

[DESCRIPTION]

[TITLE OF INVENTION]

METHOD FOR CONSTRUCTING FLOATING STRUCTURE

[Technical Field]

5 [0001]

The present invention relates to a method for constructing a floating structure.

Priority is claimed on Japanese Patent Application No. 2018-138328, filed July 24, 2018, the content of which is incorporated herein by reference.

[Background Art]

10 [0002]

When a large floating structure is constructed on the sea, mooring dolphin is known in which the floating structure is moored to dolphins provided on both sides of the floating structure. In the mooring dolphin, since the dolphin is fixed to a pile or the like supported by the seabed, it is possible to reduce a lateral movement of the moored

15 floating structure.

Further, as a method for constructing such a large floating structure, a method for joining a plurality of floating blocks on the sea is known (for example, refer to Patent Documents 1 to 4).

When a floating structure is constructed by joining a plurality of floating blocks
20 and the floating structure is moored to dolphins provided on both sides of the floating structure, first, the floating blocks provided on both ends are fixed to the dolphins, and the floating blocks may be sequentially joined to the fixed floating blocks.

[Citation List]

[Patent Literature]

25 [0003]

[Patent Document 1]

Japanese Unexamined Patent Application, First Publication No. 2002-019692

[Patent Document 2]

Japanese Unexamined Patent Application, First Publication No. 2000-025686

5 [Patent Document 3]

Japanese Unexamined Patent Application, First Publication No. H7-323884

[Patent Document 4]

Japanese Unexamined Patent Application, First Publication No. H6-092288

[Summary of Invention]

10 [Technical Problem]

[0004]

However, the floating block fixed to the dolphin has a small range of lateral movement (horizontal movement). Accordingly, when the floating block to be joined last is joined, a horizontal gap between the floating block to be joined last and a floating block already installed is narrow, and it is difficult to secure a space for joining work. Accordingly, the construction is difficult.

[0005]

Therefore, an object of the present invention is to provide a method for constructing a floating structure capable of joining floating blocks even when the horizontal gap between the floating blocks to be joined is narrow.

[Solution to Problem]

[0006]

In order to achieve the above object, according to an aspect of the present invention, there is provided a method for constructing a floating structure constructed by joining a plurality of floating blocks on the sea, the method including: a second floating

block installation step of installing a second floating block on a side of a first floating block installed on the sea, in which a side surface of the first floating block on a side to be joined to the second floating block is formed into a first inclined surface which faces diagonally upward and is gradually inclined toward a side close to the second floating block from an upper side toward a lower side, a side surface of the second floating block on a side to be joined to the first floating block is formed into a second inclined surface which faces diagonally downward and is gradually inclined toward a side away from the first floating block from the upper side toward the lower side, and the second floating block installation step includes a second floating block upper arrangement step of disposing the second floating block above the first floating block so that the second inclined surface is located above the first inclined surface, a second floating block lowering step of lowering the second floating block so that the first inclined surface and the second inclined surface are disposed to face each other, and a floating block joining step of joining the first floating block and the second floating block to each other.

15 [0007]

In the present invention, the side surface of the first floating block on the side to be joined to the second floating block is formed into the first inclined surface which faces diagonally upward and is gradually inclined from the side away from the second floating block toward the side close to the second floating block from the upper side toward the lower side, and the side surface of the second floating block on the side to be joined to the first floating block is formed into the second inclined surface which faces diagonally downward and is gradually inclined from the side close to the first floating block toward the side away from the first floating block from the upper side toward the lower side.

Accordingly, since the first inclined surface and the second inclined surface face each other in a direction oblique to the horizontal direction, even when a horizontal gap

between the first floating block and the second floating block is narrow, it is possible to provide a gap between the first inclined surface and the second inclined surface as long as the second floating block is disposed above the first floating block. Then, the gap between the first inclined surface and the second inclined surface can be set as a space
5 for joining the first floating block and the second floating block to each other.

As a result, even when the horizontal gap between the first floating block and the second floating block to be joined is narrow, the first floating block and the second floating block can be joined to each other.

[0008]

10 Further, in the method for constructing a floating structure according to the present invention, a concave portion may be formed in any one of the first inclined surface and the second inclined surface, and a convex portion which fits to the concave portion may be formed in the other thereof, and the concave portion and the convex portion may be fitted to each other in the floating block joining step.

15 According to this configuration, the second floating block can be easily positioned with respect to the first floating block by fitting the concave portion and the convex portion to each other.

[Advantageous Effects of Invention]

[0009]

20 According to the present invention, the first floating block and the second floating block can be joined to each other even when the horizontal gap between the first floating block and the second floating block to be joined is narrow.

[Brief Description of Drawings]

[0010]

25 Fig. 1 is a plan view illustrating an example of a floating structure according to

an embodiment of the present invention.

Fig. 2 is a side view illustrating the example of the floating structure according to the embodiment of the present invention when viewed from a second horizontal direction.

5 Fig. 3 is a view illustrating a second floating block upper arrangement step, a first floating block, and a second floating block, and is a view corresponding to a cross section taken along line A-A of Fig. 1.

Fig. 4 is a side view when a second side wall portion of the first floating block is viewed from a side of the second floating block.

10 Fig. 5 is a view illustrating a second floating block lowering step.

Fig. 6 is a view illustrating the second floating block lowering step following Fig. 5.

Fig. 7 is a view illustrating a floating block joining step.

Fig. 8 is a view illustrating the floating block joining step following Fig. 7.

15 Fig. 9 is a view illustrating the floating block joining step following Fig. 8.

Fig. 10 is a view illustrating a first floating block and a second floating block according to a modification example of the present embodiment.

[Description of embodiments]

[0011]

20 Hereinafter, a method for constructing a floating structure according to an embodiment of the present invention will be described with reference to Figs. 1 to 9.

As shown in Figs. 1 and 2, a floating structure 1 according to the present embodiment is constructed by joining a plurality of concrete floating blocks 2 to each other, and is moored on the sea 11 by mooring dolphin.

25 In the present embodiment, the plurality of floating blocks 2 are arranged

linearly in a horizontal direction. In the following, the horizontal direction in which a plurality of floating blocks 2 are arranged is referred to as a first horizontal direction (direction of arrow X in the drawings), and a horizontal direction orthogonal to the first horizontal direction is referred to as a second horizontal direction (direction of arrow Y in the drawings).

[0012]

In the present embodiment, the floating structure 1 is provided between a dolphin 31 and a dolphin 32 provided at intervals in the first horizontal direction, and the floating structure 1 is fixed to each of the dolphin 31 and the dolphin 32. As shown in Fig. 2, the dolphin 31 is fixed to a pile body 33a supported by the seabed, and the dolphin 32 is fixed to a pile body 33b supported by the seabed.

The floating structure 1 of the present embodiment is configured such that five floating blocks 2 are arranged in the first horizontal direction, and the floating blocks 2 adjacent to each other in the first horizontal direction are joined to each other so that their side surfaces face each other.

The five floating blocks 2 are referred to as floating blocks 2A to 2E from one side (dolphin 31 side) to the other side (dolphin 32 side) in the first horizontal direction. In the following, the second floating block 2B and the fourth floating block 2D from the one side in the first horizontal direction are referred to as first floating blocks 2B and 2D.

The third floating block 2C from the one side in the first horizontal direction which is located at the center of the arrangement is referred to as a second floating block 2C.

The first floating block 2A and the fifth floating block 2E from the one side in the first horizontal direction which are located at both ends of the arrangement are referred to as third floating blocks 2A and 2E.

[0013]

The third floating block 2A is fixed to the dolphin 31, and the third floating block 2E is fixed to the dolphin 32. That is, in the floating blocks 2A to 2E, the third floating block 2A on the one side in the first horizontal direction is fixed to the dolphin 31, and the third floating block 2E on the other side in the first horizontal direction is
5 fixed to the dolphin 32.

Each of the third floating blocks 2A and 2E is formed in a rectangular parallelepiped outer shape. Each of the third floating blocks 2A and 2E is installed so that an upper surface and a lower surface thereof are horizontal surfaces and four side surfaces thereof become vertical surfaces facing the first horizontal direction or the
10 second horizontal direction.

[0014]

A ballast water accommodation portion 23 capable of accommodating ballast water is formed inside each of the third floating blocks 2A and 2E. The third floating block 2A includes a water injection port through which external water is injected into the
15 ballast water accommodation portion 23 and a drainage port through which the water in the ballast water accommodation portion 23 is drained to the outside. The third floating block 2E includes a water injection port through which external water is injected into the ballast water accommodation portion 23 and a drainage port through which the water in the ballast water accommodation portion 23 is drained to the outside.

20 The water injection port is provided on a side surface of each of the third floating blocks 2A and 2E, and the water injection port includes a water injection valve. Each of the third floating blocks 2A and 2E is configured to inject water into the ballast water accommodation portion 23 by opening the water injection valve.

[0015]

25 As shown in Figs. 1 to 3, each of the first floating blocks 2B and 2D is formed in

a trapezoidal columnar outer shape having a trapezoidal shape when viewed from the second horizontal direction. Fig. 3 shows a separated state before the first floating block 2B and the second floating block 2C are joined to each other and the first floating block 2D and the second floating block 2C are joined to each other..

- 5 A ballast water accommodation portion 21 capable of accommodating the ballast water is formed inside each of the first floating blocks 2B and 2D. The first floating block 2B includes a water injection port through which the external water is injected into the ballast water accommodation portion 21 and a drainage port through which the water in the ballast water accommodation portion 21 is drained to the outside.
- 10 The first floating block 2D includes a water injection port through which the external water is injected into the ballast water accommodation portion 21 and a drainage port through which the water in the ballast water accommodation portion 21 is drained to the outside. The water injection port is provided on a side surface of each of the first floating blocks 2B and 2D, and the water injection port includes a water injection valve.
- 15 Each of the first floating blocks 2B and 2D is configured to inject water into the ballast water accommodation portion 21 by opening the water injection valve.

[0016]

- As shown in Fig. 3, each of the first floating blocks 2B and 2D include an upper plate portion 41 which configures an upper portion of the ballast water accommodation
- 20 portion 21, a lower plate portion 42 which is disposed below the ballast water accommodation portion 21, a first side plate portion 43 (refer to Fig. 2) which is disposed on a side of each of the third floating blocks 2A and 2E of the ballast water accommodation portion 21, a second side plate portion 44 which is disposed on the second floating block 2C side of the ballast water accommodation portion 21, a third side
 - 25 plate portion 45 which is disposed on the one side of the ballast water accommodation

portion 21 in the second horizontal direction, and a fourth side plate portion 46 which is disposed on the other side of the ballast water accommodation portion 21 in the second horizontal direction. Each of the upper plate portion 41, the lower plate portion 42, the first side plate portion 43, the second side plate portion 44, the third side plate portion 45, and the fourth side plate portion 46 is formed in a flat plate shape.

[0017]

As shown in Fig. 2, the upper plate portion 41 is disposed so that a plate surface thereof is a horizontal surface.

The lower plate portion 42 is disposed below the upper plate portion 41 so that a plate surface thereof is a horizontal surface. A dimension of the lower plate portion 42 in the first horizontal direction is longer than a dimension of the upper plate portion 41 in the first horizontal direction. Edge portions of the lower plate portions 42 on the third floating blocks 2A and 2E sides are disposed vertically below edge portions of the upper plate portions 41 on the third floating blocks 2A and 2E sides, and an edge portion 42a of the lower plate portion 42 on the second floating block 2C side is disposed on the second floating block 2C side from an edge portion 41a of the upper plate portion 41 on a side of each of the third floating blocks 2A and 2E.

An upper edge portion of the first side plate portion 43 is connected to the edge portion of the upper plate portion 41 on a side of each of the third floating blocks 2A and 2E, and a lower edge portion of the first side plate portion 43 is connected to the edge portion of the lower plate portion 42 on a side of each of the third floating blocks 2A and 2E. A plate surface of the first side plate portion 43 is disposed so as to be a vertical surface facing the first horizontal direction.

[0018]

As shown in Fig. 3, an upper edge portion 44a of the second side plate portion

44 is connected to the edge portion 41a of the upper plate portion 41 on the second floating block 2C side, and a lower edge portion 44b of the second side plate portion 44 is connected to the edge portion 42a of the lower plate portion 42 on the second floating block 2C side. The second side plate portion 44 is disposed so that a plate surface thereof does not become the vertical surface and is gradually inclined toward a side close to the second floating block 2C from an upper side toward a lower side. When a surface of the second side plate portion 44 on the second floating block 2C side is referred to as a first inclined surface 47, the first inclined surface 47 is gradually inclined toward the side close to the second floating block 2C from the upper side toward the lower side and faces diagonally upward.

As shown in Figs. 3 and 4, the first inclined surface 47 of the second side plate portion 44 includes a rubber gasket 48 used for stopping water extending along a lower edge portion of the first inclined surface 47 and both edge portions in the second horizontal direction. The rubber gasket 48 is provided so as to have a U shape which is open upward when viewed from the first horizontal direction.

[0019]

As shown in Figs. 2 and 3, an upper edge portion of the third side plate portion 45 is connected to an edge portion of the upper plate portion 41 on the one side in the second horizontal direction, a lower edge portion of the third side plate portion 45 is connected to an edge portion of the lower plate portion 42 on the one side in the second horizontal direction, an edge portion of the third side plate portion on the side of each of the third floating blocks 2A and 2E is connected to an edge portion of the first side plate portion 43 on the one side in the second horizontal direction, and an edge portion of the third side plate portion on the second floating block 2C side is connected to an edge portion of the second side plate portion 44 on the one side in the second horizontal

direction. The third side plate portion 45 is disposed so that a plate surface thereof becomes the vertical surface facing the second horizontal direction.

An upper edge portion of the fourth side plate portion 46 is connected to an edge portion of the upper plate portion 41 on the other side in the second horizontal direction, a lower edge portion of the fourth side plate portion 46 is connected to an edge portion of the lower plate portion 42 on the other side in the second horizontal direction, an edge portion of the fourth side plate portion on the side of each of the third floating blocks 2A and 2E is connected to an edge portion of the first side plate portion 43 on the other side in the second horizontal direction, and an edge portion of the fourth side plate portion on the second floating block 2C side is connected to an edge portion of the second side plate portion 44 on the other side in the second horizontal direction. The fourth side plate portion 46 is disposed so that a plate surface thereof becomes the vertical surface facing the second horizontal direction.

[0020]

As shown in Fig. 3, the second floating block 2C is formed in a trapezoidal columnar outer shape having a trapezoidal shape when viewed from the second horizontal direction.

A ballast water accommodation portion 22 capable of accommodating the ballast water is formed inside the second floating block 2C. The second floating block 2C includes a water injection port through which the external water is injected into the ballast water accommodation portion 22 and a drainage port through which the water in the ballast water accommodation portion 22 is drained to the outside. The water injection port is provided on a side surface of the second floating block 2C, and the water injection port includes a water injection valve.

[0021]

The second floating block 2C includes an upper plate portion 51 which configures an upper portion of the ballast water accommodation portion 22, a lower plate portion 52 which is disposed below the ballast water accommodation portion 22, a first side plate portion 53 which is disposed on the one side of the ballast water accommodation portion 22 in the first horizontal direction, a second side plate portion 54 which is disposed on the other side of the ballast water accommodation portion 22 in the first horizontal direction, a third side plate portion 55 which is disposed on the one side of the ballast water accommodation portion 22 in the second horizontal direction, and a fourth side plate portion 56 which is disposed on the other side of the ballast water accommodation portion 22 in the second horizontal direction. Each of the upper plate portion 51, the lower plate portion 52, the first side plate portion 53, the second side plate portion 54, the third side plate portion 55, and the fourth side plate portion 56 is formed in a flat plate shape.

[0022]

The upper plate portion 51 is disposed so that a plate surface thereof is a horizontal surface.

The lower plate portion 52 is disposed below the upper plate portion 51 so that a plate surface thereof is a horizontal surface. The length of the lower plate portion 52 in the first horizontal direction is shorter than the length of the upper plate portion 51 in the first horizontal direction. An edge portion 52a of the lower plate portion 52 on the one side in the first horizontal direction is disposed on the other side in the first horizontal direction from an edge portion 51a of the upper plate portion 51 on the one side in the first horizontal direction, and an edge portion 52b of the lower plate portion 52 on the other side in the first horizontal direction is disposed on the one side in the first horizontal direction from an edge portion 51b of the upper plate portion 51 on the other

side in the first horizontal direction.

[0023]

An upper edge portion of the first side plate portion 53 is connected to an edge portion of the upper plate portion 51 on the one side in the first horizontal direction, and
5 a lower edge portion of the first side plate portion 53 is connected to an edge portion of the lower plate portion 52 on the one side in the first horizontal direction. The first side plate portion 53 is disposed so that a plate surface thereof does not become the vertical surface and is inclined toward the other side in the first horizontal direction from an upper side toward a lower side. A surface of the first side plate portion 53 on the one
10 side in the first horizontal direction is gradually inclined toward the other side in the first horizontal direction from the upper side toward the lower side, and faces diagonally downward.

The surface of the first side plate portion 53 on the one side in the first horizontal direction is referred to as a second inclined surface 57.

15 [0024]

An upper edge portion of the second side plate portion 54 is connected to an edge portion of the upper plate portion 51 on the other side in the first horizontal direction, and a lower edge portion of the second side plate portion 54 is connected to an edge portion of the lower plate portion 52 on the other side in the first horizontal
20 direction. The second side plate portion 54 is disposed so that a plate surface thereof does not become the vertical surface and is inclined toward the one side in the first horizontal direction from an upper side toward a lower side. A surface of the second side plate portion 54 on the other side in the first horizontal direction is gradually inclined toward the one side in the first horizontal direction from the upper side toward
25 the lower side, and faces diagonally downward.

The surface of the second side plate portion 54 on the other side in the first horizontal direction is referred to as a second inclined surface 58.

[0025]

An upper edge portion of the third side plate portion 55 is connected to an edge
5 portion of the upper plate portion 51 on the one side in the second horizontal direction, a
lower edge portion of the third side plate portion 55 is connected to an edge portion of
the lower plate portion 52 on the one side in the second horizontal direction, an edge
portion of the third side plate portion on the one side in the first horizontal direction is
connected to an edge portion of the first side plate portion 53 on the one side in the
10 second horizontal direction, and an edge portion of the third side plate portion on the
other side in the first horizontal direction is connected to an edge portion of the second
side plate portion 44 on the one side in the second horizontal direction. The third side
plate portion 55 is disposed so that a plate surface thereof becomes the vertical surface
facing the second horizontal direction.

15 An upper edge portion of the fourth side plate portion 56 is connected to an edge
portion of the upper plate portion 51 on the other side in the second horizontal direction,
a lower edge portion of the fourth side plate portion 56 is connected to an edge portion of
the lower plate portion 52 on the other side in the second horizontal direction, an edge
portion of the fourth side plate portion on the one side in the first horizontal direction is
20 connected to an edge portion of the first side plate portion 53 on the other side in the
second horizontal direction, and an edge portion of the fourth side plate portion on the
other side in the first horizontal direction is connected to an edge portion of the second
side plate portion 54 on the other side in the second horizontal direction. The fourth
side plate portion 56 is disposed so that a plate surface thereof becomes the vertical
25 surface facing the second horizontal direction.

[0026]

In the present embodiment, the first floating block 2B and the third floating block 2A adjacent to each other in the first horizontal direction are joined by a PC steel material, and pre-stress is introduced into the PC steel material. The first floating block
5 2D and the third floating block 2E adjacent to each other in the first horizontal direction are joined by a PC steel material, and pre-stress is introduced into the PC steel material.

The first floating block 2B and the second floating block 2C adjacent to each other in the first horizontal direction are joined by a PC steel material 6 (refer to Fig. 9).

The first floating block 2D and the second floating block 2C adjacent to each other in the
10 first horizontal direction are joined by a PC steel material 6 (refer to Fig. 9). Prestress is introduced in the PC steel material 6.

[0027]

Next, a method for constructing the floating structure 1 according to the present embodiment will be described.

15 First, a third floating block installation step of installing the third floating blocks 2A and 2E is performed.

In the third floating block installation step, the dolphins 31 and 32 are installed, and prefabricated third floating blocks 2A and 2E are transported to an installation sea area. The third floating block 2A is fixed to the dolphin 31, and the third floating block
20 2E is fixed to the dolphin 32. The fixing of the third floating block 2A to the dolphin 31 and the fixing of the third floating block 2E to the dolphin 32 are performed by a known method.

[0028]

Subsequently, a first floating block installation step of installing the first floating
25 blocks 2B and 2D is performed.

In the first floating block installation step, prefabricated first floating blocks 2B and 2D are transported to the installation sea area, the first floating block 2B is fixed to the third floating block 2A, and the first floating block 2D is fixed to the third floating block 2E. The joining between the first floating block 2B and the third floating block 2A and the joining between the first floating block 2D and the third floating block 2E are performed by a known method.

In joining work between the first floating block 2B and the third floating block 2A and joining work between the first floating block 2D and the third floating block 2E, a space in which the second floating block 2C is installed between the two first floating blocks 2B and 2D can be used as a work space.

When the first floating block 2B is joined to the third floating block 2A and when the first floating block 2D are joined to the third floating block 2E, they are separated from each other in the first horizontal direction.

[0029]

Subsequently, a guide member installation step of installing a guide member 71 (refer to Fig. 3) on a lower side between the two first floating blocks 2B and 2D is performed.

As shown in Fig. 3, the guide member 71 is a member extending in the first horizontal direction, one end portion 71a in the first horizontal direction is fixed to a lower surface of the first floating block 2B disposed on the one side in the first horizontal direction, and the other end portion 71b in the first horizontal direction is fixed to a lower surface of the first floating block 2D disposed on the other side in the first horizontal direction. An upper surface 71c of the guide member 71 is a horizontal surface and is disposed at the same height as that of the lower surface of each of the first floating blocks 2B and 2D.

The guide member 71 is intended to integrate the first floating blocks 2B and 2D and maintain a separation between the first floating blocks 2B and 2D. Further, a lower surface 52c of the second floating block 2C comes into contact with the upper surface of the guide member 71. Accordingly, the second floating block 2C can be positioned
5 with respect to the first floating blocks 2B and 2D.

After the first floating block 2B is fixed to the third floating block 2A and the first floating block 2D is fixed to the third floating block 2E, the guide member 71 is installed in the first floating blocks 2B and 2D. In Fig. 3, the second floating block 2C floats on the sea, and the guide member 71 is installed in the first floating blocks 2B and
10 2D before the second floating block 2C is pulled between the first floating blocks 2B and 2D.

[0030]

Subsequently, a second floating block installation step of installing the second floating block 2C is performed.

15 In the second floating block installation step, first, as shown in Fig. 3, the water injection valves of the first floating blocks 2B and 2D and the third floating blocks 2A and 2E installed on the sea 11 are opened to inject the ballast water 12 into the ballast water accommodation portion 21 and 23 inside the blocks to increase drafts of the first floating blocks 2B and 2D and the third floating blocks 2A and 2E. A lower side of
20 each of the first floating blocks 2B and 2D and the third floating blocks 2A and 2E is submerged to a predetermined depth. The first floating block 2B, 2D and the third floating block 2A, 2E installed on the sea 11 can move in an up-down direction within a predetermined range in a state of being fixed to the dolphins 31 and 32.

[0031]

25 Subsequently, a second floating block upper arrangement step of transporting

the prefabricated second floating block 2C to the installation sea area and disposing the second floating block 2C above the two first floating blocks 2B and 2D is performed.

In the second floating block upper arrangement step, first, the second floating block 2C is transported to a place away from an installation space (a space between the two first floating blocks 2B and 2D) of the second floating block 2C. In this case, the ballast water accommodation portion 22 of the second floating block 2C is emptied to reduce a draft.

The second floating block 2C is towed between the two first floating blocks 2B and 2D, and the second floating block 2C is connected to winches 81 provided in the first floating blocks 2B and 2D by wires 82 (refer to Fig. 5). When the second floating block 2C is pulled between the two first floating blocks 2B and 2D, in order to reduce a friction between the second floating block 2C and the two first floating blocks 2B and 2D, guide rollers 73 (refer to Fig. 3) are installed in first floating blocks 2B and 2D.

The draft of the second floating block 2C is smaller than those of the first floating blocks 2B and 2D and the third floating blocks 2A and 2E in a state where the ballast water accommodation portion 22 is empty. Accordingly, the second floating block 2C is disposed above the first floating blocks 2B and 2D.

In this case, position adjustment of the second floating block 2C is performed so that the second inclined surface 57 is above the first inclined surface 47 of the first floating block 2B, and the second inclined surface 58 is above the first inclined surface 47 of the first floating block 2D.

[0032]

Subsequently, a second floating block lowering step of lowering the second floating block 2C is performed so that the second floating block 2C has the same height as those of the first floating blocks 2B and 2D.

As shown in Fig. 5, in the second floating block lowering step, the water injection valve of the second floating block 2C is opened, and the ballast water 12 is injected into the ballast water accommodation portion 22 inside the second floating block 2C to increase the draft of the second floating block 2C. Accordingly, as shown in Fig. 6, the second floating block 2C is lowered to a position at the same depth as those of the first floating blocks 2B and 2D. In addition to draft adjustment, the winches 81 are operated to dispose the second floating block 2C at the above position.

In this case, the lower surface 52c of the second floating block 2C is brought into contact with the upper surface 71c of the guide member 71, the second inclined surface 57 of the second floating block 2C is brought into contact with the rubber gasket 48 of the first inclined surface 47 of the first floating block 2B, and the second inclined surface 58 of the second floating block 2C is brought into contact with the rubber gasket 48 of the first inclined surface 47 of the first floating block 2D.

In this way, the second floating block 2C is disposed between the two first floating blocks 2B and 2D.

For example, the second floating block 2C disposed at the above position is temporarily fixed by a hydraulic arm 72 (refer to Fig. 7) provided in the first floating blocks 2B and 2D.

[0033]

Subsequently, a floating block joining step of joining the first floating block 2B and the second floating block 2C to each other, and joining the first floating block 2D and the second floating block 2C to each other is performed.

As shown in Fig. 7, in the floating block joining step, first, seawater 13 between the first floating block 2B and the second floating block 2C and between the first floating block 2D and the second floating block 2C is pumped up and drained. Figs. 7 to 10

show the joining between the first floating block 2B and the second floating block 2C.

The joining between the first floating block 2D and the second floating block 2C is the same as the joining between the first floating block 2B and the second floating block 2C.

[0034]

5 In the present embodiment, since the rubber gasket 48 (refer to Fig. 4, not shown in Fig. 7) having a U shape which is open upward is provided, the seawater 13 inside the rubber gasket 48 is drained.

 Accordingly, the first floating blocks 2B and 2D are brought close to the second floating block 2C each other by a water pressure acting on the first floating blocks 2B
10 and 2D and the second floating block 2C from the outside, the rubber gasket 48 is interposed and crushed between the second inclined surface 57 of the second floating block 2C and the first inclined surface 47 of the first floating block 2B, and the rubber gasket 48 is interposed and crushed between the second inclined surface 58 of the second floating block 2C and the first inclined surface 47 of the first floating block 2D. The
15 first floating blocks 2B and 2D and the second floating block 2C are joined to each other by water pressure.

[0035]

 When the first floating blocks 2B and 2D are joined to the second floating block 2C each other by water pressure, the ballast water 12 (refer to Fig. 7) of the first floating
20 blocks 2B and 2D, the second floating block 2C, and the third floating blocks 2A and 2E is drained.

 Subsequently, as shown in Fig. 8, the second side plate portion 44 of the first floating block 2B and the first side plate portion 53 of the second floating block 2C are joined to each other, and the second side plate portion 44 (refer to Fig. 3) of the first
25 floating block 2D and the second side plate portion 54 (refer to Fig. 3) of the second

floating block 2C are joined to each other.

PC sheaths 61 through which the PC steel materials 6 (refer to Fig. 9) are inserted are provided in the second side plate portion 44 of the first floating block 2B and the first side plate portion 53 of the second floating block 2C, and PC sheaths (not shown) through which the PC steel materials 6 are inserted are provided in the second side plate portion 44 of the first floating block 2D and the second side plate portion 54 of the second floating block 2C.

A grout material 62 is filled between the first floating blocks 2B and 2D and the second floating block 2C, and curing is performed for a predetermined period.

Subsequently, as shown in Fig. 9, the PC steel materials 6 are respectively inserted into the PC sheaths 61 to introduce pre-stress.

The PC sheath 61 is filled with the grout material 63.

In this way, the first floating blocks 2B and 2D and the second floating block 2C are joined to each other to construct the floating structure 1.

[0036]

Next, operation and effect of the method for constructing the floating structure 1 according to the above-described embodiment will be described with reference to the drawings.

In the method for constructing the floating structure 1 according to the present embodiment, the side surface of each of the first floating blocks 2B and 2D on the side to be joined to the second floating block 2C is the first inclined surface 47, which faces diagonally upward and is gradually inclined from the side away from the second floating block 2C toward the side close to the second floating block 2C from the upper side toward the lower side. The side surface of the second floating block 2C on the side to be joined to each of the first floating blocks 2B and 2D is the second inclined surface 57,

which faces diagonally downward and is gradually inclined from the side close to the first floating blocks 2B and 2D toward the side away from the first floating blocks 2B and 2D from the upper side toward the lower side.

Accordingly, since the first inclined surface 47 and the second inclined surface
5 57 face each other in a direction oblique to the horizontal direction, even when a horizontal gap between the first floating blocks 2B and 2D and the second floating block 2C is narrow, it is possible to provide a gap between the first inclined surface 47 and the second inclined surface 57 as long as the second floating block 2C is disposed above the first floating blocks 2B and 2D. Then, the gap between the first inclined surface 47 and
10 the second inclined surface 57 can be set as a space for joining the first floating blocks 2B and 2D and the second floating block 2C to each other.

As a result, even when the horizontal gap between the first floating blocks 2B and 2D and the second floating block 2C to be joined is narrow, the first floating blocks 2B and 2D and the second floating block 2C can be joined to each other.

15 [0037]

Hereinbefore, the embodiment of the method for constructing a floating structure according to the present invention is described. However, the present invention is not limited to the above embodiment and can be appropriately modified without departing from the spirit of the present invention.

20 For example, in the above embodiment, the floating blocks 2 are arranged in the first horizontal direction. However, the floating blocks 2 may be arranged in both the first horizontal direction and the second horizontal direction. Further, as long as the first inclined surface 47 is formed on each of the first floating blocks 2B and 2D and the second inclined surface 57 is formed on the second floating block 2C, the floating block
25 2 may have a shape other than the above-described shape.

[0038]

Further, in the above embodiment, the second inclined surfaces 57 and 58 are respectively formed on both sides of the second floating block 2C in the first horizontal direction, the first inclined surface 47 is formed on each of the first floating blocks 2B and 2D joined to both sides of the second floating block 2C, and the first inclined surface 47 and the second inclined surfaces 57 and 58 are disposed to face each other. Meanwhile, in the second floating block, the second inclined surface may be formed on only one of both sides in the first horizontal direction, the first inclined surface may be formed on only the first floating block connected to the side on which the second inclined surface of the second floating block is formed, and the first inclined surface and the second inclined surface may be disposed to face each other.

[0039]

Further, as in a floating structure 1B shown in Fig. 10, concave portions 91 may be formed in any one (second inclined surface 57B in Fig. 10) of a first inclined surface 47B and a second inclined surface 57B, convex portions 92 which fit to the concave portions 91 are formed on the other (first inclined surface 47B in Fig. 10) thereof, and the concave portions 91 and the convex portions 92 may be fitted to each other in the floating block joining step. Accordingly, the second floating block 2C can be easily positioned with respect to the first floating block 2B by fitting the concave portion 91 and the convex portion 92 to each other.

[Industrial Applicability]

[0040]

According to the present invention, the first floating block and the second floating block can be joined to each other even when the horizontal gap between the first floating block and the second floating block to be joined is narrow.

[Reference Signs List]

[0041]

- 1,1B Floating structure
- 2A, 2E Third floating block
- 5 2B, 2D First floating block
- 2C Second floating block
- 11 Sea
- 31, 32 Dolphin
- 47, 47B First inclined surface
- 10 57, 58, 57B Second inclined surface
- 91 Concave portion
- 92 Convex portion

CLAIMS

[Claim 1]

A method for constructing a floating structure constructed by joining a plurality of floating blocks on the sea, the method comprising:

a second floating block installation step of installing a second floating block on a side of a first floating block installed on the sea,

wherein a side surface of the first floating block on a side to be joined to the second floating block is formed into a first inclined surface which faces diagonally upward and is gradually inclined toward a side close to the second floating block from an upper side toward a lower side,

a side surface of the second floating block on a side to be joined to the first floating block is formed into a second inclined surface which faces diagonally downward and is gradually inclined toward a side away from the first floating block from the upper side toward the lower side, and

the second floating block installation step includes

a second floating block upper arrangement step of disposing the second floating block above the first floating block so that the second inclined surface is located above the first inclined surface,

a second floating block lowering step of lowering the second floating block so that the first inclined surface and the second inclined surface are disposed to face each other, and

a floating block joining step of joining the first floating block and the second floating block to each other,

a gasket which has a U shape and is open upward is provided along a lower edge portion and a both side edge portion of the first inclined surface, and

seawater inside of the gasket is drained and a grout material is filled between the first floating block and the second floating block after the first floating block and the second floating block are joined via the gasket.

[Claim 2]

The method for constructing a floating structure according to claim 1, wherein a concave portion is formed in any one of the first inclined surface and the second inclined surface, and a convex portion which fits to the concave portion is formed in the other thereof, and the concave portion and the convex portion are fitted to each other in the floating block joining step.