

(19)



(11)

EP 2 789 748 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
15.10.2014 Bulletin 2014/42

(51) Int Cl.:
E02D 5/28 (2006.01) E02D 27/12 (2006.01)

(21) Application number: **13425055.4**

(22) Date of filing: **12.04.2013**

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR**
Designated Extension States:
BA ME

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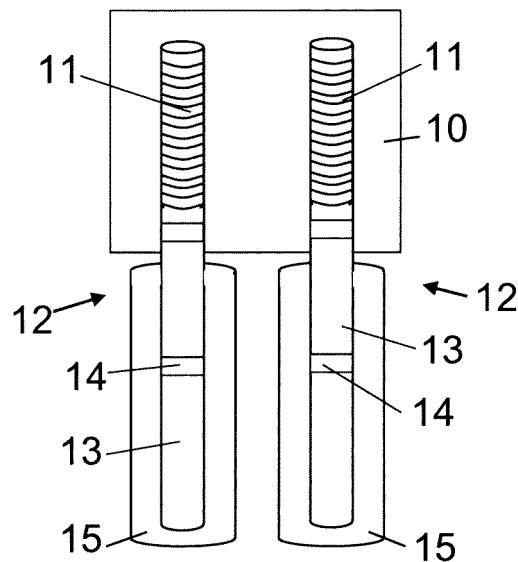
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(54) **Micropile for foundations**

(57) A micropile for foundations comprising: a first tube portion; at least one second tube portion joined to said first tube portion; said first portion being embedded

in a foundation, wherein said first tube portion has a screw thread profile.

Fig. 1



Description

[0001] The present invention relates to a micropile for foundations.

[0002] When a stable support for foundations is required, groups of metal micropiles are often used, arranged to form a structure on the top of which a foundation or a plinth rests.

[0003] Micropiles normally have a diameter variable from 80 to 300 mm and lengths typically between 12 and 15 metres, as defined at the design stage.

[0004] The micropile must be connected to the foundation by embedding the head of the micropile within the foundation structure itself, which is normally made of concrete.

[0005] To ensure good adherence of the micropile head within the foundation interior, one or more circular plates are welded onto the head of the micropile, which is then embedded in the concrete. Besides representing a considerable cost, the welding creates problems relative to the integrity of the tube due to alterations to its mechanical characteristics.

[0006] An object of the present invention is to provide a micropile for foundations with adherence to the foundation which is equal to or better than that of the known art.

[0007] Another object is to provide a micropile, the original mechanical characteristics of which do not undergo alteration.

[0008] A further object is to provide a micropile of lower cost.

[0009] Another object is to provide a micropile which is easy to install.

[0010] A further object is to provide a micropile for which plate welding is not required.

[0011] These and other objects are attained according to the present invention by a micropile for foundations comprising: a first tube portion; at least one second tube portion joined to said first tube portion; said first portion being embedded in a foundation; **characterised in that** said first tube portion has a screw thread profile. Further characteristics of the invention are described in the dependent claims.

[0012] This solution has various advantages compared with solutions of the known art.

[0013] The cost of a micropile of the present invention is considerably reduced by not using the plates. Moreover the micropiles do not undergo alterations due to the welds. In addition no mechanical operations are carried out on the building site.

[0014] The characteristics and advantages of the present invention will be apparent from the following detailed description of one embodiment thereof, illustrated by way of non-limiting example in the accompanying drawings, in which:

Figure 1 is a schematic section through a foundation with micropiles, in accordance with the present in-

vention;

Figure 2 shows schematically a portion of a micropile, in accordance with the present invention;

Figure 3 shows schematically a detail of the profile of a micropile, in accordance with the present invention.

[0015] With reference to the accompanying figures, a foundation with micropiles, in accordance with the present invention, comprises a concrete block 10 representing a foundation. The heads 11 of two micropiles 12 are embedded therein.

[0016] The micropiles 12 are formed from a head 11 and one or more tube pieces 13 to form micropiles 12 of the required length.

[0017] The tube pieces 13 are normally positioned in a hole made in the ground and are normally arranged vertically but can also be positioned inclined.

[0018] The micropile head 11 is external to the surface of the ground such that it can be embedded in the foundation.

[0019] The tube pieces 13 are joined together in known manner, for example by screw threading with or without a sleeve 14.

[0020] The micropile 12 is then buried in a concrete block 15.

[0021] According to the present invention, the head 11 of the micropile 12 has a profile 20 which is thread rolled to give the tube a profile in the form of a screw thread to increase tube adherence.

[0022] Preferably the pitch P of the screw thread is 8 mm, with a height A of 1.7 mm, a flat crest of width L equal to 3 mm, a flat base, and a profile angle α of 62°.

[0023] A micropile head 11 is joined to the adjacent tube piece by a further screw thread (male-female) as in micropiles of the known art, or by using a sleeve joint.

[0024] Alternatively the male thread of the profile of the head 11 can be used and an identical female thread be provided in the tube piece 13, or a male thread be provided on the tube piece 13 and a sleeve be used having the same female thread.

[0025] A foundation is constructed in known manner. According to the present invention, discs are not welded to the micropile head piece but instead a head is used having a profile of screw thread shape.

[0026] In particular, a hole is made in the ground, possibly inserting bentonite mud to prevent ground collapse. Then a micropile 12 is installed, joining together the various tube pieces 13 to achieve the required length. Then the head 11 with the screw thread profile is fitted so that it projects from the ground. Concrete 15 is injected into the interspace formed between the ground and the micropile, the hole in the ground having a diameter greater than the micropile, the bentonite mud hence being expelled. The foundation 10 is then made such that it embeds the micropile head 11 having the screw thread profile.

[0027] In an alternative embodiment of the micropiles

for foundations, a single tube can be used with only one head portion thread rolled to form a screw thread profile.

[0028] The micropile thread rolling is carried out under cold conditions on the tubes, using a special very high powered machine which drives profiled rollers such that they compress the material and give the tube a new continuous screw thread profile.

[0029] This profile has been designed to maximize the concrete contact effect while at the same time enabling all types of accessories and control systems to be screwed on by means of special sleeves. Thread rolling does not involve withdrawal of material and enables the entire tube cross-section to be taken into consideration for dimensioning purposes, while avoiding extra material costs which would be involved in screw thread cutting.

[0030] As the thread rolling is carried out only partially on the tube, sufficient space is left for mechanically making the connection threads.

[0031] The bar obtained in this manner can be screwed onto tubes already cemented into the hole with threading being carried out to the client's design.

[0032] The thread rolling process is applicable to all types of steel used in making reinforcement tubes for micropiles.

[0033] In practice, the materials used for constructing a micropile, its dimensions and profile, can be chosen at will according to requirements and to the state of the art.

7. A micropile as claimed in claim 1, **characterised in that** said screw thread has a pitch P equal to 8 mm, a height A of 1.7 mm, a flat crest of width L equal to 3 mm, and a profile angle α of 62°.

Claims

1. A micropile for foundations comprising: a first tube portion; at least one second tube portion joined to said first tube portion; said first portion being embedded in a foundation; **characterised in that** said first tube portion has a screw thread profile.

2. A micropile as claimed in claim 1, **characterised in that** said tube is a metal tube having a diameter between 80 and 300 mm.

3. A micropile as claimed in claim 1, **characterised in that** said at least one second portion is joined to said first portion by screw threading with or without a sleeve.

4. A micropile as claimed in claim 1, **characterised in that** said first portion and said at least one second portion form part of a single tube.

5. A micropile as claimed in claim 1, **characterised in that** said at least one second portion is embedded in a block of concrete injected into the hole provided for inserting said micropile into the ground.

6. A micropile as claimed in claim 1, **characterised in that** said at least one second portion is positioned in a hole made in the ground.

Fig. 1

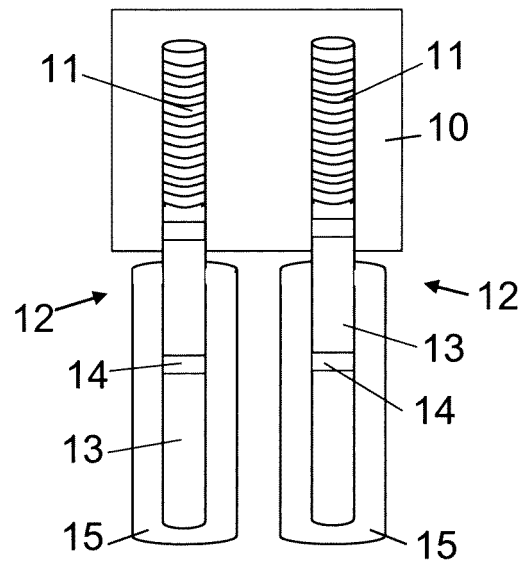


Fig. 2

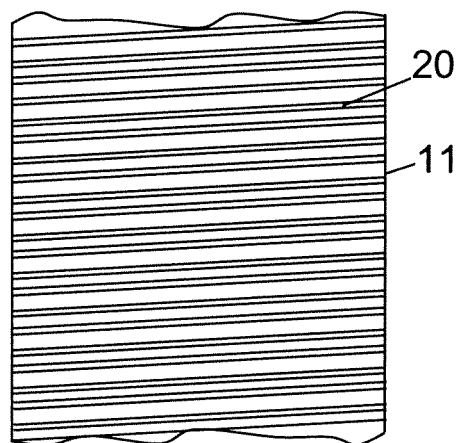
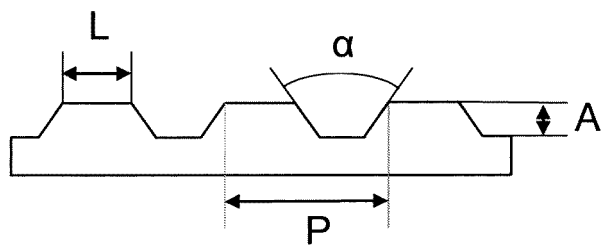


Fig. 3





EUROPEAN SEARCH REPORT

Application Number
EP 13 42 5055

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 6 012 874 A (GRONECK PAUL B [US] ET AL) 11 January 2000 (2000-01-11) * abstract * * column 5, line 11 - line 16; claim 1; figure 2 * -----	1-7	INV. E02D5/28 E02D27/12
			TECHNICAL FIELDS SEARCHED (IPC)
			E02D
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 21 February 2014	Examiner Koulo, G
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

EPO FORM 1503 03.82 (P04C01)

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EPO FORM P0459

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