

PATENT SPECIFICATION

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(54) A SELF SUPPORTING SHEETING PANEL FOR SHORING TRENCHES

(71) I, JOSEF KRINGS of D 5138 Heinsberg, Oberbuch, Hans-Boeckler Strasse 23, Germany; a German National, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention relates to a trench shoring panel for shoring trenches.

According to the invention there is provided a trench shoring panel comprising a generally rectangular frame, a pair of cover plates secured to opposite faces of said frame and defining therewith a chamber, said chamber being subdivided by a plurality of reinforcing beams extending parallel to one pair of the sides of said frame, said subdivided chamber being filled with a reinforced plastics foam material characterised in that said plastics foam material is reinforced by randomly oriented steel cord elements embedded therein.

Prior problems have been solved in accordance with the present invention by reinforcing the plastics foam within the frame and between the cover plates of the sheeting panel with the steel cord, usually steel cord waste. It has been shown that such reinforcing material provides considerable improvement in the bending strength of the sheeting panel so that the plastics foam within the chamber or chambers of the shoring panel acquires the characteristics of a structural bearing component. This construction also makes it possible to manufacture shoring panels of varied wall thicknesses depending on the particular load to which they might be subject and in any case each individual shoring panel due to this reinforced plastics foam becomes a self-supporting member. The frame of the shoring panel is preferably constructed of metallic material, such as steel, but advantageously the frame is constructed as light as might be needed due to the fact that the plastics foam within it and the cover plates provides reinforcement and therefore a lesser

amount of frame steel is required than in conventional shoring panels. Preferably the frame is constructed of a pair of U-shaped beams along each side, and spanning the frame are U-shaped beams secured in back-to-back relationship thus imparting a generally H-shaped transverse cross-section thereto. The frame is not intended as a rigidifying or reinforcing structure as the strength of the panel is determined by the beams arranged internally thereof having the H-cross-section heretofore described. By in this manner reducing the weight of the frame the overall strength is not impaired due to the U-shaped beams which are joined in back-to-back relationship and the plastics foam material within chambers formed thereby.

The cover plates are constructed from relatively inexpensive and thin material as, for example, a reinforced plastics such as synthetic polymeric or copolymeric resins sprayed on fibre glass mats. However, alternatively the cover plates may be constructed from sheet steel or steel plate, and in the latter case the steel plate is positioned against the earth or soil of a trench since it is particularly suitable for absorbing the spreading forces acting perpendicular to the shoring panel. In the latter case it is assumed that the remaining cover plate which is disposed on the interior of the trench is not constructed of steel plate or steel sheeting.

With the above and other objects in view that will hereinafter appear, the nature of the invention will be more clearly understood by reference to the following detailed description, the appended claimed subject matter, and the several views illustrated in the accompanying drawing.

Figure 1 is a fragmentary perspective view with portions broken away for clarity of a novel shoring panel of this invention and illustrates the generally rectangular configuration thereof with a plurality of U-shaped beams secured to each other in back-to-back relationship to form a

plurality of chambers or chamber sections within the shoring panel.

Figure 2 is an enlarged fragmentary vertical sectional view taken through the shoring panel of Figure 1, and more clearly illustrates the back-to-back relationship of the beams and in the manner in which metallicly reinforced foam plastics fills the chamber sections to impart rigidity to the shoring panel.

A novel shoring panel, generally designated by the reference numeral 1 (Figure 1) consists of horizontal I-beams or sections 2, 3 which are apertured to received therethrough vertical tubes 4 which are welded or otherwise secured thereto and project at 18 from one side for embedding in the bottom of a trench and upright withdrawal therefrom. The I-beams 2, 3 span the length of the shoring panel 1, extend parallel with one pair of the sides of the frame and are welded to opposite vertical beams 5, only one of which is illustrated. Generally rectangular cover plates 6, 7 are welded or otherwise fastened to the overall frame of the shoring panel 1 which is defined by the beams 2, 3, 5 and the remaining beam, corresponding to the beam 5, which is not illustrated in the drawings. The cover plates are constructed of reinforced plastics, such as synthetic polymeric or copolymeric resin which is sprayed on fibre glass mats, or are simply plates or sheets of steel. As an alternative construction one of the cover plates may be constructed from steel and the other from non-metallic material, such as the synthetic resin sprayed fibre glass mat heretofore noted. In the latter case the cover plate constructed of the plastics material, when in use, is positioned with the plastic facing the soil or earth of the trench wall while the sheet steel cover plate is on the opposite side facing the interior of the trench. The plastics is of a low coefficient of friction and permits the shoring panel to be readily removed from the trench after the laying of pipe, cable or the like therein and the subsequent and progressive refilling of the trench up to initial ground level.

Guide pieces 8, 9 in the form of channels are welded to the vertical beams 5 at each opposite shoring panel side, which is free of projections 18, so that the latter can be guided vertically relative to posts or columns which are driven into the soil.

Referring specifically to Figure 2 of the drawings, the I-beams 2, 3 and other like I-beams therebetween are formed by U-shaped channels or beams 11, 12 placed back-to-back and spot welded to each other, as is indicated by the reference numeral 10. Thus each pair of U-beams 11, 12 form a web 13, the thickness of which

determines the static strength of the shoring panel 1. Due to this construction the showing panel 1 can be made as strong as desired by selecting appropriate cross-sectional thicknesses of the U-beams 11, 12 or by interposing intermediate layers between the same prior to the welding thereof to each other. In this fashion flanges 14 of the U-shaped beams 11, 12 need not be unnecessarily reinforced, as would be the case if thicker U-shaped sections were selected. It is therefore also possible to manufacture the beams 11, 12 from sheet steel or reinforced plastics.

By the construction thus far described there is formed within the frame 2,3,5 and the cover plates 6, 7, a chamber or a plurality of chamber sections generally designated by the reference number 15 with each containing foam plastics 16 having embedded in it randomly oriented reinforcement of steel cord 17 usually of steel cord waste. The reinforcing means 17 thereby makes it possible to reduce the number of frame members 13 because the reinforced foam 16 derives considerable properties of strength from its reinforcement and isolation within the covering sheets 6, 7. The foam may be poured in situ within the chambers 15 or manufactured separately and then inserted into the chambers 15 prior to both being closed by the covering sheets 6, 7.

Though only two of the chambers 15 are shown containing the reinforced foam plastics 16, it is to be understood that the remaining chambers of Figure 2 and all of those shown in Figure 1 contain such foam plastics 16 reinforced by the steel cord 17.

While preferred forms and arrangements of parts have been shown in illustrating the invention, it is to be clearly understood that various changes in detail and arrangement of parts may be made without departing from the scope of this disclosure.

WHAT I CLAIM IS:—

1. A trench shoring panel comprising a generally rectangular frame, a pair of cover plates secured to opposite faces of said frame and defining therewith a chamber, said chamber being subdivided by a plurality of reinforcing beams extending parallel to one pair of the sides of said frame, said subdivided chamber being filled with a reinforced plastics foam material characterised in that said plastics foam material is reinforced by randomly oriented steel cord elements embedded therein.

2. A panel according to claim 1, wherein said steel cord elements are steel cord waste.

3. A panel according to claim 1 wherein members project from one side of the frame

plurality of chambers or chamber sections within the showing panel.

Figure 2 is an enlarged fragmentary vertical sectional view taken through the shoring panel of Figure 1, and more clearly illustrates the back-to-back relationship of the beams and in the manner in which metallicly reinforced foam plastics fills the chamber sections to impart rigidity to the shoring panel.

A novel shoring panel, generally designated by the reference numeral 1 (Figure 1) consists of horizontal I-beams or sections 2, 3 which are apertured to received therethrough vertical tubes 4 which are welded or otherwise secured thereto and project at 18 from one side for embedding in the bottom of a trench and upright withdrawal therefrom. The I-beams 2, 3 span the length of the shoring panel 1, extend parallel with one pair of the sides of the frame and are welded to opposite vertical beams 5, only one of which is illustrated. Generally rectangular cover plates 6, 7 are welded or otherwise fastened to the overall frame of the shoring panel 1 which is defined by the beams 2, 3, 5 and the remaining beam, corresponding to the beam 5, which is not illustrated in the drawings. The cover plates are constructed of reinforced plastics, such as synthetic polymeric or copolymeric resin which is sprayed on fibre glass mats, or are simply plates or sheets of steel. As an alternative construction one of the cover plates may be constructed from steel and the other from non-metallic material, such as the synthetic resin sprayed fibre glass mat heretofore noted. In the latter case the cover plate constructed of the plastics material, when in use, is positioned with the plastic facing the soil or earth of the trench wall while the sheet steel cover plate is on the opposite side facing the interior of the trench. The plastics is of a low coefficient of friction and permits the shoring panel to be readily removed from the trench after the laying of pipe, cable or the like therein and the subsequent and progressive refilling of the trench up to initial ground level.

Guide pieces 8, 9 in the form of channels are welded to the vertical beams 5 at each opposite shoring panel side, which is free of projections 18, so that the latter can be guided vertically relative to posts or columns which are driven into the soil.

Referring specifically to Figure 2 of the drawings, the I-beams 2, 3 and other like I-beams therebetween are formed by U-shaped channels or beams 11, 12 placed back-to-back and spot welded to each other, as is indicated by the reference numeral 10. Thus each pair of U-beams 11, 12 form a web 13, the thickness of which

determines the static strength of the shoring panel 1. Due to this construction the showing panel 1 can be made as strong as desired by selecting appropriate cross-sectional thicknesses of the U-beams 11, 12 or by interposing intermediate layers between the same prior to the welding thereof to each other. In this fashion flanges 14 of the U-shaped beams 11, 12 need not be unnecessarily reinforced, as would be the case if thicker U-shaped sections were selected. It is therefore also possible to manufacture the beams 11, 12 from sheet steel or reinforced plastics.

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2. A panel according to claim 1, wherein said steel cord elements are steel cord waste.

3. A panel according to claim 1 wherein members project from one side of the frame



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for embedding in the bottom of a trench and upright withdrawal therefrom.

4. A panel according to claim 1, wherein said reinforcing beams are U-shaped channels secured together in back-to-back relationship.

5. A panel according to claim 1, wherein at least one of the cover plates is made of reinforced plastics.

6. A panel according to claim 4, wherein at least one of the cover plates is made of reinforced plastics.

7. A panel according to any of the

preceding claims wherein guide pieces are secured longitudinally at opposed free parallel sides for upright guiding engagement with posts or columns.

8. A trench shoring panel substantially as described with reference to and as illustrated in the accompanying drawings.

W. REID SHARP & CO.,
Chartered Patent Agents,
10 Portland Terrace,
Newcastle upon Tyne.

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