Disclosed are an H-beam and a method for constructing a concrete form using the H-beam and non-metallic sheathing board. An H-beam includes a middle support part interposed between two adjacent sheathing boards so that lateral surfaces of edge portions of the two adjacent sheathing boards respectively contact both lateral surfaces of the middle support part and are supported by the middle support part, and edge connection parts bent perpendicular from both side end portions of the middle support part and extending forward and backward in a longitudinal direction in order to cover front and rear surfaces of the edge portions of the sheathing boards and support the same. Accordingly, connection of the sheathing boards can be achieved rapidly and easily, construction processes are simplified, and work time is remarkably reduced. As a result, work efficiency is improved.
Fig. 3

Fig. 4
H-BEAM AND METHOD FOR CONSTRUCTING CONCRETE FORM USING H-BEAM AND NON-METALLIC SHEATHING BOARD

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to an H-beam for connecting non-metallic (e.g., foams such as Styrofoam and plastics) sheathing boards having heat-insulating properties and used as inner and outer insulators for construction without breaking up after pouring concrete, and a method for constructing a concrete form using the H-beam.

[0003] 2. Description of the Related Art

[0004] In general, construction materials, such as a plurality of sheathing boards functioning as form boards for walls defining an outer appearance of buildings and flat ties functioning as support bars by being embedded in concrete poured between the sheathing boards, are used for construction. In addition, horizontal support bars (pipes) are mounted to hooks connected by wedges at end portions of the flat ties exposed to the outside of the sheathing boards in order to endure a concrete pressure, or back-up plates for covering and reinforcing connection portions between the consecutively arranged sheathing boards are mounted by means of the flat ties.

[0005] Schematically describing an exemplary conventional process of forming walls of a building, a plurality of sheathing boards spaced a certain distance apart from each other in a width direction are consecutively arranged in a longitudinal direction while standing upright, and then concrete is poured into the space between the sheathing boards and cured, thereby constructing the upright walls.

[0006] A process of forming laminated plates (slabs) on the top of the upright walls includes disposing layers of wood horizontally on the top of the upright walls, disposing sheets of plywood on the layers of wood and securing the same using nails, disposing heat-insulating (dustproof) Styrofoam on the sheets of plywood, and removing the layers of wood and sheets of plywood after pouring concrete.

[0007] When the sheathing boards are consecutively arranged in the longitudinal direction, the lateral end portions of the sheathing boards are connected to each other using, for example, wires so as to extend the walls in the longitudinal direction.

[0008] However, in such a conventional process of extending the sheathing boards in the longitudinal direction, because an additional connection member for connecting the sheathing boards is not provided, construction processes including wire connection become complicated, and wire connection does not guarantee firmness of the sheathing boards, which may cause a problem such that the sheathing boards connected in the longitudinal direction break due to a load of concrete poured between the sheathing boards.

SUMMARY OF THE INVENTION

[0009] Therefore, it is an object of the present invention to provide an H-beam and a method for constructing a concrete form using the H-beam and non-metallic sheathing board, in which the H-beams connect edge portions of a plurality of sheathing boards spaced a certain distance apart from each other in a width direction to receive concrete poured therebetween and consecutively arranged in a longitudinal direction while standing upright so as to extend the sheathing boards for upright walls straight in the longitudinal direction, and also connect edge portions of sheathing boards for laminated plates (slabs) disposed horizontally on the top of the sheathing boards for upright walls so as to extend the sheathing boards horizontally, thereby achieving connection of the sheathing boards rapidly and easily, simplifying construction processes, remarkably reducing work time, and as a result improving work efficiency.

[0010] It is another object of the present invention to provide an H-beam and a method for constructing a concrete form using the H-beam and non-metallic sheathing board, by which edge portions of the sheathing boards are firmly secured, the sheathing boards can stably endure a load of concrete, and accordingly work stability and resultant reliability are improved.

[0011] In accordance with an aspect of the present invention, the above and other objects can be accomplished by the provision of an H-beam configured to connect edge portions of a plurality of sheathing boards spaced a certain distance apart from each other in a width direction to form a space therebetween to receive concrete poured therein and consecutively arranged in a longitudinal direction while standing upright so as to extend the sheathing boards straight, the H-beam comprising: a middle support part interposed between two adjacent sheathing boards so that lateral surfaces of the edge portions of the two adjacent sheathing boards respectively contact both lateral surfaces of the middle support part and are supported by the middle support part; and edge connection parts bent perpendicular from both side end portions of the middle support part and extending backward in the longitudinal direction in order to prevent the middle support parts from falling downward and backward in the longitudinal direction in order to cover front and rear surfaces of the edge portions of the sheathing boards and support the same.

[0012] As is apparent from the above description, the H-beams according to the present invention connect the edge portions of a plurality of sheathing boards which are spaced a certain distance apart from each other in the width direction to receive the concrete poured therebetween and are consecutively arranged in the longitudinal direction while standing upright so as to extend the sheathing boards for upright walls straight in the longitudinal direction, and also connect the edge portions of the sheathing boards for laminated plates (slabs) disposed horizontally on the top of the sheathing boards for upright walls so as to extend the sheathing boards horizontally. Accordingly, since connection of the sheathing boards can be achieved rapidly and easily, construction processes are simplified and work time is remarkably reduced, which results in improvement in work efficiency.

[0013] Further, in the case in which the sheathing boards made of Styrofoam are used, the sheathing boards can be used as inner and outer insulators for buildings without breaking up after pouring concrete, thereby remarkably reducing construction processes.

[0014] Further, since the edge portions of the sheathing boards are firmly secured, the sheathing boards can stably endure a load of concrete, and accordingly work stability and resultant reliability are improved.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] The above and other objects, features and other advantages of the present invention will be more clearly understood from the following detailed description taken in conjunction with the accompanying drawings, in which:
FIG. 1 is a perspective view illustrating an H-beam according to one embodiment of the present invention;

FIG. 2 is a schematic perspective view illustrating a process of constructing sheathing boards using an H-beam according to one embodiment of the present invention;

FIG. 3 is a schematic cross-sectional view illustrating a process of constructing sheathing boards using an H-beam according to one embodiment of the present invention;

FIG. 4 is a schematic cross-sectional view illustrating an H-beam according to another embodiment of the present invention;

FIG. 5 is a schematic cross-sectional view illustrating a construction state of sheathing boards for slabs using an H-beam according to another embodiment of the present invention; and

FIG. 6 is a perspective view illustrating an example of sheathing boards which can be used in the embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

Hereinafter, preferred embodiments of the present invention will be described in detail with reference to the annexed drawings.

As shown in FIGS. 1 through 3, an H-beam according to one embodiment of the present invention functions to connect edge portions of a plurality of sheathing boards 10 which are spaced a certain distance apart from each other in a width direction to define a space therebetween to receive the poured concrete thereto and are consecutively arranged in a longitudinal direction while standing upright, thereby extending the sheathing boards 10 for upright walls straight in the longitudinal direction.

The H-beam 30 includes a middle support part 32 interposed between two adjacent sheathing boards 10 so that lateral surfaces of the edge portions of the two adjacent sheathing boards 10 respectively contact both lateral surfaces of the middle support part 32 and are supported by the middle support part 32, and edge connection parts 33 bent perpendicular from both side end portions of the middle support part 32 and extending forward and backward in the longitudinal direction in order to cover front and rear surfaces of the edge portions of the two adjacent sheathing boards 10 and support the same.

The edge portion of the sheathing board 10 covered by the edge connection parts 33 is formed with a concave recess 12 (refer to FIG. 6) by which the edge connection parts 33 are positioned on the same plane as the front and rear surfaces of the sheathing board 10. The edge connection parts 33 have an interval in the width direction, which is equal to a thickness of the edge portion of the sheathing board 10.

The edge portion of the sheathing board 10 contacting the middle support part 32 has slanted surfaces 34 formed at front and rear corners thereof. Corresponding to the slanted surfaces 34 of the sheathing board 10, the H-beam 30 also has slanted surfaces 34 formed at inner corners at which the middle support part 32 and the edge connection parts 33 adjoin so as to closely contact the slanted surfaces 13 of the sheathing board 10.

A through-hole 12a (refer to FIG. 6) is formed at the concave recess 12 of the edge portion of the sheathing board 10, and an additional securing pin 55 is fitted through the through-hole 12a. The edge connection parts 33 opposing each other in the width direction are fowed with pin holes 33a aligned in the width direction. In the state in which the pin holes 33a of the edge connection parts 33 are aligned with the through-hole 12a of the edge portion of the sheathing board 10 interposed between the two opposing edge connection parts 33, the securing pin 55 is fitted through the pin holes 33a and the through-hole 12a, thereby securing the sheathing board 10 to the edge connection parts 33.

The securing pin 55 may be formed in a long bar shape having a function of connecting the sheathing board 10 and the edge connection parts 33 after fitted through the pin holes 33a and the through-hole 12a, and may be made of a PVC material.

A flat tie 20 is arranged perpendicular to the edge portions of the sheathing boards 10 across the pair of sheathing boards 10 spaced apart from each other in the width direction. The middle support part 32 is formed with a tie receiving groove 31 in which the flat tie 20 is inserted.

The flat tie 20 is arranged across the pair of sheathing boards 10 spaced apart from each other in the width direction is provided in plural. The concave recess 12 of the sheathing board 10 is equipped with a T-shaped tie slit 12b (refer to FIG. 6) which one of the flat ties 20 penetrates. Each of the edge connection parts 33 has a cut portion 33b cut away from a distal end thereof corresponding to the tie slit 12b, so that the flat tie 20 penetrates the cut portion 33b.

The cut portion 33b has an opened top so as not to interrupt upward movement of the flat tie 20 when cutting end portions of the flat tie 20 fitted through the tie slit 12b of the sheathing board 10 by shaking the end portions of the flat tie 20 up and down after pouring concrete, and a support step 33c formed at a bottom thereof to support a bottom surface of the flat tie 20.

The edge connection parts 33 have slanted guide surfaces 33d formed at inner corners of the distal end portions thereof so as to guide the edge portion of the sheathing board 10 to be smoothly fitted into the space between the edge connection parts 33.

As shown in FIGS. 4 and 5, an H-beam 35 according to another embodiment of the present invention functions to connect edge portions of sheathing boards 15 for slabs disposed horizontally on the top of the sheathing boards 10 for upright walls so as to extend the sheathing boards 10 and 15 horizontally, and also functions to connect the sheathing boards 15 to layers of wood 57 disposed beneath the sheathing boards 15 and held up by supports 56 so as to firmly secure the sheathing boards 15.

The H-beam 35 includes a middle support part 35a interposed between two adjacent sheathing boards 15 so that lateral surfaces of the edge portions of the two adjacent sheathing boards 15 respectively contact both lateral surfaces of the middle support part 35a and are supported by the middle support part 35a, edge connection parts 35b bent perpendicular from top and bottom portions of the middle support part 35a and extending forward and backward in the longitudinal direction in order to cover top and bottom surfaces of the edge portions of the two adjacent sheathing boards 15 and support the same, and a nail hole 35c through which an additional nail 58 is driven into the layers of wood 57 disposed beneath the H-beam 35.

The H-beam 35 further includes a hitting space 35d formed above the nail hole 35c so as to allow a user to hit the nail 58 using a hammer or the like.
Non-described reference numeral 40 refers to a corner bar for connecting the sheathing board 10 for upright walls and the sheathing board 15 for slabs perpendicular to each other.

As shown in FIG. 2, each of the flat ties 20 has wedge holes 21a formed at both end portions thereof exposed to the outside of the sheathing board 10, and horizontal support bars (not shown) may be mounted to additional hooks (not shown) connected by wedges (not shown) through the wedge holes 21a.

Herein, additional square wooden beams (not shown) for supporting the horizontal support bars may be arranged in the space between the horizontal support bars and the sheathing boards 10.

Alternatively, as shown in FIG. 2, before mounting the horizontal support bars, additional back-up plates 54 for reinforcing connection portions between the consecutively arranged sheathing boards 10 may be mounted through wedge holes 21a formed at both end portions of the flat ties 20 exposed to the outside of the sheathing boards 10.

According to a method for constructing the concrete form using the H-beams according to the present invention constituted as above, the H-beams 30 for connecting the sheathing boards 10 for upright walls are prepared.

Next, the sheathing boards 10 spaced a certain distance apart from each other in the width direction are consecutively arranged in the longitudinal direction while standing upright.

At this time, the edge portions of each two adjacent sheathing boards 10 arranged in the longitudinal direction are inserted into the space between the edge connection parts 33 of the H-beam 30 interposed therebetween, and accordingly the sheathing boards 10 are connected by the H-beams 30.

The H-beams 30 and the edge portions of the sheathing boards 10 are secured by the securing pins 55.

Next, the flat ties 20 are fitted through the sheathing boards 10 spaced apart from each other in the width direction so as to maintain the predetermined interval in the width direction between the sheathing boards 10, thereby completing construction of the sheathing boards 10 for upright walls.

On the other hand, in order to construct slabs, the H-beams 35 for connecting the sheathing boards 15 for slabs are prepared.

Next, the sheathing boards 15 for slabs are horizontally disposed on the top of the sheathing boards 10 for upright walls, and the edge portions of each two adjacent sheathing boards 15 for slabs are connected by the H-beams 35 for slabs, thereby extending the sheathing boards 15 horizontally.

The H-beams 35 and the edge portions of the sheathing boards 15 for slabs are also secured by the securing pins 55.

Next, the layers of wood 57 disposed beneath the sheathing boards 15 and held up by the supports 56 and the H-beams 35 for slabs are secured to each other by the nails 58, thereby completing construction of the sheathing boards 15 for slabs.

In addition, the back-up plates 54 are mounted through the wedge holes 21a formed at both end portions of the flat ties 20 exposed to the outside of the sheathing boards 10 for upright walls, and the horizontal support bars are mounted by connecting the hooks.

In this state, concrete is poured into the space between the sheathing boards 10 for upright walls and onto the sheathing boards 15 for slabs and is cured, thereby completing construction of upright walls and slabs for buildings.

As described above, the H-beams according to the present invention connect the edge portions of a plurality of sheathing boards spaced a certain distance apart from each other in the width direction to receive concrete poured therebetween and consecutively arranged in the longitudinal direction while standing upright so as to extend the sheathing boards for upright walls straight in the longitudinal direction, and also connect the edge portions of the sheathing boards for laminated plates (slabs) disposed horizontally on the top of the sheathing boards for upright walls so as to extend the sheathing boards horizontally. Accordingly, since connection of the sheathing boards can be achieved rapidly and easily, construction processes are simplified and work time is remarkably reduced, which results in improvement in work efficiency. Further, since the edge portions of the sheathing boards are thinly secured, the sheathing boards can stably endure a load of concrete, and accordingly work stability and resultant reliability are improved.

Although the preferred embodiments of the present invention have been disclosed for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

What is claimed is:

1. An H-beam configured to connect edge portions of a plurality of sheathing boards spaced a certain distance apart from each other in a width direction to form a space therebetween to receive concrete poured therein and consecutively arranged in a longitudinal direction while standing upright so as to extend the sheathing boards straight, the H-beam comprising:

   a middle support part interposed between two adjacent sheathing boards so that lateral surfaces of the edge portions of the two adjacent sheathing boards respectively contact both lateral surfaces of the middle support part and are supported by the middle support part; and
edge connection parts bent perpendicular from both side end portions of the middle support part and extending forward and backward in the longitudinal direction in order to cover front and rear surfaces of the edge portions of the sheathing boards and support the same,

   wherein, with respect to a flat tie arranged perpendicular to the edge portions of the sheathing boards across a pair of sheathing boards spaced apart from each other in the width direction, the middle support part is formed with a tie receiving groove to receive the flat tie inserted therein,

   the flat tie arranged across the sheathing boards in the width direction is provided in plural, and

   with respect to a tie slit formed at a concave recess of the sheathing board, which one of the flat ties penetrates, each of the edge connection parts has a cut portion cut away from a distal end portion thereof corresponding to the tie slit, so that the flat tie penetrates the cut portion.

2. The H-beam according to claim 1, wherein, with respect to a concave recess formed at the edge portion of the sheathing board covered by the edge connection parts so as to allow the edge connection parts to be positioned on the same plane as front and rear surfaces of the sheathing board,
the edge connection parts have an interval in the width direction, the interval being equal to a thickness of the edge portion of the sheathing board.

3. The H-beam according to claim 1, wherein, with respect to slanted surfaces formed at front and rear corners of the edge portion of the sheathing board contacting the middle support part,

the H-beam has slanted surfaces corresponding to the slanted surfaces of the sheathing board, the slanted surfaces of the H-beam being formed at corners at which the middle support part and the edge connection parts adjoin.

4. The H-beam according to claim 1, wherein, with respect to a through-hole formed at the edge portion of the sheathing board and an additional securing pin fitted through the through-hole,

the edge connection parts opposing each other in the width direction are formed with pin holes aligned in the width direction so that, in the state in which the pin holes are aligned with the through-hole of the edge portion of the sheathing board interposed between the edge connection parts, the securing pin is fitted through the pin holes and the through-hole in order to secure the sheathing board to the edge connection parts.

5. The H-beam according to claim 1, wherein the cut portion has an opened top so as not to interrupt upward movement of the flat tie when cutting end portions of the flat tie penetrating the tie slit of the sheathing board by shaking the end portions of the flat tie up and down after pouring concrete, and a support step formed at a bottom thereof to support a bottom surface of the flat tie.

6. The H-beam according to claim 1, wherein the edge connection parts have slanted guide surfaces formed at inner corners of distal end portions thereof so as to guide the edge portion of the sheathing board to be smoothly fitted into a space between the edge connection parts.

7. An H-beam configured to connect edge portions of sheathing boards for slabs disposed horizontally on a top of sheathing boards for upright walls so as to extend the sheathing boards horizontally and to connect the sheathing boards to layers of wood disposed beneath the sheathing boards and held up by supports, the H-beam comprising:

a middle support part interposed between two adjacent sheathing boards so that lateral surfaces of the edge portions of the two adjacent sheathing boards respectively contact both lateral surfaces of the middle support part and are supported by the middle support part;

edge connection parts bent perpendicular from top and bottom portions of the middle support part and extending forward and backward in a longitudinal direction in order to cover top and bottom surfaces of the edge portions of the sheathing boards and support the same; and

a nail hole formed vertically through the middle support part, through which an additional nail is driven into the layers of wood disposed beneath the H-beam from a hitting space,

wherein, with respect to a through-hole formed at the edge portion of the sheathing board and an additional securing pin fitted through the through-hole,

the edge connection parts opposing each other in the width direction are formed with pin holes aligned in the width direction so that, in the state in which the pin holes are aligned with the through-hole of the edge portion of the sheathing board interposed between the edge connection parts, the securing pin is fitted through the pin holes and the through-hole in order to secure the sheathing board to the edge connection parts.

8. A method for constructing a concrete form using an H-beam comprising:

preparing H-beams for connecting sheathing boards for upright walls, each of the H-beams including a middle support part interposed between two adjacent sheathing boards so that lateral surfaces of edge portions of the two adjacent sheathing boards respectively contact both lateral surfaces of the middle support part and are supported by the middle support part, and edge connection parts bent perpendicular from both side end portions of the middle support part and extending forward and backward in a longitudinal direction in order to cover front and rear surfaces of the edge portions of the sheathing boards and support the same, wherein, with respect to a flat tie arranged perpendicular to the edge portions of the sheathing boards across a pair of sheathing boards spaced apart from each other in a width direction, the middle support part is formed with a tie receiving groove to receive the flat tie inserted therein, the flat tie arranged across the sheathing boards in the width direction is provided in plural, and, with respect to a tie slit formed at a conceave recess of the sheathing board, which one of the flat ties penetrates, each of the edge connection parts has a cut portion cut away from a distal end portion thereof corresponding to the tie slit, so that the flat tie penetrates the cut portion;

arranging a plurality of sheathing boards to be spaced a certain distance apart from each other in the width direction and extend in the longitudinal direction while standing upright;

connecting the sheathing boards using the H-beams such that edge portions of each two adjacent sheathing boards extending in the longitudinal direction are inserted into a space between edge connection parts of the H-beams; and

fitting flat ties through the sheathing boards arranged in the width direction so as to maintain a predetermined interval in the width direction between the sheathing boards.

9. The method according to claim 8, further comprising:

preparing H-beams for connecting sheathing boards for slabs;

connecting edge portions of each two adjacent sheathing boards for slabs disposed horizontally on a top of the sheathing boards for upright walls using the H-beams for slabs so as to extend the sheathing boards horizontally; and

securing layers of wood disposed beneath the sheathing boards and held up by supports and the H-beams for slabs to each other by nails.

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