

13 DEC 1996

1

10053
copy

TITLE: CONNECTING COMBINATION STRUCTURE FOR REINFORCEMENTS ✓

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a connecting combination structure for reinforcements, wherein, one end of each of two steel bars to be connected is cut transversly to form a plain plane, these ends are connected respectively with a male connector and a female connector by friction welding, an external thread and an inner thread provided respectively on the male connector and the female connector can be used to connect these connectors, the connecting combination structure for reinforcements thus is completed. By the said combination structure, objects of simplifying the structure as well as fast connecting can be achieved.

2. Description of the Prior Art

Connecting structures for reinforcements is very much influential to the quality of construction and of the construction structure, and especially in a big engineer, a serious harm may be induced if an inadvertence is made. Therefore, bigger engineers normally take extremely severe requirement on connecting structure for reinforcements, reinforcements can only be used if they pass the stationary resistance tests, and are coincident with the standard required of no damage on the reinforcement ends of the connected structure when the bars are forced to be

broken in the tensile strength test. In the earlier time, the most traditional connecting mode for reinforcements is the multiple connection mode, wherein, two steel bars to be connected lap with each other, and then are tied together on several locations thereon with wrapping wires, this type of connection results inferior strength of structure, and thus is no longer commonly used. The connecting modes or utilization of connecting combination structures for reinforcements known now a days generally include the modes such as pressing connection, weld connection, gun-powder melting connection, gas pressing connection and threading connection by tapping of reinforcements, these connecting combination structures for reinforcements may have their improved effects, they still have quite a lot of inconvenience and disadvantages though, e.g.:

1. Cold pressing connection mainly uses a cold pressing connecting machine to press the two steel bars to combine them together, the cold pressing connecting machine is uneasy to be moved, so that this method is bothersome and inconvenient to be used on a high building or for a high story for construction, not only it is difficult, construction efficiency thereof is low and not ideal.
2. Gas press connection and weld connection are controlled by man work, they can result different strength of the construction because of the man work factor, quality of

construction is not easy to be under control, and they are subjected to influence of the conditions such as of weather, temperature and time when in operation, for example, when it rains, material of steel can become fragile during operation, hence inconvenience can be experienced in construction.

3. In gun-powder melting connection, gun-powder is placed between the connecting ends of the two steel bars and is ignite to make explosion for melting, strength of the construction resulted by such connection is not very stable, operation thereof is so bothersome, yet it is highly dangerous.

4. Threading connection by tapping of reinforcements can be divided basically into two types: the first one is to make threads directly on the reinforcements and then to use them together with sleeves for connection; the other is to deform the reinforcements by cold pressing or to coat the reinforcements with solder, so that the diameters of the ends of the reinforcements to be connected can be increased, and then to tap threads on the reinforcements and to use them together with sleeves for connection; no matter it is to tap threads directly on the reinforcements or to coat the reinforcements with solder to increase the diameters of the ends of the reinforcements to then tap threads on the reinforcements, crystalline arrangement on the steel sectional area on

the ends will be destroyed, therefore, when they are connected and the construction made thereof is in use, break may occur easily.

5 Accordingly, the connecting combination structures for reinforcements used now a days still has quite much inconvenience, especially as to the requirement in concentricity, they don't have fine accuracy, so that the whole structure strength can be much reduced.

SUMMARY OF THE INVENTION

10 In view of this, the inventor of the present invention provides a connecting combination structures for reinforcements based on his professional experience of years in connection practising for reinforcements and after continuous study and tests, having larger tensile
15 strength, more accurate concentricity, and more convenience in construction. Particularly, one end of each of the two steel bars to be connected is cut transversely to form a plain plane, these ends are connected respectively with a male connector and a female connector by friction
20 welding, an external thread and an inner thread provided respectively on the male connector and the female connector can be used to connect these connectors, the connecting combination structure for reinforcements thus is completed.

25 Hence the main object of the present invention is to provide a connecting combination structure for reinforcement

cements, wherein, friction welding specifically is used to connect the male connector and the female connector respectively with the reinforcements, in this way, instant thread connection can be done on the site of construction, no requisition will be there for a cold pressing connecting machine or a welding equipment etc., the whole construction operation is simplified and convenient, it is specially because that, the male connector and the female connector are connected respectively with the reinforcements by way of friction welding, connection with accurate concentricity can be ensured, after severe tensile strength tests till breakage of reinforcements, it is testified that such connecting combination structures can never induce breakage of reinforcements (data of tests to be cited below), hence their quality is extremely stable, and is completely coincident with the standards of utility and tests.

The secondary object of the present invention is to provide a connecting combination structure for reinforcements, wherein, one end of each of the two steel bars to be connected is cut transversely to form a plain plane, the diameter of the male connector is equal to or slightly larger than that of the bar connected therewith, the female connector is provided on one end thereof a protruding stub for melting connection with the other of the bars, the said male connector and female connector are

provided on the mutual connecting ends respectively thereof a tapered external and a tapered inner thread, so that the tapered threads thereof can be connected with each other more easily, i.e., they can be connected very fast and convenient, while connection therebetween can be excellent.

The present invention will be apparent in its practical structure, characteristics and functions after reading the detailed description of the preferred embodiment thereof in reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

Fig. 1 is an analytical perspective view of the present invention;

Fig. 2 is a perspective view shows connection between the male connector, female connector and the reinforcements of the present invention;

Fig. 3 is a sectional view of the assembled combination of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to Fig. 1, the connecting combination of the present invention is comprised mainly of two steel bars 1 to be connected, a male connector 2 and a female connector 3, wherein:

one end of each of the two steel bars to be connected is cut transversly to form a plain plane 11;

the male connector 2 is a solid steel column with a diameter equal to or slightly larger than that of the bar 1 connected therewith, the male connector 2 is provided on the connecting end thereof with a tapered surface, the tapered end then is made thereon by a lathe an external thread 21 which has a tapered angle preferably of 3 degrees;

the female connector 3 is also made of solid steel, and is provided on the connecting end thereof with an inner tapered thread 31 completely corresponding to that of the external thread 21 of the male connector 2, the other end thereof is provided with a protruding stub 32 for melting connection with one of the steel bars 1 to be connected, the protruding stub 32 is also of a diameter equal to or slightly larger than that of the bar 1;

In using of the above stated members, the steel bars 1 to be connected are clamped in positions respectively and then the male connector 2 and the female connector 3 are rotated in high speed by friction welding, the steel bars 1 to be connected are aligned respectively in accurate concentric relationship with the male connector 2 and the female connector 3 and are melting connected by the said friction welding together with the connectors 2, 3 (as shown in Fig. 2), after that, the connectors 2, 3 can be tightly connected with each other by means of the

inner tapered thread 31 and the external tapered thread 21 to complete combination thereof (as shown in Fig. 3).

Because the steel bars 1 to be connected are connected respectively with the male connector 2 and the female connector 3 by the said friction welding, i.e., every steel bar 1 has already melting connected with the male connector 2 or the female connector 3 during the preparing operation thereof, when they are transported to a construction site, the bars 1 and the male and female connectors 2, 3 can be connected in combination very fast to complete connection of the reinforcements.

The inventor of the present invention knows so well the significance of a connecting combination structure for reinforcements, and therefore obtained data by tests to make a comparison between various strengths of common reinforcements and the connecting combination structure of the present invention, the data are shown below:

tested object	diameter	yield strength	tensile strength
	(mm)	(kgf/mm ²)	(kgf/mm ²)
common reinforcement	D 35	> 35	> 50
the connecting combination structure of the present invention	D 32	46.1	66.1

The data listed above testify that the connecting combination structure of the present invention is coincident with the standard requirement in construction.

5 According to the design of the connecting combination of the present invention, the two steel bars 1 to be connected have been connected respectively with the male connector 2 and the female connector 3 by friction welding in antedence during their preparing operation, yet operation of friction welding can be done very fast and
10 convenient, quality resulted from such operation is extremely stable, therefore mass production is suitable for the present invention, cost thereof is lowered, connection of the whole construction procedure is completed on the spot, heavy equipments such as a cold pressing connecting machine or a welding equipment etc. is not in need
15 here, and above all, extremely accurate concentricity can be assured by friction welding of the steel bars 1 to be connected to the male connector 2 and the female connector 3.

20 In conclusion, the present invention is brand new and is very simple and convenient, the above stated effect of the present invention can be reasonably achieved, it is innovative relative to the connecting modes or utilization of connecting combination structures for reinforcements known now a days, the effect resided in the conventional connecting combination structures can be improved
25

ved by the present invention, further more, the present invention is much influential to elevating of quality of the connection work for reinforcements in a structure or in a construction engineer.

5 Having thus described the technical structure of my invention with practicability and improveness, therefore, what I claim as new and desire to be secured by Letters Patent of the United States is:

CLAIMS

1. A connecting combination structure for reinforcements comprised of two steel bars to be connected, a male connector and a female connector, said combination structure is characterized in:

said two steel bars to be connected each is cut transversely to form a plain plane;

said male connector is a solid steel column with a diameter equal to or slightly larger than that of any one of said bars connected therewith and is provided on the connecting end thereof with an external thread;

said female connector is also made of solid steel, and is provided on the connecting end thereof with an inner thread completely corresponding to that of said external thread of said male connector, the other end thereof is provided with a protruding stub also of a diameter equal to or slightly larger than that of said bars;

in using of the above stated members, said steel bars to be connected are clamped in positions respectively and then said male connector and said female connector are rotated in high speed by friction welding, said steel bars to be connected are aligned respectively in accurate concentric relationship with said male connector and said female connector and are melting connected by said friction welding together with said connectors, after that, said male and female connectors can be tightly connected



with each other by means of said inner thread and said external thread to complete combination thereof.

2. A connecting combination structure for reinforcements as claimed in claim 1,

5 said male connector is provided on said connecting end thereof with a tapered surface which then is made thereon a tapered external thread by a lathe, said female connector is also provided on the connecting end thereof with an inner tapered thread corresponding to that of
10 said external thread of said male connector.

3. A connecting combination structure for reinforcements as claimed in claim 2, wherein,

 said external tapered thread on said male connector and said inner tapered thread on said female connector
15 each has a tapered angle preferably of 3 degrees.

