

**CONSTRUCTION METHOD OF PREFABRICATED WALL USING
PREFABRICATED WALL MODULE**

BACKGROUND OF THE INVENTION

Field of the Invention

[01] The present invention relates to a construction method of a prefabricated wall using a prefabricated wall module, which inserts and mounts horizontal joints protruding from an end portion of a prefabricated wall module into an end portion of a neighboring prefabricated wall module, thereby easily and surely joining both walls and reducing a construction duration by omitting rebar placing work and construction work of temporary materials on the site.

Background Art

[02] A reinforced concrete structure is formed by constructing various structural members in order of doing rebar placing work and pouring and curing concrete on the site. Therefore, the construction method needs more manpower on the site, requires a long construction period, and is not easy to secure quality.

[03] Moreover, because a form must be supported by external temporary materials before concrete pouring work, processes of installing temporary materials and dismantling

the temporary materials must be added. However, such temporary materials may cause traffic inconvenience of workers and may also cause safety accidents.

[04] Therefore, recently, it is increasing to use
5 precast concrete members produced in a factory in constructing a reinforced concrete structure.

[05] However, such precast concrete members have a limit in being applied to large-scaled members since it is difficult to produce beyond a predetermined size due to
10 conditions of production, lifted load or burden of transportation.

[06] So, technology on a prefabricated wall framework unit capable of reducing an on-the-site construction process by previously producing prefabricated wall units at a
15 factory has been developed (Korean Patent No. 10-1490756). The conventional technology can omit rebar placing work on the site and can install a form on the prefabricated wall framework unit without temporary materials, thereby greatly reducing the construction period.

20 [07] However, the conventional technology has a disadvantage in that it is inconvenient to fasten bolts since the neighboring prefabricated wall units are connected with each other by welding horizontal rebars to legs of vertical support members and combining the vertical support

members of the neighboring prefabricated wall units with each other by bolts.

[08] Furthermore, in order to achieve proper joining of rebars at joints, the horizontal rebars and the vertical support members must secure a welding length of more than a predetermined value. So, there is a problem in that the vertical support members must be over-designed more than needs in order to secure the welding length.

SUMMARY OF THE INVENTION

[09] Accordingly, the present invention has been made to solve the above-mentioned problems occurring in the prior arts, and it is an object of the present invention to provide a construction method of a prefabricated wall using a prefabricated wall module, which can omit rebar placing work on the site and install a form without temporary materials when a reinforced concrete wall is constructed, thereby making it easy to secure quality of the wall, allowing workers to pass smoothly by securing a sufficient working space in the site, and preventing safety accidents.

[10] It is another object of the present invention to provide a construction method of a prefabricated wall using a prefabricated wall module, which can produce simply and join neighboring prefabricated wall modules to each other firmly and easily.

[11] To accomplish the above object, according to the present invention, there is provided a construction method of a prefabricated wall using a prefabricated wall module, which includes: a plurality of main shape steel members
5 vertically arranged at both sides inside a wall; a plurality of horizontal support members for horizontally connecting the main shape steel members adjoining in a width direction; a plurality of space support members for connecting the facing main shape steel members with each other in a
10 thickness direction; and horizontal joints protruding at one side or both sides of a prefabricated wall module to be inserted into a lateral end of another neighboring prefabricated wall module, the construction method including the steps of: (a) installing a plurality of the
15 prefabricated wall modules to be spaced apart from each other at a predetermined distance so that the horizontal joint of prefabricated wall module of one side is inserted into the lateral end of the neighboring prefabricated wall module of the other side; (b) installing a form on the outer
20 surface of the prefabricated wall module of the one side; and (c) pouring concrete into the form.

[12] In a preferred embodiment of the present invention, the horizontal joint includes: an anchoring bar vertically disposed at the outside of a lateral end of the
25 prefabricated wall module of the one side and inserted and

anchored into the lateral end of the neighboring prefabricated wall module of the other side; and a plurality of horizontal support bars of which ends are joined to the anchoring bar to be fixed to the space support members
5 inside the prefabricated wall module.

[13] In a preferred embodiment of the present invention, the horizontal joint includes: a plurality of U-shaped anchoring rebars of which closed ends protrude to the lateral end of the prefabricated wall module; and a vertical
10 support bar of which one side is combined with one side of each of the U-shaped anchoring rebars and the other side is fixed to the horizontal support members.

[14] In a preferred embodiment of the present invention, an auxiliary support bar is combined with the
15 sides of the plurality of U-shaped anchoring rebars at the outwardly protruding portion of the prefabricated wall module to connect the plurality of U-shaped anchoring rebars with each other.

[15] In a preferred embodiment of the present
20 invention, the horizontal joint includes: a plurality of horizontal splicing rebars arranged in the horizontal direction to span the prefabricated wall modules; and vertical support rebars for connecting the plurality of horizontal splicing rebars.

[16] In a preferred embodiment of the present invention, the horizontal joint is slidable in the horizontal direction.

[17] According to the present invention, the construction method of the prefabricated wall using the prefabricated wall module has the following effects.

[18] First, the prefabricated wall modules including main shape steel members, horizontal support members, space support members and horizontal joints are produced previously and are installed on the site, and a reinforced concrete wall is perfectly constructed through the processes of constructing a form, pouring concrete and curing the poured concrete. Therefore, the construction method of the prefabricated wall using the prefabricated wall module can omit rebar placing work on the site and install a form without temporary materials when a reinforced concrete wall is constructed, thereby making it easy to secure quality of the wall, allowing workers to pass smoothly by securing a sufficient working space in the site, and preventing safety accidents.

[19] Second, because the horizontal joints protruding at the end portion of prefabricated wall module of one side are inserted into the end portion of a neighboring prefabricated wall module of the other side, both walls are joined with each other by the horizontal joint buried and

anchored in concrete of the wall. Therefore, there is no need to expand a cross section of the main shape steel member more than needs, and it makes joining between the neighboring prefabricated wall modules easy and secure.

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BRIEF DESCRIPTION OF THE DRAWINGS

[20] The above and other objects, features and advantages of the present invention will be apparent from the following detailed description of the preferred
10 embodiments of the invention in conjunction with the accompanying drawings, in which:

[21] FIG. 1 is a perspective view of a prefabricated wall module according to a first preferred embodiment of the present invention;

15 [22] FIGS. 2 to 6 are views showing step-by-step processes of a construction method of a prefabricated wall using a prefabricated wall module according to the present invention;

[23] FIG. 7 is a perspective view of horizontal joints
20 according to the first preferred embodiment;

[24] FIG. 8 is a front view of the prefabricated wall module illustrated in FIG. 1;

[25] FIG. 9 is a sectional view of a wall including the prefabricated wall module illustrated in FIG. 1;

[26] FIG. 10 is a perspective view of a prefabricated wall module according to a second preferred embodiment of the present invention;

[27] FIG. 11 is a perspective view of horizontal joints according to the second preferred embodiment;

[28] FIG. 12 is a front view of the prefabricated wall module illustrated in FIG. 10;

[29] FIG. 13 is a sectional view of a wall including the prefabricated wall module illustrated in FIG. 10;

[30] FIG. 14 is a perspective view of a prefabricated wall module according to a third preferred embodiment of the present invention;

[31] FIG. 15 is a perspective view of horizontal joints according to the third preferred embodiment;

[32] FIG. 16 is a front view of the prefabricated wall module illustrated in FIG. 14; and

[33] FIG. 17 is a sectional view of a wall including the prefabricated wall module illustrated in FIG. 14.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[34] Hereinafter, example embodiments of the present invention will be described in detail with reference to the accompanying drawings.

[35] FIG. 1 is a perspective view of a prefabricated wall module according to a first preferred embodiment of the present invention, FIGS. 2 to 6 are views showing step-by-

step processes of a construction method of a prefabricated wall using a prefabricated wall module according to the present invention, FIG. 7 is a perspective view of horizontal joints according to the first preferred embodiment, FIG. 8 is a front view of the prefabricated wall module illustrated in FIG. 1, and FIG. 9 is a sectional view of a wall including the prefabricated wall module illustrated in FIG. 1.

[36] The present invention relates to a construction method of a prefabricated wall using a prefabricated wall module, which includes: a plurality of main shape steel members 11 vertically arranged at both sides inside a wall; a plurality of horizontal support members 12 for horizontally connecting the main shape steel members 11 adjoining in a width direction; a plurality of space support members 13 for connecting the facing main shape steel members 11 with each other in a thickness direction; and horizontal joints 14 protruding at one side or both sides of a prefabricated wall module 1 to be inserted into a lateral end of another neighboring prefabricated wall module 1'.

[37] Because the prefabricated wall modules 1 produced previously are constructed on the site, the construction method of a prefabricated wall makes it easy to secure quality of walls due to omission of rebar placing work on the site, can sufficiently secure a working space in the

site since a form can be installed on the prefabricated wall module 1 without temporary materials, and can reduce a construction duration.

[38] Moreover, the present invention is to provide the construction method of the prefabricated wall module 1 capable of joining the neighboring prefabricated wall modules 1 easily and surely.

[39] As shown in FIGS. 1 and 7 to 9, the prefabricated wall module 1 includes the main shape steel members 11, the horizontal support members 12, the space support members 13, and the horizontal joints 14.

[40] A plurality of the main shape steel members 11 are arranged at both sides inside the wall.

[41] The main shape steel members 11 are disposed in a vertical direction which is a longitudinal direction of the wall.

[42] The main shape steel members 11 can be used for various section steel members, and it is preferable to use 'L'-shaped section steels according to the shape of wall members of a longitudinal direction.

[43] The horizontal support members 12 horizontally connect the main shape steel members 11 neighboring in a width direction of the wall with each other.

[44] The horizontal support members 12 are disposed to be spaced apart from one another in the longitudinal direction of the wall.

[45] The horizontal support members 12 serve as horizontal rebars of the wall, and may be flat bars, Z-shaped bars, L-shaped section steels, and rebars.

[46] The space support members 13 connect the main shape steel members 11 of the wall, which face each other in the thickness direction, with each other.

10 [47] The space support members 13 are disposed to be spaced apart from each other in the longitudinal direction of the wall.

[48] The space support members 13 are to maintain an interval between the main shape steel members 11 at both sides of the wall facing each other, and may be flat bars, Z-shaped bars, γ -shaped section steels, and cross ties.

[49] If the Z-shaped bars or the L-shaped section steels are used for the horizontal support members 12 or the space support members 13, the members can be combined with each other by bolts. In this instance, the construction method can secure safety and uniform quality due to omission of a welding process.

[50] The horizontal joints 14 protrude at one side or both sides of the prefabricated wall module 1, and are

inserted into a lateral end of another neighboring prefabricated wall module 1'.

[51] That is, the horizontal joints 14 protrude at an end portion of a prefabricated wall module 1 of one side,
5 and are inserted into an end portion of a neighboring prefabricated wall module 1' of the other side.

[52] The horizontal joints 14 are buried and anchored in the concrete C poured after the prefabricated wall modules 1 and 1' are installed, and join the prefabricated
10 wall modules 1 and 1' with each other.

[53] Therefore, the main shape steel members 11 of the neighboring prefabricated wall modules 1 and 1' are not directly connected with each other but are horizontally joined with each other by anchoring the horizontal joints 14
15 buried in the concrete C of both walls. Therefore, there is no need to expand a cross section of the main shape steel member more than needs.

[54] The horizontal joints 14 can be arranged in one row or two rows according to the thickness of the wall.

20 [55] The construction method of the prefabricated wall using the prefabricated wall module according to the present invention includes a step (a) of installing a plurality of the prefabricated wall modules 1 and 1' to be spaced apart from each other at a predetermined distance so that the
25 horizontal joint 14 of the prefabricated wall module 1 of

the one side is inserted into the lateral end of the neighboring prefabricated wall module 1' of the other side.

[56] Before the step (a), as shown in FIG. 2, an anchoring section steel member 31 is previously constructed
5 to protrude above a base 3.

[57] Additionally, the prefabricated wall modules 1 and 1' are constructed on the anchoring section steel member 31 in order (See FIGS. 3 and 4).

[58] If the prefabricated wall module 1 is constructed
10 at a lower part, another prefabricated wall module 1 is constructed on the main shape steel member 11 of the lower prefabricated wall module 1.

[59] The anchoring section steel member 31 and main shape steel member 11 can be joined by a splice plate.

15 **[60]** The horizontal joint 14 of the prefabricated wall module 1 of the one side can be anchored to be inserted into an end portion of the prefabricated wall module 1' of the other side.

[61] Next, the construction method of the
20 prefabricated wall using the prefabricated wall module according to the present invention includes a step (b) of installing a form 2 on the outer surface of the prefabricated wall module 1 (FIG. 5).

[62] The form 2 can be fixed on the horizontal support
25 member 12.

[63] In this instance, it is convenient since additional temporary material for supporting the form 2 is not needed.

[64] After that, the construction method of the prefabricated wall using the prefabricated wall module according to the present invention includes a step (c) of pouring concrete C into the form 2 (FIG. 6).

[65] The form 2 can be removed after the concrete C is cured, and as circumstances require, may be maintained permanently.

[66] As shown in FIG. 7, the horizontal joint 14 includes: an anchoring bar 141 vertically disposed at the outside of a lateral end of the prefabricated wall module 1 of the one side and inserted and anchored into the lateral end of the neighboring prefabricated wall module 1' of the other side; and a plurality of horizontal support bars 142 of which ends are joined to the anchoring bar 141 to be fixed to the space support members 13 inside the prefabricated wall module 1.

[67] That is, the horizontal joint 14 includes the anchoring bar 141 and the horizontal support bar 142.

[68] The anchoring bar 141 protrudes outwardly from the lateral end of the prefabricated wall module 1, and is disposed in the vertical direction, which is the longitudinal direction of the wall.

[69] As shown in FIG. 9, the anchoring bar 141 is a part inserted into the lateral end of the neighboring prefabricated wall module 1' of the other side. After the prefabricated wall module 1' of the other side is constructed, the anchoring bar 141 is fixed inside the concrete C poured in the wall of the other side so that the both walls are joined to each other horizontally.

[70] One end of the horizontal support bar 142 is combined with the anchoring bar 141, and the other end is fixed to the space support member 13 inside the prefabricated wall module 1.

[71] The plurality of horizontal support bars 142 are disposed in the longitudinal direction of the wall to be spaced apart from one another.

[72] The horizontal support bars 142 are formed to correspond to a vertical interval of the space support members 13.

[73] Here, the anchoring bar 141 must transfer tensile force by being buried in the prefabricated wall module 1' of the other side. Moreover, the horizontal support bar 142 must be fixed at an upper portion or a lower portion of the space support member 13 while being combined with the lateral surface of the anchoring bar 141.

[74] So, it is preferable that the anchoring bar 141 and the horizontal support bar 142 be angle members.

[75] Therefore, a leg of the anchoring bar 141 supports tensile force by engaging in the concrete C of the neighboring wall of the other side, and the other leg of the anchoring bar 141 is combined with the horizontal support
5 bar 142. Moreover, a leg of one end of the horizontal support bar 142 is combined with the other leg of the anchoring bar 141, and the other leg of the other end is fixed to the space support member 13.

[76] If the anchoring bar 141 and the horizontal
10 support bar 142 are angles, the anchoring bar 141 and the horizontal support bar 142 are preferably combined with each other via bolts.

[77] In FIG. 7 illustrating the horizontal joint 14, an end portion of the prefabricated wall module 1 is fixed
15 not by the horizontal support bar 142 but by the anchoring bar 141 of the vertical direction. Therefore, an outward protrusion length of the prefabricated wall module 1 can be minimized.

[78] In the meantime, in case that the prefabricated
20 wall module 1' of the other side is installed, preferably, the end portion of the prefabricated wall module 1' of the other side to which the outer end portion of the horizontal joint 14 of the prefabricated wall module 1 is inserted is formed to have an open cross section shape without

combination with the space support member 13 not to be interfered with the anchoring bar 141.

[79] FIG. 10 is a perspective view of a prefabricated wall module according to a second preferred embodiment of the present invention, FIG. 11 is a perspective view of horizontal joints according to the second preferred embodiment, FIG. 12 is a front view of the prefabricated wall module illustrated in FIG. 10, and FIG. 13 is a sectional view of a wall including the prefabricated wall module illustrated in FIG. 10.

[80] As shown in FIGS. 10 to 13, the horizontal joint 14 includes: a plurality of U-shaped anchoring rebars 143 of which closed ends protrude to the lateral end of the prefabricated wall module 1; and a vertical support bar 144 of which one side is combined with one side of each of the U-shaped anchoring rebars 143 and the other side is fixed to the horizontal support member 12.

[81] That is, the horizontal joint 14 includes the U-shaped anchoring rebars 143 and the vertical support bar 144.

[82] The U-shaped anchoring rebars 143 are formed by being bent at 180 degrees to be in a U shape. End portions of the closed U-shaped anchoring rebars 143 protrude toward the lateral end of the prefabricated wall module 1.

[83] The U-shaped anchoring rebars 143 are disposed to be spaced apart from one another in the longitudinal direction of the wall.

[84] The U-shaped anchoring rebars 143 can be arranged to stand in the vertical direction so that both ends are located vertically.

[85] The prefabricated wall modules 1 and 1' are joined with each other when the closed end portions of the U-shaped anchoring rebars 143 are buried and anchored in the concrete C poured after the neighboring prefabricated wall module 1' of the other side is installed.

[86] One side of the vertical support bar 144 is combined with one side of the U-shaped anchoring rebars 143 so that the plurality of U-shaped anchoring rebars 143 adjoining vertically.

[87] Moreover, the other side of the vertical support bar 144 is fixed to the horizontal support member 12.

[88] In detail, the one side of the vertical support bar 144 is combined with the outer surfaces of the U-shaped anchoring rebars 143, and the other side is combined with the inner surface of the horizontal support member 12.

[89] As shown in FIG. 13, the horizontal joints 14 illustrated in FIG. 11 are respectively fixed to the prefabricated wall module 1 of one side and the prefabricated wall module 1' of the other side in the

opposite directions to each other not to interfere with each other when they are anchored.

[90] In FIG. 11 illustrating the horizontal joint 14, the end portion of the prefabricated wall module 1 is fixed by the closed U-shaped anchoring rebars 143. Therefore, an outward protruding length of the prefabricated wall module 1 can be minimized.

[91] Furthermore, when the prefabricated wall module 1' of the other side is installed, the end portion of the prefabricated wall module 1' of the other side to which the outer end portion of the horizontal joint 14 of the prefabricated wall module 1 of the one side has an open cross section not to be interfered with the U-shaped anchoring rebars 143.

[92] As shown in FIGS. 11 and 13, an auxiliary support bar 145 may be combined with the sides of the plurality of U-shaped anchoring rebars 143 at the outwardly protruding portion of the prefabricated wall module 1 to connect the plurality of U-shaped anchoring rebars 143 with each other.

[93] The auxiliary support bar 145 fixes the plurality of U-shaped anchoring rebars 143 at the sides of the U-shaped anchoring rebars 143.

[94] As described above, when the auxiliary support bar 145 together with the vertical support bar 144 is disposed on the lateral surfaces of the U-shaped anchoring

rebars 143, it can prevent deformation of the U-shaped anchoring rebars 143 while being carried or lifted.

[95] Preferably, the vertical support bar 144 and the auxiliary support bar 145 are arranged on a flat surface to be spaced apart from each other at a predetermined distance.

[96] Additionally, in order to minimize interference generated when the prefabricated wall module 1' of the other side is installed, it is preferable that the auxiliary support bar 145 be fixed at the inner surfaces of the U-shaped anchoring rebars 143.

[97] FIG. 14 is a perspective view of a prefabricated wall module according to a third preferred embodiment of the present invention, FIG. 15 is a perspective view of horizontal joints according to the third preferred embodiment, FIG. 16 is a front view of the prefabricated wall module illustrated in FIG. 14, and FIG. 17 is a sectional view of a wall including the prefabricated wall module illustrated in FIG. 14.

[98] As shown in FIGS. 14 to 17, the horizontal joint 14 includes: a plurality of horizontal splicing rebars 146 arranged in the horizontal direction to span the prefabricated wall modules 1 and 1'; and vertical support rebars 147 for connecting the plurality of horizontal splicing rebars 146.

[99] That is, the horizontal joint 14 includes the horizontal splicing rebars 146 and the vertical support rebars 147.

[100] The horizontal splicing rebars 146 are arranged
5 in the horizontal direction so that both sides thereof span the neighboring prefabricated wall modules 1 and 1'.

[101] The neighboring walls are joined to each other when the horizontal splicing rebars 146 are anchored inside the wall of the prefabricated wall module 1' of the other
10 side.

[102] After the neighboring prefabricated wall modules 1 and 1' are installed, the horizontal splicing rebars 146 are buried and anchored in the concrete C poured in the both walls.

15 **[103]** The horizontal splicing rebars 146 must be long enough to be buried deeper in the concretes C of the walls than a rebar anchoring length.

[104] The horizontal splicing rebars 146 are arranged to be spaced apart from one another in the longitudinal
20 direction of the wall.

[105] The vertical support rebars 147 connect the neighboring horizontal splicing rebars 146 with each other.

[106] Preferably, the vertical support rebars 147 are arranged at both ends of the horizontal splicing rebars 146.

[107] The horizontal splicing rebars 146 protrude to a predetermined length outwardly from the vertical support rebars 147.

[108] Especially, as shown in FIG. 15, if the horizontal joint 14 is a prefabricated reinforcement net having the horizontal splicing rebars 146 spaced apart from one another in the thickness direction of the wall and the vertical support rebars 147 arranged at both ends of the horizontal splicing rebars 146, it is easy to manufacture the horizontal joint 14.

[109] Moreover, when the prefabricated wall module 1 is manufactured, because the horizontal joint 14 of the prefabricated reinforcement net type is manufactured first and is arranged inside the prefabricated wall module 1, it is easy to manufacture and construct the prefabricated wall module 1.

[110] The horizontal joint 14 may be formed to be slidable in the horizontal direction.

[111] It is not necessary to fix the horizontal splicing rebars 146 inside the prefabricated wall module 1.

[112] That is, the horizontal splicing rebars 146 are held on the upper portions of the space support members 13 and are not fixed.

[113] As described above, when the plurality of horizontal splicing rebars 146 are supported on the upper

portions of the space support members 13, in spite of self-weight, they can support the horizontal joint 14 stably.

[114] As shown in FIG. 17(a), the horizontal joint 14 may be received in the prefabricated wall module 1 of the one side. Furthermore, as shown in FIG. 17(b), after the prefabricated wall module 1' of the other side is installed, the horizontal joint 14 is horizontally moved toward the prefabricated wall module 1' of the other side as shown in FIG. 17(c), so that the horizontal splicing rebars 146 span the prefabricated wall modules 1 and 1'. After that, a form is put on the outer surfaces of the prefabricated wall modules 1 and 1', and then, concrete (C) is poured and cured. Then, the wall construction is completed (FIG. 17(d)).

[115] Because the plurality of horizontal splicing rebars 146 are integrated by the vertical support rebars 147, it is easy to slide all of the horizontal joints 14 at the same time.

[116] Because the horizontal joint 14 can be received in the prefabricated wall module 1' of the one side, there is no interference when the neighboring prefabricated wall module 1' of the other side is installed.

What is claimed is:

1. A construction method of a prefabricated wall
5 using a prefabricated wall module, which includes: a plurality of main shape steel members vertically arranged at both sides inside a wall; a plurality of horizontal support members for horizontally connecting the main shape steel members adjoining in a width direction; a plurality of space
10 support members for connecting the facing main shape steel members with each other in a thickness direction; and horizontal joints, which protrudes at one side or both sides of a prefabricated wall module to be inserted into a lateral end of another neighboring prefabricated wall module, and
15 includes a plurality of U-shaped anchoring rebars of which closed ends protrude to the lateral end of the prefabricated wall module and a vertical support bar of which one side is combined with one side of each of the U-shaped anchoring rebars and the other side is fixed to the horizontal support
20 members, the construction method comprising the steps of:

(a) installing a plurality of the prefabricated wall modules to be spaced apart from each other at a predetermined distance so that the horizontal joint of prefabricated wall module of one side is inserted into the lateral end of the
25 neighboring prefabricated wall module of the other side;

(b) installing a form on the outer surface of the prefabricated wall module of the one side; and

(c) pouring concrete into the form.

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2. The construction method according to claim 1,
wherein an auxiliary support bar is combined with the sides
of the plurality of U-shaped anchoring rebars at the
outwardly protruding portion of the prefabricated wall module
5 to connect the plurality of U-shaped anchoring rebars with
each other.