

SYSTEM AND METHOD FOR DISCHARGING A WASTE FLUID

5 TECHNICAL FIELD

Embodiments herein relate generally to a system, a floating unit and a method. More particularly the embodiments herein relate to discharging a waste fluid from the floating unit.

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BACKGROUND

In oil and/or gas drilling and production, rainwater is collected from the decks of a floating unit. Drain pipes are used to guide the collected rainwater to a body of water that at least partially surrounds the floating unit in order to prevent people that are on, or in the vicinity of the floating unit from being hit or splashed by a fluid stream that is drained from the floating unit and/or to prevent objects, structures and/or apparatus on, or in the vicinity of the floating unit from being damaged by the fluid stream drained from the floating unit.

20 The floating unit mentioned above may be an oil platform, also called oil rig, a gas platform, a drilling platform, a seabed mining apparatus, a marine biology laboratory, a power plant, a crane platform, a sea-going vessel, an offshore facility or any other structure located in a body of water, such as a sea, an ocean, a lake or a river, or adjacent thereto.

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In addition, or instead, a drain pipe may be used for discharging additional fluids, i.e. gases or liquids, which are unwanted on the floating unit for some reason and considered as waste fluids. Examples of such waste fluids are operational fluids such as cooling fluid, rain water, ballast fluid or bilge fluid etc. that needs to be discharged from the floating unit to the body of water that at least partially surrounds the floating unit.

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A drain pipe may be fixedly attached to a supporting member of the floating unit, such as a support leg of an offshore facility for example by a plurality of connecting means that are welded to the floating unit. Water waves, underwater currents and the wind may however exert substantial forces on the drain pipe and the floating unit, which may damage the

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floating unit and in the worst case may cause the drain pipe to become detached from the floating unit. Furthermore, the drain pipe involves an increased weight of the floating unit, in addition to increased steel costs. The drain pipe generally requires thick walls and supports in order to resist environmental loads.

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SUMMARY

Embodiments herein seek to obviate at least one of the above disadvantages and/or to
10 provide an improved discharge of waste fluid from the floating unit.

According to a first aspect, there is provided a system for discharging a waste fluid from a floating unit adapted to float in a body of water. The system is adapted to discharge the waste fluid to the body of water surrounding the floating unit. The system comprises a
15 mooring line compartment which is adapted to accommodate at least part of a mooring line for the floating unit. The system comprises a discharge portion adapted to discharge the waste fluid into the mooring line compartment, and an outlet which is adapted to discharge the waste fluid from the mooring line compartment to the body of water.

20 According to a second aspect, there is provided a floating unit comprising the above discussed system for discharging the waste fluid.

According to a third aspect, there is provided a method for discharging the waste fluid from a floating unit to the body of water surrounding the floating unit. The floating unit
25 comprises the system which comprises the mooring line compartment which is adapted to accommodate at least part of a mooring line for the floating unit, the discharge portion and the outlet. The waste fluid is discharged from the floating unit via the discharge portion to the mooring line compartment. The waste fluid is discharged from the mooring line compartment to the body of water via the outlet.

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Since the mooring line compartment is utilized to discharge the waste fluid from the floating unit an improved discharge of waste fluid from the floating unit is provided.

Embodiments herein may afford at least one of the below advantages.

An advantage of the embodiments herein may be that the overall weight of the floating unit is reduced when the mooring line compartment is utilized to discharge the waste fluid instead of having a separate drain pipe. This also reduces the material costs for the floating unit.

Another advantage of the embodiments herein may be that the system is simple and does not require any substantial changes of the mooring line compartment.

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Furthermore, another advantage of the embodiments herein may be that a leakage in the system would not drown any manned space on the floating unit.

Another advantage of the embodiments herein may be that the system is robust, simple to construct, repair and maintain.

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The embodiments herein are not limited to the features and advantages mentioned above. A person skilled in the art will recognize additional features and advantages upon reading the following detailed description.

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BRIEF DESCRIPTION OF THE DRAWINGS

The embodiments herein will now be further described in more detail in the following detailed description by reference to the appended drawings illustrating the embodiments and in which:

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Fig. 1 is a schematic drawing illustrating a floating unit comprising an embodiment of the system for discharging waste fluid.

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Fig. 2 is a flow chart illustrating embodiments of a method for discharging the waste fluid.

The drawings are not necessarily to scale and the dimensions of certain features may have been exaggerated for the sake of clarity. Emphasis is instead placed upon illustrating the principle of the embodiments herein.

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DETAILED DESCRIPTION

5 Figure 1 depicts a floating unit 100 in which embodiments herein may be implemented. The floating unit 100 may be an oil platform, also called oil rig, a gas platform, a drilling platform, a Floating Production, Storage and Offloading (FPSO) unit, a spar buoy, a Tension Leg Platform (TLP), a seabed mining apparatus, a marine biology laboratory, a power plant, a crane platform, a sea-going vessel or any other structure located in a body
10 of water 103, such as a sea, an ocean, a lake or a river, or adjacent thereto.

The floating unit 100 is adapted to float in the body of water 103. When the floating unit 100 floats in the body of water 103 it is at least partly surrounded by the body of water 103. The floating unit 100 comprises a system for discharging waste fluid from the
15 floating unit 100. As mentioned above, the waste fluid may be operational fluids such as for example cooling fluid, drain fluid, rain water, ballast fluid or bilge fluid etc. that needs to be discharged from the floating unit 100 to the body of water 103 that at least partially surrounds the floating unit 100.

20 The system comprises a mooring line compartment 105 which is adapted to accommodate at least part of one or more mooring lines 108 for station keeping of the floating unit 100. The mooring line 108 may comprise segments of wire, chain, polyester rope etc., or a combination of the segment types. The chain segment as well as a wire segment may be for example at least partially made of metal, such as steel. The mooring
25 line compartment 105 may be located at a pontoon deck of the floating unit 100. Purely by way of example, the mooring line compartment 105 comprises a mooring line opening 110 adapted to receive the mooring line 108. The mooring line compartment 115 in the embodiment illustrated in figure 1 comprises a mooring line trunk 105' and a mooring line pipe 105". The mooring line pipe 105" may comprise the mooring line opening 110.

30 The system further comprises a discharge portion 115 adapted to discharge the waste fluid into the mooring line compartment 105. The discharge portion 115 may be located at a deck of the floating unit 100, for example a tween deck 111a, a lower deck 111b or a main deck 111c. In other words, the system may be adapted to discharge waste fluid
35 from a plurality of decks of the floating unit 100 or from any other part of the floating unit

100 from where waste fluid needs to be discharged. The discharge portion 115 may have any shape and size suitable for discharging the waste fluid, such as for example circular, square, oval etc. The discharge portion 115 may comprise a plurality of discharge sub-portions where each sub-portion is adapted to discharge the waste fluid. In the following,
5 the term discharge portion 115 refers to both the embodiment where there is only one discharge portion and the embodiment with a plurality of discharge sub-portions. Purely by way of example, the discharge portion 115 may be adapted to be in fluid communication with a drain water connection assembly (not shown).

10 The system comprises an outlet 113 adapted to discharge the waste fluid from the mooring line compartment 105 to the body of water 103. The outlet 113 may be separate from the mooring line opening 110. The outlet 113 may have any shape and size suitable for discharging the waste fluid to the body of water 103, such as for example circular, square, oval etc. The outlet 113 may be located at any suitable position of the mooring
15 line compartment 105. The outlet 113 may be located in the mooring line trunk 105' and/or the mooring line pipe 105'', however any other suitable location is also possible. The outlet 113 may be in the form of a tube extended from the mooring line compartment 105 for example to the bottom of the floating unit 100 or to a side of the floating unit 100 in order to discharge the waste fluid to the body of water 103. The outlet 113 may be
20 adapted to provide a fluid communication, e.g. a permanent fluid communication, between the mooring line compartment 105 and the body of water 103. The outlet 113 may comprise a plurality of sub-outlets where each sub-outlet is adapted to discharge the waste fluid. As an example, the outlet 113 may comprise a grating (not shown) at the bottom of the mooring line compartment 105. In the following, the term outlet 113 refers
25 to both the embodiment where there is only one outlet and the embodiment with a plurality of sub-outlets. In figure 1, various implementations of the outlet 113 have been indicated. However, it should be noted that the embodiment of the system may comprise only one of the implementations of the outlet 113.

30 In some embodiments, the discharge portion 115 is adapted to be located above the outlet 113. In some embodiments, the discharge portion 115 is adapted to be located above a still water surface 114 of the body of water 103 when the floating unit 100 floats in the body of water 103 in an operation condition. The outlet 113 may be adapted to be located below the still water surface 114 of the body of water 103 when the floating unit
35 100 floats in an operating condition in the body of water 103.

The discharge portion 115 may be located at an upper end of the mooring line pipe 105'', e.g. close to a chain jack or mooring winch (not shown). The mooring line pipe 105'' may also be referred to as a chain pipe or a chain locker. The mooring line pipe 105'' may run
5 inside the floating unit 100 through for example ballast tanks and voids to the mooring line compartment 105 located at the bottom end of the mooring line pipe 105''. The mooring line 108 may run through the mooring line pipe 105'', e.g. towards the mooring line trunk 105'.

- 10 At least a part of the system may be located inside the floating unit 100, for example in a support column of the floating unit 100. A support column may be a substantial vertical structure adapted to support at least a deck of the floating unit 100.

In some embodiments, the system comprises an overflow pipe 116 adapted to be located
15 above the outlet 113 and adapted to guide the waste fluid through the overflow pipe 116 if the mooring line compartment 105 is overflowed by the waste fluid. This way, the waste fluid may be guided to a place where the waste fluid does not constitute any risk.

The method for discharging a waste fluid from a floating unit 100 to a body of water 103
20 surrounding the floating unit 100, according to some embodiments will now be described with reference to the flowchart depicted in Figure 2. The floating unit 100 comprises the system. The system comprises the mooring line compartment 105 adapted to accommodate at least part of the mooring line 108 for the floating unit 100, the discharge portion 115 and the outlet 113. The discharge portion 115 may be located above the
25 outlet 113. In some embodiments, the discharge portion 115 is located above the still water surface 114 of the body of water 103 and the outlet 113 is located below the surface 114 of the body of water 103. The outlet 113 may be located at the bottom part of the mooring line compartment 105. The waste fluid may be at least one of a cooling fluid, a drain fluid, rain water, a ballast fluid and a bilge fluid. The method comprises the following
30 steps, which steps may as well be carried out in another suitable order than described below.

Step 201

The waste fluid is discharged from the floating unit 100 via the discharge portion 115 to
35 the mooring line compartment 105.

Step 202

The waste fluid is discharged from the mooring line compartment 105 to the body of water 103 via the outlet 113.

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Step 203

In some embodiments, the waste fluid is guided through the overflow pipe 116 if the mooring line compartment 105 is overflowed by the waste fluid. The overflow pipe 116 may be located above the outlet 113. This step may be performed at the same time as
10 step 201, at the same time as step 202, between steps 201 and 202 or after step 202.

The embodiments herein are not limited to the above described embodiments. Various alternatives, modifications and equivalents may be used. Therefore, the above embodiments should not be taken as limiting the scope of the embodiments, which is
15 defined by the appending claims.

It should be emphasized that the term “comprises/comprising” when used in this specification is taken to specify the presence of stated features, integers, steps or components, but does not preclude the presence or addition of one or more other
20 features, integers, steps, components or groups thereof. It should also be noted that the words “a” or “an” preceding an element do not exclude the presence of a plurality of such elements.

It should also be emphasised that the steps of the methods defined in the appended
25 claims may, without departing from the embodiments herein, be performed in another order than the order in which they appear in the claims.

CLAIMS

1. A system for discharging a waste fluid from a floating unit adapted to float in a body of water, said system being adapted to discharge said waste fluid to said body of water
- 5 surrounding the floating unit, the system comprising:
 - a mooring line compartment adapted to accommodate at least part of a mooring line for the floating unit;
 - a discharge portion adapted to discharge the waste fluid into the mooring line compartment; and
 - 10 • an outlet adapted to discharge the waste fluid from the mooring line compartment to the body of water.
2. The system according to claim 1, wherein the discharge portion is adapted to be located above the outlet.
- 15 3. The system according to any of the claims 1 – 2, wherein the discharge portion is adapted to be located above a still water surface of the body of water when the floating unit floats in said body of water, and wherein the outlet is adapted to be located below the still water surface of the body of water) when the floating unit floats in said body of water.
- 20 4. The system according to any of the claims 1 – 3, wherein the outlet is adapted to be located at a bottom portion of the mooring line compartment.
5. The system according to any of the claims 1 – 4, further comprising an overflow pipe
- 25 adapted to be located above the outlet and adapted to guide the waste fluid through the overflow pipe if the mooring line compartment is overflowed by fluid.
6. The system according to any of the claims 1 – 5, wherein the waste fluid is at least one of a cooling fluid, a drain fluid, rain water, a ballast fluid and a bilge fluid.
- 30 7. A floating unit comprising a system for discharging a waste fluid according to any one of the preceding claims.

8. A method for discharging a waste fluid from a floating unit to a body of water surrounding the floating unit, wherein the floating unit comprises a system, which system comprises a mooring line compartment adapted to accommodate at least part of a mooring line for the floating unit, a discharge portion and an outlet, the method
- 5 comprising:
- discharging the waste fluid from the floating unit via the discharge portion to the mooring line compartment, and
 - discharging the waste fluid from the mooring line compartment to the body of water via the outlet.
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9. The method according to claim 8, wherein the discharge portion is located above the outlet.
10. The method according to any of the claims 8 – 9, wherein the discharge portion is
- 15 located above a still water surface of the body of water, and wherein the outlet is located below the still water surface of the body of water.
11. The method according to any of the claims 8 – 10, wherein the outlet is located at a bottom part of the mooring line compartment.
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12. The method according to any of the claims 8 – 11, further comprising:
- guiding the waste fluid through an overflow pipe if the mooring line compartment is overflowed by the waste fluid, which overflow pipe is located above the outlet.
- 25 13. The method according to any of the claims 8 – 12, wherein the waste fluid is at least one of a cooling fluid, a drain fluid, rain water, a ballast fluid and a bilge fluid.