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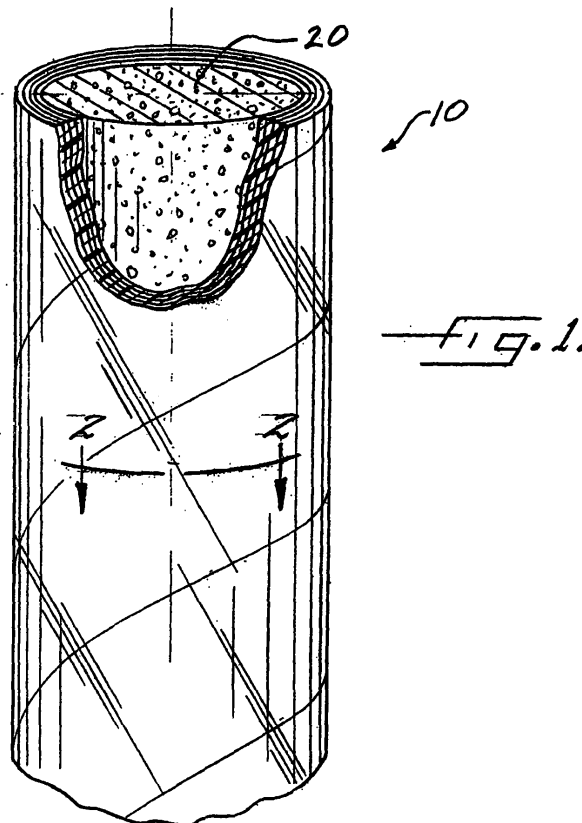
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(54) Transparent construction form

(57) A wound construction form (10) comprising a plurality of flexible sheet material layers wound one upon another about an axis and bonded together to form a tube, wherein all of the flexible sheet material layers comprise transparent polymer film. The tube thus is transpar-

ent such that a settable composition (20) poured into the tube can be seen through the tube wall. If an air bubble is present adjacent the wall, it can be eliminated while the composition is still fluid by puncturing the wall with a small hole at the bubble so that the air can escape and the composition can fill the void.



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Description

BACKGROUND OF THE INVENTION

[0001] The present invention relates to wound tubes, and more particularly to wound tubular construction forms for poured concrete columns and the like.

[0002] Tubular construction forms heretofore have been formed as spirally wound paperboard tubes. When concrete is poured into the form, air bubbles can be present in the concrete, which is undesirable from an aesthetic standpoint when the bubbles are on the outer surface of the resulting column. However, until the concrete has set and the form is removed, there is no way to know if air bubbles are present. It is known to insert a vibrating needle into the wet concrete to vibrate the concrete, which can help in eliminating air bubbles. The vibrating needle cannot be used very near the tubular form, however, because the vibrations can damage the form. Thus, even when the needle is used, air bubbles can be present adjacent the form. The air bubbles are manifested as recesses on the outer surface of the column when the form is removed. If a bubble is large, the resulting recess can compromise the column strength. Small bubbles may not affect strength to any significant extent, but do mar the appearance of the column. The recesses can be filled by hand, but the repairs remain visible unless the column is subsequently painted.

BRIEF SUMMARY OF THE INVENTION

[0003] The present invention addresses the above needs and achieves other advantages, by providing a wound construction form comprising a plurality of flexible sheet material layers wound one upon another about an axis and bonded together to form a tube, wherein all of the flexible sheet material layers comprise transparent polymer film. The tube thus is transparent such that a settable composition poured into the tube can be seen through the tube wall. If an air bubble is present adjacent the wall, it can be eliminated while the composition is still fluid. For instance, the wall of the tube can be punctured with a small hole at the bubble so that the air can escape and the composition can fill the void. The small hole will not compromise the strength of the form and will tend to be closed by the composition after the air escapes.

[0004] The flexible sheet material layers can be formed of various polymer compositions, including but not limited to polyethylene, polypropylene, polyvinyl chloride, and the like. The layers can be bonded together either by a transparent adhesive, or by at least partially melting the layers and fusing them together (e.g., by thermal welding/heat sealing). The transparent adhesive can comprise any of various known transparent adhesives capable of adhering well to the particular polymer film composition used to form the tube.

[0005] The transparent construction form can comprise various numbers of flexible sheet material layers,

from two to 20 or more, depending on the thickness of the layers and the strength requirements in each case. The wall thickness of the tube can range from about 0.02 inch to about 0.10 inch. The inside diameter of the tube can range from about 12 inches to about 36 inches. However, the invention is not limited to any particular number of layers, wall thickness, or diameter.

[0006] A coating or layer of release material can be provided on the inner surface of the form to facilitate removal of the form from the column after setting of the settable composition.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S)

[0007] Having thus described the invention in general terms, reference will now be made to the accompanying drawings, which are not necessarily drawn to scale, and wherein:

FIG. 1 is a perspective view of a construction form in accordance with one embodiment of the invention, shown filled with a settable composition; and

FIG. 2 is a cross-sectional view along line 2-2 in FIG. 1, illustrating how an air bubble is eliminated in accordance with the invention.

DETAILED DESCRIPTION OF THE INVENTION

[0008] The present inventions now will be described more fully hereinafter with reference to the accompanying drawings, in which some but not all embodiments of the inventions are shown. Indeed, these inventions may be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will satisfy applicable legal requirements. Like numbers refer to like elements throughout.

[0009] A transparent construction form 10 in accordance with one embodiment of the invention is shown in FIGS. 1 and 2. The form comprises a plurality of flexible sheet material layers 12, 14, 16, 18 wound one upon another about an axis and bonded together so as to form a tube having a wall encircling the axis. In accordance with the invention, all of the flexible sheet material layers comprise transparent polymer film. The layers are bonded together in a suitable fashion that does not impair the transparency of the tube wall. For instance, the layers can be adhesively joined by a transparent adhesive. Alternatively, the layers, when formed of a thermally weldable material, could be thermally welded by heat-sealing or the like.

[0010] In the illustrated embodiment, there are four transparent film layers 12, 14, 16, 18, but transparent construction forms in accordance with the invention can have from two to 20 layers, or from two to 15 layers, or from two to 10 layers. Furthermore, the illustrated form 10 is

constructed by spirally winding discrete polymer film plies 12,14,16,18 one upon another, but it is also possible to convolutely wind a single sheet of film for a plurality of turns to build up the desired number of layers.

[0011] The transparent film material can comprise various polymer compositions, including polyethylene, polypropylene, polyvinyl chloride, and the like. Each of the film layers can have a thickness ranging from about 0.076 mm (0.003 inch) to about 0.635 mm (0.025 inch), and more preferably about 0.254 mm (0.010 inch) to about 0.381 mm (0.015 inch).

[0012] Polyvinyl chloride film layers advantageously can be adhered together with acetone and maintain sufficient transparency for the purposes of the present invention.

[0013] Other transparent adhesives that can be used include MEK (methyl ethyl ketone), and cyano-acrylates.

[0014] Transparent construction cores in accordance with the invention can have various dimensions. The inside diameter can range from about 0.15 m (6 inches) up to about 1.07 m (42 inches), more preferably about 0.3 m (12 inches) up to about 0.91 m (36 inches). The wall thickness can vary from about 0.6 mm (0.024 inch) up to about 5 mm (0.2 inch), or more preferably up to about 2.5 mm (0.1 inch). Forms of smaller diameter can have a smaller wall thickness, while larger-diameter forms generally require a larger wall thickness.

[0015] An example of a suitable polyvinyl chloride film useful in the practice of the invention is PENTAPRINT BX M 280/80 film from Klöckner Pentaplast of America, Inc., of Gordonsville, VA 22942. This film has a specific gravity of 1.33, a tensile yield strength of 6600 psi, and a minimum elongation at break of 180%. It is available in thicknesses from 3 to 25 mils.

[0016] The transparency of the construction form 10 enables a settable composition 20 poured into the form to be seen through the wall of the form. Therefore, if an air bubble 22 is present in the composition at the inner surface of the form, it can be seen and remedied before the composition sets. With reference to FIG. 2, the air bubble can be eliminated by puncturing a small hole in the wall of the form at the location of the bubble, using a suitable tool 24. The tool can be a hollow tube or needle through which the air in the bubble can be extracted. Alternatively, the tool can be withdrawn from the hole and the air can escape through the hole until the settable composition flows to fill in the space previously occupied by the air. The composition will tend to plug up the hole once all the air has escaped.

[0017] The construction form 10 optionally can include a coating of a release material 26 on the inner surface of the tubular wall that is contacted by the settable composition. The release material facilitates release of the construction form from the composition after it has set. Various release materials can be used, such as silicone-based compounds or the like.

[0018] From the foregoing description, it will be understood that the transparent construction form has distinct

advantages over prior-art fiber construction forms. In addition to allowing air bubbles to be identified and eliminated, the transparent construction form also is water-resistant. The form thus can be exposed to water without being substantially affected. Furthermore, the form can have a thin wall and therefore can be flexible such that the cross-sectional shape of the form readily conforms to a circle under the pressure exerted by the settable composition. In contrast, if a thick-walled fiber form starts out non-circular because of warpage or other reasons, the stiffness of the form may prevent the form from assuming a circular shape. The invention thus facilitates production of columns that are round.

[0019] Many modifications and other embodiments of the inventions set forth herein will come to mind to one skilled in the art to which these inventions pertain having the benefit of the teachings presented in the foregoing descriptions and the associated drawings. Therefore, it is to be understood that the inventions are not to be limited to the specific embodiments disclosed and that modifications and other embodiments are intended to be included within the scope of the appended claims. Although specific terms are employed herein, they are used in a generic and descriptive sense only and not for purposes of limitation.

Claims

1. A tubular construction form, comprising:

a plurality of flexible sheet material layers wound one upon another about an axis and bonded together so as to form a tube having a wall encircling the axis, all of the flexible sheet material layers comprising transparent polymer film, whereby the tube is transparent such that a settable composition poured into the tube is visible from outside the tube through the wall of the tube.

2. The tubular construction form of claim 1, wherein the flexible sheet material layers are bonded together with an adhesive between the flexible sheet material layers, and the adhesive comprises a transparent adhesive.

3. The tubular construction form of claim 1, wherein the flexible sheet material layers are bonded together by at least partially melting the flexible sheet material layers and fusing the flexible sheet material layers together.

4. The tubular construction form of claim 1, wherein the flexible sheet material layers comprise polyethylene film.

5. The tubular construction form of claim 1, wherein the

flexible sheet material layers comprise polypropylene film.

6. The tubular construction form of claim 1, wherein the flexible sheet material layers comprise polyvinyl chloride film. 5
7. The tubular construction form of claim 1, wherein the flexible sheet material layers comprise polyvinyl chloride film and are bonded together with a transparent adhesive between the flexible sheet material layers. 10
8. The tubular construction form of claim 7, wherein the adhesive comprises acetone. 15
9. The tubular construction form of claim 1, wherein the tube comprises from 2 to 20 flexible sheet material layers. 20
10. The tubular construction form of claim 1, wherein the tube comprises from 2 to 15 flexible sheet material layers.
11. The tubular construction form of claim 1, wherein the tube comprises from 2 to 10 flexible sheet material layers. 25
12. The tubular construction form of claim 1, further comprising a release material disposed on an inner surface of the wall to facilitate removal of the construction form from the settable composition after setting thereof, the release material being transparent. 30
13. The tubular construction form of claim 12, wherein the release material comprises silicone. 35

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