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08 MAY 1995

ELEVATING SCAFFOLDING

The invention relates to scaffolding.

The invention relates more particularly to a scaffold structure and a method of using the structure for erection
5 of a building.

It is common practice to use scaffolding to erect and to finish off a building. Normally, the scaffolding is put together piece by piece as the building is erected and remains intact until the erection and any surface
10 finishing, or glazing where applicable, is completed. If the building is very high for example, the amount of scaffolding material required and remaining on site for long periods of time is considerable.

It is an object of the invention to overcome or at least
15 significantly reduce this problem.

According to one aspect of the invention there is provided a scaffold structure for use in erecting or finishing a building in which the structure is provided with connectors for connecting the structure to a side of a
20 building so as to be supported by the building in use, and lifting points for use in raising and lowering the structure as a whole relative to the building.

The structure may be formed by a number of like scaffold parts which are releasable joined together and movable



together or separately as desired.

According to another aspect of the invention there is provided a method of erecting and/or finishing buildings using scaffolding which comprises using scaffold sections at the outside of the building, the method comprising providing the scaffolding in pre-formed or pre-erected sections, supporting the sections on the side of the building, and lifting or lowering the sections from time to time to be supported at other heights on the building as building operations proceed.

A number of scaffold sections may be used with an releasably fixed together to form a multiple section scaffold structure.

A scaffold structure and a method of using the structure according to the invention will now be described by way of example with reference to the accompanying drawings in which :-

Figure 1 is a top plan view of a building surrounded by the scaffold structure;

Figure 2 is a front view of the scaffold structure;

Figure 3 is a side view of the structure showing supports provided by a building;

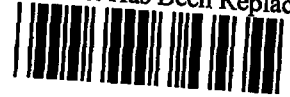


Figure 4A shows a top view of part of the support structure;

Figure 4B shows a side view of part of the support structure;

5 Figure 5A is a top view of a lifting support arrangement;

Figure 5B is a side view of the lifting support arrangement;

Figure 6 is a top view of a guiding system;

10 Figure 7 is a plan view of a building showing supporting frames;

Figure 8 is a side view of a smaller scaffolding structure.

Referring to the drawings, in Figure 1 a steel pipe scaffold structure 1, has stand-pipes 2 and the transverse
15 pipes 3 which surrounds a building 26 with a steel frame 14.

The scaffold structure is about three storeys high and constructed with steel pipes and joints, see Figure 2. It is supported by principal and supporting frames at the
20 bottom. There are standpipes 2, transverse pipes 3,



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transverse brace pipes 4, railing pipes 5, a safety net 7, a double -pipe bottom chord 9 of a truss, a double-pipe top chord 10 of the truss, a riding shore pipe 11 of the truss, a riding shore pipe 12 of the scaffold structure and a steel frame 14.

In Figure 3 (and Figure 8) the scaffold structure includes a standpipe 2, a transverse pipe 3, a transverse brace pipe 4, a riding shore pipe 12, a scaffold plank 6, a railing pipe 5, and a safety net 7. The scaffold structure is mounted to a building 26 and has six working levels and is a little taller than a normal three storey building. Hanging under the lowest level is a bottom safety net 8. The parts and materials used for the structure are standard parts used in normal double-column scaffolding. The lower part of the scaffold structure is on the two-column truss principal, having inside and outside trusses, constructed with steel pipes and joints. The trusses are composed of a double-pipe upper chord 10, a double-pipe lower chord 9, a riding pipe 11, and a standpipe 2. The two ends of the truss are supported by a support structure consisting of a support frame 14 made from steel, and tension rods 16, 17 and 18. The steel frame is anchored onto structure beam 13 with anchoring screws 22 and 28 through a pre-casted hole 23. These parts make up the scaffold structure. At its stable stage, the top of the scaffold structure is above the working level of the building and becomes a safety fence.

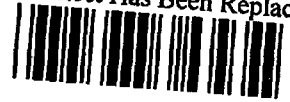
In accordance with the invention, it is necessary to lift



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and lower the structure as a whole or in sections as the building progresses. The lifting is provided by electric blocks 19 that hang under the lifting support that consists of I beams 20; steel jackstays 21; and anchoring screws 27 and 29. Electric block hooks are hooked to hangers 15 that are attached to the support frames 14. Before lifting, anchoring screws 28 and 22 on tension rods 16 are loosened, and retrievable sections 30 of support frames 14 are retrieved from the wall. Power is then applied to lift the scaffold structure slowly up one floor. The tension rods 16, anchoring screws 28, retrievable sections 30 and anchoring screws 22 are then re-installed to complete the lifting process. I beams 20 and steel jackstays 21 are removed and re-installed one floor up to be ready for the next lifting. The lifting process will be repeated one floor at a time to the top floor until construction of the building structure is completed. The process is then reversed to lower the scaffold two floors at a time for outside wall finishing until the scaffold reaches the lowest level. This process functionally replaces the conventional scaffold and requires significantly less scaffold materials to complete the building and finishing off the outer walls.

An advantage of the process is that although the two-column scaffold is only three storey high (but with its flexible lifting capability, as a whole or by section), it can replace conventional scaffold systems for the



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construction of a tall building and outside wall finishing. This system saves a lot of scaffolding material, such as steel pipes, joints, and scaffold planks. It also greatly reduces the amount of high-elevation scaffolding required at any one time and so improves safety. It also can decrease the time required to complete a building.

The scaffold structure can be elevated complete or in sections. The scaffold structure is normally supported by the truss principal, and the two ends of the truss principal are supported by the support structures composed of steel frames 14, tension rods 16, 17 and 18, retrievable sections 30, and anchoring screws and bolts 22 and 28. The supporting structures are anchored on the structure beam with anchoring screws through pre-casted holes 23. In a lifting stage, the scaffold 1 is elevated or lowered in whole or by sections, using the electric blocks 19 that hang under the lifting support structures which are composed of I beams 20, steel jackstays 21, and anchoring screws 27 and 29, with the hooks of the electric blocks hooked to hangers 15 that were attached to steel frame 14.

In a lifting stage, guiding rings 24, anchored on structure beams 13, are attached to guiding pipes 25. Guiding pipes 25 slide within guiding rings 24 to guide the lifting and lowering motion and to prevent the scaffold structure from slanting outward or inward.



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In a stable stage, the scaffold is functioning as construction scaffold. The weight of the scaffold and its workload are transferred by the truss principals, steel frames 14, tension rods 16, 17 and 18, and anchoring screws 22 and 28 onto structure beams 13.

In a lifting stage, the scaffold is being elevated or lowered. The weight of scaffold 1 is transferred by steel frames 14, hangers 15, electric blocks 19 and its hooks, I beams 20, steel jackstays 21, and anchoring screws 27 and 29 onto structure beams 13.

In Figure 4, a pre-cast hole 23 is formed in the concrete beam or shear wall 13. The length of a tension rod 16, 17, 18 can be adjusted by twisting 17 to match the distance between floors of the building. A retrievable section 30 is bolted on to a steel frame 14 with screws and bolts, and can be retreated and stay away from the wall at the lifting stages. A dish 31 can be turned around in order to align its holes with the pre-cast holes on the wall. These parts makes up a support structure.

In Figure 5, an I beam 20 has near its tip a hanging ring 32 for the electric block. The I beam is anchored on structure beam 13 with an anchor screw 27. At the lower part of a jackstay 21 is an adjustable section 33 and angle joint 34. The jackstay is anchored on the structure beam 13 with an anchor screw 29. These parts make up a



lifting support structure.

In Figure 6, the scaffold structure 1 cooperates with a guiding ring 24 anchored onto a structure beam 13. Two ends of a guiding pipe 25 are bolted to the scaffold structure 1 with joints and a bracing pipe 35.

In Figure 7, a crane 36 is shown and can ride in between where at 37 the scaffold structure is divided into sections. Sections can be arranged according to construction plan. Sections of the scaffold need not be attached to each other side to side and so they can be elevated or can be lowered separately. An overhang 38 can be used to cover short lengths without another supporting structure at the other end.

It will be noted that when the system is in stable stage or is functioning as scaffold, the steel-pipe scaffold structure 1 is supported by the truss principal constructed with steel pipes and joints. The two ends of the truss principal are supported by the support structures that compose of steel frames 14 and tension rods 16, 17 and 18, which are both anchored onto structure beam 13 with anchoring screws 22 and 28. At this stage, the weight of the entire scaffold and its workload are transferred to and are supported by pre-casted holes 23 on the structure beams 13 through steel frames 14 located under scaffold structure truss principals; tension rods



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16, 17 and 18; and anchoring screws 22 and 28.

In a lifting stage, steel-pipe scaffold 1, as a whole or by section, is elevated or is lowered by the lifting support structures that compose of anchoring screws 27, 29, bolted through pre-casted holes 23 onto structure beam 13; I beam 20; and steel jackstay 21, and by electric blocks 19, hanging under the lifting support structures, with their hooks hooked to hangers 15 that were attached to steel frames 14. In its lifting stage, the scaffold structure is being lifted or being lowered. At this stage, the entire weight of scaffold 1 is transferred to and is supported by structure beam 13 through hangers 15 attached to steel frames 14 and hooked to the hooks of electric blocks 19; I beam 20; steel jackstays 21; and anchoring screws 27 and 29.

Several electric blocks 19 hanging under the lifting support structures that compose of I beams 20 and steel jackstays 21 can be used. Anchoring screws 27 and 29 anchored onto structure beam 13, are hooked to hangers 15 and steel frames 14 with the hooks of electric blocks 19 to lift scaffold 1 up or to lower it down as a whole.

The scaffold structure can be lifted in sections. Two sections at the left side and the right side of division 37 can be separated. They can be lifted or can be lowered separately. The section that was lifted up is one storey



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above the other sections that are not lifted yet.

As mentioned, guiding rings 24 are used. Guiding pipes 25
slide inside the guiding rings 24. The lifting or the
lowering of the scaffold is guided by in this way to
5 prevent the scaffold from slanting outward or inward.



This Sheet Has Been Replaced



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CLAIMS

1. A scaffold structure for use in erecting or finishing a building characterised in that the structure is provided with connectors for connecting the structure to a side of a building so as to be supported by the building in use, and lifting points for use in raising and lowering the structure as a whole relative to the building.
2. A structure according to claim 1, characterised in that the structure is formed by a number of like scaffold parts which are releasable joined together and movable together or separately as desired.
3. A method of erecting and/or finishing buildings using scaffolding which comprises using scaffold sections at the outside of the building characterised by providing the scaffolding in pre-formed or pre-erected sections, supporting the sections on the side of the building, and lifting or lowering the sections from time to time to be supported at other heights on the building as building operations proceed.
4. A method according to claim 3, characterised by providing a number of scaffold sections and releasably fixed them together to form a multiple section scaffold structure.