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**(54) A METHOD IN CONNECTION WITH FORMWORK/CASTING.**

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## A method in connection with formwork/casting

In connection with formwork for use in the production of concrete walls by relatively large sheet-like forms, ties are used to maintain the required spacing of those forms. To prevent significant adhesion between the poured concrete and said ties, the ties are protected by plastics tubes or bushing which may have a circular or a rectangular shape.

When the poured concrete mix has set, the forms are removed and said ties are pulled out of their protective plastics tubes, which latter are, however, left in the concrete. The holes thus defined by said plastics tubes are grouted from both sides of the concrete wall with a suitable cement grout, which is quite a time-consuming operation since there will usually be a considerable number of ties. Also, it is often difficult to fill the holes completely, which may *inter alia* result in unwanted sound transmission. With some steel forms, steel cones are used, instead of plastics tubes, for tie protection. When the poured concrete mix has set, said cones are knocked out of the wall and the remaining holes are filled with concrete grout or concrete cones. United States Patent Specification No. 3648961 describes the employment of re-usable steeply conical ties followed by the plugging of the holes through the wall with a quick drying mortar which, however, often does not completely fill the holes so that sound transmission paths remain. Swedish Patent Specification No. 326548 describes a similar system employing conical spacing elements. The above mentioned methods are either too expensive or not satisfactory.

An improved method has now been developed by which the disadvantages of the known methods are avoided or very considerably reduced and which improved method is considerably less expensive and more labour and time saving than the known methods. The improved method results in walls that fully satisfy the requirements as regards sound transmission therethrough. According to the invention there is provided a method of using formwork in the production of concrete walls which method comprises connecting forms together in a predetermined spaced relationship by ties each of which is protected by a plastics cone having a bore therethrough to receive the corresponding tie, removing the ties and plastics cones after the setting of the concrete and sealing the holes left by such removal, characterised in that each such hole is sealed by introducing therein a pre-cast cone of light-weight concrete, provided with an adhesive, said cone substantially exactly fitting the hole which it is to seal.

By using a suitable plastics material for the cones it is possible to obtain cones that are easily extracted from the set concrete, that are sufficiently soft not to destroy the forms, as

occurs when using steel cones with plywood formwork, and at the same time strong enough to withstand the stresses to which they are subjected during casting.

Instead of using concrete cones for the hole seals, pre-cast cones of light-weight aeroconcrete are used. Aeroconcrete is a semi-liquid, foaming cement mix requiring watertight moulds in which to set.

For the production of said concrete cone seals, a non-cracking aeroconcrete mix is used with watertight insulating moulds.

For the water-tight and heat insulating moulds for said aeroconcrete, expanded plastics moulds are used. Due to the excellent insulating properties of expanded plastics, the temperature is easily controlled during setting, which results in a more uniform quality of the set and finished sealing cones. A preferred embodiment of the mould may comprise an expanded plastics block having a number of holes of the desired diameter and shape for the cone seals drilled out or otherwise prepared, so as to enable moulding or several sealing cones in one block. Such an expanded plastics block being comparatively inexpensive, it may also serve as a transport packing for the set sealing cones. Another advantage of making said light-weight concrete sealing cones in a mould as mentioned is that the required axial length of the finished cones is easily obtained by cutting or sawing the entire combination of set or substantially set sealing cones and their mould to correct size. Since said sealing cones lie partly restricted in their mould, a large number of cones may be cut or sawed through to the desired axial length in a single operation. In this manner it is possible to produce cones having axial lengths that exactly match the concrete wall thickness. According to the improved method, the plastics cones having longitudinal bores are inserted into the forms before concrete pouring and the ties are run through said cones and are secured to the spaced forms in a manner known *per se*. After setting of the concrete, said forms and ties are removed and said plastics cones are knocked out axially with the aid of a suitable tool. Light-weight pre-cast aeroconcrete cones of matching axial length are provided with a suitable glue and are inserted into the holes from which the plastics cones have been removed. Aeroconcrete being relatively soft, the sealing cones can additionally be secured in place by nails, be cut to size or otherwise be prepared, ensuring that each sealing cone will substantially exactly fit the conical hole which it is to seal.

#### Claims

1. A method of using formwork in the production of concrete walls which method com-

prises connecting forms together in a pre-determined spaced relationship by ties each of which is protected by a plastics cone having a bore therethrough to receive the corresponding tie, removing the ties and plastics cones after the setting of the concrete and sealing the holes left by such removal, characterised in that each such hole is sealed by introducing therein a pre-cast cone of light weight concrete, provided with an adhesive, said cone substantially exactly fitting the hole which it is to seal.

2. A method according to Claim 1, characterised in that a plurality of the light-weight concrete cones are pre-cast in an expanded plastics mould having a number of elongate casting cavities whose sizes and shapes substantially match those of said plastics cones.

3. A method according to Claim 2, characterised in that, when required, the pre-cast light-weight concrete cones are reduced in axial length by cutting them perpendicularly to their longitudinal axes whilst still contained in the casting cavities of said expanded plastics mould.

#### Revendications

1. Procédé d'utilisation de coffrages dans la production de parois en béton, procédé consistant à relier les coffrages les uns aux autres en une relation espacée prédéterminée par des tirants dont chacun est protégé par un cône en plastique muni d'un évidement traversant pour recevoir le tirant correspondant, à retirer les tirants et les cônes en plastique après durcissement du béton et à boucher les trous laissés par cet enlèvement, caractérisé par le fait que chaque trou est bouché en y introduisant un cône prémoulé de béton léger, muni d'un adhésif, ledit cône s'adaptant pratiquement exactement au trou qu'il est destiné à boucher.

2. Procédé selon la revendication 1, caractérisé par le fait qu'une pluralité de cônes en béton léger sont prémoulés dans un moule en matière plastique expansée possédant un certain nombre de cavités allongées de moulage

dont les formes et les dimensions correspondent sensiblement à celles desdits cônes en plastique.

3. Procédé selon la revendication 2, caractérisé par le fait que, lorsque cela est requis, les cônes en béton léger prémoulés sont réduits dans leur longueur axiale en les coupant perpendiculairement à leurs axes longitudinaux alors qu'ils sont encore contenus dans les cavités de moulage dudit moule en matière plastique expansée.

#### Patentansprüche

1. Verfahren zum Herstellen von Betonwänden unter Verwendung einer Schalung, wobei Schalungsteile in einem vorbestimmten Abstand voneinander durch Zugstäbe miteinander verbunden werden, von welchen jeder mittels einer durchgehenden Bohrung zur Aufnahme der entsprechenden Zugstange aufweisenden Kunststoffkonus geschützt ist, und wobei nach dem Abbinden des Betones die Zugstangen und die Kunststoffkonus entfernt und die hiebei verbleibenden Löcher verschlossen werden, dadurch gekennzeichnet, daß jedes solches Loch durch Einführen eines aus Leichtgewichtbeton vorgegossen und mit einem Klebstoff versehenen Konus verschlossen wird, welcher im wesentlichen genau in das hiemit zu verschließende Loch paßt.

2. Verfahren nach Anspruch 1, dadurch gekennzeichnet, daß mehrere Konus aus Leichtgewichtbeton in einer Schaumstoffform vorgegossen werden, welche eine Anzahl von Formhöhlräumen aufweist, deren Abmessungen und deren Gestalt im wesentlichen den Abmessungen und der Gestalt der Kunststoffkonus entsprechen.

3. Verfahren nach Anspruch 2, dadurch gekennzeichnet, daß die axiale Länge der vorgegossenen Konus aus Leichtgewichtbeton erforderlichenfalls verkürzt wird, indem die Konus noch in den Formhöhlräumen der Schaumstoffform senkrecht zu ihren Längsachsen durchgeschnitten werden.

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