

SPECIFICATION

Shoring building plate secural

5 The present invention is directed to a shoring unit which is particularly adapted to be introduced into an excavation, such as a trench, ditch, or the like, and includes a pair of normally vertical upstanding guide rails between which are slidably received one or

10 more shoring plates.

The excavation shoring unit of this invention is specifically designed for excavations which require on site shoring or support in stages as they are dug, including for example sandy sites, quicksand or for

15 excavations which require only transient or temporary shoring for various other reasons of construction apart from the condition of the soil and the excavation area. Such excavation shoring units therefore should be relatively compact in size,

20 operable without delay and capable of being enlarged or expanded rapidly as the excavation operation continues.

By means of the present invention an excavation shoring unit insertable into a trench or the like

25 excavation comprises two parallel or substantially parallel side members having shoring plates and guides therefor, for bracing in spaced relation by struts, each side member having at least two laterally interconnected U or the like shaped open

30 flanged transversely sectioned upstanding guide rails formed to receive shoes on the ends of the struts and slidably to guide at least two shoring plates arranged side by side between the guide rails with lateral edge surfaces of the plates engaged

35 thereby and at least one of said plates securable by locking means on each side member.

According to this construction, the shoring plates are permitted to be movable relative to the guide rails in a vertical direction and, with the supporting

40 members being located at the inside of the shoring unit, the entire exterior or outside of the shoring unit, including the outside surfaces of the guide rails and the shoring plates, can bear against the surface being excavated and yet be moved relative thereto

45 and to each other, contrary to known designs eg U.S. Patent No. 3,212,270. Thus, in the case of the present invention, the guide frame can be lowered to any required depth into a trench and as the depth or the latter is increased through the excavation operation,

50 one or more of the shoring plates can be lowered as the excavation is deepened, thus providing initial support of the excavation walls during the initial excavation and continuing to do so until the total depth of the excavation has been achieved.

55 In cases where the invention is applicable to relatively deep excavations, the C-shaped guide rails can be used in pairs or by the use of equivalent E-shaped guide rails, two pairs of shoring plates can be selectively guided vertically downwardly during

60 continued excavation, thus, in effect doubling the total depth which can be shored in comparison to the first described embodiment of the invention in which the guide rails are of a C-shaped construction.

In further accordance with this invention, the

65 shoring plates are preferably disposed in spaced

parallel pairs with each shoring plate having vertical ribs, and the ribs being disposed in meshed relationship with each other to impart rigidity to the shoring plates and the overall shoring unit.

70 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 claims and the several views illustrated in the

75 accompanying drawings wherein:-

Figure 1 is a fragmentary perspective view of an excavation shoring unit of this invention and illustrates a pair of shoring plates having vertical ribs and lateral edges in sliding relationship to laterally

80 spaced guide rails defining with supporting members secured to their inner surfaces a rigid guide frame.

Figure 2 is a fragmentary rear elevational view of the excavation sheeting unit of *Figure 1*, and

85 illustrates a lower most edge of an innermost of the shoring plates raised slightly above that shown in *Figure 1* preparatory to initially inserting the excavating sheeting unit into a newly begun excavation.

Figure 3 is a fragmentary top plan view partially in cross section looking downwardly in *Figure 2*, and illustrates lateral edges of a pair of shoring plates carrying rollers guided for sliding movement within the guide rails which are of a generally C-shaped

95 transverse cross section.

Figure 4 is a side elevational view partially in cross section of the excavation shoring unit, and illustrates a locking mechanism for locking an innermost one of the shoring plates at any one of a plurality of

100 selected positions.

Figure 5 is a fragmentary top plan view similar to *Figure 3* of another shoring unit of this invention, and illustrates another pair of associated C-shaped guide rails in associated shoring plates.

105 An excavation shoring unit constructed in accordance with this invention is fully illustrated in *Figures 1* to *4* of the drawings and includes a rigid guide frame 1 which is in part defined by generally vertically disposed guide rails 5, 6 of a generally c-shaped transverse section (*Figure 3*) rigidly interconnected by horizontally disposed supporting members or wales 7 welded or otherwise fastened to the guide rails 5, 6 at inside surfaces or faces (unnumbered) thereof. The C-shaped guide rails 5, 6

115 are in opposed relationship to each other (*Figure 3*) and slidably received therein are shoring plates 2, 3 whose lateral edges (unnumbered) are confined within the guide rails 5, 6.

At the lateral sides of the shoring unit, the guide rails, such as the guide rail 5 of *Figure 3*, is simply C-shaped in cross section but if the shoring unit is of an appreciable length, the next innermost guide rail 6 is secured back to back to oppositely opening C-shaped guide rail, yet the two rails may be replaced by a single, integral, one-piece H-shaped guide rail. However, irrespective of the particular transverse sectional configuration of the guide rails (for example C-shaped, E-shaped, H-shaped or U-shaped) the function thereof is to form a rigid

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130 frame in conjunction with the horizontal supporting

members 7 and to guide within the confines thereof the lateral edges (unnumbered) of the shoring plates 2,3.

The shoring unit is placed into an excavation and directly opposite thereto in the same excavation might be an identically constructed shoring unit with the two sheeting units being bracingly interconnected by adjustable supporting struts 4 carrying bearing shoes or heads 8 received in generally C-shaped or U-shaped rails (unnumbered) welded or otherwise secured to the guide rails 5,6 in the manner best illustrated in Figures 1 and 3.

Reference is now made specifically to Figure 3 of the drawings which illustrates each of the shoring plates 2, 3 having respective folded ribs 10, 9 directed toward each other and in interdigitated alternating relationship to each other for reinforcing the shoring plates 2, 3 in the overall guide frame. Preferably, the shoring plates 2,3 are formed of metal and the ribs 10, 9, respectively are simply flattened pleat like overfolds of the metal of the respective sheets.

At the lateral edges (unnumbered) of the plates 2, 3 are respective angle irons 12, 11, which carry respective rollers 13, 14. The angle irons 11, 12 and the rollers 13, 14 are disposed within the confines of the associated guide rails 5, 6 and the totality of the shoring plate 2 is confined within the angle irons 11 of the shoring plate 3.

The shoring plate 2 is the innermost of the two shoring plates 2, 3 and at its lowermost edge it is bevelled toward the outside as is indicated by the reference numeral 19 in Figure 2. The bevelled edge or surface 19 functions not only to facilitate the introduction of the excavating shoring unit into an excavation in a known manner, but also provides a lower rest for the outermost shoring plate 3, as can be most readily visualized from Figure 4.

In order to selectively position the inside shoring plate 2 at any one of a plurality of arbitrary heights relative to the guide frame and particularly the guide rails 5, 6, a spring-loaded locking means 17 (Figure 4) is provided for engaging beneath one of a plurality of vertically spaced stops 18 welded or carried in any suitable fashion by the shoring plate 2.

Insofar as the embodiment of the invention is concerned which is shown in Figure 5, in this case the first embodiment is essentially duplicated by providing additional guide rails 15, 16 and similar shoring plates 2', 3' operative in the manner heretofore described.

The excavating sheeting units of Figures 1 through 4 or 5 are placed in an excavation, such as part of a trench, by means of a crane or the like and are braced against the trench walls or surfaces in a conventional manner, as by the struts 4. Thereafter, the inside shoring plate 2 is lowered after the trench has been further excavated and after the shoring plate 2 has reached the bottom of the further excavated trench, the total guide frame including the supporting members 7 and the guide rails 5, 6 can be further lowered, should such be necessary.

Obviously, in keeping with the embodiment of the invention shown in Figure 5, the sheeting plates 2', 3' can also be lowered as might be necessary and if

necessary, another guide frame with associated sheeting plates can be placed atop the first positioned excavating shoring unit, etc.

Preferably, the excavation shoring units of the type heretofore described are approximately five meters long and may be utilized in trench depths of between three to eight meters.

Although only a preferred embodiment of the invention has been specifically illustrated and described herein, it is to be understood that minor variations may be made in the apparatus without departing from the scope of the invention, as defined in the appended claims.

80 CLAIMS

1. An excavation shoring unit insertable into a trench or the like excavation and comprising two parallel or substantially parallel side members having shoring plates and guides therefor, for bracing in spaced relation by struts, each side member having at least two laterally interconnected U or the like shaped open flanged transversely sectioned upstanding guide rails formed to receive shoes on the ends of the struts and slidably to guide at least two shoring plates arranged side by side between the guide rails with lateral edge surfaces of the plates engaged thereby and at least one of said plates securable by locking means on each side member.

2. A unit according to claim 1, wherein the shoring plates held in pairs in said guide rails have a ribbed horizontal cross-section, with vertical ribs which project normal to their plate portions in opposed meshing relationship and angle irons providing further ribs at the edge of the plates within the guide rails.

3. A unit according to claim 2, wherein each of the shoring plates is of folding metal bending in the manner of pleats to form said first mentioned ribs.

4. A unit according to any one of the preceding claims, wherein the vertical edges of each shoring plate have guide rollers which run on the inner flange surfaces of the guide rails.

5. A unit according to any one of the preceding claims, wherein the lower edge of the innermost shoring plate of each pair of shoring plates is tapered towards the side intended to abut a wall of an excavation.

6. A unit according to any one of the preceding claims having a guide frame comprising said side members held bracedly in spaced relationship by struts, guides at the sides of the guide rails receiving and holding said shoes and the guide rails at both sides of said frame securing the lateral edge surfaces of the shoring plates, for covering respectively opposed excavation walls.

7. An excavation shoring unit as defined in claim 1 and substantially as described with reference to and as illustrated in Figures 1 to 4 of the accompanying drawings.



members 7 and to guide within the confines thereof the lateral edges (unnumbered) of the shoring plates 2,3.

The shoring unit is placed into an excavation and directly opposite thereto in the same excavation might be an identically constructed shoring unit with the two sheeting units being bracingly innerconnected by adjustable supporting struts 4 carrying bearing shoes or heads 8 received in generally C-shaped or U-shaped rails (unnumbered) welded or otherwise secured to the guide rails 5,6 in the manner best illustrated in Figures 1 and 3.

Reference is now made specifically to Figure 3 of the drawings which illustrates each of the shoring plates 2, 3 having respective folded ribs 10, 9 directed toward each other and in interdigitated alternating relationship to each other for reinforcing the shoring plates 2, 3 in the overall guide frame. Preferably, the shoring plates 2,3 are formed of metal and the ribs 10, 9,, respectively are simply flattened pleat like overfolds of the metal of the respective sheets.

At the lateral edges (unnumbered) of the plates 2, 3 are respective angle irons 12, 11, which carry respective rollers 13, 14. The angle irons 11, 12 and the rollers 13, 14 are disposed within the confines of the associated guide rails 5, 6 and the totality of the shoring plate 2 is confined within the angle irons 11 of the shoring plate 3.

The shoring plate 2 is the innermost of the two shoring plates 2, 3 and at its lowermost edge it is bevelled toward the outside as is indicated by the reference numeral 19 in Figure 2. The bevelled edge or surface 19 functions not only to facilitate the introduction of the excavating shoring unit into an excavation in a known manner, but also provides a lower rest for the outermost shoring plate 3, as can be most readily visualized from Figure 4.

In order to selectively position the inside shoring plate 2 at any one of a plurality of arbitrary heights relative to the guide frame and particularly the guide rails 5, 6, a spring-loaded locking means 17 (Figure 4) is provided for engaging beneath one of a plurality of vertically spaced stops 18 welded or carried in any suitable fashion by the shoring plate 2.

Insofar as the embodiment of the invention is concerned which is shown in Figure 5, in this case the first embodiment is essentially duplicated by providing additional guide rails 15, 16 and similar shoring plates 2', 3' operative in the manner heretofore described.

The excavating sheeting units of Figures 1 through 4 or 5 are placed in an excavation, such as part of a trench, by means of a crane or the like and are braced against the trench walls or surfaces in a conventional manner, as by the struts 4. Thereafter, the inside shoring plate 2 is lowered after the trench has been further excavated and after the shoring plate 2 has reached the bottom of the further excavated trench, the total guide frame including the supporting members 7 and the guide rails 5, 6 can be further lowered, should such be necessary.

Obviously, in keeping with the embodiment of the invention shown in Figure 5, the sheeting plates 2', 3' can also be lowered as might be necessary and if

necessary, another guide frame with associated sheeting plates can be placed atop the first positioned excavating shoring unit, etc.

Preferably, the excavation shoring units of the type heretofore described are approximately five meters long and may be utilized in trench depths of between three to eight meters.

Although only a preferred embodiment of the invention has been specifically illustrated and described herein, it is to be understood that minor variations may be made in the apparatus without departing from the scope of the invention, as defined in the appended claims.

80 CLAIMS

1. An excavation shoring unit insertable into a trench or the like excavation and comprising two parallel or substantially parallel side members having shoring plates and guides therefor, for bracing in spaced relation by struts, each side member having at least two laterally interconnected U or the like shaped open flanged transversely sectioned upstanding guide rails formed to receive shoes on the ends of the struts and slidably to guide at least two shoring plates arranged side by side between the guide rails with lateral edge surfaces of the plates engaged thereby and at least one of said plates securable by locking means on each side member.

2. A unit according to claim 1, wherein the shoring plates held in pairs in said guide rails have a ribbed horizontal cross-section, with vertical ribs which project normal to their plate portions in opposed meshing relationship and angle irons providing further ribs at the edge of the plates within the guide rails.

3. A unit according to claim 2, wherein each of the shoring plates is of folding metal bending in the manner of pleats to form said first mentioned ribs.

4. A unit according to any one of the preceding claims, wherein the vertical edges of each shoring plate have guide rollers which run on the inner flange surfaces of the guide rails.

5. A unit according to any one of the preceding claims, wherein the lower edge of the innermost shoring plate of each pair of shoring plates is tapered towards the side intended to abut a wall of an excavation.

6. A unit according to any one of the preceding claims having a guide frame comprising said side members held bracedly in spaced relationship by struts, guides at the sides of the guide rails receiving and holding said shoes and the guide rails at both sides of said frame securing the lateral edge surfaces of the shoring plates, for covering respectively opposed excavation walls.

7. An excavation shoring unit as defined in claim 1 and substantially as described with reference to and as illustrated in Figures 1 to 4 of the accompanying drawings.



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8. An excavation shoring unit substantially as described with reference to and as illustrated in Figure 5 of the accompanying drawings, reference being had to Figures 1 to 4 thereof.

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