



TITLE: Scaffold	STANDARD:	215
ISSUE DATE: 31 October 2015	ISSUE No:	001

Definitions (in relation to this Standard)

Access & Egress	Includes ascent and descent, and area around access/egress points
Competent	Trained, experienced and certified by an internationally recognized 3 rd party training provider approved by the Royal Commission.
Work at Height	Including at, above, and below ground level
Scaffold erector	Shall hold a 3 rd party 'scaffold erection' training certificate
Scaffold supervisor	Shall hold a 3 rd party 'scaffold supervisor' training certificate, and be subject to an interview by Royal Commission ES&H department for approval.
Scaffold Competent Person	Shall have overall responsibility for all scaffolds on site. This person must be an experienced, qualified structural engineer, and hold a separate 3 rd party certification for "Scaffold Inspector", and be subject to an interview by Royal Commission ES&H department for approval.

Terminology

Open Tube & Clamp Scaffold

(Also called tube and coupler / tube and fitting) is a versatile type of scaffold consisting of steel tubes and clamps. Vertical tubes are connected to horizontal tubes via right angle clamps. Diagonal tubes are periodically connected to the scaffold via swivel clamps in order to stabilize the scaffold.

Scaffolding Procedure

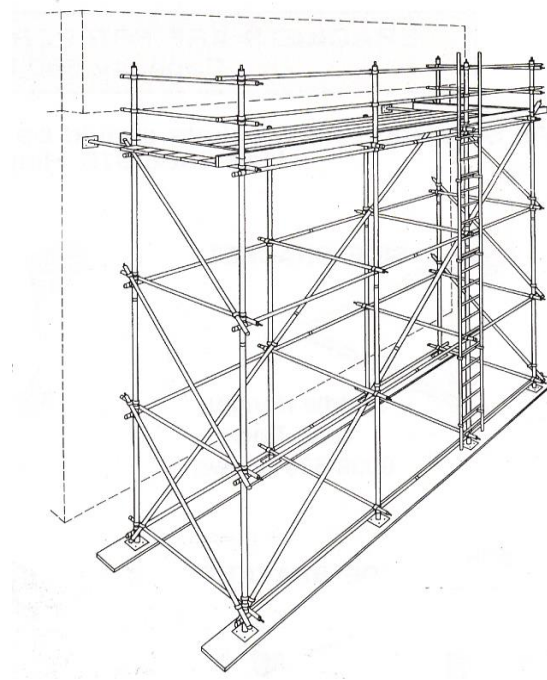


Fig. 1 Open Tube & Clamp Scaffold

This type of scaffold is generally used where unlimited versatility is required. Horizontal tubes (and thus walking-decks) can be placed at any height along the vertical tube (as permitted by engineering constraints), and vertical tubes, or legs, can be spaced at any distance apart, up to the maximum distance allowed (by engineering constraints).

System Scaffold

Is made up of different sized vertical posts and horizontal and diagonal tubes. The vertical posts have fixed connection points spaced at regular intervals to which you can quickly connect the horizontal and diagonal tubes, and can be used as an alternative to traditional 'Open Tube & Clamp'. Additionally System scaffold will also use a latch mechanism of free bearing joints.



25252-000-GPP-GAM-00162
Revision: 001

Scaffolding Procedure

Fig. 2 System Scaffold

The interlocking components on system scaffold will form standardized bays; however these can be adapted to form various structures such as cantilevers, protection fans, saddles and bridged sections to suit site needs.

The main advantages of system scaffold are that there are no protruding tubes leaving a flush finish; all working lifts are boarded, and more importantly, it is faster to erect, dismantle or adapt.

System scaffolds are usually referred to by the Manufacturer's names (i.e. such as "Twistlock", "Cuplock", "Ringlock", "Kwikstage").

Standards (uprights)

Are the vertical tubular members that transmit the vertical loads of the scaffold to the foundations. The spacing between standards should follow manufacturer's instructions; a guide to these can be found at Paragraph 14.

Transoms (bearers)

Run at right angles to the structure, joining the inside and outside ledgers and supporting the scaffold boards. Intermediate transoms may be required in some cases to support the platform between main transoms.

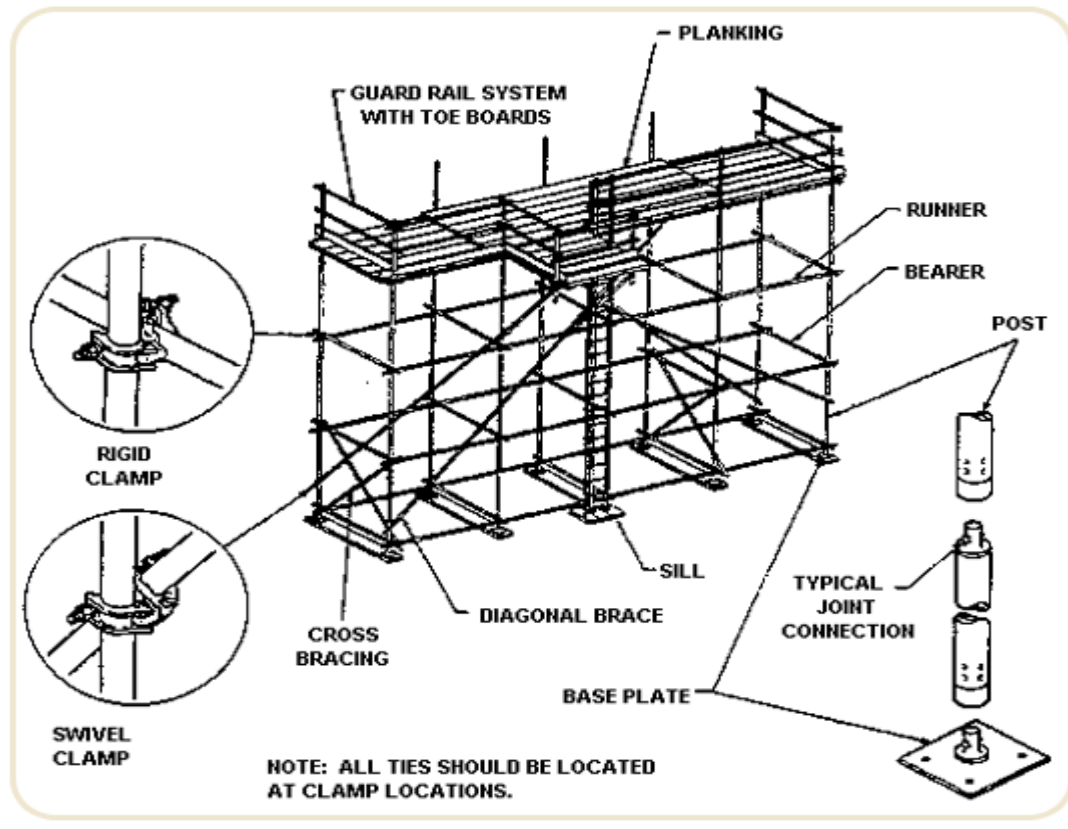


Fig. 3 Scaffolding Description

Scaffolding Procedure

Ledgers (runner)

Ledgers run along the inside and outside of the scaffolding joining each pair of standards to another pair; they also support any intermediate transoms.

Cross-References

- Standard 214 - Working at Height
- Standard 216 - Working Platforms
- Standard 218 - Fall Arrest & Work Restraint Systems, Nets & Rope Access
- Standard 219 - Ladders, Steps & Lightweight Staging
- Standard 220 - Roofing & Fragile Surfaces

Standard

General

1. For all working at height where the risk assessment shows that scaffolding is to be constructed; **only** "Open Tube & Clamp" or "System" Scaffold is acceptable to the Royal Commission.
2. Mixing of different systems or types of scaffolding shall not be employed on site.
3. H-frame scaffolds are not permitted.
4. All planning for scaffold shall include risk assessments and safe sequence of work which are to be included in the Construction Phase ES&H Plan. The scaffold competent person must attend an interview with Royal Commission ES&H for approval prior to working.
5. All scaffolds over 10m long, and/or over 8m in height, or hung, or cantilever or suspended scaffolds must be designed by a qualified, professional structural engineer. All calculations and the design drawing(s) must be included in the method statement and submitted for approval to RC ES&H prior to any erection. Once erected, designed scaffolds must be approved and signed off by the structural engineer who designed it as being built to the design. No alterations or deviations from the original design are permitted unless approved in writing from the person who designed it.
6. Only a trained and 3rd party certified scaffold erector can erect, modify, move, maintain or dismantle scaffolding and be supervised by a (scaffold) competent person.
7. Scaffolding must be constructed of sound strong material. Tubes should not be split, cracked, rusty, bent or distorted, and ends should be cut square and clean. Scaffold boards must be a minimum of 1,500 lb-f/in² construction grade lumber (minimum 2-inch thickness, by 10-inch wide), fitted with end hoop irons for protection. Couplers should be free from worn threads or damaged bolts and excess oil which reduces friction grip. Before erecting and while dismantling scaffolds, all components should be inspected and must be straight, free from bends, kinks, dents and severe rusting.

Scaffolding Procedure

8. Each scaffold and scaffold component must support without failure its own weight and at least four times the maximum intended load applied or transmitted to it. Scaffolds and scaffold components must not be loaded in excess of their maximum intended loads or rated capacities, whichever is less. Where it is necessary to load out scaffolds with bricks, cement and other materials, the scaffold should be checked on a daily basis to ensure that the loads are within permissible limits. These checks must be recorded and made available to the Royal Commission.
9. Contractor shall provide adequate and suitable tools and suitable training for the erection, modification, moving, maintaining, inspection and dismantling of scaffolding. Records of training and qualifications must be kept on site and made available to the Royal Commission. Contractor must train each employee who works on a scaffold on the hazards and the procedures to control the hazards before they work commences.
10. During erection, modification, moving and dismantling of scaffolding only competent persons and certified scaffold erector are allowed access. A (scaffold) competent supervisor shall maintain control of these works. Before each work shift and after any occurrence that could affect the structural integrity, a competent person must inspect the scaffold and scaffold components for visible defects, and sign scaffold structure off as acceptable. Records of all inspections must be kept and made available to the Royal Commission.
11. All scaffolds, during the erection, operation and dismantling process must have fitted a scaffold inspection tagging system. No scaffold shall be left partly erected or dismantled unless adequate notices are displayed and access is blocked. (For more information see Paragraph 38).
12. The scaffold should be "locked-off" at any access points (ladders) at the end of each day to prevent unauthorized access.

Foundations

13. Foundations must be of adequate strength to support and disperse the load of the scaffold. On hard surfaces, such as steel and concrete of sufficient strength and thickness, standards may be placed directly onto the surface using 150 x 150mm base plates. On all other surfaces, the load should be spread by using sole boards (mudsills) and base plates, once the soil or ground has been leveled and properly compacted. Sole board (mudsill) minimum dimensions must be 760 x 225 x 35mm for soft ground, and 450 x 225 x 35mm for hard ground. Scaffold boards that have been used as sole boards must not be used on the main scaffold as their integrity has been compromised; best practice is to spray paint all sole boards red so they are easily identifiable.

Scaffolding Procedure

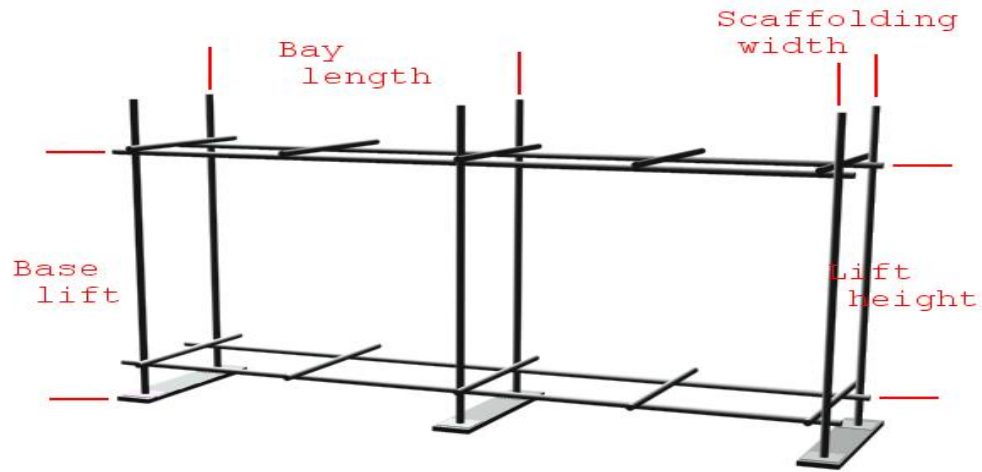


Fig. 4 Scaffold terminology, also showing sole plates.

Bay Length

14. The distance apart of transoms must not result in a bay length of greater than:

Very light duty (0.75Kn/m ²) – inspection, cleaning, painting	2.7m
Light duty (1.5Kn/m ²) – plastering, painting, glazing and pointing	2.4m
General purpose scaffold (2.0Kn/m ²) – general construction work, rendering, plastering	2.1m
Heavy duty scaffold (2.5Kn/m ²) – block work, brickwork, heavy cladding	2.0m

15. For system scaffolds, bay lengths are normally set at 2.4m.

Working Platform

16. All working platforms must comply with Procedure 216 – Working Platforms.

17. The working platform should be of adequate width to suit the work being carried out, but the minimum dimension for all working platforms is 600mm wide. The working platform must not have gaps in its surface through which a person, material or an object could fall. It must be constructed and maintained in a condition so as to prevent the risk of slipping or tripping, or prevent any person being caught between it and any adjacent structure. In the case of scaffolding, the maximum distance a working platform can be from the structure being worked on, is 300mm. A general guide for platforms is as follows:

Very light duty (0.75Kn/m ²) – inspection, cleaning, painting	3 boards wide – 600mm
Light duty (1.5Kn/m ²) –	4 boards wide – 800mm

Scaffolding Procedure

plastering, painting, glazing and pointing	
General purpose scaffold (2.0Kn/m ²) – general construction work, rendering, plastering	5 boards wide – 1050mm
Heavy duty scaffold (2.5Kn/m ²) – block work, brickwork, heavy cladding	As designed by a structural engineer; usually up to 6 boards wide – 1300mm

18. All working platforms, gangways and access points are to be kept free from obstructions to allow easy passage and a clean work area.

Ties

19. All scaffolds must be prevented from collapsing or tipping by secure attachment to the bearing surface or to another structure by the means of the following methods:

Reveal tie

A tube may be wedged or jacked tight into opposing faces of an opening. The reveal tie should be attached to the reveal tube within 150mm of the end of the opening face.

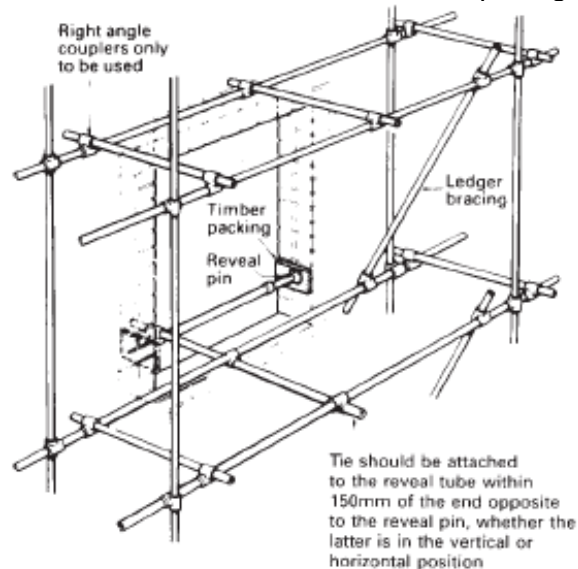


Fig. 5 Reveal Tie

Through tie

This type of tie relies on a tube, usually placed vertically inside an opening. The tube should preferably rest as close to one edge of the opening as possible.

25252-000-GPP-GAM-00162

Revision: 001

Scaffolding Procedure

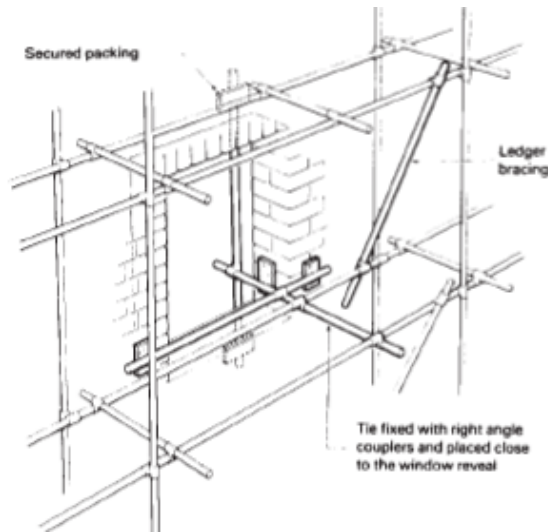


Fig. 6 Through Tie

Box tie

This forms an assembly of tubes and couplers around columns or other parts of a structure. It must be at the level of a scaffold lift and joined to both inside and outside ledgers or uprights.

Lip tie

An alternative form of tie takes the form of an "L" shaped arrangement of tubes and couplers, which hook the scaffold behind elements of the structure.

Cast-in / drilled-in anchorages

Purpose designed and sold anchorages for setting into concrete during pouring may be used. Manufacturer's instructions must be followed for spacing distances of anchor points.

Rakers

20. When no firm part of a structure exists to tie in a scaffold, the scaffold must be stabilized by the use of rakers, a raker being an inclined load-bearing tube. Movement of the lower end of the raker must be prevented by a foot tie to the main part of the scaffold.
21. Rakers must be used in addition to ties when scaffolds have a height to base ratio of more than four to one (4:1).

Bracing

22. Ledger bracing should be fitted on alternate pairs of standards, except where the width of the bays is 1.5m or less, and then they should be fitted on every third pair. Bracing should be fitted to ledgers or standards using load bearing fittings with a minimum slip resistance of 5Kn. Bracing should be fitted to the full height of the scaffold and start from base plate level.
23. Longitudinal (Façade) bracing must be provided for all scaffolds either as a zigzag from top to bottom, between a pair of standards, or as a continuous diagonal sloping tube.

Access

25252-000-GPP-GAM-00162

Revision: 001

Scaffolding Procedure

24. Ladders must be used for access to all scaffolds conforming to the 1:4 rule; under no circumstances must any attempt be made to climb up the outside of scaffolding as this makes the structure unstable.
25. All Ladders must comply with Procedure 219 – Ladders, Steps & Lightweight Staging.
26. Ladders used on scaffold shall not be more than 6m in length. At every 6m a rest platform shall be provided. At no time shall there be consecutive working platform openings that allow a fall of more than 2 lifts of scaffold height.
27. Gangways or "runs" must be a minimum of 600mm wide, preferably horizontal, but where this is not possible, they may slope up to a maximum gradient of 25%. Over a gradient of 25% or in slippery conditions, stepping laths must be provided at 300mm separation. Gangways or runs are only permitted to low level working platforms no more than 500mm high.
28. Ramp access shall not be used on any scaffold.

Fall Protection

29. Guard rails, toe-boards, brick-guards, barriers and other similar means of protection shall be so placed on the scaffold or mobile tower (specifically the working platform, access & egress) so as to prevent the fall of any person, object or materials from any place of work at height.

Protection of others

30. Protection of persons against falling materials should be provided by the use of nets, brick guards, toe-boards, fans and by the use of barricades at ground level where practicable. All fans must be designed by a qualified, professional structural engineer. All calculations and the design drawing must be included in the Construction Phase ES&H Plan.
31. Special attention must be given to loading and unloading of materials and the removal of waste debris from the scaffold (Serial 8 of this Procedure is again highlighted). All loading bays intended to be incorporated into large scaffold structures must be designed by a structural engineer, and the design and calculations made available to the Royal Commission for approval prior to erection. Waste chutes are considered best practice for large waste removal at height.

Scaffolding Procedure



Fig. 8 Best Practice - Scaffold waste chute.

32. "Sheeted Scaffolds" or scaffolds that have nets or tarpaulins attached to them must have specific calculations and design conducted by a structural engineer to address the issue of "wind-sail" on the complete structure.

Specific to Mobile Towers

33. All mobile towers should be properly constructed as per manufacturer's instructions by competent persons. Height of working platforms cannot be more than 2 ½ times the minimum base width, unless outriggers are applied.
34. The mobile tower structure must be of sufficient strength and rigidity for the works. It must be secured in position, castor wheels locked before anyone accesses the tower.
35. Placing steps, ladders or other platforms on the working platform to gain additional height is dangerous and therefore prohibited.
36. Under no circumstances must any attempt be made to climb up the outside frames of a mobile tower, and all access must be made by use of a ladder (on the internal of the structure) or purpose-built frame. No ladder of any description must be leaned against the outside of a mobile tower. To do so would cause the tower to become unstable and add to the risk of overturning the tower.
37. No attempt should be made to move tall, fully-erected towers. The tower must be reduced to a safe height appropriate to the ground conditions. Normally as guidance, the height should not exceed 2 times the minimum base dimension. Move the tower manually from the base only; not by vehicle or construction plant. No persons or materials must be on the tower during movement.

Scaffolding Procedure

38. In windy conditions, manufacturer's instructions must be adhered to; usually at 17mph all work should cease on mobile towers. When wind speed reaches 25mph, all mobile towers must be tied to a rigid structure. If it is forecasted that wind speeds will reach 40mph, all mobile towers must be dismantled.



Fig. 9 Mobile Tower showing outriggers.

Inspections

39. All scaffolds, working platforms and mobile towers must be inspected by 3rd party certified scaffolding inspector:
- a. Before being taken into use for the first time
 - b. After any modification or other alteration
 - c. After any event likely to have affected its strength or stability
 - d. Daily before use, or at the beginning of each working shift - SEE APPENDIX 1
40. All Inspections shall be recorded and must contain the particulars as set out in Appendix 1 to this Procedure.
41. The Contractor shall develop and employ a scaffolding tagging system based on the three tag system, Scafftag or similar. The color code of any system used shall be:

Red	scaffold under construction, dismantling or failed an inspection (NOT SAFE TO USE, FULL BODYHARNESS REQUIRED, 100% TIE-OFF).
Yellow	scaffold erection completed but hazards identified (NOT SAFE TO USE, FULL BODYHARNESS REQUIRED, 100% TIE-OFF).
Green	scaffold erected to a complete and safe standard (SAFE TO USE).

Scaffolding Procedure

Tags shall be placed at every access point to the scaffold.



Fig. 10 Scaffold Tagging system "Scafftag"

42. Where the Contractor has used a scaffolding sub-contractor to erect any scaffolding structures, it is recommended that the Contractor require a handover certificate specifying:
- That the scaffold is complete and complies to the manufacturer's instructions and/or the design of the structural engineer
 - The distributed loads permitted on the working platforms
 - That all bracing and ties are complete
 - The inspection regime required for the scaffolding
 - If sheeting or tarpaulins are allowed on the scaffold
 - If (and what) minor alterations are allowed to be made by the Contractor's own employees

Dismantling

43. All scaffolds are to be dismantled as per manufacturer's guidelines. Designed scaffolds must be dismantled as per the structural engineer's instructions. When dismantling scaffold structures, materials should not be thrown down. The materials should be lowered to prevent damage to scaffold materials and danger to the surrounding area or personnel.

Rev.	Date	Description	Prep.	Checked	Approved
000	May-2009	Original	MS	WG	HS
001	Oct - 2015	1 st Revision	FH	FC	AK