VOID FORMER

The present invention relates to a void former and more particularly to a void former for use with a cast-in lifting anchor for a concrete component.

Cast-in lifting anchors for concrete components such as panels or beams are installed together with the reinforcement prior to casting of the concrete. The anchor has a head designed for co-operation with the lifting equipment. The anchor head carries a removable void former which, when the concrete is cast, forms a recess within an outer surface of the concrete component around the head, so that when the void former is removed the lifting equipment can engage the head within the recess.

One current form of lifting anchor marketed under the trade mark SWIFTLIFT by the Reid Construction Systems division of the present applicants has a lifting head of pin head shape. One existing form of void former for use with such an anchor is of moulded plastics in two parts which lock onto the head. This particular form of void former is designed for single usage only as its removal from the head when the concrete has set results in destruction of the void former. In order to remove the void former it is necessary firstly to chip concrete away from the upper face of the void former to expose the void former and that may result in chipping away concrete on the adjacent part of the upper face of the component thereby requiring some remedial filling at a later stage. The void former is then prised away from the anchor head typically by means of a tool, usually a screwdriver, forced through the top of the void former. This usually requires a significant amount of force to be applied particularly when the void former is seated within a support chair by which it was securely held during casting.

The existing void former is not designed in such a way as to enable its removal in a predetermined methodical manner and what happens in practice is that the screwdriver or other tool is forced into the void former in an arbitrary position and the force required to remove the void former and its ease of removal will depend on where the screwdriver happens to penetrate the void former and the manipulation applied by the operator at that time.

CONFIRMATION COPY

According to the present invention there is provided a void former for application to the head of a cast-in lifting anchor for a cast concrete component, the void former comprising two body parts engageable to the head of the anchor to enclose the head, means defining at least one predetermined zone in an upper face of the void former for insertion of a removal tool into the interior of the void former, and means defining a predetermined zone within the interior for engagement of an end of the tool whereby the tool can be used to prise the void former from the head following casting.

Further according to the present invention there is provided a void former for application to the head of a cast-in lifting anchor for a cast concrete component, the void former comprising two body parts engageable to the head of the anchor to enclose the head, means defining a predetermined zone in an upper face of each body part for insertion of a removal tool into the interior of the void former, and means defining a predetermined zone within the interior for engagement of an end of the tool whereby the tool can be used to prise the body part away from the head and out of the void following casting.

In a preferred embodiment, the tool is a screwdriver or the like and the predetermined zone of insertion and the predetermined zone for engagement of the end of the tool are so positioned that with the screwdriver inserted into the body part, the shank of the tool abuts an edge of the anchor head which provides a fulcrum point for the tool during the removal action. Advantageously, the predetermined zone of insertion is defined by a portion of an upper wall of reduced thickness and which can be penetrated by insertion of the end of the tool.

Advantageously, the predetermined zone of engagement for the end of the tool is defined by a portion of increased wall thickness on an inner surface of the body part, and the interior of the body part includes webs for guiding the end of the screwdriver towards that portion.

Advantageously, the two parts forming the void former are substantially identical.

In a preferred form, the void former is clipped directly to a support chair by which the void former with the anchor depending from the void former is supported from a casting base. For this purpose, each body part includes on its outer surface an integrally moulded clip for engagement with a part of the chair, the design of the clip being such that upon application of force by the tool to remove the body part the clip will be broken or destroyed to facilitate easy release of the clipping action. This effect can be achieved by moulding a part of the clip in a reduced thickness with the part being so shaped that it will withstand downwards movement of the void former into the chair when initially mounting the void former to the chair and will be destroyed upon subsequent upwards movement of the body part relative to the chair by application of removal forces using the removal tool.

Advantageously, the void former has an upstanding lip around its upper face to define a shallow cavity which will fill with concrete during casting and which can be easily removed when the concrete has set.

It is to be understood that the clipping system defined above and/or the incorporation of the lip to define the shallow cavity at the upper side of the void former also have utility in other types of void former.

Accordingly, a yet further aspect of the present invention provides a void former for application to the head of a cast-in lifting anchor for a concrete component, the void former having clips for clipping directly to a support chair by which the void former and anchor is supported from a casting base, the clips being such that upon application of force by a tool to remove the void former after casting, the clips will be broken or destroyed to facilitate release of the void former from the support chair.

According to a yet further aspect of the invention there is provided a void former for application to the head of a cast-in lifting anchor for a cast concrete component, the void former having an upstanding lip around its upper face to define a shallow cavity which will fill with concrete during casting and which can easily be removed when the concrete has set.

Embodiments of the invention will now be described by way of example in which:

Figure 1 is a perspective view showing a void former in accordance with a preferred embodiment of the invention assembled to a lifting anchor and mounted to a support chair;

Figure 2 is a plan view corresponding to Figure 1;

Figure 3 is a end view corresponding to Figure 1;

Figure 4 is a side view corresponding to Figure 1;

Figure 5 is a schematic cross-section showing the void former engaged with the head of the anchor;

Figure 6 is a plan view of one body part of the void former;

Figure 7 is an end view of the body part;

Figure 8 is a perspective view of the body part;

Figure 9 is a section on line B-B of Figure 7;

Figure 10 is a view showing the interior structure of the body part;

Figure 11 is a view similar to Figure 10 but to an enlarged scale; and

Figures 12 to 14 show schematically successive stages in the action of the screwdriver to remove the body part from the anchor head and chair.

A void former in accordance with a preferred embodiment of the invention consists of two identical parts 2 of moulded plastics assembled together to fit around the head 4a of a lifting anchor 4. The body of the void former formed by the two parts 2 is generally of hemispherical shape but with opposed sides of the body being flattened. The two parts are assembled together at a vertical plane which bisects those flattened sides. The void former has an upstanding lip 6 around its upper face to define a shallow cavity which will fill with concrete during casting and which can be easily removed when the concrete has set, without chipping the concrete immediately surrounding the top of the void former.

The body part 2 of the void former and its internal structure is shown in detail in Figures 6 to 11. The anchor head 4a fits into a cavity 10 of corresponding cross-section formed between internal walls 12.

The anchor with attached void former will normally be used with conjunction with a support chair 14 formed from metal bar onto which the void former clips at the head of the chair so that the anchor 4 is suspended from the void former in the manner shown in Figures 1 to 5. The void former is fastened to the head of the chair 14 by being clipped to the head when the void former is pushed downwardly onto the head.

After setting of the concrete following casting, removal of each body part 2 of the void former from the anchor head 4a and from the chair 14 to which it is clipped is effected by the penetration of a tool, preferably a screwdriver, through a predetermined entry zone 16 within the central part of the upper wall of the body part. This entry zone is clearly marked on the upper face of the wall and may be defined by a depression of appropriate shape, the wall thickness being reduced within the depression so that it can easily be broken by the blade of the screwdriver. Figure 12 shows schematically the screwdriver 18 when it has first penetrated the entry zone 16. The screwdriver 18 is then pushed into the interior of the body part 2 with its shaft obliquely inclined as shown in Figure 13 so that the screwdriver blade will engage the inner surface of the end wall of the body part in a predetermined zone. The body part is provided internally with parallel webs 20 (see Figure 11) aligned with the entry zone 16 so that when the screwdriver blade is forced through the entry zone into the interior of the body part it will lie between the webs 20 to ensure that the blade will be guided into the engagement zone 22 which lies between the webs 20 at the inner surface of the body part and defined by wall portions of increased thickness to provide a strong bearing surface for the end of the screwdriver blade. In the embodiment shown the engagement zone 22 is of a ribbed construction which provides the increased wall thickness to carry the engagement force without the need to use significant amounts of plastic material.

It will be seen from Figures 12 and 13 that the entry zone 16 is positioned slightly inwardly from the edge of the anchor head 4a so that when the screwdriver is directed obliquely with its blade contacting the engagement zone 22, the shaft of the screwdriver can engage the edge of the anchor head which will act as a fulcrum so that when the handle of the screwdriver is pushed downwardly, the screwdriver will pivot about that fulcrum so that its blade will push upwardly against the engagement zone

and swing the body part 2 upwardly so as to disengage it from the head of the chair and commence its removal from the anchor head. To facilitate this swinging movement, each of the two flattened sides of the body part 2 is formed with an outwardly projecting arcuate segment 26 which rests on an upper bar of the head of the chair as shown in Figure 4 to provide pivot points about which the body part can swing during the initial part of the release movement.

While it is necessary that the clipping system retains each body part 2 of the void former firmly to the head of the chair to prevent its dislodgement prior to and during casting, it is necessary that when the deliberate force is applied to the body part 2 to remove it in the manner just described, the clipping system will not unduly impede that process. For this purpose the clipping system is formed by a single moulded clip 30 in the centre of the end wall of the body part 2. The clip, which is moulded integrally with the end wall, is shaped to engage a bar 14a of the head of the chair with a snap action when the void former with engaged anchor 4 is pushed downwardly into the chair 14. It will be seen from Figure 9 that the lower face 30a of the clip 30 is curved to permit its easy movement over the bar 14a of the chair so that the bar will seat into a part circular recess of corresponding section defined between upper and lower parts of the clip. It will also be observed that the lower part of the clip is of reduced wall thickness relative to that of the outer wall of the body part. As a result of this reduced wall thickness, when force is applied to remove the body part upwardly in the manner described, that force will act to push the lower reduced wall thickness part of the clip into tight engagement with the bar 14a which will then cause collapse of and thereby destruction of, the lower clip part due to its reduced wall thickness to thereby enable the body part to easily release upwardly from the chair bar 14a. It is to be noted that as the under surface of the lower clip part is only gently curved, the initial engagement of the clip with the bar 14a during assembly will not cause destruction of the clip.

After release of the first body part from the anchor head and chair in the manner described, the second body part is released in the same way.

Although the void former of the preferred embodiment illustrated herein is designed for

use with an anchor head of pin head design, the invention is not confined to use with that specific type of anchor head and void formers embodying the principles of the invention can be designed for use with anchor heads of other type with appropriate modification to the internal structure of the body parts of the void former to suit the anchor head.

The embodiment has been described by way of example only and modifications are possible within the scope of the invention.

Throughout this specification and claims which follow, unless the context requires otherwise, the word "comprise", and variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated integer or group of integers or steps but not the exclusion of any other integer or group of integers.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A void former for application to the head of a cast-in lifting anchor for a cast concrete component, the void former comprising two body parts engageable to the head of the anchor to enclose the head, means defining at least one predetermined zone in an upper wall of the void former for insertion of a removal tool into the interior of the void former, and means defining a predetermined zone within the interior for engagement of an end of the tool whereby the tool can be used to prise the void former from the head following casting.

2. A void former according to claim 1, wherein an upper wall of each body part includes a respective said predetermined zone for insertion of a removal tool into the interior of the void former, and each body part includes an associated said zone within the interior for engagement of an end of the tool whereby the tool can be used to prise the associated body part away from the head and out of the void following casting.

3. A void former according to claim 1 or claim 2, wherein the tool is a screwdriver or the like and the predetermined zone of insertion and the predetermined zone for engagement of the end of the tool are so positioned that with the screwdriver inserted, the shank of the tool abuts an edge of the anchor head which provides a fulcrum point for the tool during the removal action.

4. A void former according to any one of claims 1 to 3, wherein the predetermined zone for insertion of the tool is defined by a wall portion of reduced thickness and which can be penetrated by the end of the tool.

5. A void former according to any one of claims 1 to 4, wherein the predetermined zone for engagement of the tool for the end of the tool is defined by a portion of increased wall thickness on an inner surface of the body part, and the interior of the body part includes webs for guiding the end of the screwdriver towards that portion.

6. A void former according to any one of claims 1 to 5, wherein the two parts forming the void former are substantially identical.

7. A void former according to any one of claims 1 to 6, wherein each body part includes on its outer surface an integrally moulded clip for engagement with a part of a chair by which the void former with lifting anchor depending therefrom can be supported from a casting base, the clip being such that upon application of force by the tool to remove the body part the clip will be broken or destroyed to facilitate easy release of the clipping action.

8. A void former according to claim 7, in combination with a said chair for supporting the void former and anchor from a casting base.

9. A void former according to any one of claims 1 to 8 having an upstanding lip around its upper wall to define a shallow cavity which will fill with concrete during casting and which can be easily removed when the concrete has set.

10. A void former for application to the head of a cast-in lifting anchor for a concrete component, the void former having clips for clipping directly to a support chair by which the void former and anchor is supported from a casting base, the clips being such that upon application of force by a tool to remove the void former after casting, the clips will be broken or destroyed to facilitate release of the void former from the support chair.

11. A void former for application to the head of a cast-in lifting anchor for a cast concrete component, the void former having an upstanding lip around its upper face to define a shallow cavity which will fill with concrete during casting and which can easily be removed when the concrete has set.

12. A void former substantially as hereinbefore described with reference to the accompanying drawings.