A conduit glue bag which comprises a conduit element and a bag filled with glue fluid which extends over the exterior surface of the conduit, the bag having a zip cord along it and being built in such a manner that after pulling the zip cord, the glue fluid pours out of the bag. Conduit glue strips and methods for installing cable inside a sewer pipe are also described.
CONDUIT GLUE BAG, CONDUIT GLUE STRIPS AND METHODS FOR INSTALLING CABLE IN SEWER PIPE

FIELD OF THE INVENTION AND RELATED ART

[0001] The invention is based on a priority application EP 02360231.1 which is hereby incorporated by reference.

[0002] The invention relates to a conduit glue bag and conduit glue strips which shall be glued to the inner wall of a sewer pipe and methods for installing a cable in said sewer pipe by making use of said conduit glue strips.

[0003] Using of sewer pipes or other underground supply conduits for laying communication cables is a possibility already being exploited to lower the costs of underground work for communications subscribers access. It also enables subscriber access of this kind to be extended orientated to need and quickly, which is becoming increasingly important of late owing to the multiplicity of operators. Some known techniques for laying communication cables in sewer pipes are for example the use of customized robots which pull in and fix the conduits to the sewer wall by means of metal ring clamps; tubular liners which expand and press the cable onto the inner wall of the pipe; or an elongated strip-shaped body which is bonded to the internal surface of a pipe.

[0004] In U.S. Pat. No. 2001010781 for example, it is disclosed a method for laying data cables in underground pipes which uses an elongated strip body adhered to a portion of the pipe and which has at least one cable confined in such body, the method comprising the steps of confining at least one cable in said body of settable material, inserting the body into the pipe prior to setting of the material of such body, introducing into the pipe a deformable tubular liner, expanding the liner from within to thus urge the body against the internal surface of the pipe, and causing the body to set or bond the body to the internal surface of the pipe. A drawback of such proposal is that the cable shall be laid inside the pipe together with the strip body, and thus the need to repeat the laying process every time new cabling is needed.

OBJECT OF THE INVENTION

[0005] The object of the present invention is to provide a conduit glue bag and conduit glue strips to be glued against a portion of the internal surface of a underground pipe and methods for installing micro optical fiber cable inside said pipes which are low cost and provide easy cable exchange and repair.

[0006] The object is achieved according to the invention by

- [0007] a conduit glue bag that comprises at least one conduit element and a bag filled with glue fluid which extends over the exterior surface of said at least one conduit, said bag having a zip cord along it and being built in such a manner that after pulling the zip cord, the glue fluid pours out of the bag;

- [0008] a conduit glue strip made out of at least one conduit glue bag comprising at least one conduit element and a bag filled with glue fluid which extends over the exterior surface of said at least one conduit, said bag having a zip cord along it and being built in such a manner that after pulling the zip cord, the glue fluid pours out of the bag, or

- [0009] a conduit glue strip made out of an elongated strip body of soft material with a plurality of canals which extend lengthwise of the pipe, a glue layer which adheres it to the inner surface of the pipe and which is protected with a thin foil or tape in a prior state to installation, wherein the protection foil degrades when hot water is injected inside the canals, and

- [0010] a method for installing at least one cable in a sewer pipe using a conduit glue strip, the conduit glue strip being made out of at least one conduit glue bag comprising at least one conduit element and a bag filled with glue fluid which extends over the exterior surface of said at least one conduit, the bag having a zip cord along it and being built in such a manner that after pulling the zip cord the glue fluid pours out of the bag, comprising the steps of: introducing the conduit glue bag inside the sewer pipe; pulling the zip cord of the bag to let the glue fluid pour out over the sewer inner surface and simultaneously pressing the conduit glue bag on the installation position; activating the glue function of the glue fluid by injecting hot water inside the conduit; blowing or pulling micro optical fiber cable into the conduit, or

- [0011] a method for installing at least one cable in a sewer pipe using a conduit glue strip, the conduit glue strip being made out of an elongated strip body of soft material with a plurality of canals which extend lengthwise of the pipe, a glue layer which adheres it to the inner surface of the pipe and which is protected with a thin foil or tape in a prior state to installation, comprising the steps of: introducing the conduit glue strip into the sewer pipe; degrading the protection foil and activating the glue function of the glue layer by injecting hot water along the conduit strip canals; pressing the conduit glue strip against the inner wall of the sewer pipe; blowing or pulling micro optical fiber cable into the canals.

- [0012] Standard methods for inspection, cleaning and repair of sewer canals can be applied to the installed system.

- [0013] Advantageous configurations of the invention emerge from the dependent claims, the following description and the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] An embodiment example of the invention is now explained with the aid of FIGS. 1 to 3.

[0015] FIGS. 1A, B shows an embodiment of a conduit glue bag in cross section and sideways respectively.

[0016] FIG. 2 shows the cross-section of an underground pipe with a conduit glue strip made out of a number of conduit glue bags adhered to the inner wall of the pipe.

[0017] FIG. 3 shows the cross-section of an underground pipe with a conduit glue strip made out of a strip-shaped body adhered to the inner wall of the pipe.
DETAILED DESCRIPTION OF THE DRAWINGS

[0018] FIGS. 1A,B shows an embodiment of a conduit glue bag 10 in cross section and sideways respectively. It is designed as a conduit 1, which has a bag 2 over its exterior surface, the bag 2 being filled with glue fluid 3 and having a zip cord 4 longitudinally along its surface. It is built in such a manner that, after pulling the zip cord 4, the glue fluid 3 will pour out of the bag 2.

[0019] The conduit 1 can be made of some plastic material. The bag 2 is made of polyester felt material with inner PE coating and the glue material 3 inside the bag belongs to the acrylate glue family, which is also suitable for wet ground, such as silanmodified glue, or glassfiber epoxy resin and is kept in fluid form.

[0020] It is also advantageous to cover more than one conduit 1 with the glue bag 2 or having a conduit 1 divided with spacers or equipped with more inner conduits.

[0021] FIG. 2 shows the cross-section of an underground pipe 5 with a conduit glue strip glued to the inner surface 6 of said pipe. The conduit glue strip is made out of four conduits 1 adhered to the inner wall 6 of said pipe by means of a glue material 3 which was originally confined inside the bags 2 as already explained above.

[0022] After positioning of the conduit glue bag 10 on the desired position inside the pipe 5, preferably at the bottom of said pipe, the zip cord 4 of the bag 2 will be pulled and the glue fluid 3 will pour out of the bag 2 and over the inner surface 6 of the pipe. Simultaneously the conduit glue bag 10 will be pressed to ensure an entire glue 3 contact between the conduits 1 and the wall 6 to increase the cohesive effects. Hot water will be introduced later inside the conduit 1 to activate the glue 3 function and form a cohesive conduit glue strip adhered to the inner wall 6 of the pipe 5.

[0023] Once the conduit glue strip is formed, micro optical fiber cable (not shown) can be blown or pulled at any time into the conduit 1.

[0024] FIG. 3 shows a cross-section of a pipe 5 with a conduit glue strip glued to the inner surface 6 of said pipe. The conduit glue strip comprises an elongated strip body soft material 7 with four canals 8 which extend lengthwise of the pipe 5 and a glue layer 9 in charge of adhering the conduit glue strip.

[0025] The soft material 7 is made of polyester felt material with inner PE coating. The glue layer 9 belongs to the acrylate glue family, which is also suitable for wet ground, such as silanmodified glue.

[0026] In a state previous to the gluing of the conduit glue strip to the inner wall of the pipe, the conduit glue strip glue layer 9 is protected with thin foil (not shown) or similar protection tape, preventing it from soiling by transport and pulling into the sewer pipes.

[0027] Once the conduit glue strip is laid on the desired position inside the pipe 5, preferably at the bottom of said pipe, the protective foil or tape is put off and simultaneously the strip pressed and glued against the inner surface 5 of the pipe 6. Hot water is later introduced into the internal conduit strip canals 8 to activate the glue layer 9 function. Alternatively, hot water can also be used to loose or degrade the protection tape.

[0028] Once the conduit glue strip is successfully installed, micro optical fiber cable (not shown) can be blown or pulled at any time into the canals 8.

1. Conduit glue bag that comprises at least one conduit element and a bag filled with glue fluid which extends over the exterior surface of said at least one conduit, said bag having a zip cord along it and being built in such a manner that after pulling the zip cord, the glue fluid pours out of the bag.

2. Conduit glue bag according to claim 1, wherein the glue fluid belongs to the acrylate glue family such as elastic silanmodified glue or glassfiber epoxy resin.

3. Conduit glue bag according to claim 1, wherein the conduit is made of some plastic material and the bag is made of polyester felt with inner PE coating.

4. Conduit glue strip, to be glued against a portion of the internal surface of an underground pipe, made out of at least one conduit glue bag comprising at least one conduit element and a bag filled with glue fluid which extends over the exterior surface of said at least one conduit, said bag having a zip cord along it and being built in such a manner that after pulling the zip cord, the glue fluid pours out of the bag.

5. Conduit glue strip, to be glued against a portion of the internal surface of an underground pipe, made out of an elongated strip body of soft material with a plurality of canals which extend lengthwise of the pipe, a glue layer which adheres it to the inner surface of the pipe and which is protected with a thin foil or tape in a prior state to installation, wherein the protection foil degrades when hot water is injected inside the canals.

6. Method for installing a cable in a sewer pipe using a conduit glue strip,

comprising the following steps:

- introducing the conduit glue bag inside the sewer pipe;
- pulling the zip cord of the bag to let the glue fluid pour out over the sewer inner surface and simultaneously pressing the conduit glue bag on the installation position;
- activating the glue function of the glue fluid by injecting hot water inside the conduit;
- blowing or pulling micro optical fiber cable into the conduit.

7. Method for installing a cable in a sewer pipe using a conduit glue strip,

the conduit glue strip being made out of at least one conduit glue bag comprising at least one conduit element and a bag filled with glue fluid which extends over the exterior surface of said at least one conduit, the bag having a zip cord along it and being built in such a manner that after pulling the zip cord, the glue fluid pours out of the bag.
comprising the following steps:

- introducing the conduit glue strip into the sewer pipe;
- degrading the protection foil and activating the glue function of the glue layer by injecting hot water along the conduit strip canals;
- pressing the conduit glue strip against the inner wall of the sewer pipe;
- blowing or pulling micro optical fiber cable into the canals.

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