Description

Title of the Invention: NON-ECCENTRIC REINFORCING BAR SPLICER

Technical Field

[1] The present invention relates to a non-eccentric reinforcing bar splicer capable of transferring stress without eccentricity between jointed reinforcing bars, absorbing construction errors, and firmly splicing the reinforcing bars by coupling both sides of wing plates of first and second fixtures, each having a reinforcing bar receiving portion in which a reinforcing bar is accommodated and wing plates disposed at both ends thereof.

Background Art

[2] Reinforcing bars used in construction of a reinforced concrete structure are limited in length due to problems such as transportation or loading. Therefore, splice of reinforcing bars is essential.

[3] There are a lap splice, a pressure welding splice, a mechanical splice, and the like as conventional reinforcing bar splicing methods.

[4] The lap splice is a method of overlapping and splicing reinforcing bars to be spliced by using adhesion strength of concrete (Korean Patent No. 10-1039041). However, the lap splice is uneconomical since being the lowest in work precision, being applicable only to in-site concrete, and increasing the quantity of reinforcing bars used to secure a length of lap splice. Furthermore, the lap splice is disadvantageous in structure since it is inevitable to generate eccentricity of the reinforcing bars.

[5] The pressure welding splice is a method of facing reinforcing bars to be spliced and applying heat by gas welding

or arc welding to melt and adhere the reinforcing bars (Korean Patent Laid-open No. 10-1999-0015019). However, the pressure welding splice requires high work precision since positions of the spliced reinforcing bars must match each other exactly. Moreover, the pressure welding splice may deteriorate performance since the reinforcing bars are changed to be brittle due to thermal effect at the time of pressure welding. Additionally, it is difficult to secure uniform quality since pressure welding is affected greatly by site environment, such as weather, worker proficiency, and the like, and a fire accident may occur due to the use of fire.

[6] The mechanical splice is a method of mechanically coupling the spliced reinforcing bars together by a coupler. As disclosed in Korean Patent Laid-open No. 10-2014-0046308, end portions of reinforcing bars are spliced by screw-coupling. However, the mechanical splice is difficult to be applicable in a case in which the reinforcing bars to be spliced are different from each other in size, and is difficult to splice the reinforcing bars by the coupler in a case in which eccentricity is generated between the spliced reinforcing bars due to construction errors.

[7] In particular, like a pre-fabricated reinforced concrete (PRC), in a case in which a plurality of reinforcing bars are welded with tie hoops in a factory to form a reinforced cage, since the plurality of reinforcing bars are installed in a fixed state, it is not easy to minutely adjust the positions of the reinforcing bars. In addition, in a case in which the diameter of the reinforcing bars is large, since it is more difficult to minutely adjust the positions of the reinforcing bars, there is a limitation in splice by the coupler.

Disclosure

Technical Problem

[8] Accordingly, the present invention has been made in view of the above-mentioned problems occurring in the related art, and it is an object of the present invention to provide a non-eccentric reinforcing bar splicer capable of removing eccentricity between jointed reinforcing bars, absorbing construction errors, and firmly splicing the reinforcing bars.

Technical Solution

[9] To accomplish the above-mentioned objects, according to the present invention, there is provided a non-eccentric reinforcing bar splicer, which is to splice a first reinforcing bar and a second reinforcing bar, including: a first fixture having a semicircular reinforcing bar receiving portion in which the first reinforcing bar is accommodated and fixed, and a pair of wing plates respectively bent at both ends of the reinforcing bar receiving portion; a second fixture disposed at an end portion of the first fixture and having a semicircular reinforcing bar receiving portion in which the second reinforcing bar is accommodated and fixed, and a pair of wing plates respectively bent at both ends of the reinforcing bar receiving portion; and a pair of coupling plates getting in close contact with both sides of the wing plates of the first fixture and both sides of the wing plates of the second fixture.

[10] In another preferred embodiment, the coupling plates are fixed to the wing plates by a fastening bolt.

[11] In another preferred embodiment, the fastening bolts are high tension bolts to fix the coupling plates and the wing plates by slip critical joint.

[12] In another preferred embodiment, the reinforcing bar receiving portions respectively have plug welding slots which are

filled with a welding material to fix the reinforcing bars to the reinforcing bar receiving portions.

[13] In another preferred embodiment, joint portions between the wing plates and the reinforcing bar receiving portions have flare welding grooves formed to be rounded in an arc shape and filled with the welding material between the joint portion and the outer circumferential surface of the reinforcing bars to fix the reinforcing bars to the reinforcing bar receiving portions.

Advantageous Effects

[14] The non-eccentric reinforcing bar splicer according to an embodiment of the present invention achieve the following effects.

[15] First, the non-eccentric reinforcing bar splicer can transfer stress without eccentricity between jointed reinforcing bars, absorb construction errors, and firmly splice the reinforcing bars by coupling both sides of wing plates of first and second fixtures, each having a reinforcing bar receiving portion in which a reinforcing bar is accommodated and wing plates disposed at both ends thereof.

[16] Second, since the fixture having the reinforcing bar receiving portion and the wing plate can be manufactured just by bending a steel plate, the non-eccentric reinforcing bar splicer according to an embodiment of the present invention can simplify manufacturing and reduce manufacturing costs.

[17] Third, the non-eccentric reinforcing bar splicer according to an embodiment of the present invention can absorb construction errors by adjusting the size of the bolt fastening hole to coupling the coupling plate and the wing plate, and the reinforcing bars can be firmly spliced by slip critical joint of the high tension bolts when the coupling plate and the wing plate are coupled by the high tension bolts.

[18] Fourth, in a case in which the first and second fixtures are respectively fixed at the end portions of the first and second reinforcing bars in advance before arrangement of the reinforcing bars, the reinforcing bars can be rapidly and simply spliced just by coupling the coupling plate to the wing plate.

Description of Drawings

[19] FIG. 1 is a perspective view illustrating a non-eccentric reinforcing bar splicer according to an embodiment of the present invention.

[20] FIG. 2 is a perspective view illustrating a fixture of the non-eccentric reinforcing bar splicer according to the embodiment of the present invention.

[21] FIGS. 3 and 4 are views illustrating a reinforcing bar splicing process using the non-eccentric reinforcing bar splicer according to the embodiment of the present invention.

[22] FIG. 5 is a perspective view illustrating a state in which a reinforcing bar is coupled to a fixture by plug welding.

[23] FIG. 6 is a perspective view illustrating a state in which a reinforcing bar is coupled to a fixture by flare groove welding.

[24] FIG. 7 is a cross-sectional view illustrating a state in which a reinforcing bar is coupled to a fixture by plug welding and flare groove welding.

Best Mode

[25] To accomplish the above-mentioned objects, according to the present invention, there is provided a non-eccentric reinforcing bar splicer, which is to splice a first reinforcing bar and a second reinforcing bar, including: a first fixture having a semicircular reinforcing bar receiving portion in which the first reinforcing bar is accommodated and fixed, and a pair of wing plates respectively bent at both ends of the reinforcing bar

receiving portion; a second fixture disposed at an end portion of the first fixture and having a semicircular reinforcing bar receiving portion in which the second reinforcing bar is accommodated and fixed, and a pair of wing plates respectively bent at both ends of the reinforcing bar receiving portion; and a pair of coupling plates getting in close contact with both sides of the wing plates of the first fixture and both sides of the wing plates of the second fixture.

Mode for Invention

[26] Hereinafter, the present invention will be described in detail with reference to the accompanying drawings and preferred embodiments.

[27]

[28] FIG. 1 is a perspective view illustrating a non-eccentric reinforcing bar splicer according to an embodiment of the present invention,FIG. 2 is a perspective view illustrating a fixture of the non-eccentric reinforcing bar splicer according to the embodiment of the present invention, and FIGS. 3 and 4 are views illustrating a reinforcing bar splicing process using the non-eccentric reinforcing bar splicer according to the embodiment of the present invention.

[29] As illustrated in FIGS. 1 to 4, the non-eccentric reinforcing bar according to an embodiment of the present invention is to splice a first reinforcing bar 1a and a second reinforcing bar 1b, and includes: a first fixture 20a having a semicircular reinforcing bar receiving portion 21a in which the first reinforcing bar 1a is accommodated and fixed, and a pair of wing plates 22a respectively bent at both ends of the reinforcing bar receiving portion 21a; a second fixture 20b disposed at an end portion of the first fixture 20a and having a semicircular

reinforcing bar receiving portion 21b in which the second reinforcing bar 1b is accommodated and fixed, and a pair of wing plates 22b respectively bent at both ends of the reinforcing bar receiving portion 21b; and a pair of coupling plates 23 getting in close contact with both sides of the wing plates 22a of the first fixture 20a and both sides of the wing plates 22b of the second fixture 20b.

[30] The present invention is to provide a non-eccentric reinforcing bar splicer capable of absorbing construction errors to remove eccentricity between the first reinforcing bar 1a and the second reinforcing bar 1b to be spliced, and firmly splicing the reinforcing bars when the first reinforcing bar 1a and the second reinforcing bar 1b neighboring in a longitudinal direction are spliced.

[31] The non-eccentric reinforcing bar splicer 2 according to the preferred embodiment of the present invention includes the first fixture 20a to which the first reinforcing bar 1a is fixed, the second fixture 20b to which the second reinforcing bar 1b is fixed, and the coupling plates 23 to interconnect the first fixture 20a and the second fixture 20b.

[32] The first fixture 20a and the second fixture 20b are configured in the same shape.

[33] The first fixing member 20a and the second fixing member 20b respectively include the semicircular reinforcing bar receiving portions 21a and 21b, and a pair of the wing plates 22a and 22b respectively bent at both ends of the reinforcing bar receiving portion 21a and both ends of the reinforcing bar receiving portion 21b.

[34] Hereinafter, the first reinforcing bar 1a and/or the second reinforcing bar 1b are called the reinforcing bar 1a and/or 1b,

and the first fixture 20a and/or the second fixture 20b are called the fixture 20a and/or 20b.

[35]

[36] The reinforcing bar receiving portions 21a and 21b are portions in which a portion of the reinforcing bar is inserted and accommodated, and are bent to be round and semicircular to correspond to the outer circumferential surface of the reinforcing bar.

[37] The reinforcing bars 1a and 1b are fixed inside the reinforcing bar receiving portions 21a and 21b by welding.

[38] The wing plates 22a and 22b are respectively bent at both ends of the reinforcing bar receiving portions 21a and 21b.

[39] The wing plates 22a and 22b are formed integrally with the reinforcing bar receiving portions 21a and 21b.

[40] That is, the first fixture 20a and the second fixture 20b is configured in such a way that a rectangular steel plate is curved at the center to integrally form the reinforcing bar receiving portions 21a and 21b and the wing plates 22a and 22b.

[41] Therefore, since the fixtures 20a and 20b can be formed just by curving the steel plate, the non-eccentric reinforcing bar splicer according to the embodiment of the present invention is very simple in manufacturing and reduces the manufacturing cost.

[42]

[43] The coupling plates 23 get in close contact with the wing plate 22a of the first fixture 20a and the wing plate 22b of the second fixture 20b to interconnect the first fixture 20a and the second fixture 20 b.

[44] That is, the first fixture 20a and the second fixture 20b can be spliced when the coupling plates 23 are coupled to the wing plates 22a and 22b.

[45] Stress of the reinforcing bars 1a and 1b can be smoothly transferred through the coupling plates 23 coupling the first fixture 20a and the second fixture 20b.

[46] Therefore, the non-eccentric reinforcing bar splicer according to the embodiment of the present invention can show the same structural performance at the time of tensile and compression.

[47] In this instance, a pair of the coupling plates 23 are disposed to respectively connect a pair of the wing plates 22a and 22b located at both ends of the reinforcing bar receiving portions 21a and 21b.

[48] In addition, the coupling plate 23 may be respectively provided on both front and rear surfaces of the wing plates 22a and 22b so as to prevent eccentricity from being generated when the stress is transferred by the coupling plates 23.

[49]

[50] The first fixture 20a and the second fixture 20b are formed in the same shape.

[51] Accordingly, in a state in which the first fixture 20a and the second fixture 20b are fixed to the coupling plate 23, the reinforcing bar receiving portions 21a and 21b are positioned on the same axis. Accordingly, the first reinforcing bar 1a and the second reinforcing bar 1b to be spliced can be spliced on the same axis line without eccentricity.

[52]

[53] Referring to FIGS. 3 and 4, a reinforcing bar splicing process using the non-eccentric reinforcing bar splicer according

to an embodiment the present invention will be described as follows.

[54] First, as illustrated in FIG. 3, the first fixture 20a and the second fixture 20b are fixed at the ends of the first reinforcing bar 1a and the second reinforcing bar 1b in advance before the reinforcing bars 1a and 1b are arranged.

[55] After the reinforcing bars 1a and 1b are arranged in the state in which the fixtures 20a and 20b are fixed, as illustrated in FIG. 4, the coupling plates 23 are coupled to the first fixture 20a and the second fixture 20b so that the reinforcing bars 1a and 1b are spliced completely.

[56] As illustrated in FIG. 4, the coupling plates 23 are fixed to the wing plates 22a and 22b by a fastening bolt 24.

[57]

[58] The coupling plates 23 and the wing plates 22a and 22b are coupled to each other by fastening bolts 24.

[59] The wing plates 22a and 22b and the coupling plates 23 respectively have bolt fastening holes 221 and 231 formed at positions corresponding to each other.

[60] In order to fasten the fastening bolts 24, preferably, the bolt fastening holes 221 and 231 formed in the wing plates 22a and 22b and the coupling plates 23 are formed to be slightly larger than the diameter of the fastening bolts 24 in consideration of manufacturing errors, ease of fastening, minute adjustment of the positions of the reinforcing bars 1a and 1b to be spliced.

[61] Since the first reinforcing bar 1a and the second reinforcing bar 1b can be mounted by fixing the first fixing member 20a and the second fixing member 20b in advance, the

reinforcing bars 1a and 1b can be spliced just by fastening the fastening bolts 24.

[62] Therefore, splicing work of the reinforcing bars 1a and 1b can be performed rapidly and simply.

[63]

[64] The fastening bolts 24 are high tension bolts to fix the coupling plates 23 and the wing plates 22a and 22b by slip critical joint.

[65] A general bolt transfers stress by pressure between the bolt fastening hole and the bolt. In this instance, there is a possibility of a shear fracture of the bolt, and the general bolt is vulnerable to repeated stress since stress is concentrated around the bolt. Additionally, in a case in which direction of stress is changed due to a gap between the bolt fastening holes 221 and 231 and the fastening bolts 24, there may occur a slip between the wing plates 22a and 22b and the coupling plates 23.

[66] Therefore, when the fastening bolts 24 which are the high tension bolts are used, the coupling plates 23 and the wing plates 22a and 22b can be fixed mutually by the slip critical joint.

[67] The high tension bolts transfer stress by friction force generated between the coupling plates 23 and the wing plates 22a and 22b by using strong clamping force. Therefore, the high tension bolts prevent nuts from being released, are strong to repeated stress since reducing a local stress concentration, and is high at fatigue strength. Moreover, even if the direction of stress is changed, the high tension bolts can transfer tension force and compression force stably without confusion.

[68] The high tension bolts may be torque shear (TS) bolts which causes a shear fracture of the tip when reaching a predetermined

clamping force in order to secure the predetermined clamping force.

[69]

[70] FIG. 5 is a perspective view illustrating a state in which a reinforcing bar is coupled to a fixture by plug welding.

[71] As illustrated in FIG. 5, the reinforcing bar receiving portions 21a and 21b respectively have plug welding slots 211 which are filled with a welding material W to fix the reinforcing bars 1a and 1b to the reinforcing bar receiving portions 21a and 21b.

[72] In order to fix the fixtures 20a and 20b to end portions of the reinforcing bars 1a and 1b by welding, the plug welding slots 211a are respectively perforated in the middle of the reinforcing bar receiving portions 21a and 21b.

[73] Accordingly, the reinforcing bars 1a and 1b are inserted into the reinforcing bar receiving portions 21a and 21b, and then, come into contact with the inner circumferential surfaces of the reinforcing bar receiving portions 21a and 21b. After that, the plug welding slot 211 is filled with the welding material W so as to firmly fix the reinforcing bars 1a and 1b to the reinforcing bar receiving portions 21a and 21b.

[74] The plug welding slot 211 is elongated in the longitudinal direction of the reinforcing bars 1a and 1b to be spliced so as to secure a sufficient welding length.

[75] The reinforcing bars 1a and 1b can be firmly fixed to the fixtures 20a and 20b due to the sufficient welding length secured by the plug welding.

[76]

[77] FIG. 6 is a perspective view illustrating a state in which a reinforcing bar is coupled to a fixture by flare groove welding,

and FIG. 7 is a cross-sectional view illustrating a state in which a reinforcing bar is coupled to a fixture by plug welding and flare groove welding.

[78] As illustrated in FIGS. 6 and 7, joint portions between the wing plates 22a and 22b and the reinforcing bar receiving portions 21a and 21b have flare welding grooves 212 formed to be rounded in an arc shape and filled with the welding material between the joint portion and the outer circumferential surface of the reinforcing bars 1a and 1b to fix the reinforcing bars 1a and 1b to the reinforcing bar receiving portions 21a and 21b.

[79] In a case in which a steel plate is bent to form the fixtures 20a and 20b, the bent portion between the reinforcing bar receiving portions 21a and 21b and the wing plates 22a and 22b is rounded in an arc shape.

[80] The flare welding grooves 212, which are predetermined spaces, are formed on both sides of the reinforcing bars 1a and 1b by the rounded bent portion.

[81] In a case in which the flare welding grooves 212 are filled with the welding material W, the reinforcing bars 1a and 1b can be fixed inside the reinforcing bar receiving portions 21a and 21b by the flare groove welding.

[82] As illustrated in FIG. 7, according to circumstances, the plug welding and the flare groove welding may be performed together so that stress of the reinforcing bars 1a and 1b can be transferred to the fixtures 20a and 20b smoothly.

Industrial Applicability

[83] The non-eccentric reinforcing bar splicer according to an embodiment of the present invention is industrially applicable in that it is possible to manufacture a fixture having a reinforcing bar receiving portion and a wing plate just by bending a steel

plate, thereby simplifying manufacturing and reducing manufacturing costs.

Claims

【Claim 1】

A non-eccentric reinforcing bar splicer, which is to splice a first reinforcing bar (1a) and a second reinforcing bar (1b), comprising:

a first fixture (20a) having a semicircular reinforcing bar receiving portion (21a) in which the first reinforcing bar (1a) is accommodated and fixed, and a pair of wing plates (22a) respectively bent at both ends of the reinforcing bar receiving portion (21a);

a second fixture (20b) disposed at an end portion of the first fixture (20a) and having a semicircular reinforcing bar receiving portion (21b) in which the second reinforcing bar (1b) is accommodated and fixed, and a pair of wing plates (22b) respectively bent at both ends of the reinforcing bar receiving portion (21b); and

a pair of coupling plates (23) getting in close contact with both sides of the wing plates (22a) of the first fixture (20a) and both sides of the wing plates (22b) of the second fixture (20b).

【Claim 2】

The non-eccentric reinforcing bar splicer according to claim 1, wherein the coupling plates (23) are fixed to the wing plates (22a, 22b) by a fastening bolt (24).

【Claim 3】

The non-eccentric reinforcing bar splicer according to claim 2, wherein the fastening bolts (24) are high tension bolts to fix the coupling plates (23) and the wing plates (22a, 22b) by slip critical joint.

【Claim 4】

The non-eccentric reinforcing bar splicer according to claim 1, wherein the reinforcing bar receiving portions (21a, 21b) respectively have plug welding slots (211) which are filled with a welding material (W) to fix the reinforcing bars (1a, 1b) to the reinforcing bar receiving portions (21a, 21b).

【Claim 5】

The non-eccentric reinforcing bar splicer according to claim 1, wherein joint portions between the wing plates (22a, 22b) and the reinforcing bar receiving portions (21a, 21b) have flare welding grooves (212) formed to be rounded in an arc shape and filled with the welding material between the joint portion and the outer circumferential surface of the reinforcing bars (1a, 1b) to fix the reinforcing bars (1a, 1b) to the reinforcing bar receiving portions (21a, 21b).