a_p = 0.7$, $\beta = 1.0$ with the standard tube/foot plate dimensions. A lower factor must be applied in the case of relatively large footplate dimensions, in accordance with standard NEN 9997-1
- Skin friction $a_s = 0.012$ where the tube is withdrawn using vibration. $a_s = 0.014$ where the tube is withdrawn using a driving block (standard Terracon method).

b. Supplementary requirements for load bearing calculations: not applicable

c. Deformation under load: similar to type 1 in NEN 9997-1.

d. Loading spectrum: up to maximal around 5000 kN pressure (calculated value).

2. What is regarded as the pile tip level?

Footplate level

3. Methods to reduce negative skin friction

With the use of Terra combination pile (prefabricated concrete core, with a bentonite casing in the area of the compressible strata).

Potential applications

1.a Application with large variation in ground conditions

Good, using variable pile lengths and with acquisition of measurement data when inserting piles. 1b. Application with weak soil strata Where very weak strata are present we advise discussion with Terracon of supplementary measures possibly required for the application of this piling system.

2. Possible rake

- Forward: maximal 4:1, depending on frame type.
- Backward: maximal 3:1.

3. Application in restricted space

1b. Application with weak soil strata

Where very weak strata are present we advise discussion with Terracon of supplementary measures possibly required for the application of this piling system.

4. Minimum centres for insertion

Around 2.5 x the diameter of the foot where the adjacent piles are at least one day old (BRL-2356 (K237/01): 20 hours).

5. Minimal distance between adjacent piles for purposes of insertion

Minimally 0.8 to 0.9 m1. Where the driving frame must make an angle with a facade line, then a greater distance must be taken into account.

6. Installation in open water

Installation from open water is possible, particularly if a combination piling is used.

7. Suitability for use as tension piles

Suitable: the piles have heavy reinforcement over the full length.

8. Supplementary requirements/observations

Standard NVN 6724 does not permit termination of the pile shaft below the working level.

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".

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



TERRACON FUNDERINGSTECHNIEK B.V.

Vierlinghstraat 17 | 4251 LC Werkendam |

Postbus 49 | 4250 DA Werkendam |

T: 0183 40 13 11 | E: info@terracon.nl |

I: www.terracon.nl |