

SCAFFOLD BOARD STRUCTURE

Detailed Description of the Invention

[Technical Field of the Invention]

5 The present invention relates to a temporary structure for assembling a scaffold and support structure for various works, particularly to a scaffold board structure comprising scaffold boards bridging on a horizontal rack provided between braces.

10 [Description of the Related Art]

Hitherto, a conventional scaffold structure has been assembled using horizontal racks comprising round and square pipes and scaffold boards having grip members at both ends thereof (see, for example, patent document 1 and non-patent
15 document 1).

[Corresponding Patent 1] Japanese Utility Model Application Publication No. 1-18753 (page 3, Fig. 2)

[Corresponding Prior Art 1] NISSO CD Catalogue: "Nisso Silk Road Aluminum Frame with Cloth - toe attachable-
20 detachable gapless scaffold" by Nisso Industries Co., Ltd. : on-line retrieval (January 20, 2004) <http://www.nisso-sangyo.co.jp/silkroad.html>

Disclosure of the Invention

Problems to be Solved by the Invention

25 Of conventional techniques exemplified herein, those shown in patent document 1 has a structure in which grip members are protruding. Therefore, the protruding portion forms gaps between the horizontal racks and work board to

cause workers to stumble on walking, while tools may fall down through the completely hollow gaps.

On the contrary, the scaffold disclosed in non-patent document 1 is able to construct gapless scaffold boards, 5 since the grip members are assembled with concave and convex machining at both ends of the work board, and both ends are staggered to one another so that the ends of adjoining scaffold boards tightly fit to construct the scaffold boards without any gaps. However, safety of the structure has not 10 been perfect yet since gaps are formed between horizontal racks at portions where the scaffold boards are discontinuously provided.

The object of the present invention set forth for solving the aforementioned problems is to provide a scaffold 15 structure in which no gaps are formed between the horizontal rack and scaffold board at any sites to ensure sufficient safety for workers to walk and for preventing tools from falling down.

Means for Solving the Problems

20 For attaining the object above, the present invention provides a structure comprising a scaffold board bridging on a horizontal rack provided between braces, wherein the horizontal rack has an approximately T-shaped cross section with concave portions raising in a longitudinal direction at 25 the center of flat portions of the rack, and both ends of the scaffold board are mountable on the flat portion of the horizontal rack. According to this configuration, no gaps are formed since the scaffold boards are mounted on the

horizontal rack with overlapping portions to one another. Movement of the scaffold board in the longitudinal direction is restricted by the convex portions to stabilize the scaffold board. In addition, the scaffold boards may be
5 continuously provided with the convex portions as boundaries.

The scaffold board may be further stabilized by restricting the movement of the scaffold board in a transverse direction, as a result of providing engagement holes or protrusions on the back faces at both ends of the
10 scaffold board, while the protrusions are provided on the flat portion of the horizontal rack. The protrusion and engagement hole also serve for positioning when the scaffold board bridges the racks. When guide convex portions are provided on the flat portion of the transverse rack in place
15 of the configuration above while grooves are provided on the back face of the scaffold board so as to permit the guide convex portion to be fittable, the guide convex portion exhibits the same function as the projection and the groove exhibits the same function as the engagement hole. This
20 alternative structure is able to form the horizontal rack with a structure comprising partitioning convex portions provided in the longitudinal direction at the center of the flat portion, and fixing convex portions provided so as to be fittable with grooves provided on the back face at both
25 ends of the scaffold board at the left and right of the partitioning convex portion. Preferably, the rack is integrally molded as an approximately angled shape by forming the flat portion, partitioning convex portion and

right and left fixing convex portions by bending a sheet of a metal plate. It is also preferable in the construction of the present invention to form through-holes on a rising face of the partitioning convex portion of the rack while slide
5 pins capable of being inserted into and withdrawn from the through-hole are provided on the scaffold board, in order to prevent the scaffold board from being lifted up after placing the scaffold board. The approximately angled shape as used herein is typically a shape having three rising
10 portions (concave portions) on the flat portion, wherein the height of rising is typically higher at the center with lower rising portions at the left and right sides of the flat portion. However, the height of rising may be changed depending on the shape of the scaffold board, while the
15 locations of the left and right rising portions are also not restricted to the left and right sides of the flat portion. Instead, these rising portions may be also arbitrarily provided relative to the flat portion depending on the mode of loading of the scaffold board.

20 When the projection comprises the through-holes formed on the board member parallel to the convex portion, and the slide pin capable of being inserted into and withdrawn from the through-hole is provided on the scaffold board, the scaffold board is prevented from being lifted up by fitting
25 the slide pin into the through-hole. Consequently, the slide pin on the upper floor may be manipulated from the down floor. A margin for inserting the pin may be provided in this means by forming a slender through-hole in the

transverse direction to enable errors of the position of the scaffold board to be buffered.

The scaffold board is made to be flush with the convex portion by constructing the convex portion at the center of the transverse rack so as to have the same elevation as the height of the scaffold board when the scaffold board is mounted on the horizontal portion.

While it is ideal that no gaps are formed between both ends of the scaffold board and convex portion at the center, the scaffold board should be carefully descended while it is kept horizontal for eliminating any gaps to thereby requiring excess setting labor and time. Accordingly, it may be devised to fit the interlock holes formed on the back face of the scaffold board into the engagement holes one after another against the projection of the transverse rack, in order to promptly and simply place the scaffold board. For this purpose, the rising face of the convex portion at the center of the transverse rack is provided to be tapered for avoiding both ends of the scaffold board from interfering with the convex portion for fitting the projection into the interlock hole. According to this means, the scaffold board may be mounted by the same manner as described above even when the lower edge of the scaffold board comes into close contact with the edge formed between the horizontal portion of the transverse rack and convex portion at the center after placing the scaffold board, by adjusting an inclined angle of raising of the convex portion.

On the other hand, an arched frame may be formed by

providing leg members fixable to the braces at the left and right side of the transverse rack while an inclined member is provided between the transverse rack and brace member. According to this means, the transverse rack is reinforced
5 with the brace members while the load on the brace member is distributed by the incline member. As a result, a gable of the temporary scaffold and support structure is provided by the arched frame of the present invention, whereby the temporary scaffold and timbering system resistant to
10 twisting may be provided by the rigid structure (Rahmen structure) of the arched frame.

Metal joints for wedge binding may be provided at both ends of the transverse rack so that the joint may be applied to the brace having insertion pockets on its outer
15 peripheral circumference.

Operation

According to the present invention employing the means as hitherto described, the scaffold structure of the present invention is excellent in safety without forming any gaps
20 that interfere with walking of workers and permits tools to fall down, since the transverse rack has an approximately T-shaped cross section to enable both ends of the scaffold boards to be overlapped on the horizontal portion of the rack. The movement of the scaffold board in the transverse
25 direction may be restricted by providing protrusions on the horizontal portion of the rack while the scaffold board is allowed to have enhanced stability, while the protrusion and engagement hole function for positioning of the scaffold

board when it is bridged to the rack. The scaffold board is prevented from being lifted up by permitting the slide pin provided on the scaffold board to be fitted into the through-hole of the protrusion to enable the scaffold board
5 structure to have higher safety.

No steps are formed with the scaffold board that is flush with the convex portion by providing the convex portion of the transverse rack to have the same elevation as the height of the scaffold board to ensure the workers' safe
10 walk. Moreover, since the raising surface of the convex portion of the transverse rack is inclined with a tapered shape, the scaffold board can be promptly and simply mounted by avoiding the ends of the scaffold board from interfering with the convex portion, thereby providing the scaffold
15 board structure excellent in practical convenience.

[Best Mode for Carrying Out the Invention]

Preferred embodiments of the present invention will be described hereinafter with reference to the attached drawings. Fig. 3 shows a side view of the transverse rack,
20 and Fig. 4 shows an end view of the rack along the line A-A in Fig. 1. In this embodiment, the transverse rack 10 is approximately T-shaped portion formed of a protrusion of the convex portion 2 in the longitudinal direction at the center of the horizontal portion 1, and metal joints 3 for wedge
25 binding fittable to an insertion pocket P of the brace S are provided at both ends of the rack. As shown in Fig. 4, the rising face 2a of the convex portion 2 is inclined so that the convex portion is tapered by the reason to be described

hereinafter. While the convex portion is integrally molded with the horizontal portion 1 in this embodiment, both members 1 and 2 may be separately formed to integrate them by welding.

5 The scaffold boards 20 are arranged to be in parallel side by side in the direction of their length (in the longitudinal direction) as shown in Fig. 1 in this embodiment, and protrusions 4 are provided on the horizontal
10 portion 1 at a position with a distance of an approximately 1/4 of the length of the scaffold board from both ends of the scaffold board, so that the protrusions are located at the center of the scaffold board as shown in Figs. 2, 3 and 4. The protrusion 4 has through-holes 4b on a plate member 4a parallel to the convex portion 2. While the cross
15 sectional shape of the through-hole 4b is circular in this embodiment, it may be a different shape, and a vertically slender hole is preferable for providing a margin for inserting a slide pin to be described below.

As shown in Fig. 5, a specific example of the
20 construction of the scaffold board 20 comprises a engagement hole 23 that is able to fit the protrusion 4 of the transverse rack 10 that are formed on the back faces 22 at both ends of the main frame 21 having similar rectangular appearance to conventional ones, and a slide pin 24 that is
25 able to be freely inserted into and withdrawn from a through-hole 4b formed on the protrusion 4 of the transverse rack 10 on the back faces at both ends. The scaffold board 20 is inwardly bent at four corners to form a three

dimensional hollow space, and a hole that serves as both a spike and drain hole 26 is formed on the upper face 25 as in conventional scaffold boards.

The procedure for constructing the scaffold board 20 in the construction as described above will be described below with reference to Figs. 6 and 7. The scaffold board 20 is mounted aslant at first, and the engagement holes 23 formed on the back face 22 of the scaffold board are inserted into the protrusion 4 of the transverse rack 10 one after another. It is needless to say that the slide pin 24 of the scaffold board 20 remains retracted. While the construction work is easy and rapid by placing the both ends of the scaffold board on the horizontal portion 1 of the transverse rack 10 one after another while the scaffold board 20 is held aslant, the convex portion 2 of the transverse rack is liable to interfere with the edge of the scaffold board due to inclined setting of the scaffold board 2. However, since the raising face 2a of the convex portion 2 is also aslant in this embodiment, the protrusion 4 may be inserted into the engagement hole 23 by avoiding interference even when the scaffold board 20 is inclined.

After completing the work for inserting the protrusion 4 into the engagement hole 23 with respect to one end of the scaffold board 20, another end of the scaffold board is descended to place the scaffold board 20 horizontal as shown in Fig. 7. Consequently, the protrusion 4 can be inserted into the engagement hole 23 at the other end to enable the scaffold board to be mounted while both ends of the scaffold

board 10 to be overlapped on the horizontal portion 1 of the transverse rack 10. Since the movement of the scaffold board 20 in the longitudinal direction is restricted by engagement of the convex portion 2 and engagement hole 23 with the protrusion 4, and the movement of the scaffold board in the left and right directions is restricted by the engagement of the engagement hole 23 with the protrusion 4, the scaffold board 20 becomes stable in the horizontal directions.

10 As shown in Fig. 7, lift up of the scaffold board 20 may be prevented by protruding the slide pin 24 in order to insert it into the through-hole 4B of the protrusion 4. Since the rear end of the slide pin 24 is exposed from the free face at the back of the scaffold board 20, the slide
15 pin 24 can be manipulated to be projected and withdrawn from the scaffold boards 20 from the upper floor through the down floor in this embodiment. For preventing the slide pin 24 from being unwillingly projected and withdrawn, projection and withdrawal of the pin are preferably locked by allowing
20 the pin axis to be rotated within a prescribed angle (the pin axis is formed into an L-shape to permit the pin to rotate within an angle of 90).

Fig. 8 shows a second embodiment of the present invention. In this embodiment, a convex portion 30 is
25 provided on the horizontal portion 1 of the transverse rack 10 in place of the protrusion 4 as described in the first embodiment above, and a groove 31 capable of fitting the convex portion 30 is provided on the back face 22 of the

scaffold board 20 in place of the engagement hole 23. The function and effect thereof are the same as those of the protrusion 4 and engagement hole 23. Although the groove 31 should be provided throughout the entire width of the scaffold board 20, the convex portion 30 of the transverse rack 10 is not necessarily required to be continuously provided in the longitudinal direction. Instead, it may be located at given sites as the protrusion 4 is.

A rotatable Japanese Katakana "コ" shaped metal joint 32 is used as a means for preventing the scaffold board 20 from being lifted up after placing in this second embodiment, in place of the slide pin 24 described above. The metal fixing 32 is horizontally locked when the scaffold board 20 is being mounted, while the scaffold board 20 is prevented from being lifted up by a clamping action caused by permitting a cog portion 32a of the fixing metal to engage the back face 22 of the scaffold board 20.

Fig. 9 shows a cross section of the transverse rack 30, Fig. 10 shows a plane view thereof, and Fig. 11 shows a side view thereof as an example a third embodiment of the present invention. The overall configuration of the transverse rack 30 is the same as that in the second embodiment. The convex portion 32 is also provided on the transverse rack of this embodiment, in order to partition the scaffold board mounted in the longitudinal direction at the center of the horizontal portion 31 into left and right sides. A fixing convex portion 33 is formed at the left and right sides of the partitioning convex portion 32 for fixing the scaffold

board by permitting it to engage the grooves provided on the back faces at both ends of the scaffold body. The reference numeral 60 denotes metal fixings for wedge binding, which are provided at both ends of the transverse rack 30, having the same construction as those in the first embodiment. In more detail, the transverse rack 30 in this embodiment comprises a hollow hull formed by integrating the horizontal portion 31, partitioning convex portion 32 and fixing convex portion 33 by bending (roll machining) a metal sheet. This machining eliminates the need of providing the convex portions 32 and 33 by welding on the transverse rack 30 to provide high productivity. The left and right convex portions 33 may be continuously formed in the longitudinal direction by this machining as the central convex portion is. Alternatively, the flow of the line for bending may be based on drawing.

Figs. 12 and 13 show mounting of the scaffold board 40 onto the transverse rack according to the third embodiment. The through-hole 35 is formed on the rising face 34 of the transverse rack 30, and the slide pins 50 are provided at both ends of the scaffold body 40. According to the mounting method of this embodiment, both ends of the scaffold board 40 is mounted on the horizontal portion 31 so that the groove 41 fits the fixing convex portion 33, followed by projecting the slide pin 50 to lock into the through-hole 35. Consequently, the scaffold board 40 can be mounted on the transverse rack 30 while the scaffold board is restrained from shifting into the longitudinal direction

and from being lifted up. The structure of the slide pin 50 is the same as that in the first embodiment, and the L-shape pin axis 51 is rotated 90 in order to permit the tip of the pin 52 to be inserted into and withdrawn from the insertion
5 hole 35. The reference numeral 53 denotes a spring for biasing the tip of the pin in the direction of protrusion, and the spring is kept retracted before protrusion.

Fig. 14 shows a fourth embodiment of the invention. In this embodiment, an arched frame is formed by providing
10 braces 71 at the right and left of the transverse rack 70. In addition, a diagonal member 72 is integrated by welding between the transverse rack 70 and brace 71 for reinforcing the structure. The transverse rack 70 reinforced with the brace 71 and diagonal member 72 has a rigid frame (so-called
15 Rahmen frame) , and the temporary scaffold and support structure formed by assembling the reinforced rack is quite resistant to twisting.

Metal joints 73 for wedge binding having the same structure as those described above are provided at both
20 sides of the transverse rack 70, and a wedge-shape hook 74 fixable in the insertion pocket of the brace is also provided at the lower part of the brace 71. This construction permits the transverse rack 70 to be fixed at the metal joints 73 for wedge binding and at the wedge-shape
25 hooks 74 of the brace 71, or at substantially four points in total, to the brace. Therefore, the rack is attached to the brace with high strength to improve the function and effect of the Rahmen frame. Since the hook 74 of the brace 71 is

used for temporary fixing, the arched frame may be safely attached and detached as compared with two-point fixing using only the wedge binding metal fixings in the foregoing embodiment. However, the fixing structure of the brace into
5 the insertion pocket is not restricted to those as set forth in this embodiment, and the same metal fixing may be used between the transverse rack 70 and the brace 71, or the metal fixing may be provided so as to be attachable and detachable to a horizontal joint provided at the brace or
10 between the braces. Therefore, the metal fixing is not restricted to the wedge metal fixing and wedge hook.

While the transverse rack 70 in a fourth embodiment comprises round or rectangular pipes, and is conjectured to bridge the scaffold board having grasping portions at both
15 ends, it may comprise convex portions at the center as in the foregoing embodiments.

[Brief Description of the Drawings]

[Fig. 1] a front view of the transverse rack according to the first embodiment of the invention;

20 [Fig. 2] a plane view of the transverse rack;

[Fig. 3] a side view of the transverse rack;

[Fig. 4] an end view along the line A-A in Fig. 1;

[Fig. 5] an illustration of the scaffold board according to the first embodiment;

25 [Fig. 6] an illustration showing the procedure for placing the scaffold board according to the first embodiment;

[Fig. 7] an illustration showing the final step of the procedure;

[Fig. 8] an illustration of the relation between the transverse rack and scaffold board according to the second embodiment;

[Fig. 9] a cross section of the transverse rack according
5 to the third embodiment;

[Fig. 10] a plane view of the transverse rack according to the third embodiment;

[Fig. 11] a side view of the transverse rack according to the third embodiment;

10 [Fig. 12]

[Fig. 13] the relation between the transverse rack and scaffold board according to the third embodiment (after locking; and

[Fig. 14] a front view of the arched frame including the
15 transverse rack according to the fourth embodiment.

What is claimed is:

Claim 1

A scaffold board structure for bridging a scaffold board on a transverse rack provided between braces, wherein the
5 transverse rack comprises an approximately T-shape member having convex portions protruding in a longitudinal direction at the center of a horizontal portion, and both ends of the scaffold board is able to place on the horizontal portion of the transverse rack.

10

Claim 2

The scaffold board structure according to Claim 1, wherein protrusions are provided on the horizontal portion of the transverse rack, and engagement holes for the protrusion are
15 provided at the back face at both ends of the scaffold board.

Claim 3

The scaffold board structure according to Claim 2, wherein the protrusion comprises a through-hole in a plate member
20 disposed in parallel to the convex portion, and the scaffold board comprises a slide pin capable of being projected out and retracted from the through-hole.

Claim 4

25 The scaffold board structure according to Claim 3, wherein the through-hole of the protrusion is formed as a slender hole.

Claim 5

The scaffold board structure according to Claim 1, wherein a guide convex portion is provided on the horizontal portion of the transverse rack at the right and left side of the 5 convex portion at the center of the transverse rack, and a groove capable of fitting the guide convex portion is provided on the back face of the scaffold board.

Claim 6

10 A scaffold board structure for bridging a scaffold board on a transverse rack provided between braces, wherein the transverse rack comprises a horizontal portion, a partitioning convex portion provided in a longitudinal direction at the center of the horizontal portion, and a 15 fixing convex portion provided to be fittable with a groove provided on the back faces at both ends of the scaffold board at the left and right side of the partitioning convex portion, and wherein the overall configuration of the transverse rack is an approximately hill shape.

20

Claim 7

The scaffold board structure according to Claim 6, wherein the transverse rack is integrally formed by bending a metal sheet.

25

Claim 8

The scaffold board structure according to Claim 6 or 7, wherein a through-hole is formed on the raising face of the

partitioning convex portion of the transverse rack, and a slide pin capable of being projected out of and retracted into the through-hole is provided on the scaffold board.

5 Claim 9

The scaffold board structure according to any one of Claims 1 to 8, wherein the convex portion at the center of the transverse rack is provided to be flush with the upper face of the scaffold board when the scaffold board is
10 mounted on the horizontal portion.

Claim 10

The scaffold board structure according to any one of Claims 1 to 9, the convex portion at the center of the
15 transverse rack has a raising face with a tapered and inclined face.

Claim 11

A scaffold board structure for bridging a scaffold board
20 on a transverse rack provided between braces, wherein an arched frame is formed by providing leg members capable of being fixed to braces at the right and left of the transverse rack, and a diagonal member is provided between the transverse rack and leg member.

25

Claim 12

The scaffold board structure according to any one of Claims 1 to 10, wherein the arched frame is formed by

providing leg members capable of being fixed to braces at the right and left of the transverse rack, and diagonal member is provided between the transverse rack and leg member.

5

Claim 13

The scaffold board structure according to any one of Claims 1 to 12, wherein a metal joint for wedge binding for an insertion pocket formed on the brace is provided at each
10 end of the transverse rack.