Scaffolding
Up to 5 metres

Glossary of terms

Caster A swivelling wheel for moving scaffolding.

Dead load That portion of the scaffold consisting of the structure and platform members.

Environmental load Loads caused by (e.g. rain, wind, ice, snow, dust etc.)

Guard rail A rail or barrier secured to up right members.

Height The distance a person can fall from a scaffold.

Ladder An appliance on which a person can ascend or descend on using cleats or rungs

Lift The vertical distance ledgers that form working platforms.

Live loads The portion of the scaffold that includes the weight of persons, tools, equipment and materials on the working platform

Modular scaffold Scaffold made up from prefabricated individual components

Notifiable scaffold Scaffold above 5metres, or where a fall of 5metres or more is possible. The nearest Worksafe office must be notified at least 24 hours prior to commencement of any work on this scaffold.

Toeboard A scaffold plank or purpose designed component fixed on edge to prevent materials from falling from the working platform.

Working platform A platform that is intended to support persons, material and equipment

Legislative Requirements for Scaffolding

Health and Safety Regulations

All scaffolding, must be erected, altered and dismantled by a competent person and in accordance with the code of practice (Approved Code of Practice for the Safe Erection and Use of Scaffolding).

Scaffolding must not be used unless the employer or the employer's representative on the project is satisfied that it is safe to use and complies with the Regulations.

Scaffolders must ensure that members of the public are not endangered during any part of the process and also ensure that the lower working platforms are not used while the upper lifts are still under construction, unless the appropriate protection is in place.

Note: Certificates of Competency for Scaffolders

Scaffolding which has any part higher than 5 metres it can only be erected, altered or dismantled by, or under the direct supervision of, a person who holds an appropriate Certificate of Competency in one of the following classes.

- Basic Scaffolding
- Advanced Scaffolding
- Suspended Scaffolds

Heights of More Than 3 metres

Every employer must take all practical steps in relation to a place of work under the control of that employer, that where any employer may fall more than 3 metres.

- Means are provided to prevent the employee from falling.
- And any means so provided are suitable for the purpose for which they are to be used.

Scaffolding

Where any construction work cannot not be carried out safely without the use of scaffolding:

- Scaffold is provided.
- Suitable for the purpose for which it is to be used.
- Properly constructed of sound material.
- Constructed with sufficient reserve of strength, in regard to the loads and stresses to which it may subjected to.

Note: As well as this requirement, an employer must take all practicable steps to ensure that staff is safeguarded against serious injury due to a fall; therefore guardrails may be required on scaffolding where there is a risk of a fall less than three metres.

Duties of Principals, Contractors, Scaffolding Erectors, and Users of Scaffolding

All those involved in the construction project have responsibilities for the systematic planning, preparation and implementation of the scaffolding process to ensure that all safety requirements are meet.

Note: A party can have responsibilities both as principal and employer at the same time

Specific duties of each party in the scaffolding process may include the following:

1) Developers, Consultants, Owners and People who control a place of work.

- Ensure suitable qualified contractors are employed to erect the scaffolding.
- Ensure sufficient finance is available to fund the work so that adequate provisions can be implemented to protect against hazards.

2) Project Management, Main Contractor and Subcontractors erecting Scaffolding

- Identify and plan the work to be carried out from the scaffold and specify any special requirements for the scaffold, such as loads the scaffolding may be expected to carry.
- Co-ordinate the erection, use and dismantling of the scaffold
- Ensure the safety of all others who may be in the vicinity of the scaffold including all on site personal and public.
- Identify and manage all hazards
- Co- ordinate and / or delegate inspections and alterations required to maintain the safety and integrity of the scaffolding.
- Ensure the protection of any scaffold from damage by construction vehicles and other onsite equipment

3) Scaffolding Erection Companies.

- Develop a clear understanding of the scaffolding required, the work to be carried out on the scaffold, the protection of the workers and the identification of all hazards.
- Design and plan the erection process and co-ordination of activities with onsite personal to ensure safety during construction.
- Provide a scaffold that complies with the manufacturer's specifications and the Code of Practice
- Once the scaffold is erected, inspected and certified safe to use, and hand over to the Principal / Main Contractor

4) Users of the Scaffold

- Understand the limitations of the scaffold, such as load limits
- Do not alter the scaffold in any way which could affect its safety
- Liaise with the main contractor or the scaffold erector to have any alterations done
- Carry out work so as not to endanger any others in the area

The types

- H frames
- Aluminium prefabricated systems
- Modular systems
- Timber scaffolding
- Metal tube steel or aluminium
- Brackets
- Stools and trestles

Specific Requirements

Frame Scaffolding

Frame scaffolding in this context means the portal frame (“H”frame) type scaffolding assembled on site from prefabricated frames and members.
Frames of different proprietary types are not to be intermingled. Where frames are super imposed vertically, the connection must be such that;

• The standards are held in linear alignment.

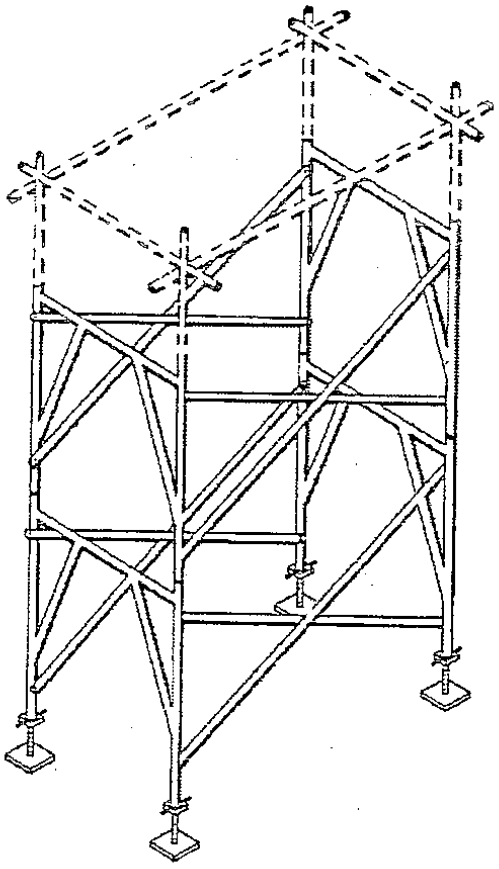
• The panels are locked together vertically by joint pin couplers or other equivalent means.

• The number of working platforms should be the same as standard tubular scaffolding. Longitudinal bracing depends on the use of ledgers.

• Without ledgers, both faces of the scaffold in each lift of each bay are to be cross-braced.

• With ledgers, at least one bay in four must be cross-braced.

• Guardrails and mid rails must be provided at all working platform levels



Access ladder and work platform omitted for clarity

Unit-assembled Scaffold Towers

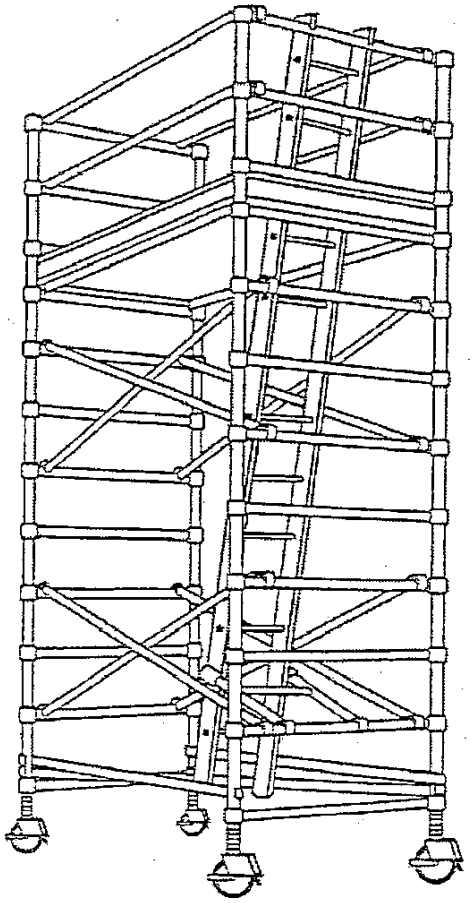
Unit-assembled scaffolding means scaffolding assembled from prefabricated frames or members, which are not single, lift portal frame-type units. The specific requirements are:

• Erection must be carried out in accordance with ‘the design specification stipulated in the
assembly instructions. With hire scaffold assembly instructions must be provided by hirer or is attached to scaffold frames.

• Spacing of unit frames will, in general, be less than for tube and frame scaffolding unless ledgers are used.

• The maximum height for scaffolds constructed from light-weight aluminium tube components
(wall thickness of less than 2mm), is 9m, unless otherwise specified in the design specification. If
the wall thickness is unknown, then it should be treated as light-weight.

• Each tower frame scaffold shall have only one working platform, unless otherwise specified in
the design specification.



Trestle

Wooden and Steel Trestles

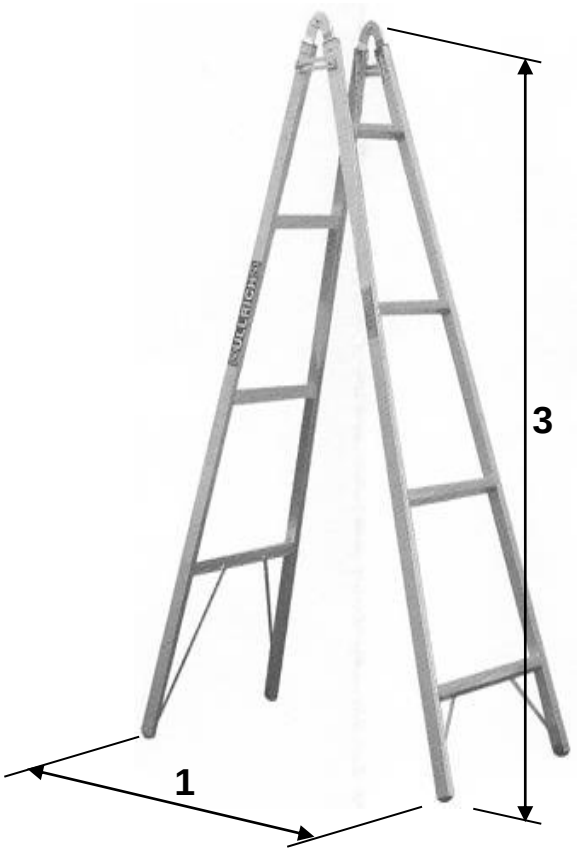
A trestle is a self-supporting stand that has one or more horizontal members on which a working platform can be laid. They may be folding, telescopic or a tripod.

The working height of trestles is restricted to **3m** because of the difficulty of providing a satisfactory guardrail.

The platform is restricted to being suitable for light duty only.

The spread of the legs of a trestle must not exceed the ratio of:

1 spread to **3** high.



Ladders

Ladders come in two different ratings, industrial and domestic. A domestic ladder is intended for occasional use around the home only. A industrial rated ladder is designed for heavy use in a work site environment.

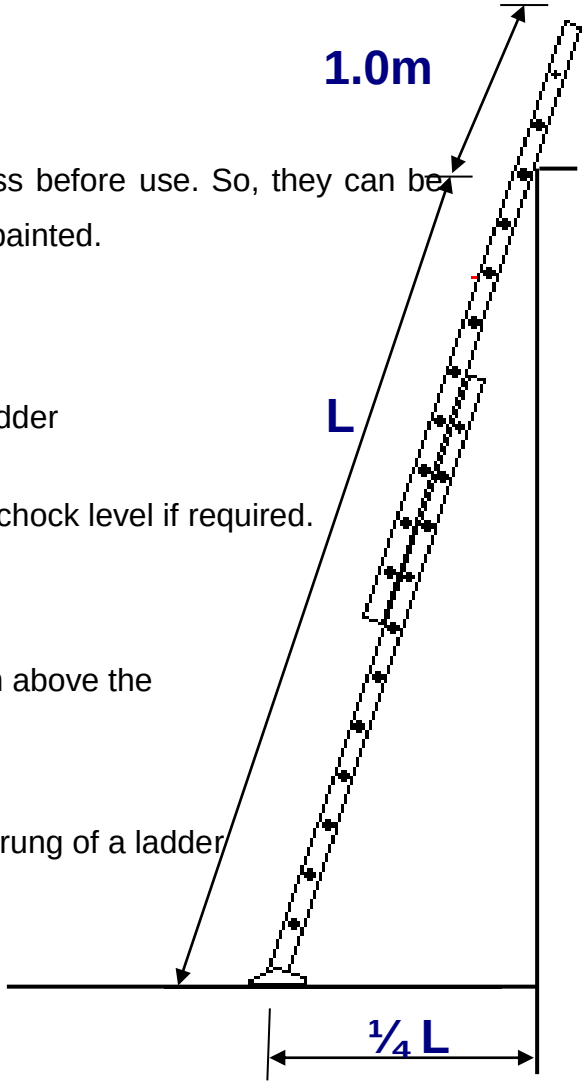
Ladders

For safe use:

- Check all the ladder parts for soundness before use. So, they can be inspected wooden ladders must not be painted.
- position the ladder with correct slope

  1 out to **4** up slope of ladder

- Position the ladder on solid ground and chock level if required.
- Fix the ladder at top
- Ensure the ladder protrudes at least **1**m above the platform or roof being accessed
- Never over - reach or work from the top rung of a ladder



Always comply with the ladders load rating and only purchase ladders that meet AS/NZ standards.

Stepladders

For safe use:

- Highest standing level on a step ladder is 2 steps down from the top
- Check all the stepladder parts for soundness before use. So, they can be inspected wooden stepladders must not be painted
- Before using a stepladder lock back frame securely in place with a locking bar or hinged metal spreader between both uprights and the legs of the frame.
- Stepladders with just ropes or chains between legs do not comply.
- Step ladders must not exceed 3m in height (unless they have a guardrail)
- Do not use a step ladder on unsound or uneven ground

Non-notifiable Scaffold

Non-notifiable scaffolding is a temporary structure less than 5.0m high that provides a working platform for workers and for the support of materials. This scaffold must be erected, altered and dismantled by competent workers under proper supervision. It is the employer's responsibility to ensure that the scaffold complies with the Health and Safety at Work regulations.

Tube and fitting scaffold

Tube and fitting scaffolds are generally not covered by manufacturer's specifications, engineer's certificates or producer statements, hence the need to have general scaffolding requirements for them. These general scaffolding requirements must also be used when altering proprietary scaffolds with tube and fitting components when the manufacturer's specifications or engineer's requirement do not include these alterations.

SCAFFOLD DUTY/LOAD

Light Duty Working Platform
Designed to support a load of 225kg per 2.4m bay including a point load of 100kg
Standards at 2.4m along and 1.5m across
Planks can span 2.4m
2 bays can be used at once (unless height exceeds 13.5m)

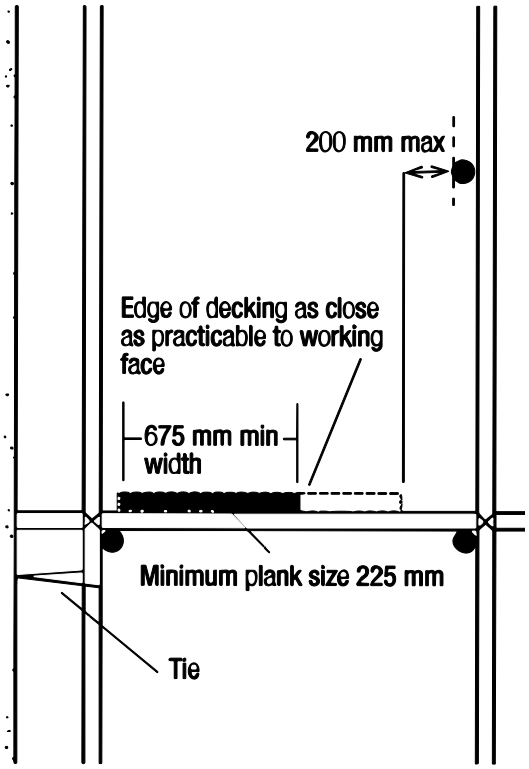
Medium Duty Working Platform

Designed to support a load of 450kg per 2.4m bay including a point load of 150kg
Standards at 2.4m along and 1.275m across
Timber planks can span 1.2m (steel or aluminium 1.8m)
2 bays can be used at once (unless height exceeds 13.5m)

Heavy Duty Working Platform

Designed to support a load of 675kg per 1.8m bay including a point load of 200kg
Standards at 1.8m along and 1.27m across
Timber planks can span 1.2m (steel or aluminium 1.8m)
2 bays can be used at once (unless height exceeds 13.5m

The working platform



A working platform must be **675mm wide**

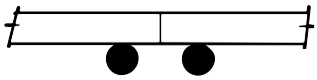
(a minimum **of 3 planks**)

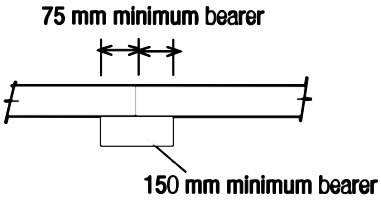
Planks must have:

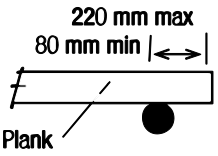
a minimum width of **225 mm**

a minimum overhang of **80mm**

and a maximum overhang of **220mm**

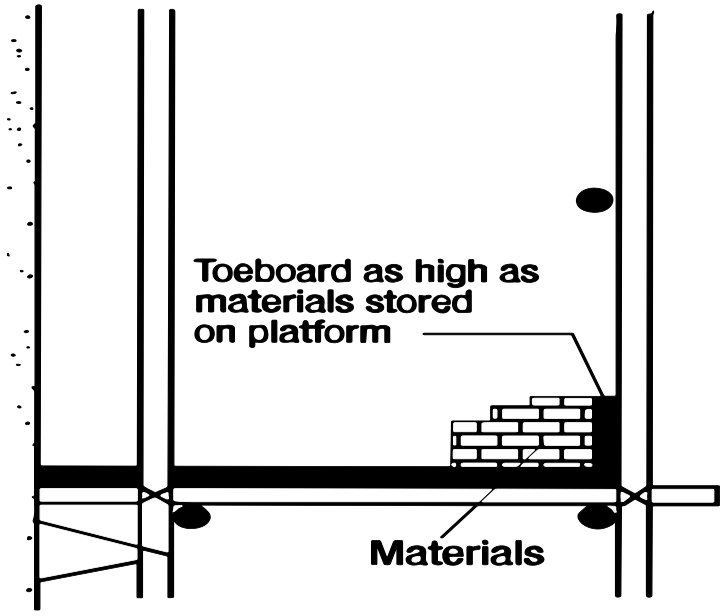






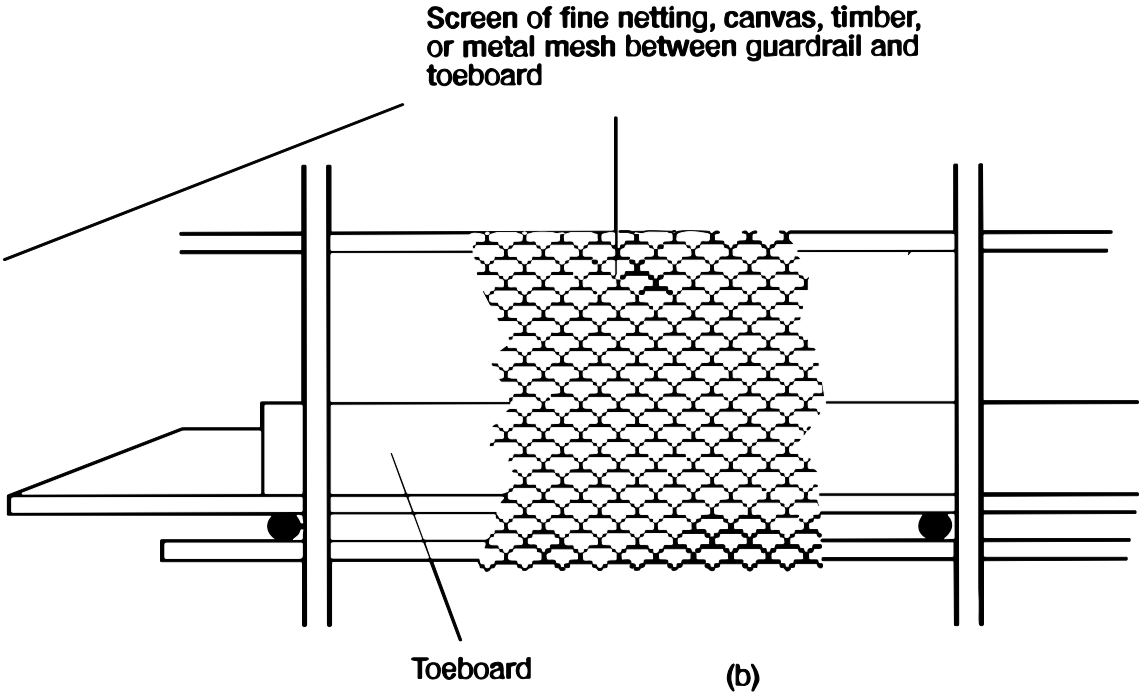
Toe boards

Toe boards must be fitted to any working platform where there is a possibility of tools or materials falling off the platform.



Screens

Screens are required to prevent large and fine materials falling onto a public thoroughfare. Wire netting, canvass or hessian can be used.



Guard rails

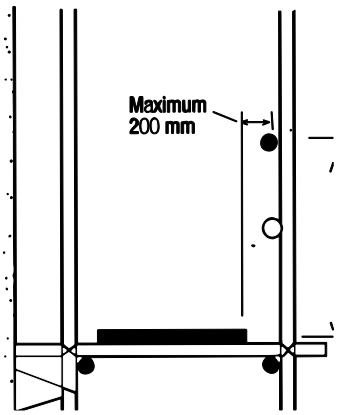
Any working platform over 3.000m requires a guardrail attached to the standards to prevent workers falling off the scaffolding.

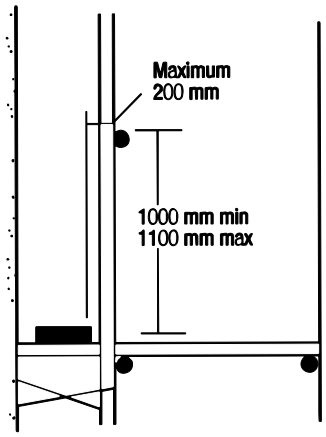
The guardrail must be between 1.100m and .900m above the working platform.

A mid-rail placed halfway must be used where there is no toe board.

The guardrails must be within 200mm of the edge of the working platform.

The guardrails must be fixed to the inside of the standards.





Headroom and Lifts

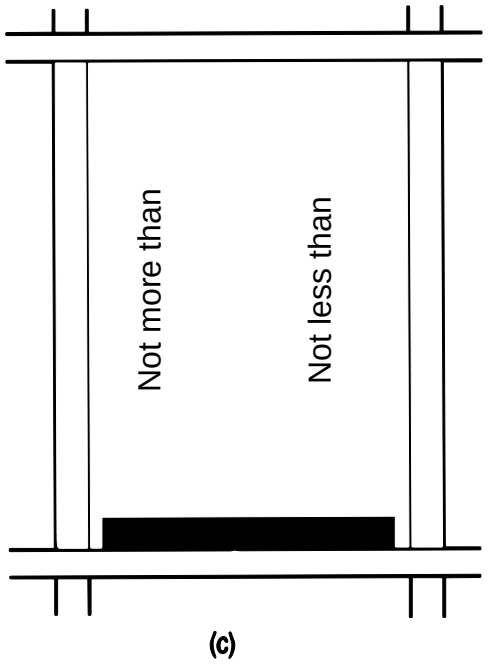
Scaffolding platforms must have a minimum clear walkway height of **1.8m**

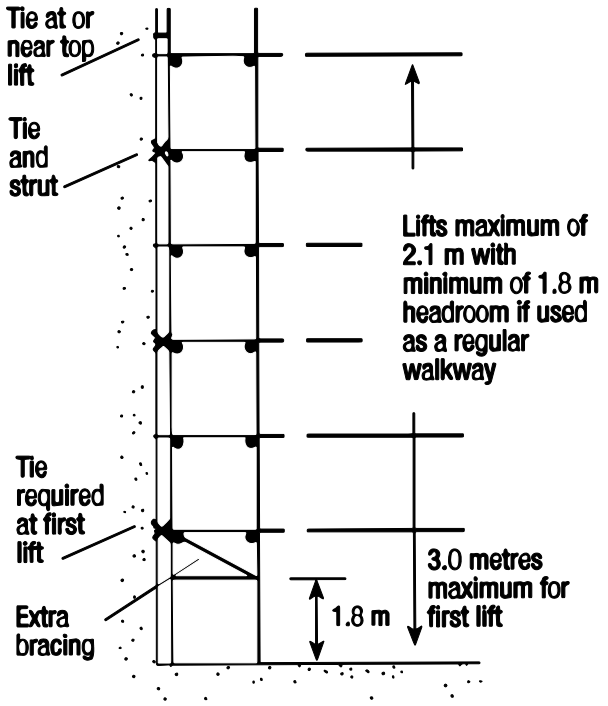
Vertical lifts must not exceed **2.1m**

Except for the first lift which may be up to **3.0m**

The maximum spacing for standards along is **2.4m (light duty)**

The maximum spacing for standards across is **1.5m (light duty)**





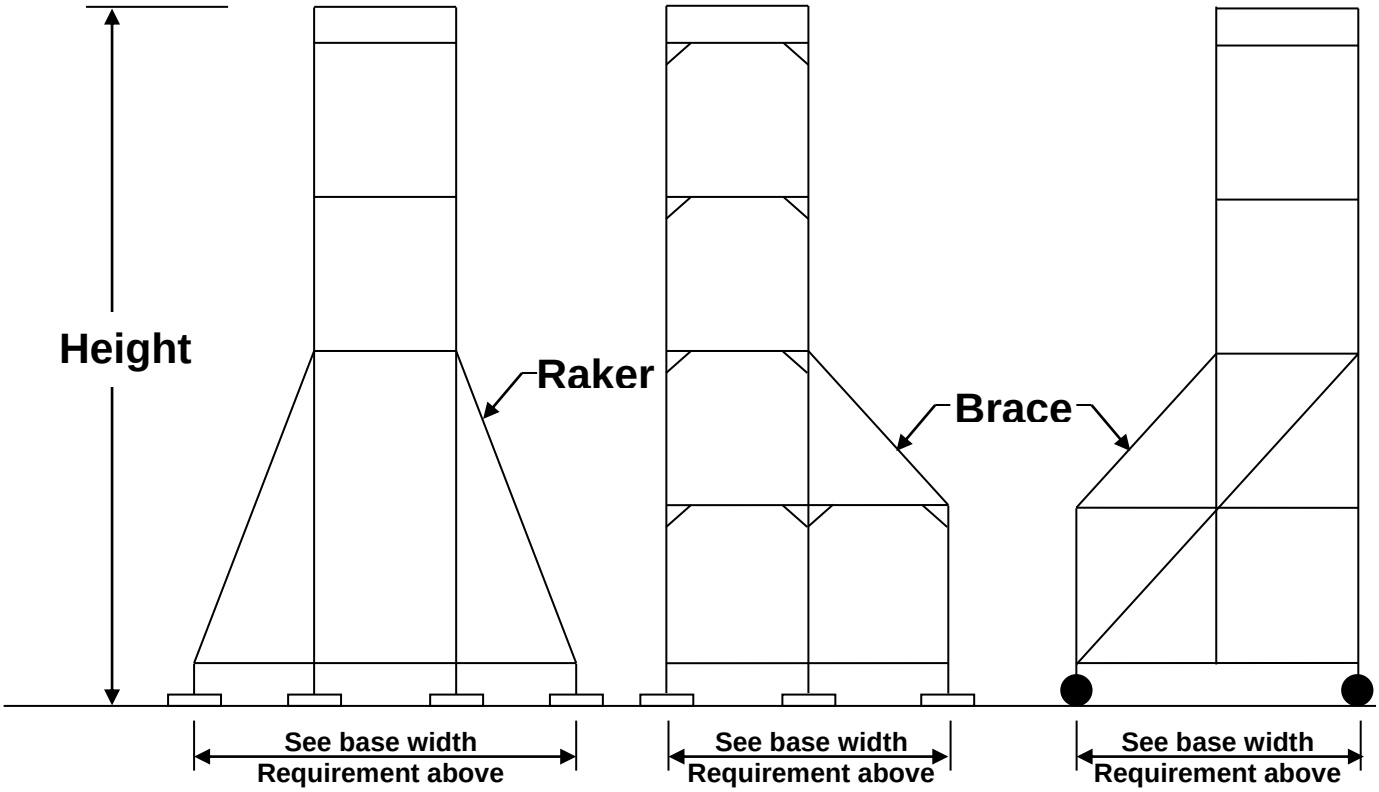
Access to working platforms

Inclined or vertical ladders must be secured to the scaffold and extend **1.0m** past the platform level

Free standing scaffolds

- Free standing scaffolds up to 3m in height, the maximum height to width ratio must not exceed **2:1**
- Free standing scaffolds over 3m in height, the maximum height to width ratio must not exceed **3:1**
- Where the work to be carried out on the scaffold may cause the scaffold to be unstable, additional means of stabilising will need to be used.

a) Tubular Scaffold **b) Frame Scaffold** **c) Mobile Scaffold**



Timber Planks

Scaffolding planks must meet the performance requirements of: AS 1577 with the exception of laminated planks, which should have each laminate the full length of the plank.

- The minimum width of a plank is 225mm
- The minimum depth of a plank is 38mm
- Both faces of a timber scaffold plank must be rough sawn finish or roughened to a similar type finish

Planks in service should be tested to the manufactures specification or by applying one of the three basic tests

- Simply supported impact test
- Cantilever impact teat
- Four-point bending test.

  With the four-point bending test the plank is placed over rollers 2.4m apart. A load of 225kg is applied over a cradle 300mm either side of the centre of the plank. The load is applied for 1 to 3 seconds on either side of the plank.
  The test is successful if the plank carries the load without signs of failure.

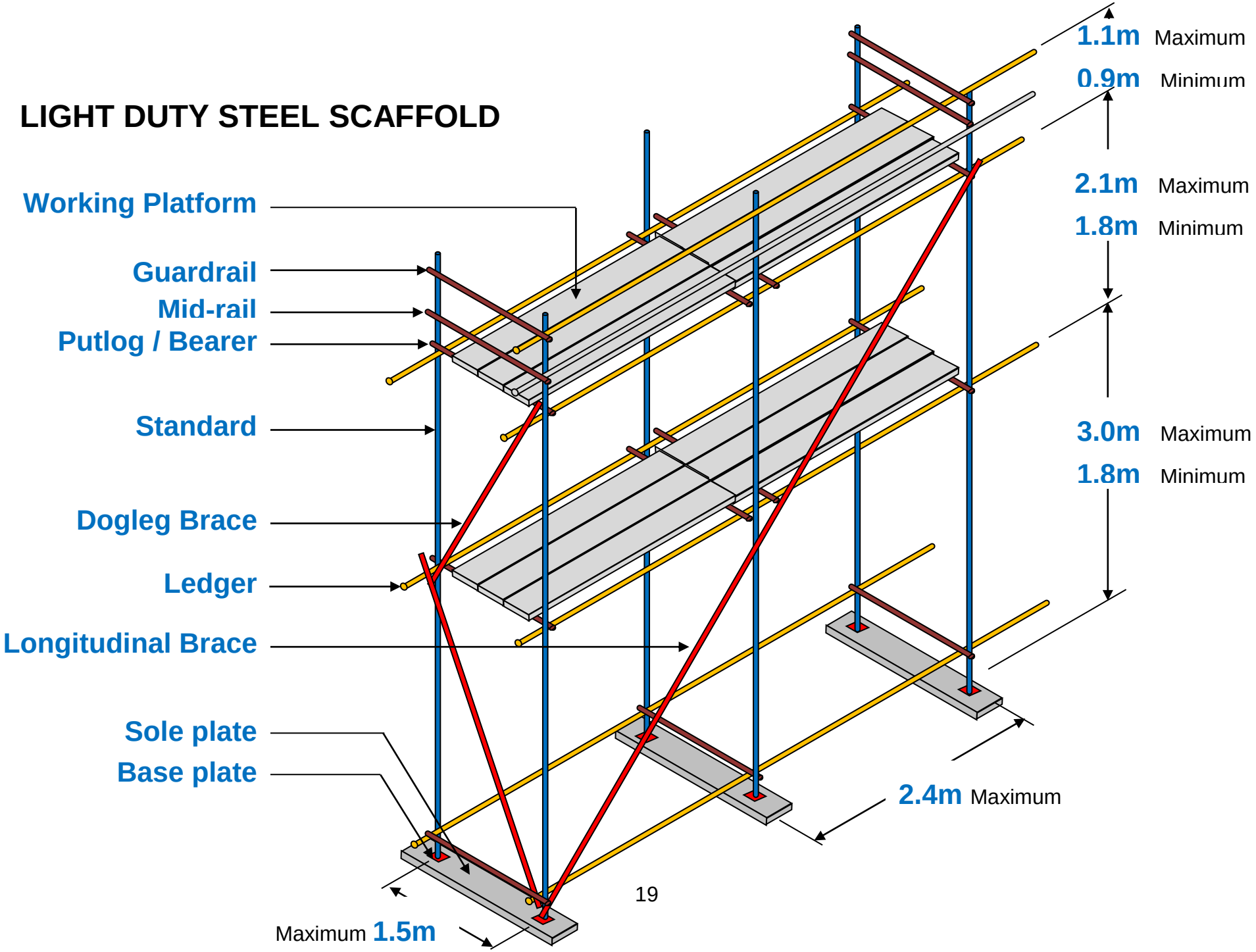
Planks must be visually inspected each time they are used for:

- Twist or warping
- Delamination/ splits
- Wear and tear
- Decay
- Build-up of concrete etc
- Oil deposits
- Burns from hot work
- Cuts
- Nails

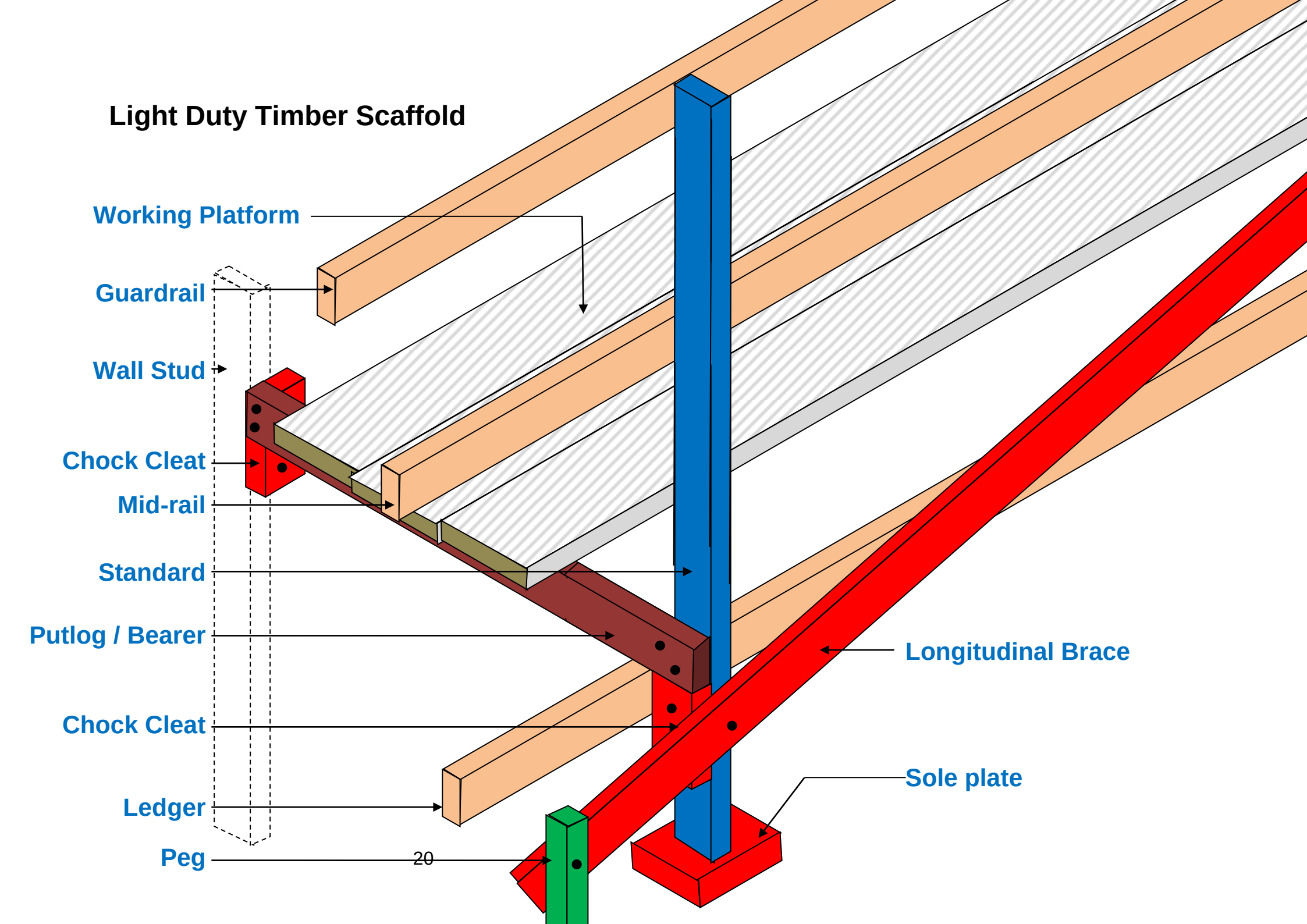
Planks that are defective must be: rendered unfit for further use

Planks should be stored up off the ground and covered to keep them dry

LIGHT DUTY STEEL SCAFFOLD



Light Duty Timber Scaffold



OTHER TEMPORARY SCAFFOLDING

Prefabricated scaffold brackets

Prefabricated scaffold brackets that are attached to a structure to provide support for a working platform must:

- Have adequate and suitable means of attachment to provide vertical support and to resist sideways movement.
- Be fitted with guard rails , mid rails and toe boards on all platform
- If attached to wall framing, the studs should be carefully checked for knots or other defects which could affect the stability of the scaffold.

Safety in scaffolding

During the scaffolding process, scaffolders will normally be faced with a potential fall from height hazard. It is essential that all practicable steps are taken to control this hazard and that the hierarchy of control is applied to the hazard management process.

Safe Working Practice

General principles:

1. Always remember that you have a duty to work in a safe manner to ensure the safety of other workers and the public.
2. Always work in a logical sequence.
3. Do not throw materials about. Always consider the safety of others.
4. Always lower materials in a proper manner during dismantling.
5. Ensure all materials are cleared from the site or job location on completion.

Before and during erection:

1. Examine all materials on arrival at the site or during unloading and put aside any defective or damaged items. These items should be removed from the site as soon as possible and should not be used in the construction of the scaffold.
2. Make sure that all materials to be used are properly stacked in a safe place, especially where work over or near a public thoroughfare is being carried out.
3. Take any and all necessary precautions to ensure that the public are not endangered. This may entail the erection of diversion barriers and signs.
4. Special care should be taken when working in the close vicinity or overhead or adjacent power cables. All exposed cables and wired should be treated as live.
5. Take care not to obstruct essential services such as hydrants, service manholes or fire exits.
6. Whenever leaving the site or job location, make sure that materials are not left in unsafe locations such as doorways, pavements, kerb sides etc. Always store in a safe and secure location.

During the use of the scaffold you need to be aware that:

1. No essential member of the structure has been removed.
2. All ties and braces are in place and are effective in stabilising the structure.
3. All couplers are tightened properly.
4. All scaffold planks are sound and properly supported.
5. All guardrails and toe boards are secured in place.
6. All ladders are in good condition, properly supported and secured.

Safe Working Practice Continued

Before and during dismantling:

1. Before dismantling examine and check the scaffold to ensure that all ties and bracing are effectively in position and that the scaffold is in a stable condition. If partial dismantling is being undertaken ensure that the remaining portion is fully safe and stable.
2. Suitable warning notices must be placed for public protection.
3. Dismantling should be carried out progressively from the top level downwards. Ties, braces, ledgers, transoms, planks and guardrails must be removed lift by lift with standards following as joint positions are reached.
4. Care should be taken to avoid mishandling of materials, all of which should be lowered regularly and not “bombed” during the dismantle.
5. Small amounts of materials may be temporarily placed on lower lifts for convenience during dismantling, but care should be taken not to allow this material to build up an unacceptable load. Where such temporary placement at low levels is carried out, it may be necessary to place raking tubes from the ground level to the lower lift in order to stabilise the scaffold.
6. During dismantling ensure that all scaffolding materials are removed from the building and that no loose materials are left on roofs or projecting cornices, etc.

Care and Maintenance

- All components must be checked for soundness and stored up off the ground and covered to avoid sun and water damage.

- Fitting and couplings should be oiled to prevent rust and to aid in reuse.


Beam Coupler


Fixed 90° Coupler


Swivel 360° Coupler


Wingnut Coupler


Putlog Coupler


Internal Sleeve


External Sleeve

Scaffolding near power lines or electrical Conductors

Power lines and conductors are a potential hazard to persons erecting, working from or in the vicinity of a scaffold. No scaffold should be erected closer to any conductors of an overhead electric line at a distance, in any direction, less than

Line voltage (under normal conditions)	Minimum Distance
Not exceeding 66 kV (maximum span 125 metres)	4.0 metres
Exceeding 66 kV (maximum span 25 metres)	5.0 metres
Any voltage (span greater than 125 metres but less than 250 metres)	6.0 metres
Any voltage (span greater than 250 metres but less than 500 metres)	8.0 metres
Any voltage (span exceeding 500 metres)	Not less than 8.0 metres (or as agreed with owner

No scaffold should be erected closer than 4.0m to power lines or electrical conductors without approval from the local electricity network company.

Tools of the trade

Scaffold spanner: “Scaffold spanners” or “scaffold key” are the preferred tool for tightening and releasing nuts on scaffold fittings or couplers.

Swing over spanners: A standard scaffolding spanner with a head to fit 7/16” or ½” nuts with the head attached to the handle with a pin or ball and socket assembly. The handle is between 200mm and 250mm long.

Podger hammer: The standard podger hammer is made of mild steel and has a straight handle between 200mm and 250mm with a tapering podger end of the handle between 30 and 45 degrees to the handle.

Adjustable wrenches (crescent or shifter): An adjustable wrench, crescent, or shifter is normally used where an obstruction prevents the use of a scaffold spanner. A spanner fits over the nut; an adjustable wrench slides over the nut. The use of an adjustable wrench should be kept to a minimum as it has a tendency to round off the nuts. The arm of an adjustable wrench should be between 200mm and 250mm long.

Spirit level: A spirit level is usually no longer than 300mm long with level bubbles showing vertical, horizontal and sometimes 45 degrees. They can be magnetic to assist in holding to metal tube during levelling. Spirit levels are used to check that scaffolding members are horizontal, vertical or at 45 degrees.

Tape measure or rules: A standard retractable tape measure or fold out rule is a useful tool for measuring distance off walls, bay lengths, lift lengths, etc,

Industrial wire nips or cutters: A flat ended set of wire cutters also used to grab, twist and tension wire. These are useful for cutting lashing for planks and cutting and tensioning “steelies” wire for screening.

Scaffold belts: A scaffold belt is used to carry scaffold tools safely and securely but still allow easy access to the tools. The belt should be made of sturdy leather, canvas webbing or similar. Leather, canvas or wire frogs should be used to secure scaffold spanners, podger hammers, adjustable wrenches and nips. Rules, tape measures, and spirit levels should be secured in pouches to prevent displacement.

Industrial safety helmet: Industrial safety helmets complying with NZS 5806 (or suitable approved head protection) must be worn at all times while on site where there is a risk of objects falling from above. In fact hard hats are becoming mandatory on most sites in New Zealand. An elastic chinstrap is recommended to secure the hat and prevent dislodgement by the wind. Hard hats should be replaced after dropping from a height or if there are any visible signs of wear and tear. Follow the manufacturer’s instructions for replacement (please check expiry dates).

Foundations

When scaffolds are supported on the ground, suitable sole plates must be used to spread the load. The sole plates should preferably be long enough to support at least two standards.

Timber sole plates must be not less than 200 x 38 x 500mm long. Bricks, blocks and similar loose material are unsuitable as they are liable to fall over or split, and are easily driven into the ground.

Where the foundation is levelled concrete of adequate thickness or of a similar hard surface, the sole plate may be omitted, but steel base plates must be provided at the bottom of all standards.

The foundations of a scaffold need to be adequate to carry and distribute the loads imposed at each standard and over the whole loaded scaffold. On hard level surfaces such as steel or concrete standards should be supported on baseplates, however soleboards may not be necessary if the surface does not require protection. When using soleboards, the ground conditions under the proposed scaffold should be checked to determine the soleboard dimensions required to provide an adequate contact area to support the total load transferred down the scaffold standards.

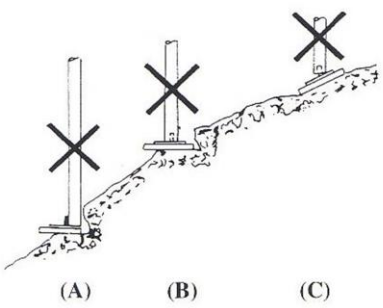
Common types of ground conditions include: concrete floor slabs, tar seal or bitumen drives/carparks, compacted fill, uneven ground/rough terrain, sloping foundations, soft soils/sand. Particular attention must be paid to:

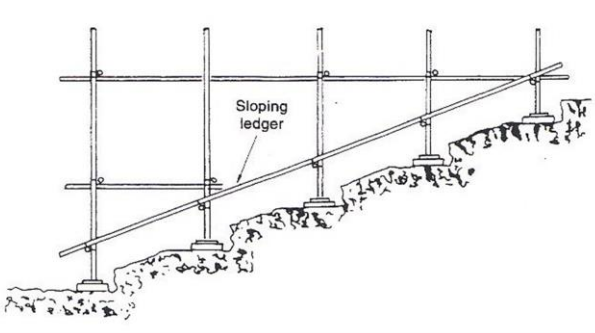
- Scaffold erected adjacent to trenches and on slopes. Pressure exerted by the scaffold foundation may lead to subsidence.
- Areas prone to run-off or flooding. Water movement or saturation may cause subsidence or undermining.

Scaffold Foundations

- Where the ground is uneven, adjustable screw jacks or stacked timber sole plates can be used to level the structure. If stacked timber sole plates are used, the stacked width must be at least twice the height.

- Bricks, blocks and other similar materials should not be used as a scaffold foundation because of their unstable nature. Where the scaffolding is to be erected on sloping ground, horizontal shelves must be dug into the slope to provide a level base for the foundations.





Mobile Scaffold

A mobile scaffold is a special type of free-standing scaffold supported by wheels, castors or other devices for ease of movement. It should be used on a firm level surface.

- Castors should be a swivel type and have minimum wheel diameter of 125mm. They must be fixed to the scaffold uprights or socketed into the uprights to a minimum length of 150mm to avoid being dislodged during movement
- When the scaffold is in use the castors /wheels must be effectively locked and turned outwards to increase base width.
- Access between working platforms must be by securely fixed ladders or purpose build rungs
- Cross braces must not be used for access
- Mobile scaffolds should be used with care. They must not be used within 1.000m of any edge, step or hole, unless effective edge protection is in place

HEALTH AND SAFETY

Employers have the principal responsibility to ensure the health and safety of employees at work.

Employers also have a general duty to take all practicable steps to ensure the safety of employees. In particular, they are required to:

- provide and maintain a safe working environment; including while at heights
- provide and maintain facilities for the safety and health of employees at work;
- ensure that machinery and equipment are safe for employees;
- ensure that working arrangements are not hazardous to employees; and
- provide procedures to deal with emergencies that may arise while employees are at work.

Employers have a duty to manage hazards and must have an effective method in place to identify and regularly review hazards in the place of work. (The term “hazards” includes existing hazards, new hazards and potential hazards.) They must also determine whether the identified hazards are significant hazards, which will require further action.

If an accident or harm occurs, the employer has a responsibility to investigate the accident and determine if it was caused by a significant hazard.

Where a significant hazard has been identified the employer must take the following steps:

- Where practicable, the hazard must be **eliminated.**
- If it is impracticable to eliminate the hazard the employer must **minimise** the likelihood that employees will be harmed by the hazard.

Where the hazard has not been **eliminated**, the employer must, where appropriate :

- ensure that protective equipment is provided, and that it is accessible and used;
- monitor employees’ exposure to the hazard;
- seek the consent of employees to monitor their health; and with the employees’ consent, monitor their health.

SCAFFOLDING CHECKLIST

On many Construction sites, there will be a need to use scaffolding. Before using scaffolding, it is necessary to consider the following points:

- ☐ If any person can fall 5 metres or more from the scaffold, it must be notified to Worksafe .

- ☐ Scaffolding 5 metres in height or greater can only be erected and altered by a person holding a certificate of competence.

- ☐ Scaffolding must be erected on a solid foundation.

- ☐ Standards must be vertical, and not placed more than 2.4 metres apart.

- ☐ A diagonal brace must be fitted for every three bays.

- ☐ Diagonal bracing is raked at approximately 40’ and is either “zigzag’ or continuous.

- ☐ Transverse bracing is fitted on each end set of standards and every tenth set between.

- ☐ Braces must pass through node points. (A node point is the intersection of the ledger standard and putlog.)

- ☐ Working platforms that are more than 3 metres above the ground must be fitted with a guardrail and a midrail or toe board.

- ☐ If there is no guardrail, there must be another mechanism in place to prevent people from falling.

- ☐ Guardrails must be installed so as not to leave a gap of more than 220mm to the edge of the working platform.

- ☐ Toe boards must extend to the edge of the working platform.

- ☐ Decking overhang must be greater than 80mm and less than 220mm.

- ☐ It is preferable that decking be butted, not lapped.

- ☐ Working platforms must be at least 675mm wide.
  All working platforms must have a clear walkway of at least 450mm.

- ☐ All planks must be tied in place.

- ☐ The scaffold must be tied to the building (or structure) or have adequate raker braces provided.
- ☐ Suitable ladder access must be provided to all platforms.
- ☐ A scaffold register for scaffold over 5 metres must be available and kept up to date.
- ☐ If there re overhead power lines in the vicinity, the scaffold must be at least 4 metres away from them.
- ☐ Lightweight aluminium scaffolds must not exceed 9 metres in height.
- ☐ Wheels on mobile scaffolds must be locked or choked when platforms are in use.
- ☐ The safe working load must be clearly shown on any suspended scaffold.
- ☐ All users of suspended scaffold are required to wear a safety harness, which must be attached to an independent lifeline.
- ☐ No person should ride on a mobile scaffold while it is being moved.

Scaffolding
Up to 5 metres

Practical Workbook

Unit Standards 13016, 13053, 9184

Building Department General Safety Rules

1. Students are not permitted in workshops unless accompanied by a Department Tutor.

2. Approved safety footwear **(STEEL TOE CAPPED BOOTS OR SHOES)** must be worn at all times during workshop or other practical exercises. You will not be accepted into class without them. This requirement does not apply to theory classes.

3. Fire alarm switches and extinguishers are strategically placed around the workshops to ensure the safety of all persons using these areas. Improper use of these devices will ***NOT BE TOLERATED!***

Students must wear hard hats at all times while doing scaffolding projects.
Signage or barriers must be in place to keep people out that are not working on projects.

If there is an emergency – such as a fire or a bomb scare – you must switch off any machine you are using and leave the workshop barn area immediately and assemble at the main car park assembly point. Do not attempt to take anything with you.

Scaffolding Projects

These projects have been designed to reinforce and consolidate the theoretical knowledge appropriate to the level of study and to meet the requirements of the unit standards 13016,13053 and 9184.

PRACTICAL PROJECTS		
Project Number	Project	Allocated Hours
1	Interlocking Scaffold	
2	Mobile frame scaffold	
3	Proscaf	
4	Aluminium Scaffold Tower	
5	Tube and clip	

Scaffolding	Scaffolding Relative units 13016,13053,9184	Project No: 1
The owner of this manual has received the specified instruction and has achieved a satisfactory standard.		
Mark : **%**	**Instructor sign :**	
Date :	**Student sign :**	

PROJECT: SCAFFOLDING

Required Learning Outcomes:

To learn erection and dismantling techniques for free standing and mobile frame type metal scaffold.

Reference:

Approved Code of Practice for The Safe Use of Scaffolding. Best Practice Guidelines for Scaffolding in New Zealand, and manufacturer's instructions and specifications.

Pass Requirements:

In this project each student must make a satisfactory attempt to complete the Learning Objectives and obtain a minimum mark of 75%.

Learning Objectives:

1. To learn to erect and dismantle:

- Interlocking Acrow scaffold
- Mobile frame scaffold
- Proscaf
- Aluminium scaffold tower
- Tube and clip

INTRODUCTION:

The scaffold required for these projects is to be erected and dismantled by a team of students, one of whom will be nominated by your Tutor as being the **Charge Hand.**

The Charge Hand's job is to organise the assembly and dismantling of the project in a safe and sequential manner. Therefore, any student refusing to carry out reasonable requests may be considered a failure at this type of work.

Your tutor will issue each member of the team with a hard hat and each team with sufficient documentation to complete the exercise. The Charge Hand must ensure that hard hats are always worn where there is any danger of being struck by a falling object. The Charge Hand must also arrange the positioning of DANGER notices.

Tighten each fitting as it is fitted (or it may be forgotten). Use only the correct scaffold spanners to adjust nuts. Do NOT drop or throw fittings. Each bay must be completed and appropriately decked before further work is proceeded with.

A project mark will be awarded individually to students and will be dependent on the assembly, dismantling, care of equipment, safety, participation, attitude and ability to work as a member of a team as demonstrated by each student.

ORDER OF OPERATION:

Project 1: Interlocking scaffold

1 Erect standards, ledgers, putlogs (bearers), and guard-rails as indicated on the drawing. Adjust standards using screw jacks to ensure a level plane

2 Fix sufficient diagonal bracing to ensure stability when in use.

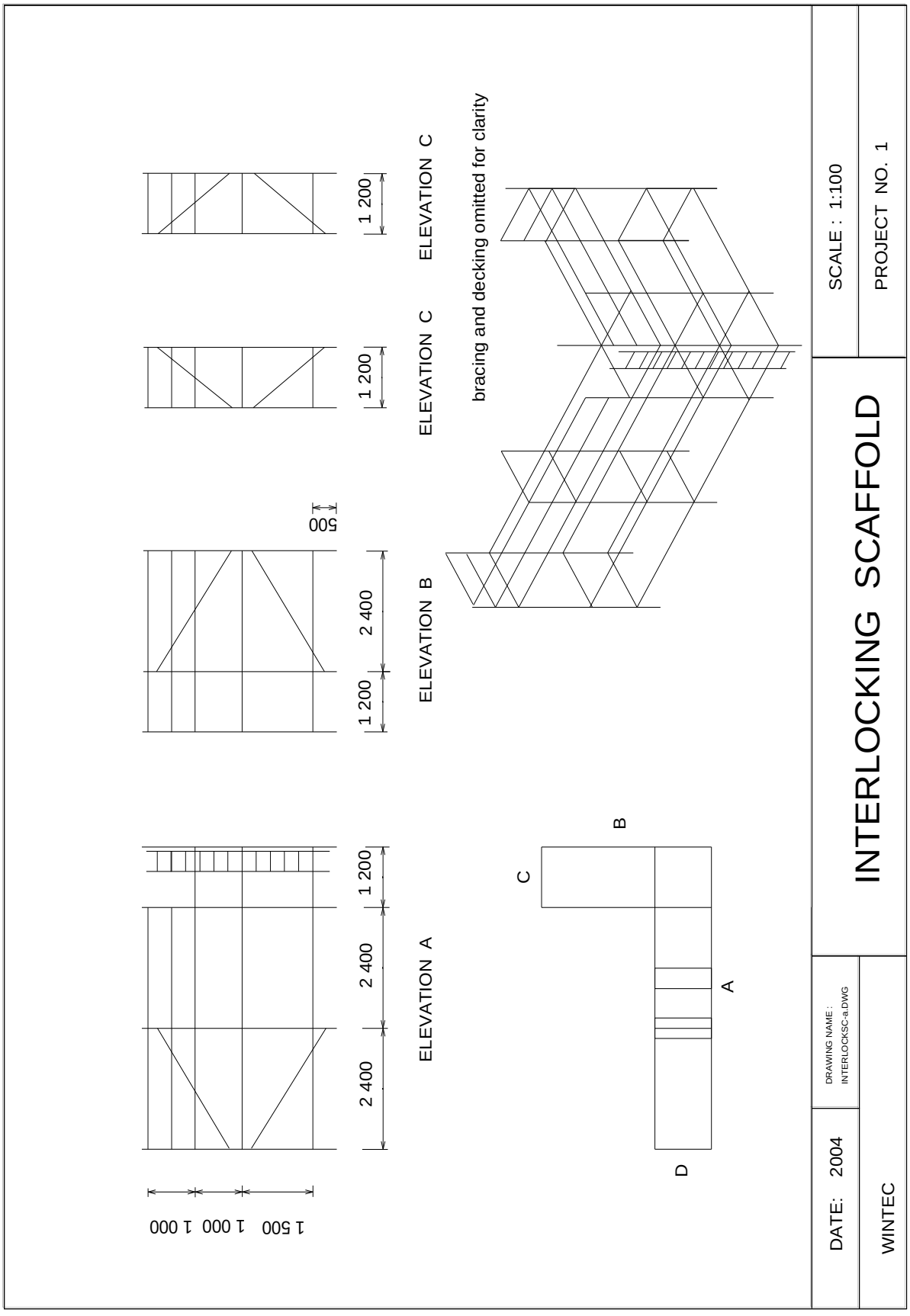
NOTE: The type of interlocking scaffold which you are erecting does not contain adequate built-in stiffness to qualify for any exemptions.

3 Provide a working platform.

4 Provide access and egress to working platform by means of a properly secured ladder.

5 After inspection by your tutor dismantle and store components in their original position.

Interlocking scaffold



ORDER OF OPERATION:

Project 2: Mobile frame scaffold

Refer to Best Practice Guidelines for Scaffolding section 3.

1. Assemble proprietary double frame base with bracing, fit cross-bracing and fit castors.

2. Erect remaining two- and one-half frames with braces.

3. Fix tube scaffold braces with right angled couplers.

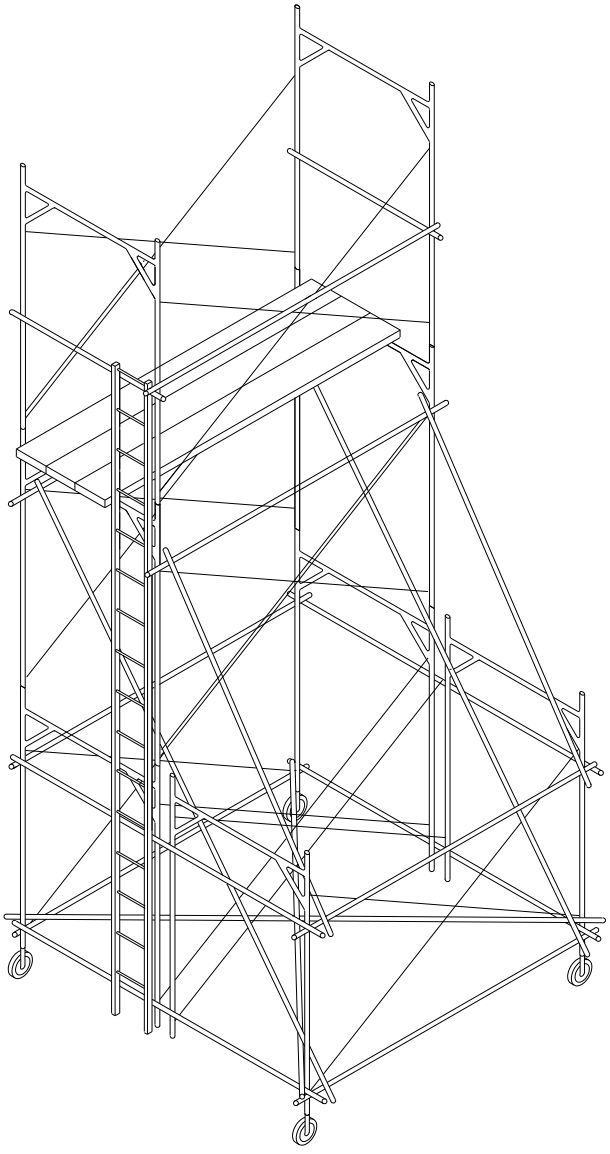
4. Fit guard rail to all four sides.

5. Provide a working platform.

6. Provide access to working platform by means of a ladder.

7. After inspection and marking, dismantle and store components in their original position.

NOTE: AN ACCESS LADDER MUST BE FIXED BY AN APPROVED METHOD TO EXTEND A MINIMUM OF 1 000mm ABOVE WORKING PLATFORM ACCESS BY WAY OF SCAFFOLD MEMBERS IS ILLEGAL AND WILL NOT BE PERMITTED.



FREESTANDING MOBILE SCAFFOLD

SCALE : N\A

PROJECT NO. 2

DATE: 2004

WINTEC

ORDER OF OPERATION:

Project 3: Proscaf Interlocking

- refer to drawings and establish what is required. Ask your tutor if you are unsure.

1 Place standards with sleeve coupler uppermost into base jacks which have been adjusted to approximately level.

2 Connect inner and outer standards (fig. 1) with two putlogs to make a frame (fig 2). Place a third standard on base jack and link to first frame with ledger (fig 3).

3 Complete free-standing frame with fourth standard and three ledgers and two putlogs (fig. 4). Square and level completed frame. Tighten wedges.

NOTE: <u>DO NOT OVERTIGHTEN!</u>

4 Repeat process until required length is reached.

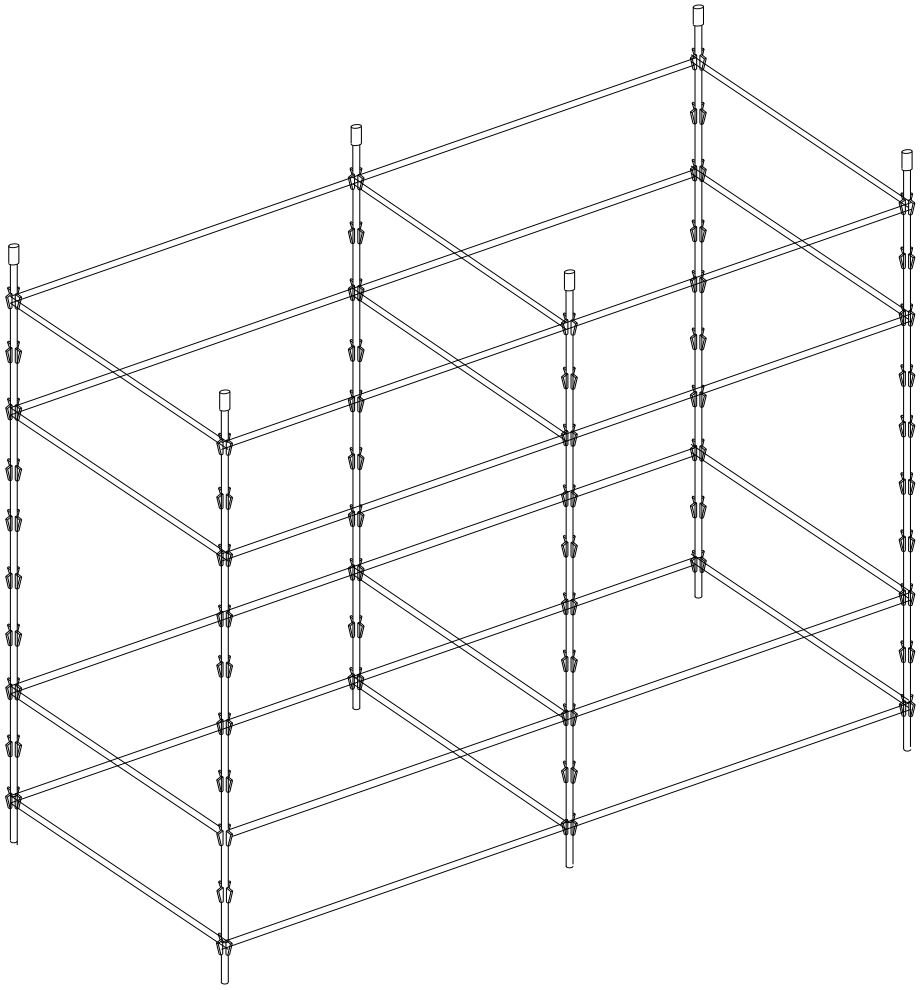
5 Add steel planks and continue the next lift. Fig. 6 and 7.

NOTE: One side of scaffold has 3m standards, and the other side has 2m standards.

6 Hop-up brackets are to be fitted after all necessary bracing has been completed.

7 Fit planks on hop-up platform.

8 After inspection by your tutor, dismantle and store components in their original position.



DATE: 2004	ACROSCAFF	SCALE : N/A
WINTEC		PROJECT NO. 3

ORDER OF OPERATION:

Project 4: Aluminium Scaffold Tower

refer to photo on adjacent page, instructions on scaffolding components and Tutor's instruction.

1. Assemble proprietary aluminium frames to base level using clip on ledgers and cross braces.

2 Install proprietary platform at first level.

3. Assemble frames to second lift including single brace components at opposing angles on each side.

4. Install horizontal ledgers at mid-section lift.

5. Install proprietary ladder to access second lift.

6. Exterior stabilising braces to be installed at this stage

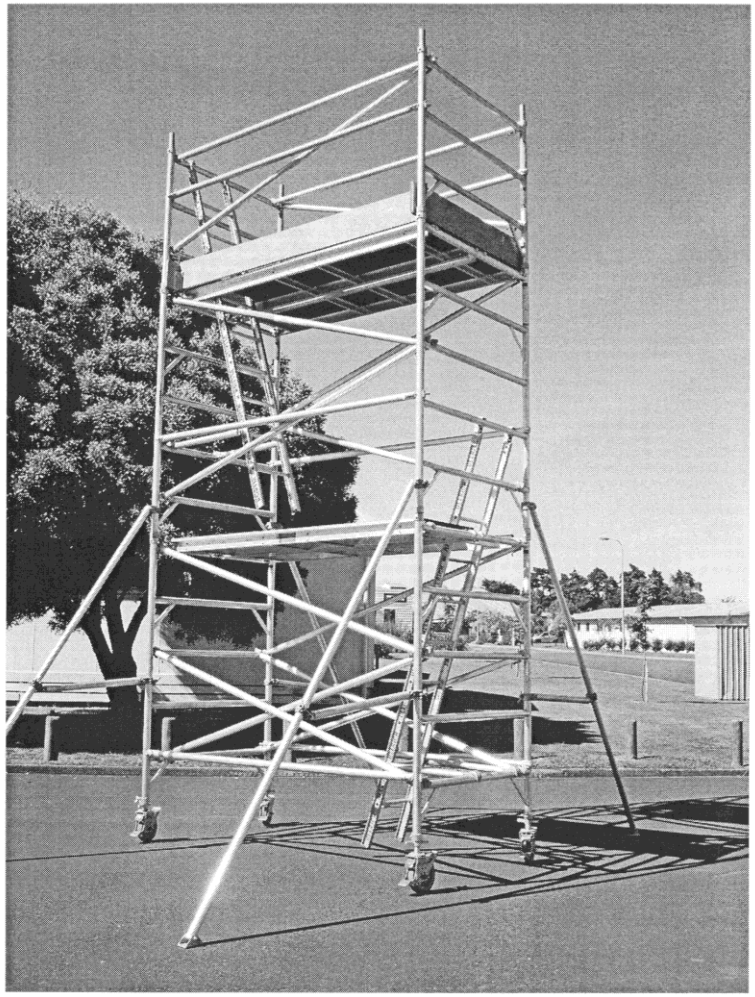
7. Install proprietary platform on top of second lift.

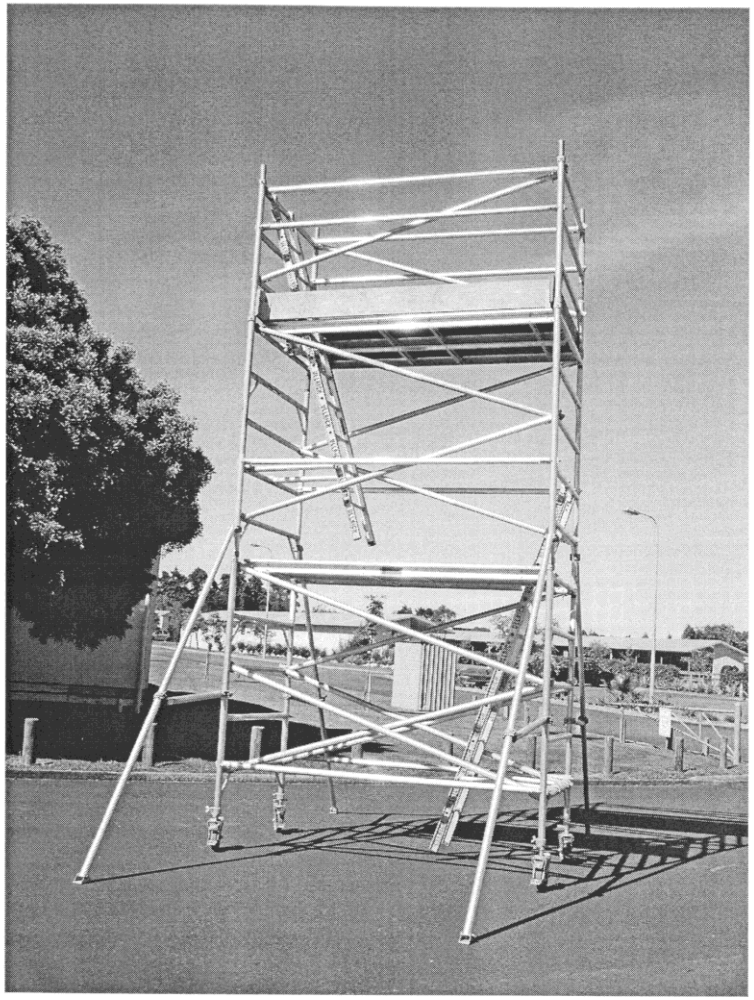
8. Install proprietary access ladder to second platform.

9. Assemble half frames to third lift using horizontal guard rails & brace.

10. Install proprietary toe boards to top platform.

11. After inspection by your tutor, dismantle in opposite order to assembly, and stare components in their original storage area.





WINTEC	Aluminum Scaffold Tower	
Date : 2005		Project 4

ORDER OF OPERATION:

Project 5: Tube and Clip

1. Using the scaffolding ‘Code of Practice’ as a reference complete the missing information in the boxes provided on the sheet ‘Light Duty Scaffold’.
   (Your Tutor will check and mark this sheet while you are erecting the scaffold.)

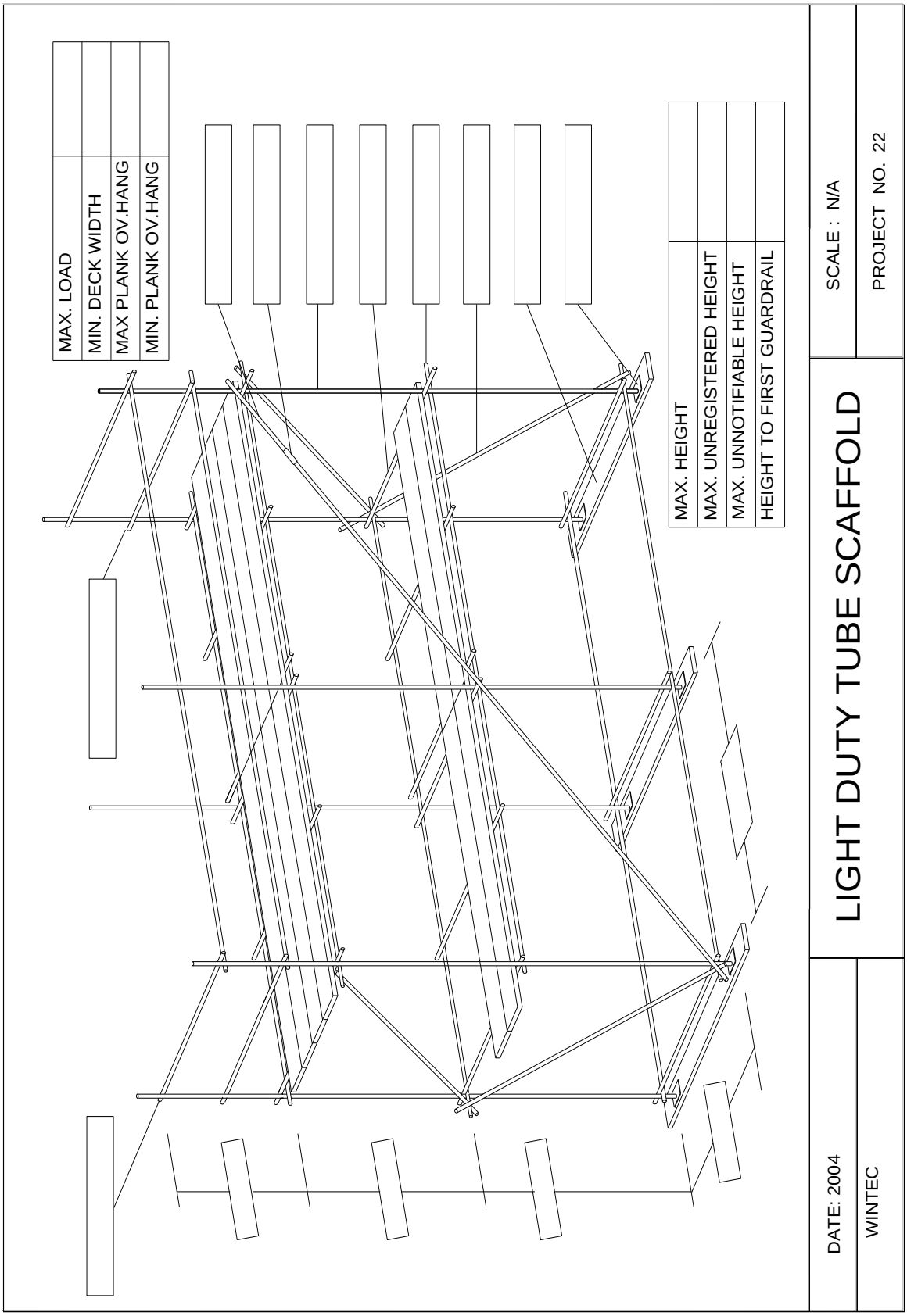
2. Select the following components:

6 – 4.8m standards	6 - 6m ledgers
1 - 6m brace	1 - 6m guard rail
1 - 3m guard rail	4 - 3m dog leg braces
18 - 1.5m putlogs	55 - right angle couplers
12 - Putlog couplers	6 - base plates
1 - Tension jointer	10 - planks

3. Assemble the tubes in compliance with your drawing and the ‘Code of Practice’.

4. After marking, dismantle and store components.

Tube scaffolding



Unit Standard 13016

Demonstrate knowledge of timber and metal scaffolds up to five metres

Level	**3**
Credits	**2**

Purpose People credited with this unit standard are able to: describe the legislative requirements for erecting scaffolds up to five metres; and describe the procedures for dismantling scaffolds in timber, metal, tube and frame.

Subfield	Construction Trades
Domain	Core Construction
Status	Registered
Status date	26 February 2002
Date version published	19 September 2008
Planned review date	31 December 2009
Entry information	Open.
Replacement information	This unit standard and unit standard 13053 replaced unit standard 617.
Accreditation	Evaluation of documentation and visit by NZQA and industry.
Standard setting body (SSB)	Opportunity - The Training Organisation

Accreditation and Moderation Action Plan (AMAP) reference 0183

This AMAP can be accessed at http://www.nzqa.govt.nz/framework/search/index.do.

Special notes

1 *Specifications* refer to documented instructions (oral, written, graphic) and may include the following: requirements in the most up to date version of the *Best Practice Guidelines for Scaffolding in New Zealand* (published by Scaffolding and Rigging New Zealand Incorporated, revised 2003); manufacturer's specifications, instructions or recommendations; material specifications; specifications from a specialist source such as architect, designer, engineer, supervisor or work specific drawings or requirements.

2 *Descriptions* of work practices must comply with the following: Health and Safety in Employment Act 1992, Health and Safety in Employment Regulations 1995, Building Act 2004, Building Code, Resource Management Act 1991, NZS 3604:1999 Timber Framed Buildings, *Approved Code of Practice for the Safe Erection and Use of Scaffolding 1995* (published by Occupational Safety and Health Service, Department of Labour, Wellington) and any subsequent amendments to these Acts, Standards, Codes and publications; Codes and publications.

3 *Site specific safety plan* refers to the documented safety plan provided by the employer to ensure compliance with the Health and Safety in Employment Act 1992, and Health and Safety in Employment Regulations 1995 and their subsequent amendments.

4 Competence in this unit standard indicates compliance with current trade practice. Current trade practice refers to the ability to work unsupervised, demonstrating knowledge and skills that reflect the productivity, uniformity, finish quality and material economies currently accepted within industry.

Elements and performance criteria

Element 1

Describe the legislative requirements for erecting scaffolds up to five metres.

Range includes but is not limited to – Health and Safety in Employment Act, Health and Safety in Employment Regulations, Approved Code of Practice for the Safe Erection and Use of Scaffolding 1995 and manufacturer's instructions.

Performance criteria

1.1 Types of scaffolds are identified and described in terms of their uses and limitations.

Range includes but is not limited to – stools and trestles, ladders, brackets, timber pole, metal frame, metal tube, modular systems.

1.2 Scaffolds are described in terms of their safe erection, maintenance and alteration requirements.

Range includes but is not limited to – decking and loading, bracing, spacing of all members, guardrails, manufacturer's instructions.

Element 2

Describe the procedures for dismantling scaffolds in timber, metal, tube and frame.

Performance criteria

2.1 The procedures are described for the safe dismantling of scaffolding.

Range includes but is not limited to – stools and trestles, ladders, brackets, timber pole, metal frame, metal tube, modular systems.

Please note

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Industry Training Organisations must be accredited by NZQA before they can register credits from assessment against unit standards.

Accredited providers and Industry Training Organisations assessing against unit standards must engage with the moderation system that applies to those standards.

Accreditation requirements and an outline of the moderation system that applies to this standard are outlined in the Accreditation and Moderation Action Plan (AMAP). The AMAP also includes useful information about special requirements for organisations wishing to develop education and training programmes, such as minimum qualifications for tutors and assessors, and special resource requirements.

Comments on this unit standard

Please contact the Opportunity - The Training Organisation info@cranes.org.nz if you wish to suggest changes to the content of this unit standard.

Unit Standard 13053

Erect scaffolds up to five metres on site

Level **3**

Credits **4**

Purpose People credited with this unit standard are able to: erect, alter, inspect, and dismantle scaffolds up to five metres; and complete work operations on site.

Subfield	Construction Trades
Domain	Core Construction
Status	Registered
Status date	26 February 2002
Date version published	19 September 2008
Planned review date	31 December 2009
Entry information	Open.
Replacement information	This unit standard and unit standard 13016 replaced unit standard 617.
Accreditation	Evaluation of documentation and visit by NZQA and industry.
Standard setting body (SSB)	Opportunity - The Training Organisation

Accreditation and Moderation Action Plan (AMAP) reference 0183

This AMAP can be accessed at http://www.nzqa.govt.nz/framework/search/index.do.

Special notes

1 *Specifications* refer to documented instructions (oral, written, graphic) and may include the following: requirements in the most up to date version of the *Best Practice Guidelines for Scaffolding in New Zealand* (published by Scaffolding and Rigging New Zealand Incorporated, revised 2003); manufacturer's specifications, instructions or recommendations; material

specifications; specifications from a specialist source such as architect, designer, engineer, supervisor or work specific drawings or requirements.

2 For all *on site* unit standards the practical assessment evidence must be provided in the context of commercial business construction operations, in the workplace, under normal workplace conditions.

3 All work practices must comply with the following: Health and Safety in Employment Act 1992, Health and Safety in Employment Regulations 1995, Building Act 2004, Building Code, Resource Management Act 1991, NZS 3604:1999 Timber Framed Buildings, *Approved Code of Practice for the Safe Erection and Use of Scaffolding 1995 (*published by Occupational Safety and Health Service, Department of Labour, Wellington) and any subsequent amendments to these Acts, Standards, Codes and publications.

4 *Site specific safety plan* refers to the documented safety plan provided by the employer to ensure compliance with the Health and Safety in Employment Act 1992, and Health and Safety in Employment Regulations 1995 and their subsequent amendments.

5 Competence in this unit standard indicates compliance with current trade practice. Current trade practice refers to the ability to work unsupervised, demonstrating knowledge and skills that reflect the productivity, uniformity, finish quality and material economies currently accepted within industry.

Elements and performance criteria

Element 1

Erect scaffolds up to five metres.

Range evidence is required for a minimum of three types of scaffolds which can include but is not limited to – timber, trestles, modular, framed, tube and clip.

Performance criteria

1.1 Spacing and size of all members, and construction is in accordance with all regulatory requirements and manufacturer's specifications.

1.2 Scaffold is constructed in accordance with site requirements.

Range manufacturer's specifications, structural requirements.

1.3 Bracing is installed to meet regulatory requirements.

1.4 Hazards associated with the construction and use of the scaffold are identified and controlled in accordance with regulatory requirements.

Element 2

Alter scaffolds up to five metres.

Range evidence is required for a minimum of three types of scaffolds which can include but is not limited to – timber, trestles, modular, framed, tube and clip.

Performance criteria

2.1 Scaffold alterations are identified and confirmed in accordance with job and safety requirements.

2.2 Scaffolding is altered in accordance with site requirements.

Range manufacturer's specifications, structural requirements.

Element 3

Inspect scaffolds up to five metres.

Range evidence is required for a minimum of three types of scaffolds which can include but is not limited to – timber, trestles, modular, framed, tube and clip.

Performance criteria

3.1 Scaffolding is confirmed as complying with structural and safety requirements, and is fit for purpose.

Range includes but is not limited to – design, Health and Safety in Employment Act 1992, Code of Practice for the Safe Erection and Use of Scaffolding 1995, manufacturer's specifications/instructions, damage, corrosion, wear, stability.

Element 4

Dismantle scaffolds up to five metres.

Range evidence is required for a minimum of three types of scaffold which can include but not limited to – timber, trestles, modular, frame, tube and clip.

Performance criteria

4.1 Scaffolding is dismantled in accordance with safe work site practices and site specific safety plan.

Range includes but is not limited to – planned hazard prevention and control measures, structural and material requirements.

Element 5

Complete work operations on site.

Performance criteria

5.1 All operations are completed without injury to operatives and public or damage to plant and materials.

Range includes but is not limited to – responsibilities, work methods, hazard identification methods, accident reporting, injury prevention, personal protection, emergency procedures.

Please note

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Comments on this unit standard

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Unit Standard 9184

Erect non-notifiable prefabricated scaffolding

Level **3**

Credits **3**

Purpose People credited with this unit standard are able to: outline the requirements of non-notifiable prefabricated scaffolds; erect non-notifiable prefabricated scaffolding; alter non-notifiable prefabricated scaffolding; inspect completed non-notifiable prefabricated scaffold; and dismantle non-notifiable prefabricated scaffolding.

This unit standard will enable the people to erect or alter temporary working platforms to the requirements of the Health and Safety in Employment (HSE) Regulations in trestles and prefabricated steel or aluminium for scaffolding up to 5 metres in height.

Subfield	Construction Trades
Domain	Core Construction
Status	Registered
Status date	23 February 2000
Date version published	19 September 2008
Planned review date	31 December 2009
Entry information	Open.
Accreditation	Evaluation of documentation and visit by NZQA and industry.
Standard setting body (SSB)	Opportunity - The Training Organisation

Accreditation and Moderation Action Plan (AMAP) reference 0183

This AMAP can be accessed at http://www.nzqa.govt.nz/framework/search/index.do.

Special notes

1 Legislation and code relevant to this unit standard include the: Health and Safety in Employment Act 1992, Health and Safety in Employment Regulations 1995, and their subsequent amendments; and the *Approved Code of Practice for the Safe Erection and Use of Scaffolding 1995* (published by Occupational Safety and Health Service, Department of Labour, Wellington).

2 The term scaffolding is defined in *Approved Code of Practice* issued pursuant to the Health and Safety in Employment Act 1992.

3 All tasks are carried out in accordance with the designer's requirements and enterprise procedures based on industry requirements in:
- a the most up to date version of the *Best Practice Guidelines for Scaffolding in New Zealand* (published by Scaffolding and Rigging New Zealand Incorporated, revised 2003);
- b quality management systems;
- c health and safety requirements and guidelines relating to unit standards;
- d manufacturer's operating instructions;
- e government and local government legislation, regulations and bylaws.

4 Those intending to work towards being credited with this unit standard should note that work in the scaffolding industry usually takes place at height well above ground level, and therefore requires a relevant level of physical fitness and ability to work at heights.

5 Range height – uppermost component of the scaffold does not exceed 5.0m above the ground;
equipment – trestles, ladder, prefabricated scaffolds, mobile scaffolds and planks.

6 This unit standard excludes work involving: cantilevered loading platforms from a scaffold; cantilevered and spurred scaffolds; barrow ramps and sloping platforms; scaffolding associated with perimeter safety screens and shutters; mast climber; tube and coupler scaffolds (including tube and coupler covered ways and gantries), and hung scaffolds (including scaffolds hanging from tubes, wire ropes and chains and suspended scaffolds).

Elements and performance criteria

Element 1

Outline the requirements of non-notifiable prefabricated scaffolds.

Performance criteria

1.1 Types of scaffold are identified and described in terms of function and use.

1.2 Outline identifies requirements for decking and loading of scaffolds in accordance with the Approved Code of Practice for the Safe Erection and Use of Scaffolding.

1.3 Outline identifies requirements for bracing scaffolds in accordance with the Approved Code of Practice for the Safe Erection and Use of Scaffolding and/or manufacturer's specification.

Element 2

Erect non-notifiable prefabricated scaffolding.

Performance criteria

2.1 Scaffolding is erected in accordance with planned hazard prevention and control measures to Approved Code of Practice and manufacturers' specifications.

2.2 Work is performed within enterprise guidelines, without injury to persons or damage to components and/or equipment while platforms are incomplete.

2.3 Erection of scaffolding is carried out in accordance with manufacturers' specifications.

2.4 Completed scaffolding is inspected for compliance with manufacturer's specification, design and statutory requirements.

2.5 Site is left clear of all surplus components, equipment, tools, and debris in accordance with enterprise standards.

Element 3

Alter non-notifiable prefabricated scaffolding.

Performance criteria

3.1 Proposed change is reviewed in relation to enterprise procedures and in accordance with manufacturer's specifications.

3.2 Scaffolding is inspected to confirm stability in accordance with enterprise procedures and Approved Code of Practice.

3.3 Alteration is performed with regard for safety of personnel and structural integrity of scaffolding to manufacturers' specifications and enterprise standards.

Element 4

Inspect completed non-notifiable prefabricated scaffold.

Performance criteria

4.1 Critical structural and safety areas of the scaffold are inspected for completeness, damage, corrosion, and wear, to ensure they conform with Approved Code of Practice and manufacturers' specifications and enterprise procedures.

4.2 Current use of scaffold complies with Approved Code of Practice, manufacturers' specifications and enterprise procedures.

4.3 Record of inspection is completed to enterprise standards.

Element 5

Dismantle non-notifiable prefabricated scaffolding.

Performance criteria

5.1 Scaffolding is dismantled in accordance with planned hazard prevention and control measures to Approved Code of Practice and manufacturers' specifications.

5.2 Work is performed within enterprise procedures, without injury to persons or damage to components and/or equipment while platforms are incomplete.

5.3 Dismantling procedure is appropriate for the type of scaffolding and in accordance with enterprise procedures and manufacturers' specifications.

5.4 Site is cleared of all surplus components, equipment, tools, and debris according to enterprise standards.

Please note

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Comments on this unit standard

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