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(54) Procedure to inspect the condition of construction scaffolding systems on site and tool for the execution of the procedure

(57) Procedure to inspect construction scaffolding systems, especially, metal made façade scaffolding systems before or even after the installation periodically on site, in the course of which we check the twisting and buckling on the frames of the scaffold system, the position of the scaffolding frame components related to each other and also the measurement discrepancies from the specification of these components. The point of the procedure according to the invention is to install a tool inside the inspected scaffolding frame attached to the frame of a possibly already erected scaffolding system to be checked on site, that follows the inner line of the scaffolding frame by a gap and the possible deformations and discrepancies from the specified measurements can be determined by survey or by measurements compared to the installed tool. To carry out the above procedure a tool is foreseen which is a rectangular shaped pattern frame (A) built up from two longer and two shorter side units (1) that follows the inner line of the inspected scaffolding frame (B) by a gap having at least two stably attached clips on one of the longer side unit (1) of the pattern frame (A) that can be connected to the system frame (B).

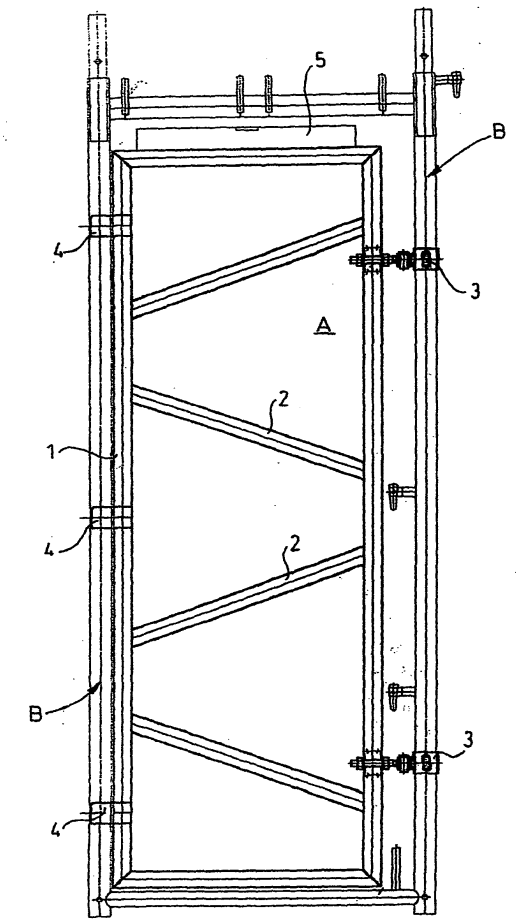

Fig.1

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Description

[0001] The subject of the invention is how to inspect the condition of construction scaffolding systems, especially facade scaffold systems before installation or periodically on site, possibly already erected, and the tool for the execution of the procedure.

[0002] Obligatory inspection before installation and periodic labor safety inspections on installation of metal made construction scaffold systems, primarily aluminum are specified by decree standards. These inspections must be done by qualified competent experts on labor safety regulations according to the parameters specified by the producers. According to the relevant standards, these inspections must include first of all the dimension and shape allowance of the vertical units of the scaffolding frames that are the main parts of the scaffolding system, moreover the dimension and shape allowance of other elements of the scaffolding system such as planking, guardrail members, cross braces, end gate assemblies, toeboards or access units, in addition, the condition of male bases, wall ties, clamps or eye bolts, as well as the quality of the joints and the surface condition. Of course, the results of the inspections are recorded in a protocol and the inspected scaffolding frames are marked accordingly.

[0003] On the course of the above mentioned inspection of the scaffolding system, the following must be checked if

- horizontal units are not deformed or twisted to such an extent that tilting occurs,
- joints are not cracked,
- vertical scaffolding frames are plumb and a proper fit can be made without force,
- handrail brackets are not deformed, the toeboards are not damaged, and the outriggers are working well,
- the cross braces are not deformed,
- the components of the scaffolding system are within the tolerance specified by the producer.

[0004] The above listed inspection tasks, primarily the inspection of scaffolding frames could not be carried out on site so far, especially when scaffolding systems had already been erected. So practically the test of conformity could be performed only under lab circumstances similarly to 102752-15100 Sps/str
the new production of scaffolding units. Due to this fact, on site safety inspections were restricted mostly to surveys.

[0005] Beside commonly used measuring instruments and testing equipment for checking joints and surface quality on different types of scaffolding systems, special testing patterns with impacting units attached to a solid, mostly fixed plate base were constructed. Components of scaffolding systems are to be attached to the patterns that measure the possible discrepancies from the specified measurements, the angles of related components, twisting, buckling and other irregularities that could endanger the safety of the scaffolding. Although this lab test pattern gives accurate test results, only few specified scaffolding types can be measured with it. Its general application is not possible, and due to its dimensions and weight, on site tests cannot be performed with it.

[0006] The invention's task is to implement such a procedure and construct such supporting equipment that enables a reliable and accurate on site safety inspection of construction or other types of scaffolding systems, especially on shape and dimension discrepancies of erected scaffold frames, possibly already in use. With reference to that, we have to note that joint and surface quality inspection as another part of the safety inspection of scaffolding can be carried out by on site survey or with help of a manual measuring equipment which can be combined with lab tests that provide more accurate data if needed.

[0007] The key to task completion is the recognition of the fact that a quick, accurate and reliable on site safety inspection can only be executed if there is an equipment available that is easy to carry and can be precisely set at the same time.

[0008] Based on this recognition, the invention that solves the task is a procedure on the course of which we install a tool inside the inspected scaffolding frame that follows the inner line of the frame by a gap. The procedure can even be used if the frame is to be inspected on site but already erected. The inspected deformations and discrepancies from the specified tolerance that may occur are to be compared to the installed tool by survey and measurements.

[0009] The tool enabling the execution of the procedure is a rectangular pattern frame with two longer and two shorter side units that attach to the inner line of the inspected scaffolding frame by a gap. One of the two longer units of this pattern frame has at least two stable brackets installed that can be attached to the inspected scaffolding frame.

[0010] To be able to fit the pattern frame precisely leveled with the inspected scaffolding frame and in order to clearly demonstrate the deformation of the scaffolding frame, according to the invention, it is advantageous to clip blockers on one out of the two longer side units that is opposite to the side unit having the brackets. These overhanging blockers, practically blocking plates must be of perpendicular position and enable the pattern frame to fit into and precisely level with the inspected scaffolding frame.

[0011] In order to achieve faster and more efficient inspection results, it is also advantageous to use eccentric quick locks that connect easily to the scaffolding frame.

[0012] For an easier application of the pattern frame, for practical reasons the brackets should have swivel joint to allow the closing-opening motion of the pattern frame.

[0013] At last, in order to provide a better stability and to maintain the shape of the pattern frame, it is advisable

to connect the longer side units with cross braces.

[0014] The invention is explained in details by the enclosed diagram of the construction drawing.
In the diagram

Figure 1 shows a sketch of the pattern frame to carry out the procedure of the invention installed in the scaffolding frame inspected,
Figure 2 shows the vertical section of fixing the pattern frame to the scaffolding frame by quick lock and
Figure 3 shows the horizontal section of Figure 2

[0015] As it is shown by Figure 1, the rectangular pattern frame A that is suitable for the execution of the procedure consists of two longer and two shorter side units 1 that can possibly be made of light metal mainly aluminium hollow sections welded together, where the longer side units 1 of pattern frame **A are connected by cross braces 2 in order to obtain higher level of stability. Pattern** frame A can be made of other materials (e.g. plastics) provided their ability to maintain shape is comparable to light metal so side panels 1 of pattern frame A can be connected in other ways accordingly. Pattern frame A is sized the way that its outer line follows the inner line of scaffolding frame B to be inspected with a gap where the gap between scaffolding frame B and the pattern frame A installed to it falls in the interval of 1 to 10 cm. Anyhow, the size of the gap should enable quick and accurate measurements on the inner circumference of scaffolding frame B and survey that can detect the possible deformations easily. Two quick locks 3 allowing a practical closing-opening motion are fixed to one of the longer side units 1 under each other in order to obtain easier use. Their detailed structure and the way of installation are shown by Figure 2 and Figure 3.

[0016] At the same time, on the longer side unit that lies opposite to the longer side unit that has installed quick locks 3, there are three evenly spaced overhanging perpendicular blockers 4, possibly blocking plates. These plates fit to one side of the inspected scaffolding frame or are laid onto it providing a leveled and precise fit of pattern frame A into B, furthermore, lack of even spacing between the blockers 4 is a definite sign of deformation. The level 5 placed on the upper shorter side unit of the pattern frame shows clearly if the inclination angle of the erected scaffolding frame exceeds the acceptable limit. Figure 2 and Figure 3 show clearly that quick locks 3 are fixed by screws 6 and bolts 7 to pattern frame A and by a tube brace 9 fixed by eccentric 10 to scaffolding frame B. As a swivel joint 8 connects the bolt of the quick lock 3 and the tube brace 9, this point allows pattern frame A to make a closing-opening motion related to scaffolding frame B, providing easier use.

[0017] Based on the invention, the execution of the procedure with help of the above described pattern frame A is as follows:

[0018] The procedure to inspect mainly metal, especially aluminium made construction scaffolding systems before installation or periodically on site should be executed as already described in the introduction. These inspections must include the dimension and shape tolerance of the vertical parts of scaffolding frames B that are the main parts of the scaffolding system, moreover the dimension and shape tolerance of other elements of the scaffolding system such as planking, guardrail members, cross braces, end gate assemblies, toeboards or access units, in addition, the condition of male bases, wall ties, clamps or eye bolts, as well as the quality of joints and the surface condition.

[0019] The on site inspection of the associated accessories consists of surveying and measuring length but it can also include the inspection of diameters when needed. The joint and surface quality inspection of scaffolding units can be carried out by manual measuring equipment which can be supported by lab tests in reasonable cases if more accurate data are required.

[0020] The most important novelty in the procedure to inspect the condition of scaffolding systems on site for safety reasons is the application of pattern frame A that can be easily delivered to the site of the inspection due to its light weight where it can be installed accurately and quickly to the current inspected scaffolding frame B with its proper connecting parts, meaning quick locks 3 fixed by eccentric 10. As the quick lock 3 has a swivel joint 8, the pattern frame that is fixed on one of the longer side of the scaffolding frame can be folded onto the inspected scaffolding frame. In case there is no occurring deformation, the pattern frame is leveled with the scaffolding frame B in a position defined by the blockers 4. It follows the inner line of scaffolding frame B by a gap and in this position on one hand, the possible deformations can already be determined by survey, on the other hand, discrepancies from the specified shape and dimension tolerance can be easily measured along the inner circumference of scaffolding frame B, usually at 2 points per side. In case the scaffolding system is already erected and installed, the procedure to install pattern frame A to each scaffolding frame B to be inspected is as follows: pattern frames A is to be installed one by one to each scaffolding frame B to be inspected, starting on the lower levels, prior to which the removal of the handrail end assemblies is required. If the rate of damaged frames exceeds 20% of the inspected scaffolding frames B, the scaffolding system is not safe any more and has to be dismantled. If the on site inspection is executed on not installed scaffold units, on the ground, the inspected scaffolding frame B and pattern frame A have to be practically placed on a spiny palette laid down on the ground.

[0021] The procedure and tool, namely pattern frame, detailed in the invention's description above makes it possible to inspect the condition of different types of scaffolding systems, especially metal made façade scaffolding systems in an economic, efficient and accurate way before installation or periodically, possibly when already erected.

Claims

1. A procedure to inspect construction scaffolding systems, especially, metal made façade scaffolding systems before or even after the installation periodically on site, in the course of which we check the twisting and buckling on the frames of the scaffolding system, the position of the scaffolding frame components related to each other and also the measurement discrepancies from the specification of these components, **characterized by** the installation of a tool inside the inspected scaffolding frame attached to the frame of a possibly already erected scaffolding system to be checked on site, that follows the inner line of the scaffold frame by a gap and the possible deformations and discrepancies from the specified measurements can be determined by survey or by measurements compared to the installed tool.

2. A tool to inspect the condition of construction scaffolding systems, especially facade scaffold systems before installation or periodically on site. In addition, we check the twisting and buckling on the frames of the scaffold system, the position of the scaffolding frame components related to each other and also the measurement discrepancies from the specification of these components. The tool is **characterized by** a rectangular shaped pattern frame (A) built up from two long and two short side-units (1) that follows the inner line of the inspected scaffold frame (B) by a gap having at least two stably attached clips on one of the longer side unit (1) of the pattern frame (A) that can be connected to the system frame (B).

3. A tool according to Patent Requirements 2, **characterized by** blockers clipped on one out of the two longer side units (1) that is opposite to the one having the brackets. These overhanging blockers (4), practically blocking plates must be of perpendicular position and enable the pattern frame (A) to fit into and precisely level with the inspected scaffolding frame (B).

4. A tool according to Patent Requirements 2 or 3, **characterized by** the application of eccentric quick locks (3) that connect easily to the scaffolding frame (B).

5. A tool according to Patent Requirements 2-4, **characterized by** brackets that have swivel joint (8) to allow the closing-opening motion of the pattern frame (A) compared to the scaffolding frame (B).

6. A tool according to Patent Requirements 2-5, **characterized by** cross braces (2) that connect the longer side units of the pattern frame (A).

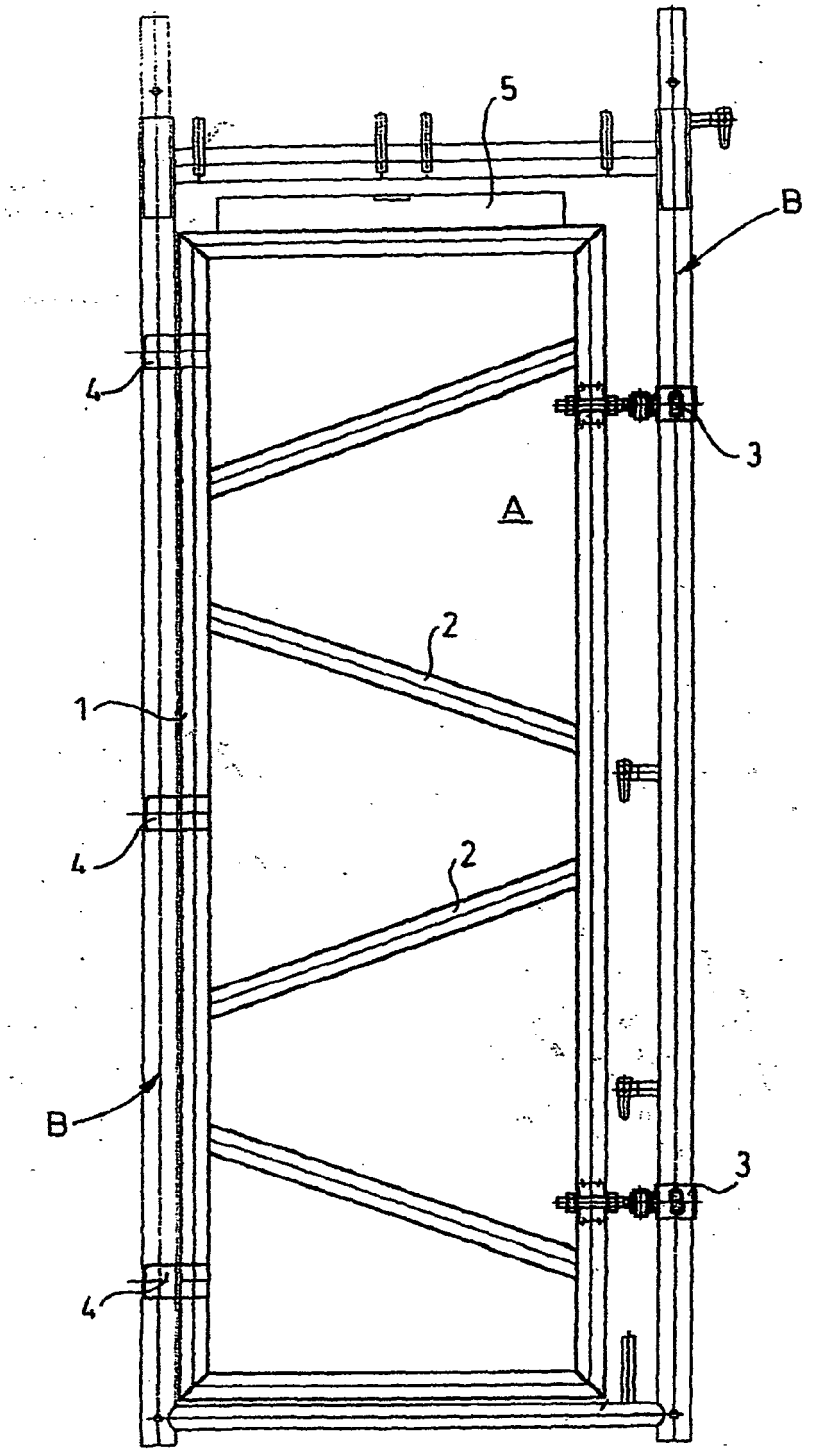

Fig.1

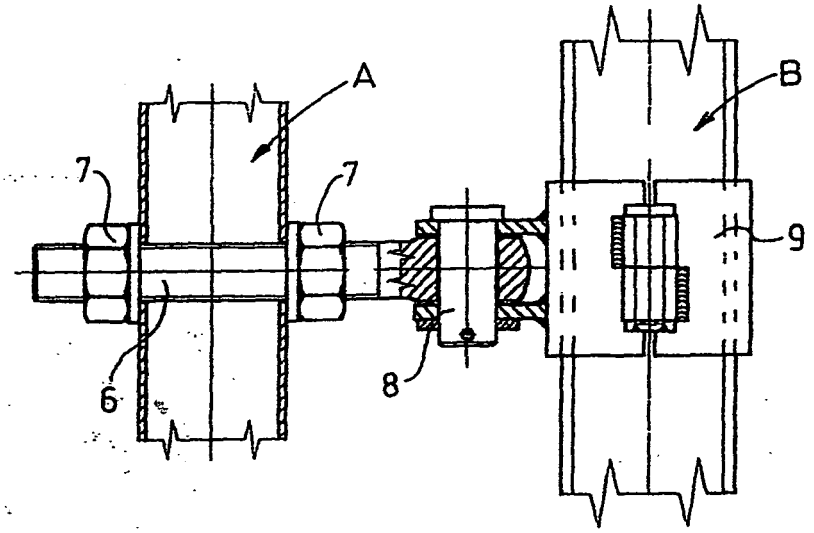

Fig.2

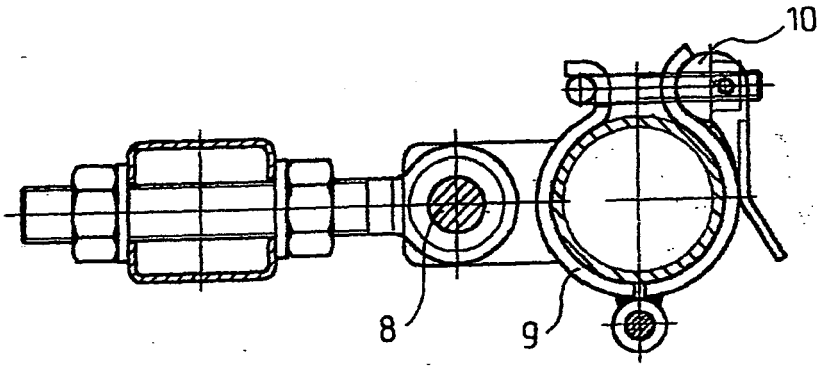

Fig.3