

SPECIFICATION

A Device for use in Connecting a Secondary Structure With a Wall to be Poured with Concrete

5 The invention relates to a device for use in connecting a secondary structure, such as a partition, a staircase or a false floor, with a structure to be poured with concrete in shuttering, the device comprising at least one
10 profile element having two side walls and at least one bottom wall, at least one steel anchoring rod extending through said bottom wall in such a way that a first rod portion which is to be concreted lies outside of said profile element and a second
15 rod portion, which is bent substantially at right angles to the first portion, lies inside said profile element resting against the bottom wall thereof and confined by said side walls, said profile element being engageable with the inside surface
20 of shuttering with its side walls resting on the shuttering so as to define a cavity between its said bottom wall and the shuttering.

In order to bond for instance a partition, a staircase, a false floor or a balcony to a concrete
25 structure a pointed connection groove has to be cut, e.g. chiselled, in the structure. Such an operation is difficult, time-consuming and expensive.

One attempt to solve this problem of the
30 building industry is described in Swiss Patent Specification No. 562376. This discloses reinforcement members bent into a U-form, the two arms of which are further bent at right angles, and placed with their bent arms lowermost in a
35 channel-shaped pan of trapezoidal cross-section into which a liquid foam material is poured. The bent arms of the reinforcement members are embedded in the solidified foam material, whereas the U-shaped loops with their legs
40 project from the material. The loop projecting from the wider one of the two parallel faces of the foam material trapezoidal-section body is intended to be embedded in the wall to be concreted. The arms which are embedded in the
45 foam material body along the narrower one of the two parallel faces are intended to be bent outward.

Before the wall is concreted, such a device is fitted to the shuttering; thereafter the wall is
50 poured with concrete. the U-shaped loops then remain firmly anchored in the completed wall, whereas the foam material body is exposed in the outer face of the wall. The foam material body has then to be scraped out to provide a groove. It is
55 known from experience that the scraping out of the foam material body takes approximately 15 to 20 minutes in order to free the arms of the reinforcement members, if the wall has a height of 240 cm and the foam material body has a
60 thickness of 20 cm. Such an operation is thus time-consuming and therefore also expensive.

A French Patent Specification No. 2142140 describes a device for connecting a part with a structure to be poured with concrete, such device

65 comprising a hard profile element made of steel sheet having a bottom wall and two side walls. Steel anchoring rods extend through the bottom wall of the profile element in such a way that one rod portion, which is intended to be concreted,
70 lies on one side of the element and forms a U-shaped loop, whereas the other rod portion is bent at right angles relative to the first portion and lies on the other side of the element where it rests against the bottom wall. The profile element is
75 intended to be fitted with its open side against the shuttering so that a cavity is formed between the shuttering and the bottom wall of the element.

After the concrete poured into the shuttering has set, the shuttering is removed. Then the
80 portions of the steel anchoring rods resting against the inside of the bottom wall are straightened, whereafter the profile element is removed from the concrete to be used again. In order to facilitate the removal of the element from
85 the concrete, each of its side walls encloses an obtuse angle with the bottom wall.

The removal of such a profile element made of steel sheet from the set concrete is, however,
90 difficult and time-consuming. Apart from this, the groove thus formed in the face of the concrete structure provides no suitable adhesion surface for the part to be bonded to the structure by pouring concrete, because the side walls of the
95 groove enclose an obtuse angle with its bottom wall.

It is the object of the present invention to remove or reduce the above described
100 disadvantages of the known methods and devices for use in providing a connection on a structure to be poured with concrete. A device is to be provided by means of which such a connection can be quickly prepared, and whereby the connection location provided by such a device has
105 a better adhesion ability than the connections provided by known devices. Furthermore, such a device should be easily transportable.

Thus according to the invention the profile element is formed of malleable metal sheet
110 material or plastics material the surface of which is roughened, and the side walls each enclose an acute angle with the bottom wall.

The profile element preferably comprises a perforated, punched, pressed or ribbed malleable metal or plastics sheet.

115 Some embodiments of the invention will now be described by way of example and with reference to the accompanying drawings, in which:—

120 Figure 1 is a perspective view of an embodiment of a profile element with steel anchoring rods which are formed on one side of the profile element as a U-shaped loop portion and on the other side of the profile element as end portions bent at right angles to the legs of the
125 loop;

Figure 2 is a bottom view of the profile element of Figure 1;

Figure 3 is a horizontal sectional view of a

profile element of Figure 1 embedded in a concrete main wall and engaging shuttering;

Figures 4 and 5 are horizontal sections of a main wall to which a partition is bonded by means of a profile element of Figure 1; and

Figure 6 is a transverse section of two other embodiments of a profile element according to the invention, shown embedded in a concrete main wall and engaging shuttering.

The profile element 4 shown in the drawings consists of a malleable metal or plastics sheet (preferably a malleable steel sheet) which is perforated, corrugated, punched, pressed or ribbed in order to roughen its surface. The roughened surface provides good adhesion between two concrete castings when the profile element 4 is embedded in the concrete of a main wall 1, as will be further explained. The profile element 4, the trapezoidal cross-section of which is shown in the drawings, comprises two side walls 7 formed with laterally projecting flanges and two coplanar bottom walls 6, which bottom walls are connected by means of a strengthening rib 5 having the form of V in cross-section. The strengthening rib 5 can be shaped as required; it is intended to take the pressure exerted by the concrete on the embedded profile element 4. The side walls 7 each enclose an acute angle of approximately 60° with the bottom walls 6; owing to this there is provided a good connection place for a structure to be bonded to the completed main wall. As can be seen from Figure 6 there can be provided only one profile element or a number of them. The profile element 4 can have a meander, a zig-zag or a wave-like cross-section, and combinations of these forms are not to be excluded.

Steel anchoring rods 3 extend through openings 10 punched in the bottom walls 6 of the profile element 4. On the outside of the profile element the rods 3 form U-shaped loop portions 3a, whereas the end portions 3b of the rods are bent substantially at right angles at a predetermined distance from these loop portions and rest against the bottom walls 6, thus confined between the side walls 7, on the inside of the profile element 4. The U-shaped loop portions 3a are intended to be embedded in the main wall 1 to be concreted. After the concrete has been poured and has set the end portions 3b of the rods 3 will be bent outward through a right angle so that they are then colinear with the legs of the U-shaped loop portions locked in the concrete. The steel anchoring rods need not, however, be formed with U-shaped loop portions. The loop portions can have the form of Omega, or there can be provided hooks instead of loops or only straight end portions, as required. A single anchoring rod must be always provided with a loop portion.

The process of preparation of the main wall 1 by pouring concrete is as follows:

First the profile element 4 with the anchoring rods 3 extending therethrough is secured to the inside face of shuttering 2 so that a cavity is

formed between the profile element 4 and the shuttering 2. Such a cavity is defined by the bottom walls 6 and the side walls 7 of the profile element 4 and the shuttering 2, the side walls 7 resting against the inside face of the shuttering. Then concrete is poured into the shuttering 2 outside of the said cavity. The U-shaped loop portions 3a of the anchoring rods 3 with their respective legs are locked in the concrete of the main wall 1. After the shuttering 2 has been removed there will remain a groove in the outer face of the concrete main wall 1, defined by the embedded profile element 4. The free end portions 3b of the anchoring rods 3 are then bent outward through a right angle from the groove, without difficulty. A partition 9, 9a or another structure which has to be bonded to the main wall 1 is then concreted.

As the width of the profile element 4 is smaller than the thickness of the partition 9, 9a, there is formed a clean groove as connection place between the partition 9, 9a and the main wall 1.

In order to allow a quick mounting of the profile element 4 before concrete is poured, fixing pins 8 are inserted through the bottom walls 6 and driven into the shuttering 2.

The form of the steel anchoring rods (U-shaped or Omega-shaped loops or hooks or straight end portions) can be specified by the civil engineer in advance, so that these types of anchoring rods and the profile element can be prefabricated in time.

For transport purposes the end portions 3b of the anchoring rods 3 will be spot welded so that they are held on each other without movement, or a plastics foil can be stretched over the side walls 7.

Thus the aforementioned scraping out of the foam material body from the connection groove in a main wall is eliminated. The manufacturing costs of the profile element made of metal or plastic are not higher than the manufacturing costs of the foam material body. The end portions of the steel anchoring rods can be bent outward from the groove in the outer face of the completed main wall quickly and without problems. There remain no plastic remnants in the corners of the dovetail groove formed by removal of the foam material body, as is the case with the above described prior art, which rendered the bonding of the joining wall to the main structure difficult.

Because the profile element is locked in the concrete of the structure and is not removed from the same, the difficult and time-consuming operation of removing of the profile element from the concrete structure is avoided. The groove formed in the outer face of the completed concrete structure has a better adhesion ability for another structure to be bonded to the main structure by pouring concrete. By means of foil stretched over the side walls of the profile element the concrete being poured can be prevented from entering the cavity between the shuttering and the bottom wall of the profile

element. In this case the profile element can be fitted to the shuttering without having been fixed thereto by means of pins.

Claims

- 5 1. A device for use in connecting a secondary structure, such as a partition, a staircase or a false floor, with a structure to be poured with concrete in shuttering, the device comprising at least one profile element having two side walls and at least
- 10 one bottom wall, at least one steel anchoring rod extending through said bottom wall in such a way that a first rod portion which is to be concreted lies outside of said profile element and a second rod portion, which is bent substantially at right
- 15 angles to the first portion, lies inside said profile element resting against the bottom wall thereof and confined by said side walls, said profile element being engageable with the inside surface of shuttering, with its side walls resting on
- 20 the shuttering so as to define a cavity between its said bottom wall and the shuttering, the profile element being formed of malleable metal sheet material or plastics material the surface of which

- 25 is roughened, and the said side walls each enclosing an acute angle with the bottom wall.

2. A device according to claim 1, wherein the profile element consists of a perforated, punched, pressed or ribbed malleable steel or plastics sheet.

- 30 3. A device according to claim 1 or 2, wherein the profile element is provided with at least one strengthening rib.

- 35 4. A device according to any of claims 1 to 3, wherein the profile element has a meander, zig-zag or wave-like transverse cross-section.

- 40 5. A device according to any of the preceding claims, wherein a foil is stretched over both the side walls of the profile element so that a closed cavity is formed between the bottom wall of the profile element and said foil.

6. A device as claimed in any preceding claim, wherein the side walls of the profile element are formed with laterally projecting flanges.

- 45 7. A device as claimed in claim 1, substantially as hereinbefore described with reference to Figures 1 to 5 or Figure 6 of the accompanying drawings.



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- 20 the shuttering so as to define a cavity between its said bottom wall and the shuttering, the profile element being formed of malleable metal sheet material or plastics material the surface of which

is roughened, and the said side walls each enclosing an acute angle with the bottom wall.

25 2. A device according to claim 1, wherein the profile element consists of a perforated, punched, pressed or ribbed malleable steel or plastics sheet.

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4. A device according to any of claims 1 to 3, wherein the profile element has a meander, zig-zag or wave-like transverse cross-section.

35 5. A device according to any of the preceding claims, wherein a foil is stretched over both the side walls of the profile element so that a closed cavity is formed between the bottom wall of the profile element and said foil.

40 6. A device as claimed in any preceding claim, wherein the side walls of the profile element are formed with laterally projecting flanges.

45 7. A device as claimed in claim 1, substantially as hereinbefore described with reference to Figures 1 to 5 or Figure 6 of the accompanying drawings.