SELF-MEASURING REUSABLE AND DURABLE BRIDGES OR SPACERS FOR CONVECTION TO THE TOP CONCRETE FORMS AND RELATED METHODS

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ABSTRACT

Self-measuring, reusable and durable struts, spacers and/or spreaders and related methods are disclosed for facely being releasably but securely joined to and self-setting the distance between the tops of vertical walls comprising concrete forms to retain the forms during a concrete pour.
SELF-MEASURING REUSABLE AND DURABLE BRIDGES OR SPACERS FOR CONVECTION TO THE TOP CONCRETE FORMS AND RELATED METHODS

FIELD OF INVENTION

[0001] The present invention relates generally to forms into which concrete is poured and allowed to set and more particularly to self-measuring reusable durable spacers or bridges for connection to the top of concrete forms, and related methods.

BACKGROUND

[0002] Traditionally the top of spaced concrete forms for footings, for example, have been joined together by spaced wooden struts, spacers or spreaders. Such struts are usually of nominal one-inch thickness, pre-cut to length to define the distance between the forms and nailed above and into the spaced side-wall forms. Such forms are typically two inches thick. The pre-cutting of the struts in the manner mentioned above is time-consuming and not cost-effective. The struts often split when nailed in place, requiring them to be discarded and replaced. When construction workers stand on a strut, during a concrete pour, for example, the strut may fracture under the load, risking a defective pour and requiring emergency replacement of the strut. Normally, after a pour, struts are removed, discarded and not reused.

BRIEF SUMMARY AND OBJECTS OF THE INVENTION

[0003] In brief summary, the present invention overcomes problems of the past respecting struts, spacers, bridges and/or spreaders spanning between the tops of spaced walls of concrete forms, including forms for concrete footings. Self-measuring, reusable and durable struts, spacers, bridges and/or spreaders are provided for facilely setting the distance between walls of concrete forms which are connected to the top of the form walls to retain the spacing during a concrete pour. Related methods are also provided.

[0004] With the foregoing in mind, it is a primary object of the present invention to overcome problems of the past respecting struts, spacers, bridges and/or spreaders used to span between the tops of spaced walls of concrete forms, including forms for concrete footings.

[0005] Another paramount object is the provision of struts, spacers, bridges and/or spreaders, and related methods, for facilely setting the distance between walls of concrete forms which are connected to the top of the form walls to retain the spacing during a concrete pour.

[0006] Further valuable objects comprise one or more of the following:

[0007] a. top spacers or bridges for concrete forms which are self-measuring to precisely set the distance between form walls;

[0008] b. top spacers or bridges for concrete forms which are not easily damaged and are reusable;

[0009] c. top spacers or bridges for concrete forms which are durable and do not fracture or split when a fastener is placed therethrough;

[0010] d. top spacers or bridges for concrete forms which reduce the number of spacers required;

[0011] e. top spacers or bridges for concrete forms which are not damaged when stepped or stood on by a worker during a concrete pour or otherwise;

[0012] f. top spacers or bridges for concrete forms which have pre-formed apertures for fastener reception;

[0013] g. top spacers or bridges for concrete forms which are pre-dimensioned so that on-job cutting is not required;

[0014] h. top spacers or bridges for concrete forms which pre-set the distance between concrete wall forms for a footing; and

[0015] i. inverted U-shaped shoes placed contiguously over top portions of the spaced form walls, one shoe in alignment with the other, with the shoe being connected to a bridge spanning transversely between the shoes.

[0016] These and other objects and features of the present invention will be apparent from the detailed description taken with reference to accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] FIG. 1 illustrates, in perspective, one form of strut, spacer, bridge and/or spreader for concrete forms in accordance with principles of the present invention, while FIG. 2 illustrates, in perspective, a second form of strut, spacer, bridge and/or spreader of this invention;

[0018] FIG. 3 illustrates in perspective two ways in which struts, spacers, bridges and/or spreaders may be used in conjunction with concrete forms;

[0019] FIG. 4 illustrates, in broken perspective, installation of the strut of FIG. 1 between the tops of two concrete forms spaced, center-to-center, at 24 inches;

[0020] FIGS. 5, 6, and 7 are diagrammatic cross-sectional views showing how the strut of FIG. 2 may be utilized between concrete forms spaced, respectively, center-to-center at 24 inches, 20 inches, and 18 inches; and

[0021] FIG. 8 illustrates, in enlarged fragmentary perspective, an additional form of the present invention utilizing both a bridge system between concrete forms comprising inverted U-shaped shoes at the top of spaced concrete forms and a pin secured strut between the shoes.

DETAILED DESCRIPTION OF THE ILLUSTRATED EMBODIMENTS

[0022] Reference is now made to the drawings wherein like numerals are used to designate like parts throughout. FIG. 1 illustrates a channel-shaped strut, spacer, bridge or spreader for use between the tops of concrete forms, as explained in greater detail hereinafter. The strut of FIG. 1 is generally designed 20, is comprised of a shape-retaining rigid material such as steel, rigid synthetic resinous material or rigid composite material. Typically, the channel-shape of strut 20 is produced comprising steel, using conventional cold rolling techniques.

[0023] The bridge 20 comprises spaced vertically-directed legs 22 and 24 formed as one piece with a top planar portion
or wall 26. The vertical walls 22 and 24 and the horizontal wall 26 are illustrated as being planar and of essentially the same thickness. The top wall 26 comprises a top surface 28. The top wall 26 is illustrated as providing 5 apertures 32, 34, 36, 38 and 40. The top surface 28 also displays indications indicating the distance from the center of end aperture 32 to each of the other apertures, respectively. These distances comprising 12 inches, 18 inches, 20 inches, and 24 inches. These distances are typically spacings center-to-center distances between vertical concrete forms. The apertures are pre-formed in the bridge 20 prior to use thereof. For example, if the channel-shaped bridge 20 is formed of steel, apertures 32, 34, 36, 38 and 40 may be centrally-drilled, in a conventional manner, through the horizontal wall 26, each at the correct location.

[0024] The distances A and F between an adjacent end of the bridge 20 and apertures 32 and 40, respectively, will typically be about three-quarters of one inch, which is approximately one-half the width of a second-in-line concrete form. Thus, when a fastener, such as a nail or screw is inserted through apertures 32 and 40, where the forms are spaced from each other by 24 inches, as shown in FIG. 4, each nail or screw will be substantially displaced into the adjacent vertically-extending concrete form wall approximately in the middle thereof.

[0025] The bridge 20 is self-measuring, the distance B being 12 inches, the distance B plus C being 18 inches, the distance B plus C plus D being 20 inches, and distance B plus C plus D plus E being 24 inches. Thus, by using the bridge 20, no separate measurement is necessary between the tops of the concrete forms over which the strut 20 is placed. Restated, the indicia 0, 12, 18, 20, and 24 on the top surface 28 represent inches and will be used in lieu of use of a separate ruler or tape. FIGS. 5, 6 and 7 illustrate the manner in which a strut in accordance with the present invention is installed across the top of two forms spaced respectively at 24 inches, 20 inches and 18 inches, respectively.

[0026] The strut 20 has sufficient strength to support a man during a concrete pour, without bending and without fracture. When the concrete pour has been concluded, the fasteners are placed through selected apertures of the bridge 20 are removed and the bridge 20 stored until such time as its use across additional vertically-extending form members is appropriate.

[0027] FIG. 4 is illustrative of the manner in which bridge 20 is placed across the top surfaces 41 of two vertically-extending concrete form members 42 and 44, spaced center-to-center at 24 inches, and secured in said transverse super-imposed position utilizing two screws 46 placed respectively through apertures 32 and 40 so as to extend thread substantially into the material comprising forms 42 and 44.

[0028] FIG. 3 illustrates that the struts in accordance with the present invention are used at spaced intervals along two vertically-extending concrete forms 42 and 44. The spacing between bridges in accordance with the present invention, when compared to the wooden counterparts of the prior art, is greater because struts in accordance with the present invention are stronger. Therefore, fewer struts, such as struts 20, are required. This is shown in FIG. 3, i.e., form members 42 and 44 as comprising sequential wall sections placed edge-to-edge at interfaces 48. The forms are held in position by pins 50, driven into the ground to establish the appropriate distance between the forms 42 and 44 at their bottom portions respectively. The pins 50 may be of steel such as concrete reinforcing rods. Normally, when the forms 42 and 44 are for the purpose of accommodating a concrete pour to create a footing, the lower edge of each form 42 and 44 is placed upon a level area 52, which may comprise of soil or gravel.

[0029] As shown in FIG. 3, sequential sections of form 42 and sequential sections of form 44 may be held in alignment, one with the other, utilizing a strut, such as strut 20, and two screws 46. Of course, use of a strut in this fashion is at the outside, not the inside, so as to bridge across two successive sections of a form member 42, 44.

[0030] Reference is now made to FIG. 2 which illustrate that struts having a cross-sectional configuration other than one comprising a channel, may be utilized. FIG. 2 illustrates a strut, spacer, bridge or spreader, generally designated 60, which is rigid and rectangularly shaped in cross-section. The top surface 62 of bridge 60 displays the same distance indicia (0, 12, 18, 20 and 24 inches) and comprises pre-formed apertures 32, 34, 36, 38 and 40. The bridge 60 is used in lieu of bridge 20 but in the same manner and for the same purpose as explained above in conjunction with strut 20. Accordingly, the bridges between form members 42 and 44 illustrated in FIGS. 5-7 may be either strut 20 or strut 60 or a combination of the two or one or more other struts in accordance with the principles of the present invention, placed at spaced intervals across the top surfaces 41 of forms 42 and 44, as explained above.

[0031] Reference is now made to FIG. 8, which illustrates a bridge system, generally designated 80, in accordance with the present invention. The bridge system of FIG. 8 comprises two inverted U-shaped shoes, generally designated 82, only one of which is illustrated in FIG. 8. It is to be appreciated that while shoe 82 is contiguously placed upon the top portion of vertical form 42, a similar shoe is placed in the same fashion over the top portion of vertical form 44. Each shoe comprises a horizontal top planar wall 84 comprising a top surface 86 with horizontal wall 84 being connected at corners 88 to vertical legs or walls 90. Horizontal wall 84 and vertical walls 90 are illustrated as being of a uniform thickness, although such is not mandated by principles of the present invention.

[0032] The interior surface of each wall 86 and 90 is snugly contiguous with the adjacent surface of the associated vertical form. The inverted U-shaped shoe 82 may be formed of any suitable rigid material including metal, such as steel, composite material and rigid synthetic resinous materials. Connected by welding or any other suitable way to the wall 84 is a vertically-extending pin or rod 92. The pin 92 is rigidly connected at its proximal end to the top 86 of wall 84 in any suitable way. For example, if the associated shoe 82 is formed of steel, pin 92 may be welded at its lower end to the wall 84. The diameter of the rod 92 is selected to be less than the diameter of the apertures contained within the associated strut. Thus, when a shoe 82 is positioned as illustrated in FIG. 8 over top 41 of both vertical forms 42 and 44, a pin 92 extends vertically above each shoe 82. The bridge system 80 of FIG. 8 is completed when strut is lowered, at two of its apertures, over the two pins 92.

[0033] When the concrete pour has been completed, using the bridge system 80 of FIG. 8, disassembly does not require
removal of any fastener, but only lifting of each bridge 20 away from the two associated pins 92, followed by manual lifting of each aligned pair of shoes 82 from vertical forms 42 and 44, as, for example, by grasping each pin 92 and lifting.

[0034] The invention may be embodied in other specific forms without departing from the spirit of the central characteristics thereof. The present embodiments therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

What is claimed and desired to be secured by Letters Patent is:

1. A self-measuring reusable bridge for connection across the tops of spaced concrete form members comprising a structural strut of a non-wooden durable rigid material, the bridge comprising:
   a predetermined length;
   fastener-receiving apertures positioned at exact locations along the length corresponding to common distances between concrete form members;
   and distance indicia adjacent to the apertures.

2. A bridge according to claim 1 wherein the structural bar is made of a rigid material select from the group consisting of metals, synthetic resinous materials and composite material.

3. A bridge according to the claim 1 wherein the structural strut comprises an elongated metal spacer comprising a standard structural shape.

4. A bridge according to claim 3 wherein the structural shape comprises a flat bar.

5. A bridge according to claim 3 wherein the structural shape comprises a channel-shaped member.

6. A bridge for position-stabilizing and for being releasably joined to spaced concrete form members comprising a rigid shape-retaining structural member having an exact predetermined length and pre-formed apertures exactly spaced one aperture from the other apertures at locations along the length corresponding to common distances at which the concrete form members are spaced whereby placement of fasteners through two selected apertures into both of the spaced concrete form members connect and position-stabilize the respective concrete form members.

7. A method of placing reusable spaced bridges between spaced concrete form members comprising the acts of:
   preliminarily positioning and generally securing at least two spaced concrete form members, each concrete form member being formed of a material and disposed in adjacent locations;
   placing a plurality of sequential reusable shape-retaining structurally rigid bridges so as to span between and across the adjacent concrete form members;
   fastening each bridge to each concrete form member by advancing a fastener through an aperture in each bridge and into the material of both concrete form members to position stabilize the concrete form members for receipt of concrete.

8. A method according to claim 7 comprising the further acts of:
   following a concrete pour into the concrete form members and after the concrete has set, removing the fasteners;
   unfastening and separating the bridges from the concrete form members;
   reusing the bridges at a later point in time by repeating the acts of claim 7.

9. A bridge system for spacing and securing concrete forms, the system comprising:
   two inverted U-shaped shoes, respectively placed contiguously over a top of spaced vertically-extending concrete forms, each U-shaped shoe comprising a top portion;
   a rigid shape-retaining structural member superimposed contiguously over the top portion of both shoes so as to span between the top portions of the two shoes;
   a connector joining the structural member to each shoe releasably locking the shoes and the structural member together to define the exact distance between the top portions of the spaced vertically-extending concrete forms.

10. A bridge system according to claim 9 wherein each connector comprises a pin.

11. A bridge system according to claim 10 wherein each pin is rigidly joined to the top portion of the associated shoe and passes through an aperture in the associated structural member.

12. A method placing a self-measuring reusable bridge between spaced vertically-extending concrete forms each comprising a top portion and a lower portion, comprising the acts of:
   locating and securing the bottom portions of each vertically-extending concrete forms in predetermined spaced relation;
   placing a reusable inverted U-shaped shoe in alignment with each other over the top portion of each spaced concrete form, each U-shaped shoe comprising a top;
   placing a self-measuring reusable bridge contiguously across the tops of the shoes releasably connecting the top of each shoe to the bridge to exactly set the distance between the top portions of the concrete forms.

13. A method according to claim 12 wherein the releasably connecting step comprises placing pins anchored to the top of each shoe through pre-formed apertures in the bridge.

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