

⑬



Europäisches Patentamt
European Patent Office
Office européen des brevets

⑪

Publication number:

0 201 122
A1

⑫

EUROPEAN PATENT APPLICATION

⑰

Application number: **86200665.7**

⑵

Int. Cl.⁴: **E 02 D 37/00, E 02 D 5/64**

⑱

Date of filing: **21.04.86**

⑶

Priority: **20.04.85 NL 8501152**

⑴

Applicant: **Bouwchemie Leggedoor B.V., Tuinstraat 58,
NL-9514 AM Gasselternijveen (NL)**

⑷

Date of publication of application: **12.11.86**
Bulletin 86/46

⑵

Inventor: **Leggedoor, J., Vaart 65, NL-9514 AB
Gasselternijveen (NL)**

⑸

Designated Contracting States: **AT BE CH DE FR GB IT LI
LU NL SE**

⑶

Representative: **Noz, Franciscus Xaverius, Ir.,
Boschdijk 155 P.O. Box 645, NL-5600 AP Eindhoven (NL)**

⑸

Method for carrying out a repair or preservation of an under water structure and the jacket to be used thereby.

⑹

Method for carrying out a repair or preservation of an under water structure by providing a jacket, after preparing the structure by e.g. chipping out and cleaning, around the parts to be repaired or preserved and filling the space between the structure and the jacket with repair or preserving material, whereby a jacket is used which is provided at its bottom side with at least one element for supplying repair or preserving material, via which supply element the material, that can be poured, is led upwards from the bottom between the jacket and the structure while removing the water present between the jacket and the structure.

EP 0 201 122 A1

-1-

Method for carrying out a repair or preservation of an
under water structure and the jacket to be used thereby.

5 The invention relates to a method for carrying out a
repair or preservation of an under water structure by providing a jacket,
after pre-treatment the subject by e.g. chipping out and cleaning, around
the parts to be repaired or preserved and filling the space between the
structure and the jacket with repair or preserving material. The inven-
10 tion further relates to a jacket to be used with such a method.

Structures being in water such as concrete piles for
the foundation of buildings, hydraulic constructions, engineering works
which are placed in water and the like, need to be repaired regularly
because of attack by corrosive elements present in the water or because
15 of damaging. Also it has become more and more usual to provide such under

water constructions or structures with a protective or preserving layer, usually being a polymer or resin component which is applied with a thickness of at least approximately 0.5 mm on the under water construction or the structure. The method to be practised so far is that with a
5 repair that needs to be carried out under water, the attacked parts are removed by e.g. chipping out, the surface to be repaired is cleaned, after which a first layer is provided and then the chipped out parts are filled with mortar, which can be done by hand in case of small surfaces. With larger surfaces it will not be possible to provide mortar
10 or other repair or preserving material by hand, but for that purpose a jacket is erected around the surface to be repaired, after which the space between jacket and the construction to be repaired is filled from above with a material that can be poured such as mortar or resin. A disadvantage of the existing methods is that comparatively much material
15 is needed to carry out the repair and that often a bad adherence to the under water construction is obtained because of the presence of the water inside the jacket and specially the film of water on the structure to be repaired or preserved. The method now practised as mentioned in the preamble, whereby the material that can be poured is supplied at the
20 upper side of the structure, as a result of which water is enclosed in the hardening material, has now been improved by a method according to the invention which is characterised in that a jacket is used which is provided at its bottom side with at least one element for supplying repair or preserving material, via which supply element the material
25 that can be poured is led upwards from the bottom between the jacket and the structure while removing the water present between the jacket and the structure.

The jacket to be used according to the invention is preferably closed at its upper and bottom side, whereby the supply and
30 discharge of material takes place via valves. As a result of the supply of the material at the bottom side of the structure to be repaired or preserved an adjustable, equal supply is obtained as a result of which the water, present between the structure and the jacket is gradually displaced by the supplied material which will harden on the structure
35 after some time. For a preservation the space between the structure and the jacket may be small, in the order of 1 mm, whereas for a structure to be repaired said distance is chosen larger, dependent on the magni-

tude of the attack and the unevenness of the surface to be repaired. If such a structure needs to be reinforced, it is also possible to fill the space between jacket and structure first with another material such as stones or another filling material, before supplying the mortar on the resin that has to harden. When the repair or the preservation is carried out with a resin that is sensitive to water, before or during hardening of the mass, it may be recommendable to fill the space between the jacket and the structure first with a liquid different from water with which water is displaced such as a hydrocarbon, to which the resin to be supplied is better resistant than to water. When the repair of the preservation must be carried out along a great length of an under water structure, then it is possible to provide a jacket according to the invention in several layers, so that the preservation or repair can be carried out in stages. It also is possible according to the invention to fill the space with the resin that has to harden, after which the space is closed by closing the supply and discharge valves and then exerting a pressure on the resin in the space eventually at elevated temperature. For this purpose specific jacket forms may be used such as flexible jackets or jackets provided with a heating casing. The pressure on the resin may also be increased by shutting off the discharge valve after the space has been filled completely and exerting an extra fluid pressure on the material via the supply valve.

The jacket may be provided in various ways around the structure or construction to be repaired or preserved and that is by means of struts which may be fixed to another part of the construction or in the bottom. Furthermore the jacket may be fixed around the structure to be repaired by fixing the jacket to a base by means of bolts.

The invention furthermore relates to the jacket which is used with the method described hereinabove, whereby it is specifically important that the jacket is provided with elements at the bottom side of the jacket to supply the material that can be poured and that has to harden, so that said material, being resin or mortar, can flow upwards from the bottom through the space between the jacket and the structure and thus evenly displaces the water from the space. Such a space may be closed at its bottom side by a rubber seal and be open at its upper side or possibly be closed at its upper side, too, in which case discharge

valves have been provided.

Further modifications and measures will be apparent to experts in this field now that the advantages have been indicated and the operations to be executed for carrying out the repair or preservation under water.

-1-

Claims.

1. Method for carrying out a repair or preservation of an under water structure by providing a jacket, after preparing the structure by e.g. chipping out and cleaning, around the parts to be repaired or preserved and filling the space between the structure and the jacket with repair or preserving material, characterised in that a jacket is used which is provided at its bottom side with at least one element for supplying repair or preserving material, via which supply element the material, that can be poured, is led upwards from the bottom between the jacket and the structure while removing the water present between the jacket and the structure.
2. Method as claimed in claim 1, characterised in that the jacket is closed at its upper side and provided with one or more

valves, which, after the space between jacket and structure has been filled with material that can be poured, is (are) shut, so that the material for preserving or repairing can be brought under pressure.

3. Method as claimed in claims 1-2, characterised in
5 that before the repair or preserving material is led through the space, water-displacing material is provided in the space or is led through the space.

4. Method as claimed in claims 1-3, characterised in
10 that with long structures several jacket units are placed above each other.

5. Method as claimed in claims 1-4, characterised in that the jacket is closed at its bottom side by a rubber sealing.

6. Method as claimed in claims 1-5, characterised in that the hardenable material is supplied, from the shore by means of a
15 pump via a hose to the bottom side of the jacket.

7. Jacket for the underwater repair or preservation of structures or constructions according to a method described in claims 1-5, characterised in that the jacket is provided at its bottom side with one or more valves for supplying the repair or preserving material.

8. Jacket as claimed in claim 7, characterised in that
20 with it, the operations can be carried out as indicated in claims 1-5.



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X	US-A-2 412 185 (WEBER) * Column 3, lines 54-75; column 4, lines 1-32, 57-67; column 5, lines 24-34; column 6, lines 8-34; figures 1-3 *	1-8	E 02 D 37/00 E 02 D 5/64
X	--- EP-A-0 071 217 (DIMMICK) * Page 3, lines 24-35; page 6, lines 3-10, 19-37; page 8, lines 17-21, 32-35; page 9, lines 21-36; page 10, lines 6-11, 7-17; page 21, lines 16-20; figures 1, 3, 4 *	1, 2, 5-7	
X	--- GB-A-1 399 510 (BALFOUR) * Page 1, lines 71-89; page 2, lines 100-114; page 5, lines 9-56, 97-116, 125-130; page 6, lines 1-51; page 7, lines 117-130; page 8, lines 1-32, 36-64, 116-124; page 9, lines 10-36, 68-97; page 10, lines 38-57; figures 1-4 *	1-4, 7	
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
X	--- DE-B-1 153 689 (DAHMEN) * Page 4, lines 3-19; figure 2 *	1, 2, 5, 7	E 02 D
A	--- US-A-3 890 794 (BROADFOOT) * Column 3, lines 64-66; column 4, lines 26-31; figure 3 *	1, 2, 7	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 28-07-1986	Examiner RUYMBEKE L.G.M.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			