ANCHOR POSITIONING ASSEMBLY

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ABSTRACT
An anchor positioning assembly to position an anchor in a concrete casting frame having a first reinforcing member and a second reinforcing member. The anchor positioning assembly includes an anchor and a hook member. The anchor includes an first portion and a second portion, and the hook member includes a first end configured to couple to the first reinforcing member, a second end configured to couple to the second reinforcing member, and an intermediate section coupled to the second portion of the anchor.
ANCHOR POSITIONING ASSEMBLY

CROSS-REFERENCE TO RELATED APPLICATIONS

0001 This application is a continuation of U.S. patent application Ser. No. 11/121,375, filed May 4, 2005, which is incorporated herein by reference in its entirety.

BACKGROUND OF THE INVENTION

0002 The present invention generally relates to positioning assembly and, more specifically, to an anchor positioning assembly for partially embeddment in a concrete member, such as a precast or tilt-up wall.

SUMMARY OF THE INVENTION

0003 The present invention is directed towards a positioning assembly to be partially embedded in a concrete form. The positioning assembly can assist with the positioning of an anchor within a casting frame which is subsequently filled with concrete.

0004 In one embodiment, the invention provides an anchor positioning system comprising at least two anchor positioning members. Each anchor positioning member has a first end configured to couple to a first reinforcing member, a second end configured to couple to a second reinforcing member, and an intermediate section which can be coupled to an anchor.

0005 In another embodiment, the invention provides an anchor positioning assembly comprising at least two anchor positioning members. Each anchor positioning member has a first end configured to couple to a first reinforcing member, a second end configured to couple to a second reinforcing member, and an intermediate section which can be coupled to an anchor.

0006 In still another embodiment, the invention provides an anchor positioning assembly to position an anchor in a casting frame having a first reinforcing member and a second reinforcing member. The anchor positioning assembly includes an anchor and a positioning member. The anchor includes a first portion and a second portion, and the positioning member includes a first end configured to couple to the first reinforcing member, a second end configured to couple to the second reinforcing member, and an intermediate section which can be coupled to the second portion of the anchor.

0007 In yet another embodiment, the invention provides a method of positioning an anchor positioning assembly within a casting frame to produce a concrete form. The method includes arranging first and second reinforcing members in the casting frame, engaging a first positioning member of the anchor positioning assembly to the first and second reinforcing members, engaging a second positioning member of the anchor positioning assembly to the first and second reinforcing members, substantially immersing a first portion of the anchor positioning assembly in concrete, and creating a void within the concrete form such that a portion of the anchor positioning assembly is exposed.

BRIEF DESCRIPTION OF THE DRAWINGS

0008 FIG. 1 is a perspective view of a portion of an exemplary anchor positioning assembly embedded in a concrete form.

0009 FIG. 2 is a front view of a partial cross-section of an exemplary anchor positioning assembly partially embedded in a concrete form.

0010 FIG. 3 is a side view of the partial cross-section of the exemplary anchor positioning assembly as shown in FIG. 2.

0011 FIG. 4 is a front view of an exemplary anchor for use in the exemplary anchor positioning assembly as shown in FIG. 2.

0012 FIG. 5 is a top perspective view of the exemplary anchor positioning assembly as shown in FIG. 2 with a portion of the concrete form removed and illustrating the reinforcing members.

0013 FIG. 6 is a bottom perspective view of the exemplary anchor positioning assembly as shown in FIG. 2 with a portion of the concrete form removed and illustrating the reinforcing members.

0014 FIG. 7 is a top view of the exemplary anchor positioning assembly as shown in FIG. 2 with a portion of the concrete form removed and illustrating the reinforcing members.

0015 FIG. 8 is a bottom view of the exemplary anchor positioning assembly as shown in FIG. 2 with a portion of the concrete form removed and illustrating the reinforcing members.

DETAILED DESCRIPTION

0016 Before the embodiments of the invention are explained in detail, it is to be understood that the invention is not limited in its application to the details of construction and/or the arrangements of the components set forth in the following description or illustrated in the drawings. The invention is capable of other embodiments and of being practiced by carrying out in various ways. Also, it is understood that the phrasing and terminology herein are for the purpose of description and should not be regarded as limiting. The use of “including,” “comprising,” or “having,” and variations thereof herein is meant to encompass the items listed thereafter and equivalents thereof, as well as additional items and equivalents thereof. The terms “connected,” “coupled,” and “mounted” are used broadly and encompass both direct and indirect connections, couplings, and mountings. Furthermore, terms such as “front,” “rear,” “top,” “bottom,” “side,” “inner,” “outer,” and the like are only used to describe elements as they relate to one another, but are in no way meant to recite specific orientations of the apparatus, to indicate or imply necessary or required orientations of the apparatus, or to specify how the invention described herein will be used, mounted, displayed, or positioned in use.

0017 An anchor positioning assembly 10 embodying the present invention is illustrated in FIGS. 1-3 and 5-8. The positioning assembly 10 can assist with the positioning of an anchor 20 within a casting frame or housing 25 (shown in FIGS. 2 and 3) by coupling to one or more reinforcing members 30 prior to the casting of concrete. As shown in FIGS. 2, 3 and 5-8, the reinforcing members 30 can be arranged in a grid pattern 35, for example, as discussed below. In some embodiments, a portion of the positioning assembly 10 can also further strengthen the anchor 20 in the concrete form 40 (shown in FIGS. 1-3) when the form 40 is lifted. The positioning assembly 10 includes an anchor 20, one or more positioning members 45, and a void former 50.

0018 FIG. 4 illustrates an exemplary anchor 20 for use in the positioning system 10. The anchor 20 can be formed from metal, such as steel, for example. The anchor 20 includes a first or upper portion 60 and a second or lower portion 65. The upper portion 60, at least in part, can be surrounded by the
void former 50 when assembled, as discussed below, and at least in part, can define an aperture 70. The lower portion 65 is connected to one or more positioning members 45. The one or more positioning members 45 and the lower portion 65, at least in part, is immersed in the concrete form 30 (shown in FIGS. 2-3), as discussed below.

[0019] As illustrated in FIG. 4, the anchor 20 includes a single bar 75 forming the upper portion 60 and the lower portion 65. The bar 75 includes a first leg 80, a second leg 85, and an intermediate section 90. The intermediate section 90 includes at least one apex section 95. The first leg 80 includes a first end 100 of the bar 75, and the second leg 85 includes a second end 105 of the bar 75. In some embodiments, the first leg 80 can further include a first foot 110, and the second leg 85 can include a second foot 115. The first foot 110 and the second foot 115 can be secured to the first end 80 and the second end 85, respectively, or can each be an integral portion of the bar 75.

[0020] In other embodiments, the anchor 20 can varying in shape, size and form. For example, the positioning system 10 can use a W-foot anchor, such as the anchor shown and described in U.S. patent application Ser. No. 10/648,935, the entire content of which is hereby incorporated by reference.

[0021] The positioning assembly 10 further includes one or more positioning members 45 to couple to one or more reinforcing members 30, such as the reinforcing bars 30 shown in the illustrated embodiments. In other embodiments, the reinforcing members 30 can vary in width, length, shape, size and material. The reinforcing members 30 can include a beam, for example.

[0022] As shown in FIGS. 2, 3 and 5-8, the exemplary positioning assembly 10 includes a first positioning member 200 and a second positioning member 205. Each positioning member 200 and 205 includes a first end portion 210, a second end portion 215, and an intermediate section 220. The first end portion 210 of each positioning member 200 and 205 couples to a first reinforcing bar 240 positioned within the casting frame 25, and the second end portion 215 of each positioning member 200 and 205 couples to a second reinforcing bar 245 positioned within the casting frame 25.

[0023] In the illustrated embodiments, the first end portion 210 and the second end portion 215 are configured to engage with the first reinforcing bar 240 and the second reinforcing bar 245, respectively, such that each positioning member 200 and 205 can be subjected to tension when coupled to the reinforcing bars 240 and 245. The positioning member 200 and 205 may also be either substantially or at least partially supported by reinforcing bars 240 and 245. Furthermore, the positioning member can be subjected to compression when coupled to the reinforcing bars 240 and 245, or can be at least partially supported by the reinforcing bars 240 and 245 and also be subjected to compression when coupled to the bars 240 and 245.

[0024] In some embodiments, the first end portion 210 of each positioning member 200 and 205 can further be configured to partially surround a portion of the first reinforcing bar 240. For example, in the illustrated embodiments, the first end portion 210 can further include a curved section 250 having an inner surface 252 and an outer surface 255 (with respect to the reinforcing bar 240). The curved section 250 can at least partially surround (e.g., partially hook around) a portion of the first reinforcing bar 210. The inner surface 252 can couple, indirectly or directly, to the reinforcing bar 240.

[0025] In some embodiments, the second end portion 215 of each positioning member 200 and 205 can further be configured to create a snap fit between the second send portion 215 and the second reinforcing bar 245. For example, in the illustrated embodiments, the second end portion 215 of each positioning member 200 and 205 can further include a first curved section 260 and a second curved section 265. As shown in FIGS. 3, 5 and 6, the first curved section 260 includes an outer concave surface 270 and an inner concave surface 272. The first curved section 260, the outer surface 270 and inner surface 272 present concave profiles with respect to a first direction, such as the direction from the first and second reinforcing bars 240 and 245. The second curved section 265 includes an outer convex surface 275 and an inner convex surface 278. The second curved section 265, the outer surface 275 and the inner surface 278 present convex profiles substantially with respect to the first direction (e.g., the direction from the first and second reinforcing bars 240 and 245).

[0026] In the illustrated embodiments, the second end portion 215 also includes an inflection section 280 (shown in FIG. 6). The inflection section 280 provides the transition between the first curved section 260 (and the outer and inner concave surfaces 270 and 272) and the second curved section 265 (and the outer and inner convex surfaces 275 and 278). The inflection section 280 also includes an outer inflection surface 282 and an inner inflection surface 285 (shown in FIG. 6). In some embodiments, such as the illustrated embodiments, the first curved section 260, the second curved section 265 and the inflection section 280 are arranged to substantially form an S-shaped end portion 215.

[0027] In some embodiments, the inner concave surface 272, the inner inflection surface 280 and the inner convex surface 278 can all, in part, couple to the second reinforcing bar 245. In other embodiments, the second reinforcing bar 245 can couple to one of the inner surfaces 272, 278 or 280 or a combination of the inner surfaces 272, 278 and 280. In some embodiments this coupling can be accomplished by welding.

[0028] As shown in the illustrated embodiments, both the first reinforcing bar 240 and the second reinforcing bar 245 are included in the grid pattern 35, and each are positioned substantially parallel to the other. In other embodiments (not shown), the first end portion 210 of the first positioning member 200 can couple to one reinforcing member 30 while the first end portion 210 of the second positioning member 205 can couple to another reinforcing member 30. Similarly, in other embodiments (not shown), the second end portion 215 of the first positioning member 200 can couple to one reinforcing member 30 while the second end portion 215 of the second positioning member 205 can couple to another reinforcing member 30. In further embodiments, the reinforcing members 30 can be arranged in a different pattern, such as, for example, a pattern with two or more non-parallel, non-perpendicular reinforcing members 30.

[0029] In some embodiments, the intermediate section 220 of each positioning member 200 and 205 can be coupled to the anchor 20, when the positioning assembly 10 is assembled. As shown in the illustrated embodiments, the intermediate section 220 of the first positioning member 200 can be secured to the first leg 80 of the anchor 20, and the intermediate section 220 of the second positioning member 205 can be secured to the second leg 85 of the anchor 20. In some embodiments, such as the illustrated embodiments, the positioning members 45 (e.g., positioning members 200 and
are secured to the lower portion 65 of the anchor 20 and is embedded in the concrete form 40. The positioning members 200 and 205 can be secured to the respective legs 80 and 85 of the anchor 20 by welding, a securing device (e.g., bolt, sleeve, joint and the like), or the like. In the illustrated embodiments, each positioning member 200 and 205 is secured to the respective leg 80 and 85 of the anchor by a welded joint 290.

[0030] The exemplary positioning assembly 10 further includes at least one void former 50. The void former 50 can be formed of a variety of materials such as, for example, rubber, plastic, wood, a combination of two or more listed materials or any other material that is easily removable from the concrete (e.g., after hardening). The void former 50 can include a first portion 305 and a second portion 310. The first portion 305 and the second portion 310 of the void former 50 can be held together to create a sufficiently tight seal between the void former 50 and, at least in part, the upper portion 60 of the anchor 20. The first portion 305 and the second portion 310 can be distinct parts (not shown), can be an integral part (as shown in FIGS. 3 and 5-8), or can be at least partially connected together (not shown). The void former 50 can comprise as few as one part and as many as desired to create a desired void in the concrete form 40. Similarly, one or more void formers 50 can be used to create one or more voids in the concrete around the anchor 20.

[0031] In the illustrated embodiment, the first portion 305 and the second portion 310 is a single part having an upper surface 315, and the first portion 305 connects to the second portion 310 by a live hinge 320 included in the upper surface. The void former 50 further includes a recess 325 defined by the upper surface 315. In the illustrated embodiment, a second hinge 330 is positioned within the recess 325. The second hinge 330 includes one or more apertures 340 to receive one or more fasteners (not shown), such as a nail, bolt, screw or the like, to fasten the second hinge 330 to the void former 50.

[0032] The one or more fasteners (not shown) can also aid in the removal of the void former 50 from the positioning assembly 20 and the concrete form 40 (e.g., when the concrete is hardened). For example, a first bolt (not shown) can be received by a first aperture 350 positioned at least partially on the first portion 305 of the void former 50, and a second bolt (not shown) can be received by a second aperture 355 positioned at least partially on the second portion 310 of the void former 50. To remove the void former 50 from the positioning assembly 20, a device or user can force the bolts (not shown) together via the live hinge 320 and the second hinge 330 such that the first portion 305 and the second portion 310 are forced apart. When the void former 50 is removed from the positioning assembly 20 and the concrete form 40, the concrete form defines a void 400 as shown in FIG. 1.

[0033] The one or more fasteners (not shown) can also be used to fasten the void former 50 to a cover 402 substantially covering the concrete casting frame 25, such as a piece of plywood 402 (shown in FIGS. 2 and 3). In some embodiments, the cover 402 (e.g., the plywood) can level concrete when the concrete is cast.

[0034] In some embodiments the positioning assembly 10 allows for the void former 50, and consequently the anchor 20, to be held in place by the positioning members 200 and 205 coupled to the reinforcing members 30. The positioning members 200 and 205 can hold in place the void former 50 which surrounds the anchor 20.

[0035] In an exemplary embodiment, the anchor positioning system 10 (shown in FIGS. 2, 3, 5-8) is positioned within the concrete casting frame 25 when the reinforcing members 30 (e.g., reinforcing bars 240 and 245) are positioned within the frame 25. The first end portions 210 of the positioning members 200 and 205 are placed partially around the first reinforcing bar 240, such that the inner surfaces 252 included in the first end portions 210 couple with the first reinforcing bar 240. The second end portions 215 of the positioning members 200 and 205 are lowered onto the second reinforcing bar 245 and positioned such as to engage the second reinforcing bar 245 in a snap fit. When the anchor positioning system 10 is positioned within the frame 25, the concrete is poured into the frame 25 covering at least a portion of the reinforcing members 30 (e.g., reinforcing bars 240 and 245) and at least a portion of the anchor positioning assembly 10.

[0036] When the concrete hardens (forming a concrete form 40), the void former 50 is removed from the concrete form 40 exposing a portion of the anchor 20. As shown in FIG. 1, when the void former 50 is removed and the concrete has formed, at least a part of the upper portion 60 of the anchor is not immersed in the concrete form 40. A lifting apparatus 405 (shown partially in FIG. 1) such as, for example, a crane, can engage with the exposed portion of the anchor 20 to lift the concrete member 40.

[0037] The embodiments described above and illustrated in the figures are presented by way of example only and are not intended as a limitation upon the concepts and principles of the present invention. As such, it will be appreciated by one having ordinary skill in the art that various changes in the elements and their configuration and arrangement are possible without departing from the spirit and scope of the present invention as set forth in the appended claims.

1. An anchor positioning assembly to position an anchor in a casting frame having a first reinforcing member and a second reinforcing member, the anchor positioning assembly comprising:
   an anchor having a first portion and a second portion; and
   a positioning member having
   a first end configured to couple to the first reinforcing member,
   a second end configured to couple to the second reinforcing member, and
   an intermediate section;
   wherein the positioning member is formed from a rod.

2. The anchor positioning assembly of claim 1 wherein the intermediate section of the positioning member is coupled to the second portion of the anchor.

3. The anchor positioning assembly as set forth in claim 1, and further comprising a second positioning member having a third end configured to couple to the first reinforcing member, a fourth end configured to couple to the second reinforcing member, and a second intermediate section.

4. The anchor positioning assembly of claim 3 wherein the second intermediate section of the second positioning member is coupled to the second portion of the anchor.

5. The anchor positioning assembly as set forth in claim 3, wherein the first end of the positioning member further includes a first curved portion;
   the second end of the positioning member further includes a second curved portion presenting a first concave profile with respect to a first direction and a third curved...
portion presenting a first convex profile substantially with respect the first direction;
the third end of the second positioning member further includes a fourth curved portion; and
the fourth end of the second positioning member further includes a fifth curved portion presenting a second concave profile with respect to a second direction and a sixth curved portion presenting a second convex profile substantially with respect the second direction.

6. The anchor positioning assembly as set forth in claim 5, wherein the second curved portion and the third curved portion are arranged to engage in a snap fit with the second reinforcing member, and the fifth curved portion and the sixth curved portion are arranged to engage in a snap fit with the second reinforcing member.

7. The anchor positioning assembly as set forth in claim 3, and further comprising a void former forming a tight seal with the first portion of the anchor.

8. The anchor positioning assembly as set forth in claim 3, and wherein the second portion of the anchor includes a first leg and a second leg, and wherein the intermediate section of the positioning member couples to the first leg and the second intermediate section of the second positioning member couples to the second leg.

9. The anchor positioning assembly as set forth in claim 3, wherein the intermediate section is secured to the first leg by a first welded joint, and the second intermediate section is secured to the second leg by a second welded joint.

10. A method of positioning an anchor positioning assembly within a concrete casting frame to produce a concrete form, the method comprising:
arranging a first reinforcing member in the concrete casting frame;
arranging a second reinforcing member in the concrete casting frame;
engaging a first positioning member of the anchor positioning assembly to the first and second reinforcing member, wherein the first positioning member is formed from a rod;
engaging a second positioning member of the anchor positioning assembly to the first and second reinforcing member, wherein the second positioning member is formed from a rod;
substantially immersing a first portion of the anchor positioning assembly in concrete; and
creating a void within the concrete form such that a portion of the anchor positioning assembly is exposed.

11. The method as set forth in claim 10, wherein a tight seal is formed between the void former and a portion of the anchor positioning assembly.

12. A positioning member having a first end configured to couple to a first reinforcing member, a second end configured to couple to a second reinforcing member, and an intermediate section;
wherein the first end of the positioning member further includes a first curved portion; and
the second end of the positioning member further includes a second curved portion presenting a first concave profile with respect to a first direction, a third curved portion presenting a first convex profile substantially with respect the first direction, and a first inflection section providing a transition between the second and third curved portions.

13. The positioning member of claim 12 wherein the second curved portion and the third curved portion are arranged to engage in a snap fit with the second reinforcing member.

14. An anchor positioning system comprising:
a first positioning member having
a first end configured to couple to a first reinforcing member,
a second end configured to couple to a second reinforcing member, and
an intermediate section;
wherein the first positioning member is formed from a rod; and
a second positioning member having
a third end configured to couple to the first reinforcing member,
a fourth end configured to couple to the second reinforcing member, and
a second intermediate section;
wherein the second positioning member is formed from a rod.

15. The anchor positioning system of claim 14 wherein the first end of the first positioning member further includes a first curved portion;
the second end of the first positioning member further includes a second curved portion presenting a first concave profile with respect to a first direction, a third curved portion presenting a first convex profile substantially with respect the first direction, and a first inflection section providing a transition between the second and third curved portions;
the third end of the second positioning member further includes a fourth curved portion; and
the fourth end of the second positioning member further includes a fifth curved portion presenting a second concave profile with respect to a second direction, a sixth curved portion presenting a second convex profile substantially with respect to the second direction, and a second inflection section providing a transition between the fifth and sixth curved portions.

16. The anchor positioning system of claim 15 wherein the second curved portion and the third curved portion are arranged to engage in a snap fit with the second reinforcing member, and the fifth curved portion and the sixth curved portion are arranged to engage in a snap fit with the second reinforcing member.

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