Scaffolding equipment, components and materials

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Ladders

Many accidents have occurred with the use of portable ladders. For this reason, requirements have been put together by the Australian Standards in an attempt to reduce the number of accidents.

You can find out what the requirements are from these Standards:

- AS/NZS 1892.1:1996 Portable ladders Part 1: Metal
- AS/NZS 1892.5:1999 Portable ladders Part 5: Selection, safe use and care

You’ll find rules that relate to:

- the pitch or slope of the ladder
- extension of the top section of the ladder
- width of landings or rest platforms
- the clear width of an access platform

Important: You can find an easy-to-read Safety Guide for Portable Ladders provided by WorkCover NSW

Using portable ladders safely

Portable ladders used for accessing or working within a scaffold should be made of:

- timber
- aluminium (unless to be used near power lines)
- fibreglass.

The following gives you a general idea for basic safe practices when you’re using a ladder:

- make sure the ladder is on a stable base.
- do not move the ladder while standing on top of the ladder – a dangerous practice called ‘walking’ the ladder.
- slope the ladder from the base at an angle of one metre for every four metres in height.
- one ladder per person – with at least three limbs on the ladder at all times—both hands and one leg or 1 hand and both legs.
• do not climb above the third rung from the top of the ladder.
• use extension ladders that are compliant and following their rules.
• use stepladders only when it is fully opened and on a stable and level surface.
• follow safety requirements when using multipurpose ladders.

Use this table as a guide for the maximum length of ladders—prevents deterioration or damage.

<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>SINGLE</th>
<th>EXTENSION</th>
<th>STEP</th>
<th>TRESTLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metal</td>
<td>9.0m (industrial)</td>
<td>15.0m (industrial)</td>
<td>6.1m (industrial)</td>
<td>5.0m</td>
</tr>
<tr>
<td>Reinforced plastic (fibreglass)</td>
<td>5.0 (domestic)</td>
<td>7.0 (domestic)</td>
<td>2.4 (domestic)</td>
<td>5.0m</td>
</tr>
<tr>
<td>Timber</td>
<td>9.2m (runged) 4.9m (cleated)</td>
<td>15.3m</td>
<td>5.5m (industrial) 2.4m (domestic) 5.5m (platform)</td>
<td>5.1m</td>
</tr>
</tbody>
</table>

Types of ladders and platforms

**Trestle ladders**

• can support the load of two workers and two scaffold planks
• useful for painting ceilings, walls, windows, and wherever external or internal surfaces require construction and/or painting
• made from timber, aluminium or steel

**Aluminium maintenance platform**

• is mobile, designed for safety and range in size
• has large and comfortable working platform
• fitted with rubber wheels for easy moving
Heavy duty aluminium step ladder

- used for very high internal jobs—on a level floor or surface
- have heavy duty side rails, reinforced treads, rubber feet and a safety hand rail and range in size

Multi-purpose ladder

- used for internal or external work and adjustable to form variety of shapes to suit variety of positions
- easily to carry, store and range in size

Important: As the following ladders are unsafe to use, it’s against the law to use them:

- single stile ladders
- extensions to the top of step ladders
- ladders with rungs nailed to the front edge of the stiles.

Again, for safety reasons, it’s against the law to use any of the following:

- ladders with broken rungs
- timber defects
- broken or defective ropes
- broken or loose tie rods
- broken or missing feet
- any metal defects eg bent rungs, cracked welds or bent stiles.

Ladder components

Pole chains and hoops

- can be attached to single or extension ladders for safety when the ladder is placed against a pole or column.
### Ladder safety shoes
- used to let ladder stand at any angle—non-slip neoprene soles grip wet and slippery surfaces
- can fit any ladder

### Ladder brackets
- designed to take a single plank of up to 305 mm width
- for use by one person to carry out light weight duties eg painting or cleaning

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## Scaffold components

### Planks

Suitable materials to use for scaffold are:
- timber
- galvanised steel
- boxed aluminium.

These planks are suitable for working platforms:
- hardwood planks
- oregon softwood planks
- single ladder bracket planks.

### Important requirements to follow

Use the planks:
- at the recommended minimal cross sectional size
- within the allowable load capacities – exceeding the limits is possible only with approval from a Structural Engineer and WorkCover NSW if you do exceed
- where the work carried out or objects used is not higher than 2 metres.
Make sure that every plank you use has the following details clearly marked:

- the Australian Standard that the plank is compliant with
- working load in kilograms
- legal span in metres for random planks

You should check that all planks are suitable before you use them and check them regularly. The following are defects and must not be used:

- undersized scaffold members/components
- splitting
- cupping
- twisting
- wear or damage
- knots
- broken hoop iron straps on ends
- missing end caps
- welds broken on metal planks
- projecting nails
- saw cuts
- mortar or concrete blobs on the face or edges
- deep burns or any other visible defect.

Other essential scaffolding components

Other essential scaffolding components include the following:

**Standards:**

- made from standard scaffold tube used to form the vertical support
- ‘V’ pressings provide placement for ledgers and transoms.

**Adjustable base and head jack/screw:**

- used for levelling the scaffolding on sloping or uneven ground
- screw jacks available in various strengths.

**Ledgers / guardrails:**

- used to tie vertical standards longitudinally and positioned on the inside and the outside of the scaffold as a guardrail.
• midrail must be positioned between platform and guardrail.

**Transoms:**
• used to fix the inner and outer standards at an angle to form a frame
• also the seating for steel or timber boards.

**Steel boards:**
• have a durable, non-skid surface designed to form the working platform on system scaffolds
• also used as toe boards (kick boards).

**Tie bars:**
• made of rolled steel angle
• used to connect two and three board stage brackets together.

**Cross brace (heel and toe):**
• used in the width of the scaffold in the same plane as the transom
• pivoting captive wedge fittings fit into the ‘V’ pressings on the standard.

**Diagonal brace (face brace):**
• has pivoting captive wedge fittings welded to each end that fit in the ‘V’ pressings on the standards.

**Stage brackets (Hop-up brackets):**
• used to carry a connected two plank wide platform
• should be erected only on the scaffold face near the side of the building
• single plank wide hop-up should be used with a working platform at the same level.

**Putlog:**
• a short horizontal pole from a wall on which scaffolding planks rest
• can also be fixed to both ledgers on independent scaffold.
Scaffolding accessories

Scaffolding accessories include the following:

**Castor wheels:**
- made from steel or polyurethane
- used to clamp onto the scaffolds to create a mobile scaffold.

**Aluminium staircase:**
- allows scaffold users to move safely on scaffolding
- lightweight, easy to install and has non-slip stair treads for added safety.

**Ladder beams:**
- clear spans for vehicle access or to support cantilevered scaffolds
- also used to support heavy concentrated loads.

**Mesh guards:**
- hook directly onto guardrails
- used for formwork protection, screening and brick guards to keep materials within the platform.

Ropes

Scaffolders use ropes mainly to lift:
- scaffold planks
- scaffold tubes
- small buckets of fittings
- items or materials to be installed from the scaffold.

The type of rope you choose should depend on all of these factors:
- it is suitable for the task
- it is capable of lifting the objects you plan to use it for
- it is in good condition – there should be no visible defects.
Safety

Where possible all components must be received by lifting over the top of guardrails, with the exception of the first bay of each lift.

To lift the first guardrail, either by hand or rope, the person lifting the component must lock him/herself around the standard with both arms and legs.

This will allow the person to exert a leaning pressure on the standard without fear of falling while lifting the component.

Ways of attaching rope

Ropes used for lifting must be properly ties to the object being lifted to prevent slipping or complete release.

<table>
<thead>
<tr>
<th>Clove hitch</th>
<th>![Clove Hitch Diagram]</th>
</tr>
</thead>
<tbody>
<tr>
<td>• used for starting a lashing and</td>
<td></td>
</tr>
<tr>
<td>should always be used with a half</td>
<td></td>
</tr>
<tr>
<td>hitch</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Round turn and two half hitches</th>
<th>![Round Turn Diagram]</th>
</tr>
</thead>
<tbody>
<tr>
<td>• used to tie a rope under load—</td>
<td></td>
</tr>
<tr>
<td>supporting a block and tackle to</td>
<td></td>
</tr>
<tr>
<td>the scaffold</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Timber hitch and half hitch</th>
<th>![Timber Hitch Diagram]</th>
</tr>
</thead>
<tbody>
<tr>
<td>• used to secure a plank for lifting</td>
<td></td>
</tr>
</tbody>
</table>
Rolling hitch
- used to tie scaffold tube or round items for lifting
- should be used with a half hitch to allow for control during lifting

Reef knot and sheet bend
- used to join the ends of ropes of the same or different sizes together

Snubber turns
- used to hold or slowly lower a heavy load

Lifting with ropes safely
Where possible plan it so that scaffolding components can be lifted over the top of guardrails (except at the first bay of each lift).

To lift the first guardrail, either by hand or rope, the person lifting the component must lock him/herself around the standard with both arms and legs. This will allow the person to lean on the standard without fear of falling while lifting the component.

Protecting the ends of the rope
It is important to protect the ends of the rope so that they don’t unravel and to increase safety in lifting and lowering.

You can either whip or back-splice the ends of the rope. This should be done a person with the appropriate skills.
Image: Black splice and whip ends of rope