

AN INSTALLATION VESSEL FOR AN OFFSHORE STRUCTURE AND A METHOD FOR THE INSTALLATION OF AN OFFSHORE STRUCTURE

Technical field

The present disclosure relates to an installation vessel for an offshore structure, for
5 example a wind turbine, and a method for the installation of an offshore structure. More
specifically, the disclosure relates to an installation vessel and a method as defined in the
introductory parts of claim 1 and claim 18.

Background art

Over the past few decades, there has been a steady transition in global energy use
10 from hydrocarbon-based sources of energy, to energy produced by renewable means. This has
been driven both by an understanding that hydrocarbon-based sources of energy are a finite
supply, and also by a need to reduce greenhouse gas emissions.

Today, renewable energy is able to be harvested in many different ways. Solar and
wind power are amongst the most popular, although other forms such as geothermal and tidal
15 energy are also harvestable. As renewable technologies mature, they become more able to,
and more efficient at, harvesting renewable energy, and in many cases also become more
affordable to produce. In recent years, there has been a surge in the number of renewable
power plants – the most visible thereof being perhaps onshore solar and wind power plants.
However, the development of renewable power plants is not restricted to onshore locations,
20 and in fact many offshore power plants exist.

Locating a renewable power plant offshore may provide numerous advantages. For
example, there may be more available space, and/or the renewable power plant may not be
obstructed by nearby infrastructure, which may allow a more renewable energy to be
harvested. In the case of wind power, offshore wind farms may be able to comprise wind
25 turbines that have a much larger blade diameter than would be possible onshore. While this,
of course, makes an offshore wind power plant an attractive prospect, the installation of such
a wind farm potentially much more complex than would be the case onshore.

In the case of an onshore wind farm, the component parts of a wind turbine may be
easily transported to their installation location by land. However offshore, this task may not be
30 so simple – particularly as their large size makes onshore construction and subsequent

transport of a fully constructed wind turbine impractical. This means that, in many cases, some degree of construction of the wind turbine must be performed offshore. The offshore construction of a wind turbine may then lead to further complications, in particular due to adverse sea and weather conditions increasing the difficulty associated with construction operations.

Other offshore installations may have similar challenges, for example other types of renewable energy systems, installations for petroleum operations, measurement stations, surveillance platforms, or any other type of offshore structure.

Summary

It is an object of the present disclosure to mitigate, alleviate or eliminate one or more of the above-identified deficiencies and disadvantages in the prior art and solve at least the above mentioned problem. According to a first aspect there is provided an installation vessel for an offshore structure, comprising;

a hull comprising a loading deck, the deck located between two longitudinally extending hull side walls, each of the side walls comprising an upper edge;

a plurality of installation legs coupled to the hull;

a buoyancy control arrangement configurable to control the buoyancy of the installation vessel between a lesser first draft and a greater second draft;

wherein in the first draft the loading deck and the upper edge of each of the two longitudinally extending hull side walls are configured to be located above the water line, and in the second draft the loading deck and at least a portion of the upper edge of each of the two longitudinally extending hull side walls are configured to be submerged.

According to some embodiments, in the second draft, a portion of the upper edge of at least one of the two longitudinally extending hull side walls is configured to be located above the water line.

According to some embodiments, the two horizontally extending side walls extend parallelly from a bow portion towards the aft.

According to some embodiments, the upper edge of each of the longitudinally extending side walls is located at or below the height of the deck.

According to some embodiments, the installation comprises four installation legs coupled to the hull.

According to some embodiments, wherein the hull is vertically movable relative to the plurality of installation legs.

- 5 According to some embodiments, wherein each of the plurality of installation legs are coupled to the hull by a geared mechanism.

According to some embodiments, wherein each of the plurality of installation legs comprises a seabed engagement surface for engaging a portion of the seabed.

- 10 According to some embodiments, wherein each of the plurality of installation legs comprises or is defined by a truss structure.

According to some embodiments, the installation vessel comprises a turbine installation apparatus in the form of a crane.

According to some embodiments, the installation comprises a support platform for mounting at least a part of an offshore structure prior to construction thereof.

- 15 According to some embodiments, the support platform is buoyant.

According to some embodiments, the installation comprises at least one tether point to which to tether the support platform.

According to some embodiments, wherein the support platform is positionable on the deck with the vessel in both the first draft and the second draft.

- 20 According to some embodiments, wherein the support platform is positionable on the hull, the weight of the support platform being supported by the deck and optionally the two longitudinally extending hull side walls.

- 25 According to some embodiments, wherein the hull is moveable to a raised configuration on the plurality of installation legs, and the support platform is positionable on the deck with the hull in the raised configuration.

According to some embodiments, the entire deck is submerged in the second draft.

According to a second aspect there is provided a method for the installation of an offshore structure, comprising:

providing an installation vessel for installation of an offshore structure, the installation vessel comprising a hull comprising a loading deck located between two longitudinally extending hull side walls, each of the side walls comprising an upper edge;

transporting at least one part of the offshore structure to an installation site;

5 securing the installation vessel to the seabed;

submerging the deck and the upper edge of at least one of the two longitudinally extending hull side walls;

positioning a support vessel above at least one of the submerged deck and at least one of the two longitudinally extending side walls, the support vessel holding at least a part of an
10 offshore structure;

resurfacing the deck and upper edge of the at least one of the two longitudinally extending hull side walls such that the support vessel is mounted on the deck;

installing the at least one part of the offshore structure in an offshore location using the installation apparatus.

15 According to some embodiments, the hull is coupled to a plurality of installation legs, and securing the installation vessel to the seabed comprises bringing the installation legs into contact with the seabed.

According to some embodiments, the method comprises reducing the buoyancy of the installation vessel such that it is configured from a lesser first draft to a greater second draft.

20 According to some embodiments, submerging the deck and the upper edge of at least one of the two longitudinally extending hull side walls comprises configuring the vessel to the second draft.

According to some embodiments, wherein submerging the deck comprises submerging the entire deck.

25 According to some embodiments, the method comprises vertically raising the hull of the installation vessel relative to the plurality of installation legs to a raised configuration by a geared mechanism coupling the hull to the plurality of installation legs.

According to some embodiments, vertically raising the hull comprises lifting the entire hull above the water line.

According to some embodiments, the method comprises positioning the support vessel above the submerged deck by moving the support vessel in a direction transverse to the longitudinal axis of the installation vessel.

According to some embodiments, the method comprises transporting a plurality of parts of an offshore structure to an installation site on the support vessel.

According to some embodiments, the method comprises lifting the at least one part of an offshore structure from the support vessel using an installation apparatus mounted on the installation vessel.

Effects and features of the second aspect are to a large extent analogous to those described above in connection with the first aspect. Embodiments mentioned in relation to the first aspect are largely compatible with the the second aspect.

In any of the aspects or embodiments described herein, the offshore structure may be an offshore wind turbine.

The offshore structure may be bottom-fixed.

The present disclosure will become apparent from the detailed description given below. The detailed description and specific examples disclose preferred embodiments of the disclosure by way of illustration only. Those skilled in the art understand from guidance in the detailed description that changes and modifications may be made within the scope of the disclosure.

Hence, it is to be understood that the herein disclosed disclosure is not limited to the particular component parts of the device described or steps of the methods described since such device and method may vary. It is also to be understood that the terminology used herein is for purpose of describing particular embodiments only, and is not intended to be limiting. It should be noted that, as used in the specification and the appended claim, the articles "a", "an", "the", and "said" are intended to mean that there are one or more of the elements unless the context explicitly dictates otherwise. Thus, for example, reference to "a unit" or "the unit" may include several devices, and the like. Furthermore, the words "comprising", "including", "containing" and similar wordings does not exclude other elements or steps.

Brief descriptions of the drawings

The above objects, as well as additional objects, features and advantages of the present disclosure, will be more fully appreciated by reference to the following illustrative and non-limiting detailed description of example embodiments of the present disclosure, when taken in conjunction with the accompanying drawings.

5 Figure 1 illustrates an installation vessel at an offshore location in a first draft configuration.

Figure 2 illustrates the vessel of Figure 1 and a support vessel.

Figure 3 illustrates a further view of an installation vessel and a storage vessel.

Figure 4 is a view of an installation vessel in a raised configuration on support legs.

10 Figure 5 shows the installation vessel of Figure 4 alongside a partially constructed wind turbine.

Detailed description

The present disclosure will now be described with reference to the accompanying drawings, in which preferred example embodiments of the disclosure are shown. The disclosure may, however, be embodied in other forms and should not be construed as limited to the herein disclosed embodiments. The disclosed embodiments are provided to fully convey the scope of the disclosure to the skilled person.

The first aspect of this disclosure shows an installation vessel for an offshore structure, such as a wind turbine, comprising; a hull comprising a loading deck, the deck located
20 between two longitudinally extending hull side walls, each of the side walls comprising an upper edge; a plurality of installation legs coupled to the hull; a buoyancy control arrangement configurable to control the buoyancy of the installation vessel between a lesser first draft and a greater second draft; wherein in the first draft the loading deck and the upper edge of each of the two longitudinally extending hull side walls are configured to be located above the
25 water line, and in the second draft the loading deck and at least a portion of the upper edge of each of the two longitudinally extending hull side walls are configured to be submerged.

Figure 1 shows an installation vessel 10 in a second draft configuration. The installation vessel comprises a hull 12, the hull comprising a loading deck 14, which is shown in a submerged configuration in Figure 1. The loading deck 14 is located between two
30 longitudinally extending side walls 16a, 16b, which in this example extend the length of the

deck 14. Here, the longitudinally extending side walls 16a, 16b each define a peripheral edge of the deck 14, although other examples may be possible wherein the deck does not extend all the way to one or each side wall 16a, 16b at one edge of the deck 14. Shown in Figure 1, the upper edge 20 (see Figure 4 for further detail thereof) of each of the side walls 16a, 16b is completely submerged. In other examples, all or part of the upper edge 20 of one or both of the side walls 16a, 16b may protrude above the surface of the water when the vessel is in the second draft configuration. In this example (and as is more clearly visible in reference to Figure 4), the height of each of the side walls is approximately equal to the height of the deck 14.

Each of the side walls 16a, 16b extends longitudinally along the vessel from a bow portion 18 of the vessel 10 towards the aft. The bow portion 18 is located at the front of the vessel 10, and may comprise an accommodation and control centre for the crew. In addition, the bow portion 18 may comprise an additional working deck or decks, which in this example are raised in height compared to the deck 14. Monitoring and communications equipment for the vessel 10 may additionally be at least partially housed in the bow portion.

As previously described, Figure 1 illustrates the vessel 10 in a second draft configuration. The vessel 10 is additionally configurable to a first draft – where the draft is a measurement of the distance between the waterline and the bottom of the hull 12. As illustrated, in the second draft, the loading deck 14 is completely submerged. The first draft may be lesser than the second draft, and in the first draft the loading deck 14 may be positioned above the water line. Additionally in the first draft, the upper edge 20 (e.g. the entirety of the upper edge 20) of the longitudinal walls 16a, 16b may be located above the water line.

The hull 12 is, in addition, coupled to a plurality of installation legs 22a-d, as is illustrated in Figure 1. Here, four installation legs are illustrated, although it should be understood that examples having more or fewer installation legs are also possible. According to this example, the installation legs 22a-d are made from truss-like structures, which may provide a strong and lightweight structure for the installation legs. In other examples, the installation legs may have a different form, for example the installation legs may have a hollow cylindrical form.

Each of the installation legs 22a-d is coupled to the hull 12. The installation legs 22a-d may be coupled by any appropriate means, and the means for coupling may enable the installation legs 22a-d to move vertically relative to the hull 12. For example, the installation legs 22a-d may be coupled to the hull 12 by means of a geared mechanism, which may be

driven to move the installation legs 22a-d relative to the hull 12. Although not shown, each of the installation legs 22a-d may comprise a profile such as a rack, or a toothed section, into which the teeth of a pinion on the geared mechanism may fit. The geared mechanism may enable each of the installation legs 22a-d to be raised and lowered relative to the hull 12. In some examples, each installation leg 22a-d may be able to be raised and lowered independently of each other installation leg 22a-d. In these examples, each of the installation legs 22a-d may comprise a separate motor or drive mechanism, and each may be controlled by a user separately.

Although not illustrated in Figure 1, each of the installation legs 22a-d may additionally comprise a seabed engagement surface for engaging the seabed. The seabed engagement surface may be located at one end of the installation leg 22a-d. For example, the seabed engagement surface may be located at an extreme lower end of each installation leg 22a-d, and may form a foot section of each installation leg 22a-d which may be configurable to rest on or to engage the seabed, while permitting the installation leg 22a-d to support a proportion of the weight of the installation vessel 10. The seabed engagement surface may be in the form of a plate structure, and/or may be or have protruding structures that are configured to engage with the seabed. The seabed engagement surface may assist to provide a stable engagement between the installation vessel 10 and the seabed.

Although the portion of the installation legs 22a-d is not illustrated in Figure 1, the installation legs may be in contact with the seabed in the configuration in Figure 1. In operation, the installation vessel 10 may be manoeuvred or positioned as desired with the installation legs 22a-d in a raised configuration, such that the installation legs 22a-d are not in contact with the seabed. With the installation vessel 10 in the desired position, the draft configuration of the installation vessel 10 may be changed from the first draft configuration to the second draft configuration, as is illustrated in Figure 1. The installation legs 22a-d may be lowered, for example through use of a geared mechanism permitting vertical movement of the legs 22a-d relative to the hull, such that the installation legs 22a-d are brought into contact with the seabed. Lowering of the installation legs 22a-d may be done after the vessel 10 has been reconfigured from the first draft configuration to the second draft configuration, or in some examples it may be possible to do both simultaneously.

With the installation legs in contact with the seabed, the installation vessel 10 may be secured in a desired position, which may be useful for the process of the installation of an offshore wind turbine.

In Figure 1, the installation vessel 10 is also illustrated with an installation apparatus 24. The installation apparatus 24 may be in the form of a crane, or other lifting apparatus, and may be used to lift a wind turbine, or parts thereof, from the installation vessel 10 to an installation location, where the installation location may be an offshore location. The installation apparatus 24 may therefore comprise a connection or engagement component (e.g. a hook, clamp, gripping member) to enable engagement of the installation apparatus 24 with an object to be installed, such as a wind turbine or part thereof.

In Figure 2, the installation vessel 10 is again illustrated in the second draft configuration. In addition, there is shown a support platform 30 which is located adjacent the installation vessel 10 and has a longitudinal axis that is located approximately perpendicular to the longitudinal axis of the installation vessel 10. Here, the installation legs 22a-d are in engagement with the seabed, such that the installation vessel 10 is held in a stable position, which may be near, e.g. in the vicinity of, the installation site.

With the vessel 10 securely in position, then support platform 30 may be brought into the adjacent position as shown in Figure 2, at the installation site. The support platform 30 may be brought to the installation site by means of being towed by the installation vessel 10 (e.g. towed behind the installation vessel as it is brought to the installation site). Alternatively, the support platform 30 may be brought to the installation site independently of the installation vessel 10. In this example, the support platform 30 has a number of components 28a-c of an offshore wind turbine positioned thereon. The components include turbine blades 28a, a nacelle 28b and a support column 28c.

As illustrated in Figure 2, the support platform 30 is in a position allowing it to be mounted on the installation vessel 10. Here, the support platform 30 is to be mounted on the installation vessel 10 in a direction perpendicular to the longitudinal axis of the installation vessel 10. To facilitate in mounting the support platform 30 to the installation vessel 10, the support platform 30 may be tethered to the installation vessel 10 as is shown in Figure 2. Here, two tethers 32 are connected to the installation vessel 10 at connection points (not shown in Figure 2), and each are connected to the support platform 30 at a connection point 34, which are located on either side of the support platform 30. A plurality of guide loops 36 exist along each longitudinally extending side of the support platform 36, and a tether extends through the guide loops, one on each side of the support platform 30.

Each tether may connect to a separate connection point on the installation vessel 10, and each connection point may have means by which the tether is reeled in – for example

each connection point may be or comprise a winch, which may pull in the tether. In this way, the support platform 30 may be pulled into the position shown in Figure 3, in which the support platform 30 is positioned over the submerged deck 14 of the installation vessel 10. Since the support platform 30 is to be positioned above the submerged deck 14, then it may be ensured that, when in the first draft, the draft is sufficiently large to provide adequate clearance between the deck 14 and the underside of the support platform 30, when in the position as illustrated in Figure 3.

With the support platform 30 in the position as shown, the installation vessel 10 may be raised to the first draft, such that the deck 14 is raised above the waterline, and comes into contact with the lower surface of the support platform 30, such that the support platform 30 is supported on the installation vessel 10. As can be seen in the examples of Figures 4 and 5, the support platform 30 is able to be supported on the installation vessel 10 with some sections of the support platform 30 hanging over the edge of the support vessel 10. In this configuration, the side walls 16a,b may be at or below the height of the deck, such that when the vessel is raised to the first draft, the support platform 30 engages and is supported by the deck, without any sagging between the side walls 16a,b. In some other examples, for example where the support platform 30 is shorter than the width of the deck, or where the support platform is positioned with its longitudinal axis parallel to that of the vessel 10, the upper edge 16a,b of the side walls may be located higher than the height of the deck, while still allowing the support platform 30 to be supported by the deck 14. In this configuration, the side walls 16a,b may be used as a guide for the location of the support platform 30 on the deck 14.

While, in this example, the support platform 30 is illustrated as being oriented such that the longitudinal axis thereof is perpendicular to the longitudinal axis of the installation vessel 10, in other examples the support platform 30 may be mounted on the installation vessel 10 such that the longitudinal axis thereof is oblique relative to the longitudinal axis of the vessel, or such that the longitudinal axis of both the support platform 30 and the installation vessel 10 are parallel. In this case, the support platform 30 may be manoeuvred above the installation vessel 10 from the aft of the vessel 10. As previously described, in the second draft, the upper edge 20 of the longitudinally extending walls of the hull is submerged in the second draft. As will be understood from the description, this feature may allow the support platform 30 to be mounted on the installation vessel 10 from a variety of different approaches, thereby greatly increasing the flexibility available to a user when installing a wind turbine.

As illustrated in Figure 4, the installation vessel 10 with the support platform 30 mounted thereon may be configured to a raised position, by engaging the hull 12 with the installation legs 22a-d (e.g. a geared mechanism by which the hull is coupled to the installation legs). The installation vessel 10 may be taken to the raised configuration from the first draft, in line with the description of the above paragraph. Alternatively the installation vessel 10 may be taken to the raised configuration from the second draft, and the step described wherein the vessel 10 is raised from the second to the first draft and the support platform 30 mounted thereon may be missed.

As illustrated in Figure 4, the entire hull 12 of the vessel is held above the water line when the vessel is in the raised configuration, and the support platform 30 is mounted thereon. As such, the subsequent installation of the wind turbine may be less affected by waves and sea swells, as the hull of the vessel is now no longer in contact with the waves. As such, this step may enable to installation of a wind turbine to be completed in weather conditions that would otherwise not be possible. It may be possible to hold the support vessel 30 in this position for as long as is necessary to complete the installation of the wind turbine in the desired location.

Shown in Figure 5 is the installation of the wind turbine in the desired offshore location. The installation apparatus 24 may be used to lift the parts of the wind turbine 28a-c from the support platform 30 to the desired offshore location. In some examples, a base may already have been installed offshore, and the part of the turbine may then be affixed to the base. As is clear from the illustration of Figure 5, the vessel 10 is held in a position above the water line during the entire installation of the offshore wind turbine.

The second aspect of this disclosure shows a method for the installation of an offshore structure, such as a wind turbine, comprising: providing an installation vessel for installation of an offshore structure, the installation vessel comprising a hull comprising a loading deck located between two longitudinally extending hull side walls, each of the side walls comprising an upper edge; transporting at least one part of the offshore structure to an installation site; securing the installation vessel to the seabed; submerging the deck and the upper edge of at least one of the two longitudinally extending hull side walls; positioning a support vessel above at least one of the submerged deck and at least one of the two longitudinally extending side walls, the support vessel holding at least a part of an offshore structure; resurfacing the deck and upper edge of the at least one of the two longitudinally extending hull side walls

such that the support vessel is mounted on the deck; installing the at least one part of the offshore structure in an offshore location using the installation apparatus.

The person skilled in the art realises that the present disclosure is not limited to the preferred embodiments described above. The person skilled in the art further realises that

5 modifications and variations are possible within the scope of the appended claims. For example, while the support vessel 30 is illustrated as being mounted on the vessel 10 in a lateral direction in relation to the length of the vessel 10, the support vessel may also be mountable on the deck 14 from the aft of the vessel, rather than either side. Any reference to installing or installation as used herein should be taken to mean installation of a part or parts

10 of the offshore structure (such as components of an offshore wind turbine) or installation of the entire offshore structure, if applicable. Additionally, variations to the disclosed embodiments can be understood and effected by the skilled person in practicing the claimed disclosure, from a study of the drawings, the disclosure, and the appended claims.

CLAIMS

1. An installation vessel (10) for an offshore structure (28), comprising;
 - a hull (12) comprising a loading deck (14), the deck (12) located between two longitudinally extending hull side walls (16a, 16b), each of the side walls (16a, 16b) comprising
5 an upper edge (20);;
 - a plurality of installation legs (22a-d) coupled to the hull (12);
 - a buoyancy control arrangement configurable to control the buoyancy of the installation vessel (10) between a lesser first draft and a greater second draft;
 - wherein in the first draft the loading deck (14) and the upper edge (20) of each of the
10 two longitudinally extending hull side walls (16a, 16b) are configured to be located above the water line, and in the second draft the loading deck (14) and at least a portion of the upper edge (20) of each of the two longitudinally extending hull side walls (16a,b) are configured to be submerged.
2. The installation vessel (10) for an offshore structure (28) according to claim 1,
15 wherein in the second draft, a portion of the upper edge (20) at least one of the two longitudinally extending hull side walls (16a,b) is configured to be located above the water line.
3. The installation vessel (10) for an offshore structure (28) according to claim 2,
wherein the two horizontally extending side walls (16a,b) extend parallelly from a bow portion
20 (18) towards the aft.
4. The installation vessel (10) for an offshore structure (28) according to any of claims 1 to 3, wherein the upper edge (20) of each of the longitudinally extending side walls (16a, 16b) is located at or below the height of the deck (14).
5. The installation vessel (10) for an offshore structure (28) according to any of claims 1
25 to 4, comprising four installation legs (22a-d) coupled to the hull (12).
6. The installation vessel (10) for an offshore structure (28) according to any of claims 1 to 5, wherein the hull (12) is vertically movable relative to the plurality of installation legs (22a-d).

7. The installation vessel (10) for an offshore structure (28) according to any of claims 1 to 6, wherein each of the plurality of installation legs (22a-d) are coupled to the hull (12) by a geared mechanism.

5 8. The installation vessel (10) for an offshore structure (28) according to any of claims 1 to 7, wherein each of the plurality of installation legs (22a-d) comprises a seabed engagement surface for engaging a portion of the seabed.

9. The installation vessel (10) for an offshore structure (28) according to any of claims 1 to 8, wherein each of the plurality of installation legs (22a-d) comprises or is defined by a truss structure.

10 10. The installation vessel (10) for an offshore structure (28) according to any of claims 1 to 9, comprising a turbine installation apparatus (24) in the form of a crane.

11. The installation vessel (10) for an offshore structure (28) according to any preceding claim, comprising a support platform (30) for mounting at least a part of an offshore structure (28) prior to construction thereof.

15 12. The installation vessel (10) for an offshore structure (28) according to claim 11, wherein the support platform (30) is buoyant.

13. The installation vessel (10) for an offshore structure (28) according to claim 11 or 12, comprising at least one tether point (34) to which to tether the support platform (30).

20 14. The installation vessel (10) for an offshore structure (28) according to any of claims 11 to 13, wherein the support platform (30) is positionable on the deck (12) with the vessel (10) in both the first draft and the second draft.

25 15. The installation vessel (10) for an offshore structure (28) according to any of claims 11 to 14, wherein the support platform (30) is positionable on the hull (12), the weight of the support platform (30) being supported by the deck (14) and optionally the two longitudinally extending hull side walls (16a, 16b).

16. The installation vessel (10) for an offshore structure (28) according to any of claims 11 to 14, wherein the hull (12) is moveable to a raised configuration on the plurality of installation legs (22a-d), and the support platform (30) is positionable on the deck (14) with the hull (14) in the raised configuration.

17. The installation vessel (10) for an offshore structure (28) according to any preceding claim, wherein the entire deck (14) is submerged in the second draft.

18. A method for the installation of an offshore structure (28), comprising:

5 providing an installation vessel (10) for installation of an offshore structure (28), the installation vessel (10) comprising a hull (12) comprising a loading deck (14) located between two longitudinally extending hull side walls (16a,b), each of the side walls (16a, b) comprising an upper edge (20);

transporting at least one part of the offshore structure (28) to an installation site;

securing the installation vessel (10) to the seabed;

10 submerging the deck (14) and the upper edge of at least one of the two longitudinally extending hull side walls (16a,b);

positioning a support vessel (30) above at least one of the submerged deck (14) and at least one of the two longitudinally extending side walls (16a,b), the support vessel (30) holding at least a part of an offshore structure (28a-c);

15 resurfacing the deck (14) and upper edge of the at least one of the two longitudinally extending hull side walls (16a,b) such that the support vessel (30) is mounted on the deck (14);

installing the at least one part of the offshore structure (28a-c) in an offshore location using the installation apparatus (24).

19. The method of claim 18, wherein the hull (12) is coupled to a plurality of installation legs (22a-d), and securing the installation vessel (10) to the seabed comprises bringing the installation legs (22a-d) into contact with the seabed.

20. The method of claim 18 or 19, comprising reducing the buoyancy of the installation vessel (10) such that it is configured from a lesser first draft to a greater second draft.

21. The method of claim 20, wherein submerging the deck (14) and the upper edge (20) of at least one of the two longitudinally extending hull side walls (16a,b) comprises configuring the vessel (10) to the second draft.

22. The method of any of claims 18 to 21, wherein submerging the deck (14) comprises submerging the entire deck (14).

23. The method of any of claims 18 to 22 comprising vertically raising the hull (12) of the installation vessel (10) relative to the plurality of installation legs (22a-d) to a raised configuration by a geared mechanism coupling the hull (12) to the plurality of installation legs (22a-d).

5 24. The method of claim 23, wherein vertically raising the hull (12) comprises lifting the entire hull (12) above the water line.

25. The method of any of claims 18 to 24, comprising positioning the support vessel (10) above the submerged deck (14) by moving the support vessel (10) in a direction transverse to the longitudinal axis of the installation vessel (10).

10 26. The method according to any of claims 18 to 25, comprising transporting a plurality of parts of an offshore structure (28a-c) to an installation site on the support vessel (30).

27. The method according to any of claims 18 to 26, comprising lifting the at least one part of an offshore structure (28a-c) from the support vessel (30) using an installation apparatus (24) mounted on the installation vessel (10).