

[DESCRIPTION]

[TITLE OF INVENTION]

UTILIZATION METHOD FOR EXISTING MARINE VESSELS

[Technical Field]

5 [0001]

The present invention relates to a utilization method for existing marine vessels.

Priority is claimed on Japanese Patent Application No. 2018-192056, filed
October 10, 2018, the content of which is incorporated herein by reference.

[Background Art]

10 [0002]

A marine vessel transporting liquefied natural gas (LNG) and the like includes a hull and a plurality of tanks. The plurality of tanks are provided side by side in the fore and aft direction of the hull and store cargo, such as LNG, therein.

[0003]

15 For example, as disclosed in Patent Document 1, a marine vessel transporting LNG tends to increase in size but there is a demand for a medium-size carrier suitable for short-distance transportation and secondary transportation in the coastal area.

[Citation List]

[Patent Document]

20 [0004]

[Patent Document 1]

Japanese Unexamined Patent Application, First Publication No. 2016-22931

[Summary of Invention]

[Technical Problem]

25 [0005]

However, a lot of costs are required to newly manufacture a marine vessel. Particularly, a lot of costs are required for the propulsion engine, the living section, and the like of a marine vessel.

[0006]

5 Incidentally, a marine vessel is used over a long period of time, for example, 20 years or more. On the other hand, the above-mentioned marine vessel has increased in size with the times, or the rate of fuel consumption thereof during navigation has been improved through the progress of a propulsion engine. For this reason, even though an old type marine vessel is still usable, the rate of operation thereof tends to be lowered.

10 In the case of a marine vessel transporting LNG and the like, tanks are made of a material that is difficult to be corroded, such as an aluminum alloy. Accordingly, the marine vessel has a high utility value. For this reason, there is a desire to effectively use a marine vessel in a state where a hull or a propulsion engine can be utilized.

 The invention has been made in consideration of the above-mentioned
15 circumstances, and an object of the invention is to provide a utilization method for existing marine vessels that can effectively utilize an existing marine vessel and manufacture a marine vessel having an appropriate size at a low cost.

[Solution to Problem]

[0007]

20 The invention employs the following means in order to achieve the object.

 According to a first aspect of the invention, a utilization method for existing marine vessels includes: a step of cutting out an intermediate hull portion as a tank unit from an existing marine vessel including a hull where a plurality of tanks are arranged in a Fore and aft direction, the intermediate hull portion being part of the hull in the fore
25 and aft direction in which the some of the plurality of tanks are disposed; and a step of

manufacturing a new marine vessel by forming a bow-side hull portion on a side of a stern-side hull portion close to a bow, the stern-side hull portion being disposed in the existing marine vessel so as to be closer to a stern than the intermediate hull portion cut out as the tank unit and including an engine room.

5 [0008]

According to this configuration, it is possible to manufacture a new marine vessel by forming the bow-side hull portion on the side, which is close to the bow, of the stern-side hull portion including the engine room after cutting out the intermediate hull portion including some tanks from the existing marine vessel. Since the new marine vessel includes the engine room of the existing marine vessel, it is not necessary to newly
10 manufacture the engine room. Accordingly, this is particularly effective in reducing costs. Further, the intermediate hull portion, which is cut out, can be used as the tank unit of the floating storage facility. Since the existing marine vessel is effectively utilized in this way to manufacture the new marine vessel and the tank unit, the
15 manufacturing costs of the marine vessel and the tank unit can be reduced.

[0009]

According to a second aspect of the invention, a bow-side hull portion of the existing marine vessel disposed closer to the bow than the intermediate hull portion of the existing marine vessel may be used as the bow-side hull portion according to the first
20 aspect.

According to this configuration, not only the stern-side hull portion but also the bow-side hull portion can be formed effectively utilizing the existing marine vessel. Accordingly, the manufacturing costs of the marine vessel can be further reduced.

[0010]

According to a third aspect of the invention, a connecting hull portion connecting the bow-side hull portion to the stern-side hull portion may be additionally provided between a rear end of the bow-side hull portion and a front end of the stern-side hull portion in the step of manufacturing the new marine vessel according to the first or
5 second aspect.

According to this configuration, the bow-side hull portion and the stern-side hull portion can be connected to each other through the connecting hull portion. Accordingly, in a case where the hull cross-sectional shapes of the rear end of the bow-side hull portion and the front end of the stern-side hull portion are significantly different
10 from each other, the bow-side hull portion and the stern-side hull portion can be satisfactorily connected to each other by the connecting hull portion. Further, various devices and the like can also be installed in the additionally provided connecting hull portion.

[0011]

15 According to a fourth aspect of the invention, the utilization method for existing marine vessels according to any one aspect of the first to third aspects may further include a step of installing the tank unit as a floating storage facility.

Since part of the existing marine vessel is cut out as the tank unit and the tank unit is installed as the floating storage facility as described above, the existing marine
20 vessel can be effectively utilized. Further, since the floating storage facility formed in this way has a length in the fore and aft direction shorter than that of the existing marine vessel, the floating storage facility can be installed even in a case where a mooring space is limited. Accordingly, the degree of freedom in the installation location of the floating storage facility is increased. Furthermore, since the number of the tanks included in the

tank unit may be determined as necessary, it is possible to provide the floating storage facility having a load capacity corresponding to the use.

[0012]

According to a fifth aspect of the invention, the utilization method for existing
5 marine vessels according to the fourth aspect may further include a step of mounting a float on the tank unit prior to the step of installing the tank unit as the floating storage facility, and a step of mounting equipment as a floating storage facility on at least one of the tank unit and the float.

Since the float and the equipment are added to the tank unit cut out from part of
10 the existing marine vessel in this way, the floating storage facility having required functions can be manufactured while the existing marine vessel is effectively utilized. Further, since the float is provided, a draft can be made shallow. Accordingly, since the floating storage facility can be installed even in a case where a mooring space is limited or even at a location where the depth of water is shallow, the degree of freedom in the
15 installation location of the floating storage facility is increased. Furthermore, since the number of the tanks included in the tank unit may be determined as necessary, it is possible to provide the floating storage facility having a load capacity corresponding to the use.

[Advantageous Effects of Invention]

20 [0013]

According to the utilization method for existing marine vessels, it is possible to effectively utilize an existing marine vessel and to manufacture a marine vessel having an appropriate size at a low cost.

[Brief Description of Drawings]

25 [0014]

Fig. 1 is a side view showing the schematic configuration of an existing marine vessel that is used in a utilization method for existing marine vessels according to a first embodiment of the invention.

Fig. 2 is a flowchart of the utilization method for existing marine vessels.

5 Fig. 3 is a side view showing a state where an intermediate hull portion of the existing marine vessel is cut out in the utilization method for existing marine vessels.

Fig. 4 is a side view showing a state where a bow-side hull portion and a stern-side hull portion of the existing marine vessel are joined to each other in the utilization method for existing marine vessels.

10 Fig. 5 is a plan view showing a state where the bow-side hull portion and the stern-side hull portion of the existing marine vessel are joined to each other in the utilization method for existing marine vessels.

Fig. 6 is a perspective view of a floating storage facility that is manufactured by the utilization method for existing marine vessels.

15 Fig. 7 is a side view of the floating storage facility that is manufactured by the utilization method for existing marine vessels.

Fig. 8 is a flowchart of a utilization method for existing marine vessels according to a second embodiment of the invention.

20 Fig. 9 is a side view of a marine vessel that is manufactured by the utilization method for existing marine vessels.

Fig. 10 is a plan view of the marine vessel that is manufactured by the utilization method for existing marine vessels.

Fig. 11 is a perspective view showing a modification example of the floating storage facility that is manufactured by the utilization method for existing marine vessels.

25 [Description of Embodiments]

[0015]

A utilization method for existing marine vessels according to an embodiment of the invention will be described below with reference to the drawings.

(First embodiment)

5 A utilization method for existing marine vessels according to this embodiment is to manufacture a marine vessel using an existing marine vessel.

Fig. 1 is a side view showing the schematic configuration of an existing marine vessel that is used in the utilization method for existing marine vessels according to this embodiment.

10 As shown in Fig. 1, the existing marine vessel 1 includes a hull 2 and a plurality of tanks 3. The hull 2 includes a pair of broadsides 2s provided on both sides in a marine vessel width direction and a bottom 2b. The hull 2 includes an upper deck 2t that is provided above the bottom 2b with an interval therebetween. The hull 2 includes an upper structure 2h that is provided close to a stern 2r in a fore and aft direction Da and
15 forms a cabin portion or the like. The hull 2 includes cargo loading section (hold) 2k that is provided closer to a bow 2a than the upper structure 2h in the fore and aft direction Da. Further, an engine room 2m, which includes a main engine for propelling the existing marine vessel 1, is provided in the hull 2 so as to be close to the stern 2r in the fore and aft direction Da.

20 [0016]

The upper deck 2t is a fully exposed deck exposed to the outside and is provided so as to cover the upper portion of the cargo loading section 2k.

[0017]

Each of the plurality of tanks 3 is an independent tank, and stores liquefied gas
25 such as LNG, which is cargo, therein. The tank 3 is made of, for example, an aluminum

alloy or the like in order to ensure toughness in a low-temperature atmosphere or corrosion resistance. The plurality of tanks 3 are disposed in the cargo loading section 2k, which is provided in the hull 2, in the fore and aft direction Da. A case where the existing marine vessel 1 of this embodiment includes five tanks 3 which are moss-type independent spherical tanks will be exemplified. Upper portions 3a of these tanks 3 are disposed above the upper deck 2t.

[0018]

Fig. 2 is a flowchart of the utilization method for existing marine vessels. Fig. 3 is a side view showing a state where an intermediate hull portion of the existing marine vessel is cut out in the utilization method for existing marine vessels.

As shown in Fig. 2, the utilization method for existing marine vessels utilizing the existing marine vessel 1 includes a tank unit cut-out step S1, a hull joining step (a step of manufacturing a new marine vessel) S2, a float mounting step S3, an equipment mounting step S4, and an installation step S5.

[0019]

In the tank unit cut-out step S1, intermediate hull portions 5C and 5D, which are an intermediate portion in the fore and aft direction Da, are cut out from the existing marine vessel 1 as shown in Fig. 3. A case where two intermediate hull portions 5C and 5D are cut out from the existing marine vessel 1 will be exemplified in this embodiment, but any one intermediate hull portion may be cut out or three or more intermediate hull portions may be cut out. Here, each of the intermediate hull portions 5C and 5D is a portion that includes some tanks 3 among the plurality of tanks 3 and part of the hull 2 of the existing marine vessel 1 in the fore and aft direction Da in which the some tanks 3 are provided.

[0020]

In order to cut out the intermediate hull portions 5C and 5D, the hull 2 of the existing marine vessel 1 is cut at each of positions P1, P2, and P3 that are arranged at intervals in the fore and aft direction Da. Each of these positions P1, P2, and P3 is set between the tanks 3 adjacent to each other in the fore and aft direction Da. Since the hull 2 is cut at each of the positions P1, P2, and P3 in this way, the existing marine vessel 1 is divided into two intermediate hull portions 5C and 5D that are disposed at an intermediate portion in the fore and aft direction Da, a bow-side hull portion 5A that is disposed closer to the bow 2a than the intermediate hull portions 5C and 5D, and a stern-side hull portion 5B that is disposed closer to the stern 2r than the intermediate hull portions 5C and 5D. Here, the stern-side hull portion 5B includes the engine room 2m and the upper structure 2h.

[0021]

In this embodiment, for example, the hull 2 is cut at each of the position P1 set between a first tank 3A and a second tank 3B from the bow 2a, the position P2 set between the second tank 3B and a third tank 3C from the bow 2a, and the position P3 set between the third tank 3C and a fourth tank 3D from the bow 2a. That is, the intermediate hull portion 5C of this embodiment includes a hull 2C provided between the positions P1 and P2, which is part of the intermediate portion in the fore and aft direction Da, and the second tank 3B from the bow 2a. Further, the intermediate hull portion 5D includes a hull 2D provided between the positions P2 and P3, which is part of the intermediate portion in the fore and aft direction Da, and the third tank 3C from the bow 2a. As described above, the intermediate hull portions 5C and 5D include the tanks 3B and 3C that are disposed at the intermediate portion in the fore and aft direction Da among the plurality of tanks 3. In this way, the intermediate hull portions 5C and 5D are cut out from the existing marine vessel 1 as two tank units 31A and 31B.

[0022]

Fig. 4 is a side view showing a state where the bow-side hull portion and the stern-side hull portion of the existing marine vessel are joined to each other in the utilization method for existing marine vessels. Fig. 5 is a plan view showing a state
5 where the bow-side hull portion and the stern-side hull portion of the existing marine vessel are joined to each other in the utilization method for existing marine vessels.

In the hull joining step S2, a rear end 5r of the bow-side hull portion 5A and a front end 5f of the stern-side hull portion 5B are joined to each other as shown in Figs. 4 and 5. The rear end 5r of the bow-side hull portion 5A and the front end 5f of the stern-
10 side hull portion 5B are mainly joined to each other by welding. In a case where the shapes of the cut surfaces of the hull 2 at the rear end 5r of the bow-side hull portion 5A and the front end 5f of the stern-side hull portion 5B are different from each other, a connecting plate 8 (see Fig. 5) extending in a plane direction crossing the fore and aft direction Da may be provided between the rear end 5r of the bow-side hull portion 5A
15 and the front end 5f of the stern-side hull portion 5B.

[0023]

For example, in a case where part or all of a manifold 23 provided in the existing marine vessel 1 is disposed in the intermediate hull portions 5C and 5D, part or all of the manifold 23 may be provided in the bow-side hull portion 5A. Further, since a cargo
20 device 24, such as a compressor, is provided at the stern-side hull portion 5B of the existing marine vessel 1, the cargo device 24 may be provided at the position as it is.

[0024]

After the rear end 5r of the bow-side hull portion 5A and the front end 5f of the stern-side hull portion 5B are joined to each other, various pipes and wirings are

connected between the bow-side hull portion 5A and the stern-side hull portion 5B. As a result, a new marine vessel 10A is manufactured.

The marine vessel 10A includes a hull 2X of which the length in the fore and aft direction Da is shorter than that of the existing marine vessel 1 (see Fig. 1). Further, the marine vessel 10A includes tanks 3 of which the number is smaller than that of the existing marine vessel 1.

[0025]

Fig. 6 is a perspective view of a floating storage facility that is manufactured by the utilization method for existing marine vessels. Fig. 7 is a side view of the floating storage facility that is manufactured by the utilization method for existing marine vessels.

In the float mounting step S3, as shown in Figs. 6 and 7, a first float portion (closed body) 33A and a second float portion (closed body) 33B are mounted on both sides of each of the tank units 31A and 31B in the fore and aft direction Da by welding.

Each of the first and second float portions 33A and 33B includes a pair of broadsides 33s provided on both sides in a marine vessel width direction and a bottom 33b. Each of the first and second float portions 33A and 33B further includes an upper deck 33t that is provided above the bottom 33b with an interval therebetween. Further, each of the first and second float portions 33A and 33B integrally includes a tank unit-connecting portion 33c and an end plate 33d.

[0026]

The tank unit-connecting portions 33c of the first float portions 33A are formed on the sides of the first float portions 33A facing the tank units 31A and 31B in the fore and aft direction Da. Likewise, the tank unit-connecting portions 33c of the second float portions 33B are formed on the sides of the second float portions 33B facing the tank units 31A and 31B in the fore and aft direction Da. The outlines of the cross

sections of the tank unit-connecting portions 33c of both the first and second float portions 33A and 33B viewed in the fore and aft direction Da, that is, the hull cross-sectional shapes of the tank unit-connecting portions 33c orthogonal to the fore and aft direction Da are the same as the outlines of the cut surfaces of end portions 5a and 5b of the tank units 31A and 31B in the fore and aft direction Da. Joint cross sections between the tank unit-connecting portions 33c of the first and second float portions 33A and 33B and the end portions 5a and 5b of the tank units 31 in the fore and aft direction Da may be different from each other without having the same shape.

[0027]

10 The end plates 33d are formed on the sides of both the first and second float portions 33A and 33B spaced apart from the tank units 31A and 31B (that is, the sides of both the first and second float portions 33A and 33B opposite to the tank unit-connecting portions 33c) in the fore and aft direction Da. The end plate 33d is provided at each of the first and second float portions 33A and 33B so as to close a portion (opening) that is
15 surrounded by the pair of broadsides 33s, the bottom 33b, and the upper deck 33t.

[0028]

Each of the first and second float portions 33A and 33B has a hollow structure where a void 34 is formed therein. The buoyancy of the first and second float portions 33A and 33B is given by these voids 34. Since sea water or the like is supplied to and
20 drained from the voids 34 by a pump (not shown) or the like to adjust buoyancy generated at the voids 34, the voids 34 can also be utilized like ballast tanks. Further, the voids 34 can also be utilized as an engine room and a living space, other tanks, and the like.

In this way, the first and second float portions 33A and 33B are mounted on
25 each of the tank units 31A and 31B. The first and second float portions 33A and 33B

close portions where the pair of broadsides 2s and the bottom 2b are opened in the fore and aft direction Da at the intermediate hull portions 5C and 5D forming the tank units 31A and 31B.

[0029]

5 In the equipment mounting step S4, equipment 40 required as floating storage facilities 30A and 30B is mounted on the tank units 31A and 31B or the first and second float portions 33A and 33B. The equipment 40 of this embodiment is provided on both the first and second float portions 33A and 33B. For example, mooring devices 35, manifolds 38 used to unload LNG stored in the tanks 3B and 3C, generators (not shown),
10 and the like can be exemplified as the equipment 40. Further, regasifiers 39 that heat LNG stored in the tanks 3B and 3C to regasify the LNG are provided as the equipment 40 in this embodiment. The equipment 40 is provided on at least one of the tank units 31A and 31B and the first and second float portions 33A and 33B.

[0030]

15 The first and second float portions 33A and 33B are joined to and mounted on both sides of each of the tank units 31A and 31B in the fore and aft direction Da in this way to form two floating storage facilities 30A and 30B. Further, the floating storage facilities 30A and 30B include the tank units 31A and 31B, the first and second float portions 33A and 33B that are provided on both sides of the tank units 31A and 31B in
20 the fore and aft direction Da, and the equipment 40 as the floating storage facilities 30A and 30B.

[0031]

 In the installation step S5, each of the two floating storage facilities 30A and 30B manufactured in this way is moored and installed at a predetermined position in a
25 port or the like.

[0032]

In the above-mentioned utilization method for the existing marine vessel 1 according to the first embodiment, the stern-side hull portion 5B is provided on the bow-side hull portion 5A including the engine room 2m after the intermediate hull portions 5C and 5D including some tanks 3B and 3C are cut out from the existing marine vessel 1, so that the new marine vessel 10A can be manufactured. Further, the intermediate hull portions 5C and 5D, which are cut out, can be used as the tank units 31A and 31B of the floating storage facilities 30A and 30B. Since the existing marine vessel 1 is effectively utilized in this way to manufacture the new marine vessel 10A and the floating facilities 30A and 30B, the manufacturing costs of the marine vessel 10A and the floating storage facilities 30A and 30B can be reduced. Further, since the new marine vessel 10A includes the engine room 2m of the existing marine vessel 1, it is not necessary to newly manufacture the engine room 2m particularly requiring costs. Accordingly, it is particularly effective in reducing costs. Furthermore, the newly manufactured marine vessel 10A can be manufactured as a marine vessel 10A of which the length in the fore and aft direction D_a is shorter than that of the existing marine vessel 1 and the number of tanks 3 is smaller than that of the existing marine vessel 1. Such a marine vessel 10A also has a small load capacity of cargo to be stored in the tanks 3 and turns in a small radius. Accordingly, the marine vessel 10A is advantageous in a case where efficiency is low in the large existing marine vessel 1 or in the case of a port or a course where the large existing marine vessel 1 is difficult to navigate. Further, since the total weight of the marine vessel 10A is smaller than that of the existing marine vessel 1, the rate of fuel consumption of a propulsion engine for navigation of the marine vessel 10A is also improved. The existing marine vessel 1 including the plurality of tanks 3 can be effectively utilized in this way.

[0033]

Furthermore, a hull portion, which has been disposed in the existing marine vessel 1 so as to be closer to the bow 2a than the intermediate hull portions 5C and 5D, is used as the bow-side hull portion 5A. According to this configuration, not only the stern-side hull portion 5B but also the bow-side hull portion 5A can be formed effectively utilizing the existing marine vessel 1. Accordingly, the manufacturing costs of the marine vessel 10A can be further reduced.

[0034]

Further, since part of the existing marine vessel 1 is cut out as the tank units 31A and 31B and installed as the floating storage facilities 30A and 30B, the existing marine vessel 1 can be effectively utilized. Furthermore, since the floating storage facilities 30A and 30B formed in this way have a length in the fore and aft direction D_a shorter than that of the existing marine vessel 1, the floating storage facilities 30A and 30B can be installed even in a case where a mooring space is limited. Accordingly, the degree of freedom in the installation locations of the floating storage facilities 30A and 30B is increased. Moreover, since the numbers of the tanks 3 included in the tank units 31A and 31B may be determined as necessary, it is possible to provide the floating storage facilities 30A and 30B having load capacities corresponding to the use. Further, since a plurality of floating storage facilities 30A and 30B can be manufactured from one existing marine vessel 1, it is advantageous even in terms of costs.

[0035]

Furthermore, since the first and second float portions 33A and 33B and the equipment 40 are added to the tank units 31A and 31B that are cut out from part of the existing marine vessel 1, the floating storage facilities 30A and 30B having required functions can be manufactured while the existing marine vessel 1 is effectively utilized.

Moreover, since the first and second float portions 33A and 33B are provided, a draft can be made shallow. Accordingly, since the floating storage facilities 30A and 30B can be installed even in a case where a mooring space is limited or even at a location where the depth of water is shallow, the degree of freedom in the installation locations of the floating storage facilities 30A and 30B is increased. Further, since the numbers of the tanks 3 included in the tank units 31A and 31B may be determined as necessary, it is possible to provide the floating storage facilities 30A and 30B having load capacities corresponding to the use.

[0036]

10 (Second embodiment)

Next, a utilization method for existing marine vessels according to a second embodiment of the invention will be described. Since the second embodiment to be described below is different from the first embodiment in terms of only the configuration of a connecting hull portion 20, the same portions as those of the first embodiment will be denoted by the same reference numerals as those of the first embodiment and repeated description will be omitted.

[0037]

Fig. 8 is a flowchart of the utilization method for existing marine vessels according to the second embodiment of the invention. Fig. 9 is a side view of a marine vessel that is manufactured by the utilization method for existing marine vessels. Fig. 10 is a plan view of the marine vessel that is manufactured by the utilization method for existing marine vessels.

As shown in Fig. 8, the utilization method for existing marine vessels according to the second embodiment utilizing an existing marine vessel 1 includes a tank unit cut-

out step S1, a connecting hull-inserting step S12, a hull joining step S13, a float mounting step S3, an equipment mounting step S4, and an installation step S5.

[0038]

In the tank unit cut-out step S1, as in the first embodiment, intermediate hull portions 5C and 5D are cut out from the existing marine vessel 1 (see Fig. 3).

[0039]

In the connecting hull-inserting step S12, as shown in Figs. 9 and 10, a connecting hull portion 20 is inserted between a rear end 5r of a bow-side hull portion 5A that is disposed closer to a bow 2a than the removed intermediate hull portions 5C and 5D and a front end 5f of a stern-side hull portion 5B that is disposed closer to a stern 2r than the intermediate hull portions 5C and 5D.

[0040]

The connecting hull portion 20 is connected to each of the bow-side hull portion 5A and the stern-side hull portion 5B in the hull joining step S13 to be described later.

The connecting hull portion 20 integrally includes a bow-side connecting portion 20a, a stern-side connecting portion 20r, and an intermediate connecting portion 20c. The outline of the cross section of the bow-side connecting portion 20a viewed in the fore and aft direction Da, that is, the hull cross-sectional shape of the bow-side connecting portion 20a orthogonal to the fore and aft direction Da is the same as the outline of the cut surface of the rear end 5r of the bow-side hull portion 5A. Likewise, the outline of the cross section of the stern-side connecting portion 20r viewed in the fore and aft direction Da, that is, the hull cross-sectional shape of the stern-side connecting portion 20r orthogonal to the fore and aft direction Da is the same as the outline of the cut surface of the front end 5f of the stern-side hull portion 5B.

[0041]

In this way, the intermediate connecting portion 20c is formed so as to continuously connect the bow-side connecting portion 20a to the stern-side connecting portion 20r. That is, the connecting hull portion 20 is provided between the bow-side hull portion 5A and the stern-side hull portion 5B so that the outer surface of a hull 2Y is continuous.

The connecting hull portion 20 may be adapted so that the length L of the connecting hull portion 20 in the fore and aft direction Da is shorter than the length of one tank 3 in the fore and aft direction Da. As a result, an increase in the length of a marine vessel 10B in the fore and aft direction Da can be suppressed.

10 [0042]

The connecting hull portion 20 includes a pair of broadsides 20s provided on both sides in a marine vessel width direction and a bottom 20b. The connecting hull portion 20 includes an upper deck 20t that is provided above the bottom 20b with an interval therebetween.

15 [0043]

As shown in Fig. 9, the connecting hull portion 20 includes a connecting pipe and connection wiring 21 therein. The connecting pipe and the connection wiring 21 connect a bow-side pipe and bow-side wiring 6 that are provided in the bow-side hull portion 5A to a stern-side pipe and stern-side wiring 7 that are provided in the stern-side hull portion 5B.

[0044]

In the hull joining step S13, the bow-side hull portion 5A and the stern-side hull portion 5B are joined to each other through the connecting hull portion 20. Specifically, the rear end 5r of the bow-side hull portion 5A and the bow-side connecting portion 20a of the connecting hull portion 20 are joined to each other by welding, and the front end 5f

of the stern-side hull portion 5B and the stern-side connecting portion 20r of the connecting hull portion 20 are joined to each other by welding.

[0045]

5 In the hull joining step S13, the upper deck 20t of the connecting hull portion 20 and the upper decks 2t of the bow-side hull portion 5A and the stern-side hull portion 5B are further joined to each other by welding.

In the hull joining step S13, the bow-side pipe and the bow-side wiring 6 and the stern-side pipe and the stern-side wiring 7 are further connected to the connecting pipe and the connection wiring 21 in the connecting hull portion 20, respectively.

10 [0046]

Here, in a case where part or all of a manifold 23 provided in the existing marine vessel 1 is provided in the intermediate hull portions 5C and 5D, the manifold 23 may be provided in the connecting hull portion 20. A cargo device 24, such as a compressor, provided in the existing marine vessel 1 can also be provided in the connecting hull
15 portion 20.

[0047]

A ballast tank 25 or the like that is used to improve the balance of the marine vessel 10B lost due to the cut-out of the intermediate hull portions 5C and 5D may be provided in the connecting hull portion 20 of the marine vessel 10B.

20 The connecting hull portion 20 can also be further provided with various devices, such as a regasifier and a ballast treatment device (both not shown), an item storage space, and the like.

The connecting hull portion 20 is additionally provided between the bow-side hull portion 5A and the stern-side hull portion 5B in this way, so that the marine vessel
25 10B is manufactured. Since the connecting hull portion 20 is provided, the draft of the

marine vessel 10B can be made shallow. Accordingly, it is possible to cope with the transport of LNG at an LNG terminal where the depth of water is shallow.

[0048]

On the other hand, the intermediate hull portions 5C and 5D cut out from the existing marine vessel 1 in the tank unit cut-out step S1 are moored and installed at predetermined positions in a port or the like as the floating storage facilities 30A and 30B shown in Figs. 6 and 7 through the float mounting step S3, the equipment mounting step S4, and the installation step S5 as in the first embodiment.

[0049]

In the above-mentioned utilization method for the existing marine vessel 1 according to the second embodiment, the bow-side hull portion 5A is provided on the stern-side hull portion 5B including the engine room 2m after the intermediate hull portions 5C and 5D including some tanks 3 are cut out from the existing marine vessel 1 as in the first embodiment, so that the new marine vessel 10B can be manufactured. Further, the floating storage facilities 30A and 30B can be manufactured using the intermediate hull portions 5C and 5D, which are cut out, as the tank units 31A and 31B. Since the existing marine vessel 1 is effectively utilized in this way to manufacture the new marine vessel 10B and the floating storage facilities 30A and 30B, the manufacturing costs of the marine vessel 10B and the floating storage facilities 30A and 30B can be reduced. Further, since the new marine vessel 10B includes the engine room 2m of the existing marine vessel 1, it is not necessary to newly manufacture the engine room 2m particularly requiring costs. Accordingly, it is particularly effective in reducing costs. Furthermore, the newly manufactured marine vessel 10B can be manufactured as a marine vessel 10B of which the length in the fore and aft direction Da is shorter than that of the existing marine vessel 1 and the number of tanks 3 is smaller

than that of the existing marine vessel 1. Such a marine vessel 10B also has a small load capacity of cargo to be stored in the tanks 3 and turns in a small radius.

[0050]

Further, in the above-mentioned utilization method for the existing marine vessel 1 according to the second embodiment, the intermediate hull portions 5C and 5D including two tanks 3 are removed from the existing marine vessel 1 and the connecting hull portion 20 is additionally provided between the bow-side hull portion 5A and the stern-side hull portion 5B. Accordingly, it is possible to manufacture the marine vessel 10B that includes the hull 2Y of which the length in the fore and aft direction D_a is shorter than that of the existing marine vessel 1 and the tanks 3 of which the number is smaller than that of the existing marine vessel 1, from the existing marine vessel 1. The existing marine vessel 1 including the plurality of tanks 3 can be effectively utilized in this way.

[0051]

Further, even in a case where the hull cross-sectional shapes of the rear end 5r of the bow-side hull portion 5A and the front end 5f of the stern-side hull portion 5B are significantly different from each other depending on the connecting hull portion 20, the bow-side hull portion 5A and the stern-side hull portion 5B can be satisfactorily connected to each other through the connecting hull portion 20. Furthermore, various devices and the like can also be installed in the additionally provided connecting hull portion 20.

[0052]

Moreover, since the connecting hull portion 20 includes the bow-side connecting portion 20a and the stern-side connecting portion 20r, the connecting hull portion 20 can continuously connect the bow-side hull portion 5A to the stern-side hull portion 5B.

[0053]

Further, the connecting hull portion 20 includes the connecting pipe and the connection wiring 21. Accordingly, the bow-side pipe and the bow-side wiring 6 provided in the bow-side hull portion 5A and the stern-side pipe and the stern-side wiring 7 provided in the stern-side hull portion 5B can be connected to each other through the connecting pipe and the connection wiring 21, respectively.

Since the bow-side hull portion 5A and the stern-side hull portion 5B are part of the same existing marine vessel 1, the bow-side pipe and the bow-side wiring 6 and the stern-side pipe and the stern-side wiring 7 are often disposed at the same positions in a cross section orthogonal to the fore and aft direction Da. For this reason, the bow-side pipe and the bow-side wiring 6 and the stern-side pipe and the stern-side wiring 7 can be particularly easily connected to each other through the connecting pipe and the connection wiring 21, respectively.

[0054]

15 (Modification examples of first and second embodiments)

For example, in the embodiments, the first and second float portions 33A and 33B are mounted on the tank units 31A and 31B cut out from the existing marine vessel 1 to form the floating storage facilities 30A and 30B. However, the invention is not limited thereto.

20 Fig. 11 is a perspective view showing a modification example of the floating storage facility that is manufactured by the utilization method for existing marine vessels.

For example, in a case where a tank unit 31C (intermediate hull portion 5C) cut out from the existing marine vessel 1 includes partition walls 9 (9A and 9B) on both end portions thereof in the fore and aft direction Da as shown in Fig. 11, respectively, the first and second float portions 33A and 33B may not be mounted on the tank unit 31C. The

25

partition wall 9A provided at one end portion of the tank unit 31C in the fore and aft direction Da is a partition wall having been provided on the side of a tank 3C close to the bow 2a in the fore and aft direction Da. The partition wall 9B provided at the other end portion of the tank unit 31C in the fore and aft direction Da is a partition wall having
5 been provided on the side of the tank 3C close to the stern 2r in the fore and aft direction Da. In this case, portions of both the end portions of the tank unit 31C in the fore and aft direction Da where a pair of broadsides 2s and a bottom 2b are opened in the fore and aft direction Da are closed by the partition walls 9 (9A and 9B). Such a tank unit 31C can be installed as a floating storage facility 30C as it is.

10 [0055]

(Other modification examples)

The invention is not limited to the above-mentioned embodiments and includes various modifications of the above-mentioned embodiments without departing from the scope of the invention. That is, the specific shape, configuration, and the like
15 mentioned in the embodiments are merely exemplary and can be appropriately modified.

For example, in the embodiments, the newly manufactured marine vessels 10A and 10B are adapted so that the stern-side hull portion 5B and the bow-side hull portion 5A obtained from the existing marine vessel 1 are joined to each other. However, the invention is not limited thereto. For example, a newly manufactured bow-side hull
20 portion or a bow-side hull portion cut out from another existing marine vessel may be joined to the stern-side hull portion 5B obtained from the existing marine vessel 1.

According to this configuration, even though a newly manufactured bow-side hull portion or a bow-side hull portion cut out from another existing marine vessel is used as the bow-side hull portion 5A, a marine vessel to be newly manufactured includes
25 at least the engine room 2m of the existing marine vessel 1. Accordingly, since it is not

necessary to newly manufacture the engine room 2m particularly requiring costs, it is particularly effective in reducing the manufacturing costs of a marine vessel.

[0056]

For example, the two tank units 31A and 31B (intermediate hull portions 5C and 5D) have been cut out from the existing marine vessel 1 in the embodiments, but the number of tank units to be cut out from the existing marine vessel 1 may be only one or three or more. Further, an intermediate hull portion including a plurality of tanks may be cut out as one tank unit from the existing marine vessel 1. Accordingly, it is possible to manufacture a floating storage facility including a plurality of tanks.

10 [0057]

Furthermore, the intermediate hull portions 5C and 5D are adapted to include the second tank 3B and the third tank 3C from the bow 2a, but are not limited thereto. The intermediate hull portions 5C and 5D may include tanks 3 disposed at the intermediate portion in the fore and aft direction Da or may include tanks 3 close to the bow and the stern in the fore and aft direction Da, among the plurality of tanks 3.

Moreover, the number of tanks 3 of the existing marine vessel 1, the number of tanks 3 to be removed from the existing marine vessel 1, the number of the tanks 3 of each of the marine vessels 10A and 10B, and the shape of the tank 3 may be arbitrary.

In addition, the tank 3 is not limited to a tank that stores LNG, and may be a tank that stores other cargoes, such as liquefied petroleum gas (LPG).

[Industrial Applicability]

[0058]

According to the utilization method for existing marine vessels, it is possible to effectively utilize an existing marine vessel and to manufacture a marine vessel having an appropriate size at a low cost.

[Reference Signs List]

[0059]

	1: Existing marine vessel
	2, 2C, 2D, 2X, 2Y: Hull
5	2a: Bow
	2b: Bottom
	2h: Upper structure
	2k: Cargo loading section
	2m: Engine room
10	2r: Stern
	2s: Broadside
	2t: Upper deck
	3, 3A, 3B, 3C, 3D: Tank
	3a: Upper portion
15	5A: Bow-side hull portion
	5B: Stern-side hull portion
	5C, 5D: Intermediate hull portion
	5a: End portion
	5b: End portion
20	5f: Front end
	5r: Rear end
	6: Bow-side wiring
	7: Stern-side wiring
	8: Connecting plate
25	9, 9A, 9B: Partition wall

	10A, 10B: Marine vessel
	20: Connecting hull portion
	20a: Bow-side connecting portion
	20b: Bottom
5	20c: Intermediate connecting portion
	20r: Stern-side connecting portion
	20s: Broadside
	20t: Upper deck
	21: Connection wiring
10	23: Manifold
	24: Cargo device
	25: Ballast tank
	30A, 30B, 30C: Floating storage facility
	31A, 31B, 31C: Tank unit
15	33A: First float portion
	33B: Second float portion
	33b: Bottom
	33c: Tank unit-connecting portion
	33d: End plate
20	33s: Broadside
	33t: Upper deck
	34: Void
	35: Mooring device
	37: Cargo pump
25	38: Manifold

39: Regasifier

40: Equipment

Da: Fore and aft direction

S1: Tank unit cut-out step

5 S2, S13: Hull joining step (step of manufacturing new marine vessel)

S3: Float mounting step

S4: Equipment mounting step

S5: Installation step

S12: Connecting hull-inserting step

[CLAIMS]

[Claim 1]

A utilization method of an existing marine vessel comprising:

a first step of separating an intermediate hull portion as a tank unit from an existing marine vessel having a hull where a plurality of tanks are arranged in a fore and aft direction of the hull, the intermediate hull portion being part of the hull in the fore and aft direction in which the some of the plurality of tanks are disposed in the fore and aft direction; and

a second step of joining a bow-side hull portion of the existing marine vessel, which is formerly disposed closer to a bow of the hull than the intermediate hull portion of the existing marine vessel, with a stern-side hull portion of the existing marine vessel, which includes an engine room and which is formerly disposed closer to a stern of the hull than the intermediate hull portion, to produce a new marine vessel,

wherein, the second step includes a third step of installing a connecting hull portion for connecting the bow-side hull portion with the stern-side hull portion between a rear end of the bow-side hull portion and a front end of the stern-side hull portion of which the hull cross-sectional shape is different from that of the rear end of the bow-side hull portion, and

wherein the connecting hull portion is provided with:

a bow-side connecting portion of which the hull cross-sectional shape orthogonal to the fore and aft direction is the same as that of the rear end of the bow-side hull portion;

a stern-side connecting portion of which the hull cross-sectional shape orthogonal to the fore and aft direction is the same as that of the front end of the stern-side hull portion; and

an intermediate connecting portion for continuously connecting the bow-side connecting portion to the stern-side connecting portion, wherein the intermediate connecting portion is provided between the bow-side hull portion and the stern-side hull portion so that an outer surface of the hull is continuous from the bow-side to the stern-side.

[Claim 2]

The utilization method of the existing marine vessel according Claim 1, further comprising:

a fourth step of reusing the tank unit as a floating storage facility.

[Claim 3]

The utilization method of the existing marine-vessel according to Claim 2, further comprising:

a fifth step of joining a float with the tank unit prior to the fourth step of reusing the tank unit as the floating storage facility; and

a sixth step of mounting equipment as a floating storage facility on at least one of the tank unit and the float.