

A QUICKLY-BUILT COMBINATION STRUCTURE FOR FORMING A BEAM COLUMN

BACKGROUND OF THE INVENTION

1. Field of the Invention

5 This invention relates to a construction structure and relates particularly to a quickly-built combination structure for forming a beam column.

2. Description of the Related Art

10 With regard to a building construction based on reinforcing concrete, it usually needs to arrange rebar (short for reinforcing bar) and formwork on a construction site and then pour concrete to form a support as a beam column on the site. Specifically, a reinforcing bar is fixed in a base position of each support in advance. Then, workers tie multiple stirrups around reinforcing bars one by
15 one and fix the formwork onto the reinforcing bars to create a temporary mould into which concrete is poured and shaped. Each traditional stirrup is an individual and closed-loop bar. Other requisite construction processes are executed only after solidifying the concrete in the formwork and removing the formwork, which is
20 usually time-consuming. Furthermore, during the common process of tying reinforcing bars, it needs to tie outermost reinforcing bars firstly by multiple stirrups and then pass the stirrups through the space between the outermost reinforcing bars to tie inner reinforcing bars individually in succession. This process is difficult and

inconvenient and also involves a long and laborious task. Therefore, the traditional construction work needs improvement.

SUMMARY OF THE INVENTION

An object of this invention is to provide a quickly-built combination structure, rebar assemblies of which are each integrally processed and constructed with the aid of welding and then fixed to positioning units and mesh formwork units, thereby reinforcing the strength of the combination structure and allowing the combination structure to be quickly built as a beam column on a construction site.

According to this invention, a quickly-built combination structure includes at least two rebar assemblies, a plurality of positioning units adapted to support and position the rebar assemblies, and a plurality of mesh formwork units positioned around the rebar assemblies. Each rebar assembly includes a plurality of spaced-apart reinforcing bars, a plurality of surrounding units disposed around and welded to the reinforcing bars, and a plurality of connecting units welded to the reinforcing bars. Each surrounding unit is integrally bent to round the reinforcing bars, so each surrounding unit includes at least two sections each extending in a straight line between any two adjacent reinforcing bars while bending each surrounding unit. Each connecting unit extends inclinedly between any two adjacent surrounding units. The surrounding units and the connecting units are integrally connected to form a stirrup, so the stirrup is bent in succession for encircling said reinforcing bars

uninterruptedly and also welded to the reinforcing bars. An accommodation room is enclosed when the reinforcing bars are encircled by the stirrup. The rebar assemblies are different in size of the accommodation room, so one inner rebar assembly can be embedded into another outer or outermost rebar assembly. The positioning units are fixed to the rebar assemblies, so the rebar assemblies are held in position and spaced apart from each other. The mesh formwork units are fixed to the positioning units, so the mesh formwork units are positioned around the outermost rebar assembly via the positioning units.

In accordance with the above arrangement, the rebar assemblies are directly shaped and then fixed to the positioning units and mesh formwork units to form a combination structure in a factory. The combination structure is directly transported to a construction site and quickly set up as a beam column on the construction site for further construction processes. The stirrup including surrounding units and connecting units are integrally bent around the reinforcing bars and welded to the reinforcing bars to increase the strength of the combination structure, and concrete is directly poured into the combination structure on the construction site. Accordingly, the efficiency and speed of the construction process can be improved.

Preferably, the surrounding unit surrounds the reinforcing bars in a same horizontal position. In one preferred embodiment, three sections are defined while bending each surrounding unit.

Preferably, fixing bars are disposed between the rebar assemblies and the positioning units to increase the combination between the rebar assemblies.

BRIEF DESCRIPTION OF THE DRAWINGS

5 Fig. 1 is a perspective view showing a first preferred embodiment of this invention;

Fig. 2 is a schematic view showing the first preferred embodiment of this invention; and

Fig. 3 is a schematic view showing a second preferred embodiment of
10 this invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to Figs. 1 and 2, a first preferred embodiment of a quickly-built combination structure **3** includes at least two rebar assemblies **31**, a plurality of positioning units **32** adapted to support
15 and hold the rebar assemblies **31** in position, and a plurality of mesh formwork units **33** positioned around the rebar assemblies **31**.

Each rebar assemblies **31** includes a plurality of spaced-apart reinforcing bars **311** and also includes a plurality of surrounding units **313** and connecting units **314** configured to surround the
20 reinforcing bars **311**. The surrounding units **313** are spaced apart from each other and are each welded to the reinforcing bars **311** while rounding the reinforcing bars **311**. The surrounding units **313** are each bent, so each surrounding unit **313** is provided with at least two sections **3131** each extending in a straight line between any two

adjacent reinforcing bars **311**. As for example shown in Fig. **1** that four reinforcing bars **311** are situated in diagonal positions, and each surrounding unit **313** is integrally bent at corners. The bending causes each surrounding unit **313** to be divided into three sections **3131** which are situated at an equal height to perform a same horizontal position. Each section **3131** also extends in a straight line whereby the section **3131** is straight, not curved. Thus, one surrounding unit **313** rounds the reinforcing bars **311** in a same horizontal position (shown in Fig. **1**). It is possible that the surrounding unit **313** may run in a non-horizontal position (not shown). Different surrounding units **313** are situated at different heights, i.e. in respective horizontal or non-horizontal positions. The connecting units **314** each extend inclinedly between any two adjacent surrounding units **313** and are each welded to the reinforcing bars **311**. Specifically, the connecting unit **314** can be inclined to the reinforcing bar **311**. The connecting unit **314** extends from one section **3131** of one surrounding unit **313** to another section **3131** of another neighboring surrounding unit **313** so that each surrounding unit **313** is integrally connected to each adjacent connecting unit **314**.

Accordingly, the surrounding units **313** and the connecting units **314** are integrally connected to each other and concurrently welded to the reinforcing bars **311**, thereby forming a stirrup **312** adapted to encircle or surround the reinforcing bars **311** in succession to present a continuous multi-loop mode. Each section **3131** which is

straight also assists the stirrup **312** in fitting snugly around the reinforcing bars **311** during the encirclement of the stirrup **312**. The encirclement of the stirrup **312** includes the aforementioned surrounding units **313** and connecting units **314**, so the term

5 "multi-loop" can be understood to mean multiple loops caused by bending the stirrup **312** uninterruptedly around the reinforcing bars **311** so that one loop continues to another adjacent loop without overlapping. For example, in Fig. **1**, a first surrounding unit **313** surrounds bottoms of the reinforcing bars **311** in a first horizontal

10 position and continues to a first connecting unit **314**, then the first connecting unit **314** extends inclinedly to define a first loop and then continues to a second surrounding unit **313** situated in a second horizontal position above the first surrounding unit **313**, and then the second surrounding unit **313** continues to a second connecting unit

15 **314** to define a second loop, and so on until all loops around the reinforcing bars **311** are complete. All of the loops are integrated to present the stirrup **312**. Accordingly, the reinforcing bars **311** penetrate through the entire stirrup **312** when they are joined to the surrounding units **313** and the connecting units **314** by welding. Thus,

20 the encirclement of the stirrup **312** coexists with the welding of the stirrup **312** to the reinforcing bars **311**.

The number of the rebar assemblies **31** is, but not limited to, two or more than two. Each rebar assembly **31** is equipped with a stirrup **312** around the reinforcing bars **311**. Each rebar assembly **31** defines

an accommodation room **315** which is enclosed when the reinforcing bars **311** are encircled by the stirrup **312**. The rebar assemblies **31** have different dimensions, that is, different in size of the accommodation room **315**, so one rebar assembly **31** having a smaller accommodation room **315** is embedded into another rebar assembly **31** having a larger accommodation room **315**. Herein, the smaller rebar assembly **31** is defined as an inner rebar assembly, and the larger rebar assembly **31** is defined as an outermost rebar assembly when two rebar assemblies **31** are adopted.

The positioning units **32** are each inserted into the rebar assemblies **31** and respectively fixed to the rebar assemblies **31**. Preferably, the positioning units **32** can be welded to the stirrups **312**, so the rebar assemblies **31** are firmly held in position and spaced apart from each other via the positioning units **32**. The positioning unit **32** can be a traditional reinforcing bar, a C-type bar, etc. The mesh formwork units **33** are each fixed to the positioning units **32**. Preferably, the mesh formwork units **33** can be welded to the positioning units **32**. Herein, the positioning units **32** project from the outermost rebar assembly **31**, so the mesh formwork units **33** are firmly positioned around the outermost rebar assembly **31** via the positioning units **32** while fixing the mesh formwork units **33** to the positioning units **32**.

The operation of this invention is described with the aid of Figs. **1** and **2**. The rebar assemblies **31** are each manufactured by a forming apparatus in a factory. To form one rebar assembly **31**, the reinforcing

bars **311** are firstly spaced apart, and then a stirrup **312** is continuously bent by the forming apparatus to encircle the reinforcing bars **311** and is also joined to the bars **311** by welding. The encirclement of the stirrup **312** includes the surrounding units **313** running in
5 different horizontal positions while extending each connecting unit **314** in an inclined or slant manner between two adjacent surrounding units **313** to complete one rebar assembly **31**. Accordingly, an inner rebar assembly **31** can be put into an accommodation space **315** of another outermost rebar assembly **31** when two rebar assemblies **31** are needed.
10 Then, the positioning units **32** are disposed across the inner rebar assembly **31** and the outermost rebar assembly **31** to be fixed to the surrounding units **313**, the connecting units **314**, or both units **313**, **314** of the rebar assemblies **31**, preferably by welding. Therefore, all rebar assemblies **31** are held in position and spaced apart from
15 each other via the positioning units **32**. Finally, the mesh formwork units **33** are fixed to the positioning units **32**, so the mesh formwork units **33** are firmly positioned around the outermost rebar assembly **31** for wrapping all rebar assemblies **31**. Therefore, the rebar assemblies **31**, positioning units **32**, and mesh formwork units **33** are
20 in combination to construct an integrated combination structure **3**. After completing the combination structure **3** in the factory, the combination structure **3** can be directly transported to a construction site and quickly set up as a beam column on the construction site. This facilitates an increase in the efficiency and speed of building

construction and attains the effect of building a beam column quickly.

Because the stirrup **312** is continuously bent around the reinforcing bars **311** in cooperation with a welding work, the strength of the combination structure **3** is greatly increased when all rebar
5 assemblies **31** are firmly fixed by the positioning units **32**.

Unlike the traditional temporary formwork, the mesh formwork units **33** facilitate a pouring process of concrete after they are firmly positioned around the outermost rebar assembly **31**, and therefore there is no need to remove the mesh formwork units **33** after pouring concrete.
10 The mesh formwork unit **33** has pores formed thereon, and part of concrete can flow through the pores and become dried. The concrete flowing through the pores can also be directly leveled in a finishing process of concrete works to provide a flat wall surface for the formation of the beam column. Therefore, the combination structure
15 **3** is quickly built on the construction site to accelerate the construction process.

Referring to Fig. **3**, a second preferred embodiment has rebar assemblies **31**, positioning units **32**, and mesh formwork units **33** and has the same concatenation of correlated elements and effects as the
20 first preferred embodiment. Particularly, the second preferred embodiment includes a plurality of fixing bars **34** disposed between the rebar assemblies **31** and the positioning units **32** to reinforce the combination between the rebar assemblies **31**. The fixing bars **34** can be fixed to the surrounding units **313**, the connecting units **314**

or both units **313**, **314** of the stirrup **312**, preferably by welding, so the rebar assemblies **31** are more firmly held in position via the fixing bars **34** to strengthen the combination structure **3**.

To sum up, this invention takes advantage of a continuously-bent
5 stirrup of each rebar assembly to surround reinforcing bars in a multi-loop manner whereby the combination structure is strengthened. At least two rebar assemblies firmly held in position by positioning units and mesh formwork units in a factory can be directly and quickly built as a beam column on a construction site, and the removal of
10 the mesh formwork units can be omitted after pouring concrete. Therefore, the above arrangements increase the construction efficiency and speed and attain a quick building effect.

While the embodiments are shown and described above, it is understood that further variations and modifications may be made
15 without departing from the scope of this invention.

WHAT IS CLAIMED IS:

1. A quickly-built combination structure (3) for forming a beam column comprising:

at least two rebar assemblies (31);

5 a plurality of positioning units (32) adapted to support and hold said rebar assemblies (31) in position; and

a plurality of mesh formwork units (33) positioned around said rebar assemblies (31);

10 wherein each of said rebar assemblies (31) includes a plurality of reinforcing bars (311) spaced apart from each other, a plurality of surrounding units (313) disposed around and welded to said reinforcing bars (311), and a plurality of connecting units (314) welded to said reinforcing bars (311), each of said surrounding units (313) being integrally bent to surround said reinforcing bars (311), with each of said surrounding units (313) provided with at least two sections (3131) each extending between any two adjacent reinforcing bars (311) while bending each of said surrounding units (313), with each of said sections (3131) extending in a straight line, each of said connecting units (314) extending inclinedly between any two adjacent surrounding units (313), said surrounding units (313) and said connecting units (314) thereby being integrally connected to form a stirrup (312) configured to be continuously bent in succession for encircling

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said reinforcing bars (311) and also welded to said reinforcing bars (311);

wherein each of said rebar assemblies (31) defines an accommodation room (315) when said reinforcing bars (311) are encircled by said stirrup (312), said rebar assemblies (31) being different in size of said accommodation room (315) to allow one rebar assembly (31) to be embedded into another rebar assembly (31), said positioning units (32) being each fixed to said rebar assemblies (31) so that said rebar assemblies (31) are held in position and spaced apart from each other, said mesh formwork units (33) being each fixed to said positioning units (32) so that said mesh formwork units (33) are positioned around said other rebar assembly via said positioning units (32) when said other rebar assembly is situated in an outermost position.

2. The quickly-built combination structure (3) according to claim 1, wherein each of said surrounding units (313) surrounds said reinforcing bars (311) in a same horizontal position.

3. The quickly-built combination structure (3) according to claim 1 or 2, further comprising a plurality of fixing bars (34) disposed between said rebar assemblies (31) and said positioning units (32).

4. The quickly-built combination structure (3) according to any of claims 1 to 3, wherein each of said surrounding units (313) has three sections (3131) while bending each of said surrounding units (313).