

Framework Scaffold

Background of the Invention

1. Field of the Invention

The present invention relates to a framework scaffold for use at construction site.

2. Prior Art

A framework scaffold erected at a construction side is, for example, as shown in a schematic perspective view in Fig. 13, in which a structural frame 1 coupling the upper ends of a pair of parallel vertical members 11 with a horizontal member 12 is disposed at specific intervals in the horizontal direction, and each structural frame 1 is stacked up in plural stages. Between the adjacent structural frame 1 and structural frame 1 on each stage, a cross diagonal brace 90 is provided, and a scaffold board 2 for working place is laid between the horizontal members 12, thereby forming a structure having a specific structural strength.

In the framework scaffold disclosed in the Japanese Laid-open Patent No. 1-146058, as shown in front view and side view in Fig. 14 and Fig. 15, a horizontal member 12 is disposed in the middle of the height direction of the vertical members 11 of the structural frame 1 to shape an H-form, and the adjacent structural frames 1 are mutually coupled with a rectangular side frame 3, instead of the cross diagonal brace 30, so that the safety is enhanced as described below.

Incidentally, when erecting or demolishing the framework scaffold shown in Fig. 13, it is necessary to further splice a structural frame on the scaffold

board 2 straddling between the structural frames 1 and 1 on the highest stage, fit the handrail, spread sound-proof sheet, and others, and the worker is exposed to a dangerous state in such case not protected with handrail or security device at all.

Accordingly, safety measures are provided in the framework scaffold disclosed in the Japanese Laid-open Patent No. 1-146058 shown in Fig. 14 and Fig. 15, in which the structural frame 1 is constituted in an H-form, and hence the upper half 11a of the vertical member 11 of the structural frame 1 projects higher than the scaffold board 2 straddling between the horizontal member 12, so that the upper half 11a and the worker can be tied with a lifeline.

In such framework scaffold, too, in the present situation of shortage of experienced workers at elevated places, the danger of the work on the scaffold board 2 on the highest stage is still present same as shown in Fig. 9, and a safer framework scaffold is expected.

Besides, the structural frames hitherto used in framework scaffold are mostly of portal shape as shown in Fig. 4, and to change to the H-formed structural frames as shown in Fig. 10 and Fig. 11, the portal structural frames accumulated in the past must be discarded, and the cost is excessive.

The invention is proposed in the light of the above circumstance, and it is an object thereof to present a framework scaffold enhanced in safety while using the hitherto employed portal structural frames.

Summary of the Invention

To achieve the object, the invention employs the following means. That is, as shown in Fig. 1 to Fig. 3, the framework scaffold is constituted by

disposing portal structural frames 1 having a horizontal member 12 for linking the upper ends of a pair of parallel vertical members 11 at specific intervals in the horizontal direction, stacking up the structural frames 1 in multiple vertical stages through coupling members 4, putting scaffold boards 2 to straddle over between horizontal members 12 of adjacent structural frames 1 on each stage, and attaching a side frame 3 to the side of the scaffold board 2 of each stage, in which the side frames 3 have a height nearly equal to that of the structural frames 1, and are provided with mounting means 6 for mounting so that the upper end of the side frames 3 may be positioned nearly in the middle of the height direction of the structural frames 1.

As shown in Fig. 1, the upper half of the side frame 3 after mounting projects higher than the upper end (horizontal member 12) of the structural frame 1, and a handrail is formed by the upper half of the side frame 3 at the side of the scaffold board 2 straddling between the horizontal members 12.

Moreover, since the side frame 3 links at least a pair of right and left adjacent structural frames 1, it provides the framework scaffold with a specific structural strength instead of the conventional cross diagonal brace. As the mounting means 6 of the side frame 3, at an intermediate height position of the side frame 3 as shown in Fig. 4, a fixing pin 61 projecting horizontally from the side frame 3 and its corresponding receiver 62 are provided, and when the fixing pin 61 is inserted into a receiving groove 62a of the receiver 62, the side frame 3 is temporarily supported at a specified height position.

Or, as the mounting means 6 fitted at the lower end or vicinity of the side frame 3, a fixing plate 63 shown in Fig. 4 and its corresponding positioning pin 64 at the structural frame 1 side are combined, or a holder 65

shown in Fig. 6 may be used.

When the fixing plate 63 is used, the pin originally provided in the structural frame 1 for fixing the conventional cross diagonal brace can be used as the positioning pin 64.

With the holder 66, still more, any member for composing the mounting means 6 is not required at the structural frame 1 side, and when conveying the side frame 3, the holder 66 is set aside to the side frame 3 side, so that the occupied space is reduced.

As the mounting means 6 provided at the upper end or its vicinity of the side frame 3, aside from the holder 66, a stopper 68 and a stopper receiver 69 may be combined as shown in Fig. 5, and in the case of this stopper 68, when conveying the side frame 3, by turning to the standby position, projecting portion from the side frame 3 can be eliminated.

Brief Description of the Drawings

The drawings show an embodiment of the present invention in which:

Fig. 1 is a perspective appearance view of an embodiment of the invention.

Fig. 2 is a front view of the embodiment of the invention.

Fig. 3 is a side view of the embodiment of the invention.

Fig. 4 is a perspective rear view of mounting mean in the embodiment of the invention.

Fig. 5 is a perspective rear view of mounting means in the embodiment of the invention.

Fig. 6 is a front view of other embodiment of the invention.

Fig. 7 is a magnified side view of mounting means in the other embodiment of the invention.

Fig. 8 is a plan view of mounting means in the other embodiment of the invention.

Fig. 9 is a plan view of mounting means in the other embodiment of the invention.

Fig. 10 is a front view of mounting means in the other embodiment of the invention.

Fig. 11 is a side view of mounting means in the other embodiment of the invention.

Fig. 12 is a perspective rear view of mounting means in the other embodiment of the invention.

Fig. 13 is a perspective appearance view of a prior art.

Fig. 14 is a front view of other prior art.

Fig. 15 is a side view of the other prior art.

Detailed Description of the Embodiments

Referring now to the drawings, some of the embodiments of the invention are described in detail below.

Fig. 2 is a front view of an embodiment of the invention, and Fig. 3 is its side view.

The structural frame 1 used in the embodiment is a portal form having the upper ends of a pair of parallel vertical members 11 linked with a horizontal member 12 as shown in Fig. 3, and a reinforcing member 13 is linked to the vertical members 11 and horizontal member 12.



In the pair of longitudinal members 11, a positioning pin 64 for fitting a cross diagonal brace (see Fig. 9) hitherto used for providing the framework scaffold with structural strength is projecting, and a lock piece 64a thrust by a spring or the like (not shown) to project in the radial direction of the positioning pin 64 is provided at the front end of the positioning pin 64. This positioning pin 64 is utilized as mounting means 6B of the side frame 3 in this embodiment as described below.

The structural frames 1 are disposed at specified intervals in the horizontal direction to constitute the framework scaffold, and are set up by linking other structural frame to the structural frame 1 at each position through the coupling member 4, and the scaffold board 2 straddled between the horizontal members 12 of the structural frame 1 of each stage.

The coupling member 4 is composed of flanges 4a having a larger diameter than the outside diameter of the vertical members 11 of the structural frame 1, and protuberances 4b projecting in a diameter matched with the inside diameter of the vertical members 11 of the structural frame 1 from the upper and lower sides of the flanges 4a, and one protuberance 4b is inserted into the upper end of the vertical member 11 of the structural frame 1 (1A) of the lower stage, and then the lower end of the vertical member 11 of the structural frame 1 (1A) of the upper side is fitted to the outside of the other protuberance 4b.

In this embodiment, the side frame 3 fitted to the side of the scaffold board 2 is composed of, as shown in Fig. 2, a pair of vertical members 31 having a dimension nearly equal to the height of the structural frame 1, upper member 32 and lower member 33 for horizontally coupling the upper and lower ends of the vertical member 31, and a reinforcing member 34 for reinforcing the inside



partitioned by them, and it is positioned and fixed so that the upper end of the side frame 3 may be located nearly in the middle of the height direction of the structural frame 1 of each stage.

To install the side frame 3 in the structural frame 1, the following three mounting means 6A, 6B, 6C are provided.

Fig. 4 is a perspective view showing the constitution of the mounting means 6A, 6B of the side frame 3 to the structural frame 3A of the lower stage out of the above.

First of all, the mounting means 6A to be provided at the middle height position of the side frame 3 is composed of a fixing pin 61 projecting horizontally from the vertical member 31 of the side frame 3, and a receiver 62 having a receiving groove 62a opened upward in a width matched with the diameter of the fixing pin 61, being fitted to the vertical member 11 of the structural frame 1.

The fixing pin 61 is composed in a pin form with a head widened in diameter at the front end, and is bent so that the front end may be positioned at the back side of the vertical member 11 of the structural frame 1 than the plane formed by the side frame 3 at the specified mounting position. The receiver 62 is fixed to the back side of the vertical member 11 by bolt 62b and nut 62c penetrating in the radial direction of the vertical member 11 of the structural frame 1.

The mounting means 6B provided at right and left lower corners of the side frame 3 are composed of fixing plates 63a projecting horizontally from the lower end of the vertical member 31 of the side frame 3, and forming insertion holes 63a, and positioning pins 64 projecting conventionally for fixing the

cross diagonal brace.

Fig. 5 is a perspective view showing the constitution of the mounting means 3C to the structural member 1B linked to the upper part of the structural frame 1A.

As shown in Fig. 5, the third mounting means 6C is composed of a stopper 68 projecting to the outside in the horizontal direction of the side frame 3 at the end of the upper member 32 of the side frame 3, supported to be rotatable about the vertical axis and elevatable, and bent downward in the front end, and a stopper receiver 69 fixed by a bolt 69a penetrating in the radial direction of the vertical member 11 of the structural frame 1B and having a receiving groove 69b for receiving the stopper 68.

At the base end side of the stopper 68, a support shaft 68a penetrating vertically through the upper member 32 of the side frame 3, and used as rotary axis of the stopper 68 is linked, and the stopper 68 is thrust downward by a spring 68b externally fitted to the support shaft 68a.

At the upper end of the side frame 3 is provided positioning means 40 for positioning at a mounting position for receiving the stopper 68 by the stopper receiver 69 and a standby position overlapping with the upper member 32 of the side frame 3 in a plan view. The positioning means 40 is extended over the support shaft 68a at the base end side of the stopper 68, and is provided with two positioning holes 42, 43 provided at the positioning part 41 having the front end deflected downward and the upper member 32 of the side frame 3.

According to the positioning means 40, at the standby position, the front end of the stopper 68 is inserted in the positioning hole 42 remote from the support shaft 68a, while the front end of the positioning part 41 is

inserted into the open end of the vertical member 31 of the side frame 3, so that the stopper 68 is positioned to overlap with the upper member 32. On the other hand, at the mounting position, the positioning part 41 is inserted into the other positioning hole 43.

The mounting procedure of the side frame 3 by the mounting means 6 in such constitution is described below.

The worker who sets up the side frame 3 stands on the ground, lifts the side frame 3, and fits the fixing pin 61 projecting from the side frame 3 into the receiving groove 62a of the receiver 62 fitted to the structural frame 1A.

As a result, the side frame 3 is temporarily supported at the specified height position by the fixing pin 61 and receiver 62. At this time, the lower end of the side frame 3 is slightly inclined to the fore side, and the fixing plate 63 is positioned at the inner side (scaffold board 2 side) of the vertical member 11 of the structural frame 1A. The stopper 68 of the mounting means 6C to be used in a later stage is forwarded into a standby position so as not to interfere with the vertical members 11 of the structural frames 1A, 1B during this job.

Afterwards, by rotating so that the plane of the side frame 3 may be perpendicular about the fixing pin 61, the positioning pin 64 is inserted into the insertion hole 63a of the fixing plate 63 in the lower corner of the side frame 3. At the front end of the positioning pin 64, as mentioned above, since the lock piece 64a is fitted, the fixing plate 63 is positioned and fixed.

The side frame 3 mounted completely on the structural frame 1A in this way possesses the height equal to the structural frame 1A, and hence its upper half projects from the upper end of the structural frame 1A.

Meanwhile, although not shown herein, on the back side of the structural frame 1A, that is, on the opposite side of mounting the side frame 3, a cross diagonal brace is fitted as in the prior art by making use of the existing positioning pin 64.

Moreover, the scaffold board 2A is put to straddle the lateral between members 12A of the structural frame 1A, and the worker moves onto the scaffold board 2A, and sets the structural frame 1B of the upper stage on the protuberance 4b of the coupling member preliminarily fitted to the upper end of the vertical member 11 of the structural frame 1A of the lower stage.

At this time, for the worker standing on the scaffold board 2A, the upper half of the side frame 3 can be used as handrail, and is free from uneasiness because the safety is assured when putting the structural frame 1B of the upper stage to the protuberance 4b of the upper side of the coupling member 4.

In succession, the stopper 68 provided in the upper corner of the side frame 3 is lifted upward resisting the thrusting direction of the spring 68b, the front end of the stopping pat 41 is released from the positioning hole 42, and is rotated about the support shaft 68a and moved from the standby position to mounting position, and the front end of the stopper 68 is inserted into the stopper receiver 69 fitted to the structural frame 1B of the upper stage along the thrusting force of the spring 69c externally fitted to the support shaft 69a.

By repeating such job, side frames 3 can be fitted to the upper and lower structural frames 1A, 1B while setting up the framework scaffold, and the safety of the worker is improved throughout this work as mentioned above.

By using such mounting means 6A, the side frame 3 can be very easily supported temporarily by one worker, and after supporting temporarily it is easy to start mounting (fixing) of the lower end of the side frame 3 by the mounting means 6B.

With the mounting means 6B, the pin for fitting the cross diagonal brace originally projecting from the structural frame 1 can be utilized as the positioning pin 64 of the side frame 3, and only by fitting the fixing plate 63 to a position corresponding to the positioning pin 64, the number of parts can be saved. Moreover, since the side frame 3 is securely fixed by the mounting means 6B, it is not necessary to use a member for preventing the fixing pin 61 from releasing upward from the receiver 62 of the mounting means 6A, so that the labor is saved.

Furthermore, according to the mounting means 6C, by forwarding the stopper 68 to the standby position when the side frame 3 is not mounted, the occupied space in conveying can be saved.

Fig. 6 is a front view of other embodiment according to the invention, Fig. 7 is a side view of the mounting means used in the embodiment, Fig. 8 is its plan view, and Fig. 9 is a perspective view showing the constitution of other mounting means.

In this embodiment, the basic constitution of the structural frame 1, scaffold board 2, and side frame 3 is same as in the embodiments shown in Fig. 2 to Fig. 5, but the constitution of the mounting means 6 of the side frame 3 is different as specified below.

That is, as shown in Fig. 7 and Fig. 8, the mounting means 6D at the middle height position of the side frame 3 is designed to fit a receiver 62

forming a receiving groove 62a for receiving a fixing pin 61 projecting in the horizontal direction from the side frame 3, to the flange 4a of the coupling member 4 for linking the structural frames 1 up and down.

The receiver 62 is supported so as to be movable back and forth in the radial direction of the protuberance 4b of the upper side of the coupling member 4 through a holder 42, and comprises a pin 71 forming an upward slope 71a, and a spring 72 for thrusting the pin 71 forward in the horizontal direction toward the protuberance 4b. In the protuberance 4b of the coupling member 4, a positioning hole 6=73 is formed so as to correspond to the pin 71 in the state of the receiver 62 installed in the coupling member 4 at specified position, and, for example, before inserting the coupling member 4 into the structural frame 1A of the lower stage, the receiver 62 is inserted into the coupler 4, the receiver 62 is moved in the axial center direction of the coupling member 4 up to the specified position, and when the receiver 62 reaches the specified mounting position, it is positioned so that the pin 71 may be put into the positioning hole 73 by the thrusting force of the spring 72.

A penetration hole 81 is pierced in the vertical member 11 of the structural frame 1B externally fitted to the protuberance 4b at a position corresponding to the positioning hole 73, and when the vertical member 11 is pushed down along the protuberance 4b, the lower end of the vertical member 11 is drawn back by the slope 71a as the pin 71 resists the thrusting direction of the spring 72, and when further pushed down, the pin 71 is put into the penetration hole 81. Consequently, the pin 71 also as the function of preventing the structural frame 1B from slipping out. When demolishing the framework scaffold, meanwhile, a knob 72b provided at the base end side of the

pin 71 is pulled out, and the pin 71 is drawn out of the penetration hole 81 of the structural frame 1B, so that the structural frame 1B may be pulled up from the protuberance 4b.

By thus fitting the receiver 62 into the coupling member 4, the receiver 62 is not used where the side frame 3 is not fitted, so that the coupling member 4 may be shared.

Besides, in the upper and lower corners of the side frame 3, common mounting means 6E as shown in Fig. 9 to Fig. 12 is provided. This mounting means 6E uses a holder 65 composed of a shaft body 66 retractably supported in the horizontal direction, and a groove member 67 fitted to the front end of the shaft body 66 and abutting against the side peripheral surface of the vertical member 11 of the structural frame 1.

The groove member 67 comprises a pair of side walls 67a having a recess 67b to be matched with the diameter of the vertical member 11, and a bottom wall 67c coupling the base ends of the side walls 67a, being affixed to the shaft body 66, and is pivoted by a rivet 67g so as to be oscillatable in the plane direction of the side wall 67a at one side of the bottom wall 67c, and is further furnished with a male threaded bolt 67d, and a bolt penetration groove 67e cut in a size to be matched with the diameter of the bolt 67d at the other side of the bottom wall 67c.

By thus constituted mounting means 6E, to fix the side frame 3 on the structural frame 1, the shaft body 6 is advanced toward the vertical member 11 of the structural frame 1, and the recess 67b of the groove member 67 is fitted to the vertical member 11. At this time, the bolt 67d is turned in a direction to be released to the outside.

Next, from the adjacent side frame 3 across the structural frame 1, the groove member 67 is forwarded same as above to abut against the vertical member 11, and in this state the bolt 67d is turned to the vertical member 11 side and the bolt 67c is fitted to the bolt penetration hole 67e of the other groove member 67, and similarly the bolt 67d of the other groove member 67 is fitted into the bolt penetration groove 67e of the groove member 67. By tightening nuts 67f from the front ends of the both bolts 67d, the vertical member 11 of the structural frame 1 can be held by the pair of groove members 67, thereby completing mounting of the side frame 3.

In thus constituted holding member 65, to hold the shaft body 66 and groove members 67 at a standby position going back to the side frame 3, a notch 66a is formed in the middle position of the shaft body 66, and a J-shaped stopper 51 to be fitted to the notch 66a at the standby position is provided in the side frame 3. The stopper 51 is thrust in a direction toward the shaft body 66 by a stopper spring 52, and when moving forward the shaft body 66 and groove members 67 from the standby position toward the vertical member 11 of the structural frame 1, it is manipulated to depart the stopper 51 from the notch 66a.

At the standby position, to prevent the right and left ends of the groove members 67 from projecting from the front and rear ends of the side frame 3, the notch 66a is formed so as to position the groove members 67 by the stopper 51 in the state of rotating 90 degrees about the center of the shaft body 66 from the state abutting against the structural frame 1.

With the mounting means 6E, it is possible to mount on either upper or lower end of the side frame 3, and without fitting any member at the structural

frame 1 side, it is possible to hold the vertical member 11 with the pair of groove members 67 advancing toward the vertical member 11 of the structural frame 1, by fitting the holders 65 in all side frames 3 erected in the framework scaffold.

Thus, according to the invention, the side frame has the height nearly equal to the dimension of the structural frame, and the upper end of the side frame is fitted to be nearly in the middle position of the height direction of the structural frame, and therefore the upper half of the side frame projects to the lower half of the structural frame of the upper stage, and the handrail is always present at the side of the scaffold board straddling over the structural frame of the lower stage, so that the psychological uneasiness of the worker is eliminated while the physical safety is assured, and thereby jobs at elevated places can be done smoothly.

Moreover, side frames are formed by mutually linking four structural frames in the upper, lower, right and left positions, and it is not necessary to install members for assuring the strength such as cross diagonal braces used hitherto, so that the job efficiency is enhanced.

Furthermore, by properly using various mounting means, side frames can be mounted by one worker, or the occupied space of side frames in transportation can be saved, and it is as easy to handle as the conventional framework scaffold using only cross diagonal braces.



What is claimed is:

1. A framework scaffold constituted by disposing portal structural frames having a horizontal member for linking the upper ends of a pair of parallel vertical members at specific intervals in the horizontal direction, stacking up the structural frames in multiple vertical stages through coupling members, putting scaffold boards to straddle over between horizontal members of adjacent structural frames on each stage, and attaching a side frame to the side of the scaffold board of each stage,

wherein the side frames have a height nearly equal to that of the structural frames, and are provided with mounting means for mounting so that the upper end of the side frames may be positioned nearly in the middle of the height direction of the structural frames.

2. A framework scaffold of claim 1, wherein the mounting means comprises a fixing pin projecting in the horizontal direction at an intermediate height position of the side frame, and a receiver fixed to the structural frame or coupling member, and having a receiving groove opened upward in the width matched with the diameter of the fixing pin.

3. A framework scaffold of claim 1, wherein the mounting means comprises a fixing plate fitted to the vertical member of the side frame and forming an insertion hole, and a positioning pin projecting from the vertical member of the structural frame and inserted into the insertion hole.

4. A framework scaffold of claim 1, wherein the mounting means comprises a stopper projecting toward the outside in the horizontal direction at right and left upper corners of the side frame and supported so as to be free to rotate about the vertical axis and free to ascend and descend, and a stopper receiver affixed to the structural frame for receiving the stopper,



wherein positioning means for positioning at a mounting position where the stopper is held by the stopper receiver, and a standby position where the stopper overlaps an upper member of the side frame is provided at the upper end of the side frame.

5. A framework scaffold of claim 1, wherein the mounting means comprises a holder composed of a shaft body supported retractable in the horizontal direction at the upper and lower corners of the side frame, and a groove member fitted to the front end of the shaft body and abutting against the side periphery of the vertical member of the structural frame,

wherein the groove member comprises a pair of side walls having a recess matched with the diameter of the vertical member, a bottom wall coupling the base ends of the side walls and affixed to the shaft body, a male-threaded bolt oscillatably pivoted in the plane direction of the side walls at one side of the bottom wall, and a bolt insertion groove cut in a size to be matched with the diameter of the bolt at the other side of the bottom wall, and

the bolt is fitted in the bolt insertion groove of the other groove member abutting against the vertical member, and a nut is driven forward from the front end of the bolt to hold the vertical member of the structural frame by the pair of groove members.