

PATENT SPECIFICATION

(11) 1 517 800 (9)

- (21) Application No. 42357/75 (22) Filed 15 Oct. 1975
 (23) Complete Specification filed 16 Dec. 1976
 (44) Complete Specification published 12 July 1978
 (51) INT CL³ E04C 5/18
 (52) Index at acceptance E1W 4A230 4A35
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(54) CONNECTING REINFORCING BARS IN CONCRETE
 BODIES

(71) We, CCL SYSTEMS LIMITED, an English Company, of Cabco House, Ewell Road, Surbiton, Surrey, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to concrete bodies reinforced with reinforcing bars. It is often necessary when making one such body or joining two of them together to leave a hole for access or inspection. The hole may later be filled in with concrete or, where access is required permanently, the hole may be provided with a demountable cover.

The metal reinforcement bridging the hole must keep its tensile strength and often such holes are located at the interconnection of two lengths of bar which must accordingly be joined in the hole. One way of making the connection is to "lap" the bars which means overlapping one on another, if necessary bending one (or each) bar to the required position. To ensure that the joint has the necessary tensile strength the length of the overlap must be at least 40 times the diameter of the bar. This means however that a bulky connection is formed, and this must be accommodated in the hole the size of which is accordingly increased over and above that required solely for the purpose of access and inspection.

According to the invention, a method of making a connection between a pair of spaced collinear reinforcing bars in concrete bodies, comprises

(i) securing to each bar by radial compression the unthreaded portion of a respective first partially threaded sleeve,

(ii) securing to each end of an intermediate bar the unthreaded portion of a respective second partially threaded sleeve, the intermediate bar being of a length slightly less than the distance between the concrete bodies,

(iii) locating in the threaded portion of the second sleeve at each end of the intermediate bar a threaded high tensile stud and locating the intermediate bar between the bars, and

(iv) rotating each stud to engage the

thread of the respective first sleeve secured to a bar so as to bridge the gap between the bars by means of the intermediate bar.

Preferably the threaded portions of the second sleeves are of greater length than those of the first sleeves. Also, preferably each stud has two threaded portions of unequal length, the shorter of the portions engaging the thread of a first sleeve. The term "stud" is used to cover a short length of rod, bar, bolt or the like.

The threaded portion of one of the second sleeves attached to the intermediate bar is preferably of a shorter length than and threaded in the opposite direction to all the other sleeves in the assembly, the corresponding stud having two threaded portions whose threads run in mutually opposite directions, and are advantageously of equal length.

The first sleeves may be secured to the reinforcing bars before casting of the concrete bodies, the concrete being cast such that the mouth of each sleeve lies at the surface of the concrete body.

The invention also provides a connection assembly for a pair of spaced collinear reinforcing bars located in concrete bodies, each bar having a respective threaded first sleeve on the end thereof, comprising an intermediate bar having a respective second sleeve secured to each end by radial compression, each second sleeve having a threaded portion extending beyond the bar, and a threaded high tensile stud engaged with each threaded portion, the studs being threaded such that they can co-operate with the respective first sleeves on the reinforcing bars.

An embodiment of the invention is illustrated by the accompanying diagrammatic drawing in which Figure 1 shows a connection about to be made and Figure 2 shows a formed connection.

The access hole is formed of two opposed bodies of cast concrete 1 separated by a distance of from about 500 mm to 5 metres. A reinforcing bar 2 of e.g. 16 to 40 mm diameter, connected adjacent the free end to a sleeve is cast into each body 1. The sleeve 3 has a

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threaded portion 4 and an unthreaded portion 5 which was radially compressed on to the bar before the bar was cast into the concrete 1.

5 A connection assembly comprises a length of bar 2', to each end of which has been secured by radial compression a sleeve 3'. The sleeves 3' are the same as the sleeves 3 save that the length of the threaded portion 4' which extends beyond the end of the bar 2' is longer by about twice. A threaded high tensile stud 6 has an external knurled part 7 between its ends dividing the bolt into two unequal threaded portions 8 and 8', the portion 8 being dimensioned so as to be received in a portion 4 of a sleeve 3 secured to a bar 2.

10 In operation, the sleeves 3 are compressed on to the bars 2 and concrete is then cast to form the bodies 1. The mouth of each sleeve 3 is protected against the ingress of dirt etc. by a removable plastics cap 10. The caps are removed and the assembly is then located in position so that a stud 6 is in axial alignment with a sleeve 3. Each stud is then rotated by gripping the portion 7 in turn to cause the threaded portion 8 to be received in a respective threaded portion 4, so locking the bar 2' to the bars 2. In this way the reinforcement extends across the access hole without forming a bulky connection.

15 The threaded portions of the sleeves 3' may be threaded in opposite directions to facilitate engagement of the bolts with the sleeves 3. The bar 2' may be replaced by other intermediate structures, although for economy and effectiveness it is most likely to be of the same material as the bars 2.

WHAT WE CLAIM IS:—

40 1. A method of making a connection between a pair of spaced collinear reinforcing bars located in concrete bodies, comprising

- (i) securing to each bar by radial compression the unthreaded portion of a respective first partially internally threaded sleeve,
- 45 (ii) securing to each end of an intermediate bar the unthreaded portion of a respective second partially internally threaded sleeve, the intermediate bar being of a length slightly less than the distance between the concrete bodies,
- 50 (iii) locating in the threaded portion of the second sleeve at each end of the intermediate bar a threaded high tensile stud and locating the intermediate bar between the bars, and
- 55 (iv) rotating each stud to engage the thread of the respective first sleeve secured to a bar so as to bridge the gap between the bars by means of the intermediate bar.

60 2. A method according to claim 1, in which the threaded portions of the second sleeves are

of greater length than those of the first sleeves.

3. A method according to claim 2, in which each stud has two threaded portions of unequal length, the shorter of the portions engaging the thread of a first sleeve.

4. A method according to claim 1, 2 or 3, in which the threaded portion of one of the second sleeves is of shorter length than and threaded in the opposite direction to all the other sleeves, the co-operating stud having two threaded portions whose threads run in mutually opposite directions.

5. A method according to claim 4, in which the threaded portions of the co-operating stud are of equal length.

6. A method according to any preceding claim, in which the first sleeves are secured to the reinforcing bars before casting of the concrete bodies, the concrete being cast such that the mouth of each sleeve lies at the surface of the concrete body.

7. A method of making a connection between a pair of opposed reinforcing bars located in concrete bodies, substantially as described with reference to the accompanying drawings.

8. A connection assembly for a pair of spaced collinear reinforcing bars located in concrete bodies, each bar having a respective internally threaded first sleeve on the end thereof, comprising an intermediate bar having a respective second sleeve secured to each end by radial compression, each second sleeve having an internally threaded portion extending beyond the bar, and a threaded high tensile stud engaged with each threaded portion, the studs being threaded such that they can co-operate with the respective first sleeves on the reinforcing bars.

9. An assembly according to claim 8, in which the threaded portions of the second sleeves are of greater length than those of the first sleeves.

10. An assembly according to claim 8 or 9, in which each stud has two threaded portions of unequal length, the shorter of the portions engaging the thread of a first sleeve.

11. An assembly according to claim 8, 9 or 10, in which the threaded portion of one of the second sleeves is of shorter length than and threaded in the opposite direction to all the other sleeves, the co-operating stud having two threaded portions whose threads run in mutually opposite directions.

12. An assembly according to claim 11, in which the threaded portions of the co-operating stud are of equal length.

13. A connection assembly for connecting a pair of spaced collinear reinforcing bars located in concrete bodies, substantially as described with reference to the accompanying drawings.



threaded portion 4 and an unthreaded portion 5 which was radially compressed on to the bar before the bar was cast into the concrete 1.

- 5 A connection assembly comprises a length of bar 2', to each end of which has been secured by radial compression a sleeve 3'. The sleeves 3' are the same as the sleeves 3 save that the length of the threaded portion 4' which extends beyond the end of the bar 2' is longer by about twice. A threaded high tensile stud 6 has an external knurled part 7 between its ends dividing the bolt into two unequal threaded portions 8 and 8', the portion 8 being dimensioned so as to be received in a portion 4 of a sleeve 3 secured to a bar 2.

- 10 In operation, the sleeves 3 are compressed on to the bars 2 and concrete is then cast to form the bodies 1. The mouth of each sleeve 3 is protected against the ingress of dirt etc. by a removable plastics cap 10. The caps are removed and the assembly is then located in position so that a stud 6 is in axial alignment with a sleeve 3. Each stud is then rotated by gripping the portion 7 in turn to cause the threaded portion 8 to be received in a respective threaded portion 4, so locking the bar 2' to the bars 2. In this way the reinforcement extends across the access hole without forming a bulky connection.

- 15 The threaded portions of the sleeves 3' may be threaded in opposite directions to facilitate engagement of the bolts with the sleeves 3. The bar 2' may be replaced by other intermediate structures, although for economy and effectiveness it is most likely to be of the same material as the bars 2.

WHAT WE CLAIM IS:—

- 40 1. A method of making a connection between a pair of spaced collinear reinforcing bars located in concrete bodies, comprising
- (i) securing to each bar by radial compression the unthreaded portion of a respective first partially internally threaded sleeve,
 - 45 (ii) securing to each end of an intermediate bar the unthreaded portion of a respective second partially internally threaded sleeve, the intermediate bar being of a length slightly less than the distance between the concrete bodies,
 - 50 (iii) locating in the threaded portion of the second sleeve at each end of the intermediate bar a threaded high tensile stud and locating the intermediate bar between the bars, and
 - 55 (iv) rotating each stud to engage the thread of the respective first sleeve secured to a bar so as to bridge the gap between the bars by means of the intermediate bar.
- 60 2. A method according to claim 1, in which the threaded portions of the second sleeves are

of greater length than those of the first sleeves.

3. A method according to claim 2, in which each stud has two threaded portions of unequal length, the shorter of the portions engaging the thread of a first sleeve.

4. A method according to claim 1, 2 or 3, in which the threaded portion of one of the second sleeves is of shorter length than and threaded in the opposite direction to all the other sleeves, the co-operating stud having two threaded portions whose threads run in mutually opposite directions.

5. A method according to claim 4, in which the threaded portions of the co-operating stud are of equal length.

6. A method according to any preceding claim, in which the first sleeves are secured to the reinforcing bars before casting of the concrete bodies, the concrete being cast such that the mouth of each sleeve lies at the surface of the concrete body.

7. A method of making a connection between a pair of opposed reinforcing bars located in concrete bodies, substantially as described with reference to the accompanying drawings.

8. A connection assembly for a pair of spaced collinear reinforcing bars located in concrete bodies, each bar having a respective internally threaded first sleeve on the end thereof, comprising an intermediate bar having a respective second sleeve secured to each end by radial compression, each second sleeve having an internally threaded portion extending beyond the bar, and a threaded high tensile stud engaged with each threaded portion, the studs being threaded such that they can co-operate with the respective first sleeves on the reinforcing bars.

9. An assembly according to claim 8, in which the threaded portions of the second sleeves are of greater length than those of the first sleeves.

10. An assembly according to claim 8 or 9, in which each stud has two threaded portions of unequal length, the shorter of the portions engaging the thread of a first sleeve.

11. An assembly according to claim 8, 9 or 10, in which the threaded portion of one of the second sleeves is of shorter length than and threaded in the opposite direction to all the other sleeves, the co-operating stud having two threaded portions whose threads run in mutually opposite directions.

12. An assembly according to claim 11, in which the threaded portions of the co-operating stud are of equal length.

13. A connection assembly for connecting a pair of spaced collinear reinforcing bars located in concrete bodies, substantially as described with reference to the accompanying drawings.



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Printed for Her Majesty's Stationery Office by the Courier Press, Leamington Spa, 1978.
Published by the Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from
which copies may be obtained.