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METHOD AND INSTALLATION FOR MANIPULATING A JACKET
RELATING TO AN ARTIFICIAL ISLAND

The invention relates to a method and installation for manipulating a jacket relating to an artificial island.

In the known method of the above mentioned kind the jacket is pushed from a floating pontoon into the water. The jacket, which may for example be 100 metres long, is thereby subjected to a large measure of local loading during the sliding contact with the edge of the pontoon. The jacket has for this reason to be strongly constructed to be able to withstand this loading. This requires the use of much costly material.

The invention has for its object to provide a method whereby maneuvering of the jacket is carried out such that great localized loading does not occur and the jacket can therefore be constructed sufficiently robustly with less material. To this end the method according to the invention has the feature that the jacket is displaced between a lying position and a downward directed position while being supported by means of a carrier which is suspended for pivoting on two vessel elements situated on either side of the carrier.

The invention further provides an installation

particularly suitable for the performing of the method according to the invention, this installation being designated in claim 8.

The features referred to in the claims and other are elucidated in the description following hereinafter with reference to a drawing.

In the drawings in schematic form:

Figures 1-5 show successive steps during the performing of a preferred embodiment of the method according to the invention,

Figure 6 shows on a larger scale a perspective view of a detail VII from figure 3,

Figure 8 shows on a larger scale a perspective view of detail VIII from figure 3, and

Figure 9 shows on a larger scale a perspective, broken away view of detail IX from figure 5.

With the method according to the invention a jacket 3 manufactured onshore is rolled from the quayside as according to arrows 14 by means of separate roller means 11 onto a carrier 2 to which it is welded for a firm attachment during transport. The carrier 2 which is thus loaded with jacket 3 and which has sufficient buoyancy for this purpose, is towed in the water to the vessel 41 of the installation 1, anchored for instance at sea outside a harbour, and arranged between two vessel elements 4 of vessel 41 disposed to an interval from one

another. Two bearing shafts 19 of the carrier 2 are accommodated in a ballasted vessel 41 in bearings 22 which are suspended by means of hydropneumatic buffers 23 for example, from the vessel elements 4. During transport the carrier 2 is further suspended from the vessel elements 4 by means of consoles 65 welded in position on vessel elements 4. The vessel 41 is then freed to ballast and navigated to the placing location. The consoles 65 are there cut free from the vessel elements 4 while the carrier 2 is then supported by means of cables 29 which are attached to the carrier 2 and run via guide pulleys 32 to winches, these guide pulleys 32 being carried by buffers 35. Hydraulically retractable consoles can also be considered for use instead of removable consoles 65. After the vessel 41 is anchored above the placing location in the required direction the jacket 3 is set in position on the underwater base 36 as follows.

In order to carry the carrier 2 together with the jacket 3 from the prone position into the downward directed position, the free end of carrier 2 is ballasted with water via valves 55 with the cables 29 under spring tension. For this purpose the carrier 2 comprises watertight chambers 40 in the lower part of which are arranged pressure resistant, cylindrical air tanks 39 which may optionally be placed under a pressure via an

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air line 42 with a valve 45, this pressure

being high enough to withstand the high external water pressure of for example 10 bar.

While the carrier 2 with the jacket 3 connected thereto hangs on the bearings 22, the jacket 3 is suspended by means of chains 57 to girders 9 which are supported by floater bodies 8 accommodated in liquid baths 7 of the vessel elements 4.

The vessel 41 preferably consists of two identical supertankers which each form a vessel element 4. The loading spaces thereof are converted into liquid baths 7 in which are arranged floater bodies 8. The latter consist of tanks of such a large volume that their buoyancy can together bear at least the weight of the jacket 3, carrier 2, floater bodies 8 and supporting girders 9 when they are floating in water 10 present in the liquid baths. The floater bodies 8 are raised by filling liquid baths 7 with water and by removing water from the floater bodies 8.

The carrier 2 is then released from the upper part of jacket 3 by adding a slight additional water ballasting to the carrier 2, which results in the weld plates 26 being released from the associated consoles 70 (figure 8). Carrier 2 is subsequently placed at a distance from jacket 2, using for instance a lifting device 56 and a cable 69, into the position drawn in figure 4 in dashed lines. Ballast water can if required be thereby removed from the carrier 2. The jacket 3, which is positioned for example 4 metres above the base 36, is then set down thereon by bringing the floater bodies 8 down to a lower level.

Because the floater bodies 8 support the jacket 3 and because swell compensators 15 are arranged between the girders 9 and the vessel elements 4, the swell of the vessel 41 during this operation is transmitted only to a very small extent and with small forces onto jacket 3. The girders 9 support on the floater bodies 8 via columns 60 which are provided with ball and socket joints 59. Girders 9 are held

in position with control cylinders 67 provided with ball and socket joints 68. Jacket 3 is first moved to a position a short distance, for example 1 metre, above the base 36 and then, preferably quickly, set down thereon. To this end the water level 37 in the liquid baths 7 is lowered rapidly and/or the floater bodies 8 are rapidly ballasted with water. Valves 30 are opened for this purpose to allow water to flow from the baths 7 into floater bodies 8. When jacket 3 is standing on the base 36 the chains 57 are released, the installation 1 is removed and the carrier 2 is suspended in the bearings 22 and raised to the prone position.

It is noted that a jacket 3 standing on the base 36 can be removed using the installation 1 by performing the method substantially in the reverse manner. Means for this purpose (not drawn) are present to pump either water out of the floater bodies 8 and out of storage tanks 40 or surrounding outside water into the baths 7.

The installation 1 can be used for the placing and removal of jackets 3 at varying water depths. To this end a piece 64 of the carrier 2 of suitable length d is then inserted therein by means of welding operations or removed therefrom to adapt the total length of carrier 2 to the depth of water or length of the jacket 2 occurring in each case. Using one and the same installation 1 a jacket 3 can in this way be placed or removed at a depth of water of 80, 100, 120 or 150 metres.

CLAIMS

1. Method for manipulating a jacket relating to an artificial island characterised in that said jacket is manipulated between a horizontal orientation and a vertical orientation while it is supported by means of a carrier which is pivotably suspended between two vessel elements situated on each side of said carrier.

2. Method as claimed in claim 1, whereby the jacket is supported by the vessel elements via horizontal swivel bearings characterised in that both swivel bearings are supported by means of said vessel elements via buffer means.

3. Method as claimed in claim 1, characterised in that the carrier is partially supported by means of cables fastened each side of said carrier and supported via buffer means.

4. Method as claimed in any of the foregoing claims, characterised in that the weight of the carrier and/or of the jacket is supported partly by means of at least one air tank arranged on said carrier which tank is filled with air that may or may not be compressed.

5. Method as claimed in any one of the foregoing claims, characterised in that the jacket is accommodated on the carrier which has sufficient floating power for that purpose, after which this carrier loaded with said jacket is navigated between the two vessel elements.



6. Method as claimed in any of the foregoing claims, characterised in that the carrier is moved away from the jacket when the carrier has been placed in position.

7. Method as claimed in any of the foregoing claims, characterised in that the jacket after being placed in downward position, is suspended from floater bodies which are held in liquid baths carried by the vessel elements.

8. Method as claimed in any of the foregoing claims, characterised in that two different jackets are successively manipulated with respect to an underwater base at two respective locations of varying water depth , and that between manipulation of a first jacket and the dis-manipulation of a second jacket, a piece of a length d is removed from or added to the carrier in order to adapt the carrier length to the depth of water at the second location.

9. Installation for manipulating a jacket relating to an artificial island which makes use of the method as claimed in any of the foregoing claims, characterised by:
two vessel elements a carrier pivotable relative to said two vessel elements between a horizontal orientation and a vertical orientation and swivel bearings present on either side of said carrier for swivel connection of said carrier to said vessel elements and at least one cable for suspension of the end portion opposite to the pivot of said carrier relative to said vessel elements.



10. Installation as claimed in claim 9, characterised in that the swivel bearings are supported by the associated vessel elements via buffer means for displacement in upward and downward direction.
11. Installation as claimed in claim 9 or 10, characterised in that the carrier has at least one chamber which serves as ballast tank, and that in this chamber is accommodated at least one air container which can be filled with air, for example compressed air.
12. Installation as claimed in any one of claims 9 to 11 characterised in that the carrier is partially supported by means of cables.
13. Installation for manipulating a jacket relating to an artificial island substantially as described herein with reference to any one of the accompanying drawings.
14. Method for manipulating a jacket relating to an artificial island substantially as described herein with reference to any one of the accompanying drawings.
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